

Appendix A

Long List Option Assessment

Expansion Areas - Long List Option Assessment

In considering development options for the Quarry site, three general areas were identified as follows:

- Area 1 - area zoned Open Space B located to the west of the site. Two general areas were identified as Area 1A and Area 1B.
- Area 2 - area zoned Open Space B to the south of the site. Three general areas were identified beyond the Business Area as Area 2A, Area 2B and Area 2C.
- Area 3 - the existing Taylor Preston site.

Figure 1 below annotates the location of each of the three areas. The identified boundaries for each of the areas are intended solely to provide a general location of the area of interest. Those areas in which quarry activity is already permitted (i.e. the North Face and South Face areas within the Business Area) have not been identified. The viability of each of the option areas are assessed in turn below.

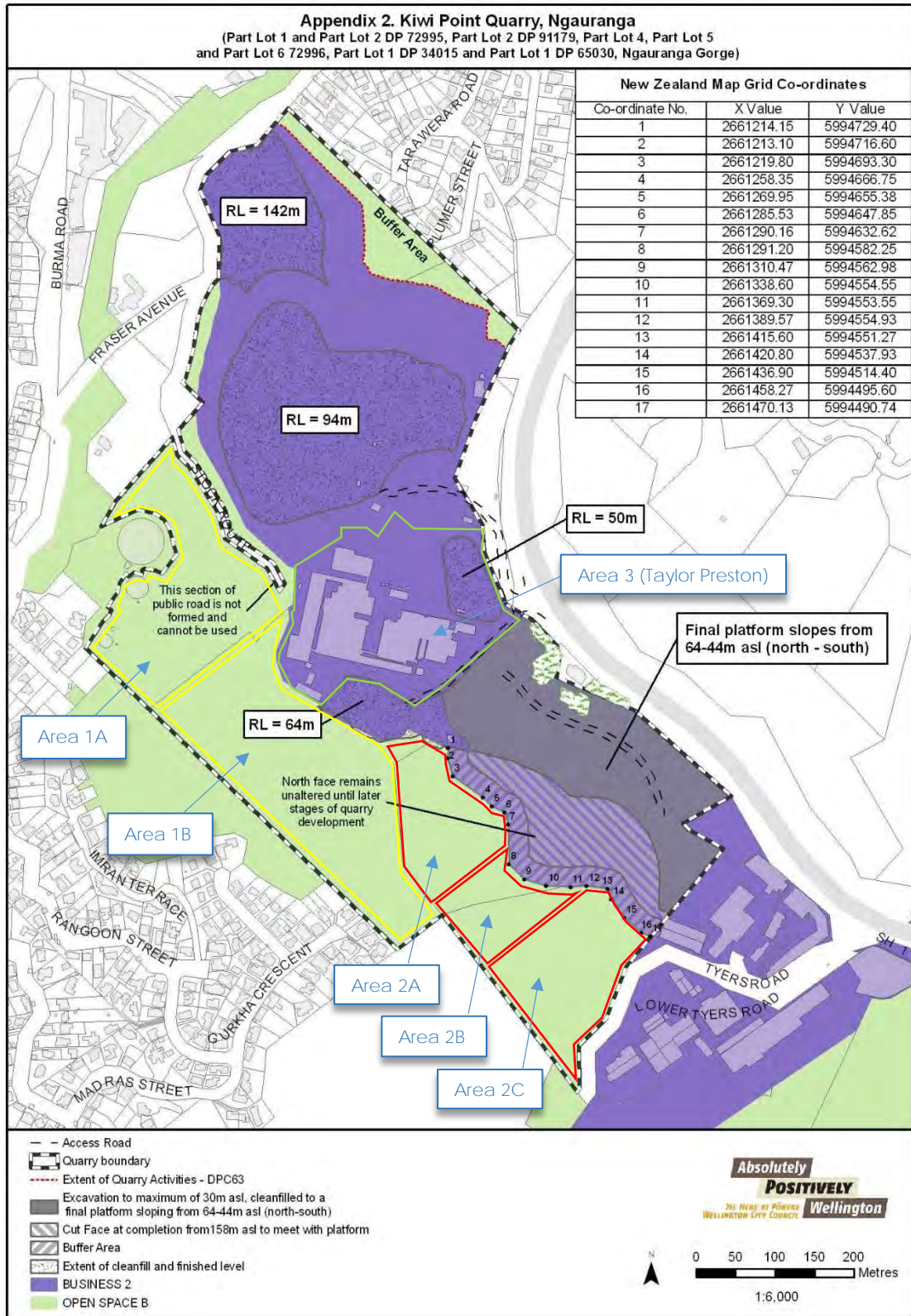


Figure 1: Kiwi Point Quarry site showing location of potential expansion areas. Base image is Appendix 2 of the Business Areas Chapter in the District Plan (source: WCC ePlan).

Area 1A - Western Quarry Area



Figure 2: General location of Area 1A showing key features (Base image source: WCC webmap).

This area forms as a buffer between North Face quarry activity and residential development to the west of the site. Stock Route further separates the area from the North Face quarry area as a public road that is not formed and cannot be used. The area features regenerating bush with the Ngauranga Stream running to the east of Stock Route. Council owned infrastructure is located within the area, consisting of two water reservoirs (4,500m³ and 910m³ capacity respectively) and associated underground water supply pipes servicing the Taylor Preston site and wider Quarry site. An additional Greater Wellington Regional Council owned water reservoir (20,000m³ capacity) is located in the Council owned reserve area immediately adjoining the Quarry site boundary to the west.

Part of the area was rezoned through Plan Change 26 as a 'land swap' (in terms of zoning) between one area of the wider Quarry site and another. A detailed overview of Plan Change 26 is included in the Issues and Options Report prepared by Incite (p17-18). Essentially the land swap provided for the utilisation of flat land for quarrying purposes (rezoning land adjoining the Taylor Preston site and the North Face quarry area to Suburban Centre (with the Suburban Centre zone subsequently replaced by the Centres and Business Areas through Plan Change 73)) and the incorporation of land around Stock Route as Open Space B to provide protection to that area from future development.

In terms of the viability of quarry activity in Area 1A the following constraints were identified:

Environmental constraints

- The area acts as a recognised buffer zone between residential development and the Quarry and Taylor Preston activities. Quarry operational activity in this area has the potential to impact on residential properties (i.e. dust, noise and vibration effects).
- The area features regenerating bush and the Ngauranga Stream is located within the general vicinity of the area. Retaining vegetation in this area would contribute positively to the rehabilitation of the site both in the short to long-term.
- Potential visual impacts with the hillside in part visible from SH1. Limited direct visual connection with surrounding residential developments in the north and west. Potential direct views from Spenmoor Street ridgeline subdivision development to the east of SH1.

Quarrying constraints

- The area is constrained geographically due to site boundaries, including Stock Route, which limits connection between the area and the existing North Face quarry area.
- The relatively steep topography limits quarry development in terms of geotechnical stability - limited opportunity to establish batters to enable quarrying to required depths to extract blue rock.
- Existing infrastructure (reservoirs and associated underground piping) would need to be relocated.
- Economically unviable - the potential volume of aggregate able to be extracted (noting also the costs required to relocate infrastructure) render the area uneconomic to develop further for quarry activity.

Based on the above identified constraints it was determined that Area 1A could be discounted as a reasonably practicable option. Quarrying in this area would be uneconomical, reduce the buffer area between residential development and likely to result in significant environmental effects.

Area 1B - Western Quarry Area



Figure 3: General location of Area 1B showing key features (Base image source: WCC webmap).

Area 1B generally features steeply sloping land with sparse vegetation coverage. The area adjoins a Council owned reserve along the western site boundary with the reserve area featuring regenerating bush. In combination with the Council owned reserve, the area acts as a buffer between residential activity, quarry activity and the Taylor Preston activity.

In terms of the viability of quarrying activity in this area the following constraints were identified:

Environmental constraints

- Similar to Area 1A, the area acts as a buffer zone between residential development and the Quarry and Taylor Preston activities. Quarry operational activity has the potential to impact on residential properties (i.e. dust, noise and vibration effects).
- The Ngauranga Stream is located at the base of the hillside. The stream is open channelled to the north east of the area and then piped underground. Quarry activity would need to be managed to limit impacts on the stream.
- Potential visual impacts with the hillside visible from SH1. Some direct visual connection with surrounding residential developments in the north. Potential direct views from Spenmoor Street ridgeline subdivision development to the east of SH1.

Quarrying constraints

- The steep topography limits quarry development in terms of geotechnical stability - limited opportunity to establish batters to enable quarrying to required depths to extract good quality rock.
- Economically unviable - the potential volume of aggregate able to be extracted (noting also the costs required to relocate infrastructure) render the area uneconomic to develop further for quarry activity.

Based on the above identified constraints it was determined that Area 1B could be discounted as a reasonably practicable option. Quarrying in this area would be uneconomical, reduce the buffer area between residential development and potentially result in significant environmental effects.

Area 2 - Southern Quarry Area (Areas 2A, 2B and 2C)



Figure 4: General location of Area 2A, Area 2B and Area 2C showing key features (Base image source: WCC webmap).

Areas 2A-2C are generally located in the area of the Quarry referred to as the South Face. The topography in the South Face area is defined by the hillside feature rising from a contour level of 70m adjacent to SH1 in a south west direction to a first peak at the 155m contour (located within a Business 2 Area) and then a second peak around the 190m contour (located within the Open Space B Area). The topography of the area generally forms as moderate to steep sloping hillside forming around the 190m contour peak. The higher peak is located within the general area identified as Area 2B with Area 2A and Area 2C generally sloping away from the peak to the north and south respectively.

The hillside (extending from the SH to the higher peak) is highly visible from SH1 to south bound traffic and forms a key feature in the 'gateway experience' of the Ngauranga Gorge. Area 2C, and to a lesser extent Area 2B, features areas of regenerating vegetation. Vegetation coverage in Area 2A is generally sparse.

Area 2C adjoins the Ngauranga Business Park (Business 2 Area) along the Quarry site southern boundary. The Business Park is centred on Tyers Road and features a range of commercial and light industrial activities currently physically separated from the Quarry activity by the existing hillside.

A Council owned reserve area adjoins the western boundary, with residential development in Gurkha Crescent located approximately 70m from the Quarry site boundary at its closest point.

The viability of quarrying in each of these areas is considered in turn below.

Area 2A Expansion - South Face

This option reduces the expansion into Area 2B (compared to the developed option prepared by Ormiston Associates) and maximises expansion into Area 2A and the northern slope of the hillside. Figure 5 below shows an indicative development option under an Area 2 expansion scenario.

In terms of the viability of quarrying activity in this area the following constraints were identified:

Environmental constraints

- Visual impacts with the hillside visible from SH1 and surrounding residential developments.
- Hillside a noted feature in the Ngauranga Gorge 'gateway experience'.

Quarrying constraints

- The steep topography limits quarry development in Area 2A - limited opportunity to establish batters to enable quarrying to required depths to extract good quality rock.
- Not economical as good quality rock is very deep - limited access to good quality rock.
- By quarrying this area the access road to the batter crest will be cut off.

Based on the above identified constraints it was determined that Area 2A could be discounted as a reasonably practicable option. Quarrying in this area would be uneconomical and could potentially result in significant environmental effects.



Figure 5: Area 2A expansion option showing indicative benching and pit development (base image source: Ormiston Associates Ltd).

Area 2B Expansion - South Face

Two sub-options for the expansion of quarry activity into Area 2B have been considered as follows:

- **Five-Stage Development** - This option is a staged development option prepared by Ormiston Associates Ltd on behalf of Holcim as the Quarry operator. The option extends to incorporate a series of benches to the 190m contour of the eastern side of the hillside peak. The option provides for an approximate 100m buffer between the maximum extent of the quarry activity and the closest residential site boundary in Gurkha Crescent.
- **Area 2B Maximum Expansion** - This option maximises the western expansion to the boundary of the Quarry site. The option provides for an approximate 70m buffer between the maximum extent of the quarry activity and the closest residential site boundary in Gurkha Crescent.

Figure 6 shows the final stage of the five-stage development. Figure 7 shows an indicative development option under an Area 2B maximum expansion scenario.

In terms of the viability of quarrying activity in this area the following constraints were identified:

Environmental constraints

- Visual impacts with the hillside visible from SH1 and surrounding residential developments, although residents on the western side of the hillside will have limited visual connection to areas of quarry activity.
- Hillside a noted feature in the Ngauranga Gorge 'gateway experience'.
- Closest proximity to residential boundaries ranging from 70-100m.
- Some areas of regenerating vegetation.

Quarrying constraints

- Topography and continuous area suitable to establish batters to enable access to known location of good quality rock.
- Economically viable from a quarrying perspective.

Based on the above identified factors it was determined that the two expansion options into Area 2B could be further assessed as potentially practicable options.

Consideration was also given to a further sub-option of reducing the maximum western extent of the quarry to approximately halfway between the site boundary and the Open Space B / Business 2 Area boundary. Following discussion with Ormiston Associates it was determined that this option would not be economically viable, with limited gains in terms of aggregate able to be sourced when compared to volumes available with a permitted activity development.

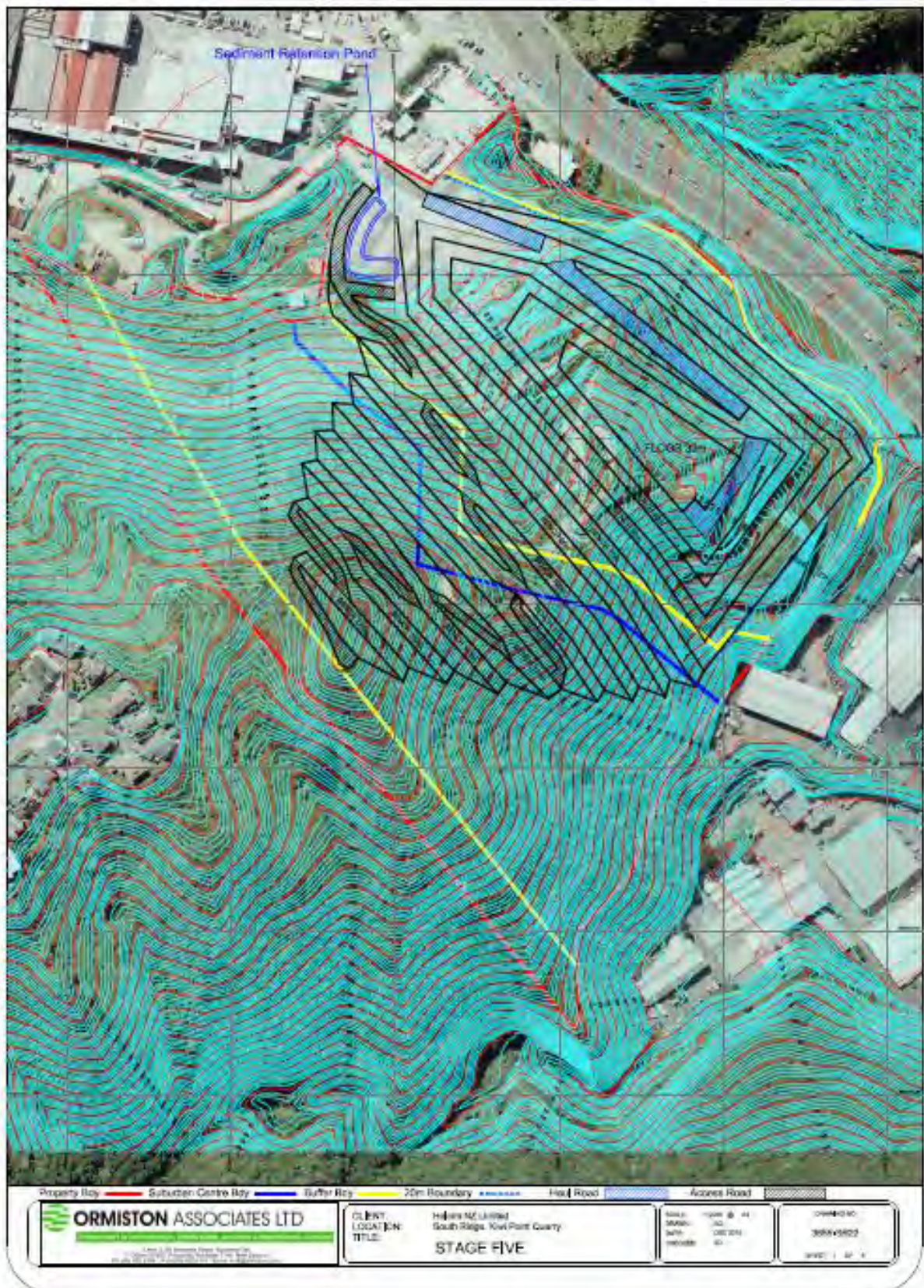


Figure 6: Final stage of the five-stage development option as prepared by Ormiston Associates Ltd (image source: Ormiston Associates Ltd).

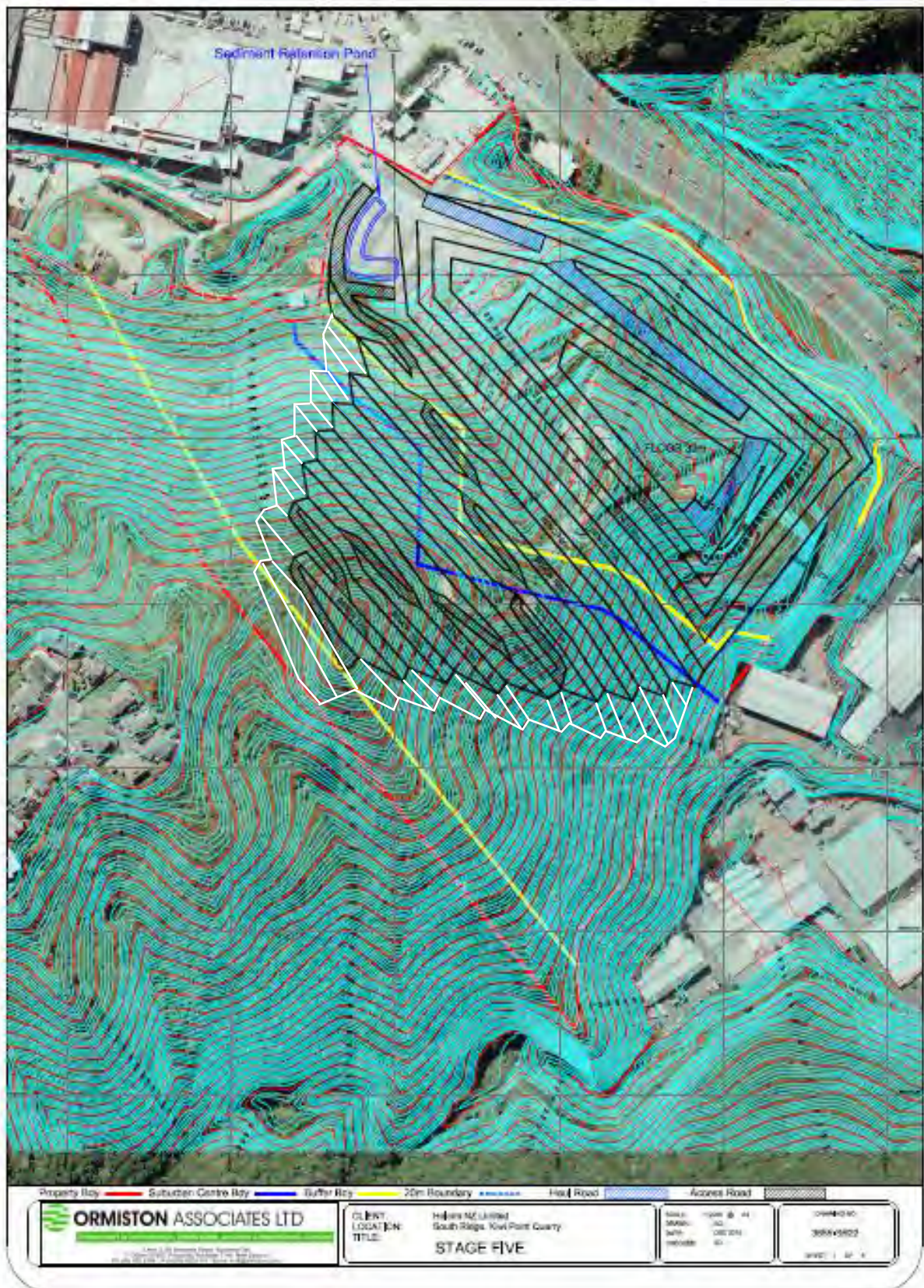


Figure 7: Area 2B maximum expansion option showing indicative benching and pit development (base image source: Ormiston Associates Ltd)

Area 2C Expansion - South Face

This option builds on the five-stage development option to include an additional expansion into Area 2C. This option seeks to maximise the potential area of available land on the southern hillside slope adjacent to the Ngauranga Business Park boundary. Figure 8 below shows an indicative development option under an Area 2C expansion scenario.

In terms of the viability of quarrying activity in this area the following constraints were identified:

Environmental constraints

- Visual impacts with the hillside visible from SH1 and surrounding residential developments.
- Hillside a noted feature in the Ngauranga Gorge 'gateway experience'.
- Area largely covered by regenerating vegetation.

Quarrying constraints

- The steep topography limits quarry development in Area 2C - limited opportunity to establish batters to enable quarrying to required depths to extract good quality rock.
- Not economical as good quality rock is very deep - limited access to good quality rock. Requires significant excavation to achieve marginal benefit.

Based on the above identified constraints it was determined that Area 2C could be discounted as a reasonably practicable option. Quarrying in this area would be uneconomical and could potentially result in significant environmental effects.

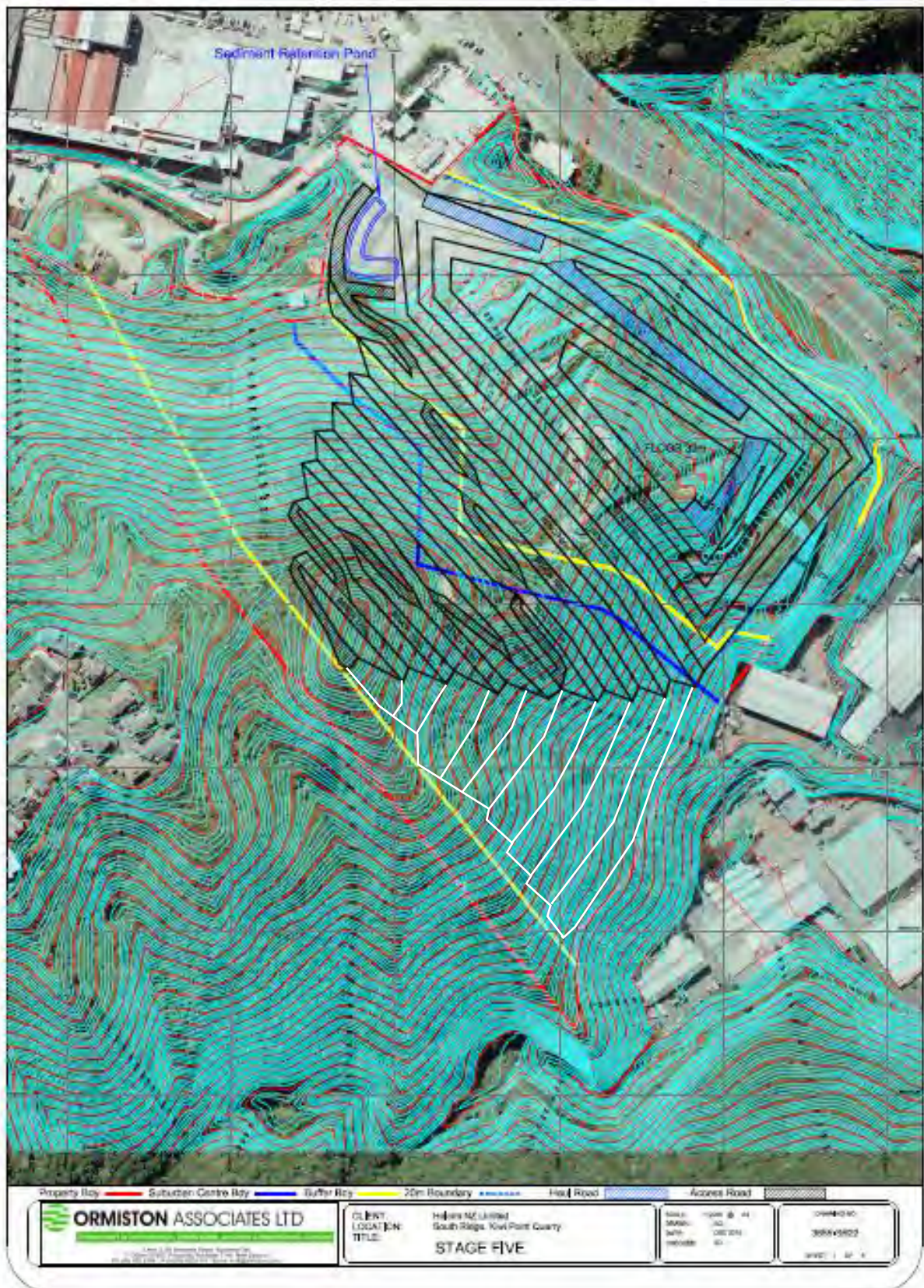


Figure 8: Area 2C expansion option showing indicative benching and pit development (base image source: Ormiston Associates Ltd)

Area 2 Maximum Expansion - South Face

Further consideration was given to a maximum combined development scenario for Area 2. Figure 9 below shows an indicative development option under an Area 2 maximum expansion scenario.

In considering relative environmental and quarrying factors it was determined that this option could be discounted as a reasonably practicable option. The environmental impact of this option would likely be significant while from an operational perspective the option is not considered to be viable - the expansion into Area 2A and Area 2C would not be economically viable.



Figure 9: Area 2 maximum expansion option showing indicative benching and pit development (base image source: Ormiston Associates Ltd)

Area 3 - Taylor Preston



Figure 10: General location of Taylor Preston site showing key features (Base image source: WCC webmap).

The Taylor Preston site is currently zoned Business 2. The current District Plan standards do not permit quarrying activity within the Taylor Preston site, with the relevant standard as follows:

34.6.5.3.1

Quarry activities shall be restricted to the area within the Business Area north of the abattoir and south of the access road, excluding the area shown as a buffer area, as identified on the plan included as Appendix 2.

As a development option it is estimated that approximately 2M tonnes of blue rock could be quarried from under the Taylor Preston site. This volume would extend the life of the Quarry by approximately six years.

The key constraint for Area 3 is the existing infrastructure associated with the Taylor Preston Abattoir with the current 25 year lease due to expire in 2033. In the context of long-term options for the development of the site the area generally presents as a viable quarry option from an operational perspective. In terms of environmental constraints, and in considering the existing environment and post-quarry rehabilitation, impacts would generally be limited to operational effects from quarry activity. Pit development would have limited visual impact on surrounding residential sites and of temporary duration (with the pit logically to be filled as part of the site rehabilitation). Ecological value is limited, although Ngauranga Stream is located adjacent to the Taylor Preston site.

Overall the Taylor Preston site is considered a suitable development option in the medium-term development of the site. Delaying quarry development in this area until the expiry of the lease, in combination with the development of an alternate quarry location in the interim, will enable the Quarry to continue to provide for forecast regional aggregate demand and provide for the staged development of the wider site.