Chapter 03

Alternatives Considered

Contents

Images

3. Alternatives Considered

3.1 Introduction

This chapter presents the alternative options of the Proposed Development that were considered prior to deciding upon the final Proposed Development design and presents an indication of the main reasons for selecting the current design.

A detailed options selection process for the Proposed Development was completed in accordance with the NTA Project Approval Guidelines (NTA, 2020), the Department of Transport Common Appraisal Framework Qualitative Appraisal Criteria (DoT, 2021) and Transport Infrastructure Ireland's Technical Approval Guidance (TII, 2019). Considering all of these requirements, a multi criteria assessment was completed to determine the preferred option which is now the design being considered. This chapter presents a summary of the options considered in this process.

For clarity, the Do-Nothing Scenario (i.e., a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline thereof without implementation of the Proposed Development, as far as natural changes from the baseline scenario can be assessed with reasonable effort, on the basis of the availability of environmental information and scientific knowledge) is provided in a number of chapters of the EIAR.

3.2 Legislative Framework

3.2.1 Background

Article 5(1)(d) of Directive 2011/92/EU, as amended by Directive 2014/52/EU ("the EIA Directive") requires that an EIAR contains *'a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and the main reasons for the option chosen, taking into account the effects of the project on the environment'*.

In addition, Annex IV to the EIA Directive provides that the EIAR shall include:

"A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."

In addition, given the proposed road development for which approval is sought in this instance, section 50(2)(b)(iv) of the Roads Act 1993, as amended ("the Roads Act") states that that the EIAR shall contain the following information:

"*…a description of the reasonable alternatives studied by the road authority or the Authority, as the case may be, which are relevant to the proposed road development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed road development on the environment*."

Section 50(2)(b)(vi) of the Roads Act also requires that "*any additional information specified in Annex IV* [as quoted above] *that is relevant to the specific characteristics of the particular proposed road development or type of proposed road development and to the environmental features likely to be affected*" also be included in the EIAR.

Thus, these are reasonable alternatives which are relevant to the project and its specific characteristics and must also indicate the main reasons for the option chosen taking into account the effects of the project on the environment and may relate to matters such as project design, technology, location, size and scale.

The amended EIA Directive requires that the environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the prescribed environmental factors which include:

- Population and human health;
- Biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
- Land, soil, water, air and climate;
- Material assets, cultural heritage and the landscape; and
- The interaction between the factors.

These prescribed factors in relation to the Proposed Development are considered in each of the relevant chapters of this EIAR, as appropriate.

This chapter of the EIAR has been prepared in accordance with the above legislative framework.

Moreover, it has similarly been prepared in accordance with a suite of guidance documents at national and European level aimed at assisting in the interpretation of the amended EIA Directive and the new transposing regulations as detailed in full below and pertaining to the assessment of alternatives that may be considered as reasonable.

3.2.2 Guidance documents

In carrying out an assessment of reasonable alternatives relevant to the Proposed Developments, a systematic and stringent approach has been adopted with a view to fulfilling the legislative obligations as described above and in order that the requirements therein are adhered to in full.

In this regard, consideration was given to a number of guidance documents in the preparation of this chapter of the EIAR, including the following:

- Department of Housing, Planning and Local Government (2018). Circular PL 05/2018 -Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive) And Revised Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment;
- Department of Housing, Planning, Community and Local Government (2017). Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems;
- Department of Housing, Planning, Community and Local Government (2017). Circular PL 1/2017 - Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on the Administrative Provisions in Advance of Transposition;
- Environmental Protection Agency (2022). Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- European Commission (2017). Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report; and
- Government of Ireland (2018). Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.

All such guidance and documentation have informed the assessment of reasonable alternatives as carried out and detailed in this chapter of the EIAR.

3.2.3 Examination of alternatives

Taking into account the above guidance framework, it is important to highlight what is underscored therein regarding the interpretation to be applied as to what constitutes a reasonable alternative in practice, the selection of alternatives in terms of feasibility and the requisite level of detail to be provided in the assessment of any reasonable alternatives to the Proposed Developments to be carried out.

There is limited European and national guidance on what constitutes a 'reasonable alternative'. It is noteworthy however, that the aforementioned European Commission guidance document (2017) states that reasonable alternatives:

"Reasonable Alternatives must be relevant to the proposed Project and its specific characteristics, and resources should only be spent assessing these Alternatives. In addition, the selection of Alternatives is limited in terms of feasibility. On the one hand, an Alternative should not be ruled out simply because it would cause inconvenience or cost to the Developer.

At the same time, if an Alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible Alternative… Ultimately, Alternatives have to be able to accomplish the objectives of the Project in a satisfactory manner, and should also be feasible in terms of technical, economic, political and other relevant criteria'.

The European Commission guidance also states that:

"The feasibility of the Alternatives proposed can be determined on a case-by-case basis. The final set of reasonable Alternatives identified will then undergo a detailed description and assessment in the EIA Report…. It should be noted that each Project and each EIA is different, and there can be no definitive list prescribing how Alternatives are to be identified and assessed….

In some cases, Alternatives will have been developed at the plan stage (e.g., a plan for the transport sector, a regional development plan, or a spatial plan) or by the Developer during the Project's initial design. In such cases, some Alternatives may have already been excluded, in which case, it would likely be unnecessary to consider them again".

Pursuant to the EPA guidance, the consideration of alternatives also needs to be cognisant of the fact that:

"in some instances some of the alternatives described below will not be applicable – e.g. there may be no relevant 'alternative location'…"

Taking the foregoing guidance and legislative framework into account, the alternatives in relation to this Proposed Development are considered in terms of a 'do-nothing' alternative (Section 3.3), alternative site locations (Section 3.4), alternative bridge alignments (Section 3.5), alternative structural options for the bridge (Section 3.6) and alternative structural options for the approach ramp structures (Section 3.7).

3.3 Do-Nothing Alternative

The 'Do-Nothing' alternative refers to what would happen if the Proposed Development was not implemented. As outlined in **Chapter 2**, *Background and Need for the Proposed Development* the need for the Proposed Development has been documented at a national, regional and local level to address the transport issues currently experienced in County Cork.

The 'Do-Nothing' alternative comprised an examination of the existing cycle and pedestrian infrastructure and its ability to meet future growth demands, in the absence of any upgrade works and additional infrastructure. The study found that the existing infrastructure and pedestrian crossing facilities in this area would have insufficient capacity to meet the growing demand for active transport modes in the future without further investment in dedicated pedestrian and cycle infrastructure.

In this instance, the 'Do-Nothing' alternative would miss the opportunity to provide dedicated and safe pedestrian and cycle infrastructure linking busy commuters and residents to the industrial park, natural amenities and the Little Island train station.

The assessment for the 'Do-Nothing' alternative concluded that:

- Key objectives of the Little Island Transport Strategy (CCC, 2018; 2019) which identify improvements for the pedestrian and cycle network in Little Island, Cork would not be achieved;
- The existing infrastructure is not sufficient to cater for the predicted growth in pedestrian and cycle movements; and

- An opportunity to support the reduction of greenhouse gas emissions through promotion of sustainable transportation modes would be missed.

For these reasons, the 'Do-Nothing' alternative was not considered further.

3.4 Alternative Site Locations

As part of the background studies which informed the bridge options selection process and the environmental impact assessment of the preferred option, several potential bridge landing points were considered in the Little Island Sustainable Transport Interventions (LISTI) feasibility report – refer to **Image 3.1**.

These potential landing points were considered in the Little Island / Eastgate areas. Initial examination based on the locations of the options and their walking catchments resulted in two of these options being removed at an early stage; namely locations 1 and 4. For either of these locations to be viable, it was determined that it would require a relocation of the Little Island train station. Cork County Council held initial discussions with Irish Rail, during which the feasibility of relocating the station was discussed. Irish Rail indicated that it could be feasible to relocate the station, hence options 1 and 4 were considered. However, when comparing the advantages and disadvantages of relocating the train station against retaining its current location, it was considered that a relocation of the station would not provide sufficient benefits to justify the capital expenditure. Therefore, options 1 and 4 were not considered further at that stage for the feasibility report.

Landing locations 2 and 3 (refer to **Image 3.1**) were considered further through a bridge feasibility report and options selection report / structures options report, with the preferred bridge alignment and landing location subsequently selected based on a multi criteria assessment. These reports are included as **Appendix 3.1** and **Appendix 3.2**, respectively, in **Volume 4** of this EIAR.

Image 3.1: Landing options considered in the LISTI feasibility report

3.5 Bridge Alignments Options

The feasibility report and an options selection report / structures options report were prepared to identify key constraints associated with the development of a pedestrian and cyclist bridge in this location and to determine if a potential bridge is likely to be feasible. Three bridge alignment options were identified and assessed to determine the preferred option for the proposed crossing.

These alignment options consider the bridge spanning the existing N25 dual carriageway and existing Cork to Middleton railway with connectivity to the Little Island train station via ramped access west of the station and the Eastgate Business Park as per the LISTI options assessment landing points.

The three alignment options are discussed in detail below as well as identifying advantages and disadvantages for each.

3.5.1 Bridge Alignment Option 1

Alignment option 1 aims at keeping the proposed bridge as close as possible to the Little Island train station and the existing An Crompán / Little Island Interchange (N25 junction 2). The key considerations of this option have been outlined below.

The overall structure length is approximately 380m.

Advantages:

- Shortest distance from the Little Island train station; and
- Provides possibility for multi modal interchange at northern landing (rail, bus, cycling and pedestrian).

Disadvantages:

- Highest crossing over N25 due to raised off ramps leading to longer approach ramps than other options;
- Proposed landing point is not towards the Eastgate Business Park (which is the densest employment area). Poor pedestrian and cycle catchment and tie in to Eastgate Business Park from south. Some pedestrians may continue using An Crompán Bridge;
- Length of northern ramp required does not distinguish crossing location greatly from option 2. Due to the proposed location of the crossing, there may be difficulty achieving the length required for the northern habitat;
- Tree felling and site clearance required for northern and southern ramps, resulting in potential habitat disturbance;
- More difficult to construct and maintain southern ramp within wooded area; and
- Layout of northern ramp not preferred for cyclists.

Further to the feasibility assessment review of this option and further assessment at the options selection stage, this option was not deemed to meet the basis requirements of encouraging active travel between Little Island train station and Eastgate Business Park and environs, as it was deemed to be off the desire line and would not provide a significantly different route to that already available via An Crompán Bridge.

Additionally, following review of the topographical survey information and consultation with Transport Infrastructure Ireland (TII) and Irish Rail, it is clear that to achieve a sufficient ramp length on the northern approach, the main crossing location would be very similar to that of alignment option 2. In this case, there would not be an obvious advantage in terms of cost, buildability, statutory consents or desire lines for proceeding with alignment option 1 over alignment option 2. Therefore, alignment option 1 was not considered further.

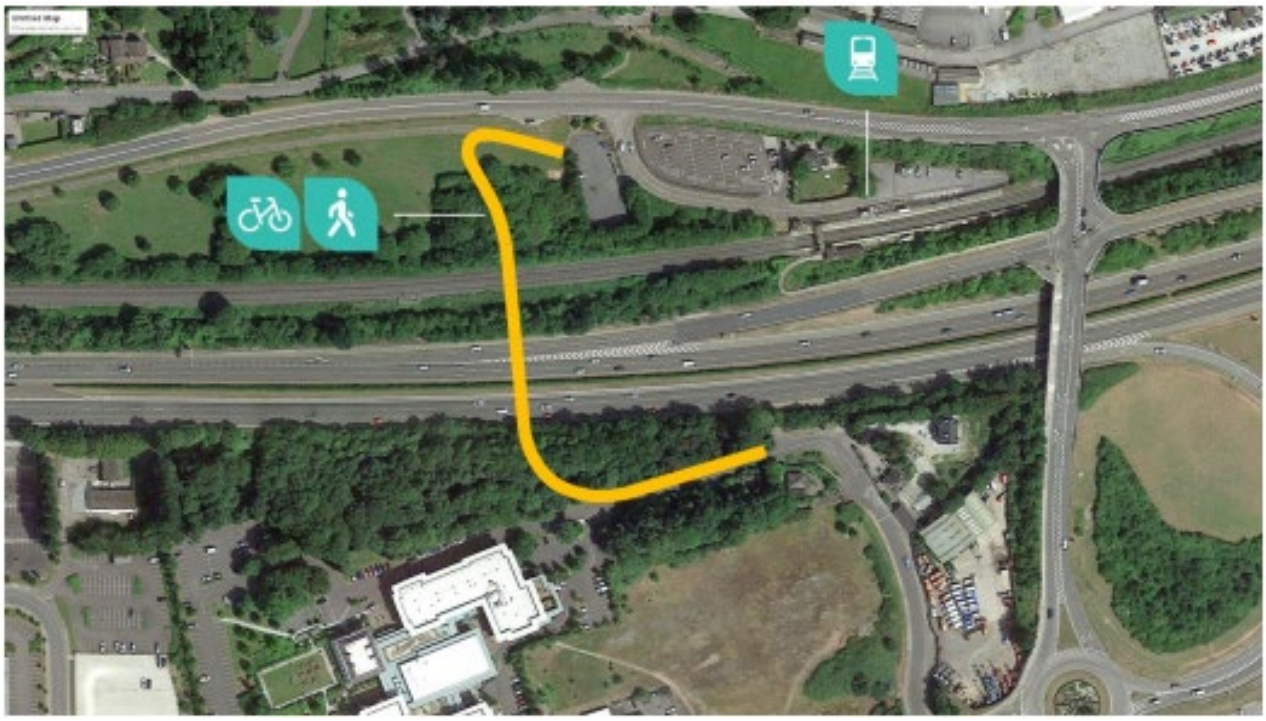

Image 3.2: Bridge alignment option 1

3.5.2 Bridge alignment option 2

Alignment option 2 moves further west from the Little Island train station. However, the landing point of the bridge is towards the hub of Eastgate Business Park. Due to the required length of ramps, the northern approach ramp still lands close to the Little Island train station. The key considerations of this option have been outlined below.

The overall structure length is approximately 350m.

Advantages:

- Landing points link Little Island train station to Eastgate Business Park, providing a better desire line;
- Has been positioned so as not to affect gantry sight lines i.e., does not require gantries to be moved;
- Shorter sections of straight ramps may aid in slowing cyclist speeds;
- Shortest overall structure length. Lower structure relative to option 1 over N25. Avoids rising section of N25 off ramp. Can potentially utilise higher length of cheaper embankment on southern approach;
- Least interference with internal Eastgate Business Park roads and infrastructure. Uses currently unused wooded area for southern approach instead;
- Not expected to require gantries to be moved; and
- Provides possibility for multi modal interchange at northern landing (rail, bus, cycling and pedestrian).

Disadvantages:

- Tree felling and site clearance required for southern ramp. Potential habitat disturbance;
- More difficult to construct and maintain southern ramp within wooded area;
- Secondary approach ramp / embankment required between Radisson Blu Hotel carpark and Eastgate Business Park; and
- Utility diversions may be necessary.

Image 3.3: Bridge alignment option 2

3.5.3 Bridge alignment option 3

Alignment option 3 is the furthest west of the options from the Little Island train station. However, the landing point of the bridge is towards the hub of Eastgate Business Park. The key considerations of this option have been outlined below.

The overall structure length is approximately 390m.

Advantages:

- Minimises tree felling and potential habitat disturbance;
- Access for construction will be easier; and
- Lower structure relative to option 1 over N25 as avoids rising section of N25 off ramp.

Disadvantages:

- Long straight southern ramp due to internal road crossing. Large amount of Eastgate Business Park land taken up along existing internal road, footway and cycle tracks which would require additional Compulsory Purchase Order (CPO);
- Landing points connect Eastgate Business Park to Little Island train station. However, the base of the northern ramp is approximately 170m from the station car park. This would lead to poorer connectivity;
- Located within gantry sight lines. Will likely need to relocate the cantilever gantry;
- Northern abutment and ramp close to existing Bord Gais Energy gas line. Utility diversion may be required;
- Bridge elevation obscured on eastern approach by portal gantry. Will affect aesthetics of the bridge, regardless of the bridge structural form;
- Southern ramp crossing Uisce Eireann premises which is currently in operation; and
- Straight ramps sections encourage faster cycling speeds.

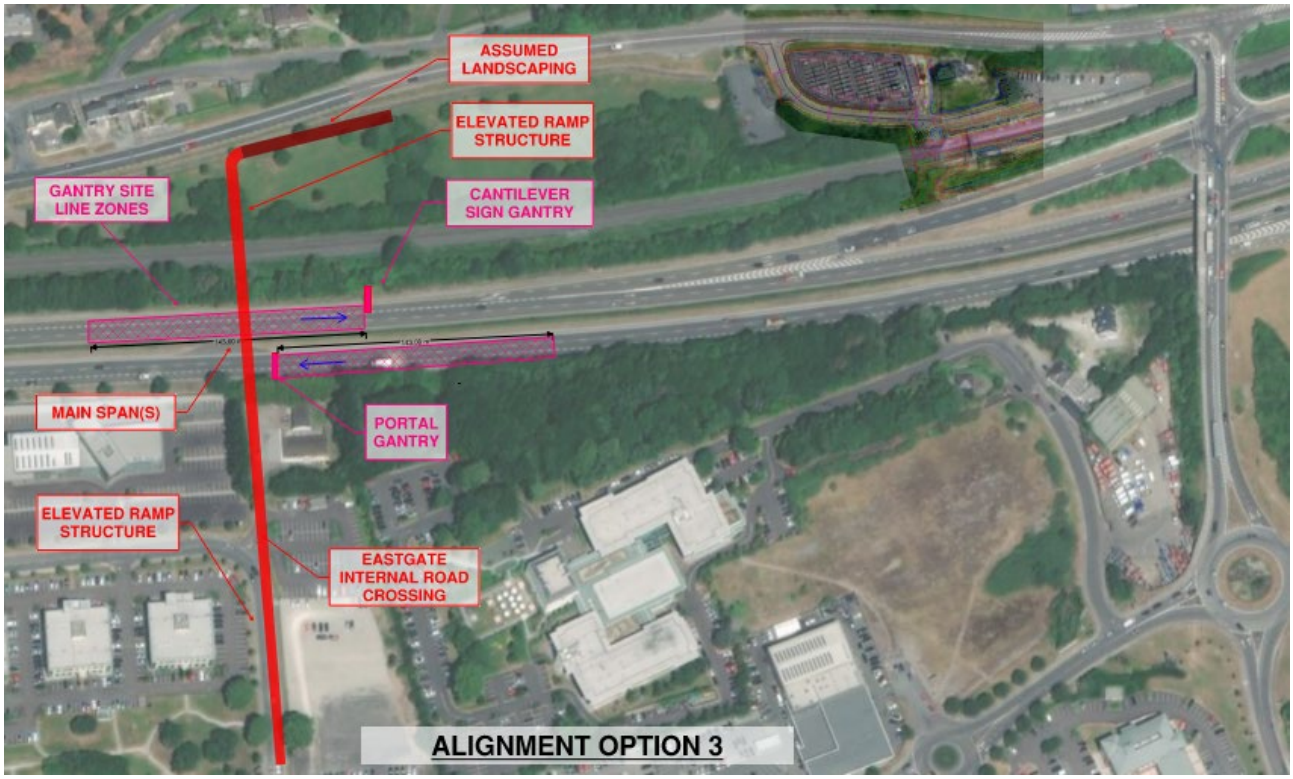

Image 3.4: Bridge alignment option 3

3.5.4 Preferred bridge alignment

Based on the assessments carried out in the feasibility report and the options selection report / structures options report, alignment option 2 (refer to **Image 3.3**) was taken forward as the preferred alignment option for consideration of bridge structural options. The primary distinguishing factors which lead to the selection of alignment option 2 are summarised below.

- This option presents the most direct route of options considered along the primary desire line from Little Island train station to Eastgate Business Park;
- The southern tie in of this option services the largest working population as per the Little Island Sustainable Transport Improvements Planning Report. This option also services the Radisson Blu Hotel directly through the intermediate landing near the existing car park area;
- This option is placed at the bottom of the east bound off ramp to minimise the vertical elevation of the bridge, while achieving the required clearances to the N25. This has an impact on minimising the length of ramping and the overall environmental impact on the area;
- This option minimises disruption to existing developments, for example the Uisce Eireann building to the south of the N25. It also allows for tie in on the north and south which do not cross other roads, thereby minimising the overall ramp length;
- This option can tie in with proposed LISTI works in the Eastgate Business Park without disrupting current proposals; and
- This option provides sufficient distance to the east of the existing TII Variable Message Signs (VMS) gantries to ensure adequate recognition time of the existing portal gantry signage on the westbound approach.

All alignments options were considered for their environmental constraints and effects. All alignments were in a relatively small study area and were located a similar distance from environmental receptors. They also generally crossed the same obstacles, and all had effects on tree removal, in particular. All options were greater than 100m in length and therefore required the preparation and submission of an EIAR. This has been noted with further detail provided in the options selection report / structures options report as **Appendix 3.2** in **Volume 4** of this EIAR.

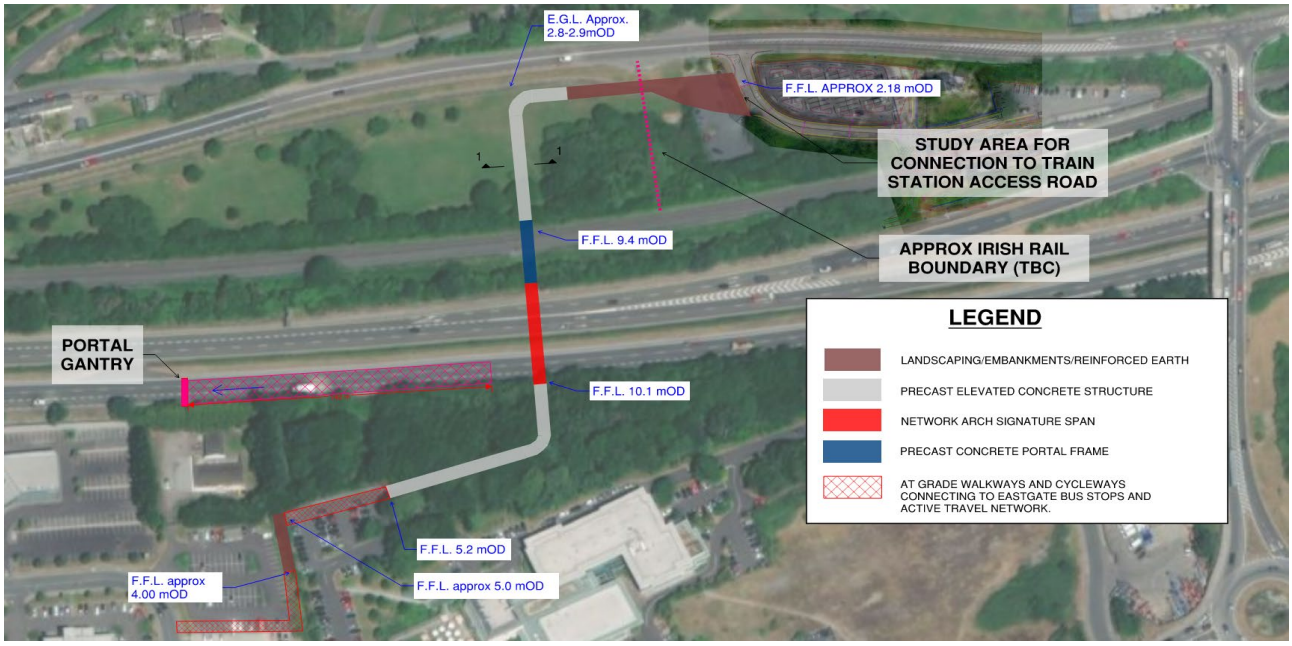

Image 3.5: Preferred alignment. Design for consideration further developed in planning drawings.

3.6 Structural Options for Bridge over Irish Rail Line and N25

Three potential bridge structure options over the N25 and Irish Rail line have been considered. The evaluation of options is limited to these spans only with the approach spans considered separately. A significant constraint is the constructability of the bridge and the need to construct the bridge quickly to avoid major traffic disruption. As a result, all options considered for the N25 bridge are assumed to be constructed off-site and installed over a weekend overnight road closure. The following bridge options were assessed in the structures options report (refer to **Appendix 3.2** in **Volume 4** of this EIAR) to identify the preferred option.

3.6.1 Bridge option 1 – single span steel through truss

Structural option 1 consists of a single span steel through truss structure crossing both the N25 and the Irish Rail line in a single span. The structure, shown in **Image 3.6**, is an arched steel Howe truss structure. The span of this structure will be approximately 82m. **Image 3.7** gives an indicative example of a similar structure, while **Image 3.8** gives an indicative example of a similar structure with a higher aesthetic quality.

Foundations for this option will be set back from the highway on the south of the N25 and to the north of the Irish Rail track. Foundations are anticipated to be of reinforced concrete piled construction.

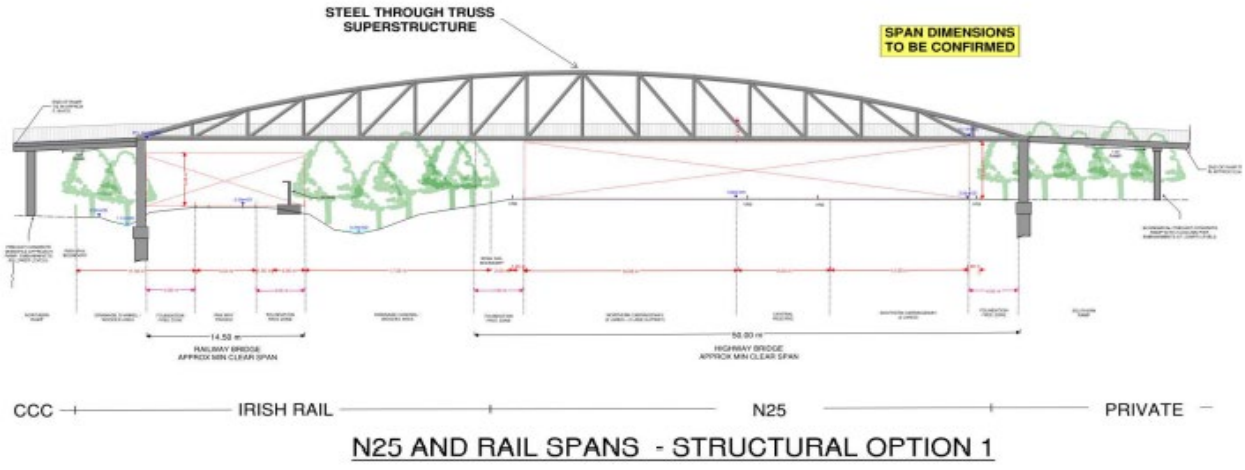

Image 3.6: Structural option 1 indicative elevation with N25 span, Irish Rail span start of approach ramps

Image 3.7: Example of through truss pedestrian and cycle bridge

3.6.2 Bridge option 2 – two span steel through truss

Structural option 2 consists of a 2-span steel through truss structure crossing the N25 and the Irish Rail line in separate spans. The structures shown in **Image 3.8** are arched steel Howe truss structures. The spans of these structures will be approximately 50m (N25) and 30m (Irish Rail).

Foundations for this option will be set back from the highway on both sides and to the north of the Irish Rail track. Foundations are anticipated to be of reinforced concrete piled construction.

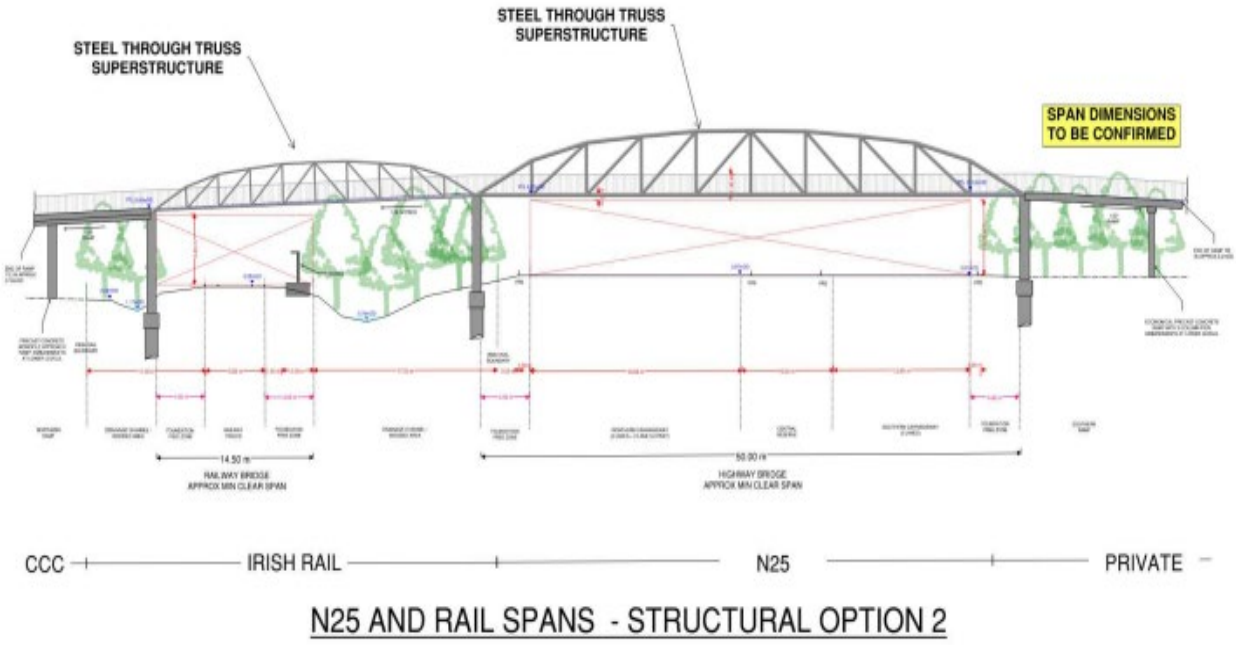

Image 3.8: Structural option 2 indicative elevation with N25 span, Irish Rail span start of approach ramps

Image 3.9: Example of multi span through truss footbridge structure

Image 3.10: Example of shorter span steel through truss over road

3.6.3 Bridge option 3 – steel network arch N25 span with reinforced concrete portal frame over rail

Structural option 3 consists of a single span steel network arch structure over the N25 and a 2-span precast segmental portal frame structure over the Irish Rail track and adjacent land to the south. The spans of these structures will be approximately 49m (N25) and 2x15m (Irish Rail).

Foundations for the N25 structure will be set back from the highway on both sides and are expected to be of reinforced concrete piled construction. Foundations for the portal frame structures are proposed to be within the Irish Rail land, as shown in **Image 3.11**.

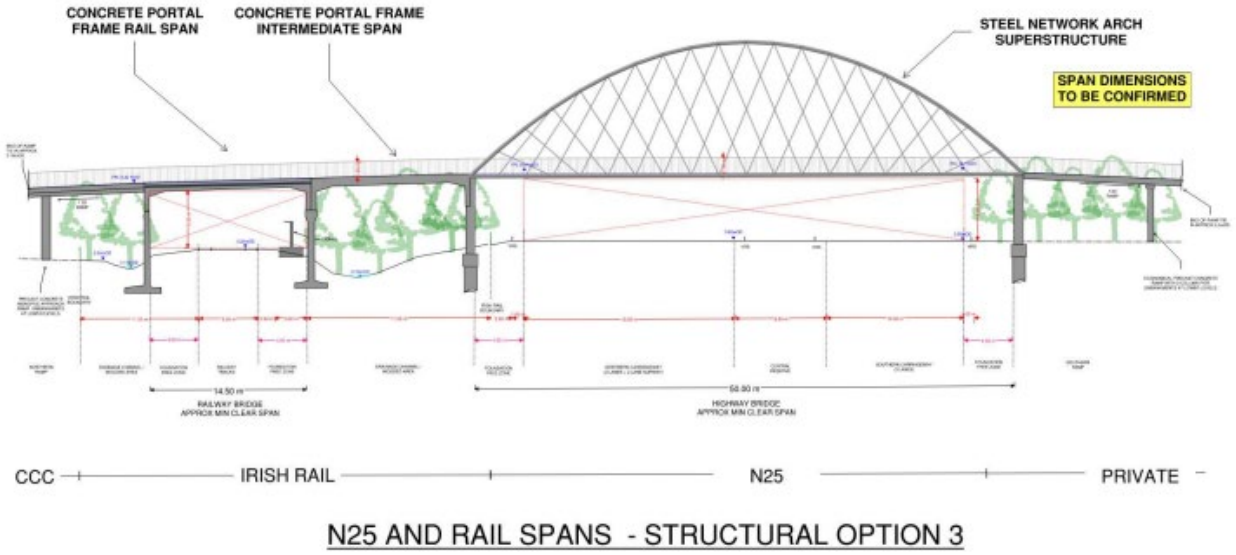

Image 3.11: Structural option 3 indicative elevation with N25 span, Irish Rail span, and start of approach ramps

Image 3.12: Example of steel network arch pedestrian and cycle bridge with concrete deck

Image 3.13: Example of segmental precast reinforced concrete porta frame structure over rail

3.6.4 Conclusions on bridge options

Based on the multi criteria assessment contained within the options selection report / structures options report, structural option 3 emerged as the preferred structural option for this bridge. This option consists of a steel network arch structure with a concrete deck over the N25, and segmental precast concrete portal frame structures over the Irish Rail line. It is anticipated that foundations will be of piled construction.

The bridge deck will have an effective width of 5m, as outlined in the alignment and width options assessment (refer to **Appendix 3.2** in **Volume 4** of this EIAR). The structural width will be approximately 6m to allow for parapets and fixings.

A multi criteria assessment (MCA) is presented in the options selection report / structures options report (refer to **Appendix 3.2** in **Volume 4** of this EIAR) which aided with the selection of the preferred structural form. From an environmental assessment perspective, as all structural options were assessed on the preferred alignment, there were no major distinctions between the structural forms considered and the bridge structural options scored neutral in the MCA with regard to environmental constraints.

Further details on the proposed design are provided in **Chapter 4**, *Description of the Proposed Development*.

3.7 Structural Options for Approach Ramp Structures

Due to the requirements for adequate clearance over the N25 and the Irish Rail line, and the required gradient for approach ramps, ramp structures for this crossing will be significant. A ramp gradient of 1 in 22 is proposed. This leads to elevated ramped approaches to reach the existing ground level of approximately 160m to the north and 130m to the south, in addition to lengths of at grade walkways / cycleways to tie in to end points of the crossing at Little Island train station and Eastgate Business Park.

Ramp structures will consist of a combination of elevated structure, embankments, landscaping and at grade sections. The following sections outline feasible structural forms considered for elevated sections of the approach ramps. Ramped structures are considered independently to the main crossings of the N25 and Irish Rail line as the considerations and constraints differ.

The northern elevated ramp section will be a prominent feature and visible from the underside by users of the northern park amenity area, the adjacent road and the Dunkettle to Carrigtwohill pedestrian and cycle route. Therefore, the aesthetic quality of this structure from deck level and from below should be considered strongly. By comparison, the southern elevated ramp section will travel through a heavily wooded area that is not currently accessible by the public. For this structure, the importance is more so on the user experience from the deck, rather than from the underside. This gives opportunities for a more economic structure to be used in this section.

For the north approach ramp, it is proposed that the lower ramp section is to be an embankment. This is consistent with recommendations in the TII Standard TII-STR-03005 Design Criteria for Footbridges (TII, 2004) to avoid confined crawl spaces under elevated structures.

The southern ramp section between the Radisson Blu Hotel car park and the N25 bridge tie in is proposed as an elevated structure due to the fall off in levels to the north and east of the Radisson Blu Hotel car park. A retained embankment is also proposed on the west side tie into the Radisson Blu Hotel car park.

3.7.1 Elevated ramp structure option 1: steel elevated ramp

This option considers the use of a steel elevated ramp structure. Steelwork can easily achieve the required span lengths for the approach ramps in a relatively lightweight form. This has advantages for construction and lifting of components. Steelwork sections can also come prefabricated with parapets included prior to being lifted into place and generally require less on-site construction works.

As there are no specific headroom requirements under the elevated ramp sections, the main structural elements can be placed under the deck, allowing for a more open parapet / edge of the structure for the user in comparison to a truss. For this reason, two structural forms are considered for this option; namely, a spine beam structure with single piers for the northern elevated ramp section and a more economical edge beam design with two column piers and crossheads for the southern ramp sections.

Refer to **Image 3.14** for indicative cross sections of both structural forms. Both options would allow for a consistent deck aesthetic for the user.

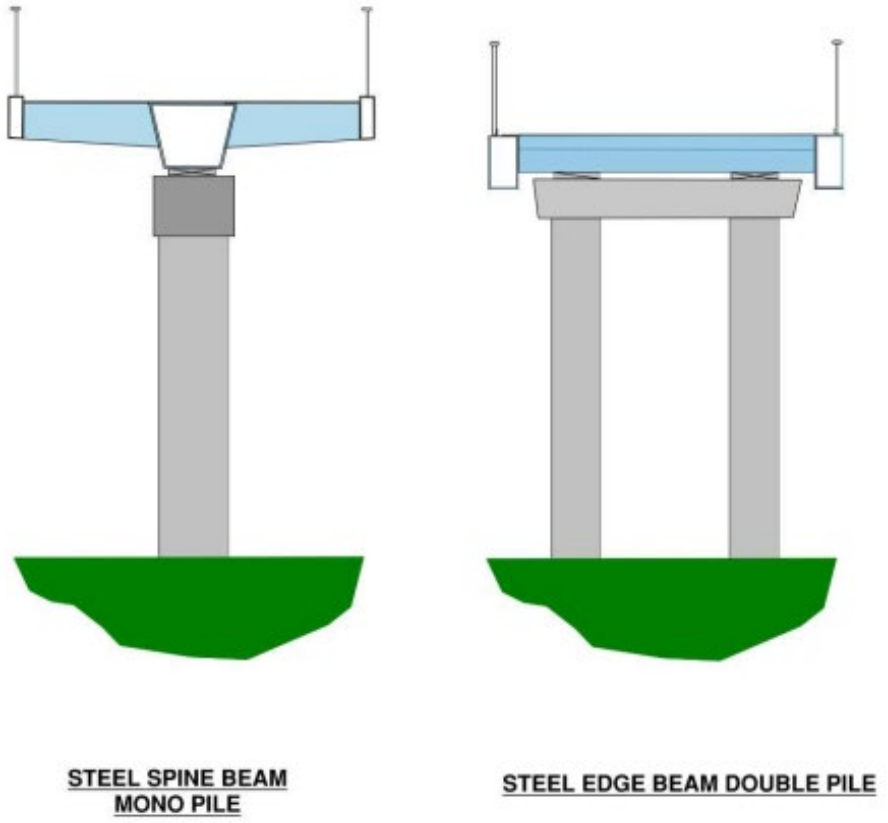

Image 3.14: Indicative cross sections of steel elevated ramp structural forms

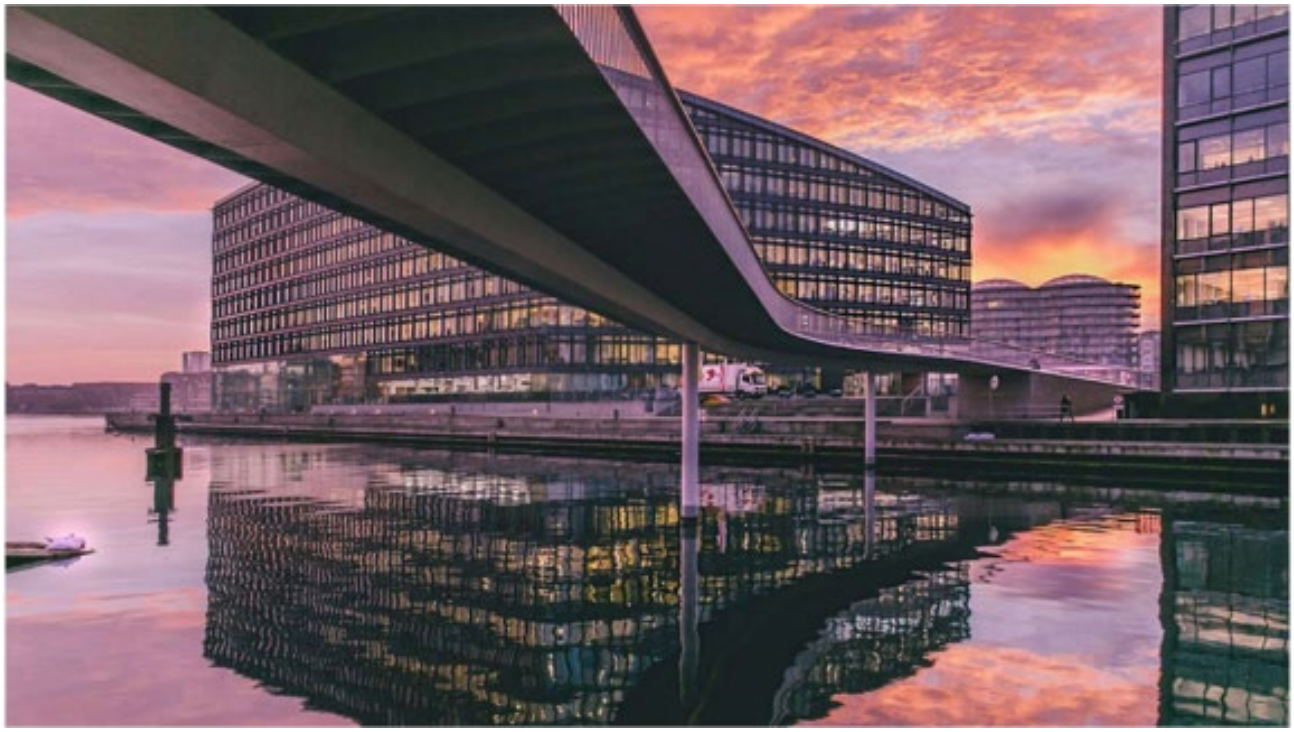

Image 3.15: Example of steel elevated ramp / cycleway structure with spine beam and monopiles / columns

Image 3.16: Steel edge beam bridge

3.7.2 Elevated ramp structure option 2: concrete structure

This option considers the use of a concrete spans. Precast concrete systems are widely available in Ireland and can easily reach the spans required. They are also extremely durable once constructed and require very low or no maintenance over their required design life of 120 years.

As there are no specific headroom requirements under the elevated ramp sections, the main structural elements can be placed under the deck, allowing for a more open parapet / edge of the structure for the user. For this reason, two structural forms are considered for this option; namely, a bespoke concrete structure with single piers for the northern elevated ramp section and a more economical precast prestressed bridge beam bridge design with 2 column piers and crossheads for the southern ramp sections.

Precast bridge beams such as MY bridge beams are available in single beams with spans of 15-25m, leading to flexibility in design and construction. Once placed on the southern ramp structure, works on the in-situ deck section are possible from the deck. Where access is easier in the northern park amenity area, a more bespoke architectural design is possible. Major strides have also been made in concrete mixes which allow for lower carbon forms of concrete to be used which can reduce the overall carbon footprint of the structure. Refer to **Image 3.17** for indicative cross sections of both structural forms. Both options would allow for a consistent deck aesthetic for the user.

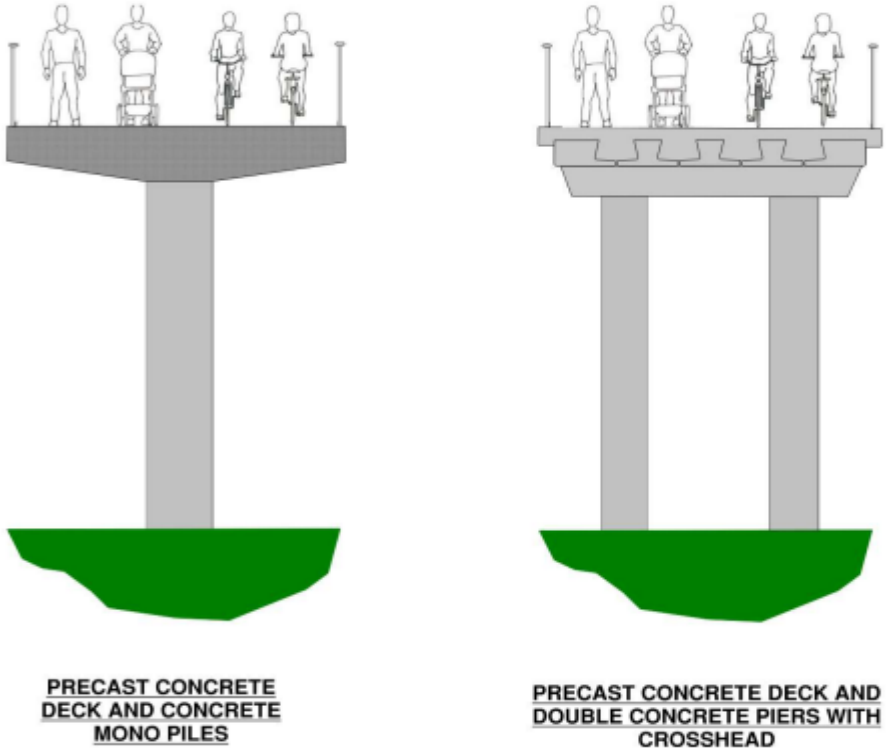

Image 3.17: Indicative cross section for reinforced concrete structural forms for elevated ramp structure

Image 3.18: Example of reinforced concrete elevated ramp structure with monopiles / columns (northern approach ramp)

Image 3.19: Economical precast prestressed concrete bridge beam option for approach ramp elevated structure (southern approach ramp)

3.7.3 Conclusions on approach ramp structural form

Considering the technical, economic, aesthetic, durability and maintenance, hydraulic, environmental and safety assessment criteria, the preferred approach ramp option was determined to be option 2 – precast prestressed concrete ramps. This option was proposed primarily to provide an economic, low maintenance and durable structures, given the location of the approach ramps close to the ocean and within a moist and vegetated wooded environment.

A MCA is presented in the options selection report / structures options report (refer to **Appendix 3.2** in **Volume 4** of this EIAR) which aided with the selection of the preferred structural form. From an environmental assessment perspective, as all structural options were assessed on the preferred alignment, there were no major distinctions between the structural forms considered other than the reduced maintenance requirements for concrete construction over the lifetime of the structure, which would lead to reduced access requirements into the wooded areas.

3.8 Conclusion

The emerging preferred option for the proposed bridge was selected following an evaluation of potential constraints. Bridge types were analysed through early screening processes (stage 1 options assessment) to reduce the number of feasible options.

The process of choosing the preferred alignment and layout from the chosen bridge type was an iterative process, whereby technical, economic, aesthetic, durability and maintenance, hydraulic, environmental, health and safety, construction and buildability were all comprehensively evaluated. Inputs were received from environmental specialists, project team workshops and stakeholder commentary. The process focused on minimising effects on stakeholders and the environment and refining the layout in order to improve pedestrian and cyclist flows. It also considered the technical requirements of providing a durable, economical, efficient and appealing structure to ensure the design would meet its service life requirements and encourage the modal shift to public and active travel modes.

Finally, through further optimisation and mitigation and avoidance of effects, the preferred bridge option, alignment, ramps and structure were determined, as set out in this chapter.

The preferred options and a full overview of the Proposed Development is provided in **Chapter 4**, *Description of the Proposed Development.*

3.9 References

CCC (2018). Little Island Transportation Study – Final Strategy Development Report.

CCC (2019). Little Island Transportation Study – Strategy Design Report.

Department of Transport (2021) Common Appraisal Framework for Transport Projects and Programmes.

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