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## **Carmichael Coal Line and Rail Project Rail Inundation Mapping**

301001-01788 –00-EN-REP-0001

19 December 2013

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CARMICHAEL COAL LINE AND RAIL PROJECT

RAIL INUNDATION MAPPING

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### PROJECT 301001-01788 - CARMICHAEL COAL LINE AND RAIL PROJECT

| REV | DESCRIPTION    | ORIG                                                                                           | REVIEW                                                                                            | WORLEY-<br>PARSONS<br>APPROVAL                                                                  | DATE      | CLIENT<br>APPROVAL | DATE |
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### 1 INTRODUCTION

WorleyParsons has been commissioned to undertake additional inundation mapping based on flood modelling results produced for the Carmichael Rail FEED Design. Two cases were assessed, the existing pre-construction case and the post-construction case (the model representing the inclusion of the Carmichael rail alignment in the topography of the model). The 20, 50, 100 and 1000 years Average Recurrence Interval (ARI) flood events were simulated.

The purpose of this assessment is to develop inundation duration maps to provide:

- Duration mapping for the six waterways that were the subject of previous 2D Modelling work, Belyando River, North Creek, Mistake Creek, Diamond Creek, Grosvenor Creek and Logan Creek. These are presented in Figure 1.
- Property specific duration maps for the properties impacted by flooding within the model areas of the six waterways (as above). There are 14 properties affected by flooding within the bounds of the six existing waterway models.

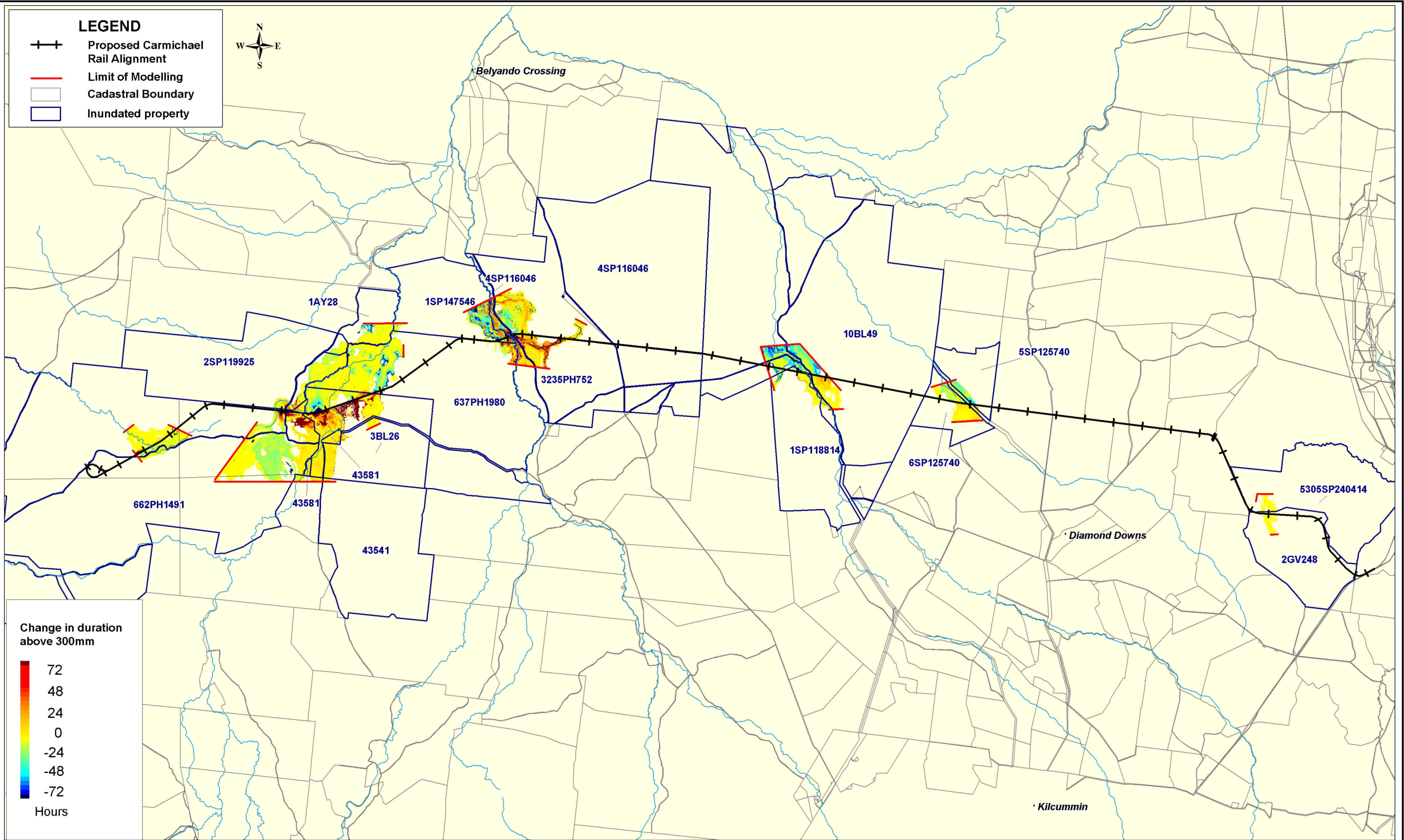
The mapping was developed for the catchments and selected properties for three flood events, the 20, 50 and 100 years ARI.

The mapping produced will be utilised for landholder consultation, and to demonstrate compliance with the Hydrology and Hydraulics Design Criteria. The design criteria states:

*“The total duration of inundation for the 50 year ARI event shall not exceed 72 hours or 20% (whichever is greater) of the existing inundation durations. The inundation duration of more than 72 hours may have some effect on growth of local grasses. Unless under specific circumstances where inundation durations for post-development can be tolerated in conjunction with landholder agreement.*

*The inundation durations shall be calculated by drawing a horizontal line on the flood hydrograph at the level when the flood depth is 300mm and measuring the time for which the flood level is above this level.”*

The following sections present the methodology and results of this inundation mapping assessment.







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## **2 METHODOLGY**

The inundation mapping utilised the results produced from the previously established modelling of the Carmichael Rail that had been undertaken as part of the Carmichael Rail Line FEED process, where two dimensional (2D) modelling approaches were applied. The 2D models produce outputs required to undertake the duration analysis. The catchments which were modelled as 2D models, and therefore were mapped for this assessment are:

### **SP1 Rail Branch**

- North Creek (170.3km)
- Mistake Creek (~120km)
- Belyando River (~148km)
- Logan Creek (82.6km)

### **SP2 Rail Branch**

- Diamond Creek (62.6km)
- Grosvenor Creek (18.5km).

Various hydraulic model and result files were provided by Adani (Proponent for the project) for use in this assessment. The following methodology was applied depending on the information provided:

- Result files, where provided and suitable for the mapping, were utilised for the assessment, without change.
- Where result files were not included in the data package (i.e. for SP2), the models were re-simulated to produce the required result files. Where the models had more than 30,000 cells, minor modifications were made to allow simulation with the WorleyParsons model licence. The models results were compared visually to the 50 year ARI afflux maps as presented in the FEED Report (CARP12033-REP-G-100\_Rev0\_FEED Report - Rail - Volume 4 Drawings), to ensure the results were replicated and were consistent with the FEED Study.
- In some instances the previously established pre and post models were simulated for different lengths of time. Where this occurred the longer results were trimmed by WorleyParsons to normalize the simulation times for the purposes of this additional inundation mapping.

Table 2-1 provides a summary of the models and the methodology as described above that was applied.



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**Table 2-1 Model Summary**

|                | Pre Event                                    |                                                                                                                     |                                              | Post Event                                   |                                                                                                                     |                                                                                               |
|----------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
|                | Q20                                          | Q50                                                                                                                 | Q100                                         | Q20                                          | Q50                                                                                                                 | Q100                                                                                          |
| Belyando River | Supplied result files used for flood mapping | Supplied result files used for flood mapping                                                                        | Supplied result files used for flood mapping | Supplied result files used for flood mapping | Supplied result files used for flood mapping                                                                        | Supplied result files trimmed to match duration of Pre Q100 event (1008hrs trimmed to 959hrs) |
| Logan Creek    | Supplied result files used for flood mapping | Supplied result files used for flood mapping                                                                        | Supplied result files used for flood mapping | Supplied result files used for flood mapping | Supplied result files used for flood mapping                                                                        | Supplied result files used for flood mapping                                                  |
| Mistake Creek  | Supplied result files used for flood mapping | Supplied result files used for flood mapping                                                                        | Supplied result files used for flood mapping | Supplied result files used for flood mapping | Result files not available. Simulated by WP to produce results.                                                     | Result files not available. Simulated by WP to produce results.                               |
| North Creek    | Supplied result files used for flood mapping | Supplied result files were trimmed to duration of 95 hours to match the durations of the Q20 and Q100 result files. | Supplied result files used for flood mapping | Supplied result files used for flood mapping | Supplied result files were trimmed to duration of 95 hours to match the durations of the Q20 and Q100 result files. | Supplied result files used for flood mapping                                                  |



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|                 | Pre Event                                                       |                                                                 |                                                                 | Post Event                                                      |                                                                 |                                                                 |
|-----------------|-----------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|
|                 | Q20                                                             | Q50                                                             | Q100                                                            | Q20                                                             | Q50                                                             | Q100                                                            |
| Diamond Creek   | Result files not available. Simulated by WP to produce results. | Result files not available. Simulated by WP to produce results. | Result files not available. Simulated by WP to produce results. | Result files not available. Simulated by WP to produce results. | Result files not available. Simulated by WP to produce results. | Result files not available. Simulated by WP to produce results. |
| Grosvenor Creek | Result files not available. Simulated by WP to produce results. | Result files not available. Simulated by WP to produce results. | Result files not available. Simulated by WP to produce results. | Result files not available. Simulated by WP to produce results. | Result files not available. Simulated by WP to produce results. | Result files not available. Simulated by WP to produce results. |



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### 2.1 Assessment of Inundation Duration

The depth result files for the six waterway models were utilised for the assessment of the duration of inundation. Analysis was undertaken using WorleyParsons proprietary software, WaterRIDE™.

WaterRIDE™ is a package that allows for the processing of model results from any hydraulic model in one platform.

Utilising waterRIDE™ Flood Manager Analysis tools, results were interrogated for the condition of duration of hours for which the model was inundated above 300mm. Using this approach the inundation durations were calculated by drawing a horizontal line on the flood hydrograph at the level when the flood depth is 300mm and measuring the time for which the flood level is above this level, for every cell in the models. The resulting output is a grid layer of hours.

This assessment was undertaken for all models for all flood events for both the existing case and the post-rail case (36 result files).

Afflux (difference in hours between the post-rail case and existing case) results were developed from the new results files using the 'calculate' function within waterRIDE™. For each catchment model and flood event the existing case was subtracted from the post-rail case to provide the difference between the two cases. 18 result files were generated from this assessment for the mapping.

### 2.2 Property Inundation

The assessment identified 14 properties that are inundated to varying extents. The properties were identified as inundated where part or all of the property is within a modelled flood extent. It is noted that other properties may be affected outside of the six catchment model extents that have not been captured by this previously completed assessment. No conclusion can be drawn on impacts to duration for those properties that fall outside of the existing model extents. The 14 properties are presented in Figure 1. Of these 14 affected properties, 11 properties are directly traversed by the Carmichael Rail Line and the remaining 3 properties are affected by the waterway systems even though they are not directly traversed by the Rail Line.



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## 3 RESULTS

Afflux duration maps were developed for the 20, 50, and 100 years ARI flood events for each of the 6 models (18 afflux maps). Maps were produced for the overall catchments and also for the individual properties that are impacted by flooding from the six catchment models (60 maps in total).

The naming convention applied to the mapping is:

*waterway.flood event.unique identifier*

where

| Waterways = |   | Flood event = |      | Unique identifier = |                     |
|-------------|---|---------------|------|---------------------|---------------------|
| Mistake     | 1 | 1             | Q100 | Catchment maps      | 0                   |
| Grosvenor   | 2 | 2             | Q50  | Property maps       | Lotplan i.e. 2GV248 |
| Diamond     | 3 | 3             | Q20  |                     |                     |
| North       | 4 |               |      |                     |                     |
| Belyando    | 5 |               |      |                     |                     |
| Logan       | 6 |               |      |                     |                     |

### 3.1 Result Interpretation

The maps provided in Appendix 1 present the computer modelled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment.

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red.  
Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.





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## 3.2 Result Presentation

The results are presented as a series of maps in Appendix 1. In addition, property specific information sheets for each of the 14 properties within the inundation extents have been developed to accompany the property maps. The property sheets are provided in Appendix 2, and include a property specific summary of the 50 years ARI flood event.



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### 4 QUALIFICATIONS

The following qualifications should be considered when interpreting the results of this assessment:

- The information presented was developed using the most up to date information available at the time of this assessment, as provided by Adani. As revised information becomes available the implications to this assessment should be reviewed.
- The information provided was considered 'fit for purpose' and no additional review of the previously developed models has been undertaken as part of this additional mapping work.
- Some of the previous model durations were normalized to address variation in the model simulation times. The implication of reducing the simulation times has been considered. Generally the impact of reducing the times has a minimal impact on the duration afflux. There are some isolated areas where it is possible the model times need extending. In most instances these areas have predicted increase above 72 hours and therefore the impact of the simulation time is not expected to be significant.
- As a result of the re-simulation of some models by WorleyParsons to obtain model results for this assessment, slight differences may appear when compared to the previous FEED model results. This may be due to differing model versions and modification of grid sizes to meet software licence requirements. It is considered any such changes are minor and will not significantly impact the outcomes of this duration assessment.
- There appears to be a variance between the duration afflux of the Belyando River between the 100 years ARI event and the 20 and 50 years ARIs. The cause of this difference has not been investigated. Based on the change in trend between the events, it is possible that the 100 years ARI Belyando model could benefit from further refinement. As the 50 years ARI is the focus event of this assessment the discrepancy of the 100 years ARI model was not investigated further.



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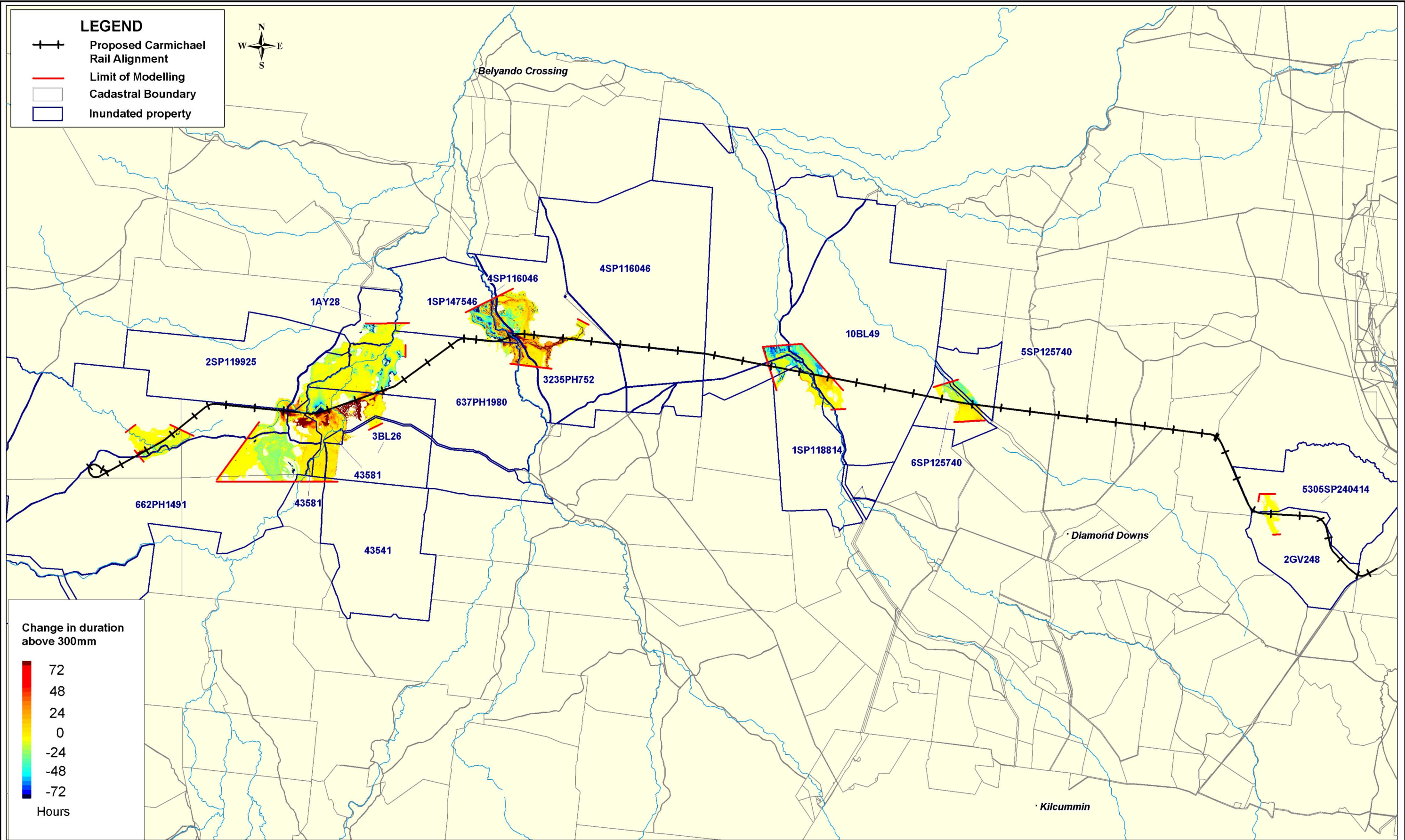
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## Appendix 1      Duration Afflux Maps



0 10 20km

SCALE - 1:450,000 (at A3)

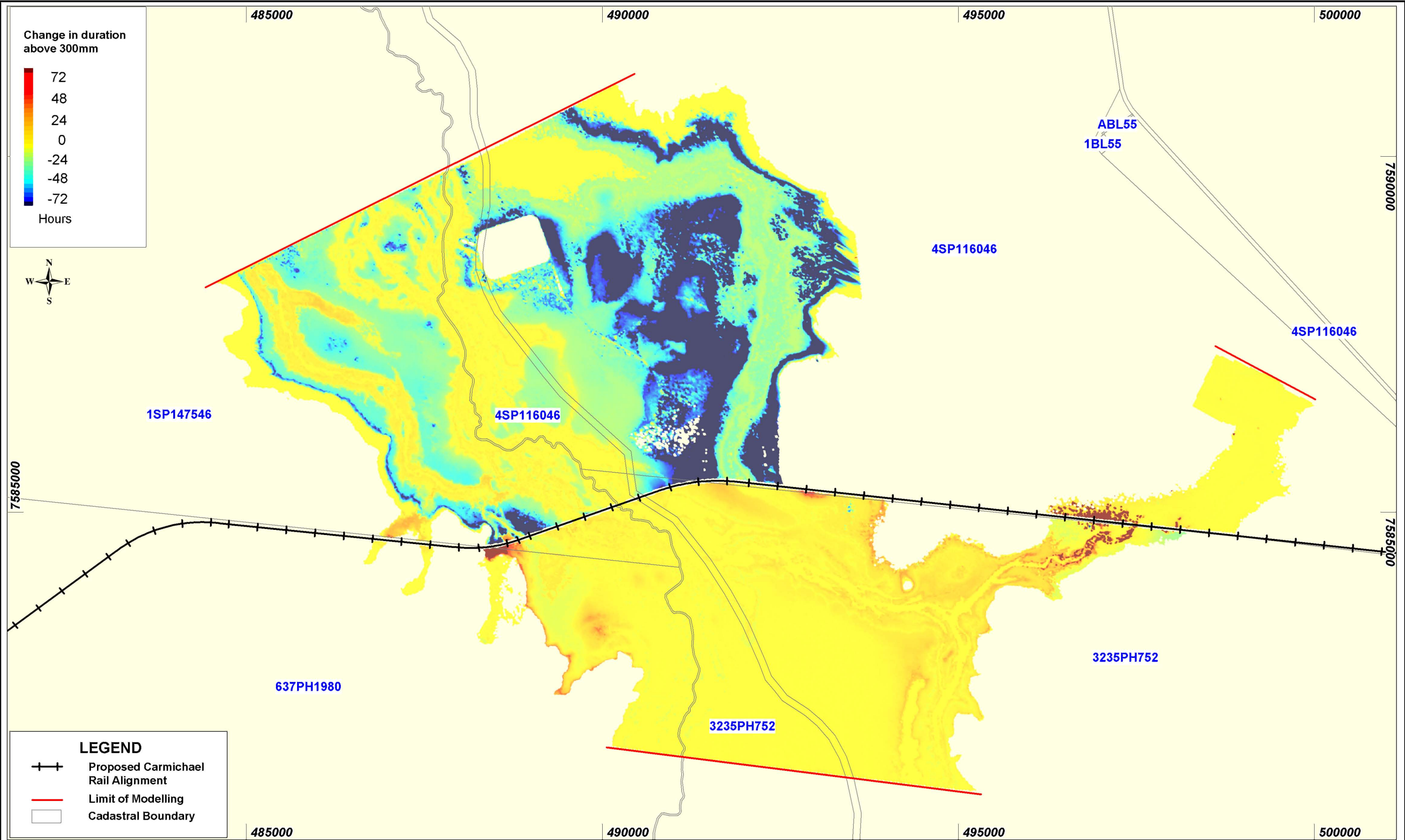
Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

|                                                                                                                                  |             |                      |                                                                                                                                             |    |    |     |     |      |
|----------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----|----|-----|-----|------|
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|-------------------------------------------------------------------------------------------------------------------|-----------|--------|
|  <b>Adani Mining Pty Ltd</b> |           |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>FIGURE 1 : Overview Map</b>                                  |           |        |
| Project No: 301001-01788                                                                                          | Figure: 1 | Rev: 0 |





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Proposed Carmichael  
Rail Alignment

Limit of Modelling

Cadastral Boundary

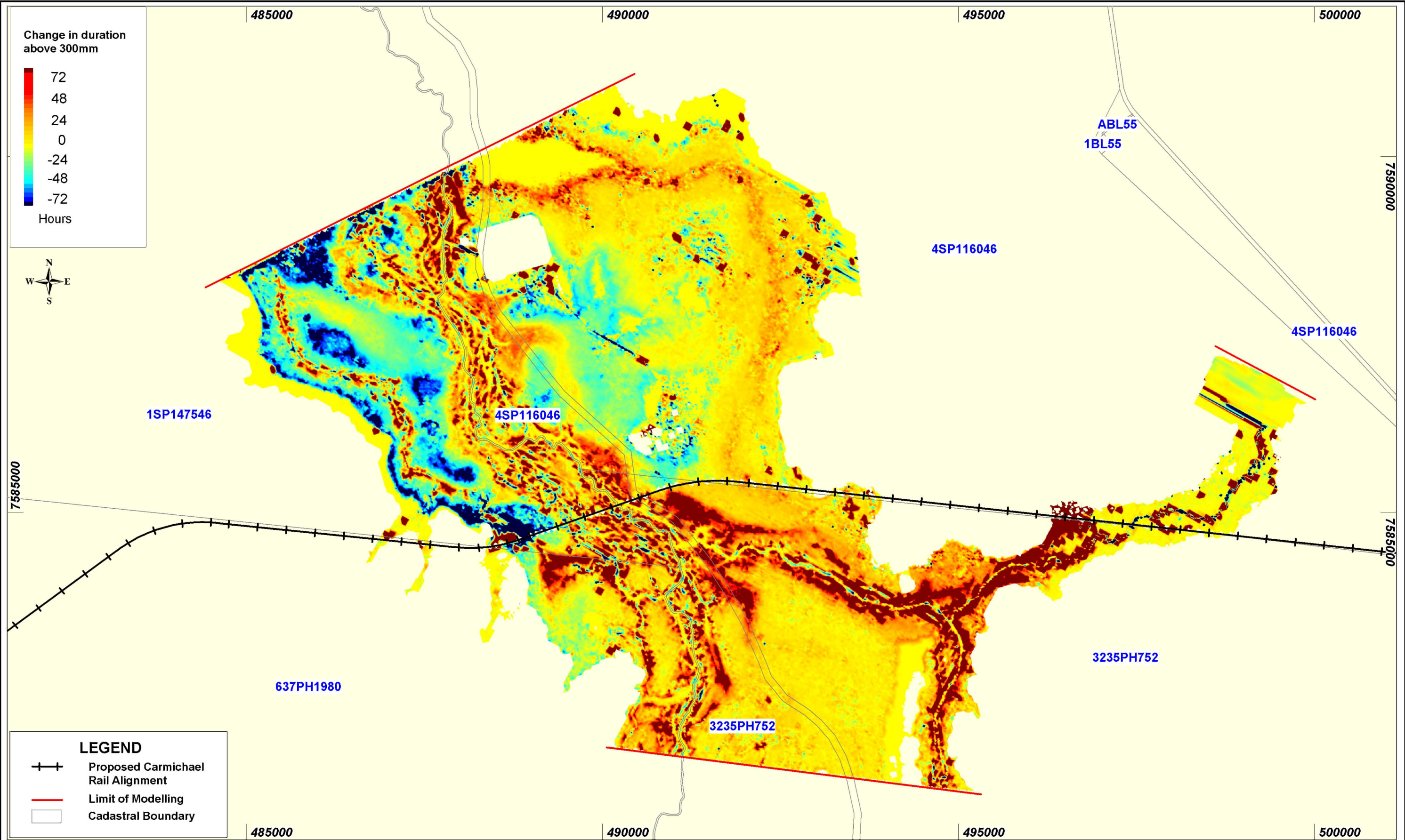
DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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| <div><div>adani</div><div>Adani Mining Pty Ltd</div></div>                                                                                     |               |        |
| <div>Carmichael Coal Mine &amp; Rail Project</div> <div>Mistake Creek Catchment Map</div> <div>(FIGURE 1.1.0 : Q100 Duration Afflux Map)</div> |               |        |
| Project No: 301001-01788                                                                                                                       | Figure: 1.1.0 | Rev: 0 |





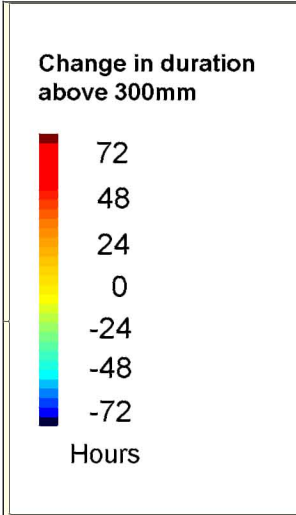
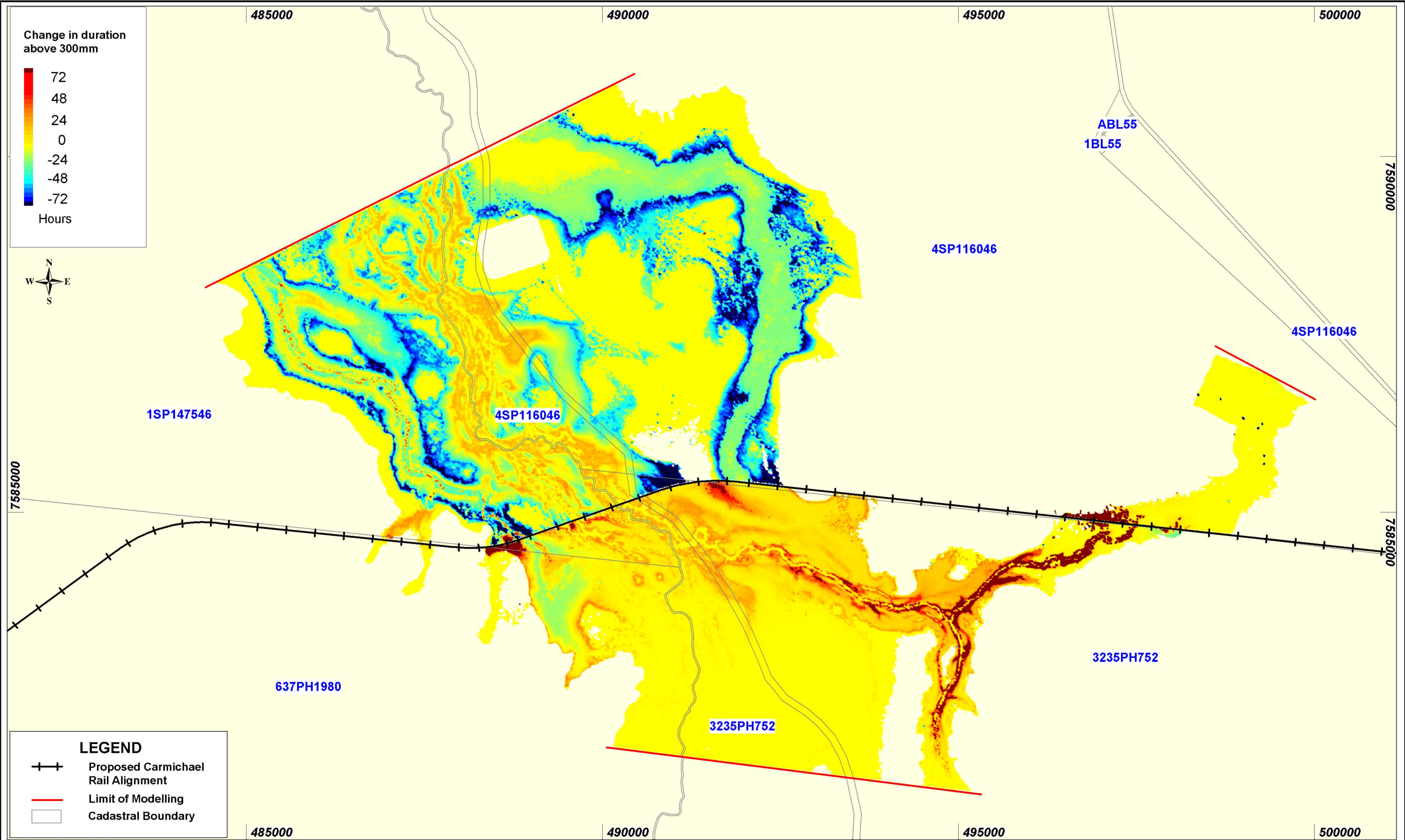
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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| <b>Carmichael Coal Mine &amp; Rail Project</b>                                                                    |               |        |
| <b>Mistake Creek Catchment Map</b><br><b>(FIGURE 1.2.0 : Q50 Duration Afflux Map)</b>                             |               |        |
| Project No: 301001-01788                                                                                          | Figure: 1.2.0 | Rev: 0 |





**LEGEND**

- Proposed Carmichael Rail Alignment
- Limit of Modelling
- Cadastral Boundary

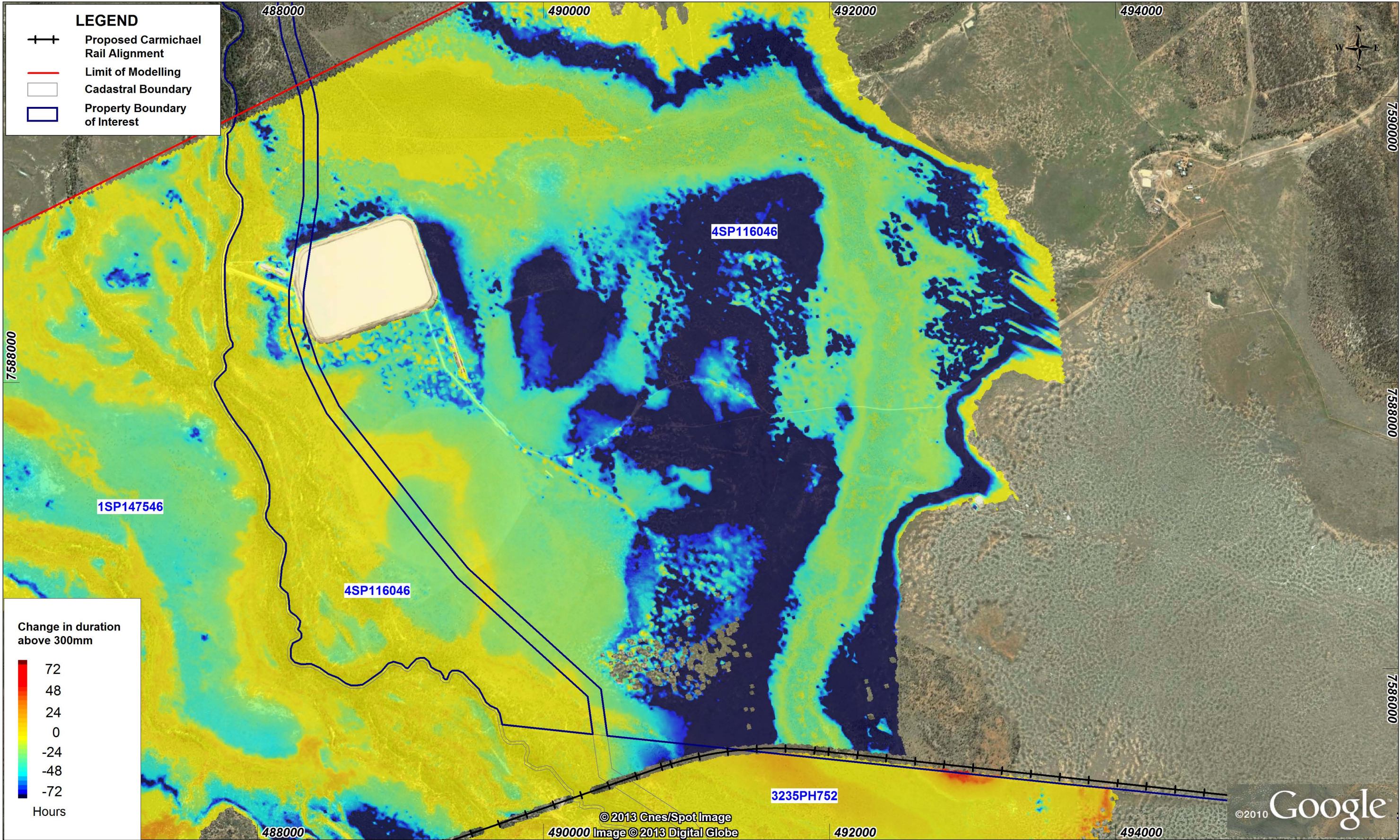
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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| <b>Carmichael Coal Mine &amp; Rail Project</b>                                        |               |        |
| <b>Mistake Creek Catchment Map</b><br><b>(FIGURE 1.3.0 : Q20 Duration Afflux Map)</b> |               |        |
| Project No: 301001-01788                                                              | Figure: 1.3.0 | Rev: 0 |





DATA SOURCES:  
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

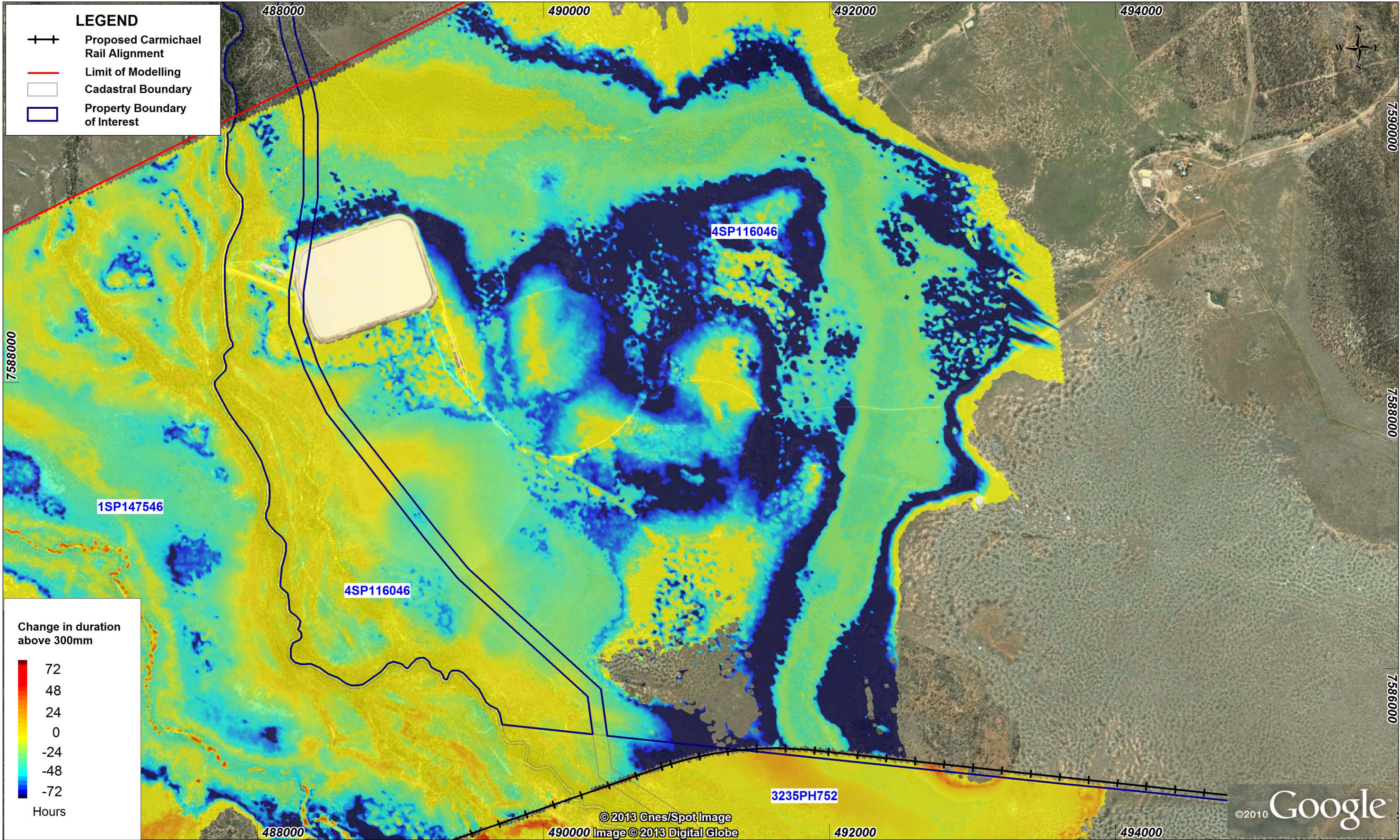
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0 0.5 1km  
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Map Grid of Australia - Zone 55  
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|  <b>Adani Mining Pty Ltd</b>                                         |                       |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>Mistake Creek Property Map 4SP116046</b><br><b>(FIGURE 1.1.4SP116046 : Q100 Duration Afflux Map)</b> |                       |        |
| Project No: 301001-01788                                                                                                                                  | Figure: 1.1.4SP116046 | Rev: 0 |





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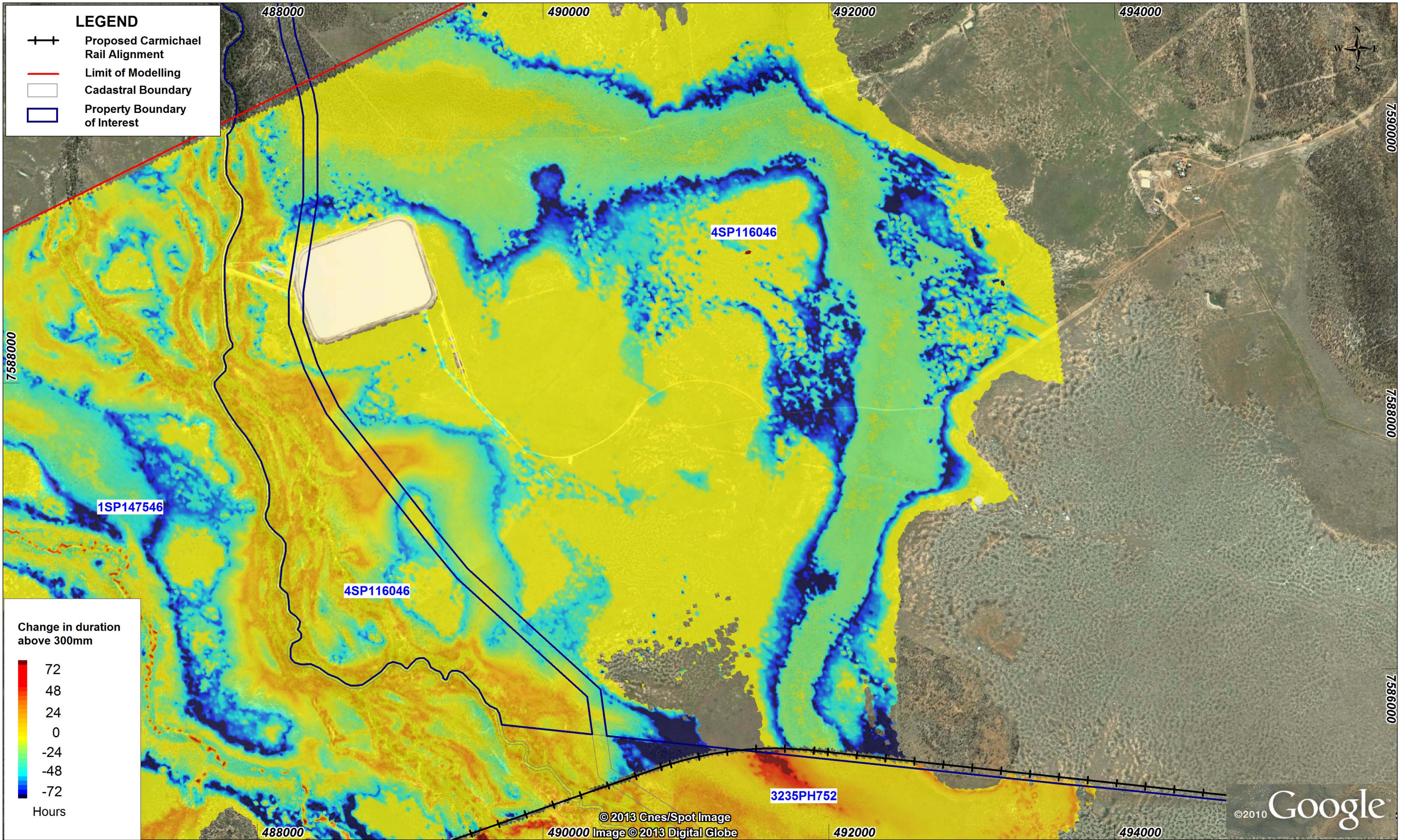
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Geocentric Datum of Australia 1994

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| <div><b>Adani Mining Pty Ltd</b></div> <div><b>Carmichael Coal Mine &amp; Rail Project</b><br/><b>Mistake Creek Property Map 4SP116046</b><br/><b>(FIGURE 1.2.4SP116046 : Q50 Duration Afflux Map)</b></div> |             |                      |                                                                                                                    |    |    |     |        |      |
| Project No: 301001-01788                                                                                                                                                                                                                                                                          |             |                      | Figure: 1.2.4SP116046                                                                                              |    |    |     | Rev: 0 |      |





**DATA SOURCES:**  
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0 0.5 1km

SCALE - 1:25,000 (at A3)

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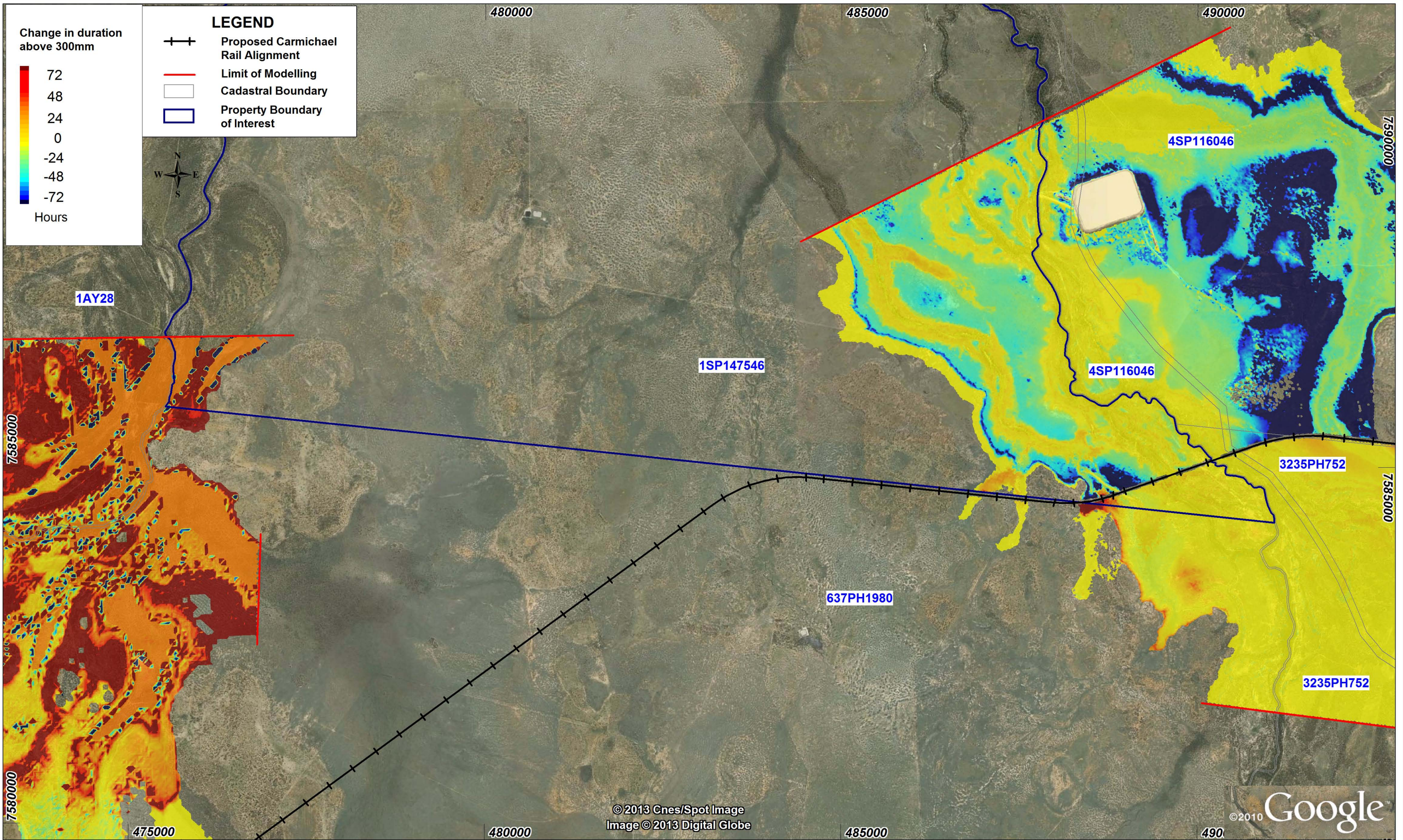
**Carmichael Coal Mine & Rail Project**  
**Mistake Creek Property Map 4SP116046**  
**(FIGURE 1.3.4SP116046 : Q20 Duration Afflux Map)**

Project No: 301001-01788

Figure: 1.3.4SP116046

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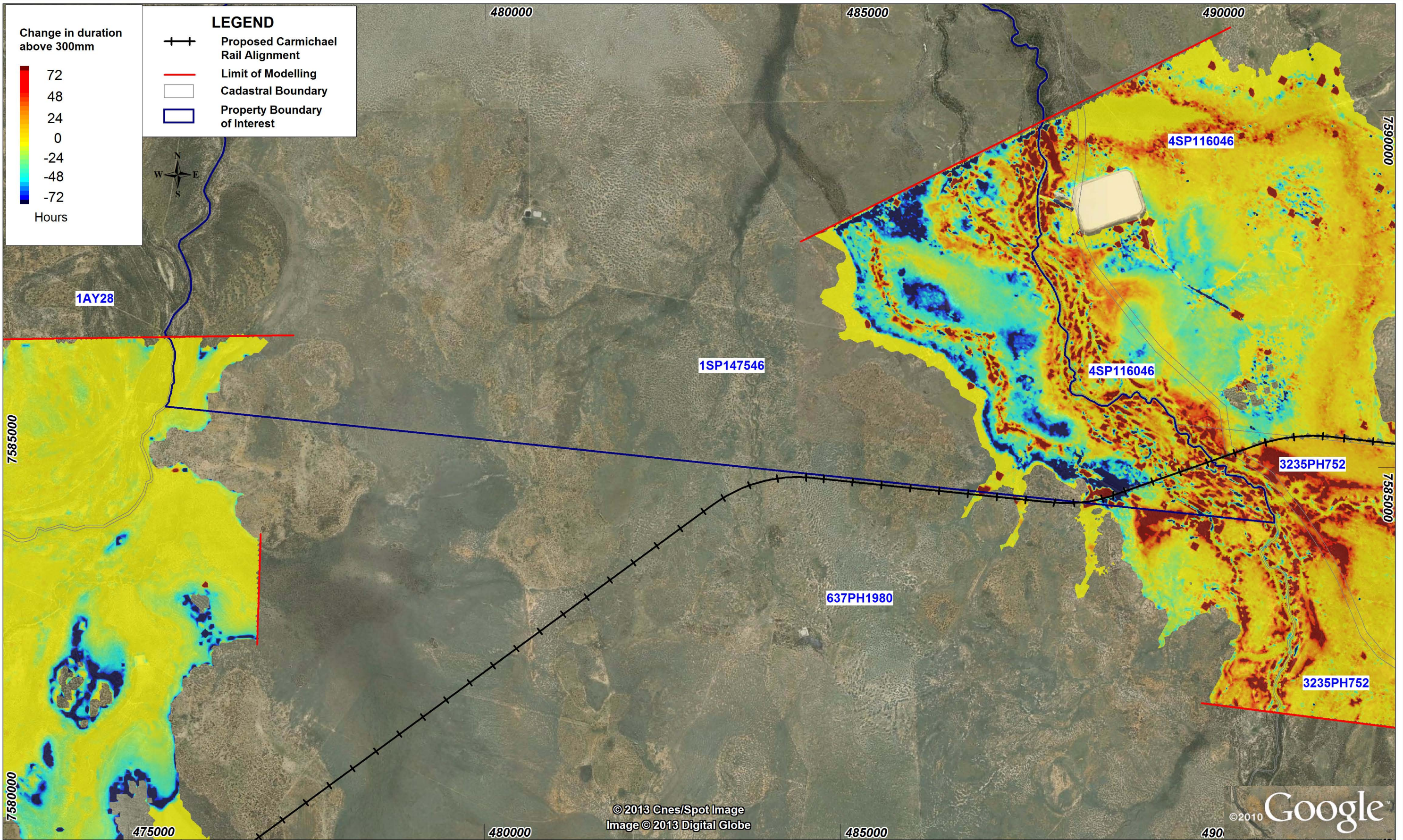
SCALE - 1:50,000 (at A3)

Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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| Rev                                                                                                                                                                                                                                                                                                                    | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK | ENG    | APPD |
|  <b>WorleyParsons</b><br>resources & energy                                                                                                                                                                                       |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |        |      |
| <div> <b>Adani Mining Pty Ltd</b></div> <div><b>Carmichael Coal Mine &amp; Rail Project<br/>Mistake Creek Property Map 1SP147546<br/>including Belyando Catchment<br/>(FIGURE 1.1.1SP147546 : Q100 Duration Afflux Map)</b></div> |             |                      |                                                                                                                                             |    |    |     |        |      |
| Project No: 301001-01788                                                                                                                                                                                                                                                                                               |             |                      | Figure: 1.1.1SP147546                                                                                                                       |    |    |     | Rev: 0 |      |

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**DATA SOURCES:**  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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0 1 2km

SCALE - 1:50,000 (at A3)

Map Grid of Australia - Zone 55  
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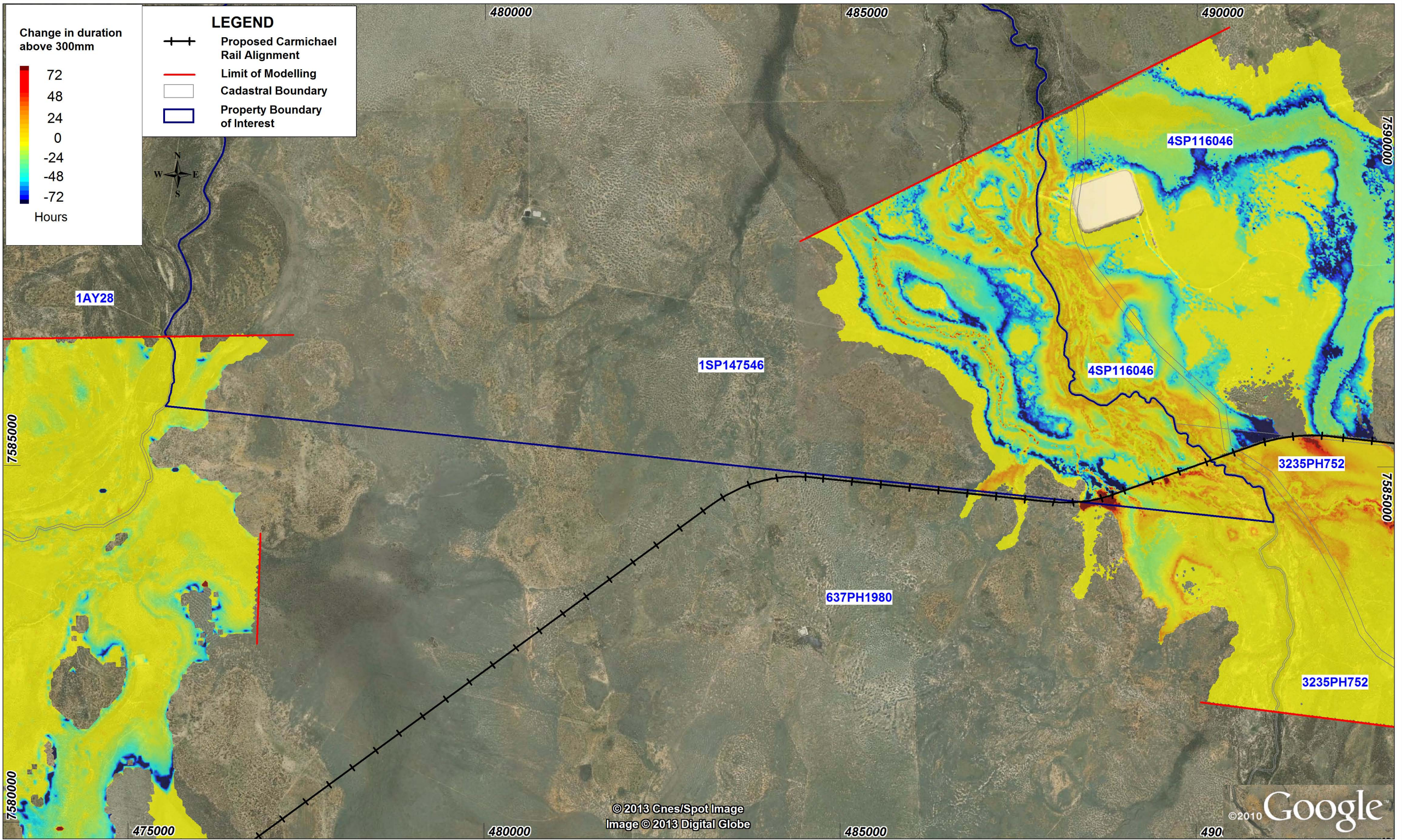
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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                     | ER | DB | CHK | ENG | APPD |
|  <b>WorleyParsons</b><br>resources & energy |             |                      | <br>aarvee associates<br>Aarvee Associates Pty Ltd |    |    |     |     |      |

**Adani Mining Pty Ltd**

**Carmichael Coal Mine & Rail Project  
Mistake Creek Property Map 1SP147546  
including Belyando Catchment  
(FIGURE 1.2.1SP147546 : Q50 Duration Afflux Map)**

Project No: 301001-01788      Figure: 1.2.1SP147546      Rev: 0





DATA SOURCES:  
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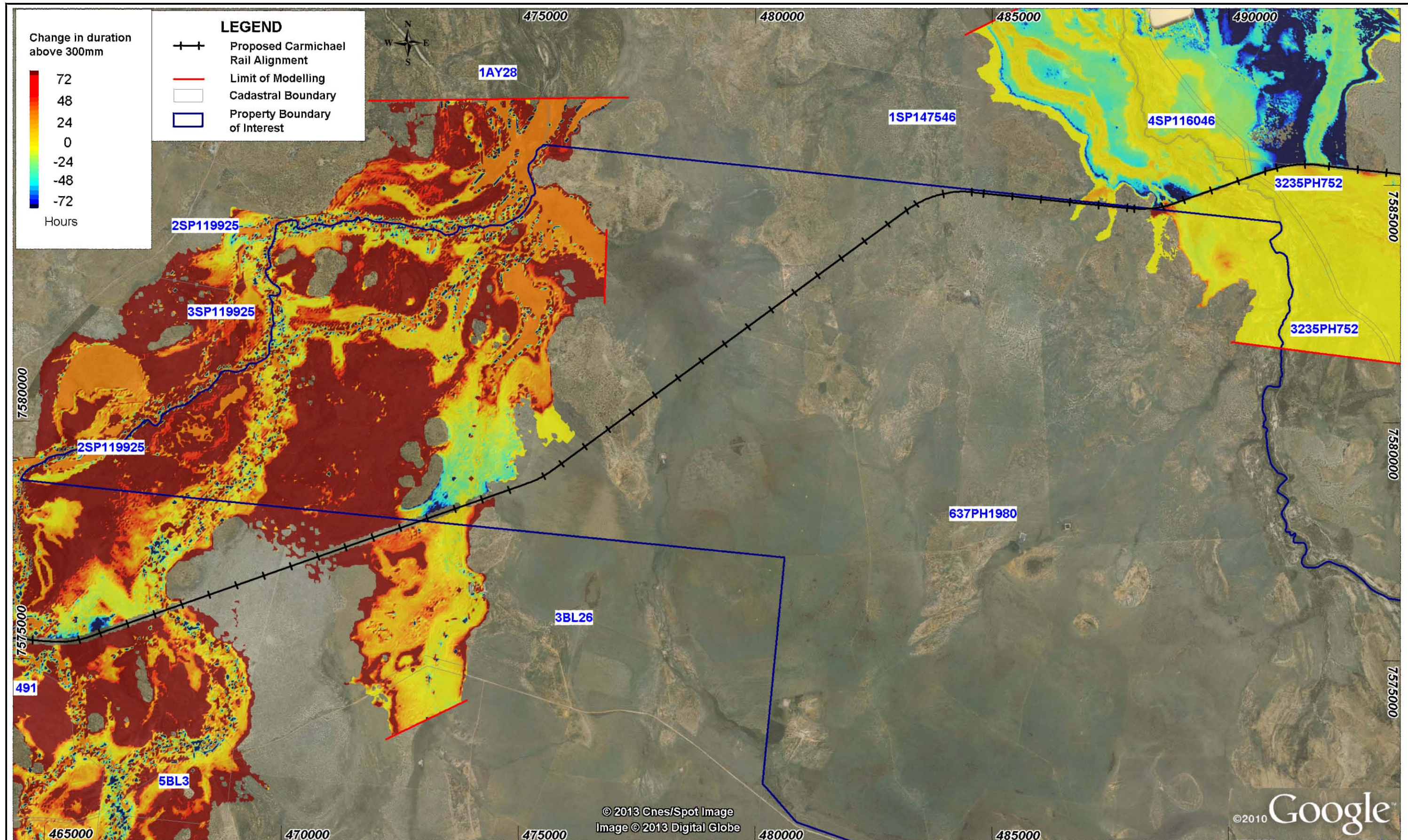
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SCALE - 1:50,000 (at A3)

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| Rev                                                                                                                                                                           | Date        | Revision Description | PMD                                                                                                                | ER | DB | CHK                                                                                                               | ENG | APPD |
| <br>resources & energy                                                                   |             |                      | <br>Aarvee Associates Pty Ltd |    |    |  <b>Adani Mining Pty Ltd</b> |     |      |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Mistake Creek Property Map 1SP147546<br/>including Belyando Catchment<br/>(FIGURE 1.3.1SP147546 : Q20 Duration Afflux Map)</b> |             |                      |                                                                                                                    |    |    |                                                                                                                   |     |      |
| Project No: 301001-01788                                                                                                                                                      |             |                      | Figure: 1.3.1SP147546                                                                                              |    |    | Rev: 0                                                                                                            |     |      |





DATA SOURCES:  
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Proposed Rail Alignment: Client supplied data

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0 2km  
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|  <b>WorleyParsons</b><br>resources & energy |             |                      | <br><b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

**adani**

**Adani Mining Pty Ltd**

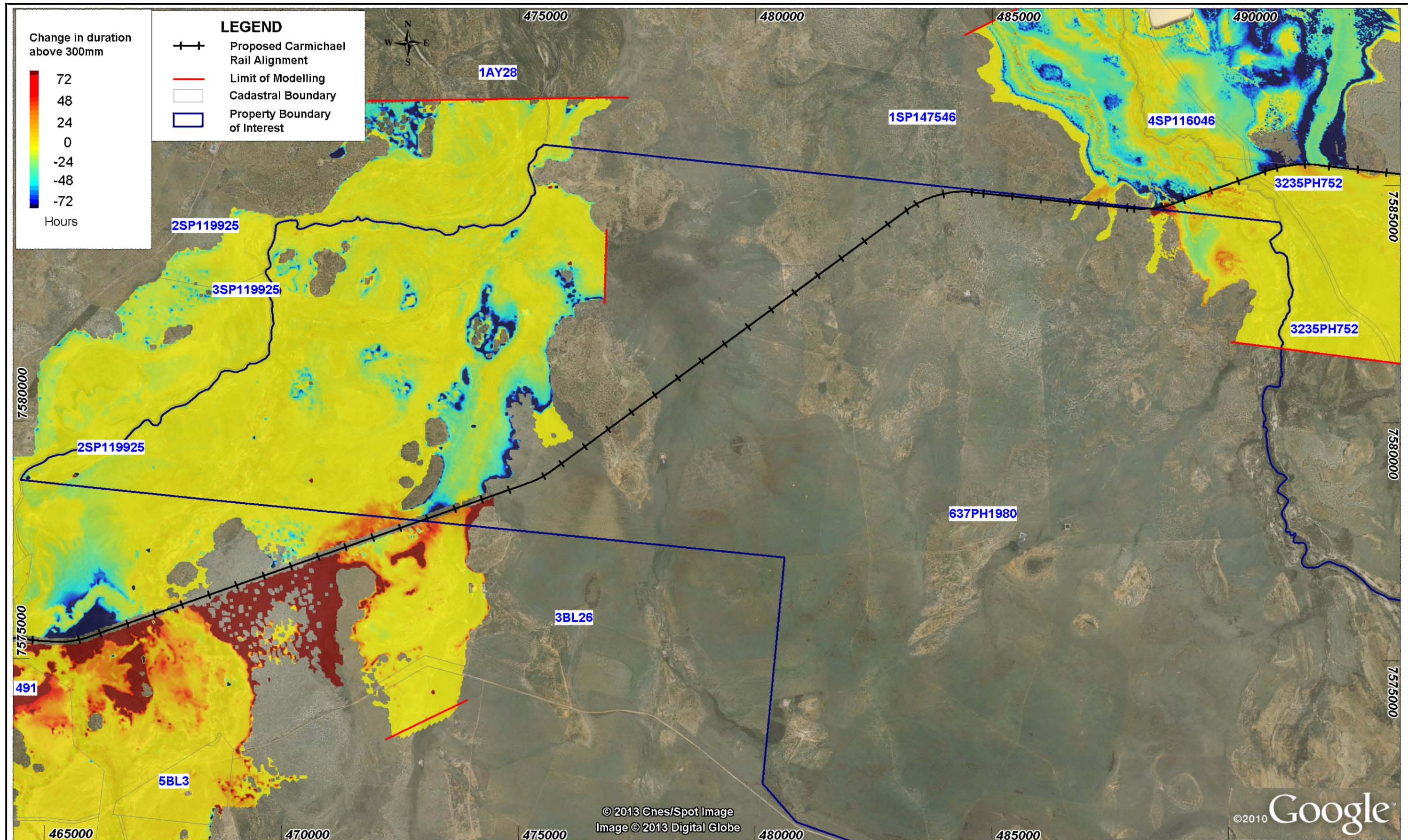
**Carmichael Coal Mine & Rail Project  
Mistake Creek Property Map 637PH1980  
including Belyando Catchment  
(FIGURE 1.1.637PH1980 : Q100 Duration Afflux Map)**

Project No: 301001-01788

Figure: 1.1.637PH1980

Rev: 0





DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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0 2km  
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|  <b>WorleyParsons</b><br>resources & energy |             |                      | <br><b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

**adani**

**Adani Mining Pty Ltd**

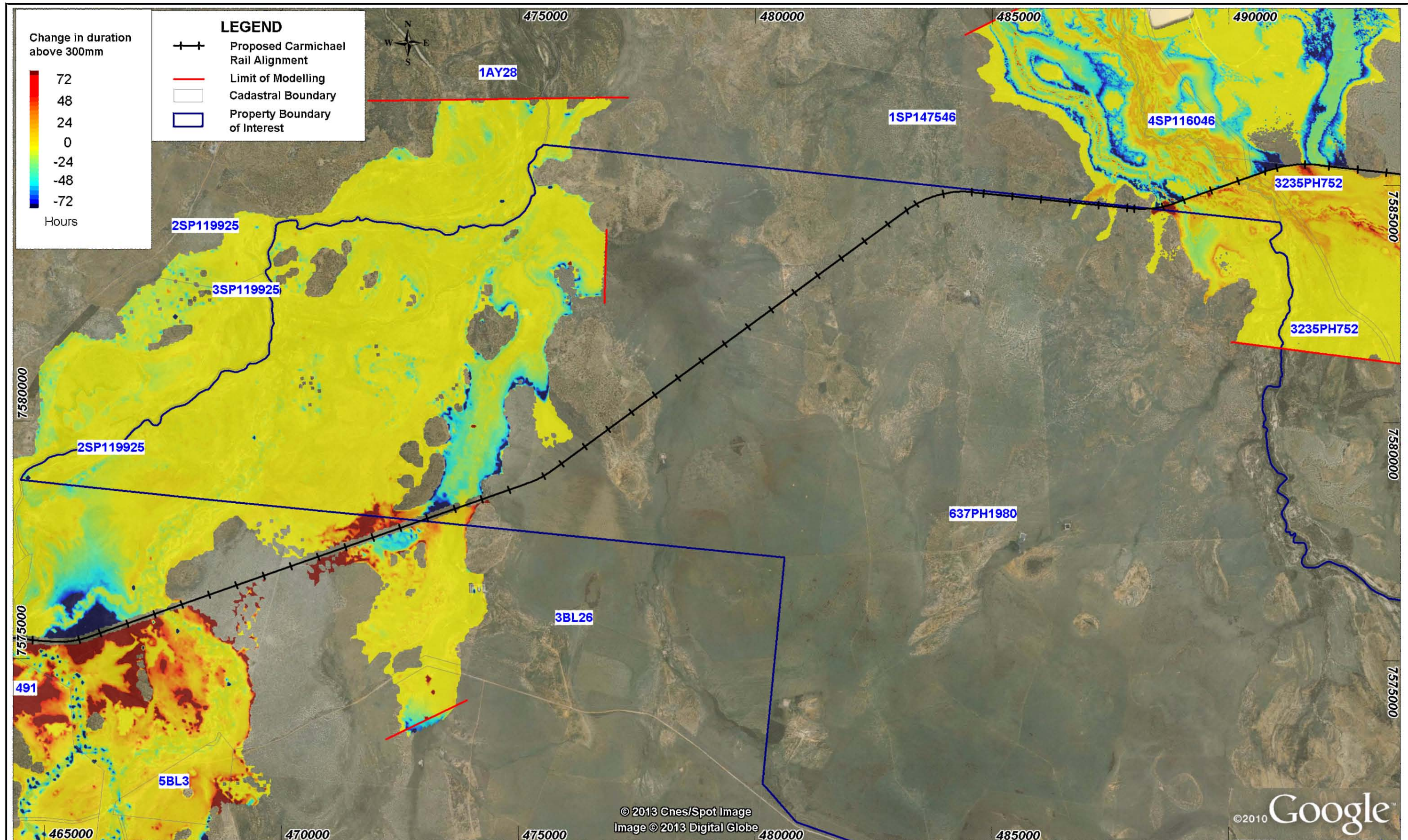
**Carmichael Coal Mine & Rail Project  
Mistake Creek Property Map 637PH1980  
including Belyando Catchment  
(FIGURE 1.2.637PH1980 : Q50 Duration Afflux Map)**

Project No: 301001-01788

Figure: 1.2.637PH1980

Rev: 0





DATA SOURCES:  
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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0 2km  
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Adani Mining Pty Ltd

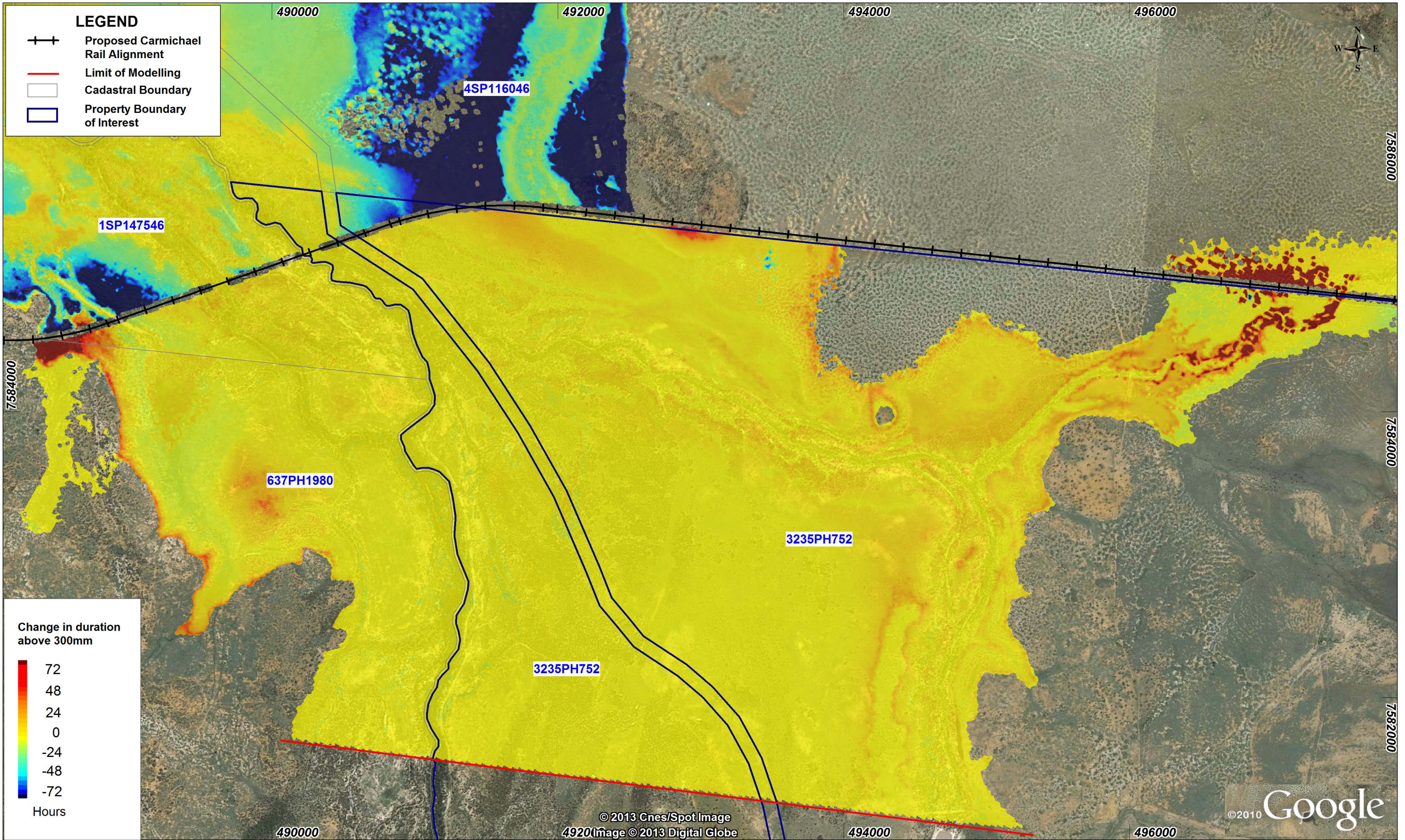
**Carmichael Coal Mine & Rail Project  
Mistake Creek Property Map 637PH1980  
including Belyando Catchment  
(FIGURE 1.3.637PH1980 : Q20 Duration Afflux Map)**

Project No: 301001-01788

Figure: 1.3.637PH1980

Rev: 0





**LEGEND**

- Proposed Carmichael Rail Alignment
- Limit of Modelling
- Cadastral Boundary
- Property Boundary of Interest

**Change in duration above 300mm**

72  
48  
24  
0  
-24  
-48  
-72  
Hours

0 0.5 1km

SCALE - 1:25,000 (at A3)

Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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resources & energy

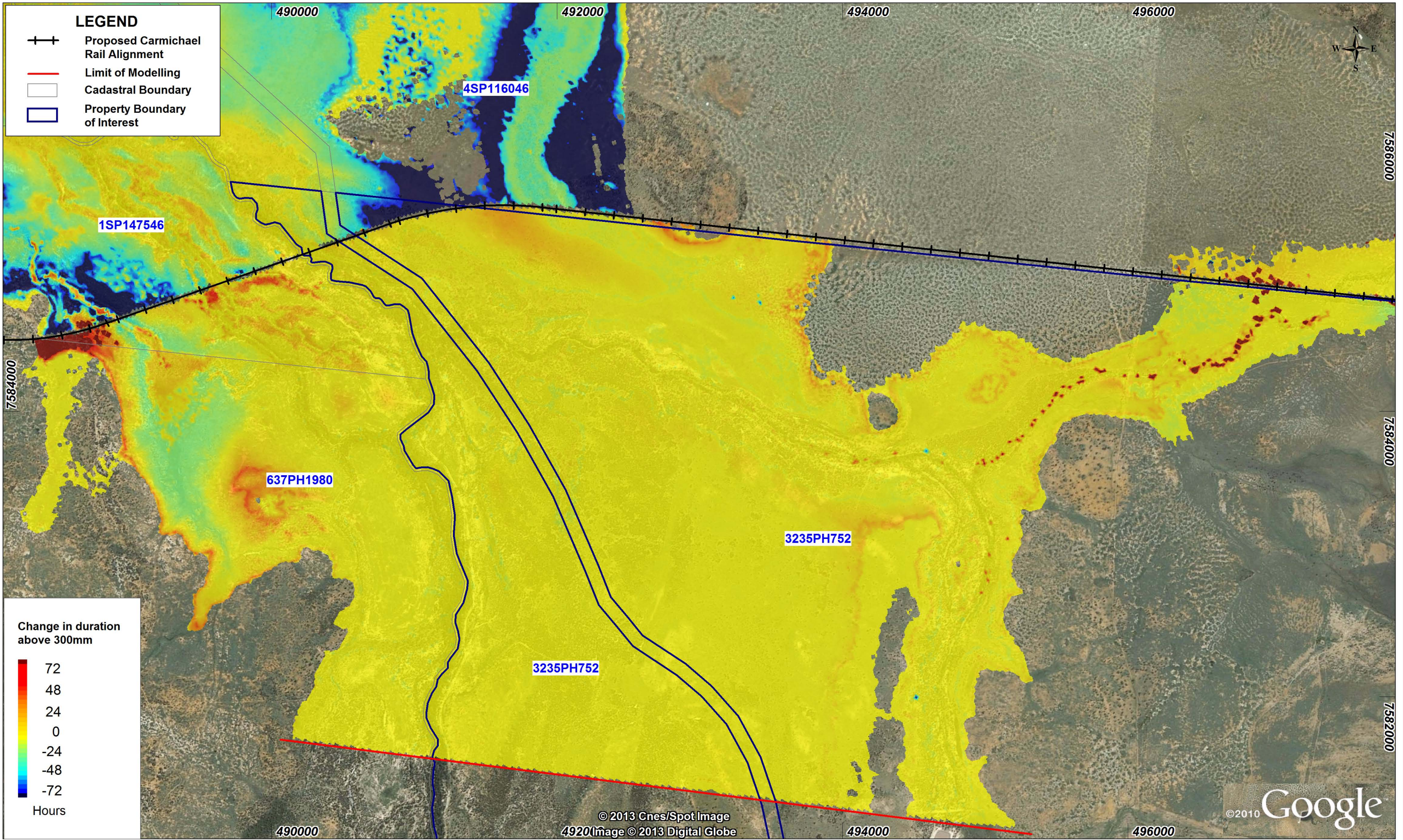
**aarvee associates**  
Aarvee Associates Pty Ltd

**Adani Mining Pty Ltd**

**Carmichael Coal Mine & Rail Project**  
**Mistake Creek Property Map 3235PH752**  
**(FIGURE 1.1.3235PH752 : Q100 Duration Afflux Map)**

|                          |                       |        |
|--------------------------|-----------------------|--------|
| Project No: 301001-01788 | Figure: 1.1.3235PH752 | Rev: 0 |
|--------------------------|-----------------------|--------|





**LEGEND**

- Proposed Carmichael Rail Alignment
- Limit of Modelling
- Cadastral Boundary
- Property Boundary of Interest

**Change in duration above 300mm**

72  
48  
24  
0  
-24  
-48  
-72

Hours

0 0.5 1km

SCALE - 1:25,000 (at A3)

Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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| 0   | 19-Dec-2013 | Issued for Use       | DH  | ER |    |     |     |      |
| Rev | Date        | Revision Description | PMD | ER | DB | CHK | ENG | APPD |

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resources & energy

**aarvee associates**  
Aarvee Associates Pty Ltd

**Adani Mining Pty Ltd**

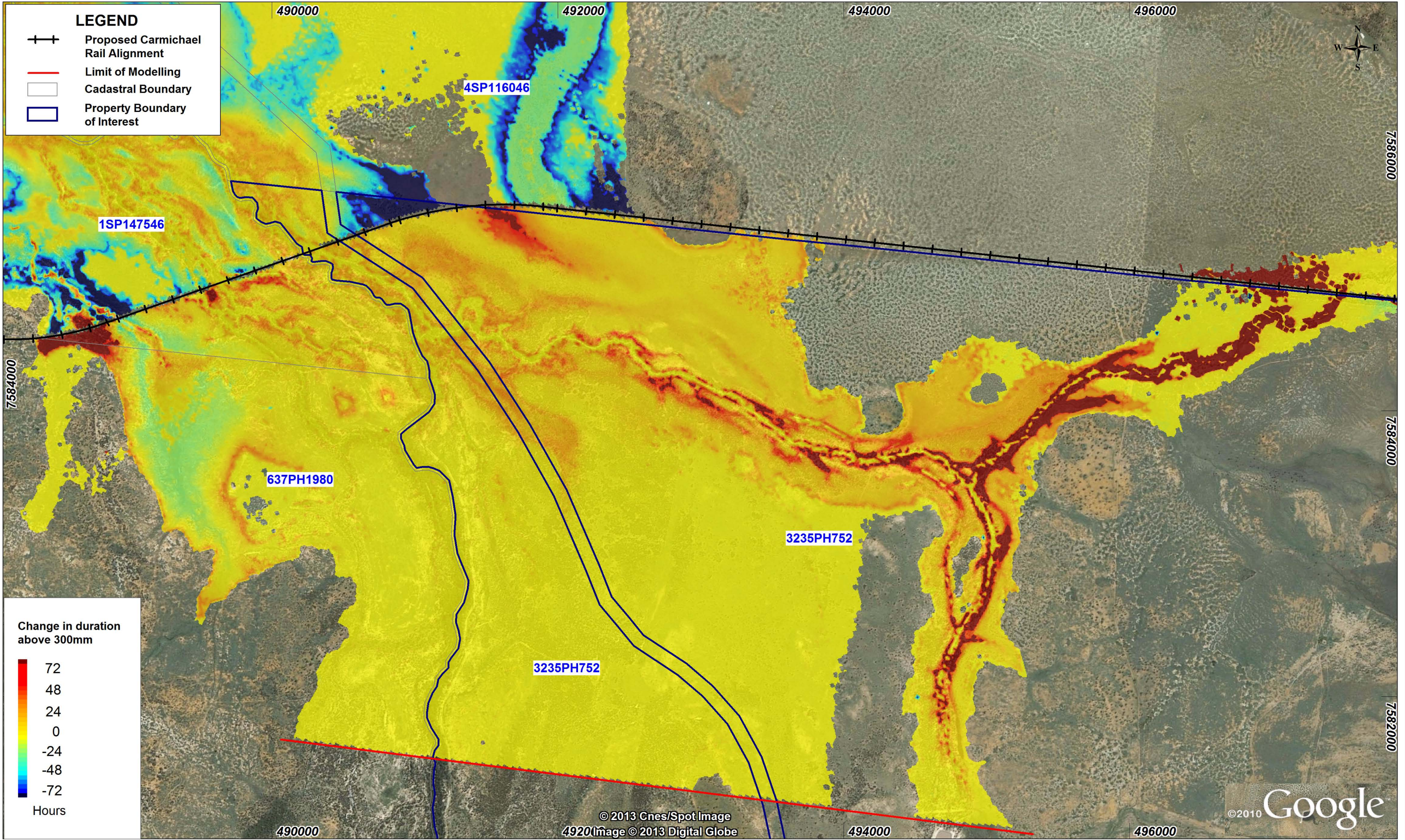
**Carmichael Coal Mine & Rail Project**  
**Mistake Creek Property Map 3235PH752**  
**(FIGURE 1.2.3235PH752 : Q50 Duration Afflux Map)**

Project No: 301001-01788

Figure: 1.2.3235PH752

Rev: 0





**DATA SOURCES:**  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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0 0.5 1km

SCALE - 1:25,000 (at A3)

Map Grid of Australia - Zone 55  
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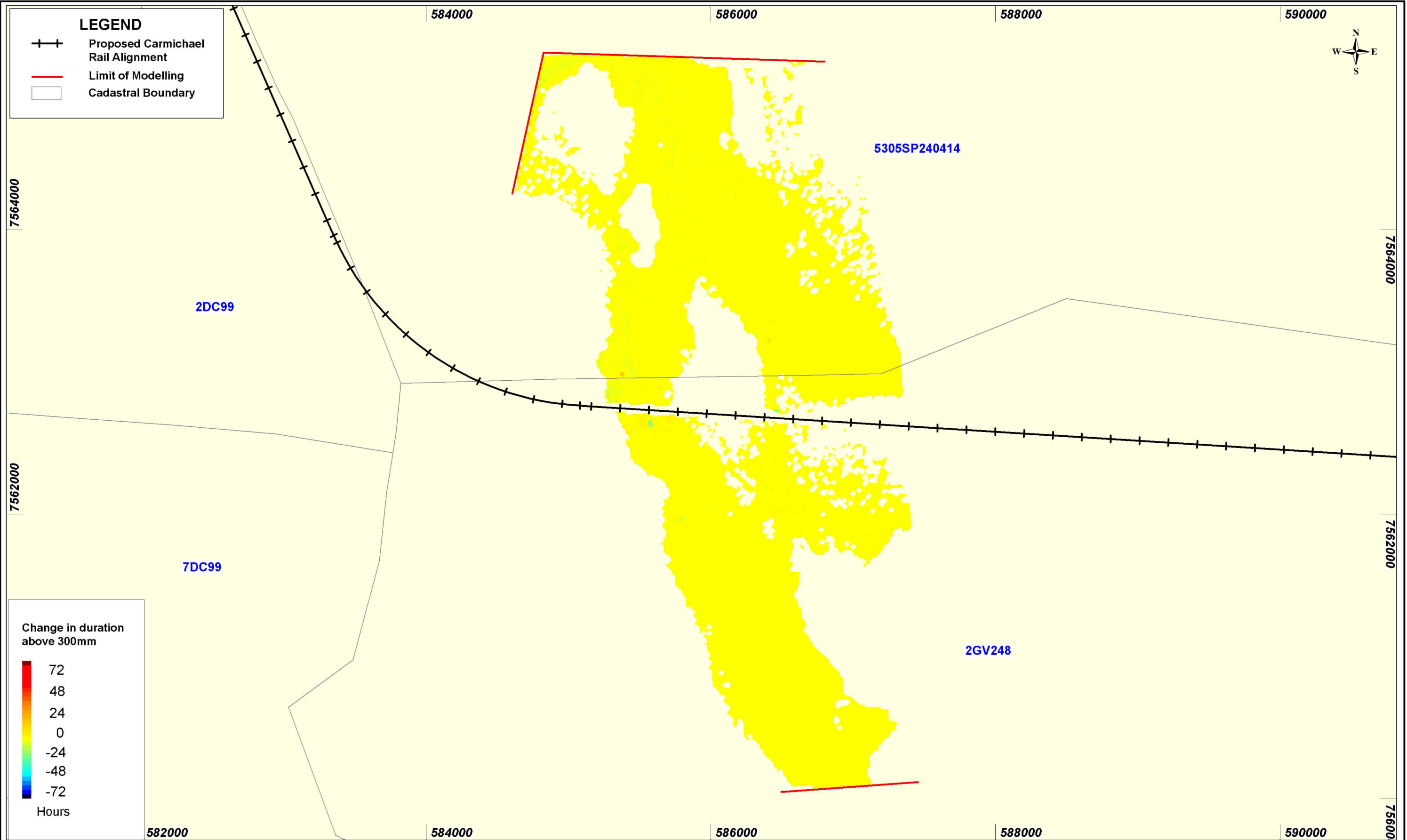
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| <br>resources & energy |             |                      | <br>Aarvee Associates Pty Ltd |    |    |     |     |      |

**adani** **Adani Mining Pty Ltd**

**Carmichael Coal Mine & Rail Project**  
**Mistake Creek Property Map 3235PH752**  
**(FIGURE 1.3.3235PH752 : Q20 Duration Afflux Map)**

|                          |                       |        |
|--------------------------|-----------------------|--------|
| Project No: 301001-01788 | Figure: 1.3.3235PH752 | Rev: 0 |
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0 0.5 1km

SCALE - 1:25,000 (at A3)

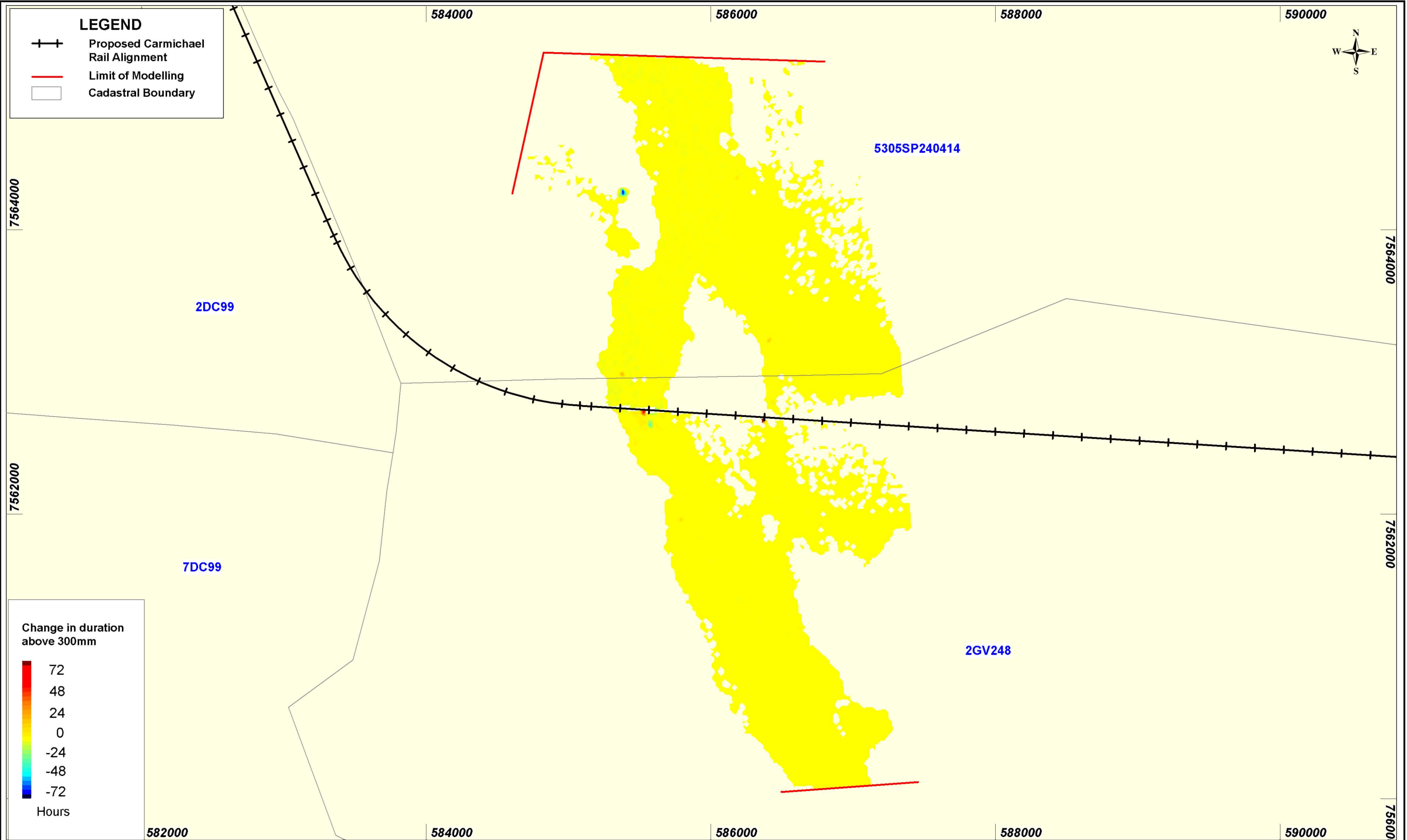
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Geocentric Datum of Australia 1994

DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

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|--------------------------------------------------------------------------------------------------------------------------------|---------------|--------|
|  <b>Adani Mining Pty Ltd</b>              |               |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Grosvenor Creek Catchment Map<br/>(FIGURE 2.1.0 : Q100 Duration Afflux Map)</b> |               |        |
| Project No: 301001-01788                                                                                                       | Figure: 2.1.0 | Rev: 0 |





0 0.5 1km

SCALE - 1:25,000 (at A3)

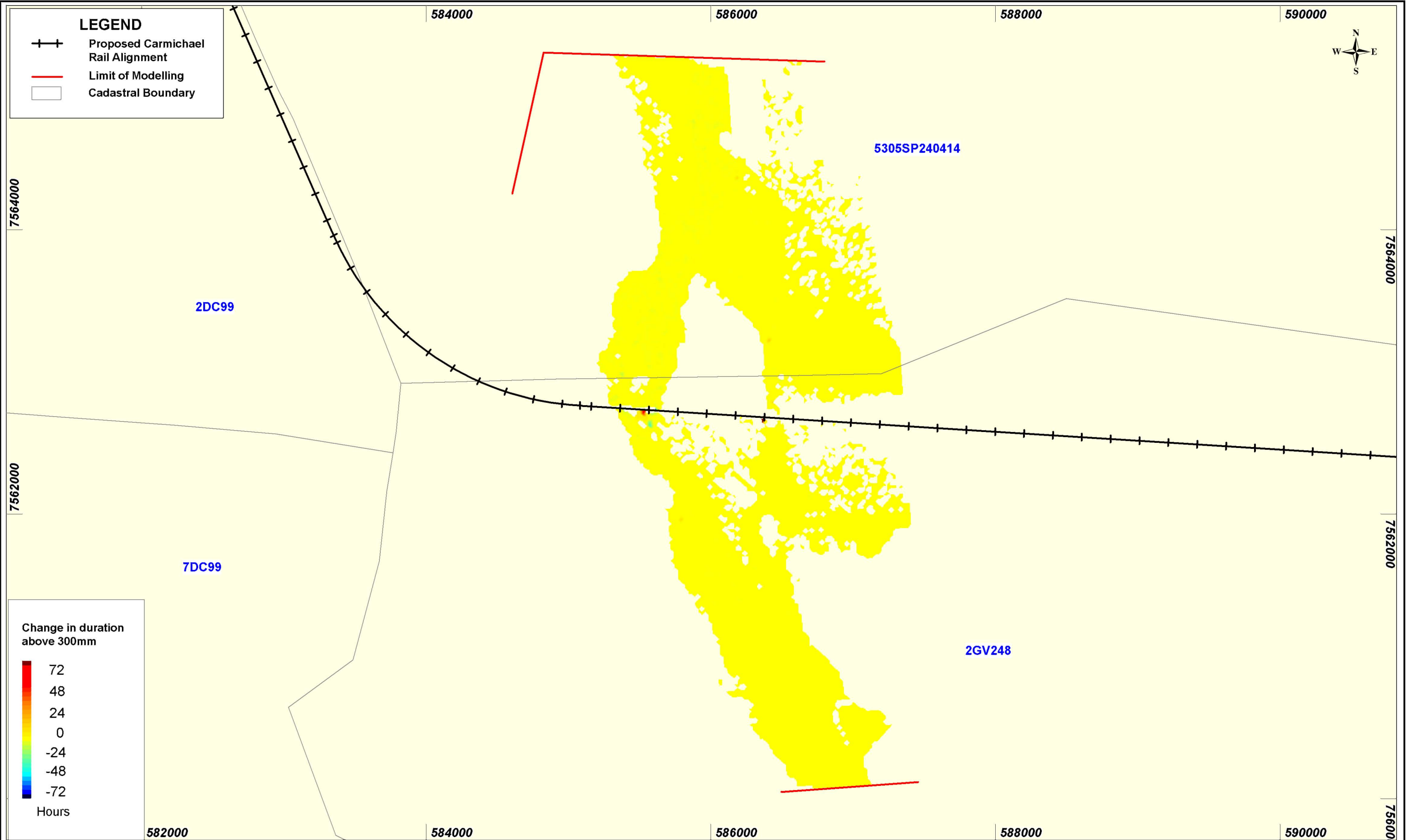
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DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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|  <b>Adani Mining Pty Ltd</b>             |               |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Grosvenor Creek Catchment Map<br/>(FIGURE 2.2.0 : Q50 Duration Afflux Map)</b> |               |        |
| Project No: 301001-01788                                                                                                      | Figure: 2.2.0 | Rev: 0 |





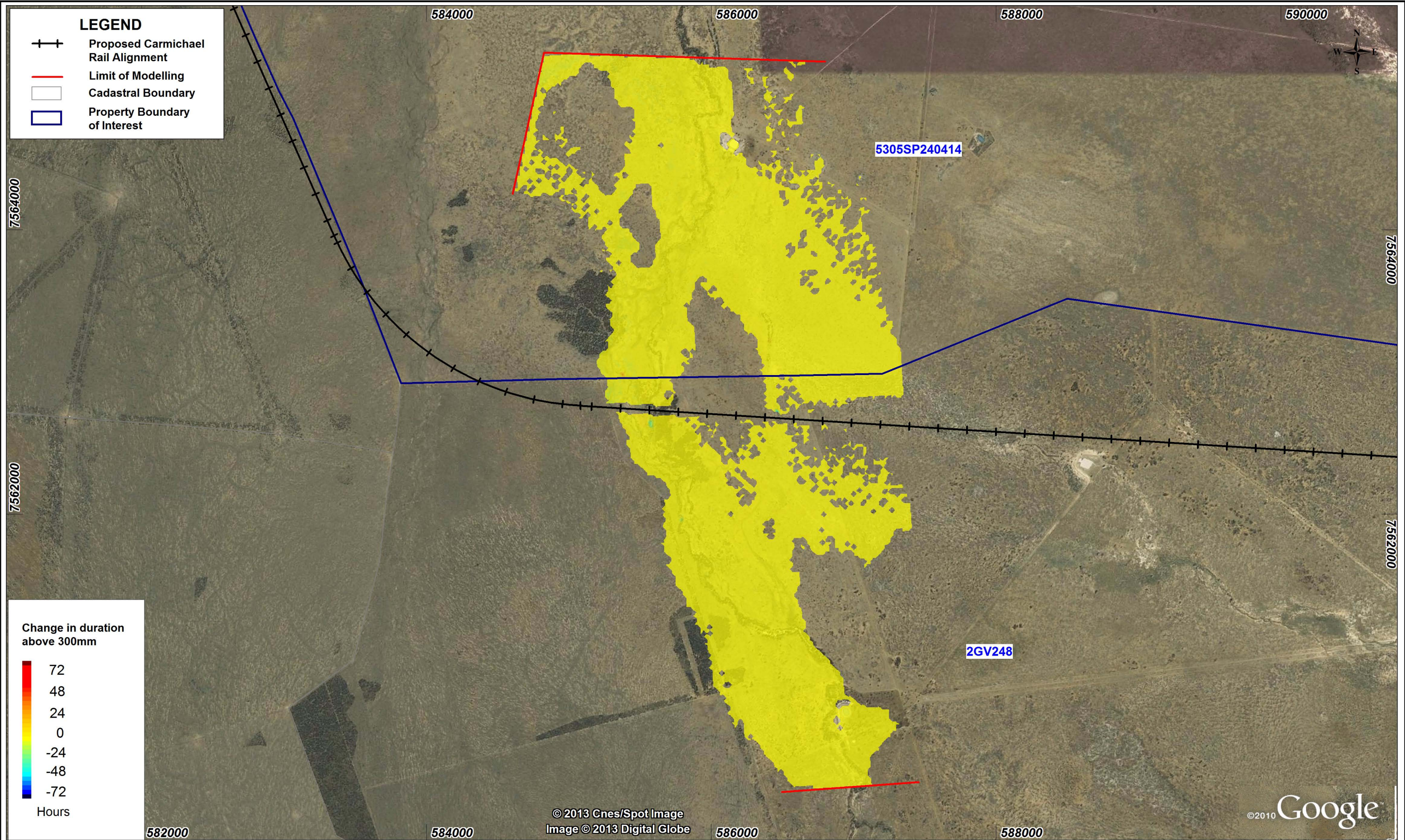
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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|  <b>WorleyParsons</b><br>resources & energy |             |                      | <br>aarvee associates<br>Aarvee Associates Pty Ltd |    |    |     |     |      |

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|  <b>Adani Mining Pty Ltd</b>             |               |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Grosvenor Creek Catchment Map<br/>(FIGURE 2.3.0 : Q20 Duration Afflux Map)</b> |               |        |
| Project No: 301001-01788                                                                                                      | Figure: 2.3.0 | Rev: 0 |





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0 0.5 1km

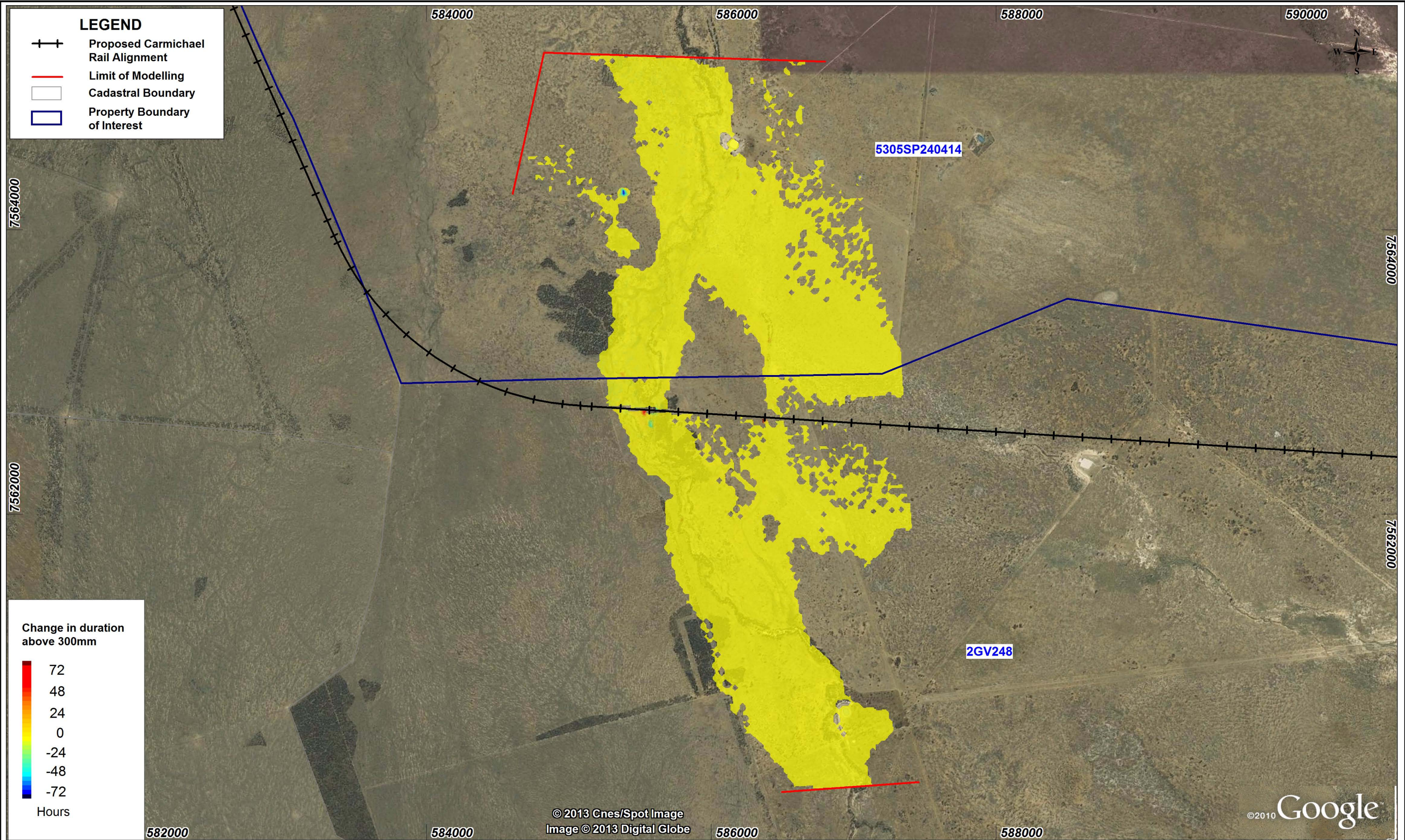
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Map Grid of Australia - Zone 55  
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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK ENG | APPD |
|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |         |      |

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|  <b>Adani Mining Pty Ltd</b>                                                 |                          |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>Grosvenor Creek Property Map 5305SP240414</b><br><b>(FIGURE 2.1.5305SP240414 : Q100 Duration Afflux Map)</b> |                          |        |
| Project No: 301001-01788                                                                                                                                          | Figure: 2.1.5305SP240414 | Rev: 0 |





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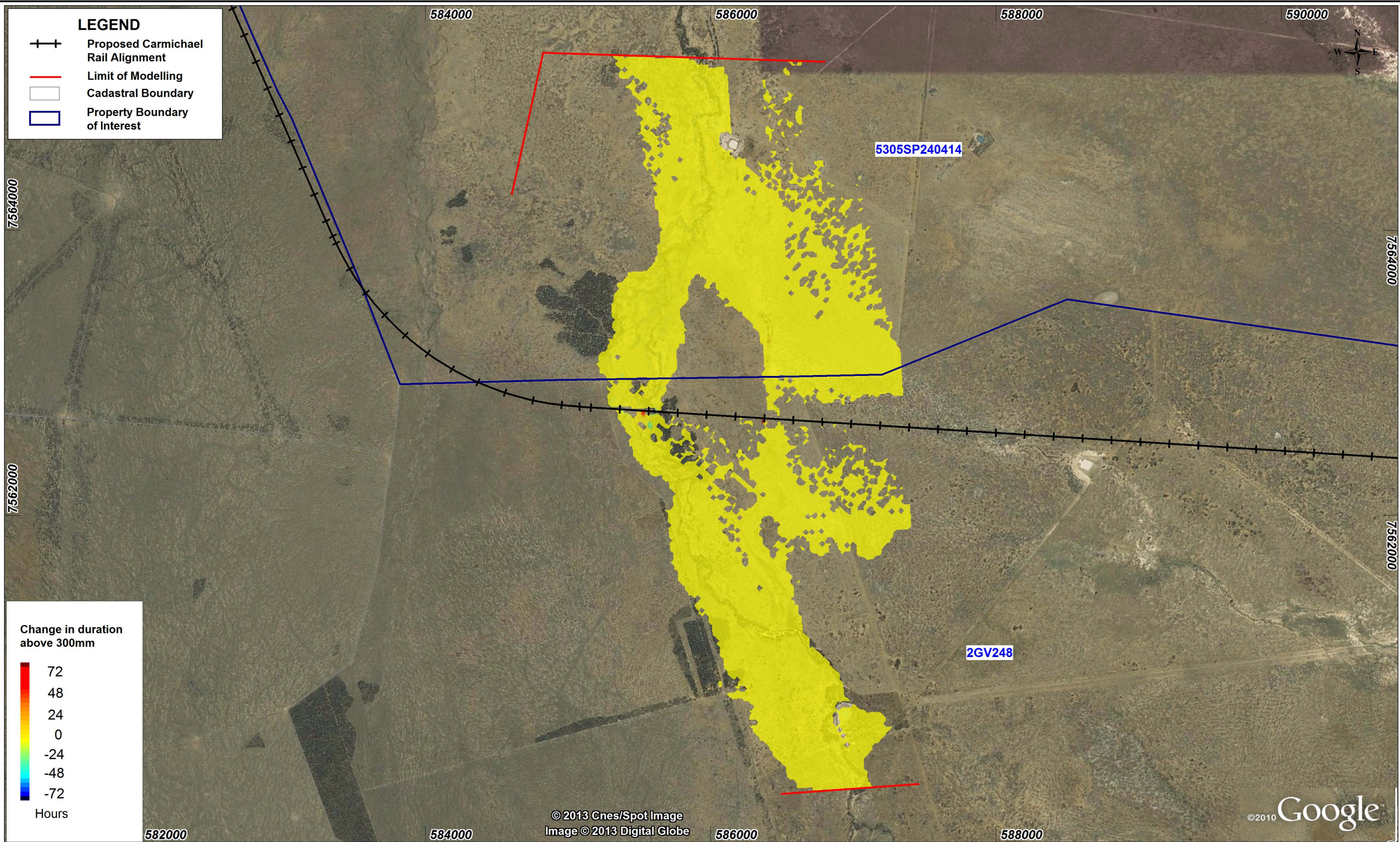
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Map Grid of Australia - Zone 55  
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|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

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|  <b>Adani Mining Pty Ltd</b>                                                |                          |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>Grosvenor Creek Property Map 5305SP240414</b><br><b>(FIGURE 2.2.5305SP240414 : Q50 Duration Afflux Map)</b> |                          |        |
| Project No: 301001-01788                                                                                                                                         | Figure: 2.2.5305SP240414 | Rev: 0 |





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Duration data: Created from client supplied modelling results  
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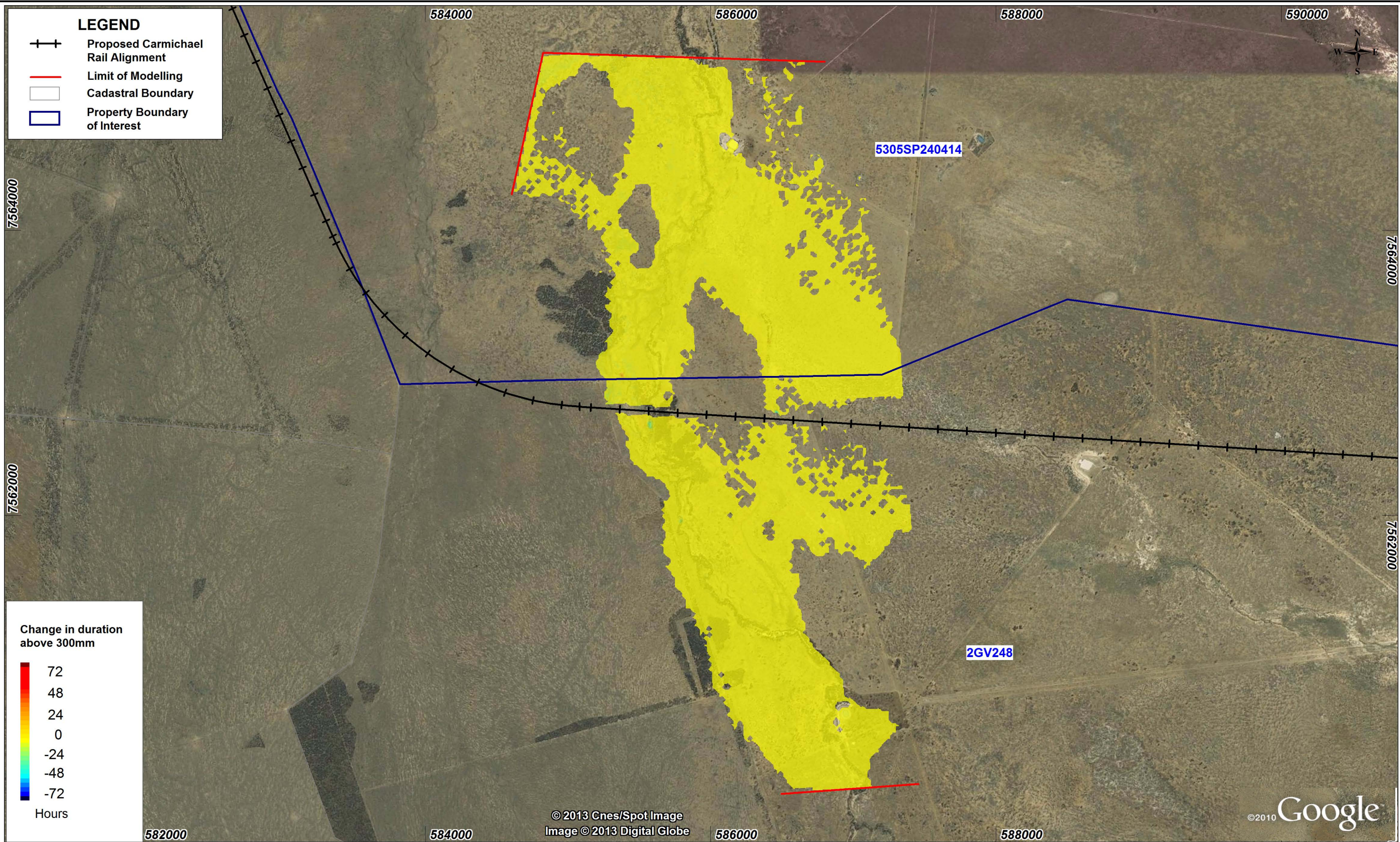
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|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |         |      |

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|  <b>Adani Mining Pty Ltd</b>                                                |                          |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>Grosvenor Creek Property Map 5305SP240414</b><br><b>(FIGURE 2.3.5305SP240414 : Q20 Duration Afflux Map)</b> |                          |        |
| Project No: 301001-01788                                                                                                                                         | Figure: 2.3.5305SP240414 | Rev: 0 |





LEGEND

Proposed Carmichael Rail Alignment

Limit of Modelling

Cadastral Boundary

Property Boundary of Interest

Change in duration above 300mm

72  
48  
24  
0  
-24  
-48  
-72  
Hours

DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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00.51km

SCALE - 1:25,000 (at A3)

Map Grid of Australia - Zone 55  
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| Rev                               | Date        | Revision Description | PMD                                  | ER | DB | CHK ENG | APPD |
| <div>resources &amp; energy</div> |             |                      | <div>Aarvee Associates Pty Ltd</div> |    |    |         |      |

Adani Mining Pty Ltd

Carmichael Coal Mine & Rail Project  
Grosvenor Creek Property Map 2GV248  
(FIGURE 2.1.2GV248 : Q100 Duration Afflux Map)

Project No: 301001-01788

Figure: 2.1.2GV248

Rev: 0

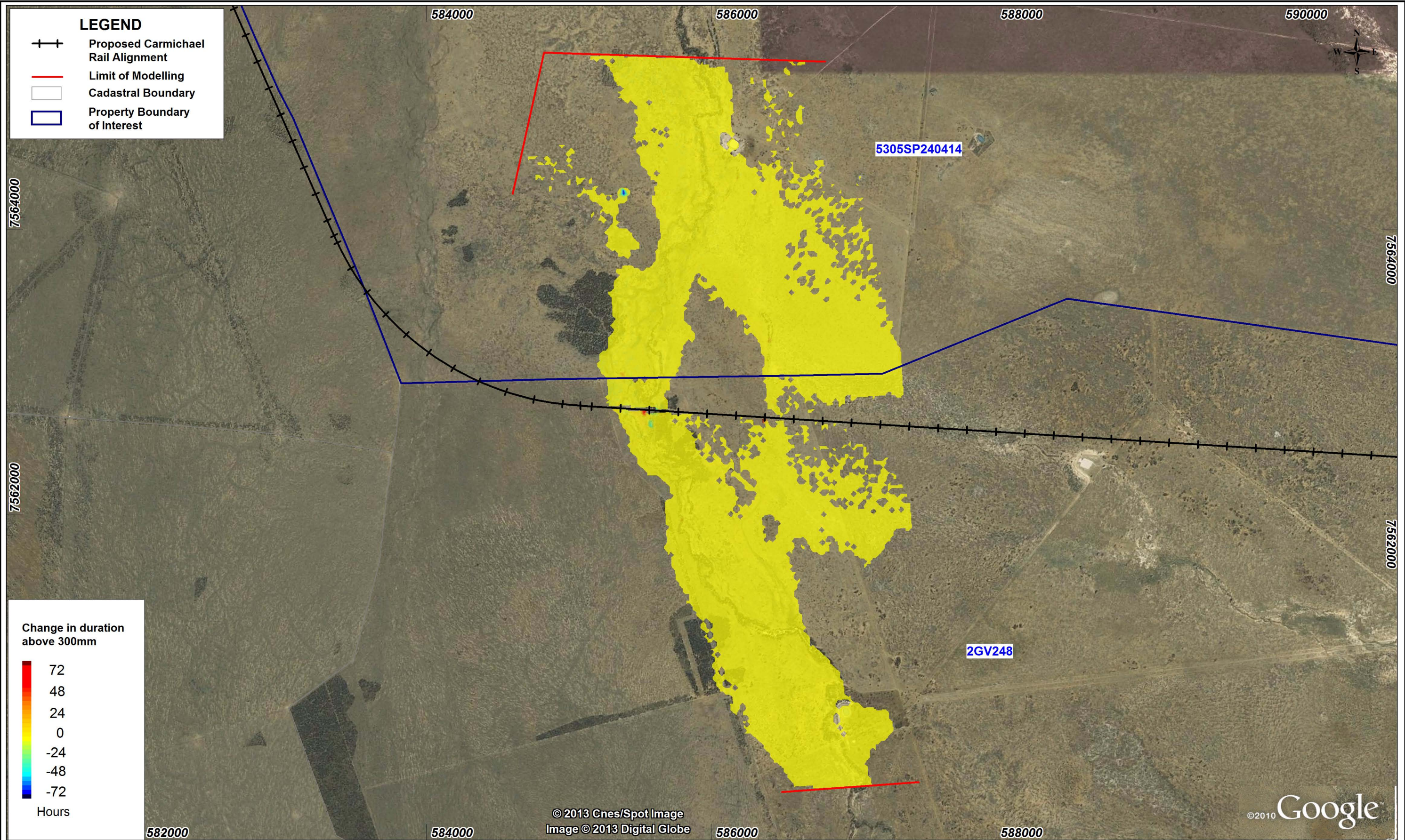
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DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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0 0.5 1km

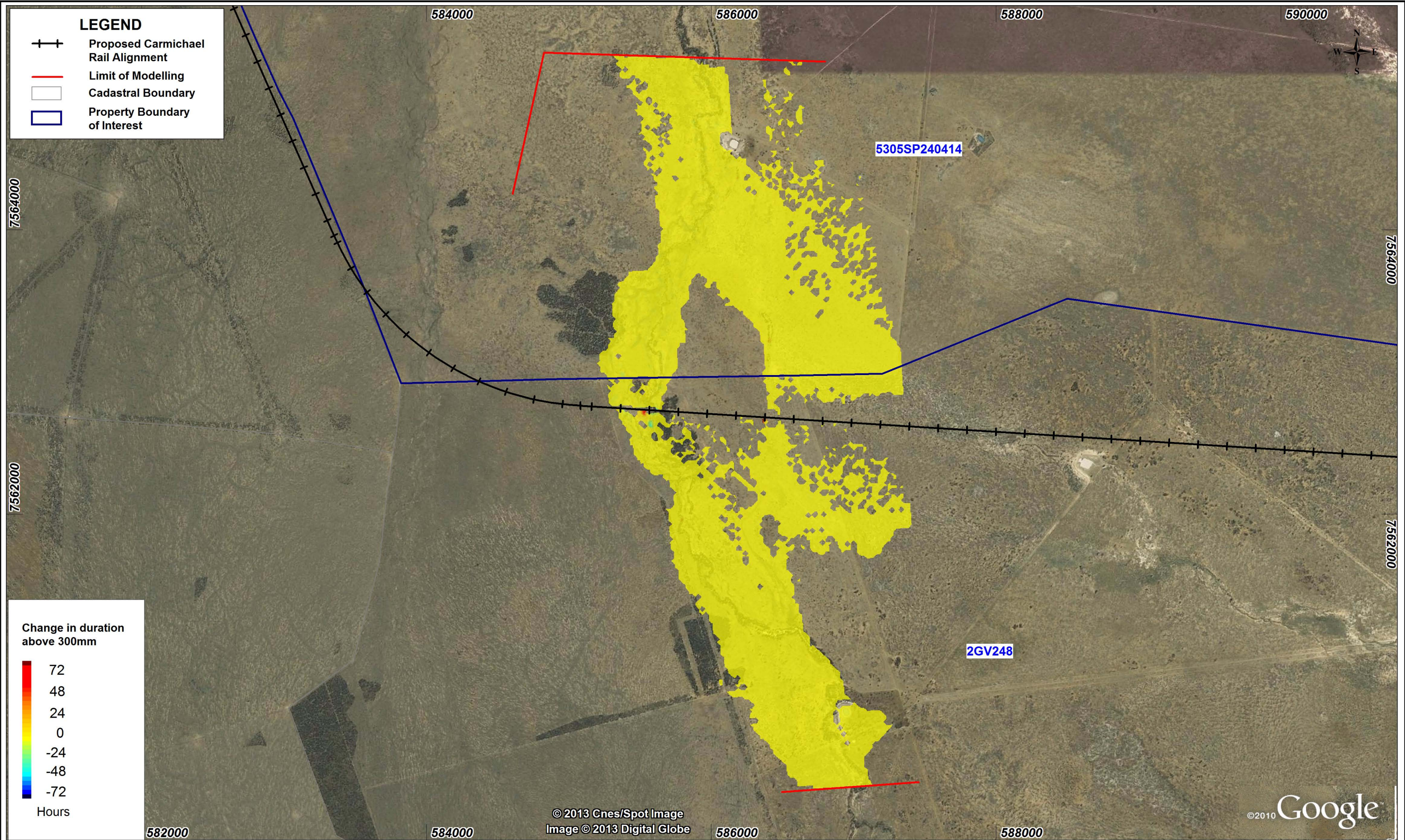
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Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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|------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------|
|  <b>Adani Mining Pty Ltd</b>                        |                    |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Grosvenor Creek Property Map 2GV248<br/>(FIGURE 2.2.2GV248 : Q50 Duration Afflux Map)</b> |                    |        |
| Project No: 301001-01788                                                                                                                 | Figure: 2.2.2GV248 | Rev: 0 |





DATA SOURCES:  
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Proposed Rail Alignment: Client supplied data

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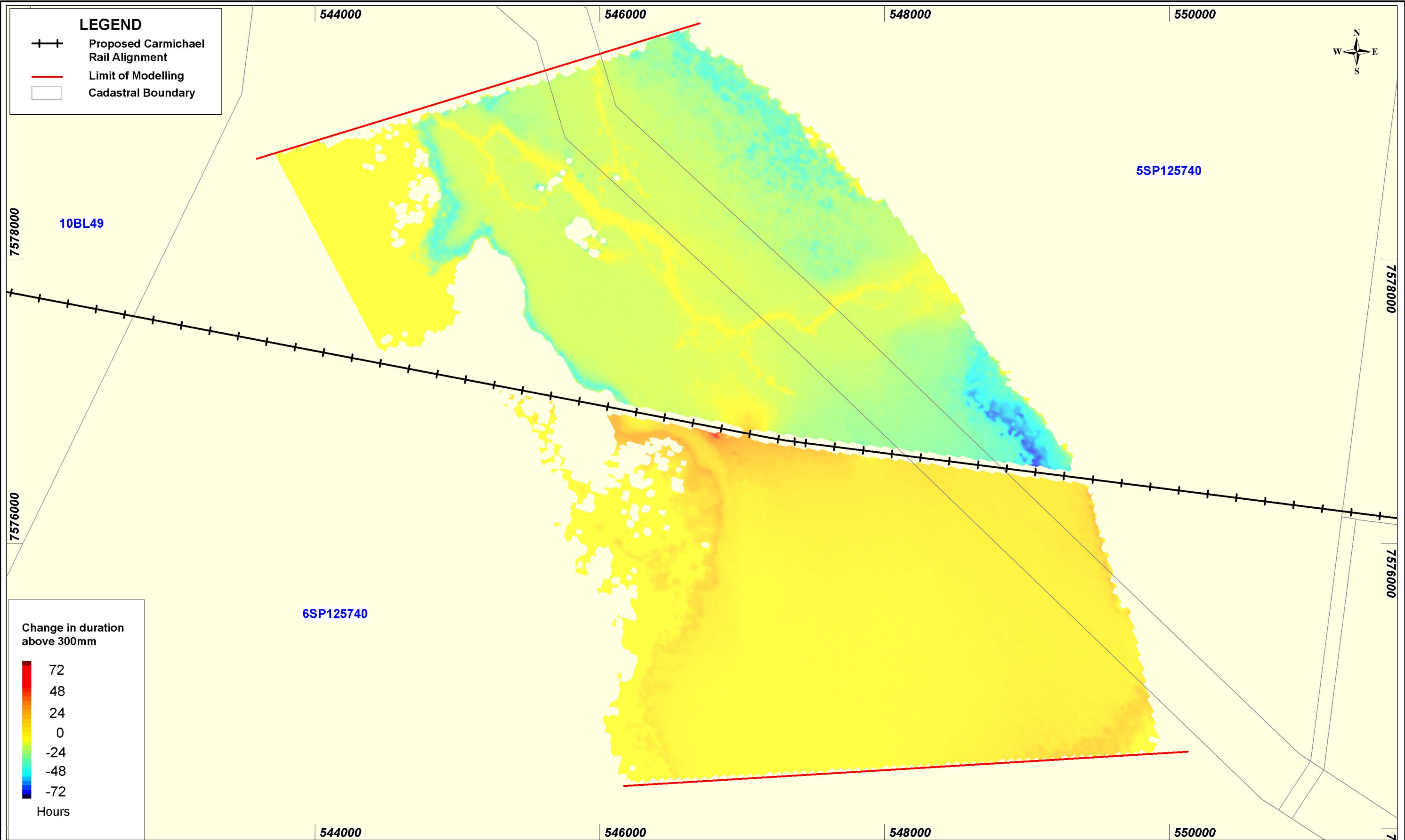
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Geocentric Datum of Australia 1994

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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK ENG | APPD |
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|------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------|
|  <b>Adani Mining Pty Ltd</b>                        |                    |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Grosvenor Creek Property Map 2GV248<br/>(FIGURE 2.3.2GV248 : Q20 Duration Afflux Map)</b> |                    |        |
| Project No: 301001-01788                                                                                                                 | Figure: 2.3.2GV248 | Rev: 0 |





0 0.5 1km

SCALE - 1:25,000 (at A3)

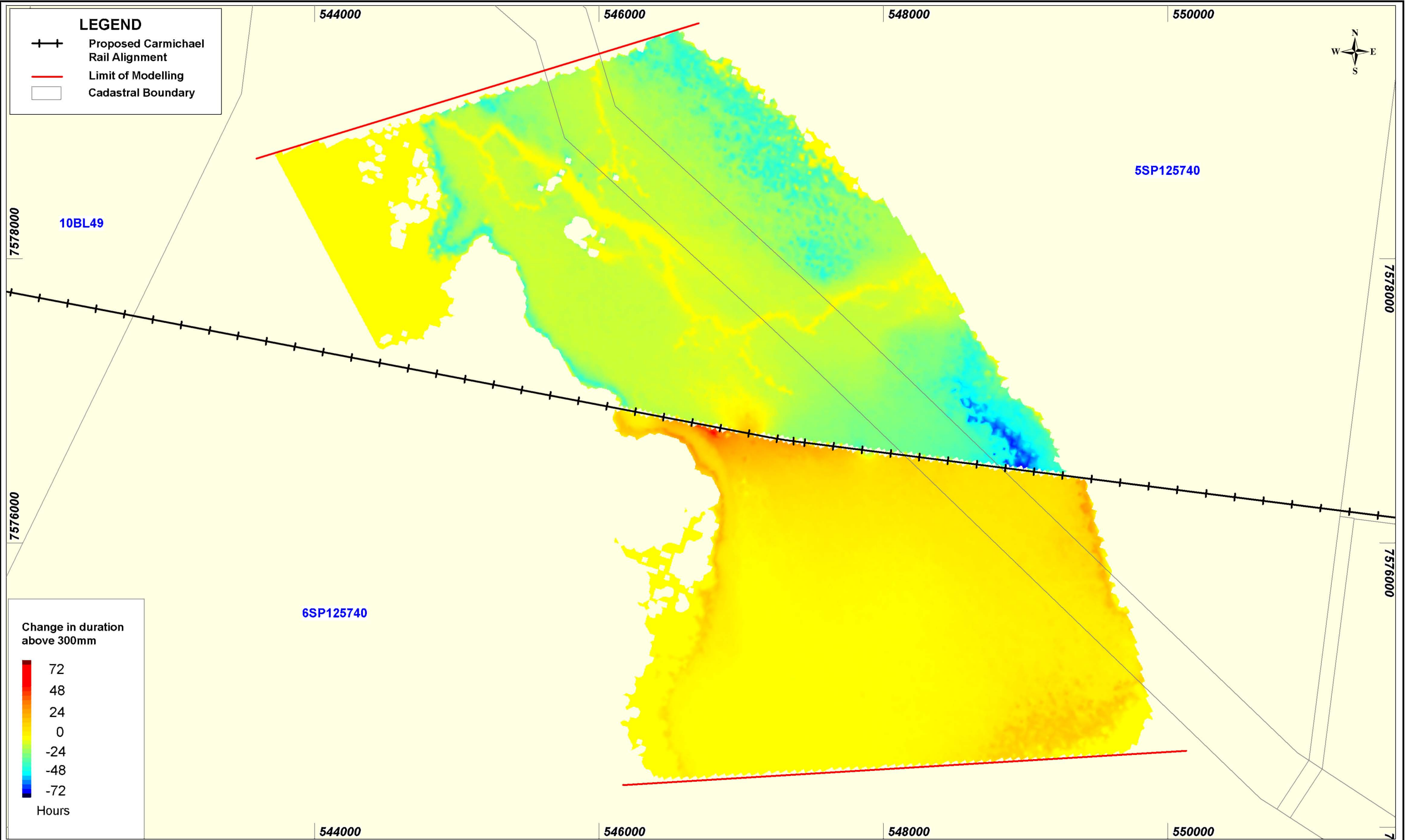
Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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|------------------------------------------------------------------------------------------------------------------------------|---------------|--------|
|  <b>Adani Mining Pty Ltd</b>            |               |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Diamond Creek Catchment Map<br/>(FIGURE 3.1.0 : Q100 Duration Afflux Map)</b> |               |        |
| Project No: 301001-01788                                                                                                     | Figure: 3.1.0 | Rev: 0 |





0 0.5 1km

SCALE - 1:25,000 (at A3)

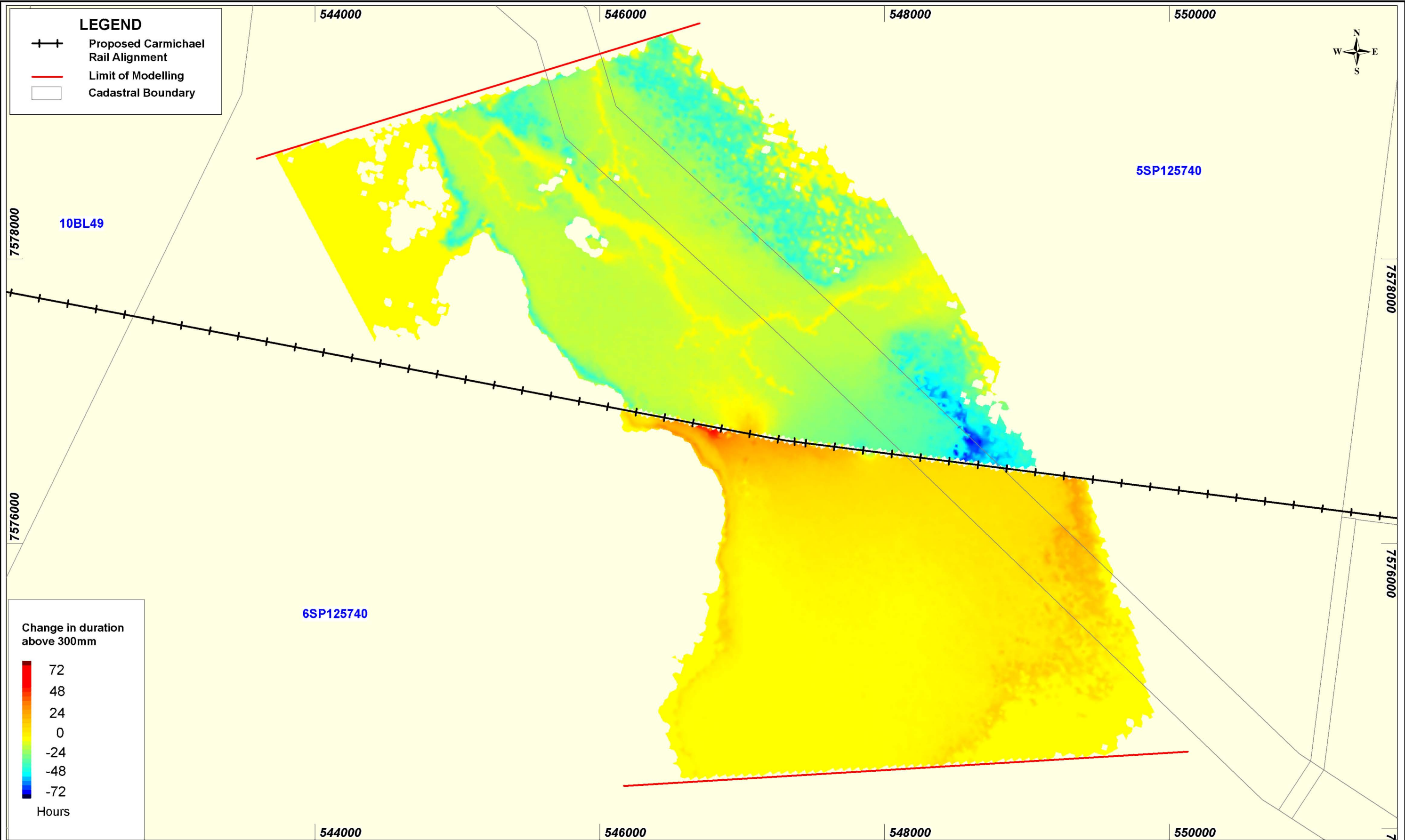
Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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|-----------------------------------------------------------------------------------------------------------------------------|---------------|--------|
|  <b>Adani Mining Pty Ltd</b>           |               |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Diamond Creek Catchment Map<br/>(FIGURE 3.2.0 : Q50 Duration Afflux Map)</b> |               |        |
| Project No: 301001-01788                                                                                                    | Figure: 3.2.0 | Rev: 0 |





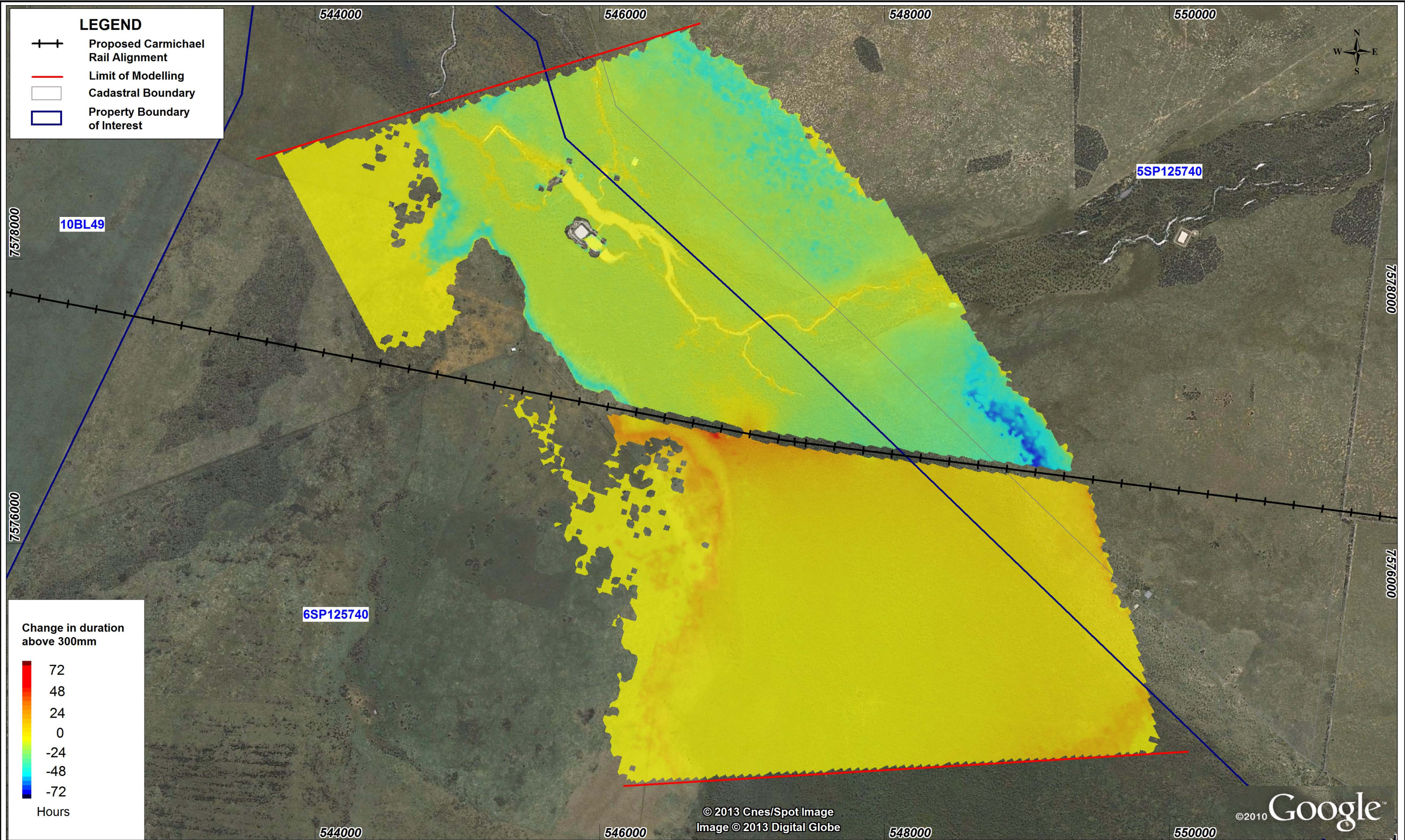
DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

0 0.5 1km  
SCALE - 1:25,000 (at A3)  
Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

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|-----------------------------------------------------------------------------------------------------------------------------|---------------|--------|
|  <b>Adani Mining Pty Ltd</b>           |               |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Diamond Creek Catchment Map<br/>(FIGURE 3.3.0 : Q20 Duration Afflux Map)</b> |               |        |
| Project No: 301001-01788                                                                                                    | Figure: 3.3.0 | Rev: 0 |





DATA SOURCES:  
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0 0.5 1km

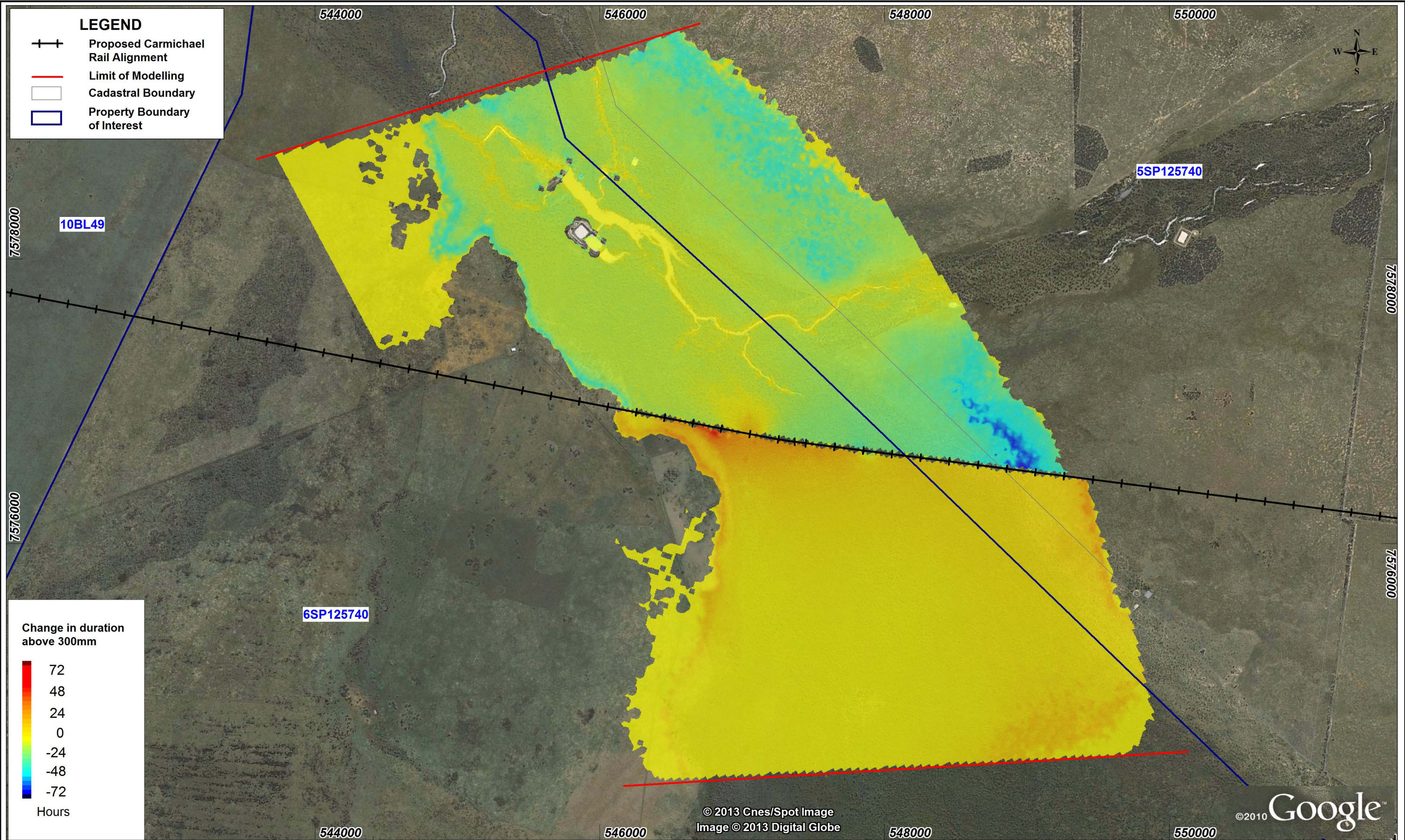
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Geocentric Datum of Australia 1994

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------|
|  <b>Adani Mining Pty Ltd</b>                                         |                       |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>Diamond Creek Property Map 6SP125740</b><br><b>(FIGURE 3.1.6SP125740 : Q100 Duration Afflux Map)</b> |                       |        |
| Project No: 301001-01788                                                                                                                                  | Figure: 3.1.6SP125740 | Rev: 0 |





DATA SOURCES:  
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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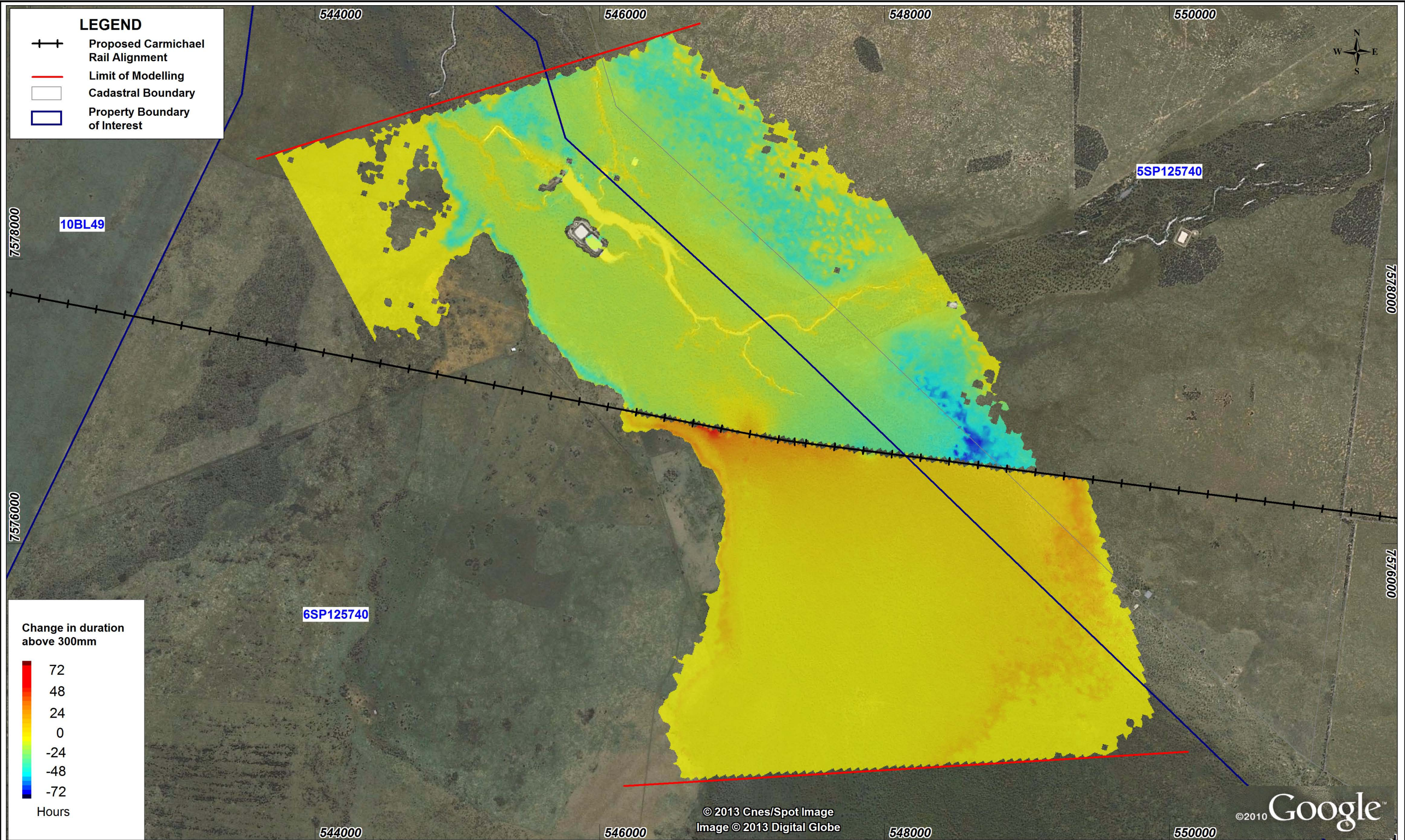
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|  <b>Adani Mining Pty Ltd</b>                                        |                       |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>Diamond Creek Property Map 6SP125740</b><br><b>(FIGURE 3.2.6SP125740 : Q50 Duration Afflux Map)</b> |                       |        |
| Project No: 301001-01788                                                                                                                                 | Figure: 3.2.6SP125740 | Rev: 0 |





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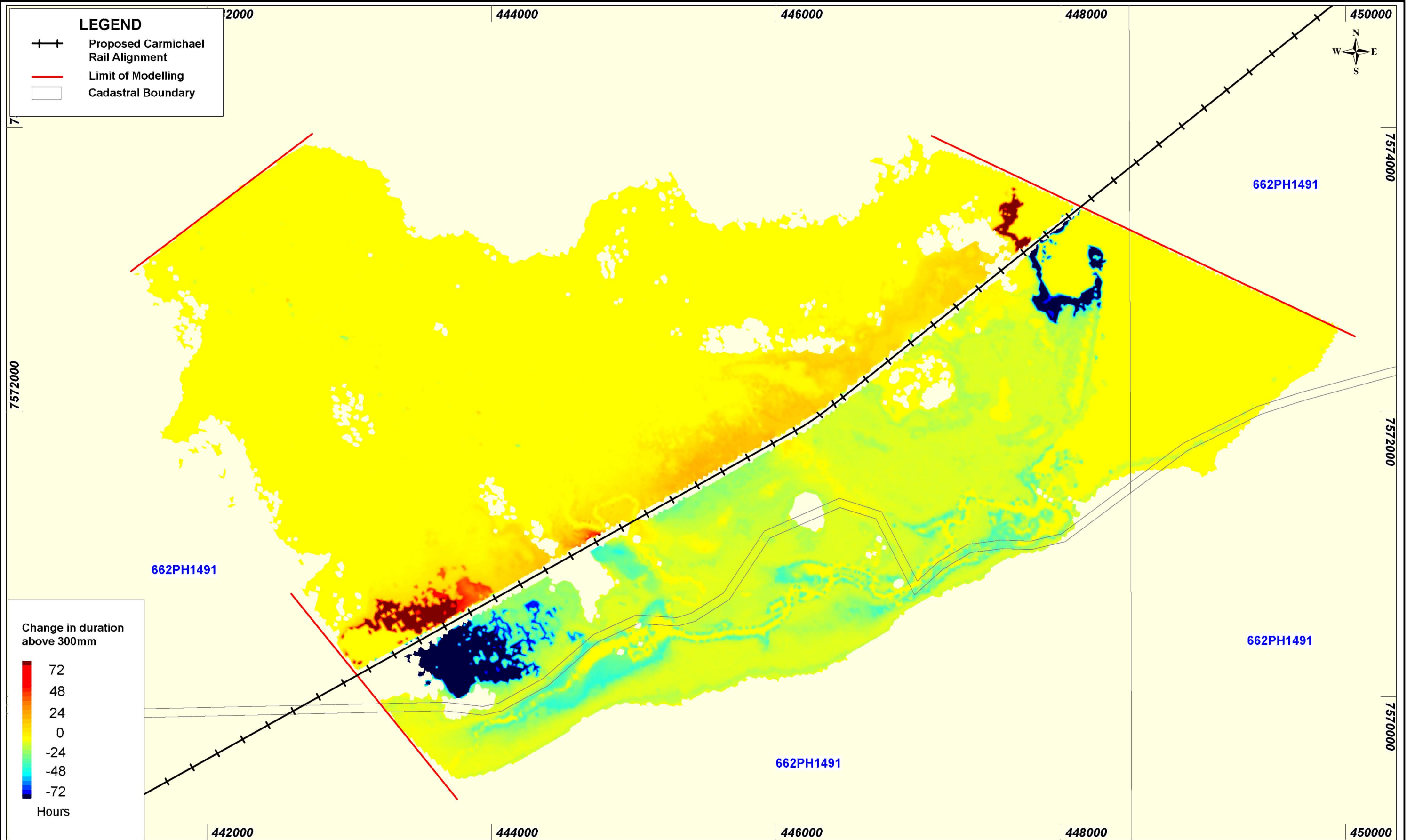
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|  <b>Adani Mining Pty Ltd</b>                                        |                       |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>Diamond Creek Property Map 6SP125740</b><br><b>(FIGURE 3.3.6SP125740 : Q20 Duration Afflux Map)</b> |                       |        |
| Project No: 301001-01788                                                                                                                                 | Figure: 3.3.6SP125740 | Rev: 0 |





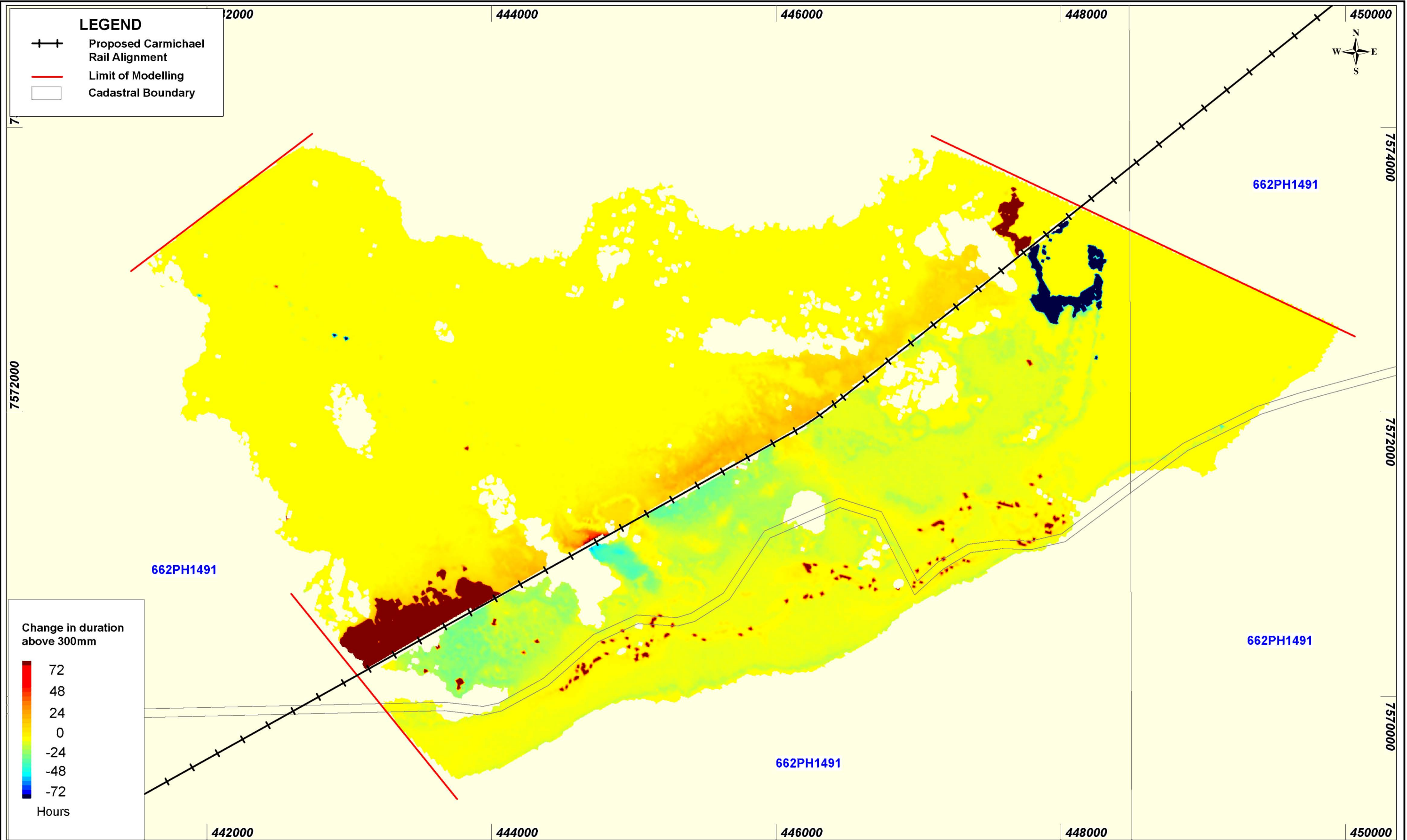
DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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SCALE - 1:25,000 (at A3)  
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|  <b>Adani Mining Pty Ltd</b>          |               |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>North Creek Catchment Map<br/>(FIGURE 4.1.0 : Q100 Duration Afflux Map)</b> |               |        |
| Project No: 301001-01788                                                                                                   | Figure: 4.1.0 | Rev: 0 |





0 0.5 1km

SCALE - 1:25,000 (at A3)

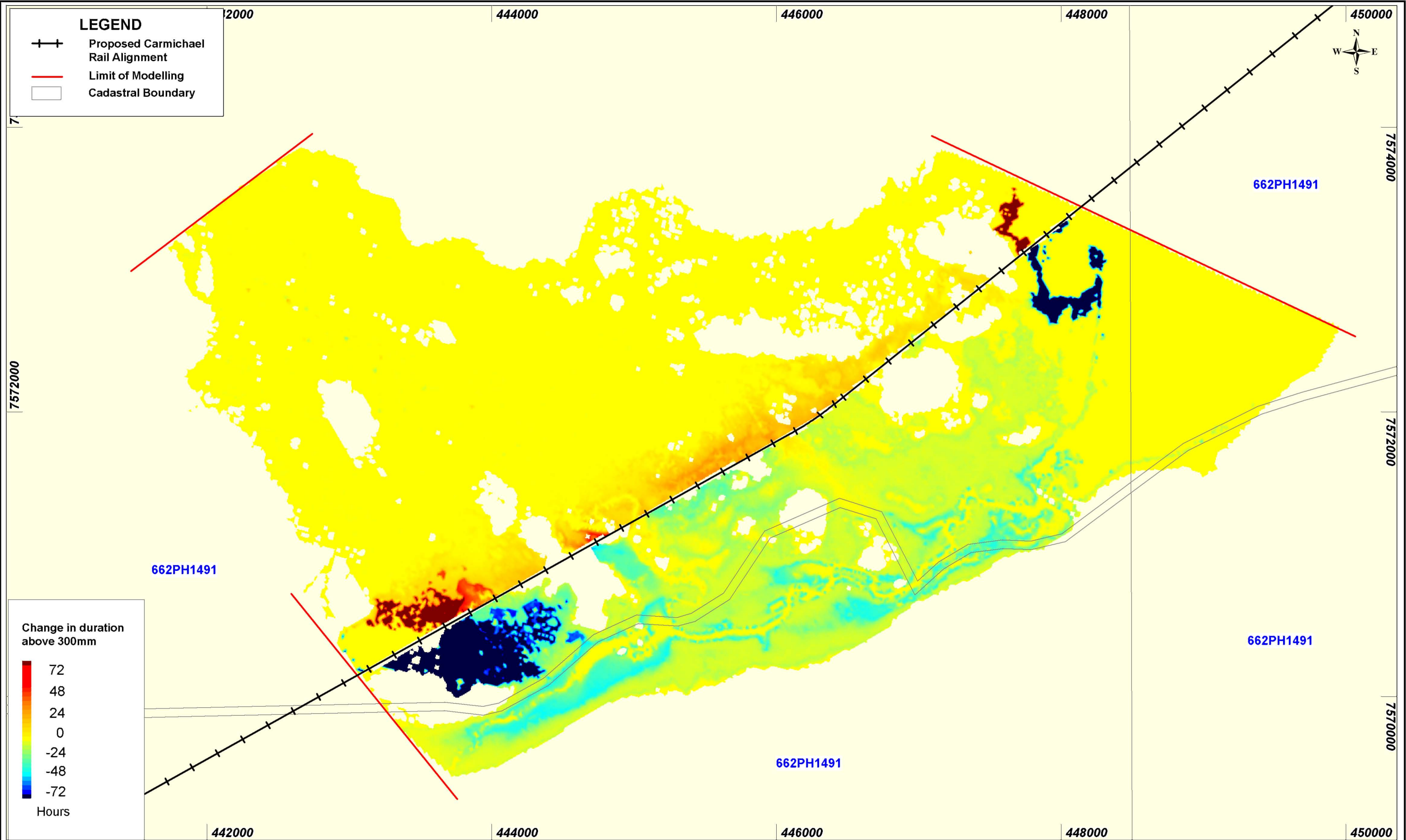
Map Grid of Australia - Zone 55  
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DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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|  <b>Adani Mining Pty Ltd</b>                     |               |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>North Creek Catchment Map</b><br><b>(FIGURE 4.2.0 : Q50 Duration Afflux Map)</b> |               |        |
| Project No: 301001-01788                                                                                                              | Figure: 4.2.0 | Rev: 0 |





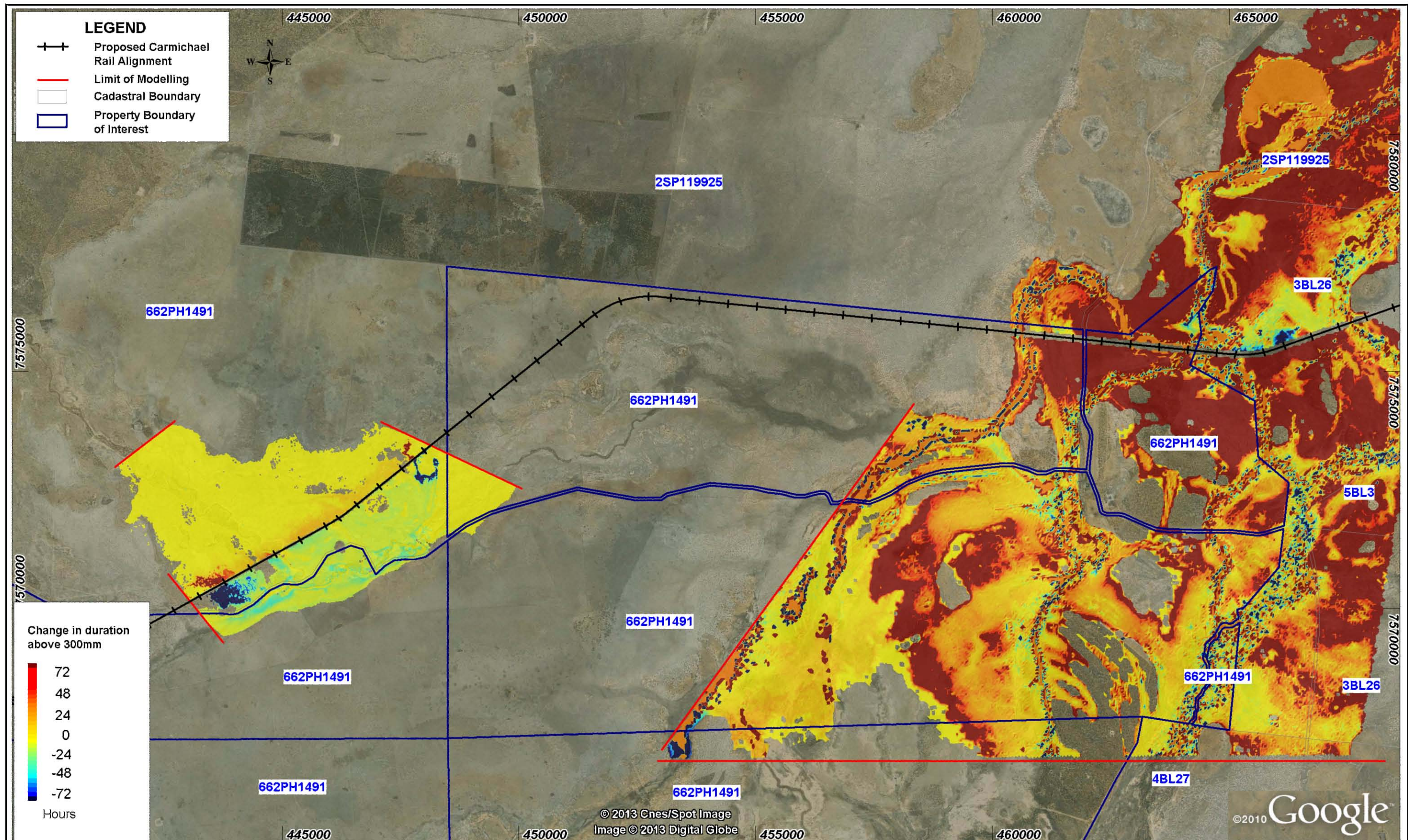
DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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SCALE - 1:25,000 (at A3)  
Map Grid of Australia - Zone 55  
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|  <b>Adani Mining Pty Ltd</b>                     |               |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>North Creek Catchment Map</b><br><b>(FIGURE 4.3.0 : Q20 Duration Afflux Map)</b> |               |        |
| Project No: 301001-01788                                                                                                              | Figure: 4.3.0 | Rev: 0 |





DATA SOURCES:  
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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|  <b>WorleyParsons</b><br>resources & energy |             |                      | <br>aarvee associates<br>Aarvee Associates Pty Ltd |    |    |     |     |      |

adani

Adani Mining Pty Ltd

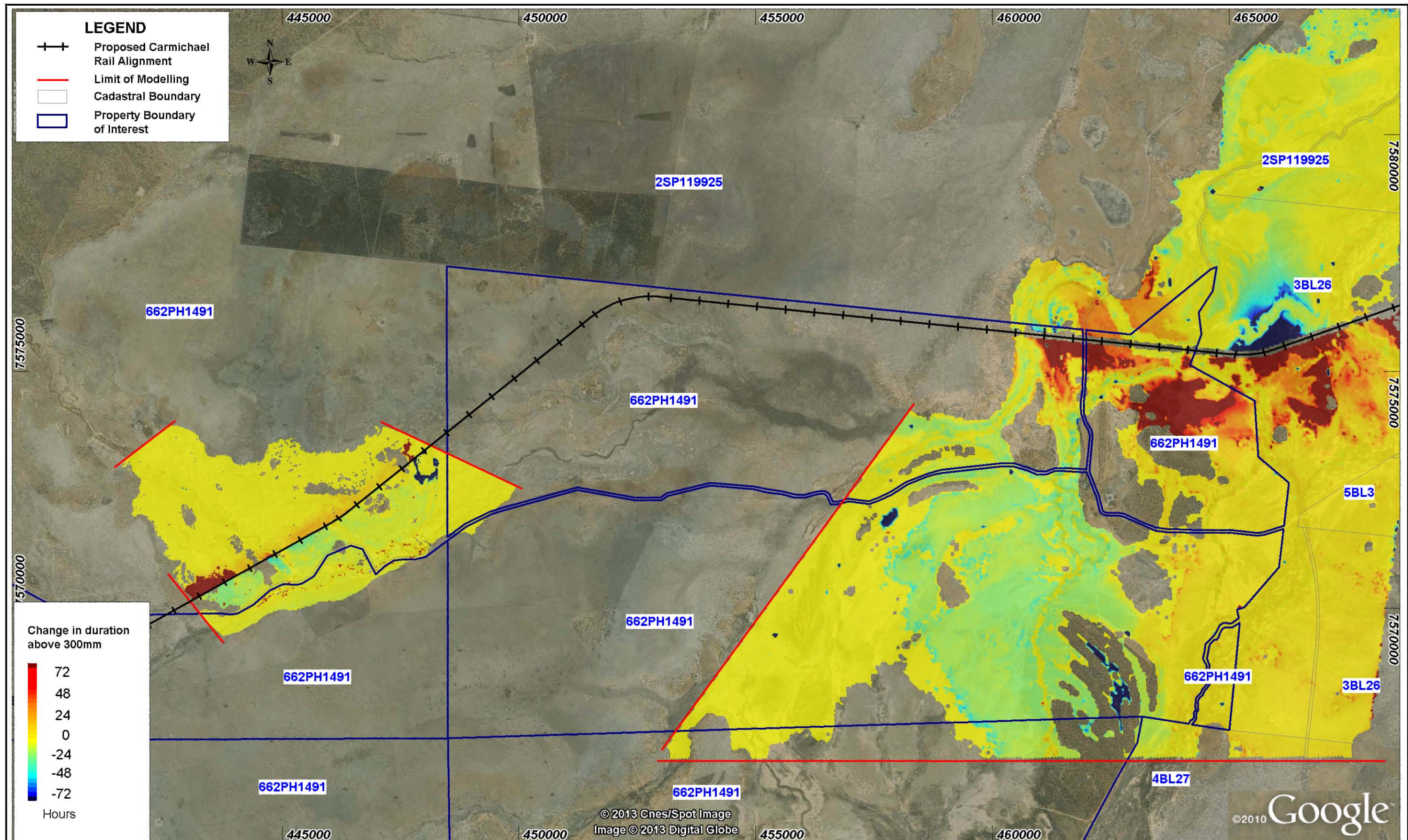
**Carmichael Coal Mine & Rail Project  
North Creek Property Map 662PH1491  
including Belyando Catchment  
(FIGURE 4.1.662PH1491 : Q100 Duration Afflux Map)**

Project No: 301001-01788

Figure: 4.1.662PH1491

Rev: 0





DATA SOURCES:  
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Duration data: Created from client supplied modelling results  
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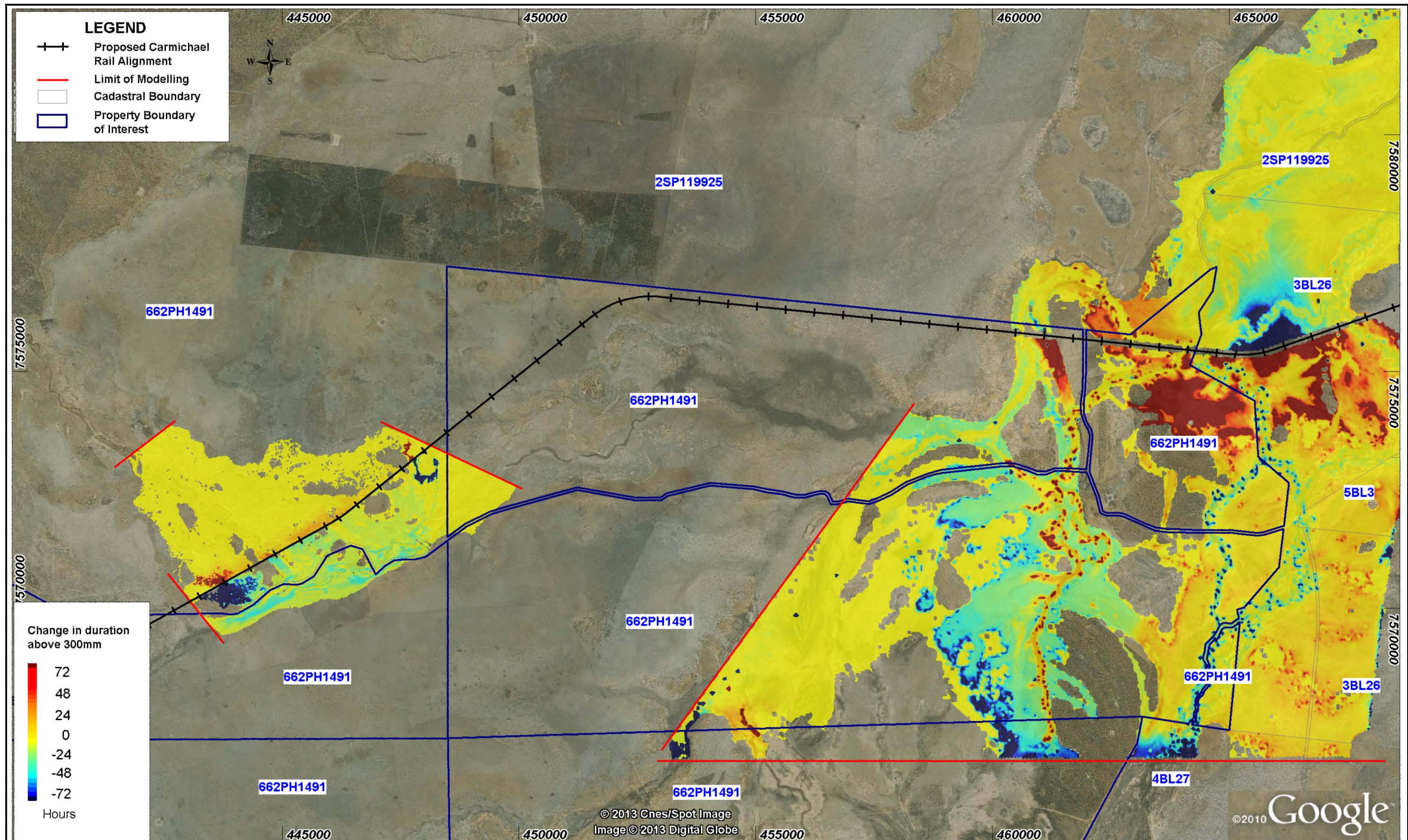
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| <b>WorleyParsons</b><br>resources & energy |             |                      | <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

**adani** **Adani Mining Pty Ltd**

**Carmichael Coal Mine & Rail Project**  
**North Creek Property Map 662PH1491**  
**and Belyando Catchment**  
**(FIGURE 4.2.662PH1491 : Q50 Duration Afflux Map)**

Project No: 301001-01788 Figure: 4.2.662PH1491 Rev: 0





DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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|  <b>WorleyParsons</b><br>resources & energy |             |                      | <br><b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

**adani**

**Adani Mining Pty Ltd**

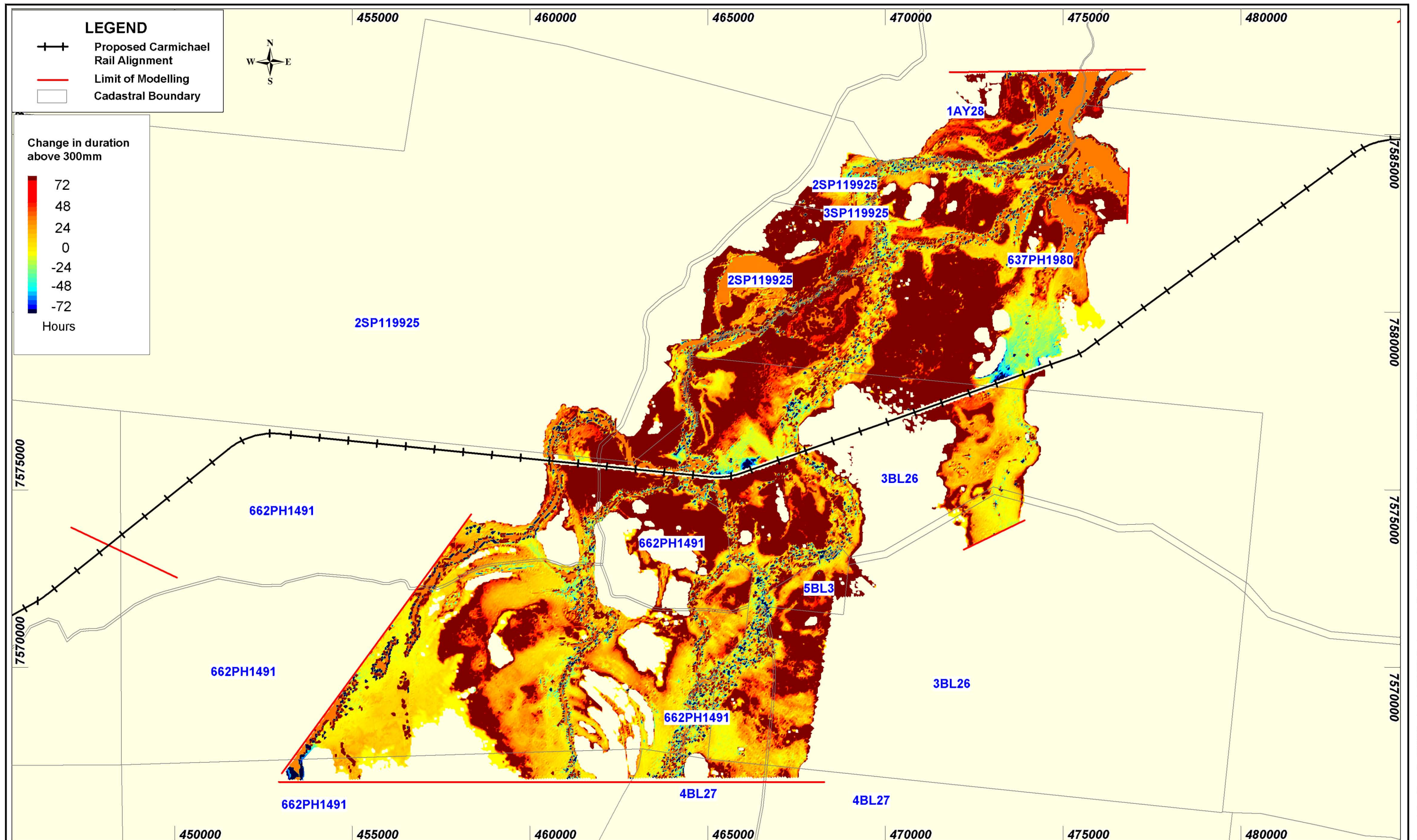
**Carmichael Coal Mine & Rail Project  
North Creek Property Map 662PH1491  
and Belyando Catchment  
(FIGURE 4.3.662PH1491 : Q20 Duration Afflux Map)**

Project No: 301001-01788

Figure: 4.3.662PH1491

Rev: 0





DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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SCALE - 1:100,000 (at A3)  
Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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**adani** **Adani Mining Pty Ltd**

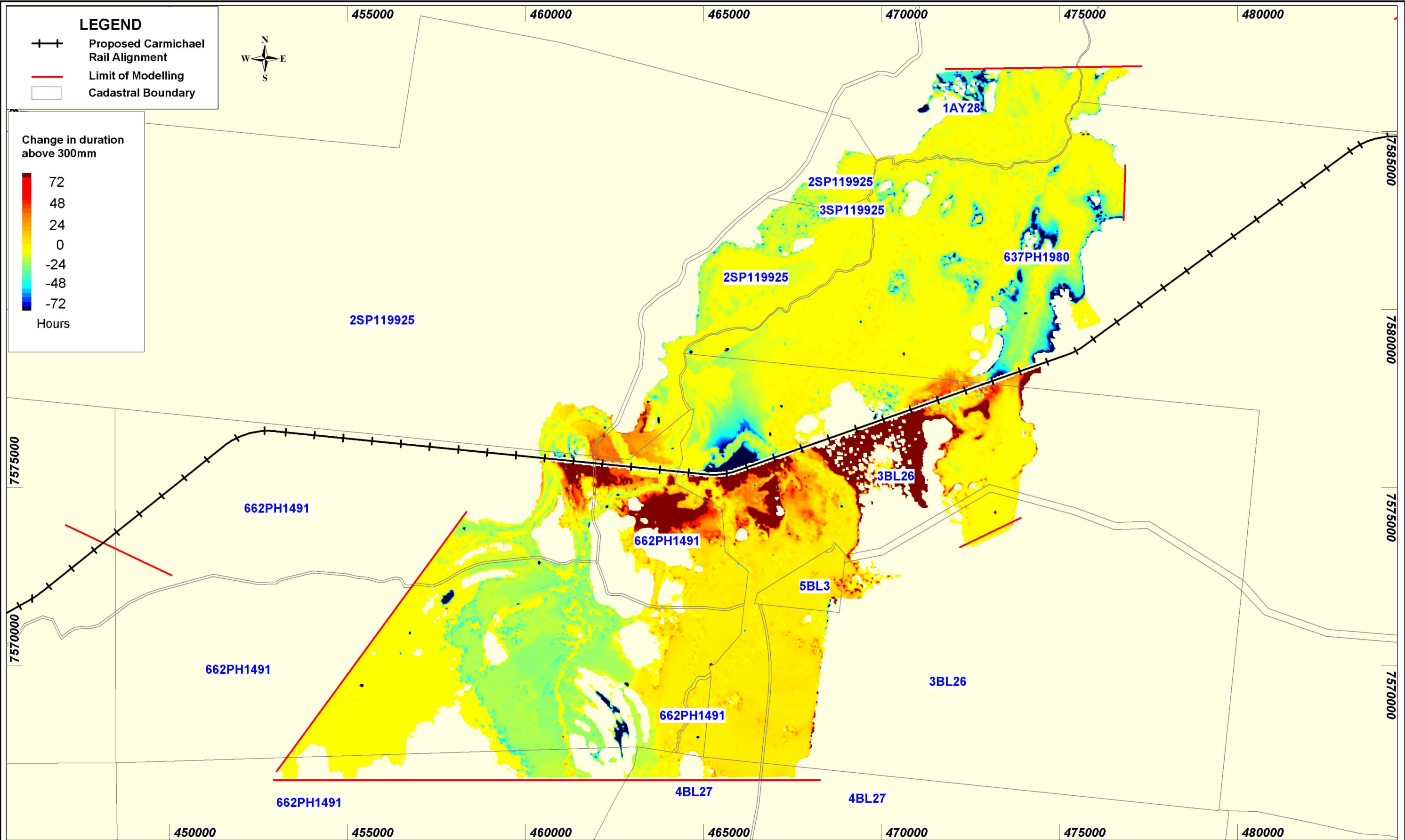
**Carmichael Coal Mine & Rail Project**  
**Belyando River Catchment Map**  
**(FIGURE 5.1.0 : Q100 Duration Afflux Map)**

Project No: 301001-01788

Figure: 5.1.0

Rev: 0





DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

0 2 4km  
SCALE - 1:100,000 (at A3)  
Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK | ENG | APPD |
|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

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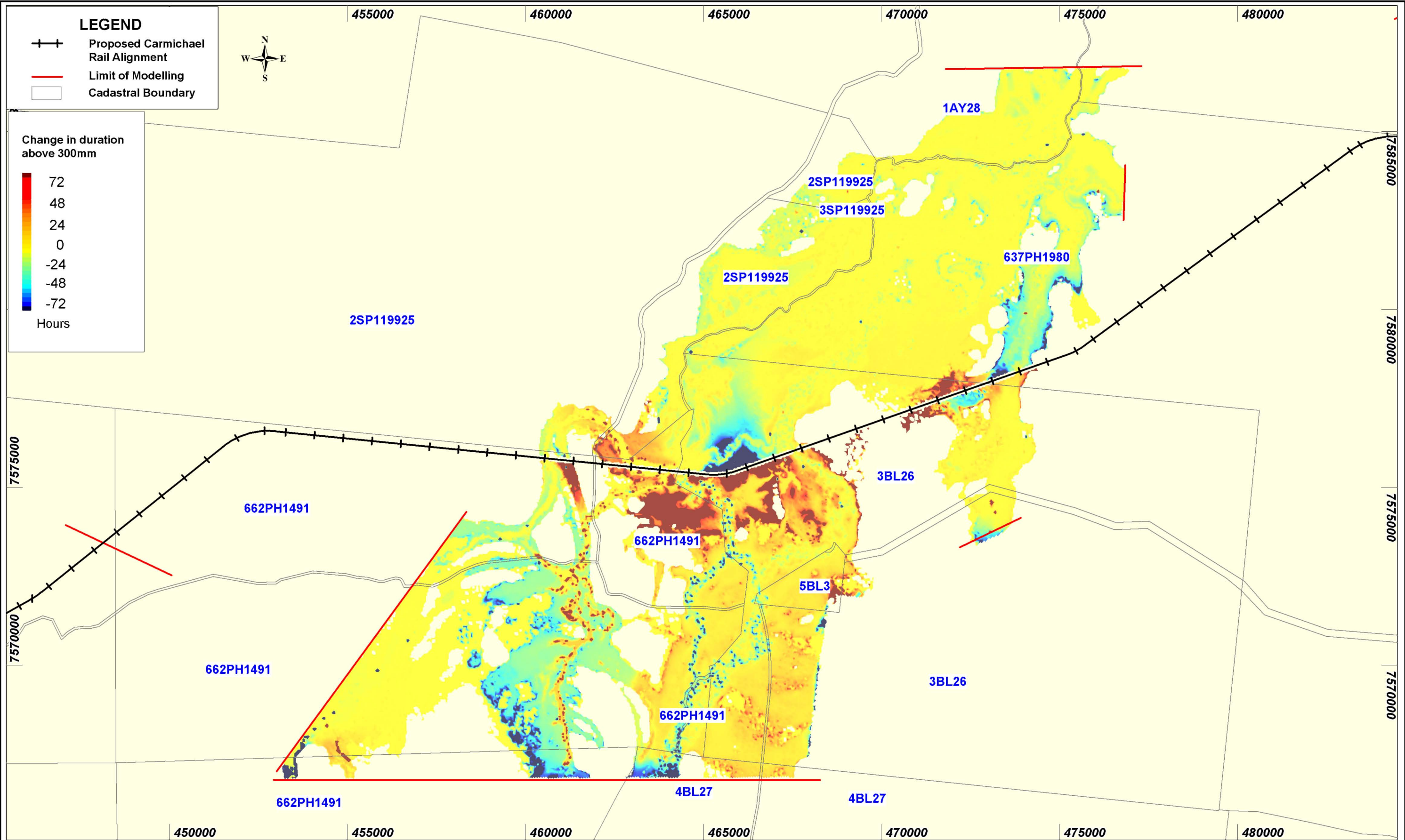
**Carmichael Coal Mine & Rail Project  
Belyando River Catchment Map  
(FIGURE 5.2.0 : Q50 Duration Afflux Map)**

Project No: 301001-01788

Figure: 5.2.0

Rev: 0





0 2 4km

SCALE - 1:100,000 (at A3)

Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK | ENG | APPD |
|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

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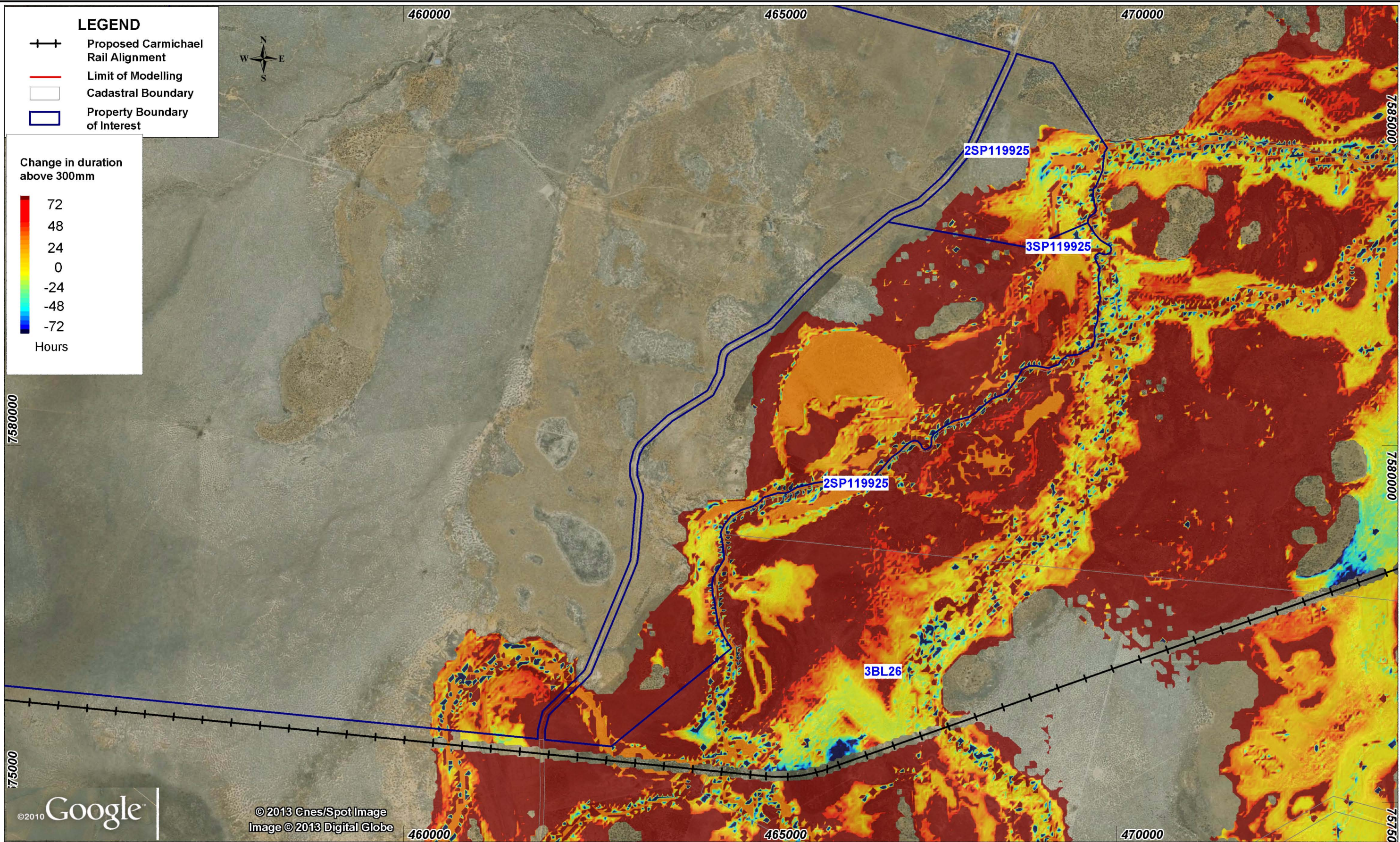
**Carmichael Coal Mine & Rail Project  
Belyando River Catchment Map  
(FIGURE 5.3.0 : Q20 Duration Afflux Map)**

Project No: 301001-01788

Figure: 5.3.0

Rev: 0





**LEGEND**

- Proposed Carmichael Rail Alignment
- Limit of Modelling
- Cadastral Boundary
- Property Boundary of Interest

**Change in duration above 300mm**

72  
48  
24  
0  
-24  
-48  
-72  
Hours

0 2km

SCALE - 1:75,000 (at A3)

Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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|-----|-------------|----------------------|-----|----|----|-----|-----|------|
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**aarvee associates**  
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**Adani Mining Pty Ltd**

**Carmichael Coal Mine & Rail Project**  
**Belyando River Property Map 2SP119925**  
**(FIGURE 5.1.2SP119925 : Q100 Duration Afflux Map)**

Project No: 301001-01788    Figure: 5.1.2SP119925    Rev: 0

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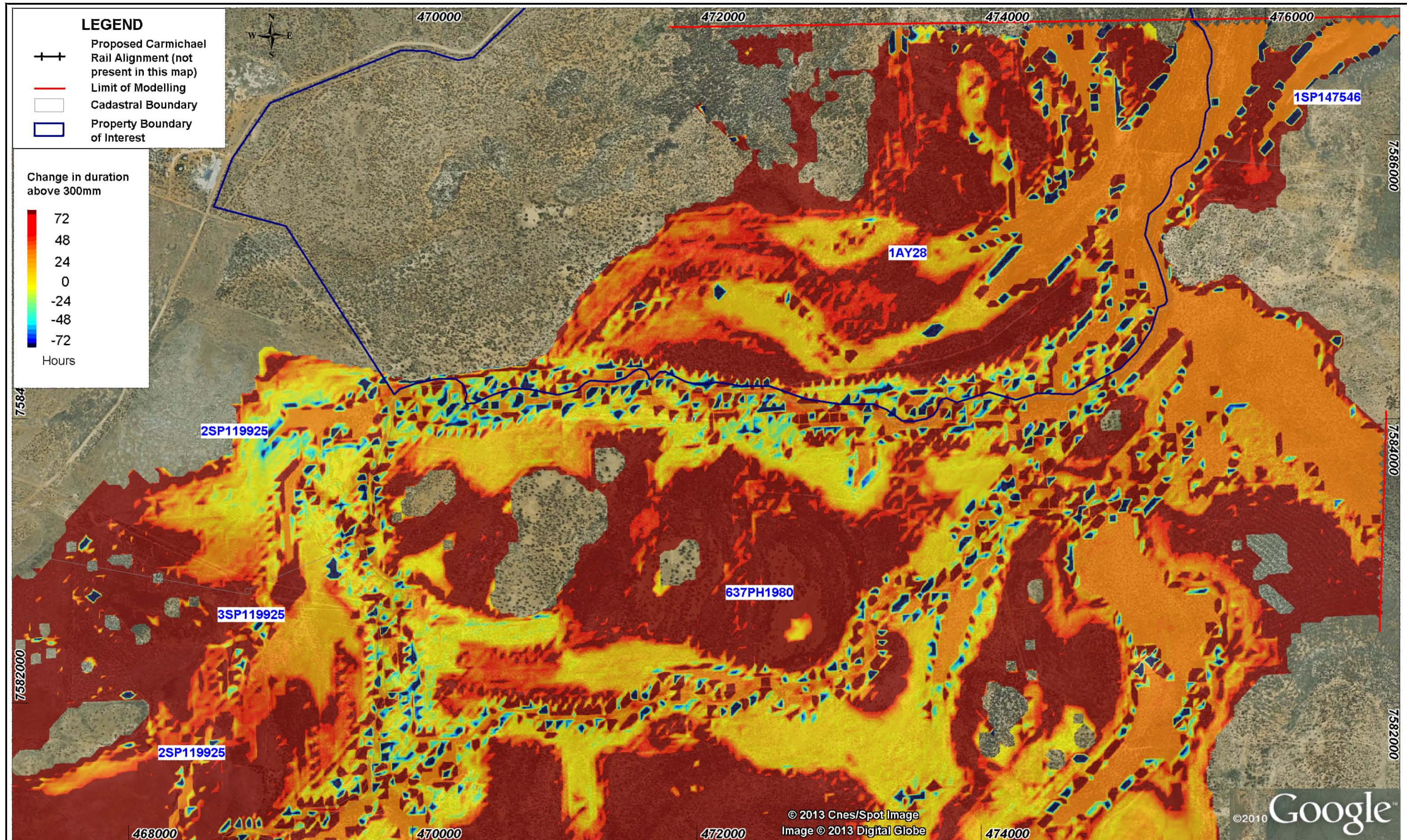












**DATA SOURCES:**  
 Cadastre: Client supplied data  
 Duration data: Created from client supplied modelling results  
 Proposed Rail Alignment: Client supplied data

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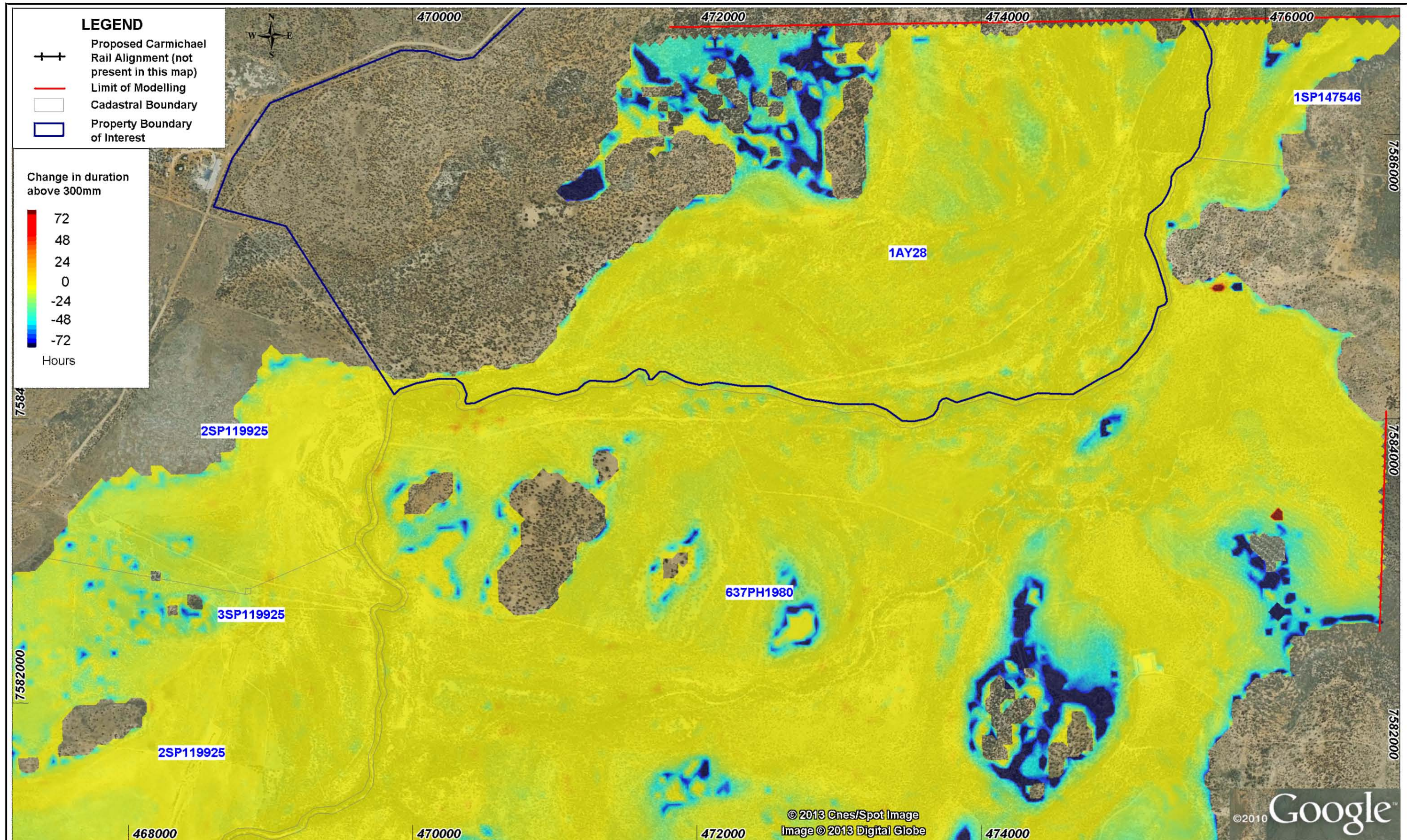
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**Carmichael Coal Mine & Rail Project**  
**Belyando Creek Property Map 1AY28**  
**(FIGURE 5.1.1AY28 : Q100 Duration Afflux Map)**

Project No: 301001-01788 Figure: 5.1.1AY28 Rev: 0





DATA SOURCES:  
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK | ENG | APPD |
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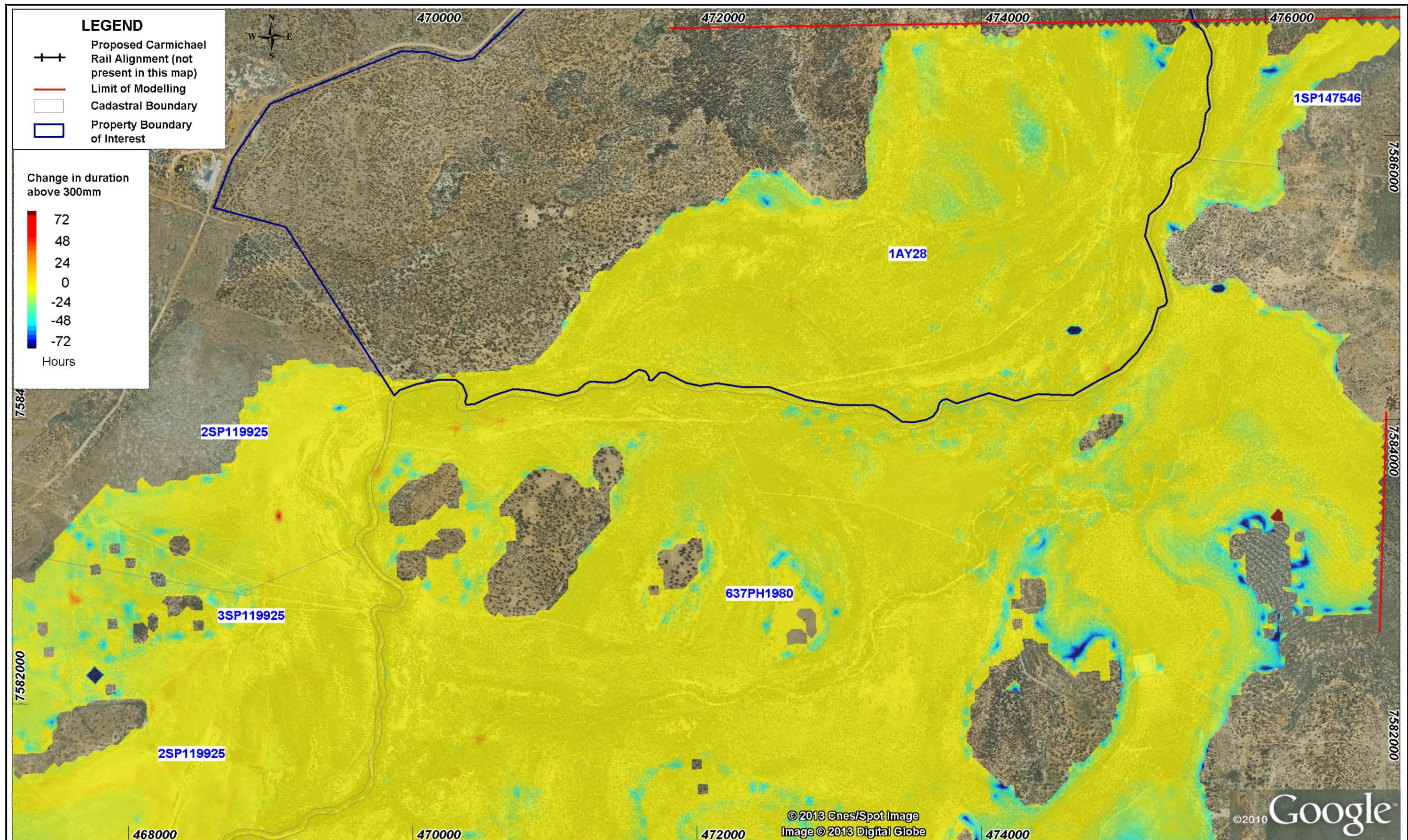
**Carmichael Coal Mine & Rail Project  
Belyando Creek Property Map 1AY28  
(FIGURE 5.2.1AY28 : Q50 Duration Afflux Map)**

Project No: 301001-01788

Figure: 5.2.1AY28

Rev: 0





DATA SOURCES:  
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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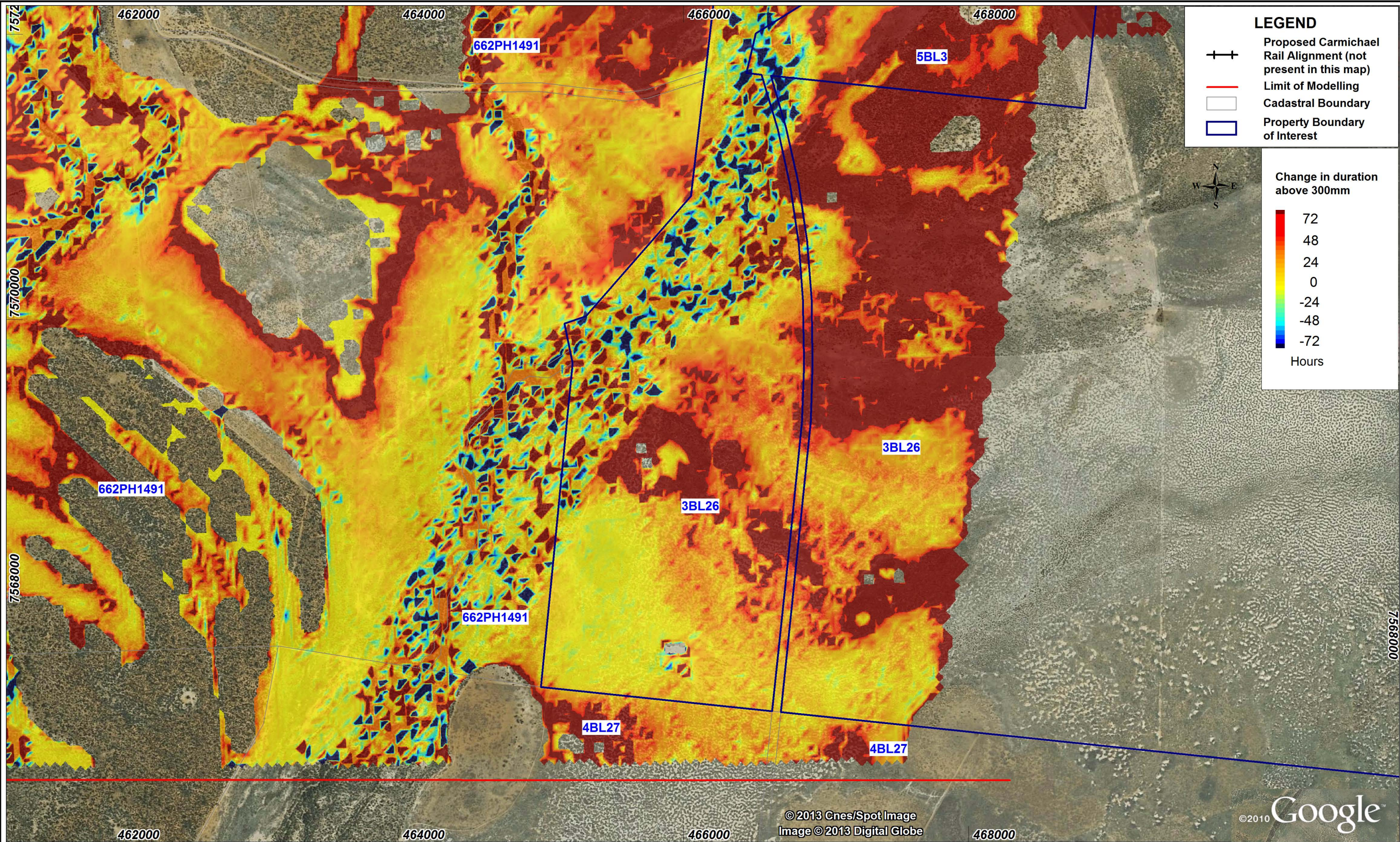
**Carmichael Coal Mine & Rail Project  
Belyando Creek Property Map 1AY28  
(FIGURE 5.3.1AY28 : Q20 Duration Afflux Map)**

Project No: 301001-01788

Figure: 5.3.1AY128

Rev: 0





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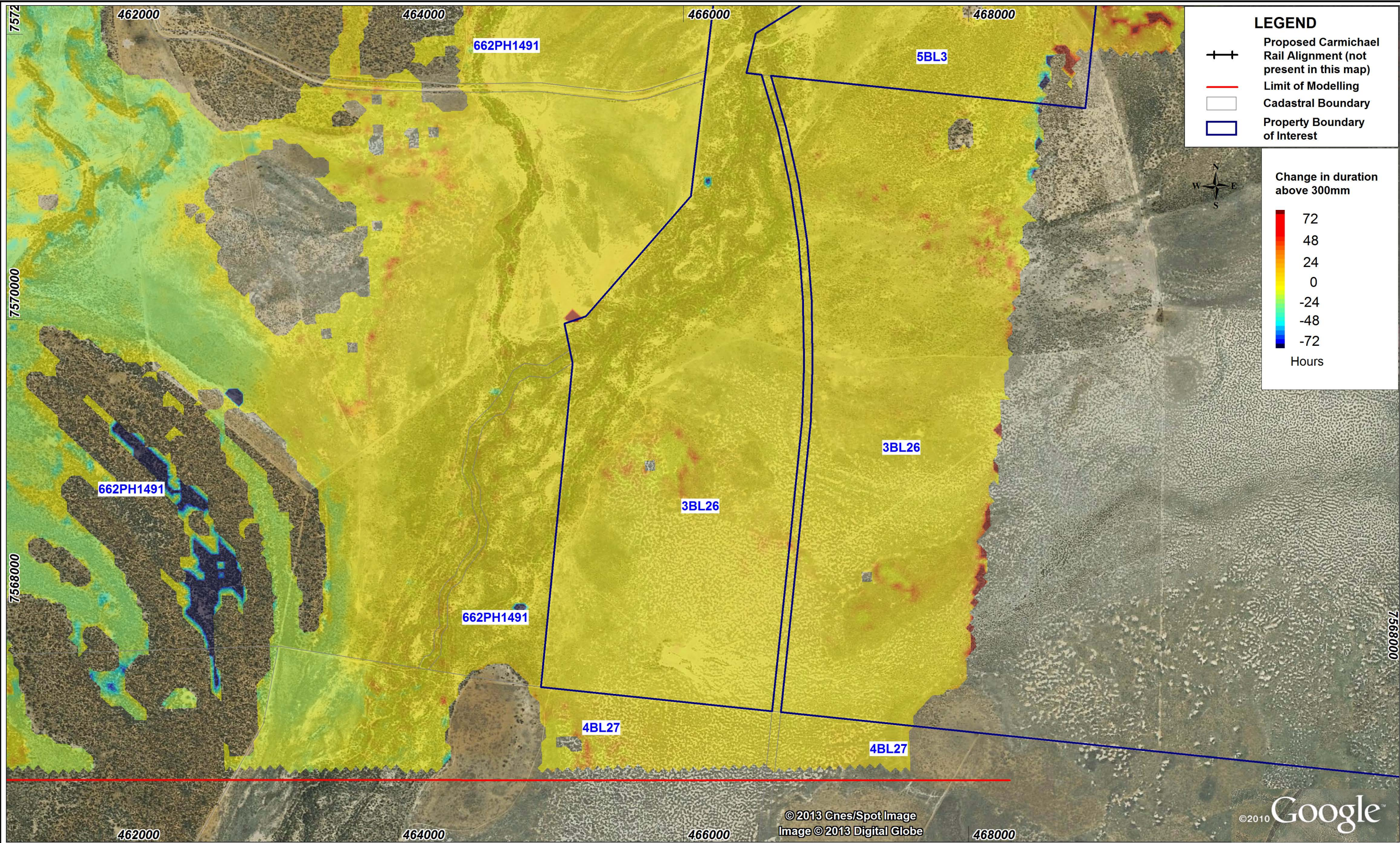
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|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------|
|  <b>Adani Mining Pty Ltd</b>                                  |                   |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>Belyando Creek Property Map 3BL26</b><br><b>(FIGURE 5.1.3BL26 : Q100 Duration Afflux Map)</b> |                   |        |
| Project No: 301001-01788                                                                                                                           | Figure: 5.1.3BL26 | Rev: 0 |





DATA SOURCES:  
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

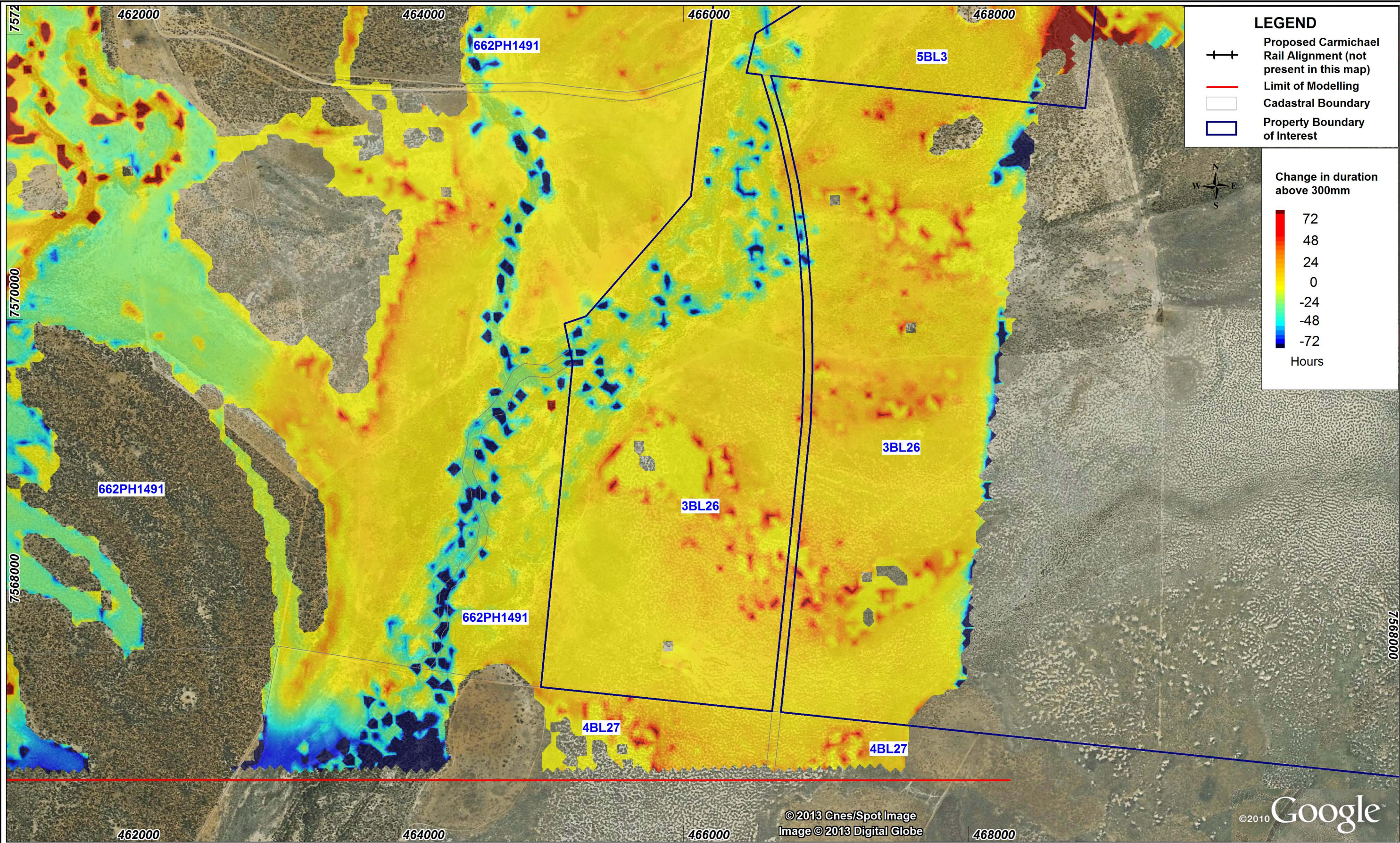
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|  <b>Adani Mining Pty Ltd</b>                     |                   |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Belyando Creek Property Map 3BL26<br/>(FIGURE 5.2.3BL26 : Q50 Duration Afflux Map)</b> |                   |        |
| Project No: 301001-01788                                                                                                              | Figure: 5.2.3BL26 | Rev: 0 |





DATA SOURCES:  
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

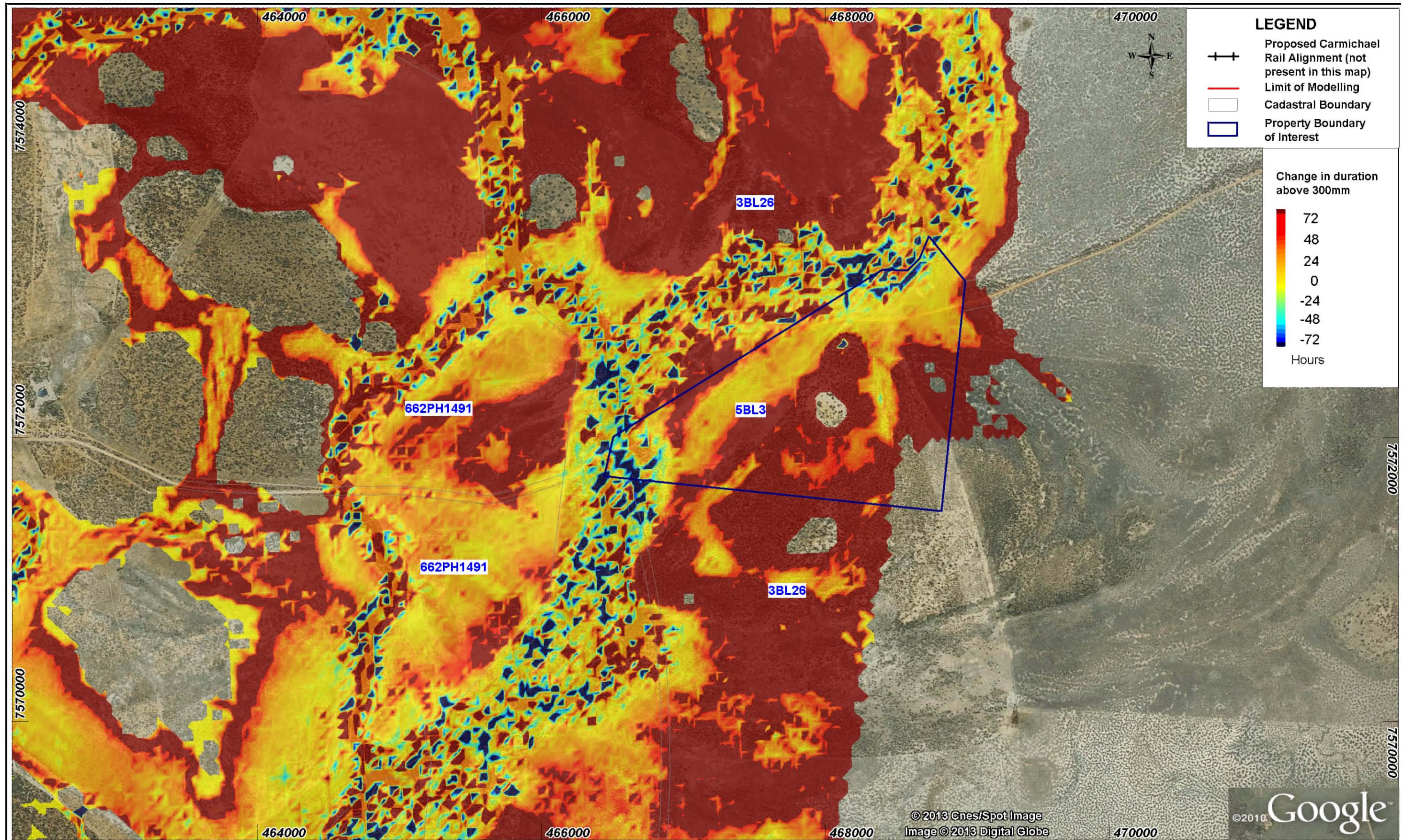
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|  <b>Adani Mining Pty Ltd</b>                     |                   |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Belyando Creek Property Map 3BL26<br/>(FIGURE 5.3.3BL26 : Q20 Duration Afflux Map)</b> |                   |        |
| Project No: 301001-01788                                                                                                              | Figure: 5.3.3BL26 | Rev: 0 |





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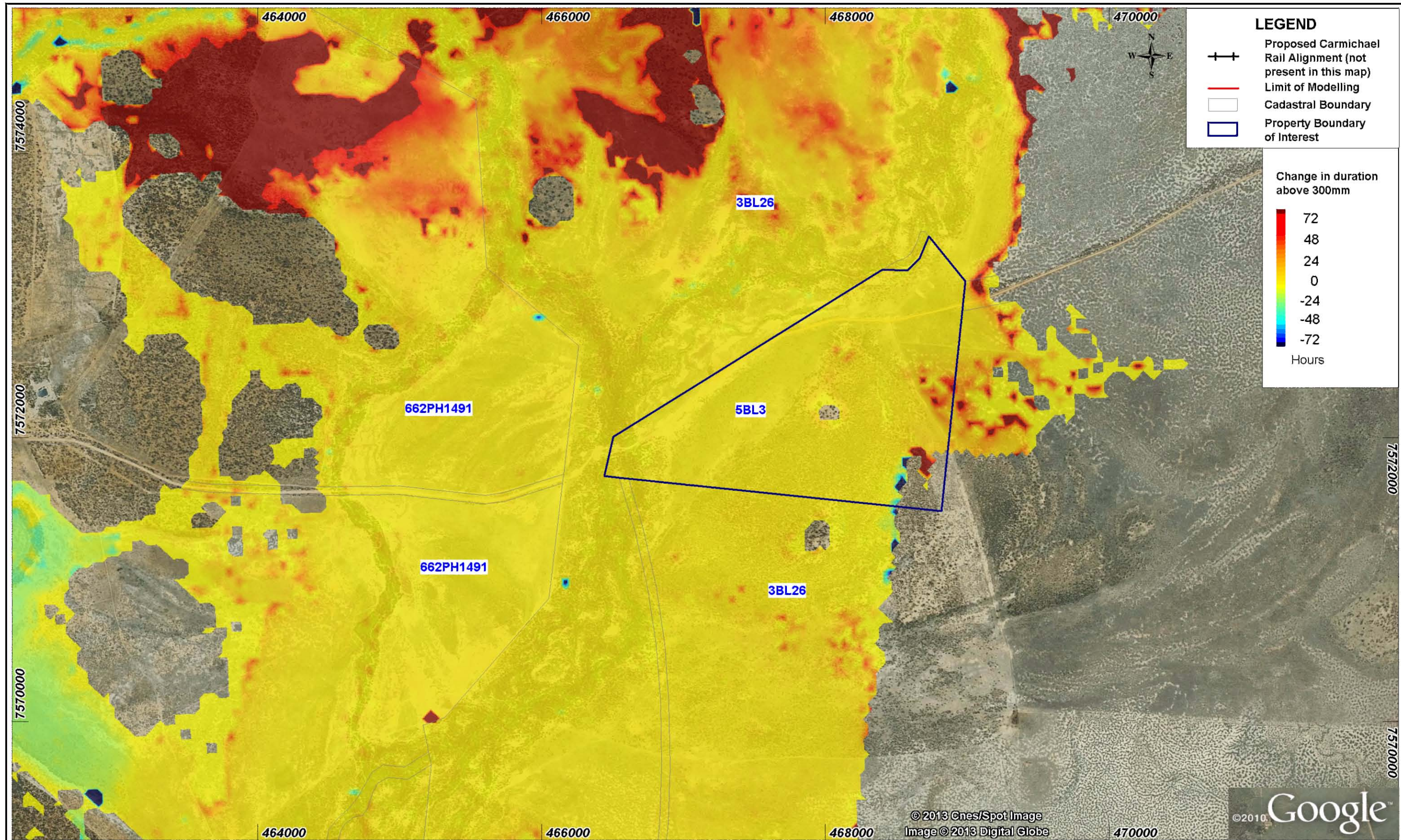
**Carmichael Coal Mine & Rail Project**  
**Belyando Creek Property Map 5BL23**  
**(FIGURE 5.1.5BL23 : Q100 Duration Afflux Map)**

Project No: 301001-01788

Figure: 5.1.5BL23

Rev: 0





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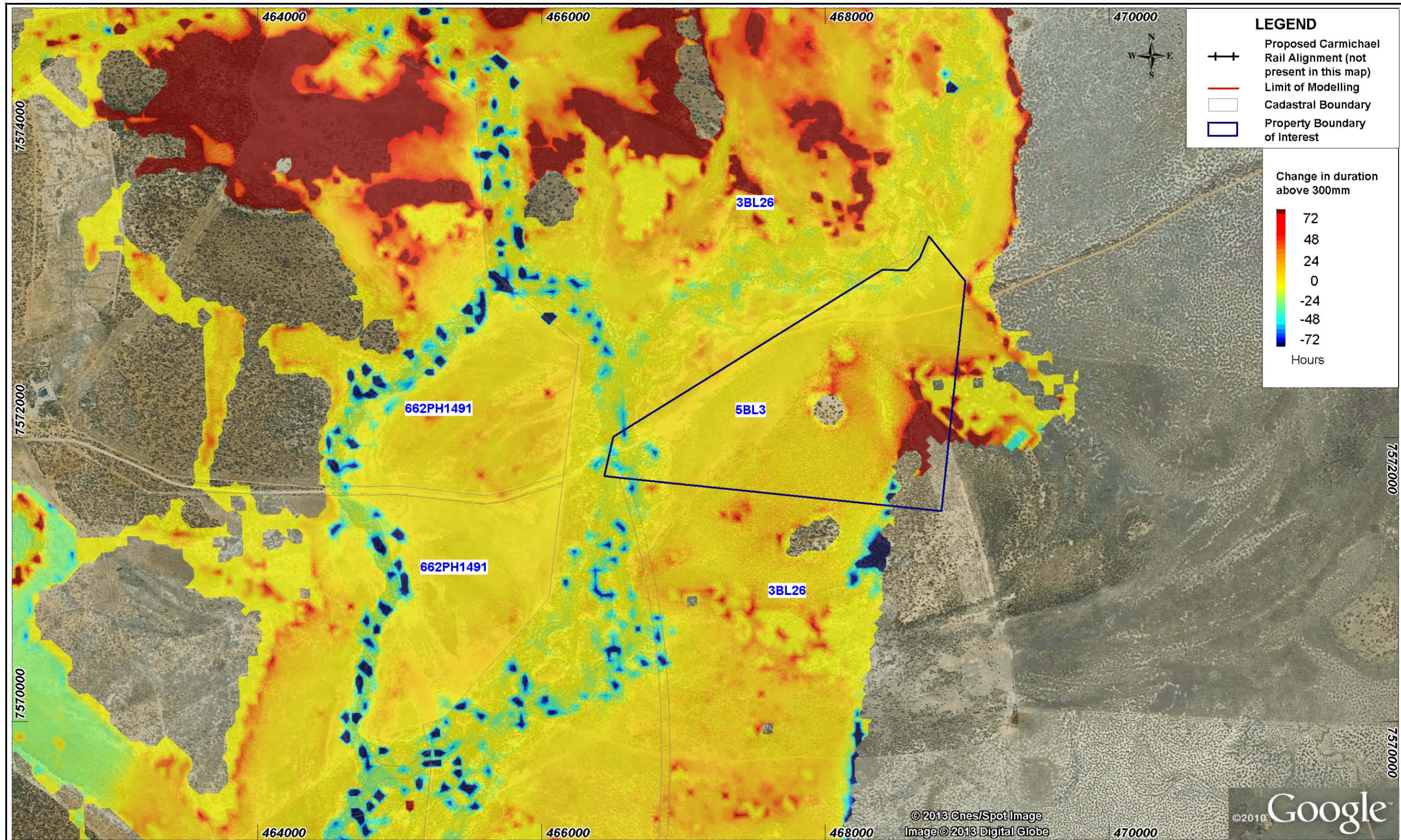
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**Carmichael Coal Mine & Rail Project**  
**Belyando Creek Property Map 5BL23**  
**(FIGURE 5.2.5BL23 : Q50 Duration Afflux Map)**

Project No: 301001-01788 Figure: 5.2.5BL23 Rev: 0





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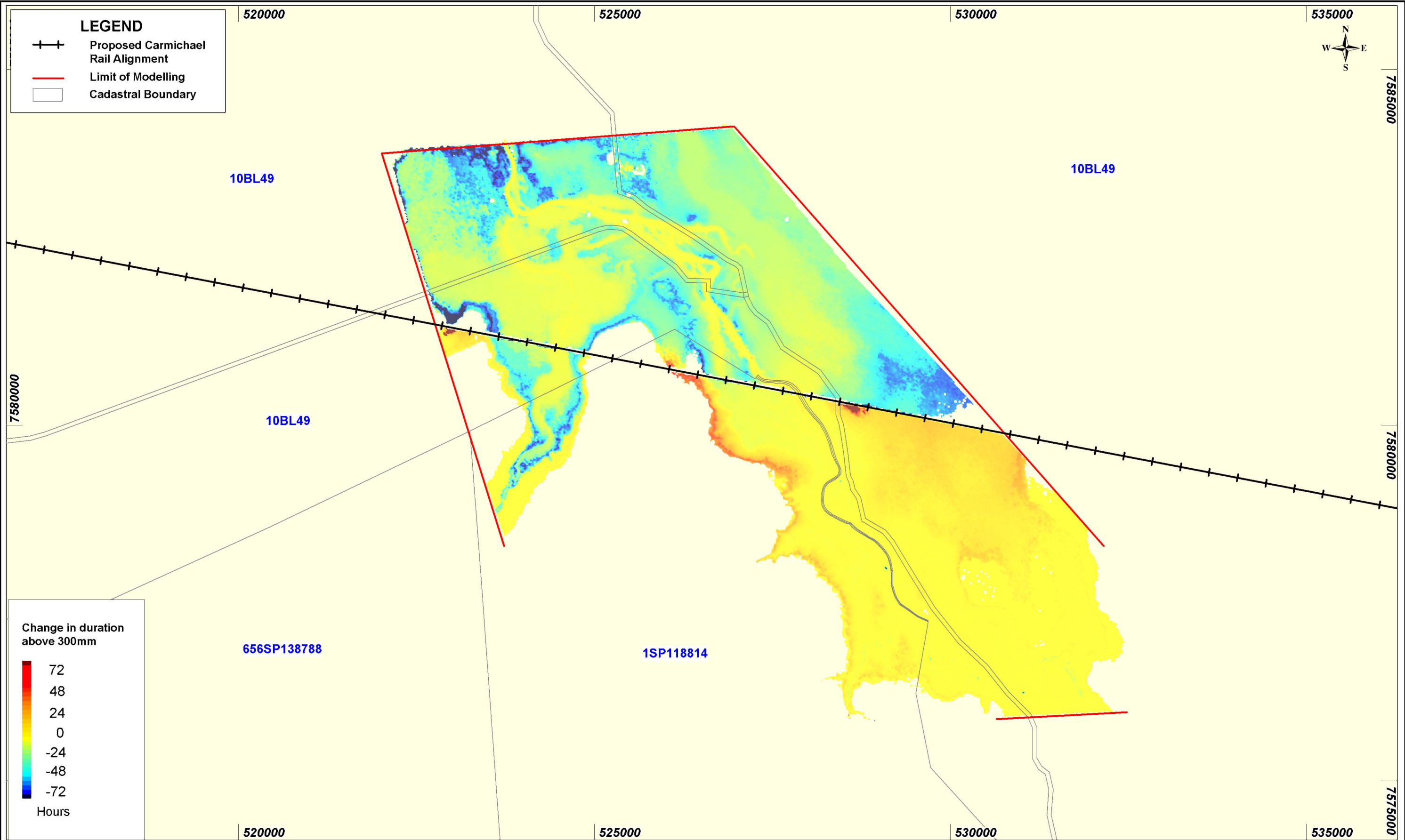
**Carmichael Coal Mine & Rail Project**  
**Belyando Creek Property Map 5BL23**  
**(FIGURE 5.3.5BL23 : Q20 Duration Afflux Map)**

Project No: 301001-01788

Figure: 5.3.5BL23

Rev: 0





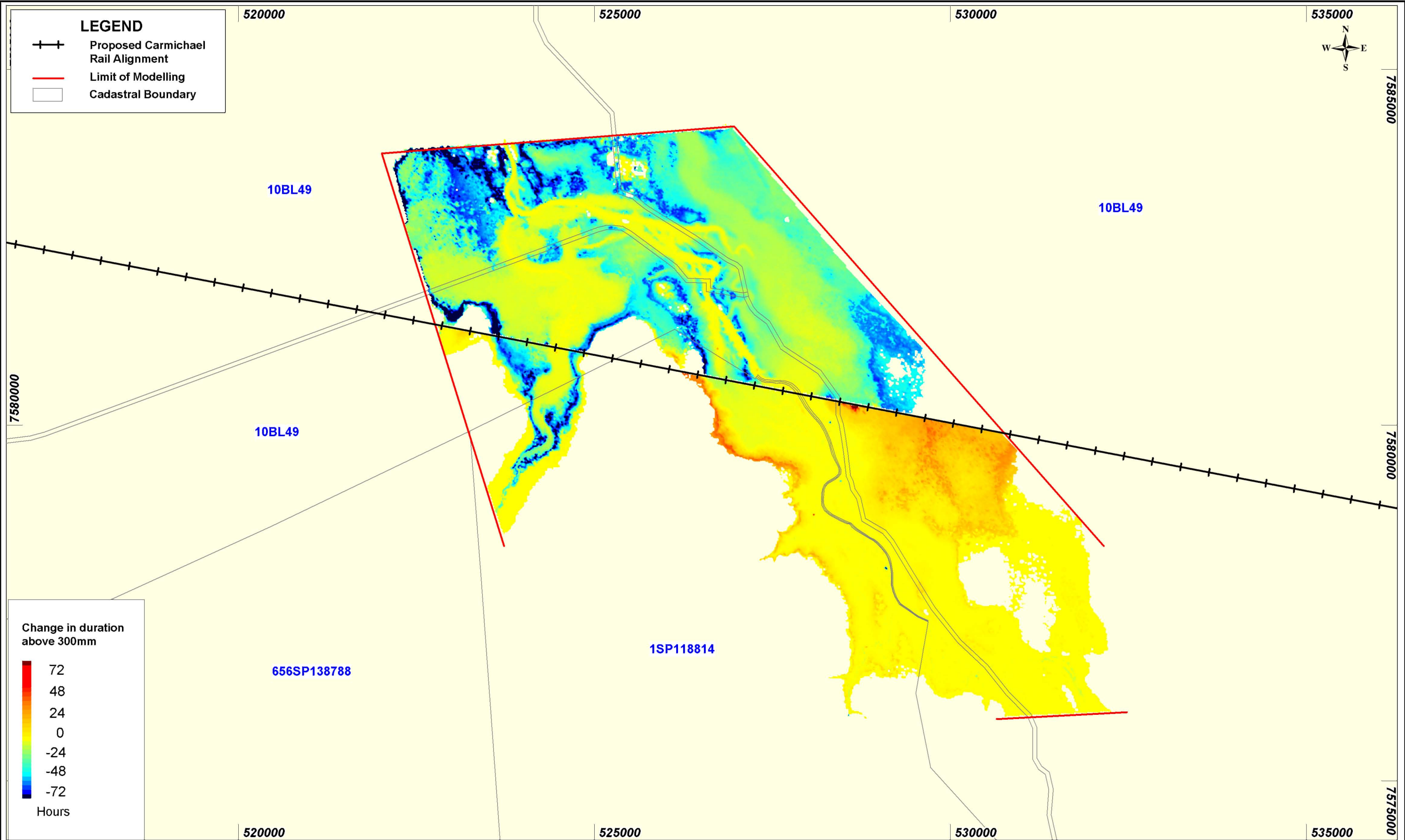
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Map Grid of Australia - Zone 55  
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|                                       | <b>Adani Mining Pty Ltd</b> |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Logan Creek Catchment Map<br/>(FIGURE 6.1.0 : Q100 Duration Afflux Map)</b> |                             |
| Project No: 301001-01788                                                                                                   | Figure: 6.1.0               |
| Rev: 0                                                                                                                     |                             |





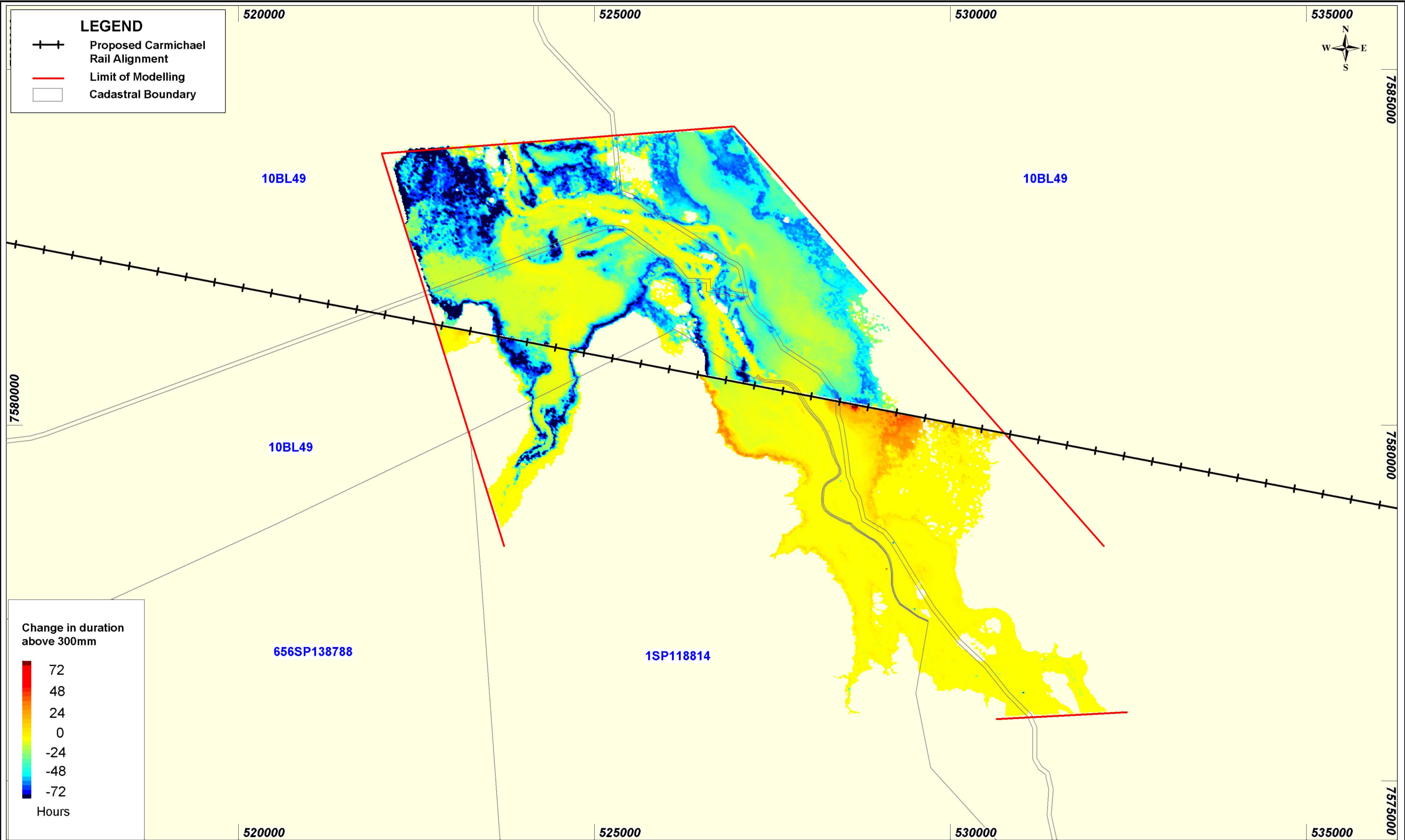
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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK | ENG | APPD |
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|---------------------------------------------------------------------------------------------------------------------------|---------------|--------|
|  <b>Adani Mining Pty Ltd</b>         |               |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Logan Creek Catchment Map<br/>(FIGURE 6.2.0 : Q50 Duration Afflux Map)</b> |               |        |
| Project No: 301001-01788                                                                                                  | Figure: 6.2.0 | Rev: 0 |





DATA SOURCES:  
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Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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Geocentric Datum of Australia 1994

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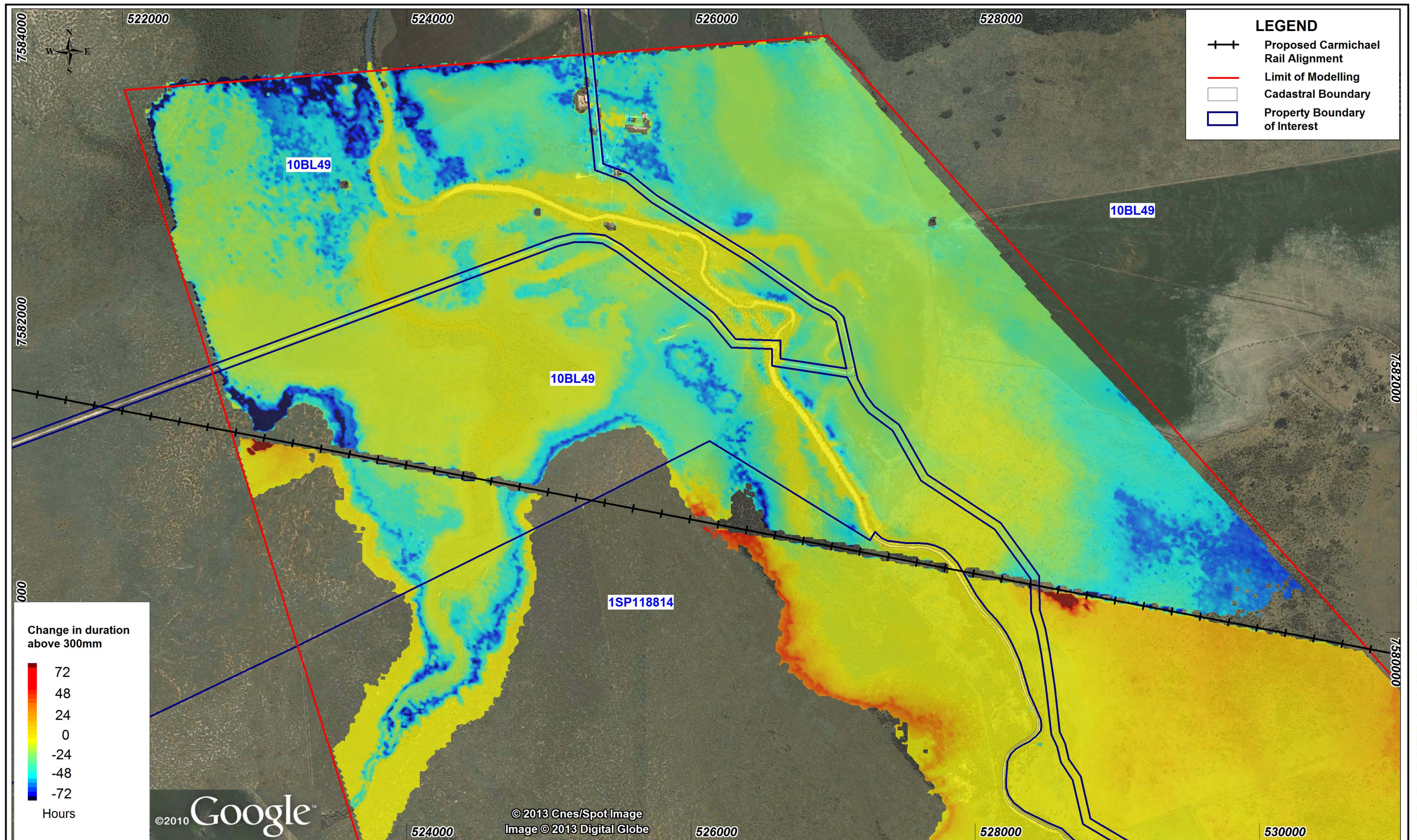
**Carmichael Coal Mine & Rail Project  
Logan Creek Catchment Map  
(FIGURE 6.3.0 : Q20 Duration Afflux Map)**

Project No: 301001-01788

Figure: 6.3.0

Rev: 0





DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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SCALE - 1:25,000 (at A3)

Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK | ENG | APPD |
|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

**adani** **Adani Mining Pty Ltd**

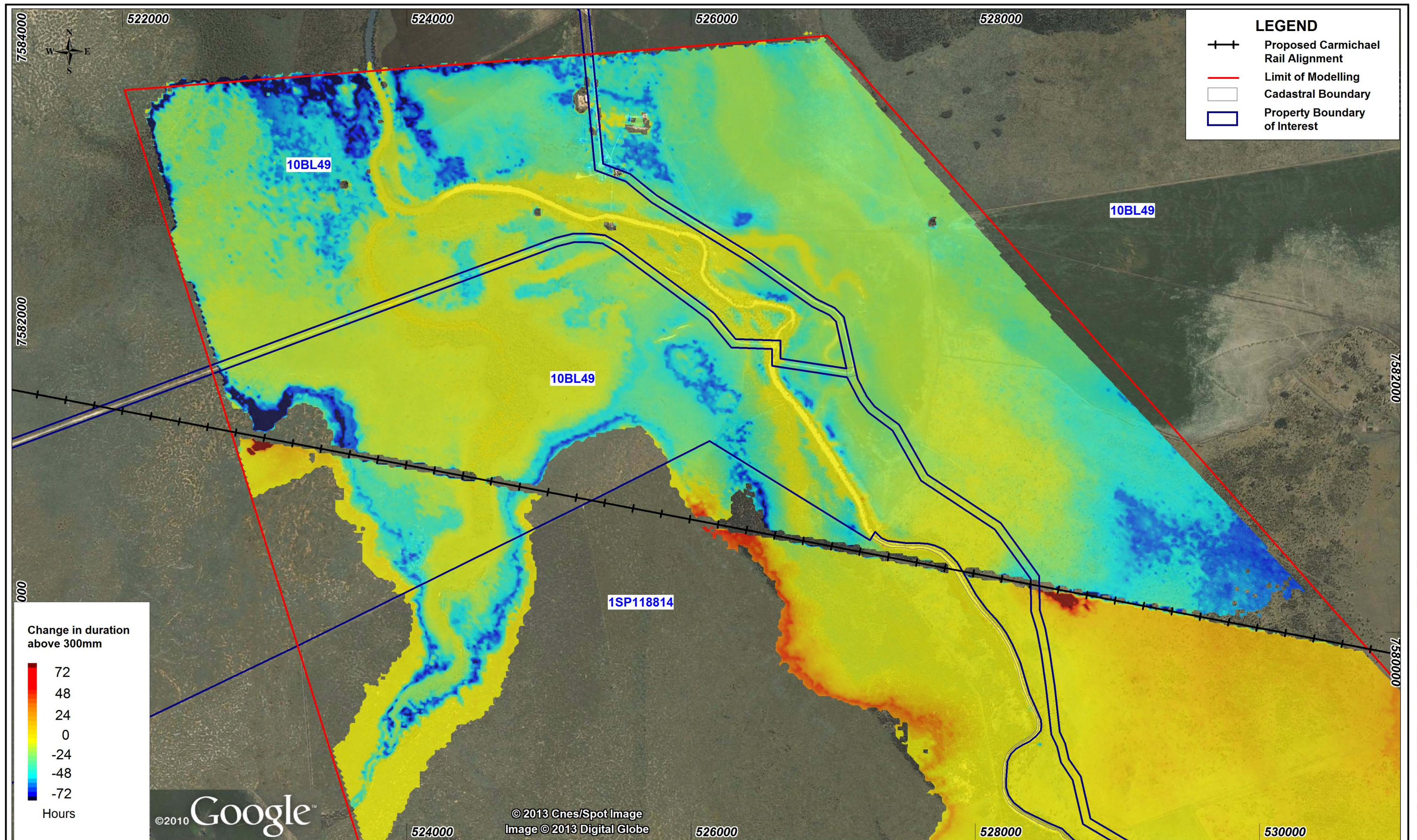
**Carmichael Coal Mine & Rail Project**  
**Logan Creek Property Map 10BL49**  
**(FIGURE 6.1.10BL49 : Q100 Duration Afflux Map)**

Project No: 301001-01788

Figure: 6.1.10BL49

Rev: A





DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK | ENG | APPD |
|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

**adani** **Adani Mining Pty Ltd**

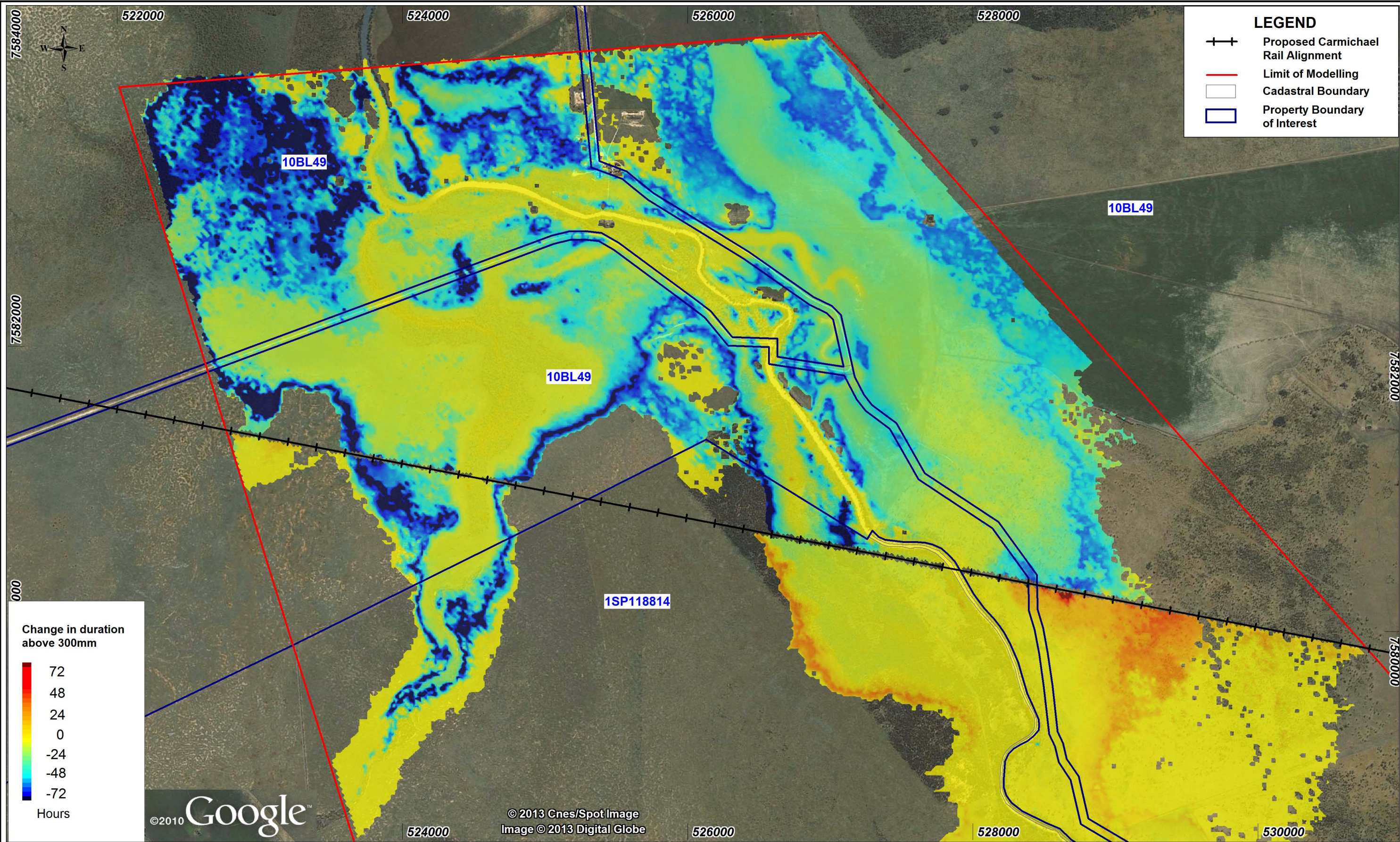
**Carmichael Coal Mine & Rail Project**  
**Logan Creek Property Map 10BL49**  
**(FIGURE 6.2.10BL49 : Q50 Duration Afflux Map)**

Project No: 301001-01788

Figure: 6.2.10BL49

Rev: 0





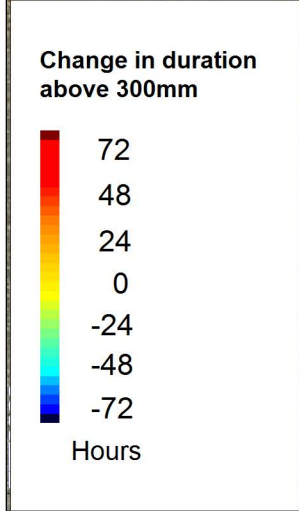
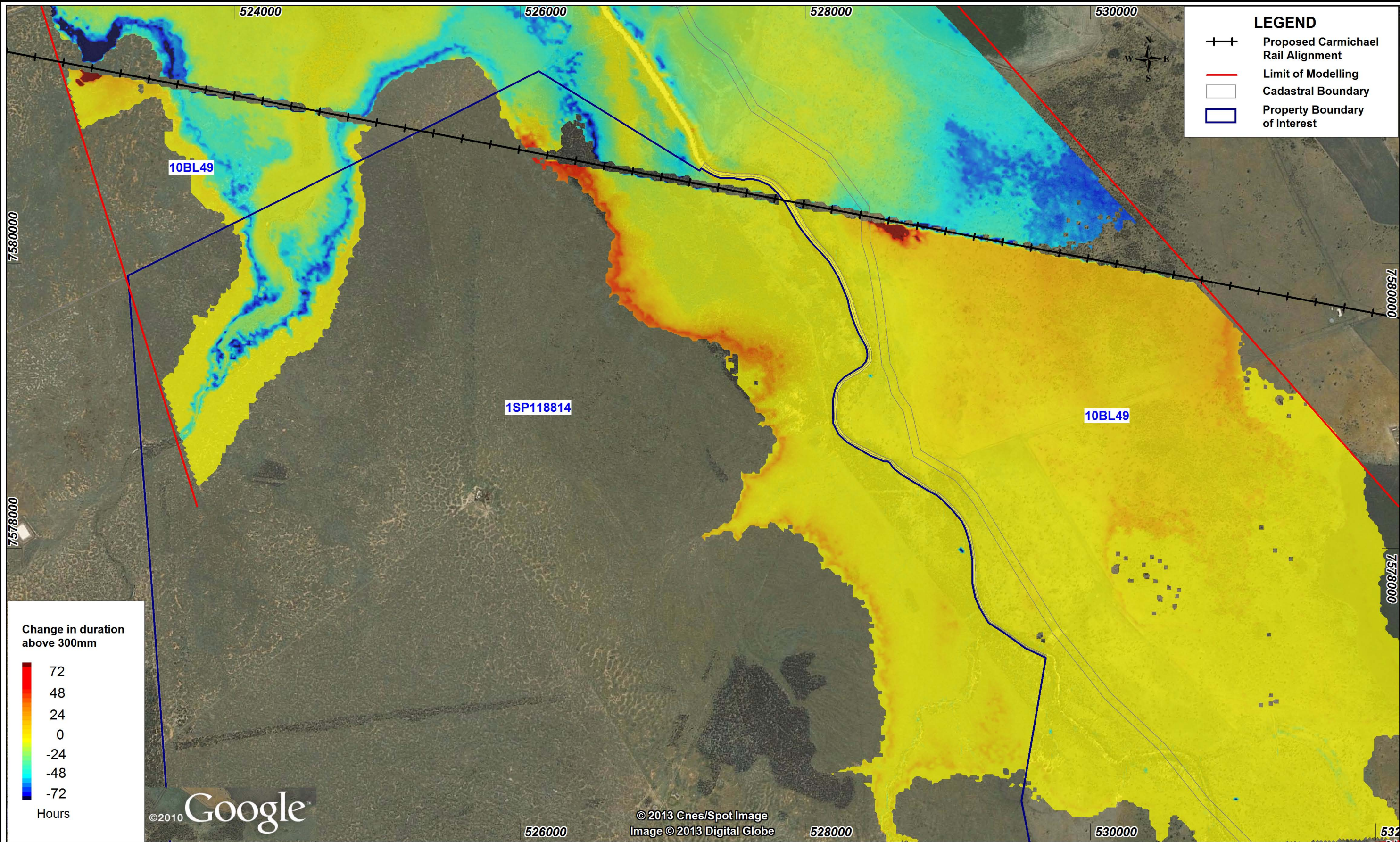
DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK | ENG | APPD |
|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

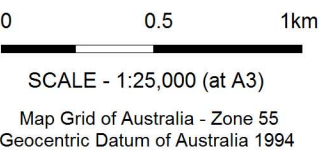
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|  <b>Adani Mining Pty Ltd</b>                    |                    |        |
| <b>Carmichael Coal Mine &amp; Rail Project<br/>Logan Creek Property Map 10BL49<br/>(FIGURE 6.3.10BL49 : Q20 Duration Afflux Map)</b> |                    |        |
| Project No: 301001-01788                                                                                                             | Figure: 6.3.10BL49 | Rev: 0 |





DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

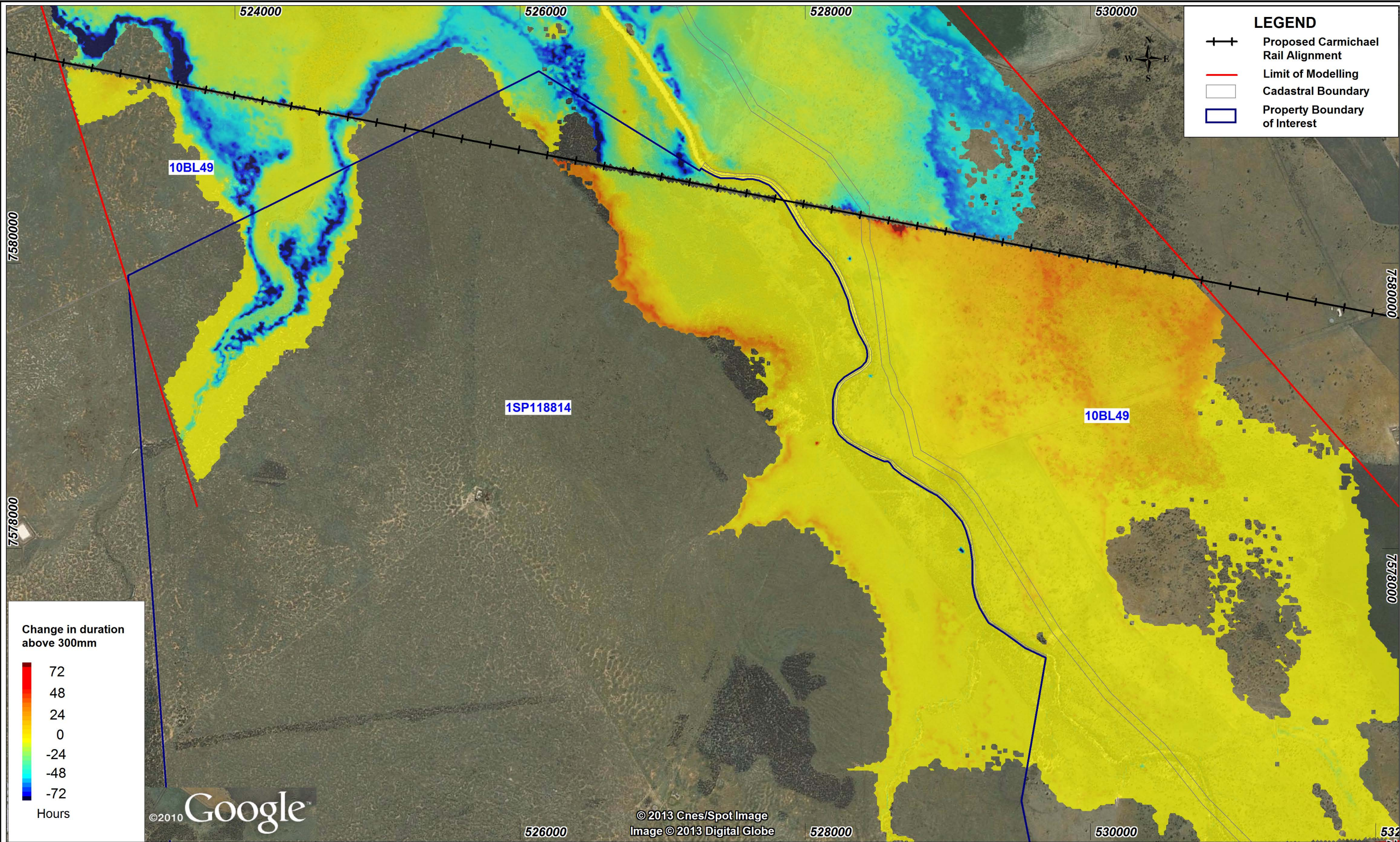
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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK | ENG | APPD |
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|  <b>Adani Mining Pty Ltd</b>                                       |                       |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>Logan Creek Property Map 1SP118814</b><br><b>(FIGURE 6.1.1SP118814 : Q100 Duration Afflux Map)</b> |                       |        |
| Project No: 301001-01788                                                                                                                                | Figure: 6.1.1SP118814 | Rev: 0 |





DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

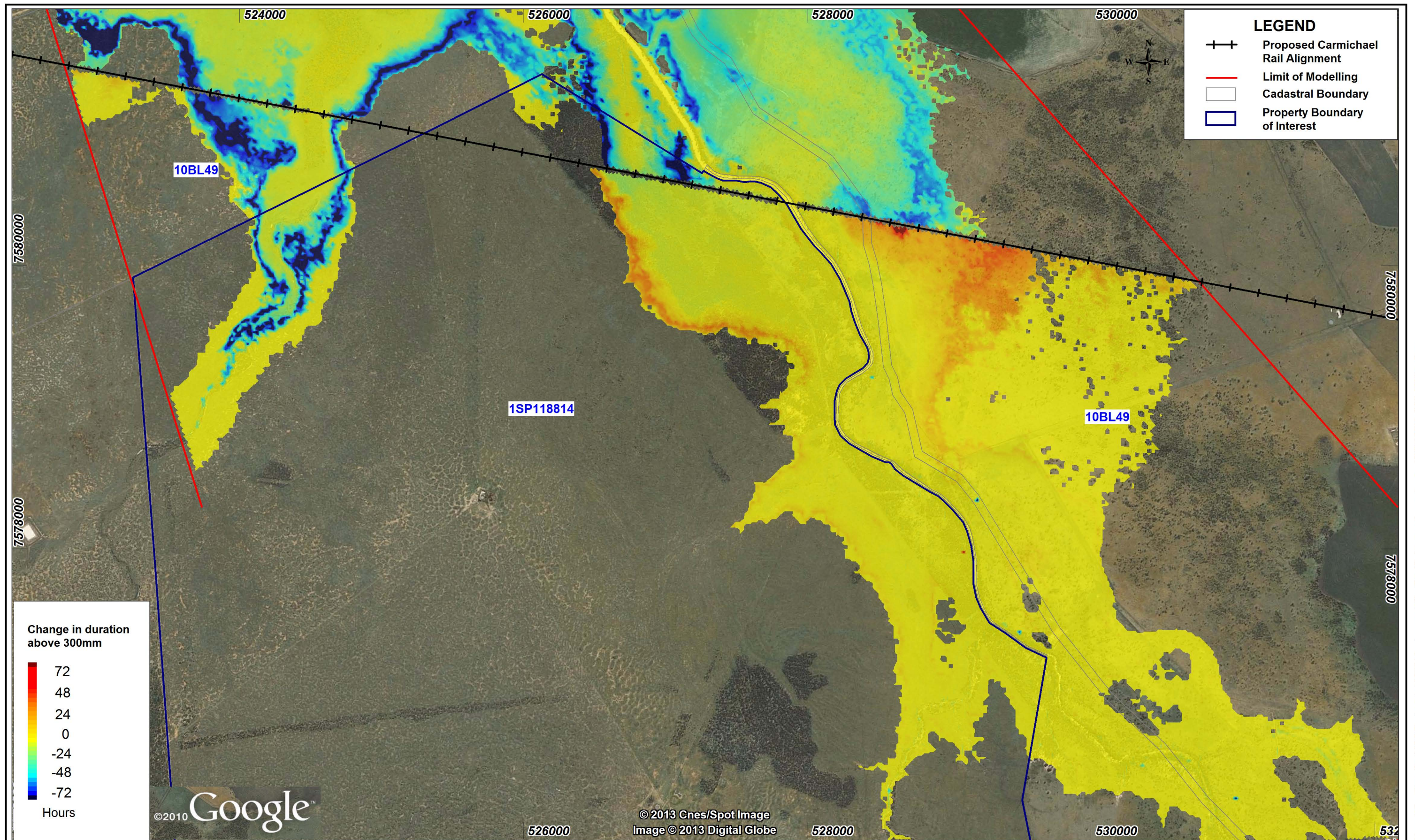
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SCALE - 1:25,000 (at A3)  
Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK | ENG | APPD |
|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

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|  <b>Adani Mining Pty Ltd</b>                                      |                       |        |
| <b>Carmichael Coal Mine &amp; Rail Project</b><br><b>Logan Creek Property Map 1SP118814</b><br><b>(FIGURE 6.2.1SP118814 : Q50 Duration Afflux Map)</b> |                       |        |
| Project No: 301001-01788                                                                                                                               | Figure: 6.2.1SP118814 | Rev: 0 |





DATA SOURCES:  
Cadastral: Client supplied data  
Duration data: Created from client supplied modelling results  
Proposed Rail Alignment: Client supplied data

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SCALE - 1:25,000 (at A3)

Map Grid of Australia - Zone 55  
Geocentric Datum of Australia 1994

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| Rev                                                                                                                              | Date        | Revision Description | PMD                                                                                                                                         | ER | DB | CHK | ENG | APPD |
|  <b>WorleyParsons</b><br>resources & energy |             |                      |  <b>aarvee associates</b><br>Aarvee Associates Pty Ltd |    |    |     |     |      |

**adani** **Adani Mining Pty Ltd**

**Carmichael Coal Mine & Rail Project**  
**Logan Creek Property Map 1SP118814**  
**(FIGURE 6.3.1SP118814 : Q20 Duration Afflux Map)**

Project No: 301001-01788 Figure: 6.3.1SP118814 Rev: 0





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AARVEE

CARMICHAEL COAL LINE AND RAIL PROJECT

RAIL INUNDATION MAPPING

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## Appendix 2      Property Information Sheets





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## PROPERTY INFORMATION

|                               |                                                                       |
|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Mistake Creek                                                         |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 4SP116046                                                             |
| <b>MAP REFERENCE</b>          | 1.1.4SP116046<br>1.2.4SP116046<br>1.3.4SP116046                       |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

- Typically a reduction in the duration of flooding is predicted across the flooded section of the property, with isolated areas of decreases in duration up to and over 72 hours.
- In some areas (predominately through the waterway corridor) minor increases are predicted.

This information represents the most current flooding information held by ADANI at the time the information was created.





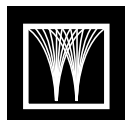
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Further information on assessment approach and qualifications of the assessment are provided in Carmichael Coal Line and Rail Project - Rail Inundation Mapping, WorleyParsons, December, 2013.





|                               |                                                                       |
|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Mistake Creek, Belyando River                                         |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 1SP147546                                                             |
| <b>MAP REFERENCE</b>          | 1.1.1SP147546<br>1.2.1SP147546<br>1.3.1SP147546                       |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

#### Mistake Creek

- A reduction in the duration of flooding is predicted on the floodplain, with some isolated of decreases in duration up to and over 72 hours.
- Through the waterway corridor increases in inundation are predicted of approximately 12 hours.

#### Belyando River





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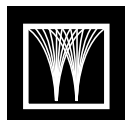
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- Generally, decreases in inundation are predicted with some isolated areas over 72 hours decrease.

This information represents the most current flooding information held by ADANI at the time the information was created.

Further information on assessment approach and qualifications of the assessment are provided in Carmichael Coal Line and Rail Project - Rail Inundation Mapping, WorleyParsons, December, 2013.





|                               |                                                                       |
|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Mistake Creek, Belyando River                                         |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 637PH1980                                                             |
| <b>MAP REFERENCE</b>          | 1.1.637PH1980<br>1.2.637PH1980<br>1.3.637PH1980                       |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

#### Mistake Creek

- Typically there are only minor changes to the duration of inundation predicted across the floodplain within this property.
- A reduction in the duration of flooding is predicted within the waterway, of approximately 20 hours.
- Isolated areas of increases of inundation are predicted by up to 30 hours, with a small area to the north of the property predicted to experience increase greater than 50 hours.





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## Belyando River

- Generally, minimal change is predicted in duration of flooding, some decreases are predicted with isolated pockets of change up to and over 72 hours decrease.

This information represents the most current flooding information held by ADANI at the time the information was created.

Further information on assessment approach and qualifications of the assessment are provided in Carmichael Coal Line and Rail Project - Rail Inundation Mapping, WorleyParsons, December, 2013.





|                               |                                                                       |
|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Mistake Creek                                                         |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 3235PH752                                                             |
| <b>MAP REFERENCE</b>          | 1.1.3235PH752<br>1.2.3235PH752<br>1.3.3235PH752                       |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

- Typically there are only minor changes to the duration of inundation predicted across the floodplain within this property.
- Isolated areas of increases of inundation are predicted by up to 12 hours. Some isolated areas of increase are predicted over 72 hours within the waterway corridor.

This information represents the most current flooding information held by ADANI at the time the information was created.





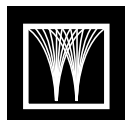
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Further information on assessment approach and qualifications of the assessment are provided in Carmichael Coal Line and Rail Project - Rail Inundation Mapping, WorleyParsons, December, 2013.





|                               |                                                                       |
|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Grosvenor Creek                                                       |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 5305SP240414                                                          |
| <b>MAP REFERENCE</b>          | 2.1.5305SP240414<br>2.2.5305SP240414<br>2.3.5305SP240414              |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

- There are only minimal changes predicted to the duration of inundation across the floodplain within this property.

This information represents the most current flooding information held by ADANI at the time the information was created.

Further information on assessment approach and qualifications of the assessment are provided in Carmichael Coal Line and Rail Project - Rail Inundation Mapping, WorleyParsons, December, 2013.





|                               |                                                                       |
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| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Grosvenor Creek                                                       |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 2GV248                                                                |
| <b>MAP REFERENCE</b>          | 2.1.2GV248<br>2.2.2GV248<br>2.3.2GV248                                |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

- There are only minor changes predicted to the duration of inundation across the floodplain within this property.

This information represents the most current flooding information held by ADANI at the time the information was created.

Further information on assessment approach and qualifications of the assessment are provided in Carmichael Coal Line and Rail Project - Rail Inundation Mapping, WorleyParsons, December, 2013.





|                               |                                                                       |
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| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Diamond Creek                                                         |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 6SP125740                                                             |
| <b>MAP REFERENCE</b>          | 3.1.6SP125740<br>3.2.6SP125740<br>3.3.6SP125740                       |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

- Immediately upstream of the proposed rail alignment increases are predicted up to 55 hours.
- A reduction in the duration of flooding is predicted downstream of the rail alignment, of approximately 10 hours.
- Isolated areas of decreases of inundation are predicted by up to 50 hours, immediately downstream of the rail alignment.

This information represents the most current flooding information held by ADANI at the time the information was created.





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Further information on assessment approach and qualifications of the assessment are provided in Carmichael Coal Line and Rail Project - Rail Inundation Mapping, WorleyParsons, December, 2013.





|                               |                                                                       |
|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | North Creek, Belyando River                                           |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 662PH1491                                                             |
| <b>MAP REFERENCE</b>          | 4.1.662PH1491<br>4.2.662PH1491<br>4.3.662PH1491                       |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

#### North Creek

- On the Northern side of the rail alignment, changes to duration of flooding are typically predicted to be minor. Immediately upstream of the proposed rail alignment some increases are predicted up to and over 72 hours.
- A reduction in the duration of flooding is predicted on the southern side of the rail alignment. Isolated areas of reductions over 72 hours are predicted immediately downstream of the alignment.





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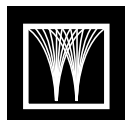
Belyando River

- Generally, decreases in inundation are predicted of up to 24 hours.

This information represents the most current flooding information held by ADANI at the time the information was created.

Further information on assessment approach and qualifications of the assessment are provided in Carmichael Coal Line and Rail Project - Rail Inundation Mapping, WorleyParsons, December, 2013.





|                               |                                                                       |
|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Belyando River                                                        |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 2SP119925                                                             |
| <b>MAP REFERENCE</b>          | 5.1.2SP119925<br>5.2.2SP119925<br>5.3.2SP119925                       |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

- Generally, minimal change is predicted with minor decreases through the waterway corridor.

This information represents the most current flooding information held by ADANI at the time the information was created.

Further information on assessment approach and qualifications of the assessment are provided in Carmichael Coal Line and Rail Project - Rail Inundation Mapping, WorleyParsons, December, 2013.





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|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Belyando River                                                        |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 1AY28                                                                 |
| <b>MAP REFERENCE</b>          | 5.1.1AY28<br>5.2.1AY28<br>5.3.1AY28                                   |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

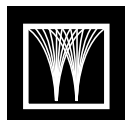
Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

- Generally, minimal change is predicted across the property with isolated areas of decreases.

This information represents the most current flooding information held by ADANI at the time the information was created.

Further information on assessment approach and qualifications of the assessment are provided in Carmichael Coal Line and Rail Project - Rail Inundation Mapping, WorleyParsons, December, 2013.





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|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Belyando River                                                        |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 3BL26                                                                 |
| <b>MAP REFERENCE</b>          | 5.1.3BL26<br>5.2.3BL26<br>5.3.3BL26                                   |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

- Generally, increases in inundation are predicted of up to and over 72 hours upstream of the proposed alignment.
- Immediately downstream of the rail alignment decreases are predicted up to and over 72 hours.

This information represents the most current flooding information held by ADANI at the time the information was created.





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|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Belyando River                                                        |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 5BL3                                                                  |
| <b>MAP REFERENCE</b>          | 5.1.5BL3<br>5.2.5BL3<br>5.3.5BL3                                      |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

- Generally, minimal change in duration of inundation is predicted across the property.

This information represents the most current flooding information held by ADANI at the time the information was created.

Further information on assessment approach and qualifications of the assessment are provided in Carmichael Coal Line and Rail Project - Rail Inundation Mapping, WorleyParsons, December, 2013.





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|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Logan Creek                                                           |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 10BL49                                                                |
| <b>MAP REFERENCE</b>          | 6.1.10BL49<br>6.2.10BL49<br>6.3.10BL49                                |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

- Upstream of the rail alignment, increases in the duration of flooding are typically predicted. Within the waterway minor decreases are predicted. Immediately upstream of the proposed rail alignment isolated increases are predicted up to and over 72 hours.
- A reduction in the duration of flooding is predicted on the downstream side of the rail alignment. Isolated areas of reductions over 65 hours are predicted. Minor decreases in the duration of inundation are predicted within the waterway

This information represents the most current flooding information held by ADANI at the time the information was created.





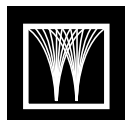
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|-------------------------------|-----------------------------------------------------------------------|
| <b>DATE</b>                   | 18 December 2013                                                      |
| <b>INVESTIGATION</b>          | Carmichael Rail Inundation Mapping                                    |
| <b>BASIS OF DATA</b>          | Hydraulic Modelling for the Carmichael Coal Mine and Rail Project EIS |
| <b>WATERWAY</b>               | Logan Creek                                                           |
| <b>PROPERTY<br/>(LOTPLAN)</b> | 1SP118814                                                             |
| <b>MAP REFERENCE</b>          | 6.1.1SP118814<br>6.2.1SP118814<br>6.3.1SP118814                       |

The maps provided present the computer modeled differences in duration of flooding, greater than 300mm deep between the existing conditions and following construction of the proposed Carmichael Rail Alignment. The three maps each represent a different flood event; the 20 years, 50 years and 100 years Average Recurrence Interval (ARI).

The difference in duration is presented in hours on the maps as different colours. Each colour range corresponds to a different number of hours of duration as follows:

- Areas shaded yellow represent the areas with the smallest amount of change (in duration of flooding between the existing conditions and after the inclusion of the rail alignment).
- Orange shades through to red represent areas where the inclusion of the rail alignment is predicted to increase the amount of time flooding occurs in that area.
- Shades of light green through to blue represent areas where the rail is predicted to reduce the hours of flooding in that area.
- Areas where the change in duration is greater than 72 hours are presented as dark red. Areas where the change in duration is reduced by more than 72 hours are presented as dark blue.

The legend on each map provides the colour shading and corresponding hours.

Specifically for this property the following summary is provided, based on the attached maps for the 50 years ARI flood event:

- Upstream of the rail alignment, minimal increases in the duration of flooding are typically predicted.
- A reduction in the duration of flooding is predicted on the downstream side of the rail alignment. Isolated areas of reductions over 72 hours are predicted.

This information represents the most current flooding information held by ADANI at the time the information was created.





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