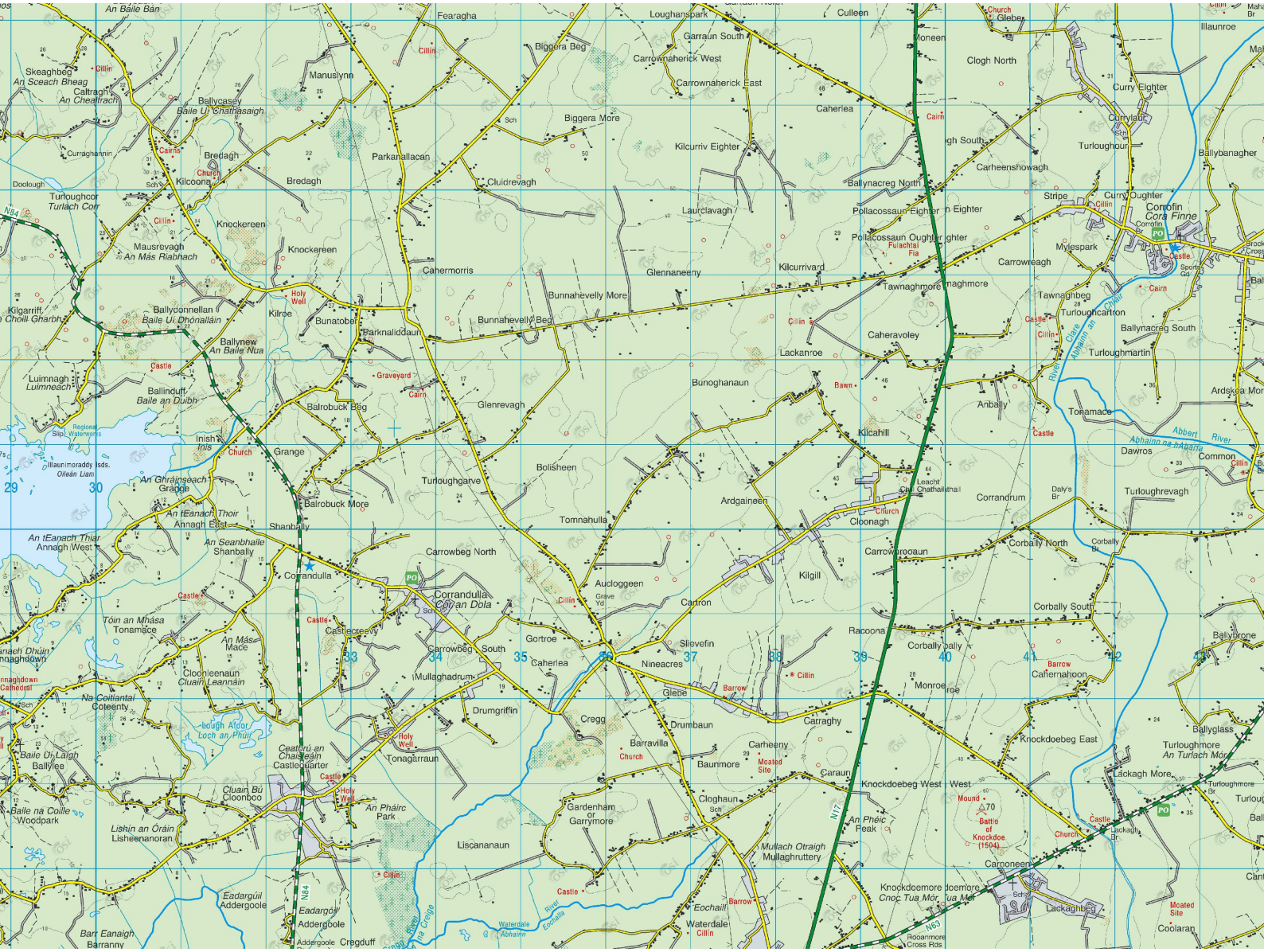
CHAPTER 4

ALTERNATIVES



QUARRY CONSULTING

Table of Contents

Table of Contents 1
CHAPTER 4: ALTERNATIVES 2
Introduction 2
EIA Directive 2
Need For the Development 2
Construction Aggregates 3
Project Ireland 2040 4
Galway Country Development Plan (CDP) 2022-2028 5
The 'Do Nothing' Scenario 5
ALTERNATIVE SOURCES OF AGGREGATES 5
ALTERNATIVE LOCATIONS 6
ALTERNATIVE DESIGNS / LAYOUTS 8
ALTERNATIVE PROCESSES 8
Comparative Analysis of Environmental Effects 9
CONCLUSION 11

CHAPTER 4: ALTERNATIVES

Introduction

4.1 The proposed development being applied for under this current planning application will consist of:

- Extraction of rock from an area consisting of 4.35 hectares which was previously subject to rock extraction and all associated facilities/works to a final floor level of 4 mOD;
- Lateral extension of the existing permitted quarry area over c.6.1 ha. area to a final floor level of 4 mOD;
- Restoration of the application area to natural habitat after uses following completion of extraction;
- all related ancillary development and associated site works including processing (crushing, screening and washing) and stockpiling of materials; provision of landscaped screening berms and all other related activities;
- The proposed development is within an overall application area of c. 12 hectares and is for a total period of 25 years.

EIA Directive

4.2 Annex IV of the amended EIA Directive, 2014/52/EU, requires a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

4.3 This chapter recognises and fulfils this requirement in respect of the Proposed Development.

4.4 In this context, the consideration of reasonable alternatives and design evolution has been undertaken with the aim of avoiding and / or reducing adverse environmental effects (following the mitigation hierarchy of avoid, reduce, and, if possible, remedy), while maintaining operational efficiency and cost – effectiveness, and considering other relevant matters such as land and planning policy.

4.5 This chapter provides an analysis of alternatives which have been considered for this proposed development in terms of the following:

- 'Do Nothing' Scenario;
- Alternative Sources of Aggregates;
- Alternative Locations;
- Alternative Designs / Layouts;
- Alternative Processes.

Need For the Development

4.6 This section examines the demand for construction aggregates, specifically limestone aggregates, in Galway and Ireland. The aim is to provide a comprehensive understanding of the existing demand for these aggregates, demonstrating the need for the continued development of new sources.

4.7 The demand for construction aggregates, particularly limestone, has been steadily increasing in Galway and throughout Ireland, driven by the growth of both infrastructure projects and the local concrete production industry.

4.8 Galway and the surrounding western region of Ireland are experiencing considerable expansion in housing, infrastructure, and commercial development. As these sectors grow, there is an increasing demand for construction materials like limestone, which is used in various forms, including as an aggregate for road base, foundations, and other construction applications, as well as in concrete production. Major drivers of this demand include:

- Residential developments to address the region's housing needs.
- Commercial and industrial construction, which underpins local economic growth.
- Public infrastructure projects, such as roads and public facilities, which are part of the Irish government's National Development Plan (NDP).

4.9 Limestone is a core material for these developments, and the on-site concrete batching plant, ready-mix concrete production facilities, and asphalt plant ensure a steady supply of these products for local projects. The continued use and extension of the existing quarry will secure the long-term availability of limestone for both aggregate production and concrete/asphalt manufacturing, ensuring that construction projects remain on schedule and within budget.

4.10 Transporting limestone from distant locations increases environmental impacts, including higher carbon emissions and fuel consumption. The continuation of use and extension of the local quarry will:

- Reduce transportation distances, directly lowering emissions from heavy goods vehicles.
- Decrease the environmental footprint of the existing manufacturing facilities at the site by sourcing limestone locally.
- Align with national sustainability objectives, contributing to Ireland's commitment to reducing its carbon footprint and managing natural resources responsibly.

4.11 By ensuring a local supply of limestone for both aggregate use, asphalt and concrete production, this development supports the region's construction needs while addressing the environmental challenges associated with long-distance transport of materials.

Construction Aggregates

4.12 The construction industry in Ireland has experienced significant growth in recent years, contributing to the demand for construction aggregates.

4.13 In 2019, the construction sector contributed €9.5 billion to Ireland's economy in terms of Gross Value Added (GVA), representing around 2.8% of Ireland's total GVA, which stood at approximately €340.5 billion that year. By 2023, the sector's contribution grew to €12.7 billion, against a backdrop of a national GVA of €482.3 billion, underscoring the ongoing demand for housing, infrastructure, and commercial developments across the country.

4.14 The Summer Economic Statement 2025 lifts National Development Plan capital ceilings for 2026-2030, channelling extra funds into water, energy grids, transport corridors and serviced land for housing. These projects will require a steady supply of locally sourced aggregates.

4.15 Housing is the flagship priority: Government now targets 41 000 new homes a year, underpinned by an additional €40 billion for 2025-2029 and a matching sum for the following

five-year span. Combined with national retrofit and climate programmes, this ensures sustained, high-volume demand for limestone.

4.16 Commercial and industrial projects, such as energy related projects, office buildings, retail centres, manufacturing facilities, and warehouses, require substantial amounts of construction aggregates. For instance, the construction of Data Centre Parks in Ireland is estimated to require around 4.6 million tonnes of aggregates over the next decade (Irish Concrete Federation).

4.17 The public sector invests in various projects, including schools, hospitals, government buildings, and public infrastructure. For instance, the National Development Plan allocates significant funds for public infrastructure projects like public transport, education, healthcare, and social housing. These projects generate substantial demand for construction aggregates.

4.18 The transportation sector relies heavily on road construction and maintenance to ensure efficient connectivity. In Ireland, the government has allocated €10.6 billion for national road projects from 2022 to 2027 (Department of Transport, Ireland). Construction aggregates and asphalt are essential components for road building and maintenance.

4.19 Concrete is a key construction material, and its production requires substantial quantities of limestone aggregates. In Ireland, the annual consumption of aggregates for concrete production is estimated to be around 31 million tonnes (Irish Concrete Federation). Concrete is widely used in foundations, structural elements (e.g. wind turbine bases), and pavement construction, driving the demand for construction aggregates.

Project Ireland 2040

4.20 Project Ireland 2040 is a long-term national planning framework that sets out the strategic vision for Ireland's future development. It aims to shape sustainable growth and improve quality of life by focusing on balanced regional development, social infrastructure, and economic progress.

4.21 Project Ireland 2040 recognises the need for housing construction to address the housing shortage and accommodate population growth. Between now and 2040, an average output of approximately 50,000 new homes will need to be provided in Ireland every year to meet people’s needs for well-located and affordable housing. The construction of these homes requires a steady supply of construction aggregates for various applications such as foundations and concrete production.

4.22 The project emphasises the importance of infrastructure development to support economic growth and improve connectivity. Investments are planned for road networks, public transport systems, utilities, and social infrastructure. These infrastructure projects require significant quantities of construction aggregates to meet the demand for concrete, road surfacing, and foundation construction.

4.23 Project Ireland 2040 aims to achieve balanced regional development by promoting investment and employment opportunities outside major urban centres.

4.24 Project Ireland 2040 recognises the importance of sustainable resource management, including the responsible extraction of construction aggregates. Further development of an existing permitted limestone quarry in Galway aligns with this goal, as it allows for the local sourcing of construction aggregates, reducing the environmental impact associated with long-distance transportation and preserving existing resources in other regions.

4.25 Given the increasing demand for construction aggregates in Galway and the wider region, there is a potential supply and demand gap. Existing sources may face limitations due to depleting reserves or transportation constraints. Further development at this existing

limestone quarry would help bridge this gap, ensuring a reliable supply of construction aggregates to meet the demands of Project Ireland 2040 and support ongoing construction activities in the region.

Galway Country Development Plan (CDP) 2022-2028

4.26 The Galway County Development Plan for the period 2022-2028 recognises the importance of the extractive industry within the county and particularly its rural areas, as it provides:

- RD1-Rural Enterprise Potential:

  'To facilitate the development of the rural economy through supporting a sustainable and economically efficient agriculture and food industry, together with forestry, fishing and aquaculture, energy and extractive industries, the bio-economy and diversification into alternative on-farm and off-farm activities, while at the same time noting the importance of maintaining and protecting the natural landscape and built heritage which are vital to rural tourism. Development of Cafes, Art Galleries, Hot Desk Facilities etc. which are important to the rural economy.'

- MEQ1-Aggregate Resources:

  'Ensure adequate supplies of aggregate resources to meet future growth needs within County Galway and the wider region and to facilitate the exploitation of such resources where there is a proven need and market opportunity for such minerals or aggregates, and ensure that this exploitation of resources does not adversely affect the environment or adjoining existing land uses.'

The 'Do Nothing' Scenario

4.27 If no further extraction works within the planning application area are carried out, the existing permitted quarry will complete its current extraction activities and be restored to natural habitat after-uses. However, this would have significant implications for the on-site concrete, ready-mix concrete, and asphalt manufacturing facilities, which rely on the steady supply of limestone from the quarry.

4.28 Without the extension of the quarry, these facilities would either cease operating or need to begin importing material from other quarries, which would increase transportation costs and emissions, potentially leading to supply chain disruptions. Furthermore, the increased reliance on external material sources could make the operations financially unsustainable, forcing the manufacturing plants to shut down.

4.29 Such a shutdown would not only affect the operations on-site but also create a gap in the local market for construction materials, including aggregates, ready-mix concrete, and asphalt. The loss of a reliable, local supplier could lead to increased costs and delays for construction projects in the region, ultimately affecting the delivery of key infrastructure and development initiatives. Additionally, the environmental benefits of sourcing materials locally, such as reduced transportation emissions, would be lost.

4.30 In this scenario, the cessation of quarrying activities would have economic and environmental consequences, making it clear that the continued development of the existing quarry is a logical and sustainable option to support both local industry and the wider construction market.

ALTERNATIVE SOURCES OF AGGREGATES

4.31 There are several alternatives to sourcing traditional limestone for construction aggregates. These alternatives aim to reduce environmental impacts, optimise resource utilisation, and promote sustainable practices. Some alternatives include:

- **Recycled Aggregates**: Utilising recycled aggregates from construction and demolition waste can help reduce the need for extracting virgin limestone. Concrete and asphalt can be crushed and processed into reusable aggregates for various construction applications. The EPA's National End-of-Waste Decision for recycled aggregates provides a framework for using these materials in compliance with environmental standards, promoting a circular economy in the construction sector.
- **Recycled Concrete Aggregates (RCA)**: RCA is derived from the demolition of structures and involves crushing and screening concrete. While it is useful in many construction applications, its end use is limited compared to the superior properties of virgin limestone aggregates.
- **Recycled Asphalt Pavement (RAP)**: RAP involves crushing and reusing old asphalt pavement in new construction projects. This process saves natural resources and reduces waste disposal costs, though it is generally more applicable for road construction than limestone replacement.
- **Manufactured Aggregates**: In some cases, aggregates can be manufactured from industrial byproducts such as slag or fly ash, providing a sustainable alternative. However, these materials often require significant processing and may not offer the same quality as natural limestone.
- **Marine-Derived Aggregates**: In some regions, aggregates are sourced from marine dredging operations. Although this is not currently feasible in Ireland due to regulatory restrictions, marine aggregates are a potential future alternative.

4.32 While these alternatives offer opportunities to reduce reliance on limestone extraction, fully replacing limestone quarries is neither feasible nor practical due to the following reasons:

- **Quality and Suitability**: Limestone is a naturally occurring material with unique characteristics, making it particularly suitable for construction applications such as concrete production and road base layers. Recycled or alternative aggregates often differ in quality and may require additional processing to meet required standards.

ALTERNATIVE LOCATIONS

4.33 The current planning application is for the lateral extension of an existing established quarry at Ardgaineen, Claregalway, Co. Galway.

4.34 When considering alternative locations for quarrying, it is essential to acknowledge that minerals can only be extracted where they naturally occur, as they are a "tied resource." Limestone aggregates, like many other minerals, are generally of low unit value, with transportation being the most significant cost. As a result, most quarries tend to operate within a radius of approximately 25-30 km of their target market. The quarry site benefits from being strategically located near the N83 and N84 national roads and within close proximity to key areas: approximately 8 km north of Claregalway, 12 km southwest of Tuam, 17 km north of Galway City, and 17 km northwest of Athenry (Refer to Figure 1.1).

4.35 This site serves a large region of Galway, where strong transport links already exist. With the increasing emphasis on reducing carbon emissions and promoting sustainability, the practical transport range for aggregates is expected to contract. Reducing the distance materials are hauled helps to minimise the carbon footprint of quarry operations and supports more sustainable development practices.

4.36 Additionally, it is often preferable, from a planning perspective, to allow for the extension of existing mineral workings rather than opening new quarries on ‘greenfield’ sites. Extending

the existing quarry offers lower development costs due to the availability of an operational quarry face and the presence of existing infrastructure.

4.37 The Applicant has considered the following alternatives:

- Expanding operations into lands west and south of the existing quarry, which do not currently have planning permission for quarrying, and completing the restoration of the established quarry;
- Deepening the extraction area within the current permitted quarry zone;
- Developing a new 'greenfield' quarry elsewhere in Galway to serve established clients and markets.

4.38 At present, there are no suitable alternative replacement quarry locations available to the Applicant in County Galway. It is generally accepted that developing a new 'greenfield' quarry, from site selection to planning, land acquisition, and preparation, through to the commencement of extraction, can take between 5 and 10 years.

4.39 Extending the existing quarry offers several planning benefits, including:

- Avoiding the extraction of additional materials from other quarries in the county, which could lead to faster depletion of their resources and potentially increase the intensity of operations at those sites;
- Preventing the need for a new 'greenfield' quarry elsewhere in the county where no prior extractive activities exist;
- Reducing the need for hauling materials from other quarries within or outside the county, which would result in longer haulage distances and increased traffic on the road network.

4.40 Further development of the existing limestone quarry at Ardgaineen townland will help maintain a proven aggregate resource, with no significant increase in environmental emissions.

4.41 As mentioned earlier, this type of development is tied to the location of the resource, unlike a factory, which can be sited in various locations. Aggregates must be worked where they are found, and this can only occur where the environmental impacts of extraction can be managed to an acceptable level.

4.42 The existing permitted quarry site has a proven track record of compliance with environmental and planning regulations. Therefore, extending the quarry laterally (along with final restoration), subject to continued implementation of best environmental management practices and compliance with planning conditions and recommended emission limits for the sector, is preferable to developing a new 'greenfield' site in Galway. The existing on-site facilities for manufacturing concrete products, ready-mix concrete, and asphalt further support the suitability of this location, as the integration of quarry operations with manufacturing plants allows for reduced transportation and lower overall environmental impact.

4.43 The site offers several advantages for quarry extension, making it highly suitable for continued development:

- Proven limestone reserves (see EIAR Chapter 7).
- Long-established history of extraction activities at the location.
- Direct access to the N84 and N83 national roads, facilitating transportation to key markets (see EIAR Chapter 13).

- Absence of national, regional, or local environmental designations under the Habitats Directive, Birds Directive, or Wildlife Acts.
- Existing infrastructure that reduces development costs, as this is a lateral extension of an established quarry.
- Use of best practice, industry-standard extraction, and processing methods.

ALTERNATIVE DESIGNS / LAYOUTS

4.44 Alternative designs, including alternative layouts within the site were considered. The design layout that was chosen is considered to best minimise the potential impacts on the environment from noise, dust and visual impacts.

4.45 When evaluating alternative layouts for the quarry extension, three primary options were considered:

- Deeper Extraction with a Smaller Footprint: One option was to go deeper, which would have limited the area of the extension. However, this approach was ultimately not pursued due to the potential for increased groundwater inflows. Extracting at a deeper level would require more complex water management strategies, potentially leading to higher operational and environmental costs.
- Extraction in Western Plant Area: Requires relocation of established manufacturing plant.
- Wider Area with a Higher Floor Level: The alternative chosen was to extend over a larger area while maintaining the floor level at 4 metres Ordnance Datum (mOD), which is significantly higher than the water level in the current quarry floor at minus 12 mOD. This layout was selected to reduce the risk of groundwater inflows while still allowing for efficient resource extraction.

4.46 In addition, landscaped screening berms will be constructed along the northern and southern boundaries to mitigate potential noise and visual impacts from nearby residences. The eastern boundary was also considered for a berm but was ultimately deemed unnecessary, as no receptors are located near the extension in that direction.

ALTERNATIVE PROCESSES

4.47 Harringtons Concrete and Quarries are a company with extensive expertise in quarrying, aggregate production, concrete manufacturing, road surfacing material manufacturing, and road construction. As part of this planning application, different extraction methods were considered to evaluate their suitability for the proposed quarry extension.

4.48 Rock breaking was explored as an alternative extraction method. While it offers the advantage of reducing vibrations and noise compared to traditional blasting, it is less efficient for large-scale operations due to slower production rates, higher operational costs, and increased equipment wear. Consequently, rock breaking was not deemed a viable alternative for this development.

4.49 Blasting**,** the preferred extraction method, provides significant operational advantages. It allows for the efficient removal of large volumes of material, reducing overall costs and ensuring timely delivery of resources to the on-site manufacturing plants. Blasting will continue to be employed, with strict environmental controls and monitoring in place to mitigate any potential impacts on surrounding areas – refer to Chapter 11.

4.50 The on-site integration of quarrying and manufacturing processes represents a logical and sustainable approach to development. It ensures efficient resource use while minimising

environmental impact, aligning with best industry practices and the company's long-term sustainability goals.

Comparative Analysis of Environmental Effects

4.51 The table-based assessment below compares the likely environmental effects of the preferred option — **lateral extension of the existing quarry to 4 m OD** — against the principal reasonable alternatives that were examined:

- A1 – 'Do Nothing' Scenario
- A2 – Alternative Sources of Aggregates (e.g. recycled aggregates / import from more distant quarries)
- A3 – Alternative Locations (opening a new "green-field" quarry elsewhere in Co. Galway)
- A4 – Alternative Layouts / Depth Profiles (deeper extraction on the existing footprint; extraction in the western plant area; wider area at higher floor level).

4.52 The analysis focuses on the key environmental receptors considered throughout the EIAR: air quality, noise & vibration, water, biodiversity, land & soils, traffic, landscape / visual, climate and waste.

Table 4.1 Environmental Comparative Analysis – Strategic Alternatives

Environmental Criterion	A1 'Do Nothing'	A2 Alternative Sources of Aggregates	A3 Alternative Locations	Preferred Option (Lateral Extension)
Air Quality & Climate	No operational emissions but transport of replacement aggregates from outside the county increases regional HGV kilometres & CO_2.	Processing & long-haul transport of imported / recycled material → higher diesel use & GHG.	New haul routes and double-handling of material; start-up plant less efficient.	Local source minimises haul distances; continuation of best-practice dust controls; lowest transport-related CO_2.
Noise & Vibration	Quarry noise ceases; regional HGV noise rises.	Additional HGV traffic at other quarries / concrete plants; intermittent crusher noise at recycling sites.	New extraction start-ups generate new blast & plant noise in a currently quiet location.	No new receptors; blasting frequency unchanged; existing berms & face shielding retained.
Water & Hydrogeology	Pumps switched off; groundwater rebound; no control on legacy runoff until void fills.	Possible runoff issues at recycling sites; higher risk of fuel spills on roads.	New green-field site requires new water-management system; higher hydro-geo risk until bedrock understood.	Proven Section 4 discharge system already licensed (W/502/22); sump & lagoons sized for extreme events; compliance record demonstrated.
Biodiversity & Habitat	Restoration provides habitat,	Higher indirect impacts from	New vegetation clearance, soil	Extension limited to already modified

Environmental Criterion	A1 'Do Nothing'	A2 Alternative Sources of Aggregates	A3 Alternative Locations	Preferred Option (Lateral Extension)
	but loss of opportunity for staged restoration & new wetland.	transport; extraction shifts pressures to other sites.	stripping and habitat loss on a green-field site.	farmland/quarry interface; phased restoration; no direct SAC/SPAs impacts.
Land, Soils & Geology	Bedrock reserve sterilised; loss of nationally significant limestone resource.	Increased pressure on other quarries → faster depletion elsewhere.	Permanent loss of additional green-field land; duplicate infrastructure required.	Optimal recovery of proven reserve; smallest new land-take (6.1 ha); uses existing plant area.
Traffic & Roads	HDV traffic displaced to other counties; longer journeys on N84 / M17.	Net increase in regional HGV kilometres.	New site might rely on weaker local roads; new entrance works & safety risk.	HDV volumes remain within historic peaks; no new junctions; Section 38 upgrades complete.
Landscape / Visual	Gradual visual improvement at Ardgaineen, but new quarries likely elsewhere.	Visual impact at distant quarries/recycling sites.	New visual intrusion in an unworked landscape; new berms & access roads.	Extension sits behind existing faces & proposed 4 m berms; limited ZTV; landscape character remains "low sensitivity".
Waste & Circular Economy	No operational waste, but local C&D waste has fewer reuse outlets.	Recycled C&D material beneficial, but not available in sufficient quantity (≤ 3 % of demand).	Surplus overburden & infrastructure waste at green-field start-up.	Overburden reused in berms / progressive restoration; minimal off-site disposal.
Overall Assessment	✗ Not Preferred – economic & climate penalty, loss of resource security.	✗ Not Preferred – insufficient volumes; higher climate & transport impacts.	✗ Not Preferred – larger land-take, green-field impacts, higher cost & risk.	✓ **Preferred** – best balance of environmental, economic & social factors; uses proven systems, shortest haulage, least new impact.

Table 4.2 Alternative Layouts / Depth Profiles – Site-Specific Comparison

Criterion	Deeper Extraction	Extraction in Western Plant Area	Wider Area @ 4 m OD (Preferred)
Hydro-geology & Pumping	Risk of intersecting water-bearing conduits; potentially larger dewatering energy & discharge volumes.	Would require relocation of concrete / asphalt plants & lagoons → major redesign.	Maintains current dewatering regime; no additional pumps required.
Operational Disruption	None (existing footprint) but slower scheduling due to bench sequencing.	Severe – relocate processing & stockpile zones; long downtime.	Minimal – quarrying progresses into previously agricultural fields while plant keeps operating.
Visual / Noise Shielding	Existing faces provide shielding; no change in plan-view footprint.	Shielding reduced while plant area excavated; higher impacts.	New berms along north & south; extraction below ground level; best combined screening.
Cost & Programme	Higher drill & blast cost per tonne; deeper haul distance.	Highest cost (new plant bases, services, haul roads).	Most cost-effective; uses existing haul routes & plant.
Preferred?	✗ No	✗ No	✓ **Yes**

CONCLUSION

4.53 A structured "avoid–reduce–remedy" review of reasonable alternatives confirms that the lateral extension of the Ardgaineen quarry to a final floor of 4 m OD is the only practicable option that can secure the proven limestone reserve while remaining fully compliant with planning policy and environmental safeguards.

4.54 The study screened

a. a 'do-nothing' scenario,

b. sourcing the same tonnage from recycling or remote quarries,

c. opening a new green-field quarry elsewhere in Co. Galway and

d. alternative layouts/depth profiles within the existing landholding.

4.55 All were rejected because they would either:

- sterilise a nationally important resource;
- generate higher HGV kilometres, greenhouse-gas emissions and cost;
- introduce fresh environmental and social impacts at new locations; or
- conflict with the Galway County Development Plan objectives for orderly, compact growth and sustainable aggregate supply.

4.56 The preferred option exploits an already modified site, re-uses established haul roads, plant and the Section 4-licensed water-management system, and can be delivered with mitigation measures such that residual effects remain within applicable guideline values and standards

(EIAR Chapters 5-16). A robust monitoring programme—dust, noise, vibration, water quality and traffic—will ensure ongoing compliance with EPA (2006) and DEHLG (2004) guidance.

4.57 Accordingly, the extension offers the best environmental, technical and economic balance: it guarantees continuity of supply to Project Ireland 2040 infrastructure and housing projects; it avoids the greater environmental footprint of new green-field extraction; and it maximises the sustainable recovery of an identified limestone reserve that already lies adjacent to an established, long-permitted quarry footprint, thereby avoiding the sterilisation of a nationally important resource.

4.58 No other alternative studied can meet these objectives with a lower overall impact, and the preferred scheme therefore represents the optimum, plan-led solution.