Chapter 3 Alternatives Considered

3.1 Introduction

Directive 2011/92/EU (as amended by Directive 2014/52/EU), Article 5(d) states that the information to be provided by the developer shall include "*a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment*".

Accordingly, this chapter describes the options which have been considered for the proposed Dursey Island Cable Car and Visitor Centre Development and which have led to the chosen design. The options fall under the following categories:

- Cableway Technology Options (4 no.)
- Cableway Alignment Options (3 no.)
- Architectural Design Options (3 no.)
- Overall Design Options (5 no.)

This chapter also outlines the multi-criteria analysis (MCA) appraisal process which was employed to select the most suitable option to advance. Additionally, the factors which influenced the design of the options, the constraints within the study area and the project brief itself are outlined.

3.2 Project Brief

Cork County Council developed the project brief for the proposed Dursey Island Cable Car and Visitor Centre Development to be executed at the site of the existing cableway. The brief sets out the Council's vision for the proposed development, including (i) the structural elements that they wish to be included in the design masterplan, and (ii) the principles upon which they wish the design to be based.

3.2.1 Requirements for Structural Elements

The Council set out a number of core structural elements which they wished to be included in the design for the proposed development (Table 3.1).

Table 3.1 Structural elements to be included in the proposed development and associated design requirements. Source: Cork County Council

Structural Element:	Brief Requirements:
Mainland-side Visitor Centre	• The building shall contain a large, open exhibition space, seated waiting area, information display area, ticket purchasing area, canteen, space for a café and retail units, toilets, interpretive panels detailing history and wildlife of the island, and a sheltered viewing area overlooking Dursey Sound and the new cableway • It shall have wireless internet connectivity • It may be separate from or connected with the mainland cableway station. • It shall be "simple and respectful of the site context and with an expression that reflects its function and relates to its context"

Structural Element:	Brief Requirements:
	• Its internal dimensions shall comfortably accommodate approx. 50,000 visitors annually • It shall be "bespoke" and "of a very high architectural standard befitting the unique nature of the site" • "The building shall be an iconic landmark destination point on the Wild Atlantic Way." • It shall "also provide space for community activities & special events such as lectures, readings, touring exhibitions, etc"
Island-side visitor waiting area	• Structure shall "offer shelter and discovery & information opportunities for the visitor and local people alike." • It shall "at a minimum, comprise of a large seated open space, audiovisual and information/interpretative display area and internal toilet block." • Internal dimensions of the structure shall accommodate 50,000 visitors annually. • "The building, although basic in function, shall be of a very high architectural standard befitting the unique nature of the site and project. The building shall be an iconic welcoming landmark for visitors onto the island." • It shall be capable of withstanding the "severe marine environment" while simultaneously not compromising appearance in any way.
Island station	• Building shall contain "all mechanical & electrical equipment & controls necessary for the safe operation of the cable car" • Its internal dimensions shall be sufficient to "facilitate on-going and future maintenance & servicing requirements"
Mainland station	• The building shall house "all mechanical & electrical equipment & controls necessary for the safe operation of the cable car, together with a small office/canteen area for the car operator." • Internal dimensions "shall be of sufficient size to facilitate on-going and future maintenance & servicing requirements"
Cableway	• To have 2 no. cable cars • Cable cars shall incorporate "potentially transparent elements and as a minimum, windows & information on sights visible from the cars" • "The major structural elements [of the cableway] are to have a 50-year design life with all other components to meet the design life of the applicable Regulations and Standards with necessary increases in specifications to reflect the exposure conditions." • "The cableway shall be capable of operating at the maximum speeds allowed by the EU and National Regulations and Standards."
Ancillary infrastructure	• Pathways • Hard and soft landscaping • Sufficient car parking on both mainland and island • Information and interpretive signage at strategic locations • Supporting water and wastewater infrastructure

3.2.2 Design Principles

In addition to the requirements set out for the various structural components, the following overarching design principles have also been outlined in the design brief:

- The development shall have "a design led integrated approach" […] "having regard to the unique and sensitive site context" (p.10)
- It shall advance "integrated and innovative design solutions that will be specific to the site." (p.10)
- The "external finishes and layout [of all structures] shall be sympathetic [and] in harmony with the surrounding landscape" (p.11)
- All structures shall be "capable of withstanding a severe marine environment with minimal yearly maintenance" (p.11)
- The site shall be "Fully landscaped [and] low maintenance" (p.12)

3.3 Design Constraints

This section describes the environmental context of the study area and identifies key constraints – environmental and otherwise – that have been taken into consideration in the design and appraisal of the options presented in this chapter.

3.3.1 Geometric Constraints

The total area of the site of the proposed development is 1.8ha – with 1.79ha on the mainland and 0.01ha on the island.

Immediately after departing the mainland station, the cableway crosses a trafficked area on the mainland and, as such, a minimum clearance from the bottom of the carrier cabin to the surface of the road of at least 6.3m will need to be maintained. Additionally, Dursey Sound itself is – although dangerous – a navigable waterway. Here too, sufficient clearance will need to be maintained for navigable vessels using Dursey Sound (although there are no formal guidelines or standards which specify mandatory minimum clearances). Vertical clearance of the existing cableway over the Dursey Sound is approximately 25.2m above ordnance datum (AOD). Sufficient lateral clearance will also need to be allowed in order to prevent carrier cabins colliding with each other or with pylons when swaying due to wind.

3.3.2 Meteorological Constraints

Wind conditions have the potential to interfere with the operation of the proposed cableway development. A preliminary wind analysis has been carried out to compare the expected wind conditions at Dursey Island and the proposed cableway installation operational wind velocities. It is assumed that the cableway should cease operations during periods when wind speeds are equal to or exceed 30 metres per second (m/s) (Table 3.2).

Table 3.2 Assumed cableway levels of operational response associated with high wind speeds, as determined by preliminary wind analysis.

Wind Speed (metres per second):	Operational Response:
≥22m/s	Operator to monitor wind speed but cableway still in operation
≥25m/s	Operator to decrease carrier cabin speed and visually monitor their passage at pylons and landing platforms
≥30m/s	Operator to decrease carrier cabin speed to minimum and return them to nearest landing points before fully stopping cableway operation

Wind data from meteorological stations at Sherkin Island and Valentia Observatory indicate that, at the site of the proposed development, wind speeds of 30m/s have rarely been exceeded in the period 2005 to 2018, and only as a gust speed, with the exception of 2014 where on one day in mid-February, the highest 10 minutes mean speed exceeded 30m/s. Gust wind speeds of 25m/s and 30m/s are primarily exceeded between October and March. During Spring and Summer, the gust speed rarely exceeds 25m/s or 30m/s. Wind direction in the study region is predominantly south-westerly.

3.3.3 Infrastructure and Utility Constraints

Supporting infrastructure and utilities are limited in the study area. There is currently no broadband network connectivity and no gas network supply to either the mainland or island sides of the site.

Island-side Water Supply

On the island, there is a small-scale water supply network serving approximately 25 properties, but not extending to the western end of the island. In this delivery system, spring water is stored in a holding tank and disinfected on demand using chlorination and UV reactor treatments.

Island-side Wastewater Treatment

There are no public toilets available to visitors on the island side of the site. There is no formal wastewater drainage and treatment system in place on the island. Residences are serviced by private septic tanks.

Mainland-side Water Supply

At the mainland side of the site, there is a very limited water supply system – although there is a well at the site of the existing visitor car park.

Mainland-side Wastewater Treatment

There is no formal wastewater drainage and treatment system at the mainland side of the site. Existing public toilets at the mainland line station are serviced by a septic tank which is periodically de-sludged.

Electrical Services

Utility power for the existing cableway is routed directly into the mainland line station. The island has a single-phase electricity supply network.

Approach Road and Site Car Park

Access to the site is via the regional road (R572), much of which is wide enough only for one-way traffic, necessitating opposing traffic to give way. At times, vehicles are forced to reverse to suitable passing locations. Additionally, the winding nature of the road, which skirts around the peninsula's rocky outcrops, has resulted in limited forward visibility. Traffic congestion occurs during busy periods. The informal 70-space car park at the mainland landing point is often oversubscribed and its design is also known to cause traffic congestion at times.

3.3.4 Archaeological and Cultural Heritage Constraints

There are no protected archaeological or architectural elements within the site of the proposed development. However, there are a number of protected sites nearby. To the north of the proposed mainland landing point are the remains of an enclosure (CO126-043----). On Dursey Island, there is a cluster of protected sites to the south-

west of the proposed landing point. Among them are the ruins of a church (CO126-012005-) and associated graveyard (CO126-012003-). On an islet just due south-west of this church, also recorded are the remains of at least seven huts (codes: CO126-030001- through CO126-030007-), a promontory fort (CO126-050----) and castle (CO126-012001-), the latter of which is associated with the famed historic local family of O'Sullivan-Beare. Other recorded protected sites to be found among this cluster are a set of steps hewn into rock (CO126-012002-) and a burial site from the late-1700s (CO126-012004-).

There are a number of protected archaeological sites adjacent to the approach road, R572 – an underground souterrain which is not visible at the surface (CO126-021----), a holy stone cemented to a stone wall (CO126-031----), and a 'coffin-resting stone' which resembles a flat-topped boulder (CO126-031001-). The latter is very close to the road. Just off the road at Scrivoge, there is also a protected building (reg. no. 20912605). These archaeological and cultural heritage sites are described in detail in Chapter 14 Archaeological and Cultural Heritage of this EIAR.

The national waymarked walking route, the Beara-Breifne Way, passes through the site of the proposed development.

While it is not a protected structure, the existing cableway is itself a west Cork landmark of substantial cultural heritage and historic value to communities in the region. It is the only operational passenger cableway in Ireland, and one of the only cableways in Europe to traverse open ocean.

3.3.5 Population and Land Use

The proposed development is situated in the Kilnamanagh electoral division. This electoral division takes in an area of 37km² including Dursey Island and the western end of the Beara Peninsula. In 2016, it had a population of 342. Of these, just two individuals have permanent residences on the island at present. It is considered under the West Cork Islands Integrated Development Strategy 2010 that the island is threatened with permanent depopulation.

Principle land use types in the vicinity of the proposed development are transportation, recreation and agriculture. With respect to transportation, infrastructure consists of the regional and local road network and the cableway itself. Residents of the island rely on the cableway infrastructure in order to move freely between Dursey and the mainland. A public road – which provides public access – cuts across the mainland side of the existing site.

With respect to recreation, the area is popular for walking and hiking, birdwatching and whale/dolphin watching. The Beara-Breifne Way, a waymarked national walking trail, passes through the site of the proposed development. Birdwatching and whale/dolphin watching activities are dependent on the preservation of local wildlife. The predominant type of agriculture in the area is pastoral, with both sheep and dry stock cattle grazing on private and commonage land.

3.3.6 Landscape and Visual Amenity

The study area is situated in a remote, picturesque, rural and coastal area. The surrounding landscape, which has been classified as Type 4 'Rugged Ridge Peninsulas' under the Cork County Council Draft Landscape Strategy (2007), is dominated by undulating landforms, indented rocky coastline and open Atlantic seascapes. This landscape character type is considered to be of 'very high' value ("Scenic landscapes with highest natural and cultural quality, areas with conservation

interest and of national importance.", p.3) and 'very high' sensitivity ("extra vulnerable landscapes […] likely to be fragile and susceptible to change", p.3). Under the Landscape Strategy, Dursey Island is also classified as a distinct 'Landscape Character Area' (LCA). Tourism is identified as both a potential threat to this landscape type, and also a source of "potential progress". A number of recommendations are set out in the Landscape Strategy (p.32), including the following:

- "Encourage sustainable tourism by maximising the potential amenity value of water bodies within this [Landscape Character Type]."
- "Ensure that new development of any kind is sympathetic to the individual form and character of the islands' landscapes and traditional building patterns."
- "Support the development of rural Cork's inland and coastal marine leisure facilities."
- "Protect the scenic rocky promontories of Mizen Head, Beara and Sheeps head."
- "Have regard to the coastline's rich and diverse natural heritage and the concentration of NHA's and SAC's that are designated for protection."

It is an objective of the Cork County Development Plan 2014 to preserve the character of such high value landscapes set out in the Landscape Strategy.

The Cork County Development Plan 2014 sets out a series of scenic routes whose nature it aims to preserve. Of these, Route S118 is the only one which takes in views of the site of the proposed development: "R572 Regional Road from Castletownbere via Cahermore to Garnish Views of Bear Haven, Bear Island, Firkeel Bay, Dursey Sound & Island, the sea, Slieve Miskish Mountains & surrounding hills" (Volume 2, p. 109). It is an explicit objective of the County Development Plan to ensure that developments in the environs of scenic routes do not result in degradation of associated views, and to encourage appropriate landscaping and screen planting of such developments in order to minimise their visual impacts.

The Kerry International Dark-Skies Reserve is situated approx. 29km north-west of the site of the proposed development, on the Iveragh Peninsula, Co. Kerry. It is one of thirteen global International Dark-Sky Association certified reserves. The absence of light pollution at the site makes it ideal for star-gazing and astronomy. The continued success of the site depends on its un-light-polluted status.

3.3.7 Soils, Geology and Topography

Subsoil depths across the study area are low (up to 0.3m) with much exposed bedrock. According to the subsoil maps of the Geotechnical Survey of Ireland (GSI) and Teagasc, the prevailing subsoil classification across the area is 'Rock – Bedrock at surface'. The bedrock in question primarily consists of purple and green sandstone and siltstone of the Caha Formation.

The topography at the site of the proposed development – which is to be situated in the nearshore with some potential outfall into the foreshore – rises very steeply from the shoreline for approx. 2 – 5m, after which it transitions into a gentler slope of under 30° - although the slope is somewhat gentler on the island side. Elevation varies by a margin of 28 vertical metres across the site.

A geological fault of north-west to south-east orientation passes in the immediate vicinity of the proposed development on both mainland and island sides. An assessment of photographic evidence indicates that bedrock in the study area is very thinly bedded to laminated, with near vertical bedding planes oriented in a north-west

to south-easterly direction. Discontinuities in the predominant discontinuity set (bedding) are generally planar, closed, slightly weathered and very closely spaced.

No landslide events have been recorded in the study area.

3.3.8 Hydrology and Hydrogeology

The site of the proposed development is immediately adjacent to the Atlantic Ocean and, more specifically, the shallow coastal waters of the Dursey Sound. These waters are included in the footprint of the protected Kenmare River SAC (see Section 3.3.9, below).

The study area is situated atop the Beara-Sneem Groundwater Body. High rates of groundwater recharge are unlikely here, since the steep local topography results in substantial runoff to sea. Recharge is further limited by the inherent low storage capacity and transmissivity of the underlying bedrock. The area is vulnerable, however, to groundwater contamination due to the absence of substantial topsoil – which would otherwise have a buffering effect on pollutants contained in runoff. It is considered that the majority of groundwater flow will occur in the upper 3m of rocks, and flow at depths of greater than 30m is only expected to occur in isolated fractures.

No flooding events have been recorded in the study area.

3.3.9 Biodiversity

Special Areas of Consevation (SACs) and Special Protection Areas (SPAs) – collectively referred to as 'Natura 2000' sites – are areas of especial ecological importance, designated for protection under EU Council Directive 92/43/EEC ('the Habitats Directive') and EU Council Directive 79/409/EEC ('the Birds Directive'), respectively. These sites have been designated due to the presence of one or more habitats/species of conservation concern ('Qualifying Interests') listed in Annexes of the aforementioned Directives. It is the objective of each Natura 2000 site in Ireland to maintain or restore the favourable conservation condition of these Qualifying Interests. The study area is within and in the proximity of a number of such sites (Table 3.3). Additionally, one Natural Heritage Area (NHA; a site of national ecological importance, designated for legal protection under the Wildlife (Amendment) Act 2000), the Pulleen Harbour Bog NHA, is situated in the vicinity of the proposed development (Table 3.3).

The Beara Peninsula SPA takes in much of the coastline of the western end of the Beara Peninsula (including that at the site of the proposed mainland landing point), and the entirety of the coastline of Dursey Island. According to the NPWS site synopsis, the SPA is "one of the most important sites in the country for Chough [*Pyrrhocorax pyrrhocorax*; protected under Annex I of Directive 79/409/EEC], with a breeding population of international importance occurring". "Large flocks" occur on the island itself.

The site also supports a "nationally important" population of fulmar (*Fulmarus glacialis*). Although not a Qualifying Interest, the peregrine falcon (*Falco peregrinus*; protected under Annex I of Directive 79/409/EEC) is also present at the site.

Table 3.3 Designated SPAs, SACs and NHAs in the vicinity of the proposed development, and their Qualifying Interests (Source: NPWS Database of Site Synopses)

Site name and NPWS code	Proximity to proposed development	Qualifying Interest(s) and corresponding NPWS code(s)
Beara Peninsula SPA [004155]	Within (mainland and island)	Fulmar (*Fulmarus glacialis*) [A009]; Chough (*Pyrrhocorax pyrrhocorax*) [A346]
The Bull and The Cow Rocks SPA [004066]	7.7km west	Storm petrel (*Hydrobates pelagicus*) [A014]; Gannet (*Morus bassanus*) [A016]; Puffin (*Fratercula arctica*) [A204]
Deenish and Scarriff Islands SPA [004175]	13.8km north	Fulmar (*Fulmarus glacialis*) [A009]; Manx shearwater (*Puffinus puffinus*) [A013]; Storm petrel (*Hydrobates pelagicus*) [A014]; Lesser black-backed gull (*Larus fuscus*) [A183]; Arctic tern (*Sterna paradisaea*) [A194]
Iveragh Peninsula SPA [004154]	14km north	Fulmar (*Fulmarus glacialis*) [A009]; Peregrine (*Falco peregrinus*) [A103]; Kittiwake (*Rissa tridactyla*) [A188]; Guillemot (*Uria aalge*) [A199]; Chough (*Pyrrhocorax pyrrhocorax*) [A346]
Kenmare River SAC [002158]	Immediately adjacent (taking in surrounding ocean and coastline up to high water mark)	Large shallow inlets and bays [1160]; Reefs [1170]; Perennial vegetation of stony banks [1220]; Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]; Atlantic salt meadows (*Glauco-puccinellietalia maritimae*) [1330]; Mediterranean salt meadows (*Juncetalia maritimi*) [1410]; Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]; Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]; European dry heaths [4030]; *Juniperus communis* formations on heaths or calcareous grasslands [5130];

Site name and NPWS code	Proximity to proposed development	Qualifying Interest(s) and corresponding NPWS code(s)
		Calaminarian grasslands of the *Violetalia calaminariae* [6130]; Submerged or partially submerged sea caves [8330]; *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014]; *Rhinolophus hipposideros* (Lesser horseshoe bat) [1303]; *Lutra lutra* (Otter) [1355]; *Phoca vitulina* (Harbour Seal) [1365]
Pulleen Harbour Bog NHA [002416]	13km east	Peatlands [4]

The Kenmare River SAC is a site with a very large footprint, which takes in the entire bay where the Kenmare River meets the sea between the Beara Peninsula and the Iveragh Peninsula (County Kerry). It also extends for some distance into the open ocean beyond the bay in question, where it takes in the entirety of the coastline of Dursey Island and that at the proposed mainland landing point (up to the point of the high water mark). Many of the Qualifying Interests of the site are not of major relevance to the proposed development since they are not found in its immediate vicinity but are present elsewhere in the SAC. Qualifying Interests of the SAC which, according to NPWS maps of the site, are found in close proximity to the proposed development are as follows:

- Reefs [1170]
- Submerged or partially submerged sea caves [8330]
- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]
- Otter (*Lutra lutra*) [1355]
- Harbour seal (*Phoca vitulina*) [1365]

In addition to the Qualifying Interests listed in Table 3.3, surveys of the site have revealed that a number of other protected species of flora and fauna have been identified in close proximity to the proposed development, including Betony (*Betonica officinalis*; protected under Floral (Protection) Order 2015), common pipistrelle (*Pipistrellus pipistrellus*; protected under Annex IV of Directive 92/43/EEC) and soprano pipistrelle (*Pipistrellus pygmaeus*; protected under Annex IV of Directive 92/43/EEC).

There are also a number of proposed NHAs (pNHAs) within and in the vicinity of the proposed development (Table 3.4). These are sites which have been proposed for protection under the Wildlife (Amendment) Act 2000 but have not yet been officially designated. pNHAs are afforded some limited protections (including the requirement for consideration of their ecological value in the formal planning process.

Table 3.4 Proposed NHAs within 15km of the proposed development

Site name and NPWS code:	Proximity to proposed development:
Dursey Island pNHA [000086]	Within (island)
Garinish Point pNHA [001986]	2km east
Firkeel Gap pNHA [001051]	2km east
Bull and Cow Rocks pNHA [000080]	8km west
Deenish and Scarriff Islands pNHA [001345]	14.1km north
Kilkinnikin pNHA [001985]	7.7km east

Of these, just one is within the immediate vicinity of the proposed development – the proposed Dursey Island NHA. The island has been proposed for designation as a NHA due to its important breeding populations of fulmar and chough.

Habitat mapping of the site of the proposed development indicates that exposed rocky shore, rocky sea cliffs, exposed siliceous rock, dry-humid acid grassland and dry siliceous heath are the predominant habitat types at the site. The habitat at the proposed passing bay locations along the approach road is largely heath and grassland. The grassland is a mixture of dry-humid acid grassland and improved

agricultural grassland. The habitat on Dursey Island is largely semi-natural grassland and heath and contains rocky sea cliffs also.

A survey of invasive alien species (IAS) indicates that *Rhododendron ponticum*, *Gunnera tinctoria* and Japanese Knotweed (*Fallopia japonica*) are present at a number of sites on the approach road, R572, but not within the cable car site on the island or mainland. All three are classified as 'High Impact' IAS by Biodiversity Ireland. *Allium triquetrum* has also been identified along the approach road and is classified a 'Medium Impact' IAS by Biodiversity Ireland. A single plant of *Carpobrotus edulis* was identified growing in a private garden on Dursey Island and cascading onto the public road. This is classified as a 'High Impact' IAS by Biodiversity Island. Stems of *Allium triquetrum* were identified on the grass verge opposite this private garden on Dursey Island. Two stands, one small stand and one moderately sized stand, of *Fallopia japonica* were also identified along the Garinish Loop.

Of the sites listed in Table 3.3, just two are within or in the immediate vicinity of the site of the proposed development – The Beara Peninsula SPA and the Kenmare River SAC.

3.3.10 Noise and Vibration

According to the National Roads Authority (NRA) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes, a sensitive receptor is a location such as "*residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present*" and as a result, may be affected by the presence of noise/air pollution in their surroundings. The nearest sensitive receptor to the proposed development is a residential property located approximately 300m east of the proposed development. The proposed development also includes the provision of 10 no. passing bays, 1 no. visibility splay, and a number of additional localised improvements along the 8km stretch of the R572 leading to the mainland landing point.

The nature of the study area is rural within a coastal area and, therefore, the existing noise levels within the proposed study area are relatively low.

3.3.11 Air Quality and Climate

The nearest air quality monitoring station to the site of the proposed development is the Valentia (Rural West) Station at Cahersiveen, County Kerry. According to EPA records, the current air quality in the Rural West AQIH Region is 'Good'.

High sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity.

In terms of receptor sensitivity to dust soiling, there are no sensitive receptors within 20m of the proposed works and less than 10 sensitive receptors within 50m of the proposed works. Garinish Point pNHA, Bearish Peninsula SPA, Kenmare River SAC and Dursey Island pNHA are also considered to be sensitive receptors to air quality impacts.

It was determined that, in terms of potential environmental impacts, all options are rated equally.

3.4 Do-Nothing Scenario

In 2010, 2013 and 2016 Roughan & O'Donovan (ROD) were commissioned to undertake a 'Deterministic & Probabilistic Assessment' of the existing Dursey Island Cable Car, which involved a complete structural, mechanical and electrical health check of the infrastructure. The results of this inspection and assessment indicated that the cableway is in reasonable working condition. There are no immediate safety concerns evident from the inspection and assessment subject to the recommendations of Section 6 of that report.

However, the reports also noted that the current system is not and cannot be fully compliant with the requirements of the European Standards for "The Safety Requirements for Cableway Installations Designed to Carry Persons", S.I. No. 470 / 2003 and S.I. 766 / 2007. The cableway was constructed in 1969 and, therefore, the various components of the system are outdated to the extent that upgrading them to meet current standards is not feasible. Although exemptions for most of the non-compliances identified in the report have been granted by the Commission for Railway Regulation, many of these exemptions have been granted on the basis that the cableway will be replaced in 3-5 years.

As a result, the do-nothing scenario would result in the decommissioning of the cableway in the short to medium term, resulting in the need for a barge/ferry for residents and visitors to access the island as is the case with all other West Cork Islands. As the cableway is a unique and distinguishing characteristic of the Beara Peninsula and West Cork, and has been for the past 50 years, it was decided that the do-nothing scenario should not be further considered.

In addition, the car park at the site currently accommodates approximately 70 vehicles but is often oversubscribed. This can lead to cars being parked informally at the side of the road and drivers making awkward U-turn movements, which can add to congestion in the area. Furthermore, ticket sales records show that visitor numbers are increasing year on year. Consequently, it is clear that the existing parking facilities are unsustainable, and the situation will worsen if no action is taken to improve parking facilities and control visitor numbers.

3.5 Alternatives Considered

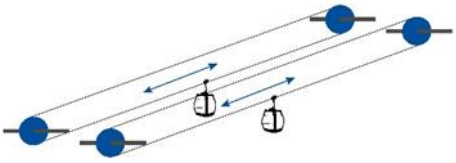
Four no. Cableway Technology Options, three no. Cableway Alignment Options and three no. Architectural Design Options were developed for the purposes of the project. Subsequently, five Overall Design Options were developed by combining options from the respective option categories. This section provides a description of each option, according to option category. All options will allow sufficient lateral clearance, and sufficient overhead clearance over the Dursey Sound and the trafficked area on the mainland.

3.5.1 Cableway Technology Options

3.5.1.1 Technology Option 1 – Detachable Gondola

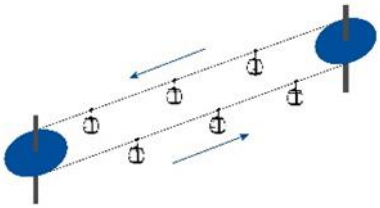
Option 1 constitutes the most basic solution available today. In this type of system, detachable cabins can accommodate 4 – 15 passengers and are installed on a single rope which carries and hauls. In comparison with other available technologies, this option is very economical for transport capacities of over 1,000 p/h, but the speed is lower and the cabins are less stable in strong winds. This type of system is most common in urban areas, ski resorts and tourist attractions because it is quick to build,

very reliable and allows a return on investment (ROI), amortised over 5 or 15 years, ranging from €8 - €20 million, depending on the number of stations, the transport capacity and the distances travelled.



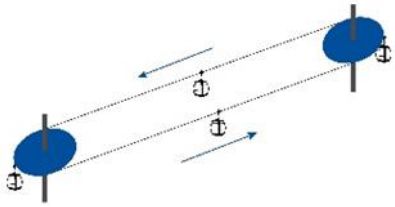
3.5.1.2 Technology Option 2 – Pulsed Ropeway

Pulsed ropeways are similar to those of mono-cable installations (such as that described in Option 1) but differ in that their carrier cabins are equipped with a fixed grip and are grouped together, instead of being equally distributed along the length of the rope. For this reason, the entire cableway must slow down or stop to allow passengers to board/disembark at stations. The resultant lack of flexibility and low transport capacity inherent with this type of ropeway has made them unsuitable for urban and ski resort environments and better suited to tourist sites. This type of system was very popular throughout the latter half of the 20th century. Although it is still used for some tourist site developments, the number of projects of this type is decreasing every year.



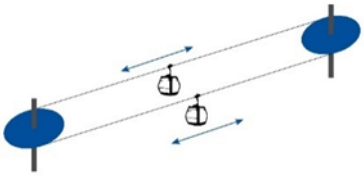
3.5.1.3 Technology Option 3 – Reversible Ropeway Synchronised

Unlike Options 1 and 2, this type of ropeway is reversible, meaning the rope itself can move backwards or forwards as required, rather than moving in one direction only. It carries two carrier cabins. Each cabin is fixed to a single hauling rope. In solutions of this type using just one rope, high tensions limit the choice of equipment.



3.5.1.4 Technology Option 4 – Reversible Ropeway Desynchronised

Like Option 3, this type of ropeway is reversible and has two cabins. It differs in that it has two separate and desynchronised ropeways, each of which conveys a single carrier cabin. Additionally, each ropeway has two ropes (as opposed to one) – one of which supports and carries the cabin, while the other hauls it. Each carrier is fixed to the loop of its own hauling rope. Solutions like this are widely used, allowing long spans and high tension. The advantage of this option over the previous three is that if one of the carrier cabins is stopped for repair/maintenance, the other can remain in operation. The transport capacity of this system depends highly on the length of the ropeway and waiting/boarding times.



3.5.1.5 Evaluation of Cableway Technology Options

Criteria used to evaluate the four no. cableway technology options are as follows:

1. Investment cost ratio

   This rating, on a scale of 0 – 3, considers 0 to be the most expensive solution and 3 to be the least expensive solution in terms of investment costs, i.e. costs associated with studies, equipment, assembly, and civil engineering.

2. Operating cost ratio

   This rating, on a scale of 0 – 3, considers 0 to be the most expensive solution and 3 to be the least expensive solution in terms of operating costs, i.e. costs associated with components required, complexity of solutions, maintenance costs, etc.

3. Wind resistance

   In a ropeway equipped with cabins, the wind resistance factor is defined by the inclination that an empty cabin, without passenger, can take. A cabin that weighs more and can carry less passengers is more capable of resisting wind. Therefore, we evaluated solutions that reconcile transport capacity (i.e. number of passengers) with the feasibility of installing cabins meeting the wind resistance criteria. The rating, on a scale of 0 – 3, considers 0 to be the solution requiring the most cabins (for a transport capacity of 300 p/h at 25 m/s), and 3 to be the solution requiring the least cabins (for a transport capacity of 300 p/h at 25 m/s).

4. Operational flexibility

   Operational flexibility refers to an option's ability to operate effectively in the face of temporal fluctuations in visitor numbers due to season, time of day and weather; and to continue to operate in the event of a mechanical failure. The rating, on a scale of 0 – 3, considers 0 to describe a 'not a very flexible' option, and 3 to describe the 'most flexible' option.

5. Quality of the experience

   The quality of the experience is difficult to define. However, discussions with Cork County Council have indicated that experience is a critical aspect to consider for the proposed development. In this case, travel time has been selected as a proxy to describe the quality of the visitor experience. Travel time is defined as the minimum time it takes to travel from the mainland to the island. This time must be close to the time it currently takes, which is six minutes. At a speed of about 1 m/s a cable car will cover a distance of 400m in approx. 5 minutes. This rating, on a scale of 0 – 5, considers 0 to describe a 'low quality' experience, and 5 to describe a 'high quality' experience (one which offers the possibility of travelling under 1 m/s, reducing travel time to 5 minutes.

6. Transport capacity range

   The transport capacity values were established, taking into account various factors, development opportunities and the potential for Dursey Island to attract visitors into the future. The values were set at 200 - 300 people per hour (p/h) from the mainland to the island and, equally, 200 - 300 p/h from the island to the mainland. This criterion assessed whether each option would be capable of delivering this transport capacity.

Table 3.5 presents the evaluation criteria scores for each technology option.

Table 3.5 Evaluation criteria scores and total scores according to cableway technology option

	1. Detachable Gondola	2. Pulsed Ropeway	3. Reversible Ropeway Synchronised	4. Reversible Ropeway Desynchronised
Investment cost ratio	0	1	3	2
Operating cost ratio	0	3	3	2
Wind resistance	0	1	3	3
Operational flexibility	2	1	0	3
Quality of experience	2	0	1	3
Transport capacity OK?	OK	OK	OK	OK
TOTAL	4	6	10	13

According to these criteria, it was decided that the most appropriate technological solution for the Dursey Island Cable Car is Technology Option 4 - a ropeway transport solution with a capacity of 200 to 300p/h in each direction with a de-synchronised reversible ropeway operation with two independent tracks.

Operation at half-capacity on one track will be possible to facilitate maintenance or to allow for a degraded operation mode in the event of a track failure. Operation in normal daily use at nominal capacity will be possible in winds of up to 25 m/s and in winds of up to 30 m/s using the degraded operation mode.

The standard operation mode will be capable of a journey from the mainland to the island in at least 5 minutes for the minimum transport capacity of 200 p/h. Standard operation mode will also allow for rapid evacuation from the island to the mainland of at least 300 p/h in winds blowing at a maximum speed of 25 m/s. In winds exceeding this value, transport capacity may be degraded while ensuring island evacuation in the shortest possible time.

Table 3.6 summarises the capacities attainable by the proposed cableway at different conceivable operating speeds for different times of the day, assuming a cabin capacity of 15 no. people.

Table 3.6 Capacities attainable with Cableway Technology Option 4 at various conceivable speeds (assuming cabin capacity of 15 no. people)

	Route and speed	Capacity
Day operating	Mainland to island at 1m/s Island to mainland at 6m/s	170 p/h each way
	Mainland to island at 1.5m/s Island to mainland at 6m/s	200 p/h each way
	Mainland to island at 2m/s Island to mainland at 6m/s	245 p/h each way
Afternoon operating	Mainland to island at 4m/s Island to mainland 4m/s	300 p/h each way

	Route and speed	Capacity
Extra operating	Mainland to island at 6m/s Island to mainland at 6m/s	330 p/h each way

3.5.2 Cableway Alignment Options

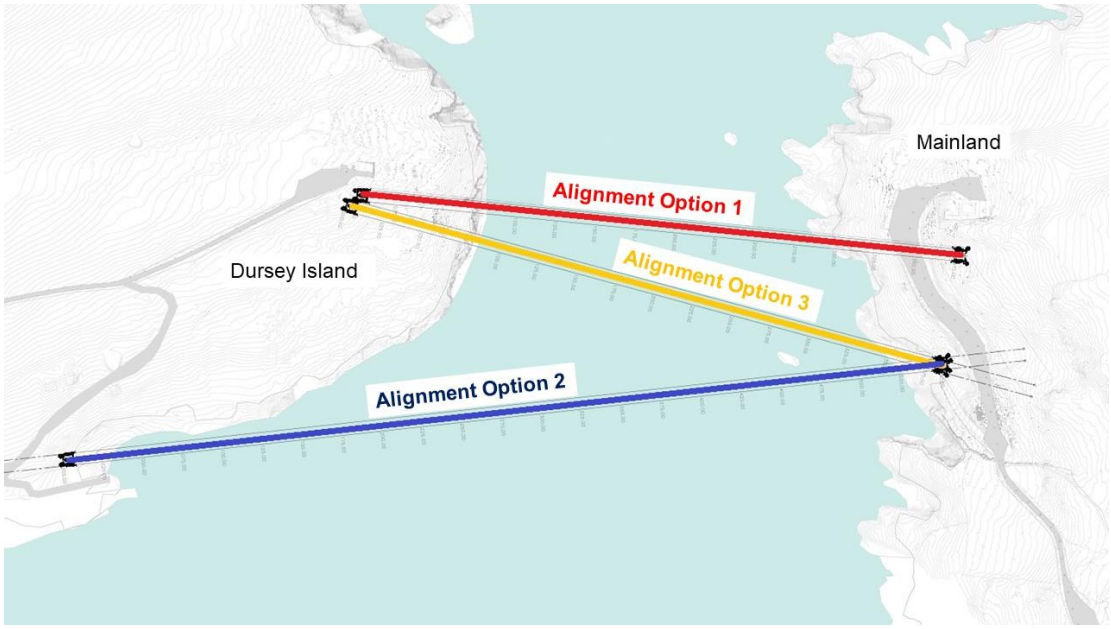


Plate 3.1 Map illustrating locations of Cableway Alignment Options 1, 2 and 3

Three cableway alignment options have been considered. These alignments are presented in Plate 3.1, in Figure 3.1 of Volume 3 of this EIAR and are described below.

3.5.2.1 Alignment Option 1 – Existing to Existing

The first potential alignment option would be situated approx. 25m south-east of the existing alignment (Plate 3.1). This proposed alignment constitutes the shortest route between the island and the mainland. Its ropeway main span (240m) and side spans (65m) would be similar to that of the existing ropeway. With this option, pylons of 30m weight would be required. The decision to offset the cableway 25m to the south-east would allow both the pylons and the stations to be erected at levels similar to those of the existing cableway. It would also allow the operation of the original cableway to continue throughout construction. Furthermore, it would provide sufficient clearance over the existing road and car park on the mainland.

3.5.2.2 Alignment Option 2 – Slipway to Slipway

With a main span length of 540m, the second potential alignment option (Plate 3.1) would have the longest crossing span of the three options presented. This alignment, which would stretch from the location of a slipway on the mainland (immediately south of the existing line station) to a slipway on the island (south-west of the existing line station), would create a crossing in a more 'open sea' environment. An alignment option of this length would require pylons of approx. 50% greater height on both island and mainland than those of Option 1. The ropes could be anchored at the proposed line stations or extended in side-spans to either side of the line station buildings. The latter option would facilitate the transfer of the cable forces to the ground without significantly increasing building foundations. A total building height of approximately 45m – 50m would be required on both mainland and island. This alignment represents the most visually striking option for the Dursey Sound crossing. On the other hand, a

span of this length might require either (a) an upgrade in the cableway technology (ropes, cabins, speed) in order to facilitate the required capacity, or (b) accepting a significant decrease in visitor capacity.

3.5.2.3 Alignment Option 3 – Slipway to Existing

The third potential alignment option (Plate 3.1) is an approximately intermediate route between Alignment Option 1 and 2. On the mainland, the line station would be located at the location of the nearby slipway, while on the island it would be situated close to the existing line station building. The main span of the ropeway would measure approximately 320m – a distance which would necessitate minimal changes to the cableway installation. The height of the mainland station building would need to be 50% greater than that of Alignment Option 1 but would be of a similar height on the island.

Alignment option 1 – existing to existing was selected as the chosen alignment option as this is the shortest distance for crossing the Dursey Sound. The existing landing point was also determined to be the most suitable location for constructing the visitor centre and car park.

3.5.3 Architectural Design Options

This section outlines the proposed architectural layout for the proposed Dursey Island Cable Car and Visitor Centre. Firstly, it sets out the aspects of the architectural and structural design that are common to all three Architectural Design Options ('General Architectural Design and Layout', Section 3.5.3.1). Then it outlines the differences in approach of the three no. Architectural Design Options developed for the proposed project (Sections 3.5.3.2 (Option 1), 3.5.3.3 (Option 2), and 3.5.3.4 (Option 3).

The cableway stations have been tested at different locations on the site to assess the advantages and disadvantages of each location and to seek a solution that overcomes the varied challenges of the site, program and budget in the most satisfactory way. Critical considerations of the masterplan have been how to simultaneously achieve level access into the cableway stations in accordance with accessibility requirements set out in Part M of the building regulations; to achieve the necessary elevation of the cable cars above the water's surface so as not to impede watercraft navigating through Dursey Sound; to avoid impacting on the nearby Kenmare River Special Area of Conservation (SAC) by keeping back from the water's edge; to minimise visual / aesthetic impact on the naturally beautiful rocky, sloping landscape; to minimise impact on the heath, flora and nesting sites that surround the site; and to produce a solution that is within the allocated budget.

3.5.3.1 General Architectural Design and Layout

All three Architectural Design Options will seek to allow the original cableway service to continue to operate throughout construction. As outlined in the brief provided by Cork County Council, all Options will include the following structural components: mainland station, island station, pylons, mainland-side visitor interpretive centre and visitor car park. Ancillary works, including infrastructural upgrades and hard and soft landscaping will also be required. General specifications associated with these elements are outlined in this section. Because of the exposed, marine environment of the study area, all structures (associated with all Architectural Design Options) will need to be designed with due consideration of durability requirements.

Visitor Centre

It is a design goal of the proposed development to create a fluid, connected experience for the visitor moving from the visitor centre to the mainland-side line station. As such,

the two programmes will be designed as one. At present, visitors to the existing cableway are spending extended periods of time queuing at the platform with no shelter or entertainment available, leading to frustration and negatively impacting the visitor experience. In order to avoid this situation and deliver a more positive visitor experience in future, the intended logical sequence of events for the visitor to the Dursey Island Cable Car and Visitor Centre is as follows:

(i) Visitor arrives at car park and has either already bought their ticket in advance online, or upon entering the building has the opportunity to immediately purchase a tracked ticket, thereby securing their place in a digital queue with an estimated departure time clearly communicated in advance.

(ii) Visitor is free, therefore, to spend the majority of their 'queuing time' exploring the visitor centre and not waiting at the line station. Exhibitions of interpretive information, views of the Dursey Sound, garden spaces, a gift shop and a café will keep visitors entertained during this time and the educational aspect will prime their overall experience of the destination.

(iii) Visitor is prompted by audiovisual cues to move to the line station when their boarding time is near. At this time they can move to the departure platform to board the cablecar and depart for the island.

It would be preferable if the visitor centre was kept open to some degree year-round and not sitting idle during the off-season. To encourage year-round use of the visitor centre facility, it would be worth exploring the possibility of combining the visitor centre with the local community centre, either by accommodating the community centre at the facility, or by establishing some kind of reciprocal relationship where local community groups can use the facilities for their own events during the off-season. The design of the building should reflect the intended mixed-use purpose and flexible nature of the space. The building's architecture should be simple and spacious, and composed of natural, hard-wearing materials. The visitor centre will be a heated and ventilated building (potentially using a combination of mechanical and natural ventilation).

Mainland-Side Line Station Building

The design and layout of the mainland-side line station building will be strongly informed by the cableway machinery contained within it, which is likely to come as a set-piece from a specialist supplier. Since the majority of visitors' queuing time should be spent in the connected visitor centre, the line station space will be designed to be aesthetically pleasing and provide shelter, but to discourage visitors from lingering too long. As a result, the building will have a relatively minimalist design. It is proposed to provide a rainscreen enclosure, level platforms, and office facilities for the operator, but little else beyond these essential elements. The structure will have to be situated at a sufficient elevation so as to provide adequate clearance over any trafficked area on land, and over the navigable Dursey Sound waters.

Island Station Building

The design and layout of the island station will similarly be largely influenced by the cableway machinery to be contained within it. It is anticipated that the majority of the development budget will be spent on the mainland-side facilities. Accordingly, the island station building will be a relatively simple structure. In contrast to the mainland side of the site, where visitors will spend most of their time in the visitor centre (and not the line station), the goal of the island station is to provide sufficient welfare facilities to support waiting passengers without the need for an additional structure. The station will include a rainscreen enclosure which will shelter both the landing platforms and a waiting area and toilet facilities; and a small playground. The only heated space will

be the toilet block. The rest of the space will be open to the elements – but sheltered from the worst of the weather by the rainscreen.

Pylons

The primary functions of these structures are to support the cableway ropes and provide the necessary vertical clearance over the Dursey Sound and the trafficked area on the mainland, while allowing a suitable landing point level at the stations. Traditionally, pylons for cableways have been latticed space-frame structures, located in discrete locations on mountain sides or other non-visually intrusive locations. Because of the open and exposed nature of the landscape in the study area, it is not possible in this case to situate the pylons in non-visually intrusive positions. The design goal for the pylons is to erect structures which perform their functions while having a visual appearance which compliments the existing landscape. Foundations will be of durable reinforced concrete. The body of the pylons themselves will be coated in a high specification protective paint whose colour is aesthetically appropriate for the surrounding environment. Depending on the Alignment Option selected, the pylons will have an overall height above the foundation in the region of 28-30m and, assuming a circular cross-section, will have a varying diameter, tapering from base to cable saddle support.

Based on the ground conditions described in Section 3.3.7, two structural options have been considered: (1) a lattice tower with four legs, and (2) a monopole. Foundations for the stations are considered separately.

Lattice Tower

Shallow pad reinforced concrete foundations are proposed under each leg of the lattice tower. The exact foundation dimensions will depend on the final tower geometry and loading regime. The formation level of the foundation shall be set at a sufficient depth so as to avoid the layers of overburden and weathered rock. Further consideration of the foundation depth will be necessary in the event that rock socket friction is required to resist tensile loads.

Monopole

For the monopole option, a single shallow pile (or, alternatively, a pile group) could be employed to provide resistance against the vertical, horizontal and overturning forces imposed by the structure. The diameter and depth of the pile will be designed based on the findings of the ground investigation and the final loading regime. However, if a piled solution is used, it is anticipated that the piles will be relatively short given the presence of competent bedrock at shallow depths. Bored concrete piles are the most suitable pile type, given the local ground conditions. Subject to the final loading regime, it is likely that shallow pad foundation will be a viable alternative to piled foundations. The geological structure of the rock will have to be taken into consideration, particularly if the monopole will be situated in steeply sloping terrain, as the rock's major plane of weakness (bedding) seems to have the same orientation as Alignment Option 1.

Car Park

The capacity of the proposed Visitor Centre car park will be increased (from 70 spaces) to somewhere in the range of 100-180 spaces. The larger car park options will accommodate the parking demand for most of the year, but on the busiest in-season days there will be a likely shortfall in the range of 170-230 spaces. However, due to site constraints and landscape, it is not desirable or cost-effective to have a car park of scale exceeding 180 spaces. At the same time, consideration should be given to

the possibility of providing an overflow car park in the vicinity of the proposed development. This could be situated in a suitably located field within walking distance of the Centre, and only made available as required. Alternatively, a satellite car park with a shuttle bus service linking the Centre with the Beara Peninsula Ring Road could be provided to the east of the proposed development. Steps will be taken to minimise the visual impact of the car park on the landscape.

A relatively large area of the proposed car park is likely to require cuttings and embankments to ensure consistent elevation levels. The cuttings may be able to be executed in the rock with no additional retaining measures required. The excavated rock is very likely to form an excellent fill material for the fill/embankment areas and for capping/pavement purposes. With careful planning it will be possible to balance the cut and fill volumes, achieving an environmentally acceptable solution

It is proposed that, whichever Design Option is pursued, the car park be developed in two phases:

Phase 1. Consolidation of the existing car park; to be carried out during the construction phase.

Phase 2. Construction of a larger car park; to be deferred until such time as growing visitor numbers necessitate it.

Lighting

The lighting of the proposed development will be understated and unobtrusive insofar as possible, in order to prevent/minimise light pollution to the surrounding environment, including protected environmental areas and the Kerry International Dark-Sky Reserve. The potential occurrence of the following phenomena will be taken into consideration in the lighting design: sky glow (direct upward waste light), light trespass (intrusive light and light into windows/windscreens), over-illumination, glare (source intensity).

Approach Road Works

In order to address existing congestion and facilitate anticipated volumes of traffic during the operation of the proposed development, it is proposed to carry out road improvement works on the 8km stretch of the R572 between Bealbarnish Gap and the mainland side of the cable car site. These works will involve the construction of 10 no. passing bays, 1 no. visibility splay, and completion of a number of additional localised improvements to increase forward visibility. Anticipated traffic volumes are detailed in Chapter 5 of Volume 2 of this EIAR – Traffic and Transport. Proposed road improvement works are detailed in Chapter 4 – Description of the Proposed Development. Figures 4.12 – 4.22 of Volume 3 of this EIAR present drawings of the proposed passing bays and visibility splay.

3.5.3.2 Architectural Design Option 1

The layout of Option 1 is presented in Figure 3.2 of Volume 3 of this EIAR. Option 1 station building adopted a similar tack to the existing station, in that it was positioned on the high ground immediately northeast of the carpark and immediately southeast of the existing station buildings at a height of +25m AOD. This raised position reduced the angle of inclination of the cablecar rising from the platform to the upper pylon height, enabling it to gain the appropriate elevation to clear the carpark and Dursey Sound at an acceptable height while keeping the pylon footing location back from the water's edge. This position was initially also thought to be advantageous as it would work with the natural topography, minimising excavation on what was considered to be a sensitive site and allowing re-surfacing and demarcation of the existing carpark

to form the new, larger carpark. Finally this position was considered advantageous as, due to it being offset from the current cableway and power lines, it allowed the new cableway system to be constructed without interfering with the continuing operation of the existing system, minimising any period of disconnection of the island from the mainland.

The landing platform is located on high ground immediately south-east of the existing station, accessed by an external elevator from carpark level. A large terraced carparking platform is formed to raise the carpark capacity to 184 spaces; an expansive visitor centre is located in the undercroft space which is a byproduct of forming this carparking platform. At carpark level there is a ticket desk, a shop, and an office. The large lower level of the visitor centre is accessed by external landscaped ramps and also by elevator. The lower level includes a large café/restaurant served by a bar and kitchen, a large exhibition hall, a conference room, WCs, and circulation. There is also a projecting viewpoint which extends out from the lower level to the southwest over the cliffs. Advantages of this option considered to be synergetic combination of carpark structure and visitor centre structure design solutions.

Plate 3.2 Option 1 architectural site plan

Mainland-side Line Station Building

Like the existing building, the mainland-side line station of Option 1 will be positioned on the high ground immediately northeast of the existing car park and southeast of the existing platforms at a height of +25m AOD. This position reduced the angle of inclination of the cablecar rising from the platform to the upper pylon height enabling it to gain the appropriate elevation allowing sufficient clearance of both the trafficked area below and the Dursey Sound. Unlike the existing station however, the Option 1 mainland station will provide level disabled access (via a lift) in compliance with current building regulations under Part M. The architectural rainscreen which will oversail and shelter the stations, will be designed to complement the appearance of the other visitor centre buildings and pylons, so they share a common architectural language and so that all constituent elements of the masterplan read as a family of related forms.

Island Station Building

The island station building will be positioned on what is currently the rough carparking area to the southwest of the existing station. It will mirror the design of the mainland station, with a similar architectural rainscreen oversailing the platforms and machinery, and will have a toilet block as well as an operator's office.

Plate 3.3 Option 1 architectural site plan of the island station

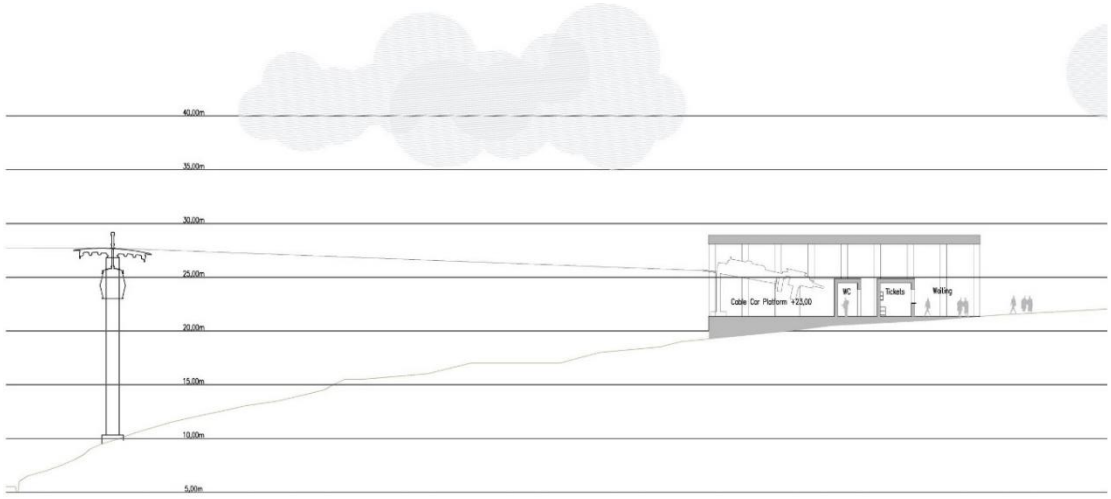


Plate 3.4 Option 1 architectural section of the island station

The key architectural precedent for the Option 1 Line Station Buildings is the Gaia Ropeway Cable Car in Portugal, by Menos é Mais Arquitectos.

Plate 3.5 Gaia Ropeway Cable Car in Portugal, by Menos é Mais Arquitectos

Visitor Centre – 'Concourse' Design

In Architectural Design Option 1, the guiding principles informing the general arrangement are to express the 'vector' of the cableway at ground level as a threshold/arrival space; and to seek to work with the natural site topography as much as possible by terracing both the carpark and the visitor centre itself down the sloping terrain, harnessing the sloping topography as a design driver.

Ticketing for the cableway will be provided in the visitor centre lobby, located at the head of the carpark at +16.0m AOD, and aligned with the cableway overhead. From here, visitors can access the line station platform above, or access the visitor centre located beneath the carpark via the lifts, or via landscaped pathways. At this point it would be expected that visitors will proceed down the pathway into the visitor centre.

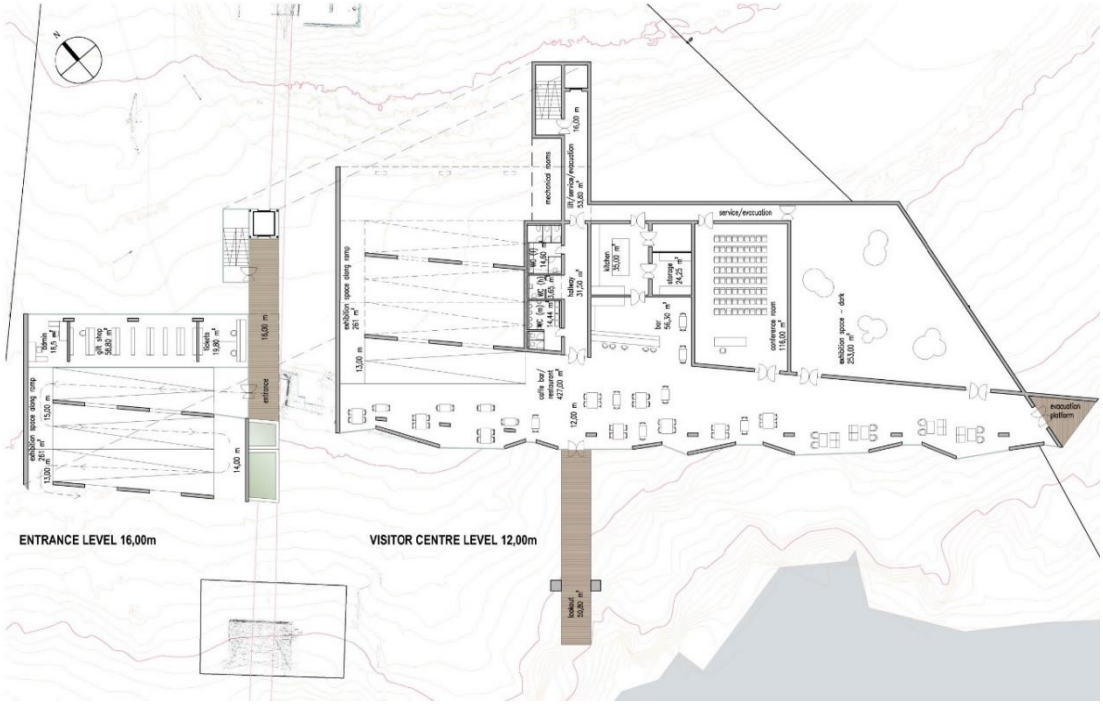


Plate 3.6 Option 1 architectural floor plans showing arrival and undercroft levels

The naturally lit exhibition space / concourse located beneath the carpark benefits from dramatic views of the Dursey Sound through a glazed southern elevation which cranks and folds to imitate the cliff face below. An external viewing platform, dark exhibition space, café, toilets, conference room and classroom spaces are accessed via this concourse. The external viewing platform reaches out and cantilevers beyond the foot of the main pylon allowing the visitor to experience the cableway from a different point of view. The building will be approx. 1,500m² in area.

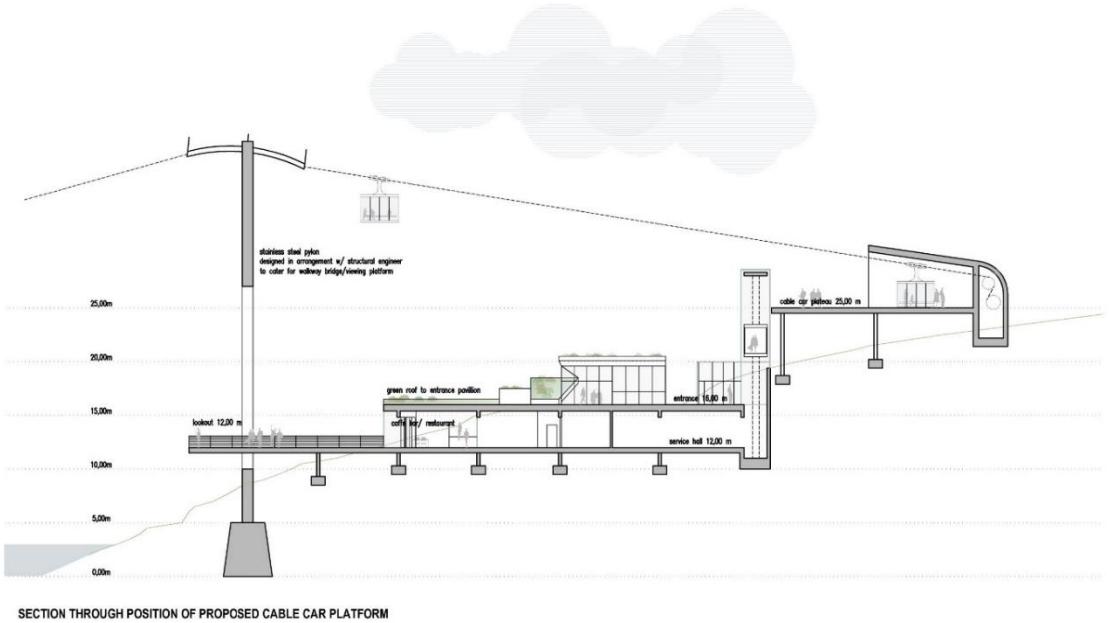


Plate 3.7 Option 1 architectural section demonstrating how the building would follow the natural topography of the site

The key architectural precedent for this option is the Vucedol Archaeological Museum, in Croatia, by Radionica Arhitekure.

Plate 3.8 **Vucedol Archaeological Museum, in Croatia, under construction, by Radionica Arhitekure.**

Mainland-side Pylon

The pylon will be the tallest structure in the proposed development, rising to +40m AOD. In Design Option 1, it will have a 'wishbone' mast construction at the foot. A viewing bridge will extend from the visitor centre external viewing platform to the platform and will cantilever beyond it, creating a dramatic viewing point overlooking the Dursey Sound.

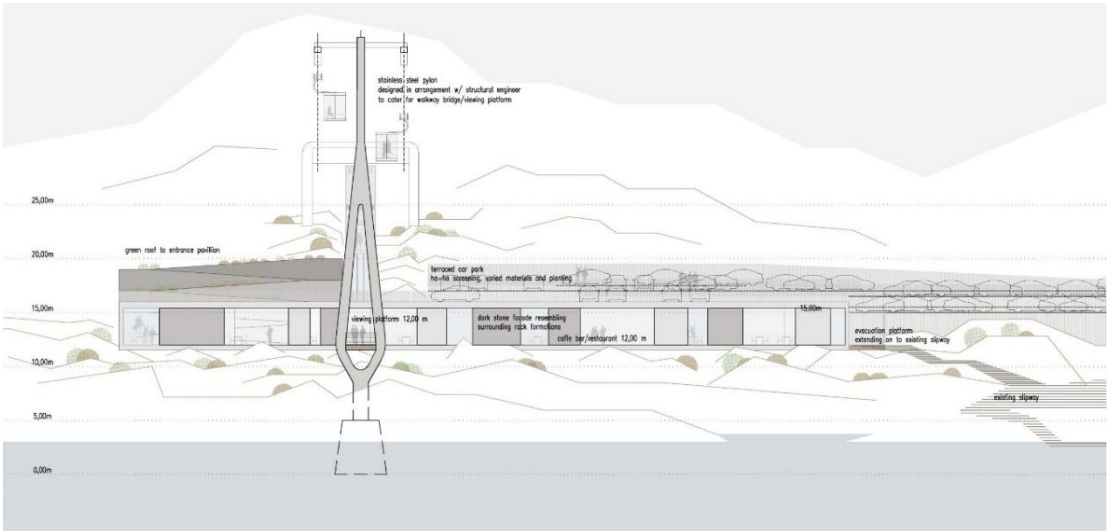


Plate 3.9 **Option 1 architectural elevation showing the 'wishbone' pylon structure with integrated viewing platform**

Car Park

The Option 1 proposal incorporates a terraced carpark to minimize rock break and maximize spaces. The site plan indicates that 184 cars will be accommodated on terraces rising from the direction of the sea, shaped to the existing contour lines. The extant carpark arrival point is at +17m AOD. In the Option 1 design, three terraces set at +16m AOD, +17m AOD and +18m AOD branch from this arrival point and are connected by the slope of the parking surface. Negative seaward visual impact will be mitigated against through the use of a series of berms and screen walls in a variety of stone materials. The construction of the car park described can be phased, with the final higher terrace at +18m AOD only being built subject to future requirements.

Landscaping

Hard landscaping to the west of the visitor centre will resemble the surrounding natural environment.

Structural Considerations

The heavy loading associated with the green roof element of this option has implications for the space at 12m below. As a result, it is envisaged that columns on a 5m nominal structural grid will be required to reinforce the exhibition space below. The conference room will be a column-free zone with the roof comprising reinforced concrete (RC) slab with downstand RC beams. Much of the walls will be load-bearing reinforced concrete with various treatment to the façade external leaf making up the cavity wall construction. Reinforced concrete walls will provide lateral stability to the building.

3.5.3.3 Architectural Design Option 1a

A version of Option 1 with a reduced visitor centre footprint, conceived in particular to minimise excavation into the landform at undercroft level and preference conformity to the natural topography instead as a way of reducing the projected cost. This resulted in a scheme with landing platforms (still) located on high ground immediately south-east of the existing station, accessed by an external elevator from carpark level. A reduced carpark platform providing 90 spaces. A ticket office and a food hut with external seating area located at carpark level, with a second external elevator and three staircases leading to a reduced undercroft level, long and shallow, containing a shop, exhibition spaces, and WCs. Advantages of this option considered to be synergetic combination of carpark structure and visitor centre structure design solutions and acceptable build cost.

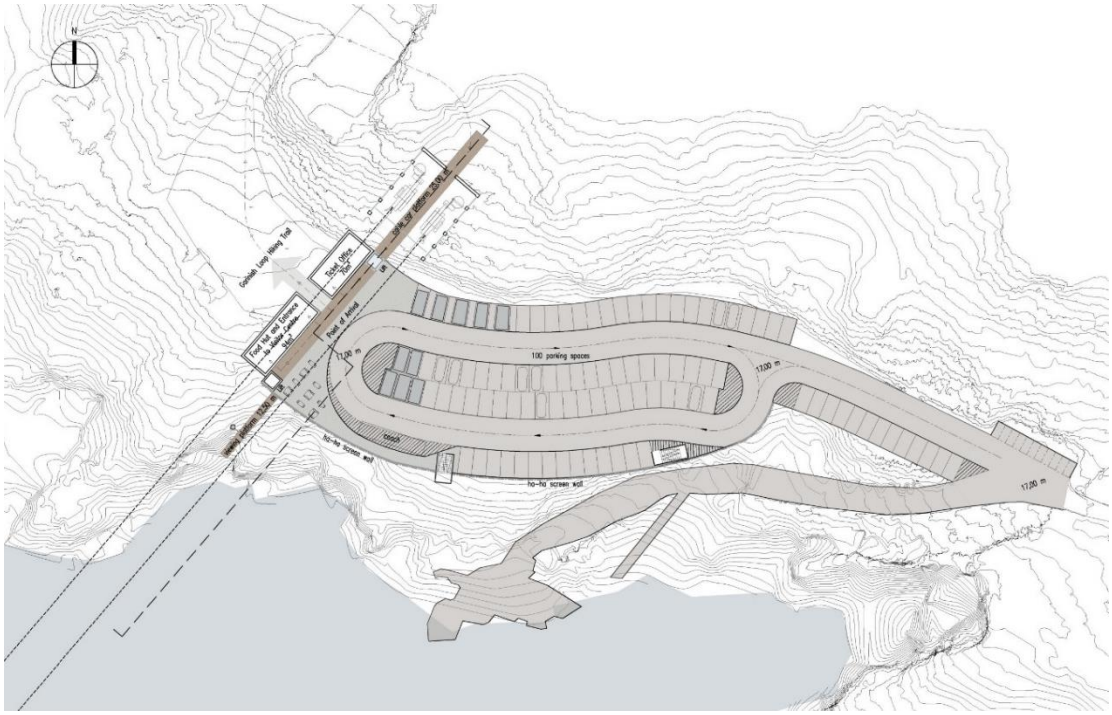


Plate 3.10 Option 1a architectural site plan

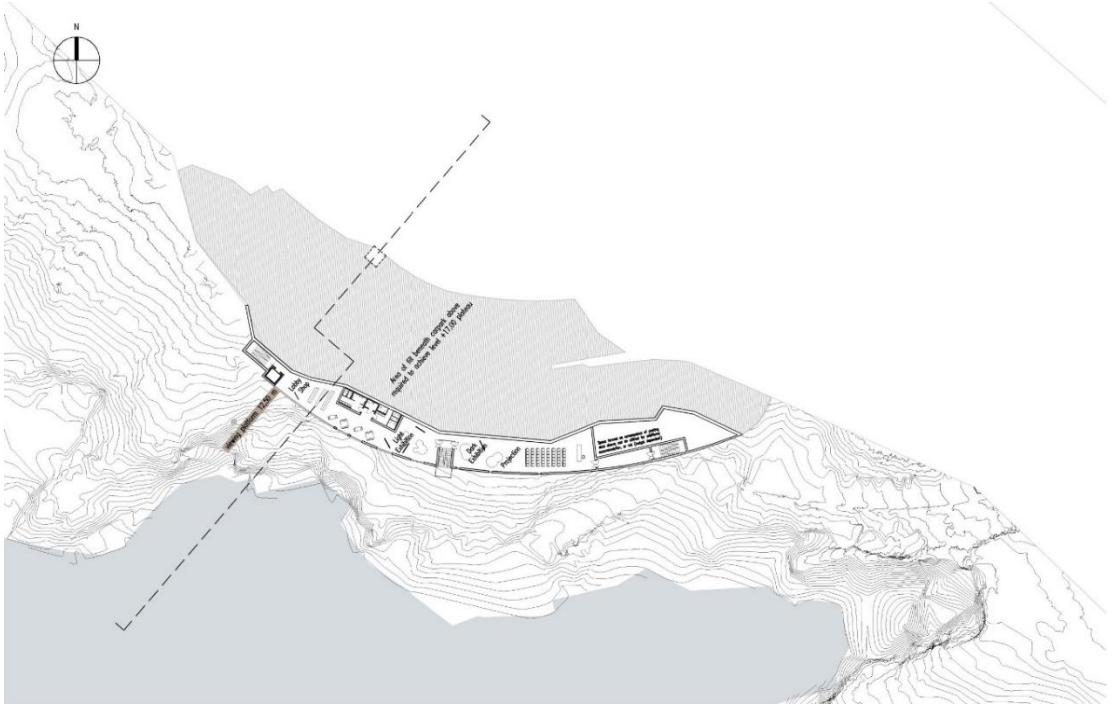


Plate 3.11 Option 1a architectural undercroft plan

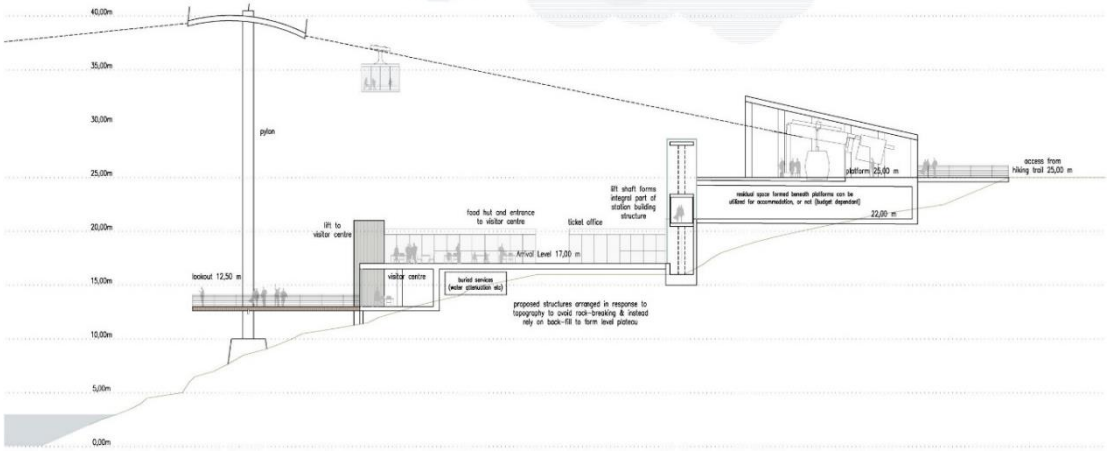


Plate 3.12 **Option 1a architectural section showing the building staggering to follow the landform**

3.5.3.4 Architectural Design Option 2

The layout of Options 2A and 2B is presented in Figure 3.3 of Volume 3 of this EIAR. Option 2 proposed a relatively tall multi-storey 'tower' building located at the existing mainland slipway that would house the cableway machinery and landing platforms at the top, be accessed from the carpark level at mid-height, and also provide level access via a lift down to the existing slipway at its base. The cableway station would be located at the top of the 6-7 storey tower building, located at the water's edge alongside the existing marine slipway, which incorporates all of the visitor centre / support functions in a single building across multiple levels. The visitor centre facilities would be provided on the intermediate floors between entry level and platform level linked internally to form an 'architectural promenade' winding up through the building, providing intermittent interpretative exhibition spaces complimented by cantilevering balconies framing views across the Dursey Sound in different directions, guiding the visitor from the carpark level through the various internal exhibition spaces, café and viewing points en route to the departure point. The tower is served by an internal elevator which rises to the platforms, and also descends to the marine slipway, providing part-M compliant disabled access to all functional parts of the site. A new boat house would be located at the slipway level conceived to allow for a future rehabilitation and reuse of the slipway for some tourism function such as boat tours or charters. Therefore, this option would function as a vertical multimodal interchange between land, sea and air-based transport modes. The car park is expanded to 177 spaces on a single level and relies upon formed land to the south of the existing carpark achieving the necessary width to form a loop. The main advantages of this option are considered to be the minimal built footprint; the neatness of the Part-M accessibility solution; and the exciting architectural expression of the tower. This option was also considered to offer up a neat solution as it combined the various programmes into one single building and avoided the need for a separate pylon structure, minimising clutter on site, while also generating a building form reminiscent of the defensive tower house structures found elsewhere along the Irish coastline.

Two potential Island station locations were assessed as part of Option 2, effectively splitting Option 2 into two sub-options '2A' and '2B';

Plate 3.13 **Option 2 architectural site plan, showing the tower location between the car park and the slipway**

The following text should be read in conjunction with drawing DCCVC-ROD-STR-SW_AE-DR-CB-10006 titled 'Option 2A and 2B – Mainland Site Layout Plan'.

Mainland Station Building

Architectural Design Option 2 has no stand-alone mainland-side line station building as the line station element of the proposal is integrated within the visitor centre design.

Island Station Building "2A"

The island station building 2A is proposed to mirror the mainland 'tower' design solution on the island-side slipway i.e. to create a vertical multimodal interchange building allowing Part M-compliant access to the slipway, to the island itself, and to the cablecar platforms. Upon development of this concept on the island slipway site, it was found that this approach was not as suited to the island slipway site topography which is less steep with a longer and more gradual slope between the slipway and the road. It was also considered that due to the slipway being located significantly further from the mainland than the existing landing point, to locate the station at the island slipway would significantly lengthen the cableway span, with resultant implications on clearance over Dursey Sound and on the expense of the cableway system. The clearance over the sound is dictated by the sag in the ropes which in turn is related to the span of the ropes. Therefore, the elongated span length for Option 2A would mean the island station building for Option 2A would have to be taller than desirable or than required by the programme to be contained within it.

Island Station Building "2B"

Option 2B proposed to incorporate an island station location similar to that for Option 1 which represented the shortest span across Dursey Sound from the mainland slipway site. The mainland station building would be rotated in plan by 21 degrees to accommodate the alternative cableway alignment. The proposed island station for Option 2B is almost identical to that proposed for Options 1 and 3 but with the station rotated in plan by 9 degrees to accommodate the alternative cableway alignment. This

location has the added benefit of making use of the existing carpark and roadway currently serving the existing mainland station.

Visitor Centre – 'Vertical Interchange' Design

As described above, the Visitor Centre of Architectural Design Option 2 is conceived as a winding architectural promenade within a tower structure that effectively forms a vertical transport interchange between the land (access via car/bike/coach/walking), the sea (access by boat via the slipway), and the sky (access via cable car). In this design, the ground floor structure is positioned at +4m AOD on a brownfield site next to the existing mainland-side slipway, south of the existing cableway landing point. The visitor centre would be able to link the slipway, cableway and approach road via lifts enabling level access from the visitor car park to all the points of use. Central lift cores will provide access to the facilities and amenities spread across various levels of the visitor centre tower block. The third floor of the tower would be accessible via the ground level car park via a light bridge.

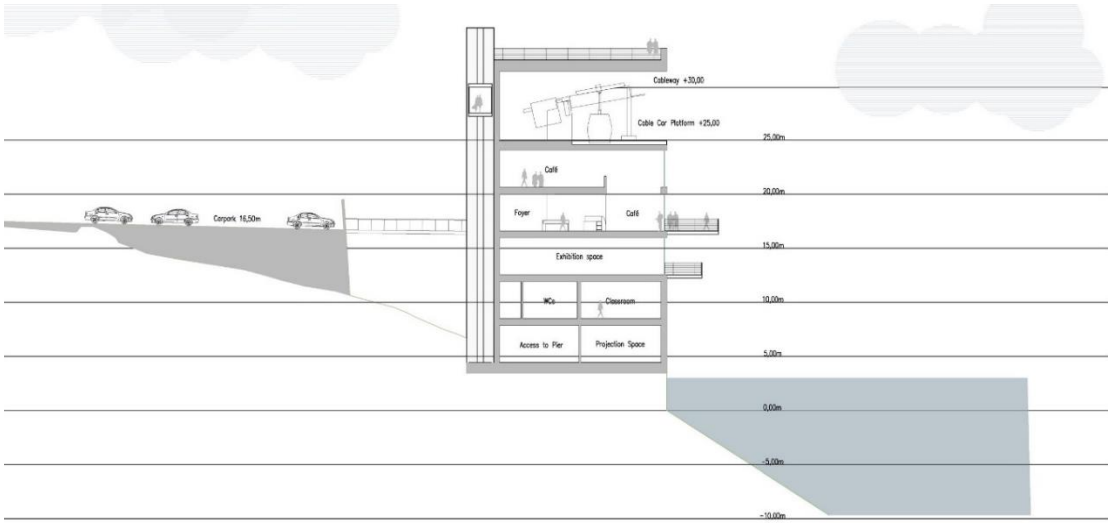


Plate 3.14 **Option 2 architectural section showing how the tower addresses the sloping site topography**

There are numerous advantages to this approach. The fact that this Design Option is situated on an existing brownfield site means that it would potentially have a lesser environmental impact than some other options, particularly since a rare, protected floral species (Betony) has been identified growing on the site. Additionally, because the visitor centre building itself will form a tower, it can support the cableway directly and eliminate the need for one of the pylons. There will be an opportunity for a viewing platform on the roof of the tower block from where there will be magnificent panoramic views of the surrounding landscape. In this way even those who opt not to ride on the cable car will be able to experience similar vistas. Furthermore, building regulations-compliant disabled access to the slipway and waterfront will enable visitors to experience this aspect of the site as well, and will keep the door open for future redevelopment of the slipway for some marine/tourism use yet unforeseen. The dramatically designed tower rising out of the ocean in this remote environment will certainly meet the call in the project brief for an 'iconic' landmark, while at the same time having a form which serves its function well, and forming a modern continuation of the long history of coastal tower structures such as forts, tower houses and lighthouses in Ireland.

The key architectural precedent for this option is the Knut Hamsun Centre in Norway by Steven Holl.

Plate 3.15 **A cut-away model of the Knut Hamsun Centre in Norway by Steven Holl Architects demonstrating the internal 'architectural promenade' winding up through the building.**

Plate 3.16 **Photograph of the Knut Hamsun Centre in its coastal context in Norway by Steven Holl Architects**

Car Park

The Option 2 proposal incorporates a broadly flat carpark set at the entry level of +17m AOD which minimises the need for rock breaking by curving to follow the existing topographical contours. The site plan indicates over 177 cars could be accommodated on the extant car park area and supplemented with formed land to the south. By virtue of the relatively small footprint of the proposed Option 2 visitor centre, this car park solution could make better use of the limited available areas of relatively flat ground. Negative seaward visual impact will be mitigated against through the use of berms and screen walls, extending from the retaining structure used to form the parking plateau, and treated in a variety of stone materials. This would conceal the carpark from view when seen from Dursey Island, thereby helping to preserve the natural and unspoilt feel of the area.

Structural Considerations

The various floors of the multi-storey building will comprise reinforced concrete (RC) slabs with downstand RC beams with external balconies at levels 2 and 3, cantilevering up to +5m AOD. The cantilevered external space will need careful consideration to avoid thermal bridging at the interface with the internal 'warm' space. The cantilevered RC beams supporting the thermally bridged RC floor slab will greatly assist in addressing this issue. Lateral stability will be achieved using RC walls to the perimeter of the building. In addition, it is proposed that the substantial forces associated with the cableway will be resisted by a back-span or tie-back cable and not resisted by the building structure itself. In this design option, the mainland buildings are located near to the existing slipway. There are significant additional durability requirements associated with a building located in a marine splash zone. In addition, there are inherent risks associated with construction close to the sea edge. However, the use of prefabricated forms of construction (concrete and steelwork) can somewhat mitigate these construction risks.

3.5.3.5 Architectural Design Option 3

The layout of Option 3 is presented in Figure 3.4 of Volume 3 of this EIAR. Landing platform is located on high ground immediately south-east of the existing station following advice from cablecar specialist engineer, accessed by an external elevator from carpark level. A relatively small and compact visitor centre to perform as a 'multifunctional space' with ticket desk, store, WCs, a small shop stand area, and a projection/exhibition area, arranged in a wide and shallow single storey building to maximise views to sea and help to screen the carpark from view when seen from the island. 109-space carpark arranged in a single level built on the existing carpark plateau and also making use of formed land to the south of the existing carpark achieving the necessary width to form a loop. Projecting viewing platform extending from the visitor centre out into open air to the southwest. Main advantages of this option are considered to be the minimal built footprint, possibility of extending building in future stages as visitor numbers grow, screening of carpark/lessen visual impact of carpark.

Plate 3.17 Option 3 architectural site plan

Mainland-side Line Station Building

Option 3 adopts a similar architectural design tack to that of Option 1 for the mainland-side line station building, but one that is likely to be of a lower specification and include more 'off-the-shelf' components, due to a reduced budget which was assumed as part of this option development.

Island Station Building

The island station building will be almost identical to that of Option 1 described in the previous section.

Visitor Centre

The proposed structure is a smaller scale building than what was proposed in Options 1 and 2, which was part of exploring the implications of a reduced budget. This proposal sought to position a small pavilion building between the carpark and the water's edge so that the volume of the building itself acted as a screen to conceal the carpark from view when seen from the Island. The internal space provided is minimal in this option and so the emphasis would have been put on external spaces, such as picnic areas, viewpoints, and pathways around the site. These external areas would be complimented with external visitor interpretive materials in the form of sculptures, information boards and similar.

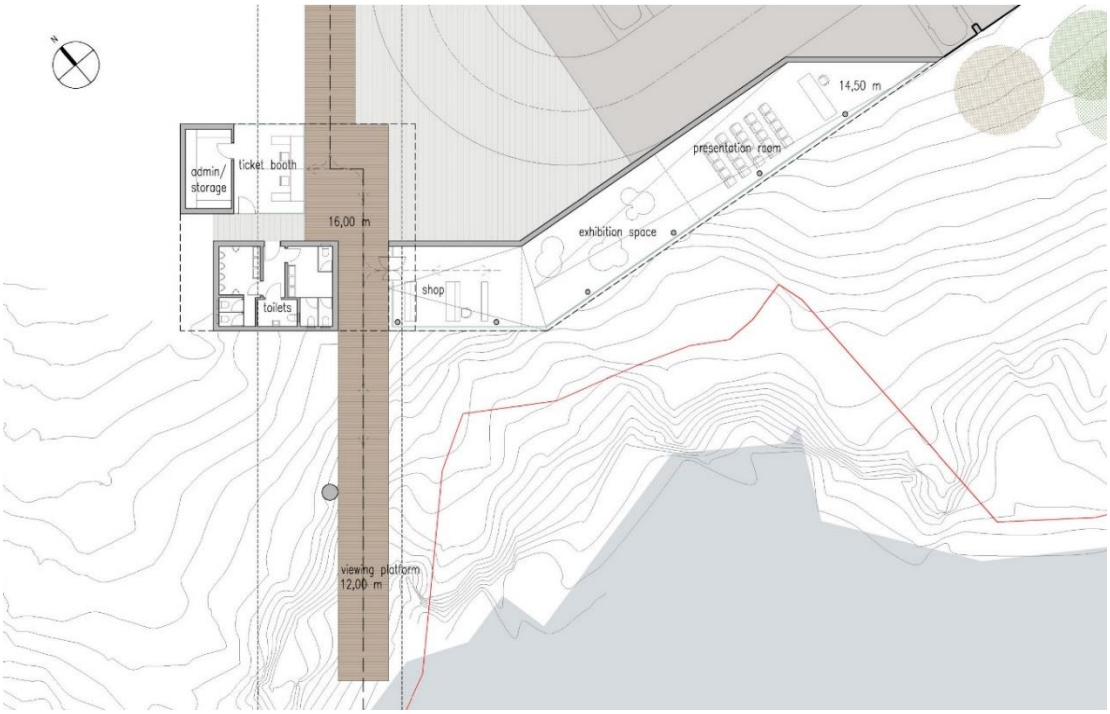


Plate 3.18 Option 3 architectural floor plan

The key architectural precedent for this option is the Trollstigen Visitor Centre, Norway by Reiulf Ramstad Arkitekter.

Plate 3.19 Trollstigen Visitor Centre by Reiulf Ramstad Arkitekter

Plate 3.20 Trollstigen Visitor Centre by Reiulf Ramstad Arkitekter

Structural Considerations

This heading pertains to structural considerations specific to Options 3 and 3A. The superstructure will most likely be RC piers and unbraced structural steelwork. There is a significant amount of glazing to the south facing façade of the visitor centre with the building lateral stability provide by the rear RC concrete wall and RC roof slab supported off the RC columns. Lateral stability for the entrance/ticket booth to be provided by RC walls to the toilet block and admin/storage room. The glazed facades will require access for maintenance. This difficulty can be addressed on the sea facing sides by the provision of a suitable safe access strip provided externally to relevant perimeters.

Car Park

The Option 3 proposal is conceived as a scaled-down version of Option 2, incorporating a broadly flat carpark that includes 100 spaces for cars and a bus bay. Negative seaward visual impact will be mitigated against through the use of 'ha-ha' screen walls which are intended to be expressed as a continuation of the visitor centre elevation.

3.5.3.6 Architectural Design Option 3a

Following the publication of the Options Report in December 2018, further design development took place as feedback from Cork County Council was taken on board by the architects and the designs were refined, leading to the development of option 3a.

Following review of Option 1a, it was felt that the undercroft-type solution posed to many constraints on visitor movement and access due to the level change, and so it was decided to take another look at Option 3, which was similar in layout but for the visitor centre being located at carpark level rather than undercroft level. This option can thus be understood as an amalgamation of Option 3 and Option 1a. The landing platform remains located immediately south-east of the existing station. However, the

ground is excavated to lower the platforms level so that they can be accessed by ramp and the need for a mechanical lift is eliminated. A visitor centre is positioned in a wide and shallow linear building between the carpark and the water's edge to maximise views to sea and help to screen the carpark from view when seen from the island. The floor area is enlarged to 440m^2. The carpark is conceived as a two-phase development, which can start by optimising the existing carpark plateau only and avoid excessive landforming, with a future 2nd phase possible by terracing the carpark into the rising land to the northeast. A key concept of Option 1a is the embracing of the existing 'Garinish loop walking trail' which crosses the site, by providing a boardwalk across the waterfront of the building to ensure continuity of the trail. This boardwalk would double as a spill-out area for the visitor centre.

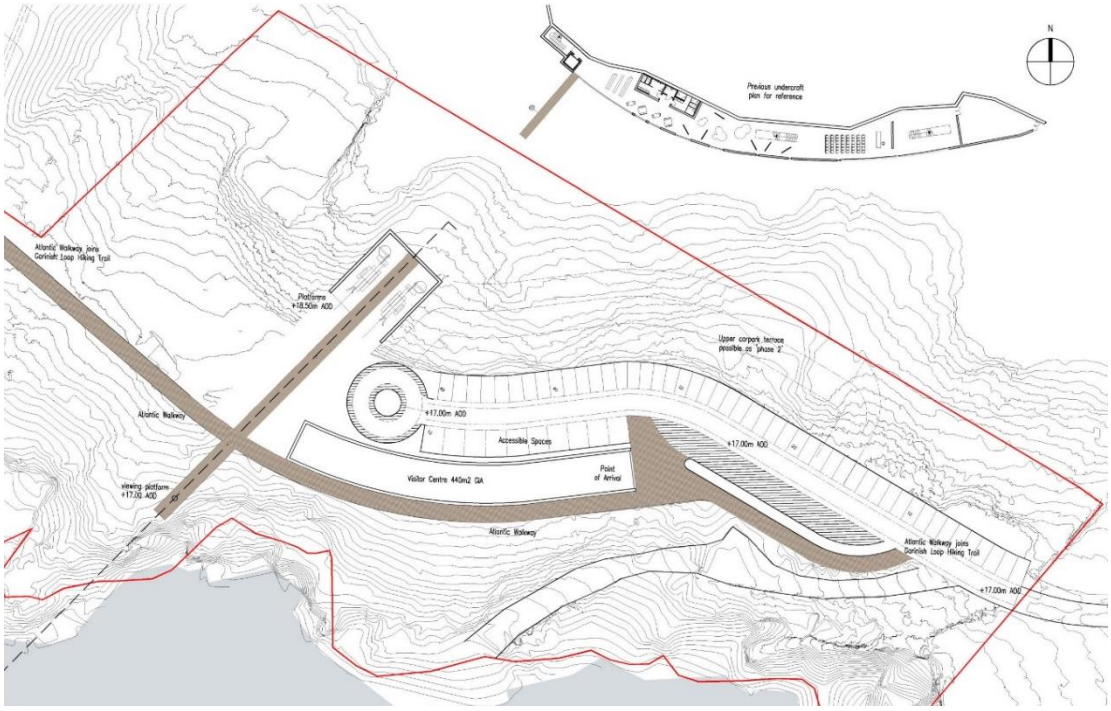


Plate 3.21 Option 3a architectural site plan showing 'phase 1' carpark

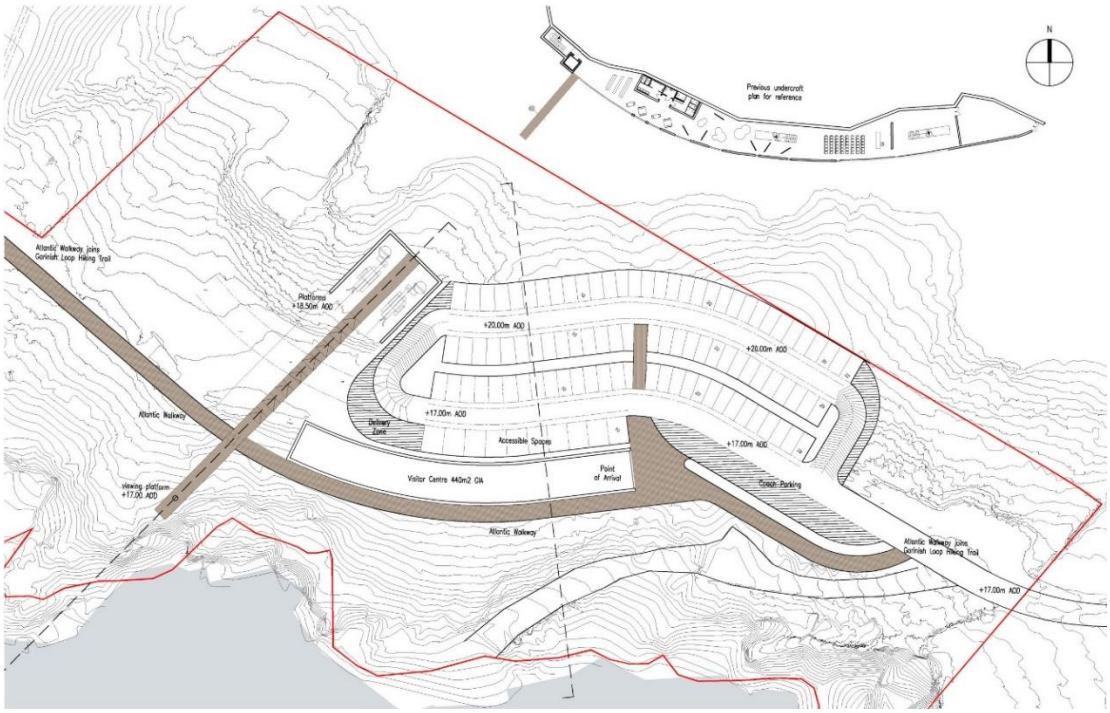


Plate 3.22 Option 3a architectural site plan showing 'phase 2' carpark

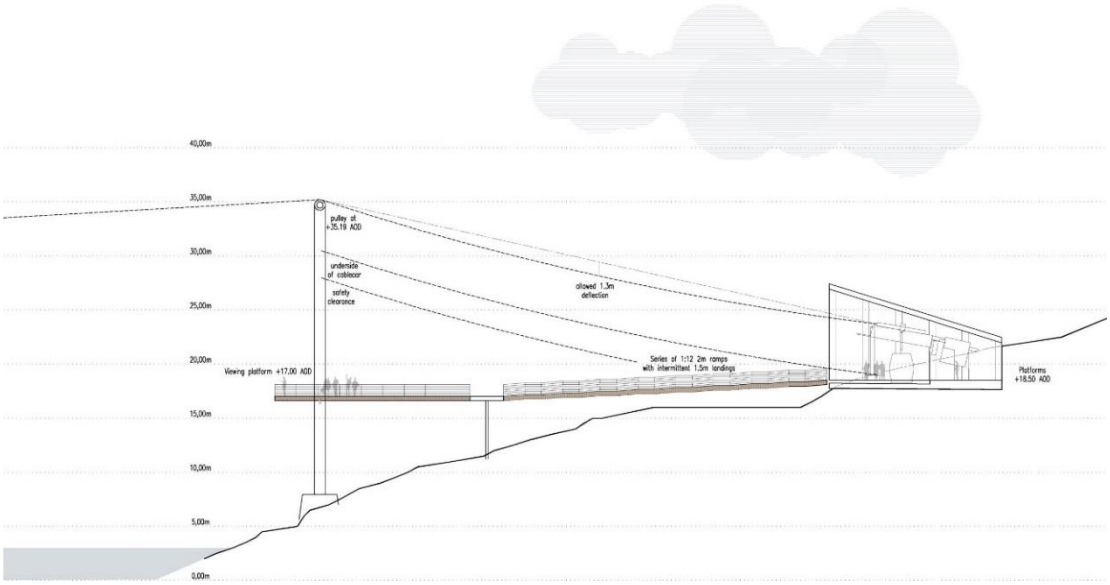


Plate 3.23 Option 3a architectural section showing ramped access to station platforms

3.5.3.7 Architectural Design Option 3b

Following review of Option 3a, it was felt that there was too much of a disconnect between the mainland station and the Visitor Centre, and so that the visitor centre building ought to be extended to the west to control the 'axis' between the boardwalk and the gangway leading to the cablecar platforms. There was also the view expressed that vehicle access to the rear of the cablecar station would be necessary for deliveries / servicing, and that plant spaces should be located to the rear of the cablecar station also. As a result, Option 3b builds on Option 3a and proposes a new block of accommodation on this axis point, and a new service yard to the rear of the cablecar platforms accessed from the upper terrace of the carpark. The proposal now is three distinct elements; the cablecar station/service yard; the long and slim

interpretative exhibition/visitor centre building; and the café/shop building in between. All three buildings are interconnected with ramped access, eliminating the need for mechanical elevators. The only staircase is located in the exhibition building and leads to basement WCs. The building bisects the site and the area west of the visitor centre is intended to be 're-naturalised' to return to heath land and native flora, which could have some external interpretative materials (sculptures) and play equipment for visiting children.

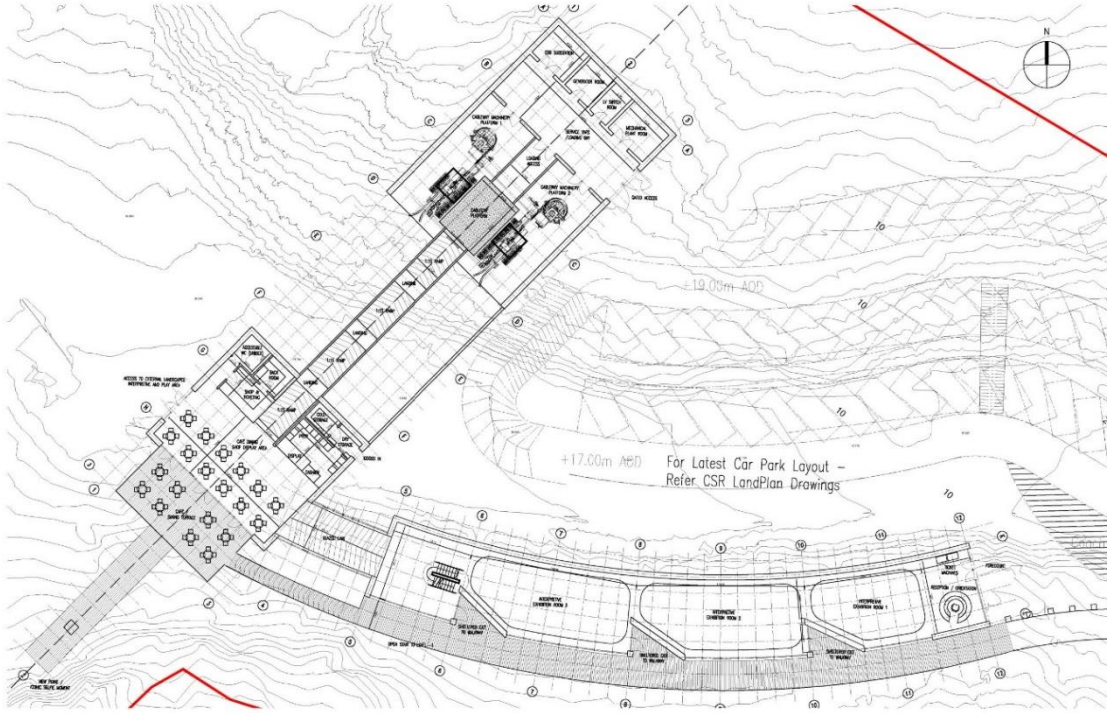


Plate 3.24 Option 3b architectural ground floor plan

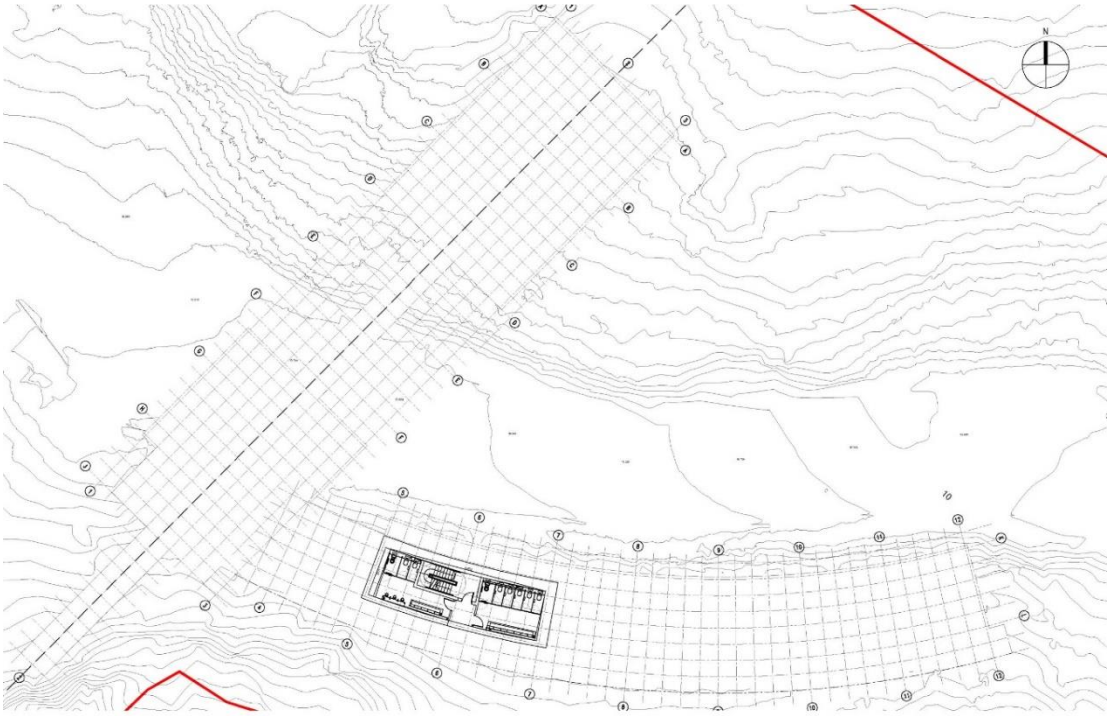


Plate 3.25 Option 3b architectural basement plan

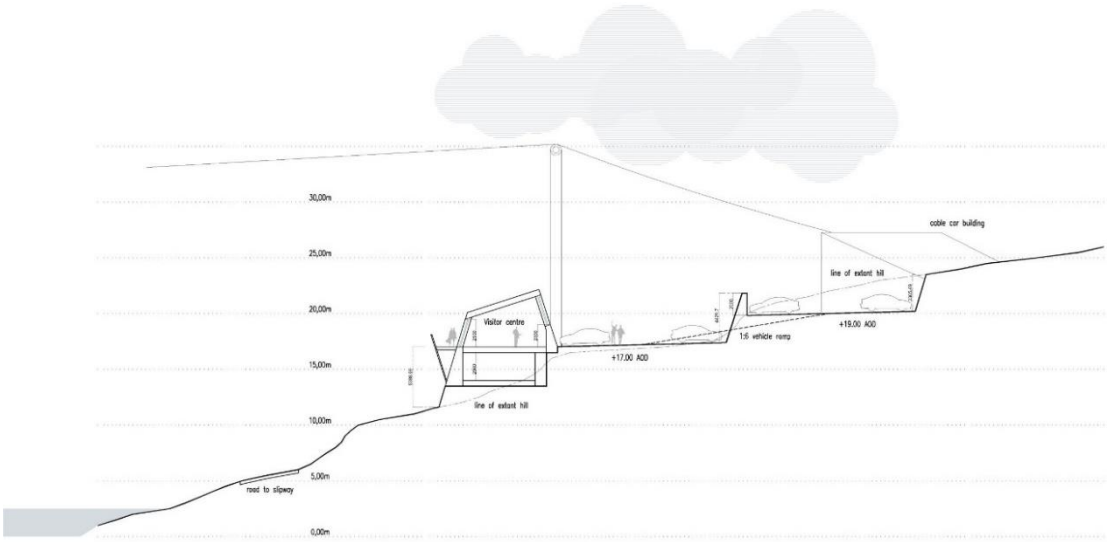


Plate 3.26 Option 3b architectural section showing the terracing of the carpark

3.5.3.8 Architectural Design Option 3c

Following review of Option 3b, it was felt that the café building at the axis between the interpretative exhibition building and the station building was too busy and represented a 'pinch point' in the overall visitor flow diagram. It was also considered that the overall building footprint had grown too large again, and that the interpretative exhibition building in particular was too large. At this time, it also came to light that the Cork County Council was required to provide a Right of Way to a third party across the site to the western extremity of site for farming-related activities including herding sheep and operating a tractor. This right of way was now in conflict with the ramped access link between the café/shop building and the cablecar platforms building which previously bisected the site. In light of this new information STW formed the view that the cablecar platforms location was no longer viable and needed to be relocated to be level to the arrival/carpark level, and forward of the Right of Way route to prevent crossing. This view gained client support and resulted in a reworked version of Option 3b where the café/shop building was deleted and replaced with the cablecar platform building; and the exhibition building was reworked to host the café and shop functions alongside the exhibition materials in the same footprint. This allowed the Right of Way to continue past behind the new buildings unimpeded, reduced the level changes within the building, reduced the building floor area, and simplified the visitor movement / flow within the buildings.

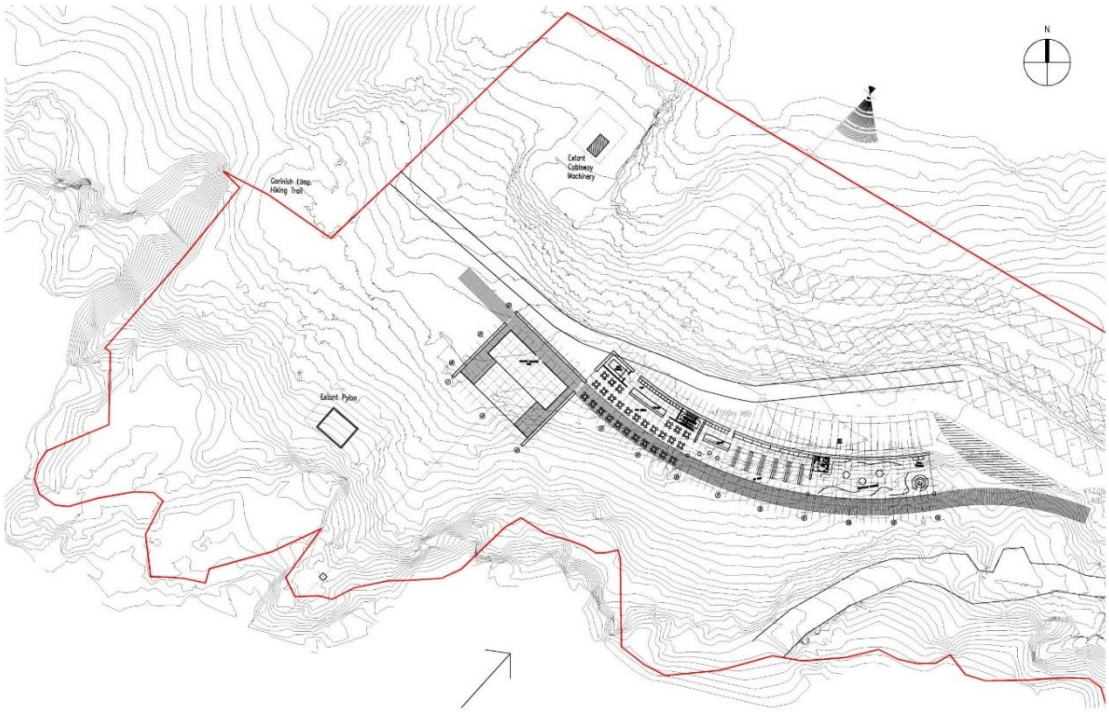


Plate 3.27 **Option 3c architectural site plan showing the line station platforms moved forward towards the water**

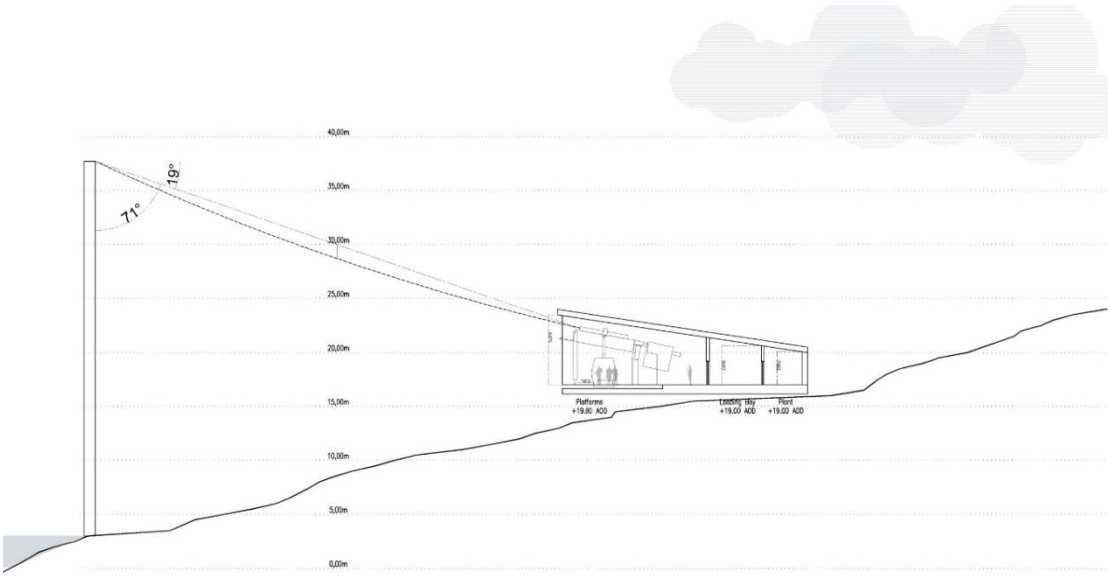


Plate 3.28 **Option 3c architectural section diagram showing the line station platforms at the forward and slightly lower position**

3.5.3.9 Architectural Design Option 3d

Following review of Option 3c, ROD expressed concern that the new cablecar platforms location would result in the location of the cableway pylon being too close to the water's edge. ROD suggested that the station move laterally to the northwest end of the site, where the landform would allow for the pylon to be located an adequate distance ahead of the cablecar platforms to achieve the necessary car uplift, while remaining an acceptable distance back from the water's edge. STW agreed to run with this compromise location. The distance between the agreed platform location and the established interpretative exhibition building location was now such that a single linear building was no longer logical, and so the design was amended to become

separated out into individual pavilion buildings between the two. This approach was signed off in March 2019 and formed the basis of the final proposed design.

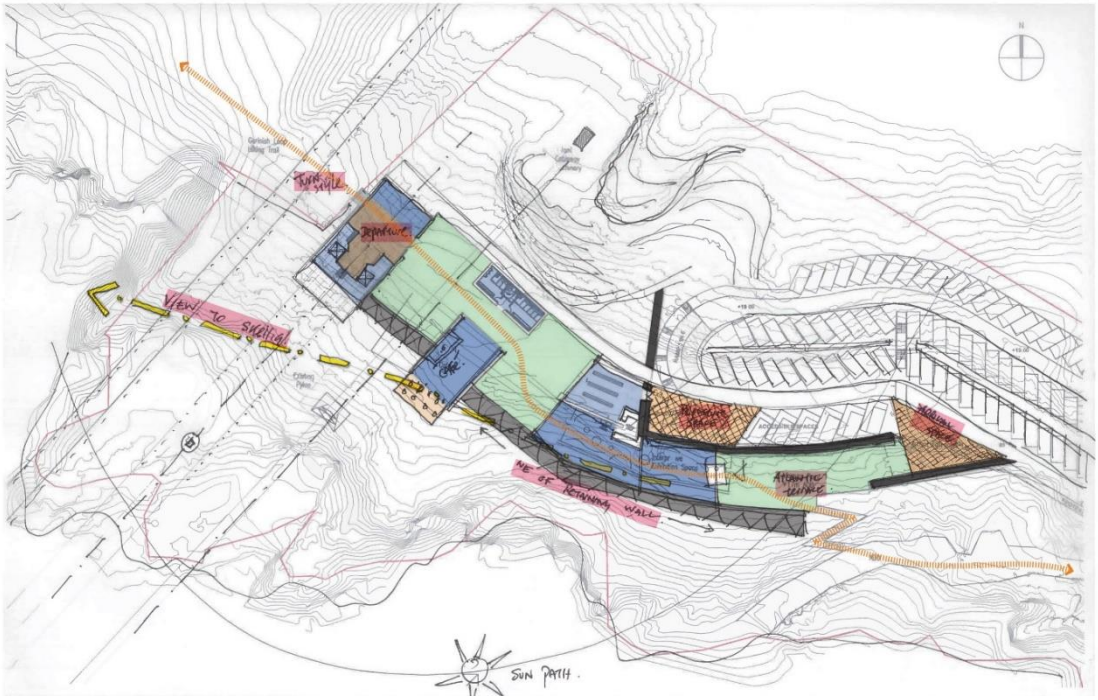


Plate 3.29 Option 3d architectural site plan hand drawing

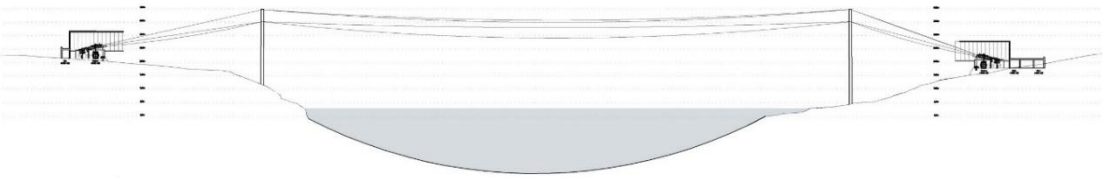


Plate 3.30 Option 3d architectural section across the Dursey Sound

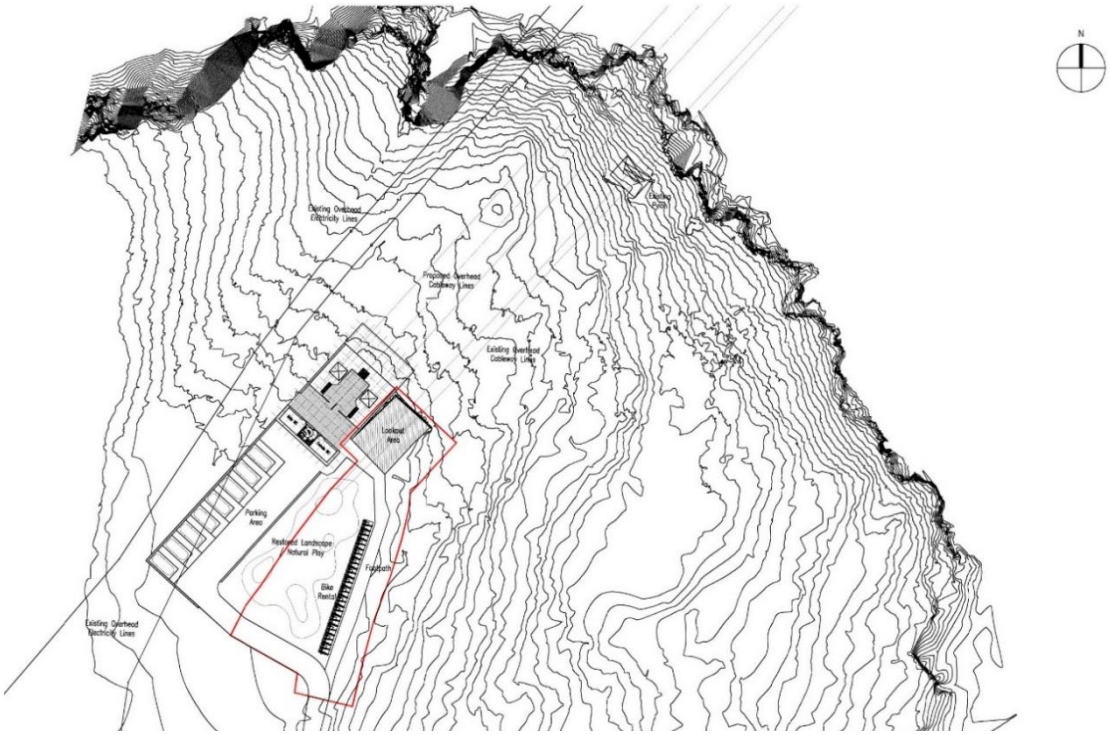


Plate 3.31 Option 3d – Architectural island-side site plan

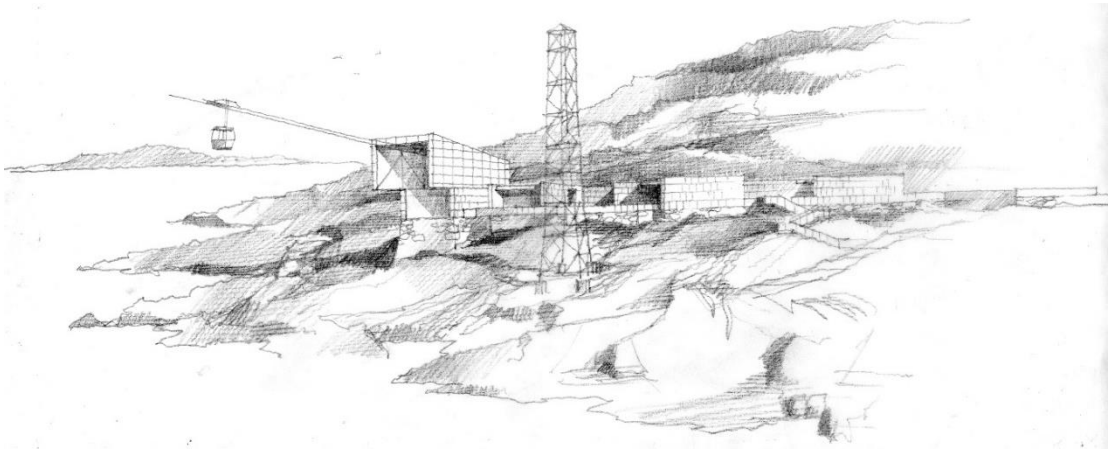


Plate 3.32 Option 3d – Artists' impression of the proposal

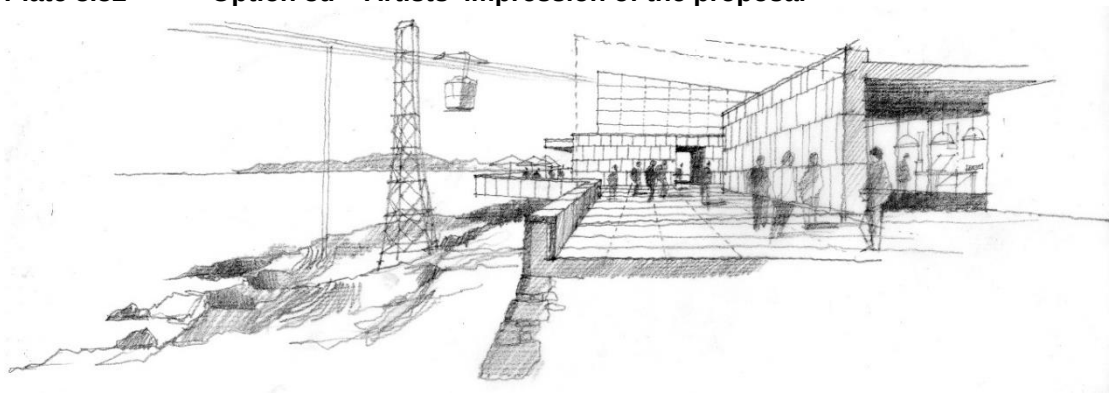


Plate 3.33 Option 3d – Artists' impression of the proposal

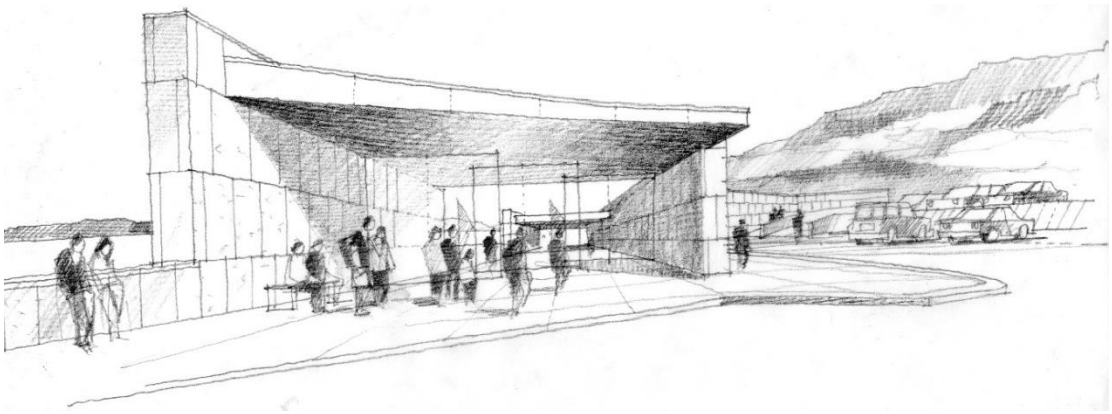


Plate 3.34 Option 3d – Artists' impression of the proposal

3.5.4 Overall Design Options

At Options Stage, five no. Overall Design Options were developed by combining options from the three option categories – Options 1, 2a, 2b, 3 and 3a. As is shown, based on the evaluation of the Cableway Technology Options, which concluded that Option 4, 'Reversible ropeway desynchronised' was the most suitable option for the proposed development, all five Overall Design Options use this Technology Option. What varies between the five options are (1) the alignment of the cableway, and (2) the architectural design and layout of the development. Following the issuance of the Options Report, Option 3a was refined to develop three further options – firstly, 3b; followed by 3c; and finally, 3d. All eight no. options are presented in Table 3.7.

Table 3.7 Overview of Overall Design Options, outlining the options from each option category that were selected for each

	Option 1	Option 2a	Option 2b	Option 3	Option 3a	Option 3b	Option 3c	Option 3d
Cableway Technology Option	4	4	4	4	4	4	4	4
Cableway Alignment Option	1	2	3	1	1	1	1	1
Architectural Design Option	1	2	2	3	3a	3b	3c	3d

3.6 Environmental Appraisal of Overall Design Options

In order to determine the most suitable option to advance, the Overall Design Options developed at Options Stage were appraised in a multi-criteria analysis (MCA) Since Options 3b, c and d were developed subsequent to the issuance of the Options Report, these options were not included in the MCA, which was completed at Options Stage. However, since 3b, c and d are derogations/variations on 3a, it is considered that they would have scored very similarly to Option 3a in all criteria of the MCA. The MCA evaluated the Options with respect to the following criteria:

- Environmental merit
- Aesthetic merit
- Technical merit

- Buildability and disruption impact during construction
- Durability and maintenance requirements
- Capital construction costs
- Economic viability
- Project risk

A summary of the environmental appraisal of each option is presented in this section. In order to assess the environmental merit of each option, the risk posed by each option to 9 no. environmental criteria was estimated. These environmental criteria are as follows:

(i) Biodiversity
(ii) Soils and Geology
(iii) Hydrogeology
(iv) Hydrology
(v) Landscape and Visual Amenity
(vi) Noise and Vibration
(vii) Air Quality and Climate
(viii) Archaeology, Architecture and Cultural Heritage
(ix) Population, Human Health and Material Assets

3.6.1 General

3.6.1.1 Biodiversity

All options are situated within the Beara Peninsula SPA, although they pose various degrees of risk towards the Qualifying Interests of the area, as outlined for each option in turn, in the following sections.

3.6.1.2 Soils and Geology

Since there are no records of any landslide events in the study area, it is considered that the risk of such an event occurring is low for all options.

3.6.1.3 Hydrogeology

While the hydrogeological risk posed varies somewhat from option-to-option (as described in the following sections) it is considered that the risk posed by all options in this respect is low, provided mitigation measures and best practice guidelines are adhered to.

3.6.1.4 Hydrology

There is no risk of flooding associated with any of the proposed options.

3.6.1.5 Population, Human Health and Material Assets

It is considered that all options will have positive effects on the local community by creating new jobs and stimulating the local economy. The degree to which these benefits are felt, however, varies from option-to-option, as described in the following sections.

3.6.2 Option 1

3.6.2.1 Biodiversity

This option will result in the largest area of habitat loss due to the scale of the footprint of proposed development. While this Option covers much of the area of existing hard surface, it will also extend into the grassland/heath mosaic to the north of the existing car park and this would necessitate the translocation of grassland habitat supporting the protected plant species, betony (*Betonica officinalis*). Loss of such habitat may have adverse effects on populations of chough (*Pyrrhocorax pyrrhocorax*) and fulmar (*Fulmarus glacialis*). It is envisaged that the grassland habitat could be salvaged and subsequently reinstated in the landscaping of the proposed development. This would require translocation by licenced National Parks and Wildlife Service personnel. This Option would not entail any works *within* the Kenmare River SAC, although suitable preventative and mitigating measures would have to be employed during the construction phase to address the possibility of run-off of polluted water from the construction site into the adjacent SAC.

For these reasons, Option 1 has been ranked as the 2nd most preferred option in terms of biodiversity.

3.6.2.2 Soils and Geology

Because this option has the footprint with the greatest area, it will necessitate the greatest amount of earthworks (excavation, rock-breaking, and movement of soil and rock), and will also require the greatest volume of imported materials.

For these reasons, Option 1 has been ranked as the least preferred option in terms of soils and geology.

3.6.2.3 Hydrogeology

As described in the previous section, this option entails the most substantial earthworks of all five. It is also considered to pose the greatest risk in terms of groundwater pollution. However, this risk is small and, provided mitigation measures and best practice guidelines are adhered to, it is unlikely that the hydrogeological regime of the study area will be negatively affected.

For these reasons, Option 1 has been ranked as the least preferred option in terms of hydrogeology.

3.6.2.4 Hydrology

In the design and layout of this option, similarly to the existing cableway, both landing points are located at a distance from the Kenmare River SAC (i.e. the sea) and this reduces the risk of pollution relative to other options. However, this large-scale option is likely to attract the highest number of visitors and will, therefore, place the greatest demand on the on-site wastewater treatment system, thereby increasing the risk of effluent entering the adjacent SAC.

For these reasons, Option 1 has been ranked as the intermediate preferred option in terms of hydrology.

3.6.2.5 Landscape and Visual Amenity

In this option, although the design of the proposed development is to a much higher specification than that of the existing site, the layout of the proposed development is similar to that of the existing site, with the exception of the car park, which will be much larger than its extant equivalent, and the visitor centre, which will be at a similar level to that of the existing car park. The large car park has the potential to negatively affect

views from elevated locations in close proximity to the site (i.e. the approach road, the cableway, and the Beara-Breifne Way walking trail to the east of the site). The structures of the proposed development will have localised adverse effect on the landscape character. The enlarged car park, for instance, has the potential to encroach upon rock outcrops to the north of the site.

Potential negative landscape effects would include some effects on the fabric of the landscape due to the construction of the building, car park and associated works, but the land is generally level and the effects are expected to be minor. The introduction of visitor facilities integrated with the station building, on a remote and isolated island, are likely to have a localised effect on the isolated and tranquil character of the island. This may be perceived by some as negative, and others as positive. However, the wider landscape character of Dursey Island is not expected to be affected. The visitor centre green roof, the 'ha-ha' wall surrounding the carpark, the use of high quality construction materials, and soft landscaping will mitigate to some degree against adverse visual impacts.

In fact, it is considered that, overall, Option 1 would have neutral to positive effects on landscape and visual amenity, since the design in question constitutes a substantial improvement from the appearance of the existing cableway site.

3.6.2.6 Noise and Vibration

Due to the scale of the proposal, Option 1 is expected to be associated with the highest levels of noise and vibration during the construction phase. Due to its size and capacity, this option is also likely to result in the highest visitor numbers and, as a result, the greatest noise levels during the operational phase.

For these reasons, Option 1 has been ranked as the least preferred option in terms of noise and vibration.

3.6.2.7 Air Quality and Climate

Due to the scale of the proposal, Option 1 is expected to be associated with the greatest emissions of air pollutants and greenhouse gases during the construction phase. Due to its size and capacity, this option is also likely to result in the highest visitor numbers and, as a result, the greatest vehicular emissions of all five options.

For these reasons, Option 1 has been ranked as the least preferred option in terms of air quality and climate.

3.6.2.8 Archaeology, Architecture and Cultural Heritage

While Option 1 has the largest footprint of all five options, it is not situated in close proximity to any recorded sites of archaeological or architectural interest. Therefore, Option 1 is not of archaeological or architectural heritage concern and is considered the intermediate preferred option in this respect.

3.6.2.9 Population, Human Health and Material Assets

Because of its scale, Option 1 is likely to give rise to the most noise pollution, air pollution and traffic congestion (during both construction and operation) and these factors have the potential to cause some nuisance locally. In this sense, Option 1 is the least preferred option.

However, during the operational phase, Option 1 (because of its scale) is considered to be the most beneficial option in terms of regional economic and infrastructural development. By increasing tourist numbers at the site, the proposed development will boost local economic growth, create jobs, and improve local water,

telecommunications and transport infrastructure. In this respect, Option 1 is the preferred option during operation due to the magnitude of benefits.

As the benefits associated with the operation of the proposed development outweigh any nuisance during the construction/operation phase, Option 1 has been ranked as the 1st preference in terms of population and human health.

3.6.3 Option 2a/2b

3.6.3.1 Biodiversity

Option 2a will result in the development footprint extending into the Kenmare River SAC on both the mainland and island sites. The following protected habitats and species, which are Qualifying Interests of the SAC, are present at both locations, and may be negatively affected by the proposed development:

- Reefs [1170]
- Submerged or partially submerged sea caves [8330]
- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]
- Otter (*Lutra lutra*) [1355]
- Harbour seal (*Phoca vitulina*) [1365]

Option 2b, which has the same architectural design and layout as Option 2a, but has a different cableway alignment, will fall within the Kenmare River SAC on the mainland side of the site only, but would also carry the risk of negatively effecting these Qualifying Interests.

Based on the findings of a preliminary betony survey, it would appear that the footprints of both Options 2a and 2b would avoid locations where the protected plant species is present, thereby eliminating the need for translocation.

The footprint of the proposed car park for this option is predominantly confined to the existing car park and adjacent disturbed ground. While some amount of heathland habitat will be lost to the construction of the new car park, the loss will be less than that accrued under Option 1.

In terms of biodiversity, Option 2a has been ranked as the 4th preference, while Option 2b has been ranked 3rd.

3.6.3.2 Soils and Geology

As Options 2a and 2b incorporate the provision of towers, there are substantial less earthworks associated with these options compared to Option 1.

For this reason, Options 2a, 2b, 3 and 3a have been ranked jointly as the preferred options in terms of soils and geology.

3.6.3.3 Hydrogeology

As Options 2a and 2b incorporate the provision of towers, there are substantially less earthworks associated with these options compared to Option 1.

For this reason, Options 2a, 2b, 3 and 3a have been ranked jointly as the preferred options in terms of hydrogeology.

3.6.3.4 Hydrology

Because of its close proximity to the Kenmare River SAC (i.e. the sea) at both the island and mainland side of the site, Option 2a poses the greatest risk of aquatic pollution in the SAC during construction and operation. Additionally, of all options, 2a will bring the greatest number of visitors within very close proximity to the SAC, increasing the risk of littering in the protected area.

Option 2b poses somewhat less of a risk in this respect, since it is immediately adjacent to the SAC on the mainland side only. This risk, however, is still greater than that associated with Options 1 or 3/3a.

Accordingly, in terms of hydrology, Option 2a has been ranked as the least preferred option, while 2b has been ranked as the second least preferred option.

3.6.3.5 Landscape and Visual Amenity

Like Option 1, Options 2a and 2b will have visual impacts on views, particularly those from elevated sites overlooking the development (i.e. approach road, cableway and Beara-Breifne Way walking trail to east). The height of the tower associated with these options, however, is likely to result in visual impacts accruing over a greater area, since the development will be visible from further afield. The car park of Options 2a/2b will be better integrated into the natural contours of the landscape than those of Options 1 or 3 (although it is larger than that of Option 3). Nevertheless, the car park is still likely to be visually prominent. The use of landscaping, high quality material and the 'ha-ha' wall surrounding the car park will mitigate to some degree against adverse visual impacts.

3.6.3.6 Noise and Vibration

Due to the intermediate scale of the proposals, Options 2a and 2b are expected to be associated with slightly increased noise and vibration during construction and operation relative to Options 3/3a and are, therefore, considered to be intermediate preferred options in terms of noise and vibration.

3.6.3.7 Air Quality and Climate

Due to the intermediate scale of the proposals, Options 2a and 2b are expected to be associated with slightly increased air pollutant and greenhouse gas emissions during construction and operation relative to Options 3/3a and are, therefore, considered to be intermediate preferred options in terms of air quality and climate.

3.6.3.8 Archaeology, Architecture and Cultural Heritage

Because of the proximity of the proposed island station (adjacent to the existing slipway) to a cluster of archaeological sites immediately south of the existing island station (described in Section 3.3.1), Option 2a is considered the least preferred option of all five in terms of archaeology, architecture and cultural heritage.

Option 2b does not pose a known risk in this respect. Its landing point on the island (adjacent to the existing landing point) is of sufficient distance from recorded sites of archaeological, architectural and cultural heritage interest to pose any concern.

3.6.3.9 Population, Human Health and Material Assets

Options 2a, 2b and 3 are jointly ranked as the most preferred options in terms of disturbance during construction as they entail the least nuisance due to noise pollution, air pollution and traffic congestion. Because of their intermediate scale, Options 2a and 2b will bring intermediate benefits in terms of economic growth, job creation and infrastructural development.

3.6.4 Option 3/3a

3.6.4.1 Biodiversity

Option 3 and, to a lesser extent, 3a have the smallest footprints of development of all options, with no elements extending directly into the Kenmare River SAC. The cableway alignment associated with this option will result in cableway infrastructure extending into the grassland habitats where betony is known to occur, necessitating the translocation of plants under licence. The associated car parks, which are the smallest of all options, will bring about the least loss of area of acid grassland and dry heath habitat. As a result, these options are likely to have the least adverse effects on the conservation status of chough and fulmar, Qualifying Interests of the Beara Peninsula SPA.

For these reasons, Options 3 and 3a have been ranked jointly as 1st preference in terms of biodiversity.

3.6.4.2 Soils and Geology

By virtue of their intermediate to small footprints and the relatively minimal earthworks associated with them, Options 3, 3a, 2a and 2b have been jointly ranked as the most preferred options in terms of soils and geology.

3.6.4.3 Hydrogeology

By virtue of their intermediate to small footprints and the relatively minimal earthworks associated with them, Options 3, 3a, 2a and 2b have been ranked jointly as the most preferred options in terms of hydrogeology.

3.6.4.4 Hydrology

Unlike Options 2a/2b, much of the proposed development set out in Options 3/3a is set at a distance from the seafront. Additionally, the footprints of development associated with these options – and therefore, the scale of construction works – are substantially lesser than those of Options 1, 2a or 2b. As such, there is a reduced risk of run-off of pollutants to sea and subsequent adverse effects in the Kenmare River SAC.

For this reason, Options 3 and 3a have been ranked jointly as the most preferred options in terms of hydrology.

3.6.4.5 Landscape and Visual Amenity

As with Options 1, 2a and 2b, visual effects of Options 3 and 3a will mostly accrue to views from elevated areas overlooking the site (i.e. approach road, cableway, and Beara-Breifne Way walking trail to east). The proposed developments of Options 3 and 3a will occupy a similar area to that of the existing site. The buildings and structures will be of much higher specifications and greater aesthetic merit than those of the existing cableway. Pylons, for instance, will be more compact and less visually imposing. The structures associated with Options 3 and 3a will be substantially smaller, less imposing than those of Options 1, 2a/b. Option 3a has the smallest car park of all five options. It will also be better aligned with the contours of the landscape than that of Option 3, although neither car park will be as well integrated into the landscape as that of Options 2a/b.

3.6.4.6 Noise and Vibration

Due to their relatively small scale, Options 3 and 3a are expected to be associated with the shortest and least intrusive construction phases. Increases in noise pollution, air pollution and traffic associated with these options are likely to be the least of all options,

thereby resulting in the least nuisance to local residents. Of the two options, it is considered that Option 3 will result in the least adverse effects of this nature.

For this reason, Option 3 and 3a have been ranked jointly as the most preferred option in terms of noise and vibration.

3.6.4.7 Air Quality and Climate

Because of their relatively small scale, Options 3 and 3a are expected to be associated with the shortest construction phases and the lowest numbers of site visitors during operation. It follows that they are likely to give rise to the least emissions of air pollutants and greenhouse gases of all options.

For this reason, Options 3/3a have been ranked as the most preferred options in terms of air quality and climate.

3.6.4.8 Archaeology, Architecture and Cultural Heritage

Because of their relatively small footprints and their distance from recorded archaeological sites, Options 3/3a have been ranked jointly as the most preferred options in terms of archaeology, architecture and cultural heritage.

3.6.4.9 Population, Human Health and Material Assets

It is considered that, due to their relatively small scale, Options 3/3a will result in the least benefits in terms of regional economic growth and job creation. However, Options 3 and 3a are likely to give rise to similarly low construction phase nuisance (due to noise pollution, air pollution and traffic) as Options 2a and 2b.

3.6.5 Options 3b/3c/3d

While, as discussed above, it is considered that Options 3b, c and d would have scored equally or very similarly to Option 3a in terms of the criteria applied in the MCA, 3d was considered to be the most preferred option by CCC, since it had the added benefits of (i) allowing vehicular access to the rear of the Cable Car, (ii) allowing the mainland pylon to be situated back from the high water mark, and (iii) facilitating maintenance of an existing right of way. Thus, the design option being put forward for the proposed development is Option 3d.

3.6.6 Summary and Conclusions

Table 3.8 Environmental impacts scoring system used in MCA of options

Environmental Impact Score	Description of Option
9 – 10	Preferred in 5+ environmental criteria
7 – 8	Preferred in 1 – 4 environmental criteria
5 – 6	Least preferred in 5+ environmental criteria
3 – 4	Least preferred in 7+ environmental criteria
0 – 2	Least preferred in all 9 criteria

Environmental impact scores were assigned to each option, according to the scoring system outlined in Table 3.8. Table 3.9 shows the results for all assessment criteria of the MCA of options. It shows that, in terms of environmental merit, the Overall Design Options were ranked as follows (where 1st is the option with the greatest environmental merit, and so on):

1st Option 3

2nd Option 3a and Option 2b

3rd Option 1

4th Option 2a

In spite of Option 3 being ranked as the option with the greatest environmental merit, the MCA found Option 3a to be preferable in terms of aesthetic and technical merit. It was also considered that Option 3a had greater economic viability. Option 2b, which ranked equally with 3a in terms of environmental merit, lost out to 3a in terms of buildability, durability, capital construction costs and overall project risk. Option 1 (which emerged as the second-best option overall) ranked low in terms of capital construction costs. It was considered that Option 2a was prohibitively expensive. It also ranked low in terms of buildability, durability, economic viability and overall project risk. For these reasons, Option 2a was ultimately ranked as the least preferred option overall in the MCA. Thus, Option 3a was ranked as the most preferred option overall in the MCA and has been selected as the option to advance for the proposed development.

Table 3.9 Results of Multi-criteria Analysis of options including all assessment criteria

Assessment Criteria	**Weighting**	**Scores**				
		Option 1	*Option 2a*	*Option 2b*	*Option 3*	*Option 3a*
Environmental merit	100%	7	6	8	9	8
Aesthetic merit	100%	8	9	8	7	8
Technical merit	100%	8	6	7	6	7
Buildability and disruption impact during construction	75%	8	4	5	9	9
Durability and maintenance requirements	100%	6	3	4	7	7
Capital construction costs	75%	4	0	3	7	6
Economic viability	100%	9	4	8	6	8
Project risk	100%	8	3	3	8	8
Assessment Score		58	35	46	59	61
Weighted Assessment Score		55	34	44	55	57
Rank		**2**	**5**	**4**	**2**	**1**

3.7 Design Development

Since the selection of Option 3A as the preferred option, the design has further evolved. The design has developed organically as well as variations arising from discussions with CCC's Project Steering Group, Failte Ireland and various scheme consultees. Feedback gathered via public consultation events has also shaped the final design. The most significant developments are summarised in the following sections.

3.7.1 Position of Mainland Station Building and New Cableway Alignment

A notable development in the mainland site layout stemmed from CCC's request to omit the two lifts from the proposed design. This request necessitated (1) relocation of the mainland station to lower ground closer to the sound i.e. to the middle of the existing carpark and (2) raising of the visitor centre so that it was level with the proposed carpark instead of the undercroft arrangement shown in Option 3A. Item (1) above had the knock-on affect of blocking access to the west end of the site. Consequently, it was decided to investigate an alternative alignment to the northwest of (but still parallel to) the existing cableway alignment. This new alignment was adopted following checks that sufficient clearance to the existing cableway and existing ESB overhead lines could be maintained (see Plate 3.35).

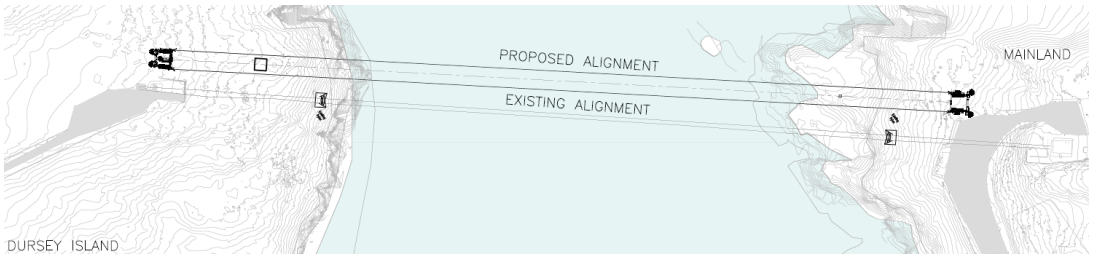


Plate 3.35 Map Illustrating Proposed Cableway Alignment

The new alignment necessitated the relocation of the mainland and island pylons and cableway stations.

3.7.2 Mainland Visitor Centre

A number of developments arose from meetings with Failte Ireland (FI) with regards to the design of the mainland site and in particular the layout of the visitor centre:

- Arrival – FI stressed the importance of having a central arrival point as a 'scene setter';
- FI asked that consideration be given to an 'Atlantic Terrace' in front of the café overlooking the Dursey Sound;
- Maximising the Atlantic views as a key part of the visitor experience/interpretation.
- FI asked that ROD give further consideration to avoiding congestion at the building entrance;

These comments lead to the addition of an arrival forecourt / terrace and a more open layout to avoid congestion.

Concerns expressed by CCC that the visitor centre was becoming too long and narrow were addressed by splitting the visitor centre into a number of smaller buildings i.e. separate exhibition space / gift shop, café and station building. This new segregated arrangement lent itself to the introduction of landscaped gardens to fill the interposing spaces.

Finally, liaison with CCC operations department resulted in additional storage space, extra office space and a service yard to the rear of the station building for deliveries.

3.7.3 Island Station Building

Following feedback from Failte Ireland it was agreed that the proposed building and associated facilities on the island would be reduced to essentials only, to minimize its environmental impact. Accordingly, the waiting area was reduced from a 40-seater

waiting lounge with welcome desk, to a relatively small waiting area with no seating or welcome desk, and reduced welfare facilities. It was decided to retain the existing small residents' car park on the island.

As a result of the change in the cableway alignment discussed above, the island station building and parking facilities were moved to the northwest side of the existing cableway.

3.7.4 Carpark

In order to achieve the number of parking spaces stipulated by the CCC project Steering Group it was decided to further extend the car park into high ground bordering the northern edge of the existing carpark. In addition, in order to minimize the additional rock-cut associated with this extension, and to avoid a vast visually monotonous car park, it was decided to provide the parking over two levels, a lower tier at grade (circa 17m AOD) and an upper tier at (19m AOD) connected by ramps with a gradient of 1 in 6.