Macraes Phase 4 Project

Integrated Transport Assessment

Prepared for:
OceanaGold

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1 Introduction

OceanaGold (New Zealand) Limited ("**OGNZL**") currently undertakes open pit and underground gold mining operations at the Macraes Operation located at Golden Point Road, Macraes Flat, East Otago. As part of their ongoing operations, OGNZL continually reviews the remaining life of the Macraes Operation in light of updated knowledge of the gold resource and the economics of mining.

Reflecting recent exploration success and optimisation work, together with higher gold prices, the Macraes Phase Four Project ("**MP4**" or "**the Project**") seeks to extend the life of mining at the Macraes Operation until at least 2039. The Project, which will enable ongoing gold production at a rate of approximately 130,000 ounces per annum, is identified as a Listed Project in Schedule 2 of the Fast-Track Approvals Act 2024 ("**FTAA**") as a project providing significant national or regional benefits.

To support the development of the substantive application for the Project, OGNZL has engaged Stantec NZ to provide an assessment of the Project's transport effects and, to the extent required, identify any necessary management and operational measures to address any such effects.

The scope of this report is to:

- Provide a description of the existing transport environment around the Macraes Operation, including traffic volumes and road safety;
- Assess the suitability of the existing transport network to continue to accommodate traffic associated with the Macraes Operation; and
- Assess the appropriateness of proposed public road realignments as well as new intersections and vehicle access points.

2 Site Location

OGNZL owns and operates the Macraes Operation at Macraes Flat, approximately 30 km northwest of Palmerston in the Otago Region. The Macraes Operation is the largest gold mine in New Zealand and, since commissioning in 1990, has produced more than 6 million ounces of gold.

Macraes Flat is situated on an elevated plateau at approximately 500 m above sea level. The plateau is flanked by the Taieri Ridge to the northwest, Shag Valley and Horse Range to the east, and the coastal hills and extinct volcanic cones of Palmerston and Waikouaiti to the southeast. Macraes Road provides access to Macraes Flat and the Macraes Operation, connecting to State Highway 85 to the east and State Highway 87 (SH87, Hyde-Middlemarch Road) to the west (along with Hyde-Macraes Road), as shown in Figure 2-1. Macraes Road and Hyde-Macraes Road are classified as Secondary Arterial roads in the Operative Waitaki District Plan.

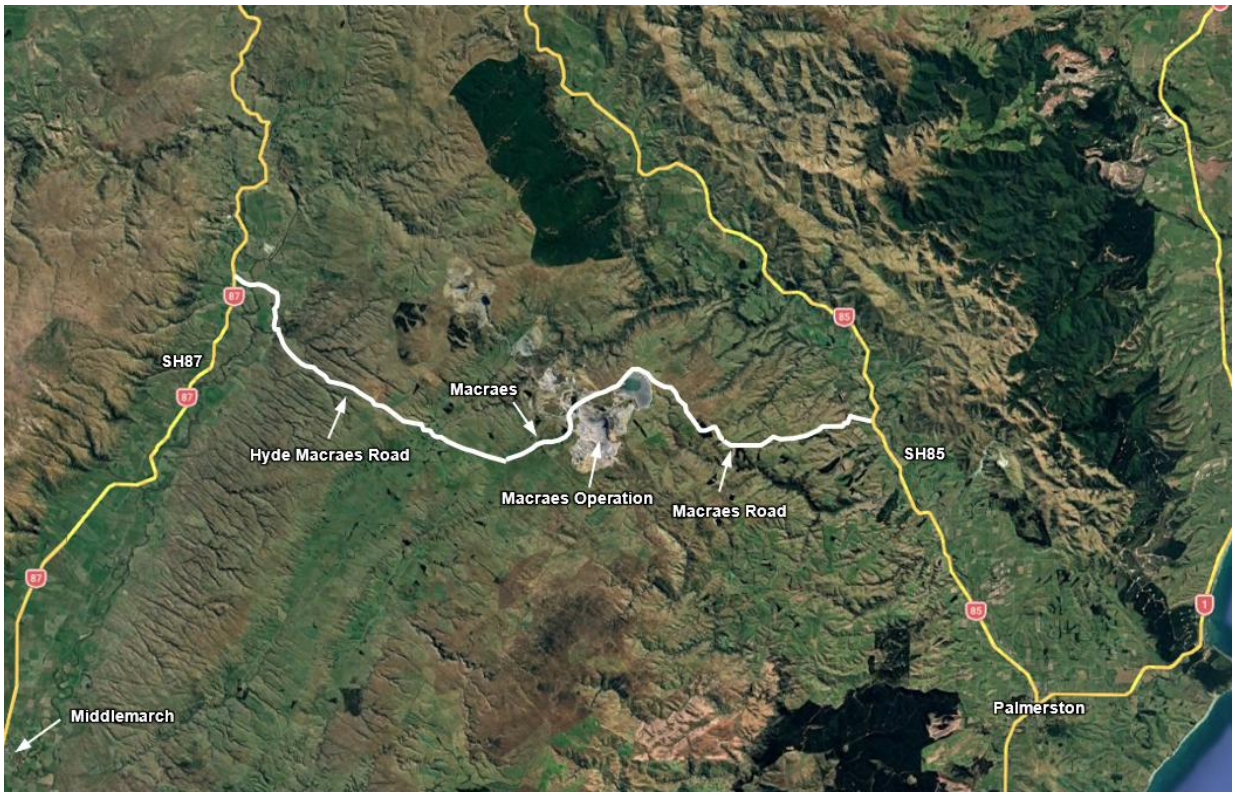


Figure 2-1: Macraes Operation Location

Figure 2-2 shows that there is a specific Macraes Mining zone in the Operative Waitaki District Plan.

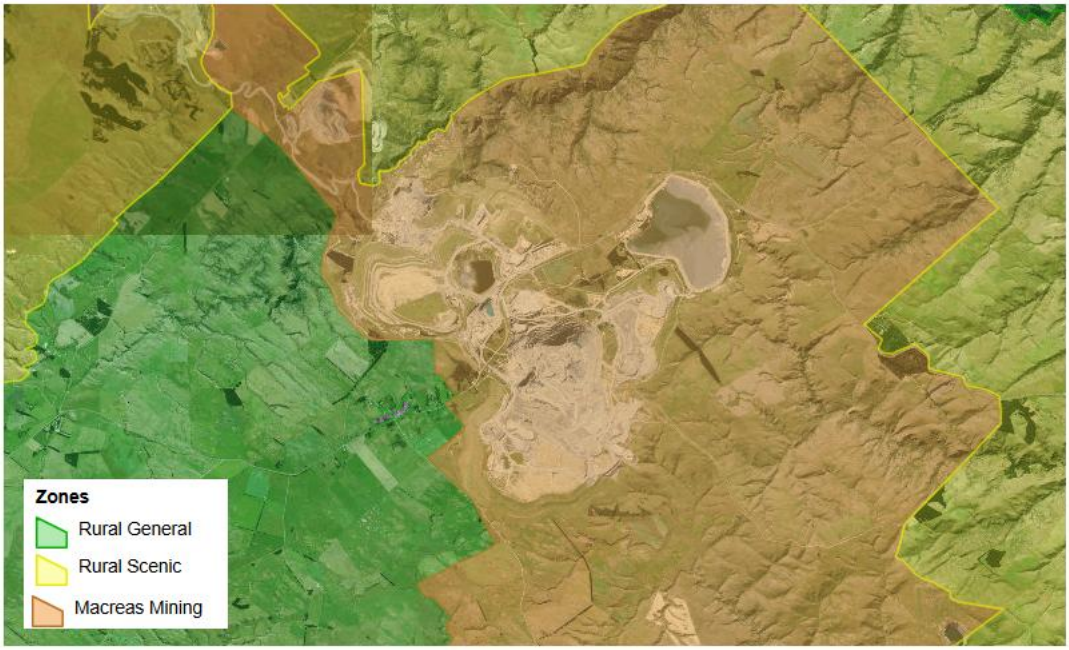


Figure 2-2: Waitaki District Plan Zoning

3 Existing Macraes Operation Description

The environment within and surrounding the Macraes Operation has been shaped by historic and current mining activities. Figure 3-1 shows the arrangement of the major mine features at the Macraes Operation. In summary, the current components of the Macraes Operation include:

- Numerous open pits (both operational and non-operational);
- Two underground mines (Frasers, now closed, and Golden Point, which is actively mined);
- Waste rock stacks at various stages of operation and rehabilitation;
- A network of haul roads and general mine service tracks;
- A Processing Plant;
- Five tailings storage facilities (three inactive, one active but nearing capacity, and one under construction and currently receiving tailings);
- An extensive network of water management infrastructure, including diversion drains, silt ponds, sumps, pit lakes, and freshwater storage reservoirs;
- Two consented but not yet constructed water storage reservoirs (Camp Creek Dam and Coal Creek Dam); and
- Associated infrastructure supporting ongoing operations, including district roads, powerlines, workshops, offices, and associated water and amenity facilities.

Figure 3-1: Existing Macraes Operation

Golden Point Road provides access to the offices, workshops and the processing plant to the north. Golden Bar Road provides access to the south of Macraes Road.

A realignment of Golden Bar Road was consented as a component of a previous expansion proposal[1]. Figure 3-2 shows the authorised corridor for the realignment, which at the time of writing had not been constructed.

Figure 3-2: Consented Golden Bar Road Realignment Corridor

[1] Consents Continuity Project Stage 2 – Waitaki District Council land use consent 201.2023.2302/3.

4 Existing Road Network

4.1 Macraes Road

Macraes Road runs generally uphill from SH85 to the Macraes Operation and has a curvilinear alignment. The road has a sealed width of 7.4 m, a marked centreline and edgelines, and an open road speed limit. Figure 4-1 shows a typical section of the road east of the Macraes Operation.

Figure 4-1: Typical Section of Macraes Road East of Macraes Operation, Looking North at Ritchie Road

West of the Macraes Operation, Macraes Road passes through the Macraes village (Figure 4-2), where a 50 km/h speed limit is in place.

Figure 4-2: Macraes Road in Macraes Village

West of the village, Macraes Road has a narrower sealed carriageway width of 6.0 m to 6.4 m and a marked centreline only, as shown in Figure 4-3.

Figure 4-3: Typical Section of Macraes Road West of Macraes Operation

Macraes Road and Hyde-Macraes Road meet at a skewed, Give-Way controlled intersection. Macraes Road to the south of the intersection is a lower-classified road, continuing further south as the unsealed Moonlight Road. However, Macraes Road retains the priority through this intersection, with Hyde-Macraes Road meeting Macraes Road on the outside of a curve, as shown in Figure 4-4.

Figure 4-4: Hyde-Macraes Road / Macraes Road Intersection, Hyde-Macraes Road on Right

4.2 Hyde-Macraes Road

Hyde-Macraes Road runs generally uphill from SH87 to Macraes Road. This road has a more winding alignment than Macraes Road. The seal width varies from 6.0 m to 6.8 m and there is a marked centreline and edgelines. Figure 4-5 shows a typical section of Hyde-Macraes Road.

Figure 4-5: Typical Section of Hyde-Macraes Road

There are several curves with 45 km/h and 55 km/h advisory speeds, multiple minor road intersections and two one-lane bridges, shown in Figure 4-6 and Figure 4-7, along Hyde-Macraes Road. Both have adequate forward visibility to allow drivers to manage interactions.

Figure 4-6: Hyde-Macraes Road Western One Lane Bridge

Figure 4-7: Hyde-Macraes Road Eastern One Lane Bridge

4.3 SH85 / Macraes Road Intersection

Macraes Road meets SH85 at a Give-Way controlled T-intersection, as shown in Figure 4-8. The intersection is formed to a basic standard, with large radii to accommodate left turn movements, with no widening on the opposite side of the road.

Figure 4-8: SH85 / Macraes Road Intersection

The alignment of SH85 means that visibility to and from the intersection is limited. Based on observations, it is estimated that there is approximately 150 m visibility over the crest curve to the south (Figure 4-9) and around the 85 km/h advisory speed horizontal curve to the north (Figure 4-10).

Figure 4-9: View South at SH85 / Macraes Road Intersection

Figure 4-10: View North at SH85 / Macraes Road Intersection

4.4 SH87 / Hyde-Macraes Road Intersection

Hyde-Macraes Road meets SH87 at a skewed, Give-Way controlled intersection, as shown in Figure 4-11. Hyde-Macraes Road approaches SH87 at an angle of approximately 45 degrees. The intersection has a basic formation, with no widening on the opposite side of the road.

Figure 4-11: SH87 / Hyde-Macraes Road Intersection

The alignment of SH87 means that visibility to the south is limited. Based on observations, it is estimated that there is approximately 150 m visibility over the crest curve to the south (Figure 4-12). The horizontal curve just beyond has an 85 km/h advisory speed. There is good visibility to the north, with over 300 m sightlines available (Figure 4-13).

Figure 4-12: View South at SH87 / Hyde-Macraes Road Intersection

Figure 4-13: View North at SH87 / Hyde-Macraes Road Intersection

5 Existing Traffic Volumes

Table 5-1 presents daily traffic volumes on Macraes Road (provided by Waitaki District Council) and the two nearby State Highways (sourced from NZTA TMS).

Table 5-1: Daily Traffic Volumes

Road	Location	Average Weekday Traffic Volume	Count Date
Macraes Road	East of Macraes Operation	800 vpd	Jan 2025
Macraes Road	West of Macraes Operation	500 vpd	Jan 2025
SH85	South of Macraes Road	1,500 vpd	Mar 2024
SH85	North of Macraes Road	650 vpd	Feb 2024
SH87	South of Hyde-Macraes Road	410 vpd	Feb 2024
SH87	North of Hyde-Macraes Road	410 vpd	Dec 2024

Macraes Road carries low traffic volumes for an arterial road with less than 1,000 vehicles per day (vpd). Traffic volumes are higher on Macraes Road east of the Macraes Operation than to the west, which shows that Macraes Road east of the Macraes Operation is the preferred route for mine access. 40% of traffic east of the Macraes Operation was recorded as heavy traffic.

SH85 carries 1,500 vpd south of Macraes Road, which is a modest traffic volume for a rural State Highway. As expected, traffic volumes north of Macraes Road are lower, showing that more Macraes Road traffic travels to and from Palmerston than inland.

SH87 carries low traffic volumes north and south of Hyde-Macraes Road.

Daily traffic volumes on SH85 and SH87 have seen low growth of approximately 1% per annum since 2010.

6 Existing Macraes Operation Traffic Generation

6.1 Light Traffic

The majority of traffic generated by the Macraes Operation external to the mine site is staff travel related. Most other light traffic generation is associated with contractors. There are typically 210 mining staff working the day shift (7:00am – 7:00pm) and 120 working the night shift (7:00pm – 7:00am), along with 65 office staff present through the day. OGNZL runs multiple buses daily to and from Macraes for both Dunedin and Oamaru staff. Figure 6-1 presents hourly traffic volumes on Macraes Road east of the Macraes Operation, to give an idea of staff traffic generation. The peak in the morning before 7:00am is when day shift staff and office staff arrive, while departures are more spread out in the late afternoon and evening. Based on the information available, it is estimated that the Macraes Operation generates in the order of 500 light vehicle movements per day and 120 light vehicle movements per hour, during the busiest morning shift changeover time, external to the mine.

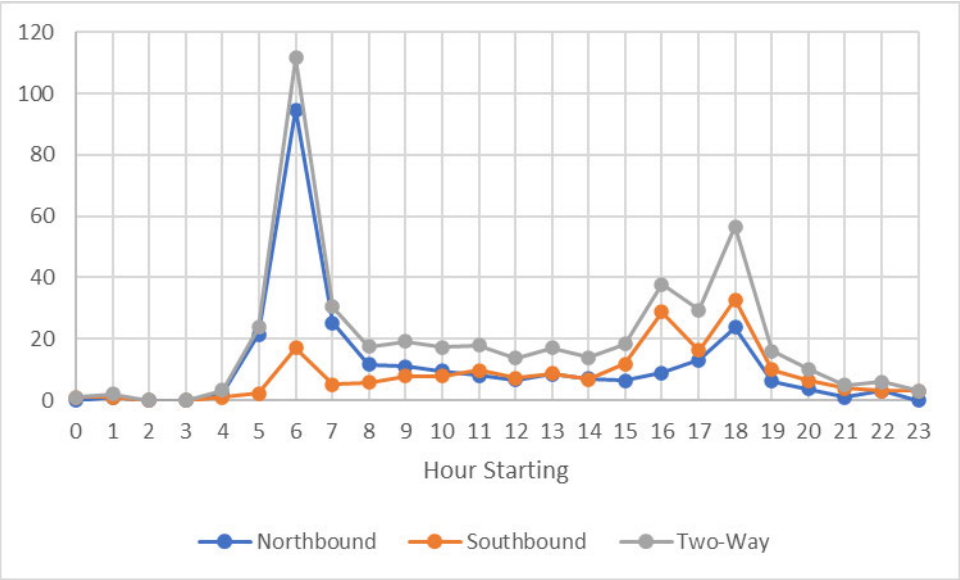


Figure 6-1: Weekday Hourly Light Traffic Volumes on Macraes Road East of Mine, January 2025

6.2 Heavy Traffic

Macraes Operation heavy vehicle traffic generation on public roads surrounding the mine site, including OGNZL vehicles and external contractor / delivery vehicles, is low in volume. These include some daily freight and fuel delivery movements, and then less frequent but still regular deliveries of expendables, such as lubricant, blasting agents and explosives, and product transportation. It is estimated that there are less than 10 heavy vehicle deliveries to the Macraes Operation per day, or 20 heavy vehicle movements per day utilising public roads.

Higher volumes of heavy vehicle movements occur during construction and maintenance periods, including during three-day plant maintenance shut-downs which occur three to six-monthly. These activities are occasional in nature, but remain a routine and anticipated component of the established operational environment.

Most heavy traffic movements between different parts of the Macraes Operation are made on a series of haul roads, minimising the need for heavy vehicle movements on public roads.

7 Existing Road Safety

7.1 Crash Records

Crash records along Macraes Road and Hyde-Macraes Road for the full 10-year period of 2015-2024 have been reviewed using NZTA's Crash Analysis System.

Figure 7-1 presents crashes reported on Macraes Road east of the Macraes village and on SH85 within 50 m of the Macraes Road intersection.

Figure 7-1: Crashes on Macraes Road, East of Macraes, 2015-2024

There have been 10 crashes, including one fatal, two serious-injury and six minor-injury crashes, reported on the section of Macraes Road between the Macraes village and SH85. Eight of these, including the fatal and serious-injury crashes, involved drivers losing control of their vehicle. The crashes are generally not at common locations, and adverse weather and driver unfamiliarity are regularly reported factors. The fatal crash was a single vehicle loss of control crash with the driver under the influence of alcohol. The other two crashes on this section of Macraes Road involved drivers hitting farm animals.

One minor-injury crash was reported at the SH85 / Macraes Road intersection, in 2015. According to the police report, this involved a driver turning out of Macraes Road failing to give way and hitting a northbound vehicle on SH85. There are limited details available, but the crash description suggests that the limited visibility to the right from Macraes Road was not a factor. The other crash presented in

Figure 7-1 was a loss of control crash on SH85 unrelated to the operation of the Macraes Road intersection.

Figure 7-2 presents crashes reported on the Macraes Road / Hyde-Macraes Road route west of the Macraes village.

Figure 7-2: Crashes on Macraes Road, West of Macraes, and Hyde-Macraes Road, 2015-2024

One minor-injury, loss of control crash was reported on Macraes Road between the Macraes village and Hyde-Macraes Road.

Five crashes, including one serious-injury crash, were reported on Hyde-Macraes Road. Four of these were loss of control crashes, with again adverse weather conditions / ice being a factor in multiple of these. A driver fell asleep in one of the crashes.

No crashes have been reported at the SH87 / Hyde-Macraes Road intersection.

To summarise, most of the crashes along the route have been loss of control crashes in isolated locations. The crash records are not surprising given the alignment of the route and the prevalence of adverse weather conditions during certain times of the year. No particular locations of concern have been identified.

7.2 Safety Ratings

The NZTA MegaMaps presents various metrics relating to the safety of road corridors. Figure 7-3, Figure 7-4 and Figure 7-5 present personal risk[2], collective risk[3], and infrastructure risk ratings[4] for the Hyde-Macraes Road and Macraes Road route between SH87 and SH85 respectively.

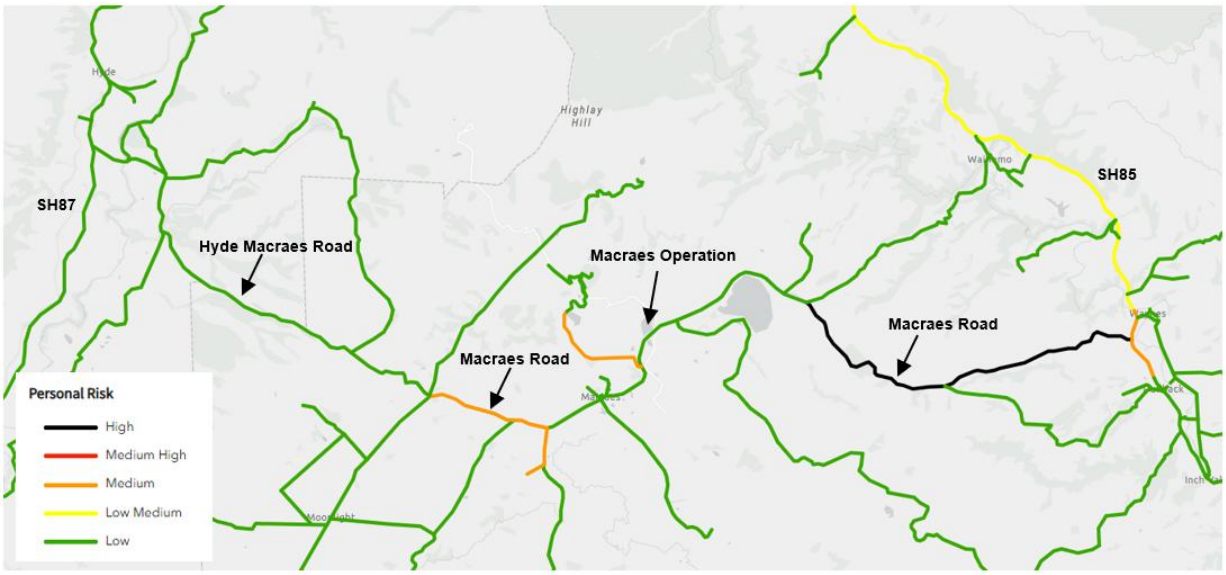


Figure 7-3: Personal Risk Ratings

[2] Personal risk is a measure of the danger to each individual using the road being assessed.

[3] Collective risk is a measure of the total number of fatal and serious injury crashes per kilometre over a section of road.

[4] Infrastructure risk rating is a proactive method for assessing road safety risk, based on the Star Rating approach of coding road and roadside features to model the underlying risk of a road section.

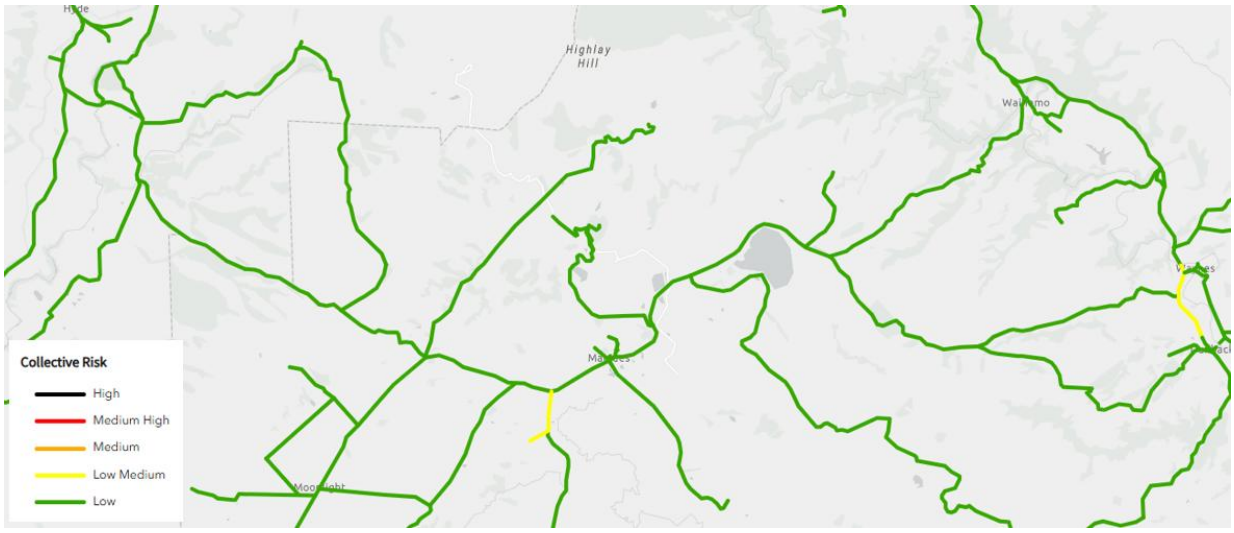


Figure 7-4: Collective Risk Ratings

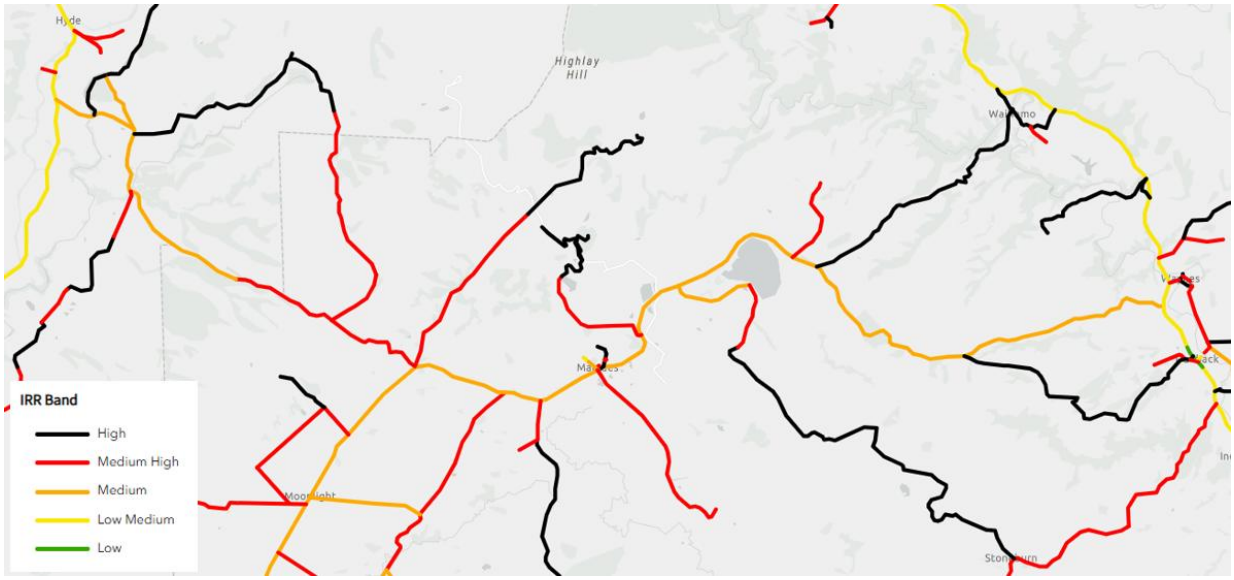


Figure 7-5: Infrastructure Risk Ratings

Most of the route has a Low personal risk rating, with a section west of Macraes having a Medium rating and the eastern section of the route having a High rating. These ratings reflect the locations of reported injury crashes. The Low collective risk across the entire corridor reflects the low number of crashes, while the higher personal risks arise based on the low traffic volumes using the route. The route predominantly has a Medium infrastructure risk rating, likely reflecting narrow carriageway widths / shoulder widths in places and the curving alignments, with only a more winding section of Hyde-Macraes Road having a Medium High rating.

8 Proposed Project

8.1 Overview

The Project is made up of the following proposed key activities:

- **Open pit extensions** at Coronation, Coronation North, Innes Mills, and Golden Bar.
- **Underground mine expansion** through further development of the Golden Point Underground mine ("**GPUG**").
- **Tailings management**, including:
    - Construction of the Frasers Tailings Storage Facility ("**FTSF**") Stage 3 to accommodate a total tailing storage of up to 153 Mt; and
    - Hydraulic mining and relocation of tailings from the Mixed Tailings Impoundment ("**MTI**"), Southern Pit Option 10 TSF ("**SP10**"), and Southern Pit Option 11A TSF ("**SP11**") to FTSF.
- **Waste rock disposal**, including increased storage capacity within open pits and at existing waste rock stacks at Coronation, Coronation North, Innes Mills, Golden Bar, Golden Point, and Frasers.
- **Water management infrastructure and operations**, including:
    - Construction of Camp Creek and Coal Creek water storage dams for flow and water quality management;
    - Construction, operation and maintenance of a Water Treatment Plant; and
    - Ongoing operation and maintenance of the Mine Water Management System ("**MWMS**").
- **Infrastructure and roading works**, including:
    - Realignment of Macraes Road in two stages; and
    - Relocation of the Open Pit Mining Workshop.
- **Ecological enhancements**, including establishment of:
    - Murphys Ecological Enhancement Area ("**MEEA**") near Murphys Creek, including predator fencing, access tracks, and site facilities;
    - Mt Highlay restoration area;
    - Cranky Jims Link shrubland enhancement area;
    - Murphys Link tussock protection area; and
    - Additional compensation measures for residual ecological impacts.
- **Mine closure and rehabilitation activities**, including rehabilitation of mining landforms, creation of pit lakes, dry capping of tailings storage facilities, and revegetation in accordance with closure objectives.

The proposed extensions to the Macraes Operation are expected to allow mining to continue through to at least 2039.

The capacity of the Processing Plant will be maintained at approximately 6.5 Mtpa. No notable change to existing staffing levels is proposed and there will be no notable change to traffic generation to and from the Macraes Operation on Macraes Road, notwithstanding that traffic volume fluctuations associated with construction and maintenance are a routine and anticipated component of the established operational environment, as outlined in Section 6.2,

An overview of the proposed activities which make up the Project is shown in Figure 8-1 below.

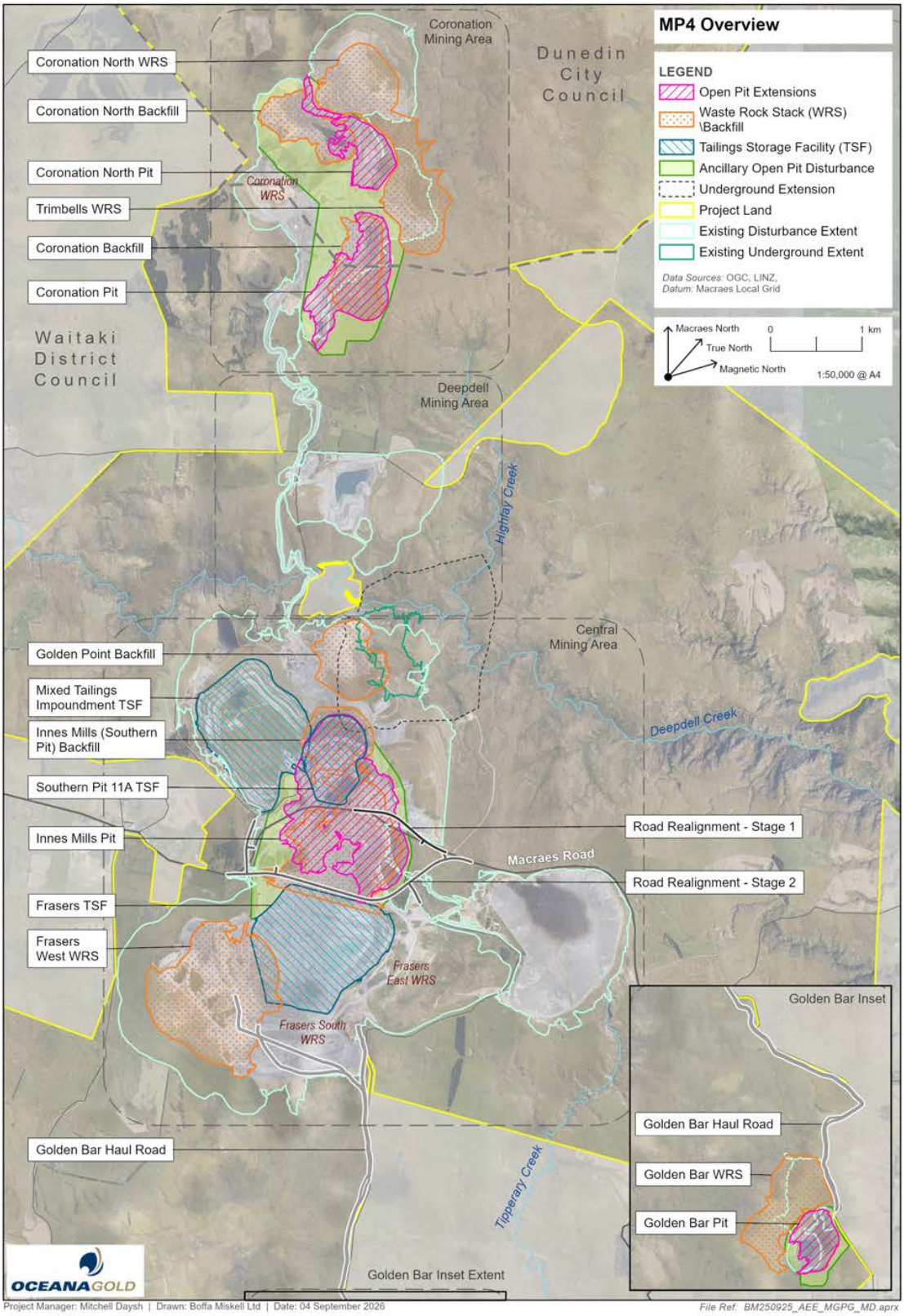


Figure 8-1: MP4 Overview Plan

8.2 Proposed Stage 1

8.2.1 Road Realignment

A Stage 1 realignment of Macraes Road is proposed to accommodate an extension of the Innes Mills Pit. The proposed realignment is shown in Figure 8-2.

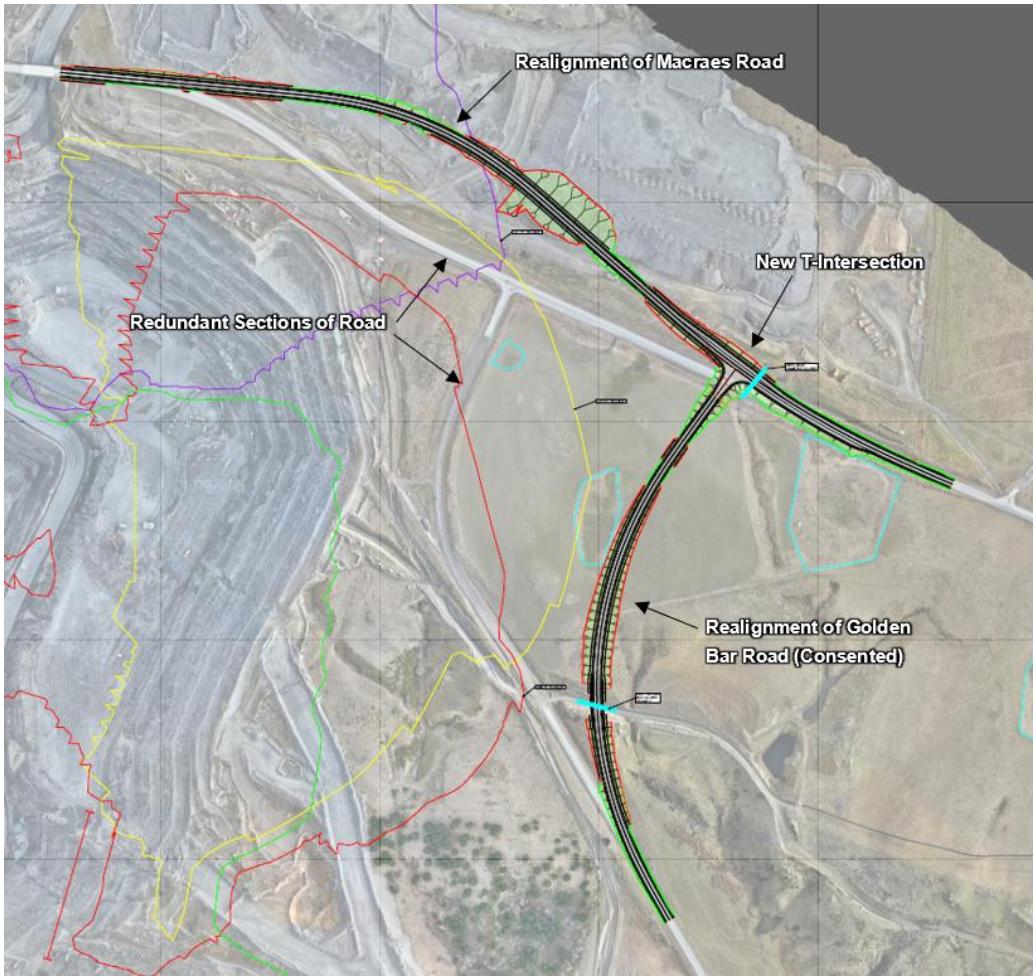


Figure 8-2: Overview of Stage 1 Road Realignment

McIlroy Consultancy Limited has carried out the road design and has prepared an accompanying Road Design Report (attached as Appendix B). The report outlines the following:

- The roads will be designed for a 100 km/h speed environment
- New sections of carriageway will allow for 3.5 m lanes and 1.2 m sealed shoulders, matching or improving the existing carriageway formation
- All fill batters slopes are to be 1V:4H with cuts at 1V:2H, consistent with existing arrangements
- Where a guardrail is proposed, it will be setback 2.4 m from the lane edge to meet minimum shy-line requirements
- Both roads are to be constructed geometrically in accordance with Austroads standards as well as NZTA Traffic Control Devices Manual and MOTSAM
- Superelevation on curves will be provided as required for the design speed

- A new T-intersection will be required at Macraes Road / Golden Bar Road, as discussed below

Road designs will go through a detailed design process post-consent, requiring engineering approval from Waitaki District Council. The new sections of road will be vested with Council after construction. The road design / construction / vesting processes (and road stopping where required) will be the same as followed for previous road realignments within the Macraes Operation.

8.2.2 New Intersection

Figure 8-3 is a concept design for the new T-intersection.

Figure 8-3: Stage 1 Macraes Road / Golden Bar Road Intersection Concept

Features of the proposed intersection include:

- Widening on the opposite side of the road to allow a vehicle to pass a vehicle waiting to turn right into Golden Bar Road, which is not provided at the existing intersection. This is proposed to the basic right turn (BAR) type treatment standard from Austroads, using a 25 m truck and trailer as the design vehicle for the storage length on Macraes Road.
- A left turn deceleration lane as provided at the existing intersection, but lengthened to the Austroads standard for the design speed
- Design to accommodate manoeuvring of a 25 m truck and trailer
- Sightlines in accordance with Austroads safe intersection sight distance (SISD), including allowance for grade corrections to be confirmed.

8.3 Proposed Stage 2

8.3.1 Road Realignment

Stage 2 will involve a more major realignment of Macraes Road, as shown in Figure 8-4. The road will run across the proposed Frasers Tailings Storage Facility embankment which is located inside Frasers Pit. Stantec understands from OGNZL that where the road passes across the embankment, the road will not be vested and instead public use will be provided for by way of an easement in gross. This will see Macraes Road relocated south of proposed mining in Innes Mills Pit, meaning it will not impede future expansion to the north. The 2.84 km realignment will result in an approximately 200 m shorter section of road. Golden Point Road will be realigned, back onto a previous alignment that was utilised prior to 2020. A new bridge will be required across the haul road east of Golden Point Road.

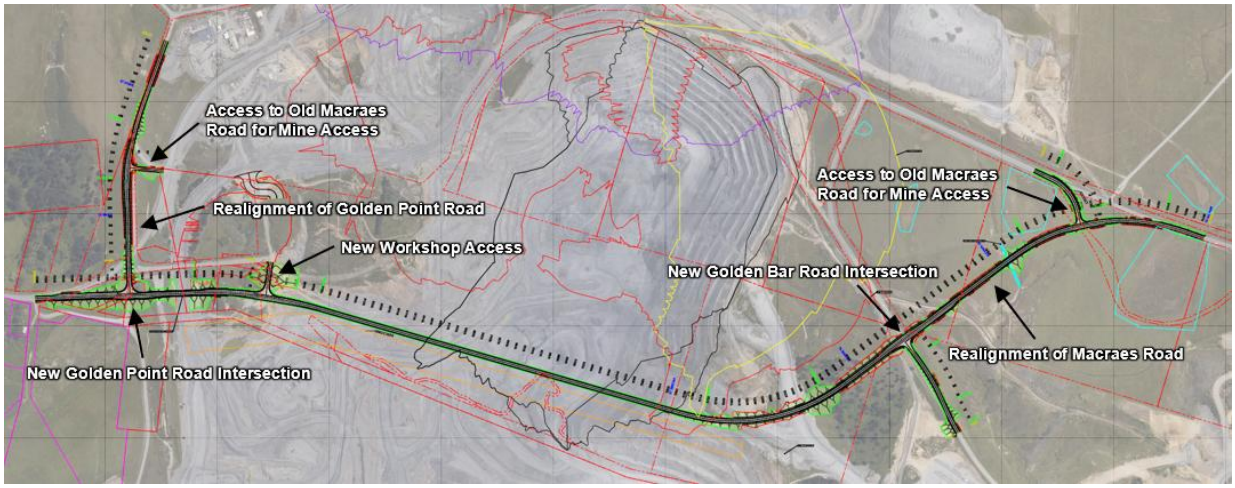


Figure 8-4: Overview of Stage 2 Road Realignments

McIlroy Consultancy Limited has carried out the road design for Stage 2 and has prepared an accompanying Road Design Report (attached as Appendix C). Design standards adopted are consistent with those for the Stage 1 design.

8.3.2 New Intersections

Two new T-intersections are proposed where Golden Point Road and Golden Bar Road meet the realigned Macraes Road. The two intersection concepts are shown in Figure 8-5 and Figure 8-6. Intersection designs are consistent with the design of the Stage 1 intersection, with a 25 m truck and trailer used as a design vehicle and both the widening on the opposite side of the road and the left turn slip lane proposed. Sightlines in accordance with SISD standards will be ensured through the detailed design process.

Figure 8-5: Stage 2 Macraes Road / Golden Point Road Intersection Concept

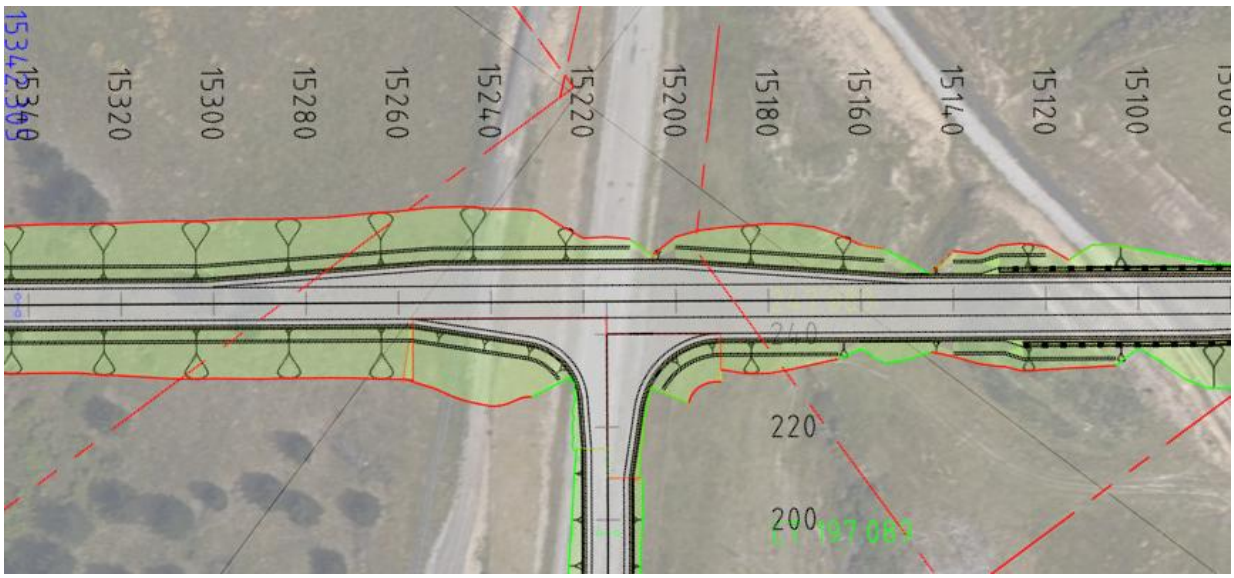


Figure 8-6: Stage 2 Macraes Road / Golden Bar Road Intersection Concept

8.3.3 New Vehicle Access Points

Two new vehicle access points for the Macraes Operation are proposed along the realigned section of Macraes Road. One will serve the new Open Pit Workshop (Figure 8-7), and one will be at the eastern end of the realignment (Figure 8-8), to provide access to the redundant section of Macraes Road for mine access.

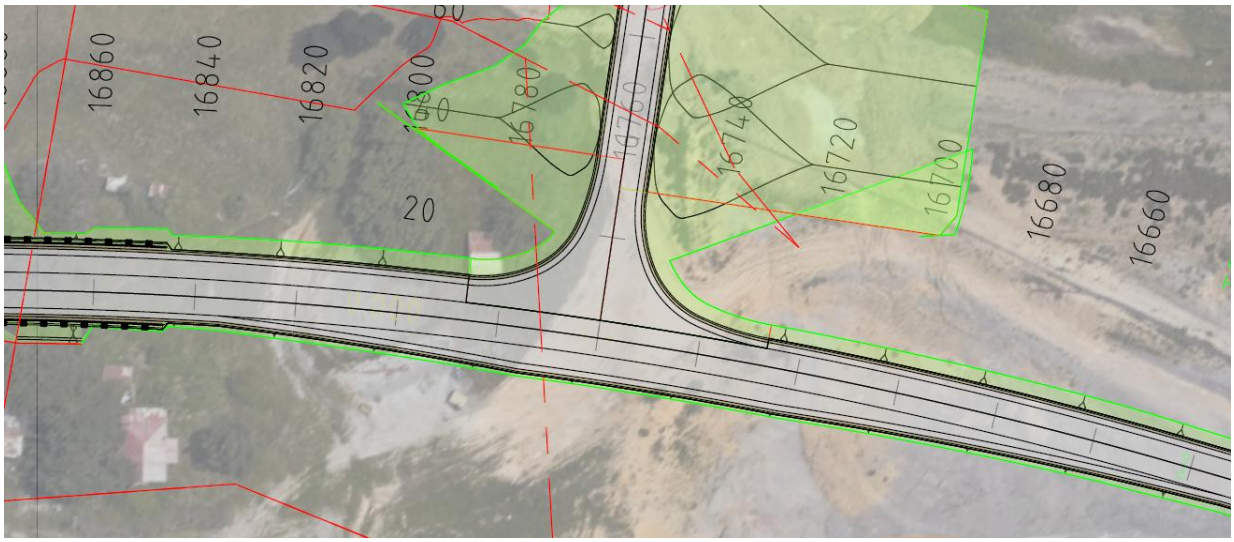


Figure 8-7: Proposed Workshop Macraes Road Access Point

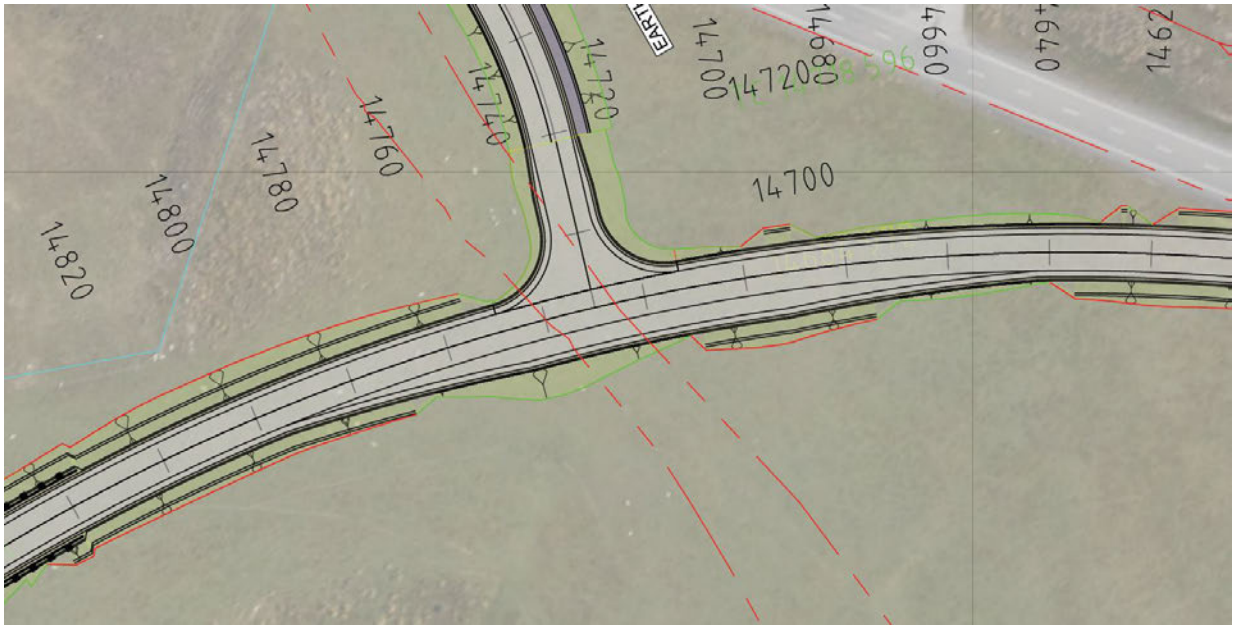


Figure 8-8: Proposed Access Point at Eastern End of Realignment

The two access points are generally proposed to the same standard as the new intersections.

One exception is that the left turn slip lane for the Open Pit Workshop access point is proposed to be 130 m in length rather than 162 m so that it fits clear of the bridge across the haul road.

A vehicle access point is proposed on the realigned Golden Point Road, to provide access to the redundant section of Macraes Road for mine access, as noted in Figure 8-4.

Vehicle access points will be sealed to at least 5.5 m within the site boundary as required by the Waitaki District Plan.

9 Assessment of Effects

9.1 Road Realignments

The Stage 1 and Stage 2 Road Design Reports (refer Appendices B and C) have been reviewed. It is concluded that both the Stage 1 and Stage 2 realignments tie neatly into the existing road, and their horizontal geometry is appropriate and in keeping with the existing environment. Details of gradients and superelevation around curves have been well considered and can be confirmed through the detailed design process.

The proposed carriageway width, including sealed shoulders, is appropriate for the environment and the future function of Macraes Road.

The small distance saving as a result of the Stage 2 realignment is noted as a very minor benefit.

Other details such as linemarking and signage will be able to be confirmed during the detailed design process.

Consent conditions relating to the road realignments, consistent with those applied for previous road realignments at Macraes, are volunteered. Relevant to road safety, these will require engineering design in accordance with industry standards, design approvals by Council and a post-construction safety audit, and these are considered appropriate.

It is concluded that the proposed road realignment designs provide a suitable basis for detailed design, and that with the detailed design and approval process in place, the road realignments will not have adverse road safety and efficiency effects on future Macraes Road users.

9.2 New Intersections / Mine Access Points

The new intersections and mine access points are generally proposed to the same standard, with widening on the opposite side for vehicles to pass any vehicle waiting to turn right, a left turn deceleration lane, and radii to suit vehicle manoeuvring of a large truck and trailer.

This is considered to be a high standard of design given the low through-traffic volumes on Macraes Road, including in the future based on low traffic growth, and is noted to be an improvement on the existing Golden Point Road and Golden Bar Road intersections.

As noted earlier, the workshop access point will have a shorter left turn deceleration lane length of 130 m compared to the 162 m length proposed elsewhere, due to the proximity to the bridge. The Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections lists a deceleration distance of 120 m for cars to slow from 90 km/h to 20 km/h and 150 m to slow from 100 km/h to 20 km/h. Based on this, only a small amount of deceleration will be necessary before entering the left turn deceleration lane. Any following drivers will be able to see the vehicle in front beginning to slow before pulling to the left and be able to respond accordingly. Given low traffic volumes on Macraes Road, this will occur infrequently and have a negligible effect on safety and efficiency for through-traffic.

It is intended that sightlines in accordance with SISD standards, including allowance for grade corrections, will be provided at all intersections and access points, with this able to be confirmed through the detailed design process.

Intersection and access point separations are sufficient that manoeuvring is well separated and they will all function distinctly, with no potential for driver confusion.

It is concluded that the new intersections and access points are proposed to a high standard which will allow them all to function safely and efficiently, with only negligible adverse effects on the safety and efficiency of Macraes Road into the future.

9.3 Macraes Road / Hyde-Macraes Road Routes

As presented earlier, there have been 17 crashes along the Macraes Road / Hyde-Macraes Road route in the last 10 years, including some serious crashes. Most of the crashes have been loss of control crashes in isolated locations. The crash records are not surprising given the alignment of the route and the prevalence of adverse weather conditions during certain times of the year. No particular locations of concern have been identified. Given this, it is considered that this route can continue to carry Macraes Operation traffic as it is currently. Since Macraes Operation traffic generation will not increase as part of the Project, and Macraes Road and Hyde-Macraes Road will continue to carry low traffic volumes, it is assessed that the Project will not have a noticeable effect on the safe and efficient operation of the Macraes Road / Hyde-Macraes Road route.

The traffic effects of the Project have been discussed with Waitaki District Council and Dunedin City Council (Road Controlling Authority for part of Hyde-Macraes Road) Transport Engineers in January 2026. Neither raised any road safety or efficiency related concerns with the ongoing use of this route for Macraes Operation access given traffic generation is expected to remain as it is currently. The Waitaki District Council engineer noted, as above, that there have been several crashes along Macraes Road, but these have been isolated incidents and have not pointed to a safety concern with a particular location.

9.4 SH85 and SH87 Intersections

The two State Highway intersections at the ends of the Macraes Road / Hyde-Macraes Road route operate efficiently with minimal delays and queuing based on both modest passing traffic volumes and low turning traffic volumes. This will continue to be the case into the future given the low rate of traffic growth in the area.

The crash records presented earlier did not highlight any serious safety concerns, with only one minor injury crash reported at the SH87 intersection, which was attributed to a driver failing to give way.

As described, it has been estimated from observations on the ground that visibility in the order of 150 m is available in both directions from a car driver’s eye height at the SH85 intersection. Similar visibility is available to the south at the SH87 intersection. While this is less than what would be desirable at intersections on open roads, this meets stopping sight distance recommendations for cars in very constrained locations (such as lower volume roads and mountainous roads) listed in Austroads Guide to Road Design Part 3: Geometric Design of 141 m to 155 m for a 100 km/h design speed. This means that drivers approaching would be able to react and slow down if required, for example if a slow-moving vehicle is turning out of the intersection.

At the SH85 intersection, the approach from the south is more critical due to the potential impact angle (T-bone) if a crash was to occur. 150 m visibility to the right for a car driver represents over 5 s of travel

time at 100 km/h, which is more than a typical critical gap that a driver would be willing to accept (5 s as listed in Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections). This means that provided a driver can see the road to their right is clear, they will be able to safely cross the northbound traffic lane as the initial part of their right turn movement. Trucks will be more visible to approaching drivers due to their larger size, providing increased opportunity for drivers to recognise and respond to a truck crossing the intersection. In addition, truck drivers will be able to see further to the south along SH85 given their higher eye height, assisting their ability to identify approaching traffic.

At the SH87 intersection, there would only be low volumes of Macraes Operation traffic and this would predominantly be expected to turn left out of Hyde-Macraes Road towards Middlemarch and Mosgiel, so would not conflict with northbound traffic.

It is concluded that the available sightlines, while below desirable standards, allow the intersections to operate satisfactorily, as demonstrated by the crash records, accommodating the low traffic volumes they carry. Given the low level of forecast traffic growth on the State Highway network and that Macraes Operation traffic generation will not increase as a result of the Project, the intersections are expected to continue operating satisfactorily in the future. Accordingly, the Project is not expected to have a noticeable effect on the safe and efficient operation of the two State Highway intersections.

The local NZTA Safety Engineer was contacted in January 2026 and noted no issues in principle from a traffic and safety perspective with the highway intersections remaining as they are given the Project will not increase traffic generation.

9.5 Construction Traffic Effects

Notable construction activities within the MP4 scope that will generate traffic in addition to what occurs ordinarily at the Macraes Operation include:

- Establishment of hydraulic mining infrastructure;
- Establishment of pipelines and the power supply for tailings and return water;
- Construction of the Murphys Ecological Enhancement Area fence;
- Road construction – Macraes Road realignments Stages 1 and 2; and
- Open pit workshop relocation.

It is understood that there are construction or maintenance works (big or small) occurring at the Macraes Operation reasonably regularly. As a result, Macraes Operation traffic generation fluctuates and can be higher, when construction materials are being brought to site or intensive maintenance activities are being carried out, and there may be more contractors present. It is considered that temporary traffic volume increases associated with the MP4 construction projects will not be out of character with the existing environment and these traffic volume increases can readily be accommodated on the existing road network.

It is noted that any short-term construction activity impacting public road users, for example, new road construction works immediately adjacent to Macraes Road, will have temporary traffic management in place through a standard Temporary Traffic Management Plan process, led by the contractor. Public access along existing roads will be maintained, with part of the road always remaining usable.

10 District Plan Compliance

The Project has been assessed against relevant Transport / Car Parking rules in Chapter 12 of the Operative Waitaki District Plan. The full assessment is contained in Appendix A and an assessment of identified matters of non-compliance is provided below.

10.1 Rule 12.2.1 Parking and Loading

While an on-site carpark layout is not available for assessment, the requirements of this rule have been applied to the new workshop area, which is expected to be the only new parking / loading area of note. Other vehicle parking and loading areas, for example outside the offices and the Processing Plant, will remain unchanged under the Project and their use will not noticeably change.

Two instances of non-compliance are likely. 12.2.1.f requires cycle parking and 12.2.1.k requires surfaces of parking and loading areas to be sealed. It is understood that no cycle parking will be provided at the new workshop because the remote location means that cycling is not a practical travel mode option. Accordingly, there will be no adverse effects on cycling uptake from not providing cycle parking. The parking and loading areas at the new workshop are to be graded and compacted but are expected to be unsealed consistent with other parking and loading areas throughout the Macraes Operation. Any adverse effect of not sealing the new Open Pit Workshop carpark will be negligible.

The new workshop area will be designed to allow enough space for car parking areas with dimensions in accordance with 12.2.1.d so that all vehicles can turn around on the site and not need to reverse onto Macraes Road (12.2.1.g).

10.2 Rule 12.2.2 Vehicle Access

The Waitaki District Plan specifies a 9 m maximum vehicle crossing length for “other” land uses (12.2.2.d). The proposed new vehicle access points on Macraes Road have been assessed as not complying with this requirement. As shown in Figure 10-1, the vehicle crossings will be approximately 40m long, measured at the edge of the Macraes Road carriageway. The vehicle crossings are proposed to intersection standards as described earlier, to accommodate convenient manoeuvring by all vehicles including large heavy vehicles. It has been assessed that the new access points will function safely and efficiently, and are appropriately designed. It is considered that this is a matter of technical non-compliance only and there will be no adverse effects on the safe and efficient operation of the vehicle access points and Macraes Road as a result.

Figure 10-1: Workshop Vehicle Crossing Length

"Vehicle oriented activities" require 275 m sightlines at access points on roads with a posted speed limit of 100 km/h (12.2.2.h). As described earlier, SISD requirements will vary by location depending on road gradients. The intention is to meet SISD standards at new access points for a 100 km/h design speed, which is considered appropriate in this location as already assessed, and will ensure access points operate safely.

11 Conclusion

The Project does not involve any material increase in staffing levels or production related traffic generation, and therefore will not result in additional daily traffic demand on Macraes Road, Hyde-Macraes Road, or the wider State Highway network.

The Stage 1 and Stage 2 road realignments have been designed in accordance with Austroads standards and will provide carriageway widths, geometry, and sight distances that meet or exceed those of the existing road. The proposed new intersections and Macraes Operation access points incorporate appropriate treatments, including widening for passing of right-turning vehicles, left-turn deceleration lanes, and design vehicle accommodation, to ensure safe and efficient operation for all road users. No adverse safety or efficiency effects are anticipated as a result of these works. Consent conditions relating to the road realignments, consistent with those applied for previous road realignments at the Macraes Operation, are volunteered. Relevant to road safety, these will require engineering design in accordance with industry standards, design approvals by Council and a post-construction safety audit, and these are considered appropriate.

Construction traffic associated with the Project will be temporary and not out of character with existing Macraes Operation construction and maintenance activities. Any construction works affecting the public road can be appropriately managed through standard construction traffic management planning.

The project is generally consistent with the relevant provisions of the Waitaki District Plan relating to transport, vehicle access, and parking. Any non-compliances are minor in nature and will not give rise to adverse effects.

While there have been loss of control type crashes along Macraes Road and Hyde-Macraes Road, crashes have tended to be isolated incidents and no particular locations of concern have been identified. The State Highway intersections at each end of the route have visibility that is less than desirable; however, it is sufficient for the low traffic volume intersections to be operating safely. It is concluded that the Project, which will not involve traffic volume increases, can be accommodated within the existing transport environment with negligible adverse effects.

Appendices

Appendix A District Plan Transport Rules Compliance Assessment

Rule / Requirement	Proposed Provision	Compliance
12.2.1 Parking and Loading		
12.2.1.d. Size of Parking Spaces All parking spaces, other than for residential units, and associated manoeuvring areas are to be designed to accommodate a design motor car and shall be laid out in accordance with Table 2 and Appendix G.	Sufficient space to provide new car parking areas with complying dimensions	Yes
12.2.1.e. Car Spaces for People with Disabilities Car parking areas containing 50 or more car parking spaces shall include spaces for people with disabilities provided at the rate of 1 for the first 50 to 100 spaces plus 1 more for every additional 100 spaces. Car parking for people with disabilities shall be located as close as practicable to the building entrance. The spaces should be on a level surface and be clearly signed.	No new car parking areas containing 50 or more car parking spaces. No change to mobility parking demand at existing office car parking.	N/A
12.2.1.f. Cycle Parking All developments, other than residential and farming, are to provide cycle parking at a rate of 1 cycle space for every 10 car parking spaces. The cycle stands are to be laid out in accordance with Appendix G.	No cycle parking proposed at the new workshop. No change to cycle parking supply or demand at existing office.	No, see discussion on on-site provisions in Section 10.1
12.2.1.g. Reverse Manoeuvring On site manoeuvring for a design car shall be provided to ensure that no vehicle is required to reverse either onto or off a site where any activity contains six or more parking or loading spaces, any non-residential activities except for those within the Business 1 and H zones. On-site manoeuvring for a design truck (refer Appendix G) shall be provided to ensure that no truck is required to reverse onto or off a site where any development requires loading areas or trade vehicle storage having access onto a roadway in the Business 2, 3, 4 and 5 Zone or having access onto an Arterial Road. Parking spaces shall be located so as to ensure that no vehicle is required to carry out any reverse manoeuvring when moving from any vehicle access to any required parking spaces. Vehicles shall not be required to undertake more than one reverse manoeuvre when manoeuvring out of any required parking or loading space to depart the site.	New parking areas and areas to be used by trucks, for example at the new workshop, will be designed to be able to accommodate manoeuvring on-site.	Yes
12.2.1.i. Queuing A queuing space of two-way aisle at least 6m in length at each vehicle crossing shall be provided for all vehicles entering and leaving a parking area where more than 20 car-parking spaces are provided in the parking area served by the vehicle crossing. The required queuing space length shall be measured from the road boundary to the first point at which a vehicle can turn into a parking space or aisle.	More than 6m queuing space will be available at new access points given intersection-style designs	Yes
12.2.1.k. Surface of Parking and Loading Areas i. The surface of all parking, loading and trade vehicle storage areas shall be constructed to meet either of the following standards - at the developer's discretion:	New parking areas for workshop expected to be unsealed.	No, see discussion on on-site provisions in Section 10.1

1. Such areas shall be formed and surfaced in accordance with the requirements of the Waitaki District Standard Specification for the Construction of New Vehicle Entrances (10.5.96 and its amendments). Or 2. The area shall be constructed on a well drained subgrade developed to give a CBR of not less than 12, with 150mm of compacted AP65 basecourse and 100mm of compacted M4/AP40 top course. The area shall be sealed with two coat Grade 4 / Grade 6 chip seal. All stormwater shall be controlled within the site, and led to approved outfalls. All parking areas shall be marked to define required staff and visitor parking spaces.		
12.2.1.l. Landscaping Landscaping shall not adversely affect the visibility of motorists leaving a site or create an unsafe environment for persons using the car park or the adjacent footpath. Subject to any Zone Rules, all car parking areas containing 5 or more spaces shall have along the road frontage, a landscape strip in accordance with the Business Rules 7.4.9 (Landscaping) and Subdivision Rules where these spaces are to be located adjacent to the road frontage.	Landscaping will not adversely affect the visibility of motorists leaving the Macraes Operation or within any new car parking areas.	Yes
12.2.2 Vehicle Access		
12.2.2.a. Vehicle Access to be Provided 4. A complying vehicle crossing shall meet the following requirements: a. Where a lot has direct vehicle access to a road; a formed and driveable surface shall be provided between the carriageway of the road and the road boundary of the lot d. An access space shall be established on the lot. This shall comprise an area of land within the lot 3.5m wide by 5.5m long, formed and set aside and useable by a motor access and accessible from the vehicle crossing.	New vehicle crossings proposed for the workshop on Macraes Road, and at each end of the redundant section of Macraes Road (one at the eastern end of the Macraes Road realignment and one on the realigned Golden Point Road). Access space will be available within new driveways.	Yes
12.2.2.b. Formation and Sealing of Vehicle Crossings All vehicle crossings onto sealed roads, sealed footpaths or sealed service lanes shall be sealed to ensure that material such as mud, stone chips, gravel, crop or animal wastes is not carried onto such roads, footpaths or service lanes. The surface of all vehicle crossings that are not to a State highway shall be constructed to meet either of the standards set out in Clauses 1 or 2 below – at the developer's discretion. 1. Vehicle crossings shall be formed and surfaced in accordance with the requirements of the Waitaki District Standard Specification for the Construction of New Vehicle Entrances (10.5.96 and its amendments). Or 2. Vehicle crossings shall be constructed on a well drained subgrade developed to give a CBR of not less than 12, with 150mm of compacted AP65 basecourse and 100mm of compacted M4/AP40 top course. The area shall be sealed	New vehicle crossings will be sealed from the road carriageway to 5.5m within the boundary as required.	Yes

with two coat Grade 4 / Grade 6 chip seal. In locations where there is no existing kerb and channel, the stormwater channels shall be maintained by the provision of a concrete culvert. The culvert shall have a wetted cross section of not less than 80% of the wetted cross section of the existing channel on the down-stream side of the vehicle crossing. To provide economical access for underground service installation and repair, concrete surfacing of vehicle crossings is not permitted. The area to be sealed shall be as follows: a. The full width of the vehicle crossing or service lane; and, b. Between the edge of the carriageway to the road boundary; and, c. The first 5.5m of the access within the site (as measured from the road boundary).		
12.2.2.c Location of Vehicle Crossings with Frontage in Relation to Intersections of Roads i. The following standards apply to all sites; except for sites that have frontage to an arterial road in the Rural G and S Zones: • Where the road frontage of the site or vehicle access lot lies entirely within 80 metres of an intersection, the vehicle crossing to the site or vehicle access lot shall be located on the access frontage within 12.0 metres of the side boundary of the site or vehicle access lot which is farthest from the intersection. • Where the road frontage of the site or vehicle access lot is greater than 80 metres in length, the vehicle crossing shall be located on the allowed access frontage at least 68.0 metres from the intersection.	New workshop vehicle crossing will be approximately 300m from Golden Point Road intersection. Vehicle crossing at eastern end of Macraes Road realignment approximately 460m from Golden Bar Road intersection. Vehicle crossing on Golden Point Road approximately 280m from Macraes Road intersection.	Yes
12.2.2.d Length of Vehicle Crossings The following crossing lengths shall apply: Land Use – Other Minimum 4.0m Maximum 9.0m The length of culverts and crossings shall be the actual length of channel covers or the length of the fully dropped kerb.	Vehicle crossings longer than this to accommodate large vehicle manoeuvring.	No, see assessment in Section 10.2
12.2.2.e Minimum Distance between Vehicle Crossings The minimum distance between any two vehicle crossings on the road frontage of any one development shall be 7m	No closely spaced vehicle crossings	Yes
12.2.2.f Maximum Number of Vehicle Crossings i. Arterial Road Frontage -No site shall have more than one vehicle crossing plus one vehicle crossing per km for sites with over 1km of road frontage. ii. Frontage to All Other Roads -No site shall have more than four vehicle crossings plus one vehicle crossing per km for sites with over 4km of road frontage.	Two vehicle crossings on northern side of Macraes Road east of Golden Point Road over 2.6km Two vehicle crossings on Golden Point Road between Macraes Road and Macraes Back Road (approx. 600m)	Yes
12.2.2.g Sight Distances from Vehicle Crossings	Sightlines in accordance with SISD, expected to be in the	Yes

Unobstructed sight distances, in accordance with minimum sight distances specified in Table 4, shall be available from all vehicle crossings to vehicles moving on the frontage road. Legal speed limit 100km/h- 195m minimum sight distance	order of 250m, will be confirmed at detailed design	
12.2.2.h Vehicle Oriented Commercial Activities i. Notwithstanding Rules 12.2.2.b, d and f above, all sites generating over 30 vehicle movements per day with any vehicle access directly onto arterial roads and sites generating 60 vehicle movements per day with vehicle access only onto other roads, shall comply with the following additional rules ii. Unobstructed sight distances, in accordance with Table 5 shall be available from all vehicle crossings Legal speed limit 100km/h- 275m minimum sight distance	Sightlines in accordance with SISD, expected to be in the order of 250m, will be confirmed at detailed design	Potential non-compliance depending on SISD standard. See assessment in Section 10.2

Appendix B Stage 1 Road Design Report - McIlroy Consultancy Limited

ROAD DESIGN REPORT

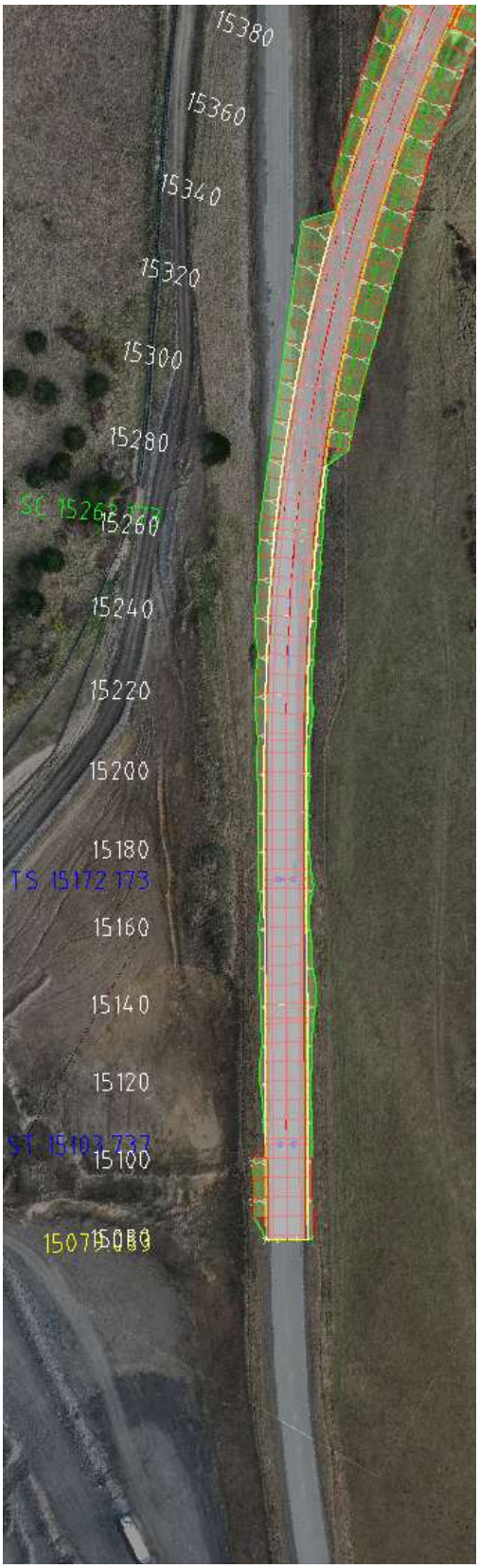
MACRAES ROAD REALIGNMENT

STAGE 1

CONCEPT DESIGN

Revision for Issue

Fraser Hocks / McIlroy Consultancy Ltd / August 2026



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Appendix A STAGE 1 PLAN AND LONG-SECTIONS

This document has been produced for New Zealand consenting purposes only. Information contained herein must not be relied on for investment purposes.

INTRODUCTION

OceanaGold (New Zealand) Limited ("**OGNZL**") currently undertakes open pit and underground gold mining operations at the Macraes Operation located at Golden Point Road, Macraes Flat, East Otago. As part of their ongoing operations, OGNZL continually review the remaining life of the Macraes Operation in light of updated knowledge of the gold resource and the economics of mining.

Reflecting recent exploration success and optimisation work, together with higher gold prices, the Macraes Phase Four Project ("**MP4**" or "**the Project**") seeks to extend the life of mining at the Macraes Operation until at least 2039. The Project, which will enable ongoing gold production at a rate of approximately 130,000 ounces per annum, is identified as a Listed Project in Schedule 2 of the Fast-track Approvals Act 2024 ("**FTAA**") as a project providing significant national or regional benefits.

To support the development of the substantive application for the Project, OGNZL has engaged McIlroy Consultancy Limited to provide an assessment of the Project's effects on the public road network and, to the extent required, identify any necessary management and operation measures to address any such effects.

The scope of this report is to provide a concept design for Stage 1 of the Macraes Road realignment which is necessitated by the proposed expansion of Innes Mills Pit (Stage 12). The concept design also includes the T intersection to Golden Bar Road. The concept design for a realignment of Golden Bar Road itself was recently authorised as part of the Continuity Consents Project Stage 2 (CCP2).

This design report has been prepared for OGNZL to accompany the road realignment concept drawings, attached in Appendix A, prepared in support of the substantive application for approvals for MP4 under the FTAA. The Stage 1 realignment is approximately 1,120m long but it adds no additional length to the existing road as shown in Figure 1. It simply replaces 2 existing curves with a single curve that is located 80m back from the proposed IM12 pit boundary.

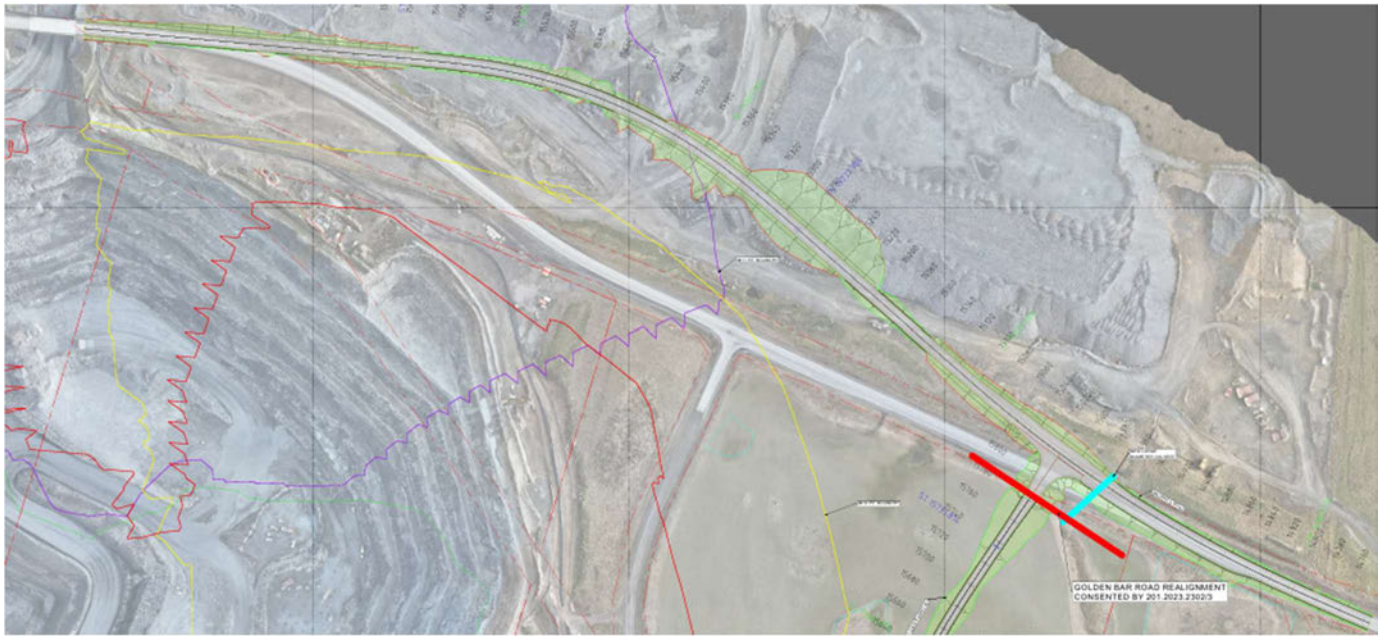


Figure 1; Extent of Stage 1 Macraes Road Realignment

The extent of the Stage 1 realignment in context of the Innes Mills footprint is shown in Figure 2 below.

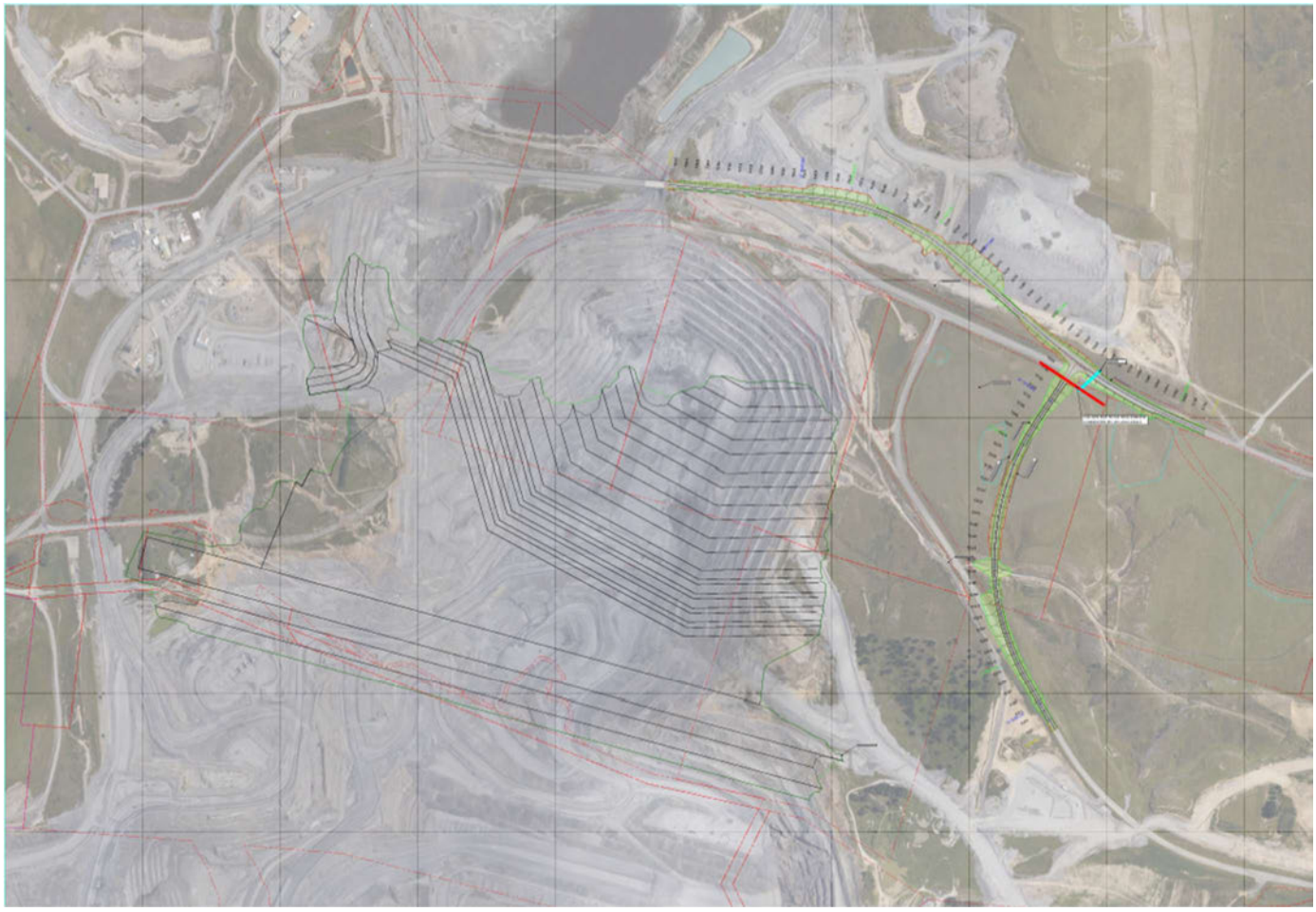


Figure 2; Extent of Stage 1 Macraes Road Realignment in context to the Innes Mills Footprint

Site Location and Description

OGNZL owns and operates the Macraes Operation at Macraes, approximately 30 km northwest of Palmerston in the Otago Region. The Macraes Operation is the largest gold mine in New Zealand and, since commissioning in 1990, has produced more than 6 million ounces of gold.

Macraes Flat is situated on an elevated plateau at approximately 500 m above sea level. The plateau is flanked by the Taieri Ridge to the northwest, Shag Valley and Horse Range to the east, and the coastal hills and extinct volcanic cones of Palmerston and Waikouaiti to the southeast. Macraes Road provides access to Macraes Flat and the Macraes Operation, connecting to State Highway 85 to the east and State Highway 87 (SH87, the Middlemarch–Hyde Road) to the west.

The environment within and surrounding the Macraes Operation has been shaped by historic and current mining activities. Figure 3 shows the arrangement of the major mine features at the Macraes Operation. In summary, the current components of the Macraes Operation include:

- Numerous open pits (both operational and non-operational);
- Two underground mines (Frasers, now closed, and Golden Point, which is actively mined);
- Waste rock stacks at various stages of operation and rehabilitation;
- A network of haul roads and general mine service tracks;
- A Processing Plant;

- Five tailings storage facilities (three inactive, one active but nearing capacity, and one under construction and currently receiving tailings);
- An extensive network of water management infrastructure, including diversion drains, silt ponds, sumps, pit lakes, and freshwater storage reservoirs;
- Two consented but not yet constructed water storage reservoirs (Camp Creek Dam and Coal Creek Dam); and
- Associated infrastructure supporting ongoing operations, including district roads, powerlines, workshops, offices, and associated water and amenity facilities.

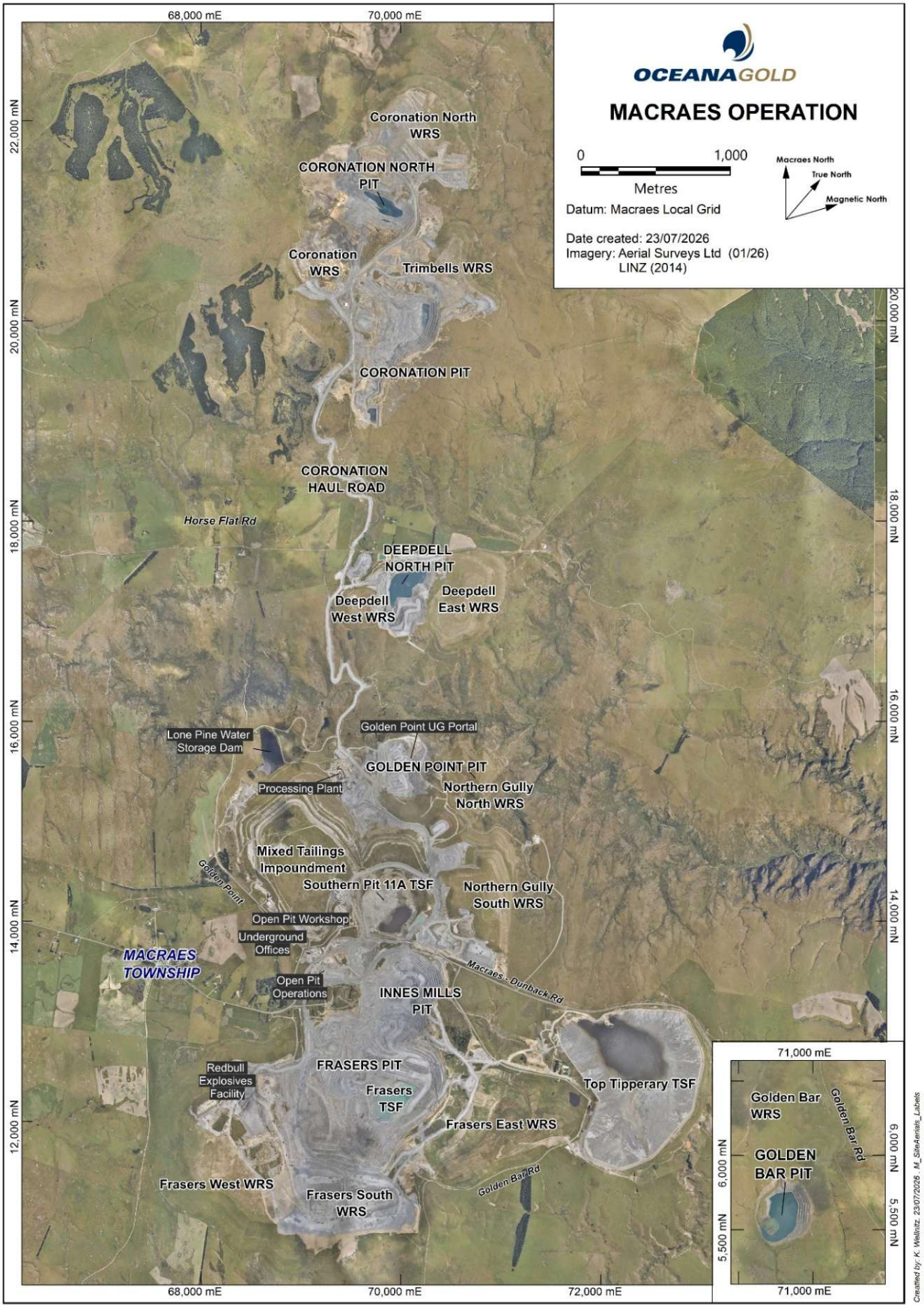


Figure 3: Existing site layout at the Macraes Operation (as of July 2026)

Project Overview

The Project is made up of the following proposed key activities:

- **Open pit extensions** at Coronation, Coronation North, Innes Mills, and Golden Bar.
- **Underground mine expansion** through further development of the Golden Point Underground mine ("**GPUG**").
- **Tailings management**, including:
    - Construction of the Frasers Tailings Storage Facility ("**FTSF**") Stage 3 to accommodate a total tailings storage of up to 153 Mt; and
    - Hydraulic mining and relocation of tailings from the Mixed Tailings Impoundment ("**MTI**"), Southern Pit Option 10 TSF ("**SP10**"), and Southern Pit Option 11A TSF ("**SP11**") to FTSF.
- **Waste rock disposal**, including increased storage capacity within open pits and at existing waste rock stacks at Coronation, Coronation North, Innes Mills, Golden Bar, Golden Point, and Frasers.
- **Water management infrastructure and operations**, including:
    - Construction of Camp Creek and Coal Creek water storage dams for flow and water quality management;
    - Construction, operation and maintenance of a Water Treatment Plant; and
    - Ongoing operation and maintenance of the Mine Water Management System ("**MWMS**").
- **Infrastructure and roading works**, including:
    - Realignment of Macraes Road in two stages; and
    - Relocation of the Open Pit Mining Workshop.
- **Ecological enhancements**, including establishment of:
    - Murphys Ecological Enhancement Area ("**MEEA**") near Murphys Creek, including predator fencing, access tracks, and site facilities;
    - Mt Highlay restoration area;
    - Cranky Jims Link shrubland enhancement area;
    - Murphys Link tussock protection area; and
    - Additional compensation measures for residual ecological impacts.
- **Mine closure and rehabilitation activities**, including rehabilitation of mining landforms, creation of pit lakes, dry capping of tailings storage facilities, and revegetation in accordance with closure objectives.

An overview of the proposed activities which make up the Project is shown in Figure 4 below.

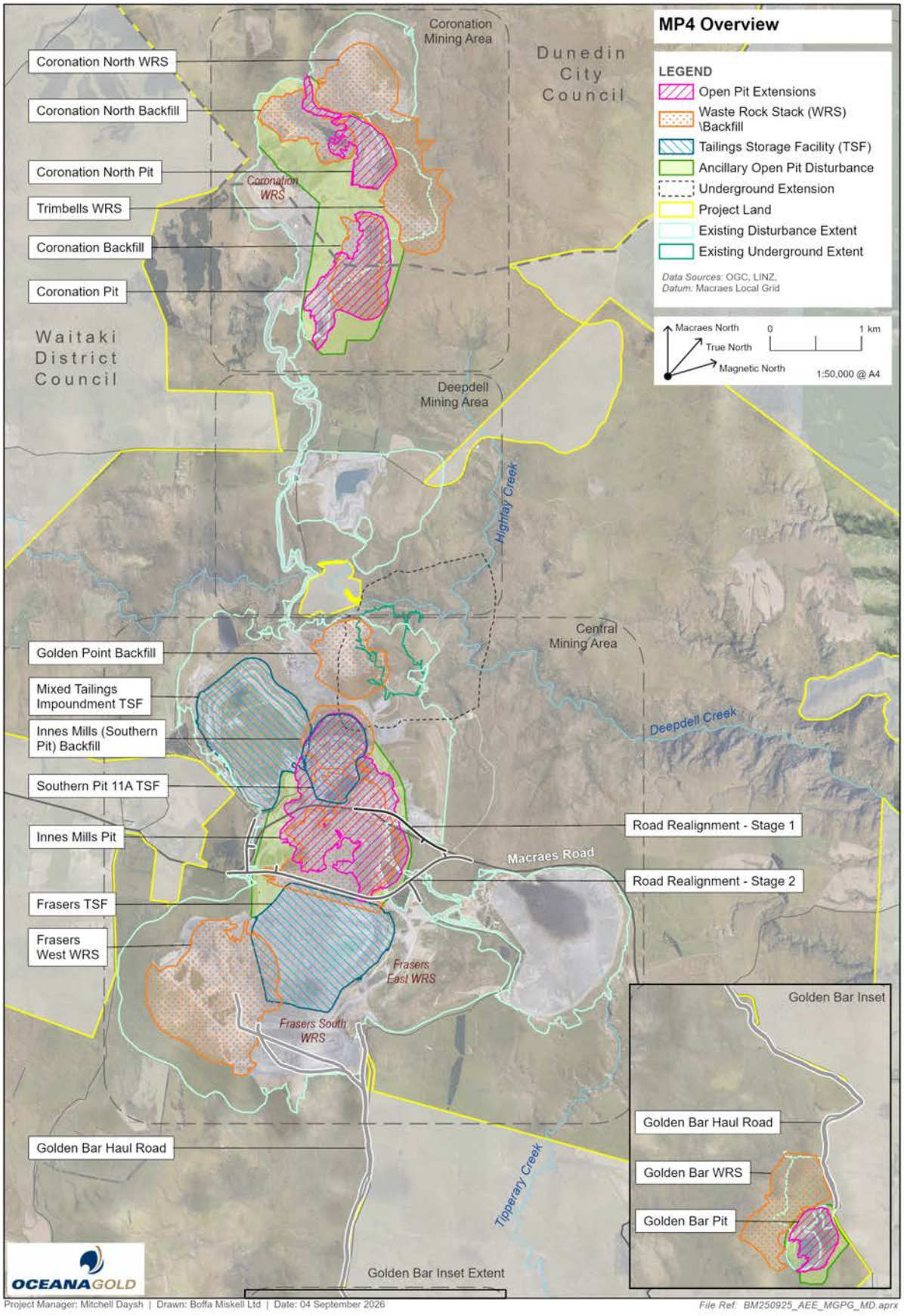


Figure 4: MP4 Overview Plan

Existing Roading

The existing road network consists of the high speed Macraes Road (Figure 5 posted 100km/h) and the local Golden Bar Road, with a singular tee intersection. These roads run through open Otago country plains which are either grassed or covered with red tussock. There is no large vegetation (trees) within the existing road reserve or further away from the road. The road alignment is generally straight in nature utilizing the existing topography. No large earthworks cuts or fills exist close to the road edge. The typical road formation is shown in Figure 5 below.

The existing Macraes Road that will be engulfed by the IM12 pit expansion was a recent realignment itself, being completed in 2020. It adjoins to the east with a similarly surfaced 2 coat chip seal with 3.5m lanes. The 2020 section was constructed with variable width sealed shoulders, the minimum being 1m. The new realignment, the subject of this report, will have minimum 1.2m wide sealed shoulders. Deep wide shoulder drains have been formed in locations where required. These have been formed with 1V:4H or flatter batter slopes from the shoulder edge, with the drain invert several meters back from the edge of carriageway, leaving plenty of runoff area.

In areas where larger cuts were required, typically a relatively steep 1V:2H batter slope has been utilized. In fill situations a 1V:4H (recoverable slope) has been utilized.

The existing T intersection of the two roads has been constructed with a left turn slip lane (approx. 120m total length), however no lane or shoulder widening opposite the intersection, such as a basic right turn (BAR) type intersection, has been provided. It is of note that a relatively large table drain exists in the shoulder opposite the intersection, which poses a hazard for errant vehicles.

Stantec's Transport Assessment lists the existing portions of Macraes Rd east of the Macraes Operation as having an average daily traffic (ADT) of 800 vehicles per day with 40% heavy vehicles. However, the Mobile Road App states an ADT of 475 with 26% heavy vehicles (est 30/06/2025) and Golden Bar Road as having an ADT of 5 with 13% heavy vehicles (est 18/06/2023). The designers expect that these figures will not be adversely affected by any proposed works.

Figure 5; Typical Macraes Road section

DESIGN

Alignment Location

OGNZL proposes that Macraes Road be realigned into a location that does not impede the proposed mine expansion and takes into account road safety considerations. This means that the revised location of the road should be sufficiently set back from the deep open cut of the mine to ensure that any geological impacts of the deep cutting for the mine is allowed for, and does not cause possible subsidence / movement of the existing subgrades that might impact the road in its new location. An 80m setback from road edge to the edge of the proposed pit has been utilized when designing the proposed alignment. This large setback also ensures that an errant vehicle, even at high speeds, is provided with a very large runoff area and is therefore very unlikely to enter the mine area.
However, this setback has been reduced to 70m at the western end of Macraes Road as it approaches the existing bridge over a mine haul road. This is due to the position of the bridge limiting the setback of the road on its existing alignment and with very little alignment length in order to be able to reposition the road further back while staying within design guidelines / standards for the proposed posted speed.

Carriageway and Pavement

Macraes Road is to be constructed to generally match the existing carriageway formation. The proposed formation is to be made up of 2 x 3.5m lanes with a 1.2m wide sealed shoulder and a further 0.8m wide unsealed shoulder. All fill batter slopes are to be 1V:4H with cuts at 1V:2H.
Pavement design is to be constructed on a subgrade with a minimum CBR 10, which will be achieved in the natural and recompacted schist fill. CBR10 may not be achieved in the overlying loess material which will then need to be undercut. The proposed pavement design is as per previous works in this area with a minimum of 170mm deep AP65 followed by a 120mm deep TNZ M/4 AP40 and two coat chip seal (G3/5).
There are no major geotechnical risks associated with the road cuts that cannot be adequately managed during the detailed design and construction process.
The realignment includes cuts into insitu shist rock and into schist rockfill. Some areas may include a thin cover of loess or colluvial soils. OceanaGold has considerable experience constructing cut batter slopes within all these materials as part of open pit mining, infrastructure development and for previous realignments of Macraes Road. The proposed cuts are considered reasonable on the basis of site experience, however the final stable cut slope profiles will need to be determined on the basis of both further investigation prior to detailed design and also the observational method during construction.

Geometric Design

Macraes Rd is to be constructed geometrically in accordance with Austroads standards as well as NZTA Traffic Control Devices Manual and MOTSAM. A design speed of 100km/h has been selected for Macraes Road. Austroads Part 3 Section 3.1 suggests designing roads with an additional 10km/h to the proposed posted speed limit. However, a design speed of 100km/h has been selected for Macraes Road consistent with the posted speed limit due to a very high percentage of heavy vehicles with relatively short lengths of straight. The designers believe that the high proportion of heavy vehicles and the limited length of straights will prevent these larger vehicles from attaining higher speeds. The higher proportion of heavy vehicles also means that cars will likely have their operating speed limited.

Macraes Road runs through flat terrain which means that vertical grades are relatively flat. The steepest longitudinal grade is 3.5%. Horizontally, with the restrictions of the pit offset, there are some relatively tight horizontal curves in order to realign the road to suit. This does result in some steeper superelevation to cater for the speed requirements of this road (posted 100km/h). Of note a curve at RP.15.40 has a superelevation of 8%. A large cut will occur between RP.15.2 and RP.15.4. This cut is on the outside of a horizontal curve and will not impede sightlines for the road. The stormwater design will be included in the detailed design.

Geometric Design - Intersection

The intersection between Macraes and Golden Bar Roads is to be constructed geometrically in accordance with Austroads standards as well as NZTA Traffic Control Devices Manual (TCD) and MOTSAM. The designers propose that the revised intersection be an improvement on the existing design. Any specific traffic safety matters will be addressed by Stantec and captured in detailed design.

The designers propose that the Design and Check Vehicle be an Austroads B-Double (25m) truck. This vehicle is larger than the maximum NZTA design vehicle of a Large Rigid Truck (11.5m). The reason for this is to allow for larger vehicles that will need to access the mine site with large machinery. No assessment for over-dimension vehicles has been undertaken as this is not part of the NZTA High Productivity Motor Vehicles (HPMV) network.
The left turn slip lane has been retained from the original intersection, however this has been lengthened to 160m. For a design speed of 100km/h and a design speed (cars) on exit of curve of 20km/h a 150m lane length would typically be selected. Due to the high proportion of heavy vehicles, a longer length of 160m has been chosen. The physical taper length (T) to this left turn has been reduced to the minimum standard of 30m for rural locations. This assists in providing clearer definition of the turn lane and, due to the left slip starting on a right handed curve (1000mR) will make it easier for longer vehicles such as a B-Double to enter the slip lane earlier as they decelerate.
A BAR type treatment (3.5m additional seal width) has been provided for right turning vehicles. This treatment provides sufficient trafficable width for the design vehicle to pass on the left of a stationary turning vehicle. This is achieved by widening the shoulder to provide a minimum width sufficient to allow the vehicles to pass. A substantial speed reduction (potentially half of the design speed =50km/h) is a feature of this layout.
An assessment of Safe Intersection Sight Distance (SISD) has been undertaken and this shows that in excess of 300m of sight distance can be provided from / to the intersection as per Austroads Part 4A Section 3.2.2.

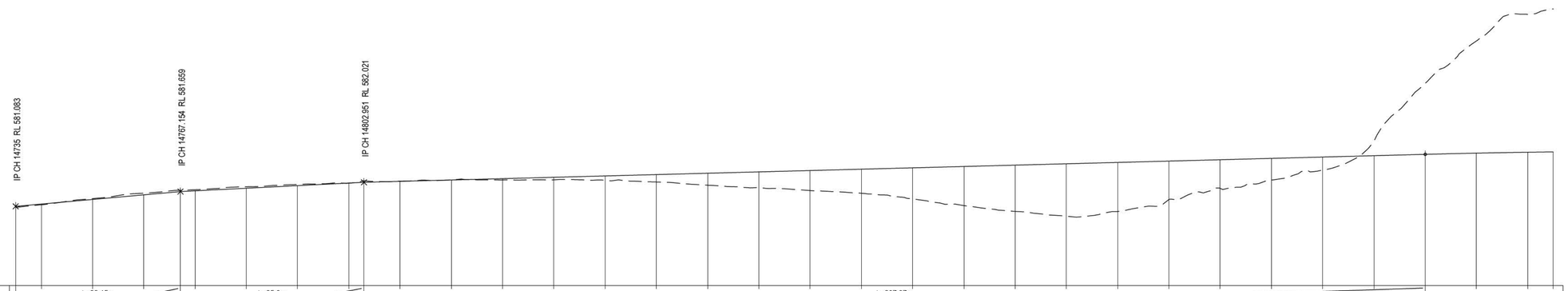
Linemarking and Signage

Although linemarking and signage will not be done until the detailed design stage the intention is to provide a centerline (with no-overtaking linemarking if required) throughout the revised network with the intersection receiving linemarking and signage as per TCD and MOTSAM. The intersection will be assessed for STOP/GIVE WAY but is likely to remain as a GIVEWAY control.

APPENDIX A

STAGE 1 PLAN AND LONG-SECTIONS

12d Model
Scale 1:1000
Wed Apr 1 11:15:25 2026



DATUM RL. 578.00

VERTICAL ALIGNMENT	L=32.15m G=1.79%				L=35.8m G=1.01%																L=207.07m G=0.53%														K=85.76 L=110m	
HORIZONTAL ALIGNMENT					L=68.71m R=3450m																L=293.95m R=1000m															
LEVEL DIFFERENCE CUT - / FILL +	0.04	0.03	-0.03	-0.06	-0.05	-0.04	-0.06	-0.05	0.01	-0.06	-0.01	0.00	0.05	0.10	0.17	0.29	0.47	0.61	0.78	0.94	1.21	1.53	1.80	2.04	1.91	1.50	1.12	0.85	0.51	-0.56	-2.76	-4.37	-5.37	-5.57
DESIGN SURFACE LEVEL	581.083	581.172	581.352	581.531	581.659	581.688	581.789	581.89	581.991	582.021	582.058	582.111	582.163	582.216	582.268	582.321	582.374	582.426	582.479	582.532	582.584	582.637	582.689	582.742	582.795	582.847	582.9	582.953	583.005	583.058	583.11	583.157	583.192	583.206
EXISTING SURFACE LEVEL	581.04	581.14	581.38	581.60	581.71	581.73	581.85	581.94	581.99	582.08	582.07	582.11	582.11	582.12	582.10	582.03	581.91	581.81	581.70	581.59	581.37	581.11	580.89	580.70	580.88	581.35	581.78	582.11	582.50	583.62	585.67	587.53	588.56	588.78
CHAINAGE	14735	14740	14750	14760	14767.15	14770	14780	14790	14800	14802.95	14810	14820	14830	14840	14850	14860	14870	14880	14890	14900	14910	14920	14930	14940	14950	14960	14970	14980	14990	15000	15010	15020	15030	15035
SUPER ELEVATION	LHS and RHS -3%						RHS -3%																LHS 3.3%													
																							RHS -3.3%													

14735 14750 14782.7 14814 14818 15035

LONGITUDINAL SECTION - ROAD01

HORZ 1:500 VERT 1:100

LONGITUDINAL SECTION

12d Model
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Vertical Scale 1:100
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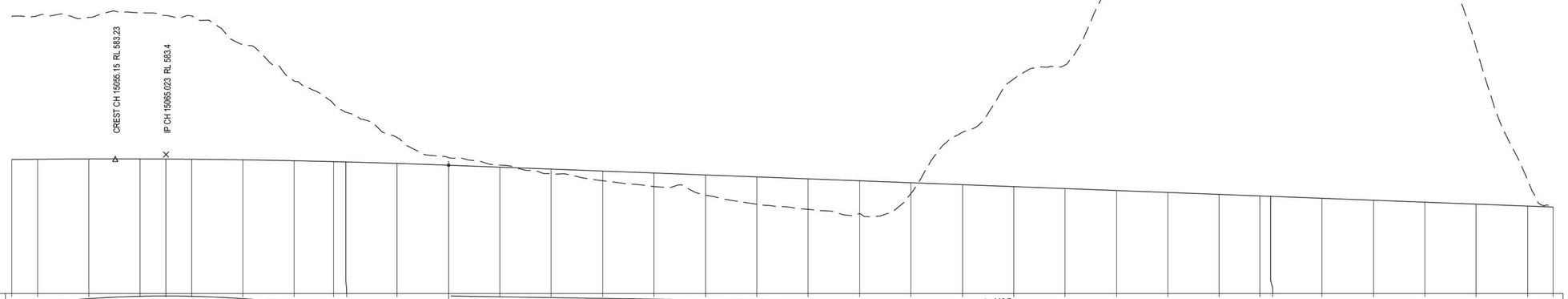

DATUM RL. 578.00

VERTICAL ALIGNMENT	K=85.76 L=110m; L=446.7m G=-0.76%
HORIZONTAL ALIGNMENT	L=293.95m R=1000m; L=180.24m; SPIRAL L=90m

CHAINAGE	LEVEL DIFFERENCE CUT - / FILL +	DESIGN SURFACE LEVEL	EXISTING SURFACE LEVEL
15035	-5.57	583.206	588.78
15040	-5.58	583.216	588.80
15050	-5.50	583.228	588.73
15060	-5.69	583.228	588.91
15065.02	-5.58	583.224	588.81
15070	-5.57	583.216	588.79
15080	-4.49	583.193	587.68
15090	-3.10	583.159	586.25
15097.66	-2.24	583.124	585.36
15100	-1.94	583.112	585.05
15110	-1.00	583.054	584.06
15120	-0.30	582.984	583.28
15130	-0.08	582.909	582.99
15140	0.18	582.833	582.65
15150	0.38	582.757	582.38
15160	0.53	582.682	582.15
15170	0.78	582.606	581.83
15180	1.06	582.53	581.47
15190	1.19	582.455	581.27
15200	1.28	582.379	581.10
15210	0.42	582.303	581.88
15220	-2.03	582.228	584.26
15230	-4.19	582.152	586.34
15240	-4.80	582.076	586.88
15250	-8.85	582.001	590.85
15260	-13.25	581.925	595.17
15270	-15.73	581.85	597.58
15277.9	-14.99	581.79	596.78
15280	-15.16	581.774	596.93
15290	-15.30	581.698	596.99
15300	-14.60	581.623	596.22
15310	-11.39	581.547	592.94
15320	-6.08	581.471	587.55
15330	-1.02	581.396	582.42
15335	-0.03	581.358	581.39

SUPER ELEVATION: LHS 3.3%; RHS -3.3%; RHS -3%; LHS -3%

15035 15083 15087 15118.7 15151 15244 15277.9 15311

LONGITUDINAL SECTION - ROAD01

HORZ 1:500 VERT 1:100

LONGITUDINAL SECTION

12d Model
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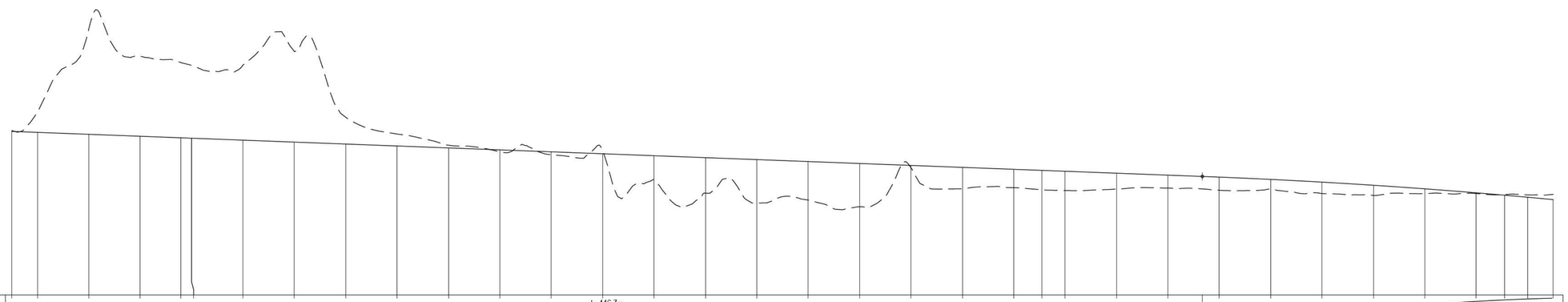

DATUM RL. 575.00

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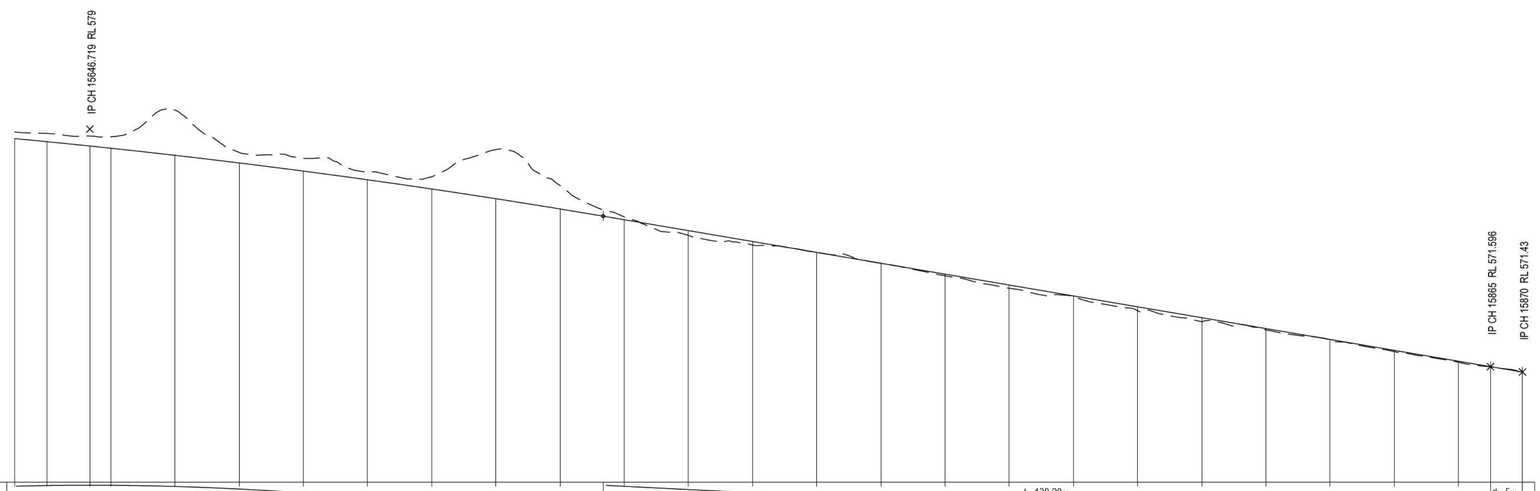

DATUM RL. 568.00

VERTICAL ALIGNMENT: K=60.71, L=160m; L=138.28m, G=-3.39%; L=5m, G=-3.32%

HORIZONTAL ALIGNMENT: L=244.49m

CHAINAGE	LEVEL DIFFERENCE CUT - / FILL +	DESIGN SURFACE LEVEL	EXISTING SURFACE LEVEL
15635	-0.20	578.705	578.91
15640	-0.26	578.609	578.86
15646.72	-0.31	578.473	578.78
15650	-0.36	578.404	578.76
15660	-1.41	578.183	579.59
15670	-0.33	577.945	578.27
15680	-0.40	577.691	578.09
15690	-0.24	577.421	577.66
15700	-0.38	577.134	577.51
15710	-1.53	576.83	578.36
15720	-0.73	576.511	577.24
15730	-0.09	576.175	576.26
15740	0.15	575.838	575.69
15750	0.11	575.497	575.39
15760	0.00	575.158	575.16
15770	-0.00	574.818	574.82
15780	0.05	574.479	574.43
15790	0.10	574.14	574.04
15800	0.03	573.801	573.77
15810	0.12	573.462	573.34
15820	0.12	573.122	573.00
15830	0.04	572.783	572.74
15840	0.03	572.444	572.42
15850	0.04	572.105	572.06
15860	0.03	571.766	571.74
15865	0.00	571.596	571.59
15870	-0.00	571.43	571.43

SUPER ELEVATION: LHS -3% (15635–15660); LHS and RHS -3% (15660–15870)

LONGITUDINAL SECTION - ROAD01

HORZ 1:500 VERT 1:100

LONGITUDINAL SECTION

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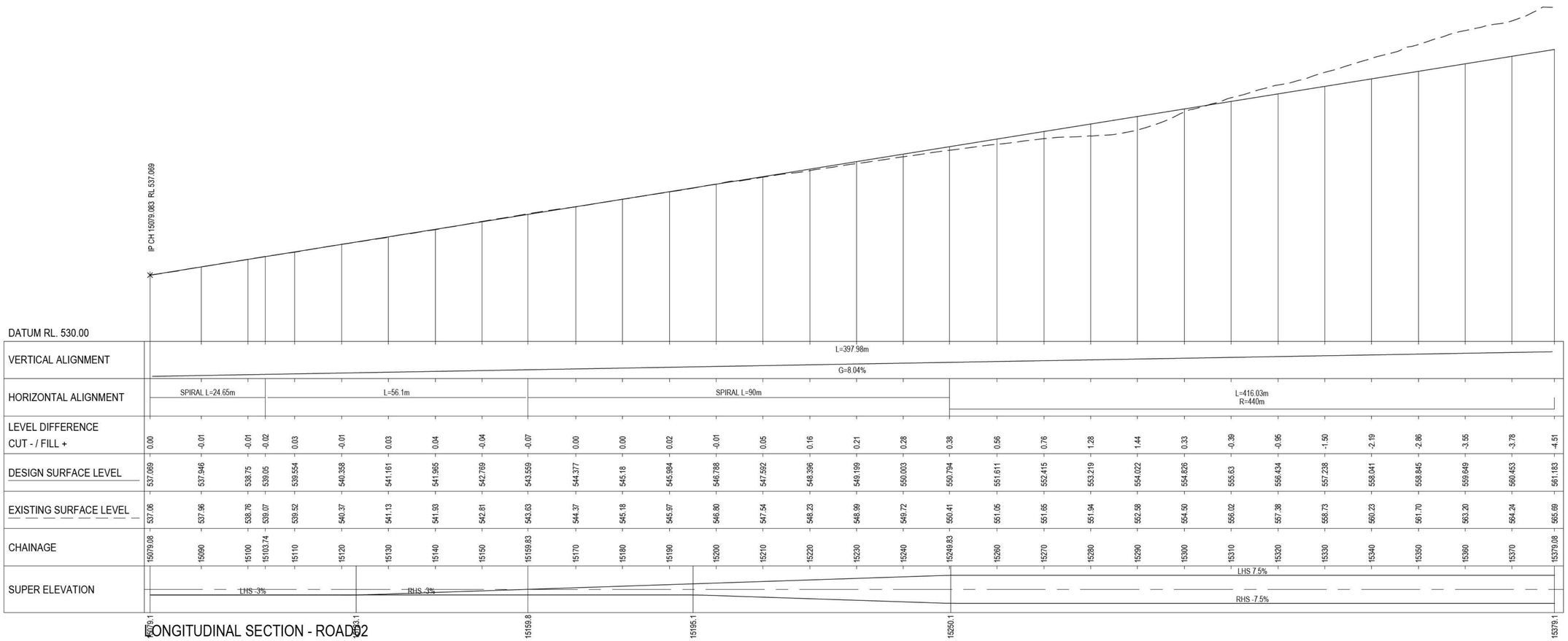

LONGITUDINAL SECTION - ROAD 02

HORZ 1:500 VERT 1:250

LONGITUDINAL SECTION

12d Model
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Vertical Scale 1:250
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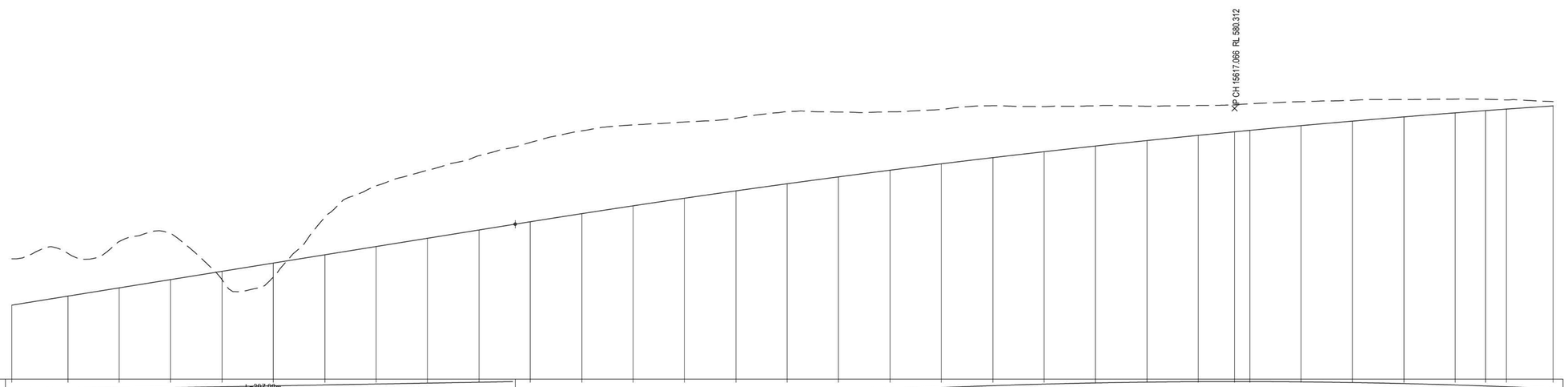

DATUM RL. 554.00

VERTICAL ALIGNMENT	L=397.98m G=8.04% K=43.11 L=280m
HORIZONTAL ALIGNMENT	L=416.03m R=440m SPIRAL L=90m
LEVEL DIFFERENCE CUT - / FILL +	-4.51 -4.16 -4.50 -4.48 0.80 1.37 -3.64 -5.90 -6.61 -7.23 -7.71 -8.05 -7.87 -7.41 -7.07 -7.01 -6.31 -5.68 -5.28 -5.05 -4.39 -3.91 -3.34 -2.90 -2.63 -2.58 -2.33 -2.02 -1.68 -1.34 -1.11 -0.89 -0.41
DESIGN SURFACE LEVEL	561.183 562.06 562.864 563.668 564.472 565.276 566.08 566.883 567.687 568.491 569.294 570.079 570.841 571.58 572.296 572.989 573.658 574.305 574.928 575.527 576.104 576.657 577.188 577.695 578.039 578.179 578.839 579.077 579.491 579.882 580.101 580.25 580.564
EXISTING SURFACE LEVEL	565.69 566.22 567.37 568.15 563.67 563.91 569.72 572.78 574.30 575.72 577.00 578.13 578.71 578.99 579.36 580.00 579.97 579.98 580.21 580.58 580.50 580.56 580.53 580.60 580.67 580.76 580.97 581.10 581.17 581.22 581.21 581.14 580.98
CHAINAGE	15379.08 15390 15400 15410 15420 15430 15440 15450 15460 15470 15480 15490 15500 15510 15520 15530 15540 15550 15560 15570 15580 15590 15600 15610 15617.07 15620 15630 15640 15650 15660 15665.86 15670 15679.08
SUPER ELEVATION	LHS 7.5% RHS -7.5%

15379.1 15665.1

LONGITUDINAL SECTION - ROAD02

HORZ 1:500 VERT 1:250

LONGITUDINAL SECTION

12d Model
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Vertical Scale 1:250
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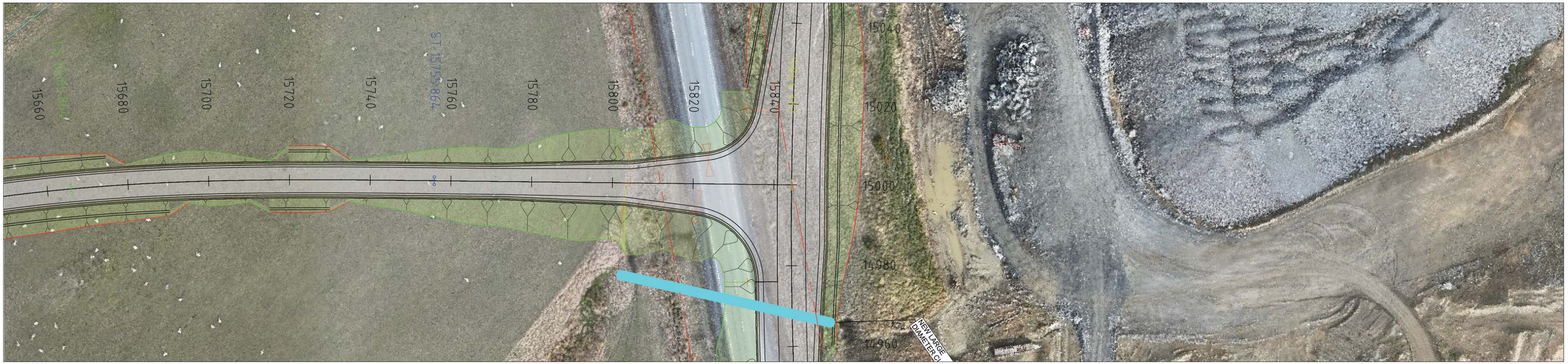
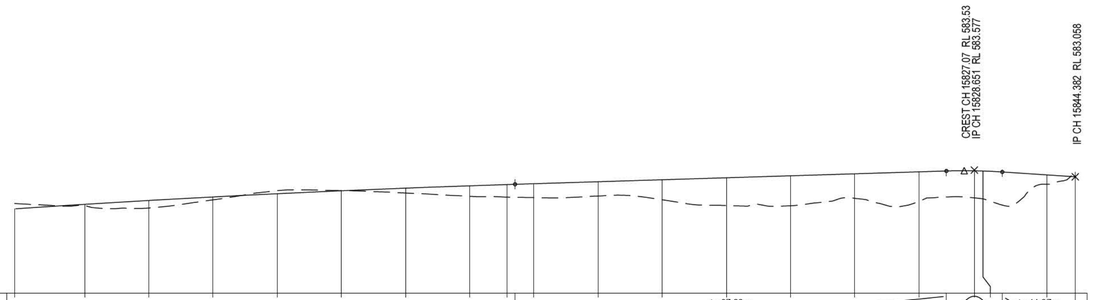




DATUM RL. 574.00

VERTICAL ALIGNMENT	K=43.11 L=280m								L=67.23m G=1.54%									K=1.8 L=8.72m		L=11.37m G=-3.3%		
HORIZONTAL ALIGNMENT	SPIRAL L=90m								L=88.52m													
LEVEL DIFFERENCE CUT - / FILL +	-0.41	0.14	0.59	0.21	-0.27	-0.03	0.37	0.82	0.98	1.08	1.11	1.56	2.16	2.34	1.91	2.33	2.11	2.17	0.73	-0.56		
DESIGN SURFACE LEVEL	580.564	580.916	581.214	581.489	581.741	581.97	582.175	582.358	582.454	582.518	582.672	582.826	582.981	583.135	583.289	583.443	583.524	583.507	583.202	583.058		
EXISTING SURFACE LEVEL	580.98	580.78	580.63	581.28	582.02	582.00	581.81	581.54	581.47	581.44	581.56	581.27	580.82	580.80	581.38	581.11	581.42	581.33	582.48	583.62		
CHAINAGE	15679.08	15690	15700	15710	15720	15730	15740	15750	15755.86	15760	15770	15780	15790	15800	15810	15820	15828.65	15830	15840	15844.38		
SUPER ELEVATION																						
					15720.1				15755.9				15792.1	15800.1							15803.1	

RHS -3%

LHS -3%

LONGITUDINAL SECTION - ROAD02

HORZ 1:500 VERT 1:250

LONGITUDINAL SECTION

12d Model
Horizontal Scale 1:500
Vertical Scale 1:250
01-Apr-2026 11:04:49

Appendix C Stage 2 Road Design Report - McIlroy Consultancy Limited

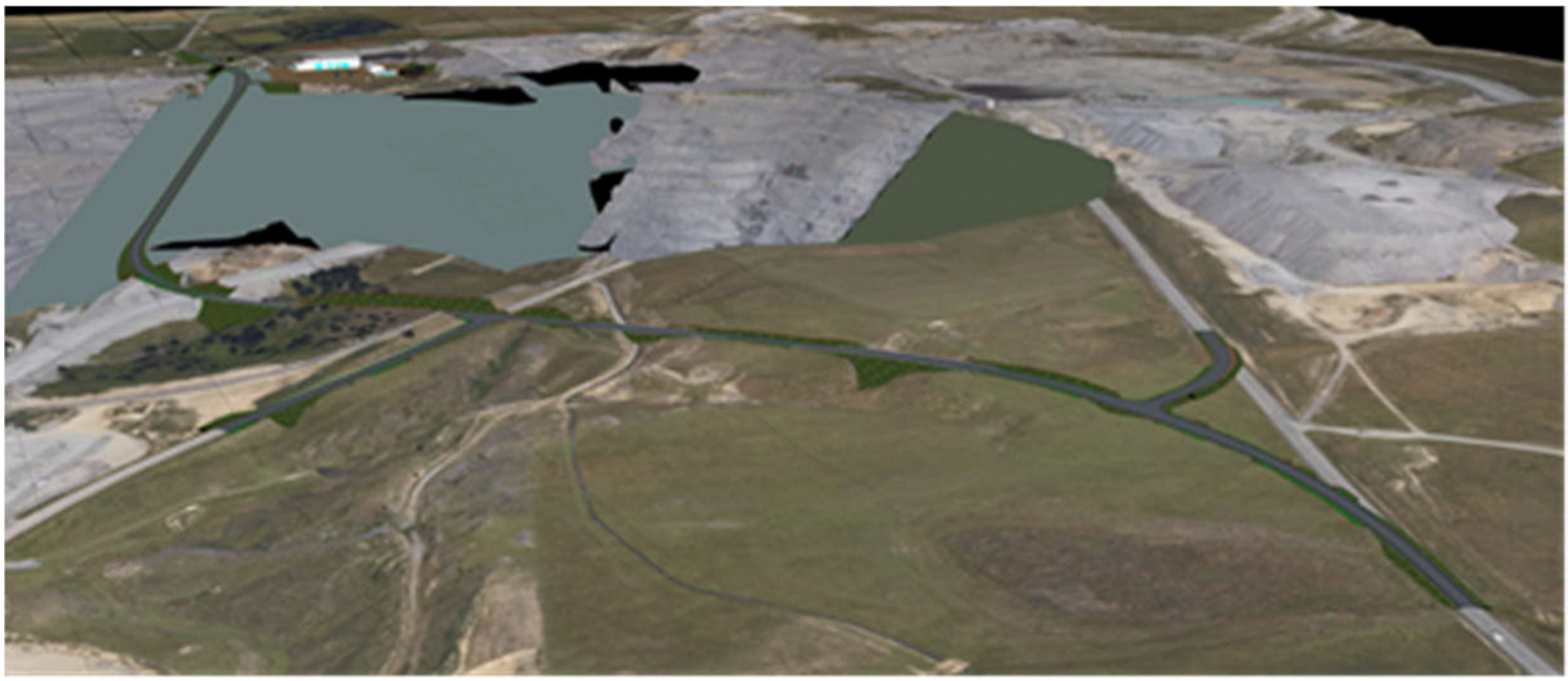
ROAD DESIGN REPORT

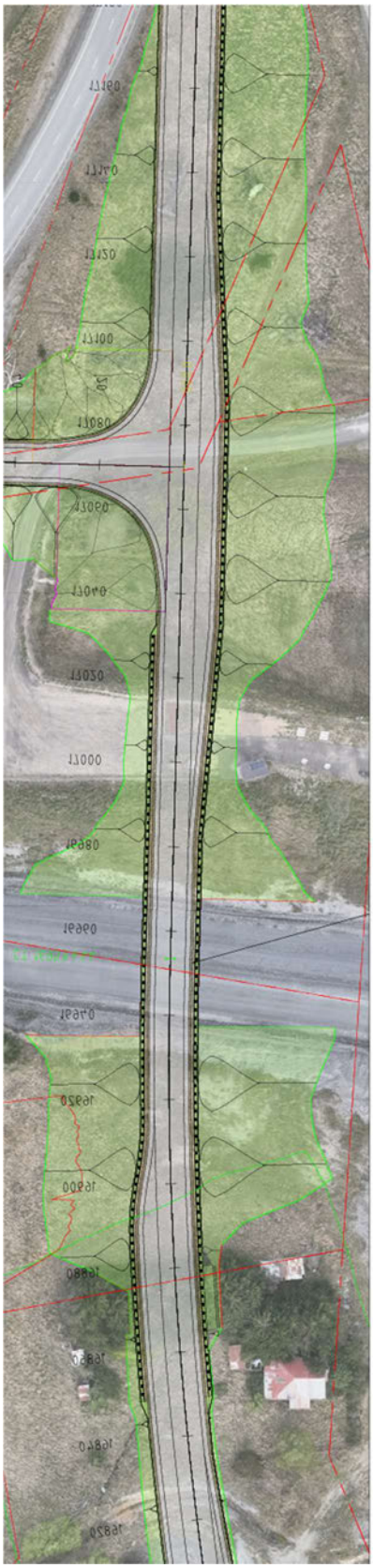
MACRAES ROAD REALIGNMENT

Stage 2

Revision for Issue

Fraser Hocks / McIlroy Consultancy Ltd / August 2026





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Alignment Location 7

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Geometric Design – Roads 7

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Geometric Design – Workshop Intersection 8

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New Bridge 10

Linemarking and Signage 10

Appendix A 11

Stage 2 Plan and Long-sections

INTRODUCTION

OceanaGold (New Zealand) Limited ("**OGNZL**") currently undertakes open pit and underground gold mining operations at the Macraes Operation located at Golden Point Road, Macraes Flat, East Otago. As part of their ongoing operations, OGNZL continually review the remaining life of the Macraes Operation in light of updated knowledge of the gold resource and the economics of mining.

Reflecting recent exploration success and optimisation work, together with higher gold prices, the Macraes Phase Four Project ("**MP4**" or "**the Project**") seeks to extend the life of mining at the Macraes Operation until at least 2039. The Project, which will enable ongoing gold production at a rate of approximately 130,000 ounces per annum, is identified as a Listed Project in Schedule 2 of the Fast-track Approvals Act 2024 ("**FTAA**") as a project providing significant national or regional benefits.

To support the development of the substantive application for the Project, OGNZL has engaged McIlroy Consultancy Limited to provide an assessment of the Project's effects on the public road network and, to the extent required, identify any necessary management and operation measures to address any such effects.

To support the development of the substantive application for the Project, OGNZL has engaged McIlroy Consultancy Limited to provide an assessment of the Project's effects on the public road network and, to the extent required, identify any necessary management and operation measures to address any such effects.

The scope of this report is to provide a concept design for Stage 2 of the Macraes Road realignment which is necessitated by the proposed expansion of Innes Mills Pit (Stage 13). Expansion of the Innes Mills pit to the North, referred to as IM13, cuts across both the existing Macraes Road and the proposed Stage 1 alignment. New intersections on the realigned section of Macraes Road are required to facilitate connection to Golden Bar Road, Golden Point Road, and to provide for internal mine accesses.

This design report has been prepared for OGNZL to accompany the road realignment concept drawings, attached in Appendix A, prepared in support of the substantive application for approvals for MP4 under the FTAA

The proposed realignment traverses over the top of the Frasers backfill, which is yet to be constructed, realigning Macraes Road to the south of the proposed mine expansion. This will allow the pit to be expanded northward, unimpeded by any public roading network. The 2.84km realignment will shorten the length of road by approximately 200m as shown in Figure 1.

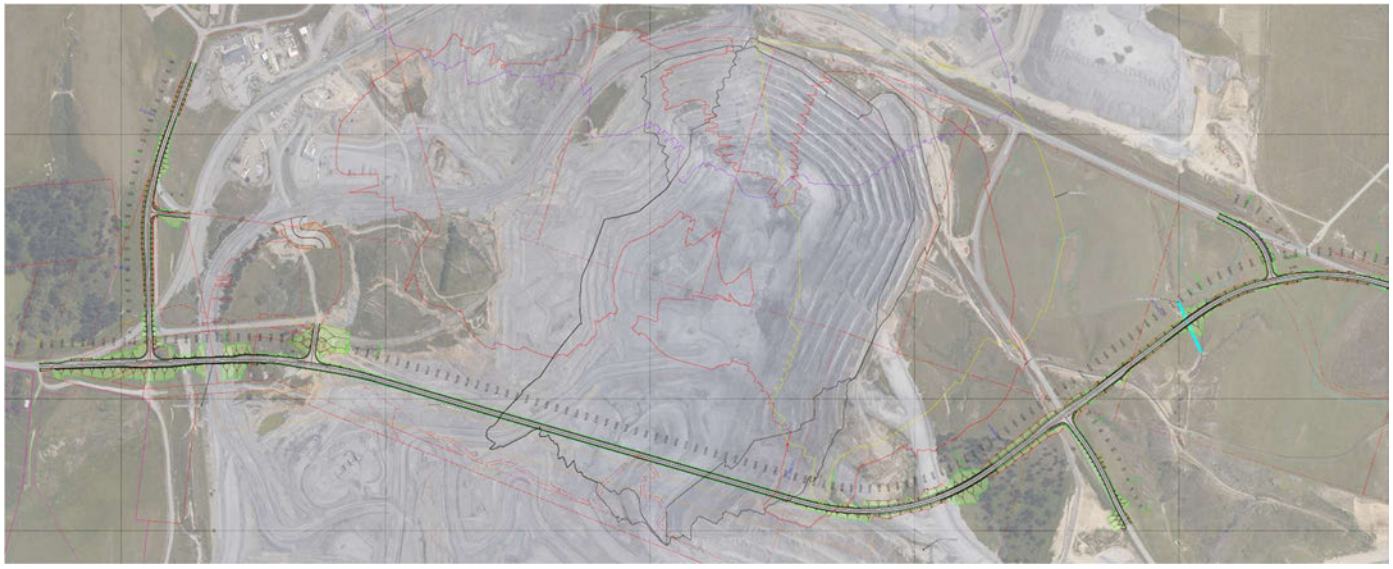


Figure 1; Extent of Stage 2 Macraes Road Realignment

The works proposed are to keep the same road formation standards and posted speed limits, but to relocate these roads into locations that mean they do not impede the expansion of the open cut mine site and which provides for road safety considerations.

In addition to the road alignment, Frasers Backfill Embankment (FRBF) will also accommodate channelization of the Waikouaiti North Branch stream. This ephemeral stream will run parallel and south of the road alignment at a sufficient distance that it presents no hazard to the road function.

Site Location and Description

OGNZL owns and operates the Macraes Operation at Macraes, approximately 30 km northwest of Palmerston in the Otago Region. The Macraes Operation is the largest gold mine in New Zealand and, since commissioning in 1990, has produced more than 6 million ounces of gold.

Macraes Flat is situated on an elevated plateau at approximately 500 m above sea level. The plateau is flanked by the Taieri Ridge to the northwest, Shag Valley and Horse Range to the east, and the coastal hills and extinct volcanic cones of Palmerston and Waikouaiti to the southeast. Macraes Road provides access to Macraes Flat and the Macraes Operation, connecting to State Highway 85 to the east and State Highway 87 (SH87, the Middlemarch–Hyde Road) to the west.

The environment within and surrounding the Macraes Operation has been shaped by historic and current mining activities. Figure 2 shows the arrangement of the major mine features at the Macraes Operation. In summary, the current components of the Macraes Operation include:

- Numerous open pits (both operational and non-operational);
- Two underground mines (Frasers, now closed, and Golden Point, which is actively mined);
- Waste rock stacks at various stages of operation and rehabilitation;
- A network of haul roads and general mine service tracks;
- A Processing Plant;
- Five tailings storage facilities (three inactive, one active but nearing capacity, and one under construction and currently receiving tailings);
- An extensive network of water management infrastructure, including diversion drains, silt ponds, sumps, pit lakes, and freshwater storage reservoirs;
- Two consented but not yet constructed water storage reservoirs (Camp Creek Dam and Coal Creek Dam); and Associated infrastructure supporting ongoing operations, including district roads, powerlines, workshops, offices, and associated water and amenity facilities.

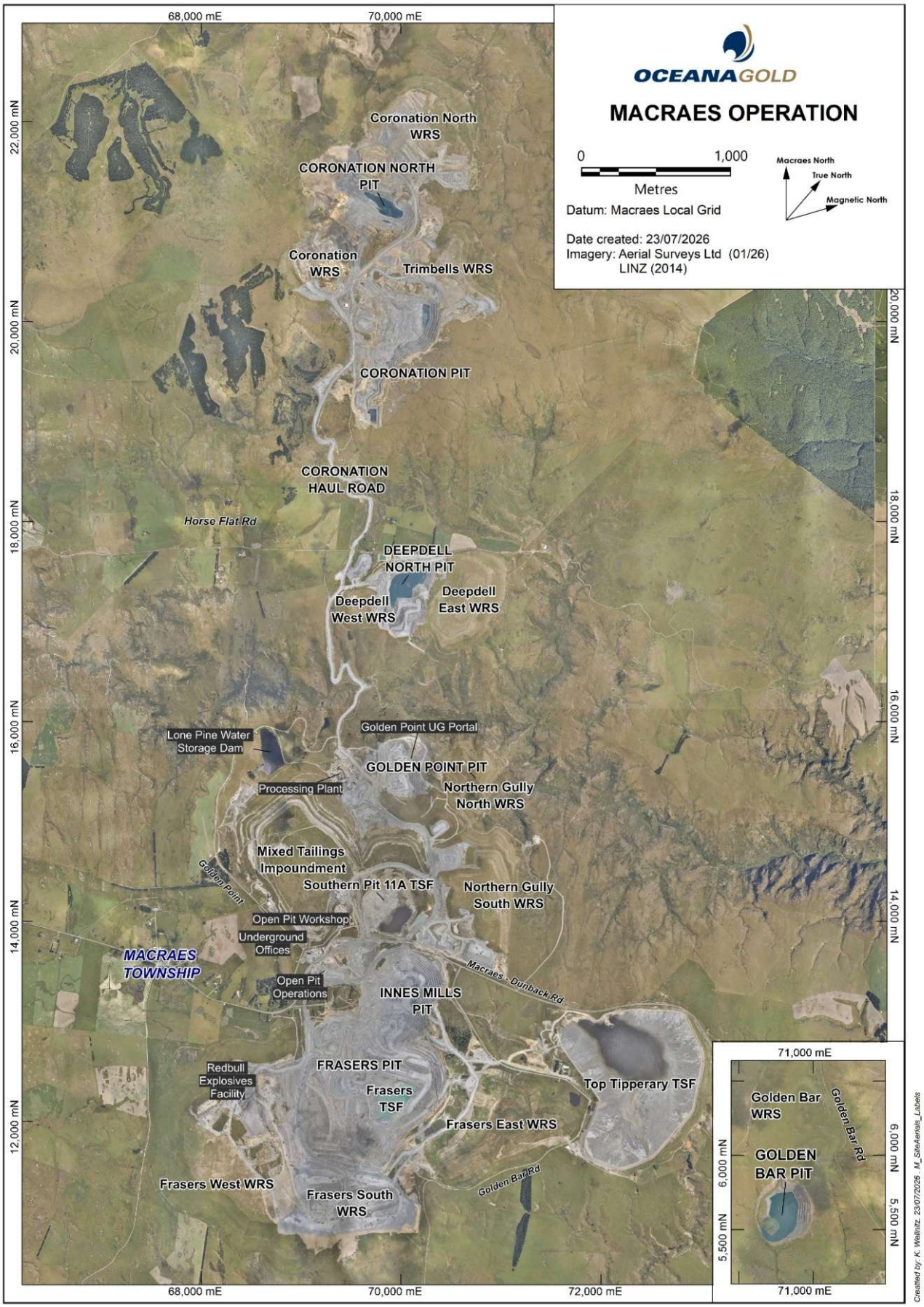


Figure 2: Existing site layout at the Macraes Operation (as of July 2026)

Project Overview

The Project is made up of the following proposed key activities:

- **Open pit extensions** at Coronation, Coronation North, Innes Mills, and Golden Bar.
- **Underground mine expansion** through further development of the Golden Point Underground mine ("**GPUG**").
- **Tailings management**, including:
    - Construction of the Frasers Tailings Storage Facility ("**FTSF**") Stage 3 to accommodate a total tailings storage of up to 153 Mt; and
    - Hydraulic mining and relocation of tailings from the Mixed Tailings Impoundment ("**MTI**"), Southern Pit Option 10 TSF ("**SP10**"), and Southern Pit Option 11A TSF ("**SP11**") to FTSF.
- **Waste rock disposal**, including increased storage capacity within open pits and at existing waste rock stacks at Coronation, Coronation North, Innes Mills, Golden Bar, Golden Point, and Frasers.
- **Water management infrastructure and operations**, including:
    - Construction of Camp Creek and Coal Creek water storage dams for flow and water quality management;
    - Construction, operation and maintenance of a Water Treatment Plant; and
    - Ongoing operation and maintenance of the Mine Water Management System ("**MWMS**").
- **Infrastructure and roading works**, including:
    - Realignment of Macraes Road in two stages; and
    - Relocation of the Open Pit Mining Workshop.
- **Ecological enhancements**, including establishment of:
    - Murphys Ecological Enhancement Area ("**MEEA**") near Murphys Creek, including predator fencing, access tracks, and site facilities;
    - Mt Highlay restoration area;
    - Cranky Jims Link shrubland enhancement area;
    - Murphys Link tussock protection area; and
    - Additional compensation measures for residual ecological impacts.
- **Mine closure and rehabilitation activities**, including rehabilitation of mining landforms, creation of pit lakes, dry capping of tailings storage facilities, and revegetation in accordance with closure objectives.

An overview of the proposed activities which make up the Project is shown in Figure 3 below.

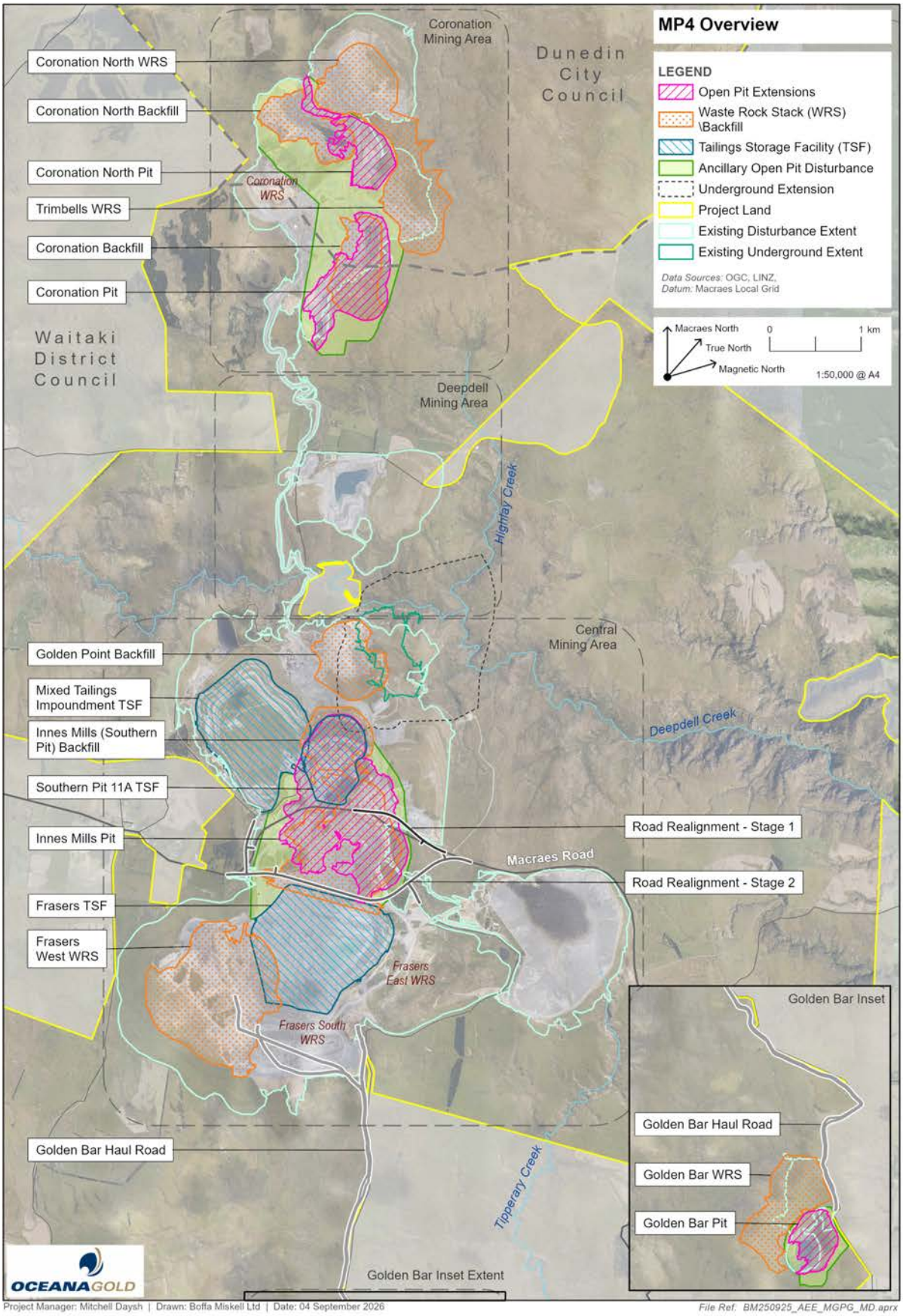


Figure 3: MP4 Overview Plan

Existing Roading

The existing road network consists of the high speed Macraes Road (posted 100km/h), with T-intersections at Golden Bar and Golden Point roads. These roads run through open Otago country plains which are either grassed or covered with red tussock. There is no large vegetation (trees) within the existing road reserve. The road alignment is generally straight in nature utilizing the existing topography. The typical road formation is shown in Figure 4 below.

Figure 4; Typical existing Macraes Road formation (Approx RP 14.46)

Stantec's Transport Assessment lists the existing portions of Macraes Road east of the Macraes Operation as having an average daily traffic (ADT) of 800 vehicles per day with 40% heavy vehicles. However, the Mobile Road App states an ADT of 475 with 26% heavy vehicles (est 30/06/2025) and Golden Bar Road as having an ADT of 5 with 13% heavy vehicles (est 18/06/2023). The designers expect that these figures will not be adversely affected with any proposed works

The existing Macraes Road that will be engulfed by the IM13 pit expansion was a recent realignment, being completed in 2020. It adjoins to the east with a similarly surfaced 2 coat chip seal with 3.5m lanes. The 2020 section was constructed with variable width shoulders. The new realignment will have a minimum 1.2m sealed shoulders. Deep wide shoulder drains have been formed in locations where required. These have been formed with 1V:4H or flatter batter slopes from the shoulder edge, with the drain invert several meters back from the edge of carriageway, leaving plenty of runoff area.

In areas where larger cuts were required, typically a relatively steep 1V:2H batter slope has been utilized. In fill situations a 1V:4H (recoverable slope) has been utilized. Macraes Road crosses a mine site haul road at approx. RP15.80, via a recently constructed bridge, which will become redundant when the proposed Stage 2 alignment is constructed. Macraes Road descends at approximately 8% grade through the intersection with Golden Point Road flattening out near the proposed intersection with the new alignment at the western extent.

Compliant steel post W section TL3 guardrail is extensively used on Macraes Road where edge hazards exist.

The existing T-intersection of Macraes and Golden Bar Roads has been constructed with a left turn slip lane (approx. 120m total length), however no lane or shoulder widening opposite the intersection, such as a basic right turn (BAR) type intersection, has been provided. The intersection with Golden Point Road , which has recently been constructed in the 2020 realignment, has sufficient shoulder widening.

DESIGN

Alignment Location

OGNZL proposes that Stage 2 of the road realignment project, realigns Macraes Road, following the Stage 1 realignment works (refer Stage 1 Road Design Report). This stage of works sees Macraes Road realigned to the south of the proposed Stage 1 works location. This revised location will relocate Macraes Road south of all mine works and will ultimately mean that it will not impede the proposed mine future expansion to the north.

Macraes Road realignment Stage 2 will start at approx. RP14.44 and will rejoin the existing Macraes road at RP17.28. This 2.84km realignment will result in an approximately 200m shorter section of road.

A new intersection with Golden Bar Road will be required as Macraes Road swings further south making redundant the Stage 1 intersection and the section of Golden Bar Road leading up to it.

Similarly, Golden Point Road will be extended to intersect with Macraes Road further south of the existing intersection, closer to its original intersection location. The new intersection is at a lesser vertical gradient than the existing intersection with better intersection visibility.

Carriageway and Pavement – All Roads

Macraes Road and the extension of Golden Point Road are to be constructed to match or improve the existing carriageway formation. The proposed formation is 2 x 3.5m lanes with a 1.2m wide sealed shoulder and a further 0.8m wide unsealed shoulder. All fill batter slopes are to be 1V:4H with cuts at 1V:2H.

In locations where larger fill slopes are required, they will be locally steepened up to geotechnical requirements with guardrails proposed to protect the significant drops. All guardrails are proposed to be setback at 2.4m from edge of lane to meet minimum skyline requirements.

Pavement design is to be constructed on a subgrade with a minimum CBR 10, which will mostly consist of placed fill. The proposed pavement design is as per previous works in this area with a minimum of 170mm deep AP65 subbase followed by a 120mm deep TNZ M/4 AP40 basecourse and two coat chip seal (G3/5).

Geometric Design – Roads

The realignment of Macraes Road is to be constructed geometrically in accordance with Austroads standards as well as NZTA Traffic Control Devices Manual and MOTSAM.

The initial 1.1-1.2km realignment of Macraes Road will run through the existing undulating terrain, so the design alignment has been chosen to best suit this terrain with two curves. The road falls at a relatively steep grade of 10% to the south. Two relatively tight horizontal curves have been utilized in order to realign the road to the south. This combined with the proposed posted speed limit of 100km/h means that both curves have a relatively high superelevation of 8%. The vertical alignment of this section is set to best suit a balanced cut fill scenario, with some larger cuts and resultant fills of gullies. These gullies will require culverts to accommodate runoff flows. Due to the height of some of these fills a steeper fill batter (1V:2H) has been chosen and guardrail proposed to suit. New TL3 guardrail will be installed as per Austroads Part 6 Roadside Design, Safety and Barriers at all locations where these steeper batters are required.

From the 1.2km mark the alignment will run on top of the Frasers Backfill (FRBF) earthworks. The proposed road is to sit with the centreline at approximately 0.5m above the design pit bulk earthworks level to enable transverse water runoff.

From RP16.90 onwards the formation leaves the FRBF and enters back onto exiting ground. Over the last 400m or so the road realigns with the existing Macraes Road. The road goes through two proposed junctions and crosses a new bridge (see commentary below).

Geometric Design – Intersections

New intersections are to be constructed to reconnect Golden Bar Road and Golden Point Road with the relocated Macraes Road. The intersections are to be geometrically in accordance with Austroads standards as well as NZTA Traffic Control Devices Manual and MOTSAM. The designers propose that the Design and Check Vehicle be an Austroads B-Double (25m) truck for these intersections. This vehicle is larger than the maximum NZTA design vehicle of a Large Rigid Truck (11.5m). The reason for this is to allow for larger vehicles that will need to access the mine site with large machinery. No assessment for over-dimension vehicles has been undertaken as Macraes Road is not part of the NZTA High Productivity Motor Vehicles (HPMV) network.

The designers propose that the revised intersections be improved on the existing. Any specific traffic safety matters will be addressed by Stantec and captured in detailed design.

The proposed design for both intersections is for a left turn slip with a 30m taper. A BAR type treatment has been provided for right turning vehicles. This treatment provides sufficient trafficable width for design vehicle to pass on the left of a stationary turning vehicle. This is achieved by widening the shoulder to provide a minimum width sufficient to allow the vehicles to pass. Substantial speed reduction (potentially half of the design speed =50km/h) is a feature of this layout.

Sightlines in accordance with Safe Intersection Sight Distance (SISD) standards, including allowance for grade corrections, will be provided at all intersections, with this able to be confirmed through the detailed design process.

Geometric Design – Workshop Intersection

A new intersection is proposed on the north side of the realigned Macraes Road at RP 16.76 in order to provide mine site access to a workshop facility. The intersection is to be geometrically in accordance with Austroads standards as well as NZTA Traffic Control Devices Manual and MOTSAM. The designers propose that the Design and Check Vehicle be a Austroads B-Double (25m) truck for this intersection. This vehicle is larger than the maximum NZTA design vehicle of a Large Rigid Truck (11.5m). The reason for this is to allow for larger vehicles that will need to access the mine site with large machinery. No assessment for over-dimension vehicle has been undertaken as Macraes Road is not part of the NZTA High Productivity Motor Vehicles (HPMV) network.

Any specific traffic safety matters will be addressed by Stantec and captured in detailed design. The proposed design is for a reduced length left turn slip of 130m total length with a 30m taper. The reduced length slip has been utilized due to the proximity of this left turn slip to the adjacent bridge and intersection with Golden Point Road. These two features, just prior to the intersection, means that vehicle speeds are likely to be lower than the posted speed limit of 100km/h (approx. 90-95km/h).

A BAR type treatment has been provided for right turning vehicles. This treatment provides sufficient trafficable width for design vehicle to pass on the left of a stationary turning vehicle. This is achieved by widening the shoulder to provide a minimum width sufficient to allow the vehicles to pass. Substantial speed reduction (potentially half of the design speed =50km/h) is a feature of this layout.

Figure 5; Workshop Intersection (approx RP 16.76)

Sightlines in accordance with Safe Intersection Sight Distance (SISD) standards, including allowance for grade corrections, will be provided at all intersections, with this able to be confirmed through the detailed design process.

Geotechnical

The realignment includes cuts into insitu shist rock and into schist rockfill. Some areas may include a thin cover of loess or colluvial soils. There are no major geotechnical risks associated with the road cuts that cannot be adequately managed during the detailed design and construction process.

OceanaGold has considerable experience constructing cut batter slopes within all these materials as part of open pit mining, infrastructure development and for previous realignments of Macraes Road. The proposed cuts are considered reasonable on the basis of site experience, however the final stable cut slope profiles will need to be determined on the basis of both further investigation prior to detailed design and also the observational method during construction including geotechnical mapping with options for slope reprofiling or ground support to ensure a stable outcome.

The detailed road design will need to manage and accommodate settlement of FRBF. Assessment and monitoring of rockfill settlement will be considered as part of detailed design for FRBF. Stability of FRBF will be assessed in detail to a very high standard as part of the design for FRBF High PIC embankment dam. Stability of the road and Waikouaiti North Branch channel alignments over the embankment will be explicitly considered as part of the FRBF design. This is covered in the FTSF technical report by EGL. The detailed road design will also include engineered compaction of the immediate subgrade rockfill layers beneath the road formation.

New Bridge

The realignment converges onto the existing road just after crossing an active mine haul road at RP 16.95 which will require a new bridge to be constructed. The design intent is that the new bridge is a duplicate of the recently constructed bridge on the existing Macraes Road since the types of mine machinery passing under the bridge have not changed since that bridge was constructed. The abutments are mechanically stabilized earth (MSE) walls at approximately 11m high. Steel bridge beams land on concrete abutments sitting on top of the MSE walls. Bridge decks are precast sections with grout pockets fixing the precast units to stubs on the steel bridge beams. The existing bridge will become redundant but cannot be relocated due to being required to be in service during construction of the realignment.

New TL3 guardrails will be installed as per Austroads Part 6 Roadside Design, Safety and Barriers. The position of the intersection with Golden Point Road has been located to the west to ensure that carriageway widening associated with the intersection (BAR) does not extend over the bridge. This ensures that additional bridge width is not required, while mitigating safety concerns around vehicle interactions close to the bridge as a hazard.

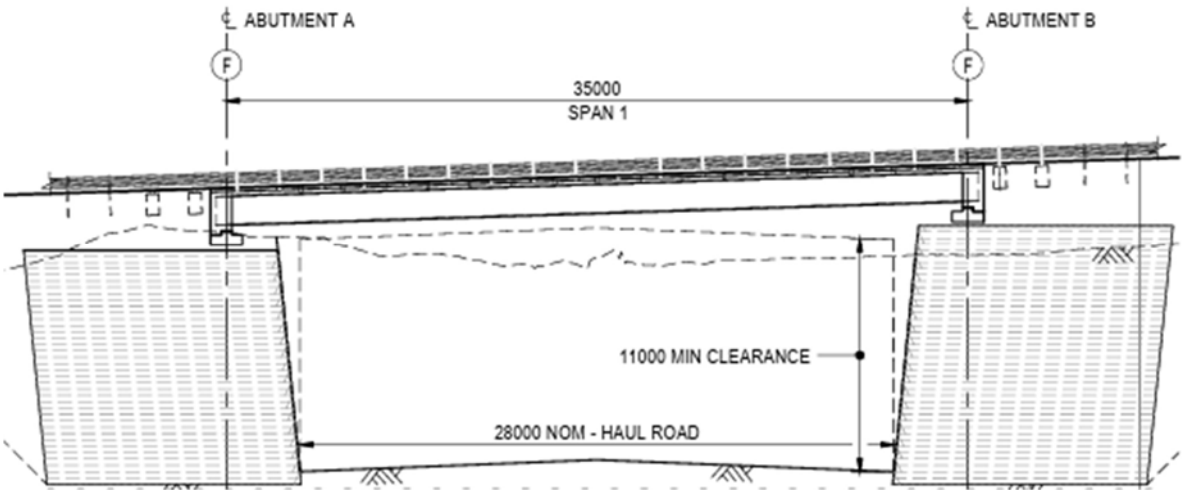


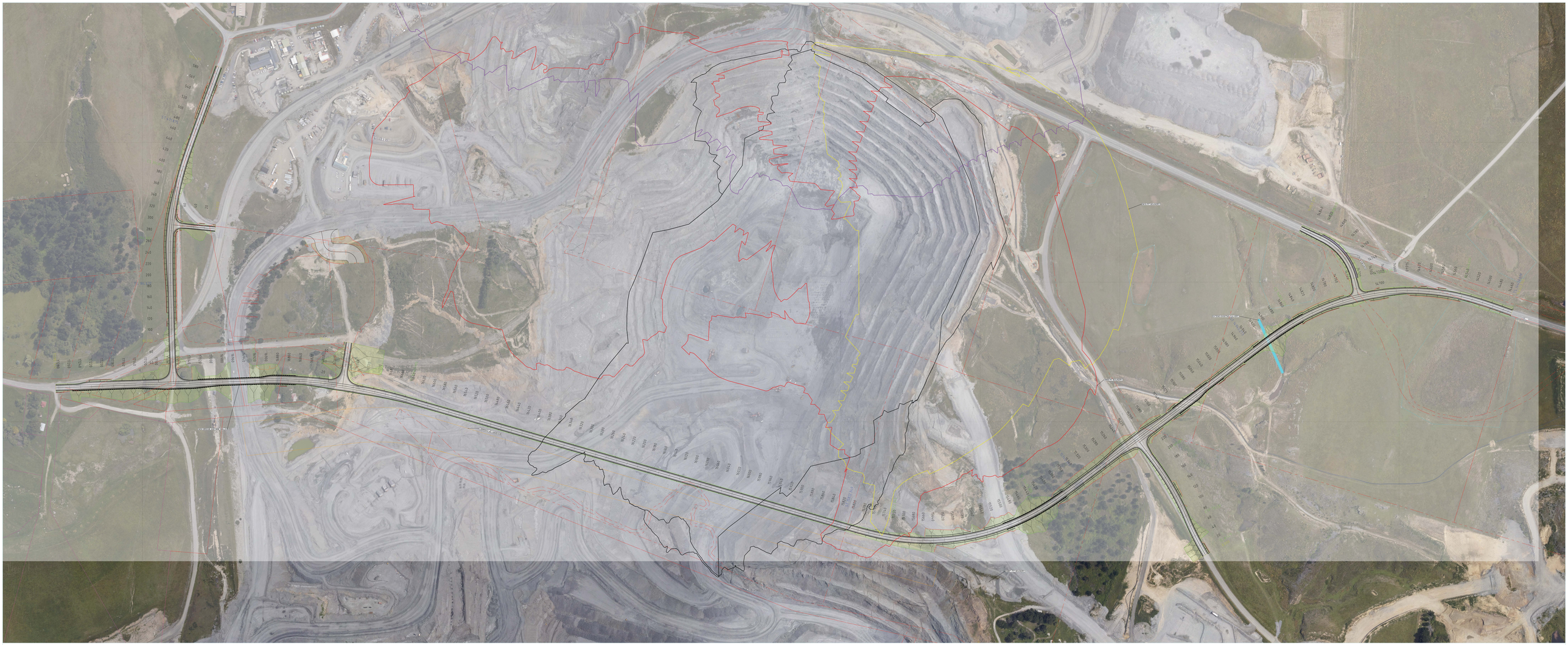
Figure 6; Existing bridge cross-section. Proposed location (approx RP 16.95)

Linemarking and Signage

Although linemarking and signage will not be done until the detailed design stage the intention is to provide a centerline (with no-overtaking linemarking if required) throughout the revised network with the intersection receiving linemarking and signage as per the Traffic Control Devices manual and the Manual of Traffic Signs and Markings (MOTSAM). The intersections will be assessed for STOP/GIVE WAY but are likely to remain as a GIVEWAY control.

APPENDIX A

STAGE 2 PLAN AND LONG-SECTIONS



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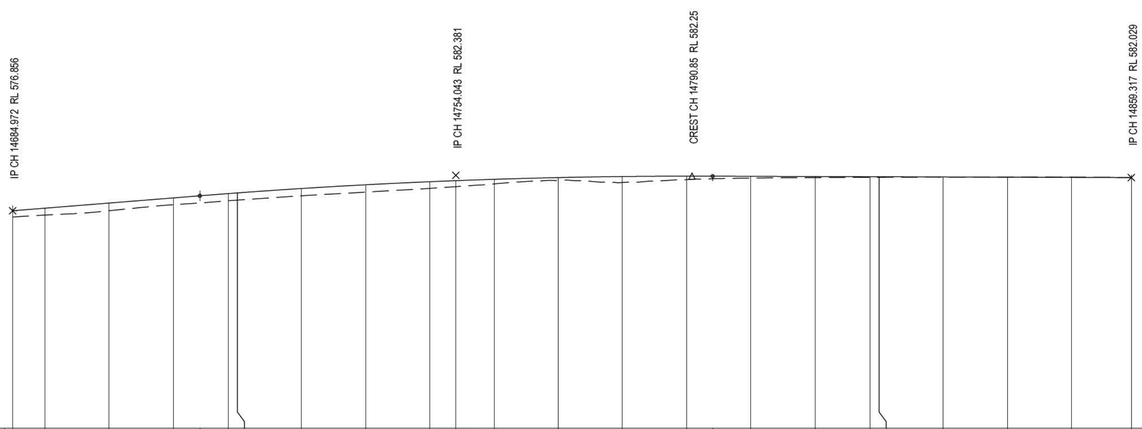

DATUM RL. 543.00

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HORIZONTAL ALIGNMENT	L=33.62m					L=100.02m R=-110m										L=40.7m						
LEVEL DIFFERENCE CUT - / FILL +	0.98	1.07	1.20	1.06	1.12	1.12	1.14	1.14	1.04	0.94	0.71	0.46	0.93	0.55	0.29	0.17	0.09	0.08	0.02	-0.02	-0.03	-0.01
DESIGN SURFACE LEVEL	576.856	577.258	578.058	578.858	579.535	579.64	580.326	580.908	581.385	581.548	581.758	582.027	582.192	582.252	582.228	582.194	582.165	582.161	582.127	582.094	582.06	582.029
EXISTING SURFACE LEVEL	575.87	576.19	576.86	577.80	578.42	578.52	579.19	579.76	580.35	580.61	581.04	581.56	581.27	581.70	581.94	582.02	582.07	582.08	582.11	582.11	582.09	582.04
CHAINAGE	14684.97	14690	14700	14710	14718.6	14720	14730	14740	14750	14754.04	14760	14770	14780	14790	14800	14810	14818.61	14820	14830	14840	14850	14859.32
SUPER ELEVATION																						

LONGITUDINAL SECTION - ROAD03

HORZ 1:500 VERT 1:500

LONGITUDINAL SECTION

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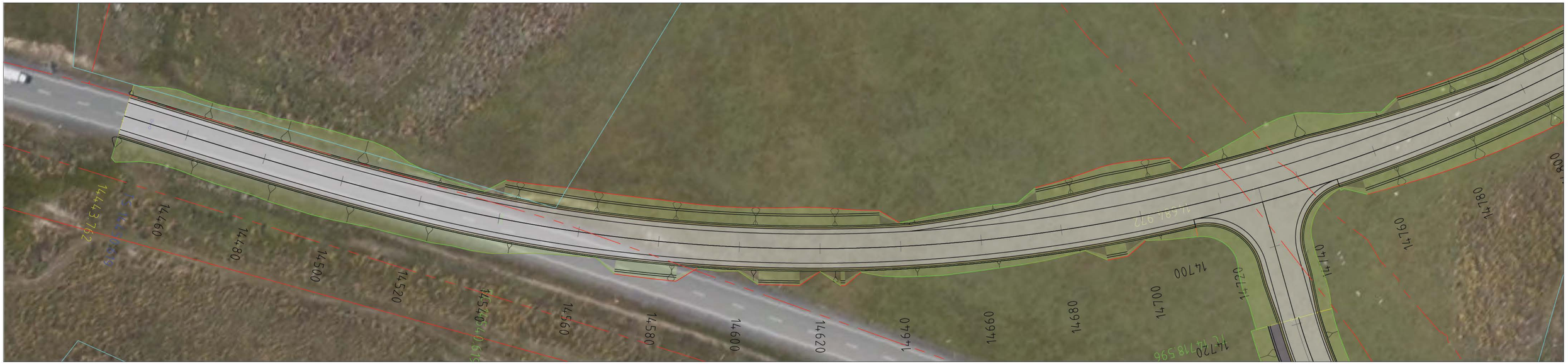

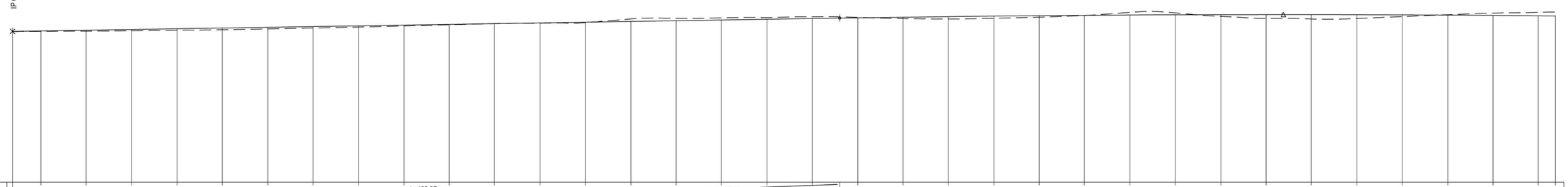

DATUM RL. 540.00

VERTICAL ALIGNMENT: L=182.27m, G=1.61%; K=60.8, L=702.22m

HORIZONTAL ALIGNMENT: L=6.86m; L=314.65m, R=-410m

CHAINAGE	LEVEL DIFFERENCE CUT - / FILL +	DESIGN SURFACE LEVEL	EXISTING SURFACE LEVEL
14443.76	0.03	573.142	573.11
14450	0.09	573.242	573.15
14460	0.19	573.403	573.21
14470	0.28	573.564	573.28
14480	0.33	573.725	573.39
14490	0.37	573.886	573.52
14500	0.35	574.046	573.69
14510	0.32	574.207	573.89
14520	0.27	574.368	574.10
14530	0.18	574.529	574.35
14540	0.07	574.69	574.62
14550	0.01	574.85	574.84
14560	0.06	575.011	574.95
14570	0.11	575.172	575.07
14580	-0.55	575.333	575.89
14590	-0.52	575.494	576.02
14600	-0.47	575.654	576.12
14610	-0.39	575.815	576.20
14620	-0.39	575.976	576.36
14630	-0.09	576.135	576.23
14640	0.32	576.281	575.96
14650	0.54	576.411	575.87
14660	0.49	576.524	576.03
14670	0.34	576.621	576.28
14680	0.05	576.701	576.65
14690	-0.57	576.765	577.34
14700	-0.41	576.812	577.22
14710	0.40	576.843	576.45
14720	0.87	576.858	575.99
14730	0.98	576.856	575.87
14740	0.86	576.837	575.98
14750	0.41	576.802	576.39
14760	-0.06	576.751	576.81
14770	-0.49	576.683	577.17
14780	-0.74	576.599	577.34
14783.76	-0.84	576.563	577.40

SUPER ELEVATION

LONGITUDINAL SECTION - ROAD04

HORZ 1:500 VERT 1:500

LONGITUDINAL SECTION

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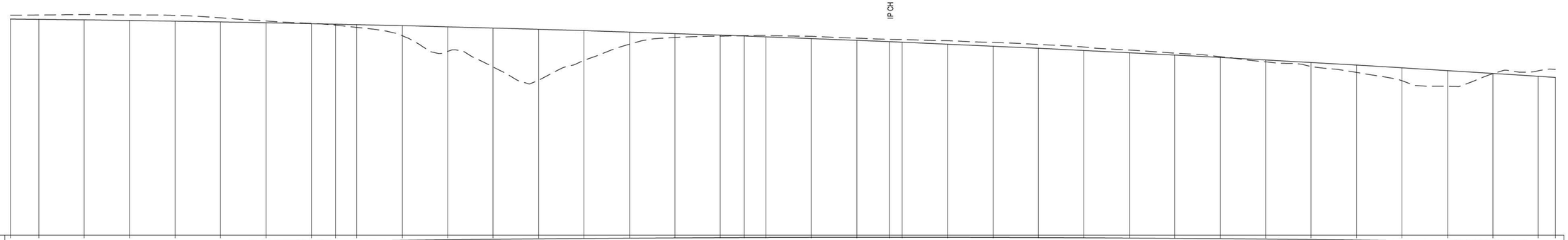

DATUM RL. 529.00

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HORIZONTAL ALIGNMENT	L=314.65m R=-410m L=397.03m
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DESIGN SURFACE LEVEL	576.563 576.498 576.381 576.248 576.098 575.931 575.748 575.549 575.437 575.333 575.101 574.852 574.587 574.306 574.008 573.693 573.382 573.015 572.825 572.651 572.271 571.874 571.581 571.461 571.031 570.585 570.123 569.644 569.148 568.637 568.108 567.564 567.002 566.425 565.831 565.22 564.593 563.95 563.703
EXISTING SURFACE LEVEL	577.40 577.44 577.53 577.46 577.36 576.82 576.11 575.60 575.21 574.71 572.88 569.44 565.99 563.10 567.45 571.02 572.50 572.78 572.88 572.91 572.74 572.34 572.09 572.05 571.78 571.40 570.96 570.39 569.72 569.04 568.25 567.13 566.10 564.80 562.97 561.73 564.52 565.16 565.46
CHAINAGE	14783.76 14790 14800 14810 14820 14830 14840 14850 14855.27 14860 14870 14880 14890 14900 14910 14920 14930 14940 14945.27 14950 14960 14970 14977.15 14980 14990 15000 15010 15020 15030 15040 15050 15060 15070 15080 15090 15100 15110 15120 15123.76
SUPER ELEVATION	

LONGITUDINAL SECTION - ROAD04

HORZ 1:500 VERT 1:500

LONGITUDINAL SECTION

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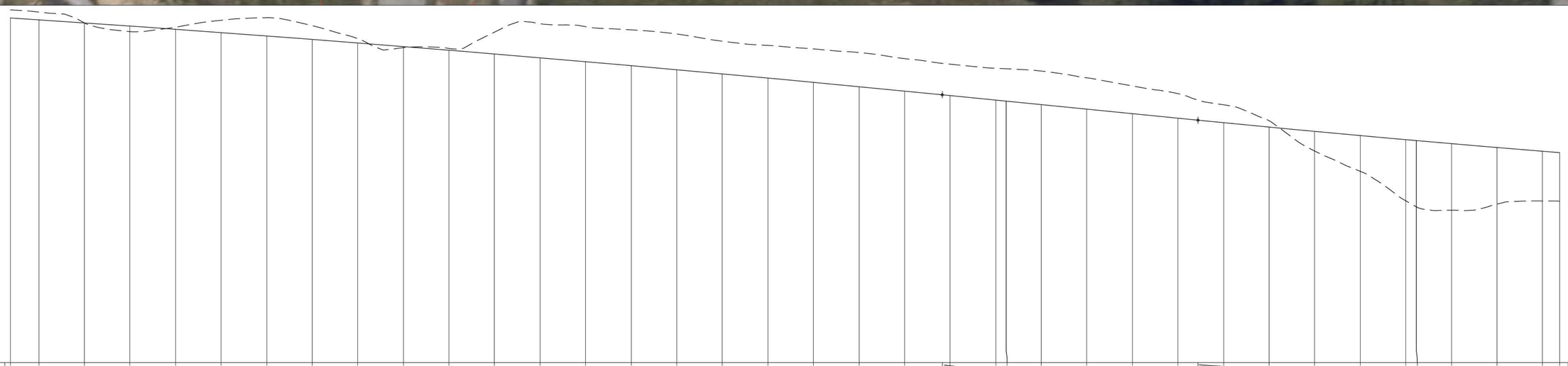

DATUM RL. 488.00

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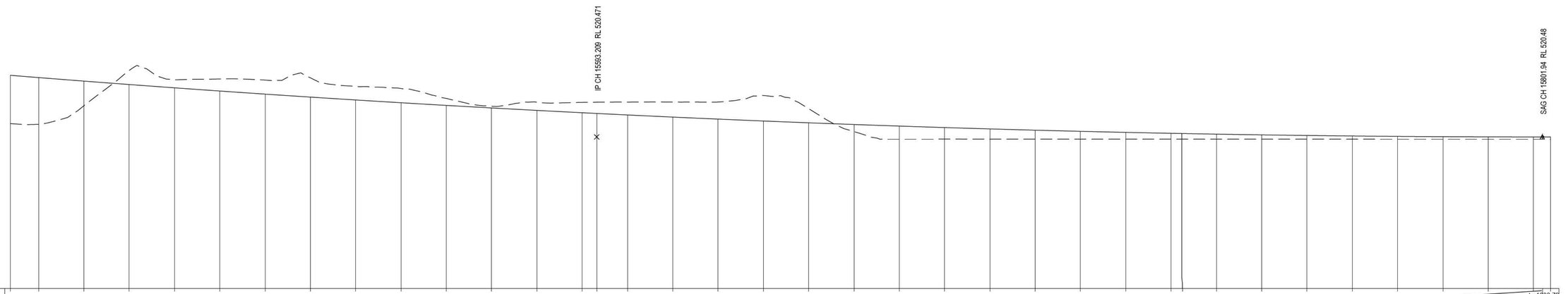

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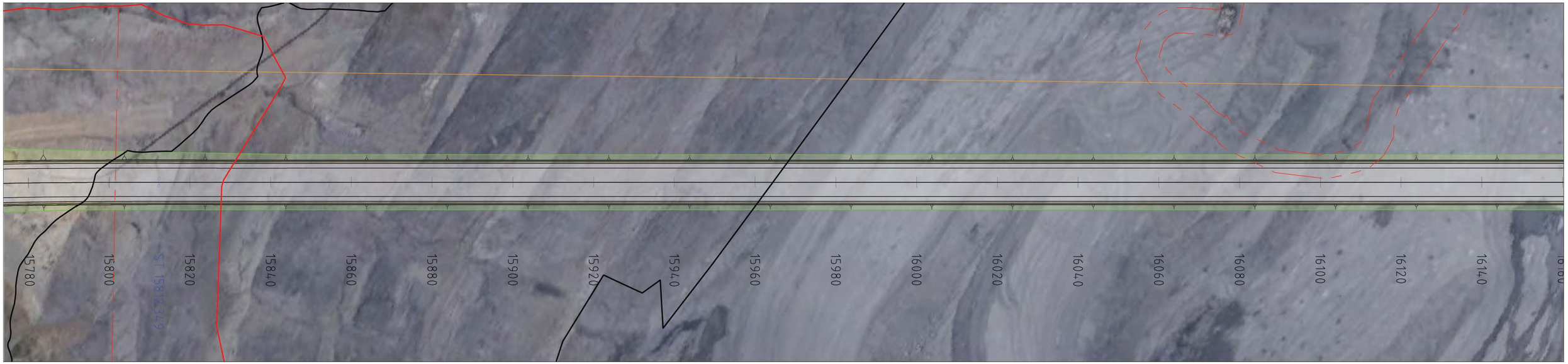


DATUM RL. 487.00

VERTICAL ALIGNMENT: L=1003.79m, G=0%

HORIZONTAL ALIGNMENT: L=829.05m

CHAINAGE	LEVEL DIFFERENCE CUT - / FILL +	DESIGN SURFACE LEVEL	EXISTING SURFACE LEVEL
15803.76	0.50	520.476	519.98
15810	0.50	520.476	519.98
15812.35	0.50	520.476	519.98
15820	0.50	520.476	519.98
15830	0.50	520.476	519.98
15840	0.50	520.477	519.98
15850	0.50	520.477	519.98
15860	0.50	520.477	519.98
15870	0.50	520.477	519.98
15880	0.50	520.478	519.98
15890	0.50	520.478	519.98
15900	0.50	520.478	519.98
15910	0.50	520.478	519.98
15920	0.50	520.479	519.98
15930	0.50	520.479	519.98
15940	0.50	520.479	519.98
15950	0.50	520.479	519.98
15960	0.50	520.479	519.98
15970	0.50	520.48	519.98
15980	0.50	520.48	519.98
15990	0.50	520.48	519.98
16000	0.50	520.48	519.98
16010	0.50	520.481	519.98
16020	0.50	520.481	519.98
16030	0.50	520.481	519.98
16040	0.50	520.481	519.98
16050	0.50	520.482	519.98
16060	0.50	520.482	519.98
16070	0.50	520.482	519.98
16080	0.50	520.482	519.98
16090	0.50	520.482	519.98
16100	0.50	520.483	519.98
16110	0.50	520.483	519.98
16120	0.50	520.483	519.98
16130	0.50	520.483	519.98
16140	0.50	520.484	519.98
16143.76	0.50	520.484	519.98

SUPER ELEVATION

LONGITUDINAL SECTION - ROAD04

HORZ 1:500 VERT 1:500

LONGITUDINAL SECTION

12d Model
Horizontal Scale 1:500
Vertical Scale 1:500
27-Jul-2026 11:45:19

DATUM RL. 487.00

VERTICAL ALIGNMENT: L=1003.79m, G=0%

HORIZONTAL ALIGNMENT: L=829.05m

CHAINAGE	LEVEL DIFFERENCE CUT - / FILL +	DESIGN SURFACE LEVEL	EXISTING SURFACE LEVEL
16143.76	0.50	520.484	519.98
16150	0.50	520.484	519.98
16160	0.50	520.484	519.98
16170	0.51	520.484	519.98
16180	0.51	520.485	519.98
16190	0.51	520.485	519.98
16200	0.51	520.485	519.98
16210	0.51	520.485	519.98
16220	0.51	520.485	519.98
16230	0.51	520.486	519.98
16240	0.51	520.486	519.98
16250	0.51	520.486	519.98
16260	0.51	520.486	519.98
16270	0.51	520.487	519.98
16280	0.51	520.487	519.98
16290	0.51	520.487	519.98
16300	0.51	520.487	519.98
16310	0.51	520.488	519.98
16320	0.51	520.488	519.98
16330	0.51	520.488	519.98
16340	0.51	520.488	519.98
16350	0.51	520.488	519.98
16360	0.51	520.489	519.98
16370	0.51	520.489	519.98
16380	0.51	520.489	519.98
16390	0.51	520.489	519.98
16400	0.51	520.49	519.98
16410	0.51	520.49	519.98
16420	0.51	520.49	519.98
16430	0.51	520.49	519.98
16440	0.51	520.491	519.99
16450	0.50	520.491	519.99
16460	0.50	520.491	519.99
16470	0.50	520.491	519.99
16480	0.50	520.491	519.99
16483.76	0.50	520.492	519.99

SUPER ELEVATION

LONGITUDINAL SECTION - ROAD04

HORZ 1:500 VERT 1:500

LONGITUDINAL SECTION

12d Model
Horizontal Scale 1:500
Vertical Scale 1:500
27-Jul-2026 11:45:22

CREST CH 16805.97 RL 520.5

DATUM RL. 487.00

VERTICAL ALIGNMENT: L=1003.79m, G=0%; K=64.3, L=383.38m

HORIZONTAL ALIGNMENT: L=829.05m; L=280.04m, R=-886m

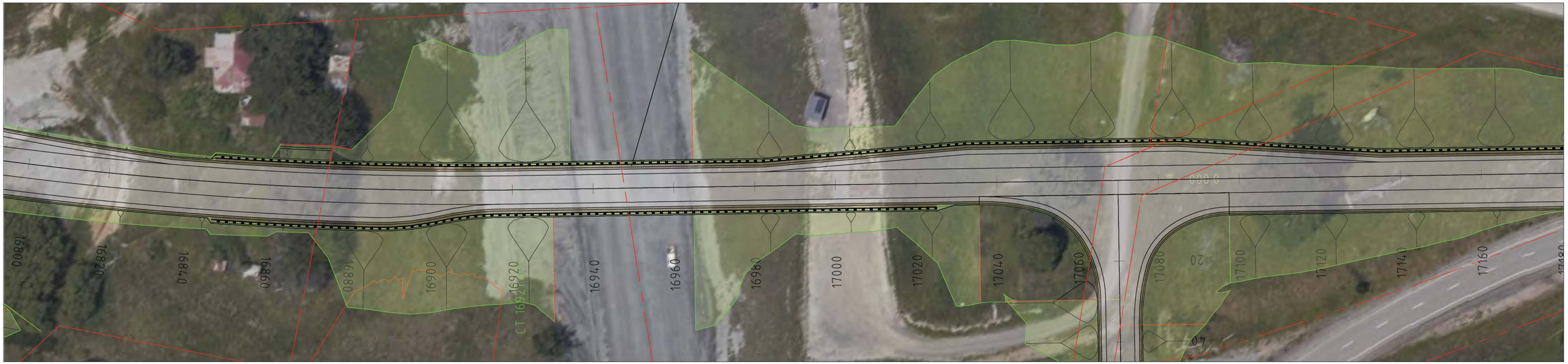
CHAINAGE	LEVEL DIFFERENCE CUT - / FILL +	DESIGN SURFACE LEVEL	EXISTING SURFACE LEVEL	SUPER ELEVATION
16483.76	0.50	520.492	519.99	
16490	0.50	520.492	519.99	
16500	0.50	520.492	519.99	
16510	0.50	520.492	519.99	
16520	0.50	520.492	519.99	
16530	0.50	520.493	519.99	
16540	0.50	520.493	519.99	
16550	0.50	520.493	519.99	
16560	0.50	520.493	519.99	
16570	0.50	520.493	519.99	
16580	0.50	520.494	519.99	
16590	0.50	520.494	519.99	
16600	0.50	520.494	519.99	
16610	0.50	520.494	520.00	
16620	0.50	520.495	520.00	
16630	0.50	520.495	520.00	
16640	0.50	520.495	520.00	
16641.39	0.50	520.495	520.00	
16650	0.50	520.495	520.00	
16660	0.50	520.496	520.00	
16670	0.50	520.496	520.00	
16680	0.50	520.496	520.00	
16690	0.50	520.496	520.00	
16700	0.50	520.496	520.00	
16710	0.50	520.497	520.00	
16720	0.50	520.497	520.00	
16730	0.50	520.497	520.00	
16740	0.50	520.497	520.00	
16750	0.50	520.498	520.00	
16760	0.50	520.498	520.00	
16770	0.50	520.498	520.00	
16780	0.50	520.498	520.00	
16790	0.50	520.499	520.00	
16800	0.50	520.499	520.00	
16810	0.50	520.498	520.00	
16820	0.48	520.484	520.00	
16823.76	0.47	520.474	520.00	

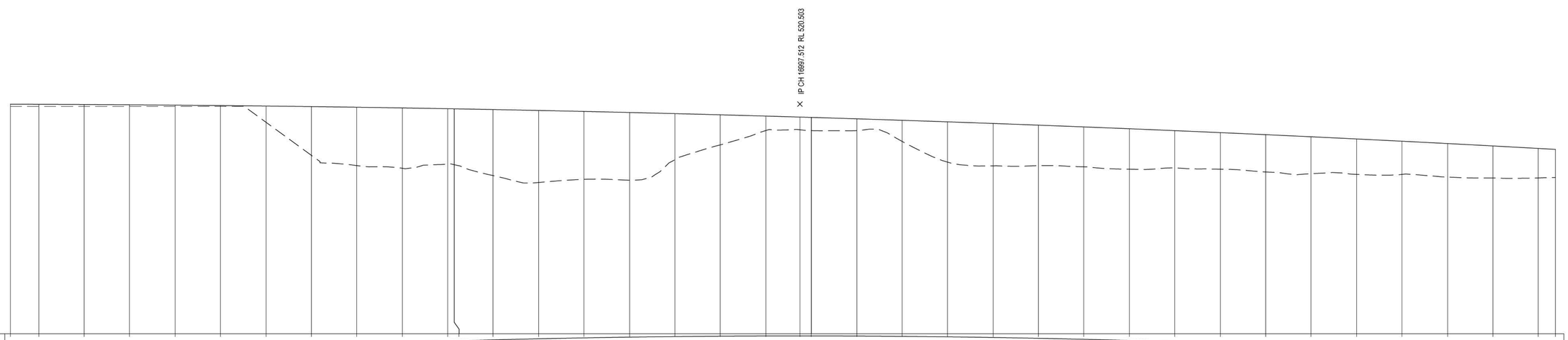
LONGITUDINAL SECTION - ROAD04

HORZ 1:500 VERT 1:500

LONGITUDINAL SECTION

12d Model
Horizontal Scale 1:500
Vertical Scale 1:500
27-Jul-2026 11:45:25





DATUM RL. 470.00

VERTICAL ALIGNMENT: K=64.3, L=383.38m

HORIZONTAL ALIGNMENT: L=280.04m, R=-886m; L=364.11m

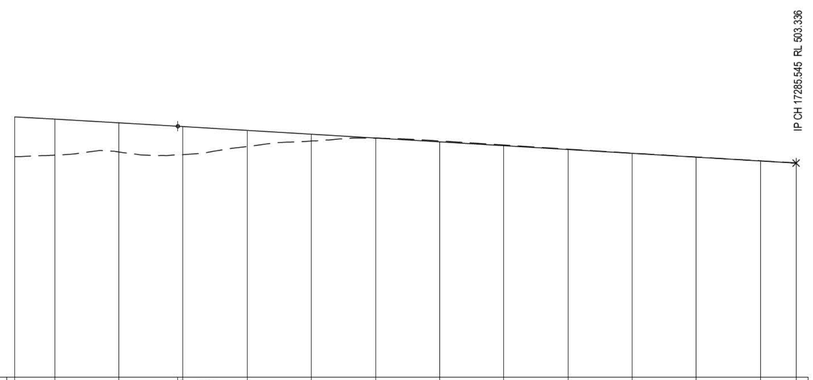
CHAINAGE	LEVEL DIFFERENCE CUT - / FILL +	DESIGN SURFACE LEVEL	EXISTING SURFACE LEVEL	SUPER ELEVATION
16823.76	0.47	520.474	520.00	
16830	0.45	520.454	520.00	
16840	0.41	520.409	520.00	
16850	0.35	520.348	520.00	
16860	0.27	520.272	520.00	
16870	0.18	520.18	520.00	
16880	3.56	520.073	516.51	
16890	10.72	519.95	509.23	
16900	12.84	519.811	506.97	
16910	13.27	519.657	506.38	
16920	12.18	519.488	507.31	
16921.43	12.29	519.462	507.17	
16930	14.53	519.303	504.77	
16940	15.85	519.102	503.25	
16950	14.94	518.886	503.95	
16960	14.91	518.654	503.75	
16970	10.13	518.407	508.28	
16980	6.61	518.144	511.53	
16990	3.18	517.865	514.68	
16997.51	2.80	517.646	514.85	
17000	2.90	517.571	514.67	
17010	2.59	517.262	514.67	
17020	4.65	516.937	512.29	
17030	8.86	516.596	507.74	
17040	9.33	516.24	506.91	
17050	8.91	515.868	506.96	
17060	8.78	515.481	506.70	
17070	8.90	515.078	506.17	
17080	8.21	514.66	506.45	
17090	8.05	514.226	506.17	
17100	8.21	513.776	505.57	
17110	8.12	513.311	505.19	
17120	7.79	512.83	505.04	
17130	7.30	512.334	505.04	
17140	7.37	511.823	504.45	
17150	7.06	511.295	504.24	
17160	6.50	510.752	504.25	
17163.76	6.20	510.544	504.35	

LONGITUDINAL SECTION - ROAD04

HORZ 1:500 VERT 1:500

LONGITUDINAL SECTION

12d Model
Horizontal Scale 1:500
Vertical Scale 1:500
27-Jul-2026 11:45:27



DATUM RL. 470.00

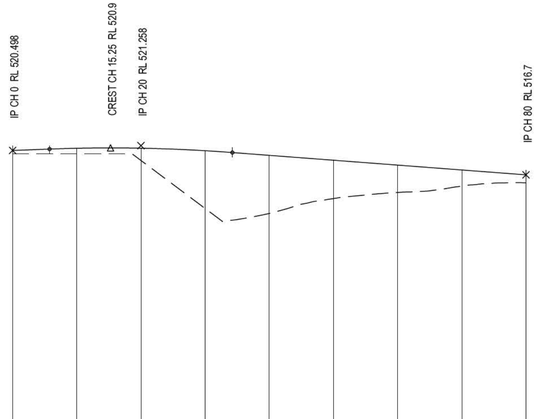
VERTICAL ALIGNMENT	K=64.3 L=383.38m								L=96.34m G=-5.96%					
HORIZONTAL ALIGNMENT	L=364.11m													
LEVEL DIFFERENCE CUT - / FILL +	6.20	5.62	4.55	4.38	2.52	1.06	0.03	-0.14	-0.11	-0.06	-0.02	-0.02	-0.02	-0.04
DESIGN SURFACE LEVEL	510.544	510.194	509.62	509.031	508.435	507.839	507.243	506.647	506.051	505.455	504.859	504.263	503.667	503.336
EXISTING SURFACE LEVEL	504.35	504.57	505.07	504.65	505.92	506.78	507.22	506.79	506.16	505.51	504.88	504.28	503.69	503.37
CHAINAGE	17163.76	17170	17180	17190	17200	17210	17220	17230	17240	17250	17260	17270	17280	17285.54
SUPER ELEVATION														

LONGITUDINAL SECTION - ROAD04

HORZ 1:500 VERT 1:500

LONGITUDINAL SECTION

12d Model
Horizontal Scale 1:500
Vertical Scale 1:500
27-Jul-2026 11:45:30



DATUM RL. 476.00

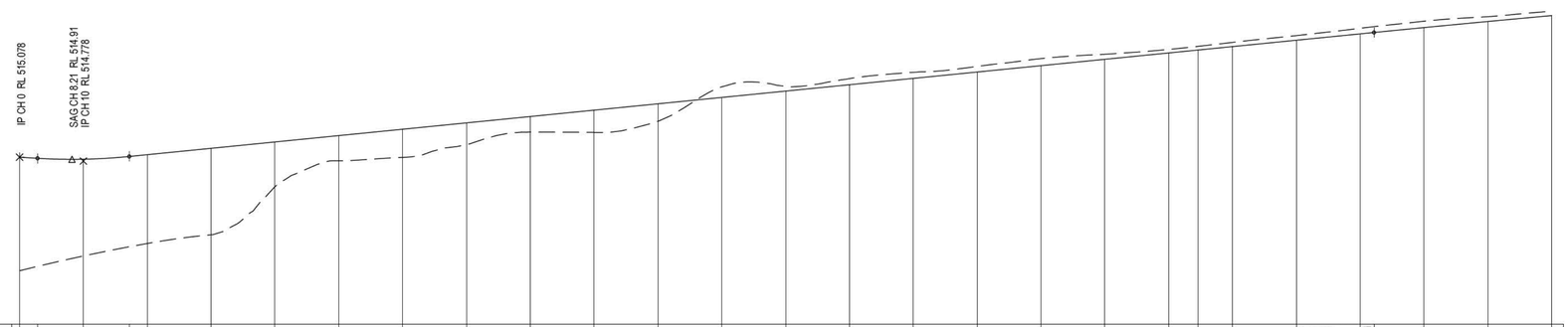
VERTICAL ALIGNMENT	L=5.75m G=3.8%	K=2.5 L=28.49m			L=45.75m G=-7.6%				
HORIZONTAL ALIGNMENT	L=80m								
LEVEL DIFFERENCE CUT - / FILL +	0.50	0.84	1.91	9.00	9.05	5.97	4.26	2.52	1.23
DESIGN SURFACE LEVEL	520.498	520.842	520.852	520.462	519.738	518.979	518.219	517.459	516.7
EXISTING SURFACE LEVEL	520.00	520.00	518.94	511.46	510.69	513.01	513.95	514.94	515.47
CHAINAGE	0	10	20	30	40	50	60	70	80
SUPER ELEVATION									

LONGITUDINAL SECTION - ROAD05

HORZ 1:500 VERT 1:500

LONGITUDINAL SECTION

12d Model
Horizontal Scale 1:500
Vertical Scale 1:500
27-Jul-2026 11:45:34



DATUM RL. 502.00

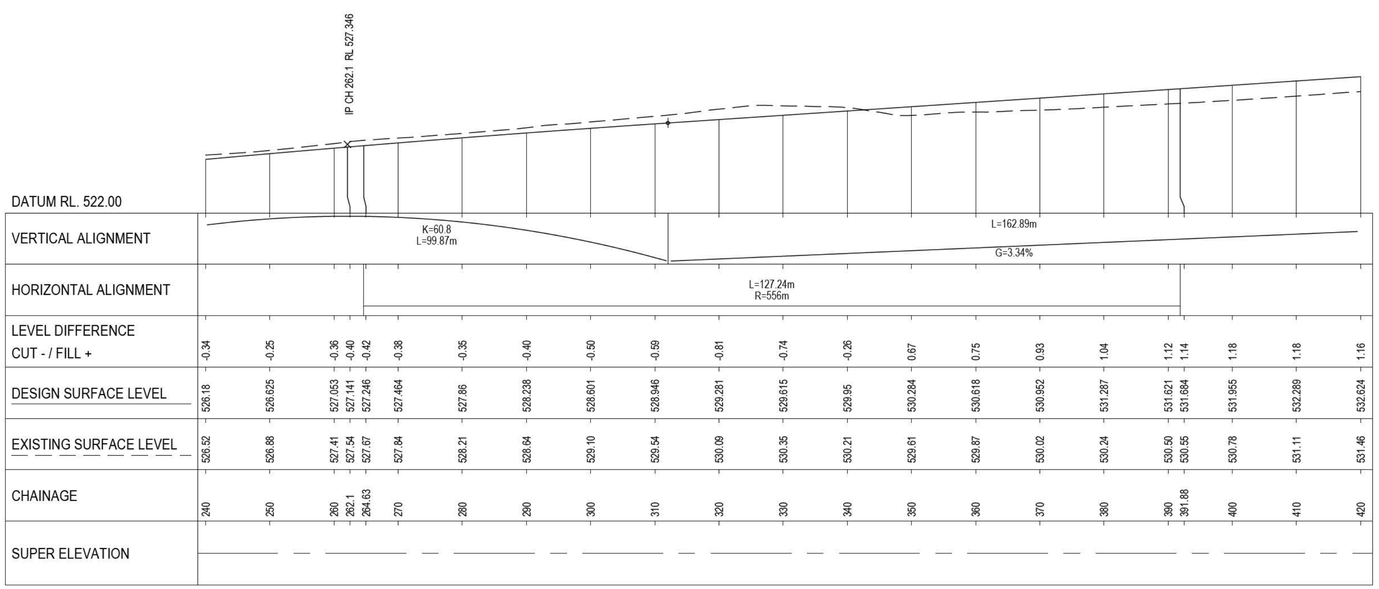
VERTICAL ALIGNMENT	L=2.81m G=-3%	K=1.8 L=14.37m	L=194.98m G=4.99%																						K=60.8 L=99.87m	
HORIZONTAL ALIGNMENT	L=80m												L=104.63m													
LEVEL DIFFERENCE CUT - / FILL +	8.90	7.59	6.96	6.78	3.51	1.97	2.21	1.70	1.22	1.75	1.37	-0.83	-0.37	-0.48	-0.48	-0.44	-0.55	-0.40	-0.28	-0.29	-0.33	-0.36	-0.44	-0.51	-0.39	-0.34
DESIGN SURFACE LEVEL	515.078	514.921	515.277	515.775	516.274	516.772	517.271	517.769	518.268	518.766	519.265	519.763	520.262	520.76	521.259	521.757	522.256	522.754	523.253	523.484	523.751	524.25	524.746	525.242	525.719	526.18
EXISTING SURFACE LEVEL	506.17	507.34	508.31	508.99	512.77	514.80	515.06	516.07	517.04	517.02	517.90	520.60	520.63	521.24	521.73	522.20	522.81	523.15	523.53	523.77	524.08	524.61	525.19	525.75	526.11	526.52
CHAINAGE	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	184.63	190	200	210	220	230	240
SUPER ELEVATION																										

LONGITUDINAL SECTION - ROAD06

HORZ 1:500 VERT 1:250

LONGITUDINAL SECTION

12d Model
Horizontal Scale 1:500
Vertical Scale 1:250
27-Jul-2026 11:45:37

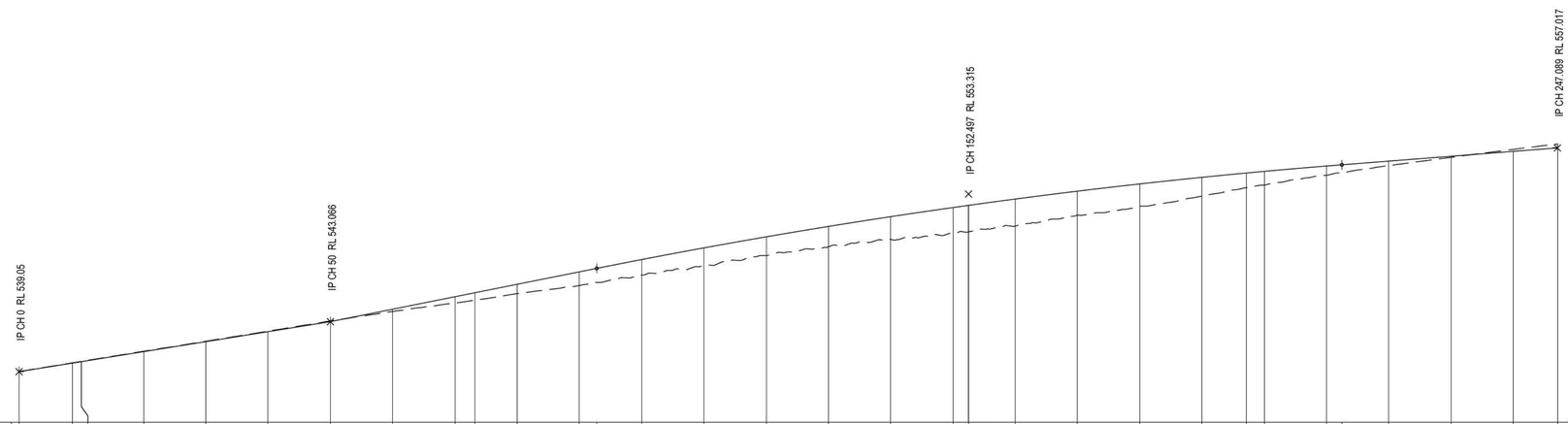


LONGITUDINAL SECTION - ROAD06

HORZ 1:500 VERT 1:250

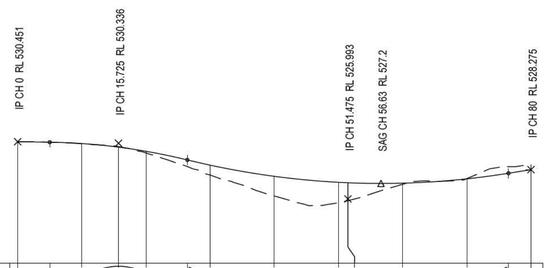
LONGITUDINAL SECTION

12d Model
Horizontal Scale 1:500
Vertical Scale 1:250
27-Jul-2026 11:45:40



DATUM RL. 535.00

| | | |



DATUM RL. 521.00

VERTICAL ALIGNMENT	L=5m G=-0.74%		K=1.88 L=21.45m	G=12.15%			K=2.48 L=50.05m				L=3.5m G=8%
HORIZONTAL ALIGNMENT	L=80m										
LEVEL DIFFERENCE CUT - / FILL +	0.00	0.02	-0.04	0.13	0.77	1.53	1.58	1.40	0.09	-0.02	-0.43
DESIGN SURFACE LEVEL	530.451	530.311	530.03	529.706	528.827	527.757	527.289	527.254	527.223	527.56	528.275
EXISTING SURFACE LEVEL	530.45	530.29	530.07	529.58	527.86	526.22	525.71	525.86	527.13	527.58	528.70
CHAINAGE	0	10	15.72	20	30	40	50	51.47	60	70	80
SUPER ELEVATION											

LONGITUDINAL SECTION - ROAD08

HORZ 1:500 VERT 1:250

LONGITUDINAL SECTION

12d Model
Horizontal Scale 1:500
Vertical Scale 1:250
27-Jul-2026 11:45:47

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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