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THE STATES OF DELIBERATION
of the
ISLAND OF GUERNSEY

COMMITTEE *FOR THE* ENVIRONMENT & INFRASTRUCTURE

THE ISLAND'S FUTURE AGGREGATE SUPPLY

The States are asked to decide: -

Whether, after consideration of the Policy Letter entitled 'The Island's Future Aggregate Supply' dated 28th June, 2021 they are of the opinion: -

1a. To agree the principle of on-island quarrying in order to provide the future supply of aggregate for Guernsey (Option A in the policy letter).

Or, only if Proposition 1a shall have been defeated,

1b. To agree the principle that the future supply of aggregate for Guernsey shall be through importation (Option B in the policy letter) on exhaustion of existing aggregate reserves at Les Vardes Quarry.

2. If Proposition 1a is approved:

a) to agree that Phase 3 of the development of Chouet Headland for quarrying will be subject to a decision of the States as to whether on-island quarrying remains the most appropriate method of supply of aggregate for Guernsey at that time, and to direct the Committee *for the* Environment & Infrastructure to provide the States with updated evidence to inform their decision no later than five years before the completion of Phase 2.

b) to direct the Policy & Resources Committee, in consultation with the Committee *for the* Environment & Infrastructure, to continue negotiations with land owners in relation to Les Vardes Quarry and Chouet Headland, including, where appropriate, in relation to the acquisition of land or the right to use land, in order to best achieve the States of Guernsey's strategic aims in relation to on-island quarrying and other potential future strategic uses and to bring forward its recommendations to the States of Deliberation.

c) to direct the Development & Planning Authority to complete the Development Framework for Chouet Headland in order to give planning guidance for the area safeguarded for mineral extraction; and

d) to note Ronez Limited's agreement to offset local negative environmental impacts in the short and long term, to achieve overall biodiversity net gain (see section 10.68).

3. If proposition 1b is approved, to direct the States' Trading and Supervisory Board and the Committee *for the* Environment & Infrastructure to submit propositions and a policy letter to the States which establishes the infrastructure requirements associated with the importation of aggregate and includes updated estimates of any financial implications to the States of any improvements needed in relation to infrastructure, storage space and other matters to allow for future supply of aggregates through import and any proposals needed for approval of funding of the same.

The above Propositions have been submitted to Her Majesty's Procureur for advice on any legal or constitutional implications in accordance with Rule 4(1) of the Rules of Procedure of the States of Deliberation and their Committees.

THE STATES OF DELIBERATION
of the
ISLAND OF GUERNSEY

COMMITTEE *FOR THE* ENVIRONMENT & INFRASTRUCTURE

THE ISLAND'S FUTURE AGGREGATE SUPPLY

The Presiding Officer
States of Guernsey
Royal Court House
St Peter Port

28th June, 2021

Dear Sir

1 Executive Summary

1.1 Security of supply of aggregate is essential for construction in the Island. Ronez Limited ("Ronez") (the operator of the existing quarry) has advised that current workable unconstrained[1] reserves of granite at Les Vardes Quarry, which are used for aggregate, are expected to be exhausted by the end of 2023. This may be sooner if demand increases, with a corresponding increase in the extraction rate, which could potentially be triggered by large infrastructure projects and/or increased house building which might be required as part of the Island's economic recovery actions. The Committee recognises that the future strategic requirements for waste, water and stone would be most appropriately considered together to provide a co-ordinated response to the short, medium and long-term requirements. However, the previous estimate in 2016 had suggested that unconstrained reserves would not be exhausted until 2028, but this date has since been brought forward to 2023 by Ronez. This means that the matter of future aggregate supply now needs to be resolved with greater urgency than previously understood and the Committee has therefore needed to consider this matter within a short time period ahead of other strategic requirements.

[1] 'Unconstrained' reserves relate to the area of granite which can be extracted through continuing existing quarry operations; 'constrained' reserves relate to the area of granite located beneath the operator's plant and equipment at the quarry, which cannot be extracted until that plant is re-located to give access to the reserves.

1.2 In order to make a recommendation to the States Assembly, the Committee *for the* Environment & Infrastructure ("the Committee") has assessed two options:

> OPTION A – To continue the principle of on-island quarrying by quarrying a new site in order to meet the majority of aggregate demand, with the balance of additional aggregate requirement met through importation when required (as existing); and
>
> OPTION B – On exhaustion of existing aggregate reserves at Les Vardes Quarry, to meet the demand for aggregate through importation from suppliers overseas.

1.3 The Committee has evaluated as much evidence as possible to assess the relative merits and disadvantages of each option, taking into careful account economic, social and environmental factors. As these span such issues as security of aggregate supply, effects on construction costs and employment, infrastructure demand and requirements, pollution impacts, carbon emissions, biodiversity and nature loss, a strategic assessment is neither simple nor straightforward. In summary, there is a clear economic case for the continuation of on-island quarrying (Option A), but the environmental and social amenity cases are much more complex.

1.4 Option A has more positive and fewer negative economic impacts than Option B, as importation would increase the cost of aggregate and necessitate the loss of jobs. Both options have some social amenity impacts. In terms of environmental impacts, Option A has lower energy and climate change impacts than Option B, but higher localised environmental impacts. Having assessed all the impacts at a strategic level, the Committee recommends, by a majority, Option A – the continuation of on-island quarrying of aggregate. However, in doing so, the Committee stresses that the negative localised environmental impacts need to be minimised, mitigated and more than offset. There are in fact opportunities to realise net positive environmental improvements, both at Chouet Headland and (by virtue of restoration and offsetting projects) in other parts of the Island as well. Ronez's agreement to Biodiversity Net Gain ("BNG"), which would deliver this overall environmental improvement locally, is a key factor in the Committee's majority recommendation of Option A.

1.5 There are three phases of development of Chouet Headland as a quarry that could potentially progress over approximately 35 years (see Image 1 on p.12), but the effects of this large-scale infrastructure development will be wide ranging over a significant time period. Baseline evidence and the nature of impacts and effects have the potential to change significantly over that timeframe. These include potential changes to carbon impacts due to

developments in shipping and vehicle technology, and the transition away from hydrocarbon fuels.

1.6 Given that impacts on social amenity are particularly focussed in Phase 3 of Chouet Headland and that there may be changes to demand and the amount of aggregate required due to innovations in building and construction techniques over time, the Committee considers it is appropriate to recommend that the States has the opportunity to review up-to-date evidence before agreeing to the commencement of Phase 3 extraction at Chouet Headland so that it can be determined if evidence continues to support on-island quarrying as the most appropriate aggregate supply option. The quarry operator has confirmed that quarrying the headland would remain a viable proposition in the event that Phase 3 is not commenced.

2 Introduction

2.1 The intention of this policy letter is to provide security of supply of aggregate for Guernsey. Aggregate is particulate material, which is supplied to the local construction market, either as 'dry stone' or for use in the manufacture of concrete, concrete products and asphalt. It is an essential commodity, the supply of which has significant impacts on the construction industry and on the supply and cost of asphalt and concrete. Notwithstanding options for alternative building techniques, such as modular buildings, aggregate continues to be essential for elements of building construction as well as roadbuilding and repair. It is not anticipated that alternative building methods will have a noticeable impact on aggregate demand locally in the short to medium term as some methods reduce aggregate requirements e.g. structural insulated panels (SIPS) replacing concrete blocks but others require more aggregate (e.g. Sustainable Urban Drainage Systems).

2.2 Aggregate is used in the production of a range of concrete blocks and road kerbs, lintels etc. Local companies rely on concrete supplied by Ronez in order to manufacture other products used in construction such as the beams for beam and block flooring and rings for drainage systems. The States of Guernsey is the primary consumer of asphalt for road building and repair, the costs of which would increase should the cost of aggregate increase.

2.3 Guernsey's base aggregate demand (110,000 tonnes per annum) is currently met by mineral extraction at Les Vardes Quarry ("Les Vardes") in the north of the Island which is the only currently workable local commercial quarry. Sand, cement and the balance of aggregate required to meet demand is met by importation from the UK or mainland Europe. Sand and cement are not available

locally so will always need to be imported, although the amount imported has reduced consistently in recent years.

2.4 In addition to the extracted reserves, Ronez currently imports 500 tonnes of coarse aggregate to supplement local production, 10,500 tonnes of sand and 8,000 tonnes of bulk cement per annum. As well as Les Vardes, Ronez also operates a site, Les Monmains, Vale, which is used to produce concrete and concrete products as well as for storage and recycling.

2.5 In the last five years, the average annual production rate at Les Vardes was 103,000 tonnes, and in the last 10 years it was 125,000 tonnes. The predicted average production rate going forward is 110,000 tonnes. In 2020, production was reduced to 92,000 tonnes as a result of the pandemic, but this is expected to return to at least the average predicted extraction rate in the near future. Ronez has advised that current workable unconstrained reserves of granite (211,000 tonnes as of June 2021) at Les Vardes, which are used for aggregate, are expected to be exhausted by the end of 2023 at the average extraction rate. The remaining constrained reserves (488,000 tonnes) can only be extracted if the existing plant and equipment is then removed. This would allow extraction to continue to 2029 if all the existing plant and equipment is removed and replaced elsewhere. However, if replacement plant and equipment is not provided at Chouet Headland mobile plant would be required to process extracted constrained reserves at Les Vardes. This could extend extraction until 2032 but due to limitations of space and maximum production when mobile plant is required, it would not be possible to meet the full base demand volume from extraction at Les Vardes if Chouet Headland is not developed. As a result, volumes would need to be supplemented by increased importation potentially from 2024. However, this date would be influenced by the balance between the rate of extraction and amount of aggregate imported, which in turn would influence the cost of aggregate. Timelines may be brought forward if demand were to increase, with a corresponding increase in the extraction rate which could potentially be triggered by large infrastructure projects and/or increased house building which might be required as part of the Island's economic recovery actions.

2.6 Estimates prior to 2016 suggested that unconstrained reserves would not be exhausted until 2028, but this has now been brought forward to the end of 2023. There would be implications for ports infrastructure which would have considerable lead in times to resolve should importation be agreed as the future route of aggregate supply. Although the Committee recognises that ideally the future strategic requirements for waste, water and stone should be considered together to provide a co-ordinated response, considering this information, there is now some urgency in determining if the principle of continuing on-island

quarrying on a new site is acceptable or whether full importation would be the most appropriate route for future aggregate supply.

2.7 Since the Island Development Plan ("IDP") was approved in 2016 there has been a requirement for some developments to provide site waste management plans, which has led to greater reuse of inert material on site and increased recycling, including aggregate. However, the grading of recycled aggregate restricts what it can be used for. It can also be difficult to assess the quality of used aggregate without knowing the specific particulates that it comprises. Therefore, there are limitations to what recycled aggregates can be used for. Ronez and other local companies have confirmed that they are already recycling and reusing as much aggregate as they feasibly can, so it is unlikely that future recycling rates will impact significantly on the level of local demand for aggregate.

2.8 Market forces may change the level of demand over time and any large-scale infrastructure project may significantly increase demand. Capital projects agreed and implemented by the States of Guernsey contribute significantly to the demand for aggregate, as does house building and the road resurfacing programme. The decision on the most appropriate route for future aggregate supply will directly influence the cost of development and will therefore have implications for our economic recovery.

2.9 Two options have been investigated to provide an appropriate future supply of aggregate for Guernsey once existing reserves are exhausted. These are:

> OPTION A – To continue the principle of on-island quarrying by quarrying a new site in order to meet the majority of aggregate demand, with the balance of additional aggregate requirement met through importation when required (as existing); and
>
> OPTION B – On exhaustion of existing aggregate reserves at Les Vardes, to meet the demand for aggregate through importation from suppliers overseas.

2.10 A draft Development Framework for the use of Chouet Headland for quarrying was prepared by the Development and Planning Authority ("DPA") and was published for public consultation in April 2019. The DPA received over 100 responses. Although it was decided at that stage that the States of Deliberation should decide whether the principle of on-island quarrying was acceptable before progressing further with the Development Framework, the Committee has taken the responses received into consideration at the appropriate strategic level in drafting this policy letter and related propositions. These matters will be considered in greater detail at the planning application stage, which will require the submission of a full Environmental Impact Assessment ("EIA").

2.11 A summary of the main topics covered within the representations is as follows:

- The need for a quarry and investigation of alternatives;
- Process and procedures;
- Cost vs benefit;
- A need for further investigation and evidence;
- Concerns regarding the effects on health implications;
- Visual impacts;
- Traffic and road safety – welcome the inclusion of a Traffic Impact Assessment;
- Impacts on neighbouring businesses;
- Maintaining access to the coastal path;
- Historic environment;
- Environmental impact;
- Concerns regarding the discharge of water from the site;
- The continuation of quarrying in respect of maintaining employment levels and keeping down the costs of construction; and
- Location and demand of the Chouet Range and pistol shooting facilities.

3 Background

3.1 Quarrying in Guernsey started in the late 18th century and peaked during the 19th century, with more than 250 quarries being actively mined for stone. The quarry at Les Vardes is understood to have originated in the early 19th century and remained in operation until it was abandoned shortly after the Second World War. Ronez re-opened the quarry in 1961 and has operated there continuously ever since. Permission for a north-western extension to the quarry containing about 750,000 tonnes of reserve was granted in 2010. There are no further feasible extensions to Les Vardes.

3.2 The quarry extracts granite deposits from the Bordeaux Northern Diorite formation to produce a range of aggregate products which are supplied to the local construction market, either as 'dry stone' or for use in the manufacture of concrete, concrete products and asphalt.

3.3 In 2012, the former Policy Council decided to investigate and consult on options for how the Island's future requirements for aggregate could be most appropriately met. In October 2014, a sub-group (later subsumed into the Environmental Policy Group, or EPG) considered a paper that evaluated potential options for dealing with the future supply of aggregate in Guernsey. The group specifically considered whether Guernsey should continue to quarry aggregate locally once Les Vardes was exhausted, or whether there was a viable alternative that would better balance the environmental, economic and social objectives of the States of Guernsey.

3.4 In 2015, the Policy Council subsequently agreed to ratify the recommendations of the EPG and agreed to support the principle of quarrying the Chouet Headland (comprising land owned by the States and by Ronez) following the exhaustion of stone at Les Vardes, negotiate terms for an exchange of land with Les Vardes, and prepare a policy letter to be presented to the States Assembly seeking support to enable quarrying of Chouet Headland (and by implication on-island quarrying).

3.5 In July 2016, having considered the handover document and the conclusions of the EPG in relation to the principle of mineral extraction on-island, the newly-formed Committee *for the* Environment & Infrastructure (the former Committee) endorsed the previous decision of the Policy Council to generally support the continuation of quarrying in Guernsey and to continue to negotiate with Ronez regarding the Chouet Headland and Les Vardes. This decision also endorsed the Policy Council's previous intention that the strategic decision about whether to continue on-island quarrying once Les Vardes was exhausted should be a decision of the States Assembly. It is important to note that the then Committee agreed to advise Ronez that the decisions were made without prejudice to any final decision on the carrying out of quarrying operations at the Chouet Headland.

3.6 At that time, the anticipated exhaustion date for unconstrained reserves at Les Vardes was 2028. Therefore, although it endorsed the continuation of negotiations with Ronez, the work was not prioritised. However, in 2019 the former Committee became aware that the anticipated exhaustion date for unconstrained reserves at Les Vardes had been significantly revised to mid-2021 at predicted average extraction rate. This has since been revised to the end of 2023 because of the impacts on demand of the COVID-19 pandemic and a resurvey of the quarry.

3.7 The former Committee noted, however, that its position was based on evidence which was well over five years old at the time and did not consider in depth some relevant issues that had since become more prominent, such as the carbon impacts of the various options for aggregate supply and other environmental considerations. It also did not have up-to-date information on the economic impacts and costs associated with the various options. It therefore determined that further evidence was required which reflected the current and future situation, to enable a robust consideration of the economic, environmental, social and infrastructural impacts of the options. That evidence is central to this policy letter.

3.8 After being approached by the quarry operator, the former DPA began to draft a Development Framework for the use of Chouet Headland for quarrying, which is now substantially progressed. The public consultation on the draft Development Framework attracted a significant number of representations which notably

questioned the principle of quarrying on-island instead of importation of aggregate. Although no consent is conferred by a Development Framework, the former DPA considered that it would not be appropriate for it to continue to develop this policy delivery mechanism ahead of the Assembly's decision about the future supply route for aggregate. It paused the completion of the Development Framework until the matter had been debated.

3.9 The Committee recognises that this policy letter and States debate is the most effective mechanism by which the public can engage with policy makers about the most appropriate route for the future supply of aggregate, the principle of on-island quarrying, and the potential use of Chouet Headland for mineral extraction.

4 Mineral Reserves at Les Vardes Quarry and Chouet Headland

4.1 The Committee was informed in 2016 that the unconstrained reserves at Les Vardes would be exhausted by the middle of 2021. However, this estimate has now been revised further: unconstrained reserves are now expected to last until the end of 2023 at the predicted average extraction rate. This is a consequence of various circumstances. Pandemic-related lockdowns in both 2020 and 2021 have resulted in a lower demand and a corresponding reduced average aggregate production rate. In addition, Les Vardes' design was updated towards the end of 2020 following a resurvey, allowing for optimal reserve extraction.

4.2 Therefore, as of 23 June 2021, the remaining unconstrained reserves were 211,000 tonnes. Using a predicted average annual demand of 110,000 tonnes, this is anticipated to last just under two years. However, this will be influenced by factors such as increased house building or infrastructure projects coming forward.

4.3 The constrained reserves (situated under existing plant) are now estimated to be 488,000 tonnes, giving a total reserve at Les Vardes of 699,000 tonnes. However, the time period in which reserves will be extracted will depend to some extent on the Assembly's decision regarding the future supply of aggregate, as each option necessitates different logistical arrangements.

4.4 If the Assembly decides not to continue to quarry on-island at Chouet Headland, Ronez would consider locating a new asphalt plant at its Les Monmains site, if it is viable to do so. It would then remove the existing asphalt plant and quarry process plant at Les Vardes so that constrained reserves could be extracted and processed using mobile plant. This would maximise extraction at Les Vardes. However, restrictions due to the size of the quarry and capacity limitations associated with the use of mobile processing plant would negatively affect supply. It is anticipated that 60,000 tonnes per annum could be achieved through extraction in these circumstances, so the balance of demand (on average 50,000

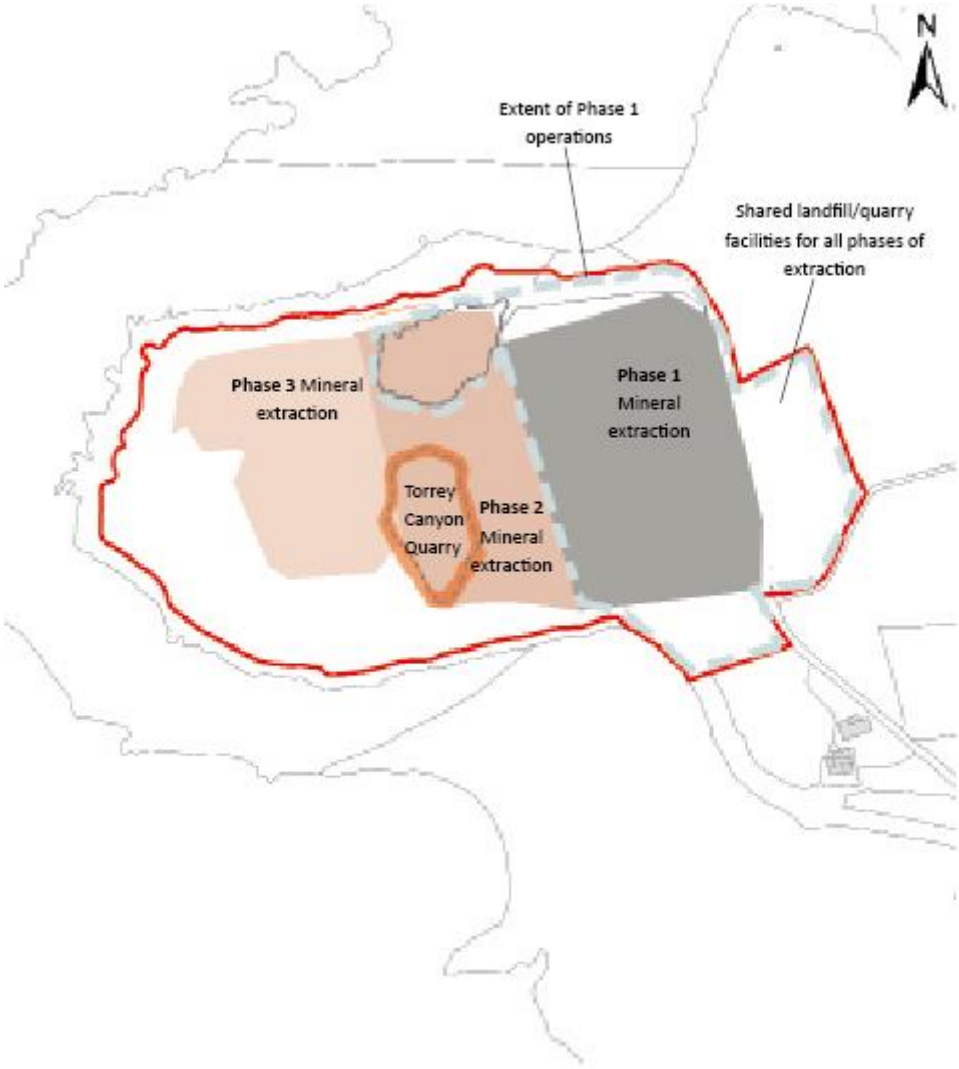
tonnes) would be required to be imported. Production will reduce as the quarry reaches the lowest 'bench' (or layer of rock) with a corresponding increase in importation to meet demand. Following this, the Island would be reliant upon imported aggregates to meet all construction industry needs.

4.5 Chouet Headland, located in the north of the Island, has an area of winnable aggregate which is 70% owned by the States of Guernsey and 30% owned by Ronez[2]. There are no other viably recoverable reserves of stone within the Island other than at Chouet Headland according to all available information.

4.6 Preliminary quarry design work for Chouet Headland indicates that there is potential for 3.5-4.1 million tonnes of granite to be worked from the headland in three distinct phases. Image 1 below shows the potential phasing plan for the headland.

[2] The National Trust and the heirs of the Estate of Mr Marlow also own very small pieces of land within the area.

Image 1 – Potential Phasing of Chouet Headland



4.7 Phase 1 encompasses land owned by Ronez, with Phases 2 and 3 falling within States-owned land. Based on the average extraction rate, development of the full headland would represent between 32 and 37 years of supply, although again this could increase or decrease depending on the level of future demand.

5 Policy Context

5.1 Chouet Headland has been identified as an important strategic reserve of stone for a considerable time. It was identified in the Rural Area Plan as a Mineral Resource Safeguarding Area in 2005. At that time, the Planning Inquiry Inspector noted that the policy was consistent with the 2003 Strategic and Corporate Plan. Strategic Policy SP27(S) stated that provision may be made in the Detailed Development Plans to protect those areas where there are known reserves of stone from development that would compromise future extraction. The

Inspector further noted that the safeguarding is different from a firm commitment to extraction, as that can only arise once the States have resolved on their future extraction policy. The headland was also identified as a strategic reserve for mineral extraction by the Strategic Land Use Plan (2011) ("SLUP"). This is reflected in the IDP designation of the site as a Safeguarded Area for possible mineral extraction (Policy IP5: Safeguarded Areas). The IDP policy relating to Safeguarded Areas underwent full Environmental Impact Assessment and the corresponding Environmental Statement was considered by the States, as required by the Planning Law, when it adopted the IDP in 2016. The IDP designation does not signify a commitment to extraction but rather protects the designated area from any development that may prejudice its potential for future mineral extraction should it be required for that use.

5.2 The relevant policies of the SLUP and IDP seek to balance protection of the physical and natural environment with the need to offer flexibility for those businesses that have a legitimate need to operate from and carry out development in particular locations. It is accepted that mineral extraction can only occur where reserves are located. The remaining mineral reserves have been recognised by the States as strategically important to the Island through the designation in the IDP.

5.3 Proposed development within the Safeguarded Area for possible mineral extraction will require a Development Framework to be approved by the Development & Planning Authority which, once approved, will be taken into account when considering planning applications for the site. A detailed Environmental Impact Assessment will be required as part of the planning application process and an Environmental Statement must be submitted with a planning application. The Development Framework is therefore part of the policy delivery mechanism for bringing forward quarrying at Chouet Headland if the States determines that this option is most appropriate for future aggregate supply. Whilst it confers no consent or commitment to extraction, it would set out the best way of achieving it in terms of impacts should planning applications be submitted.

5.4 In May 2020, the States of Guernsey Energy Policy 2020-2050[3] was approved and the following objectives were agreed:

- Decarbonisation;
- Security and resilience of supply;
- Consumer value and choice;
- Equity and fairness;
- Supportive of a vibrant economy; and
- Greater energy independence.

[3] "States of Guernsey Energy Policy 2020-2050", Billet d'État XI, May 2020

5.5 In addition, the vision for Guernsey's energy future included:

> "By 2050 at the latest, the vast majority of Guernsey's energy supplies will come from clean, low carbon sources and residual emissions will be offset… Conscientious use of on-island natural resources will safeguard our healthy environment and clean air, whilst protecting Guernsey's unique surroundings, biodiversity, and natural beauty. Generation of on-island (where 'on-island' includes within our territorial waters) renewable, clean, affordable energy is supported by implementation of the Energy Policy and will provide value and choice for everybody and will play its part in helping Guernsey to mitigate climate change. Guernsey's energy supply will be resilient and secure, as well as sustainable, to meet reasonable demands for energy. Guernsey will be aligned with global efforts to reduce emissions and development of renewable technologies."

5.6 Guernsey is already experiencing the impacts of climate change through localised sea level rise around the Channel Islands and more extreme weather (more intense rainfall, greater frequency of storm damage, and flooding to name a few examples) and the majority of the last decade has been warmer than average. The Climate Change Policy & Action Plan[4] was agreed by the States of Deliberation in August 2020, legislating the target of net zero emissions (or carbon neutrality) by 2050 in relation to greenhouse gas emissions and an interim target of reducing emissions by 57% on 1990 levels by 2030. These targets include all emissions for Scope 1, Scope 2, and Scope 3, the latter initially limited to waste management and off-island travel. Achieving these targets requires significant co-ordination from government, businesses and individuals, and therefore, climate change should be carefully considered in the development of all future policies.

5.7 One of the outcomes of the Government Work Plan ("GWP") is to provide "resilient and sustainable infrastructure and connectivity". The GWP also aims to enable opportunities for regeneration, secure transport connectivity and infrastructure, invest in the visitor economy and to meet Guernsey's housing need all of which, together with infrastructure previously agreed by the States, such as significant developments for educational purposes, will play a large role in determining the future aggregate demand but the delivery of which will be impacted by the decision about the future aggregate supply route for reasons of cost and supply. The decision on the most appropriate route for future aggregate supply will therefore have implications for our medium and long-term economic recovery and may impact on many of the priority recovery actions in the GWP.

[4] "Mitigate Climate Change – States of Guernsey Climate Change Policy & Action Plan", Billet d'État XVI, August 2020

5.8 The Committee, under its mandated responsibility for policy for infrastructure and waste, water and stone, has been exploring future strategic requirements and the potential opportunities for presenting a co-ordinated response to the short, medium and long term requirements for inert waste disposal and aggregate supply and the longer term requirements for fresh water storage. It would not be appropriate to seek to combine a decision about the future strategic use of Les Vardes, once mineral reserves are depleted, with the decision about the future supply of aggregate because of the different timescales and the pressing need for a decision on the future supply route for aggregate; however, the Committee recognises the interdependencies.

5.9 The Assembly's decision about the principle of future aggregate supply, and therefore on-island quarrying, is an important first step and could, depending on the decision, act as a catalyst for further negotiation with the quarry operator regarding the potential future strategic use of Les Vardes.

5.10 If the principle of on-island quarrying is agreed, this policy letter is asking the Assembly to delegate authority to the Policy & Resources Committee, in consultation with the Committee, to continue with negotiations with land owners in relation to Les Vardes and Chouet Headland in order to best achieve the States of Guernsey's strategic aims in relation to on-island quarrying and other potential future strategic uses, and to return to the States with its recommendations.

6 Potential Options for Future Supply of Aggregate

6.1 The two potential options which have been considered for the future supply of aggregate on Guernsey are:

> OPTION A – To continue the principle of on-island quarrying by quarrying a new site in order to meet the majority of aggregate demand, with the balance of additional aggregate requirement met through importation when required (as existing); and
>
> OPTION B – On exhaustion of existing aggregate reserves at Les Vardes, to meet the demand for aggregate through importation from suppliers overseas.

6.2 Option A has the greatest negative localised environmental impacts and the lowest overall carbon emissions impact. It also has the most beneficial economic impact, some social impacts and the least infrastructural impact with respect to the port/s, storage and logistics. These various impacts are explained in detail in the sections of this policy letter that follow.

6.3 Option B has no localised negative impacts on the environment of Chouet Headland and its immediate surroundings, but no positive environmental improvement opportunities arising as a requirement of, and funded by, the developer. It has wider environmental and economic impacts associated with the importation and transportation of aggregate which are also considered in detail in the sections that follow.

6.4 Both options have been assessed against their expected environmental, economic, infrastructural and social impacts in order to assess which best balances the environmental, economic and social objectives of the States of Guernsey whilst providing a consistent and affordable aggregate supply. Fig.1 below gives a summary of each of these options, with the following sections adding further detail.

Fig.1. Summary of Options against Impact Criteria

	Environmental	**Economic**	**Infrastructure**	**Social**
Option A positive impacts	+ Lowest total carbon emissions (Scopes 1 and 3), particularly if all three phases completed + Biodiversity Net Gain pilot will mitigate negative impacts plus increase biodiversity overall + Carbon intensity of Guernsey's on-island quarrying is comparatively low versus quarrying and processes in other jurisdictions + Contamination at the old Torrey Canyon quarry cleared without a potential capital spend of £1.5m	+ Aggregate prices will be more predictable, reducing potential for knock-on inflationary impacts (e.g. house prices) + Predictability/reliability of continuity of supply as now will benefit construction industry + Security of supply + Strategic capital projects (e.g. hospital, schools) will not be impacted by loss of supply or inflationary impacts + Government Work Plan and economic recovery actions and workstreams supported and facilitated + Retains jobs directly associated with quarrying and associated services	+ Seamless transition of aggregate supply from one on-island source to another + Plant, workforce and processes all available from Les Vardes operation + Fully extracted Les Vardes quarry would maximise its future strategic value	+ Opportunity for social amenities such as enhancements to nature/coastal path/heritage interpretation boards to be incorporated into quarry surroundings during operation (e.g. similar to Les Vardes walk) + Long-term improvement of biodiversity through Biodiversity Net Gain with associated benefits for health and wellbeing

	Environmental	Economic	Infrastructure	Social
Option A negative impacts	- Direct Scope 1 carbon emissions are highest - Localised short- and medium-term impact on ecology and heritage of Chouet Headland -Localised air quality, noise and vibration effects (although can be mitigated) - Visual impact, especially in initial stages - Increase in traffic volumes, including HGVs	- Supply route determined for up to approximately 35 years only - Cost of aggregate could rise proportionately with economic inefficiencies of reducing local supply		- Loss of some wider use of Chouet Headland area for 30+ years - Potential loss of pistol & model aircraft club areas and requirement to relocate (incurring potential costs) if Phase 3 is progressed -Physical alteration of the headland, affecting landscape and vista -Loss of heritage features, including historic tunnel complex -Adverse effects on local businesses and residents through noise, air quality, loss of views

	Environmental	Economic	Infrastructural	Social
Option B positive impacts	+ Lowest direct (Scope 1) carbon emissions + Chouet Headland remains unaffected in terms of localised ecology, heritage, traffic impacts etc.	+ Potential for additional jobs at the harbours + Support for some local businesses (e.g. Guernsey Stevedores) as needed in the process + No adverse effect on the businesses in the vicinity	+ Potential for new cranes at St Sampson harbour	+ Chouet Headland retains existing social amenity and landscape value and positive wellbeing potential

	Environmental	Economic	Infrastructural	Social
Option B negative impacts	- Highest overall carbon emissions (Scopes 1 and 3), mainly due to emissions from shipping - Potential traffic impact and associated emissions due to higher number of HGVs needed to transport large amounts of imported aggregate to destinations (either directly from ports or from storage areas) - The Torrey Canyon quarry will not be cleared, meaning contamination remains	- Increased cost of aggregate, with likely consequential cost increases for aggregate-related products and services and potential inflationary impact on house prices and other development costs, including road repairs/maintenance - Construction industry may experience downturn in projects due to rising cost - Reduced control over continuity of supply and security of supply: more points of potential failure increase risk to supply chain due to elements outside of control (e.g. weather conditions, tidal conditions, storage capacity, availability of vessels, dependency on other jurisdictions for supply, off-island pricing influenced by off-island demand, competition for goods off-island) - Likely reduction in range of concrete products produced on-island - States capital projects could be negatively impacted due to increased costs and availability of supply - Loss of jobs in quarrying sector and supporting services - Risk of reputational damage to the Bailiwick should an importation route with higher associated carbon emissions be adopted - Large rocks used for sea defence (rock armour) will need specialist ships to import, adding further cost - Identification and provision of storage areas for imported aggregate, increasing land use pressures and costs	- Significant costs for increased maintenance or purchase of new cranes and equipment - Storage for imported aggregate will require large and conveniently situated areas	

7 Transitional requirements

Transition of quarrying operations from Les Vardes to Chouet Headland as per Option A

7.1 The issues associated with the principle of future aggregate supply and quarrying at Chouet Headland have been conflated over time. However, reference to quarrying the specific location and establishing a principle of on-island quarrying are one and the same, as there is in practical terms only one site available. Therefore, agreeing to the principle of on-island quarrying is effectively agreeing to quarrying the specific location and vice versa, although this is an in principle policy decision and not the same as any later planning decision relating to a specific development which is made on the basis of the detailed proposed development and the full material planning considerations.

7.2 If Option A is approved, development of a new quarry site would be progressed through a phased development of Chouet Headland described below and shown in Image 1 above. If quarrying at Chouet Headland is approved, production capacity could increase to 150,000 tonnes per annum within 6 months of starting quarrying operations if required.

7.3 The development of Phase 1 only (land owned by Ronez) would place significant limitations on the capacity of production and would be likely to require importation of aggregate to supplement on-island production. As a result the development of Phase 1 only could be economically unviable and would attract the negative impacts of both importation and on-island quarrying.

7.4 As the operator, Ronez would like to extract the full extent of mineral reserves if quarrying is approved at Chouet Headland, therefore their ideal scenario would be to progress all three phases. However, Ronez has confirmed that it would still be economically viable for them to progress just the first two phases. The Committee recognises that if Option A is approved, the effects of this large-scale infrastructure development will vary over its operational life: baseline evidence and the nature of impacts and effects have the potential to change significantly over that timeframe. Proposition 2 therefore recommends that the States agree that Phase 3 of the development of Chouet Headland for quarrying will be subject to a decision of the States towards the end of Phase 2, so that up-to-date evidence can be assessed as to whether on-island quarrying remains the most appropriate method of supply of aggregate for Guernsey at that time.

7.5 If the Assembly agrees the option of continuing quarrying on-island (Option A – Proposition 1a), there will be a transition between quarrying at Les Vardes and Chouet Headland. The unconstrained reserves at Les Vardes would be extracted until the end of 2023. Quarrying at Chouet Headland would be in three phases with Phase 1 anticipated to begin towards the end of 2023 and the constrained reserves at Les Vardes being extracted between 2026 and 2031. Phase 2 of

Chouet Headland is then expected to begin in 2031. Extraction at Chouet Headland is expected to continue until 2065 based on current predicted extraction rates if all three phases are progressed.

7.6 The three phases of development at Chouet Headland would advance westwards and align with the completion of Les Vardes. Operations would commence within the eastern part of the site (which is owned by Ronez) and progressively deepen the mineral working through successive levels, each nominally 10m high, to create a suitable platform below surface level upon which a new processing plant could be erected. During Phase 1 the extracted granite from Chouet Headland would undergo crushing using a mobile primary crusher located within an old quarry on the northern edge of the headland (currently used for green waste recycling). This would make the material more suitable for road transportation to Les Vardes for further processing to produce aggregates using the established plant.

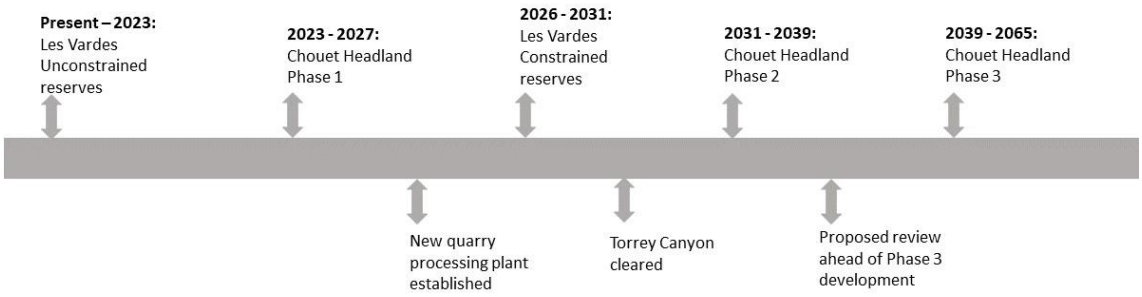
7.7 Once a suitable platform below ground level has been created in the Chouet quarry void, a new quarry processing plant would be established and the existing plant at Les Vardes dismantled. This would allow the remaining constrained reserves at Les Vardes to be worked, with the extracted rock transported by road to the new plant at Chouet for processing. Following exhaustion of the reserves at Les Vardes, the workings at the Chouet Headland would progress into Phase 2, extending westwards into land owned by the States of Guernsey and taking in the Torrey Canyon Quarry and current green waste site.

7.8 Phase 3 (the final phase) would extend the workings further to the west and include land currently used by the Guernsey Pistol Club and the Guernsey Model Aircraft Club. If this final phase is progressed, the quarry would develop to its maximum lateral extent which would allow the workings in Phase 2 to be deepened. If Phase 3 is not progressed, it should be noted that the maximum extraction of Phase 2 cannot be achieved.

7.9 At the end of Phase 2, the plant would be dismantled, and the remaining reserves worked, again being processed using a mobile plant. The design of the quarry would take into account the volume of soils and other deposits (known as overburden) stripped to expose the granite and how this can be beneficially used to help screen the workings to ameliorate both visual and acoustic impacts. It would also be necessary to consider what volume of material might need to be retained for final restoration works. Should there be a surplus of such materials then a scheme would need to show how this material can be beneficially used off site as part of the planning application. Any overburden not used for screening or other schemes agreed with the States would be placed in the worked-out sections of Les Vardes.

7.10 Image 2 below shows a visual representation of the transition of quarrying operations from Les Vardes to Chouet Headland.

Image 2 – Transition Timeline



7.11 If the principle of on-island quarrying continues (Option A), the impacts on local infrastructure are unlikely to substantially differ from the present situation.

Requirements to enable importation as per Option B

7.12 The States' Trading Supervisory Board ("STSB") has been formally consulted, particularly regarding the potential impacts on and implications for the ports if the decision is made to meet aggregate demand through importation (Option B – Proposition 1b), which will significantly increase the levels of importation. Their full response is in Appendix A, but the main observations are detailed below.

7.13 The largest vessels currently servicing the Island can carry up to 2,200 tonnes of aggregate per voyage and at least 1,700 tonnes could be unloaded daily using existing levels of equipment. These vessels also require a minimum tide height of 7.6 metres above chart datum. This occurred on 243 days of the year in 2020. The STSB considers that, generally, importing 120,000 tonnes of aggregate per year could be achievable through existing ports.

7.14 It has also highlighted that any future harbour construction/reorganisation options can provide space and facilities for importation of aggregate to a similar volume. However, suitable vessels are becoming harder to find and anecdotally available shipping for bulk materials are becoming scarcer.

7.15 Norman Piette Group commented on potential infrastructure concerns related to the full importation of aggregate:

> "As the Norman Piette Group is possibly the largest importer of sand into the Island, we do clearly understand some of the difficulties and costs involved in importation of bulk product. One of the recent challenges we have faced is the availability in a timely manner of bulk cargo ships small enough to enter St Sampson's Harbour and have the ability to deal with the

fact the harbour 'dries' at low tide requiring a ship of the right shape in order for it to settle on the seabed whilst being off-loaded. The ships we currently have available to us are nearing the maximum size for entry into the harbour. Our bulk cargo landings have had to increase in size by over 30% in the last ten years, this is to match the carrying capacity of the ships now available. The long-term availability of ships of an appropriate size & type is an ongoing concern."

7.16 The STSB considers that the issue of harbour pilots is also a concern. All ship movements in and out of St Sampson's Harbour require the attendance of a harbour pilot. Increased movements into and out of the existing harbour for increased importation of aggregate would present challenges in providing pilotage facilities. This is a future issue not specifically related to the potential importation of aggregate but would be exacerbated by increased port movements.

7.17 Increased importation would substantially increase the workload on the existing ports infrastructure, particularly the two cranes which are over 30 years old. The STSB advises it would have to consider two options:

1) Ahead of importation, commission a full conditional survey and corrective maintenance on the existing cranes, whilst increasing regular maintenance and recruiting additional personnel; or

2) Replace both cranes.

7.18 The cost associated with Option 1 is expected to be £300,000 initial cost with an additional £120,000 per annum for the additional members of staff required. Each new crane within Option 2 is expected to cost in the region of 2M Euro (at current exchange rates this is approximately £1.7M). Although this would result in a higher initial cost, it would demonstrate better value for money over time. More detail on the two options is included in the response from STSB (Appendix A).

7.19 The mechanical grabs and hoppers used to unload the aggregate are the property of Guernsey Stevedores, and are also ageing and in need of refurbishment or replacement. Guernsey Stevedores could undertake replacement at its own cost but would need assurance that the increased volumes would continue to be imported via St Sampson's Harbour. However, this may not be the case depending on any future work in relation to future ports provision.

7.20 The increased importation associated with Option B will necessitate sizable areas close to the port to provide storage capacity for imported aggregate once it is

unloaded from a vessel. To accommodate full importation (Option B), it is estimated that storage capacity for around 28,000 tonnes would be required.

7.21 The storage compound at Les Monmains in Vale owned by Ronez can currently store only 9,600 tonnes of sand and aggregate, but currently also accommodates the concrete production, concrete product production and recycling area. The current stockpile capacity at Les Vardes is 25,000 tonnes.

7.22 Although transporting aggregate from the port to Les Vardes would create negative environmental impacts, this arrangement would utilise the quarry benches. However, as the reserves are extracted over the next 18 months, regardless of the future supply route agreed, this capacity will reduce significantly.

7.23 There are few areas of land with sufficient capacity to store the volumes that would be imported on a regular basis for Option B. Griffiths Yard, St Sampson may provide a suitable site in terms of location and area. Griffiths Yard accommodates open yard storage uses which were relocated from Fontaine Vinery following a States Resolution in 2017 and provides 15,139m^2. The site is at maximum capacity with 30 tenants and has a waiting list of 15, with demand for sites from prospective new tenants. There are also some existing tenants wishing to expand their businesses requiring larger compounds.

7.24 During the development of the Policy Letter titled "Land For Industrial And Storage Uses"[5] by the Committee *for* Economic Development, the tenants of the Fontaine Vinery site said that there was lack of availability of suitable sites in the private market and as a result this makes those that do become available more expensive. The current maximum capacity and waiting lists for Griffiths Yard suggests that market forces are not servicing demand for these types of use and it is likely that tenants would need to be relocated to alternative sites if Griffiths Yard is used for aggregate storage. These types of uses, due to impacts associated with them, are generally difficult to accommodate and, as emerged when considering an alternative site to Fontaine Vinery in 2017, appropriate sites are scarce and likely to have their own environmental impacts. Excluding the potential costs of purchasing land, the costs associated to relocating tenants at Griffiths Yard are anticipated to be over £1M.

7.25 The current estimate for the completion of the void space at Longue Hougue reclamation site is between July 2023 and July 2024. This site is now required for stockpiling inert waste before a new inert waste disposal site is established, therefore making Longue Hougue unavailable for aggregate storage.

[5] "Land for Industrial and Storage Uses", Billet d'État V, February 2018

7.26 In order to maximise extraction of constrained reserves at Les Vardes, Option B would require the locating of a new asphalt plant. The design, procurement and construction process for a new asphalt plant is estimated to take at least 12 months, so there is risk that the supply of material for road building and repair could be interrupted. If Les Monmains is utilised for a new asphalt plant it will (without further investment) reduce the capacity of the site to produce concrete, concrete products and recycling.

7.27 Concerns regarding the number and availability of suitable vehicles on-island to transport materials from ship to storage area when required have also been raised. Unloading a ship requires a large number of tipper trucks for a short period of time, and with limited numbers available for hire on-island it can be difficult to source sufficient transport to discharge vessels.

7.28 Another consideration is the need for large granite boulders that are used for rock armour around Guernsey's coast for sea defences. These are typically extracted from Les Vardes, so if full importation is the favoured future supply route (Option B), arrangements would need to be made to import these if the Island's sea defences and infrastructure is to be maintained. Due to the size and weight of this rock, it is likely that it would need to be transported by a specialist vessel and would probably only be viable for one-off large-scale projects where specialist vessels could be justified.

7.29 If Option B is agreed as the preferred method of supply, Proposition 3 directs that the STSB and the Committee establish the infrastructure requirements associated with the importation of aggregate and return to the States with fully costed proposals for approval of funding to facilitate importation.

7.30 Should infrastructure limitations not allow full importation through St Sampson's Harbour, this could be supplemented with containerised importation through St Peter Port. The associated costs for this are likely to be higher than bulk importation through St Sampson's Harbour as shipping costs for general LOLO cargo passing through St Peter Port Harbour is around £55 per tonne, compared with £20 per tonne for bulk importation through St Sampson's. There are also expected to be additional haulage costs in the UK which could add a cost of £5 to £10 per tonne.

7.31 In the event that Option B is agreed as the future supply of aggregate, there will be a period prior to full importation when existing reserves at Les Vardes will be extracted. This will require supplementation with imported aggregate with the associated increased costs.

8 Economic Impacts

8.1 Ronez employ 66 staff in Guernsey and have a further 15 contractors: 13 in direct quarry operations; 17 in downstream processing (asphalt, concrete, concrete products); 15 in road surfacing; 1 in transport; 12 in maintenance (of which 6 relate to the existing quarry); 2 in technical, and 6 in administration and management. Most transport is outsourced to on-island contractors, and current operations require 6-8 tipper drivers, 8 concrete delivery drivers and 2 concrete products delivery drivers during a normal working day.

8.2 Continuation of the principle of on-island quarrying (Option A) is unlikely to have an impact on the current situation regarding the employment sector. Although the quarrying site would change, operations would continue in a similar way as now, with a similar amount of aggregate and related products produced on-island and services provided by the existing workforce. The level of imported sand and 'top-up' aggregate would also be similar, so any change in economic impact would be negligible. It is estimated that full importation (Option B) would result in at least 10 redundancies. However, it should be noted that if full importation is agreed, there is a possibility that new jobs at the ports would be required.

8.3 Should Les Vardes need to operate on a reduced output (Option B), this will have implications for operating costs. As the quarry production rate reduces, operating costs increase, because a significant proportion of costs are fixed. For example, the explosives cost is 100% variable with the production rate, but pumping costs for the quarry are 100% fixed whatever the production rate. It is estimated that a reduction in output of 25% would increase costs by £5 per tonne, and a 40% reduction in output would increase costs by £10 per tonne. This would be reflected in an increase in the price of aggregate and would be in addition to the increased cost of aggregate due to importation to supplement on-island production.

8.4 Full importation of aggregate will have an economic impact. With aggregate having to be quarried and processed in another jurisdiction, transported to a port and then transported from overseas to Guernsey, it is inevitable that the price of aggregate per tonne will increase.

8.5 Ronez estimates that partial importation would increase prices by £7.50 per tonne, or 25%; full importation would lead to an increase of £10 per tonne, or 33%. In addition, in the UK or Europe, cost of aggregate tends to be a lot more volatile than for material produced locally. Other products which rely on aggregate would also increase in price in relation to the increase in proportion of imported stone, so asphalt would increase by 4.5%, ready-mix concrete by 6% and concrete products by 9%. This will have greatest impact on the construction industry and a potentially inflationary impact on house building costs at a

challenging time of rising house prices and low housing supply. It should also be noted that the States of Guernsey is the primary consumer for the use of asphalt for road building and repair.

8.6 Ronez manufacture locally and sell between 20,000 and 28,000 tonnes of concrete products each year using local aggregates. This includes a range of sizes of concrete blocks and road kerbs, lintels etc. Other local companies rely on concrete supplied by Ronez in order to manufacture other products used in construction such as the beams for beam and block flooring and rings for drainage systems. Material is also produced for road building and repair. At this time, there is uncertainty whether it would be viable or practical for Ronez to continue making concrete products using more costly imported aggregate, or whether such products would also need to be imported in the future. If the latter, these products would also then be affected by off-island supply and demand and associated costs. If more costly imported aggregate is required for asphalt, the cost of road building and repair is likely to increase.

8.7 Quarrying on-island provides the construction industry with a consistent and reliable source of aggregate. Increased rates of importation could have ramifications for continuity and security of supply due to factors outside of the Island's control. The availability and increased cost of appropriate shipping in a competing market would have a considerable impact and increases Guernsey's vulnerability. Weather disruption, tidal restrictions or technical faults could also have an impact. Guernsey would also be competing for supply on an international level, currently in a demand driven market, where it may not be able to compete due to economies of scale. If aggregate is supplied from outside of the UK there may be additional costs associated with Brexit related tariffs.

8.8 If on-island quarrying were to cease (Option B) there could be negative implications for the local economy due to the loss of skills, jobs and tax revenue generated by the local quarrying industry. In 2018, the construction sector was worth c.£114m Gross Value Added to the Island's economy and as at March 2020 it was responsible for the employment of 2,787 people[6]. A rise in the cost of construction could lower the demand for construction projects, thereby damaging the prosperity of the construction industry. The Committee *for* Economic Development has endorsed the principle of on-island quarrying and development of Chouet Headland as an area of mineral extraction for these reasons.

8.9 Targeted consultation has been carried out with key local stakeholders in the construction industry on the impacts of the options for the future supply of aggregate. Feedback included that the projected increased cost of aggregates if importation was implemented would have an inflationary effect on quite a large

[6] Guernsey Facts & Figures 2020

part of the construction industry. With such large increases in costs being projected, there would be no alternative other than to pass these costs through the supply chain to the end user(s).

8.10 Whilst aggregate is the named product, the scope of product affected by reduced local production could be far greater. Stone hardcore, concrete blocks, lintels, concrete beams, paving slabs, pre-mix concrete, aggregates and stone dust could all be affected if local quarrying were to cease.

8.11 There is an economic value attached to the mineral assets located on States owned land at Chouet Headland which could be realised through Option A, but not Option B. If Option B is progressed, consideration may need to be given to the removal of the safeguarding of land at Chouet Headland for mineral reserves in the IDP which could affect land values for the States in relation to mineral reserves. However, the removal of the safeguard could not take place until after the SLUP and then the IDP had been amended in accordance with the public inquiry procedure in the land planning legislation. This would mean that development could not be carried out for any other significant purpose on the States' land, which could suffer from planning blight as a result until the IDP policy is amended.

9 Social Impacts

9.1 During the public consultation phase of the draft Development Framework for Chouet Headland, a number of representations were received which raised concerns about loss of public amenity should the headland be developed for quarrying.

9.2 As provisionally designed, Phase 3 of the development would affect an area of land that is currently used as a shooting range for the Guernsey Pistol Club, and this has raised concerns from the public and the former Committee *for* Education, Sport & Culture. The club currently operates from a specially designed range and has a lease in place until 2031. Any impact on this area of the headland would not be until much later in the development (anticipated to be around 2037), which provides a significant amount of time for alternative arrangements to be made should the States decide nearer the time that Phase 3 be progressed. However, this activity is subject to strict safety criteria for the containment of ammunition and this, together with the need to avoid noise nuisance, could make identification of an alternative site difficult. This could potentially, therefore, if Phase 3 were to be progressed, have a long-term negative impact on the sport.

9.3 The headland also accommodates within the area designated for Phase 3 the Guernsey Model Flying Club who operate remote controlled model aircraft with a take-off and landing area. This agreement is renewed annually. In the event

that Phase 3 is progressed, the IDP would place obligations on the developer to mitigate this social amenity impact, and there would be no costs incurred by the States.

9.4 Because of this and other potential impacts specific to Phase 3, it is recommended in Proposition 2 that, if the States agrees that on-island quarrying is appropriate, they also agree that Phase 3 of development of Chouet Headland for quarrying will be subject to the further agreement of the States so that they can decide whether on-island quarrying remains the most appropriate method of supply of aggregate for Guernsey in light of evidence available at that time.

9.5 Ronez estimates that the lead in time for the development of Phase 3 would be 42 months. This accounts for the planning process (including a further EIA), site preparation and quarrying weathered rock to expose 'blue' granite. Taking into account the time required to update evidence and the lead in time for Phase 3, the Committee recommends (if Option A is progressed) that the States reviews the principle of quarrying on-island no later than five years before the completion of Phase 2.

9.6 Other concerns raised through the public consultation centred on the loss of general public amenity for dog-walking, exercise and family activities. Through the Development Framework and planning application process, the quarry operator can be required to protect and enhance the public coastal path retaining public access and, especially given the biodiversity value of the land bordering the path, there is every realistic expectation that this protection and enhancement would form part of the planning conditions.

9.7 The loss of some of the Chouet Headland to quarrying does not mean that alternative options cannot be put in place to mitigate the loss of public amenity in the area. Les Vardes has a nature walk around the perimeter of the excavation area which allows the public to view the quarry and learn its history while providing seating and picnic areas in the vicinity. There are opportunities to enhance public access and interpretation along the coastal path at Chouet Headland that could be required of the developer through the planning process.

9.8 Quarrying on-island (Option A) would increase the number of vehicle movements, including HGVs, in the area but it is anticipated that traffic volumes would still be significantly less than when Mont Cuet was in operation as a landfill site a few years ago. More information is included within the environmental section of this policy letter.

9.9 Any inflationary impact on house prices caused by increased costs associated with importation (Option B) would obviously have negative social impacts as well.

10 Environmental Impacts

10.1 The Island's future supply of aggregate will have significant environmental impacts, whether the States opts to continue quarrying on-island (Option A) or to move to importation (Option B). Potential environmental impacts on-island need to be assessed in relation to potential environmental impacts in other jurisdictions. There is a tension between local impacts and wider regional or global impacts: local impacts can be minimised only at the expense of increased impacts elsewhere (a displacement known as 'offshoring'); alternatively, reducing overall environmental impact tends to come at a cost of higher localised impact. Localised environmental damage and negative impacts are inevitable if quarrying continues on-island (Option A) so the Committee considers it essential that any negative impact on ecology and habitats should be mitigated and offset through environmental improvement, both at Chouet and at other locations. Whilst Option B has less localised negative environmental impacts, it does have greater environmental impacts overall, and there are none of the near-term developer-funded opportunities for positive environmental enhancements and biodiversity net gain that Option A would bring about.

Carbon Emissions & Sequestration

10.2 In order to better understand the environmental impacts of the options in terms of carbon emissions, air quality and climate change impact, the Committee commissioned a study by subject matter experts to provide measurable evidence of these impacts. The report, titled 'Carbon impacts of different quarrying options for Guernsey'[7], considered among other things the following aspects:

- Energy used in on-island quarrying and transportation;
- Energy used for transportation of imported materials;
- Consideration of the global impacts;
- Energy intensity of quarrying practices in Guernsey, compared to international standards and neighbouring countries that could supply imported materials; and
- Possible impacts on carbon sequestration/release.

10.3 The report considered four different supply scenarios and two demand scenarios.

10.4 A significant factor in understanding the impact of predicted emissions is distinguishing between direct (on-island) emissions and indirect (off-Island) emissions.

> "Using internationally recognised metrics, emissions can be accounted for as follows: Scope 1 – emissions from all activities that occur within Guernsey;

[7] The full report is available as Appendix B and a summary document is available as Appendix C.

Scope 2 – indirect emissions from the generation of purchased or acquired electricity in Guernsey; and Scope 3 – all other indirect emissions. By quantifying emissions in this way, Guernsey can responsibly work towards a target for carbon neutrality in a meaningful way that has a local and global impact."[8]

10.5 If only Scope 1 (direct) emissions are considered, scenarios that involve significant importation will have considerably lower emissions than those with greater on-island supply. Emissions associated with the quarrying of rock will be accounted for in the jurisdiction that the activities occur, and emissions associated with shipping are accounted for in the jurisdiction where the fuel is sold. Therefore, should the Assembly agree to total importation as the appropriate aggregate supply route rather than quarrying on-island, Guernsey's ability to meet its agreed target of achieving net zero by 2050 as set out in the Climate Change Policy may not yet be affected, but only because of the current methods of accounting, which are expected to change in future.

10.6 As a mature and responsible jurisdiction, Guernsey is expected to be cognisant of global implications and take responsibility for our own emissions, rather than offshoring and passing those impacts to another jurisdiction. This is recognised in the States' approved Climate Change Policy. Although currently only Scope 3 emissions from exported waste and travel are calculated towards our targets, our Climate Change Policy recognises the need to consider the wider global context and intends that "further work with the aim of incorporating further Scope 3 emissions [be undertaken] once there is a suitable method for measuring these emissions for the Island." In view of the requirement of the Climate Change Policy, it is considered appropriate to consider the Scope 3 indirect emissions associated with importation of aggregate when assessing such a long-term strategic infrastructure proposal.

10.7 There are also community initiatives to be considered. In 2019, the 'Keep Guernsey Green Award' was incorporated into ESI Monitor's 'Environmental Operations Award'. ESI Monitor ("ESI") is a not-for-profit organisation which is passionate about the environment and wants to develop Guernsey as a centre for green finance and a recognised leader in sustainable business. An MOU between the Committee and ESI was signed to ensure that the award aligns with government priorities. Enrolled organisations can demonstrate to clients and the public that they are committed to sustainability as well as environmental, social and governance issues through the alignment with UN Sustainable Development Goals. There are currently 50 local organisations enrolled (correct at the time of writing).

[8] "Mitigate Climate Change – States of Guernsey Climate Change Policy & Action Plan", Billet d'État XVI, August 2020

10.8 The Guernsey Financial Services Commission's ("GFSC") Guernsey Green Fund provides a platform upon which investments into various green initiatives can be made. The scheme has strict eligibility criteria of green investing and has the objective of a net positive outcome on the planet's environment. Guernsey Green Finance is an initiative through which Guernsey Finance delivers on the strategic commitment to sustainable finance.

10.9 Consideration of the carbon emissions associated with our aggregate supply through the narrow lens of direct emissions only and failure to consider the wider implications and impacts of indirect emissions in the global context could negatively impact on these initiatives and potentially cause reputational damage.

10.10 One of the significant conclusions of the report is that the full development of Chouet Headland (all three phases) results in the lowest carbon impact for both high and low demand scenarios. Because there are additional carbon emissions associated with importation (mostly from shipping), the embodied carbon emissions for Option B (no development of Chouet/full importation) are around twice as high as embodied carbon emissions associated for Option A (on-island quarrying/full development of Chouet Headland).

10.11 The 'cradle-to-gate[9]' carbon intensity of Guernsey's on-island quarrying is comparatively low when benchmarked against similar operations in other jurisdictions: it tends to be close in value to the average carbon intensity of aggregate quarried from land (c.4.4kg CO_2e per tonne). The report considered 134 individual supplies of aggregate quarried from land to form an average, and the Guernsey embodied carbon factor sits somewhere between the 50th and 75th percentile in value, suggesting that it is fairly typical of an aggregate source of its type in terms of carbon intensity.

10.12 It is important to note that the carbon intensity of quarrying aggregate from land is lower than 'marine-won' and recycled aggregate. This sets a high bar for the carbon intensity of any imported supply of aggregate to be lower than Guernsey's own supply, when solely considering 'cradle-to-gate' emissions. In other words, the carbon intensity of Guernsey's own supply of aggregate is low, largely due to the type of extraction and processing that quarrying from land requires. The use of electricity in processing also contributes to its low value relative to aggregate from other sources. If aggregate is quarried in another jurisdiction and imported as would be the case for Option B, Guernsey would

[9] A boundary condition associated with embodied carbon, carbon footprint and LCA (Life Cycle Assessment) studies. It considers all activities starting with the extraction of materials from the earth (the cradle), their transportation, refining, processing and fabrication activities until the material or product is ready to leave the factory gate (https://www.designingbuildings.co.uk/wiki/Cradle-to-gate)

have no control over the methods of extraction and processing and the wider carbon impacts as a result.

10.13 In terms of carbon sequestration/release from the development of Chouet Headland, in 2018, only 4.3% of Guernsey's total greenhouse gas emissions originated in the AFOLU sector (Agriculture, Forestry and Other Land Use), which corresponds to 17.3kt CO_2e. With most emissions in this category originating from livestock and agricultural processes, only a small proportion of emissions are likely to be sensitive to changes in land use. Any removal of vegetation for quarrying purposes at Chouet Headland will result in a net removal of sequestered carbon, but given the size of the area affected and the low carbon sequestration value of this land currently, this impact will be fairly minimal and can be mitigated or offset. Accounting for these considerations, it seems likely that the impact on carbon sequestration/release from the development of a new quarrying site on-island would not be significant.

10.14 Most of the significant carbon impacts associated with Option B are related to emissions and transportation impacts as a result of importation and haul to site from port. There will also be other unknown carbon and wider environmental impacts around the quarrying activity in whatever jurisdiction supplies the off-island aggregate. Whichever option is agreed, there will be inevitable carbon impacts associated with Guernsey's aggregate supply, be that on-island or in other jurisdictions.

Other Environmental Impacts

10.15 As well as the carbon impacts described above, excavating stone from land has other potential environmental impacts including impacts on ecology and habitats and air quality and from noise and vibration. The most significant localised environmental impacts will therefore result from Option A (on-island quarrying).

10.16 This policy letter considers environmental impacts at a strategic level: specific impacts will be considered in closer detail through an Environmental Impact Assessment at the detailed planning application stage, along with specific mitigation requirements and will be subject to any necessary statutory permissions, licences or other consents. A planning application will also require a Traffic Impact Assessment and Construction Environmental Management Plan. Planning conditions can require mitigation and suitable monitoring regimes.

10.17 Larger jurisdictions, including the UK, Australia and Canada, require high level Strategic Environmental Assessments ("SEA") when a new policy or plan or major infrastructure is being developed. The UK's SEA requirements are based on the European Commission's Protocol on Strategic Environmental Assessment to the

Convention on Environmental Impact Assessment in Transboundary Context (SEA Protocol, Kyiv 2003).

10.18 Environmental aspects included are:

- Biodiversity;
- Population;
- Human health;
- Fauna;
- Flora;
- Soil;
- Water;
- Air;
- Climatic factors;
- Material assets;
- Cultural heritage, including architectural and archaeological;
- Landscape; and
- The inter-relationship between the issues mentioned above.

10.19 SEAs consider many of the same factors as more detailed Environmental Impact Assessments but, importantly, this is much wider and at a much higher level to inform large-scale strategic decisions and would not be expected to include specific detail that would be considered at the EIA stage.

10.20 Wider SEAs like those carried out in other jurisdictions are not required under Guernsey planning laws. However, the IDP policy relating to Safeguarded Areas, including the designation of Chouet Headland as a site for possible mineral extraction, underwent full Environmental Impact Assessment and the corresponding Environmental Statement was considered by the States, as required by the Planning Law, when they adopted the IDP in 2016, so the strategic decision was informed by relevant environmental information.

10.21 The Land Planning and Development (Environmental Impact Assessment) Ordinance, 2007 requires a full EIA at the planning application stage when detailed information and studies will be needed to determine impacts and the ways in which to mitigate those impacts. Full detailed analysis of the impacts and the mitigation required is therefore undertaken in Planning Law through the planning application process.

10.22 However, to make an informed decision, the Assembly will require certain information and evidence, at an appropriately high level, in the form of an environmental assessment. This helps to identify and understand potential impacts of this kind of strategic development on the localised environment around the site and the environment of Guernsey as a whole.

10.23 The purpose of an environmental assessment is to identify the primary potential effects of the development and to highlight potential mitigations. It does not pre-empt the EIA which attributes the significance of those effects and considers them at a more detailed level. The Land Planning and Development (Environmental Impact Assessment) Ordinance, 2007 sets out when an EIA is required and the process to be followed. If Option A is agreed, a draft scope of the EIA will be appended to the draft Development Framework.

10.24 The DPA's draft Development Framework attracted a number of representations during its public consultation process, and the majority of these centred on the potentially negative localised environmental impacts that quarrying an area of Chouet Headland might have. As owners of a third of the Chouet Headland, safeguarded by the IDP for possible mineral extraction, and operators of the current quarry at Les Vardes, Ronez commissioned subject matter experts to carry out an environmental assessment of developing a quarry at Chouet Headland[10]. While this environmental assessment will be developed further with more detail to form the EIA to be submitted with a planning application, it provides a summary of findings and covers many of the aspects considered in other jurisdictions under SEAs. The ecological section was peer reviewed locally (at the instigation of the Committee), which confirmed that the methodology is appropriate, taking account of EIA requirements and the nature and scale of the potential development, the nature of the receiving environment, best practice for EIAs and consultation commitment.

10.25 The conclusions of the assessment are based on a number of baseline studies which have been conducted through survey, fieldwork and desktop-based studies since 2017 into:

- Air quality;
- Archaeology and cultural heritage;
- Ecology (this section has subsequently been updated and is available as appendix E);
- Landscape and visual impact;
- Noise;
- Transportation;
- Vibration; and
- Water environment.

10.26 It should be noted that the environmental assessment only covers Phases 1 and 2 of quarrying at Chouet Headland. This policy letter recommends a review between Phases 2 and 3 to allow for up-to-date evidence to be considered in determining if quarrying on-island is still the appropriate supply route for aggregate in the future. A further EIA should be conducted at that time, as the

[10] The full environmental assessment is available as Appendix D

receiving environment may have changed significantly over the time period.

10.27 In some sections of the environmental assessment the data has been identified on a national or international basis, rather than local, specifically within the ecology section. It is important that the EIA takes a detailed approach based on the local importance and significance of habitats and species, especially regarding Sites of Special Significance ("SSS") and Areas of Biodiversity Importance ("ABI"). To ensure this, the information provided for the EIA could be reviewed by a local ecologist as part of the EIA process. Notwithstanding the above, it is considered that sufficient information is available in order to support the high-level assessment of the likely environmental impacts as required for this stage of the process.

10.28 The proportionality of available records locally and within the Guernsey Biological Records Centre should be acknowledged. The records may not be representative of the actual distribution and abundance of species within Guernsey due to the absence of available data. A summary of the key findings of the environmental assessment is below.

Air Quality, Noise and Vibration

10.29 Particulate matter ("PM") is a common proxy indicator for air pollution and affects more people than any other pollutant. The major components are sulphate, nitrates, ammonia, sodium chloride, black carbon, mineral dust and water. Nitric Oxide ("NO_x") is a chemical compound of oxygen and nitrogen that is formed by reacting with each other during combustion at high temperatures.

10.30 The environmental assessment concludes that, using available data relating to Les Vardes, there have been few occasions where air quality falls outside of the UK's national standards as a result of the quarrying operation. However, this data arises from monitoring NO_2 (nitrogen dioxide) and SO_2 (sulphur dioxide) through diffusion tubes, not PM^{10} and NO_x as alluded to. Diffusion tubes provide a monthly mean figure which is not directly comparable to the standard. Therefore, through the Environmental Impact Assessment, it is important to assess this in detail. The Committee recommends that the DPA works closely with the Office of Environmental Health & Pollution Regulation in order to ensure that accurate and localised information is obtained. In addition, quarry operations require a licence as it is a prescribed operation within the Environmental Pollution (Air Pollution) Ordinance, 2019.

10.31 The quarry operator has advised that additional monitoring along the route which would be used to haul rock between Chouet and Les Vardes as part of the transition and static dust monitoring would be undertaken, and the data updated accordingly for the EIA, which would be submitted at the planning application stage.

10.32 An assessment of predicted blast-induced vibration levels has been made to vibration-sensitive receptors near Les Vardes, which is considered representative for Chouet headland. This has shown that acceptable standards can be achieved. The specific effects of blasting-related vibration on the integrity of the Mont Cuet landfill site and engineered cells should also be addressed in detail within the full EIA.

10.33 However, it should be recognised that, although using Les Vardes as a proxy may be acceptable in the absence of data, there will be differences between the existing quarry and the proposed site at Chouet Headland because of the depth of the existing quarry compared to the surface level work that will be required initially at Chouet Headland. There are also differing factors such as wind, due to Chouet's exposed headland location, and that nearby receptors to the existing quarry operation may be acclimatised to a certain extent to quarrying and its effects. A full and detailed assessment would form part of the detailed EIA at the planning application stage.

Noise

10.34 Noise surveys have been undertaken to determine the existing environment at the nearby noise-sensitive receptors:

- Location 1 – Adjacent to Roc Salt restaurant on Mont Cuet Road, approximately 150m to the south-east of the quarry workings;
- Location 2 – Property off Mont Cuet Road, approximately 290m to the south-east of the quarry workings; and
- Location 3 – Adjacent to L'Ancresse Golf Club on La Jaonneuse Road, approximately 590m to the east of the quarry workings.

10.35 The soundscape has been considered as distant road traffic and natural sounds such as birdsong.

10.36 At a strategic level, the conclusion is that there is no indication that there are any air quality issues, noise or vibration effects which are of such significance that they cannot be acceptably mitigated and/or controlled through legislation and which would prevent quarrying at Chouet Headland, and there are no significant dust impacts on ecological receptors.

10.37 The current quarry operators are accustomed to implementing mitigations on air quality, noise and vibration as they operate quarries in Jersey as well as Les Vardes.

Archaeology and Cultural Heritage

10.38 There are 32 sites of archaeological and cultural heritage importance within the headland (although not all of these are within the site of the proposed quarry), including the Pre-Martello loophole Tower No. 10 and its associated battery buildings and a magazine and World War II structures and features. Of these 32, eight sites stand within the potential quarry development area.

10.39 There are also six protected monuments on L'Ancresse Common. No protected buildings or monuments will be demolished as a result of the quarry development.

10.40 The Pre-Martello loophole Tower No.10 and its associated battery buildings are marked on the Duke of Richmond survey map of 1787. These would be afforded a high degree of protection from both direct and indirect impacts of the site due to their location.

10.41 There would need to be a range of mitigation measures in place for sites both within the boundary and on the headland should quarrying on-island be the option that is progressed. As part of the EIA process, the Committee recommends that the archaeology and cultural heritage section of the EIA is peer reviewed by local experts.

Ecology

10.42 The Ecology section (the updated version of which is attached as Appendix E) includes a baseline study of habitats using the States' 1999 and 2010 habitat reports as well as a commissioned survey from 2018. A further habitat site survey was undertaken in 2020 to ensure the information was still valid. In summary, the habitats mapped in 2017 remain largely unchanged. There has been a negligible loss of semi-improved grassland and a lack of management has resulted in a downturn in overall conditions across the site.

10.43 The main habitats listed within the headland are:

- Scrub/tall ruderal, which includes a number of non-native shrubs/trees;
- Semi-improved grassland, found to be species-poor;
- Coniferous woodland (Monterey Pine);
- Standing water/inland cliffs; and
- Maritime grassland, where regular mowing has reduced the species complement.
-

10.44 The most naturalistic and species-rich examples were found near the public path around the headland, which is not in the area that would be quarried.

10.45 Flora and fauna found within the headland include:

- Terrestrial mammals;
- Invertebrates;
- Reptiles and amphibians;
- Birds; and
- Plant species.
-

10.46 A peer review of the ecological section has been undertaken which has confirmed that the methodology was appropriate and takes account of EIA requirements and the nature and scale of the potential development, the nature of the receiving environment, best practice for EIA and consultation commitment.

10.47 The site is adjacent to the Foreshore Area of Biodiversity Importance, which extends to almost all of Guernsey's inter-tidal area, and further afield there is the L'Ancresse Site of Special Significance. Chouet Headland would have to be developed in a way to ensure no unacceptable impacts on the special interests of these areas. However, although the site itself has some biodiversity and ecological value, and the loss of any habitat is regrettable, the biodiversity and ecological value of that at Chouet Headland has been found to be relatively low and does not warrant statutory or non-statutory protection, such as a Site of Special Significance and Area of Biodiversity Importance.

Landscape and Visual Impact

10.48 The headland is generally rural in appearance and located away from built up areas.

10.49 Visual receptors include:

- Inhabitants of properties at Rousse;
- Visitors to the Peninsular Hotel;
- Inhabitants of properties on the southern side of Ladies' Bay;
- A small number of properties at Mont Cuet;
- Users of the public highway and car parks; and
- Users of the cycle and walking route.

10.50 The EIA will require a full landscape and visual impact assessment, expanding on the detail provided below, but in summary the high-level environmental assessment concluded that no significant effects to the landscape are identified, other than on the headland itself. The main source of significant visual effect would be the disturbance generated by the stripping of soils and overburden at the quarrying preparation stage. Impacts from this stage can be minimised by the re-use of a significant amount of overburden material to provide screening bunds for the site and to finish the adjacent Mont Cuet landfill site which will

remove the need for transportation of excess overburden by road to Les Vardes for disposal and transportation of inert material from Longue Hougue to restore the Mont Cuet site.

10.51 Guernsey Waste anticipates that 75,000 tonnes of inert material will be needed to complete the final profile of Mont Cuet. This will extend the plateau to provide space for all green waste composting activities at Mont Cuet, instead of transferring it to Longue Hougue for maturation as currently takes place. Should the development of Chouet Headland for quarrying not go ahead (as per Option B), inert waste from Longue Hougue will need to be transferred to Mont Cuet in large tipper trucks which are expected to have a 10 tonne capacity. This would equate to approximately 7,500 lorry movements from Longue Hougue to Mont Cuet. The use of the overburden for restoration of Mont Cuet is being considered along with shared facilities for a weighbridge and welfare facilities at the entrance compound should the quarrying of Chouet Headland be approved. Therefore, these would be positive environmental impacts of Option A (on-island quarrying).

10.52 Phase 2 of the proposed development at Chouet headland would include the Torrey Canyon Quarry which has been used to store crude oil removed from Guernsey's beaches in 1967. Although there has been some remediation, contamination remains a risk. It is also likely that munitions have been disposed of in the quarry in the past, raising the possibility of unexploded ordnance, although confirmation of this is not possible. The clearing of Torrey Canyon quarry would be a significant positive environmental impact of Option A and, should it need to be funded by the States, could be funded by the royalties associated with the value of aggregate on States-owned land at Chouet Headland. This would not then require capital expenditure should the States pay for the work to be undertaken. The cost is anticipated to be around £1.5m but is dependent on what is found in the quarry on further investigation and the options for removal within environmental legislation. The positive environmental implications of clearing Torrey Canyon would obviously not be realised if the Assembly agreed to Option B (full importation).

<u>Transportation</u>

10.53 An initial environmental assessment of the impacts on the local transportation network as a result of developing a quarry on the headland has been undertaken. Traffic movements have been considered for the maximum export from the site within the operational period. The assessment has determined that the volume and composition of the resulting traffic would have no significant impact on the operation and safety of the local road network, and the amenity of local residents. The EIA will include a full Traffic Impact Assessment

10.54 Further information and clarification have since been provided by the quarry operator and is available below.

10.55 A 10-hour working day was used within the environmental appraisal to be consistent with the working hours stipulated in planning conditions applied to the permission for the quarry extension at Les Vardes. Should quarry production increase to 125,000 tonnes then it is likely that additional hours would need to be worked. However, production has not exceeded 110,000 tonnes in the last 6 years, and haulage contractors currently work an 8-hour day.

10.56 Ten tonne trucks are currently used by the contractor as they are more manoeuvrable and can be used for a variety of tasks, including island-wide deliveries. However, the quarry operator has said that hauling part-processed aggregate from Chouet to Les Vardes during the transition phase will require dedicated trucks with specialist rock bodies, so it is likely that it would specifically require 3 axle, 14 tonne payload trucks. Ten tonne trucks might be used to cover breakdowns.

10.57 The table below sets out how many truck movements (return journeys) would be anticipated per hour across all options for HGV capacity and working hours:

Table 1 – Anticipated HGV Movements

Annual Tonnes	Truck Capacity (t)	Working Hours	Vehicles per hour
125,000	14	10	3.5
125,000	14	8	4.4
125,000	10	10	4.9
125,000	10	8	6.1
110,000	14	10	3.1
110,000	14	8	3.8
110,000	10	10	4.3
110,000	10	8	5.4

10.58 It is relevant to note that there was previously a significant number of vehicle movements in the vicinity of Chouet Headland as both commercial and domestic vehicles visited the Mont Cuet landfill site before the site stopped accepting general waste. Other than green waste for composting, the site is now restricted to hazardous wastes and waste unsuitable for energy recovery.

10.59 In 2017, which was the last full year when waste was accepted at the landfill site at Mont Cuet, there were approximately 125 commercial movements over the weighbridge per day and roughly half of these were HGVs. This equates to

around 16 per hour. Waste inputs in 2017 had also fallen significantly compared to historical movements, due to the introduction of recycling initiatives and charging policies and were less than half of those received in the early years of the site, which opened in 1998. Traffic volumes would therefore rise under Option A, but not to anything like levels typical of the last two decades in the area.

10.60 Under Option B, containerised importation would significantly increase the number of HGV movements travelling through the St Peter Port Main Centre to St Sampson and beyond, with the associated negative localised environmental (and social) impacts.

Water

10.61 The Water Environment baseline section of the environmental assessment covers: geological setting; potential contamination; hydrogeological setting; and hydrological setting. No significant effects are expected on the regional groundwater flow regime given the following factors:

- The permeability of the bedrock is measured as being very low at depth;
- No groundwater inflows have been observed from the quarry faces;
- There are no visible surface water streams present;
- The proposed site is not located in a groundwater catchment area; and
- The area is not deemed to be at risk from flooding.

10.62 The potential effects on groundwater and surface water quality are included within section 9.2.2 of the environmental assessment and precautionary measures are recommended. There may be regulation of any discharges of water involved in the quarrying process if the proposed Water Pollution Ordinance is approved in the next year.

Biodiversity Net Gain Pilot

10.63 Notwithstanding the conclusions of the environmental assessment, particularly regarding ecology, it is recognised that the development of a new quarry at Chouet Headland would have unavoidable localised ecological and environmental impacts which the Committee is keen to emphasise will need to be appropriately mitigated.

10.64 Maintaining a healthy natural environment with adequate habitat connectivity and species resilience is vital in underpinning the economy and serves as an enabler to strategic actions within the Government Work Plan and other States policies and objectives.

10.65 The IDP policies provide protections for ecologically valuable sites through designation of Sites of Special Significance and Areas of Biodiversity Importance. However, there is little requirement to mitigate the impacts of development on 'lower value' habitats, the cumulative impact of which is significant. The 2018/19 Habitat survey of Guernsey identified a significant loss of biodiversity, including 'lower value' habitat, due to development and land management practices. These findings emphasise that cumulatively, even seemingly insignificant losses of habitat at a development scale can add up to significant rates of biodiversity loss overall.

10.66 Biodiversity Net Gain is a work stream in the GWP and needs to be developed for the Guernsey context. The UK legally mandated BNG in October 2019. As an interim measure, the DPA has adopted the 2020 'Strategy for Nature' as supplementary planning guidance, which includes provisions for the delivery of voluntary BNG.

10.67 The primary aim of BNG is to secure a measurable improvement in the value of our natural assets and to help maintain the Island's ecological network, while also streamlining development processes.

10.68 In addition to delivering a net gain in biodiversity, supporting good practice principles such as BNG can demonstrate the leadership by the States in sustainable management practices, for example by:

- Demonstrating that the States is committed to investing in integrated benefits for our local environment, community and the economy through BNG, especially in terms of strategic developments proposed in the Government Work Plan;
- Gaining trust and confidence from stakeholders through the transparent reporting of biodiversity losses and net gains;
- Demonstrating through BNG efforts that Guernsey is supporting the delivery of the UN Sustainable Development Goals[11], specifically 'Climate Action' and 'Life on Land'; and
- Giving opportunities to share lessons learned to support wider uptake of BNG in neighbouring jurisdictions.

10.69 Although BNG has yet to be developed for Guernsey, there is an opportunity, particularly given the long-term nature and scale of the potential strategic development at Chouet Headland and its impacts, to require overall biodiversity net gain on completion of the development in mitigation. If quarrying at Chouet Headland is considered the best route for the future supply of the Island's aggregate, the development would provide a good opportunity to pilot a BNG project for the site. Ronez has agreed to be the pilot scheme. In addition, Ronez has agreed to offset local negative environmental impacts in the short term,

[11] https://sdgs.un.org/goals

which will continue to be developed further at the planning application stage.

10.70 In May 2020, the Committee endorsed the redesigned biodiversity strategy for Guernsey, titled the 2020 Strategy for Nature, to drive the long-term management of nature in Guernsey.

10.71 The vision of the Strategy is "Guernsey's nature; great today, better tomorrow" and the three goals are:

- **Goal A:** Connect our Island community with nature;
- **Goal B:** Care for nature to ensure the diversity and resilience of our natural capital and assets; and
- **Goal C:** Foster and share knowledge about nature.

10.72 There are 9 objectives in total[12], but the three within Goal B are most relevant to the Island's future aggregate supply:

- **Objective 4:** Ensure an integrated, broad-scale approach to the conservation and management of our nature;
- **Objective 5:** Maximise the diversity of species and ecosystems; and
- **Objective 6:** Reduce pressures on nature and ensure the resilience of our natural capital assets.

10.73 By taking the opportunity to make Chouet Headland a pilot and case study for BNG, there would be a clear alignment with the States' Strategy for Nature.

[12] https://gov.gg/strategyfornature

11 Conclusions

11.1 In view of the limited workable reserves remaining at Les Vardes and the lead in times associated with ensuring adequate infrastructure at the ports there is now urgency in establishing the principle for future aggregate supply. The decision will have significant impacts on economic as well as environmental factors. Determining the most appropriate future supply route for aggregate for Guernsey entails a difficult balancing of issues between economic, environmental and social impacts, in both the local and wider global context.

11.2 Notwithstanding potential for environmental enhancements and improvements, localised environmental damage is inevitable if such large-scale infrastructure is provided on-island and this should be mitigated to have the least possible adverse impacts using BNG and offsetting. Whichever option is agreed, there will inevitably be environmental impacts associated with Guernsey's aggregate supply, on-island and/or in other jurisdictions, but there is also potential for positive local environmental improvements and benefits.

11.3 Option B would have no localised environmental impacts on Chouet Headland, but there would be wider environmental impacts both locally and globally, associated with importation, transportation and indirect carbon impacts. This option has the highest total carbon emissions. Taking into account the current uncertainty about whether or when a new harbour might be completed, which would provide the infrastructure for the bulk importation of aggregate at the scale required, the limitations of existing ports infrastructure, and the likely negative economic impacts of full importation, the Committee, by a majority, considers that Option B (full importation of aggregate) is not an appropriate future supply option at this time.

11.4 Option A (the continuation of on-island quarrying) is the most closely aligned of the two options to the States' Climate Change Policy and the Energy Policy as it delivers the lowest overall carbon emissions when including both direct (Scope 1) and indirect (Scope 3) emissions. The development of Biodiversity Net Gain through Option A, and the positive environmental improvements that would result, align this option with the objectives of the Strategy for Nature.

11.5 Although Option A has the greatest localised environmental impact, proportionate consideration of the impacts generally against the infrastructure requirements, continuity and security of supply issues and the significant potential negative economic impacts of importation has led the Committee, by majority, to the conclusion that Option A is the best option to balance the environmental, economic and social objectives of the States. With proactive environmental protection, restoration and offsetting, the Committee, by a majority, considers the most appropriate and least damaging approach for future

aggregate supply overall would be to allow on-island extraction at Chouet Headland.

11.6 The Committee recognises that if Option A is approved, the effects of this large-scale infrastructure development will vary over its operational life, and that baseline evidence and the nature of impacts and effects have the potential to change significantly over that timeframe. Not least of these are potential changes to carbon impacts because of developments in shipping and vehicle technology, and the transition away from hydrocarbon fuels. Given that impacts on social amenity would be particularly focussed in Phase 3, and that there may be changes to demand and the amount of aggregate required due to innovations in building and construction techniques over time, the Committee recommends that the States has the opportunity to review up-to-date evidence before agreeing to the commencement of Phase 3 extraction at Chouet Headland. This would enable the States nearer the time to determine whether the evidence continues to support on-island quarrying as the most appropriate aggregate supply option. This should be completed no later than five years before the completion of Phase 2. The quarry operator has confirmed that quarrying the headland would remain a viable proposition in the event that Phase 3 is not commenced.

12 Compliance with Rule 4

12.1 Rule 4 of the Rules of Procedure of the States of Deliberation and their Committees sets out the information which must be included in, or appended to, motions laid before the States.

12.2 In accordance with Rule 4(1), the Propositions have been submitted to Her Majesty's Procureur for advice on any legal or constitutional implications. She has advised that there is no reason in law why the Propositions should not to be put into effect.

12.3 In accordance with Rule 4(4) of the Rules of Procedure of the States of Deliberation and their Committees, it is confirmed that the Propositions within this policy letter have the majority support of the Committee. Deputy Haskins does not support Proposition 1a; Deputy Haskins supports Proposition 1b.

12.4 In accordance with Rule 4(5), the Propositions relate to the duties of the Committee *for the* Environment & Infrastructure: infrastructure, including but not limited to water, wastewater, the ports and the airports; waste, water and stone reserves.

12.5 The Propositions also relate in particular to the following Government Work Plan outcomes:

- Resilient and sustainable infrastructure and connectivity;

- Enable opportunities for regeneration;
- Secure transport connectivity and infrastructure;
- Invest in the visitor economy; and
- Meet Guernsey's housing need.

12.6 Also, in accordance with Rule 4(5), the Committee consulted:

- The States' Trading Supervisory Board;
- The Committee *for* Economic Development; and
- The Development & Planning Authority.

Yours faithfully

Committee *for the* Environment & Infrastructure

H L de Sausmarez
President
S P Haskins
Vice-President

A Cameron
S Fairclough
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APPENDIX A

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22 April 2021

Dear Deputy de Sausmarez

Future Supply of Aggregate – Potential Importation Requirements

Thank you for your letter dated 24th March 2021, which provides useful insight into the potential volumes of aggregate which might be required to be imported, depending on the decisions reached regarding extraction within the Island.

There are a number of questions which the Committee has posed, and which will be answered in turn.

What will be the impact of such an increase in importation levels upon existing and potential future ports infrastructure and capacity, including operational limitations such as bulk storage areas and the availability of suitable ships and pilots?

The current infrastructure at St Sampson's harbour is capable of receiving 120,000 tonnes of aggregate per year. The largest vessels which currently service the island can carry up to 2,200 tons of aggregate per voyage and at least 1,700 tonnes of this could be unloaded daily, using the existing cranes and associated equipment. Given their loaded draft, the vessels require a minimum height of tide of 7.6 metres above chart datum. In 2021, for example, this occurred on 243 days of the year. If we allow 2 days per cargo, this means that the notional maximum quantity of aggregate which could be imported per year is over 200,000 tonnes. This takes no account of weather, which might impact deliveries, but it is assessed that the total of 120,000 tonnes discharge would easily be achievable.

In respect of future planning, and the Future Harbour Development Programme, this is a factor which has been considered. Any new harbour construction or reorganization will provide space and facilities for such volumes of aggregate import. Since this work will also inform the work of the Seafront Regeneration Sub-Committee it is reasonable to assume that it will be reviewed in the future planning for the eastern seaboard.

An area would need to be provided for bulk storage of such materials. While there is no space within the harbour confines at St Sampson, it is noted that Griffiths yard, which could provide a suitable venue, remains under States' ownership, and is conveniently adjacent to the harbour.

Regarding the availability of suitable vessels: discussions with local shipping agents confirms that vessels of a suitable size which can safely dry on their moorings are becoming harder to find. That said, it is likely that availability will remain adequate for the period until the Future Harbour Development Project is likely to begin deliver its outcomes, i.e. for approximately the next 10 years. It is possible to import aggregates via unitized or bulk methods into St Peter Port, but both options will present logistical challenges in terms of moving the goods to storage and/or managing the increased volume of ISO containers (up to 150 in circulation or storage at any one time).

The issue of general pilots is of wider concern. All ship movements in and out of St Sampson's harbour require the attendance of a harbour pilot. The pilots are self-employed and rely on a regular demand for their services to generate income. Two of the 4 current pilots are nearing retirement age, and the reduction in demand for pilotage duties due to the pandemic has cast doubt on the long-term viability of the pilotage service in its current form. Recruiting pilots locally is challenging, since they need a significant level of experience and ability in ship handling. At the same time, it is difficult to recruit from off-island, due to the lack of guaranteed income, relocation costs, and inability to provide a suitable relocation package. Guernsey Ports is exploring the viability of recruiting a harbour pilot as a States employee, working under the Harbourmaster and alongside the existing pilots. This may be a precursor to subsuming the pilotage service in-house. It is thought that this process would be close to cost neutral.

What new infrastructure or resources would be required to support this level of importation?

Sustained full importation of aggregates would substantially increase the workload on the existing two St Sampson's cranes. The current cranes are over 30 years old and, while mechanically sound, they are showing their age and there are 2 options to consider:

- At the very least, it would be prudent to commission a full conditional survey and corrective maintenance before importation of such an increased volume commenced. It would also be necessary to increase the amount of regular maintenance, which in turn would require the recruitment and training of 2 additional personnel. It is also likely that Guernsey Ports would need to recruit an additional crane driver to cope with the additional workload. This cost would be partially offset by craneage dues, but it takes 2 years to train a driver for these particular cranes, so there is significant lead time and associated cost. The process of recruiting these 3 staff would need to commence immediately. This option carries the significant risk that one or both cranes could fail, leading to additional cost, delays in supply, and potential claims from shipping companies and/or importers.

- The safer and preferred option would be to replace both cranes. This would negate the need for additional maintenance and associated staff uplift, and significantly reduce the training time for the additional crane driver.

The mechanical grabs and hoppers used to unload the aggregate are the property of Guernsey Stevedores. These too are ageing and in need of refurbishment or replacement. It is likely that Guernsey Stevedores would undertake this replacement at its own cost, given the assurance that these increased volumes would continue to be imported via St Sampson's harbour.

What additional associated costs are attached to the above?

Option	Description	Cost	Time required	Manpower Implications	Risks/Cons
1	Deep survey and remedial maintenance of existing cranes	£150k each	8 weeks estimate	Additional 2 FTE maintenance staff £40k each plus overtime and hazard pay as required per annum. Additional 1 FTE crane driver £35k estimate per annum plus up to 30% additional overtime.	Likely retirement of specialist maintenance staff. Difficulty in obtaining manufacturer support and/or spares.
2	Replace existing cranes with similar	1.9M Euro each	12 months lead time for Liebherr crane, 4 rope LHM120	Additional 2 FTE maintainers £40k each plus overtime and hazard pay as required Per annum Additional 1 FTE crane driver £35k estimate per annum plus up to 30% additional overtime.	May also need to procure a grab, but likely that Guernsey Stevedores will invest, given an 8-year commitment to import

What other operational constraints might occur with increased aggregate importation?

Conversations with the main importers of bulk aggregate reveal that they are concerned about the number and availability of heavy trucks to transport their materials, particularly given the lack of onsite storage at St Sampsons, which demands an immediate fleet to ensure efficient discharge of any vessel. This same constraint would apply for any potential

plans to import aggregate via St Peter Port. It is believed that the market will find its own solution to this issue, without direct cost to the States.

I trust this response assists your Committee's deliberations and ongoing discussions.

Yours sincerely

Deputy P Roffey
President
States' Trading Supervisory Board

CC: Managing Director, Guernsey Ports

APPENDIX B

Carbon impacts of different quarrying options for Guernsey

Report to the States of Guernsey

August 2020

Title	Carbon impacts of different quarrying options for Guernsey
Customer	States of Guernsey
Recipient	Lois Reid, Peter Barnes, Claire Barrett
Report Reference	2452/1
Report Status	Final
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File	Y:\Projects\2452-Guernsey Quarrying\2_Work\Final deliverables\Carbon Impacts Quarrying Report_v1.4_final.docx

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Contents

1 Introduction

The States of Guernsey is currently considering options relating to on-island quarrying for aggregates. Currently, there is one quarry in Guernsey, Les Vardes, which produces approximately 100,000 to 165,000 tonnes of aggregate per year and is the primary source of aggregates for the island. Other quarried materials including sand and aggregate, are imported from the UK and mainland Europe. However, Les Vardes is moving towards being expended. With the recognition that Guernsey will not move away from concrete products in the immediate future, the States of Guernsey have a need to gather evidence and knowledge on the options for quarrying and supply of aggregates. This report will consider the carbon impacts of different options. It sits within a wider programme of work to assess quarrying options including economic and other environmental impacts.

1.1 Background

Les Vardes quarry currently meets the on-island demand for base aggregate, producing a 10-year average of 125,000 tonnes per year. The quarry operator is Ronez Ltd. The quarry works granite to produce aggregate that is supplied to the local construction market as 'dry stones' or used in the manufacture of concrete or asphalt. Rock is extracted using drill and blast techniques with the extracted rock transported using dump trucks to a processing plant located within the quarry site.

Once Les Vardes has been expended, the only remaining accessible area of quality stone on the island is at Chouet Headland. The Chouet Headland site is within the Vale Parish, at the north-western top of Guernsey. The site is bordered by Mont Chouet landfill to the east and by the sea to the north, west and south. The site contains a mix of uses including residential, leisure and recreation, open land, public amenity land, car parking, heritage and refuse and recycling facilities.

Ronez Ltd intends to continue with the current extraction rate at Les Vardes until reserves are exhausted. It is estimated that current workable reserves at Les Vardes will be exhausted in approximately 6 to 7 years. After this, demand for aggregates will need to be met either by moving to the Chouet Headland or by increasing importation (historically more expensive). Preliminary analysis suggests that 3.5 to 4.1 million tonnes of granite could be extracted from Chouet Headland (based on a phased transition). Using historical demand for aggregate, this equates to approximately 33 years of supply.

The Chouet Headland area is safeguarded for mineral extraction. In April 2019, a draft Chouet Headland Development Framework Supplementary Planning Guidance was shared for public consultation. With a large proportion of the 100+ responses objecting to quarrying of the headland, the Development Framework was put on hold. The States of Guernsey are subsequently reviewing the principle of on-island quarrying and gathering robust evidence to support policy decisions. Any plans for future mineral extraction at Chouet Headland must be sustainable, respecting and protecting the local environment as well as the amenity of local communities and residents and the local infrastructure.

1.2 Project overview

In June 2020, the States of Guernsey commissioned Aether to undertake work to assess the potential carbon impacts of different quarrying options for Guernsey. The project will consider the following:

- The energy used in on-island mining and quarrying and on-island transportation.
- Energy used for transportation of imported materials.
- A consideration of the global impacts.
- Energy intensity of quarrying practices in Guernsey, compared to international standards and neighbouring countries that could supply imported materials.
- Potential for increased use of recycled aggregate materials in Guernsey.
- Possible impacts on carbon sequestration/release.
- Modelling of different scenarios that may arise out of the recovery plan and future policy directions.
- A consideration of the options for different stone types e.g. granite, mason stone.

The project will provide the following outputs:

1. **Scenario tool** - A tool will be developed that allows the user to explore the emissions associated with different quarrying scenarios. User will be able to build scenarios by adjusting demand and supply variables (**Section 3**).
2. **Project report** – The project report (this document), will provide detail on the results of scenarios covering the range of different options for on island production (**Section 2**), details of the tool, including methodology, input data and outputs (**Section 3**), and other considerations that should be made when thinking about the possible carbon impacts of quarrying (**Section 4**).

2 Scenario analysis

The scenario tool has been used to develop a range of scenarios that encompass carbon emission outcomes for constraints in the development of on island supply (at Chouet) as well as two demand scenarios:

The different development phases for Chouet Headlands (see Error! Reference source n ot found.), from no development to full development have been modelled.

- **Supply Scenario A: No development of Chouet Headland**: Using an extraction rate of 110 kilotonnes per year, unconstrained reserves at Les Vardes will be exhausted in February 2022 and constrained reserves will be exhausted in December 2025[1]. Following exhaustion of Les Vardes, Chouet Headland will not be developed.
- **Supply Scenario B: Phase 1 development of Chouet Headland**: Development of part of Chouet Headland and all constrained reserves at Les Vardes.
- **Supply Scenario C: Phases 1 and 2 development of Chouet Headland**: Les Vardes will be quarried until exhaustion alongside development of the phase one Chouet Headland area. After this, all processing activities will move to Chouet for Phase 2.
- **Supply Scenario D: Full (phases 1, 2 and 3) development of Chouet Headland**: This includes the phases above with additional extraction during Phase 3.

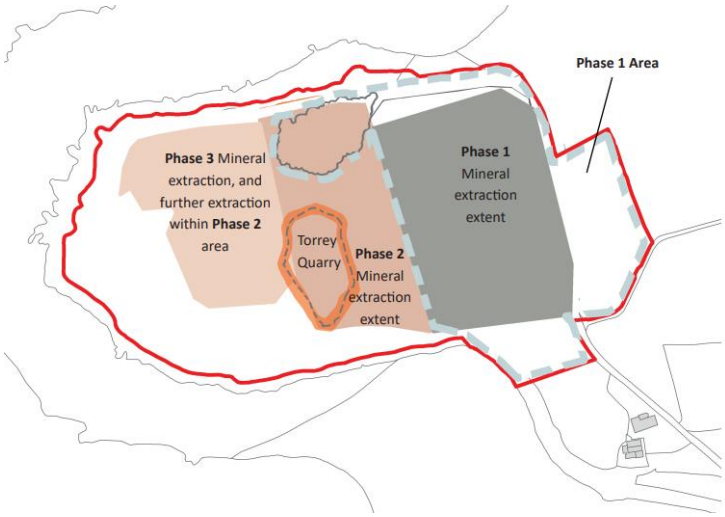

Figure 1 - Proposed phases of development for Chouet Headland

Different assumptions around demand (including an initial decline in activities (down to 80%) followed by recovery and a high growth (10% increase per year) scenario). These include:

- **Demand Scenario A: Demand drops to 80% of current levels** for next three years before returning to and plateauing at 2020 levels.
- **Demand Scenario B: Demand rises by 10% per year on 2020 levels for next 5 years** then plateaus at 50% above 2020 levels.

[1] Unconstrained reserves: Reserves that are currently available
Constrained reserves: Reserves that are currently unavailable as they are located beneath the processing plant

2.1 Headline messages

The carbon dioxide emissions for 6 emissions scenarios with and without Chouet development (supply scenarios) and high and low growth demand scenarios have been estimated for each year in the timeseries 2020 – 2035 and for the total sum of the timeseries. The emissions scenarios are shown in **Table 1** and the key messages can be summarised as follows:

- Full development of Chouet results in the lowest carbon impact for both high and low demand scenarios. Due to additional carbon emissions from importation (mostly shipping) of materials the embodied carbon emissions with supply scenario A no development of Chouet (emissions scenarios 1 and 4) are around a factor of two higher than emissions for supply scenario D for the full development of Chouet (emissions scenarios 3 and 6). The carbon intensity of Guernsey's on-island supply of aggregate is comparatively low.

- The differences in high and low growth demand scenario are more significant where there is full development of Chouet. The difference in emissions between the two no Chouet development supply scenarios (scenarios 1 and 4) is 21%. In contrast, the difference between the two full Chouet development supply scenarios (scenarios 3 and 6) is 46%.

- It is important to distinguish between direct (on-island) emissions and indirect (off-island) emissions. Scenarios with no development of Chouet have the lowest direct emissions but the highest indirect emissions and vice versa for full Chouet development scenarios. Only direct emissions count towards Guernsey's national total emissions however indirect emissions are important for considering the global impact of Guernsey's activities.

Table 1 - Report scenarios

Emissions Scenario	Demand Scenario	Supply Scenario - Chouet development	Total 2020-2035 tonnes CO_2e
1	A: Drops to 80% of current levels for next three years before returning to and plateauing at 2020 levels.	A: No development of Chouet site.	46,628
2		B: Only phase 1 of Chouet site development.	39,254
3		D: Full development of Chouet site.	21,026
4	B: Rises by 10% per year on 2020 levels for next 5 years then plateaus at 50% above 2020 levels.	A: No development of Chouet site.	56,623
5		B: Only phase 1 of Chouet site development.	48,913
6		D: Full development of Chouet site.	30,682

Figure 2 and **Table 2** show the trend in total emissions up to 2035 associated with each scenario outlined above. Scenarios that shows a growth in demand accompanied with the need for importation of materials (scenarios 4 and 5) are associated with the highest total emissions. In contrast, the two scenarios that involve full development of the Chouet Headland site (scenarios 3 and 6) are associated with the lowest total emissions.

The difference in emissions between scenarios with significant importation and those with little importation can largely be attributed to the embodies emissions of imported products, particularly from transportation.

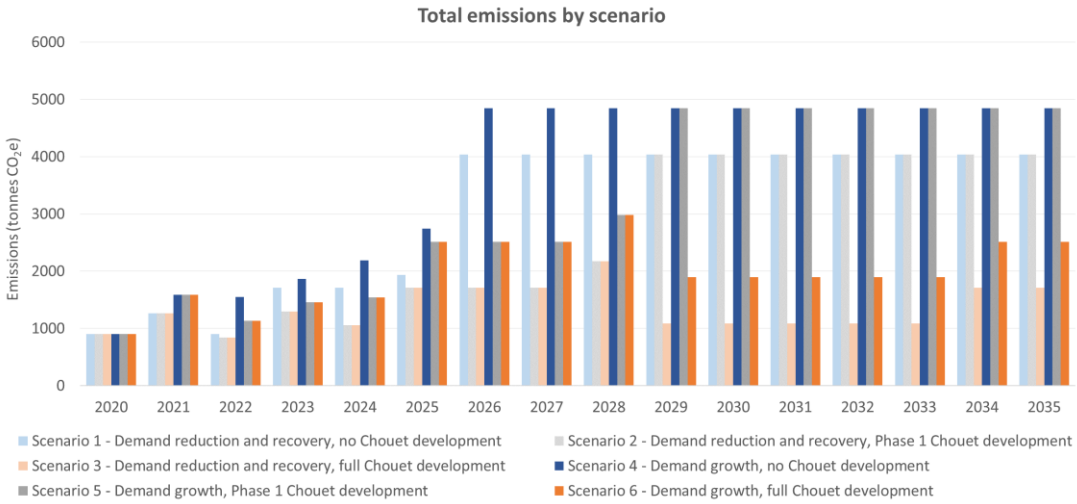

Figure 2 - Total emissions 2020-2035 by scenario

Table 2 - Total emissions 2020-2035 for each scenario (tonnes CO_2e)

Emissions scenario		2020	2025	2030	2035	Total emissions 2020-2035
Scenario 1 – Demand reduction and recovery, no Chouet development	**Direct**	630	625	204	204	**48,766**
	Indirect	271	1,309	3,831	3,831	
Scenario 2 – Demand reduction and recovery, Phase 1 Chouet development	**Direct**	630	670	204	204	**40,900**
	Indirect	271	1,037	3,831	3,831	
Scenario 3 – Demand reduction and recovery, full Chouet development	**Direct**	630	670	795	670	**21,514**
	Indirect	271	1,037	295	1,037	
Scenario 4 – Demand growth, no Chouet development	**Direct**	630	665	245	245	**59,256**
	Indirect	271	2,076	4,597	4,597	
Scenario 5 – Demand growth, Phase 1 Chouet development	**Direct**	630	711	245	245	**51,039**
	Indirect	271	1,803	4,597	4,597	
Scenario 6 – Demand growth, full Chouet development	**Direct**	630	711	835	711	**31,650**
	Indirect	271	1,803	1,061	1,803	

The total emissions shown in **Figure 2** and **Table 2** refer to both direct and indirect greenhouse gas emissions and therefore reflect Guernsey's global impact. However, Guernsey's total national emissions, as described in the national greenhouse gas inventory, only include direct emissions. Direct emissions are those which occur due to activities within a jurisdiction. In the context of this analysis that means that direct emissions are those associated with on-island quarrying activities and indirect emissions

are those from off-island activities associated with imported materials (e.g. shipping, quarrying in the source country and transport of material in the source country).

If only direct emissions are considered (as per the greenhouse gas inventory), scenarios that involve significant importation (scenarios 1, 2, 4 and 5) will have considerably lower emissions than scenarios with greater on-island supply (scenarios 3 and 6). Indirect emissions will be accounted for in the jurisdiction that the activities occur in (in the case of this analysis, the UK). Considering both direct and indirect emissions, whilst not in line with international inventory reporting methodologies, allows for consideration of the global impacts of Guernsey's quarrying activities. This is considered further in the individual scenario sections below.

Figures 3 and **Table 3** show the average emissions per tonne of aggregate for 2020 to 2035 by scenario (also called implied emission factors). Off-island implied emission factors do not vary between the scenarios. On-island emission factors vary very slightly between scenarios due to differences in the amount of transport between Les Vardes and the Chouet Headland site that is required. With the no Chouet development supply scenarios, there is no transport required between the two sites. With the Phase 1 Chouet development only supply scenario, there is a transition between the sites and a time where transportation between the two sites will be required due to extraction happening at one site and processing at the other. This also occurs as part of the full Chouet development supply scenario however in this case there is a longer period after transition where all activities occur at Chouet and transport is no longer needed between the sites.

There is variation in emissions intensities when considering all supply. This is due to the scenarios having different amounts of imported materials. Imported materials have high embodied emissions and therefore, the more material that is imported, the higher the average emissions per tonne of aggregate.

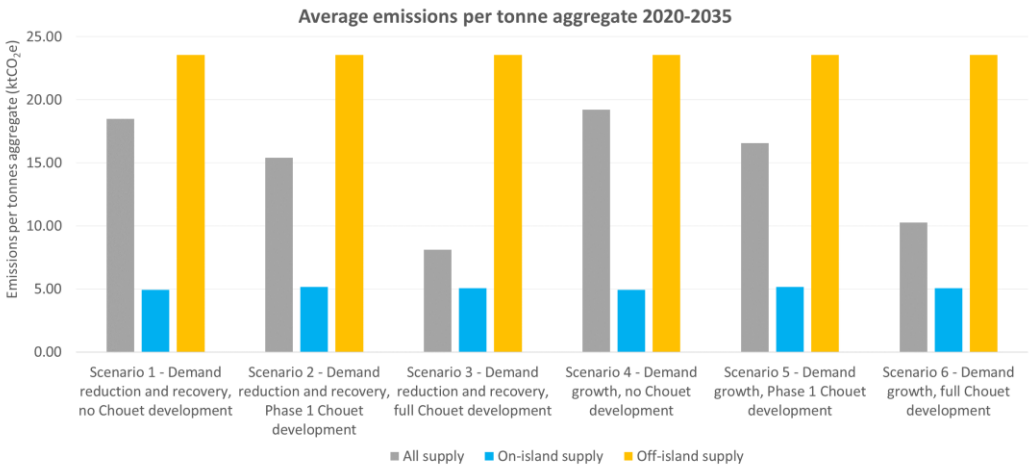

Figure 3 - Average emissions per tonnes aggregate 2020-2035

Table 3 - Average emissions per tonnes aggregate for each scenario, split by on-island and off-island supply

	Average emissions per tonne aggregate 2020-2035 ($ktCO_2e$)		
	All supply	**On-island supply**	**Off-island supply**
Scenario 1	18.48	4.92	23.55
Scenario 2	15.41	5.16	23.55
Scenario 3	8.11	5.05	23.55
Scenario 4	19.21	4.92	23.55
Scenario 5	16.55	5.16	23.55
Scenario 6	10.26	5.05	23.55

The embodied carbon intensity for on-island production and supply ranges from 4.9 to 5.2 $ktCO_2e$ per tonne of aggregate across all development scenarios compared to the imported equivalent of 23.6 kt CO_2e per tonne of aggregate.

The "cradle-to-gate" carbon intensity of Guernsey's on-island supply of aggregate is comparatively low[2]. It tends to be close in value to the average carbon intensity of virgin 'land-won' aggregate (approx. 4.4 kg CO_2e per tonne[3]). Of the 134 individual supplies of virgin 'land-won' aggregate considered in this average, the Guernsey embodied carbon factor sits somewhere between the 50th and 75th percentile in value, suggesting that it is a fairly typical aggregate source of its type in terms of carbon intensity. Crucially, the carbon intensity of this type of aggregate source is the lowest of all the averages listed. Other types of source, including 'marine-won' and recycled, tend to have a higher carbon intensity. This sets a high bar for the carbon intensity of any alternative, imported, supply of aggregate to be lower than Guernsey's own supply, when solely considering "cradle-to-gate" (in-earth to processed product) emissions. For more technical detail on the terminology used here, and calculations behind this conclusion, see section 3.2.4.

Therefore, the carbon intensity of Guernsey's own supply of aggregate is low, largely due to the type of extraction and processing that virgin, "land-won" sources involve. The use of electricity in processing also contributes to its low value relative to aggregate from other sources. Any changes in fuel mix used in processing and extraction would result in changes to the carbon intensity of Guernsey's own supply.

When analysing scenarios, it is important to remember that the uncertainties associated with the tool are high. They are also subject to a number of assumptions, which are summarised in section 3.1 and explained in detail throughout the tool and the detailed analysis presented in this report. Therefore, the results are best considered relative to other scenarios, instead of as absolute numbers for an individual scenario.

[2] Using a cradle-to-gate scope means emissions from in-earth through to processed product. Note that, for the sake of comparison to other existing data, this scope includes slightly fewer sources of emission than for the data of on-island carbon intensity in Table 3. For more detail, see section 3.2.4.
[3] ICE Database V3.0, 2019

2.2 Individual scenario analysis

As mentioned above the key variables adjusted while generating these scenarios are demand and the phasing for on-island quarrying activities. For this analysis, all other variables available in the scenario tool have been kept constant, including:

- Constraints on production – the 'probable' estimate for the Chouet reserves, for scenarios where Chouet is developed, and upper quarry production capacity are used in all scenarios
- Storage capacity – The maximum storage capacity is assumed to be 20 kilotonnes and the amount in storage in the base year is assumed to be 0 kilotonnes in all scenarios
- Materials that can be imported – In all scenarios it is assumed that all materials except for masonry stone and rock armour can have some share of demand met by imported materials
- The mix of imported materials – In all scenarios it is assumed that the mix of imported aggregates will reflect the UK market average
- Source of imported materials – In all scenarios it is assumed that imported materials will come from the Teignmouth (33%), Plymouth (34%) and Swansea (33%).

2.2.1 Scenario 1: Demand scenario A (80% drop in demand followed by recover), supply scenario A (no Chouet development)

In this scenario, demand drops to 80% of expected 2020 levels from the start of 2020 to the end of 2022 and then recovers to the expected 2020 levels where it remains constant. The Chouet Headland site is not developed (**Table 4**).

Table 4 - Timing of on-island supply phases in scenario 1

On-island supply	Start year	End year
Les Vardes remaining unconstrained	2020	2022
Les Vardes constrained	2022	2030 (or earlier if exhausted)
Phase 1 Chouet development	Never	N/A
Phase 2 Chouet development	Never	N/A
Phase 3 Chouet development	Never	N/A

Once Les Vardes has been fully quarried, all demand must be met by imports (**Figure 4**).

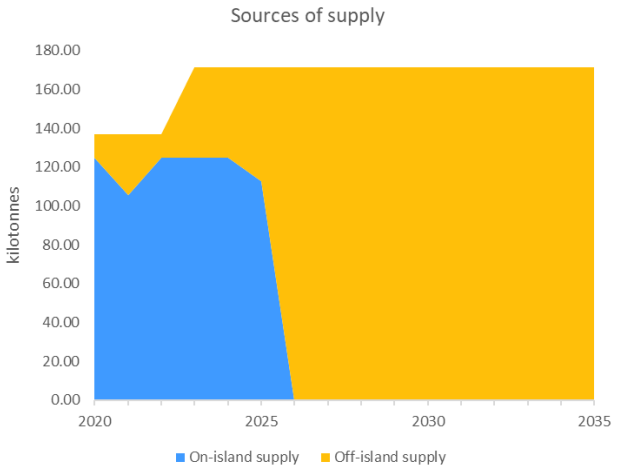

Figure 4 - On-island and off-island supply required to meet demand under scenario 1

The overall emissions per tonne of aggregate timeseries reflects the move from on-island supply to entirely imported materials that have a higher emissions intensity (**Figure 5**). As mentioned previously, this is largely due to the emissions associated with shipping, but also the increase in emissions associated with production and transportation of imported materials (**Figure 6**).

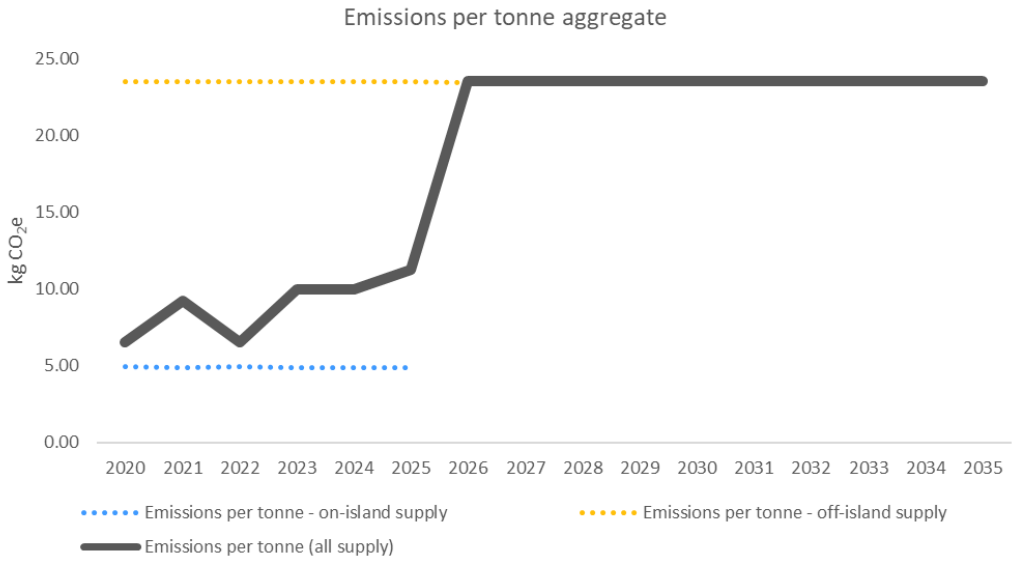

Figure 5 - Emissions per tonne of aggregate under scenario 1

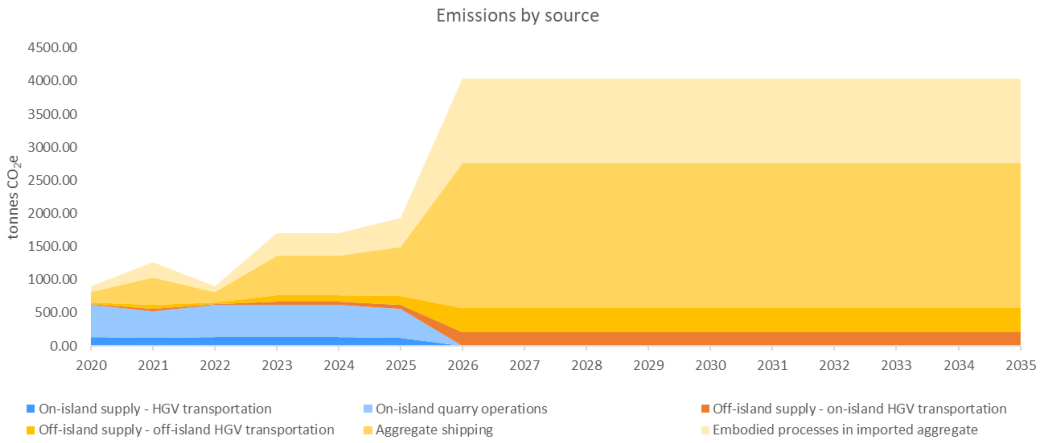

Figure 6 - On-island (blue) and off-island (yellow) emissions under scenario 1

It is important to distinguish between direct and indirect emissions. Direct emissions are those associated with on-island activities and are therefore counted in Guernsey's total national emissions. Indirect emissions are those associated with activities occurring off-island, for example the production, processing and transportation of imported materials. These are not counted in Guernsey's total national emissions but are important when considering the global impact of Guernsey's quarrying activities.

Figure 7 illustrates the split between direct and indirect emissions for scenario 1. It shows that, after 2030, direct emissions from quarrying activities will be negligible and therefore Guernsey's total national emissions will decrease. However indirect emissions will increase considerably. Whilst these will be accounted for in the source country's inventory, they should be considered when trying to reduce Guernsey's global impact. Indirect emissions are largest under scenarios 1 and 3 as these scenarios are associated with the greatest need for importation (no Chouet site development).

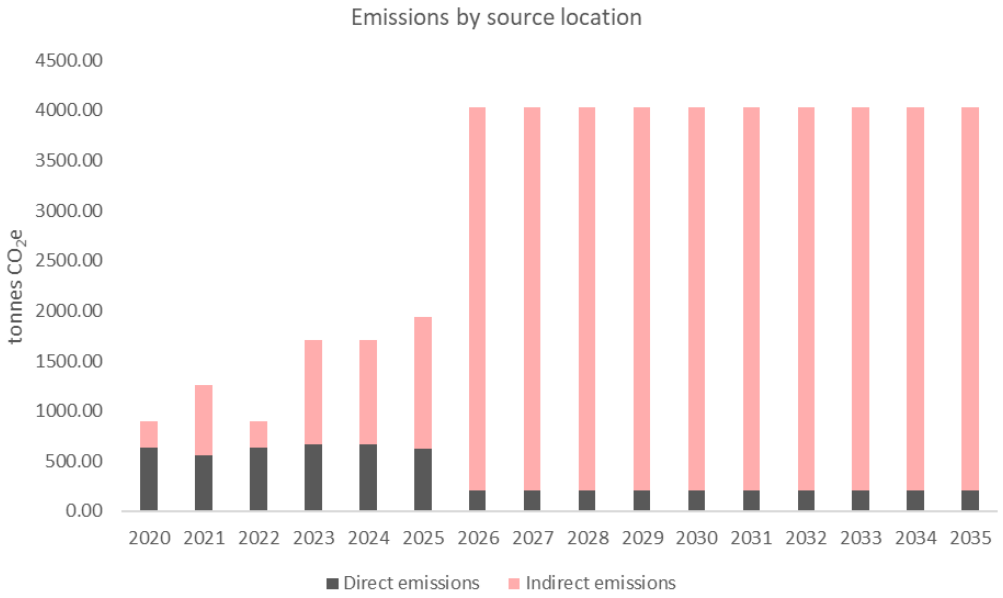

Figure 7 - Emissions split by direct and indirect sources for scenario 1

2.2.2 Scenario 2: Demand scenario A (80% drop in demand followed by recovery), supply scenario B (Phase 1 Chouet development only)

In this scenario, demand drops to 80% of expected 2020 levels from the start of 2020 to the end of 2022 and then recovers to the expected 2020 levels where it remains constant. The Chouet Headland site is only subject to Phase 1 development (**Table 5**).

Table 5 - Timing of on-island supply phases in scenario 2

On-island supply	Start year	End year
Les Vardes remaining unconstrained	2020	2022
Les Vardes constrained	2024	2030 (or earlier if exhausted)
Phase 1 Chouet development	2022	2025
Phase 2 Chouet development	Never	N/A
Phase 3 Chouet development	Never	N/A

Once Les Vardes reserves and the reserves associated with Phase 1 development of the Chouet Headland site have been exhausted, demand must be met by imports (**Figure 8**).

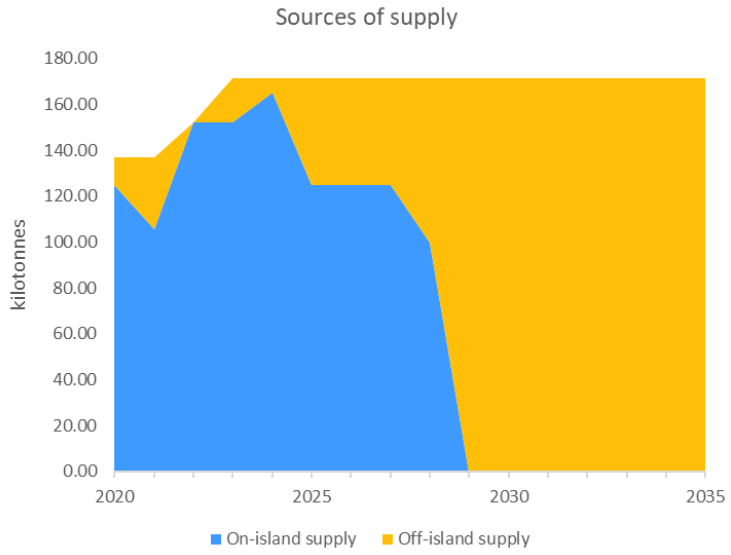

Figure 8 - On-island and off-island supply required to meet demand under scenario 2

As with scenario 1, the overall emissions timeseries per tonne of aggregate reflects the move from on-island supply to entirely imported materials that have a higher emissions intensity (**Figure 9**), however in scenario 2 this transition occurs later due to the additional Chouet reserves. There is a drop in emissions per tonnes of aggregate for off-island supply in 2022 as in this year, both Les Vardes and Chouet are operational and therefore on-island supply is greater than demand and there is no need for imports.

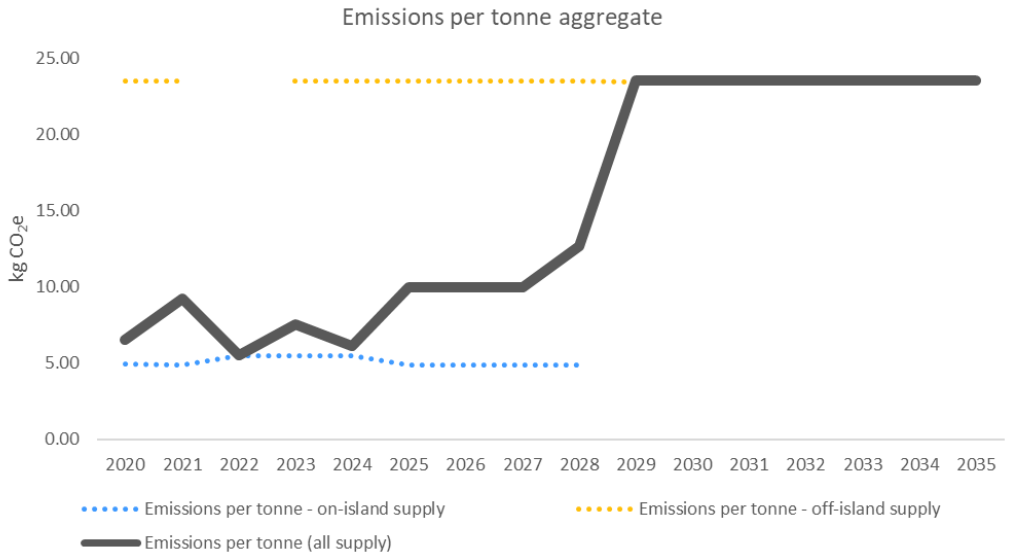

Figure 9 - Emissions per tonne of aggregate under scenario 2

As with scenario 1, the move to fully imported supply causes higher emissions due to emissions from shipping as well as production and other transportation on imported materials (**Figure 10**).

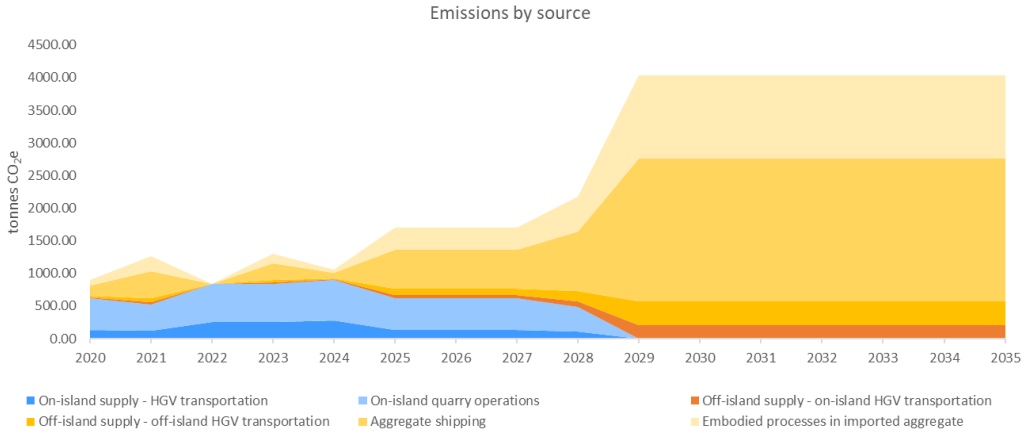

Figure 10 - On-island (blue) and off-island (yellow) emissions under scenario 2

As mentioned previously it is important to distinguish between direct and indirect emissions. **Figure 11** shows a similar trend to scenario 1 with direct emissions being replaced by indirect emissions with the transition to imported materials. In scenario 2 however, this transition occurs later and therefore Guernsey's direct emissions will decrease over a longer time period. Considering Guernsey's global impact, total direct and indirect emissions will be lower for scenario 2 in comparison to scenario 1 due to the later transition to imported materials.

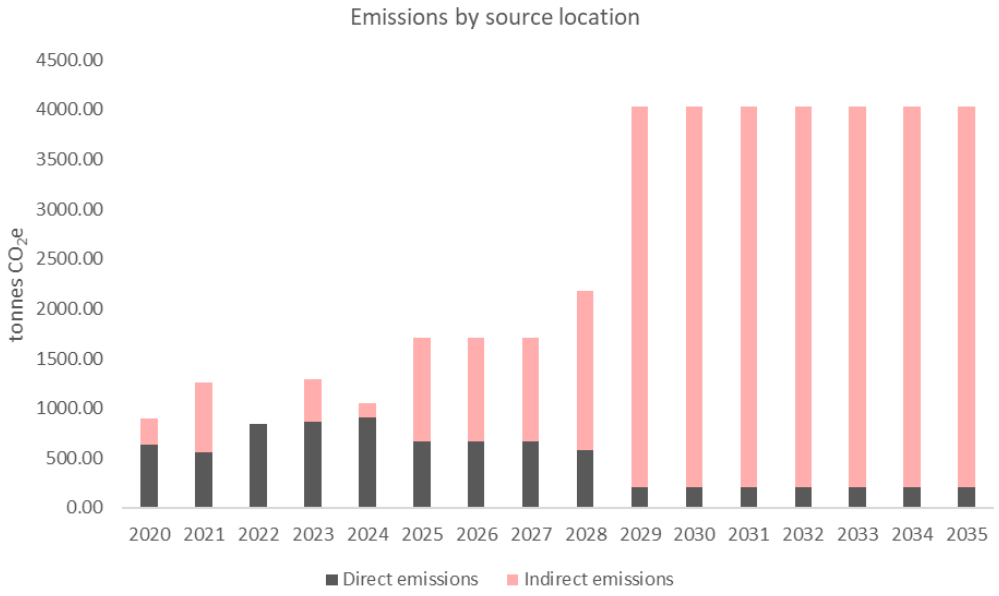

Figure 11 - Emissions split by direct and indirect sources for scenario 2

2.2.3 Scenario 3: Demand scenario A (80% drop in demand followed by recovery), supply scenario D (full Chouet development)

In this scenario, demand drops to 80% of expected 2020 levels from the start of 2020 to the end of 2022 and then recovers to the expected 2020 levels where it remains constant. The Chouet Headland site is fully developed including phases 1, 2 and 3 according to the schedule presented in **Table 6**.

Table 6 - Timing of on-island supply phases in scenario 3

On-island supply	Start year	End year
Les Vardes remaining unconstrained	2020	2022
Les Vardes constrained	2024	2030
Phase 1 Chouet development	2022	2025
Phase 2 Chouet development	2029	2034
Phase 3 Chouet development	2034	2060

In this scenario, there is no transition to only imported materials as on-island quarrying occurs throughout the timeseries. Imported materials therefore make up the difference between on-island supply and demand (**Figure 12**).

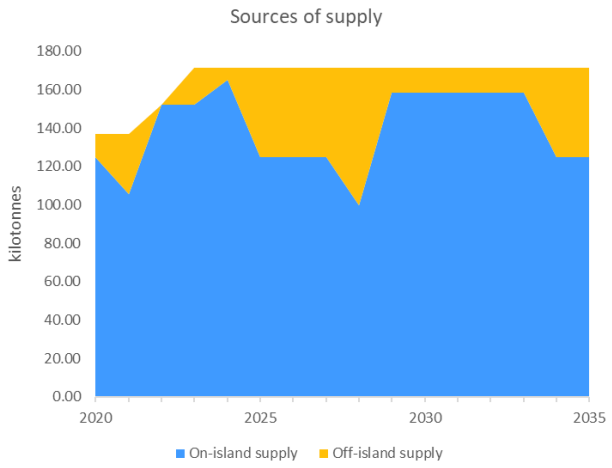

Figure 12 - On-island and off-island supply required to meet demand under scenario 3

As there is no need for large-scale importation of aggregate with associated production and transportation emissions, the overall average emissions per tonnes of aggregate for scenario 3 remain at a lower level across the timeseries (**Figure 13**). As with scenario 2, there is a decrease in emissions per tonne of aggregate in 2022 due to Les Vardes and Chouet being operational and able to meet demand.

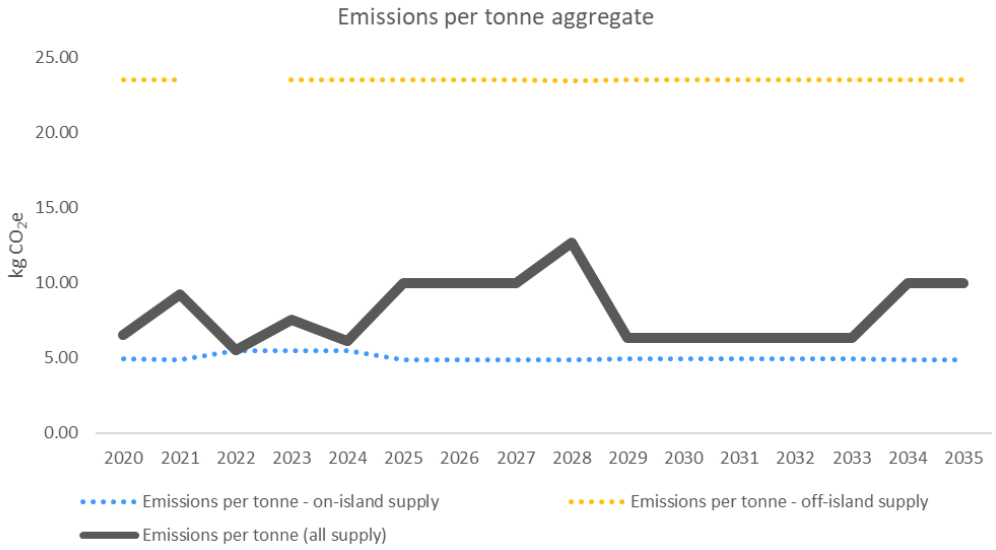

Figure 13 - Emissions per tonne of aggregate under scenario 3

Total emissions for scenario 3 are lower than all other scenarios as emissions from imported material are the lowest out of all emissions scenarios due to the high on island capacity supply scenario and low demand scenario (**Figure 14**). Fluctuations across the timeseries relate to the phasing of Les Vardes and Chouet development (see **table 6**) and therefore the on-island availability of supply.

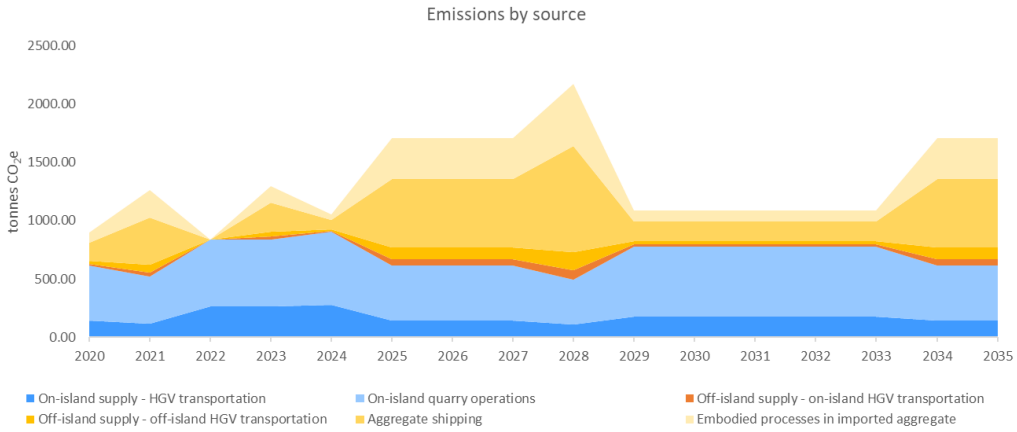

Figure 14 - On-island (blue) and off-island (yellow) emissions under scenario 3

However, as Guernsey is producing more of its own materials there will be more direct emissions that contribute to its official national totals (that exclude indirect embodied emissions) (**Figure 15**).

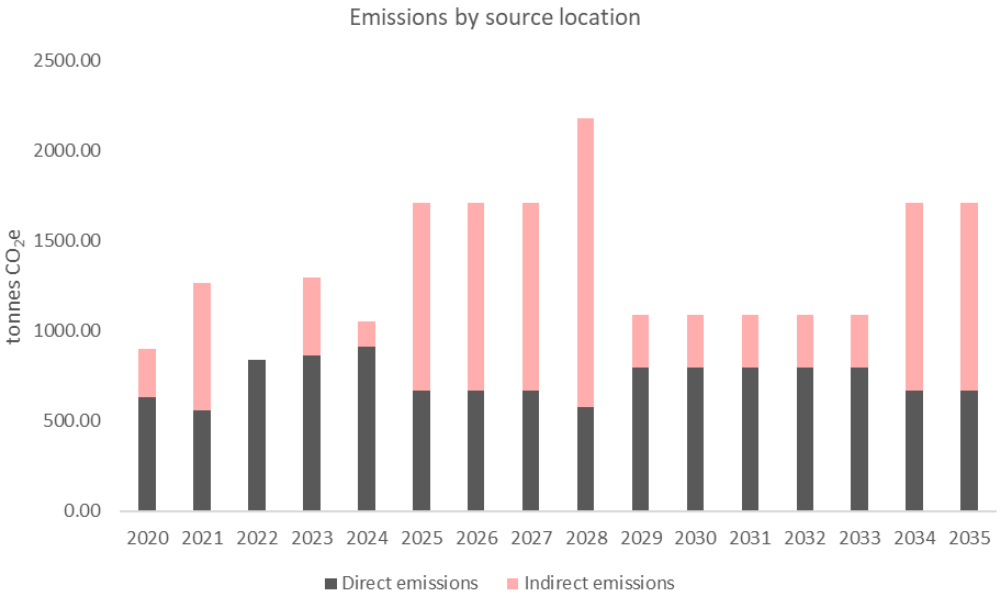

Figure 15 - Emissions split by direct and indirect sources for scenario 3

2.2.4 Scenario 4: Demand scenario B (Demand increases by 10% per year for 5 years), supply scenario A (no Chouet development)

Scenario 4 is the first of the high growth scenarios, with demand increasing by 10% per year for 5 years (2020-2025) before plateauing. There is no development of the Chouet Headlands site (**Table 7**). This demand scenario pushes the demand for materials above the capacity of on island supply to provide.

Table 7 - Timing of on-island supply phases in scenario 4

On-island supply	Start year	End year
Les Vardes remaining unconstrained	2020	2022
Les Vardes constrained	2022	2030 (or earlier if exhausted)
Phase 1 Chouet development	Never	N/A
Phase 2 Chouet development	Never	N/A
Phase 3 Chouet development	Never	N/A

As with scenario 1, once Les Vardes has been fully quarried, all demand must be met by imports (**Figure 16**). In addition, Les Vardes does not have the capacity to meet the demand while operating.

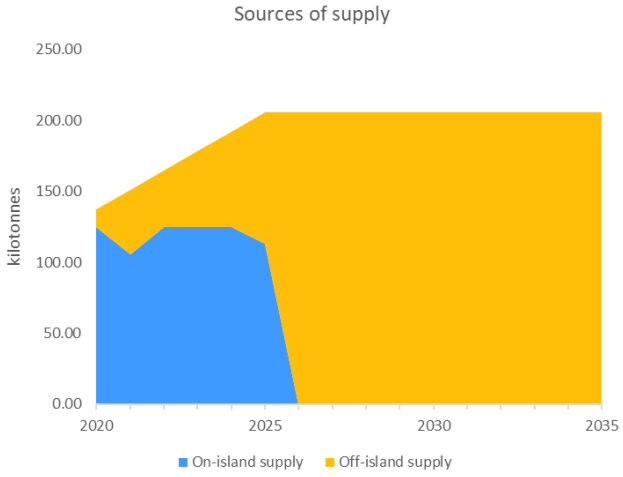

Figure 16 - On-island and off-island supply required to meet demand under scenario 4

The overall average emissions per tonne of aggregate timeseries is similar to that of scenario 1 however there is a steeper rise in emissions between 2020 and 2025 associated with the demand growth (**Figure 17**) especially as this is met through imports. The transition to a full importation results in an increase in indirect emissions as imported materials have a higher emissions intensity. The increase in emissions can largely be attributed to slightly higher embodied emissions in production of materials and from the additional transportation of imported materials (shipping) (**Figure 18**).

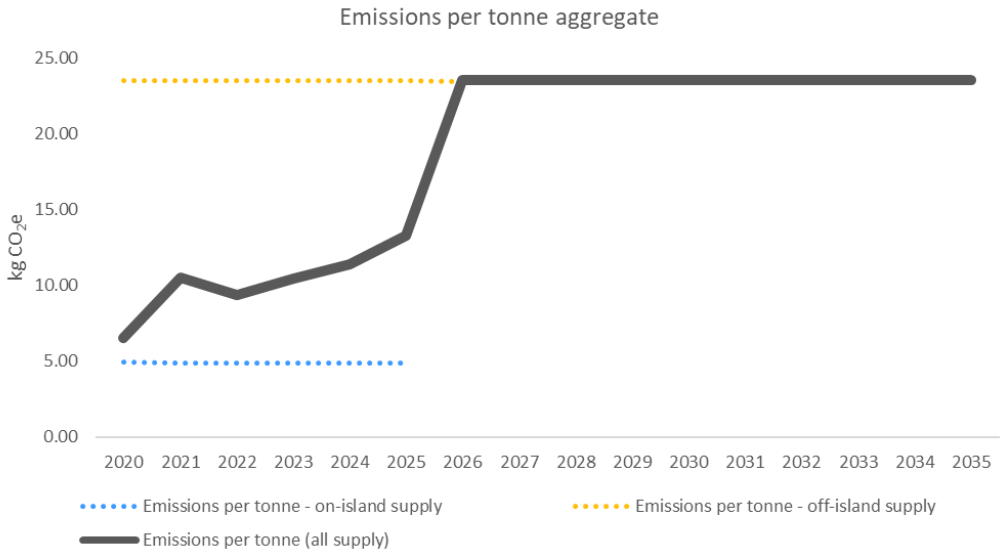

Figure 17 - Emissions per tonne of aggregate under scenario 4

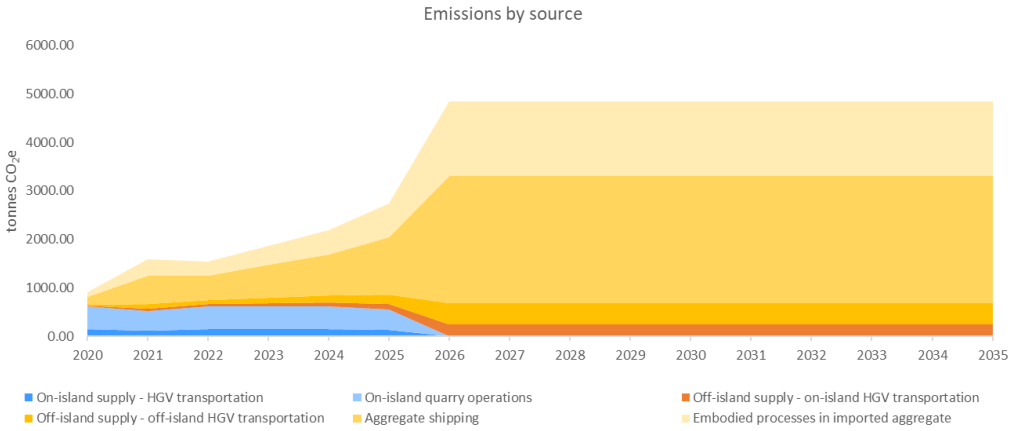

Figure 18 - On-island (blue) and off-island (yellow) emissions under scenario 4

In comparison to scenario 1, scenario 4 results in total emissions for the timeseries due to increased demand. However, the trend in direct and indirect emissions remains the same with direct emissions becoming negligible (only transportation emissions remaining) but indirect emissions increasing significantly after 2025. Therefore, in this scenario, Guernsey's total direct emissions will decrease. However, when considering Guernsey's global impact, scenario 4 will result in the greatest indirect emissions of all the scenarios (**Figure 19**).

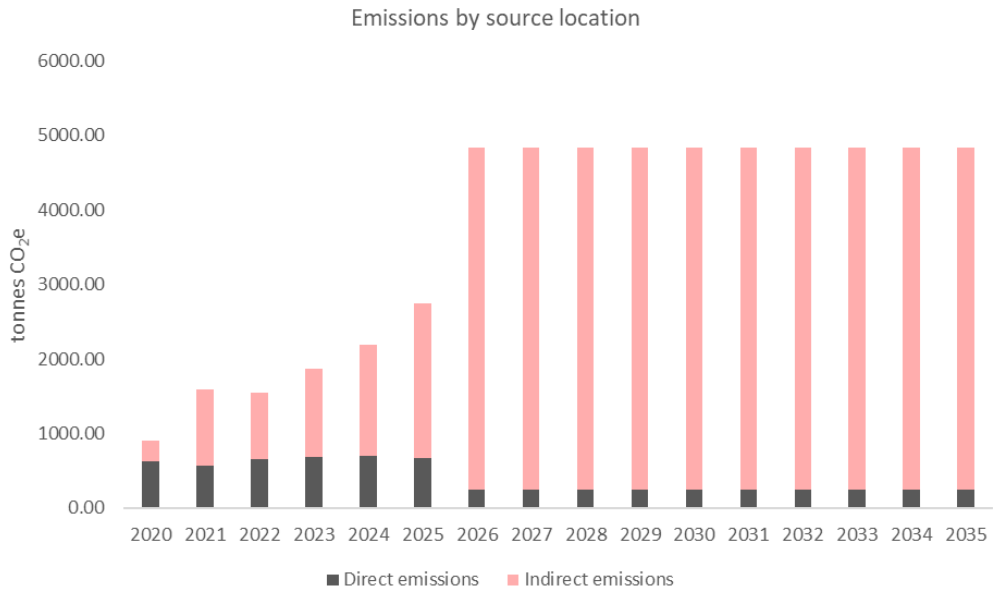

Figure 19 - Emissions split by direct and indirect sources for scenario 4

2.2.5 Scenario 5: Demand scenario B (Demand increases 10% per year for 5 years), supply scenario B (Phase 1 Chouet development only)

As with scenario 4, in scenario 5, demand grows by 50% between 2020 and 2025 before plateauing. The Chouet Headland site is only subject to Phase 1 development (**Table 8**).

Table 8 - Timing of on-island supply phases in scenario 5

On-island supply	Start year	End year
Les Vardes remaining unconstrained	2020	2022
Les Vardes constrained	2024	2030 (or earlier if exhausted)
Phase 1 Chouet development	2022	2025
Phase 2 Chouet development	Never	N/A
Phase 3 Chouet development	Never	N/A

Once Les Vardes reserves and the reserves associated with Phase 1 development of the Chouet Headland site have been exhausted, demand must be met by imports (**Figure 20**). Variation in the on-island supply trend relate to the phase timings mentioned above. For example, between 2022 and 2024, both Les Vardes and Chouet are operational and therefore on-island supply increases.

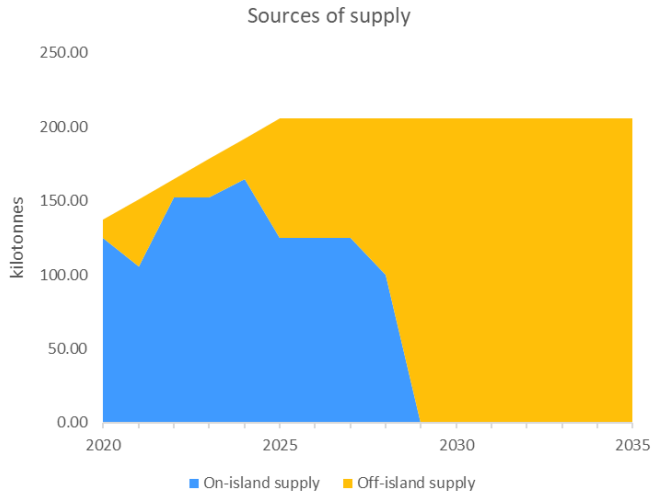

Figure 20 - On-island and off-island supply required to meet demand under scenario 5

Like scenarios 1, 2 and 4, the overall average emission per tonnes of aggregate timeseries reflects the transition to imported materials that have a higher emissions intensity (**Figure 21**). The emissions intensity is higher in the early part of the timeseries in comparison to scenario 2 as increasing demand is greater than on-island supply and therefore some importation is needed. The increasing emissions per tonne of aggregate due to increased emissions is also reflected in the total emissions timeseries (**Figure 22**). On-island emissions reduce to a very low level once on-island quarrying ceases, with only emissions from transportation left. However, off-island emissions significantly increase, especially those associated with transportation and processing of materials.

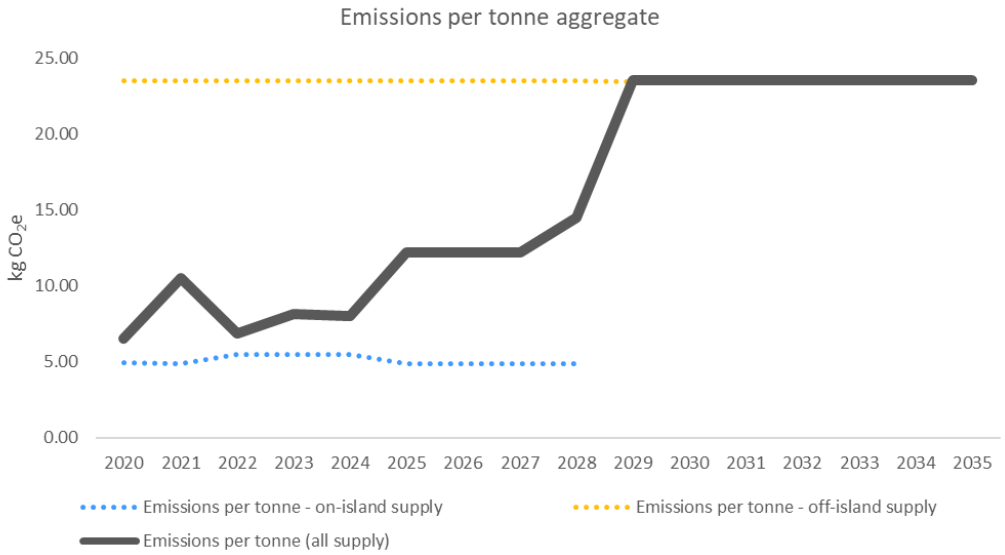

Figure 21 - Emissions per tonne of aggregate under scenario 5

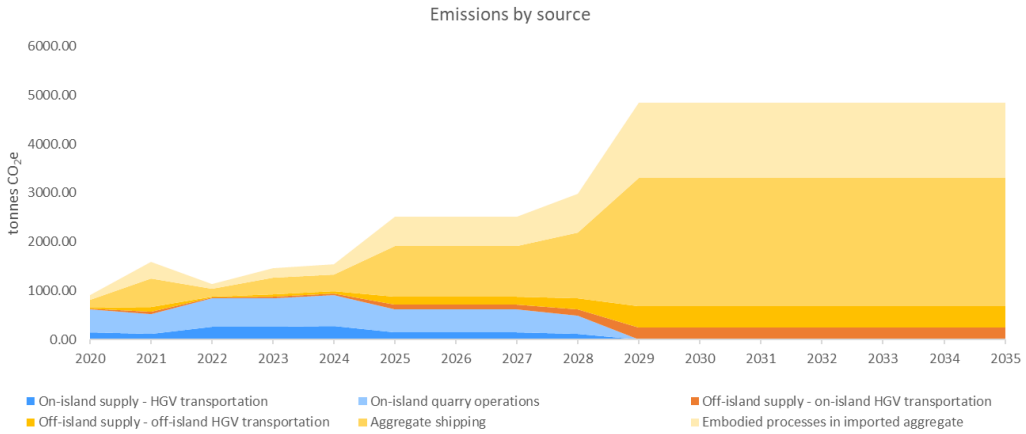

Figure 22 - On-island (blue) and off-island (yellow) emissions under scenario 5

The split between direct and indirect emissions is similar in trend to scenarios 1, 2 and 4. Direct emissions are significant until on-island quarrying ceases and are then negligible. Indirect emissions are higher in scenario 5 compared to scenario 2 as the additional demand requires imports to supplement on-island supply. A large increase in indirect emissions is seen once all material is imported (**Figure 23**).

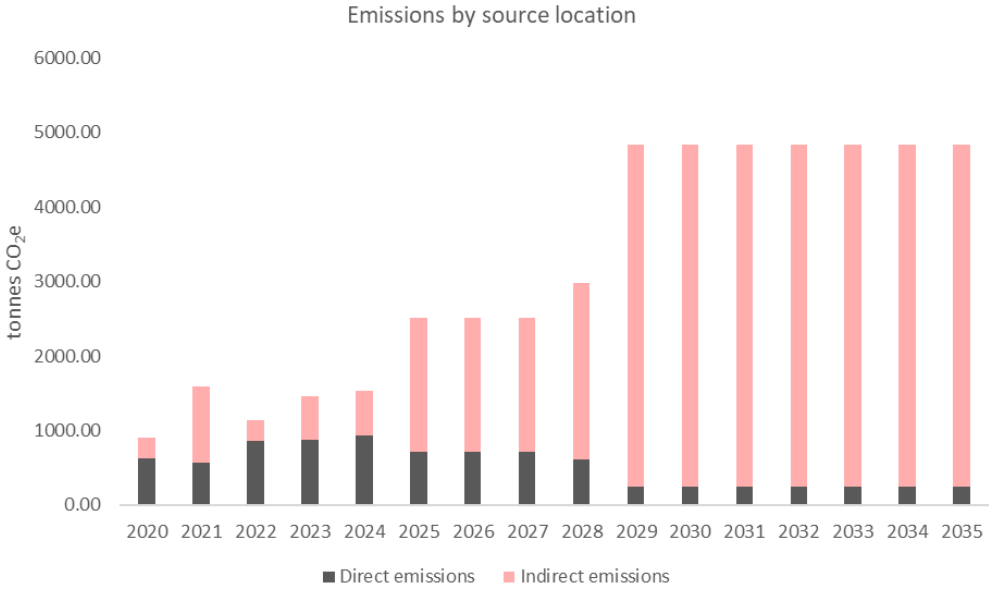

Figure 23 - Emission split by direct and indirect sources for scenario 5

2.2.6 Scenario 6: Demand scenario B (Demand increases 10% per year for 5 years), supply scenario D (full Chouet development)

In scenario 6, demand increases by 50% of the first 5 years (2020-2025) and then remains constant. The Chouet Headland Site is fully developed including phases 1, 2 and 3 (**Table 9**).

Table 9 - Timing of on-island supply phases in scenario 6

On-island supply	Start year	End year
Les Vardes remaining unconstrained	2020	2022
Les Vardes constrained	2024	2030
Phase 1 Chouet development	2022	2025
Phase 2 Chouet development	2029	2034
Phase 3 Chouet development	2034	2060

As with scenario 3, there is no transition to only imported materials and on-island quarrying occurs throughout the timeseries. The majority of demand is met by on-island supply with imports supplementing supply when demand requires it (**Figure 24**). On-island supply is the same as in scenario 3 however off-island supply is greater in scenario 6 due to higher demand.

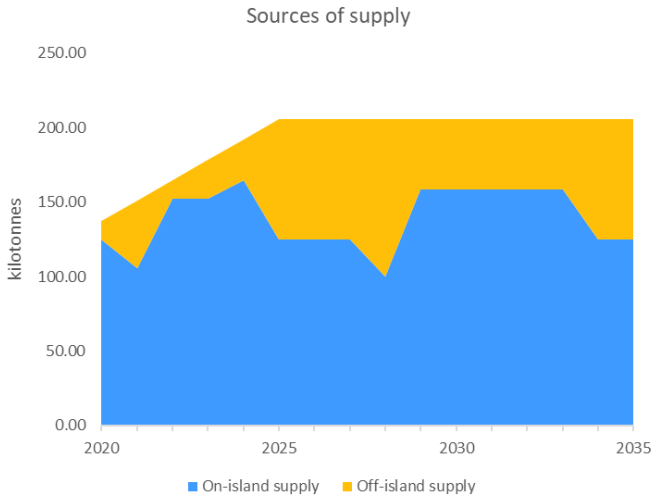

Figure 24 - On-island and off-island supply required to meet demand under scenario 6

There is no large-scale importation of aggregate under scenario 6 and therefore the average overall emissions per tonne of aggregate remains relatively constant across the timeseries (**Figure 25**). Total emissions under this scenario are lower than all other scenarios except scenario 3 (scenario 3 has lower demand). This is due to most material being produced on-island with lower associated emissions intensities. Imported materials are associated with high emissions from processing and transportation (**Figure 26**). Fluctuations across the timeseries relate to the phasing of Les Vardes and Chouet development and therefore the on-island supply.

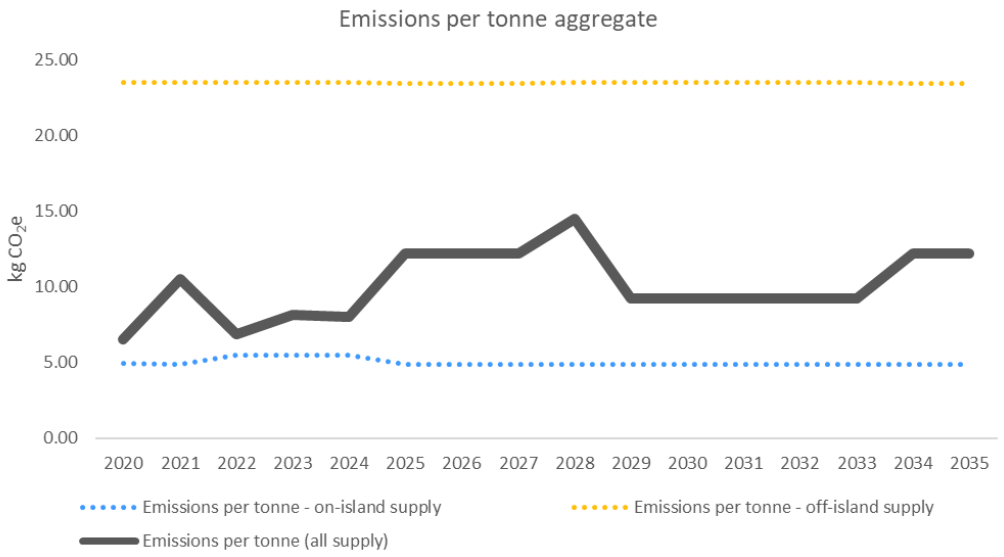

Figure 25 - Emissions per tonne of aggregate under scenario 6

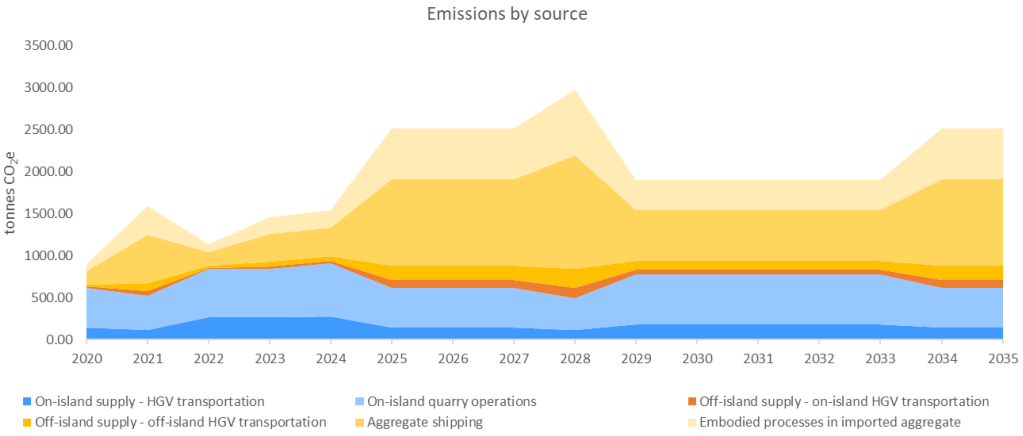

Figure 26 - On-island (blue) and off-island (yellow) emissions under scenario 6

Whilst scenario 6 has one of the lowest total emissions when analysing direct and indirect emissions, it has the highest direct emissions of all the scenarios. This means that, if looking at only Guernsey's total direct emissions, this scenario will produce the highest value. However, indirect emissions are lower than all scenarios except scenario 3 (scenario 3 has lower demand). Therefore, scenario 6 could be considered to have a lower global impact than scenarios 1, 2, 4 and 5 (**Figure 27**).

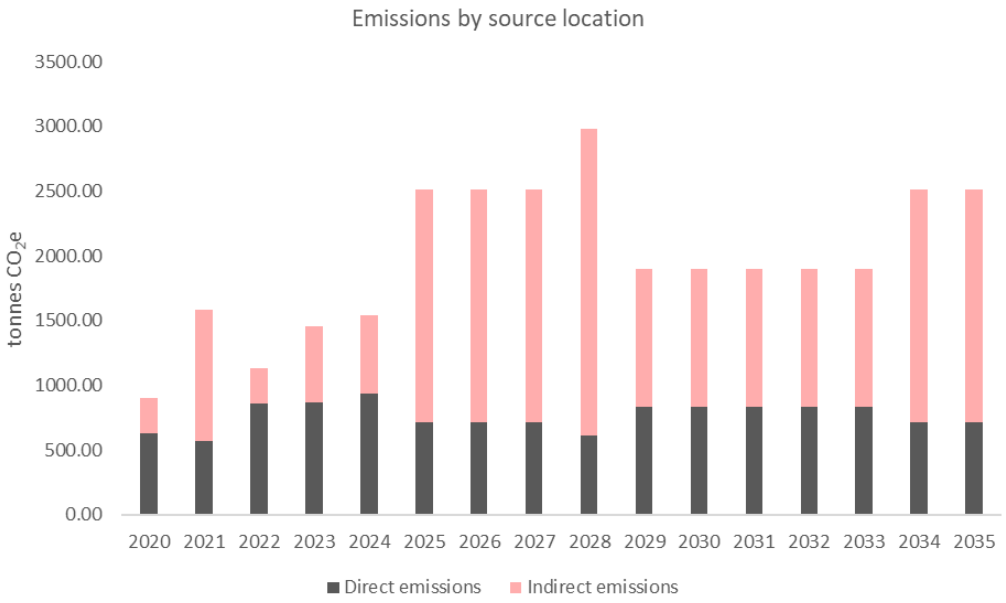

Figure 27 - Emissions split by direct and indirect sources for scenario 6

3 Scenario tool methodology

The scenario tool is an Excel based tool that brings together activity data and emission factors to estimate possible future emissions scenarios relating to aggregate supply in Guernsey. The activity data is estimated on the balance of on-island demand, supply, and existing constraints, such as on-island reserves and storage capacity. Where on-island supply cannot satisfy on-island demand, the activity data also accounts for the source and port of origin of imported material. Users of the tool can generate emissions scenarios by adjusting these variables. Scenarios can be saved and compared.

This section will go into further detail about the tool including methodology and key functionalities.

3.1 Key assumptions

For the scenario tool to produce emissions estimates, it relies on some key assumptions. These are listed below; where relevant they are informed by the background information provided by and consultation with Ronez Limited and/or States of Guernsey:

- Historical data is assumed to be representative of future supply and demand, and Ronez Limited's activities in producing aggregate.
- It is assumed that the emission factor used in each calculation is the most relevant available to characterise the activity taking place (see Table 10 for data sources). The assumptions made here are particularly well supported by the evidence provided by Ronez Limited and States of Guernsey.
- There are assumed to be no major changes to predominant technologies used in the 15-year period considered. For example, fossil fuel-based shipping and diesel fuel-based HGV transportation are assumed as constants.
- Relatedly, the constraints of Ronez Limited's operations are largely assumed to stay constant, unless the user input section of the tool indicates otherwise. For example, it assumes that the same number of vehicles, rate of extraction, storage capacity available and production capacity will persist over the time series considered.
- On-island demand is assumed to always be met or exceeded by supply from on-island and imported materials.
- It is assumed that all journeys made on-island to transport aggregate are both ways. Therefore, for the purposes of emissions calculations, half of journeys are assumed to be completely laden, while the other half are assumed unladen.
- For journeys made off-island (HGV and shipping), it is assumed that only the one-way, "A to B" journey is relevant to Guernsey's aggregate supply – so only the emissions from these journeys, as fully-laden journeys, are included.
- More specific assumptions are made throughout the scenario tool – these are indicated in text boxes and in this report where relevant.

3.2 Scenario Builder

The Scenario Builder allows the user to customise supply and demand variables to build emissions scenarios.

The tool allows the user to select which of these phases will occur and adjust the start and end date for each phase. In the "Scenario Composer" section the user can also adjust the following:

- Constraint selection – users can select whether to use the probable, maximum, or minimum estimate for the reserves at Chouet Headland, and the on-island production capacity
- Demand scenario – users can select a starting point of high, average, or low levels of demand for each product type, and the predominant driver of its trend in future years
- Storage capacity – users can change the maximum storage capacity (kilotonnes) available on-island
- Alternative supply – users can prioritise the types of aggregate product that can be imported, the type(s) of aggregate source making up the imported supply, the port(s) from which it is shipped and the distance travelled between source (e.g. quarry) and port

Once these variables have been selected, the user can then use the supply, demand and balance modules to further refine the scenario. If the user wants to edit any part of the supply, demand or balance modules, it is advisable to work with the current in-cell formulae rather than overwrite them (where feasible).

3.2.1 Supply module

Taking into account the phases and timings that are selected in the scenario composer, the supply module uses reserve quantities and threshold minimum and maximum capacity to calculate the amount quarried from Les Vardes and Chouet Headlands each year. The reserves quantities and threshold values were supplied to Aether by Ronez Ltd. The output of this module is a timeseries of the amount of product quarried from each site per year and a timeseries of the on-island transport distances associated with the scenario.

The tool assumes that material is quarried at a constant rate per site across the active period of a phase. For example, a reserve of 300 kilotonnes quarried over three years would produce 100 kilotonnes per year.

The tool accounts for the need for activities to be economically viable. If the estimate of quarried material exceeds the maximum capacity available, outputs are rescaled to this capacity. Similarly, if production is predicted to be below the minimum threshold, it is assumed that production will be increased to this threshold value.

3.2.2 Demand module

The demand module starts with a base year assumption on the level of demand for each stream of aggregate use. This base level demand has been supplied to Aether by Ronez Ltd. Future demand is scaled using one of the following proxies which are individually selected for each product:

- Population
- Gross Domestic Product (GDP)
- Flat – demand is flatlined from the base year estimate as no change in demand is predicted
- User input – users can define their own trajectory

3.2.3 Balance module

The main function of the balance module is to balance demand with on-island supply, importation and storage capacity, per stream of aggregate use. It assumes that if supply is greater than demand, then no imports are required, although some material may be stored for use in future years or exported. It also assumes that if demand is greater than supply, then use of imports (or previously stored material) is needed.

Where imports are required, the module decides which streams of aggregate use to supplement with imports based on the prioritisation set out by the user in the Scenario Composer section of the Scenario Builder sheet. This is important where imports make up a share of the total supply to Guernsey, as it determines the level of processing still taking place for the on-island supply. Where imports make up the whole supply of aggregate, this prioritisation remains but has no impact on the emission calculations.

3.2.4 Calculating emissions

On-island quarrying and transportation

Activity data for extraction, production operations and transportation are calculated using the supply, demand and balance modules. Emission factors for on-island quarrying are sourced from a range of UK government databases, as activities in Guernsey are assumed to be comparable to those in the UK. A number of conversion factors, based on the data input from Ronez Ltd, facilitate the adaptation of activity data such that its units are matched to that of the best available emission factor. Activity data and emission factors are multiplied together to generate greenhouse gas emissions estimates.

Imported materials

As with on-island quarrying, activity data for imported materials (quantities and on-island transportation) are calculated using the supply, demand and balance modules. User input largely dictates the activity data informing off-island transportation (HGV and shipping). Emission factors are taken from the Inventory of Carbon & Energy (ICE) Database (2019) which provides emission factors for the embodied carbon and energy in construction materials.

Embodied emissions

The ICE (Inventory of Carbon & Energy) database is the result of an ongoing project which seeks to assess the embodied carbon in construction materials in the UK. As part of the project, data has been collated for embodied carbon from aggregates and average embodied carbon factors calculated for different types of aggregate source. For example, for “land-won” aggregate sources they have taken the average of 134 aggregate sources of this type to calculate the average embodied carbon factor of “land-won” sources. In other cases, a considerably smaller sample size is available to calculate an average, though each factor is accompanied by an indication of data quality. This average factor can be thought of as the expected carbon intensity of production of aggregate from any given source.

In the scenario tool, 8 of the ICE embodied carbon factors are offered for the purpose of comparison (and so the user can determine the types of aggregate source making up the imported supply). By looking at the same scope of activities from the Guernsey supply, it

is possible to gain an indication of how carbon intensive the supply of aggregate is from Guernsey relative to the averages of other types of source.

The ICE database uses a cradle-to-gate scope, which refers to the emissions that occur between the material being extracted to the end of its processing. Therefore, this includes emissions related to the quarry operations (extraction and processing) and any transportation between quarry and processing plant. To ensure comparability, therefore, calculating the relevant factor for Guernsey's on-island aggregate supply includes the energy used in extraction, any travel between Les Vardes and Chouet and the energy used in processing. Travel between Les Vardes and Chouet is conditional on extraction taking place at a site while the chief processing for that material takes place at the other site. For the outcome of this analysis, see section 2.2.

It is worth noting that, in part, the modelled carbon intensity data for Guernsey reflects a limitation of the data in the scenario tool. As future fuel use for extraction and processing is determined on the basis of a historical average for fuel use per tonne of aggregate extracted/produced, it does not reflect any changes in intensity of fuel use associated with the quantity processed (or any other factor). For example, in reality, less fuel use per tonne processed may occur when higher tonnages of aggregate are produced, resulting in lower carbon intensity.

3.2.5 Outputs

This section shows a summary of emissions calculations for the scenario prescribed in the Scenario Composer section. This includes key metrics, indicating the total emissions over the time period considered and average emissions per tonne for the whole supply, on-island supply and off-island supply. The range below each large number indicates the minimum and maximum value for that metric, accounting for all saved scenarios in the tool.

The graphs that follow indicate the year-to-year changes to estimated activity data and emissions. The accompanying text boxes are designed to provide some context to the data presented.

3.2.6 Saving scenarios

There are two buttons at the top of the Scenario Builder, which enable the storage, manipulation, and comparison of data from different scenarios.

- **Save this scenario** - adds a new sheet in the "Archive" section of the tool, with a copy of all the data from the Scenario Builder in its present form, allowing the scenario to be reloaded at a later time. This also saves key data into the Scenario Comparison sheet, so that the scenario can be compared to other saved scenarios. The name of the scenario must be different from all other saved scenarios.
- **Restore saved scenario** - allows the user to restore all the data from a previously saved scenario back into the Scenario Builder so that they can work with this scenario again. For example, the user could restore the data from a scenario created previously, edit parameters of their choice, and then re-save as a new scenario. The dropdown below the button allows the user to select the saved scenario to be re-loaded to the Scenario Builder.

3.2.7 Data sources

Further to the information listed above, information on the source of each data point used in the scenario tool is contained in the "Central Data Store", which is a hidden sheet in the tool. This follows a matrix structure where each parameter, with supporting information, is listed and recorded for all the years relevant to this project. The user can use this sheet and the filters available at the top of the data table to trace each number back to its specific data source. **Table 10** provides information on data sources used for the tool.

Table 10 - Sources of data used in or consulted for the scenario tool

Name	Year of publication/ completion	Data source for:
SLR Report: Chouet Headland – Environmental Appraisal of Establishing a Quarry, Prepared for Ronez Limited	2020	Scenario tool constraints; background information
Draft Chouet Headland Development Framework: Supplementary Planning Guidance 2019	2019	Background information and context
Confidential Consultation Questionnaire: Ronez Response	2020	Scenario tool constraints; activity data for quarrying in Guernsey
Response to Follow up States of Guernsey Questionnaire 050620	2020	The majority of activity data for quarrying in Guernsey; constraints; conversion factors
ICE (Inventory of Carbon & Energy) Database v3.0	2019	Embodied emission factors for different types of aggregate
UK Government GHG Conversion Factors for Company Reporting	2020	Emission factors for transportation activity and fuel use
Guernsey Electricity: http://www.electricity.gg/about/carbon-reporting/	Accessed: 2020	Emission factor for Guernsey's electricity factor
Ports.com: http://ports.com/sea-route/	Accessed: 2020	Shipping distances between St Peter Port and other port locations
Chouet Reserve Range, provided by Ronez Limited	2020	Scenario tool constraint
Google Maps	Accessed: 2020	Distance between Chouet Headland site and Les Vardes
States of Guernsey Population Projection Bulletin June 2018	2018	Scenario tool constraint

3.3 Scenario comparison

The scenario comparison tool allows users to compare different scenarios to highlight the key differences and sensitivities. The user can select two scenarios to see data tables and graphs side-by-side for various key metrics, including the make-up of supply source (on-island or off-island), the emissions per tonne of aggregate consumed and location of

emissions sources. This can be helpful in analysing the key messages that the collated scenarios convey.

3.4 Considering uncertainties and sensitivities

For quarrying operations on-island and associated on-island transportation, the activity data is largely sourced from Ronez Limited. This goes a long way to minimising the uncertainty in data for on-island activities. Input from Ronez Limited also underpins much of the logical process applied to the scenario tool, regarding the rate and phasing of extraction on-island, and the balancing of on-island supply with imported aggregate to meet demand. This too will work towards minimising the uncertainties in the tool's method.

The tool allows the user some choice over the range of likely reserves at the Chouet Headland site and the on-island production capacity. This can allow the user some indication of the range of uncertainty according to feasible changes in these parameters.

Given that emissions associated with imported materials are highly sensitive to the location and nature of material source(s) supplying Guernsey, which have regularly changed in the past, the emissions estimate here likely have a far greater range of uncertainty. In particular, the emission factors used for shipping of imports are relatively generic (i.e. they are not specific to the type of cargo ship involved in the importation of various materials). Given the magnitude of emissions from shipping, the results of each scenario will be relatively sensitive to refinements of these emission factors.

In a similar fashion, the outputs from the tool are also sensitive to the embodied emission factors used. These are mostly based on averages from variably sized datasets, so the uncertainty varies from factor to factor (the ICE database gives an indication of data quality with each factor). Crucially, aggregates are renowned for having a wide range of embodied emissions, relative to many other construction materials. Therefore, embodied emissions estimates are likely to be a key source of uncertainty in the projected total emissions.

4 Other considerations

4.1 Global impacts

The decision over the development of the Chouet headland site, and subsequent impacts on the share between on-island and off-island aggregate supplies, has a small global impact through greenhouse gas emission on island and off island for extraction of and import of materials.

Beyond the modelled approach detailed above, it becomes very difficult to quantify these impacts in a way that meaningfully relates to meeting the aggregate demand on-island. In particular, the long-term upstream and downstream effects of decisions made in Guernsey are difficult to disentangle and compare. For example, a decision in favour of importing aggregate from a nearby, existing quarry, with a relatively low-carbon fuel mix in its operations, could have a minimal impact on a global scale. However, the extra demand on this quarry may push the site closer to exhaustion on a shorter timescale, contributing to the environmental impacts of establishing another quarrying site. As the chain of impact grows longer, the uncertainties of impacts are likely to grow. This kind of impact has not been modelled.

Nonetheless, this should not take away from decisions over sources for imported aggregate that favour quarrying operations with a low environmental impact, operated by an organisation which places emphasis on environmental sustainability.

4.2 Carbon sequestration/release from development of Chouet

In 2018, only 4.3% of Guernsey's total greenhouse gas emissions originated in the AFOLU sector (Agriculture, Forestry and Other Land Use), which corresponds to 17.3 kt CO_2e[4]. With most emissions in this category originating from livestock and agricultural processes, only a small proportion of emissions are likely to be sensitive to changes in land use. Any removal of vegetation for quarrying purposes will have a net removal of sequestered carbon. However, the land use change proposed for the development of a quarry at Chouet Headland only affects a small proportion of the total island area. Changes away from the existing land use, of grassland and agricultural fields, are not normally associated with significant releases of carbon stores. Accounting for these considerations, it seems likely that the impact on carbon sequestration/release from the development of a new quarrying site on-island would be negligible.

5 Conclusions

This report has presented details for a number of scenarios for the provision of aggregate materials to meet Guernsey's needs to 2035. The work includes a model for the development of additional scenarios that can help in assessing the estimated carbon impact of decisions relating to Guernsey's aggregate supply. In particular, the tool outputs can be used to direct decisions regarding the potential development of a new quarrying site at Chouet Headland. The users of the tool can also change other variables, such as the make-up of the imported supply, future demand and other factors relevant to GHG emissions, to enable a more comprehensive comparison of future scenarios for quarrying and aggregate supply in Guernsey.

[4] From 'Guernsey Annual Greenhouse Gas Bulletin, 2018'

Through the analysis of the six scenarios presented above, it can be seen that demand met by imports has a significant impact on greenhouse gas emissions. This is due to imported materials having high emissions from the processing and transport of materials, especially shipping. Imported material emissions are indirect emissions and not attributable to Guernsey's official national totals. Scenarios with high on-island supply throughout the timeseries are associated with lower total emissions which are included in Guernsey's national total emissions.

It is therefore important to consider any decision within the wider context:

- Guernsey's national total emissions and associated targets for carbon neutrality – direct emissions will be particularly important for on-island carbon neutrality targets
- Global impact – Under international emission reporting practices, all emissions will be accounted for in the source country however, indirect emissions are important to consider when thinking about the global impact of Guernsey's activities
- Economic and other environmental considerations – the emissions impacts outlined above need to be considered as part of a wider assessment of Guernsey's quarrying activities including economic factors and other environmental factors such as impacts on biodiversity and water resources.

6 Recommendations for further work

Following the work undertaken in this project, we recommend progress in the following areas to further aid the consideration of carbon impacts in future decisions regarding Guernsey's aggregate supply.

Training and engagement

The tool and report currently contain instructions to aid the user in understanding the data inputs required and the likely reasons for differences between scenarios. A deeper engagement with the emissions calculations and the process used by the tool would allow for the uncertainties of outputs to be reduced, methodologies to be refined and a more detailed understanding of decision-relevant factors to be obtained. This could be achieved through training sessions for staff in using the tool to inform decision-making, and workshops to allow further input from key stakeholders. This tool can also be used as part of a wider engagement on the impacts of quarrying options for Guernsey, including a consideration of how carbon impacts balance with economic and other environmental impacts and priorities.

Tool improvement

There is scope for the current assumptions and uncertainties in the model to be reduced with further stakeholder engagement and tool development. Further factors relevant to the carbon impacts of quarrying could also be considered by adding more functionality to the model. For example:

- Further consideration of development of technology that decarbonises certain emissions sources
- The use of projected emission factors, so that the emissions estimate reflects changes to the carbon intensity of an activity over time

- More refined consideration of recycled aggregate supply, to give more detailed consideration to the carbon impacts of recycled aggregate relative to virgin resources
- Refinement of the tools user interfaces and user interaction to its output. This could include developing more refined user workflows, input screens and development of online data visualisation of different scenario outputs and scenario comparisons.

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APPENDIX C

States of Guernsey
Energy and Infrastructure

Carbon Impacts for Different Quarrying Options for Guernsey Summary Report August 2020

Introduction

The States of Guernsey is considering options relating to on-island quarrying. Currently, there is one quarry in Guernsey, Les Vardes, which produces up to 165,000 tonnes of granite per year, with a 10 year average of 125,000 tonnes, and is the primary source of aggregates for the island. Other quarried materials including sand and other aggregate, are imported from the UK and mainland Europe. With Les Vardes moving towards becoming expended and the recognition that Guernsey will not move away from concrete products in the immediate future, the States of Guernsey have a need to gather evidence and knowledge on the options for quarrying and supply of aggregates.

Once Les Vardes has been expended, the only remaining accessible area of quality stone on the island is at Chouet Headland. The Chouet Headland site is within the Vale Parish, at the north-western top of Guernsey. The site is bordered by Mont Chouet landfill to the east and by the sea to the north, west and south. The site contains a mix of uses including residential, leisure and recreation, open land, public amenity land, car parking, heritage and refuse and recycling facilities

Aether Ltd were commissioned to undertake a review of future quarrying options, including a range of phased development and demand led scenarios. Recovery action plans may impact on future demand, and also if the Island entered in and out of lockdown due to the ongoing global pandemic. A 'scenario tool' had been developed to help future decision making.

This report summarises the findings of that review on the carbon impacts of potential different future options for the provision of rock and aggregates.

Background

The Chouet Headland area is identified as an area for mineral extraction. In April 2019, a draft of the Chouet Headland Development Framework Supplementary Planning Guidance was shared for public consultation. Following the consultation the States of Guernsey are reviewing the principle of on-island quarrying and gathering robust evidence to support policy decisions. Any plans for future mineral extraction at Chouet Headland must be sustainable, respecting and protecting the local environment as well as the amenity of local communities and residents and the local infrastructure. The work on carbon impacts of

quarrying options will feed into this wider body of work which will be taken to the States in the future.

Scope

The report focusses only on carbon emissions and not on other factors such as wider environmental factors, economics or rock availability (beyond the anticipated lifetime of the on island quarries as informed by Ronez). Ronez contributed technical information on the amounts of material they quarry as well as providing information allowing a detailed assessment of their on-island carbon footprint.

The following factors were considered when undertaking the scenarios and creating the tool for future use:

- The energy used in on-island mining and quarrying and on-island transportation.
- Energy used for transportation of imported materials.
- Global carbon impacts.
- Energy intensity of quarrying practices in Guernsey, compared to international standards and neighbouring countries that could supply imported materials.
- Potential for increased use of recycled aggregate materials in Guernsey.
- Possible impacts on carbon sequestration/release.
- Scenarios that may arise out of the recovery plan and future policy directions.
- The options for different stone types e.g. granite, mason stone.

An Excel spreadsheet based tool was developed which enables consideration of further scenarios allowing re-evaluation as further information is made available. The following scenarios were explored in the report:

- Supply Scenario A: No development of Chouet Headland
- Supply Scenario B: Phase 1 development of Chouet Headland
- Supply Scenario C: Phases 1 and 2 development of Chouet Headland
- Supply Scenario D: Full (phases 1, 2 and 3) development of Chouet Headland
- Demand Scenario A: Demand drops to 80% of current levels
- Demand Scenario B: Demand rises by 10% per year on 2020 levels for next 5 years

Key findings

When accounting for carbon across the entire supply chain; full development of Chouet results in the lowest carbon impact for both high and low demand scenarios. Due to additional carbon emissions from importation (mostly shipping) of materials the embodied carbon emissions with no development of Chouet are around a factor of two higher than emissions for supply scenario for the full development of Chouet. The carbon intensity of Guernsey's on-island supply of aggregate is comparatively low.

It is important to distinguish between direct (on-island) emissions and indirect (off-island) emissions. Scenarios with no development of Chouet have the lowest direct emissions but the highest indirect emissions and vice versa for full Chouet development scenarios. Only direct emissions count towards Guernsey's national total emissions however indirect emissions are important for considering the global impact of Guernsey's activities

Table's 1 and 2 and figure 1 below illustrate the different carbon intensities of the scenarios modelled. Figure 2 and table three illustrate the average emissions per tonne of aggregate and the breakdown of on and off-island supplies. These all clearly illustrate that additional global carbon impact of importation.

The carbon intensity of Guernsey's own supply of aggregate is low, largely due to the type of extraction and processing that virgin, "land-won" sources involve. The use of electricity in processing also contributes to its low value relative to aggregate from other sources. Any changes in fuel mix used in processing and extraction would result in changes to the carbon intensity of Guernsey's own supply.

When considering supplies of virgin 'land-won' aggregate, the Guernsey embodied carbon factor sits somewhere between the 50th and 75th percentile in value, suggesting that it is a fairly typical aggregate source of its type in terms of carbon intensity. Crucially, the carbon intensity of this type of aggregate source is the lowest of all the averages listed. Other types of source, including 'marine-won' and recycled, tend to have a higher carbon intensity. This sets a high bar for the carbon intensity of any alternative, imported, supply of aggregate to be lower than Guernsey's own supply, when solely considering "cradle-to-gate" (in-earth to processed product) emissions.

Table 1 - Report scenarios

Emissions Scenario	Demand Scenario	Supply Scenario - Chouet development	Total 2020-2035 tonnes CO_2e
1	A: Drops to 80% of current levels for next three years before returning to and plateauing at 2020 levels.	A: No development of Chouet site.	46,628
2		B: Only phase 1 of Chouet site development.	39,254
3		D: Full development of Chouet site.	21,026
4	B: Rises by 10% per year on 2020 levels for next 5 years then plateaus at 50% above 2020 levels.	A: No development of Chouet site.	56,623
5		B: Only phase 1 of Chouet site development.	48,913
6		D: Full development of Chouet site.	30,682

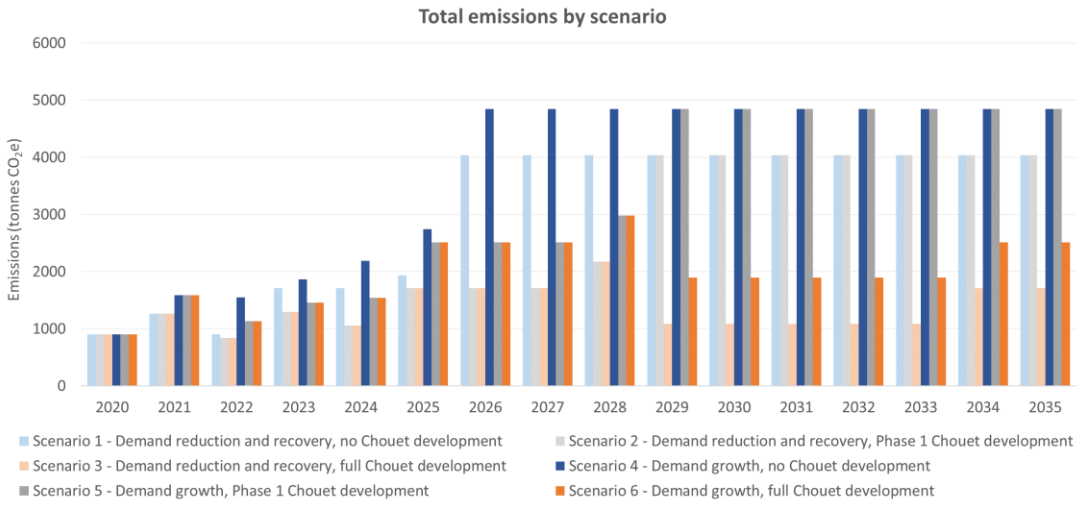

Figure 1 - Total emissions 2020-2035 by scenario

Table 2 - Total emissions 2020-2035 for each scenario (tonnes CO_2e)

Emissions scenario		2020	2025	2030	2035	Total emissions 2020-2035
Scenario 1 – Demand reduction and recovery, no Chouet development	**Direct**	630	625	204	204	**48,766**
	Indirect	271	1,309	3,831	3,831	
Scenario 2 – Demand reduction and recovery, Phase 1 Chouet development	**Direct**	630	670	204	204	**40,900**
	Indirect	271	1,037	3,831	3,831	
Scenario 3 – Demand reduction and recovery, full Chouet development	**Direct**	630	670	795	670	**21,514**
	Indirect	271	1,037	295	1,037	
Scenario 4 – Demand growth, no Chouet development	**Direct**	630	665	245	245	**59,256**
	Indirect	271	2,076	4,597	4,597	
Scenario 5 – Demand growth, Phase 1 Chouet development	**Direct**	630	711	245	245	**51,039**
	Indirect	271	1,803	4,597	4,597	
Scenario 6 – Demand growth, full Chouet development	**Direct**	630	711	835	711	**31,650**
	Indirect	271	1,803	1,061	1,803	

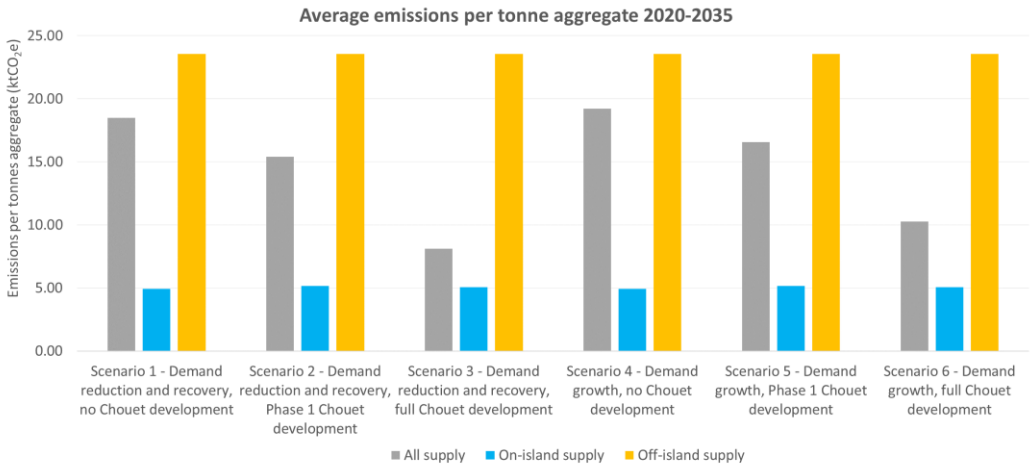

Figure 2 - Average emissions per tonnes aggregate 2020-2035

Table 3 - Average emissions per tonnes aggregate for each scenario, split by on-island and off-island supply

	Average emissions per tonne aggregate 2020-2035 ($ktCO_2e$)		
	All supply	**On-island supply**	**Off-island supply**
Scenario 1	18.48	4.92	23.55
Scenario 2	15.41	5.16	23.55
Scenario 3	8.11	5.05	23.55
Scenario 4	19.21	4.92	23.55
Scenario 5	16.55	5.16	23.55
Scenario 6	10.26	5.05	23.55

The difference in emissions between scenarios with significant importation and those with little importation can largely be attributed to the embodied emissions of imported products, particularly from transportation. It should be noted that changes in international shipping practices to low carbon fuel would greatly reduce the impact of importing aggregate.

However, if only direct (scope 1) emissions are considered (as per the greenhouse gas inventory), scenarios that involve significant importation will have considerably lower emissions than scenarios with greater on-island supply. Emissions associated with the quarrying of the rock will be accounted for in the jurisdiction that the activities occur in (in the case of this analysis, the UK) and shipping in the jurisdiction where the fuel is sold. Considering both direct and indirect emissions allows for consideration of the global impacts of Guernsey's quarrying activities and also is in alignment with the aims of Guernsey's Climate Change Policy.

Conclusions

- It is important to consider any decision within the wider context;
- Local vs global impact – Under international emission reporting practices, all emissions will be accounted for in the source country however, indirect

emissions are important to consider when thinking about the global impact of Guernsey's activities; and
    - On island aggregate production has the lowest associated emissions;
    - Off island aggregate has a lower impact on Guernsey's national reporting of emission;
    - The climate change policy supports accounting for whole life emissions, with E&I tasked to provide more comprehensive reporting in the future;
- Decarbonisation of supply chains has the potential to significantly reduce the carbon intensity of imported aggregate;
- Guernsey's source of rock is a low carbon intensity source.

APPENDIX D

CHOUET HEADLAND

Environmental Appraisal of Establishing a Quarry

Prepared for: **Ronez Limited**

Client Ref:

RONEZ
PART OF THE ISLANDS' FOUNDATIONS

SLR Ref: 403.06370.00001
Version No: FINAL ISSUE
February / 2020

SLR

BASIS OF REPORT

This document has been prepared by SLR with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Ronez Limited (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

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CONTENTS

DOCUMENT REFERENCES

TABLES

FIGURES

APPENDICES

1.0 Introduction

SLR Consulting Limited ('SLR') has been appointed by Ronez Limited to advise on the potential effects on the environment and local amenity through developing a quarry at the Chouet Headland. This work has been undertaken as part of a formal Environmental Impact Assessment ('EIA') which has been undertaken to assess the likelihood of significant effects by developing the eastern part of the headland.

This document is an Environment Appraisal of the likely effects and in essence is an extended summary of the EIA (not a Non Technical Summary as required under the EIA Ordnance) and has been prepared to inform States of Guernsey Committee for the Environment and Infrastructure as part of their consideration of evaluating the options for the future supply of aggregates to the Island construction sector.

It should be noted that the environmental work commenced in c. 2017 and is ongoing and will be refined following the provision of a Scoping Opinion relating to the development. The detailed assessment work also relates to development in the eastern part of the headland as part of the initial phase of developing the headland to establish a new processing plant site. Notwithstanding this, most of the baseline work undertaken relates to the whole of the headland. However, it is considered that this work will provide a reasonable basis for considering the effects of developing a quarry on the headland as an 'on-Island' source of aggregates.

1.1 Quarrying on Guernsey

The granite trade started in the late 18th century. At its peak in 19th Century there were over 250 active quarries within Guernsey. Today there is one active quarry on Guernsey (Les Vardes Quarry) located in the north of the island at St Sampson. The origins of the quarry at Les Vardes are understood to date back a couple of hundred years. It was operated during WW II and abandoned afterwards. The quarry was reopened by Ronez in 1961 and has been operated continuously ever since. Permission for a north-western extension to the quarry containing about 750,000 tonnes of reserve was granted in 2010. There are no further feasible extensions to Les Vardes Quarry.

The quarry works granite deposits from the Bordeaux Northern Diorite formation to produce a range of aggregate products which are supplied to the local construction market, either as 'dry stone' or used in the manufacture of concrete or asphalt.

The quarry has sufficient reserves to sustain production for around six to seven years. Notwithstanding this, over half of the consented reserves lie underneath the processing plant within the southern part of the quarry void and so cannot be accessed until the plant is dismantled.

It is therefore important to source new reserves of granite if supplies of aggregates and related products (concrete, asphalt etc.) are to continue to be available to the island construction sector from an on-island source.

1.2 The Chouet Headland

The Chouet Headland is located at the north-western tip of Guernsey, some 5.6km to the north of St Peter Port, immediately to the west of Mont Cuet landfill site. To the north, west and south the headland is surrounded by sea. To the south is Ladies Bay whilst to the south-east is L'Ancresse Common (within which is the Royal Guernsey Golf Club).

The eastern part of the headland comprises five linear agricultural fields orientated in an east to west fashion with clearly delineated boundaries formed by low vegetated stone walls. To the east of the fields is a road (Rue des Grands Camps) and ancillary land associated with the Mont Cuet landfill site. To the south-west of the fields

is a residential property (bungalow), whilst to the north-west is an old quarry which is being used for recycling/processing green (garden) waste.

The western part of the headland is more open and without any formal structure, comprising an area of coastal grassland on the higher ground surrounded by scrub, bare ground, old quarries and historic buildings, including 18C Pre-Martello tower and associated magazine, batteries and WWII fortifications. The grassland area is used by a model aeroplane club and includes benches and picnic tables. On the western edge of the headland, to the north of the largest WWII structure is a building and shooting range associated with a pistol club. The range, which is located within an old quarry, is securely fenced with chain link fencing, with a flagpole located at the north-western corner. On top of the WWII bunker are an array of masts and solar panels within a fenced compound associated with a weather station.

The initial area to be developed as part of the establishment of a new quarry comprises the eastern part of the headland, namely the agricultural fields and property. In addition, an old quarry and the reception are of Mont Cuet landfill would also be used for ancillary operations, whilst an area to the south of the fields would be used to create a landscaped screen mound. An outline of the development is set out in section 1.3 below.

1.3 The Development of a Quarry on Chouet Headland

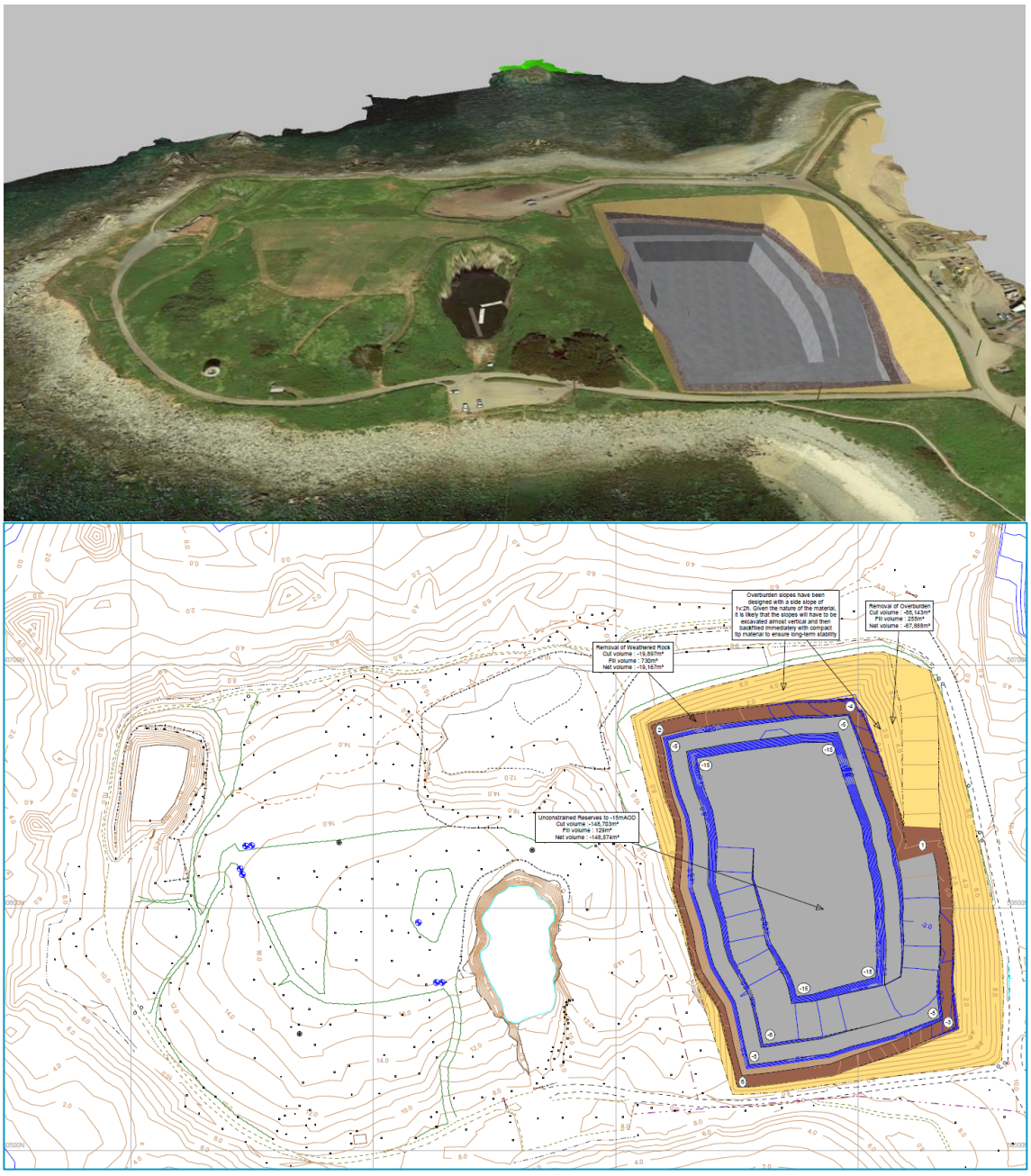
It is anticipated that the Chouet Headland would be developed in three phases, progressively advancing westwards and dovetailing with the completion of Les Vardes Quarry. Operations would commence within the eastern part of the site (which is owned by Ronez Limited) and progressively deepen the mineral working through successive levels, each nominally 10m high, to create a suitable platform below ground level upon which a new processing plant could be erected. During the first phase it is likely that the extracted granite would undergo crushing using a mobile primary crusher located within an old quarry on northern edge of the headland (currently used for green waste recycling). This would make the material more suitable for transporting to Les Vardes Quarry for further processing to produce aggregates using the established plant. Once a suitable platform had been created in the quarry void a new quarry processing plant could be established and the plant at Les Vardes dismantled, allowing the remaining reserves at Les Vardes to be worked, with the extracted rock transported to Chouet for processing.

Following exhaustion of the reserves at Les Vardes Quarry, the workings at the headland would progress into the second phase, extending westwards taking in the old Torrey Canyon Quarry and current green waste tip. The final phase would extend the workings further to the west and include land occupied by a pistol club and model aircraft runway. During this final phase, the quarry would develop to its maximum lateral extent which would allow the workings in Phase 2 to be deepened. At the end of this phase, the plant would be dismantled and the remaining reserves worked, again being processed using a mobile plant.

The design of the quarry would take into account the volume of soils and other deposits (known as overburden) stripped to expose the granite and how this can be beneficially used to help screen the workings to ameliorate both visual and acoustic effects. It would also be necessary to consider what volume of material would need to be retained for final restoration works. Should there be a surplus of such materials then the scheme would need to show how this material can be beneficially used off site. Any overburden not used for screening or other schemes agreed with the States would be placed in the worked out sections of Les Vardes Quarry. As part of the design work consideration would be given to the perimeter treatment of the site to deter access into the working area.

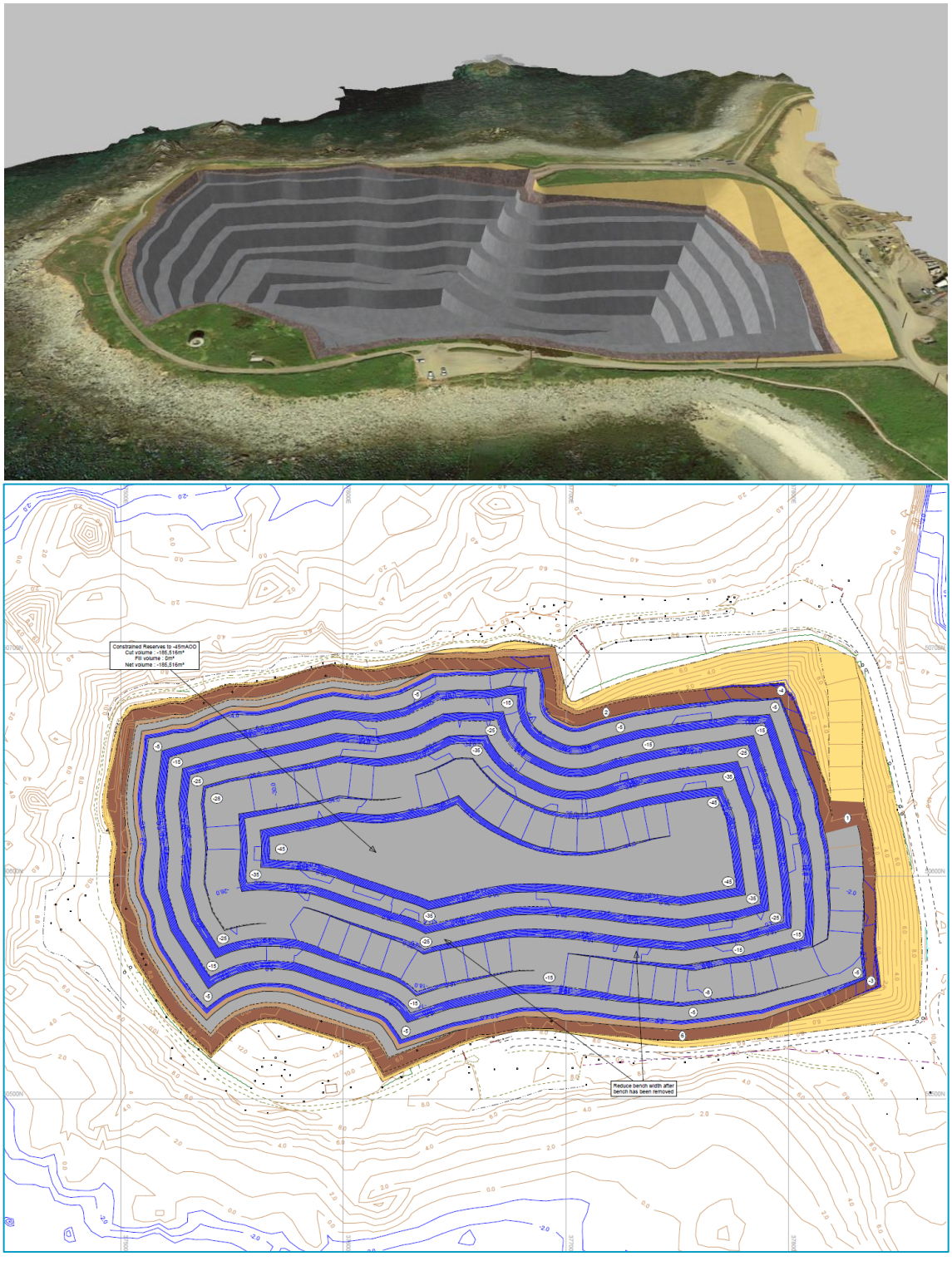
Based on a quarry design work undertaken for Ronez Limited it is anticipated that the first phase of the development could release around 400,000t of saleable rock (allowing for production losses) and so sustain production for around 3 years. After this, the remaining 480,000t of reserves at Les Vardes Quarry would be transported to Chouet for processing, which could last for around 3 to 4 years. Figure 1-1 provides an illustration of how the eastern part could be developed; however, the illustration is not meant to be prescriptive as the final design would be informed by various environmental studies as well as geotechnical considerations.

Figure 1-1
Phase 1 Development within the Headland



Phase 2 of the development could release a further 685,000t of saleable rock whilst Phase 3 could release and additional 3.05Mt of saleable rock. The overall design of the quarry, allowing for reserves lying underneath the processing plant, could yield in total 4.1Mt. Figure 1-2 illustrates the possible maximum quarry design (again it is not meant to be prescriptive).

Figure 1-2
Maximum Extraction Potential



In terms of restoration without importing fill materials the quarry void would fill with water over time to create a new waterbody. At this stage it is not possible to be prescriptive over the final restoration scheme and after-use for the quarry. However, the following options present themselves:

- Infill the quarry void with inert waste materials; or

- Allow the void to fill with water for the supply of water; or
- Link the quarry void to the bay to the south and create a marina.

1.4 The Environmental Studies

SLR has undertaken a range of baseline studies to be able to characterise the environment of the headland and the immediate surrounding area. These studies comprise the initial part of the EIA work and form the basis against which assessments can be undertaken. The baseline studies include survey and other field work alongside desk based data gathering. In this respect the following surveys have been undertaken:

- Archaeology and Heritage – desk based data gathering and 'walk over' survey of the headland by qualified archaeologist.
- Ecology – an extended Phase 1 habitat survey along with targeted surveys for:
    - Reptile Survey;
    - Bat Survey;
    - Wintering Bird Survey; and
    - Breeding Bird Survey.
- Landscape and Visual – desk based assessment in relation to landscape character and the potential zones of visibility followed by site work to examine potential viewpoints.
- Noise – measuring background noise levels at sensitive receptors around the headland.
- Transport – undertaking traffic counts on local roads and survey of local road network.
- Vibration – gathering of data on recorded vibration levels as a result of blasting operations at Les Vardes Quarry;
- Water Environment – desk based data gathering, groundwater monitoring, walk over survey by qualified hydrogeologist.

1.5 Structure of this Report

The following sections in this report address each environmental topic that has been studied; the topics have been addressed in alphabetical order as opposed to any perceived order of importance.

- Section 2 Air Quality Assessment
- Section 3 Archaeology and Cultural Heritage
- Section 4 Ecology
- Section 5 Landscape and Visual Impact
- Section 6 Noise
- Section 7 Transportation
- Section 8 Vibration
- Section 9 Water Environment

1.6 SLR Consulting Limited

SLR is a multi-disciplinary environmental consultancy to *inter alia* the minerals, energy and waste management industries, and also provides advice to local authorities together with both nongovernment and government bodies on strategic issues. SLR is a registered Environmental Impact Assessor Member of IEMA and has secured the EIA Quality Mark awarded by IEMA.

In undertaking the environmental assessment work, SLR has drawn upon the expertise of an in-house team of specialists comprising planners, landscape architects and environmental scientists for the technical assessments. SLR has also worked closely with the management teams and technical staff of Ronez Limited, as part of an iterative process, to ensure that the proposed development is practical, feasible and optimises environmental protection.

SLR has a specialist capability in mineral and waste planning. SLR is a member of the 'Institute of Environmental Management and Assessment' (IEMA) with an awarded EIA 'Quality Mark'. The EIA Quality Mark is a voluntary scheme, operated by IEMA through which EIA activity is independently reviewed, on an annual basis, to ensure it delivers excellence in the following areas:

- EIA Management
- EIA Team Capabilities
- EIA Regulatory Compliance
- EIA Context & Influence
- EIA Content
- EIA Presentation
- Improving EIA practice

2.0 Air Quality

2.1 Baseline

2.1.1 Air Quality Review and Assessment

The Office of Environmental Health and Pollution Regulation (OEHPR) prepares air quality screening and assessment reports to provide an overview of the air pollution levels on-island and the local contributors to the measured pollutants.

The most recent 'Screening and Assessment Document' for air quality in Guernsey is the report issued in July 2015, representing the second comprehensive document following the 2010 Air Quality Screening and Assessment. The reports seek to provide a detailed review of air quality monitoring data collected and present trend analysis data. The reports focus on sources and levels of local ambient (outdoor) air pollution in comparison with the standards and objectives set in UK law.

The 2015 Screening and Assessment Document states that ambient air quality has been monitored across the island by the OEHPR since 1992 with strong evidence that generally air quality is good. There is evidence of pollutants that pose notable concern locally and the presence of hotspots where there are localised high concentrations of pollutants.

The 2015 report concluded that over the five year period (2010 to 2014) ongoing compliance with standards (UK AQO) for nitrogen dioxide have been achieved whilst PM_{10} concentrations in the built up industrial area on the south of the Island exceeded the more stringent Scotland AQO in 2014. This area of concern is located approximately 3.5km south of the headland and is not therefore identified as an area that would be affected by the proposed development of a quarry.

2.1.2 OEHPR Monitoring Data

The OEHPR currently maintain two permanent monitoring locations; Lukis House monitoring for NOx (and CO) and Bulwer Avenue monitoring for NO_x & PM_{10} (& SO_2).

Lukis House station is located on a busy road between St Sampson and St Peter Port, in a built up urban area approximately 5.5km southwest of the headland. Bulwer Avenue is a roadside location in the industrial area of St Sampson, located approximately 3.5km south of the headland.

Given the distance and the location in the built up urban / industrial environments of the permanent automatic monitors, pollutant concentrations are not considered to be representative of the rural locale of the headland. Monitoring data for the two permanent monitors for 2017 is presented below in Table 2-1.

There are no data sources for which to predict background concentrations of PM_{10} or NO_2 for the area of the application site and surrounding receptors.

Table 2-1
2017 Automatic Monitoring Data

Monitor	Classification (& distance from Site)	PM_{10}		NO_2	
		PM_{10} Annual Mean	No. 24hr exceedances >50µg/m³	NO_2 Annual Mean	No. hrly exceedances >200µg/m³
Bulwer Avenue	Roadside 3.5km from Site	27	0	14	0
Lukis House	Roadside 5.5km from Site	-	-	27	0

a) Lukis House monitor monitors for NO_2 only

Table 2-1 demonstrates that in the built up urban / industrial areas where SoG consider monitoring of air quality to be required, the UK AQOs have been met during 2017. On this basis, it would be reasonable to assume that PM_{10} and NO_2 levels within the rural setting of the application site would be considerably less.

Nitrogen dioxide (NO_2) levels are also monitored on a monthly basis using diffusion tubes situated at roadside locations across Guernsey. The annual mean objective level for NO_2 of 40µg/m³ is being achieved across each individual monitoring location.

The closest diffusion tube monitoring location to the headland is approximately 2km distant within the residential area of La Passee on the northern coastline. There are no diffusion tubes located in rural areas similar to that of the application site that would be considered to be representative of air quality in the locale of the Site.

2.1.3 PM_{10} Monitoring at Les Vardes Quarry

A 3 month monitoring programme was undertaken in 2012 by Aggregate Industries[1] to establish the ambient baseline concentrations of PM_{10} in relation to the extension of operations at Les Vardes Quarry. The monitoring was undertaken at a property to the west of the quarry, representing the closest residence to the extension area.

The results concluded the following:

- the 3 month mean was 24.7 µg/m³, well within the AQO of 40 µg/m³;
- the scheme recorded 2 exceedances of the daily limit of 50 µg/m³;
- easterly winds transported a notable influence of secondary particles from mainland Europe;
- the predominant southwest and westerly winds conveyed considerable concentrations of sea salt, resulting in an addition 15 µg/m³ when compared to data collected from Plymouth and Southampton City Centres; and
- southwest and westerly winds accounted for over 50% of wind within Guernsey.

2.1.4 Disamenity Dust Monitoring and Complaints Records

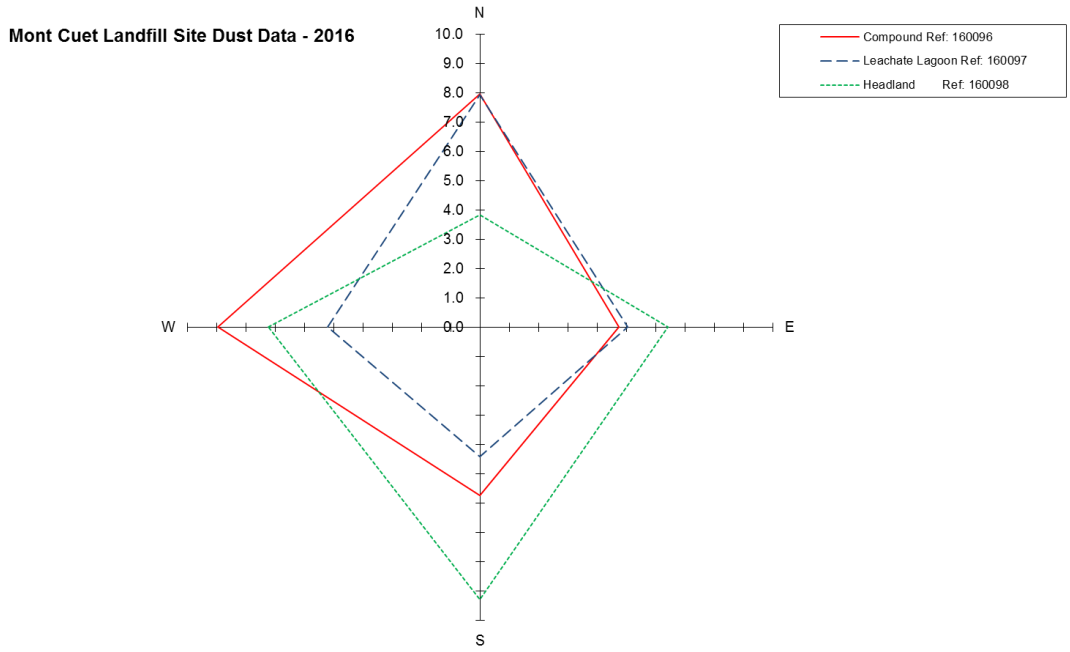
Monitoring of dust levels have been undertaken at the adjacent Mont Cuet Landfill site. Monitoring is undertaken at three locations:

[1] Advance Environmental, 2012. Report on PM_{10} in the vicinity of the Les Vardes Quarry Guernsey. November 2012

- southern boundary ("Leachate Lagoon");
- north western corner ("Headland"); and
- southwestern corner of the operational landfill site. ("Compound").

Dust is monitored by the determination of the 10-day percentage obscuration on samples collected in the directional dust gauges. The 10-day obscuration percentage (TDO) is a measure of the percentage of horizontal area which would be covered by dust during 10 days exposure. The 2016 dust-roses for the three monitors at Mont Cuet landfill site is presented below in Figure 2-1.

Figure 2-1
Mont Cuet Disamenity Dust Monitoring Results (2016)



Disamenity dust at the compound monitor have strong northerly and westerly components, corresponding with internal infrastructure and onsite areas where vehicle movements are likely to be frequent. The monitor at the headland demonstrates a strong southerly component likely to be attributed to the active filling area. The monitor at the leachate lagoon indicates a northerly component of disamenity dust likely to correspond to the landfill area utilised for stockpiling purposes.

2.1.5 Complaints

Given the likely similarity of operations, working techniques and attitude towards environmental management between the current operations at Les Vardes Quarry and the proposed development a review of complaints received in relation to dust in the local area of Les Vardes Quarry has been undertaken. Les Vardes Quarry is located in an area where residential properties of high sensitivity to dust are located within 100m; more than 200 dwellings are located within the IAQM screening distance of 400m. For comparison, for the proposed development at the headland has 4 residential properties located within this distance.

It has been confirmed during discussions with the OEHPR that no complaints in recent years have been received with regard to dust emissions from existing operations undertaken at the working Les Vardes Quarry.

Following discussions with the Waste Services and Environmental Monitoring department of States of Guernsey, it was confirmed that complaints regarding dust from the landfill site are 'rare'. Active dust suppression on site includes a perimeter misting system along the southern boundary of the site and a mobile sprinkler system to dampen down internal roadways.

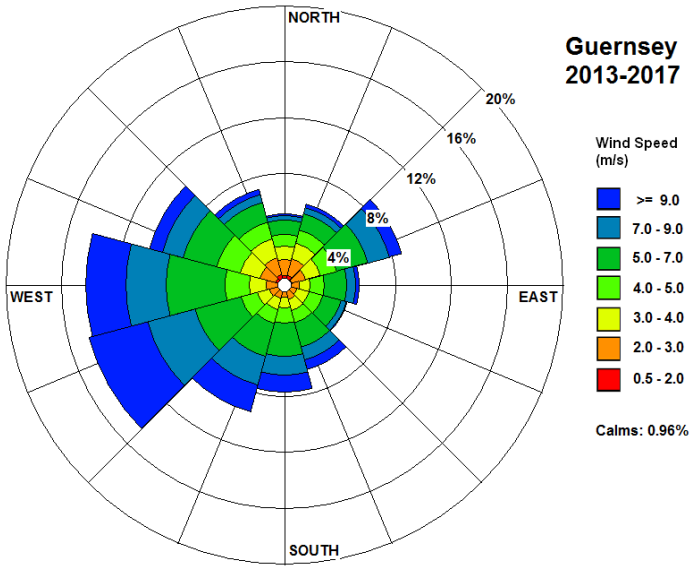
2.1.6 Meteorology – Dispersion of Emissions

The most important climatic parameters governing the release and dispersal of fugitive emissions from the proposed development are wind speed, direction and rainfall (for dust emissions):

- wind direction determines the broad direction of dispersal;
- wind speed affects ground level concentrations by increasing the initial dilution of pollutants in the emission. It will also affect the potential for dust entrainment; and
- rainfall naturally supresses dust release.

A five year windrose from Guernsey Airport (located approximately 9km to the south west) is presented in Figure 2-2.

Figure 2-2
Wind Rose of Guernsey Airport Meteorological Station (2013 to 2017)



The windrose from Guernsey Airport shows that the majority of winds are from the western sectors, with winds from 195° to 315° occurring for approximately 49% of the year. High winds (greater than 5m/s) occur for an average of 56% of the year, with the dominant directions being between 215° to 285°. On this basis, locations to the east and northeast would expect to have the highest potential for impacts from any dust emissions generated by the proposed development.

Relevant rainfall data applicable to the application site has been obtained from the Met Office website[2] of UK mapped climate averages for 1981-2010. The average annual rainfall >1.0mm/day for the area of the site is 130.5 days per year, comprising approximately 36% of the year. As such, the number of days with sufficient rainfall to suppress dust emissions (>0.2mm/day) is expected to be greater still.

[2] Meteorological Office Website http://www.metoffice.gov.uk/climate/uk/averages/key-features-1981-2010, accessed August 2018

Table 2-2
Rainfall (Total) Data: Guernsey Observation Station

highlights seasonal rainfall variation during the climate period 1981 - 2010. As anticipated, winter months experience an increase in the quantity of rainfall. As such, the potential for dust emissions are higher during the summer months.

Table 2-2
Rainfall (Total) Data: Guernsey Observation Station

Rainfall (mm)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
92.5	70.2	66.7	53.1	51.2	45.5	42.1	47.8	57.6	95.0	104.3	112.7

2.2 Appraisal

2.2.1 Screening Criteria

The IAQM[3] uses a distance-based screening criteria for both airborne concentrations and deposited dust. It states that dust impacts associated with disamenity effects from hard rock sites are considered to occur mainly within 400m of the operations.

In accordance with the IAQM methodology, if there are relevant receptors within 400m and 1km then further assessment of dust deposition and PM_{10} will be required, respectively.

2.2.2 Assessment of Vehicular Emissions

Atmospheric emissions from vehicles related to site proposals are primarily associated with the exhaust emissions from Heavy Duty Vehicles (HDVs). The decision as to whether an assessment of potential impact is required is based upon the screening criteria set out in the EPUK/IAQM guidance.

The primary criteria set out in the EPUK/IAQM to assist in the determination of whether further assessment of vehicle exhaust emissions is required, as presented in Table 2-3.

Table 2-3
EPUK / IAQM Vehicle Emissions Screening Criteria

Vehicle Category	Relevant Criterion for Application Site
LDVs (vehicles <3.5 tonnes)	>500 AADT additional movements
HDVs (vehicles >3.5 tonnes)	>100 AADT additional movements

In the event that, as a result of the proposed development there is an increase in vehicle movements that exceeds the IAQM/EPUK guidance criteria, further assessment would be undertaken.

[3] Institute of Air Quality Management

2.2.3 Sensitive Receptors

The term 'sensitive receptors' includes any persons, locations or systems that may be susceptible to changes in abiotic factors as a consequence of the development. These have been identified as human receptors and ecological receptors sensitive to fugitive dust and vehicular emissions.

Human Receptors

The IAQM Guidance states that the majority of impacts from fugitive dust emissions from hard rock quarries are experienced within 400m of the dust generating activity. A desk study was undertaken to identify sensitive receptors within 400m of the application site.

The receptors considered in the assessment of dust amenity impacts are presented within Table 2-4 Human Sensitive Receptors

2-4 and on **Drawing CH 1**. Where these are referenced within the report text, they are referred to as R1 – R9. It is noted that the residential property within the headland would demolished as part of the proposals.

Table 2-4
Human Sensitive Receptors

Receptor		Distance / Direction from Development Boundary		Sensitivity to Dust
R1	Residence Mont Cuet Road	<100m	South	High
R2	Restaurant Mont Cuet Road	<100m	South	High
R3	Residence	250m	East	High
R4	Residence	<200m	South-east	High
R5	Café	<200m	South-east	High
R6	Golf Club (playing green)	350m	South-east	Low
R7	Car Park	<50m	West	Low
R8	Golf Club (playing green)	>400m	East	Low
R9	Recreational RC flying area	<100m	West	Low

Ecological Receptors

There are no designated ecological designations within the application site, with isolated areas of the Site of Special Significance (SSS) L'Ancresse Common located within 400m of the development site boundary. L'Ancresse Common is a large area of unenclosed land in the north of Guernsey, which consists mainly of dune grassland and scrub. Areas of the SSS within 400m of the Site include a small area comprising a water body with dense scrub located 190m to the west of the site, and an area of dune grassland located 100m to the south.

The IAQM Guidance states the sensitivity of an ecological receptor to dust emissions should be based on both the value of the habitat (i.e. level of designation) and the sensitivity of features within the areas to dust deposition. The guidance suggests that sites of National importance with designated features with the potential to be affected by dust deposition should be classified as medium in sensitivity.

On the basis of discussions with SLR's ecologist and information provided in Section 4 (Ecology), there are not considered to be any feature of specific sensitivities to dust within the L'Ancresse Common SSS. In accordance with IAQM guidance, the SSS has been classified in the assessment as a receptor of medium sensitivity.

On the basis that the L'Ancresse Common SSS does not have any features with any specific sensitivities to dust, it has been included in the assessment as a receptor of medium sensitivity.

2.2.4 Potential Sources of Fugitive Dust

The potential sources of airborne dust emissions are considered to include the following activities:

- site preparation activities (stripping of soils, screen mound formation);
- mineral extraction;
- handing and transfer of material;
- mineral processing;
- storage and stockpiling of material; and
- off-site vehicle movements.

Table 2-5
Residual Source Emission Magnitude

Phase	Dust Generating Activity	Justification	Maximum Source Magnitude
Preparation	Construction of ancillary areas	Limited to plant site, stockpiling areas and loading / unloading area (<5,000m^2) Minimum stand off to receptors	Small
	Soil stripping and overburden removal	Unsurfaced haulage routes Water bowser on site Discrete areas worked Minimum stand off to receptors	Small
	Construction of screening mounds	Material potentially dry and high dust potential Located along periphery of site Duration of 3 months for southern mound seeded immediately on completion	Medium
	On-site vehicle movements	Unsurfaced haulage routes Water bowser on site	Small
Operational Phase	Mineral processing (Plant Site)	Mobile screen and jaw crusher (with incorporated dust suppression system) 125,000 tonnes per annum throughput Majority of processing offsite initially (at Les Vardes Quarry)	Small

Phase	Dust Generating Activity	Justification	Maximum Source Magnitude
	Mineral stockpiling (Plant Site)	Location at greatest distance from off-site receptors	Small
	Soil stripping and overburden removal (Excavation Area)	limited to discrete sections <2.5ha	Small
	On-site vehicle movements	2 x dump trucks for internal transfer Proportion of route above ground would reduce as working depth increases Unsurfaced haulage routes Water bowser on site	Small
	Mineral extraction	Single excavator (such as Komatsu PC450 or similar) Sheltering effect as working face deepens Blasting 2-4 times / month Blasting equipment with incorporated dust collection system Excavated mineral of low dust potential	Small
	Off-site vehicle movements	Approx. 64 HDV movements per working day (46 AADT) Offsite vehicles restricted to paved roads to access loading area at plant site Minimum of 200m paved road prior to using wheel wash Additional 70m paved road after wheel wash before joining public road network Loads if <75mm particle size sheeted	Medium <200m from Site Access Small >200m from Site Access

Activities associated with the site preparation phase have the potential to cause a slight adverse effect on receptors R1, R2 and R3. Predicted effects at the remaining receptors and for the operational phase are considered to be negligible.

The stripping of soils and overburden and the construction of the southern screening mound during the preparation phase would be located within 200m of the identified receptors (R1, R2 and R4) for a maximum period of up to 6 months. During this period there would be the potential for slight adverse effect on disamenity in the absence of any additional dust control on site. Following the seeding and subsequent stabilisation of the mound, the potential for dust generation would reduce to negligible.

In terms of the impact assessment of off-site transportation the source of dust emissions that would cause trackout on the local road networks would be the site itself, including the site access road. As such, the potential for trackout would reduce with distance from the quarry as the dust source is reduced.

The dust impact assessment for trackout has identified that there is one receptor (R1, Residence on Mont Cuet Road) where there is potential for a slight adverse effect from trackout. Receptor R1 is located within 10m of the road for which HDVs would be travelling on route to Les Vardes Quarry, 100m from the site access. However, it should be noted that the effects would be similar to those associated with HGVs visiting the Mont Cuet landfill site.

The overall assessment of effect is considered to be not significant. Additional mitigation has, however, been recommended (see **Appendix 01**) with particular attention to those activities that have been identified as having the potential to cause 'slight adverse' effects on the receptors in the immediate locale.

2.2.5 Assessment of Effects and Significance – Vehicular Emissions

The increase in vehicle movements from the headland during the operational phase of extraction would be around 46 HDV movements as AADT[4]. The predicted trip generation is significantly below the EPUK-IAQM screening criteria of 100 HDV AADT movements for which further assessment of emissions would be required. Therefore, consistent with EPUK-IAQM guidance, no further quantitative assessment is required and the impacts of traffic emissions in the local area can be considered 'not significant'.

2.3 Conclusions

A qualitative dust impact assessment has been undertaken in order to assess predicted impacts as a result of dust emissions from the proposed development, in line with the IAQM document *Guidance on the Assessment of Mineral Dust Impacts.*

The assessment of PM_{10} effects on human health concluded that air quality would remain well within the UK national air quality standards, with no significant effects predicted.

With regard to disamenity effects from deposited dust, the overall significance of effect of the proposed activities is predicted to be negligible in accordance with IAQM guidance. The assessment takes into account the environmental designed in measures in addition to range of recommended dust controls that would incorporated into the proposed working scheme. A number of mitigation measures in accordance with industry best practice have been recommended for inclusion within the proposed working scheme.

The proposed working of the headland is considered unlikely to cause any adverse effects with regard to dust or air quality. The overall residual impact of the site on PM_{10}, suspended dust and deposited dust is considered to be not significant.

All potential dust impacts from the proposed development are considered to be reversible i.e. the risk of impact will cease on completion of the extraction and restoration activities at the site, with no significant impacts on local air quality during the operation or following completion of the development.

[4] Annual Average Daily Traffic

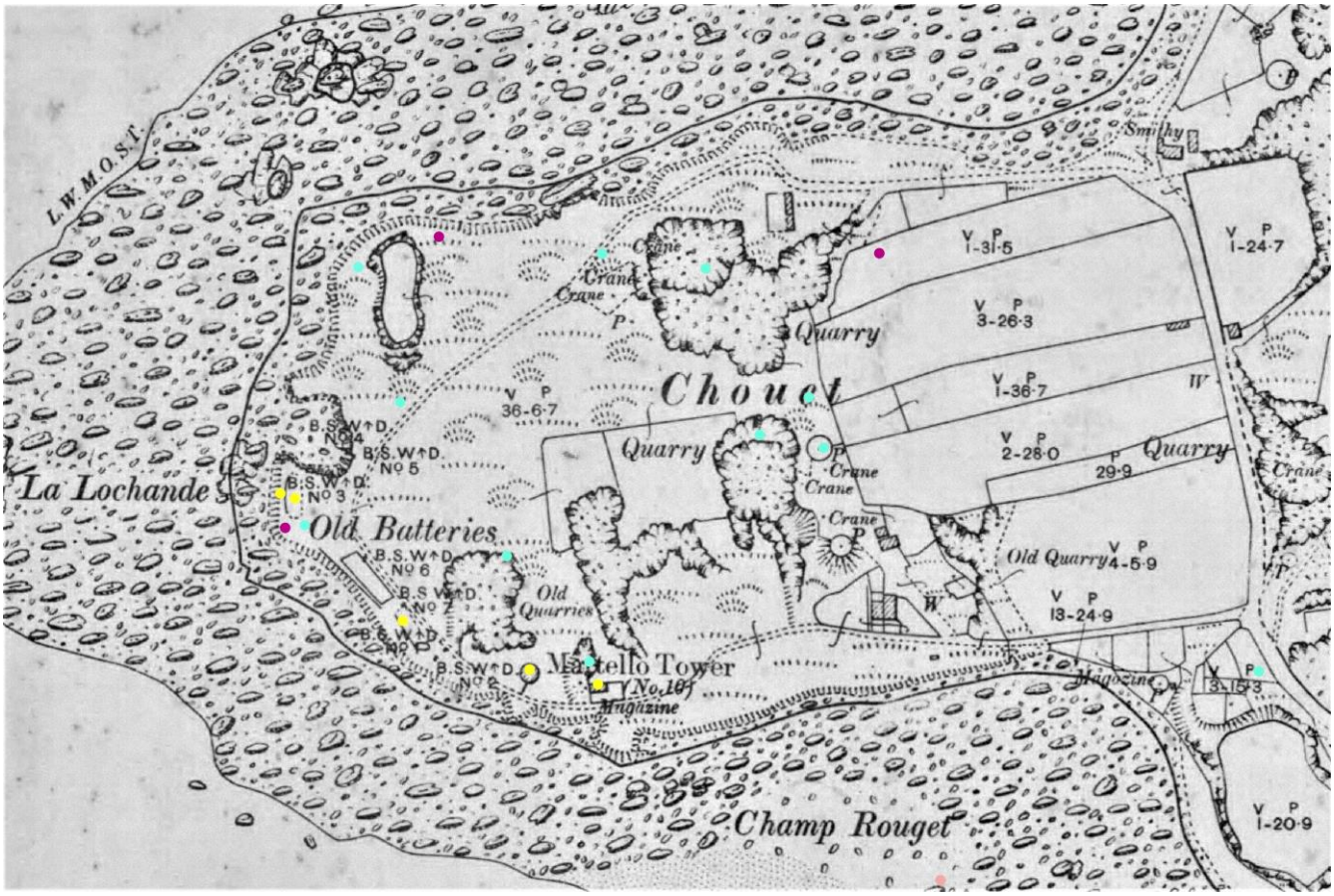
3.0 Archaeology and Cultural Heritage

3.1 Baseline

Despite historic and recent quarrying activity, the archaeology and cultural heritage in and surround the Chouet Headland is extensive. Many sites, including Registered Buildings and Registered Sites, are mainly within the foreshore zone, with eight sites located within the core of the Headland (Figure 3-1). Many of the sites are considered industrial, associated with recent former quarrying industry (Figure 3-2). Immediately east of the quarrying is a linear field system, constructed of five rectangular east-west plots.

Figure 3-1
List of sites present on the States of Guernsey's Historic Environment Record (HER)

Figure 3-2
Ordnance Survey map dated 1898 showing the quarried landscape of the Headland and the rectangular plots to the east



The Chouet Headland is located within the northern part of Vale[5] Parish. The history of this part of Guernsey extends as far back as the Mesolithic period (if not earlier). The neighbouring L'Ancresse Common, much of it used for public recreation, is home to a number of significant Protected Monuments and includes:

- Le Dolmen de Déhus;
- La Varde passage grave;
- Les Fouaillages;
- La Platte Mare, cist-in-circle;
- La Mare es Mauves, cist-in-circle; and
- Martello loophole Tower No. 7 cist-in-circle.

In addition to these sites, the parish also contains a number of archaeological findspots that date from the prehistoric era to the post-medieval period; findspots are recorded on the States of Guernsey Historic Environment Record (HER). The distribution of the prehistoric findspots provides some indication of the

[5] Guernésiais French: Lé Vale, one of the ten parishes of Guernsey

potential density of prehistoric activity within this part of the island. For example, identified within the western section of the Chouet Headland are seven prehistoric findspots.

During the early part of the historical period, Guernsey was under the control of the Duchy of Normandy (William I). At this time much of Vale parish was under the fiefdom of Saint Michael and nearby a Benedictine Abbey was established. Also established within the parish were Vale Castle (also known as the Castle of St Michael) and the Vale Parish Church of St Michel du Vale. It was around these two prominent landmarks that the settlement of Vale became established.

During the medieval and post-medieval periods Vale Parish was involved in external conflict. In 1372 a pretender to the Welsh throne (Owain Lawgoch) attacked Guernsey (on behalf of the French Crown) killing 400 island militia before retreating. Further conflicts between the islands and French continued during succeeding centuries; most notably were the Napoleonic Wars of the late 18th and early 19th century and the German invasion of the island archipelago in 1940. For each event, Vale Parish, and, in particular, the Chouet Headland contains a number of extant buildings and monuments that reflect these military campaigns.

Prior to 1806 Vale Parish formed the island of Le Clos du Valle and land on the Guernsey mainland - Vingtaine de l'Epine. Separating this island from the Guernsey mainland was a narrow tidal channel of water known as the Le Braye du Valle which was drained and reclaimed (filled-in) to create one island. The reclaiming of this stretch of water by the British Government was for defensive reasons. It was during this time that many of the Napoleonic military installations were constructed and in use.

At the beginning of World War II, the German military invaded the Channel Islands. As part of their long-term defence strategy, the Atlantic Wall was constructed. This programme of work involved the fortification of the western and norther coastlines of Guernsey where a possible Allied invasion might occur. Evidence for this massive fortification programme is present along the coastline of Vale Parish, including gun emplacements and tunnels on the Chouet Headland.

Notable military sites within the parish include:

- The site of Vale Castle;
- Fort le Marchant;
- Fort Doyle;
- Fort Pembroke;
- Rousse Tower;
- Eight Guernsey loophole towers (Numbered 4 to 11);
- Beaucette Battery dating from the Napoleonic Wars;
- La Lochande Battery dating from the Napoleonic Wars;
- Nid L'Herbe Battery and Magazine dating from the Napoleonic Wars;
- Portinfer Battery dating from the Napoleonic Wars;
- German fortifications, built during the occupation years 1940-45.

Based on the States of Guernsey's Historic Environment Record (HER), over 7000 sites are recorded; of these 5623 sites are identified on the mainland of Guernsey. The Chouet Headland and the neighbouring L'Ancresse Common boast a rich prehistoric and historic past with a number of extant Neolithic and Bronze Sites dispersed across an open landscape, including those incorporated into the greens and fairways of the Royal Guernsey Golf Club (also known as L'Ancresse Golf Club). A prehistoric presence on the Chouet Headland is the form of

diagnostic worked flint and stone artefacts, referred to in the HER as 'findspots'. The date range for these artefacts extends between the Neolithic (4500-2000 BCE[6]) and Bronze Age (2500 to 900 BCE).

The most obvious and earliest extant monuments present within the Study Area include the Pre-Martello loophole Tower No. 10 (MGU 171) and its associated battery buildings (MGU 449 & 450) and a magazine (MGU 588). The tower and batteries are marked on the Duke of Richmond survey map of 1787 . The magazine building constructed of stone and supporting a slate tiled roof is not marked but it is assumed that the tower could not function effectively with its magazine. Both this building, Pre-Martello loophole Tower and the batteries are located close to the coastal edge, on the southern and western side of the headland and are therefore afforded a high degree of protection from the Development Site, both from direct and indirect impacts.

Based on the Duke of Richmond survey map and late 19th century Ordnance Survey mapping are the field boundaries that belong to the field system that occupies the main part of the development site (SLR 002, Table 2 in **Appendix 02**). The southern-most field[7] of this group is present on the Duke of Richmond survey map, along with a north-south field boundary that later forms the western boundaries to the other four fields appears to be the earliest; although, one could argue that the void between the southern-most field and a section of the northern coastline of the headland were in agricultural use. It is more than likely that elements of the earlier field system survive within the current field boundary alignment.

Intense industrial activity is witnessed on the Ordnance Survey map of 1898 (and its early 20th century successors). On this map (but sometimes difficult to identify within the field) are up to seven quarries (e.g. SLR 001, Table 2 in **Appendix 02**), the [current] historic layout of the five fields, the Pre-Martello loophole Tower and its magazine, the Old Batteries, an ancillary buildings associated with a quarry, locally known as 'Green Waist' Quarry, a series of cranes (and associated stanchions), water pumps and a remnant field system located immediately west of the quarry that currently holds crude oil from the Torrey Canyon (SLR 001); later quarrying has cut into the eastern section of the field. Immediately south and east of the same quarry are a number of buildings including a cottage terrace. The mapping at this time also shows the western side of the headland to be covered by grassland. It is probable that by the end of the 19th century most of the quarrying activity had ceased. Currently five of the seven quarries shown of the 1898 Ordnance Survey map have been backfilled.

There are numerous archaeological sites that arguably have a group value including World War II installations. These sites include the Pre-Martello loophole Tower (and associated magazine, a telephone switching post (MGU 2430) and military magazine building, located south-east of the headland and World War II military installations that occupy the western coastal fringes of the headland (MGU 449, MGU 565, MGU 2434 and MGU 2435). Further sites occupy the northern shoreline of the headland and include MGU 2437 and MGU 6923 (World War II military installation and the prehistoric flint findspot). A further military installation is located outside the headland and lies to the east within the current landfill area (MGU 2469).

One site, which is not visible, stands c. 63m north of the Pre-Martello loophole Tower, between two backfilled quarries, and is at depth of c. 8m below the current ground level. The tunnel system, used for generating electricity was uncovered by the Festung Guernsey Group in 2011 and later reported in detail in their publication *German Tunnels in Guernsey, Alderney and Sark* (2012) (MGU 2439). This roughly H-plan tunnel system housed three 30 KVA generators for use in an emergency should the mains electricity fail.

Archaeological and cultural heritage assets within and surrounding the development site include a number of extant monuments, find-spots and World War II (WWII) structures/features (totalling 27 sites); these sites are present on the island's Historic Environment Record (HER), see **Table 1 in Appendix 02**. In addition to this assemblage, the walkover survey, undertaken by SLR in May 2018 identified a further five sites – see **Table 2 in Appendix 02**.

[6] Before Christian Era
[7] Registered as land parcel C012745

3.2 Appraisal

Based on the walkover survey and online and hard-copy documentary sources, the assessments of the effects on archaeology and Cultural Heritage are considered to be largely Minor in relation to developing the eastern part of the headland; this is despite the fact that non-designated sites such as a field system (SLR 002) located within the eastern section of the proposed development site would be removed as part of the initial phase of development (a *preservation-by-record* account of these two sites is recommended - see Mitigation in Section 3.2.2 below). As the quarry develops the other sites that stand within the boundary of the proposed development site will also be affected (see Section 3.2.2 below).

No Protected Monuments would be directly affected through the development of the quarry, as these would be excluded from the footprint of any development works.

3.2.1 Archaeological/Cultural Heritage Potential

To summarise the findings of this chapter and to broadly assess the potential for survival or presence of archaeological/cultural heritage assets of the various chronological periods discussed above, the table below outlines the known archaeological and historic evidence that stands within the arbitrary study area.

Table 3-1
Summary of the archaeological potential for Developing Eastern part of Headland

Period	Evidence	Potential
Palaeolithic-Neolithic	Based on various documentary sources, there is no evidence of early prehistoric activity within the curtilage of the proposed development site or within the vicinity. There is, however, a Neolithic presence in the form of several Neolithic findspots including a stone ring (MGU 6284) and stone axe (MGU 3677) from nearby Mont Cuet. To the south of the Headland, on L'Ancresse Common are a number of extant prehistoric sites dated to the Neolithic period; however, dues to the topography of the northern part of the common there is no intervisibility and therefore no indirect impacts.	LOW TO MODERATE
Bronze Age - Iron Age	Based on various documentary sources, there is limited evidence of Bronze Age or Iron Age activity within the curtilage of the site or the surrounding landscape including four findspots that have yielded flint artefacts (MGU 565, MGU 2139, MGU 5599, MGU 6923); one of these sites MGU 2139 is located within the field system (SLR 002).	LOW TO MODERATE
Romano-British	Based on various documentary sources, there is one findspot that has yielded Roman coins, located outside the proposed development site.	LOW TO MODERATE
Early Medieval	Based on various documentary sources, there is no evidence of Early medieval activity within the curtilage of the site or the surrounding landscape.	LOW TO NEGLIGIBLE
Medieval	Based on various sources, there is no evidence of medieval activity within the curtilage of the proposed development site, although one cannot dismiss the fact that certain features present on the Duke of Richmond survey map of 1787 may have their origins in the medieval period, including sections of the current field system that stands within the eastern section of the proposed development site.	MODERATE
Post-Medieval	Present within the proposed development site boundary are a number of sites that characterise the headland as a post-medieval industrial area (SLR 001, SLR 005), along with an agricultural presence (SLR 002). During and following industrial activity, the headland became the focus for military activity, especially during the late 18th/early 19th century and World War II (MGU 171, MGU 449, MGU 450, MGU 588, MGU 830, MGU 2438, MGU 2430 to MGU 2439, MGU 2469 and MGU 6903). Sites MGU 2430,	HIGH

Period	Evidence	Potential
	MGU 2431, MGU 2432, MGU 2434. MGU 2438, MGU 2439 and MGU 6957 inside the curtilage of the proposed development site.	
Conservation Areas	The proposed development site does not stand within a designated Conservation Area; however, two Conservation Areas (Vale Church and Les Mielles) stand some way south of the Chouet Headland and are therefore not directly or indirectly affected due to the topography of the landscape between Vale and Chouet Headland.	N/A
Protected Buildings	There are no Protected Buildings that stand within the curtilage of the proposed development site.	N/A
Protected Monuments	There are no Protected Monuments within the curtilage of the proposed development site; however, a Pre-Martello loophole Tower (and its associated magazine stands west of the Development Site boundary, within States of Guernsey land (MGU 171). Further Protected Monuments stand close by but are not affected by potential indirect impacts that may occur from quarrying operations from the proposed development site	N/A
Battlefield sites	There are no Battlefield sites within the curtilage of the site or the proposed development site.	N/A
World Heritage Sites	There are no World Heritage Sites within the proposed development site.	N/A

3.2.2 Mitigation

There are no direct impacts to those sites that stand outside the boundary of the proposed development. Several of these including the loophole Tower (No. 10) may be indirectly impacted upon. and therefore a programme of screening and possible boundary realignment to the north of this site would be required in order to protect its setting.

The post-medieval field system (SLR 002), located within the eastern section of the proposed development site would be removed as a result of proposed quarrying operations. It is therefore proposed that the field system is monitored and recorded prior to its removal. In addition, palaeoenvironmental sampling should be undertaken under selective boundaries should *palaeosols* be revealed during the monitoring stage. The *palaeosol* could determine the date of the field system and the probable palaeoclimate/environment during pre-construction, construction and early use.

As part of the mitigation process, several of the gateposts recognised within the field system should be researched as they may have once formed part of a later prehistoric landscape. It is not uncommon for standing stones and menhirs to be utilised in this way.

Archaeological fieldwork would be required to those sites that stand within the boundary of the proposed development site. Sites that will be directly impacted are mainly associated with German World War II activity. Arguably, all are of minor significance but the impact on each will be severe. Directly-impacted sites include: MGU 2139, MGU 2431, MGU 2432, MGU 2434, MGU 2436 AND MGU 2138(?). Site MGU 2439, an electrical generating supply tunnel stands north of the loophole Tower and has previously been recorded by Fustung Guernsey; however, the site would require further recording using CIfA/Historic England building recording standards.[8]

3.3 Conclusions

This assessment has followed best practice guidance in undertaking a reasonable and proportionate appraisal of the heritage assets likely to be affected, and the degree of adverse impact that the proposed development could

[8] See *Understanding Historic Buildings: A Guide to Good Recording Practice* (Historic England 2017).

potentially incur. The assessment complies with EIA and [English] national planning policy requirements which aim to achieve a sustainable development process, so that heritage assets are conserved in proportion to their heritage significance. There is also sufficient detail included in this assessment to allow decision-makers to be confident that they can discharge their statutory duties. Although the proposed development would constitute incremental change within the setting of a limited number of designated heritage assets of the highest significance and sensitivity, the indirect harm is considered Minor or Negligible. There are designated heritage assets such as several WWII sites and remnants of the quarry industry; however, their loss should not result in a reason for refusal should proportionate mitigations measures be implemented, as long as a considerate preservation-by-record programme is installed.

Identified within the walkover survey were thirty-two sites. These were located via the SLR Walkover Survey and information supplied by the States of Guernsey's Historic Environment Record. Of these 32 sites, eight stand within the core of the Headland; six within the area of the proposed first phase of development.[9]

The direct impacts to the field system would be Severe resulting in substantial harm to the majority of the field embankments/boundaries. In addition to the extant field boundaries, a subterranean set of World War II tunnels MGU 2439), constructed by the German Army would also be severely impacted, as well as six sites that stand within the boundary of the proposed development including MGU 2139, MGU 2431, MGU 2432, MGU 2434, MGU 2436 and MGU 2438. All the above sites, with the exception of MGU 2139 are World War II defence structures, including the German Army electricity generating tunnel (MGU 2439). Although the physical impact to all sites is Severe, their heritage value is considered Low to Moderate.

In terms of indirect impacts to identified designated heritage assets (Tables 1 and 2, **Appendix 02**), the topography of the Headland conceals those heritage assets located on L'Ancresse Common. Those sites, such as the loophole Tower and its associated magazine (MGU 171 & MGU 588) may incur an impact; however, based on the local topography immediately north of these two sites, the indirect impact will probably be Low to Negligible.

In terms of indirect impacts to those Protected Buildings and Protected Monument to the south and west of the Headland, the natural topography of the landscape of the western and southern headland above the shoreline will provide necessary screening for the proposed development site; therefore, the indirect impacts will be Negligible.

[9] Site MGU 830 appears to have been destroyed by quarrying.

4.0 Ecology

4.1 Baseline

4.1.1 Habitats

Desk Study

A review of available aerial photography[10] and comparison between the Island-wide Phase 1 habitat surveys which were undertaken in 1999 and again in 2010 show that the extent of maritime grassland decreased within the survey area during this 10 year period. Further comparison between the 2010 survey and SLR's 2017/18 habitat plan shows a further reduction in the extent of this habitat type. There is a long term trend of grazing being abandoned on coastal grassland and heath in Guernsey with an attendant increase in scrub, bracken, bramble and tree cover; a situation which has been mirrored at Chouet Headland.

The main site habitats are described below and are shown on **Drawing CH 2.**

The dominant vegetation type on Guernsey is grassland. The most threatened habitats are saltmarshes, dune slacks and open dune. The terrestrial habitats most important for their biodiversity include Dune, Coastal and Marshy Grasslands.

Field Survey – Main Habitats

Drawing CH 2 illustrates the main habits within the headland, as surveyed by SLR.

Scrub / Tall Ruderal (Target Note 1) – See Figure 5

The dominant species are bracken (*Pteridium aquilinum*) and bramble (*Rubus fruticosus*) with more localised beds of nettle (*Urtica dioica*). Thickets of blackthorn (*Prunus spinosa*) and European gorse (*Ulex europeaus*) also occur on the lower slopes. Various species of non-native shrub/tree are present in discrete patches including Muttonbird scrub (*Brachyglottis rotundifolia*), Buttonwood tree *(Conocarpus erectus var. sericeus), tamarisk (Tamarix gallica*) and German ivy (*Senecio mikaniodes*).

Along the edges of tracks and where bracken/bramble is less dense, the diversity of plants is higher with a range of robust species such as red campion (*Silene dioica*), sea radish (*Raphanus raphinistrum subspecies maritimus*), bittersweet (*Solanum dulcamara*), lesser burdock (*Actium minus*), wood sage (*Teucrium scorodonia*), black horehound (Ballota nigra), Pellitory of the Wall (*Parietaria Judaica*), hedge bedstraw (*Galium album*), common ragwort (*Senecio jacobea*), common mallow (*Malva sylvestris*), hedge bindweed (*Calystegia sepium*), field bindweed (*Convulvulus arvensis*), fennel (*Foeniculum vulgare*), wild carrot (*Daucus carota*), hogweed (*Heracleum sphondylium*), wall barley (*Hordeum murinum*) and thistles (*Cirsium arvense, C.vulgare, Carduus tenuiflorus and C.nutans*).

Semi-Improved Grassland Fields

The fields were found to be species-poor and to be dominated by grasses such as cock's foot (*Dactylus glomerata*), Yorkshire fog (*Holcus lanatus*) and crested dog's tail (*Cynosurus cristatus*) with some white clover (*Trifolium pratense*) and cat's ear (*Hypochoeris radicata*). It is, however, unlikely that they receive regular inputs of fertilisers or manure. In one of the fields is a clump of Guernsey lily (*Nerine sarniensis*).

[10] Internet search and Google Earth Pro.

Coniferous Woodland (Monterey Pine)

A mature plantation of pine trees with no discernible ground or shrub layer.

Standing Water / Inland Cliffs – Target Note 4 and Figure 3

The cliff faces and water body are largely un-vegetated.

Maritime Grassland – Target Note 5 and Figure 7

Examples of mown, rabbit-grazed and un-grazed areas of maritime grassland are present.

Regular mowing has reduced the species complement and favoured species adapted to such conditions such as chamomile (*Chamaemelum nobile*), daisy (*Bellis perennis*), yarrow (*Achillea millefolium*), common stork'sbill (*Erodium circutarium*), scarlet pimpernel (*Anagallis arvensis*), dove's foot cranesbill (*Geranium molle*) and the uncommon Allseed (*Radiola linoides*).

The most naturalistic and species-rich examples were found around the top of the rocky shore by the public path. Frequently recorded species in the more diverse swards included birds foot trefoil (*Lotus corniculatus*), autumn hawkbit (*Leontodon autumnalis*), greater plantain (*Plantago major*), ribwort plantain (*Plantago lanceolata*), thrift (*Armeria maritima*), rock samphire (*Crithmum maritimum*), sheep's sorrel (*Rumex acetosa*), common restharrow (*Ononis spinosa*), common toadflax (*Linaria vulgaris*), wild carrot (*Daucus carota*), common fleabane (*Pulicaria dysenterica*), perennial wall rocket (*Diplotaxis tenuifolia*), sea radish (*Raphanus raphinistrum subspecies maritimus*), hare's tail grass (*Lagurus ovatus*), fine-leaved fescue grass (*Festuca tenuifolia***),** other fescue and bent grasses (*Festuca/Agrostis*) and sea beet (*Beta vulgaris subspecies maritima*).

Less commonly recorded species were parsley-leaved waterdropwort (*Oenanthe lachenalii*), buck's-horn plantain (*Plantago coronopus*), galingale (*Cyperus longus*), sheep's bit (*Jasione montana*) and sea campion (*Silene uniflora*).

Non-native / invasive species included hottentot fig (*Carpobrotus edulis*), agave cactus, pink sorrel (*Oxalis articulate*), Spanish bluebell (*Hyacinthoides hispanica*) and Duke of Argyll's tea plant (*Lycium halimifolium*).

More ruderal areas comprised of bristly oxtongue (*Helminthotheca echiodes*), mugwort (*Artemesia vulgaris*), thistles, cock's foot grass (*Dactylus glomerata*), tree mallow (*Malva arborea*), smooth sow thistle (*Sonchus oleraceus*), frosted orache (*Atriplex laciniata*), spear-leaved orache (*Atriplex prostrata*), rye grass (*Lolium perenne*) and wild carrot.

4.1.2 Species

Background to Guernsey's Flora and Fauna

Terrestrial Mammals[11]

The Bailiwick has few native terrestrial mammals. The shrew found in Guernsey (and also Herm and Alderney) is the Greater White-toothed Shrew (*Crocidura russula)*, recently introduced to Ireland but otherwise not known in the British Isles. The Guernsey Vole, (*Microtus arvalis sarnius)*, is a subspecies of the Common Vole of Europe, and is only found in Guernsey.

[11] Extract from: UK Overseas Territories and Crown Dependencies: 2011 Biodiversity snapshot. Guernsey: Appendices. Author: Dr Charles David Guernsey Biological Records Centre, States of Guernsey Environment Department & La Societe Guernesiaise. More information available at: www.biologicalrecordscentre.gov.gg

Other rodents include the Wood Mouse (*Apodemus sylvaticus)* on all major islands and the introduced House Mouse (*Mus musculus)*, Brown and Black Rats (*Rattus norvegius) and (R. rattus)*.

The largest native mammalian carnivore is the stoat, (*Mustela ermine)* but this is believed to be extinct. Rabbits (*Oryctolagus cuniculus)* and Hedgehogs (*Erinaceus europaea*) are found in all the major islands but these were introduced.

Six species of bats have been observed in Guernsey, with caves on the south coast used as roosting sites. The species assemblage includes the rare grey long-eared bat.

Invertebrates

Guernsey is important for the conservation of several species of invertebrates which include mole cricket (*Gryllotalpa gryllotalpa*), Glanville Fritillary butterfly (*Melitaea cinxia*), blue-winged Grasshopper (*Oedipoda caerulescens*) and the Dung Beetle (*Copris lunaris*) which are either scarce on mainland UK, extinct or never occurred.

Reptiles and Amphibians

Guernsey supports three native species of amphibian and reptiles (i.e. common frog, smooth newt and slow worm) and one introduced species (Green Lizard).

Birds

The most important bird populations in the Bailiwick are its seabirds 1% of the World's Northern Gannets (*Sula bassana*) (c. 6000 pairs) breed on the Les Etacs (Garden Rocks) and Ortac off Alderney.

Guernsey has a healthy population of Barn Owls (*Tyto alba*) boosted by a scheme to provide large numbers of nest boxes.

Plant Species

Many of the UK Red Data Plant Book species are common in the Channel Islands because of their geographical position. Some species are of cultural significance as they are named after the islands, such as Guernsey Centaury and Guernsey fern and Guernsey spleenwort. Loose-flowered orchids, which do not occur in the UK, are a characteristic plant of damp meadows.

4.1.3 Desk Study Results

GBRC supplied records from within a 2km search area of the Chouet Headland as defined by a central grid reference. A summary of records of species considered to be endangered or at risk is provided in Table 1 in **Appendix 03**.

4.1.4 Summary of Baseline Survey Results – Flora

No plant species of particular rarity were recorded. The surveys recorded the presence of musk thistle (*Carduus nutans*), allseed (*Radiola linoides*) and common toadflax (*Linaria vulgaris*). All three of these species are considered to be "at risk".

A number of non-native / invasive plant species were recorded, some of which are likely to have originated from deliberate planting and others are likely to have spread from the green waste facility.

4.1.5 Summary of Baseline Survey Results – Fauna

Amphibians

The GBRC report returned records for slow worm, smooth newt and common frog from within the 2km search area.

The reptile survey undertaken in autumn 2017 recorded one juvenile slow worm. Due to the presence of a juvenile animal there must be a breeding population of this species which is likely to be small in size due to the limited extent of rough grassland and predation by rats and other predators.

No species of amphibian were recorded or are considered to be present based on the habitats which are present. It is considered unlikely that the waterbody present in the quarry void would support amphibians given its past use as a facility for the bio-remediation of oil.

Bats

The survey work undertaken in 2017/18 aimed to establish (1) whether bat roosts are present and could be affected and (2) whether the application site is of value to bats for foraging and commuting.

In respect of (1) above, structures/trees or other features within the survey area were inspected by a Natural England licensed bat worker during the daytime for evidence of bat roosts and/or the potential for them to occur. No bat roosts or potential roosting sites were identified.

In respect of (2) above, a combination of walked transects with bat detectors at dusk and dawn (with listening points at key stages) and remote recording was undertaken (with detectors being left in suitable locations for extended periods of time). The surveys aimed to achieve coverage in the spring, summer and autumn seasons.

All of the walked transects recorded very low levels of usage by bats. The August 2017 transect recorded 1-2 common pipistrelles foraging around the plantation of pines and the frontage of the quarry. An ANABAT left overnight on the edge of the pine plantation facing west (30th August 2017) and east (31st August 2017) also recorded common pipistrelle. The late October 2017 transect recorded no bats. The series of dusk and dawn transects in early May 2018 recorded virtually no activity by bats.

Further automated recording was undertaken in late October/early November 2017 which recorded very low levels of activity by mainly common pipistrelle and to a lesser extent Nathusius' pipistrelle. Further automated recording in May 2018 recorded a similar pattern of bat use by these two species with higher levels of activity (as measured by bat passes per hour) by common pipistrelle. A small number of calls were provisionally assigned to "big bat" - on the UK Mainland this would usually be a noctule. No calls attributable to grey long-eared bats were recorded.

To summarise, the bat surveys undertaken have not detected the presence of roosts. They found that the survey area is mainly used by two species of pipistrelle bats, of which common pipistrelle was the most frequently recorded. All activity by bats was at a low level and localised in distribution to the sheltered south-facing parts of the survey area such as the edges of the conifer plantation.

The survey area are therefore not considered to be of high value to bats.

Rodents

The reptile survey also recorded the presence of small numbers of the greater white-toothed shrew (*Crocidura russula*). Brown rats were seen on a number of occasions during fieldwork.

Invertebrates

No formal invertebrate surveys have been undertaken. Brown argus (*Aricia agestis*) butterfly is present within the coastal grassland on the plateau. This species has a localised presence on Guernsey. Likely foodplants in this location are low Geraniums and common stork's-bill.

Strong colonies of gatekeeper butterfly and common blue butterfly were recorded in 2017 and 2018 which are common species on the Island. In addition, other common species included red admiral, meadow brown, large white, small copper, brown-tailed moth (*Euproctis chrysorrhoea*) and the common carder bee (*Bombus pascuorum*).

Wintering Birds

Thirty bird species were recorded during the course of the winter CBC surveys.

The bird community was dominated by gulls and in particular many thousands of herring gull *Larus argentatus.* At any one time there were usually at least 1000 herring gull roosting on shoreline rocks, with several thousand more on the neighbouring landfill site or flying to/from it. Although herring gull is a Red list species, and the other four gulls are Amber list for varying degrees of population decline, they are still common, and also a pest species at landfill sites.

The scrub and semi-improved grassland habitats had low general value for birds. Wren *Troglodytes*, dunnock *Prunella modularis*, robin *Erithacus rubecula*, goldfinch *Carduelis* and starling *Sturnus vulgaris* were frequently seen or heard in these habitats; all are common birds, although dunnock and starling are on the Amber and Red lists respectively. Starling is listed due to a UK and Channel Islands population decline of over 50% from 1990 to 2015, while the dunnock has suffered a longer term UK and Channel Islands population decline of 31%. A few other notable birds were seen here including individual song thrush *Turdus philomelos*, mistle thrush *T. viscivorus*, linnet *Carduelis cannabina* (all Red list), and three meadow pipit *Anthus pratensis* (Amber list).

Breeding Birds

The Breeding Bird Survey recorded 17 nesting species, comprising mostly of common species.

The survey area is notable for breeding long-eared owl (*Asio otus*) which uses old crows nests in the mature plantation of pine trees (Target Note 3). The pole/tree mounted nest boxes and quarry rock ledges support breeding / roosting kestrel (*Falco tinnunculus*) and barn owl.

A house sparrow colony is associated with the bungalow and its grounds.

No other notable bird species were recorded.

4.2 Appraisal

4.2.1 Habitat

The development of the quarry would result in the direct loss of habitats within the development footprint due to the need to expose the underlying rock. Based on the Phase 1 survey work the main habitats to be lost would be dense scrub/bracken, semi improved grassland, with smaller amounts of maritime grassland. In the context of the Island wide resource, losses would be small. Notwithstanding this, a small area of planted coniferous woodland lies within the development footprint; whilst this is a habitat with low ecological value, it can be of

importance as a place of shelter for migrant birds, nesting birds such as raptors and as for insects which specialise in the tree species present (e.g. moths). In addition, it is scarce within the Island.

4.2.2 Species

Flora

Surveys of the application site and wider area have not recorded any particularly rare species of plant.

Mammals

Surveys of the headland recorded the presence of two species of pipistrelle bat (common and Nathusius'). Low levels of foraging by these species were recorded in 2017/18. This is attributed to the generally exposed nature of the headland and the limited availability of sheltered opportunities for foraging.

No bats roosts are considered to be present.

The survey area and application site are therefore not considered to be of high value to bats.

Birds

Surveys of the headland encompassing every season did not record the presence of a particularly notable assemblage of birds using the headland for breeding or wintering.

The presence of breeding long-eared owl, barn owl and kestrel was considered to be noteworthy in an Island context.

The bungalow supports a breeding colony of house sparrows, a species which is in steep decline in the UK Mainland, but which remains a reasonably common species on Guernsey.

Reptiles and Amphibians

Reptile surveys have recorded the presence of a "small" population of slow worm.

Invertebrates

The wider survey area supports a colony of brown argus butterfly which has a restricted distribution on the Island.

4.3 Conclusions

No designated ecological sites such as Sites of Special Significance (SSS) would be affected by the development of a quarry on the headland, provided that dust suppression measures are adopted in respect of heavy goods vehicles.

Surveys have not recorded the presence of notable habitats.

Surveys undertaken for flora and fauna have not recorded any particularly rare or uncommon species.

A small population of slow worm was recorded within the wider survey area. Although no slow worms were recorded from within the development site it is possible that this species also occurs in the rough margins of the hay fields.

The survey area supports three species of raptor (barn owl, long-eared owl and kestrel) which nest/roost in purpose-built boxes, old crow nests in mature pines or cliff faces. The habitats present within the development site form part of a wider resource of rough grassland which supports their small mammal prey. A colony of house sparrows is resident in and around the bungalow. No other notable species of birds were recorded during the winter or breeding seasons; however, the site has a general value to birds in providing nesting opportunities for a variety of common species in buildings, low scrubby vegetation, cliffs, edges of standing water etc.

Bat surveys have not detected the presence of any roosts. Foraging activity by bats was attributed to two common species of pipistrelle bat. Activity levels were very low across the seasons and were restricted to sheltered areas on the south-facing flank of the site. The majority of the site is quite exposed to prevailing winds and lacks structured vegetation such as trees or hedgerows and as a consequence its value to bats is limited.

Recommendations have been made in respect of avoidance and mitigation measures required to ensure that impacts on species and off-site habitats are either avoided or their effects are reduced to acceptable levels. These relate to the timing of operations (e.g. the removal of vegetation outside of the bird nesting season) or measures required in advance of development commencing (e.g. reptile and raptor mitigation schemes).

Residual ecological impacts have been predicted in respect of house sparrow only which are considered to be of significance at local level.

5.0 Landscape and Visual Impact

5.1 Landscape Baseline

The Chouet Headland is a gently undulating promontory with visual connections to Lady's Bay and Grand Havre to the south, the Rousse Headland to the south west, and the open moorland areas associated with L'Ancresse Common to the south-east. To the north and west there is a strong and often direct connection to the open sea of the English Channel.

The headland is generally rural in appearance and located away from built up areas. The closest built up areas being Vale Marais (approximately 1km to the south east) and L'Islet / La Garenne (approximately 1-1.5km to the south). To the east, the gradually increasing topography of a working landfill site prevents visual connectivity with the eastern part of Mont Cuet and L'Ancresse/Pembroke Bay.

Despite being generally rural in appearance, Chouet Headland contains evidence of much previous development, ranging from historic coastal defences (Napoleonic and WWII) to previous quarrying and current waste management.

5.1.1 Character of the landscape

The Guernsey Character Study (Stage 1), undertaken in June 2013 and published by The States of Guernsey Government Department, describes the landscape of Guernsey and has been used to inform the assessment of landscape character as set out below.

Figure 8 (Landscape Character) within the Guernsey Character Study shows the application site is located within the Northshores Character type. Further to the south are the Wetlands and Lowland Hills character types. The Lowland Hills provide the southern and eastern backdrop to the landscape of the site.

Figure 13 of the Guernsey Character Study identifies some 49 Landscape Character Areas (LCAs), with the headland being located within LCA 1 - L'Ancresse Character Area. Each Character Area is also defined as being one of four general land uses; rural, semi-rural, built-up and urban. The "L'Ancresse" Character Area is defined as having a 'Rural' category. The Site has potential visual connectivity with LCA 11 - Les Vardes / Haut Coutis / L'Islet to the south/southeast, and LCA 49 - Vale Church to the south. Visual connectivity is more restricted for two other character areas that are part of the study area, namely LCA 5 - Braye du Valle and LCA 2 - Les Landes.

The headland has a coastal position and therefore seascape is equally important as landscape. No suitable published Seascape Character Assessments (SCA) have been identified for Guernsey, therefore this assessment proposes its own for the purpose of identifying landscape effects. Three SCAs have been defined to measure the level of effect on the marine 'landscape'. These three areas are as follows; the Grand Havre; Baie de Port Grat; and Open Sea/Baie de la Jaonneuse.

L'Ancresse

The topography of this area includes areas of exposed rock and higher ground above the general lowland landscape, including the northern coastline of Chouet and Mont Cuet, and the L'Ancresse Common. The exposed rock has resulted in the establishment of numerous historic quarries and subsequent landfill activities in the north of this character area.

The character area comprises large areas of coastal heath and rough grazing land much of this supporting its use as a golf course. Enclosure is limited with large open areas of heathland and very few agricultural field units.

Where present, field boundaries include stone walls, but are often in poor condition and overgrown by vegetation.

The scale of the landscape is large and exposed with open views towards the sea and the rising ground towards the south of the island, particularly from the areas of higher ground. The combination of heathland and golf course provides the most extensive area of terrestrial open space on the island. Open panoramic views are a noted characteristic of L'Ancresse Common.

This character area has a rich historical record with a number of Martello towers and other Protected Monuments present around the coastline at regular intervals, largely concentrated around Pembroke Bay, and in combination with other monument sites such as the Star Fort (PM127), Fort Pembroke (PM128) and Fort Le Marchant (PM126). Other protected monuments include 'La Varde Dolmen' (PM15) 'Les Fouaillages Dolmen' (PM97) and 'Platte Mare Dolmenon' (PM130) further south on L'Ancresse Common.

With regard to the headland specifically, Martello Tower (Protected Monument (PM117) and Chouet Batteries (PM134) are of particular note. The Martello Tower is the focal point for the Chouet Headland when viewed across the Grand Havre, with a visual connection across the bay to the Rousse Martello tower.

Les Vardes / Haut Coutis / L'Islet

The higher ground in this character area is concentrated on the area of the existing Les Vardes Quarry, rising above the surrounding lowland landscape.

A complex network of local roads divides this area into numerous small landscape units, and in the case of Les Vardes Quarry one larger unit. Ribbon development has been historically established along these roads, with a mixture of remnant agricultural land and larger scale development located within the centre of landscape units surrounded by such ribbon development.

Land enclosure is formed by a mixture of residential plot boundaries (garden vegetation, hedges and fencing) and tall hedgerows around the remnant agricultural fields. The scale of enclosure is generally small scale but increases to medium scale in the west.

The long-term settlement of this area has resulting in numerous historic buildings towards the more sheltered eastern side of the area. In addition, protected monuments such has the Megalithic chamber, Sandy Lane, have been preserved and add to the historic settled nature of the character area.

Preserved monuments of note for this study are the Rousse Tower (No 11), battery and magazine (PM115) and adjacent burial 'cists' (PM133), below the high-water level. These monuments are situated on the Rousse Headland where views across the Grand Havre towards the proposed development are present.

The enclosure by vegetation generally restricts views within this character area to short distances and glimpses. Although the coastal edge frequently has distant views to the sea.

Vale Church

This character area is entirely lowland, with the exception of a small rocky outcrop which is the location of Vale Church (St. Michel du Valle Protected Building PB1180). The character area is dominated by the church, and associated Mentone (PB1179) and cemetery, which are largely encircled by residential development. More open coastal heath is present to the west, with boat storage and a large pond.

The area of the church is designated as a conservation area which forms the majority of the character area and provides the character area with a strong historic nature.

Visually the church steeple is a prominent feature in the local landscape and provides a strong visual connection to the coastal area to the west. However, the enclosing residential belt and associated vegetation provide an enclosed nature for views within the character area with generally only glimpsed views out. Of more note are the views from the raised ground around the church to the south.

Les Landes

This is a semi-rural area where the underlying landform and character dominate, but the landscape is enclosed by built features restricting long range views. There are clusters of buildings and ribbon development along the main roads which enclose and impede visual connections to the remaining open space between roads.

Braye du Valle

This LCA is identified in the Island Development Plan as a built-up area with a medium level of development with large scale buildings such as the Guernsey Clematis Nursery, Alliance supermarket and Moonpig Factory. Residential development tends to have extended from the main roads via secondary side roads, as oppose to the linear ribbon development elsewhere. An exception to this general characteristic is present within the study area to the south of the Vale Church where the LCA crosses more open land around Vale Pond which is classed as part of the Pont Soif to Pont du Valle Site of Special Significance (SSS) in the IDP. This area includes the brackish pond and salt marsh of Vale Pond and a small area of coastal land. The SSS continues along the coast through the following LCA.

Seascape Character Areas

The Grand Havre SCA comprises the bay of Grand Havre, enclosed by the headlands of Rousse and Chouet. The bay is enclosed and sheltered with large areas of sand exposed at low tide as well as rocks around the edge of the low water mark. The area is influenced by adjacent recreational uses such as the shoreline path, L'Ancresse Common and tourist attractions such as the Rousse Martello Tower. Its sheltered nature makes it important for harbouring boats.

The Bais de Port Grat SCA is more exposed than that of the Grand Havre and characterised by extensive areas of exposed rock. These areas of rock include Quenon, Grands Moulinets, The Knife and La Marquie, some of which form part of the boundary with the Grand Havre in the east. To the west the area is open to the sea. Beach areas are limited to the curve of shoreline between Pulias Pool and the Rousse Headland, protected from the sea by extensive rock areas.

The Open Sea/Baie de la Jaonneuse SCA includes the English Channel to the north of the rocks of the Baie de Port Grat, and the Baie de la Jaonneuse north of the Chouet Headland. This area is predominantly open sea with very occasional small areas of rock exposed. It is wild and vast in nature with the rocky shoreline edge generally an area of spray and waves even in calm weather.

5.2 Visual Baseline

The focus of local views is generally centred on Ladies Bay and Grand Havre, one of the main bays in north Guernsey. The Rousse and Chouet headlands frame sea views from the coastline of the bay.

To the west of Rousse visibility is affected by the sinuous coastline and extensive areas of intertidal rocks, which reduce the prominence of the Chouet headland in any views present. Further visibility to the west is prevented beyond the coastline and inland vegetation near Pulias Pool.

To the east of the Chouet headland views are limited to a short section of coastline, and views east of the Marine Wildlife Observatory are screened by the existing landform of the adjacent landfill site.

5.2.1 Visual receptors

Potential visual receptors in the area with theoretical visibility include the following:

- Inhabitants of properties at Rousse, visitors to the Peninsular Hotel and residential properties on the southern side of Lady's Bay (fronting Route Du Picquerel and adjacent roads). A small number of properties at Mont Cruet;
- users of public highways such as Mont Cuet, Route Du Picquerel and a number of car parks around the bay supporting recreational purposes, including at Rousse, Picquerel Point, Pont St Michel, Amarreurs Harbour, Roc Salt Restaurant and the south side of the Chouet Headland. (recreational, local residents or workers); and
- recreational users of the surfaced, off road, cycle and walking route present around the edge of the Ladies Bay / Grand Havre. Visitors to the strategic views identified in the Guernsey Character Study, and these include panoramic views at Rousse and L'Ancresse Common.

In addition, users or passengers on vessels on the sea (recreational or workers) are also theoretically affected. However, the main ferry route from Portsmouth passes the eastern coast of the island before landing at St Peter Port, and the nearest ferry route to the north of the island is over 7km offshore. However, private boat users could pass close to the Chouet headland and Grand Havre includes 3 minor arrival points for private boats at Chouet, Les Amarreurs and Rousse (marinas, slipways and moorings), as identified in the 2013 Guernsey Character Study.

5.3 Appraisal

5.3.1 Landscape

The proposed development may potentially affect the following landscape receptors:

- physical disturbance of landscape elements and features within the site and adjacent landscape;
- alteration to aesthetic and perceptual aspects such as scale, simplicity, openness and sense of tranquillity and wildness; and
- alteration to overall landscape character and key characteristics.

Alterations to Aesthetic and Perceptual Aspects

Changes to aesthetic and perceptual aspects occur principally within the development footprint and its immediate landscape setting, with effects on the wider landscape setting being limited to visual connections with other landscape character areas and features due by the size and scale of the new elements and their visibility.

Overall Effects on Landscape Components and Character

The alterations to overall landscape character and key characteristics result from a combination of changes to physical elements and features and the changes to the aesthetic and perceptual aspects of views/inter-visibility. Such effects occur both within the application site and its immediate landscape setting (and these are considered together).

The sensitivity of the Chouet Headland is to be considered within the context of prior use of the headland for quarrying, built development (coastal defences), existing waste operations and adjacent landfill. The magnitude of any change relates largely to the loss of landform and resultant physical change to the topography.

The proposed development does not add or remove elements from the existing character of the Chouet Headland. The distinctive Martello Tower on the Chouet Headland would be retained and the visual connection between the Chouet Headland and Rouse Headland maintained.
The proposed development would not directly affect the Vale Church Conservation Area or alter any visual connectivity between the conservation area and the Chouet Headland. In many views from around the Grand Havre the steeple of the Vale Church is a key feature, linking the church to the coast. However, none of these views are orientated to take in the steeple in the same frame of view as the Chouet Headland so that both are seen at the same time.

The more important effects would be those on the landscape character areas of L'Ancresse and Les Vardes / Haut Coutis / L'Islet. This is due to perceived changes in the visual connections between these two LCA and the Chouet Headland.

Although visible from the western side of L'Ancresse Common and the coastline of Grand Havre the level of landscape change would not be sufficient to alter the composition of the landscape or dominate the key visual connections for these character areas.

In the Grand Havre SCA, the Chouet Headland would still enclose the entrance to the bay from the open sea, but the skyline of the headland would be changed and the bay slightly more open due to this. However, the change would not add or remove any important features of the existing landscape character, just modify the existing elements.

5.3.2 Visual

The extent of visual effects would generally be restricted to the coastal edge between Pulias Pool and Mont Cuet, Garden vegetation, built development and landform prevent visual effects from being perceived further inland. In addition, viewers on private boats approaching and entering the bay of Grand Havre from the north and north-west would be affected.

The visual effect would consist of two operational stages, firstly the stripping of soils and overburden from the surface, and extraction of the top layers of rock. Secondly, the extraction void deepening and descending below the level of the adjacent landscape. In the first stage earthmoving machinery and disturbance would be very evident on the landform of the headland. In the second stage the extraction process would be screened from view and the restoration process undertaken around the periphery of the quarry void. The second stage would result in less disturbance and a gradual merging of the disturbed area into the adjacent landscape. The first stage would be adverse in nature, with the second stage starting as adverse but becoming neutral in nature as the restoration establishes.

The most prominent effects have been identified for Rouse Headland and in the vicinity of Roc Salt Car Park. This level of effect would extend for viewers on the paths around the Chouet Headland, where proximity to the development generates significant change to the visible landscape.

The visual effects identified above would be created by proximity to the proposed development and the soil and overburden stripping this would entail. Once those early stages are completed and restoration of the peripheral areas of the proposed quarry carried out, the level of effect is predicted to reduce. The remaining change in the view would relate to the part removal of the skyline of the Chouet Headland, rather than the addition of elements to the view.

Similarly, views from the path around the headland are likely to remain significant due to proximity, and high level of visual change.

The visual effects from other areas would be less, and largely related to the proximity of the viewer.

5.4 Conclusions

Overall this assessment has not identified any significant landscape effects as a result of the proposed development, other than on the Chouet Headland itself, where the change in topography and loss of vegetation would be a significant change.

Moderate landscape effects have also been identified for the L'Ancresse and Les Vardes / Haut Coutis / L'Islet LCAs and the Grand Havre SCA. Moderate effects can be significant, with value, susceptibility, size/scale of effect, and whether the effect is found across a number of receptors or in a pattern that intensifies the overall impact, all carefully considered to identify significant Moderate effects. In the case of the proposed development it is considered that the change would only be perceived in certain parts of the LCAs and that the scale and size of change within visual connections between the LCAs and the proposed development would not be sufficient to generate a significant effect. With regard the Grand Havre SCA, lower angles of view between the seascape area and the Chouet headland would reduce the degree to which the reduction in the Chouet Headland skyline was perceived, and thus the landscape effect is not considered significant.

More of the identified visual effects have been considered significant due to their concentrated and directed nature, thus having a greater effect on the viewer, compared to the more diluted landscape effects. The main source of significant visual effect would be the disturbance generated by the stripping of soils and overburden, with these effects being removed from view as the extraction process worked downward into the ground. Similar disturbance is already present in many of these identified views, caused by waste management operations and/or landfill operations at Mont Cuet.

6.0 Noise

6.1 Baseline

Noise monitoring has been undertaken to determine the existing noise environment at the nearby noise-sensitive receptors. All measurement instrumentation was calibrated before and after the measurements. The calibration chain is traceable via the United Kingdom Accreditation Service to National Standards held at the National Physical Laboratory. No significant drift was observed.

To assess the potential impact of the development upon existing receptors close to the site, daytime noise measurements were taken at the following locations representative of the soundscape at the receptor:

- Location 1 – Adjacent to the Roc Salt restaurant on Mont Cuet Road, approximately 150m to the south-east of the quarry workings;
- Location 2 – Property off Mont Cuet Road, approximately 290m to the south-east of the quarry workings; and
- Location 3 – Adjacent to L'Ancresse Golf Club on La Jaonneuse Road, approximately 590m to the east of the quarry workings.

The results of the noise surveys are presented Table 6-1.

Table 6-1
Summary of Measured Noise Levels, free-field, dB

Location	Date	Period	$L_{Aeq,T}$	L_{A90}	L_{Amax}
Location 1	Thursday 6th July 2017	14:36	51.2	39.9	70.8
		15:25	51.6	43.1	75.2
	Friday 7th July 2017	12:23	44.3	36.3	56.9
		13:38	56.2	38.2	80.3
	Saturday 8th July 2017	10:16	52.3	40.5	74.2
		11:41	50.3	35.0	60.4
Location 2	Thursday 6th July 2017	11:59	41.2	34.9	57.7
		16:19	40.9	31.6	57.9
	Friday 7th July 2017	12:48	45.4	40.1	57.8
		14:03	42.3	34.2	74.2
	Saturday 8th July 2017	10:57	51.0	31.9	76.3
		12:01	37.0	31.2	47.7
Location 3	Thursday 6th July 2017	13:33	52.6	36.0	75.9
		14:59	42.3	36.7	59.4

Location	Date	Period	$L_{Aeq,T}$	L_{A90}	L_{Amax}
	Friday 7th July 2017	15:54	48.2	36.3	72.3
		13:23	52.6	36.0	75.9
	Saturday 8th July 2017	10:38	42.2	33.9	57.9
		11:18	40.7	35.2	51.5

The soundscape at all the noise-sensitive locations considered may be described as distant road traffic and natural sounds such as birdsong.

6.2 Appraisal

Surface minerals extraction sites, by their nature, generate noise due to the use of heavy machinery. During the proposed development the potential risk of noise impacting on the nearby noise-sensitive receptors would vary depending on the type of activities being undertaken at the time and the effectiveness of any noise control measures that are in place.

6.2.1 Quarry Development

In the absence of specific guidance in Guernsey, discussions have been had with the Environmental Health department at the States of Guernsey. This has indicated that any assessment should be undertaken in accordance with the National Planning Policy Guidance and associated Planning Practice Guidance, which contains details regarding noise from mineral operations as previously presented in MPG11.

In this respect, the relevant guidance states:

"*Mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level (LA90,1h) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) LAeq, 1h (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level (LA90,1h) by more than 10dB(A) and should not exceed 55dB(A) LAeq, 1h (free field). For any operations during the period 22.00 – 07.00 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) LAeq,1h (free field) at a noise sensitive property".*

Based on the anticipated compliment of plant and machinery the worst case predicted noise levels associated with the initial phase of development would be as follows:

- Location 1 – 52.3dB(A)
- Location 2 – 48.6dB(A)
- Location 3 – 46.1dB(A)

These predicted limits are all above the PPG criterion of setting a noise limit that is 10dB(A) above the background noise level, but all are below the absolute maximum of 55dB(A). It should be noted that the noise predictions are worst case, when all plant is operational and working at the closest part of the site to the receptor. As such the predicted levels would only occur for a small period of the overall life of the development.

With additional mitigation based around operational practices experience shows that predicted noise levels can be reduced by around 5dB(A).

6.2.2 Traffic

According to the DMRB, *"a change in noise level of 1dB is equivalent to a 25% increase or 20% decrease in traffic flow"*. This change in noise level, in accordance with the IEMA guidelines, equates to a difference which is just perceptible under laboratory conditions; however, a change or difference of 3dB is perceptible under most normal conditions.

By comparing the total 'baseline' and 'baseline + development' flows it can be seen that the increase in traffic would be below 25%. However there is a significant increase in HGV movements.

Calculating the Basic Noise Level using the methodology outlined in the Calculation of Road Traffic Noise indicates that the increase in noise level as a result in the overall change in flow and increase in percentage HGV's would result in a 0.2dB increase of each of the assessed roads. As such, traffic noise would have a negligible impact.

6.3 Conclusions

The noise assessment was based on a baseline sound survey undertaken over midweek and weekend periods at locations considered representative of the nearest noise-sensitive receptors to the development site.

The assessment has considered the potential noise impacts of the operation of the proposed development and has been undertaken in conjunction with BS5228:2009+A1:2014.

All sound prediction has been undertaken using the proprietary noise modelling software Cadna/A which incorporates all the relevant calculation algorithms within BS5228:2009+A1:2014.

The assessment has shown that the predicted noise levels from on-site quarrying operations would be below the absolute noise limit of 55dB $L_{Aeq,1hour}$ outlined within the PPG guidance.

The assessment has also shown that with the adoption of mitigation measures in the form of good site practices the residual impacts at the nearest noise-sensitive receptors would as a worst-case be minor.

The assessment for development related traffic movements has shown that the increase in HGV movements would lead to a negligible impact on all the roads considered.

7.0 Transportation

7.1 Baseline

Access to the headland site is via Rue des Grand Camps (which leads onto Mont Cuet Road at the junction with Les Hures) which runs south east from the headland to connect with Les Clotures Road and L'Ancresse Road. From here Les Clotures Road connects east towards La Fontella Vale and L'Ancresse Road links south towards La Tonnelle.

Initially, extracted rock would be processed at the headland using a mobile processing plant and transported by HGV's to Les Vardes Quarry for further processing and dispatch. In so doing, HGVs would travel along the following roads:

- Mont Cuet Road;
- L'Ancresse Road;
- Road between L'Ancresse and junction with La Route De L'Islet;
- La Route De L'Islet;
- La Route du Picquerel;
- Route du Port Grat; and
- Route de Pulias (to the junction of Les Vardes Quarry).

The second phase of the development would then see the reverse, with rock extracted at Les Vardes Quarry (from underneath the plant site) and transported to a new processing plant site at Chouet Headland.

The final phase of developing the headland would result in the final reserves at the headland being worked and processed at the headland, with aggregates dispatched to the local market using the most suitable route.

7.1.1 The Highway Network

Mont Cuet Road is a single carriageway with two-way flow leading off the application site in a south-easterly direction before a sweeping bend to the east adjoins the road to La Jaonneuse Road, Les Clotures Road and L'Ancresse Road via a crossroads junction with priority to La Jaonneuse Road and L'Ancresse Road. Give-way road markings on Mont Cuet Road and Les Clotures Road are visible and clear to inform this layout.

L'Ancresse Road follows on from Mont Cuet Road to the south west as a single carriageway with two-way flow. Unlike Mont Cuet Road there are residential properties fronting the link along the eastern side, and fields when heading north-east. This link ends at Route Militaire with a staggered crossroad priority junction with Ville Baudu Road extending east and La Route de L'Islet, which extends west.

La Route de L'Islet, a single carriageway road, extends west from the junction for approximately 250m before an almost 90 degree bend where it continues south west towards L'Islet. The full length contains central white line road markings. A second staggered crossroads then gives way to La Route du Picquerel in the north; Les Petites Mielles in the south; and Les Tracheries Road in the west.

La Route du Picquerel is a single carriageway road with two-way flow and central white line road markings. It extends to the north and then continues north west until a bend left after which it changes to Route du Port Grat.

Route du Port Grat is of the same road description as La Route du Piquerel and heads mostly in a westerly direction until linking with Route de Pulias which continues for a further 140m until adjoining with the access lane to Les Vardes Quarry.

There appears to be a limited area of dedicated footway and no pedestrian crossing facilities along the extent of the route from the headland to Les Vardes Quarry. The route along Route du Port Grat accommodates a footway along the southern edge of the road, as does La Route du Picquerel along its eastern edge through L'Islet. There are footpaths that extend within grassland between the road and the coast, in locations such as Route du Port Grat and La Route de L'Islet; however these do not provide direct pedestrian routes.

7.1.2 Existing Traffic Flows

Survey specialist Axiom Traffic Limited (Axiom) were commissioned to undertake traffic counts. The traffic surveys included two Automatic Traffic Counts (ATC) and two Manual Turning Counts (MTC). These were placed at the following locations:

- ATC 1 – L'Ancresse Road;
- ATC 2 – Route du Port Grat;
- MTC 1 – La Jaonneuse Road/ Mont Cuet Road/ L'Ancresse Road/ Les Clotures Road; and
- MTC 2 – La Route du Picquerel/ Les Tracheries Road/ Les Petites Mielles/ La Route De L'Islet.

The one week period during which the surveys were completed did not contain any public or bank holidays, nor did it fall within any school holiday periods; the data collected is therefore considered representative of the typical conditions on the local road network.

ATC Data

The ATC captured classified directional flow data continuously over a 7-day period between Tuesday 20th June 2017 and Monday 26th June 2017. The total vehicle numbers through an average weekday are provided for each location surveyed in Figures 7-1 and 7-2 below.

Figure 7-1
Average weekday flows (total vehicles) for L'Ancresse Road

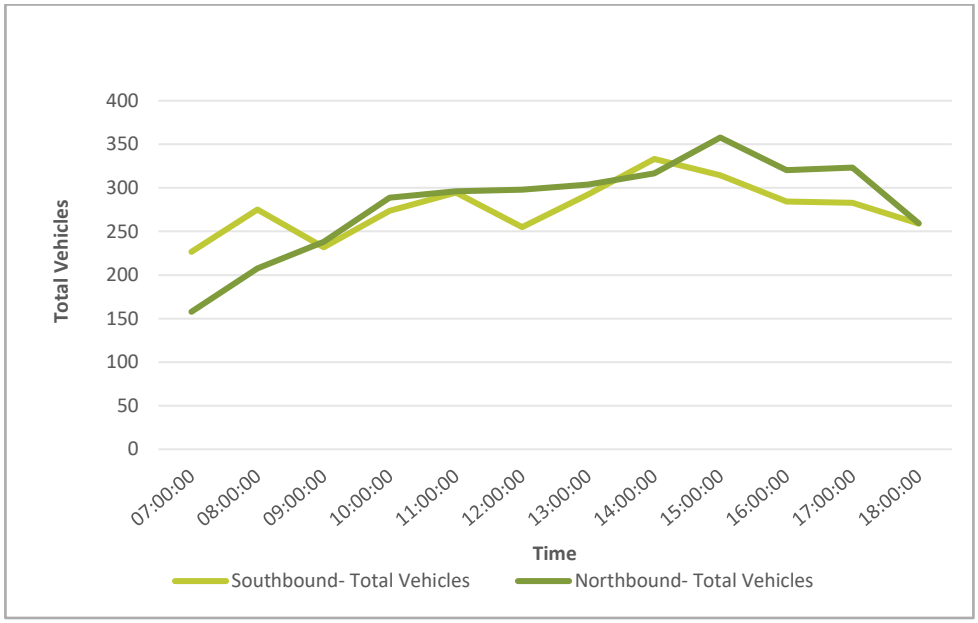


Figure 7-2
Average weekday flows (total vehicles) for Route de Port Grat

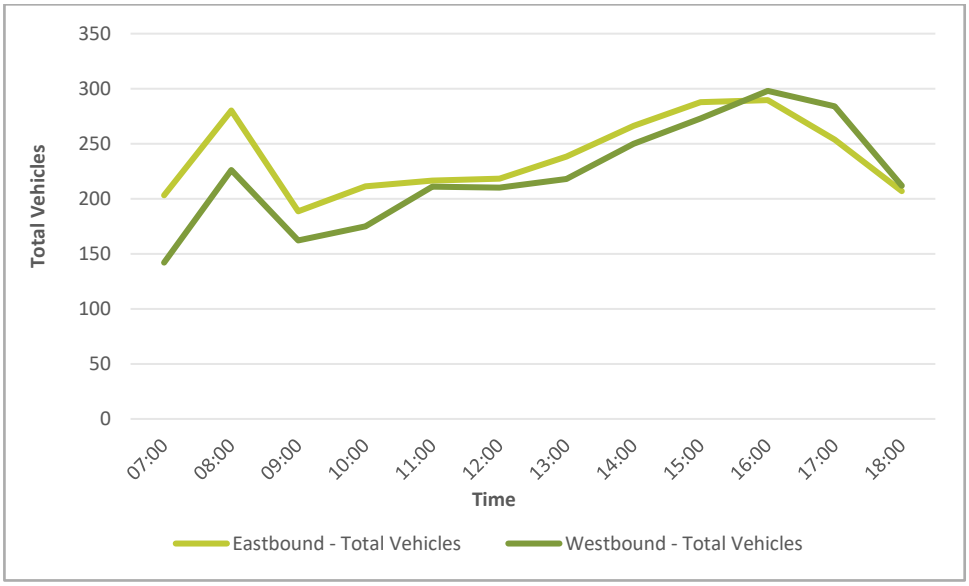


Figure 7-1 shows that the current traffic flows through an average weekday are similar for each direction on L'Ancresse Road. The southbound flows are slightly higher in the morning and the northbound flows are slightly higher in the afternoon and evening; however as the difference is not significant, and as the flows rise gradually through the day for each direction, there is no obvious commuter travel pattern to the data. Figure 7-2 shows a similar pattern for Route de Port Grat, with the eastbound flow higher in the morning, however there is an obvious peak in both flows at 08:00; from here the eastbound flow remains slightly dominant until after 15:00, with both directional flows rising gradually through the day. The time period that most stands out as the peak for both roads is between 15:00 and 16:00.

The average weekday (Monday to Friday) peak hour (15:00-16:00) and 12 hour (07:00-19:00) traffic flows are summarised below, with figures provided for total vehicles and HGVs in Table 7-1, with the Saturday 12-hour flows provided in Table 7-2.

Table 7-1
Average 5-day Traffic Flow data (Monday to Friday)

Location	Period	Northbound			Southbound			Two-Way		
		Total	HGV	%HGV	Total	HGV	%HGV	Total	HGV	%HGV
L'Ancresse Road	Peak Hour (15:00-16:00)	358	8	2%	315	6	2%	673	14	2%
	12-hour (07:00-19:00)	3367	76	2%	3323	63	2%	6690	139	2%
		Eastbound			Westbound			Two-Way		
Route de Port Grat	Peak Hour (15:00-16:00)	288	6	2%	273	3	1%	561	9	2%
	12-hour (07:00-19:00)	2860	55	2%	2656	38	1%	5516	93	2%

A review of the traffic flow data for each route confirms that between 1% and 2% of the vehicles on the roads are HGVs. The data also confirms that there is no significant dominant directional flow on either road. L'Ancresse Road has a higher flow of total traffic over the 12 hours, with 6690 vehicles compared to 5516.

Table 7-2
Saturday Traffic Flow data

Location	Period	Northbound			Southbound			Two-Way		
		Total	**HGV**	**%HGV**	**Total**	**HGV**	**%HGV**	**Total**	**HGV**	**%HGV**
L'Ancresse Road	12-hour (07:00-19:00)	3431	60	2%	3542	69	2%	6973	129	2%
		Eastbound			**Westbound**			**Two-Way**		
Route de Port Grat	12-hour (07:00-19:00)	2740	31	1%	2536	27	1%	5276	58	1%

The 12-hour flows for a Saturday are slightly higher on L'Ancresse Road than on an average weekday, although the numbers of HGVs appear to be slightly lower, while the 12 hour flows on Route de Port Grat are slightly lower for all vehicles.

MTC Data

The MTC was undertaken on Tuesday 20th June 2017, covering a 12-hour period between 07:00 and 19:00; the data provide the turning movements for each arm of the two junctions surveyed, with vehicle types classified. The MTC data has been used to create turning flow diagrams to produce a visual summary of the traffic movements at the junction of La Jaonneuse Road/ Mont Cuet Road/ L'Ancresse Road/ Les Clotures Road and the junction of La Route du Picquerel/ Les Tracheries Road/ Les Petites Mielles/ La Route De L'Islet.

The peak period for each junction has been determined from the review of the ATC data, with the hour from 15:00 to 16:00 selected. The turning flow diagrams show the numbers of total vehicles and numbers of heavy goods vehicles for each time period. The turning flow diagrams are set out in Figures 7-3 and 7-4.

Figure 7-3
Turning Count for Mont Cuet/L'Ancresse Road junction – from 15:00 to 16:00

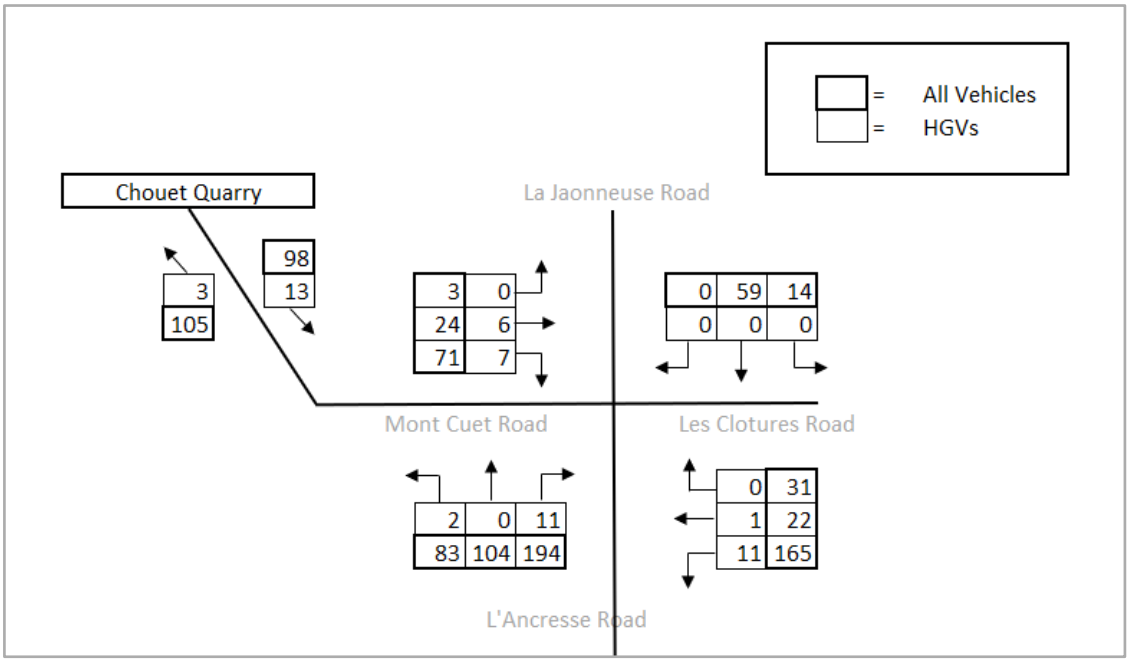


Figure 7-3 provides a summary of the existing movements on the first junction along the route from the applications site to Les Vardes quarry. This shows that the largest flows are on Les Clotures Road and L'Ancresse Road, for both the total vehicle and HGV movements. The existing flows on Mont Cuet Road include the movements to and from the landfill site adjacent to the application site, which can be seen here with larger HGV numbers on this arm of the junction (16 two-way movements). The movement of vehicles between Les Clotures Road and L'Ancresse Road is shown to be the highest, with 359 two-way total vehicle movements and 22 two-way HGV movements.

Figure 7-4
Turning Count for Les Petites Mielles/La Route de L'Islet junction (15:00 to 16:00)

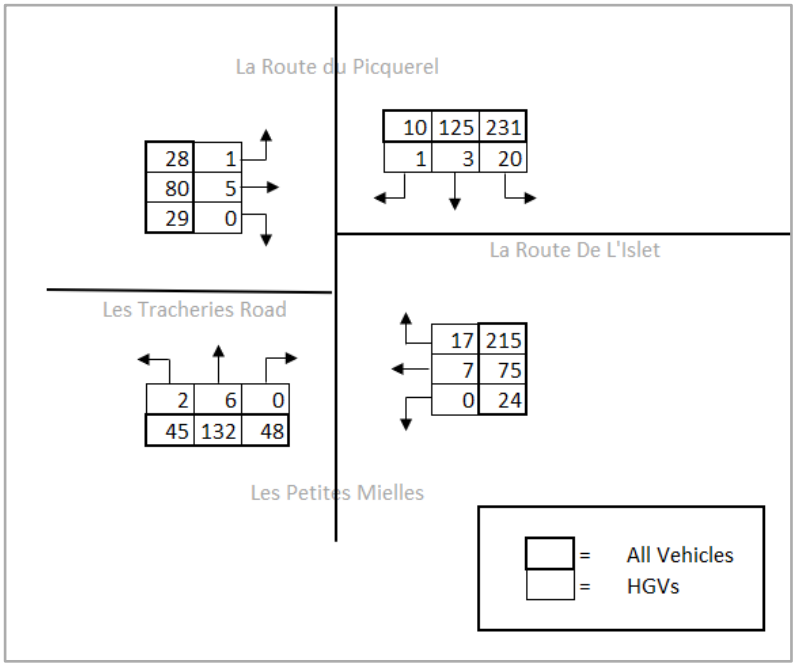


Figure 7-4 provides a visual summary of the movements at the second junction along the route to Les Vardes quarry. It can be seen that during this peak period the largest movement of all vehicles can be seen between La Route de L'Islet and La Route du Picquerel, with 215 vehicles turning right from La Route de L'Islet onto La Route du Picquerel and 231 vehicles making the opposite movement. Similarly the largest numbers of HGVs also make these movements.

7.1.3 Accidents

A total of seven accidents were recorded throughout the study area over a five year period up to 2017. Six of the seven accidents resulted in minor injuries with the most recent resulting in major injuries; there were no fatalities recorded during the five year study period. There have been no recorded injury accidents within the study area during the years of 2013 or 2016.

7.2 Appraisal

The quarry would generate on average 125,000 tonnes of material each year, all of which would initially be transported to the Les Vardes Quarry for processing. The vehicles have been confirmed as 14 tonnes capacity HGVs and so there would be on average 31 loads per day or 3 loads per hour (using a 10 hour working day).

Based on the data from the ATC, Table 7-3 below set out the existing traffic flows for the network peak period for an average weekday and the 12 hours flows for an average weekday for L'Ancresse Road.

Table 7-3
Traffic Flows (Two-way) for Opening Year Scenario – L'Ancresse Road

	2022 Base		Proposed Development		Base + Proposed Dev.		Percentage Increase	
	All Veh.	**HGVs**	**All Veh.**	**HGVs**	**All Veh.**	**HGVs**	**All Veh.**	**HGVs**
Peak (15:00-16:00)	673	14	8	3	681	17	1%	21%
12 Hour (07:00-19:00)	6690	139	72	62	6762	201	1%	45%

It is clear from the tables above that the impacts of all of the additional vehicles derived from the site would be negligible in terms of total vehicle numbers with a 1% increase. However, the increase in HGVs is significant in, with a 21% increase on L'Ancresse Road in the peak hour; during the 12 hour period L'Ancresse Road would see an increase of 45%. While the percentage increase is significant, it should be noted that the numbers of HGVs are currently low, with HGVs counting for less than 2% of all traffic on these routes.

7.3 Conclusions

An assessment of the impacts on the local transportation network as a result of the developing a quarry on the headland has been undertaken. To ensure a robust assessment, traffic movements have been considered for the maximum export from the site within the operational period, which equates to 125,000 tonnes per annum.

A full environmental impact assessment has been undertaken, considering the potential transport related impacts associated with the proposed development. The assessment has determined that the volume and composition of the proposed development traffic would have no significant impact on the operation and safety of the local road network, and the amenity of local residents.

In conclusion, it is considered that the proposed development traffic would have no adverse impact on the surrounding road network.

8.0 Vibration

8.1 Baseline

In order to be able to extract the rock it will be necessary to use controlled explosive charges. The detonation of explosive charges in a borehole (often referred to as a 'shot hole') generates stress waves causing localised distortion and cracking of the rock mass. Outside of this immediate vicinity of the blast permanent deformation does not occur. Instead, the rapidly decaying stress waves cause the ground to exhibit elastic properties whereby rock particles are returned to their original position.

Despite the substantial design process involved in determining the parameters of the blast, such as borehole diameter, spacing, depth, amount of explosive etc., all blasts will generate vibration. This vibration occurs both through the ground and through the air (as a pressure wave).

Research has concluded that the maximum value of particle velocity in any stress wave is the parameter of significance. Recognised best practice is to measure blast-induced vibration using a seismograph in terms of unfiltered time histories of three component particle velocities from which the peak values can be identified. As set out in BS 7385-2: 1993 measurements are taken on a well-founded hard surface at the base of the building on the side of the building facing the source of vibration; this is because in most instances, consideration is being given to compliance with prescribed limits. The vibration monitor is covered with a sandbag to ensure good contact with the ground and that the monitor does not bounce in response to a blast.

With experience and knowledge of the factors which influence ground vibration, such as blast type and design, site geology and receiving structure, the magnitude and significance of the blast induced waves can be accurately predicted at any location.

The accepted method of predicted peak particle velocity for any given situation is that of *'scaled distance'*. BS 6472-2:2008 states that in order to predict the likely vibration magnitude, a series of measurements at several locations should be taken from one or more trial blasts. For this assessment data gathered from monitoring production blasts at Les Vardes Quarry has been used (a total of 996 blasting events has been used in the assessment). The scaled distance value (s) for any location may be calculated as follows:

$$s = d/\sqrt{C}$$

where:

d is the separation distance (blast to receiver) in metres; and

C is the Maximum Instantaneous Charge (MIC) weight in kilograms (kg) i.e. maximum weight of explosive per delay interval in kg.

8.2 Appraisal

Recorded vibration values have then been plotted against scaled distance on logarithmic scales to give a blast regression line. Differing geology and blast design result in a degree of dater scatter. As noted in the Institute of Quarrying publication[12] (page 146) the statistical method adopted in assessing the vibration data is that used by Lucole and Dowding. The data is presented in the form of a graph showing the attenuation of ground vibration with scaled distance and results from log - normal modelling of the velocity distribution at any given scaled distance. The plotted data are generally presented with the mathematical best fit or mean (50%) line through

[12] The Use of Explosives in Quarrying. T E White and P Robinson. The Institute of Quarrying

the data, calculated by least squares regression, together with an upper confidence level, which is generally taken as 95%.

Analysis of the recorded vibration data from Les Vardes Quarry has been used to create a regression line, showing both the 50% and the 95% confidence limit and is shown in Figure 8-1. The regression line plot shows that the corresponding scaled distance value for a vibration criterion of 10.0mm/s PPV at 95% confidence level is 32.2mkg$^{-1/2}$.

Figure 8-1
Blasting Regression Line Model

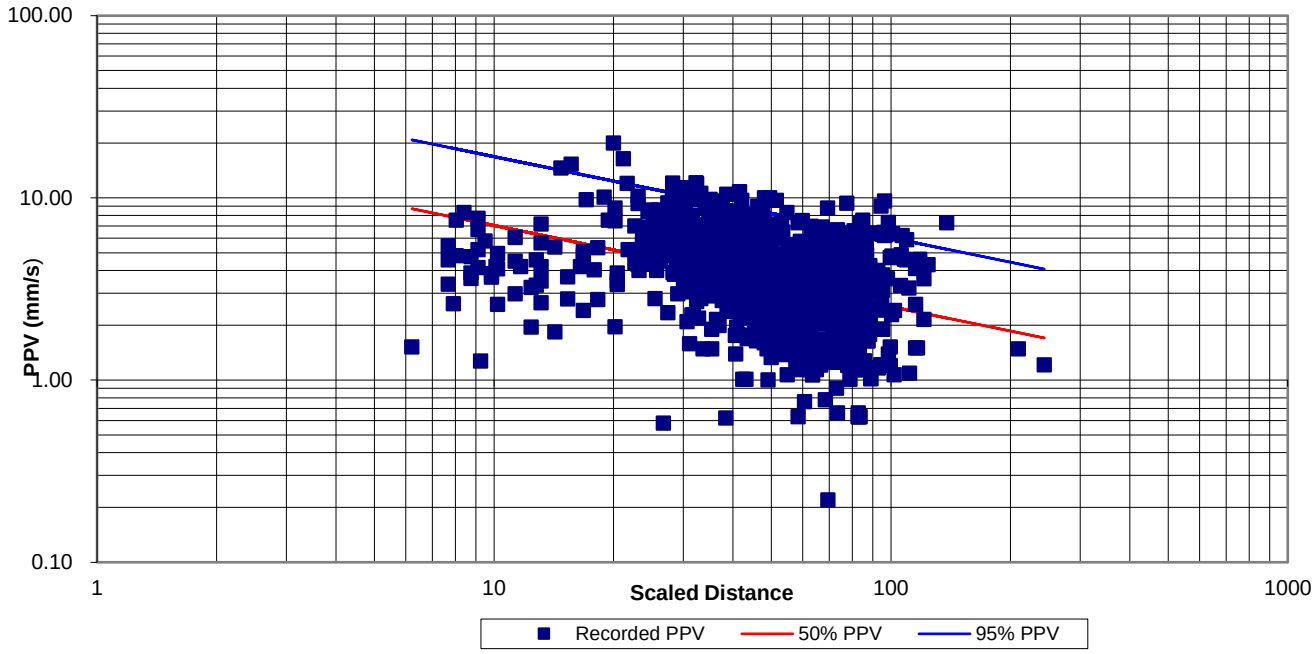


Table 8-1 shows the allowable maximum instantaneous charge weight to comply with this criterion at given separation distances.

Table 8-1
Allowable maximum instantaneous charge weights

Blast/receiver separation distance (m)	Allowable maximum instantaneous explosive charge weight to comply with 10mm/s criterion (kg)
50	2.41
75	5.41
100	9.63
125	15.04
150	21.66

Blast/receiver separation distance (m)	Allowable maximum instantaneous explosive charge weight to comply with 10mm/s criterion (kg)
175	29.48
200	38.50

Where it is predicted that the levels of vibration at a receptor would exceed the relevant criteria then it would be necessary to reduce the MIC. One method of achieving such a reduction is to 'deck' the explosives within the borehole. This technique splits the column of explosives in two (or more), separated by inert material. If blasting is required at closer distances than that where double decking would be a successful strategy, other charge reduction methods would have to be employed. These could be more complex decking strategies or changes to the blast geometry and / or the use of smaller diameter boreholes.

These are matters for the operator as part of the detailed design of individual blasts and adherence to blast vibration limits, rather than for the imposition by planning condition of prescriptive blast design requirements.

In terms of receptors, the closest residential properties are located to the south (L'Eternite) and south-east (La Morada) of the proposed quarry. L'Eternite is around 130m from the closest part of the proposed quarry workings and La Morada is over 200m. in comparison, the closest properties to Les Vardes Quarry are within 60m – 90m of the quarry workings.

To limit the environmental effects of blasting, limits are imposed on vibration levels based on the 95 percentile and maximum limit. For Les Vardes Quarry, the limits are 10mm/s. However, much higher vibration levels are required to cause damage to a property.

8.3 Conclusions

An assessment of predicted blast-induced vibration levels has been made to nearby vibration-sensitive receptors. The predictions are based on 996 blast induced vibration events which were measured at various locations around the nearby Les Vardes Quarry and considered representative for Chouet Quarry.

Using the measured data a blast regression line has been plotted and a maximum instantaneous charge weight of 16.27kg has been derived at of 130m which is the approximate distance to the nearest vibration sensitive receptor.

The assessment has shown that the criterion of 10.0mm/s PPV at 95% confidence can be achieved by suitable blast design using the suggested instantaneous charge weights.

Therefore, vibration generated by blasting events is not considered to be a limiting factor in blasting within the proposed quarry.

9.0 Water Environment

9.1 Baseline

9.1.1 Geological Setting

Soils

The vegetation across the headland includes 'semi-improved' grassland. Semi-improved grassland is a transition category made up of grasslands which have been modified by artificial fertilisers, slurry, intensive grazing, herbicides or drainage.

Information about the soil underlying the grassland has been taken from the Soil and Land Evaluation for Guernsey (2010). Whilst the exact location of the site is not assessed the L'Ancresse area is classified as Grade 4 soil due to very severe droughtiness limitation. These soils are of poor quality with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops the yields of which are variable.

Superficial Geology

The superficial geology comprises raised beach deposits located in the La Chouet area. This comprises gravels and fine grained material cemented by iron minerals.

In the immediate vicinity of the headland, the deposits are likely to comprise 1m – 3m depth of topsoil and clay underlain by fractured granitic bedrock.

Bedrock Geology

The headland is underlain by the Bordeaux Diorite Complex, comprising a range of lithologies, but generally hard, relatively coarse grained granodiorite to dioritic rocks.

The Complex is seamed with weakness associated with joints and narrow dykes. The fracture diameter has been reported as being 'open'[13] in some areas. However, in the walkover, the Torrey Canyon Quarry showed very tight fracturing. This is supported by the very low permeability results for the aquifer in the area of the proposed quarry.

The top of the bedrock is likely to be weathered to a soft, friable material. The depth of the weathered zone may be over 30 metres below ground.

Radon is of potential concern in Guernsey because the geology of the island is made up of a number of different types of granite that contain natural uranium in the bedrock. Most buildings in Guernsey are sited on potentially radon-emitting geology or bedrock.

9.1.2 Potential Contamination

Information supplied by the States of Guernsey[14] indicates that there is no Made Ground on the proposed application site. The land use history, described in a Phase 1 Land Quality Risk Assessment Report, supports this as the land has been fully agricultural since the 19th century. The site walkover did not identify potential source of contamination in Ronez Field either, but potential off site sources included:

[13] Cucakovic, M., 2014, An Evaluation of Chouet Head Quarry. MSc Dissertation, Engineering Geology Department, Newcastle University. Page 10.
[14] Borehole construction information supplied to SLR via email August 2017.

- Torrey Canyon Quarry to the west of the application site which has held oil in water since the 1970's; and
- Mont Cuet Landfill located to the east of the site - this is an operational landfill site which accepts domestic and construction waste.

The Phase 1 Report indicates that the area of land to the west of the proposed site (in and around where the Torrey Canyon Quarry is sited) has a history of quarrying activity within proximity of the application site. Many of these former quarries have been backfilled.

9.1.3 Hydrogeological Setting

With the exception of military fortifications (refer to Section 3 above) and small quarries the headland has not been developed and predominantly has a history of agricultural uses. A landfill, Mont Cuet, is operational and is located to the east of the headland.

The Torrey Canyon Quarry is also located to the west of the proposed development. This is a flooded quarry which has been used to store crude oil which was removed from Guernsey's beaches in the 1967 following the Torrey Canyon disaster. In addition anecdotal evidence suggests that, when retreating from the Island, the German's placed munitions in the quarry. A more detailed breakdown of the site history and setting can be found in SLR(2017)[15] .

Aquifer Characteristics

The geological setting and hydrogeological characteristics within the vicinity of application site are summarised in Table 9-1. In summary the site is underlain by superficial raised beach underlain by deposits of diorite.

Table 9-1
Summary of Aquifer Characteristics

Age	Parent Unit	Description	Aquifer Characteristics
Quaternery	Raised Beach Deposits	Wind-blown silt (1 - 3m thick)	The superficial deposits comprise gravels and fine grained material cemented by iron minerals in places. In the immediate vicinity of the site the deposits are likely to comprise 1m – 3m topsoil, sand, silt and clay. Exposure in the Torrey Canyon quarry wall suggests that there might only be <1m of superficial deposits in the immediate vicinity of the site. Examination of the borehole records provided by the States of Guernsey indicates the depth to bedrock (which includes superficial and fractured bedrock) ranges from 5-10m below ground. This information has been used to provide depth to bed rock contours presented in the attached drawing.

[15] SLR (2017) Chouet Quarry, Guernsey, Phase 1 Land Quality Risk Assessment Ref: 403.06370.00001. Rev 2 Prepared for Ronez

Age	Parent Unit	Description	Aquifer Characteristics
Lower Palaeozoic	Bordeaux Northern Diorite Complex	Granodiorite comprising coarsely grained, crystalline, plutonic intrusive igneous rocks.	Negligible primary porosity and permeability. The water table lies within 3 to 8 metres of the ground surface, and the main aquifer, in which the majority of groundwater flow takes place, is situated in a 25m thick zone immediately below the water table. However the Geological Society states there is little potential for groundwater flow beneath low lying land towards the north of the island where the fractured bed rock has a clay matrix or the degree of fracturing is not as pronounced. Beneath this depth there is some groundwater flow in deeper fractures, but borehole yields from the greater depths are commonly less than those from the shallow weathered zone. This reduction in aquifer yield with depth provides an element of self-protection, whereby base-flow discharge from the aquifer and abstraction from boreholes is automatically reduced as the water table falls. The fractured bedrock is likely to be contributing to the groundwater flow across the site. In-situ permeability testing was undertaken in two boreholes in the area of the proposed quarry during the July 2017 sampling event. The results of the assessment are shown in Table 13-6 below.

The BGS hydrogeological report indicates the following:

- The groundwater body is itself divisible into three contiguous levels. Where present there is an upper granular aquifer within superficial deposits of alluvium and raised beach material. Beneath this is the main aquifer which is contained within the shallow weathered zone of the bedrock. This is underlain by a deeper aquifer with groundwater flow restricted to occasional dilated fractures. Bedrock mainly consists of ancient crystalline metamorphic rocks.
- Borehole information obtained from States of Guernsey indicate that there is over 10m of material (comprising superficial deposits and fractured bedrock) that overlies the bed rock across the site.

The information obtained from the States of Guernsey regarding the depth to groundwater and also the depth to bedrock, support the published information presented by the Geological Society.

The following observations regarding the geology at the site were made during the site visit:

- there are limited thicknesses of superficial deposits recorded across Torrey Canyon Quarry, immediately to the west of the proposed quarry; and
- the quarry faces within Torrey Canyon Quarry are variably fractured. The fractures appear tightly held with variable orientation. Photographs of the quarry are presented in the SLR (2017) Phase 1 Desk Study for La Chouet Headland

Recharge Mechanisms

Guernsey has a temperate maritime climate, with prevailing wind directions from the west. Average annual rainfall (1907 to 1980) is reported as ranging from c. 790mm to c. 850mm. The potential evapotranspiration has been taken from Jersey data (in the absence of suitable data from Guernsey) and is c. 613mm per year. Regionally, stream flow (of which 60% is derived from groundwater recharge as base flow) is c. 226mm and groundwater recharge is estimated as c. 128mm/year.

Given the thin sequence of superficial deposits in the general vicinity of the application site, it is considered that the majority of effective rainfall will form groundwater recharge to the fractured bedrock aquifer. The groundwater surface sits in the fractured bedrock as identified by the site boreholes.

Any groundwater infiltrating through the superficial horizon and fractured bed rock is expected to recharge the underlying bedrock aquifer via vertical leakage.

Groundwater Levels and Flow

A number of boreholes have been monitored by the States of Guernsey over a number of years at the application site. The 2011-2017 monitoring data have been collated and are presented in Table 9-2 below.

Table 9-2
Summary of Groundwater Elevation

BH No.	Min of Water Level (mAGD)	Average of Water Level (mAGD)	Max of Water Level (mAGD)
2020	-0.01	0.62	1.51
2021	0.07	0.69	1.70
2022	6.22	6.55	7.00
2023	2.22	2.60	3.29
2026	2.18	5.68	8.80
2027	4.51	5.33	6.89
2031	1.67	2.15	2.99
9122	-4.31	-2.77	-0.32
9130	-0.96	0.16	2.43
9131	-1.30	0.03	2.61
9133	-3.05	0.05	3.62
9134	-2.60	-0.88	1.21
9135	-2.47	1.16	2.60
9136	-1.98	1.77	4.02
9137	-3.21	-1.86	0.89

Groundwater contours indicate that the groundwater flow direction in the vicinity of the headland is towards the Mont Cruet landfill to the east. This might suggest that there is some groundwater management being undertaken in the landfill site. Although information from Guernsey Water indicates there is no licensed groundwater abstraction in the area, the landfill site does operate a leachate treatment system (with discharge to the sea) which might be locally influencing groundwater flow.

This appears to be supported by the groundwater hydrographs for boreholes 9122, 9133, 9137 and 9134 which appear to indicate pumped levels and recovery over periods of time. The maximum head in the boreholes is around March with a minimum head in November of the same year. Boreholes more distant from Mont Cuet, such as 2027 and 2022, do not show the same hydrograph responses over the same time period. Boreholes 9136 and 2023, which are close to the sea (as with 2027) also so not show the same hydrograph which suggests any differences seen closer to the landfill are not due to tidal variation.

There also appears to be a localised groundwater drainage feature to the within the southern part of the headland, south west of the first phase of extraction. When this is compared to the depth to bedrock, this feature coincides with relatively thick sequence of fractured bedrock/superficial deposits. Therefore, it is likely that a preferential flow path exist for groundwater in this location of the site.

The hydraulic gradient does increase in the vicinity of the coastline. In the immediate vicinity of the Torrey Canyon quarry the hydraulic gradient appears to be different depending on the orientation of the former quarry:

- Borehole 2026 immediately to the north has a groundwater elevation similar to the water level, in the flooded quarry;
- Borehole 2021 immediately to the east has a groundwater elevation lower than the quarry water level.
- Borehole 2021 has a much thicker sequence of material overlying the bed rock (12.2m compared to 6.3m in borehole 2026) and therefore the groundwater is likely to be draining preferentially to the east at this location. There is no visual evidence of significant permanent groundwater inflows taking place into Torrey Canyon Quarry, either from the seaward or the landward quarry faces. Onsite in-situ permeability testing in borehole 2021 is recorded as 5.7 x 10^{-9} m/s (see below).

As part of the July 2017 fieldwork permeability tests were completed in 2 boreholes at the site; the results are summarised below:

Table 9-3
Summary of Permeability Data

Borehole Number	Permeability (m/s)
2021	5.679 x 10^{-9}
9131	2.12 x 10^{-7}

The groundwater elevation observations and permeability measured during the July 2017 sampling indicates that the groundwater velocity in the area of the proposed quarry is likely to be low.

Competent granodiorite aquifers typically demonstrate low transmissivities, which supports the results of the in-situ permeability assessment, resulting in narrow and deep drawdown cones in response to pumping; even more so given the unconfined nature (and high storage values) of the aquifer in question. Consequently the zone of influence (ZOI) associated with any dewatering strategy is likely to small. In order to make a preliminary assessment of the ZOI, a simple calculation was made utilizing the highest transmissivity value calculated from slug testing conducted in July 2017 (2.1 x 10^{-7} m/s) and a specific yield (0.02) typical of fractured rock.

Using a Cooper-Jacob solution, a ZOI of less than 5m was calculated with a drawdown of 15m. The calculation is preliminary in nature. The phreatic surface is located in the slotted screen of the wells which sit in the superficial deposits and fractured bed rock. Therefore, it is likely the presence of potentially more permeable strata, has been accounted for in the preliminary testing and analysis undertaken. Consequently, whilst this is a preliminary assessment, it is useful to demonstrate that under typical conditions the ZOI should be anticipated to be small.

Water Resources and Abstractions

The headland is not located in a Water Catchment Area as defined by Guernsey Water. Commercial enterprises that operate within a Water Catchment Area require a formal Permit for Development from Guernsey Water, if planning and building consent is given by the Environment Department. The Permit will contain Guernsey Water's conditions for the site to prevent pollution, or a risk of pollution, arising to the Public Water Supply.

Guernsey Water's pollution legislation does not permit trade effluents to be discharged into surface water. Guernsey Water has reported that there are no current abstraction license applications, pollution incidents or discharge licenses located at the development site.

Guernsey Water outlined potential issues for contamination of surface water that is currently located within the Torrey Canyon Quarry:

- Guernsey Water are aware that the quarry contains oil which is a result of a spill off the coast of Guernsey known as the Torrey Canyon oil spill;
- This occurred in 1967 when the SS Torrey Canyon super tanker hit a reef off the coast of Cornwall resulting in an estimated 25 to 36 million gallons of crude oil being spilled.

The Mont Cuet Landfill site is located to the east of the headland. This accepts a mixture of waste materials from the island and is operational. The site has a leachate and gas management system.

Groundwater Quality

Groundwater quality sampling and analysis has been completed by the States of Guernsey using the boreholes at site. Review of the water quality monitoring records shows the following:

- The concentration of major ions is similar to that reported in the BGS (2000) study which indicates they are a result of mixing between rainwater and sea-spray. This is also supported by the electrical conductivity measurements which are shown in Figure 13-3. The highest concentration relates to boreholes located closest to the sea (9136 and 2023). Over time the concentration in boreholes 9034 and 9022, which are further inland, have increasing conductivity which is probably related to salinization/mixing in the groundwater.
- The organic load markers (BOD, COD and DOC) are not considered elevated and therefore don't show the presence of significant concentrations of petroleum hydrocarbons. The only anomaly is the groundwater in 9130 which has high BOD, COD and DOC.
- The elevated oxidised nitrogen compounds are consistent with shallow groundwater across the island and reflect infiltration of rainwater through the surrounding agricultural land.
- Ammonium is elevated at locations 2027 and 9130. The organic carbon is also relatively elevated and suggests this is a function of the site use as a biomass recycling facility(2027) and anthropogenic source (9130).
- The concentration of iron is consistent with the understanding that any superficial raised beach drift deposits are cemented by iron minerals. Although it is very high in groundwater adjacent to the landfill site (9137). This may be due to reducing conditions in the groundwater which causes greater concentrations of iron to be soluble (typically when the dissolved oxygen is < 2mg/l).

Additional groundwater sampling was undertaken by SLR in July 2017. This was to identify the presence or otherwise, of organic compounds which might be present in the Torrey Canyon Quarry and/or associated with the groundwater in close vicinity to Mont Cuet landfill. The main conclusions from the sampling and analysis are as follows:

- The major ion analyses indicated the majority of the groundwater was sodium – chloride waters, with the exception of borehole 2020 which was sodium carbonate dominant groundwater.
- The wide variety of analysed volatile organic compounds, speciated total petroleum hydrocarbons and semi-volatile hydrocarbon were not detect at significant concentrations.
- Trace concentrations of chlorinated and polyaromatic aromatic hydrocarbons were detected in borehole 2022 in the Torrey Canyon Quarry. This is most likely related to the historic cleaning of hydrocarbon sampling tools or similar. The chlorinated hydrocarbons were not detected in the quarry surface water or in any of the other groundwater sampled.
- Trace concentrations of xylene and phenol were detected in borehole 9134. This is located in Ronez Field and given the lack of significant concentrations elsewhere in this area, it is considered most likely this has resulted from a small spill probably during agricultural activities in the field.
- Given the anecdotal evidence regarding the German's disposing of munitions in the quarry, an explosive residue suite was also included in the analysis of the surface and groundwater closest to the quarry. There were no explosive resides detected in the borehole closest to the Torrey Canyon quarry.

9.1.4 Hydrological Setting

Surface Water Features

The closest surface water feature to the application site is the Torrey Canyon Quarry where historical storage of crude oil has occurred. Visual and olfactory information from a site walkover also suggests hydrocarbons are present, although the surface water here has undergone a number of years of treatment. More information regarding the quarry and its contents are included in detail within the Phase 1 Report (Appendix 13-3)

During the site walkover it was not possible to identify any other surface water features such as land drains, springs or rivers associated with the study area . The proposed quarry area is bounded to the north and south the sea.

The walkover did note a small diameter (50mmID) uPVC or HDPE pipe apparently directing drainage from the biomass Recycling Centre onto the northern beach. The exact purpose of the pipe is not known but it appears to be a localised surface water control feature of low significance.

Surface Water Quality

Surface water in Torrey Canyon Quarry was sampled during the July 2017 water sampling event. This showed that whilst there was observable historic crude oil in areas of the site surface, the surface water chemistry had the following characteristics:

- no detectable speciated hydrocarbons;
- no detectable explosive residues (anecdotal evidence indicates there may be munitions in the base of the quarry); and
- trace concentrations of polyaromatic hydrocarbons were present in the water which is not surprising given the history of oil containment in the quarry.

This confirms that the trace organic compounds identified in the Torrey Canyon surface water are not identified in groundwater immediately next to the quarry and therefore migration from the quarry is not occurring or has not occurred over the last 40 years. In addition, the lack of detectable hydrocarbon adjacent to the landfill suggests if hydrocarbons are present in leachate in the landfill, these are not impacting the groundwater.

9.2 Appraisal

9.2.1 Hydrogeological and Hydrological Flow Regimes and Flooding

The proposed quarry would not have any significant effect on the regional groundwater flow regime within the bedrock aquifer, either during future quarrying activities or following restoration, given the following:

- The area of the island is designated as a Safeguarded Zone for mineral extraction;
- The permeability of the bedrock is measured as being very low at depth;
- No groundwater inflows have been observed from the quarry faces in areas such as the Torrey Canyon Quarry;
- There are no visible surface water streams present surrounding the application site;
- The closest surface water receptor will be the marine environment;
- There are no groundwater abstractions in the area of the application site;
- The proposed site is not located in a groundwater catchment area;
- Groundwater levels in the area would be reduced due to the dewatering likely to be required in the proposed quarry. However there are no obvious receptors which might be impacted by the dewatering;
- Based on the preliminary calculations, the Zone of Influence of any quarry dewatering is unlikely to include the existing Torrey Canyon Quarry which comprises hydrocarbons in the surface water. Hydrochemical analysis has shown that this surface water is not influencing the groundwater quality in the area;
- The very low permeability in the aquifer immediately adjacent to the Torrey Canyon Quarry confirms the containment of the hydrocarbons in the quarry is still occurring after a number of years since the crude oil was first contained in the quarry;
- Based on the preliminary calculations, the Zone of Influence of any quarry dewatering is unlikely to include the existing Mont Cuet landfill;
- Hydrographs suggest there may be some form of localised groundwater control in vicinity of the landfill, possible associated with the leachate treatment system;
- Hydrochemical analysis has shown that the chemistry of the groundwater close to the landfill does not appear to be influencing the groundwater quality in the proposed quarry area; and
- The area is not deemed to be at a risk from flooding.

9.2.2 Potential Effects on Groundwater and Surface Water Quality

During the operation of the quarry there is a risk of contaminated runoff being generated from the following potential sources, as a result of:

- intercepting potentially contaminated groundwater from the area to the west Torrey Canyon Quarry) and east (Mont Cuet Landfill) of the site;
- inducing saline intrusion;
- accidental spillage of fuels, lubricants and other potentially contaminating liquids; and
- suspended solids within surface water runoff.

The sensitivity of the groundwater surface water receptor, in terms of quality is assessed as 'high', given the proximity to the coastline.

Pollution prevention and control measures are currently employed by the applicant at other quarries it operated on Guernsey and Jersey; therefore, it is considered that the magnitude of change on groundwater quality due to spillage of fuels, lubricants and other potentially contaminative liquids would be 'negligible'. This assessment is also based on the relatively small areal extent of potential spillages due to the relatively small number of vehicles that would be accessing the quarry during the operational and decommissioning phases.

Any suspended solids generated within surface water runoff would also 'settle out' within the quarry sump and settlement lagoons and so this potential effect is not considered further.

Given the above, the significance of potential direct effect to groundwater and surface water quality would be 'negligible', and consequently there is no requirement for additional mitigation measures to protect water receptors. Consequently, these potential effects can be scoped out of further assessment.

The groundwater and surface water sampling indicates there appears to be limited or no interaction with water in the Torrey Canyon Quarry and that in the area of the Mont Cuet landfill. The following has been considered regarding these two areas of potential impact:

- the quarry and the landfill have been in existence for a considerable length of time;
- these structures do not appear to have influenced the groundwater quality over this period of time;
- the lack of interaction is supported by low and very low intrinsic permeability of the bed rock across the area;
- preliminary calculations indicate that the Zone of Influence of the quarry dewatering is unlikely to intersect the Torrey Canyon surface water, Mont Cuet landfill leachate or the sea (inducing saline intrusion); and
- the groundwater and surface water is already saline.

It is therefore not unreasonable to assume that these conditions would remain during the lifetime of the proposed quarry development and would not be altered by the quarry dewatering. Notwithstanding this, precautionary measures would be required during the groundwater management in the proposed quarry and surrounding area, as discussed below.

9.3 Conclusions

As a consequence of the site design, site setting and embedded mitigation, no significant effects are predicted. Notwithstanding this, and like other operations managed by the applicant, confirmatory monitoring would be undertaken to confirm there are no residual effects. The monitoring protocol would be agreed with States of Guernsey.

APPENDIX 01

Table 1
Recommended Dust Control Measures

Activity	Dust Control Measures
General	• Planning and design of the scheme to make provision for water supply to ensure supply can meet site demand at areas such as plant site and during perimeter bund construction along the southern boundary • Existing woodland / hedgerows to be retained along site southern site boundaries where possible. Additional planting along southern boundary • Provide training on dust mitigation to personnel as part of any site / job induction procedure • Maintain good communication between operator and surrounding communities
Site Preparation and Restoration	• Water suppression to be available when screening mounds are being constructed within 200m of off-site receptors • No vehicles to traverse near the base of screening mounds unless explicitly required • Screening of mounds to be seeded at the earliest opportunity and thereafter maintained free from weeds • Temporary cessation of soil stripping / bund construction during conditions whereby high winds are from the northerly sectors and activities are present within 200m of activities
Plant Site: Processing, Materials Handling & Stockpiling	• Drop heights of mineral into stockpiles / dump trucks minimised • Use of water bowsers/spray systems to dampen stockpiles during dry / windy conditions • Paved surface area of plant site to be swept regularly • Mobile plant to be maintained / serviced as per manufacturers recommendations • Visual checks of mobile plant to ensure dust suppression working and effective
On-site Transportation	• Use of water bowsers/spray systems to dampen haul roads • No plant/vehicles shall cross any area of unstripped topsoil or subsoil or areas of loosened ground, except where unavoidable for the purposes of undertaking permitted operations • Speed limit usually controlled to 10mph • Haul roads are maintained to remove potholes and dips which trap dust and cause plumes
Off-site Transportation	• Wheel wash facility to be used by all vehicles that enter site; • Wheelwash to be serviced and maintained as per manufacturers recommendations • Access tracks to loading / unloading area to be hard paved and separate from those routes utilised by on-site dump trucks All loaded vehicles transferring material off-site to be covered • Induction of staff members to include awareness of trackout and to report signs of trackout beyond the site boundary to the relevant person • A separate paved parking area for off-site non-HDV vehicles (i.e. staff cars) with no access to working areas / plant site to reduce track-out onto public highway

APPENDIX 02

Table 1. List of Sites present on the States of Guernsey's HER that are present within the Study Area

HER UID Reference Numbers	Site Name	NGR	Description
MGU 171	No. 10 (Pre) Martello loophole Tower	37566 50510	Late 18th/19th century defensive structure.
MGU 449	Chouet Battery No. 1	37497 50553	Late 18th/19th century defensive structure.
MGU 450	Chouet Battery No. 2	37497 50553	Late 18th/19th century defensive structure.
MGU 565	Flint findspot at Chouet	37566 50568	Later prehistoric artefact
MGU 588	Chouet magazine	37594 50504	Late 18th/19th century defensive structure.
MGU 830	Strongpoint 'Kraehennest'	37660 50606	World War II defensive structure
MGU 2139	Flint findspot at Chouet	3786 5044	Later prehistoric artefact
MGU 2430	Telephone switching post N (C3)	3786 5050	World War II Transmitter site
MGU 2431	8cm mortar and trenches, associated with MGU 830	3768 5060	World War II defensive structure
MGU 2432	5cm M19 Automatic mortar bunker, associated with MGU 830	3768 5062	World War II defensive structure
MGU 2433	Small shelter, associated with MGU 830	3759 5051	World War II defensive structure
MGU 2434	Machine gun post and trenches, associated with MGU 830	3755 5055	World War II defensive structure
MGU 2435	Site of 10.5cm K331 (f) Casemate, associated with MGU 830	3747 5056	World War II defensive structure
MGU 2436	10.5cm K331 (f) Casemate at Chouet	3751 5062	World War II defensive structure
MGU 2437	Multi loop-holed turret (Mehrschartenturm), associated with MGU 830	3749 5067	World War II defensive structure
MGU 2438	10.5cm K331 (f) Casemate (associated with MGU 830)	3759 5068	World War II defensive structure
MGU 2439	Electricity Generating tunnel (Ho. 31)	375 505	World War II defensive structure
MGU 2469	Army Observation Post (M2) and Navel Tower	3794 5065	World War II defensive structure
MGU 3677	Stone axe from Mont Cuet	37967 50743	Later prehistoric artefact
MGU 4893	Minesweeper 2070 off Chouet	37325 50857	Wreck
MGU 5243	Unidentified vessel off Chouet	37325 50857	Wreck
MGU 5341	Roman coins from Chouet	38013 50585	Roman coinage
MGU 5569	Flint findspot at Mont Cuet	3796 5074	Later prehistoric artefact
MGU 6284	Stone ring from Chouet Point	3804 5062	Neolithic artefact
MGU 6903	Stone Platform at Chouet	3746 5057	Late 18th/19th century defensive structure
MGU 6923	Flint findspot at Chouet	37525 50069	Later prehistoric artefact
MGU 6957	Cottages at Mont Cuet	37705 5053	Post-medieval dwelling

Table 2. Additional sites identified from the Walkover Survey (undertaken in May 2018)

SLR Ref. No.	Site Name	NGR	Description
SLR 001	Quarry (Torrey Canyon oil storage site)	376 506	Former 18th/19th century quarry site that was later used to store some of the crude oil from the stricken super tanker Torrey Canyon in 1967.
SLR 002	Field system located within the Development Site	37 50	Five rectangular fields (oriented E-W) located within the eastern section of the Development Site, each field is delineated by drystone walled boundaries. Date range: medieval to post-medieval.
SLR 003	Worked and dressed gate posts and attached gate furniture	37 50	A series of squared dressed and worked granite gate post, providing access to each of the five fields. Date range: post-medieval to modern.
SLR 004	Possible later prehistoric standing stones	37 50	Two irregular-shaped stones with tapered point, standing c. 1.5m in height and surviving as a gate posts. Located in the boundary of Field No. 2 and accessed via the Rue des Grands Champs.
SLR 005	Historic quarries within the western part of the Chouet Headland	375 506	Severn historic quarries were in operation during the 19th century, two of these are still exposed, and the remaining five have been backfilled. One Quarry, locally known as Green Waste Quarry is visible.

APPENDIX 03

Table 1
Data Search Results (At Risk and Endangered Species only)

Species/Group	Latin Name	English Name	Status
Insects	*Callophrys rubi*	Green hairstreak	At Risk
	Nepa cinerea	Water Scorpion	At Risk
	Asilus crabroniformis	Hornet Robberfly	At Risk
	Copris lunaris	Horned Dung Beetle	Endangered
	Gryllotalpa gryllotalpa	Mole Cricket	At Risk
Arthropods	*Cypris bispinosa*	large mussel-shrimp	Endangered
Flowering Plants	*Ranunculus sceleratus*	Celery-leaved Crowfoot	At Risk
	Ranunculus baudotii	Brackish Water-crowfoot	Endangered
	Ranunculus trichophyllus	Thread-leaved Water-crowfoot	Endangered
	Ranunculus peltatus	Pond Water-crowfoot	Endangered
	Saxifraga tridactylites	Rue-leaved Saxifrage	At Risk
	Euphorbia amygdaloides	Wood Spurge	At Risk
	Linum catharticum	Fairy Flax	At Risk
	Radiola linoides	Allseed	At Risk
	Lythrum salicaria	Purple-loosestrife	At Risk
	Matthiola sinuata	Sea Stock	At Risk
	Arabis hirsuta	Hairy Rock-cress	At Risk
	Cakile maritima	Sea Rocket	At Risk
	Crambe maritima	Sea-kale	At Risk
	Rumex hydrolapathum	Great Water Dock	At Risk
	Herniaria ciliolata ciliolata	Fringed Rupturewort	At Risk
	Silene nutans	Nottingham Catchfly	Endangered
	Silene conica	Sand Catchfly	Endangered
	Dianthus armeria	Deptford Pink	Endangered
	Anagallis tenella	Bog Pimpernel	At Risk
	Centunculus minimus	Chaffweed	Endangered
	Galium constrictum	Slender Marsh-bedstraw	Endangered
	Cicendia filiformis	Yellow Centaury	Endangered

Species/Group	Latin Name	English Name	Status
	Exaculum pusillum	Guernsey Centaury	Endangered
	Echium vulgare	Viper's-bugloss	Endangered
	Cynoglossum officinale	Hound's-tongue	At Risk
	Calystegia soldanella	Sea Bindweed	At Risk
	Hyoscyamus niger	Henbane	Endangered
	Linaria vulgaris	Common Toadflax	At Risk
	Plantago major intermedia	Greater Plantain (hybrid)	At Risk
	Stachys palustris	Marsh Woundwort	Endangered
	Mentha pulegium	Pennyroyal	Endangered
	Parentucellia viscosa	Yellow Bartsia	At Risk
	Pedicularis sylvatica	Lousewort	Endangered
	Orobanche purpurea	Yarrow Broomrape	At Risk
	Carduus nutans	Musk Thistle	At Risk
	Scorzoneroides autumnalis	Autumn Hawkbit	At Risk
	Hieracium umbellatum bichlorophyllum	Umbellate Hawkweed	At Risk
	Aster tripolium	Sea Aster	Endangered
	Erigeron acris	Blue Fleabane	Endangered
	Eryngium maritimum	Sea-holly	At Risk
	Eryngium campestre	Field Eryngo	Endangered
	Oenanthe fistulosa	Tubular Water-dropwort	Endangered
	Bupleurum baldense	Small Hare's-ear	Endangered
	Falcaria vulgaris	Longleaf	Endangered
	Torilis japonica	Upright Hedge-parsley	At Risk
	Alisma plantago-aquatica	Water-plantain	Endangered
	Triglochin maritima	Sea Arrowgrass	Endangered
	Potamogeton natans	Broad-leaved Pondweed	Endangered
	Zostera marina	Eelgrass	At Risk
	Asparagus prostratus	Prostrate Asparagus	At Risk
	Sparganium erectum	Branched Bur-reed	At Risk

Species/Group	Latin Name	English Name	Status
	Schoenoplectus tabernaemontani	Grey Club	Endangered
	Bolboschoenus maritimus	Sea Club-rush	At Risk
	Eleocharis palustris	Common Spike-rush	At Risk
	Eleocharis multicaulis	Many-stalked Spike-rush	Endangered
	Carex flacca	Glaucous Sedge	At Risk
	Carex demissa	Common Yellow Sedge	At Risk
	Carex oederi	Lesser Yellow Sedge	Endangered
	Carex caryophyllea	Spring-sedge	At Risk
	Carex pilulifera	Pill Sedge	Endangered
	Carex nigra	Common Sedge	Endangered
	Milium vernale sarniense	Dwarf Millet	Endangered
	Festuca filiformis	Fine-leaved Sheep's-fescue	Endangered
	Vulpia fasciculata	Dune fescue	At Risk
	Poa bulbosa	Bulbous Meadow-grass	Endangered
	Agrostis canina	Velvet Bent	At Risk
	Phleum arenarium	Sand Cat's-tail	Endangered
	Danthonia decumbens	Heath Grass	Endangered
Bats	*Plecotus austriacus*	Grey Long-eared Bat	Endangered
Birds	*Hirundo rustica*	Swallow	At Risk
	Anthus pratensis	Meadow Pipit	At Risk
	Carduelis cannabina	Linnet	At Risk
Fungi	*Hygrocybe conicoides*	Dune Waxcap	At Risk

DRAWINGS

N

Land Fill Site

Chouet

Mont Cuet

Martello Tower

Martel

a Lochante

R8

R7

R1

R2

E1

E2

R3

R4

R5

R6

R8

PC

La Varde Dolmen

Ladies Bay

Hommet de Grève

Baie des

P

0 100 200 300 400m 600 800 1000

Metres 1:10,000

NOTES

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LEGEND

HUMAN RECEPTORS

ECOLOGICAL RECEPTORS

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CHOUET HEADLAND

PLANNING APPLICATION

AIR QUALITY RECEPTORS

CH 1

Scale: NTS

Date: march 2019

CL_AQ_receptors (002).dwg

N

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LEGEND

- APPLICATION SITE BOUNDARY
- SURVEY AREA
- CONIFEROUS PLANTATION
- SCATTERED MATURE CONIFERS
- BARE GROUND
- HARDSTANDING / BARE GROUND
- SI — MOWN GRASSLAND
- SI — SEMI-IMPROVED GRASSLAND
- BUILDINGS / STRUCTURES
- A — AMENITY GRASS
- MARITIME GRASSLAND
- Q — ARTIFICIAL QUARRY
- SCATTERED SCRUB
- EARTH / STONE WALL

- TREE
- PLANTED CONIFEROUS WOODLAND
- NON- NATIVE HEDGE
- TALL RUDERAL
- STANDING WATER
- BRACKEN / BRAMBLE / BLACKTHORN/ INTRODUCED SCRUB / GORSE
- 1 — TARGET NOTE
- KESTREL / OWL BOX x3

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CHOUET HEADLAND

PLANNING APPLICATION

PHASE 1 HABITAT PLAN

CH 2

Scale 1:1500 @ A3

Date APRIL 2019

403.06370.00001.27.ECO1.1 Phase 1 habitat plan.dwg

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CONTENTS

INTRODUCTION

Background

11.1 This chapter of the ES provides an Ecological Impact Assessment (EcIA) following completion of baseline surveys of flora and fauna between 2016 and 2018.

11.2 The purpose of this EcIA is to establish the ecological value of the application site by collating the findings of the desk study and baseline surveys; to identify the specific impacts that could occur to valued ecological features; to characterise such impacts (e.g. magnitude, permanence); and to recommend appropriate avoidance and mitigation measures so that residual effects are either not predicted or are at a level considered to be acceptable.

Site Description

11.3 The geographical term "Chouet" refers to the western-most part of a low coastal peninsula situated at the north-western tip of Guernsey (at map reference XD 6069956250). The underlying geology is Bordeaux Diorite (an intrusive igneous rock).

11.4 As noted from Chapter 2 above, the Chouet Headland is accessed from the south by Mont Cuet Road and La Jaonneuse Road (see Figure 11-1). Other land uses and features present in the wider area to the east include the Mont Cuet landfill site, Fort Pembroke and beach, Jaonneuse Bay and Chouet Beach. The large L'Ancresse common, much of which is designated as a Site of Special Significance and also used as a golf course is present to the south.

Figure 11-1
Chouet and Surrounding area (excerpt from the Island Development Plan)

11.5 Figure 11-2 shows the general nature of the habitats and features present at the Chouet Headland (being based on Drawing CH 11/1).

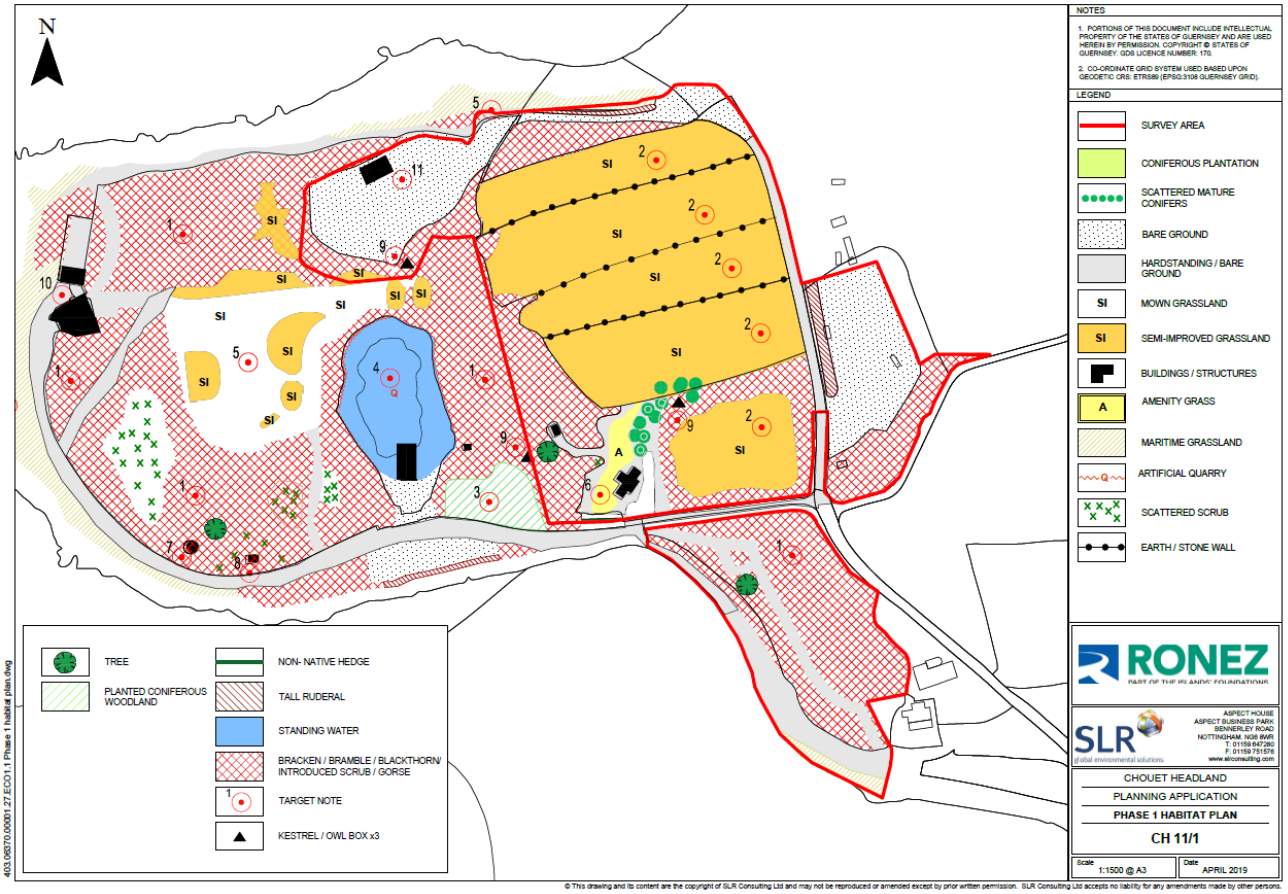

Figure 11-2
Drawing showing the Main (Phase 1) Habitat Types

11.6 The headland comprises of a low hill (up to 13 metres above sea level in height). A centrally located small quarry void (0.15ha) is present on its southern flank which contains a water body / lagoon and vertical faces (see Figure 11-3).

11.7 A narrow pebble/cobble beach is present on its southern side and a rocky shoreline forms the western and northern sides. Mont Cuet landfill site is situated to the east which receives household waste. A public path starting from a small carpark to the south of the quarry void runs around the lower perimeter along the top of the rocky shore through maritime grassland and scrub.

11.8 Being a strategic point on the Island, a stone "loophole" (Martello) tower and small ammunition store were constructed in the late 18th century.

11.9 The central and western-most areas of the wider survey area predominantly comprise of a mosaic of dense bracken, bramble, blackthorn scrub, patches of non-native shrubs and scattered trees. On the plateau itself, open patches of maritime grassland are present in a mosaic with the scrub / trees.

The largest patch of grassland is located centrally within the headland and is mown to facilitate the flying of model aircraft. A network of paths is present and the area is popular with dog walkers.

11.10 The eastern parts of the wider survey area, within which the application site is situated, comprise of five small rectangular hay fields on level ground which are bordered by low stone walls and dense bracken. To the south-west of the fields is a small plantation of now mature pine trees. The application site also contains a modern bungalow and outbuildings. Its garden has areas of lawn, mature trees, a small quarry void/low cliff and lengths of non-native hedgerow. To the east is a small road (Rue des Grand Camps) and the reception area of the Mont Cuet landfill site. The reception area to the landfill comprises bare ground on which are several structures, including weighbridge, office/welfare and stores.

11.11 An area of bare and disturbed ground occurs in association with the green waste facility to the north, situated within a quarry void and also the public car park.

11.12 In addition to the bungalow, the headland contains other built structures notably a Martello Tower (see Figure 11-4), a small ammunition store (stone built), a firing range, WW2 concrete bunker and a fenced compound containing anemometer masts and aerials. A portacabin and old conveyor structure are also present. Three bar owl / kestrel boxes have been erected on wooden poles or attached to mature pine trees (shown as black triangles on Figure 11-2).

Figure 11-3
Torrey Canyon Quarry.

Terms of Reference

11.13 The study area for the purpose of desk study is the survey area and a 2km buffer.

11.14 The term survey area refers to the area of land shown edged green on Figure 11-2 and Drawing CH 11/1. The application site is shown edged red in the same Figure and Drawing.

Details of the Proposed Development

11.15 As described in Chapter 3 above the application site extends to c. 4.4 ha. The proposed development would comprise of the phased removal of buildings, trees and other surface vegetation followed by the remove of over-burden (soils). This would be followed by the phased quarrying of rock using mobile plant and machinery, along with primary processing. Rock would be transported from the site and processed at Les Vardes Quarry via local roads.

11.16 It is estimated that around 343,000 tonnes of aggregate could be extracted from the application site over a period of around 24 - 36 months.

11.17 At the end of the development, a suitable platform would have been established within the quarry void upon which an aggregate processing plant could be erected (subject to a further planning application). That plant would replace the one at Les Vardes Quarry.

Purpose of the Assessment

11.18 The purpose of this Ecological Impact Assessment is:

- to describe the baseline data collection and assessment methodologies used;
- to summarise the baseline ecological conditions;
- to identify and describe all potentially significant ecological effects associated with the proposed development;
- to set out the mitigation and compensation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- to identify how mitigation and compensation measures will/could be delivered;
- to provide an assessment of the significance of any residual effects in relation to the effects on biodiversity and the legal and policy implications;
- to identify appropriate enhancement measures and how these will/could be delivered; and
- to set out the requirements for post-construction monitoring.

11.19 Included with this EcIA report are four survey reports as appendices:-

- Reptile Survey (Appendix 11/1);
- Bat Survey (Appendix 11/2);
- Wintering Bird Survey (Appendix 11/3); and
- Breeding Bird Survey (Appendix 11/4).

RELEVANT LEGISLATION AND PLANNING POLICY

Relevant Legislation[1]

11.20 Limited local legislation is in place to protect wild birds and wild flowers. The current planning laws contain enabling powers which allow for the control of development on land and there is also provision in the main Planning Law to designate Sites of Special Significance (SSSs) to protect areas that are particularly rich in biodiversity[2].

11.21 However, it should be recognised that Planning Laws in general are limited in their protection of biodiversity since they only seek to control development as defined in law. There are currently no comprehensive and over-arching laws which specifically seek to protect wildlife or habitat in the Bailiwick.

11.22 Until now the need for legislation has been tempered by the fact that a large proportion of publicly accessible and managed land is in public ownership or owned by organisations that are well disposed toward the protection of the natural environment. This has often been backed by specific management policies which seek to enhance biodiversity.

11.23 The formal relationship between the Channel Islands and the EU is enshrined in Protocol 3 of the UK's 1972 Accession Treaty, and confirmed in what is now Article 355 (5) (c) of the EU Treaties. Under Protocol 3, the Islands are part of the Customs Union and are essentially within the Single Market for the purposes of trade in goods, but are third countries (i.e. outside the EU) in all other respects. However, the Channel Islands have a close relationship with the EU in many different fields, not simply those covered by the formal relationship under Protocol 3. Both Jersey and Guernsey voluntarily implement appropriate EU legislation or apply the international standards on which they are based.

Relevant Planning and Environmental Policy

Biodiversity Strategy

11.24 A Biodiversity Strategy for Guernsey was published in 2015. The strategy provides a framework for future development of specific actions to safeguard and enhance biodiversity.

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[1] Please note that the summary of relevant legislation provided here is intended for general guidance only. The original legislation should be consulted for definitive information.

[2] The Land Planning and Development (Guernsey) Law, 2005, which was enacted in 2009, makes provision for the designation of Sites of Special Significance (SSSs) through Development Plans or Subject Plans. A Site of Special Significance may be designated if it has been identified as an area having a special significance, whether because of archaeological, historical, botanical, geological, scientific, cultural, zoological or any other interest, which it is desirable to preserve, enhance or manage by the application of special provisions. For the purposes of designation in the Island Development Plan only areas of botanical, scientific or zoological interest have been considered. However, on receipt of robust evidence, the Environment Department may choose to designate other Sites of Special Significance in the future through a proposal for a Local Planning Brief or Subject Plan which would be subject of a separate independent public Inquiry.

States of Guernsey – Strategic Environmental Policy Plan

11.25 This document provides a holistic approach to sustainable development in respect of land-use and includes indicators for measurement for biodiversity and a summary of actions.

Island Development Plan

11.26 The Island Development Plan (published in 2016) includes proposals to designate areas regarded as important for biodiversity (Areas of Biodiversity Importance – ABIs) and which provides a level of protection from specific activities to Sites of Special Significance (SSSs).

METHODOLOGY

Scope

11.27 The ecological survey area comprised of the whole of the Chouet Headland (c. 7.5 ha) excluding the active landfill to the east. The application site is situated within the eastern part of the study area.

11.28 Drawing CH 11/1 shows the boundaries of the survey area and the application site boundary.

11.29 The following ecological features have been considered:-

- Designated sites; and
- Habitats and Species of importance for the conservation of biodiversity.

11.30 SLR engaged the services of Environment Guernsey, the Island's ecological consultancy, to provide local assistance with survey work and to assist SLR in interpreting the findings of site surveys in a Guernsey context.

11.31 The scope of this EcIA, i.e. the collection of baseline data, evaluation of ecological resources and description and assessment of the significance of impacts, follows guidelines set out by the Chartered Institute of Ecology and Environmental Management (CIEEM 2018) and references therein.

11.32 The survey work has been undertaken in accordance with CIEEM's Code of Professional Conduct when undertaking ecological work.

Baseline Data Collection

Desk Study

11.33 In July 2017, SLR commissioned the Guernsey Biological Records Centre (GBRC) to undertake a data search of the headland and a 2km buffer.

11.34 GBRC supplied a species list (all Taxa) for the site and 2km radius which included interpretation of conservation status, date of records, exact location of the record, accuracy and recorder and the Guernsey plant species checklist.

11.35 In addition, the following sources of information have been reviewed by SLR for background information:-

General Websites

- Birding in Guernsey[3];
- Ornithology Section of La Société Guernesiaise's website[4];
- Sustainable Guernsey[5]; and
- Société Guernesiaise[6]

Biodiversity Strategy

- Safeguarding Guernsey's Wildlife: A Biodiversity Strategy for Guernsey. Environment Department - August 2015.

Habitat Audits

- Habitat Survey of Guernsey, Herm and Associated Islands 1999[7]. Environment Department 1999;
- Habitat Survey of Guernsey, Herm and Associated Islands 2010[8]. Environment Department 2010; and
- UK Overseas Territories and Crown Dependencies: 2011 Biodiversity snapshot. Guernsey: Appendices. Author: Dr Charles David Guernsey Biological Records Centre, States of Guernsey Environment Department & La Societe Guernesiaise. More information available at: www.biologicalrecordscentre.gov.gg

Site Designation

- Approach to the Designation of Sites of Special Significance. October 2014. Environment Guernsey; and
- Appraisal of Sites of Special Significance *By J Gilmour, B.Sc. & J Hooper, B.Sc. Environment Guernsey. 2015*

Field Survey(s) in Chronological Order

11.36 The following field surveys have been undertaken of the survey area.

Wintering Bird Survey 2016/17 – See Appendix 11/3

11.37 Due to the coastal location of the site it was considered necessary to undertake surveys of birds over the winter period.

[3] http://www.guernseybirds.org.gg/
[4] http://www.guernseybirds.org.gg/
[5] http://www.sustainableguernsey.info/
[6] http://www.societe.org.gg/
[7] http://maps.digimap.gg/gsyHabitat.htm
[8] http://maps.digimap.gg/gsyHabitat.htm

11.38 Three surveys based on the Common Bird Census (CBC) methodology[9] were undertaken by Mr Ben Garnett MCIEEM, a Senior Consultant with SLR on the 15th November 2016, 7th December 2016, and 6th January 2017.

11.39 Each survey session was undertaken in fair weather conditions during the morning. Each survey started approximately one hour after local sunrise and lasted for up to three hours.

11.40 During each survey session, the surveyor walked a repeatable route across the survey area, approaching to within at least 100 m of all points to ensure adequate coverage, but at the same time being careful to avoid double-counting birds.

11.41 Bird registrations were recorded on large scale field maps using British Trust for Ornithology (BTO) activity recording codes and two-letter species codes.

Breeding Bird Survey 2018 – See Appendix 11/4

11.42 Due to the presence of scrub and other habitats and features (e.g. nest boxes) which had the potential to be used by birds for nesting it was necessary to undertake surveys of breeding birds.

11.43 Three surveys were undertaken based on the Common Bird Census (CBC) methodology[10]. The area was surveyed at dawn for up to three hours on the 23rd May, 16th June and 18th July 2018.

11.44 Weather conditions during each survey were warm and dry.

11.45 The May and June 2018 surveys were undertaken by Mr Chris Townend, a consultant ornithologist. The July survey was undertaken by Mr Andy Law CEcol, MCIEEM, a Principal Ecologist with SLR.

Phase 1 Habitat Survey 2017/18

11.46 Initial interrogation of aerial photography and desk study records found that the study area largely comprised of un-developed land including semi-natural and man-made habitats. As such, it was necessary to undertake a habitat mapping exercise.

11.47 The habitats present within the survey area were surveyed to Phase 1 level (i.e. mapped according to broad habitat categories) on the 17th July 2017, 30th and 31st August 2017 and 17th and 18th July 2018 by Mr Andy Law CEcol, MCIEEM, an experienced Phase 1 surveyor and Principal Ecologist with SLR.

11.48 Weather conditions during all of the habitat surveys were warm and dry.

11.49 The surveys followed the standard methodology for Phase 1 habitat survey; this approach was developed by the Joint Nature Conservation Committee (JNCC) in the mid 1980's and has, as its core, the utilisation of a standardised series of colour, symbols and descriptive categories to record habitats, species and other physical features. The methodology was developed in order to allow a quick, universal, means of mapping semi-natural and other habitats at up to a county scale. A Phase

[9] Marchant, J.H. 1983. *Common Birds Census instructions*. BTO, Tring. 12pp.
[10] Marchant, J.H. 1983. *Common Birds Census instructions*. BTO, Tring. 12pp.

1 survey therefore provides a consistent approach to habitat recording and evaluation, and a means of identifying features which may be of value for protected species.

Reptile Survey 2017 – See Appendix 11/1

11.50 Initial interrogation of aerial photography and desk study records found that the study area contained habitats which could be used by reptiles such as coastal grassland.

11.51 A preliminary walkover survey of the study area was undertaken on 3rd September 2017 by ecologists from Island Guernsey using direct observational methods to detect the presence of reptiles with particular effort made to observe individuals in and around vegetation or likely basking spots.

11.52 A total of 64 artificial refuges, consisting of sheets of roofing felt of varying sizes were deployed within areas of suitable habitat on the 31st August 2017 and in the following days.

11.53 The refugia were given one week to 'bed in' before commencing a total of 7 further visits in suitable weather between 7th September and 24th October 2017 to determine presence or all reasonable likelihood of absence of reptile species.

11.54 During each visit, the refugia were checked, wherever practically possible, during suitable weather conditions (dry, calm, ambient temperature 9-18^{o}C), either in the morning or afternoon inspecting both on top of and below each refuge. In addition, during each visit all other parts of the survey area were subject to a walkover survey with direct observational methods employed to detect reptiles.

11.55 Records of the location, species, sex and life stage were made.

Bat Survey 2017/17

Scoping

11.56 The findings of the Phase 1 survey and desk study records were reviewed. It was found that the study area largely comprised of un-developed land including semi-natural and man-made habitats. As such, it was considered that the site could potentially be used by bats for foraging and commuting.

11.57 In addition, the presence of a bungalow and the stone Martello tower and store were noted which potentially could be used by bats for roosting.

11.58 The survey area was initially assessed as being of likely "low" potential value to bats as a foraging / commuting resource due to its isolated geographic location and exposed nature and the general absence of woodland/sheltered opportunities for foraging.

11.59 The man-made structures which are present were initially evaluated as having "low" potential to support bat roosts. The bungalow is of modern construction and in a good state of repair. The Martello tower and store provide no enclosed loft/voids other than locally where mortar is missing. The other structures such as the WW2 bunker, portacabin and rifle range sheds were either sealed or had no features which could provide opportunities for roosting by bats.

11.60 No trees were recorded within the survey area with the potential to support bat roosts.

11.61 The rock faces associated with Torrey Canyon Quarry were inspected using binoculars. No significant gaps or crevises were identified which could be used by bats for roosting.

Approach

11.62 The overall aim was to determine the likely importance of the application site for bats within the context of the use made by bats of the wider survey area and beyond that the value of the Island of Guernsey for bats in general.

11.63 The survey strategy in respect of bats was based on the recommendations contained with the third edition of the Bat Conservation Trust (BCT) Guidelines for Bat Surveys (2016) and comprised of a combination of daytime building inspections, dusk and dawn transects and automated recording.

Figure 11-4
"Martello" Tower (left) and WW2 Bunker and Mast Enclosure (Right)

Summary

11.64 Table 11-1 provides a summary of the bats surveys undertaken. Surveys were undertaken in the spring, summer and autumn seasons across 2017 and 2018 during suitable weather.

Table 11-1
Bat Surveys (2017/2018)

Survey Description	Date	Personnel
Daytime Building Inspection of "Martello" Tower and Bungalow	30th August 2017	Andrew Law (AL), SLR (NE Licensed batworker – England and Wales) Jamie Hooper (JH), Environment Guernsey (EG)

Survey Description	Date	Personnel
Dusk Transect Survey	30th August 2017	AL and Julia Denney, EG
Automated Recording (One ANABAT device – two locations)	30th & 31st August 2017	SLR and EG
Dusk Transect	30th October 2017	Environment Guernsey
Automated Recording (One ANABAT device)	30th October 2017 to 6th November 2017	Environment Guernsey
Dusk Transect Survey	1st May 2018	Phillippa Dean (PD) and JH
Dusk Transect Survey	2nd May 2018	Phillippa Dean (PD) and JH
Dawn Transect Survey	3rd May 2018	Phillippa Dean (PD) and JH
Automated Recording (Two ANABAT devices).	1st to 3rd May 2018	SLR
Automated Recording (One ANABAT device).	18th May to 22nd May 2018.	Environment Guernsey

Limitations

Desk Study

11.65 Desk study data is unlikely to be exhaustive, especially in respect of species, and is intended mainly to set a context for the study. It is therefore possible that protected species not identified during the data search do in fact occur within the vicinity of the site. Interpretation of maps and aerial photography has been conducted in good faith, using recent imagery, but it has not been possible to verify the accuracy of any statements relating to land use and habitat context outside of the field study area.

Field Surveys

11.66 Field surveys were generally not constrained by access, weather or the time of year available.

11.67 Access to the actual quarry void (Figure 11-3 / TN 4) was not possible at ground level as it is fenced and the gates are locked. However, visual inspection was possible from the fence and upper parts of the site. Similarly, the small fenced enclosure with various masts (TN 10) was also not directly accessible.

Assessment Methodology

11.68 The CIEEM Guidelines for Ecological Impact Assessment in the UK form the basis of the impact assessment presented in this report.

11.69 In accordance with the CIEEM guidelines only ecological features (habitats, species, ecosystems and their functions/processes), which are considered to be important and potentially affected by the

project should be subject to detailed assessment. It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable.

11.70 Ecological features should be considered within a defined geographical context. For this proposal the following geographic frame of reference is used:

- International;
- Island-level (i.e. Guernsey);
- Parish (i.e. Vale); and
- Local (i.e. within circa 2km).

11.71 For designated sites, importance should reflect the geographical context of the designation. For example, a Site of Special Significance (SSS) would be considered of Island-wide importance and a more local designation i.e. Area of Biological Importance (ABI) would normally be considered to be of importance at a 'parish' level.

11.72 In accordance with CIEEM guidelines the value of habitats has been measured against published selection criteria where available.

11.73 In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Reference has therefore been made to published lists and criteria where available and assistance sought from Environment Guernsey.

11.74 For the purposes of this assessment ecological features of Local importance or greater and/or subject to legal protection have been subject to detailed assessment. Effects on other ecological features are considered unlikely to be significant in legal or policy terms.

Impact Assessment

11.75 The impact assessment process involves the following steps:

- identifying and characterising impacts;
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects (if required); and
- Identifying opportunities for ecological enhancement.

11.76 When describing impacts, reference has been made to the following characteristics, as appropriate:

- positive or negative;
- extent;
- magnitude;
- duration;
- timing;
- frequency; and

- reversibility.

11.77 Both direct and indirect impacts are considered: direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or feature, e.g. the introduction of artificial lighting which may not directly decrease the extent of vegetation but may influence the behaviour of nocturnal species.

11.78 For the purposes of this assessment, in accordance with CIEEM guidelines, a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated Site) or broad (e.g. national/local nature conservation policy). Effects can be considered significant at a wide range of scales from international to local. As such, a significant effect does not always correspond to a significant effect under the EIA Ordnance.

11.79 Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance:

- habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
- species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

Avoidance, Mitigation, Compensation and Enhancement

11.80 A sequential process has been adopted to avoid, mitigate and compensate for ecological impacts. This is often referred to as the '*mitigation hierarchy'*.

11.81 It is important for the EcIA to clearly differentiate between avoidance mitigation, compensation and enhancement and these terms are defined here as follows:

- avoidance is used where an impact has been avoided e.g. through changes in scheme design;
- mitigation is used to refer to measures to reduce or remedy a specific negative impact in-situ;
- compensation describes measures taken to offset residual effects, i.e. where mitigation in-situ is not possible; and
- enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

Assessment of Cumulative Impacts and Effects

11.82 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a particular location. The potential for cumulative effects with other development projects has also been considered as part of this assessment.

BASELINE ECOLOGICAL CONDITIONS

11.83 The purpose of this section is to provide:

- a clear description of the baseline conditions for all ecological features considered based on the conditions at the time of survey and where relevant a consideration of likely baseline conditions in future years; and
- a statement for each ecological feature in respect of the geographical context within which that feature is considered to be important.

Designated Ecological Sites

11.84 The Island Development Plan[11] (see Figure 11-1) shows that the application site and wider survey area is not designated as a Site of Special Significance (SSS) or other ecological designation (e.g. Area of Biological Importance, ABI).

11.85 The following sites of ecological interest are present within a 2km radius:

- L'Ancresse common / La Varde is present at its closest point 278m to the south-east. This is a Site of Special Significance (SSS) comprising of a large area of unenclosed land, which consists mainly of marshy areas, damp shortgrass areas, areas of high quality species-rich dune grassland, open dune, bare peaty ground that is wet in winter, heath, and ponds. The common supports rare and threatened flora and fauna including significant populations of birds of conservation interest (e.g. kestrel, barn owl, long-eared owl and Dartford Warbler, amphibians and reptiles and invertebrates[12]);
- Associated with L'Ancresse common SSS is a flooded quarry (Mont Cuet Quarry) which is situated around 216m east of the application site. The surrounding scrub is also included as an Area of Biological Importance designation, serving as a buffer. Long-eared Owls use the quarry area for roosting at times and probably have bred there in some years; and
- Also present and associated with L'Ancresse common SSS is a parcel of coastal grassland/scrub near to Jaonneuse Bay which is situated around 488m also to the east. This land was included as buffer ABI land because there are remnants of coastal grassland. The current habitat is much the same as large parts of the Common.[13]

Habitats

Desk Study

11.86 A review of available aerial photography[14] and comparison between the Island-wide Phase 1 habitat surveys which were undertaken in 1999 and again in 2010 show that the extent of maritime grassland decreased within the survey area during this 10 year period. Further comparison

[11] https://idp.digimap.gg/
[12] Appraisal of Sites of Special Significance *By J Gilmour, B.Sc. & J Hooper, B.Sc. Environment Guernsey*
[13] Jamie Hooper, Environment Guernsey *pers comm*. 20.12.18
[14] Internet search and Google Earth Pro.

between the 2010 survey and SLR's 2017/18 habitat plan shows a further reduction in the extent of this habitat type. There is a long term trend of grazing being abandoned on coastal grassland and heath in Guernsey with an attendant increase in scrub, bracken, bramble and tree cover; a situation which has been mirrored at Chouet Headland.

11.87 The main site habitats are described below and are shown on Drawing CH 11/1.

11.88 The dominant vegetation type on Guernsey is grassland. The most threatened habitats are saltmarshes, dune slacks and open dune. The terrestrial habitats most important for their biodiversity include Dune, Coastal and Marshy Grasslands.

Field Survey – Main Habitats

Scrub / Tall Ruderal (Target Note 1) – See Figure 5

11.89 The dominant species are bracken (*Pteridium aquilinum*) and bramble (*Rubus fruticosus*) with more localised beds of nettle (*Urtica dioica*). Thickets of blackthorn (*Prunus spinosa*) and European gorse (*Ulex europeaus*) also occur on the lower slopes. Various species of non-native shrub/tree are present in discrete patches including Muttonbird scrub (*Brachyglottis rotundifolia*), Buttonwood tree *(Conocarpus erectus var. sericeus),* tamarisk *(Tamarix gallica*) and German ivy (*Senecio mikaniodes*).

11.90 Along the edges of tracks and where bracken/bramble is less dense, the diversity of plants is higher with a range of robust species such as red campion (*Silene dioica*), sea radish (*Raphanus raphinistrum subspecies maritimus*), bittersweet (*Solanum dulcamara*), lesser burdock (*Actium minus*), wood sage (*Teucrium scorodonia*), black horehound (Ballota nigra), Pellitory of the Wall (*Parietaria Judaica*), hedge bedstraw (*Galium album*), common ragwort (*Senecio jacobea*), common mallow (*Malva sylvestris*), hedge bindweed (*Calystegia sepium*), field bindweed (*Convulvulus arvensis*), fennel (*Foeniculum vulgare*), wild carrot (*Daucus carota*), hogweed (*Heracleum sphondylium*), wall barley (*Hordeum murinum*) and thistles (*Cirsium arvense, C.vulgare, Carduus tenuiflorus and C.nutans*).

Figure 11-5
Bramble and Bracken Dominated Shrub

Semi-Improved Grassland Fields – Target Note 2 and Figure 6

11.91 The fields were found to be species-poor and to be dominated by grasses such as cock's foot (*Dactylus glomerata*), Yorkshire fog (*Holcus lanatus*) and crested dog's tail (*Cynosurus cristatus*) with some white clover (*Trifolium pratense*) and cat's ear (*Hypochoeris radicata*). It is, however, unlikely that they receive regular inputs of fertilisers or manure. In one of the fields is a clump of Guernsey lily (*Nerine sarniensis*).

Figure 11-6
Hay Fields – Species Poor Grassland and Boundary Vegetation

Coniferous Woodland (Monterey Pine) – Target Note 3

11.92 A mature plantation of pine trees with no discernible ground or shrub layer.

Standing Water / Inland Cliffs – Target Note 4 and Figure 3

11.93 The cliff faces and water body are largely un-vegetated.

Maritime Grassland – Target Note 5 and Figure 7

11.94 Examples of mown, rabbit-grazed and un-grazed areas of maritime grassland are present.

11.95 Regular mowing has reduced the species complement and favoured species adapted to such conditions such as chamomile (*Chamaemelum nobile*), daisy (*Bellis perennis*), yarrow (*Achillea millefolium*), common stork'sbill (*Erodium circutarium*), scarlet pimpernel (*Anagallis arvensis*), dove's foot cranesbill (*Geranium molle*) and the uncommon Allseed (*Radiola linoides*).

11.96 The most naturalistic and species-rich examples were found around the top of the rocky shore by the public path. Frequently recorded species in the more diverse swards included birds foot trefoil (*Lotus corniculatus*), autumn hawkbit (*Leontodon autumnalis*), greater plantain (*Plantago major*), ribwort plantain (*Plantago lanceolata*), thrift (*Armeria maritima*), rock samphire (*Crithmum maritimum*), sheep's sorrel (*Rumex acetosa*), common restharrow (*Ononis spinosa*), common toadflax (*Linaria vulgaris*), wild carrot (*Daucus carota*), common fleabane (*Pulicaria dysenterica*), perennial wall rocket (*Diplotaxis tenuifolia*), sea radish (*Raphanus raphinistrum subspecies*

maritimus), hare's tail grass (*Lagurus ovatus*), fine-leaved fescue grass (*Festuca tenuifolia***),** other fescue and bent grasses (*Festuca/Agrostis*) and sea beet (*Beta vulgaris subspecies maritima*).

11.97 Less commonly recorded species were parsley-leaved waterdropwort (*Oenanthe lachenalii*), buck's-horn plantain (*Plantago coronopus*), galingale (*Cyperus longus*), sheep's bit (*Jasione montana*) and sea campion (*Silene uniflora*).

11.98 Non-native / invasive species included hottentot fig (*Carpobrotus edulis*), agave cactus, pink sorrel (*Oxalis articulate*), Spanish bluebell (*Hyacinthoides hispanica*) and Duke of Argyll's tea plant (*Lycium halimifolium*).

Figure 11-7
Maritime Grassland

11.99 More ruderal areas comprised of bristly oxtongue (*Helminthotheca echiodes*), mugwort (*Artemesia vulgaris*), thistles, cock's foot grass (*Dactylus glomerata*), tree mallow (*Malva arborea*), smooth sow thistle (*Sonchus oleraceus*), frosted orache (*Atriplex laciniata*), spear-leaved orache (*Atriplex prostrata*), rye grass (*Lolium perenne*) and wild carrot.

Species

Background to Guernsey's Flora and Fauna

Terrestrial Mammals[15]

11.100 The Bailiwick has few native terrestrial mammals. The shrew found in Guernsey (and also Herm and Alderney) is the Greater White-toothed Shrew (*Crocidura russula)*, recently introduced to Ireland but otherwise not known in the British Isles. The Guernsey Vole, (*Microtus arvalis sarnius)*, is a subspecies of the Common Vole of Europe, and is only found in Guernsey.

11.101 Other rodents include the Wood Mouse (*Apodemus sylvaticus)* on all major islands and the introduced House Mouse (*Mus musculus)*, Brown and Black Rats (*Rattus norvegius) and (R. rattus)*.

11.102 The largest native mammalian carnivore is the stoat, (*Mustela ermine)* but this is believed to be extinct. Rabbits (*Oryctolagus cuniculus)* and Hedgehogs (*Erinaceus europaea*) are found in all the major islands but these were introduced.

11.103 Six species of bats have been observed in Guernsey, with caves on the south coast used as roosting sites. The species assemblage includes the rare grey long-eared bat.

Invertebrates

11.104 Guernsey is important for the conservation of several species of invertebrates which include mole cricket (*Gryllotalpa gryllotalpa*), Glanville Fritillary butterfly (*Melitaea cinxia*), blue-winged Grasshopper (*Oedipoda caerulescens*) and the Dung Beetle (*Copris lunaris*) which are either scarce on mainland UK, extinct or never occurred.

Reptiles and Amphibians

11.105 Guernsey supports three native species of amphibian and reptiles (i.e. common frog, smooth newt and slow worm) and one introduced species (Green Lizard).

Birds

11.106 The most important bird populations in the Bailiwick are its seabirds 1% of the World's Northern Gannets (*Sula bassana*) (c. 6000 pairs) breed on the Les Etacs (Garden Rocks) and Ortac off Alderney.

11.107 Guernsey has a healthy population of Barn Owls (*Tyto alba*) boosted by a scheme to provide large numbers of nest boxes.

[15] Extract from: UK Overseas Territories and Crown Dependencies: 2011 Biodiversity snapshot. Guernsey: Appendices. Author: Dr Charles David Guernsey Biological Records Centre, States of Guernsey Environment Department & La Societe Guernesiaise. More information available at: www.biologicalrecordscentre.gov.gg

Plant Species

11.108 Many of the UK Red Data Plant Book species are common in the Channel Islands because of their geographical position. Some species are of cultural significance as they are named after the islands, such as Guernsey Centaury and Guernsey fern and Guernsey spleenwort. Loose-flowered orchids, which do not occur in the UK, are a characteristic plant of damp meadows.

Desk Study Results

11.109 GBRC supplied records from within a 2km search area of the Chouet Headland as defined by a central grid reference. A summary of records of species considered to be endangered or at risk is provided in Table 11-2.

Table 11-2
Data Search Results for 2km Radius (At Risk and Endangered Species only)

Species/Group	Latin Name	English Name	Status
Insects	*Callophrys rubi*	Green hairstreak	At Risk
	Nepa cinerea	Water Scorpion	At Risk
	Asilus crabroniformis	Hornet Robberfly	At Risk
	Copris lunaris	Horned Dung Beetle	Endangered
	Gryllotalpa gryllotalpa	Mole Cricket	At Risk
Arthropods	*Cypris bispinosa*	large mussel-shrimp	Endangered
Flowering Plants	*Ranunculus sceleratus*	Celery-leaved Crowfoot	At Risk
	Ranunculus baudotii	Brackish Water-crowfoot	Endangered
	Ranunculus trichophyllus	Thread-leaved Water-crowfoot	Endangered
	Ranunculus peltatus	Pond Water-crowfoot	Endangered
	Saxifraga tridactylites	Rue-leaved Saxifrage	At Risk
	Euphorbia amygdaloides	Wood Spurge	At Risk
	Linum catharticum	Fairy Flax	At Risk
	Radiola linoides	Allseed	At Risk
	Lythrum salicaria	Purple-loosestrife	At Risk
	Matthiola sinuata	Sea Stock	At Risk
	Arabis hirsuta	Hairy Rock-cress	At Risk
	Cakile maritima	Sea Rocket	At Risk
	Crambe maritima	Sea-kale	At Risk

Species/Group	Latin Name	English Name	Status
	Rumex hydrolapathum	Great Water Dock	At Risk
	Herniaria ciliolata ciliolata	Fringed Rupturewort	At Risk
	Silene nutans	Nottingham Catchfly	Endangered
	Silene conica	Sand Catchfly	Endangered
	Dianthus armeria	Deptford Pink	Endangered
	Anagallis tenella	Bog Pimpernel	At Risk
	Centunculus minimus	Chaffweed	Endangered
	Galium constrictum	Slender Marsh-bedstraw	Endangered
	Cicendia filiformis	Yellow Centaury	Endangered
	Exaculum pusillum	Guernsey Centaury	Endangered
	Echium vulgare	Viper's-bugloss	Endangered
	Cynoglossum officinale	Hound's-tongue	At Risk
	Calystegia soldanella	Sea Bindweed	At Risk
	Hyoscyamus niger	Henbane	Endangered
	Linaria vulgaris	Common Toadflax	At Risk
	Plantago major intermedia	Greater Plantain (hybrid)	At Risk
	Stachys palustris	Marsh Woundwort	Endangered
	Mentha pulegium	Pennyroyal	Endangered
	Parentucellia viscosa	Yellow Bartsia	At Risk
	Pedicularis sylvatica	Lousewort	Endangered
	Orobanche purpurea	Yarrow Broomrape	At Risk
	Carduus nutans	Musk Thistle	At Risk
	Scorzoneroides autumnalis	Autumn Hawkbit	At Risk
	Hieracium umbellatum bichlorophyllum	Umbellate Hawkweed	At Risk
	Aster tripolium	Sea Aster	Endangered
	Erigeron acris	Blue Fleabane	Endangered
	Eryngium maritimum	Sea-holly	At Risk
	Eryngium campestre	Field Eryngo	Endangered

Species/Group	Latin Name	English Name	Status
	Oenanthe fistulosa	Tubular Water-dropwort	Endangered
	Bupleurum baldense	Small Hare's-ear	Endangered
	Falcaria vulgaris	Longleaf	Endangered
	Torilis japonica	Upright Hedge-parsley	At Risk
	Alisma plantago-aquatica	Water-plantain	Endangered
	Triglochin maritima	Sea Arrowgrass	Endangered
	Potamogeton natans	Broad-leaved Pondweed	Endangered
	Zostera marina	Eelgrass	At Risk
	Asparagus prostratus	Prostrate Asparagus	At Risk
	Sparganium erectum	Branched Bur-reed	At Risk
	Schoenoplectus tabernaemontani	Grey Club	Endangered
	Bolboschoenus maritimus	Sea Club-rush	At Risk
	Eleocharis palustris	Common Spike-rush	At Risk
	Eleocharis multicaulis	Many-stalked Spike-rush	Endangered
	Carex flacca	Glaucous Sedge	At Risk
	Carex demissa	Common Yellow Sedge	At Risk
	Carex oederi	Lesser Yellow Sedge	Endangered
	Carex caryophyllea	Spring-sedge	At Risk
	Carex pilulifera	Pill Sedge	Endangered
	Carex nigra	Common Sedge	Endangered
	Milium vernale sarniense	Dwarf Millet	Endangered
	Festuca filiformis	Fine-leaved Sheep's-fescue	Endangered
	Vulpia fasciculata	Dune fescue	At Risk
	Poa bulbosa	Bulbous Meadow-grass	Endangered
	Agrostis canina	Velvet Bent	At Risk
	Phleum arenarium	Sand Cat's-tail	Endangered
	Danthonia decumbens	Heath Grass	Endangered
Bats	*Plecotus austriacus*	Grey Long-eared Bat	Endangered
Birds	*Hirundo rustica*	Swallow	At Risk

Species/Group	Latin Name	English Name	Status
	Anthus pratensis	Meadow Pipit	At Risk
	Carduelis cannabina	Linnet	At Risk
Fungi	*Hygrocybe conicoides*	Dune Waxcap	At Risk

Summary of Baseline Survey Results – Flora

11.110 No plant species of particular rarity were recorded. The surveys recorded the presence of musk thistle (*Carduus nutans*), allseed (*Radiola linoides*) and common toadflax (*Linaria vulgaris*). All three of these species are considered to be "at risk".

11.111 A number of non-native / invasive plant species were recorded, some of which are likely to have originated from deliberate planting and others are likely to have spread from the green waste facility.

Summary of Baseline Survey Results – Fauna

Amphibians

11.112 The GBRC report returned records for slow worm, smooth newt and common frog from within the 2km search area.

11.113 The reptile survey report for the site is provided as Appendix 11/1.

11.114 The reptile survey undertaken in autumn 2017 recorded one juvenile slow worm. Due to the presence of a juvenile animal there must be a breeding population of this species which is likely to be small in size due to the limited extent of rough grassland and predation by rats and other predators.

11.115 No species of amphibian were recorded or are considered to be present based on the habitats which are present. It is considered unlikely that the waterbody present in the quarry void would support amphibians given its past use as a facility for the bio-remediation of oil.

Mammals

Bats

11.116 The bat survey report for the site is provided as Appendix 11/2.

11.117 The survey work undertaken in 2017/18 aimed to establish (1) whether bat roosts are present and could be affected and (2) whether the application site is of value to bats for foraging and commuting.

11.118 In respect of (1) above, structures/trees or other features within the survey area were inspected by a Natural England licensed bat worker during the daytime for evidence of bat roosts and/or the potential for them to occur. No bat roosts or potential roosting sites were identified.

11.119 In respect of (2) above, a combination of walked transects with bat detectors at dusk and dawn (with listening points at key stages) and remote recording was undertaken (with detectors being left in suitable locations for extended periods of time). The surveys aimed to achieve coverage in the spring, summer and autumn seasons.

11.120 All of the walked transects recorded very low levels of usage by bats. The August 2017 transect recorded 1-2 common pipistrelles foraging around the plantation of pines and the frontage of the quarry. An ANABAT left overnight on the edge of the pine plantation facing west (30th August 2017) and east (31st August 2017) also recorded common pipistrelle. The late October 2017 transect recorded no bats. The series of dusk and dawn transects in early May 2018 recorded virtually no activity by bats.

11.121 Further automated recording was undertaken in late October/early November 2017 which recorded very low levels of activity by mainly common pipistrelle and to a lesser extent Nathusius' pipistrelle. Further automated recording in May 2018 recorded a similar pattern of bat use by these two species with higher levels of activity (as measured by bat passes per hour) by common pipistrelle. A small number of calls were provisionally assigned to "big bat" - on the UK Mainland this would usually be a noctule. No calls attributable to grey long-eared bats were recorded.

11.122 To summarise, the bat surveys undertaken have not detected the presence of roosts. They found that the survey area is mainly used by two species of pipistrelle bats, of which common pipistrelle was the most frequently recorded. All activity by bats was at a low level and localised in distribution to the sheltered south-facing parts of the survey area such as the edges of the conifer plantation.

11.123 The survey area and application site are therefore not considered to be of high value to bats.

Rodents

11.124 The reptile survey also recorded the presence of small numbers of the greater white-toothed shrew (*Crocidura russula*). Brown rats were seen on a number of occasions during fieldwork.

Invertebrates

11.125 No formal invertebrate surveys have been undertaken. Brown argus (*Aricia agestis*) butterfly is present within the coastal grassland on the plateau. This species has a localised presence on Guernsey. Likely foodplants in this location are low Geraniums and common stork's-bill.

11.126 Strong colonies of gatekeeper butterfly and common blue butterfly were recorded in 2017 and 2018 which are common species on the Island. In addition, other common species included red admiral, meadow brown, large white, small copper, brown-tailed moth (*Euproctis chrysorrhoea*) and the common carder bee (*Bombus pascuorum*).

Wintering Birds

11.127 The winter bird survey report for the site is provided as Appendix 11/3.

11.128 Thirty bird species were recorded during the course of the winter CBC surveys.

11.129 The bird community was dominated by gulls and in particular many thousands of herring gull *Larus argentatus.* At any one time there were usually at least 1000 herring gull roosting on shoreline rocks, with several thousand more on the neighbouring landfill site or flying to/from it. Although herring gull is a Red list species, and the other four gulls are Amber list for varying degrees of population decline, they are still common, and also a pest species at landfill sites.

11.130 The scrub and semi-improved grassland habitats had low general value for birds. Wren *Troglodytes troglodytes*, dunnock *Prunella modularis*, robin *Erithacus rubecula*, goldfinch *Carduelis carduelis* and starling *Sturnus vulgaris* were frequently seen or heard in these habitats; all are common birds, although dunnock and starling are on the Amber and Red lists respectively. Starling is listed due to a UK and Channel Islands population decline of over 50% from 1990 to 2015, while the dunnock has suffered a longer term UK and Channel Islands population decline of 31%. A few other notable birds were seen here including individual song thrush *Turdus philomelos*, mistle thrush *T. viscivorus*, linnet *Carduelis cannabina* (all Red list), and three meadow pipit *Anthus pratensis* (Amber list).

Breeding Birds

11.131 The breeding bird survey report for the site is provided as Appendix 11/4.

11.132 The Breeding Bird Survey recorded 17 nesting species, comprising mostly of common species.

11.133 The survey area is notable for breeding long-eared owl (*Asio otus*) which uses old crows nests in the mature plantation of pine trees (Target Note 3). The pole/tree mounted nest boxes and quarry rock ledges support breeding / roosting kestrel (*Falco tinnunculus*) and barn owl.

11.134 A house sparrow colony is associated with the bungalow and its grounds.

11.135 No other notable bird species were recorded.

Predicted Trends

11.136 In the absence of development the main part of the application site would continue to be managed as hay meadow with annual cuts and baling of fodder. Other parts would remain in domestic or waste management use.

11.137 The wider survey area would be expected to continue to become scrubbier in nature with increasing cover of non-native trees and shrubs over time.

Evaluation

Habitats present within the Application Site and Wider Survey Area

11.138 Due to there being Island-wide coverage of Phase 1 (most recent being 2010), it is possible to place the application site in a quantitative context as shown in Table 11-3.

Table 11-3
Evaluation of Site Habitats in Comparison to Island Wide Habitat Data (2010)

Habitat – Island extent 2010	Application Site only	Percentage of Guernsey Resource (2010 figures)
Planted coniferous woodland 26 ha	n/a	n/a
Coastal grassland 60.94	n/a	n/a
Dense Scrub / Bracken (amalgamated by SLR) – 416ha	1.46ha	0.35%
Maritime Grassland – 74.03ha	0.04	0.05%
Semi-improved grassland 192.00ha	1.73ha	0.90%
Amenity grassland 687.00ha	0.04ha	0.005%
Standing water 48.00ha	0	
Other (Building/Hardstanding/tall ruderal etc)	1.21	n/a
Total	4.48	

11.139 Table 11-3 shows that none of the habitats present within the application site alone represent more than 1% of the total Island-wide resource of a particular habitat.

11.140 The table shows that planted coniferous woodland is generally a scarce habitat in Guernsey. Intrinsically this is a habitat with low ecological value; however, it can be of importance as a place of shelter for migrant birds, nesting birds such as raptors and as for insects which specialise in the tree species present (e.g. moths). This habitat is present off-site to the west.

Species Summary

Flora

11.141 Surveys of the application site and wider area have not recorded any particularly rare species of plant.

Mammals

11.142 Surveys of the application site and wider area recorded the presence of two species of pipistrelle bat (common and Nathusius'). Low levels of foraging by these species were recorded in 2017/18. This is attributed to the generally exposed nature of the site and the limited availability of sheltered opportunities for foraging.

11.143 No bats roosts are considered to be present.

11.144 The survey area and application site are therefore not considered to be of high value to bats.

Birds

11.145 Surveys of the application site and wider area encompassing every season did not record the presence of a particularly notable assemblage of birds using the site for breeding or wintering.

11.146 The presence of breeding long-eared owl, barn owl and kestrel was considered to be noteworthy in an Island context.

11.147 The bungalow supports a breeding colony of house sparrows, a species which is in steep decline in the UK Mainland but which remains a reasonably common species on Guernsey.

Reptiles and Amphibians

11.148 Reptile surveys have recorded the presence of a "small" population of slow worm.

Invertebrates

11.149 The wider survey area supports a colony of brown argus butterfly which has a restricted distribution on the Island.

Summary of Important Ecological Features

11.150 Table 11-4 provides a summary table listing all important ecological features for which detailed assessment is required (i.e. all features of a defined level of importance and/or subject to legal protection), the geographical context within which each is considered to be important and their legal status where appropriate.

Table 11-4
Summary of Important Ecological Features Subject to Detailed Assessment

Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
Application Site Only		
Site Habitats	Local	Farmland is considered to be an important resource on the Island due to being a finite resource.
Breeding Raptors	Guernsey	Presence of three breeding species plus buzzard.
Breeding Birds (General)	Local	Relatively small breeding bird assemblage. Nests are protected.
Foraging Bats	Local	Low levels of activity recorded by common species. No roosts affected.

Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
Slow Worm	Local	A small population is likely to occur. This species is not uncommon in suitable habitats in Guernsey.
Wider Survey Area (Mineral Safeguard Area)		
Maritime Grassland	Guernsey	Scarce and declining resource.
Mature Conifer Woodland	Parish	Localised habitat of value in coastal locations for birds in particular.
Foraging Bats	Local	Low levels of activity recorded by common species. No roosts affected.
Breeding Birds (General)	Local	Relatively small breeding bird assemblage. House sparrow colony associated with the bungalow would be lost.
Slow Worm	Local	A small population is likely to occur. This species is not uncommon in suitable habitats in Guernsey.
Brown Argus Butterfly	Guernsey	Localised status on Guernsey possibly due to local geology rather than geographical location.

ASSESSMENT OF EFFECTS AND MITIGATION MEASURES

Statutory Ecological Sites

11.151 No direct effect on statutorily designated ecological sites has been predicted. No sensitive sites, such as those which could be linked hydrologically to the application site and be affected by quarrying / dewatering are present.

11.152 In terms of dust from mineral extraction operations, the closest part of L'Ancresse Common SSS is over 200m to the south of the proposed quarry and so unlikely to be affected through dust emissions due to the separation distance and the prevailing wind not blowing in that direction (refer to Chapter 8 above). The potential exists for dust deposition (through heavy vehicle use) to affect the road verges present adjacent to L'Ancresse Common / La Varde which is an important ecological site. It would therefore be necessary to ensure that dust control/suppression measures are implemented at the site such as a wheel wash/sprayer bay to minimise the amount of material 'dragged' out onto the public highway. Notwithstanding this, the roads are already experiencing HGV traffic associated with the Mont Cuet Landfill site.

Notable Habitats

11.153 No notable habitats have been recorded as being present within the application site itself.

11.154 The loss of species-poor hay meadow and associated areas of bracken/bramble scrub, amenity grassland and mature conifers (in a garden setting) is considered to be of ecological significance at a local level only. The loss of a very small area of maritime grassland (0.04ha) is not considered to be of ecological significance. The areas involved are subject to trampling by walkers and indirect disturbance from the landfill operations.

Notable Species

Breeding Birds

11.155 The demolition of the bungalow and removal of associated shrubbery would result in the loss of nesting opportunities for a colony of house sparrow.

11.156 The proposals would involve the need to re-locate 2 of the 3 pole/tree mounted bird nest boxes.

11.157 Adjacent quarrying activities could result in disturbance to the pair of long-eared owl which are known to use the adjacent conifer plantation although due to the presence of the adjacent car-park the birds which are present would already be accustomed to human activity.

11.158 At a general level, the proposals would involve the need to remove vegetation which could be used by birds for nesting.

11.159 The following mitigation measures are proposed in respect of breeding birds:

- all vegetation removal and building demolition would take place outside of the nesting season (February[16] to August inclusive); and
- the pole/tree mounted nest boxes used by barn owl/kestrel would be re-located within the wider survey area away from possible sources of disturbance and future development. This would take place outside of the nesting season well in advance of the commencement of development activities. The boxes would be repaired/replaced with new boxes as required.

Bats

11.160 No impacts on roost sites have been predicted.

11.161 Significant impacts on foraging habitats used by bats are considered to be unlikely to occur. Removal of vegetation would result in the loss of foraging opportunities for bats; however, surveys have not found that the application site is well used by bats.

Slow Worm

11.162 A small population of slow worm was recorded in autumn 2017. The potential exists for slow worms to be present in the application site and to be associated with the field margins of the hay fields. As such it would be necessary to implement appropriate mitigation measures for this species in

[16] Spring in Guernsey is at least 2-3 weeks earlier that the rest of the UK and therefore nesting in late February could start to take place.

advance of development activities commencing. The scope of such measures is likely to include the targeted use of artificial refuges for 1 week immediately in advance of soil stripping activities. The refuges are attractive to reptiles as they assist with the animal's thermoregulation. Any slow worms present could then be captured and relocated away from development activities.

Residual Effects

Designated Sites and Notable Habitats

11.163 Residual effects on designated sites or notable habitats have not been predicted provided that the avoidance and mitigation measures set out in this EcIA are followed and a nature-conservation led restoration is implemented.

Notable Species

11.164 The loss of nest sites for a house sparrow colony, which currently uses the bungalow/associated shrubbery, could not be easily mitigated for as there are no other suitable buildings where communal nest boxes could be erected. This would represent a residual impact of ecological significance at a local level.

11.165 The fields which form the application site currently offer a plentiful source of small mammal prey (due to the presence of rough field boundaries and the adjacent domestic landfill) for kestrel, barn owl and long-eared owl as part of a larger resource available to these birds. The removal of the fields through quarrying would result in the birds which use the site having to forage further afield. It should, however, be noted that the nest boxes which are currently present can be moved to other locations away from disturbance and large areas of suitable hunting habitat are present at the adjacent golf course/common. As such, this would be an effect which is of ecological significance at a local level only.

11.166 A residual effect on slow worm has not been predicted as suitable habitat will remain within the wider survey area.

CONCLUSIONS

11.167 No designated ecological sites such as Sites of Special Significance (SSS) would be affected by the proposed development, provided that dust suppression measures are adopted in respect of heavy goods vehicles.

11.168 Surveys of the application site have not recorded the presence of notable habitats.

11.169 Surveys undertaken for flora and fauna have not recorded any particularly rare or uncommon species.

11.170 A small population of slow worm was recorded within the wider survey area. Although no slow worms were recorded from within the application site it is possible that this species also occurs in the rough margins of the hay fields.

11.171 The application site and wider survey area support three species of raptor (barn owl, long-eared owl and kestrel) which nest/roost in purpose-built boxes, old crow nests in mature pines or cliff faces. The habitats present within the application site form part of a wider resource of rough grassland which supports their small mammal prey. A colony of house sparrows is resident in and around the bungalow. No other notable species of birds were recorded during the winter or breeding seasons, however, the site has a general value to birds in providing nesting opportunities for a variety of common species in buildings, low scrubby vegetation, cliffs, edges of standing water etc.

11.172 Bat surveys have not detected the presence of any roosts. Foraging activity by bats was attributed to two common species of pipistrelle bat. Activity levels were very low across the seasons and were restricted to sheltered areas on the south-facing flank of the site. The majority of the site is quite exposed to prevailing winds and lacks structured vegetation such as trees or hedgerows and as a consequence its value to bats is limited.

11.173 Recommendations have been made in respect of avoidance and mitigation measures required to ensure that impacts on species and off-site habitats are either avoided or their effects are reduced to acceptable levels. These relate to the timing of operations (e.g. the removal of vegetation outside of the bird nesting season) or measures required in advance of development commencing (e.g. reptile and raptor mitigation schemes).

11.174 Residual ecological impacts have been predicted in respect of house sparrow only which are considered to be of significance at local level.

Committee *for the*
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28 June 2021

Dear Deputy Ferbrache

Policy Letter - The Island's Future Aggregate Supply

In accordance with Rule 4(2) of the Rules of Procedure for the States of Deliberation and their Committees, it is requested that the Policy Letter entitled "The Island's Future Aggregate Supply" be considered by the States of Deliberation at its meeting on Wednesday 8 September 2021.

The request is made to ensure that the Island will continue to receive aggregate without interruption because security of supply of aggregate is essential for construction in the Island. Ronez Limited has advised that current workable unconstrained reserves of granite at Les Vardes Quarry, which are used for aggregate, are expected to be exhausted by the end of 2023. This may be sooner if demand increases.

From discussions with members of the Policy & Resources Committee, I am aware that there is a strong understanding of the need to expedite the decision in relation to aggregate production and supply, and trust that they will also be supportive of this request.

Yours sincerely

H L de Sausmarez
President
Committee *for* the Environment & Infrastructure