Attachment 6

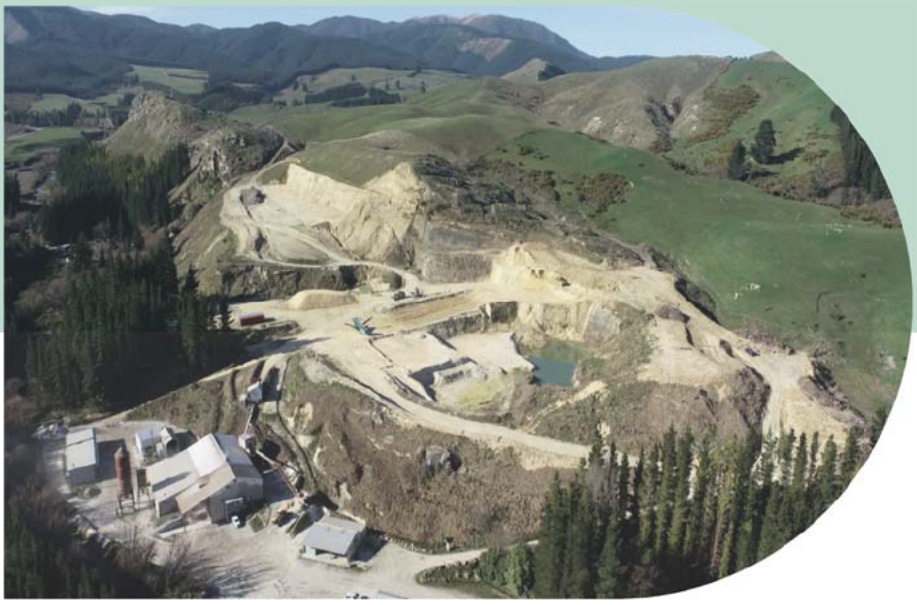
6a - Economic Benefits – Sapere (April 2026) report

6b - Sapere response to Cognitus Economic Insight (July 2026)

Whiterock Class 3 Managed Fill

A review of economic benefits

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April 2026



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Executive summary

Whiterock Lime Limited proposes ("the proposal') to establish a Class 3 managed fill facility at the Whiterock Lime Quarry near Loburn, Canterbury. The facility would accept predominantly inert construction and demolition waste, contaminated soils, and asbestos-containing materials, with an estimated capacity of approximately 800,000 tonnes.

The proposal is intended to support more efficient regional waste management by directing inert and low-risk contaminated materials away from higher-specification Class 1 landfills and into a facility designed for those waste streams.

An earlier assessment sought to identify potential economic and system-level benefits associated with the proposal. However, it includes what we think of as commercial benefits and the application under the Fast-Track Approvals Act 2024 that it was appended to was declined. Decision-makers wanted a focus on the economic benefits and more information, including in respect of additionality, regional significance, and benefit realisation.

This report builds on previous analysis by:

- clarifying the role of a Class 3 facility within Canterbury's waste disposal network
- assessing whether additional Class 3 capacity is required in the region
- considering the economic benefits of the proposal in more detail, with a focus on system-wide effects.

From a system perspective the central economic question is whether the Whiterock proposal changes how efficiently contaminated soil and aggregates disposal services are delivered across Canterbury. This report focuses on how the proposed facility interacts with the existing disposal network, and whether its location and operating characteristics reduce the resources required to achieve the same disposal outcomes over time.

The analysis shows that Whiterock's primary economic effects arise through two related channels. First, the facility's operation generates ongoing regional economic activity, captured through gross domestic product (GDP) and employment impacts. Second, and distinct from these activity-based effects, the location of the facility relative to Canterbury's main sources of development activity can give rise to incremental efficiency gains by reducing haulage distance, travel time, and associated external costs. These efficiency effects do not rely on increased levels of disposal but on changes in where disposal occurs within the existing system.

Demand for a new Class 3 facility in Canterbury

Stakeholder engagement undertaken for this assessment indicates consistent and ongoing demand for the disposal of contaminated soils across Canterbury. Contamination is routinely encountered across residential, commercial, and infrastructure projects, with both small and large developments generating significant volumes of Class 3-appropriate material.

Existing disposal options in Canterbury are limited and constrained by:

- narrow acceptance criteria

- operational limits on intake volumes and truck movements
- short remaining consent durations
- relatively high disposal and transport costs.

These constraints have contributed to project delays, increased costs, reliance on more distant disposal sites, and increased compliance risks, particularly for time-critical or brownfield developments.

The Whiterock facility would expand the region's disposal network by providing a well-located Class 3 option closer to major sources of waste generation in Christchurch City and surrounding districts.

GDP and employment contributions arising from the Whiterock project

The Whiterock project is expected to make a measurable positive contribution to Canterbury's regional economy through its ongoing operational activity. Using a regional input–output modelling framework based on Statistics New Zealand data, the analysis estimates that the project would support **8.7 full-time equivalent jobs on a Type II basis.**

In GDP terms, the project is estimated to generate annual Type II GDP impacts of approximately $1.76 million. While modest relative to Canterbury's total GDP, this represents a persistent contribution over the operational life of the facility taken over a 20-year period. Applying an 8 per cent commercial discount rate consistent with Treasury guidance, **the present value of Whiterock's contribution to regional GDP is estimated at $17.3 million, on a Type II basis.**

These impacts reflect the ongoing provision of waste disposal services rather than one-off construction effects, and represent continuing economic activity associated with employment, supply-chain interactions, and household expenditure in the Canterbury region.

Economic efficiencies arising from the Whiterock project

From an economic efficiency perspective, the proposed Class 3 managed fill at Whiterock affects the resources required to provide contaminated soil disposal services in the Canterbury region. The analysis examines how transport distance influences system-level efficiency, focusing on travel time, vehicle movements, and related external effects. Efficiency effects are assessed by comparing haulage distances to Whiterock with those to existing disposal facilities.

Comparative analysis of the Whiterock site against existing disposal options at Taiko Road and Kate Valley indicates that the location of disposal activity can give rise to economic efficiency effects over time. These effects relate primarily to differences in haulage distance and are expressed through changes in travel time, emissions, and road safety outcomes.

Taiko Road and Kate Valley are used as counterfactuals because they are established, consented facilities with comparable waste classifications and long-term operational certainty. Woodstock and Burwood are excluded on analytical grounds: Woodstock's consenting status and waste classification

are uncertain, while Burwood's consent is expected to expire, limiting its suitability as a reliable comparator.

Over a 20-year analysis period, and in the absence of consenting constraints (base case):

Table 1: Base case economic efficiency comparisons between Whiterock, Taiko Road, and Kate Valley

	Taiko Road	Kate Valley
Base case		
Value of time	$23,429,348	$1,665,204
Avoided emissions	$4,534,628	$492,216
Avoided injuries	$7,148,778	$783,380
Total	**$35,112,753**	**$2,940,800**

Under a consent-constrained scenario of 2,976 trips per year:

Table 2: Consent-constrained economic efficiency comparisons between Whiterock, Taiko Road, and Kate Valley

	Taiko Road	Kate Valley
Consent constraints		
Value of time	$1,992,165	$215,473
Avoided emissions	$606,096	$64,133
Avoided injuries	$960,075	$101,375
Total	**$3,558,336**	**$380,981**

Overall, these results indicate that efficiency effects are sensitive to both the counterfactual disposal location and the extent to which material can be directed to Whiterock. Under constrained conditions, the effects are less but positive. In the absence of such constraints, the efficiency gains are larger, particularly where Whiterock substitutes for more distant disposal options. The consenting constraint is the binding factor limiting the scale of these benefits, and any relaxation of that constraint would be expected to materially increase the estimated gains.

Does the project deliver significant regional or national benefits?

Section 22 of the Fast-track Approvals Act 2024 sets out an acceptance criterion requiring that a project be an infrastructure or development project with significant regional or national benefits. While the term "significant" is not explicitly defined, section 22(2)(a) of the Act specifies matters the Minister may consider when assessing this criterion. The following sections set out those considerations and describe how, and to what extent, the Whiterock project meets each of them.

Table 3: Significant benefit considerations

Section 22 (2)(a) considerations	How does the Whiterock project correspond
Whether the project has been identified as a priority project in a central government, local government, or sector plan or strategy (or a central government infrastructure priority list)	The project has alignment with national and regional waste management policy settings (Waste Minimisation Act, Waste and Resource Efficiency Strategy, regional waste management plans).

Whether the project will deliver new regionally or nationally significant infrastructure or enable the continued functioning of existing regionally or nationally significant infrastructure	The project would add Class 3 disposal infrastructure to Canterbury's waste system, addressing identified capacity, acceptance criteria, and operational constraints and helping preserve higher specification Class 1 landfill capacity. i.e. it would enable the continued functioning of existing regionally significant infrastructure.
Whether the project will deliver significant economic benefits	The report quantifies ongoing regional GDP contributions (PV ≈ $17.3m over 20 years), employment (≈8.7 FTE Type II), and system level efficiency gains (PV up to $35.1m unconstrained, $3.6m constrained). Benefits are described as modest individually but material in aggregate and persistent over time.
Whether the project will address significant environmental issues	The project supports diversion of inert and low risk contaminated materials away from higher specification landfills, improved compliance outcomes, reduced incentive for non-compliant disposal, and more appropriate containment of contaminated soils and asbestos. These are framed as system level environmental management improvements.
Whether the project is consistent with local or regional planning documents, including spatial strategies	The report identifies consistency with regional waste-management objectives and spatial patterns of development (Christchurch, Selwyn, Waimakariri).
Whether the project will increase the supply of housing, address housing needs, or contribute to a well-functioning urban environment	There is no direct link between the project and the supply of housing. However, the provision of additional disposal capacity may support the development of new housing.
Whether the project will support primary industries, including aquaculture	There is no direct link between the project and primary industries or aquaculture.
Whether the project will support development of natural resources, including minerals and petroleum	There is no direct link between the project and development of natural resources
Whether the project will support climate change adaptation, reduce risks arising from natural hazards, or support recovery from events caused by natural hazards	There is no direct link between the project and benefits in terms of climate adaptation or hazard recovery.
Whether the project will promote competition in the grocery industry	There is no direct link between the project and competition in the grocery industry.

1. Introduction and background

Whiterock Lime Limited (WLL) are seeking to establish a Class 3 managed fill landfill at the Whiterock Lime Quarry. This facility would be located at 150, 154, and 174 Quarry Road in Loburn (referred to in this report as "the Whiterock site" or simply "Whiterock"). The site lies approximately 23.5km from central Rangiora and around 50km from central Christchurch.

The landfill is intended to receive predominantly inert construction and demolition (C&D) waste, contaminated soil, and asbestos-containing materials. No biodegradable organic waste would be accepted.

The proposed Class 3 managed fill would provide an estimated total capacity of about 500,000m^3. When applying appropriate waste density assumptions and cover requirements, this equates to roughly 800,000 tonnes of material (based on an average fill density of 1.6 t/m^3).

The Waste Minimisation Association of New Zealand's (WasteMINZ) Disposal to Land Guidelines (2023) serve as the current national best practice standard for solid waste disposal facilities. The guideline's landfill classification system, classes 1 through 5, defines the necessary engineering controls and waste acceptance criteria for different waste types. Under this system, the Whiterock proposal aligns with the Class 3 category, thereby offering important infrastructure to divert inert waste away from Class 1 landfills in Canterbury.

Developing the Whiterock Class 3 managed fill would broaden Canterbury's disposal network and contribute to a more efficient regional disposal system by:

- providing a purpose-built facility for the safe handling of inert waste streams
- reducing transportation distances relative to other disposal sites that accept comparable materials
- supporting more effective use of landfill capacity across the region by ensuring waste types are directed to facilities with the appropriate containment standards, essentially ensuring "the right waste goes to the right place."

In this sense, the Whiterock proposal is best understood as a change to the configuration of the disposal system rather than an expansion in total waste generation. The relevance of this distinction is that system-level economic effects arise not from increasing disposal volumes, but from altering the distance, time, and resources required to manage contaminated soil that would be generated irrespective of Whiterock's development.

1.1 The purpose of this report

This report provides a rigorous assessment of the economic benefits associated with the Whiterock Managed Fill project. It applies a formal economic evaluation framework to identify, quantify, and explain the ways in which the project contributes to regional economic performance over the analysis period.

The assessment examines how Whiterock generates economic efficiencies within the Canterbury waste management system and how these efficiencies translate into measurable regional outcomes. In

particular, the report evaluates impacts on gross domestic product (GDP) and employment, alongside cost efficiencies arising from reduced transport distances, more appropriate use of landfill classifications, and improved availability of Class 3 disposal capacity.

The analysis is undertaken at a regional scale and captures system-level interactions between individual benefits, recognising that their combined effects may be more significant than any single benefit in isolation.

Specifically, the report:

- Assesses the extent to which Whiterock meets regional demand for Class 3 managed fill capacity, including its role in managing contaminated soils and the additional capacity it provides within the existing network; and
- Quantifies the economic benefits associated with Whiterock, with a focus on whether interconnected benefits collectively support outcomes of regional significance for Canterbury.

1.2 A note on the scope of this work and Sapere's role

This work examines and analyses the potential economic impacts associated with the proposed Whiterock project, with the purpose of assessing whether the project is likely to generate material economic benefits for the Canterbury region. The analysis focuses on identifying and quantifying selected economic effects rather than providing an assessment of overall net social welfare. Accordingly, this work does not constitute a Treasury-style social cost-benefit analysis, which would typically encompass a broader range of costs, benefits, and distributional considerations. This approach is consistent with the objective of identifying economic benefits and with the scope of other applications considered under the FTAA framework.

Sapere's role in this work is to provide independent economic expertise. We are an economic consultancy and do not undertake advocacy or promote predetermined outcomes. Our role is to deliver robust and transparent economic analysis grounded in independence, objectivity, and professional integrity. The analysis presented in this report reflects these principles.

1.3 Relevant policy background

The WSP report included the national and regional policy background to situate the Whiterock proposal within the wider strategic direction for waste management, demonstrating how the facility aligns with existing legislative, strategic, and regional waste-minimisation objectives. This context helps clarify why additional Class 3 capacity is relevant and supports the case that the proposal contributes to established policy goals rather than operating in isolation. We have provided this brief overview of the policy context, in the table below, to support the reading of this report and to clarify how the subsequent analysis aligns with these established strategic settings.

National and regional policy frameworks provide the strategic context for waste management in New Zealand and help clarify the role of a Class 3 managed fill within the wider disposal system. Nationally, the Waste Minimisation Act and the Waste and Resource Efficiency Strategy set expectations for reducing waste, improving resource efficiency, and ensuring materials are directed to appropriately engineered facilities. These policies emphasise the need to divert inert C&D materials and contaminated soils away from Class 1 municipal landfills, supported by levy settings that increasingly favour separation and recovery of materials.

At the regional level, Canterbury's territorial authorities outline objectives in their waste minimisation and management plans to improve resource efficiency, promote circular-economy outcomes, and preserve existing Class 1 landfill capacity. The availability of a broader range of disposal options, including dedicated Class 3 facilities, supports these aims by encouraging greater sorting of C&D waste, reducing transport distances to suitable sites, and ensuring that landfill airspace with higher levels of engineering and environmental controls is reserved for materials that genuinely require it.

Collectively, these policy settings highlight the need for additional, well-located Class 3 capacity in Canterbury. The establishment of a managed fill at Whiterock would align with both national and regional direction by enabling more cost-effective diversion of inert materials, reducing pressure on Class 1 facilities, and supporting more efficient and sustainable waste system performance across the region.

2. Additionality

WSP assessed the demand for a Class 3 managed fill to understand the scale and drivers of inert waste generation in Canterbury and to determine whether additional disposal capacity is required. Below is a summary of their findings.

WSP analysis shows that New Zealand's disposal of inert materials, such as contaminated soils and sorted C&D waste, has more than doubled since 2010, with an estimated two million tonnes of such waste currently going to Class 1 landfills nationally. This trend, combined with increasing development activity, regulatory requirements for managing contaminated land, and significant regional infrastructure and housing growth, signals sustained and growing demand for Class 3 disposal capacity.

WSP also identified that current disposal options in Canterbury are limited, with existing alternatives either distant, more expensive, or unable to accept the full range of Class 3-appropriate materials. They highlighted several major projects, including nationally significant transport upgrades and substantial residential and industrial developments, that are expected to generate sizeable volumes of surplus soil and inert waste requiring appropriate containment. This reinforces the need for additional, well-located Class 3 capacity to support ongoing development and reduce pressure on higher-classification landfills.

Our approach to assessing the additionality of the proposed Class 3 managed fill at Whiterock builds on WSP's findings by gathering qualitative evidence by interviewing developers, earthmoving contractors, waste operators, and technical specialists who routinely manage contaminated soils and other Class 3 materials. Four interviews were conducted in person during fieldwork in Christchurch on 19 and 20 March 2026, with the remaining interviews undertaken by telephone. Stakeholders were assured that their personal details would be securely stored and that their contributions would not be attributed to individuals, in accordance with standard research practice and ethical requirements for research involving human participants. The stakeholder groups engaged, and the number of interviews conducted are summarised in the table below.

Table 4: List of stakeholder engagements

Stakeholder type	Number of engagements
Property developer	4
Earthmover	4
Engineer	2
Public policy	1

The inputs and insights provided by these stakeholders inform the observations presented in this section.

The purpose of our assessment is to understand:

- whether and why users would choose to dispose of material at Whiterock
- the value Whiterock would add to the region's current landfill and clean fill network
- the operational and regulatory constraints that limit existing Class 3 disposal options.

Our assessment was undertaken to determine the additionality of a proposed Class 3 disposal facility at Whiterock and, critically, to establish whether such a facility would be used. While not an economic analysis itself, this assessment provides essential context for the economic modelling that follows by examining real-world constraints, user behaviour, and the practical realities of contaminated soil disposal across the region.

2.1 Consistent demand for contaminated soil disposal

Discussions with sector stakeholders indicate a consistently high level of demand for facilities capable of accepting contaminated soils across Canterbury. Stakeholders reported contamination is now routinely encountered in both redevelopment and new development projects, with several noting that it is increasingly uncommon to work on a site that does not contain some form of contamination.

Across a range of project types, the volumes of contaminated soil requiring disposal are significant. Interviewees indicated that even small residential projects can generate approximately 1,000 to 1,500m^3 of contaminated material, while larger developments have produced volumes of up to 12,000m^3.

The types of contamination requiring Class 3 disposal were described by stakeholders interviewed, as broad and varied. Examples cited across different interviewees included asbestos, heavy metals, treated timber residues, and other unexpected contaminants. These materials were identified on a range of development sites, including residential areas, former commercial or industrial land, and major redevelopment precincts such as Burnham and the former Air New Zealand site.

Taken together, these accounts of stakeholders suggest the demand for Class 3 disposal capacity is both substantial and ongoing, driven by the contamination profiles of a wide range of sites across the region.

2.2 The availability of suitable Class 3 capacity

Developers looking to dispose of contaminated soils have two main options close to development sites in Christchurch and the surrounding region: Burwood Landfill and Kate Valley landfill.[1]

2.2.1 Burwood Landfill

Overview

[1] We are aware of an alternative site in Hororata and Taiko Road, Timaru. The former was not mentioned by stakeholders during our discussions. The latter was mentioned as an alternative site and is discussed below. Both landfills, along with Kate Valley and Whiterock, feature in our economic analysis.

Burwood Landfill is a Christchurch City Council-operated facility that provides a disposal option for soils containing low levels of contamination. It does not accept hazardous materials. Only a small section of the site remains open, and it is used exclusively for contaminated soil disposal under a council-approved special waste permit. The site operates with set access hours and charges disposal fees per tonne.

Acceptance criteria constraints

While Burwood is a viable option for the disposal of some soil material, it does not accept soils containing:

- combustible materials
- putrescible materials (food waste, organic matter that decays)
- degradable or leachable components
- hazardous substances
- any material that presents a risk to human health
- liquid waste
- rocks, stones, or objects larger than 60mm
- asbestos.

Burwood is currently consented to operate until June 2026. We understand there may be an intention to seek a further consent extension of approximately five years, although this has not yet occurred. In either case, the facility appears to provide only a short-term option for the types of contaminated soils it is currently permitted to accept.

2.2.2 Kate Valley Landfill

Overview

Kate Valley Landfill is a 37-hectare, fully engineered regional waste management facility located in the Hurunui District, north of Christchurch. It is designed and operated to international landfill standards, including multi-layered lining systems, leachate collection and treatment, landfill gas capture, and comprehensive stormwater management. Although principally a landfill for kerbside waste, Kate Valley has carved out space which can accept contaminated soil waste, including those not currently accepted by Burwood.

Operational capacity constraints

- The use of Kate Valley is affected by operational constraints that limit the volume of soil it can receive, regardless of the total airspace available at the site. The cap on truck movements, originally consented at 600 trucks per week, means developers and earthmoving contractors cannot consistently secure access for their required loads.
- Kate Valley requires contaminated soil to be transported in lined hook-lift bins, which typically carry around 25 tonnes, compared with the 33 to 36 tonnes possible using standard truck-and-trailer units. This reduces the volume that can be moved per trip and can increase transport time and cost for projects generating larger quantities of contaminated soil. As a

result, disposal activities may take longer to complete, particularly where high daily movement rates are needed to maintain project schedules.

Cost constraints

- Stakeholders reported disposal at Kate Valley can involve comparatively high gate fees, with reported charges in the vicinity of $500 per tonne. In some cases, this level of pricing has been associated with substantial increases in overall project costs, including estimates that contaminated soil disposal could add close to $1 million to a development budget if all material were sent there.
- High disposal costs may influence how projects are scoped and managed. In one example, approximately $400,000 of contaminated material was removed from a project's disposal plan to avoid cost escalation associated with sending it to Kate Valley. These cost pressures can contribute to broader project-level financial impacts, including those relating to land development and housing delivery.
- In addition to gate fees, the requirement for contaminated soil to be transported in lined hook-lift bins can increase overall disposal costs. These bins typically have lower payload capacity than standard truck-and-trailer units and may be more expensive to operate, resulting in higher transport and handling costs for projects generating larger volumes of contaminated soil.

2.3 Impacts of constraints on development

Constrained access to appropriately consented Class 3 disposal facilities can create a range of practical challenges for development and earthmoving projects. Several examples were provided to illustrate how current limitations influence project delivery and compliance:

- Some large development projects in the region have required substantially higher daily soil movement volumes than can be accommodated by existing disposal facilities. For example, projects needing around 40 truckloads of contaminated soil per day cannot be serviced within required timeframes when facilities are able to accept only a small number of loads each day. This illustrates how intake limits can affect the feasibility of progressing high-volume sites.
- Instances of non-compliant disposal have been observed in situations where appropriately consented facilities were either unavailable or unable to receive material at the rate required for active projects. In such cases, contaminated soil has at times been taken to sites not approved to accept that waste type, indicating that limited disposal availability can create pressures that increase compliance risks.
- Project timelines and budgets can also be affected where disposal capacity is constrained. Some developments have experienced delays of two to three months linked to limited intake availability, resulting in additional holding costs. In other cases, disposal-related challenges rather than construction activities have contributed to overall cost increases.
- Constraints in suitable Class 3 disposal capacity may influence the viability of certain developments, particularly brownfield sites, where contamination is more likely to be encountered. When disposal options are slow or costly, the financial feasibility of some projects

can be reduced, and in certain situations, sites may be deferred or not progressed where contamination is expected or known.

The project does not directly influence housing demand, contaminated soil disposal is a necessary input to many residential developments, particularly on brownfield and infill sites. Constraints on disposal capacity can delay earthworks and extend project delivery timeframes.

By improving the availability and spatial efficiency of Class 3 disposal capacity, the Whiterock facility may reduce the likelihood that disposal constraints become a binding factor in housing-related development.

2.4 Acceptance criteria, operational, and cost constraints can require sorting of soil before disposal

Variability in acceptance criteria across disposal facilities has created uncertainty for contractors when determining the most appropriate and cost-effective destination for soil waste. This uncertainty makes it challenging to identify the correct disposal pathway without additional testing and assessment.

Sorting soil into compliant waste streams can add significant cost to projects due to the need for multiple test stockpiles, repeated sampling, and additional labour inputs. In cases where asbestos-containing materials may be present, further testing can escalate costs into the tens or hundreds of thousands of dollars.

Because sorting and classification processes are time-consuming, costly, and operationally disruptive, contractors may default to sending soil to higher-cost facilities with broader acceptance criteria. While this approach simplifies logistics and reduces the risk of misclassification, it also increases overall disposal expenditure and can extend project timelines due to intake limits at other sites.

2.5 Alternative disposal site options for contaminated soil

Stakeholders reported using alternative disposal sites in South Canterbury and the West Coast to manage landfill constraints while limiting project delays and cost impacts.

2.5.1 Taiko Road as a disposal option

Projects also rely on facilities in Timaru, such as the Taiko Road site, as an option for managing contaminated soil. The greater transport distance from Christchurch introduces additional time and cost pressures for projects requiring frequent or high-volume soil movements.

Use of Taiko Road reflects the need to maintain project continuity where local options are constrained. However, the reliance on long-haul trucking can increase overall logistical complexity. This includes higher fuel and labour costs, extended turnaround times for truck and trailer units, and potential scheduling impacts on earthworks programmes. These factors can influence both project efficiency and budget management when local capacity is unavailable.

2.5.2 West Coast facilities as a disposal option

Developers currently consider West Coast disposal facilities when both Kate Valley and Burwood are unable to accept soil waste, and due to lower gate fees, which can make the longer haulage economically viable however these sites are typically regarded as a secondary fallback rather than a routine option. Their use tends to arise only under conditions where regional sites are either unavailable, significantly constrained, or unable to meet acceptance requirements for waste types.

The considerable distance to the West Coast imposes notable transport-related costs and operational inefficiencies, making it an impractical choice for most projects generating moderate to high volumes of contaminated soil. As a result, these facilities are generally viewed as a last-resort option within the broader disposal landscape when closer facilities are not viable

3. GDP and FTE impacts

To assess the employment and GDP and full-time equivalent (FTE) impacts of the project, a regional input–output (I/O) modelling approach has been used. I/O tables describe how different industries within an economy purchase from and sell to one another. By applying this framework, it is possible to estimate how expenditure in one industry flows through to other industries, generating wider economic effects.

These impacts should be interpreted as measures of economic activity supported by the project, rather than indicators of improved productivity or net welfare. They are therefore analytically distinct from the efficiency effects examined in section 4.

3.1 Two types of impacts are reported: Type I and Type II impacts

Type I impacts capture the direct and indirect effects of a project. Direct effects refer to the economic activity generated by the project itself, such as employment and output within the project delivery. Indirect effects arise from the project's supply chain, for example when the project purchases goods and services from other industries, which in turn generate further economic activity.

Type II impacts extend this analysis by also including induced effects. Induced effects reflect the additional economic activity that occurs when employees supported by the direct and indirect effects spend their wages and salaries in the wider economy. As a result, Type II impacts provide a more comprehensive measure of the total economic effect, while Type I impacts provide a more conservative estimate focused on production and supply-chain linkages.

3.2 Type I FTE impacts are 6.7, while Type II impacts are 8.7

We estimate that the Whiterock project will support approximately 8.7 FTE roles during its operational phase. This estimate assumes that the project operates in line with the current design and cost assumptions, and that there are no material changes to operational activity that would affect industry output. Changes to operational expenditure or scale, if they were to occur, could alter industry output and, in turn, the level of employment supported.

3.3 Type II GDP impacts over a 20-year period represent a contribution of $17.3 million to Canterbury's GDP

Based on the proposed operating expenditure for the Whiterock project, we estimate:

- **Type I** annual GDP impacts of **$1.39 million**
- **Type II** annual GDP impacts of **$1.76 million.**

Over a 20-year assessment period, consistent with the expected operating life of a landfill of this type, and applying a Treasury discount rate of 8 per cent (used for estimating the present value (PV) of contributions from commercial projects), the PV of the project's contribution to Canterbury's GDP is estimated at $17.3 million, based on the calculation formula set out below:

$$PV = A \times r1 - (1+r) - n$$

Where:

- A=1.76 (annual GDP impact, $ millions)
- r=0.08r (8 per cent discount rate)
- n=20 years

4. Economic efficiencies from a new Class 3 landfill

In addition to estimating GDP and FTE impacts, our analysis also considers the Whiterock project from an economic efficiency perspective. Specifically, it examines whether the provision of a Class 3 facility at the proposed Whiterock site could affect the resources required to deliver contaminated soil disposal services. This section focuses on the role of transport distance in shaping system-level efficiency within the Canterbury waste management system, considering how the spatial relationship between development activity and disposal facilities influences travel time, vehicle movements, and associated external effects. By comparing the proposed Whiterock site with existing disposal options, the analysis assesses whether differences in haulage distances result in observable efficiency effects.

From an economic perspective, system efficiency relates to the quantity of resources required to deliver a given service. In the context of contaminated soil disposal, the service being delivered is compliant disposal to an appropriately consented facility. Efficiency improvements occur where the same volumes of material can be managed using less travel time, fewer vehicle kilometres, and lower exposure to transport-related external costs. Importantly, these effects are independent of changes in the quantity of waste generated and arise solely from the spatial relationship between waste sources and disposal infrastructure.

The counterfactual scenarios used in this analysis are Taiko Road and Kate Valley. These sites are operationally comparable to Whiterock and represent plausible alternatives over the 20-year analysis period. The analysis is constructed on a counterfactual basis, asking what would have occurred in 2025 had Whiterock been operational, and projecting that activity forward to derive future values.

Woodstock and Burwood were considered but ultimately excluded. Woodstock is not yet consented, and its likely waste classification remains uncertain. If it were consented as a Class 2 facility—which is considered the more probable outcome—diverting Class 3 material there would introduce additional inefficiencies. This would render any direct comparison with Whiterock speculative and difficult to robustly defend. Burwood, meanwhile, is expected to lose its consent in the near term and therefore does not represent a viable long-run alternative over the full analysis period.

By contrast, Taiko Road and Kate Valley are established, fully consented facilities that can reasonably be assumed to remain operational throughout the analysis horizon. As such, they provide the most credible and transparent basis for comparison.

4.1 A note on our approach to estimating economic efficiencies

Our estimation of efficiency effects associated with the Whiterock project is based on a set of input assumptions. Some of these are drawn from established sources commonly used in economic analysis, including guidance from the New Zealand Transport Agency Waka Kotahi (NZTA), while others are informed by stakeholder engagement and relevant literature. All key assumptions are explicitly

documented throughout this section. Overall, a conservative approach has been adopted in estimating potential efficiency effects.

The analysis is also grounded in the expected operational parameters of the Whiterock site. In particular, assumptions reflect practical constraints such as limits on truck movements, to ensure that estimated effects are realistic. Certain disposal options have been excluded where their relevance is uncertain or limited. This includes sites on the West Coast due to uncertainty regarding their use, and the Burwood facility given its restricted acceptance criteria for contaminated materials and its role as a short-term rather than long-term disposal option.

Finally, the analysis focuses specifically on the managed disposal of contaminated soil. Other material streams that the Whiterock site may be capable of accepting are excluded from the assessment in order to maintain clarity, consistency, and analytical tractability.

4.2 Reduced distance between development activity and disposal facilities as an efficiency effect

A key potential effect of the Whiterock facility relates to reduced haulage distances for contaminated soil. Rather than representing a purely logistical consideration, shorter travel distances affect the level of resources required to deliver disposal services across the waste management system.

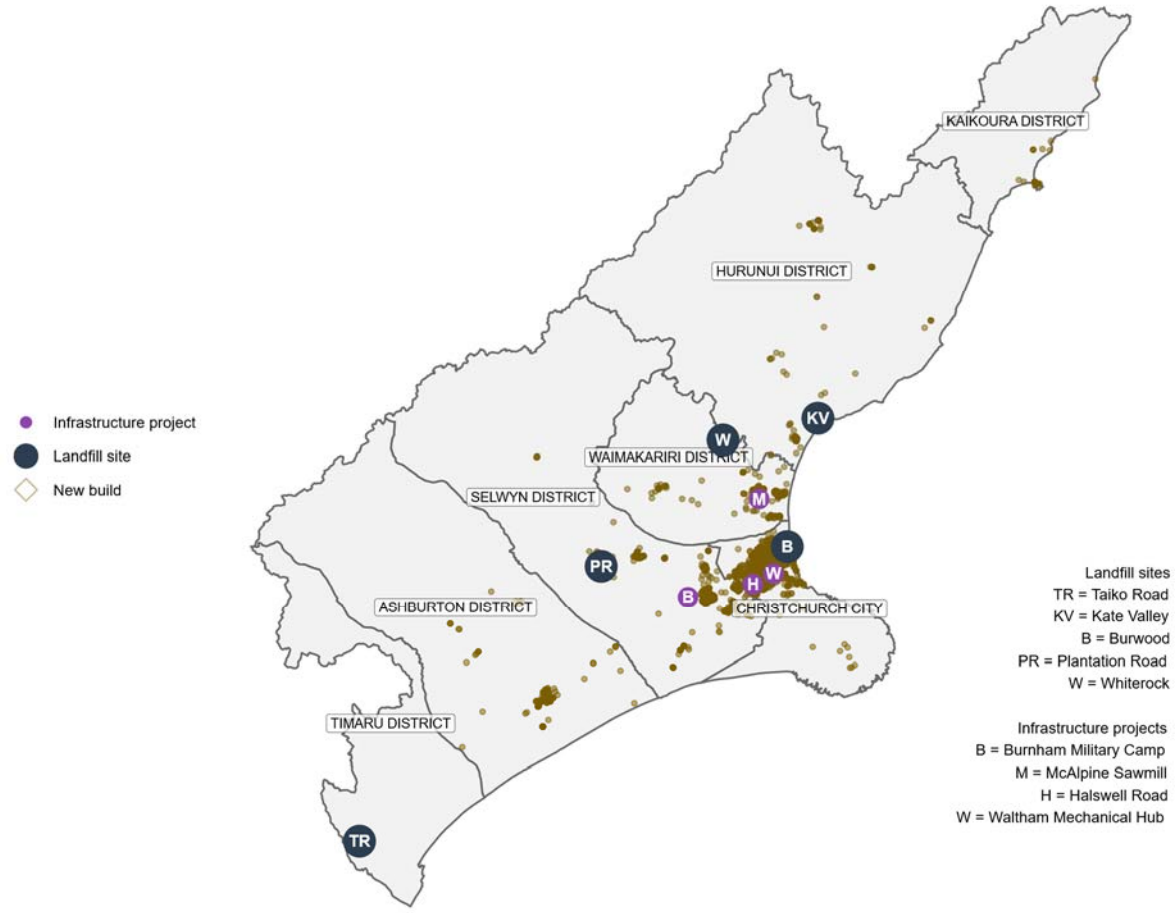
At present, a significant share of contaminated soil is transported to Taiko Road and Kate Valley. Locating a disposal facility closer to the source of waste, as would be the case with Whiterock, reduces the total distance travelled for contaminated soil in the Canterbury region. This, in turn, reduces the inputs needed to achieve the same outcome, namely the compliant disposal of contaminated material.

From an economic perspective, this is an efficiency gain. Fewer resources are used to deliver the same service.

Recent development activity in Canterbury has been concentrated in Christchurch City and nearby districts, particularly Selwyn and Waimakariri. Figure 1 shows the spatial distribution of these developments alongside the location of existing landfill facilities and the proposed Whiterock site. In total, more than 5,800 developments were completed in 2025 that could have generated contaminated soil requiring disposal. Most of these developments occurred in Christchurch City, followed by Selwyn District and Waimakariri District, with smaller but still notable levels of activity in Ashburton, Hurunui, and Kaikōura districts.

Figure 1 also shows recent large-scale commercial infrastructure projects undertaken by Protranz, which include two projects in Christchurch City, two in Selwyn District (both at the Burnham site) and one in Waimakariri. These projects collectively generated nearly 14,591 tonnes of waste which were disposed of at either the Kate Valley landfill, or the Taiko Road landfill.

Figure 1: Developments completed in the Canterbury region in 2025



Source: CoreLogic property data, Stats NZ territorial authorities, WSP (2025)

4.2.1 Approach to estimating travel distances and times

Our analysis uses property-level data to estimate the location and scale of waste-generating activity across Canterbury. Data from CoreLogic was used to identify properties that completed construction in 2025 across Christchurch City, Selwyn, Waimakariri, Ashburton, Hurunui, and Kaikōura districts. In total, 5,883 properties were initially identified as potential sources of construction-related waste. Of these, 5,633 properties were retained where there was clear evidence that physical construction had occurred. This filtering step was undertaken to ensure the analysis reflects developments likely to have generated excavation or construction waste, rather than including properties where no substantive earthworks took place.

4.2.2 Estimating waste volumes

To translate development activity into waste volumes, we applied a simplifying set of assumptions, shown in Table 5. These assumptions provide a pragmatic basis for estimating the number of trips required to transport material from each site.

Table 5: Assumptions to inform waste generation in the region

Parameter	Value
Contaminated soil per m^2 of development	$0.2m^3$
Density of soil	1.6 tonnes per m^3
Payload per truck movement	32 tonnes

Source: Conservative estimates for contaminated soil volume and payload from industry consultation, and soil density from (Hill Labs, (n.d.)

4.2.3 Estimating travel distances and times

Travel distances and times were estimated for each site to relevant landfill locations. This was undertaken using the Open-Source Routing Machine (OSRM) in R, which calculates routes based on the underlying road network. For each property, the shortest-path distance and associated driving time were calculated to each landfill, and we accounted for a round-trip.

We note that the calculated drive time is based on road types and speed limits from OpenStreetMap data, but does not factor in traffic, road works or time of day.

4.2.4 Status quo scenarios

Status quo scenarios are included to provide a consistent baseline against which the potential efficiency effects of the proposed Whiterock facility can be assessed. By representing current disposal practices, these scenarios allow observed differences in travel distances, time, and associated external effects to be attributed to the location of disposal facilities rather than to changes in development activity or waste generation.

Our status quo scenarios reflect observed disposal patterns for contaminated soils in Canterbury. In practice, disposal is predominantly undertaken at the Kate Valley and Taiko Road facilities. While other disposal options exist, their applicability is more limited across a range of development types and locations, as outlined below:

- Stakeholders noted that the Burwood facility can be challenging to utilise in practice. This reflects a combination of administrative requirements and specific acceptance criteria, discussed in section 2.2.1.
- The Hororata (Plantation Road) facility serves a more specialised role, with relatively narrow acceptance criteria. While suitable for certain material types, stakeholders indicated that these constraints could limit its applicability for typical development projects.

As a result, disposal decisions in the current system are generally made between the Kate Valley and Taiko Road facilities. In practice, some developments may distribute waste across both sites, reflecting factors such as gate fees, acceptance criteria, and operational limits. However, the precise allocation of waste between facilities is not directly observable. To address this uncertainty, the analysis adopts two status quo scenarios, modelling outcomes in which waste is directed exclusively to either Kate Valley or Taiko Road. These scenarios provide a transparent and consistent basis for representing current practice and assessing the relative efficiency effects associated with the proposed Whiterock facility.

4.3 Economic efficiencies arising from reduced travel distance and time

This section presents estimates of the economic efficiency effects that could have arisen from the availability of the Whiterock facility for developments completed in 2025. These effects are assessed through changes in travel distance and travel time associated with contaminated soil disposal.

Table 6 shows there were potentially significant time and travel savings from most builds in the selected council areas. Of note are builds in the Ashburton area, which despite being geographically closer to Taiko Road than to Whiterock, still had potential time savings.

Table 6: Potential efficiency gains from builds completed in 2025 in the Canterbury region

Council Area	Total tonnage	Number of truck movements	Efficiency gains from Taiko Road		Efficiency gains from Kate Valley	
			Time savings (mins)	Distance savings (km)	Time savings (mins)	Distance savings (km)
Christchurch City	152,327	12,754	1,281,493	1,510,739	129,687	149,557
Selwyn District	72,118	5,648	392,362	457,753	63,021	70,568
Waimakariri District	26,319	2,114	298,920	341,563	24,833	28,150
Ashburton District	1,115	88	263	-623	1,859	2,114
Hurunui District	58	4	627	696	71	76

Due to its relative proximity to Kate Valley, the gains relative to Kate Valley are not as substantial as those relative to Taiko Road. However, this comparison should be interpreted in the context of how the system operates in practice. As discussed, Kate Valley is subject to operational constraints such as limits on truck movements. As a result, not all material can be directed to Kate Valley, even where it may be geographically closer. Instead, a portion of waste is diverted to more distant facilities such as Taiko Road.

4.3.1 Increased time as a productive input

Shorter haulage distances can create economic benefits by reducing the time spent transporting material. When trips take less time, drivers and vehicles are available sooner for other tasks. This means the same amount of waste can be moved using less time and fewer transport resources overall. In practical terms, this reflects a more efficient use of labour and vehicles, rather than an increase in activity.

To quantify these benefits, travel time savings have been valued using a standard value of time (VOT) approach. The VOT reflects the opportunity cost of time, capturing the value of alternative productive uses that time could be put towards. This analysis applies the equalised work VOT of $37.92 per hour per person, consistent with guidance from NZTA (2025). The use of this parameter provides a robust and widely accepted basis for valuation, ensuring consistency with established transport appraisal methodologies.

The VOT reflects the opportunity cost of time to society, capturing the value of alternative productive uses that travel time savings could be put towards, rather than the private costs associated with haulage, such as labour, fuel, vehicle maintenance, and operator margin. These private cost components are treated as transfers in an economic sense, meaning they represent redistributions between parties rather than net gains to society as a whole. The VOT therefore provides the appropriate basis for an economic efficiency analysis, where the objective is to measure changes in aggregate societal welfare.

Applying this approach, the estimated potential benefits that could have accrued in 2025 associated with reduced travel times are presented in Table 7. The results indicate materially larger gains under the Taiko Road scenario, reflecting greater distances involved, with comparatively smaller but still positive gains under the Kate Valley scenario. These benefits are concentrated in Christchurch City, Selwyn District and Waimakariri District, consistent with the spatial distribution of development activity and resulting haulage demand.

Table 7: Estimated potential value of time benefits from builds completed in 2025 in the Canterbury region

	Time savings (mins) vs.		Value of time saved ($)	
Council area	Taiko Road	Kate Valley	Taiko Road	Kate Valley
Christchurch City	1,281,493	129,687	$809,904	$81,962
Selwyn District	392,362	63,021	$247,973	$39,829
Waimakariri District	298,920	24,833	$188,917	$15,694
Ashburton District	263	1,859	$166	$1,175
Hurunui District	627	71	$396	$45
Total	**1,973,665**	**219,470**	**$809,904**	**$81,962**

4.3.2 Reduced emissions as a societal economic benefit

Reductions in haulage distances also generate economic benefits through lower greenhouse gas emissions. Emissions impose a cost on society by contributing to climate change, which in turn gives rise to a range of environmental, economic and social impacts. From an economic perspective, these effects are treated as an external cost. Assigning a monetary value to emissions allows these impacts to be incorporated into a consistent framework, ensuring that changes in resource use are fully accounted for.

Emissions have been estimated using a distance-based emissions factor of 1.51 kg CO_2e per kilometre (Ministry for the Environment, 2023), reflecting heavy vehicle movements. These emissions are then valued using a central shadow price of carbon of $0.10 per kg CO_2e (or $101 per tonne) consistent with NZTA guidance for 2025.

Applying this framework, the estimated avoided emissions associated with reduced haulage distances are presented in Table 8. The results indicate total annual benefits of approximately $418k under the Taiko Road scenario, and $45k under the Kate Valley scenario. As with the time savings, the magnitude of these benefits reflects the relative distances involved.

Table 8: Estimated potential value of reduced emissions from builds completed in 2025 in the Canterbury region

	Distance savings (km) vs.		Avoided value of emissions ($)	
Council area	Taiko Road	Kate Valley	Taiko Road	Kate Valley
Christchurch City	1,510,739	149,557	$230,322	$22,801
Selwyn District	457,753	70,568	$69,787	$10,759
Waimakariri District	341,563	28,150	$52,073	$4,292
Ashburton District	-623	2,114	-$95	$322
Hurunui District	696	76	$106	$12
Total	**2,310,129**	**250,464**	**$352,194**	**$38,185**

At a more detailed level, the results reflect variation in travel patterns across districts. For example, in the Ashburton District, the comparison with Taiko Road indicates a small increase in emissions, reflecting that for a limited number of sites the Whiterock location would involve marginally longer travel distances than the baseline option. These effects are small in absolute terms and should be interpreted alongside the associated travel time results.

4.3.3 Reduced safety risk as a societal economic benefit

We estimate reduced safety risk by quantifying the avoided social cost of road crashes. We do this by combining Canterbury-specific crash rate data with the Ministry of Transport's published social cost figures (Ministry of Transport, 2026).

Crash rates are derived from the NZTA Waka Kotahi (2026a) Crash Analysis System (CAS), which has recorded 3,284 total crashes and 28 fatal crashes in Canterbury over the reference period, alongside vehicle kilometres travelled (VKT) data for Canterbury in 2024/25 of around seven billion kilometres (NZ Transport Agency Waka Kotahi, 2026b).

We use these figures to derive a fatal crash rate per kilometre travelled, and a non-fatal crash rate per kilometre travelled. We note that while there are social cost figures for "serious" crashes, we assume that all non-fatal crashes are minor, as a conservative estimate due to data constraints. However, we acknowledge that serious, non-fatal crashes carry significant physical, emotional, and financial consequences for those involved. The Ministry of Transport's social cost figures are as follows:

- Fatal crash: $19,463,800 per crash.
- Non-fatal crash (minor): $393,700 per crash.

The resulting estimated potential avoided social costs relating to the removal of contaminated waste in the Canterbury region are shown in Table 9.

Table 9: Estimated avoided social cost of crashes and injury in 2025 in the Canterbury region

	Distance savings (km) vs.		Avoided social cost of crashes vs.	
Council Area	Taiko Road	Kate Valley	Taiko Road	Kate Valley
Christchurch City	1,510,739	149,557	$393,879.99	$38,992.46
Selwyn District	457,753	70,568	$119,345.46	$18,398.46
Waimakariri District	341,563	28,150	$89,052.40	$7,339.20
Ashburton District	-623	2,114	-$162.43	$551.09
Hurunui District	696	76	$181.48	$19.74
Total	**2,310,129**	**250,464**	**$602,297**	**$65,301**

Our analysis estimates the Whiterock scenario would result in approximately 1.08 fewer crashes relative to the Taiko Road scenario, and approximately 0.12 fewer crashes relative to the Kate Valley scenario. In absolute terms, the probability of a crash occurring over the estimated kilometrage is low and will depend on a range of factors including road conditions, driver behaviour, and vehicle type. However, the social costs associated with road crashes, particularly fatal crashes, are substantial.

The avoided cost estimates presented here are therefore conservative in nature: should a fatal crash be avoided because of reduced travel distances, the resulting economic savings would far exceed those captured in this analysis. It must be acknowledged, however, there is inherent uncertainty in this type of analysis, whereby it is not possible to determine with certainty whether any individual crash would be avoided under a given scenario. These figures are best interpreted as indicative of the order of magnitude of potential savings, rather than precise predictions.

4.3.4 The implications of potential consenting constraints

A constraint on the Whiterock site is a potential consenting limit of 12 drop-offs per day, yielding a maximum of 2,976 trips per year (assuming 248 working days). To reflect this constraint, a multinomial simulation[2] was used to repeatedly allocate trips across council areas proportionally (i.e., with fixed probabilities) to the estimated number of new developments in each area, subject to the 2,976 trip cap. Given the inherent uncertainty in how trips might be distributed across council areas in practice, lower bound estimates are used throughout as a conservative assumption, with 95 per cent of simulations exceeding this figure. This means the implied total trips across council areas will be less than 2,976, which is a deliberate modelling choice to avoid overstating the benefits.

The effect of the consenting constraint is significant. In the absence of a capacity constraint, where developers could dispose of contaminated soil at Whiterock purely based on travel efficiency, the estimated benefits would be substantially larger.

Under the constrained scenario, the estimated potential efficiency gains that could have been achieved in 2025 **relative to Taiko Road at the lower bound** amount to:

- $168,820 in time savings
- $81,363 in avoided crash costs
- $56,528 in carbon savings.

Relative to the Kate Valley scenario, the estimated potential efficiency gains that could have been achieved in 2025 amount to:

- $19,327 in time savings
- $9,099 in avoided crash costs
- $6,321 in carbon savings.

[2] A multinomial simulation is a method that uses random draws to assign outcomes into different categories (e.g. choices or behaviours), based on assumed probabilities, to mimic how events might be distributed in the real world.

While these efficiency gains are modest in absolute terms, they nonetheless represent real efficiency gains for Canterbury developers and the broader regional economy and would be expected to grow over time as development activity in the region continues.

4.3.5 Evaluating the cumulative economic efficiencies of Whiterock over 20 years

We estimate the cumulative effects over 20 years, assuming the number of developments will grow in line with district-level population growth as forecasted by Statistics New Zealand (2025), and estimate benefits as if Whiterock had begun operation in 2025.

Over a 20-year horizon, the efficiency gains from Whiterock are substantial in the base case—that is, in the absence of consenting constraints. Relative to the Taiko Road scenario, the present value of efficiency gains amounts to $35.1 million, comprising $23.4 million in time savings, $4.5 million in avoided emissions, and $7.1 million in avoided injury costs. The gains relative to Kate Valley are more modest, reflecting the shorter distances involved, with a total present value of $2.9 million, comprising $1.7 million in time savings, $0.5 million in avoided emissions, and $0.8 million in avoided injury costs.

Under the consenting constraint of 2,976 trips per year, the estimated efficiency gains are considerably smaller, as the constraint limits the volume of waste that can be directed to Whiterock relative to the unconstrained scenario. Against Taiko Road, the present value of constrained efficiency gains is $3.6 million over 20 years, with time savings ($1.99 million) again the dominant component, followed by avoided injury costs ($0.96 million) and avoided emissions ($0.61 million). Against the Kate Valley scenario, the constrained present value is $380,981.

Table 10: Present value of economic efficiencies generated, 2025 to 2045[3]

	vs. Taiko Road	vs. Kate Valley
Base case		
Value of time	$23,429,348	$1,665,204
Avoided emissions	$4,534,628	$492,216
Avoided injuries	$7,148,778	$783,380
Total	**$35,112,753**	**$2,940,800**
Consent constraints		
Value of time	$1,992,165	$215,473
Avoided emissions	$606,096	$64,133
Avoided injuries	$960,075	$101,375
Total	**$3,558,336**	**$380,981**

Note: the analysis uses an 8 per cent commercial discount rate in line with Treasury guidance.

[3] The monetised estimates presented below translate changes in travel distance and time into economic values using standard appraisal parameters. These values are intended to represent the opportunity cost of resources used and avoided at a system level, rather than financial savings captured by any single party. As such, they should be interpreted as indicative measures of relative efficiency under alternative disposal scenarios, rather than as forecasts of realised revenues or cost reductions.

Taken together, these results suggest that even under conservative assumptions and binding consent constraints, Whiterock offers meaningful efficiency gains over the long run—particularly relative to Taiko Road. The consenting constraint is the binding factor limiting the scale of these benefits, and any relaxation of that constraint would be expected to materially increase the estimated gains.

4.4 Concluding remarks

The analysis contained in this report has examined the Whiterock proposal primarily through the lens of economic efficiency and regional economic activity within Canterbury's waste disposal system. The project's economic relevance lies in how the location and characteristics of an additional Class 3 facility affect the resources required to manage contaminated soils that are already being generated. Where Whiterock substitutes for more distant disposal options, the modelling identifies incremental but measurable efficiency gains, alongside ongoing contributions to regional GDP and employment.

Viewed collectively, the efficiency effects identified in this report suggest that Whiterock contributes to greater resilience in Canterbury's waste disposal system. By reducing reliance on a limited number of distant or capacity-constrained facilities, the project lowers the risk that disposal availability becomes a critical constraint on time-sensitive development, including housing and large-scale infrastructure. These effects are incremental, but persistent over time.

This analysis provides a focused assessment of selected economic impacts associated with the proposed Whiterock Class 3 managed fill facility. It presents an account of economic impacts, concentrating on those effects that are the most significant, measurable, and analytically tractable within the scope and timeframe of this work. As such, the findings are intended to inform decision-making by illustrating specific economic effects under defined scenarios, rather than to represent a comprehensive assessment of overall net welfare outcomes.

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Whiterock class 3 managed fill development

A response to a statement of evidence from Dr Richard Brent Meade, Cognitus Economic Insight

Toby Stevenson, Dr Jamie O'Hare, and Douglas Yee
15th July 2026



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Introduction

This report responds to the Statement of Evidence prepared by Cognitus Economic Insight in relation to the proposed Whiterock Class 3 Managed Fill development. The Cognitus Report ('the Report') provides a critique of the economic assessment prepared by Sapere.

The Cognitus Report presents three main criticisms:

- First, it argues that the FTAA effectively requires a comprehensive Cost-Benefit Analysis (CBA) focused on net social welfare outcomes and that Economic Impact Assessment (EIA) methodologies, including those based on Input-Output (I/O) modelling, are not capable of demonstrating regional or national benefits in the manner required by the Act.
- Second, the Report is critical of the use of Input-Output modelling and associated multiplier analysis. It argues that I/O models rely on simplifying assumptions, may overstate economic impacts, do not adequately account for opportunity costs, supply constraints or market adjustments.
- Third, the Report argues that, even if the Sapere estimates are accepted, the quantified economic benefits are too small to be regarded as significant at either a regional or national scale.

Overview of our response

We agree with some of the Report's observations in principle. We accept that Cost-Benefit Analysis is an analytically comprehensive framework, that Input-Output modelling has recognised limitations, and that economic models of all forms should be interpreted with appropriate regard to their underlying assumptions. However, we do not agree that these observations lead to the conclusions reached by the Report.

In summary, our response is that:

- the FTAA does not expressly require a comprehensive CBA and does not prescribe a single economic methodology for assessing regional or national benefits;
- professional practice under the FTAA demonstrates that a range of economic methodologies, including Economic Impact Assessments, economic contribution analyses and avoided-cost approaches, have been used in successful applications;
- the limitations of Input-Output modelling are well understood and do not invalidate its use as a recognised and widely applied tool for estimating economic impacts; and
- the assessment of whether benefits are "significant" is ultimately a matter for FTAA decision-makers, informed by the broader statutory framework, the nature of the project, and the context in which those benefits arise, rather than being capable of determination through any single economic metric or quantitative threshold

While the Cognitus Report provides a useful alternative perspective, in our view it overstates the case for a comprehensive welfare-based CBA and the limitations of the methodologies adopted in the Sapere assessment. The following sections explain the basis for that conclusion.

Economic practice under the FTAA is not limited to a comprehensive Cost-Benefit Analysis

A central argument of the Cognitus Report is that to assess whether a project delivers regional or national benefits, it requires an assessment of net social welfare. The Report concludes the only appropriate economic framework for making such an assessment is a comprehensive CBA, rather than an EIA.

The Report places substantial weight on the wording of section 3 of the FTAA, which refers to projects with significant regional or national benefits. The Report argues, in economic terms, a benefit is something that makes a region or the nation better off and therefore increases social welfare. Consequently, the Report considers the legislation is focused on net benefits, rather than on economic activity or economic impacts in isolation.

The Report reasons that where a project's overall costs exceed its benefits, the project cannot properly be described as beneficial. Accordingly, an assessment framework that explicitly weighs benefits against costs is required.

The report also argues that section 85(3) of the FTAA, which requires consideration of adverse impacts, is consistent with a cost-benefit framework because it requires positive and negative effects to be considered together.

We selected a methodology appropriate for the task and statutory context

The economic methodology (an EIA and assessment of efficiency benefits) adopted for the Sapere assessment was selected because it was fit for purpose in addressing the statutory questions arising under the FTAA. The approach is orthodox, widely used, and capable of providing robust evidence regarding the project's economic effects and contribution to regional and national benefits. We undertook a site visit and engaged with a range of industry participants involved in earthworks, construction and waste management activities to better understand current disposal practices, operational constraints, transport logistics and market conditions. While these discussions were not used as a formal quantitative input to the modelling, they provided valuable context and assisted our understanding of the practical issues facing users of disposal infrastructure in the Canterbury market.

A comprehensive welfare-based CBA would have required substantially broader evidence collection, including primary research and the monetisation of a wide range of market and non-market impacts. In our judgement, this additional analysis was not necessary to provide reliable and decision-relevant evidence.

Accordingly, the absence of a comprehensive CBA should not be taken to imply that such an analysis was necessary to establish the project's economic merits. Rather, it reflects a professional judgement that the methodology adopted could provide reliable and decision-relevant evidence regarding the

scale and nature of the project's economic benefits. In our view, the approach was fit for purpose, proportionate to the matters being assessed, and consistent with both the requirements and intent of the FTAA.

We are confident in our selection of methodological approach for the reasons outlined below:

A Cost-Benefit Analysis is not explicitly required by the FTAA

The FTAA refers to projects delivering significant regional or national benefits. One interpretation is that such benefits should be assessed through a comprehensive cost-benefit framework focused on net social welfare outcomes. However, that proposition is not self-evident.

The FTAA does not expressly require a CBA, (as acknowledged in section 19 of the Cognitus Report) nor does it prescribe a particular economic methodology for identifying or measuring regional or national benefits. While the Act refers to significant regional or national benefits, it is silent as to the specific economic framework through which those economic benefits must be assessed.

Accordingly, the conclusion that a comprehensive CBA is required does not arise from an express statutory requirement. Rather, it represents one interpretation of how the concept of "benefits" should be assessed. Other economists have adopted different approaches when assessing regional or national benefits under the FTAA and related planning processes, including economic impact assessments, economic contribution analyses, enabling-benefit analyses and avoided-cost approaches.

Economic practice under the FTAA is not limited to comprehensive CBAs

A review of FTAA approvals demonstrates no single methodology has emerged as the sole accepted framework.

For example:

- The Ayrburn Screen Hub assessment used a regional economic impact methodology based on Input-Output modelling, economic injections, employment generation and industry development effects. It did not undertake a comprehensive welfare-based CBA.
- The Drury Centre Precinct assessment likewise used an Economic Impact Assessment framework supplemented by qualitative consideration of wider economic costs and benefits. The report expressly concluded that a detailed CBA was not necessary given the scale of identified benefits.
- The Port of Auckland assessment focused on trade facilitation, economic contribution, enabling effects and future economic growth attributable to infrastructure investment. It did not conduct a Treasury-style social welfare CBA.
- The Drury Quarry assessment adopted an avoided-cost and economic-efficiency approach focused on transport, emissions and social cost savings associated with local aggregate supply. Again, it was not a comprehensive welfare-based CBA.

These examples demonstrate that professional economists operating within FTAA and closely related consent environments have employed a range of economic methodologies including:

- economic impact assessments;
- economic contribution analysis;
- enabling-benefit analysis;
- avoided-cost analysis; and
- partial cost-benefit frameworks.

The prevalence of these methodologies in successful FTAA applications does not, of itself, establish they are beyond criticism. It does, however, demonstrate a reasonable reading of section 22 of the FTAA does not necessitate a comprehensive CBA as the sole means of demonstrating regional or national benefits. Notably, this understanding is evident both in the work of the economic experts who prepared these assessments and in the decisions of those responsible for considering and approving the applications. The existence of multiple successful FTAA applications relying on economic impact, economic contribution, enabling-benefit, or avoided-cost methodologies suggests that a broader range of economic evidence can satisfy the Act's requirements and is acceptable to the panel.

Our approach is aligned with the wording of the FTAA

The table below identifies where and how our chosen approach is aligned with the requirements gazetted in Section 22 of the FTAA.

Table 1: Alignment between Sapere approach and Section 22 of the FTAA

FTAA Criterion	What the Act Appears to Require	Evidence in Sapere Report
22(1)(a) Significant regional or national benefits	Evidence that benefits exist and are capable of being considered significant at regional or national level. Act does not prescribe methodology.	Demonstrates increased Class 3 disposal capacity, support for development activity, GDP impacts, employment impacts, and system efficiencies.
22(2)(a)(i) Priority project in government/local government/sector strategy	Alignment with plans, strategies, infrastructure priorities.	Links proposal to Waste Minimisation Act, Waste and Resource Efficiency Strategy, regional waste management objectives.
22(2)(a)(ii) Deliver significant infrastructure or enable existing infrastructure	Demonstrate new infrastructure or support existing infrastructure.	Provides Class 3 disposal infrastructure and preserves Class 1 landfill capacity by directing waste to more appropriate facilities.

FTAA Criterion	What the Act Appears to Require	Evidence in Sapere Report
22(2)(a)(iii) Housing supply / housing needs / urban environment	Direct or indirect support for housing.	Identifies contaminated soil disposal as a necessary enabling input to housing and brownfield development, reducing risk of disposal constraints delaying projects.
22(2)(a)(iv) Significant economic benefits	Evidence of economic benefits. Act does not define economic benefits or specify methodology.	Quantifies GDP impacts ($17.3m PV), employment impacts (8.7 FTE), transport efficiencies, emissions reductions, safety benefits, disposal system efficiencies.
22(2)(a)(v) Support primary industries	Evidence where relevant.	No substantive connection identified.
22(2)(a)(vi) Natural resources	Evidence where relevant.	No substantive connection identified.
22(2)(a)(vii) Climate change mitigation	Support emissions reduction or mitigation outcomes.	Quantifies avoided transport emissions through reduced haulage distances.
22(2)(a)(viii) Adaptation / natural hazards / recovery	Evidence where relevant.	No direct claim.
22(2)(a)(ix) Significant environmental issues	Demonstrate environmental improvement or issue resolution.	Supports appropriate disposal of contaminated soils and asbestos, diversion from Class 1 facilities, reduction in non-compliant disposal incentives.
22(2)(a)(x) Consistent with planning documents	Alignment with planning and strategic documents.	Links facility to regional waste management objectives and development patterns.
22(2)(b) Other relevant matters	Minister may consider any other relevant matter.	Additionality analysis, stakeholder interviews, disposal constraints, system resilience, landfill network functionality.

Our assessment provides a reasonable and robust basis for assessing economic benefits

The Cognitus Report presents critiques of our assessment and concludes that the project's economic benefits are either overstated or insufficiently demonstrated. The Report argues:

- the use of Input-Output modelling and associated multipliers overstates economic impacts;
- the assessment is overly sensitive to underlying assumptions; and
- the resulting benefits are insufficiently large to constitute significant regional or national benefits under the FTAA.

The following sections consider the principal criticisms raised by the Report.

The limitations of Input-Output modelling do not invalidate its use

The Cognitus Report raises concerns regarding the use of Input-Output modelling and multiplier analysis. In summary, it argues:

- I/O models measure economic impacts rather than economic benefits;
- rely on a series of simplifying assumptions regarding market behaviour and resource availability; and
- have a tendency to overstate economic effects.

The Report further suggests that alternative approaches, such as Computable General Equilibrium (CGE) modelling, are better suited to capturing price effects, supply constraints and wider economy-wide adjustments. As a result, the Report concludes that the Sapere assessment may overstate the economic contribution of the proposed development.

Input-Output modelling is a proportionate and widely accepted approach

I/O modelling was selected because it is a recognised and widely applied methodology for estimating the economic effects of infrastructure and development projects. It is specifically designed to quantify economic activity, output, employment and GDP effects arising from an economic stimulus and has long been used in planning, infrastructure and public policy assessments in New Zealand.

The methodology is well understood, and capable of providing decision-makers with a clear indication of the scale and distribution of economic impacts across sectors and regions. These were the matters the Sapere assessment sought to quantify to inform consideration of the project's regional and national benefits.

Alternative approaches, like Computable General Equilibrium (CGE) modelling, are typically require substantially more data, modelling assumptions, calibration and specialist resources than I/O-based assessments. By contrast, I/O modelling remains one of the most applied methodologies for

estimating regional economic impacts in New Zealand because it provides a well-understood and proportionate means of estimating output, employment and expenditure effects.

All economic models involve trade-offs between complexity, transparency, data requirements, analytical scope and the assumptions required to generate results. CGE models rely on numerous assumptions relating to behavioural responses, substitution effects, elasticities, future market conditions and baseline economic structure. The choice between I/O and CGE modelling is therefore not a choice between an imperfect model and a perfect one, but between alternative frameworks with different strengths and limitations.

In our view, the relevant question is whether the methodology adopted is fit for purpose in addressing the issues before decision-makers. Input-Output modelling is a commonly applied approach for estimating regional economic impacts in New Zealand and has been used extensively within FTAA and related planning assessments. The prevalence of I/O-based assessments within those contexts indicates the methodology is widely regarded by both practitioners and decision-makers as a legitimate means of understanding the economic effects of a project.

Limitations of Input-Output modelling are well-known and widely acknowledged

Input-Output modelling relies on simplifying assumptions and its limitations are well understood within the economics profession. No economic model perfectly reflects the operation of the real economy and Input-Output modelling is no exception. As the Report notes, issues such as supply constraints, fixed technical coefficients, static prices and potential crowding-out effects are recognised limitations of the methodology.

The existence of limitations does not invalidate the methodology

The relevant question is not whether Input-Output modelling is imperfect. The relevant question is whether it remains a recognised and useful tool for estimating economic impacts. In our view it plainly does.

All economic models, including CGE models and CBAs, rely upon assumptions regarding future behaviour, prices, market responses and counterfactual scenarios. The question is therefore not whether assumptions exist, but whether the chosen assumptions are reasonable and fit for purpose.

Input-Output modelling was used in this case because it is specifically designed to estimate economic effects, including economic activity, output and employment impacts. These were the matters our assessment sought to quantify to inform consideration of the project's regional and national benefits.

The criticism that Input-Output modelling does not estimate net social welfare is only determinative if one first accepts the proposition that a comprehensive welfare-based framework i.e. a CBA is the only appropriate means of demonstrating regional or national benefits under the FTAA. As discussed in the prior section, we do not accept the Act requires a single prescribed economic methodology or that evidence of economic impacts is incapable of informing the assessment of regional or national benefits.

FTAA practice indicates Input-Output modelling is an acceptable approach

Whatever one may think of Input-Output modelling in theory, the practical reality is that Input-Output and related economic impact methodologies are widely used in New Zealand, including within the FTAA regime. The prevalence of such methodologies across successful FTAA applications strongly indicates that they are regarded by both practitioners and decision-makers as legitimate tools for assessing economic effects and regional benefits.

The Cognitus Report's assessment of cultural costs is illustrative, not determinative

As the Report acknowledges, the proposition that cultural costs may offset economic benefits is an illustrative estimate of potential cultural costs. We accept that Willingness to Pay (WTP) methods are recognised and widely used in estimating non-market values. However, it is important to recognise the valuation exercise presented in the Report is itself highly dependent on assumptions and professional judgement, dependant on:

- the selection of WTP studies;
- the transferability of those studies to the Whiterock context (i.e. a 4-hectare site in North Canterbury);
- the assumed affected populations; and
- if WTP estimates can reasonably be interpreted as project-level cultural costs

Notably, the Report expressly acknowledges that the adopted WTP values do not represent the preferences of Ngāi Tūāhuriri, do not represent the preferences of Ngāi Tahu generally, and are intended only as illustrative values used to demonstrate the potential scale of cultural costs. Accordingly, the WTP exercise does not establish that cultural costs exceed project benefits. Rather, it demonstrates that under a particular set of assumptions, it is possible to derive cultural cost estimates that could be material to a broader evaluation.

In our view, this does not invalidate Cognitus Report's exercise. Rather, it demonstrates a broader point, that all economic valuation methodologies involve assumptions, professional judgement, and uncertainty.

Treatment of private transport cost savings

The Cognitus Report raises a point regarding the treatment of private transport cost savings within the efficiency analysis. Our report stated that costs associated with haulage, including labour, fuel, vehicle maintenance and operator margins, were treated as transfers in an economic sense and therefore excluded from the quantified efficiency benefits. The report instead focused on travel time, emissions and crash-cost savings.

The Cognitus Report argues that this treatment is not appropriate for all categories of haulage cost. In particular, it notes that reductions in vehicle operating costs arising from shorter haulage distances

represent real resource savings rather than transfers between parties and therefore may appropriately be considered as economic benefits.

On reflection, we agree that our original treatment combined two distinct concepts. The question of whether a benefit accrues to a private party is separate from the question of whether it reflects a genuine saving in resources consumed by the economy. A reduction in fuel use, tyre wear or vehicle maintenance requirements represents a reduction in resource consumption and may therefore properly be regarded as an economic benefit, regardless of whether that benefit accrues to a private operator or end user.

A transfer is an offsetting redistribution, where one party's gain is exactly another party's loss, so there is no change in the resources the economy consumes. Whether a benefit accrues to a private party is a separate question entirely, one of incidence rather than of economic substance. A real reduction in the resources an economy consumes remains a real benefit regardless of who captures it.

Fuel and vehicle maintenance are vehicle operating costs. Shorter haulage burns less fuel and generates less mechanical wear. These are reductions in resources consumed, not redistributions between parties. Standard transport appraisal, including the NZTA Monetised Benefits and Costs Manual, treats vehicle operating cost savings as a benefit category alongside travel time and externalities, rather than as a transfer. The MBCM's VOC parameters are understood to represent resource costs rather than the financial price paid by operators, which excludes genuinely transfer-like elements such as fuel excise. On that basis the savings are properly characterised as a reduction in resources consumed, and our exclusion of them on transfer grounds does not hold.

One element of our exclusion was nonetheless correct, though for a different reason than the one we gave. We value travel time using the equalised work value of time of $37.92 per hour, which is itself a labour resource cost, being the opportunity cost of paid working time. Separately valuing driver labour on top of this would count the same resource twice. Driver labour was therefore rightly excluded, but the justification is avoidance of double counting rather than transfer treatment.

The MBCM running-cost parameters offer one potential approach to capturing these savings, applying published rates by vehicle class and operating speed to the distance savings already estimated. We set out an illustrative application below. It is one route to quantification rather than the definitive one, and a fuller treatment would require route-level speed profiling, given the non-linear relationship between running cost and operating speed.

Illustrative vehicle operating cost savings

The estimates presented below should be regarded as illustrative. They are intended to illustrate the potential scale of vehicle operating cost savings that were conservatively excluded from the original assessment, rather than to provide a full recalculation of transport-related benefits.

A more comprehensive assessment would require a level of route-specific analysis beyond the purpose of this addendum and unnecessary for demonstrating the principal point: namely that the original treatment was conservative and likely understated the efficiency benefits associated with the Whiterock location.

Vehicle operating cost (VOC) savings, comprising fuel, tyres, maintenance, and related running costs, represent a further efficiency effect of the Whiterock location that has not been separately valued

elsewhere in this report. This section provides an estimate of that effect under both the base case and the consent constrained scenario, using published NZTA Monetised Benefits and Costs Manual (MBCM) running cost rates applied to the distance savings already reported in this analysis.

VOC rates vary by operating speed, and the relationship between speed and cost is nonlinear, running costs are comparatively high at low speed, fall to a minimum around 45 to 50 km/h, and rise again at highway speeds. We have bracketed the estimate using two speed points: 50 km/h, which reflects the trough of the MBCM running cost curve and represents the most efficient operating speed on the network, and 100 km/h, which reflects a typical open road cruising speed for these predominantly rural highway routes.

We have applied the MBCM Heavy Commercial Vehicle II (HCV II) running cost table, as this best reflects the vehicle configuration used for this haulage. Section 2.2.2 of this report describes the standard vehicle as a truck-and-trailer unit carrying 33 to 36 tonnes, consistent with the HCV II classification of trucks and trailers and articulated vehicles with 5 to 8 axles in total, up to 44 tonnes.

The cent per kilometre VOC for these vehicle types and speeds are presented in Table 2.

Table 2: VOC parameters

Vehicle type and speed	VOC cent per km
HCVII at 50kmph	194.6
HCVII at 100kmph	226.9

Source: Waka Kotahi NZTA Monetised benefits and costs manual – volume 2

Results

The illustrative VOC savings for 2025 in the base case are presented in Table 3. This gives an overall illustrative range in 2025 of $4.50 million to $5.24 million relative to Taiko Road, and $487,403 to $568,302 relative to Kate Valley.

Table 3: Illustrative VOC savings, base case, 2025 (total)

	vs Taiko Road	vs Kate Valley
HCV II at 50 km/h	$4,495,510	$487,403
HCV II at 100 km/h	$5,241,682	$568,302

The illustrative VOC savings for 2025 in the consenting constraints scenario are presented in Table 4.

Table 4: Illustrative VOC savings, consent constraints, 2025 (total)

	vs Taiko Road	vs Kate Valley
HCV II at 50 km/h	$607,292	$67,913
HCV II at 100 km/h	$708,092	$79,185

Limitations

These estimates are illustrative rather than definitive, for two reasons:

1. It applies a single speed point to each bound rather than the actual speed profile of each route, which include a mix of local roads and open highway; a route level analysis would integrate the running cost curve along each route rather than apply a flat rate.
2. The gradient has been treated as nominal, consistent with the largely flat to rolling terrain of the routes involved.

Had vehicle operating cost savings been included in our analysis, it would increase the quantified efficiency benefits associated with the proposal and therefore strengthen, rather than weaken, the economic conclusions reached in the original assessment. While it does not resolve the broader methodological concerns raised in the Cognitus report, it demonstrates that the original assessment adopted a conservative treatment of transport-related benefits and that the reported economic benefits should not be viewed as an upper bound estimate.

Determinations of significance are reserved for FTAA decision-makers

A central argument of the Cognitus Report is that the resulting economic benefits are insufficiently large to be considered "significant" at either a regional or national level.

The Report reaches this conclusion by assessing the scale of the estimated impacts relative to the overall size of the Canterbury economy. It compares the project's estimated employment, GDP and efficiency effects against total regional employment, total regional GDP, and typical annual changes in those indicators.

The Report notes that the maximum employment impact identified in the Sapere assessment is 8.7 FTEs and argues that this represents only a very small proportion of total Canterbury employment. Similarly, it notes that the estimated annual GDP impact represents only a negligible share of total Canterbury GDP.

The Report applies a similar approach to the estimated efficiency benefits, concluding that even the highest quantified efficiency gains are small when assessed relative to the scale of the regional economy. On this basis, the Report concludes that the project's claimed benefits are immaterial and therefore incapable of constituting significant regional or national benefits under the FTAA.

Our task was to estimate economic benefits, not to determine significance

The Report's criticism of the magnitude of Sapere's assessed GDP, employment and efficiency effects conflates two separate tasks:

- estimating the scale of relevant economic benefits; and
- determining whether those benefits are "significant" under the FTAA.

We undertook an economic assessment to estimate the magnitude of relevant economic effects associated with the proposed project. The report did not seek to establish a definitive threshold for significance, nor could it do so given that the FTAA does not define significance in economic terms. Rather, it provided evidence intended to inform the judgement ultimately required of decision-makers.

Accordingly, the question of significance is fundamentally a matter for Ministers, expert panels, and other FTAA decision-makers. Determining the significance of the results is not the purpose of economic modelling. The economic evidence presented in our assessment forms one input into that determination, alongside any other matters contemplated by the FTAA.

Conclusions

- The Cognitus Report advances a coherent argument for the use of a comprehensive CBA as the preferred framework for assessing regional or national benefits under the FTAA. However, neither the FTAA nor established FTAA practice prescribes a comprehensive CBA as the sole acceptable methodology for demonstrating such benefits.

- The FTAA requires evidence of significant regional or national benefits, but it does not prescribe the economic framework through which those benefits must be assessed. The Act allows for the use of a range of economic evidence and methodologies capable of informing decision-makers on the scale and nature of project benefits.

- A review of successful FTAA applications demonstrates that economic impact assessments, economic contribution studies, enabling-benefit analyses and avoided-cost methodologies have all been used to support assessments of regional and national benefits. The methodology we adopted is therefore consistent with broader practice under the FTAA.

- The limitations of Input-Output modelling identified by the Cognitus Report are well known within the economics profession. However, those limitations do not invalidate the methodology or render it incapable of providing useful and reliable estimates of economic effects. Similar limitations, assumptions and uncertainties exist across all forms of economic modelling, including CBA, CGE modelling and willingness-to-pay valuation exercises.

- Our assessment adopted a methodology that was fit for purpose in the context of the statutory questions being addressed. The approach was selected because it could provide robust and decision-relevant evidence regarding economic activity, employment, GDP and efficiency impacts associated with the project. It was not intended to provide a comprehensive welfare assessment of every potential cost and benefit associated with the proposal.

- Our assessment focused on the magnitude and direction of relevant economic effects associated with the proposed project. We did not attempt to determine significance, nor would such an assessment have been possible, given that the FTAA does not define significance in economic terms.

- The Cognitus Report raises a point regarding the treatment of private transport cost savings within the efficiency analysis. We acknowledge the point and have reviewed our approach accordingly. Had vehicle operating cost savings been included in our analysis, it would increase the quantified efficiency benefits associated with the proposal and therefore strengthen, rather than weaken, the economic conclusions reached in the original assessment.

- We acknowledge the alternative perspective advanced in the Cognitus Report, we remain satisfied that our assessment provides a reasonable, robust and fit-for-purpose basis for understanding the economic benefits of the proposed Whiterock Class 3 Managed Fill development and for informing the statutory assessment required under the FTAA.

About Sapere

Sapere is one of the largest expert consulting firms in Australasia, and a leader in the provision of independent economic, forensic accounting and public policy services. We provide independent expert testimony, strategic advisory services, data analytics and other advice to Australasia's private sector corporate clients, major law firms, government agencies, and regulatory bodies.

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