



**Clifton Scannell Emerson**  
Associates

## **EIAR Chapter 3 Alternatives Considered Suir Island Infrastructure Links**



Comhairle Contae Thiobraid Árann  
Tipperary County Council

Civil  
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## Table of Contents

Document Control Sheet .....	2
Table of Contents .....	3
List of Figures .....	4
List of Tables .....	4
3 Alternatives Considered .....	5
3.1 Introduction .....	5
3.2 Consideration of Other Assessments .....	5
3.3 'Do-Nothing' Alternative .....	5
3.4 Alternative Locations .....	6
3.5 Alternative Access Routes .....	6
3.6 Alternative Layouts and Designs .....	6
3.6.1 Site and Design Constraints .....	6
3.6.2 Bridge Options Considered .....	7
3.6.3 Bridge Option No.1 .....	8
3.6.4 Bridge Option No. 2 .....	10
3.6.5 Bridge Option No.3 .....	11
3.6.6 Proposed Design Options Preliminary Cost Estimates .....	13
3.6.7 Multi-Criteria Analysis Applied .....	13
3.6.8 Introduction .....	13
3.6.9 Assessment Methodology .....	14
3.6.10 Options Ranking Scale .....	16
3.6.11 Stage I – Comparative Assessment .....	16
3.6.12 Stage II – Multi-Criteria Analysis .....	17
3.6.13 Conclusion .....	21
3.6.14 Non-Statutory Public Consultation .....	22
3.6.15 Emerging Preferred Option .....	22
3.7 Alternative Mitigation .....	23
3.8 Construction Delivery Alternatives .....	23
3.8.1 Construction Timeframe and Commencement Period .....	23
3.8.2 Construction Compounds .....	24
3.8.3 Alternative Transport Route and Site Access .....	24
3.8.4 Alternative Construction Processes and Equipment .....	25

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## List of Figures

Figure 3-1: Bridge Option 1 plan layout .....	9
Figure 3-2: Bridge Option 2 plan layout .....	10
Figure 3-3: Bridge Option 3 plan layout .....	12
Figure 3-4: Alternative construction compounds .....	24
Figure 3-5: Alternative transport and site access routes .....	25

## List of Tables

Table 3-1: Proposed Design Options Preliminary Construction Costs .....	13
Table 3-2: Multi Criteria Analysis Criteria and Sub-Criterion .....	14
Table 3-3: Options Colour Coded Ranking Scale .....	16
Table 3-4: Stage I Sifting Assessment Results .....	17
Table 3-5: Options Assessment Summary .....	17
Table 3-6: MCA Route Options Assessment Summary (Main Criteria) .....	21

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## 3 Alternatives Considered

### 3.1 Introduction

The EIA Directive requires that the EIAR include the following in terms of the assessment of alternatives:

- 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/an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

This chapter addresses reasonable alternatives under the following headings:

- ‘Do-Nothing’ Alternative;
- Alternative Locations;
- Alternative Access Routes to Suir Island;
- Alternative Layouts and Designs;
- Alternative Mitigation; and
- Construction Delivery Alternatives.

### 3.2 Consideration of Other Assessments

The proposal for this development was originally identified in the Clonmel and Environs Development Plan published in 2013, which sets out the vision for Clonmel town centre. The Plan identified the town centre as the focal point for retail, office and service provision whilst identifying the need to re-invigorate the centre through attracting-in other appropriate and value-added uses for a town of this size and function. Public Realm and traffic management improvements together with enhancements and increases in the provision of amenity, recreation, leisure and cultural space will ensure that the urban centre of Clonmel can be in a position to capture its deserved status as a top-quality shopping and service destination. The Plan identified Suir Island (Development Opportunity No. 1) as an ideal location to serve as an amenity hub with both formal and informal amenity and recreational facilities to be developed including the development of a new pedestrian bridge to improve the linkages between Sarsfield Street and Suir Island.

Following on from the publication of the Clonmel and Environs Development Plan in 2013, a Masterplan for Suir Island was prepared in September 2019 by Tipperary County Council which further expands on the proposals to develop Suir Island into an amenity, recreation, leisure and cultural hub whilst improving pedestrian and cyclist linkages between Suir Island, Sarsfield Street and Denis Burke Park with the provision of new pedestrian bridges.

### 3.3 ‘Do-Nothing’ Alternative

In terms of the urban centre of Clonmel and in relation to amenity, recreation, leisure and cultural space, the ‘Do-Nothing’ alternative would mean the island would remain secluded, unattractive and would remain derelict in nature in terms of landscape and visual views, whilst anti-social behaviour would continue to occur in and around the island.

In terms of transport connectivity, the island will remain accessible via Old Bridge Road, and current trends in terms of the use of sustainable transport modes for purposeful trips taken from the town centre, Suir Island and Raheen Road would remain, which will not contribute positively on;

- Population human health by encouraging physical activity;

- Climate from reduced greenhouse gas emissions;
- Safety, Accessibility or Social Inclusion.

If the proposed development is not carried out, the potential to provide a high-quality, safe and universally accessible pedestrian and cyclist route from the town centre and Raheen Road to Suir Island to enhance the amenity potential of Suir Island whilst conserving and promoting the rich cultural, architectural and natural heritage of Clonmel will not be realised. Currently, there is inadequate linkages between the town centre, Suir Island and existing active travel facilities for pedestrians and cyclists.

If the proposed elements of the development are not carried out, the need for development in the area would remain, and as such, it would be necessary to construct a similar development at another location.

### **3.4 Alternative Locations**

The specific location (i.e. Suir Island and town centre) was considered appropriate for a development of this nature and scale and alternate locations were considered not to align with the agreed project objectives.

### **3.5 Alternative Access Routes**

As the objective of the development is to re-invigorate Suir Island into an amenity, recreation, leisure and cultural hub whilst improving access from the island to the town centre (north and south of the River Suir), it was considered that 'Alternative Access Routes' are limited to alternative means of accessing Suir Island over the existing bridges. In light of this, the only feasible alternative location to access the island is via the existing Old Bridge Road. Alternative bridge locations to the island was assessed at inception phase from a desktop level and considered not feasible due to flood risk arising from the River Suir, which inundates the eastern section of the island in its entirety.

Old Bridge Road links Old Quay / Joyce's Lane as well as O' Connell Street (R884) to the north of the island to the Raheen Road (R680) and Dungarvan Road (R671) to the south of the island. Old Bridge Road consists of two-way traffic flow, facilitating vehicular and pedestrian movement and includes two bridges over the River Suir which vary in width from 4.8 to 5.8m with footpaths ranging between 1.0 and 1.2m. The 14<sup>th</sup>-century bridges are identified as protected structures by the National Inventory of Architectural Heritage (NIAH) with registration numbers of 22121006 and 22117113 for the southern and northern bridges, respectively.

Due to the abovementioned spatial and architectural heritage constraints limiting modification of the existing bridges it was considered unfeasible to provide a suitably wide 4-metres-wide, high-quality, shared surface which is safe and universally accessible for pedestrians and cyclists, thus resulting in the further assessment of new pedestrian bridge options as highlighted in the Clonmel and Environs Development Plan (2013).

### **3.6 Alternative Layouts and Designs**

#### **3.6.1 Site and Design Constraints**

An Options Assessment Study for the Suir Island Infrastructure Links development comprised of a data collection exercise which focussed on determining the physical, environmental and engineering constraints which exist and which could affect the design and progress of the proposed development within the proposed study area.

The study was carried out at an early stage of the project life-cycle with the objective of gathering as much background information relating to the study area as possible. The main design parameters and constraints arising from the constraints study in 2021 are listed below:

(i) Planning and Land use

Policies were reviewed and objectives that support the development of pedestrian bridges over the River Suir, Blueway routes and cycling infrastructure were identified within the study area. These transport objectives were considered as part of design options for this project.

(ii) Biodiversity

The principal ecological constraint identified was the requirement to protect and enhance the conservation objectives of the Lower River Suir Special Area of Conservation (SAC) (site code 002137). The Lower River Suir SAC supports a range of Annex II species and Annex I habitats. Habitat and species surveys were required to confirm the presence of habitats and species on site.

Hydraulic modelling was required, and a Natura Impact Statement was determined necessary for the proposed development. Consultations with NPWS and IFI were required as part of this process.

(iii) Hydrology

The protection of river water quality of the Lower River Suir SAC was an important consideration of the project design. Compliance with the requirements of the Water Framework Directive and the protection of fish populations were key considerations of the design process. Flood risks due to the construction and operation of the proposed development were important considerations.

Hydraulic modelling was carried out for the proposed development. A Flood Risk Assessment was carried out and incorporated the proposed bridges.

(iv) Soils and Geology

Geotechnical investigations have been carried out to inform potential contaminated land issues and ground conditions / depth to rock. Consultation took place with the NPWS prior to the site investigations being conducted.

(v) Archaeological and Architectural Heritage

The study area is included as part of a Zone of Archaeological Potential which extends into parts of the Lower River Suir SAC.

(vi) Landscape and Visual

There are a number of protected views to and from the study area included in the Tipperary County Development Plan 2022-2028 and Clonmel & Environs Development Plan 2013 (as extended).

### 3.6.2 Bridge Options Considered

The following bridge options have been considered and assessed for the proposed development:

- Bridge Option 1 – Curved Bridge consisting of a hollow steel bridge superstructure on reinforced concrete piers and piled foundations.

The curved Footbridge allows one to discover the island ‘from on high’ by walking seamlessly between the trees while linking the project elements (Sarsfield street, the Suir Island flood protection berm and the southern river bank) along one sinuous route.

The orientation of the footbridge follows the geometry of Sarsfield Street and integrates onto the island’s flood protection berm alignment.

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On the south side, the curved bridge alignment ties into Raheen Road perpendicularly referred to as the southern arrival point. In elevation, the structure of the footbridge is a 'caisson' (hollow section steel structure) supporting a lightweight deck. The caisson avoids having structural elements above the deck so as not to obstruct views.

- Bridge Option 2 – Curved Bridge same design to Bridge Option 1 with alternative North Plaza and Suir Island promenade designs.

This new public space is aligned with Sarsfield Street. The steps and landscaped ramp are visible from O'Connell Street creating a new landmark in the town of Clonmel, encouraging pedestrian movement towards the River. The bicycle access ramp follows the line of the landscaped plaza edge down to street level.

The design in this space will focus on enhancing the amphitheatrical qualities of the steps and seating facing Sarsfield Street. The 4m wide pedestrian and cycle route follows the flood barrier, passing under the bridge arrival point.

- Bridge Option 3 – Straight Bridge consisting of a hollow steel bridge superstructure on reinforced concrete piers and piled foundations and alternative North Plaza, Suir Island promenade and Raheen Road designs.

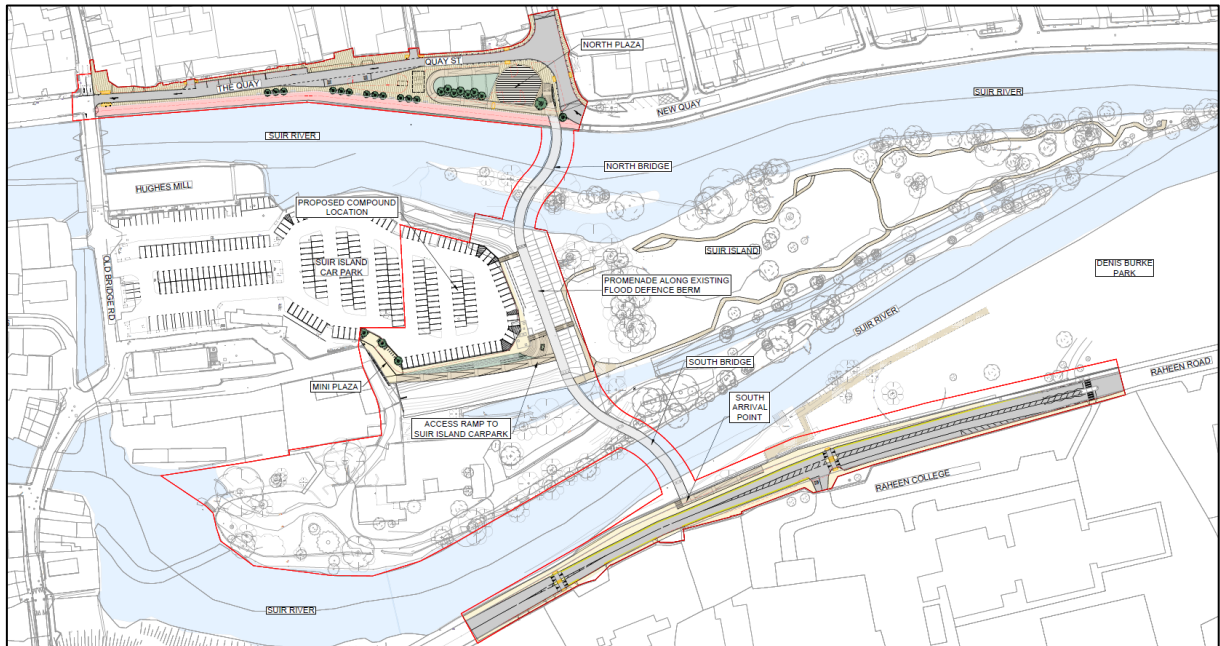
This option proposes two straight Footbridges along angled lines from point to point, one connecting from the northern berm to the western end of the plaza, the other from the southern berm to the same arrival point as Bridge Options 1 & 2 at Denis Burke park.

The arrival point to the west of the Plaza creates a generous public space facing the end of Sarsfield Street. In elevation, the structure 'inflects' at the intermediate supports, passing alternately above and below the deck. This variation makes it possible to sequence the promenade between its river and island crossing points.

### **3.6.3 Bridge Option No.1**

Detailed drawings showing the overall plan for the different elements of Bridge Option No.1 along with photomontages are provided in Volume C of this EIAR. Drawing No. 20\_071-CSE-00-XX-DR-C-2210 to 20\_071-CSE-00-XX-DR-C-2219. The plan layout of Bridge Option 1 is shown on Figure 3-1.





*Figure 3-1: Bridge Option 1 plan layout*

The visual connection between users of the route and the landscape is omnipresent. The structure then disappears to reveal only a strip running between the trees. Structurally, the caisson allows spans of up to 35m while limiting the visual impact of the structure as much as possible.

### **Proposed North Plaza Layout**

This new public realm is aligned with Sarsfield Street. The stairs and ramp have been designed to be visible from O'Connell Street creating a new landmark in the town of Clonmel and encouraging pedestrian movement towards the River Suir.

The bicycle access ramp is designed to be as transparent as possible so as not to block the view of Suir Island from Sarsfield Street.

An open public space is created within the curve of the ramp at street level. Various design options are being explored here to create a mini-plaza for impromptu performances and social gatherings.

A bus stop will be provided on the western end of the plaza.

### **Proposed Bridge Design Layout (Curved Deck)**

A curved footbridge is proposed with Bridge Option No.1. Details of this bridge are provided in Volume C Drawing No. 20\_071-CSE-00-XX-DR-C-2215. This bridge would be 4.0 metres in width and will allow users to discover the island 'from up high' by walking seamlessly between the trees while linking the project elements (Sarsfield Street, the berm embankment and the south riverbank) along one sinuous bridge. The departure of the footbridge follows the geometry of Sarsfield Street and arrives on the island following the line of the berm embankment.

On the south side, the curved path allows a perpendicular arrival point with Raheen Road. In elevation, the structure of the footbridge is a 'caisson' (hollow section steel structure) supporting a lightweight deck. The caisson avoids having structural elements above the deck so as not to obstruct views.

### **Proposed Access to Suir Island Carpark Design Layout**

A comfortable access to the bridge from the existing carpark on Suir Island is essential.

The bridge promenade is aligned with the existing berm (the flood control dyke). This berm can also be used to accommodate a universal access ramp.

This ramp is fully integrated into the landscape by using the existing slope of the berm. Steps are also present to the north and south to quickly reach the Island level.

Four parking spaces (currently used for storage) have been removed to allow the creation of a mini public space at the entrance to the former Mill site.

### Proposed South Arrival Point Design Layout

To improve the safety of pedestrians/cyclists at the South Arrival Point, the footpaths are being widened and the road narrowed to accommodate 3.0-metre-wide lanes. Three carparking spaces have been removed from the southern edge of the road to allow for wider footpaths. Two crossing points are positioned at either end of the proposed access ramps to provide traffic calming. The access ramp to the bridge is located outside the flood barrier to allow access even during a flood event. This bridge arrival point is located close to the school entrance of Raheen College, providing safe and convenient access for the schoolchildren.

### 3.6.4 Bridge Option No. 2

Detailed drawings showing the overall plan for the different elements of Bridge Option No.2 along with photomontages are provided in Volume C of this EIAR. Refer to Drawing No. 20\_071-CSE-00-XX-DR-C-2220 to 20\_071-CSE-00-XX-DR-C-2226. The plan layout of Bridge Option 2 is shown on Figure 3-2.

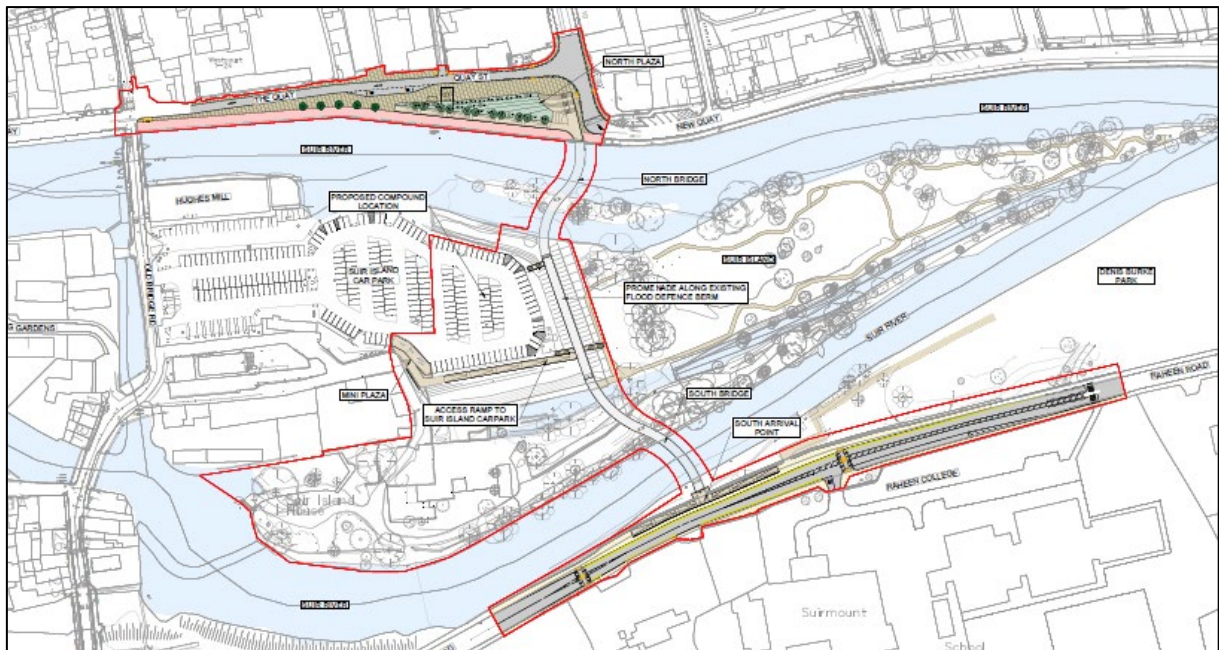


Figure 3-2: Bridge Option 2 plan layout

### Proposed North Plaza Design Layout

Similar to Bridge Option No.1, this new public space is aligned with Sarsfield Street. The steps and landscaped ramp are visible from O'Connell Street creating a new landmark in the town of Clonmel, encouraging pedestrian movement towards the River.

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The bicycle access ramp follows the line of the landscaped plaza edge down to street level. The detailed design in this area will focus on enhancing the amphitheatrical qualities of the steps and seating facing Sarsfield Street. A bus stop would be provided on the western end of the plaza.

#### **Proposed Bridge Design Layout (Curved Deck)**

The proposed bridge design layout for Bridge Option No.2 is identical to the one proposed for Bridge Option No.1. Details of this bridge are provided in Volume C Drawing No. 20\_071-CSE-00-XX-DR-C-2225.

#### **Proposed Access to Suir Island Carpark Design Layout**

The universal access ramp to the bridge has been aligned with this berm embankment as an additional element. This new ramp is detached from the flood barrier, having very minimum impact on it.

Three sets of steps are provided to facilitate pedestrian access to the carpark at two locations points and also to Suir Island gardens. As part of this design a mini public space has also been created at the entrance to the former Mill site.

#### **Proposed South Arrival Design Layout**

The proposed South Arrival design for Bridge Option No.2 is identical to the one proposed for Bridge Option No.1. To improve the safety of pedestrians/cyclists at the South Arrival Point, the footpaths are being widened and the road narrowed to accommodate 3.0-metre-wide lanes. Three carparking spaces have been removed from the southern edge of the road to allow for wider footpaths. Two crossing points are positioned at either end of the proposed access ramps to provide traffic calming. The access ramp to the bridge is located outside the flood barrier to allow access even during a flood event. This bridge arrival point is located close to the school entrance of Raheen College, providing safe and convenient access for the schoolchildren.

### **3.6.5 Bridge Option No.3**

Detailed drawings showing the overall plan for the different elements of Bridge Option No.3 along with photomontages are provided in Volume C of this EIAR. Refer to Drawing No. 20\_071-CSE-00-XX-DR-C-2230 to 20\_071-CSE-00-XX-DR-C-2236. The plan layout of Bridge Option 3 is shown on Figure 3-3.

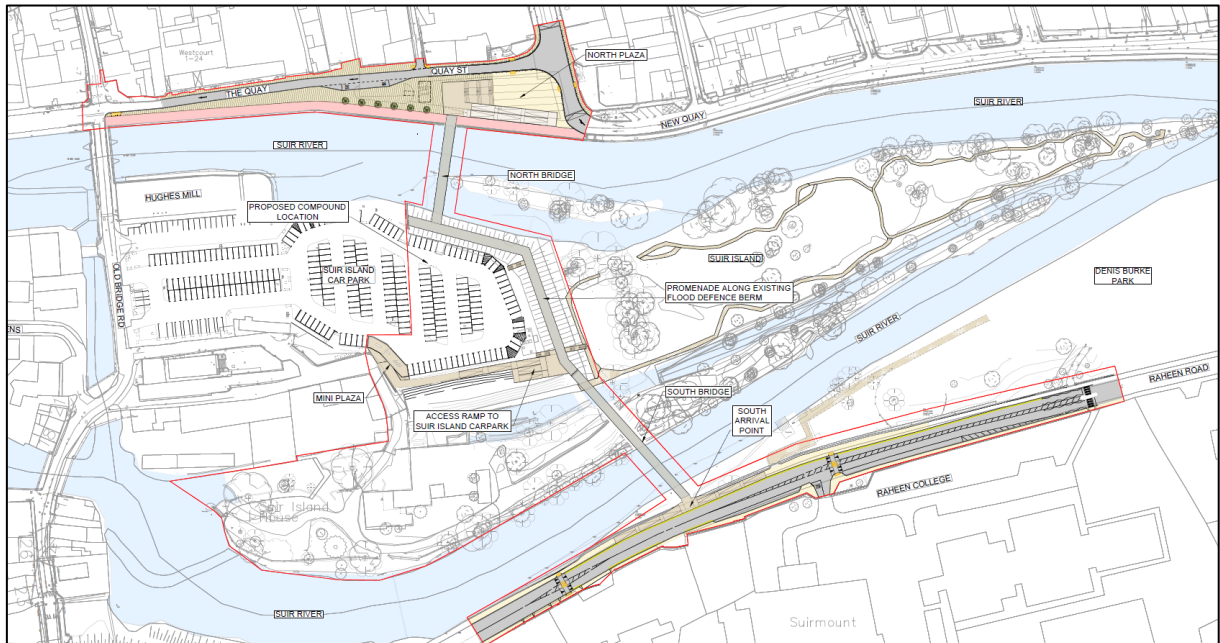


Figure 3-3: Bridge Option 3 plan layout

### Proposed North Plaza Design Layout

The new public space proposed offers a generous plaza to the Town. The view of this plaza is clear from O'Connell Street and Sarsfield Street and allows an appreciation of the natural backdrop of trees towards Suir Island.

A dog-leg ramp is provided with this design allowing access to the bridge without obstructing the space of the plaza. The steps and the seating create a very generous performance space in the form of an amphitheatre. A bus stop will be provided on the western end of the plaza.

### Proposed Bridge Design Layout (Straight Deck)

Details of this bridge are provided in Volume C Drawing No. 20\_071-CSE-00-XX-DR-C-2235. This option proposes two straight pedestrian bridges along angled lines from point to point, one connecting from the northern berm to the western end of the plaza, the other from the southern berm to the same arrival point, as Bridge Options No.1 & 2 at Denis Burke Park.

The arrival point to the west of the Plaza creates a generous public space facing the end of Sarsfield Street. In elevation, the structure 'inflects' at the intermediate supports, passing alternately above and below the deck. This variation makes it possible to sequence the promenade between its river and island crossing points.

Structurally, the footbridge is made of two straight spandrel beams in plan but variable in elevation. The variation of the inertias follows the diagram of the bending moments of a continuous beam on three supports. The spandrel beams have two functions: load-bearing structures and guardrails (when the arches are above the deck).

### Proposed Access to Suir Island Carpark Design

Similar to Bridge Options No.1 and 2, the promenade of the bridge is also aligned with the existing berm. A universal access ramp to the bridge is treated as a separate, truncated structure. In this option, the access ramp is zigzagged to confine it to a reduced area with as little impact on the berm possible.

Three sets of steps are provided to facilitate pedestrian access to the carpark at two locations points and also to Suir Island gardens. As part of this design a mini public space has also been created at the entrance to the former Mill site.

### Proposed South Arrival Design Layout

In this option the current footpath line is being occupied by the ramp from the bridge arrival level, so the current footpath will rise to the bridge level and then fall again. The access ramp to the bridge is located outside the flood barrier to allow access even in a flood event. This bridge arrival point is located close to the school entrance providing safe and convenient access for the school children.

The current road width is slightly reduced, and all current parking spaces would be retained. Two crossing points are positioned at the two ends of the site to provide traffic calming near the school.

### 3.6.6 Proposed Design Options Preliminary Cost Estimates

The costing estimations have been undertaken by Nolan Construction Consultants, on behalf of Clifton Scannell Emerson Associates. The figures estimated for each bridge option are presented in Table 3-1 below.

*Table 3-1: Proposed Design Options Preliminary Construction Costs*

Costing Item	Bridge Options		
	No.1	No.2	No.3
North Plaza	€ 4,030,250	€ 3,822,060	€ 3,841,280
Bridge	€ 4,375,700	€ 4,401,160	€ 4,801,600
South Arrival Point	€ 1,381,800	€ 1,505,660	€ 1,560,520
Access Ramp	€ 1,727,250	€ 1,853,120	€ 1,800,600
<b>Total (Excluding VAT)</b>	<b>€ 11,515,000</b>	<b>€ 11,582,000</b>	<b>€ 12,004,000</b>
<b>Value Added Tax at 13.5% (SAY)</b>	<b>€ 1,555,000</b>	<b>€ 1,564,000</b>	<b>€ 1,621,000</b>
<b>Total Estimated Construction Costs (Including Vat)</b>	<b>€ 13,070,000</b>	<b>€ 13,146,000</b>	<b>€ 13,625,000</b>

As set out in table above, it is estimated that Bridge Option No. 3 construction costs would be the highest of all the bridge options.

### 3.6.7 Multi-Criteria Analysis Applied

#### 3.6.8 Introduction

This Section of the report presents the Multi-Criteria Analysis (MCA) undertaken to evaluate the three bridge design options developed for the proposed development. These layout options have been assessed in accordance with the Common Appraisal Framework (CAF) updated in 2021 and Transport Infrastructure Ireland Project Appraisal Guidelines for National Roads Unit 7.0 Multi-Criteria Analysis (PE-PAG-02031) and Unit 13.0 Appraisal of Active Modes (PE-PAG-02036).

As noted in PAG Unit 13.0, the CAF requires that transport projects be appraised against six key criteria: 'Economy', 'Safety', 'Integration', 'Physical Activity', 'Environment' and 'Accessibility and Social Inclusion'; along with other relevant sub-criteria that reflect the nature of the project and its impacts. Based on these six CAF criteria, TII has developed a list of sub-criteria that reflect the main impacts of active modes, which can also be used as headings when undertaking qualitative appraisal.

A review of the sub-criterion of the aforementioned TII guidelines was undertaken as part of the multi-criteria analysis to assess which document sub-criterion is the most applicable to the proposed development. Chapter 2 Project Description and Planning Policy Context of this EIAR details the objectives of the proposed development and describes how the proposed development aligns with relevant planning policy documents. Based on the contents in Chapter 2, the appraisal document for Active Travel Modes is considered more appropriate for this proposed development.

### 3.6.9 Assessment Methodology

The assessment is based on a two-stage approach:

- Initially a "Stage 1 – Sifting" assessment was carried out on all possible bridge options. This high-level assessment was carried out whereby the options were appraised on their viability; to provide suitable infrastructure for pedestrians and cyclists; engineering complexities; environmental and economic feasibility. A simple pass/fail result was given for each option at this stage.
- The options that passed Stage 1 were then taken forward and assessed by a "Multi-Criteria Analysis" process, in which the options were ranked in a comparative manner under a number of primary criterion and sub-criterion.

The proposed layout options were assessed using 'Multi Criteria Analysis' (MCA) as outlined in the 'Common Appraisal Framework for Transport Projects and Programmes' published by the Department of Transport, Tourism and Sport (DTTAS) (2021). The following CAF Criterion were used in the MCA:

- Economy;
- Safety;
- Environment;
- Accessibility and Social Inclusion;
- Integration; and
- Physical Activity.

A description for the sub-criteria as highlighted in the TII Appraisal of Active Modes guideline document (PE-PAG-02036) is summarised in Table 3-2:

*Table 3-2: Multi Criteria Analysis Criteria and Sub-Criterion*

CAF Criteria	Sub-Criteria	Description
<b>Economy</b>	Transport Efficiency	User benefits associated with more efficient transport and lower journey times
	Household Impacts	Impacts on household costs associated with owning and operating vehicles
	Tourism	Potential for increased tourism and spending from domestic and overseas visitors
	Wider Economic Impacts	Other wider economic impacts that may be relevant, such as reduced congestion in urban areas, access to

		employment centres, and improved town centre vibrancy
	Funding Impacts	Costs associated with the proposal
<b>Safety</b>	Collision Reduction	Reduced risk of collisions with traffic associated with safe and segregated walking and cycling infrastructure
	Journey Quality	Other components of journey quality, such as width, gradient, surface type or setting, that influence users' journey quality and likeliness to use infrastructure.
	Security	Sense of personal security and safety while using active travel
<b>Environment</b>	Carbon	Impact on carbon emissions from transport
	Air Quality	Impact on non-greenhouse gas emissions from transport that have a negative impact on human health, such as nitrous oxides and particulate matter
	Noise	Impact on local noise levels from transport
	Landscape and Visual Quality	Impact on local landscapes and viewpoints
	Biodiversity	Impact on biodiversity and habitats, particularly protected habitats and species.
	Cultural Heritage	Impact on areas or structures of cultural importance, including archaeological sites, historic buildings and structures, or culturally significant landscapes.
	Land Use	Impact on land uses, such as through land-take, excavation and infill, or severance.
	Water Resources	Impact on surface waters, ground waters and coastal resources.
<b>Accessibility and Social Inclusion</b>	Disadvantaged Geographic Areas	Accessibility for users in disadvantaged areas, usually as identified in the Pobal Deprivation Index
	Vulnerable Groups	Accessibility of infrastructure for users of all ages and abilities
	Active Travel & Gender	Impact in addressing the transport needs of women and girls and reducing the gender disparity in walking and cycling.
	Social Inclusion	Improving the potential for interaction and participation in community life and reducing the risk of isolation.
<b>Integration</b>	Policy	Integration with relevant local, regional and national policy
	Land Use	Improved connectivity between population, employment and retail centres

	Schools & Education	Improved connectivity to schools and third-level facilities
	Transport	Improved connectivity to major transport interchanges, such as rail, bus and ferry stations
	Tourism	Improved connectivity to 'things to see and do', such as tourism sites, attractions or activities.
	Cycling	Improved connectivity to other local, regional and national cycling facilities
<b>Physical Activity</b>	Health	Positive health outcomes due to increased levels of physical activity, including reduced risk of premature mortality, as well as lower rates and reduced costs of serious illnesses.
	Recreation	Improved wellbeing due to access to high quality facilities for outdoor recreation.

### 3.6.10 Options Ranking Scale

Under each criterion presented above, all identified bridge options were assessed using a 7-point qualitative scale for scoring options, which was used to rate the extent to which an option is likely to represent a positive/negative impact in each criterion as shown in Table 3-3.

*Table 3-3: Options Colour Coded Ranking Scale*

Scoring/Colour	Description
1	Major Negative
2	Moderate Negative
3	Minor Negative
4	Neutral
5	Minor Positive
6	Moderate Positive
7	Major Positive

### 3.6.11 Stage I – Comparative Assessment

As highlighted in **Section 3.6.2**, a high-level Stage 1 – Sifting assessment was carried out on all possible bridge options based on their viability to provide suitable infrastructure for pedestrian and cyclists under the headings of engineering, environment and economy. A simple pass/fail grading was given to each of the options as summarised in Table 3-4.

As shown in the table below, all the options developed for the proposed development passes the Stage 1 sifting assessment.



*Table 3-4: Stage I Sifting Assessment Results*

Route Option	Viability	Engineering	Environment	Economy
<b>Bridge Option 1</b>	Pass	Pass	Pass	Pass
<b>Bridge Option 2</b>	Pass	Pass	Pass	Pass
<b>Bridge Option 3</b>	Pass	Pass	Pass	Pass

### 3.6.12 Stage II – Multi-Criteria Analysis

Table 3-5 presents the results of the Multi-Criteria Analysis (MCA) undertaken to evaluate the bridge options in terms of the Assessment Sub-Criteria discussed in **Section 3.6.2**. The MCA scoring is discussed in more detail in below the table. Following from the Sub-Criteria Assessment, the Main Criteria assessment is summarised in **Section 3.6.6** (Table 3-6).

*Table 3-5: Options Assessment Summary*

CAF Criteria	Sub-Criteria	Bridge Option 1	Bridge Option 2	Bridge Option 3
<b>Economy</b>	Transport Efficiency	7	7	6
	Household Impacts	6	6	6
	Tourism	6	6	6
	Wider Economic Impacts	6	6	6
	Funding Impacts	7	6	4
<b>Safety</b>	Collision Reduction	7	7	6
	Journey Quality	7	7	6
	Security	7	7	7
<b>Environment</b>	Carbon	5	5	5
	Air Quality	5	5	5
	Noise	5	5	5
	Landscape and Visual Quality	7	6	5
	Biodiversity	3	3	3
	Cultural Heritage	7	7	7

	Land Use	6	6	6
	Water Resources	3	3	3
<b>Accessibility and Social Inclusion</b>	Disadvantaged Geographic Areas	7	7	7
	Vulnerable Groups	7	7	7
	Active Travel & Gender	7	7	7
	Social Inclusion	7	7	7
<b>Integration</b>	Policy	7	7	7
	Land Use	7	7	7
	Schools & Education	7	7	7
	Transport	7	7	7
	Tourism	7	7	7
	Cycling	7	7	7
<b>Physical Activity</b>	Health	7	7	7
	Recreation	7	7	7

This section of the report provides justifications for the Multi-Criteria Analysis carried out on the Assessment Criteria (Sub-Headings) for each of the route options.

- **Economy**

Transport Efficiency: Bridge Options 1 and 2 were score slightly higher than Option 3 due to the overall length of the bridges and the time it would take for pedestrians and cyclists to cross from the northern to southern riverbank. The curved bridge alignments provide for a smoother transition from the bridges to the Suir Island link promenade, where the northern bridge crossing for Option 3 contains an almost 90-degree bend to match the alignment of the defence berm, which would be an awkward interface between pedestrians and cyclists, thus was scored slightly lower. Overall all three bridge options provide a major improvement in terms of access efficiently to transition from Raheen Road to the proposed North Plaza and Suir Island.

Household Impacts: All three bridge options were scored equally as moderately positive. The proposed development will provide access for residents living within close proximity to Suir Island to take more trips by making use of active modes rather than vehicular trips to either places of employment or retail centres located in and around O'Connell Street and the Town Centre.

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Tourism and Wider Economic Impacts: All three bridge options scored equally in terms of their potential to attract increased visitors both locally and from overseas. The proposals will enhance the vibrancy of the town centre, provide opportunities for local artist to showcase their performances which will attract more visitors. Increased visitors will positively impact on local businesses and retail shops and stores.

Funding Impacts: As summarised in Section 3.5, Bridge Option 1 has the lowest initial capital investment cost with a value of €13,070,000, followed by Option 2 of value €13,146,000 and lastly Option 3 with the largest initial capital investment requirement of €13,625,000. The options were scored accordingly with Option 1 scoring the most advantageous and Option 3 the least. Due to the considerable variance in funding requirements between Option 1 and 3, Option 3 was scored an additional level lower than Option 2.

- **Safety**

Collision Reduction, Journey Quality and Security: Similarly to the Transport Efficiency sub-criteria, Option 3 was scored slightly lower in terms of Collision Reduction and Journey Quality due to the almost 90-degree transition from the Suir Island flood defence berm link promenade to the northern bridge crossing. Overall the three bridge options will provide a moderately to major positive impact on pedestrian, cyclist and vehicular safety. With the proposal to reduce lane widths in Raheen Road and with the creation of a one-way road in a westerly direction for Quay Street, vehicle speeds will automatically reduce which will enhance safety for all users. The addition of bespoke public lighting handrails will discourage anti-social behaviour.

- **Environment**

Carbon, Air Quality and Noise: All three bridge options scored similarly to have a minor positive impact as the proposals would encourage people to take less vehicular trips either for employment commuting, shopping trips and recreational activities. Fewer trips taken with vehicles reduces greenhouse gas emissions which increases air quality and reduces noise.

Landscape and Visual Quality: The bridge options were scored in terms of their landscape and visual quality on the 4 critical elements of each proposal, namely; the North Plaza, bridge alignment and architectural attributes, Suir Island link promenades/mini plaza and Raheen Road south arrival point. Bridge Option 3 was scored lowest (Minor Positive) due to the arrangement of the North Plaza, which would block most of the natural landscape views from the town centre. The straight bridge alignment in Option 3 provides a lesser positive impact in terms of visual quality and architectural views compared to Options 1 and 2 consisting of the curved alignments disappearing between the tree canopies. Option 2 was scored as Moderately Positive, with the proposal to construct the northern bridge access ramp on top of a newly constructed berm which would hinder the view of the natural landscape from the town centre. Compared to Option 3, the berm proposal of Option 2 on the northern plaza would provide a softer impact than the concrete rising structure on visual quality and landscape. Option 1 was scored as Majorly Positive compared to the other options due to the elevated access ramp and steps which would not hinder the natural landscape from the town centre. The hairpin-shape/alignment of the access ramp provides a seating area which will be further complimented by landscaping which will enhance the visual quality of the open amenity space and the natural backdrop of the proposed development.

Similarly to the above, the proposals on Suir Island was scored more favourable to Option 1, followed by Option 2 and 3. For the southern arrival point located in Raheen Road, the proposals for the three options would provide an equally moderate to major positive impact.

Biodiversity: The critical area for all three options in terms of impact on biodiversity receptors is associated with the northern bridge crossing and the requirement to construct a support pier on the small island located on Suir Island. The small island is accessible during summer low-flows but is inundated when the water level rises in the River Suir during the winter months. During construction

there will be a temporary and negative impact when accessing the small island to construct the bridge foundation. The island will be accessed by constructing an access road over a temporary culvert to allow baseflow ecological water requirements to pass the access road. The culvert will also reduce the impact on flood water levels during construction and the operation of the flood defence scheme. Localised and temporary sheet piling will be required during the works which will be restricted to the summer months. The potential construction impacts is assessed in Volume B EIAR Chapter 5 Biodiversity, Species and Habitats. The potential impacts on flood water levels during construction is assessed in EIAR Chapter 7 Hydrology. Overall for this MCA, the three options were scored to have a minor negative impact on Biodiversity. During the construction, the works in this area will be continuously monitored by the Ecological Clerk of Works and works will be carried out in accordance with best-practice guidelines, construction method statements and environmental management plans.

Cultural Heritage: All three options were scored to have a major positive impact on the cultural heritage of the town centre. The proposals would increase visitors, create tourism opportunities in the town centre and Suir Island, which is home to an abundance of culturally-significant landscapes.

Land Use: All three options were scored to have a moderate positive impact on Land Use. The options will connect communities and establishments and decrease the severance between the town centre and communities located south of the River Suir.

Water Resources: Similarly to Biodiversity, the construction works for all three options will have a temporary, negative impact on water resources. All three options were scored to have a minor negative impact. The potential construction impacts is assessed in Volume B EIAR Chapter 5 Biodiversity, Species and Habitats and Chapter 7 Hydrology.

- **Accessibility and Social Inclusion**

Disadvantaged Geographic Areas: All three bridge options were scored to have a major positive impact on disadvantaged geographic areas. All options would benefit the Clonmel East Urban and West Urban areas, identified as marginally below average and disadvantaged, respectively, according to the 2016 small-area Pobal Deprivation Index.

Vulnerable Groups: All three bridge options were scored to have a major positive impact on vulnerable groups. The bridge options allow for access ramps on the North Plaza, Suir Island and Raheen Road with suitable grades to ensure that the bridges are universally accessible.

Active Travel & Gender: All three bridge options were scored to have a major positive impact on active travel and gender equality. With the increase in visitors and users of a walking and cycling facility and with the addition of public lighting, anti-social behaviour will be discouraged and thus reducing the gender disparity.

Social Inclusion: All three bridge options were scored to have a major positive impact on social inclusion in the surrounding communities. The bridge options will improve access to services, increase social interaction, improve health and wellbeing, reduce crime by increasing visitors and increase accessibility for vulnerable groups.

- **Integration**

Policy, Land Use, Schools & Education, Transport, Tourism and Cycling:

All three options were scored to have a major positive impact on the integration of different Land Uses, Schools/Education establishments, public transport and tourism. Walking and Cycling facilities benefits the integration of amenities and creates a more sustainable and healthy community by:

- connecting different land uses, such as residential areas, commercial districts, and recreational spaces. This integration will facilitate access to essential services and

- amenities, such as grocery stores, healthcare facilities, and parks, without the need for a car. This, in turn, can help reduce traffic congestion and air pollution.
- provide safe and convenient routes for children/students to walk or cycle to educational facilities. This reduces vehicle traffic around schools and promote physical activity among children and thus enhances health and wellbeing of children.
  - The bridge proposals aims to enhance access to public transport systems by providing an additional bus stop in the town centre. The proposals will increase connection to O'Connell Street which contains multiple public transport facilities.
  - The bridge proposals provide opportunities for tourists to explore the town or region in a more sustainable and enjoyable way.

All three bridge options were scored to have a positive impact on the objectives set out in National, Regional and Local Policies as highlighted in EIAR Chapter 2 Project Description and Planning Policy Context.

- **Physical Activity**

Health and Recreation: All three bridge options were scored to have a major positive impact on human health and enhance the access to recreational amenities. The bridge proposal will encourage people to make use of active travel methods for commuting, shopping or recreational activities. Walking and cycling increases cardiovascular health, increases muscular strength and endurance and promotes weight loss. Walking and cycling can also reduce stress and anxiety. The bridge options will enhance access from recreational amenities such as Denis Burke Park, Suir Blueway and Greenane Blueway. The bridge proposal also integrates and enhances access to future planned developments such as the Suir Island Gardens and Clonmel Urban Realm developments.

### 3.6.13 Conclusion

As discussed in **Section 3.6.5** and shown in Table 3-5, the Bridge Options were evaluated based on the Assessment Sub-Criterion highlighted in **Section 3.6.2**. Table 6-5 summarises the outcomes Multi-Criteria Analysis under Main Criteria headings.

As shown in the summary table, under the Economy heading, Options 1 scored more favourably in terms of efficiency, household impact, tourism, wider economic impact and funding requirements. Option 2 scored more favourable in relation to Option 3 due to the funding impact.

Based on the "Safety" criteria, Option 3 score the slightly less favourably compared to the Options 1 and 2 due to the almost 90-degree transition between the Suir Island link promenade and the northern bridge.

Based on the Environmental sub-criterion, the bridge options were scored equally in the criteria except for visual impact and landscape. The bridge proposals of Option 3 is considered to take away from the visual quality compared to Option 1 and 2.

Based on the accessibility and social inclusion, integration and physical activity criteria, all three bridge options were score maximum points.

*Table 3-6: MCA Route Options Assessment Summary (Main Criteria)*

CAF Criteria	Bridge Option 1	Bridge Option 2	Bridge Option 3
<b>Economy</b> (Max Score = 35)	32	31	28
<b>Safety</b>	21	21	19

<b>(Max Score = 21)</b>			
<b>Environment</b> <b>(Max Score = 56)</b>	41	40	39
<b>Accessibility and Social Inclusion</b> <b>(Max Score = 28)</b>	28	28	28
<b>Integration</b> <b>(Max Score = 42)</b>	42	42	42
<b>Physical Activity</b> <b>(Max Score = 14)</b>	14	14	14

From the evaluation presented above, it can be concluded that all bridge options are relatively similar. The main difference between these is the financial investment required for their delivery and their potential to impact on the landscape and visual experiences.

Option 3 requires a higher economic investment for the project delivery, putting it at a disadvantage when compared to the other bridge options. It is evident from the preliminary cost estimates discussed in section 3.5 that Bridge Option 1 is the most cost efficient whilst providing a unique and positive impact on the landscape.

### 3.6.14 Non-Statutory Public Consultation

A non-statutory public consultation for the project was undertaken between 28<sup>th</sup> July and 27<sup>th</sup> August 2021 allowing the public to provide their views and feedback on the different designs presented within this report.

A total of 41 submissions were received by the closing date of the public consultation period. Of these submission, 35 responses were received via the Innovision on-line portal, and 6 responses were received via email by Tipperary County Council's Representative or submitted at the Public Consultation Exhibition at Clonmel Library.

The results obtained from the public consultation showed that the majority of submissions are supportive of the proposed development. 82% of the respondents expressed support to the proposed development implementation. 13% of the respondents were not in favour of the proposed development, and the remaining 5% did not provide any feedback.

Overall, the results showed that the preferred design option was Bridge Option No. 1, which was preferred by 42% of the respondents. This was followed by option No. 2 obtaining a 34% support. 12% chose design option No. 3 and 12% did not provide a response to this section of the survey.

### 3.6.15 Emerging Preferred Option

This section of the report provides justification on the selection of the Preferred Bridge Option proposed for the Suir Island Infrastructure Links Development.

As highlighted in **Section 3.6.4**, a Stage 1 Comparative Assessment of the bridge options were carried out in terms of their engineering, environmental and economic viability. All three bridge options were considered appropriate for further analysis.

**Section 3.6.5** details the Stage 2 Multi-Criteria Analysis based on the Common Appraisal Framework Criteria and the TII Appraisal of Active Travel Modes Sub-Criteria, which resulted in the selection of the Bridge Option 1 as the Emerging Preferred Option.

As summarised in **Section 3.6.7**, the Public Consultation resulted in the selection of Bridge Option No. 1 which was preferred by 42% of the respondents. The results obtained from the public consultation showed that the majority of submissions are supportive of the proposed development. 82% of the respondents expressed support to the proposed development implementation. 13% of the respondents were not in favour of the proposed development, and the remaining 5% did not provide any feedback.

Based on the outcomes of the Multi-Criteria Analysis and the Non-Statutory Public Participation, Bridge Option 1 was selected as the Emerging Preferred Option and progressed to the Preliminary Design Stage, which is assessed in this Environmental Impact Assessment Report for the proposed development.

### **3.7 Alternative Mitigation**

Mitigation measures have been considered based on the effect on quality, duration of impact, probability and significance of effects. The selected mitigation measures for the proposed development are outlined in each of the EIA Report Chapters 4-15 and summarised Chapter 16. By considering a range of mitigation measures and strategies, the environmental assessment team has sought to ensure that the proposed development is as environmentally sustainable and responsible as possible.

In addition to the mitigation measures, the Outline Construction Environmental Management Plan (OCEMP) considers various best-practice measures to efficiently manage the construction works to ensure that sensitive environmental receptors are not significantly impacted upon during the construction works. The OCEMP is appended to Chapter 7 Hydrology of the EIAR (Appendix 7.1).

### **3.8 Construction Delivery Alternatives**

In accordance with the European Commission (2017, p54), this section of the EIAR Chapter describes various Construction Delivery Alternatives which were assessed as part of the proposed development.

#### **3.8.1 Construction Timeframe and Commencement Period**

The construction period and timespan of a project can have significant impacts on environmentally sensitive receptors such as rivers, ecological habitats, human health, air quality, and noise. The following environmental aspects were assessed in the selection process of the construction timeframes and span:

- **Construction Period:** The River Suir is prone to significant flooding events and water-levels regularly inundate significantly large sections of Suir Island. As highlighted in Chapter 2 Project Description and Planning Policy Context, the construction works will entail works within the floodplain but not in the main river channels. The first consideration was given to access to the pier works areas, which means construction of the pier supports (consisting of piling, reinforced concrete pile caps and piers) has to be carried out when the river is not in spate i.e. flooding. This resulted in the proposed commencement period of early-to-mid summer when flood risk is at its lowest. The alternative would require large-scale sheetpiling works to provide access to the works areas, which would impact on flooding and the operation of the Clonmel Flood Defence Scheme, put human lives at risk and could potentially alter the geomorphology of the river, impacting on sensitive habitats.
- **Construction Timeframe:** It is estimated that the construction timeframe to complete the works would take 18-months in total. The design philosophy considered proposals to reduce the construction work timeframes by ensuring the bridge superstructure could be constructed off-

site, transported and placed on supports, thus reducing unnecessary on-site works which would have consisted of large-scale scaffolding, formwork, reinforcement and concrete works which is timely operations in nature. In addition to off-site manufacturing, the design is minimalistic in nature in terms of the number of supports required thus designing for the maximum permissible bridge spans.

### 3.8.2 Construction Compounds

Alternative construction compounds were evaluated early in the project lifecycle. The alternatives identified is shown on Figure 3-4 and summarised below:

- Suir Island car park; and
- Denis Burke park.

The Suir Island carpark consists of an asphalt surface and is located within close proximity to the works areas and access to the proposed North Plaza and Raheen Road works can be facilitated via Old Bridge Road. The carpark is protected by the existing flood defence berm which was constructed during the Clonmel Flood Defence Scheme works.

The Denis Burke Park compound option was not considered feasible with its close proximity to the spate Suir River during heavy rainfall periods. Although long-term material storage is not envisaged for the construction works, pollutants, construction chemical storage units and bunded refuelling areas would pose a risk to the environment and human health in the event of flooding. Due to the relatively isolated nature of this compound option in relation to the works on the North Plaza, this option would have resulted in increased fuel usage (longer travel distance and idling times at traffic junctions) and thus increasing the potential emissions of greenhouse gasses compared to the Suir Island carpark alternative.

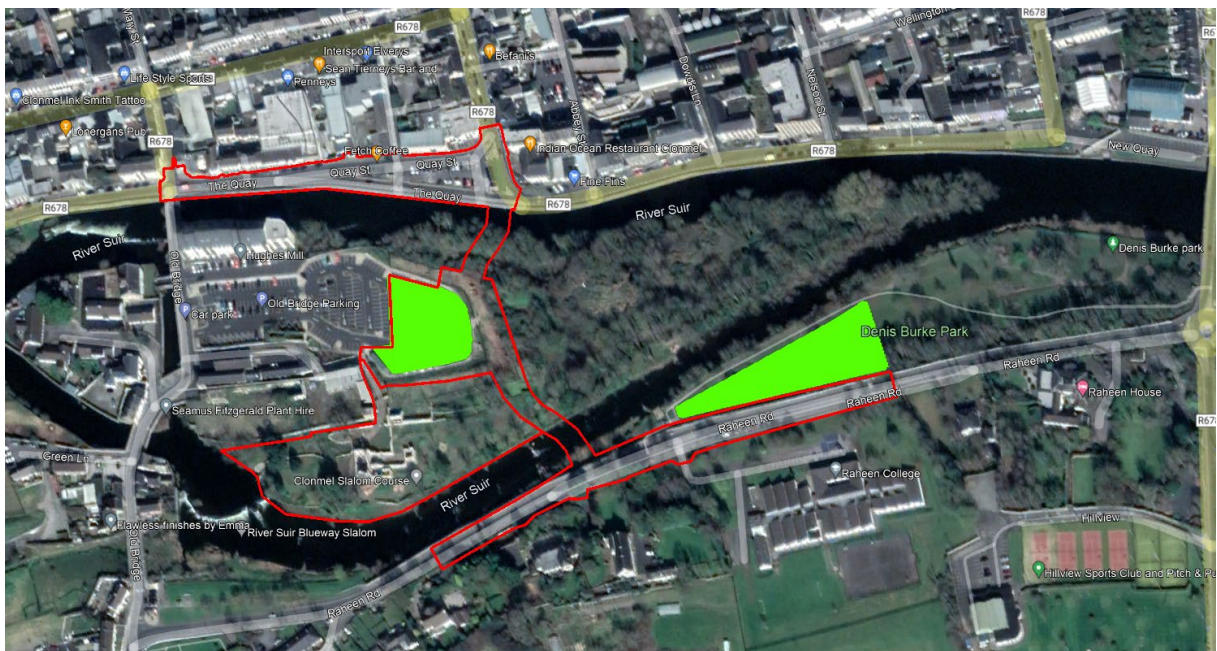


Figure 3-4: Alternative construction compounds

### 3.8.3 Alternative Transport Route and Site Access

As shown in Figure 3-5, three primary transport and access routes are identified from the National Road (N24) to the proposed site location. The assessment of the options are summarised below:



- Option 1 (green) commences from the N24/R689 junction and heads southwards through the centre of Clonmel via the R689, Thomas Street, Dillon Street, The Mall Street and New Quay up to the site, equating to a total distance of 1.65km.
- Option 2 (yellow) commences from the N24/R707 (Davis Road), and heads westwards through Clonmel via the Davis Road, The Mall Street and New Quay up to the site, equating to a total distance of 2.80km.
- Option 3 (red) commences from the N24/Cahir Road junction and heads eastwards through Clonmel via Cahir Road, Abbey Road, Irishtown Road, Bridge Street and The Quay towards the site, equating to a total distance of 2.80km.

Based on the above alternatives, it is recommended that all transport to the site be limited to Option 1 via the N24, Thomas and Dillon Streets. Making use of the shortest route alternative through the town centre of Clonmel would lessen greenhouse gas emissions from delivery vehicles due to reduced idling at traffic junctions.

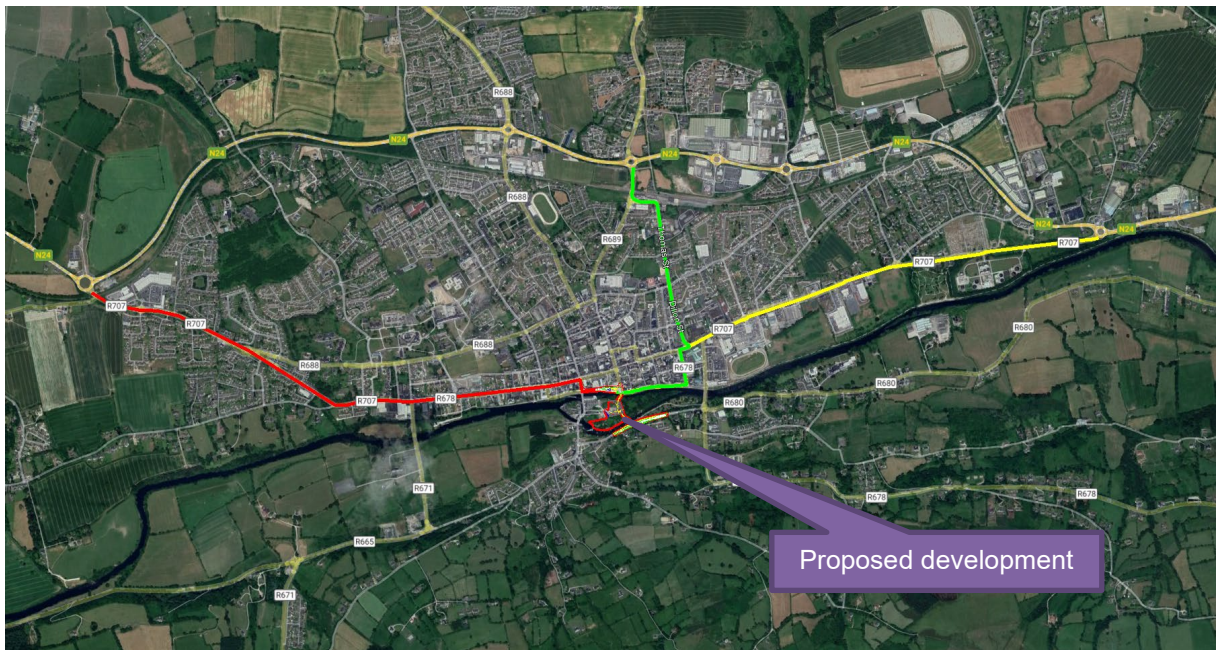


Figure 3-5: Alternative transport and site access routes

### 3.8.4 Alternative Construction Processes and Equipment

The following high-level construction processes were considered during the design of the proposed development:

- Sustainable Construction Practices: The implementation of sustainable construction practices were assessed to reduce the overall environmental footprint of the project. This included using environmentally friendly materials and employing energy-efficient technologies thus minimising resource consumption, waste generation and carbon emissions;
- Pre-fabrication and Modular Construction: The bridge superstructure, handrails, lighting components, access ramps and steps will be manufactured off-site. This approach reduces construction time, waste generation, and disturbance to surrounding areas. This process was aimed to provide for a more controlled construction environment aimed at facilitating the integration of sustainable features into the development design.
- Low-Impact Construction Techniques: The assessment of utilising low-impact construction techniques such as non-invasive foundation construction techniques such as piling, non-

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destructive excavation, and minimising tree removal was carried out to minimise any potential impacts on habitats, soils, hydrology, and ecologically sensitive receptors.

- **Noise and Vibration Mitigation:** The use of percussion/vibratory-related construction techniques will be strictly prohibited for the construction of the proposed development elements such as piling. Alternate techniques such as driven, bored or augured techniques will be employed to minimise noise and vibration during the construction works.
- **Environmental Monitoring and Management:** Various monitoring and management strategies are available to ensure that early-intervention on potential impacts can be carried out to manage construction risks. These strategies involve proper implementation of management plans (OCEMP, H&S, Traffic, Waste etc), providing qualified staff to oversee the works and the implementation of real-time monitoring devices for air-quality, water quality and noise levels.
- **Construction Equipment:** In so far as practical, the selection of construction plant and equipment should be electrically powered, which is quieter than combustion-engine powered equipment. Alternative methods considered included fitting suitable anti-vibration mountings to equipment to reduce noise and vibration emissions, limiting the size/scale and number of plant operating at one time and locating noise generating equipment such as generators suitably far enough from sensitive receptors. The proper management of construction equipment is crucial in the process of environmental management and is highlighted in further detail in the OCEMP included in Appendix 7.1 of the EIAR Chapter 7 Hydrology.



**Clifton Scannell Emerson Associates Limited**, Civil & Structural Consulting Engineers

3rd Floor, The Highline, Bakers Point, Pottery Road, Dun Laoghaire, Co. Dublin, A96 KW29

T. +353 1 288 5006 F. +353 1 283 3466 E. [info@csea.ie](mailto:info@csea.ie) W. [www.csea.ie](http://www.csea.ie)

