CHAPTER 4

ALTERNATIVES

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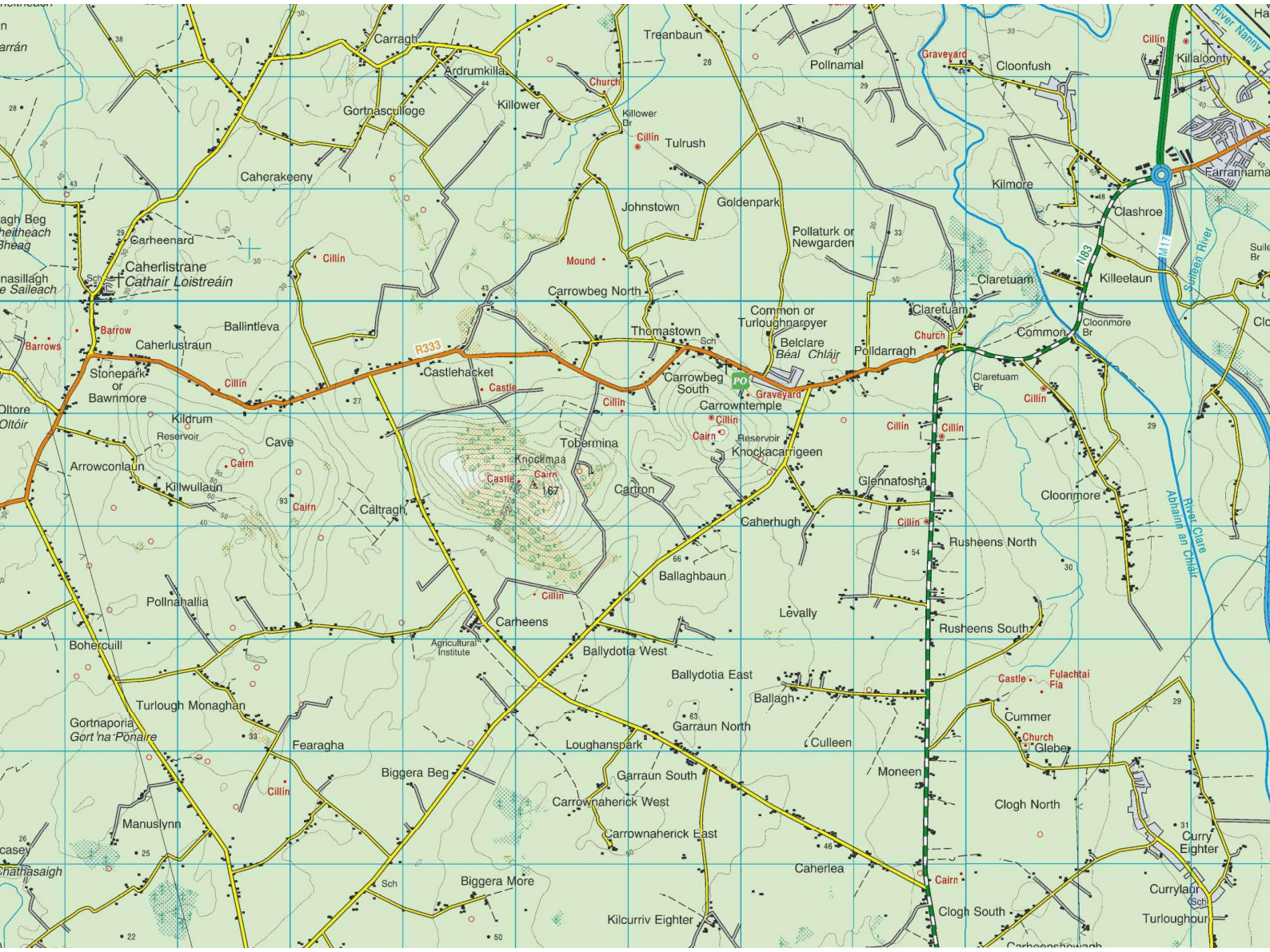

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QUARRY CONSULTING

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Introduction

4.1 The proposed development being applied for under this current planning application is shown on Figure 3.1 and will consist of:

- Continued use of the existing quarry (granted under Planning Ref. File No.: 06/2275 and ABP Ref.: PL07.222783), including drilling, blasting, crushing, processing, and stockpiling of materials within a total site area of 15.09 hectares to the permitted depth of 33m OD.
- Continued use of existing permitted structures and facilities, including:
  - Weighbridge and wheelwash with side and overhead spray bars.
  - Office and staff facilities building and carpark provision (Ref. 17512).
  - Asphalt plant (Ref. 15104), concrete batching plant (Ref. 20419), maintenance shed (Ref. 141295), aggregate shed, ESB substation (Ref. 191964), crushing and screening plant, and stock bays (Ref. 062275 & 21442).
  - Associated site infrastructure.
- Construction of a new quarry storage yard (c. 1.09 Ha.) to the east of the existing quarry.
- Relocation of the existing permitted sheds (Plan Ref File No. 21442) to an area beside the proposed storage yard area.
- Importation of soil and stone (both waste and non-waste) for site restoration purposes and selected construction and demolition waste for recycling to preserve natural aggregate resources, subject to the necessary authorisations.
- The proposed development will facilitate the continued operation and restoration of the site, with the operational life of the quarry ceasing upon resource exhaustion, followed by restoration to agricultural and natural uses using imported material.

4.2 The proposed development is within an overall application area of c. 16.3 hectares and is for a total period of 35 years (comprising an operational period of 33 years followed by 2 years for restoration). The application is accompanied by an Environmental Impact Assessment Report (EIAR).

EIA Directive

4.3 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.

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

4.5 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.

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

- 'Do Nothing' Scenario;

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- Alternative Sources of Aggregates;
- Alternative Locations;
- Alternative Designs / Layouts;
- Alternative Processes.

Need For the Development

4.7 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.

4.8 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, and asphalt plant ensure a steady supply of these products for local projects. The continued use 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 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 demand for construction aggregates, particularly limestone, has been steadily increasing in Galway and throughout Ireland, driven by the growth of infrastructure projects and the local concrete production industry.

4.13 Limestone is a highly desirable aggregate material due to:

- Its physical properties, which allow for efficient crushing and shaping to meet a variety of construction specifications.

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- Its chemical composition, which provides excellent sub-base strength, making it particularly suitable for road construction, drainage, and engineered fill applications.
- From an engineering perspective, limestone is preferred for its cementitious nature when placed and compacted to provide stable high strength sub-bases under concrete slabs, roadways etc.

4.14 Given these attributes, the continued availability of limestone aggregates is critical to supporting regional development, construction, and agriculture.

Concrete and Asphalt Manufacturing

4.15 In addition to quarry extraction activities, the site also houses a concrete batching plant and an asphalt manufacturing plant, both of which are essential for regional infrastructure projects. The ability to process extracted limestone on-site ensures a local and steady supply of concrete and asphalt products, supporting both private and public sector construction projects.

4.16 The on-site manufacturing of ready-mix concrete and asphalt offers multiple benefits:

- Ensures a secure and reliable supply of key construction materials.
- Minimizes transportation distances and related emissions by sourcing raw materials on-site.
- Supports regional infrastructure projects, including road construction, housing, and industrial development.

4.17 While the quarry provides the primary source of limestone aggregate, certain high-specification aggregates are not available on-site and must be imported for use in concrete and asphalt manufacturing. These include:

- High PSV (Polished Stone Value) stone, which is essential for producing high-quality asphalt with superior skid resistance for road surfacing applications.
- Asphalt sand, which meets the required specifications for use in bituminous mixtures.
- Concrete sand, which ensures the correct grading and performance in concrete production.

4.18 The continuation of use of the quarry and its associated processing facilities will secure the long-term availability of these critical construction materials, ensuring that infrastructure projects remain on schedule and within budget.

Recycling and Aggregate Reuse

4.19 In addition to primary extraction, the site also imports and processes selected construction and demolition (C&D) waste for recycling purposes. The recovery and reuse of C&D materials contribute to sustainable resource management by:

- Reducing the demand for virgin aggregates.
- Extending the lifespan of existing resources.
- Lowering the environmental footprint of construction activities.

4.20 Recycling activities at the site align with national circular economy objectives, supporting Ireland's transition to more sustainable construction practices.

Agricultural Ground Limestone

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4.21 Agricultural ground limestone – essentially finely milled calcium-carbonate ($CaCO_3$) – is produced on-site by running selected limestone through a series of secondary and tertiary crushers until it reaches the required fineness (<3 mm).

4.22 Locally supplied lime allows Galway farmers to correct soil acidity without relying solely on synthetic fertilisers; a well-limed field can cut nitrogen requirements, reducing both costs and fertiliser-related greenhouse-gas emissions. By keeping production within the quarry, haulage distances (and associated CO_2) are minimised, while the product remains just one of several grades of limestone aggregate leaving the site.

Restoration Infill and Article 27 By-Product

4.23 When extraction ends, the remaining void will be back-filled and re-contoured so that it merges with the surrounding lands and delivers the agricultural & biodiversity-led after-use previously agreed with Galway County Council – refer to Chapter 3. The subsoil and overburden on-site are not sufficient to achieve this landform, so an import of inert soil and stone is proposed throughout the operational phase.

4.24 This import embodies a circular-economy approach. Under the site's Waste Facility Permit (WFP-G-21-0007-02) the quarry can accept clean excavation spoil that might otherwise be land-filled or transported long distances. Where material meets the criteria for Article 27 "by-product" status it can be reused directly without ever becoming waste, further relieving disposal pressures. In this way the scheme turns unavoidable spoil from regional projects into a resource, minimises HGV kilometres, and allows restoration to progress in tandem with extraction, preventing the legacy of an abandoned void.

Project Ireland 2040

4.25 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.

4.26 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.

4.27 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.

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

4.29 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.

4.30 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.

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Galway Country Development Plan (CDP) 2022-2028

4.31 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

4.32 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 both the quarrying operations and the on-site concrete, ready-mix concrete, and asphalt manufacturing facilities, all of which rely on a steady supply of limestone from the quarry.

4.33 Without the continuation of use of the quarry, the entire site operation, including quarrying, concrete batching, and asphalt production, would cease, as the planning permissions for the asphalt and concrete plants are explicitly tied to the duration of the overall quarry permission. The concrete and asphalt plants would be unable to source raw materials on-site, requiring either:

- Permanent closure, resulting in job losses and disruption to local supply chains.
- Importation of limestone from other quarries, leading to increased transportation costs and emissions, and potential supply chain disruptions.

4.34 The cessation of quarrying and manufacturing at the site would result in a major gap in the local market for construction materials, including aggregates, ready-mix concrete, and asphalt. This could lead to:

- Increased costs and delays for infrastructure and development projects in the region.
- Greater reliance on distant material sources, increasing transport-related emissions and environmental impacts.
- Reduced economic viability of construction projects, affecting housing, road building, and industrial developments.

4.35 In addition to economic consequences, the environmental benefits of local sourcing would be lost, as transporting aggregates and manufactured products over longer distances would lead to higher carbon emissions.

4.36 The 'Do Nothing' scenario, therefore, would not only result in the cessation of quarrying activities but would also lead to the closure of the on-site concrete and asphalt manufacturing plants, as their permissions are explicitly tied to the continuation of the quarry. This would have significant implications for regional supply chains and construction sector stability.

4.37 Given these economic, environmental, and logistical impacts, the continued development of the existing quarry is the most logical and sustainable option to support local industry, economic growth, and infrastructure development.

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Alternative Sources Of Aggregates

4.38 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.

4.39 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. Recycled aggregates could only supply about 2% of demand for aggregates and is precluded from use in many high quality products

Alternative Locations

4.40 The current planning application is for the continuation of use of an established quarry at Cartron, Belclare, Co. Galway. This site serves a large region of Galway, benefiting from strong transport links that facilitate efficient distribution of materials to key markets.

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4.41 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.

4.42 Additionally, it is often preferable from a planning and environmental perspective to allow for the continuation of existing mineral workings rather than opening new quarries on 'greenfield' sites. The continuation of an established quarry significantly reduces environmental impacts associated with land disturbance, habitat loss, and the development of new access infrastructure.

4.43 The 2004 Quarry Guidelines (Quarries and Ancillary Activities: Guidelines for Planning Authorities, DECLG) explicitly support the continuation and extension of existing quarries where appropriate, stating:

4.44 "*Where the expected life of the proposed quarry exceeds 5 years, it will normally be appropriate to grant permission for a longer period (such as 10-20 years), particularly where major capital investment is required at the outset… The purpose of setting a finite period is not to anticipate that extraction should not continue after the expiry of that period, but rather to enable the planning authority, in conjunction with the developer and environmental authorities, to review changes in environmental standards and technology over a decade or more since the original permission was granted*."

4.45 Continuing the use of the existing quarry site provides several advantages over developing a new extraction area:

- Lower development costs due to the presence of an operational quarry face, established haul roads, and processing infrastructure.
- Reduced environmental impact compared to greenfield extraction, as the site has already been disturbed and developed for quarrying activities.
- Continued use of existing infrastructure, including weighbridges, water management systems, wheel washes, and processing facilities, minimising additional capital investment.
- Avoidance of increased land take and potential planning conflicts, as new quarries often face greater opposition due to their visual, environmental, and social impacts.

4.46 The low landscape sensitivity of the area is an important factor supporting the continuation of quarrying activities at this location. The site is not within any designated landscape protection zones, and the visual impact of continued quarrying is significantly reduced due to the site's natural screening and existing mitigation measures.

4.47 The site's favourable location north of Galway city and 5.6km south-west of Tuam, with proximity to growing urban areas and major infrastructure corridors, makes it highly suitable for continued quarrying and aggregate supply. The site is positioned within efficient haulage distance of Galway city and surrounding areas, ensuring that essential construction materials are readily available to meet demand for housing, infrastructure, and industrial projects.

4.48 In line with national policy, regional planning guidelines, and the 2004 Quarry Guidelines, the proposed continuation of quarrying activities at this site represents the most sustainable and efficient option, ensuring that the required construction materials remain available without necessitating the development of a new extraction site.

4.49 The Applicant has considered the following alternatives:

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- Expanding operations into lands south of the existing quarry, which do not currently have planning permission for quarrying, and completing the restoration of the established quarry. This was considered because it would enable the preservation of higher-quality, deeper resources within the current site for specialised products. By accessing shallower limestone deposits in adjacent lands, the company could use these resources for general aggregate production, thereby preserving the superior quality limestone within the deeper existing quarry for specialised applications.
- Deepening the extraction area within the current permitted quarry zone;
- Developing a new 'greenfield' quarry elsewhere in Galway to serve established clients and markets.

4.50 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.

4.51 Continuing the use of 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.

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

4.53 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.

4.54 The existing permitted quarry site has a proven track record of compliance with environmental and planning regulations. Therefore, the continuation of the existing quarry (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. The existing quarry, given the lack of other limestone quarries of current operating scale in the area, is already an established regionally important quarry.

4.55 The site offers several advantages for continuing the use of the existing quarry, 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 N83 and M17 national roads, facilitating transportation to key markets (see EIAR Chapter 13).

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- 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 the continuation of use of an established quarry.
- Use of best practice, industry-standard extraction, and processing methods.

Alternative Designs / Layouts

4.56 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.

4.57 When evaluating alternative layouts for the continuation of use, the following option was considered, but due to existing reserves and increased costs associated, it was not ultimately pursued:

- Deeper Extraction within a Smaller Footprint: One option was to go deeper. However, this approach was ultimately not pursued due to the potential for groundwater inflows. Extracting at a deeper level would potentially require more complex water management strategies, leading to higher operational and environmental costs.

Alternative Processes

4.58 Mortimer Quarries Ltd. are a long established 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 continuation of use of the existing limestone quarry.

4.59 Rock breaking was explored as an alternative extraction method. While it offers the advantage of reducing vibrations compared to traditional blasting, it is significantly less efficient for large-scale operations due to:

- Slower production rates, which would hinder the timely delivery of materials to the on-site manufacturing plants.
- Higher operational costs, increasing the economic burden on quarry operations.
- Increased equipment wear and fuel consumption, leading to greater long-term maintenance and environmental impacts.
- Potential introduction of routine character noise, which could result in lower operating noise emission thresholds, making compliance with quarrying noise regulations more challenging.

4.60 Blasting remains the preferred extraction method, offering significant operational and environmental advantages over rock breaking. It allows for:

- Efficient removal of large volumes of material, ensuring a reliable supply of aggregates for on-site concrete and asphalt production.
- Lower overall costs, improving the long-term economic sustainability of quarry operations.
- Controlled operations, with strict environmental controls and monitoring in place to mitigate potential impacts—refer to Chapter 11.

4.61 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.

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Table 4.2: Environmental Comparative Analysis of Alternatives: 'Do Nothing' Scenario; Alternative Sources of Aggregates; Alternative Locations

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Environmental Criteria	'Do Nothing' Scenario	Alternative Sources of Aggregates	Alternative Locations
Air Quality	Potential for improved air quality post-restoration.	Increased emissions from transportation and processing.	Potential dust emissions from new site preparation.
Noise Pollution	Reduction in operational noise.	Noise from transport and processing facilities at off-site locations.	Increased noise from new site operations.
Water Quality	Potential improvement with cessation of quarrying activities.	Risk of contamination from transportation runoff.	Potential impacts on local water bodies from new development.
Biodiversity	Habitat restoration opportunities.	Potential disturbance to natural habitats from material sourcing.	Potential habitat loss and fragmentation.
Land Use	Restoration to natural habitat.	Increased pressure on other land uses for material sourcing.	Significant land use change required for new quarry site.
Waste Management	No further waste generation from quarrying activities.	Increased waste from processing and transport operations.	Potential for increased waste generation at new location.
Visual Impact	Improvement over time as site is restored.	Visual intrusion at new transport and processing sites.	Significant visual impact from greenfield development.
Climate Impact	Increased carbon footprint from sourcing materials from other locations.	Higher emissions due to transportation and processing.	Increased emissions from infrastructure development.
Preferred Option	✗ Not Preferred	✗ Not Preferred	✗ Not Preferred

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Table 4.3: Comparative Analysis of Environmental Effects for Alternative Layouts / Designs

Criteria	Deeper Extraction with a Smaller Footprint	Permitted Footprint Area with a Higher Floor Level (Preferred)
Water Management	Increased risk of groundwater inflows requiring complex systems.	Minimal risk of groundwater inflows, manageable with existing systems.
Noise and Vibration	Reduced spatial impact, potentially more intense operations at depth.	Balanced noise impact due to wider distribution of activities.
Visual Impact	Less visible due to smaller footprint.	Effective use of landscaped berms for screening.
Operational Disruption	None as existing footprint is used.	Minimal; aligns with current operations.
Environmental Footprint	Increased due to more energy-intensive water management.	Optimised for resource extraction with minimal additional footprint.
Cost	Higher due to deeper extraction area.	Cost-effective; leverages existing infrastructure.
Overall Feasibility	Not preferred due to operational and environmental challenges.	Preferred; most balanced and sustainable approach.

Conclusion

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4.62 The comprehensive alternatives assessment has demonstrated that the continuation of use of the existing limestone quarry is the most appropriate, viable, and sustainable option. The assessment considered alternative locations, extraction methods, and material sourcing options, but none presented a practical or environmentally preferable alternative to the proposed development.

4.63 Alternative locations for limestone extraction were deemed impractical and environmentally unsustainable, as they would require significant new land disturbance, the development of additional infrastructure, and increased transportation distances, leading to higher carbon emissions. The strategic location of the existing quarry, proximity to Galway city, and established infrastructure make it the most efficient and least environmentally impactful option for securing a continued local supply of limestone aggregates.

4.64 Alternative extraction methods, such as rock breaking, were evaluated but found to be operationally inefficient, leading to higher emissions, slower production rates, and greater environmental impacts in the long term. Blasting remains the most sustainable and effective extraction method, with strict environmental controls in place to mitigate potential impacts.

4.65 Alternative materials sourcing, including the importation of aggregates from other regions or the use of recycled materials, was assessed. However, importing aggregates would result in higher transportation costs, increased traffic emissions, and a reduced supply-chain resilience for regional construction projects. While recycled aggregates play an important role in sustainable construction, they cannot fully replace primary limestone aggregates for high-specification applications such as road surfacing, concrete production, and structural foundations.

4.66 Policy alignment:

- The National Planning Framework (NPF) recognises the strategic importance of aggregate extraction for national infrastructure and development.
- The Galway County Development Plan (CDP) 2022-2028 explicitly supports the sustainable extraction of construction materials, acknowledging its role in economic development, rural employment, and infrastructure delivery.
- The 2004 Quarry Guidelines emphasise that the continuation of established quarry sites is preferable to new 'greenfield' extraction, where environmental and planning challenges would be greater.

4.67 The existing quarry adheres to all relevant environmental regulations, guidelines, and best practices, ensuring responsible resource management while minimising potential environmental impacts. A comprehensive set of mitigation measures will be implemented, including noise and dust controls, traffic management, water protection measures, and progressive site restoration.

4.68 Given the economic, environmental, and social considerations, the proposed continuation of the existing quarry represents the most logical, policy-aligned, and sustainable solution to meet regional construction and infrastructure needs. The project ensures a stable, cost-effective, and environmentally responsible supply of limestone aggregates, supporting Galway's growth and development while minimising environmental impacts.