ATKINS

Fingal County Council
(in association with the National Transport Authority)

Royal Canal Greenway

Feasibility Report

December 2012

Plan Design Enable

Royal Canal Greenway

Feasibility Report

October 2012

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Executive Summary

This study examined the engineering feasibility of upgrading the existing towpath along the Royal Canal to meet the objectives as set out in Chapter 1 of this report.

The study included widespread consultations with identified key stakeholders and the general public.

A total of 24 submissions were received from the public during the consultation period.

The consultation period revealed an overall level of support for the project but also highlighted that there are important environmental and ecological issues to be addressed.

A desktop study and numerous site visits were undertaken to establish the constraints and develop a working knowledge of the issues along the proposed route. A constraints map was produced to identify the critical matters and assist in the development of route options. The constraints study examined both the engineering and environmental aspects of the proposed route.

An opportunities map was also developed to identify areas where potential benefits of the project could be maximised. It was proposed that all “opportunity” items identified would be brought forward to the final emerging preferred route option.

Options were generated for the identified constrained areas along the route. These options were assessed against agreed criteria and their effectiveness in meeting the stated project objectives. The evaluation process permitted the emerging preferred option to be extracted from the data gathered and is presented in Chapter 7 and Appendix A.

The overall capital cost of the emerging preferred option was estimated at circa € 8.3 million exclusive of VAT. A reduced option would cost €6.2m.

The emerging preferred option was also subjected to a preliminary screening process to determine whether the proposals should be subjected to an Environmental Impact Assessment in accordance with prevailing legislation. A technical paper was commissioned which found that the scheme to date does not automatically require an EIA, but that the local authority should give appropriate consideration to the sensitivities of the receiving environment along the canal corridor in any future upgrading project.

The local authority, following consideration of the potential environmental impacts of an upgrading project, may deem the project to require an EIA. Where it is determined that the development does not require an EIA, the appropriate route for the Statutory Approval would be in accordance with Part 8 of the Planning and Development Regulations.

Detailed ecological information is currently available between 10th lock at Ashtown and 12th lock at Castleknock and this should provide a basis for determining if an EIA is required for any future upgrading works to this easterly section.

The study includes a costing for the emerging preferred option. However short term cost-sensitive solutions were identified where the key benefits of the scheme could be delivered immediately without prejudice to the longer term project goals.

1. Introduction

Background

1.1 Fingal County Council and the National Transport Authority have identified the Royal Canal as having the potential to become a strategic regional cycling route in the Greater Dublin Area. This report has been commissioned to examine the feasibility of upgrading the Royal Canal towpath within the Fingal County Council area to a shared cycle / pedestrian route in conjunction with Waterways Ireland who are the custodians of this important public asset.

1.2 The study area is defined as the Royal Canal corridor commencing at the eastern county boundary at the 10th Lock (Longford Bridge), Ashtown and continuing along the Royal Canal to the western county boundary at Confey, immediately east of Leixlip. This distance is approx. 11.5 km.

Proposed Scheme Objectives

1.3 The objectives for the scheme are out outlined as follows:

1.4 **Primary Objective** – to provide a premium quality cyclist and pedestrian route in order to encourage and promote cycling in the Dublin Region in accordance with the stated objectives of the National Cycle Policy Framework, Greater Dublin Area: Draft Transport Strategy, Regional Planning Guidelines for the GDA and Fingal County Development Plan 2011-17.

1.5 Secondary Objectives –

- To improve the canal corridor as a recreational cycle and pedestrian route;
- To improve connectivity between the canal and adjacent public transport;
- To improve inter-connectivity between the canal and adjacent (existing and proposed) residential neighbourhoods;
- To increase and promote the amenity value of the resource;
- To increase and promote the historical and heritage value of the resource;
- To increase the accessibility of the resource to all users.

Existing Situation

1.6 The Royal Canal is an important and historic feature in Dublin's urban fabric which connects the city centre with its western suburbs and the adjoining counties. The canal corridor in the Fingal area can be divided into three distinct geographical sections based on the existing character of the Royal Canal. These are as follows:

Area 1: Longford Bridge (Ashtown Road) to Granard Bridge (Castleknock Road)

1.7 The towpath in this area is generally constructed on a flat gravel/tarmac path along the southern side of the canal corridor. it has open views to urban development and major infrastructure on both sides of the canal. The towpath is generally at the grade of the canal itself and is located immediately adjoining to the Dublin-Sligo railway line to the south.

Area 2 – Granard Bridge (Castleknock Road) to Callaghan Bridge (Clonsilla Road)

1.8 The towpath comprises of a gravel path on a steep gradient at the various access points with the remainder being a narrow rough dirt track along the corridor. This section includes the Deep Sinking area where there is a significant grade difference between the towpaths and water surface

of the canal. In addition, the railway line is elevated above the level of the towpath with existing housing development present on both sides of the canal corridor.

Area 3 – Callaghan Bridge (Clonsilla Road) to County Boundary (Confey)

1.9 This section of the towpath on the northern bank consists of a dirt track on relatively flat lying ground with the exception of access points from the road network which are on a steep gradient. The path is flanked by mature hedgerows and the railway is elevated above the grade of the canal.

1.10 The current undeveloped character of this area is planned to change as the adjacent zoned residential lands are developed at Hansfield Strategic Development Zone (SDZ) and the Barnhill Local Area Plan.

1.11 All above areas are shown on drawing 3098SK042 Revision 0 overleaf.

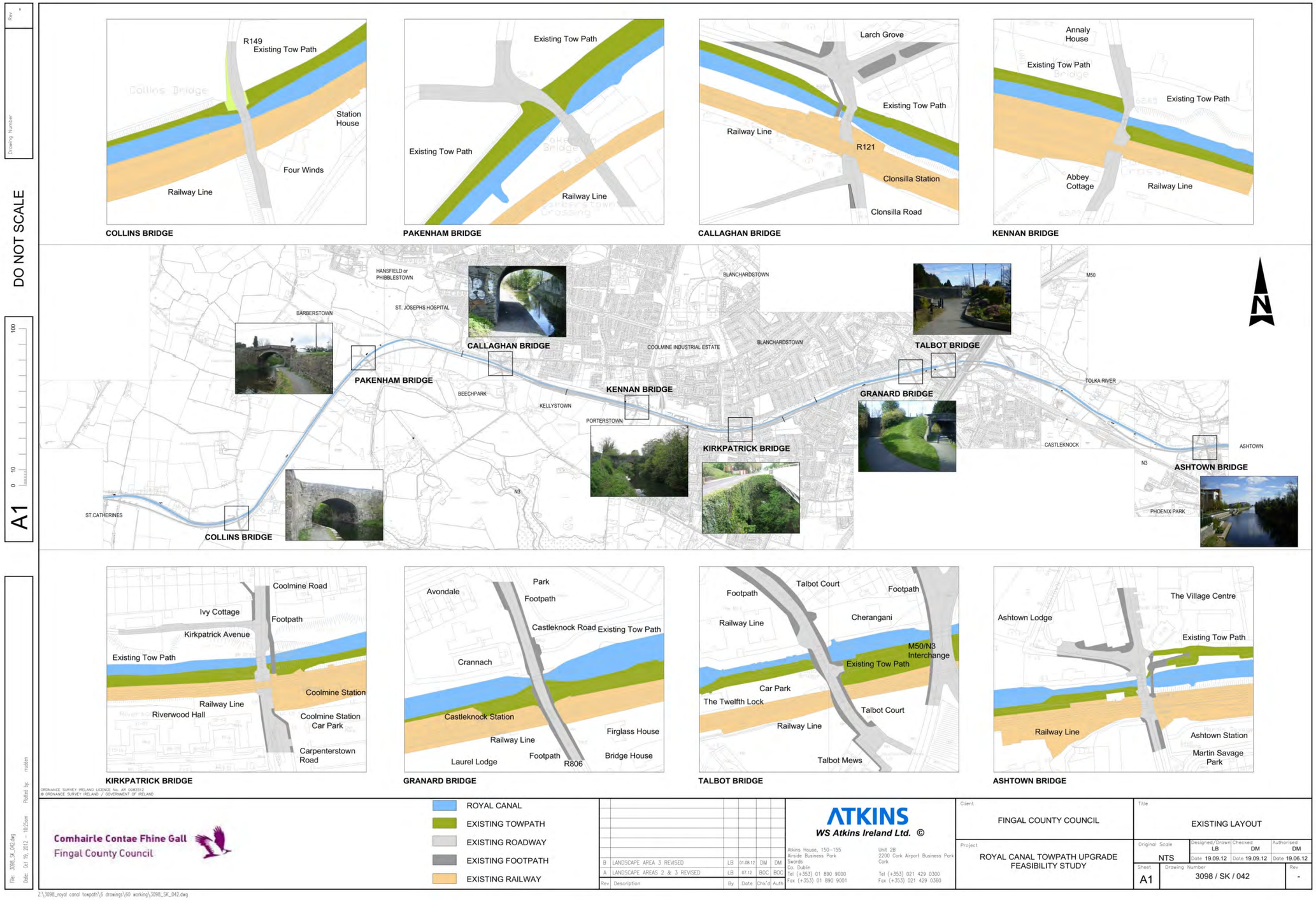

Figure 1.1 - Existing Layout

2. Scheme Context

Planning Policy & Guidance

2.1 In undertaking this feasibility study, a number of plans, guidance documents reports and project references were reviewed. This section summarises the main sources of reference starting with national, regional and local policy and then describing the various existing studies and best practice guidance documents published with regards to the Royal Canal Towpath and cyclepaths in general.

National Transport Policy

Smarter Travel and National Cycle Policy Framework

2.2 In February 2009, the Smarter Travel Policy document for achieving a sustainable transport system for Ireland was published, this document outlines a number of policies to encourage a modal shift away from private car use and promoting public transport, walking and cycling.

2.3 In April 2009, Ireland's first National Cycle Policy Framework (NCPF) was issued, the vision of the policy is "all cities, towns, villages and rural areas will be bicycle friendly. Cycling will be a normal way to get about, especially for short trips". The aim of this framework is to encourage a culture of cycling to the extent that 10% of all trips will be completed by bicycle by 2020.

2.4 The National Cycle Policy Framework also sets out the objective of creating a national cycle network around Ireland and using disused railway lines and canal/river towpaths as cycling and walking routes to achieve this.

Regional Cycling Policy

Strategy for the Development of Irish Cycle Tourism 2007

2.5 This document highlights the need for renewing the popularity of cycling in Ireland and how tourism generated through this sector can increase visitor spending in rural and urban areas. Guidance is also given on the types of roads suitable for a national cycle network along with the provision for cycling facilities eg. signage.

Regional Planning Guidelines for the Greater Dublin Area: 2010-2022

2.6 This document provides the development strategy for the Dublin and Mid-East regions over the plan period. It emphasizes the role of the capital city in future economic growth of the region and the need to ensure it is an attractive, vibrant location for industry, commerce, recreation and tourism. Development in the GDA shall be directly related to investment in high quality public transport and focused on achieving a compact urban form.

2.7 The strategy considers that a minimum of 10% of all trips should be by bicycle by 2020. It emphasizes the integration of cycle routes and infrastructure into new development and communities as key component of the delivery of greener transport travel patterns. Programmes to support this objective and create a culture of cycling should be pursued as well as promoting the tourism benefits of improved cycle networks within the GDA.

Greater Dublin Area: Draft Transport Strategy 2011-2030

2.8 The National Transport Authority was set up in 2009 to develop greater use of sustainable modes of transport across the country. The Authority's Greater Dublin Area Draft Transportation Strategy 2011-2030 sets out a vision for *"a competitive, sustainable city-region with a good quality of life for all"*.

2.9 The five overarching objectives for the Strategy to support this vision are:

- Build and strengthen communities

- Improve economic competitiveness
- Improve the built environment
- Respect and sustain the natural environment
- Reduce personal stress

2.10 The plan provides the transport strategy for the Greater Dublin area to 2030. It highlights the need to integrate land use and transport planning in achieving a consolidated urban area supported by non-private vehicle movement. The environment for pedestrians and cyclists needs to be improved to encourage a much greater proportion of trips to be made on foot, by bicycle or public transport. Dublin is to become a recognized walking and cycling city-region with a street environment that is attractive, safe and pedestrian/cyclist orientated in design.

2.11 Section 9.5 of the Strategy proposes identified measures to encourage and increase the share of cycling journeys including new routes, networks and infrastructural provision. Measure WCY 13 specifically seeks the provision of the Royal Canal as a cycle track for commuter and leisure cyclists.

County Policy

Fingal County Development Plan 2011-2017

2.12 The core strategy of the plan is to consolidate new development along defined corridors in accordance with the identified settlement strategy. Integration of land use and transport infrastructure is a key objective in achieving sustainable development within the county. The plan seeks the development of a green infrastructure network across the county including the transport aspects of such assets.

2.13 The Development Plan sets out to promote and facilitate movement within and to the County through the integration of land use with a sustainable transport system. Priority is given to public transport, walking and cycling. There is a dedicated section in Chapter 4 of the Development Plan that deals with Cycling and Walking. The emphasis in the Development Plan is on the promotion and facilitation of sustainable forms of transport of which cycling is a key component. Objective TO10 seeks to Promote and incorporate the objectives contained within the Government's National Cycle Policy Framework 2009 – 2020.

2.14 Cycling is also promoted in the Development Plan as a significant form of leisure. Section 8.4 Rural Enterprise, Cycling and Walking, seeks to promote the development of cycling in rural areas as a form of recreation.

2.15 Specifically Objective RE37 highlights the county's aim to 'investigate the possibility of developing named linear cycle routes within Fingal utilising existing natural or human-made corridors such as riversides and abandoned road and rail infrastructure'.

2.16 The Development Plan features an Objective AH34 'Protect and enhance the built and natural heritage of the Royal Canal and ensure that development within its vicinity is sensitively designed and does not have a detrimental effect on the character of the Canal, its built elements and its natural heritage values'. The canal corridor also has a Specific Objective as a Designated Nature Conservation Area.

2.17 Figure 2.1 Overleaf is an extract from the Fingal County Development Plan showing the overall planning context in terms of land use zoning.

2.18 Chapter VIII of the County Development Plan aims to improve the amenity and recreational value of the Royal Canal without causing significant disturbance to the Canal's natural heritage.

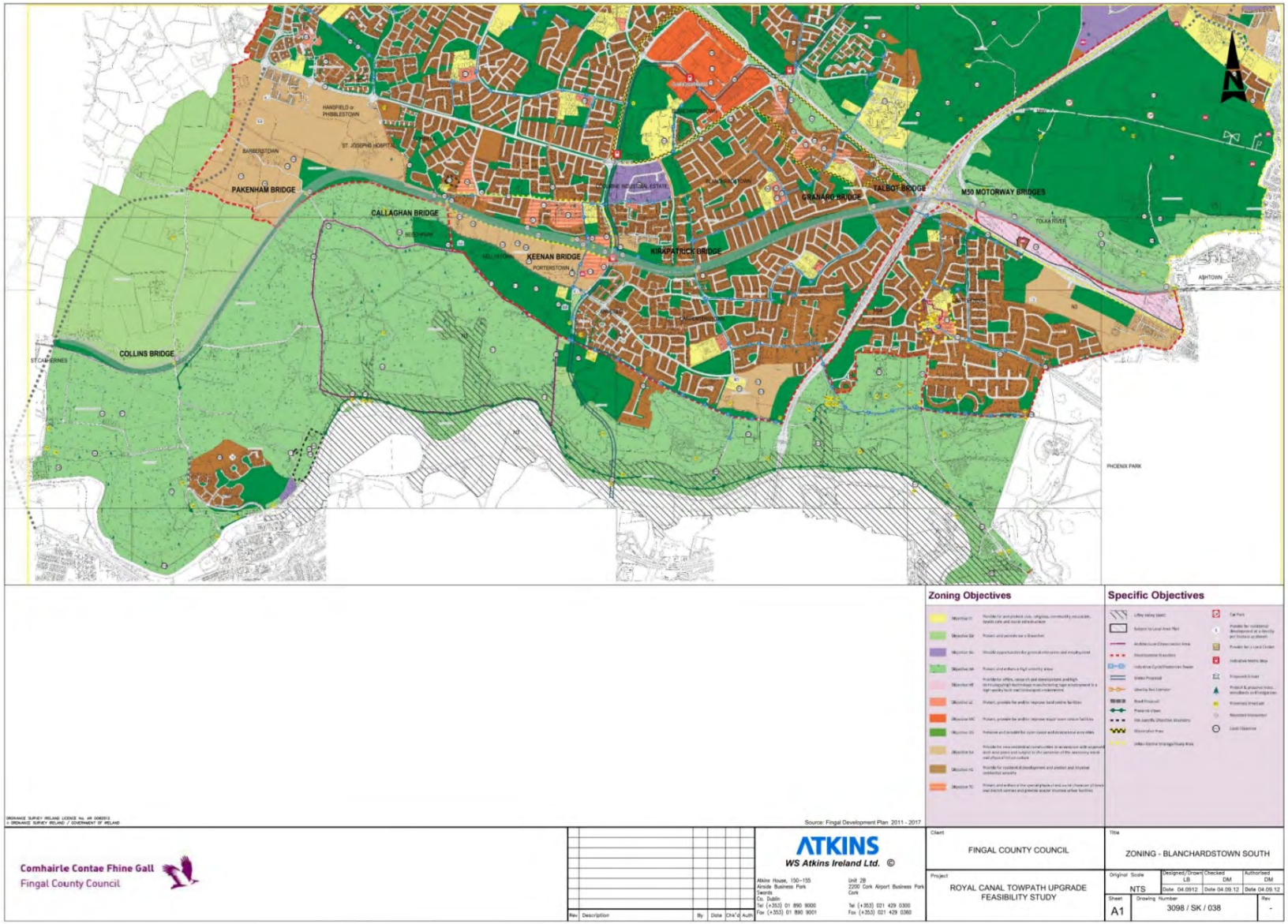

Figure 2.1 - Fingal County Development Plan, Land Use Zoning

Existing Studies

Royal Canal Planning and Development Strategy for Fingal 2008

2.19 The main objectives of the Planning and Development Strategy are to;

- Promote the royal canal as a site for education and enjoyment of the environment for all
- Support sustainable economic development that is compatible with the character of the royal canal
- Improve security and safety along the canal corridor
- Promote the royal canal as an recreational resource
- Establish a programme to implement and deliver the royal canal strategy

2.20 It is hoped that the above objectives will help achieve the vision that 'the royal canal will be a high quality, vibrant and attractive linear greenway recognised and protected as a recreational, historic and natural resource'.

Dublin City Canals – Recreational Tourism & Commercial Product Identification Study & Development of an Investment and Maintenance Framework July 2009

2.21 Scott Wilson were commissioned by Waterways Ireland with DCC, Failte Ireland and the Dublin Docklands Development Authority to undertake a recreational, tourism & commercial potential of the Dublin City Canals and associated docks within the Dublin City Council boundary. Through stakeholder consultation the following proposals for programmes were highlighted as helping achieve the overall vision of a healthier, wealthier, vibrant and attractive canal corridor;

- Canal corridor widening and parks integration programme
- Boundary enhancement and screening programme
- Canal Garden scheme
- Habitat and landscape enhancement programme
- Interpretation and signage programme
- Canal Arts and Culture programme
- Animation programme
- Pedestrian safety programme
- Canal wardening/ranger scheme

An Ecological Survey of the Grand & Royal Canals in Dublin 2011

2.22 This survey found that both canals supported a number of semi-natural habitats and important habitat corridors within a heavily urbanised area. The study also found only a few of the habitats were of high conservation importance in the broader sense but given their urbanised setting they were of great importance.

2.23 A number of protected species were noted, such as the otter and the opposite leaved pondweed and endangered species such as the snail *Myxas glutinosa* indicate the canals are of high value in maintaining biodiversity in the Dublin Area and beyond. It is believed that maintaining their populations in the canals in Dublin could be vital to their continued survival in Ireland.

2.24 Overall the report found 'the Grand and Royal Canal despite being man-made are now very important refuges for flora and fauna within Dublin and with careful management and protection can continue to provide amenity value to people while not compromising their value to nature conservation'.

Royal Canal Premium Cycle & Pedestrian Route 2011

2.25 A feasibility study for upgrading the existing Royal Canal towpath from Cross Guns Bridge (Westmoreland Bridge) to Reilly's Bridge (Ratoath Road Bridge) was carried out by Clifton Scannell Emerson Associates. This section of the canal is within the Dublin City Council area and would join two existing upgraded sections of the towpath.

2.26 Proposed future upgrading of this part of the canal (5th to 8th locks) includes the following;

- 3.5m wide shared pedestrian/cycle route kerbed on both sides
- Disabled access with ramps no steeper than 1:20
- Integrate new route with existing/proposed routes in locality
- New bridge & access at Shandon Park
- Public lighting
- CCTV system
- Security Fencing
- Landscape upgrade

2.27 Several constraints along the proposed route for the above upgrade were highlighted such as steep access points, anti-social behaviour, restricted head height for cycle access under bridges and protected species etc.

3. Stakeholder Consultation

Consultation

3.1 Consultation with all major stakeholders along the route including the general public took place as part of the feasibility study for the upgrade of the Royal Canal towpath. These consultations were undertaken between the 5th April 2012 to the 14th June 2012.

3.2 Given the environmental sensitivity of the canal corridor, it was agreed that individual meetings would be arranged with major stakeholders to effectively discuss and understand the major concerns and limitations on any feasible development options.

3.3 Other larger voluntary organisations with a vested interest in the conservation of the canal heritage and promoting the use of the canal were contacted and consultation meetings held.

3.4 Written submissions from smaller local interest groups and the general public would be invited via a public advertisement to be circulated in local newspapers and erected at selected entry points to the canal towpath within the study area.

3.5 A full summary of the stakeholder consultation process can be found in the Stakeholder Consultation Report (Atkins Document Reference: 3098DG008). A summary of the report is provided below.

Waterways Ireland

3.6 Meetings were held with Mr Mervyn Hamilton of Waterways Ireland on 5th April 2012 and 24th April 2012. Mr Hamilton noted that Waterways Ireland would be in favour of the project provided that the level or scale of development is consistent with the heritage character and cognisant of the environmental sensitivity of the existing canal corridor. Mr Hamilton also stated that conservation of the canal's heritage value is also a key concern of Waterways Ireland.

3.7 In developing the canal towpath, it would be of benefit to Waterways Ireland if the proposed path could be designed to accommodate existing Waterways Ireland maintenance machinery, including 20T wheeled excavators for effective dredging of the canal. However, it was agreed that smaller maintenance vehicles such as 4x4 jeeps or similar are accommodated as a minimum requirement and where feasible.

3.8 Further consultations were held with Ms Paula Treacy of Waterways Ireland's Environmental Department. Ms Treacy noted the environmental sensitivity of the canal corridor in general and its potential for protected species habitats. Specific information on the Royal Canal is available through the following publications:

- Ecological Survey of the Royal Canal Part 1 – 1990
- Ecological Survey of the Royal Canal Part 2 – 1990
- Fingal County Council Flora Report – 2004
- Fingal County Council Mammal Report – 2004
- The Royal Canal Architectural, Engineering and Industrial Heritage Assessment – 2007
- Survey of the Aquatic Mollusca of the Grand and Royal Canals – 2010
- Ecological Survey of the Grand and Royal Canals in Dublin – 2011 (From Ashtown to the M50)
- Various reports from Inland Fisheries Ireland

3.9 Following a site meeting with Dr Maurice Eakin of the National Parks and Wildlife Service (NPWS) (refer to paragraph 3.39), the options for widening the existing towpath into the canal water body was discussed with Mr Mervyn Hamilton. Mr Hamilton noted that Waterways Ireland tend not to agree to such measures but in this case, given the width of the canal channel, there was scope to consider such proposals as the net effect on the navigable channel would be negligible.

Irish Rail

3.10 Atkins met with Mr Nick West of Irish Rail on 1st May 2012. The consultation included a walk along the canal towpath between Ashtown Station (Longford Bridge) and Clonsilla Station (Callaghan Bridge).

3.11 Mr West's main concerns were as follows:

- Where the railway line borders the existing towpath (Longford Bridge to Kennan Bridge), security of the line with respect to trespassers. It was noted that there is a history of trespassing on the railway due to anti-social behaviour and underage drinking. Mr West noted that the existing fencing was lacking in some areas and that incidences of trespassing on the line would most likely increase should the towpath be developed.
- Through the area of the Deep Sinking, any future proposals to widen the towpath into the existing embankment would require careful consideration of the railway line above. Mr West requested that the channels of communication are maintained between the local authority and Irish Rail in this regard to ensure that all solutions can be considered at the earliest possible opportunity.
- Mr West noted Irish Rail's intent to close level crossings and provide alternative (and safer) routes to cross the railway. It was agreed that these proposals should be taken into account when developing design options for the feasibility study, where possible.

3.12 A further consultation with Mr West took place on 6th July 2012 at Pearse Station. At this meeting a number of options for the development of the towpath were presented to Mr West for comment. The options focussed on the difficult area of the Deep Sinking.

3.13 Mr West advised that Irish Rail would prefer if a cantilever boardwalk type option was adopted as it would have minimal impact on the adjacent embankment. Thereafter, where it is not feasible to avoid the embankment, a secant pile wall options is preferred followed by a king-post retaining system. Options which require large areas of excavation to be left open are least preferred.

3.14 At this second consultation, Mr West also suggested that the project seeks to improve the existing masonry retaining wall structures supporting the railway and provides for security fencing along the railway in the interest of deterring trespassers on the railway which is an ongoing safety concern for Irish Rail.

Fingal County Council – Conservation & Heritage

3.15 The development of the Royal Canal as a pedestrian and cyclist route is underpinned by the Fingal County Development Plan and by the Royal Canal Strategy (2008). To consult in relation to particular issues, a meeting with Mr Gerry Clabby, Fingal County Council Heritage Officer and Ms Helena Bergin, Fingal County Council Conservation Officer, was held on 12th June 2012.

3.16 Mr Clabby noted that any proposals should aim to retain the existing undeveloped character of the canal corridor as much as possible. Notwithstanding the above, it was also noted that there may need to be "trade-offs" between the level of development required and the existing natural environment at certain locations, e.g. at interfaces with existing roads where gradients will need to be amended to better accommodate the mobility impaired.

3.17 It was further noted that public lighting will be considered in the development of options for the Greenway. This is to ensure that the proposed route is an attractive option for the cyclist

commuter, especially during the winter months when the morning and evening commutes will most likely be in the hours of darkness. Mr Clabby advised that any such lighting system may have an adverse affect on bats which are a protected species under Irish legislation. However, it was considered that the lighting system could utilise modern auto-dimming technology, effectively turning the lights off during the night and early hours of the morning.

3.18 In terms of habitats, Mr Clabby noted that Fingal County Council has limited information and habitat mapping for the Royal Canal corridor and that this would be made available to the Consultant team. It is vital to the success of the project that habitats of protected species are known as early as possible so that appropriate measures can be taken and effective project planning maintained.

3.19 Ms Bergin advised that the entire canal should be carefully considered including the historic bridge structures. In this regard, works to the towpath and access points should be kept to the minimum required to achieve the project goals. It was also noted that where guidance for mobility impaired dictates that extensive works would be required; the project team are encouraged to enter into dialogue with the National Disability Authority to develop an acceptable compromise solution.

Inland Fisheries Ireland

3.20 Mr Paul McLoone of Inland Fisheries Ireland was consulted on 29th June 2012.

3.21 Mr McLoone noted that construction of a proposed cycle / pedestrian route would ideally leave a 1 - 2m marginal buffer along the canal bank. He also indicated that best practice should be used during any proposed construction process to ensure that disturbance of vegetation is minimised, special care is taken when working with deleterious materials (oils, fuels, wet concrete etc), and runoff is controlled to eliminate any risk of sedimentation of the waterbody.

3.22 With regard to angling activities, Mr McLoone indicated that parts of the canal are used by coarse anglers who sometimes use extended fishing poles (up to 12 m long). Mr McLoone indicated that there may be potential issues in some areas where the proposed facility may interfere with current angling practices.

Inland Waterways Association of Ireland

3.23 Mr Mick Kinahan of the Inland Waterways Association of Ireland (IWAI) was met on the 14th June 2012.

3.24 In general, Mr Kinahan noted that the IWAI was in favour of the project. He particularly welcomed the addition of amenity areas along the canal and would especially welcome additional jetties / marina facilities for boat users.

3.25 Mr Kinahan expressed a desire for the towpath to be opened up and the visibility between the canal and the towpath to be restored, especially in the area of the Deep Sinking where the canal banks are currently overgrown.

3.26 There was no objection to a possible public lighting system provided that it is habitat sensitive.

3.27 Mr Kinahan also noted the presence of protected species along the canal corridor, including Mandarin Duck and Kingfisher.

Royal Canal Amenity Group

3.28 Mr Noel Spaine of the Royal Canal Amenity Group (RCAG) was consulted on 14th May 2012.

3.29 Mr Spaine noted that the RCAG are 100% in favour of this project.

3.30 The RCAG had no objection to the potential 3.5m footpath / cycle track width.

3.31 While the difficulties in developing the towpath within the Deep Sinking area were acknowledged, Mr Spaine advised that he would still prefer to see a lesser path developed through this area rather than (or as well as) an alternative parallel route.

3.32 Areas at Hansfield and the 12th Lock were identified as potential amenity areas to facilitate boaters. A third area at the 11th Lock was also suggested, although this area has a history of frequent anti-social behaviour and is a known location where underage drinkers congregate.

3.33 Mr Spaine advised that the RCAG would also be providing a written submission in response to the public notice published in the local papers.

The Twelfth Lock Hotel / Castleknock Marina

3.34 Efforts to contact the reputed owner of the above premises were unsuccessful and consultations with the Twelfth Lock Hotel / Castleknock Marina were not possible.

National Parks and Wildlife Service

3.35 Department of the Arts, Heritage and the Gaeltacht (within which National Parks and Wildlife Service now resides) was consulted on 30th April 2012. Information on background ecological information regarding the Royal Canal corridor between Ashtown and Leixlip was requested.

3.36 It was noted that the canal is known to support consistent otter activity along its course although no formal information on this is currently available.

3.37 The woodland areas along the canal route are of an obvious value to bats. No detailed information on the existence of bat roosts is currently available.

3.38 The canal banks and margins support pockets of semi-natural grassland some of which are orchid rich.

3.39 A further consultation was held with Dr Maurice Eakin of the National Parks and Wildlife Service on 22nd August 2012. This consultation included a site walkover through the Deep Sinking area.

3.40 Dr Eakin was concerned about the potential removal of an approximate 200m stretch of riparian margin species. This stretch occurs at the pinch point between the railway retaining wall and the canal bank, located approximately 400m west of Castleknock Station. Potential solutions to maximise the retention of the riparian zone were discussed at length for inclusion in the study process.

3.41 Dry grassland supporting species of high importance was identified within the area of the Deep Sinking. The options for upgrading the towpath within this particular area were discussed. It was considered that option of the retaining wall along the length of the Deep Sinking could potentially have a major negative impact on such species. The cantilever option was favoured due to the minimal impact on the dry grassland and on the riparian margins at the water's edge below.

3.42 There were no issues anticipated with the proposed scheme either side of the Deep Sinking area. It was deemed unnecessary to extend the site visit to these areas.

3.43 With respect to the provision of public lighting along the route, Dr Eakin suggested that best practice, as provided on the recent Grand Canal route, should be followed. The Grand Canal route used various mitigation measures to minimise the impact on bats. Baffles and short column heights were included in the design to effectively limit the level of light spill onto the waterbody. A dimming system was also introduced so that lighting could be automatically dimmed or switched off during the hours of dawn and dusk, when bats are feeding and most active.

3.44 It was noted that the issue of bats and proposed lighting was only prevalent in the summer months as bats hibernate for the winter.

3.45 Otters are known to be active along the canal corridor and are a protected species. The proposed construction activities are unlikely to adversely affect any existing otter habitats. However, a detailed habitat survey for protected species would need to be carried out.

Dublin Fire Brigade

3.46 A consultation meeting was held with Dublin Fire Brigade on 10th August 2012 to discuss issues relating to the emergency response services.

3.47 Currently, emergency access to the canal is via existing adjacent properties and gardens. It was considered that any improvement in access would be very beneficial to the emergency services. Access for a fully loaded ambulance of approximate fully laden vehicle weight of 4.5 tonnes would be ideal. However, where such provision would be unfeasible, access for a standard vehicle such as a standard car or a 4x4 jeep would be sufficient.

3.48 It was also noted that the provision of location markers would be of great benefit. Such measures would allow a member of the public to pin point their location in the event of a call to the emergency services. Markers could be provided on lighting columns or life buoys, where present.

3.49 It was noted that some form of vehicle prohibition would be provided to ensure that unauthorised vehicles did not have access to the canal towpath. This would most likely be in the form of removable gates or bollards which would permit the occasional use by maintenance personnel and vehicles. While fire tenders do carry keys for local authority controlled facilities, any locks provided on removable bollards or gates must be accessible to bolt cutters to allow quick access in the event of an emergency.

3.50 In terms of access to the canal itself, the provision of the pedestrian guardrail throughout the area of the Deep Sinking would make access to/from the water difficult. It was discussed that some form of access point would be preferable where either an access hatch or ladder attachment could be incorporated into the design of the guardrail. For the cantilevered boardwalk option, this ideally would also include an emergency hatch in the “floor” where the difficulties of the boardwalk overhang could be eliminated.

3.51 Dublin Fire Brigade requested that ongoing consultations are carried out as the project progresses.

General Public & Local Interest Groups

3.52 It was decided the most appropriate method of seeking public engagement would be to put a public notice in local newspapers inviting observations and suggestions from the public.

3.53 A total of 24 (twenty-four) submissions were received from the public before the stated deadline of 27th May 2012. There was broad support for the use of the canal towpath as a pedestrian / cyclist route and its potential as a public amenity.

3.54 The main points of concern were as follows:

- Loss of rural character/environmental sensitivity
- Antisocial behaviour/rubbish
- Access
- Provision of signage & amenities
- Phasing of works
- Integration with local community
- Safety of users and local residents

3.55 It is recommended from the stakeholder consultation the following points are taken into account for the feasibility study:

- Consider the safety and antisocial behavioural security aspect of the canal towpath and how the provision of public lighting and/or remote CCTV monitoring might alleviate the problem.
- Provide adequate facilities to cater for all members of the public, including a carefully measured and balanced approach to maintaining the rural character of the canal corridor and protecting its environment and heritage.
- Provide a balance of amenities to promote the recreational aspect of the canal.
- Seek to create safe and unhindered access to the canal towpath through improvement of existing access points and provision of additional direct links to adjacent residential areas.
- Seek to protect and enhance the structural heritage of the canal, i.e. the existing canal bridges and the canal channel.
- Provide signage to communicate distances to key destinations along the canal corridor.
- Erect information plaques at various locations giving a brief history of the canal and its heritage.
- Consider where measures to assist in the reduction of littering and fly tipping can be incorporated into the development of scheme options.

4. Constraints

Constraints General

4.1 A constraints study was carried out comprising of a desktop study and review of existing literature and reports, and various site walkovers conducted by environmental, ecological and engineering consultants in April 2012.

4.2 The identified constraints were listed and discussed to form the Constraints Map provided at Figure 4.1 at the end of this chapter. These constraints are provided in detail below. The engineering constraints are followed by the environmental constraints and are described as travelling westwards from Longford Bridge / Ashtown Road.

Engineering Constraints

Area 1: Longford Bridge (Ashtown Road) to Granard Bridge (Castleknock Road)

4.3 **Longford Bridge:** Linkage between the recently completed upgrade of the towpath east of Longford Bridge at Rathbourne and the proposed Greenway will need to be addressed to ensure continuity of the facility. The towpath approaches from the east on the northern bank of the canal and switches to the southern bank at Longford Bridge. There is an existing footbridge crossing the canal immediately east of Longford Bridge which provides a safe pedestrian route to the adjacent Ashtown Railway Station. This existing footbridge measures 2.2m in width.

4.4 The road width across Longford Bridge is narrow at 6.3m; there are no footpaths present and there are no formal crossing facilities at the entrance to the canal towpaths. The road is heavily trafficked although traffic speeds are low due to the constrained alignment across the bridge and adjacent level crossing which is manually operated.

4.5 **10th Lock:** On entering the canal towpath at Longford Bridge, the path passes between the lower chamber of the 10th Lock and the adjacent private dwelling with a maximum available width of 3.0m.

4.6 Thereafter, the towpath passes the upper chamber of the lock and continues westwards along the southern bank of the canal. The towpath width at this point is approximately 3.2m with potential to widen to 3.5m towards to lock wall.

4.7 The gradients of the towpath through the lock are approximately 7% (1:14) which would not be in accordance with current recommendations for 5% or 1:20.

4.8 **10th Lock to 11th Lock:** The width of the existing towpath along this section varies from 2.4m to 2.8m in width. It is bordered with a 0.6m buffer on the canal bank side and a grass verge of varying width on the railway side. There is good potential to widen to 3.5m along this stretch of the canal; the most constrained area being between the Navan Road Parkway Station and the 11th Lock, where the existing (minimum) 1.8m verge increases in height by approximately 1.0m as it approaches the railway boundary at its narrowest point.

4.9 **11th Lock:** The path through the 11th Lock is currently 2.8m wide and there is potential to achieve the desired 3.5m. However, the longitudinal gradient would need to be checked for compliance with current accessibility requirements.

4.10 **11th Lock to Talbot Bridge:** There is potential to achieve the desired width of 3.5 m along this section of the towpath, although the gradients at Ranelagh Bridge will need to be assessed in detail to achieve acceptable accessibility limits.

4.11 Thereafter, moving westwards along the canal, there is a pinch point in the towpath width across the M50 Aqueduct where the current footpath provision in terms of available width is reduced to 2.2m.

4.12 The approach to Talbot Bridge is sufficiently wide and there is scope for potential widening of the towpath to achieve the required 3.5m. On the immediate approach to the bridge, the towpath rises to meet the existing road level on Talbot Court above. The gradient on this section of the path is currently 1:10

4.13 **Talbot Bridge:** the Old Navan Road is a quiet vehicular cul-de-sac which consists of the entrance to the 12th Lock Hotel carpark and a small number of private dwellings. Traffic volumes across the bridge are correspondingly low. At the end of the cul-de-sac, there is access to an existing pedestrian and cyclist bridge route over the M50 motorway to continue along the Old Navan Road to the city.

4.14 There are currently no formal pedestrian crossing facilities at Talbot Bridge.

4.15 **Talbot Bridge to Granard Bridge:** A towpath is provided along both banks of the canal over this short section.

4.16 Access to the southern bank is via a series of shallow steps at Talbot Bridge or via the privately owned car parking area of the 12th Lock Hotel. The existing path is surfaced in tarmac and is approximately 2.0m wide. Passing the hotel and 12th lock, the potential for widening is limited to circa 2.5m due to the retaining wall and service entrance to the adjacent hotel on the south and the 12th lock structure on the north.

4.17 Further west and past the hotel, there is an open grassed area between the existing towpath and the railway with minimal constraint in widening to the desired 3.5m. The approach to Granard Bridge and access to Castleknock Road above is via existing concrete steps. However, there is evidence that the adjacent grassed area is commonly used by both pedestrians and cyclists to access the towpath despite the existing steep gradient of approximately 1:10.

4.18 Access to the northern bank is via an existing access lane which is 3.0m wide and includes a steep gradient of 1:10 to reach the upper level of the adjacent canal lock. Any increase in width would be difficult due to the retaining walls on both sides which form the boundary with the 12th lock to the south and the private grounds of the Talbot Mill residential development to the north.

4.19 Heading westwards past the 12th lock, the existing path meanders into open parkland and emerges onto Castleknock Road immediately north of Granard Bridge. The desired 3.5m width can be achieved in this area with minimal work required.

4.20 **Granard Bridge:** Granard Bridge carries the Castleknock Road which is the main thoroughfare between Blanchardstown and Castleknock Villages. It is a busy road with heavy traffic volumes especially during peak hours. The immediate location is comprised of numerous residential developments and the Castleknock Railway Station is located immediately west of the bridge. Adjacent junctions accessing these residential areas are signalised and controlled under the Dublin City Council SCATS system.

4.21 The towpath along the canal passes under the bridge. The path width under the bridge is approximately 2.0m and vertical clearance is considerably less than the 2.3m required for cyclists. Notwithstanding this, there is a pinch point along the route of 0.95m where the towpath rejoins the railway access ramp from Castleknock Road.

4.22 Continuity of the towpath route would therefore require users to cross Castleknock Road at Talbot Bridge. Visibility of oncoming traffic is poor and there is currently no formal crossing facility at the entrance to the canal towpath. Existing footpath provision across Granard Bridge is also poor with a minimum width currently at 0.7m.

Area 2: Granard Bridge (Castleknock Road) to Callaghan Bridge (Clonsilla Road) – "The Deep Sinking"

4.23 **Granard Bridge to Kirkpatrick Bridge:** Castleknock Railway Station is located immediately west of Granard Bridge. Access to the station is provided from Castleknock Road via a purpose built ramp which was constructed at a gradient of 1:10. Thereafter, the towpath continues to the west,

past the station on a less formal grass path. A narrow muddy trail indicates the most trafficked areas of the towpath. The grassed area is of sufficient width to accommodate a 3.5m wide shared facility. Existing signage along this section of the towpath informs users that they are entering the Deep Sinking.

4.24 Approximately 400m west of Castleknock Station, the railway passes extremely close to the existing towpath creating a pinch point. The railway level is approximately 1.5m above the towpath level and is supported by a masonry retaining wall structure. This structure is in a poor state of repair. The total towpath width through this pinch point is typically 1.5 – 1.7m. Further west level difference between the towpath surface and the canal water level gradually increases as one enters the Deep Sinking. This level difference is at circa 1.0m at this pinch point.

4.25 Continuing westwards, the lateral clearance to the railway increases to a typical value of 10m before decreasing again in the vicinity of Coolmine Station. The towpath width is typically 2.0m through this section with a circa 5.0m high embankment dividing it from the railway. The existing towpath is located within the area of influence of the railway line. At this point in the Deep Sinking, the canal waters are approximately 5.0m below the towpath level, with a steep canal bank consisting of rock outcrops and overgrown vegetation and trees which, due to the limited access, prevents maintenance from being carried out on the canal towpath and banks.

4.26 The approach to Kirkpatrick Bridge is both narrow and steep as it emerges onto Coolmine Road. The adjacent access to the inbound platform at Coolmine Station also merges with the towpath at Coolmine Road. At this point, a pedestrian bridge providing safe linkage between Coolmine Station and the existing residential area to the north of the canal meets the towpath and access to Coolmine Station. The southern abutment of this bridge creates a pinch point on the towpath, limiting its width to approximately 1.6m.

4.27 **Kirkpatrick Bridge** carries Coolmine Road across the canal. An automatic level crossing is located immediately south of the bridge. The existing carriageway width across the bridge is approximately 6.3m and there are no footpaths provided for pedestrians. On emerging from the canal towpath pedestrians have good visibility of oncoming traffic, primarily due to the low height of the bridge parapet walls. The carpark serving the railway station is located immediately south of the level crossing.

4.28 Coolmine Road is a local distributor road serving local residential developments in the Coolmine and Carpenterstown areas. It is therefore especially busy with traffic at peak times.

4.29 **Kirkpatrick Bridge to Kennan Bridge:** The towpath west of Kirkpatrick Bridge consists of a typically 2.5m wide path, with protection provided from the deep canal channel by means of a timber post and rail fence erected at the top of the canal bank. The initial 30m of the path is located on a gradient of 1:11.

4.30 In general, this section of the towpath is typical of the Deep Sinking where a narrow towpath width is provided with steep embankments. The width of the path through this section is typically 2.0 to 2.5m with the adjacent embankments falling within the railway's zone of influence.

4.31 Thereafter, the railway and canal towpath tend to merge to create a local 1.9m wide pinch point on the towpath for a length of approximately 50m. A retaining wall is provided between the towpath and the railway, which is covered with overgrown vegetation.

4.32 Further west, the distance between the railway and towpath increases and a drainage ditch is provided in this area. The ditch is approximately 1.6m deep. This provides a causeway effect with the narrow 2.0m towpath bounded on both sides with a deep cutting. The drainage ditch outfalls to the canal waters via an existing culvert under the towpath. The structural integrity of this culvert is unknown.

4.33 In the vicinity of Kennan Bridge, the towpath rises to meet Porterstown Road. Similar to the approaches at Kirkpatrick Bridge, the path is approximately 1.5m and the gradient 1:12.

Waterways Ireland has carried out some minor maintenance of the towpath in this area, including clearance of vegetation and localised widening of the entrances to the towpath.

4.34 **Kennan Bridge:** The carriageway across Kennan Bridge is narrow at just 3.7m. Horizontal alignment is poor and the bridge is a hazardous location for motorists given the poor forward visibility, narrow carriageway and the automatic level crossing located immediately south of the bridge. The towpath also switches from the southern bank to the northern bank of the canal at this point, requiring users to use the bridge to cross the canal. There are no footpaths provided.

4.35 Despite the number of existing and planned schools on Porterstown Road, traffic levels are low primarily due to the fact that Diswellstown Road/Bridge is now open to traffic and provides a better link to communities across the canal. Diswellstown Road provides an important link between the commercial and retail centres in Blanchardstown, the surrounding residential communities and major trunk roads via the N3 dual carriageway.

4.36 It should also be noted that Diswellstown Road and bridge crossing the Royal Canal and the railway provides the link between Clonsilla Road and Luttrelstown Road and are intended to replace the level crossing at Porterstown Road. The closure of this level crossing will effectively eliminate motorised traffic from using Kennan Bridge. However, there is no fixed date as to when this will occur. Hence, the closure of the level crossing has been ignored for the purposes of this study.

4.37 **Kennan Bridge to Callaghan Bridge:** While still within the Deep Sinking, the existing towpath along this section is typically 3.0m wide. The level difference between the towpath and the canal is approximately 3.0m, gradually reducing on approach to Callaghan Bridge at Clonsilla. Waterways Ireland recently carried out extensive works to clear overgrown vegetation and widen the towpath to achieve the typical width of 3.0m.

4.38 The northern boundary of the towpath consists of a minor earthwork embankment of varying height, typically varying from 1.0 to 2.2m. Approaching Callaghan Bridge, a number of private residential gardens form the boundary with the towpath. The existing width at this location is typically 5.0m minimum.

4.39 **Callaghan Bridge:** There is currently no direct access to street level at Callaghan Bridge. Pedestrians are required to proceed under the bridge and reach the street level via concrete steps provided some 75m to the west of the bridge. The path under the bridge is limited in width to 1.8m at its minimum, thus creating a pinch point.

4.40 Clonsilla Station is located adjacent to the bridge and access to the station is provided by means of a pedestrian bridge linking directly from Clonsilla Road to the inbound platform.

4.41 Callaghan Bridge carries Clonsilla Road over the canal. The total available width of 6.5m is used for traffic lanes and there are no footpaths provided.

4.42 Immediately south of the bridge is a partially automated level crossing. Immediately north of the bridge, traffic signals have been installed recently to increase the capacity of the junction and enhance user safety. It is proposed to link these signals to the level crossing in the near future.

Area 3: Callaghan Bridge (Clonsilla Road) to Fingal County Boundary (Confey)

4.43 **Callaghan Bridge to Pakenham Bridge:** Heading west from Callaghan Bridge, the canal emerges from the Deep Sinking. Initially, there is a section of the existing towpath which has been recently surfaced and widened to approximately 3.0m. A maintenance access is provided at the end of the improved section, which is approximately 350m west of Callaghan Bridge.

4.44 Further west and towards the railway over bridge, the towpath resembles an informal track on a grass bank. The available width is 3.0 to 3.5m typical. However, the northern abutment of the

Clonsilla SW watermain pipe-bridge represents a significant pinch point, where the available width is reduced to 2.5m.

4.45 Where the Dunboyne spur line of the railway crosses the canal, a pedestrian underpass has been provided. The internal width and height of this underpass exceed 4.0m and 2.3m respectively. Therefore, the underpass is suitable for a shared cycle / pedestrian track.

4.46 Between the railway overbridge and Pakenham Bridge, the canal bank widens to form a two-tiered towpath. The upper and lower tiers are generous in terms of their available widths, measuring approximately 12m in total available width.

4.47 To access the road at Pakenham Bridge, the towpath rises at a gradient of 1:17. The available width at this location is in excess of 10m.

4.48 **Pakenham Bridge:** This bridge is located on the Barberstown Road which connects westwards to the Lucan Barnhill Road (R149). The alignment of the road is poor both horizontally and vertically and visibility is compromised as a result. There are no footpaths provided in the vicinity.

4.49 The railway also crosses this road at an automatic level crossing located approximately 30m south of the canal. There are two private entrances located within this 30m.

4.50 The towpath splits at Pakenham Bridge and provides an option to proceed under the bridge, although the footpath width is limited to 2.0m minimum and headroom is restricted, making it unsuitable for cyclists.

4.51 An important fibre optic network known as Dublin's T-50 network crosses the canal within the deck of Pakenham Bridge. This consists of a large number of ducts carrying high speed data cables and links Dublin business parks with existing sub marine data cables to Europe and the United States. A branch of the T-50 network uses the canal corridor to link with Leixlip and a number of ducts are therefore present along the towpath westwards from Pakenham Bridge. The exact location, depth and number of ducts are unknown but would be unlikely to present any impact on the proposed upgrade works.

4.52 **Pakenham Bridge to Collins Bridge:** Immediately west of Pakenham Bridge, the towpath descends to meet the canal bank at a gradient of 1:15 and continues towards Collins Bridge. The towpath throughout this section is wide and free of obstacles. However, there are numerous fishing stands visible along the canal bank which are used occasionally for angling competitions.

4.53 The approach to Collins bridge is typical in that an approximate gradient of 1:10 is provided to access the road level above.

4.54 **Collins Bridge:** similar to Pakenham Bridge, Collins Bridge is distinctively rural in character, although traffic levels are notably higher on the R149 which links Clonee/Dunboyne to Lucan. The existing carriageway is circa 5.4m wide. The horizontal and vertical alignments are poor and typical of a rural "hump-back" bridge. Forward visibility for motorists is poor and where the towpath emerges onto the road, visibility of oncoming traffic is particularly poor. There are no footpaths across the bridge although a footpath is provided towards Lucan village, commencing approximately 20m beyond the adjacent railway bridge.

4.55 The towpath splits at Collins Bridge to offer an alternative route under the bridge although due to insufficient width and headroom, this would be unsuitable for cyclists.

4.56 **Collins Bridge to Fingal County Boundary:** The final section of the route descends to the canal bank on a gradient of 1:9. The towpath width remains favourable throughout this section, with a pinch point evident at the back of private gardens on the approach to the county boundary. The available width at this pinch point is approximately 3.5 to 4.0m. However, there is an existing drainage ditch along the back of the towpath at this location which is approximately 2.0m deep. The safety implication of this would need to be carefully considered for the end user of the upgraded towpath.

4.57 The route will finish close to the premises of the Royal Canal Amenity Group where access to the adjacent public road is achievable.

Environmental Constraints

Designations

4.58 The Royal Canal is a protected area of national importance. It is designated as a proposed Natural Heritage Area (pNHA) and a Water Framework Directive Register of Protected Areas site (WFDRPA)

Proposed Natural Heritage Areas (pNHA)

4.59 Under the Wildlife (Amendment) Act, 2000 Natural Heritage Areas (NHAs) are being designated to conserve species and habitats of national importance.

4.60 Under the Wildlife Amendment Act, 2000 the entire Royal Canal is formally designated a proposed Natural Heritage Area (pNHA) under site code 002103. The Royal Canal pNHA is defined by the National Parks and Wildlife Service (NPWS) to include the central channel and adjoining banks, hedgerows, towpath, grassland, open water, related scrub and woodland features. The pNHA designation indicates that the site has a B rating and is of national importance. According to the report accompanying the pNHA designation, the ecological value of the canal lies in the diversity of species along its linear habitats.

Biodiversity

4.61 The conservation of biodiversity in Ireland is a legislative imperative. Many species of national and international importance have been identified within the Royal Canal corridor. In particular, within Fingal, species identified have included the Otter (Lutra lutra), bats and the Kingfisher (Alcedo atthis). Under the Wildlife Acts (1976-2000) it is illegal to disturb of harm Protected Species and their habitats.

4.62 FCC is the appropriate planning authority for any changes which affect the Royal Canal. FCC will normally only grant permission where it is clearly demonstrated that a proposal will have no significant adverse impact on the habitats and species of interest in the designated area and its ecological integrity.

Register of Protected Areas under the Water Framework Directive

4.63 In accordance with the requirements of the Water Framework Directive and the associated national regulations, the Environment and Heritage Service (EHS) and the Environmental Protection Agency have compiled Registers of Protected Areas. Under this legislation, EHS and EPA are further required to maintain and update the register as needed.

4.64 The protected areas are identified as those requiring special protection under existing national or European legislation, either to protect their surface water or groundwater, or to conserve habitats or species that directly depend on those waters.

4.65 The register consists of an inventory of protected area sites representing the protected area categories outlined below:

- Waters used for the abstraction of drinking water;
- Areas designated to protect economically significant aquatic species;
- Recreational Waters;
- Nutrient Sensitive Areas; and
- Areas designated for the protection of habitats or species.

4.66 The Royal canal is a protected areas designated for the protection of habitats or species' category. These are areas designated for the protection of habitats or species where the

maintenance or improvement of the status of water is an important factor in their protection. These are designated under the Birds Directive (79/409/EEC) and the Habitats Directive (92/43/EEC).

Landscape Character Types and Values

4.67 The Landscape Character Assessment for Fingal as reported in chapter 5 of the Fingal County Development Plan divides the County into 6 Landscape Character Types. Each landscape type is given a value through the consideration of such elements as aesthetics, ecology, historical, cultural, religious or mythological.

4.68 A value can range from low to exceptional. The Landscape Character Types are:

- Rolling Hills Character Type;
- High Lying Character Type;
- Low Lying Character Type;
- Estuary Character Type;
- Coastal Character Type; and
- River Valleys and Canal Character Type.

River Valleys and Canal Character Type

4.69 The Royal Canal corridor is included in the River Valleys and Canal Character Type zone. The canal and its corridors provide valuable habitat for fish and other species. The canal itself and the many bridges and other structures associated with it are an integral part of the County's architectural heritage.

4.70 The Character Type is categorised as having a high value, due to the visual and recreation qualities contained therein. This is evident by virtue of the High Amenity zoning and Special Amenity Area designation in the area in addition to the dense tree belts and steep river valley slopes. The river valleys and the canal are also important for their ecology and biodiversity.

Landscape character types – sensitivity

4.71 Where a wide range of developments would sit comfortably in a particular landscape and would not interfere with a character or interfere or eliminate a value, such a landscape is deemed to be of low to medium sensitivity. On the other hand, where any proposed development would seriously damage a character or eliminate or seriously damage an irreplaceable value, such a landscape would be considered to be highly sensitive.

Highly sensitive character types

4.72 The following four character types are identified, in general, as having a high sensitivity to development:

- High Lying Character Type
- Estuary Character Type
- Coastal Character Type
- River Valleys & Canal Character Type

4.73 There are areas contained within these four character types which are identified in the County Development Plan as highly sensitive areas, these areas have a low capacity to absorb new development without damage resulting to the very characteristics that make them attractive such as nature conservation or scenic qualities.

Character area 3 - Callaghan Bridge to Collins Bridge at St. Catherine's
Links with adjacent land: Intermittent views through hedgerow of adjacent flat countryside and scattered dwellings
Gradients: Generally flat rough tracks, no constructed footpaths
Biodiversity in canal corridor: Proposed greenway footprint comprises amenity grassland flanked by mature hedgerows and treelines of low to moderate ecological importance.

Note: Area 3a will be subject to development of adjacent zoned lands

Character area 2 - Granard Bridge to Callaghan Bridge in Porterstown
Links with adjacent land: Enclosed wooded canal corridor including the Deep Sinking area, glimpse views out of corridor only
Gradients: Narrow steep rough tracks, no constructed footpaths
Biodiversity in canal corridor: Both sides of the canal support linear mixed broadleaved woodland and scrub areas with the northern bank supporting more continuous and extensive woodland / scrub areas. Footprint of proposed greenway comprised of semi-natural / rough grassland and bare ground bordered by treelines and pockets of scrub. This section of the canal corridor is of moderate to high local importance and may be of particular importance to species such as bats, badger and passerine birds.

Character area 1 - Ashtown to Granard Bridge /Lock11
Links with adjacent land: Views to adjacent canal corridor with open views to urban development and major infrastructure on both sides of canal
Gradients: Generally flat constructed footpaths
Biodiversity in canal corridor: Proposed greenway footprint comprises amenity grassland and bare ground - habitats of low ecological value. Fringing wet grassland and marsh habitats near Phoenix Park railway station and mature mixed broadleaved woodland on the canal's northern bank represent habitats that are of moderate to high local importance.

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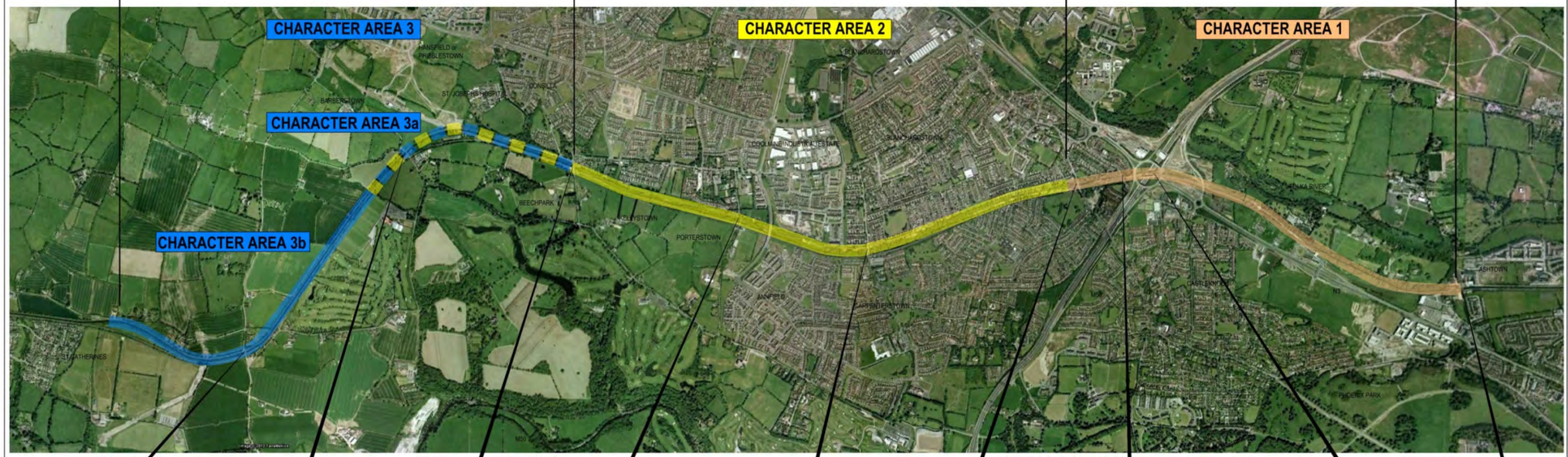

COLLINS BRIDGE

PAKENHAM BRIDGE

CALLAGHAN BRIDGE

KEENAN BRIDGE

KIRKPATRICK BRIDGE

GRANARD BRIDGE

TALBOT BRIDGE

M50 MOTORWAY BRIDGES

ASHTOWN

Comhairle Contae Fhine Gall
Fingal County Council

Rev	Description	By	Date	Chk'd	Auth
C	Landscape Character Area 3a & b revised	LB	29.08.12	DM	DM
B	Landscape Character Area 3 revised	LB	01.08.12	DM	DM
A	Landscape Character Areas 2 & 3 revised	LB	07.12	BOC	BOC

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Client: FINGAL COUNTY COUNCIL
Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY
Title: LANDSCAPE CHARACTER AREAS

Original Scale	Designed/Drawn	Checked	Authorised
NTS	LB Date 18.06.12	BOC Date 19.06.12	BOC Date 19.06.12

Sheet: A1
Drawing Number: 3098 / SK / 020
Rev: C

Figure 4.1 - Existing Layout

4.74 The Royal Canal Corridor is included in the River Valleys and Canal Character Type. The Canal has particular qualities, including steep banks and mature woodland, which makes it particularly sensitive to development.

4.75 The principles for development as detailed in the Fingal County Development Plan which relate to the Royal Canal are:

- Skylines, horizon and ridgelines should be protected from development;
- Field and roadside hedgerows should be retained. Proposals necessitating the removal of extensive field and roadside hedgerows should not be permitted;
- The retention and active management of trees and woodland blocks should be promoted;
- The use of trees and woodlands to contain new development should be encouraged. Strong planting schemes using native species, to integrate development into these sensitive landscapes, will be required. New planting needs to be carefully located and selected outside urban areas, the major river corridors should be protected and improved by leaving a minimum 30 metre wide margin, on each side of these rivers, undeveloped and encouraging planting where appropriate, to enhance the landscape and habitat value of these corridors (see Objective BD24, Section on Ecological Corridors and Stepping Stones); and
- Estuary margins and any hedgerows along the margins must not be disturbed

Architectural / Heritage

4.76 The six bridges listed below over the Royal Canal are included within the Record of Protected Structures included within Appendix 3 of the Fingal County Development Plan 2011-2017:

- Longford Bridge (RPS No. 693), Stone single-arched bridge over Royal Canal at Ashtown Road Railway Station;
- Ranelagh Bridge, (RPS No. 694), Stone arched bridge over Royal Canal.
- Talbot Bridge (RPS No. 695), Stone arched bridge over Royal Canal. Also known as Old Bridge;
- Granard Bridge (RPS No. 696), Stone arched bridge over Royal Canal;
- Kirkpatrick Bridge (RPS No. 697), Stone arched bridge over Royal Canal;
- Kennan Bridge (RPS No. 698), Bridge over Royal Canal;
- Callaghan Bridge (RPS No. 701), Bridge over Royal Canal.
- Pakenham Bridge (RPS No. 711), Stone single arched road bridge over the Royal Canal at Barberstown railway crossing; and
- Collins Bridge (RPS No. 693), Bridge over Royal Canal.

4.77 As such it will be important in this study to note that the land in the immediate environs of the bridge is also protected and needs consultation with Development Application Unit of Department of the Arts, Heritage and the Gaeltacht (DAHG) to agree any alterations required as part of the canal improvements.

Further Studies Required

4.78 Further environmental studies will be required to identify the exact location of sensitive habitats and species along the Royal Canal to inform the preliminary design process of the Tow Path upgrade. Thereafter the effects of the proposed Tow Path upgrade on the sensitive environments can be assessed, and mitigation agreed in association with the key environmental stakeholders i.e. Waterways Ireland, Fingal County Council (Conservation & Heritage Sections), Inland

Fisheries Ireland, Inland Waterways Association of Ireland, Development Application Unit of Department of the Arts, Heritage and the Gaeltacht (DAHG) for Cultural Heritage and Department of the Arts, Heritage and the Gaeltacht (within which National Parks and Wildlife Service now resides) for aspects of nature conservation.

4.79 It is noted that detailed ecological information is currently available between the 10th lock at Ashtown and the 12th lock at Castleknock and this should provide a basis for determining if an EIA is required for any future upgrading works to this easterly section.

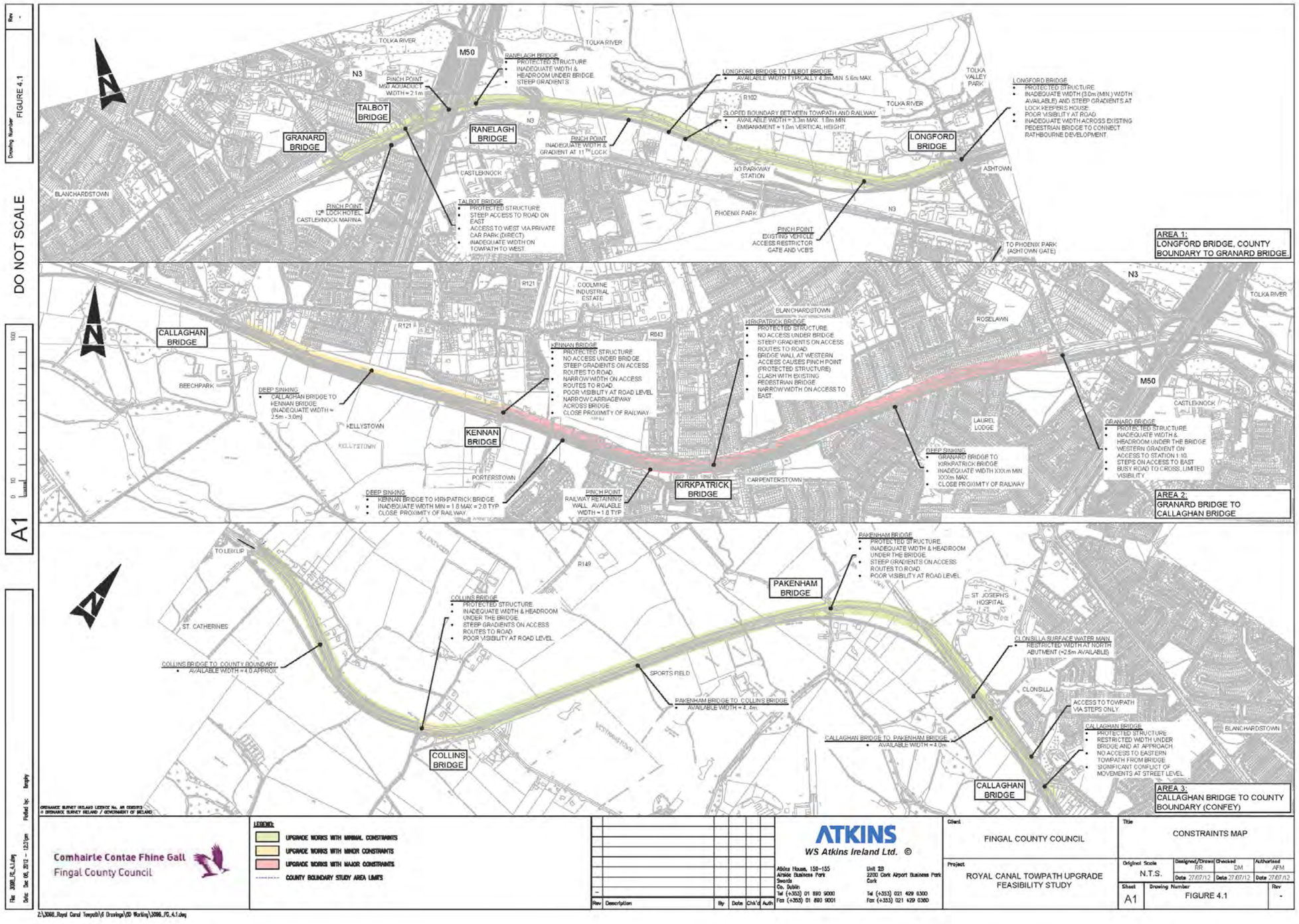


Figure 4.2 - Constraints Map

5. Opportunities

Secondary Objectives

5.1 In accordance with the study brief, further opportunities to enhance the canal environment and how these could be realised as part of any scheme have been considered. These have been identified as the secondary scheme objectives.

5.2 Items such as improved access points and accessibility for mobility impaired users were considered. It is recognised that any potential facility must be easily accessible for all to maximise the potential for its use.

5.3 Similarly, ease of access from adjacent existing (and proposed) residential areas was assessed and areas for potential additional linkage to the towpath are identified on the attached Opportunities Map. Such locations would potentially include:

- Proposed footbridge near 11th Lock – linkage to zoned lands to south of railway line adjacent to N3;
- Proposed footbridge to link Brompton Court (Roselawn) and Maple Green (Laurel Lodge);
- Proposed footbridge between Kennan Bridge and Callaghan Bridge to link Clonsilla on the north with zoned lands at Kellystown on the south;
- Proposed footbridge to link Clonsilla and Beechpark Regional Park;
- Linkage to Hansfield Strategic Development Zone (SDZ) to north of the canal (no bridge required).

5.4 Throughout the consultation stage of the study, the provision of additional (and betterment of existing) recreational facilities along the route was a recurring theme. In addressing this, a number of locations were identified where the following facilities could potentially be located:

- Off-road car parking facilities in the vicinities of Collins Bridge and Pakenham Bridge to facilitate recreational anglers and walkers along the adjacent stretches of the canal towpath;
- The potential for retention and/or betterment of existing formal angling posts was examined. These are located along the towpath westwards from Pakenham bridge. Further angling posts could be provided immediately west of Castleknock Station and in the area between the 10th and 11th locks;
- Picnic areas potentially located immediately east of Pakenham Bridge and adjacent to the 12th Lock Hotel, Castleknock. Ideally, these areas would be co-located with existing and proposed boat mooring points;
- Potential locations for coffee shops and the like were identified along the route at Clonsilla Station, Kennan Bridge and the 12th Lock.

5.5 In recognition of the overall thrust of this study, the connectivity of the proposed pedestrian and cycle route with other sustainable transport modes and cycle networks (existing and proposed) was considered throughout the study area. The study seeks to maximise such integration to provide an ease of access which would favour the use of bus, rail, cycling and walking.

5.6 *Royal Canal to Grand Canal Regional Cycle Route Connection* - Regionally the Royal Canal has the potential to integrate with other emerging strategic cycle routes within the Greater Dublin Area. In particular, the connection can be made southwards across the Liffey Valley and via Lucan and Griffeen Park to the Grand Canal north of Grangecastle which has been upgraded to a Green Route in 2010. This cycle connection has the potential to create a regional cycle loop within the Dublin Metropolitan area joining the city centre and docklands with established suburban areas

along the canals with planned new residential communities in West Dublin such as the Adamstown, Clonburris and Hansfield Strategic Development Zones.

5.7 This Identified link could be provided as follows:

- Collins Bridge on the Royal Canal (Barnhill Road) southwards to Laraghcon housing development. This would pass the eastern entrance to St. Catherine's Regional Park which facilitates cycle routes to Leixlip and west Lucan.
- Laraghcon Housing Estate southwards to Lucan Bridge on the River Liffey utilizing existing off-road cycle facilities
- Lucan Bridge through Lucan Village and crossing the M4 to Griffeen Valley Park
- Griffeen Valley Park southwards crossing the Kildare Rail line and joining to the Grand Canal via the new bridge north of Grangecastle Business Park

5.8 The potential route is illustrated on Figure 5.1 - Canal 2 Canal Regional Cycle Route

5.9 In addition to the above items, opportunities to enhance awareness and promote the historical and heritage value of the canal will be maximised through the provision of street furniture in the form of seating areas and information signage and plaques at appropriate locations, It is intended that such information points would give interesting snippets of information on the canal and its environment.

5.10 The overall Opportunities Map provided below highlights the areas where the above benefits can be brought to the proposed scheme to improve accessibility to the canal towpath and improve the amenity and recreational value of the project.

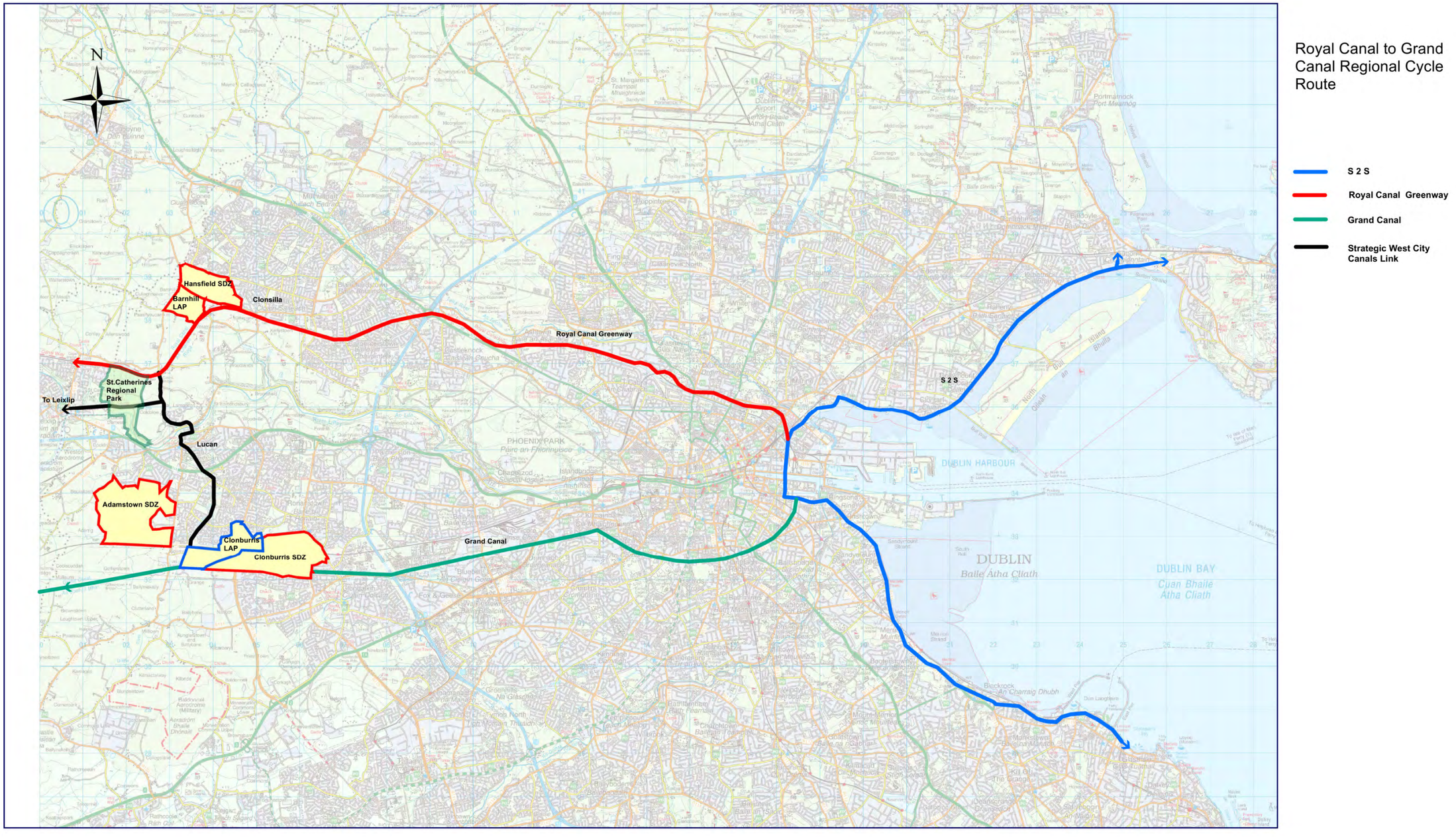


Figure 5.1 - Canal 2 Canal Regional Cycle Route

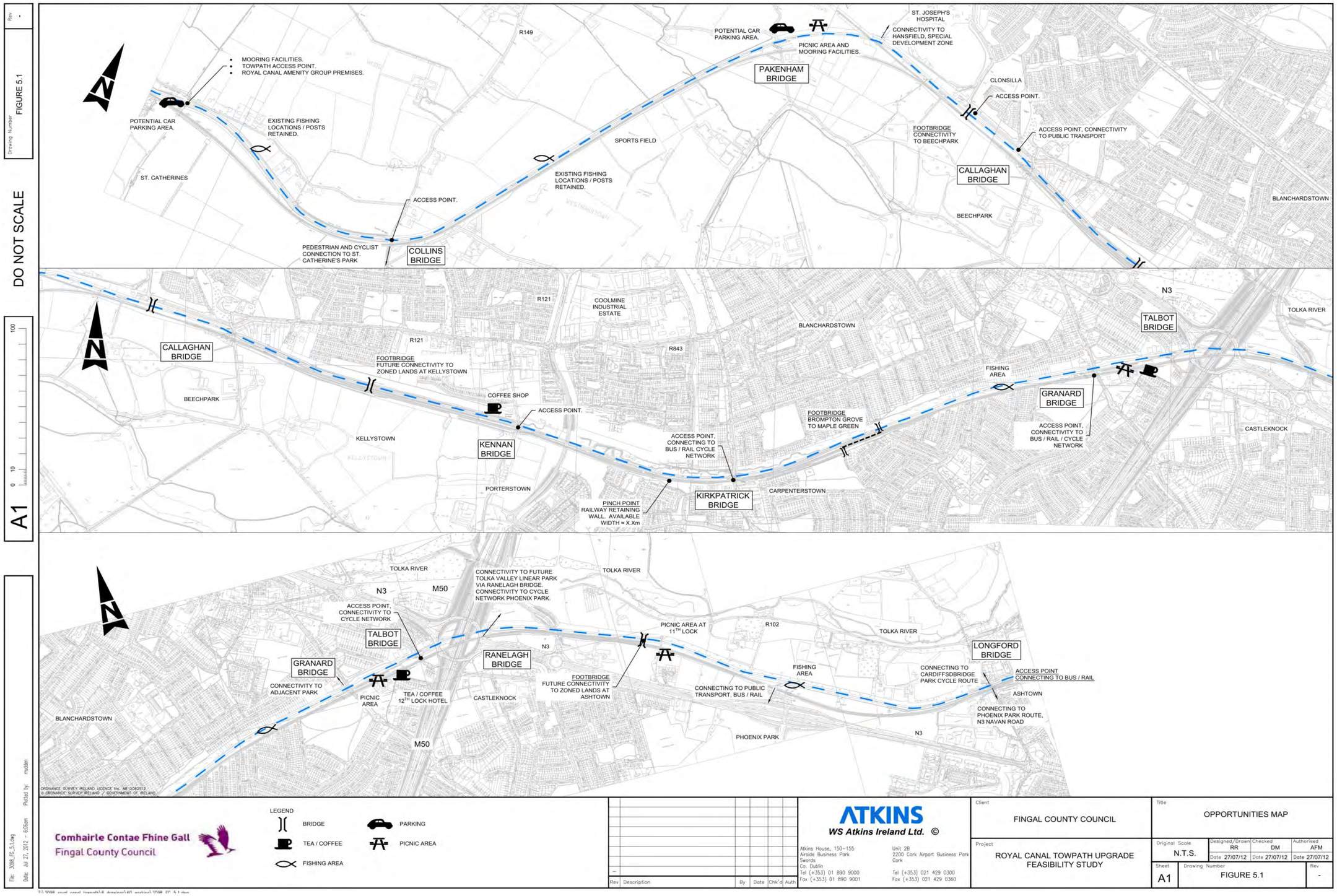


Figure 5.2 - Opportunities Map

6. Option Development & Evaluation

General

6.1 The Client's primary objective is to provide a premium quality cycle and pedestrian route along the existing canal towpath. The potential facility should be inherently safe and suitable for use as a cycle commuter and recreational route.

6.2 Secondary objectives can be realised through application of the 'opportunities' identified in Chapter 5 of this report. It is intended that in order to maximise the level of 'gain' and improvement in facilities which will benefit all users, all opportunities identified shall be applied to the final preferred route.

6.3 This chapter examines all available options to overcome the identified constraints within specified areas. An evaluation of the options is carried out against selected criteria to arrive at a favoured solution in each case.

Evaluation Criteria and Methodology

6.4 All of the options considered have been subjected to a comparative assessment against five key criteria, namely:

- Economy;
- Safety;
- Environment;
- Technical, and
- Integration.

6.5 The full assessment criteria are presented in Table 6.1.

General Assumptions Common To All Options

6.6 Given the Client's primary objective to provide a premium quality cycle and pedestrian route to encourage and promote commuter cycling, the options have been generated with a view to providing a high quality bound surface along the whole length of the route. Access to the facility would be controlled by installing removable bollards at access points which would effectively prohibit unauthorised vehicular access but ensure minimal delays to cyclists.

6.7 For security reasons, it has been assumed that CCTV will be required along the whole length of the route.

6.8 Given the primary objective for the cycleway to be a commuter route, lighting will be required along its length.

6.9 Where there is a height difference between the cycleway and surrounding ground, a pedestrian railing (to the appropriate height for cycles) has been assumed to be required.

6.10 A 3.5m width will be provided where feasible and it is assumed that this is achievable along the whole route, except where detailed below. Where constraints exist along the route, these are discussed below with options presented on how they can be overcome or otherwise.

6.11 All options consider upgrading the existing towpath along the canal banks. Consideration was given to development of the opposite bank in all cases. However, this was deemed unfeasible and undesirable due to the proximity of the adjacent railway line, scope of work required and the likely environmental and ecological impacts, land ownership issues and topographical constraints.

Table 6.1 – Assessment Criteria

Route Assessment Criteria	
Assessment Criterion	**Criterion Elements**
Economy	Comparison of cost levels for: • Land Acquisition Costs • Construction Costs • Operation & Maintenance Costs
Safety	Comparison of level of safety offered in terms of: • Interaction with live traffic & nature of traffic control facilities offered • Personal security, levels of public lighting and surveillance offered
Environment	Comparison on level of impact on the environment in terms of: • Air Quality • Noise & Vibration • Landscape & Visual • Biodiversity / Ecology • Cultural, Archaeological & Architectural Heritage • Land Use, Soils & Geology • Water Resources
Technical	Comparison of technical merits in terms of: • Cycleway Level of Service offered o Surface Quality / Comfort o Gradient o Continuity of Route o Directness (Waiting time at signals, detours) • Accessibility (mobility impaired)
Integration	Comparison of level of integration and inter-connectivity offered in terms of: • Connectivity to public transport (bus and rail) • Connectivity to wider cycle network • Inter-connectivity of adjacent residential communities (existing and planned) • Provision of car parking areas at access points / key amenity areas • Connectivity to adjacent recreational & amenity areas (existing and planned)

Option Evaluation

6.12 The following sections present the options available and provide a brief analysis of the evaluation of these options. The preferred solution for each area is brought forward for inclusion in the overall preferred route and presented as the preferred scheme.

Area 1: Longford Bridge (Ashtown) to Granard Bridge (Castleknock)

Longford Bridge

6.13 The proposed scheme will commence at Longford Bridge, Ashtown. In considering the previously upgraded section of the towpath at Rathborne, connectivity between the new existing facility and the proposed upgrade to the canal towpath west of Longford Bridge is key to the success of the overall project.

6.14 The overriding requirement is to provide a safe and efficient means of access from the east to the west of Longford Bridge. Ashtown Road is a busy local road, dominated by vehicular traffic.

6.15 To obtain a 3.5m width through the 10th lock, it would be necessary to acquire the adjacent private dwelling. This is considered impractical given the benefits would only be realised for an approximate length of 25m. All options propose a width of between 2.4m and 3.0m through this short section and would require added protection to the lower chamber of the adjacent lock to eliminate all risks of falling into the canal waters.

6.16 All options at this location offer good connectivity to adjacent public transport (bus and rail) networks and onward cycle connections to the Phoenix Park, Tolka Valley Cycle Route and adjacent residential areas. However, given the high density development of the area, provision of additional car parking is not feasible or desirable.

6.17 Whilst not considered as an option, Irish Rail's proposal to close the existing level crossing at Ashtown is noted. If this proposal were to proceed, Longford Bridge would be effectively "traffic-free". At that stage, users of the towpath may favour the easier, more spacious route of crossing the canal via Longford Bridge over the dedicated cycle bridge. The options presented at this location would then become somewhat redundant.

6.18 A number of options have been considered as follows:

6.19 **Option 1:** *Figure 6.2 - Longford Bridge Option 1* is provided below. This option will require the construction of a second bridge across the canal which would be located adjacent to the existing footbridge. The proposed bridge would be intended for the exclusive use of cyclists along the proposed route.

6.20 Continuity across Ashtown Road will be provided by the installation of a signal controlled toucan crossing. The controlled crossing would effectively eliminate any risks associated with the busy traffic and poor visibility at the crossing location. In addition, appropriate detection systems could be incorporated so that cyclists would trigger the lights on approach and thus eliminate the need to dismount and wait.

6.21 The signal controller for the toucan crossing would need to be fully integrated with the adjacent level crossing.

6.22 In assessing this option, the construction of a dedicated cyclist bridge across the canal would be of obvious benefit to all users. However, this would require a land purchase on the southern bank of the canal at Ashtown Station. For these reasons this option may attract a significant cost premium.

6.23 The provision of the bridge would, however, provide a safe means for all users to cross from the north bank to the south bank of the canal on segregated facilities. The proposed toucan crossing would provide a safe route across Ashtown Road where users would be required to interact with live traffic. Traffic along Ashtown Road is often heavy, especially at peak hours when the cyclist commuter route would also be expected to be busy.

6.24 The environmental impact of this option would be considered to be low during service. However, depending on the final design of the proposed bridge, construction stage impacts would need to be examined in detail.

6.25 The implementation of this option would have no impact on Longford Bridge. However, the introduction of a toucan crossing would have obvious impacts on traffic at Ashtown Road. Therefore, the success of this option would be contingent on a detailed assessment of the impact on traffic.

6.26 The layout would address the requirement to provide a high Level of Service in terms of continuity and directness of the route. However, the proposed gradients through the 10th lock would fall short of the recommended minima for mobility impaired users. It would not, however, preclude mobility impaired users from accessing the facility.**Option 2:** *Figure 6.3 - Longford Bridge Option 2* is provided below. "Shuttle lights" are proposed so that a one-way traffic system can be enforced across Longford Bridge. The carriageway width would be reduced from 6.3m to 3.8m, providing a 2.5m cycle route across the bridge. This cycle route would be physically segregated from the traffic lane by means of a raised kerb. Increased delineation could be achieved through the installation of pencil bollards adjacent to the new kerbline if warranted.

6.27 Pedestrians would use the existing footbridge, as per the existing situation.

6.28 The "shuttle" traffic signals would require synchronisation with the adjacent level crossing so that all traffic is stopped when trains are approaching. Ashtown Road can have significant tailbacks during peak times due to the level crossing being closed. If this situation was to be exacerbated by the introduction of shuttle working at the bridge it is possible that queuing could extend to both the Navan Road and the River Road on each side of the level crossing.

6.29 At the access to the western towpath, a signalised toucan crossing would be installed to provide a safe means of crossing Ashtown Road. The length of crossing provided would be reduced to 3.8m in accordance with the traffic lane reductions. The toucan crossing would need to be linked to the 'shuttle lights' and the level crossing.

6.30 The layout would also provide a safe route for all users due to the segregation from vehicular traffic. The provision of the toucan crossing would further enhance the safety aspects of the layout.

6.31 Impacts on the receiving environment would be minimal. While construction activities would be required to modify the surface layout across Longford Bridge, there would be no structural modifications required. Similarly, the impacts of the layout in service would be negligible. However, the proposed shuttle traffic control system would be likely to increase traffic congestion locally on Ashtown Road.

6.32 Technically, this layout would offer a high Level of Service as the continuity and directness of the route would be preserved. However, as per Option 1, the proposed gradients through the 10th lock would fall short of the recommended minima for mobility impaired users. It would not, however, preclude mobility impaired users from accessing the facility.

6.33 **Option 3:** *Figure 6.4 - Longford Bridge Option 3 is provided* below.

6.34 For this option a raised traffic surface linking the towpath entrance points would be constructed. This surface would be shared with motorised traffic. Traffic speeds would be restricted through the establishment of a special 30kph speed limit and "town centre" character within Ashtown Village.

6.35 Pedestrians would be directed to use the footbridge as per the current layout.

6.36 A toucan crossing would be provided at the entrance to the western towpath to permit pedestrians and the less confident cyclists to cross the road in a safe manner. More experienced and competent cyclists may choose to wait in the carriageway and give way to oncoming traffic before

turning onto the towpath at this location, although this would be considered hazardous given the narrow carriageway width.

6.37 The proposed toucan crossing signals would need to be synchronised with the adjacent level crossing.

6.38 The capital outlay in providing this option would be comparable to that of Option 2. Works to the road carriageway across Longford Bridge would be necessary to increase driver awareness of the shared surface and presence of cyclists on the road.

6.39 The safety of the end user, in particular the cyclist, would be compromised due to the proposed shared surface which relies on the awareness / astuteness of motorists and their adherence to the proposed 30 km/h special speed limit.

6.40 The impact on the environment would be negligible both for the construction stage and when in service. The proposed works would not require any structural modifications to Longford Bridge. However, the introduction of a 30 km/h special speed limit would be expected to have some negative impact on traffic locally. The exact impacts would need to be understood through a detailed assessment of traffic

6.41 Continuity and directness of the route would be compromised with this option. The layout would also be less favourable to cyclists as the requirement to "mix" with motorised traffic would be less attractive. Option 3 would therefore be less favourable in terms of technical merit.

6.42 **Option 4:** *Figure 6.5 - Longford Bridge Option 4 is provided* below. This option is the "do minimum" scenario. Cyclists would be required to dismount on the approach to the existing pedestrian bridge and walk across the canal.

6.43 A pedestrian crossing would be installed to provide a safe means of crossing Ashtown Road. As with previous options, the traffic signals would be integrated with the adjacent level crossing. The existing road layout would remain unchanged and motorists would have right of way over pedestrians and cyclists.

6.44 As this would be the "do minimum" option, it would also be the cheapest to implement and construct. With the exception of the proposed pedestrian crossing, there would be no further modifications required to the existing layout.

6.45 It is unlikely that cyclists will follow the instructions to dismount and walk across the pedestrian bridge. It would be highly probable that cyclists would either elect to cycle across the pedestrian bridge or join the narrow traffic lanes at Longford Bridge. Either decision would put cyclists at risk of conflict with other users, thus reducing the level of safety offered.

6.46 This option would have negligible negative effect on the receiving environment.

6.47 While the proposed pedestrian crossing would offer some level of segregation from motorised traffic, the overall level of service is compromised in terms of continuity, directness and comfort.

Figure 6.1 - Longford Bridge Option Evaluation Summary

Option Evaluation Summary Longford Bridge, Ashtown				
	Option 1	**Option 2**	**Option 3**	**Option 4**
Rank	**#1**	**#4**	**#2**	**#3**
Economy	Cost premium due to provision of dedicated cyclist bridge and acquisition of land at Ashtown Station.	Cost effective option for both short and long term scenarios Comparable to Option 3	Cost effective option for both short and long term scenarios Comparable to Option 2	"Do minimum" scenario – therefore cheapest alternative available while providing some benefit / improvement
Safety	Offers good levels of safety and personal security	Offers good levels of safety and personal security	Shared surface with motorised vehicles means safety is compromised	Requires cyclists to dismount and walk across pedestrian bridge – cyclists unlikely to comply, therefore increased risk of conflicts with pedestrians and/or vehicles
Environment	No impacts on Longford Bridge. Minimal impact in service, although toucan crossing has potential to increase traffic congestion locally. Construction of bridge abutments may potentially have impacts, but these are considered to be minor at this stage.	No structural modifications required to Longford Bridge. Minimal impact in service, although shuttle traffic control has potential to increase traffic congestion locally.	No structural modifications required to Longford Bridge Minimal impact in service and during construction. Lesser impact on local traffic	Least impact on environment
Technical	High Level of Service in terms of continuity and directness of route. Gradients offered would fall short of recommended minima for mobility impaired. Does not affect traffic in the same way as reducing effective road width would. Requires Purchase of land to facilitate the new bridge	High Level of Service in terms of continuity and directness of route. Gradients offered would fall short of recommended minima for mobility impaired. Is likely to severely disrupt traffic in the area.	Continuity compromised due to the requirement to mix with vehicular traffic – probable delays for cyclists negotiating traffic	Least preferred as Level of Service is not significantly improved over a 'do nothing' scenario
Integration	High level of integration and accessibility. No adjacent car parking area feasible.	High level of integration and accessibility. No adjacent car parking area feasible.	High level of integration and accessibility. No adjacent car parking area feasible.	High level of integration and accessibility. No adjacent car parking area feasible.

6.48 **Conclusion:** Option 1 provides the highest level of service in that there is segregated cycleway.

6.49 Option 2 also provides segregated cycleway but is reliant on the road width for Ashtown Road being reduced. This is likely to exacerbate an already congested area (when the level crossing is closed for trains) and the congestion could lead back to the Navan Road and River Road. As a result, this is the least preferred option.

6.50 Option 3 allows some continuity of service but is compromised by direct interaction with the road traffic.

6.51 Option 4 is a do-minimum scenario with the introduction of a toucan crossing being the main proposal. It has least provision of service. Overall, Option 1 would be preferred in that the service provision is high and it would not overly affect traffic in the area. If Option 1 was not possible, then Option 3 should be considered, as it provides a level of service which is reasonably high, without affecting traffic. Option 4 should be considered if Options 1 and 3 are too expensive.

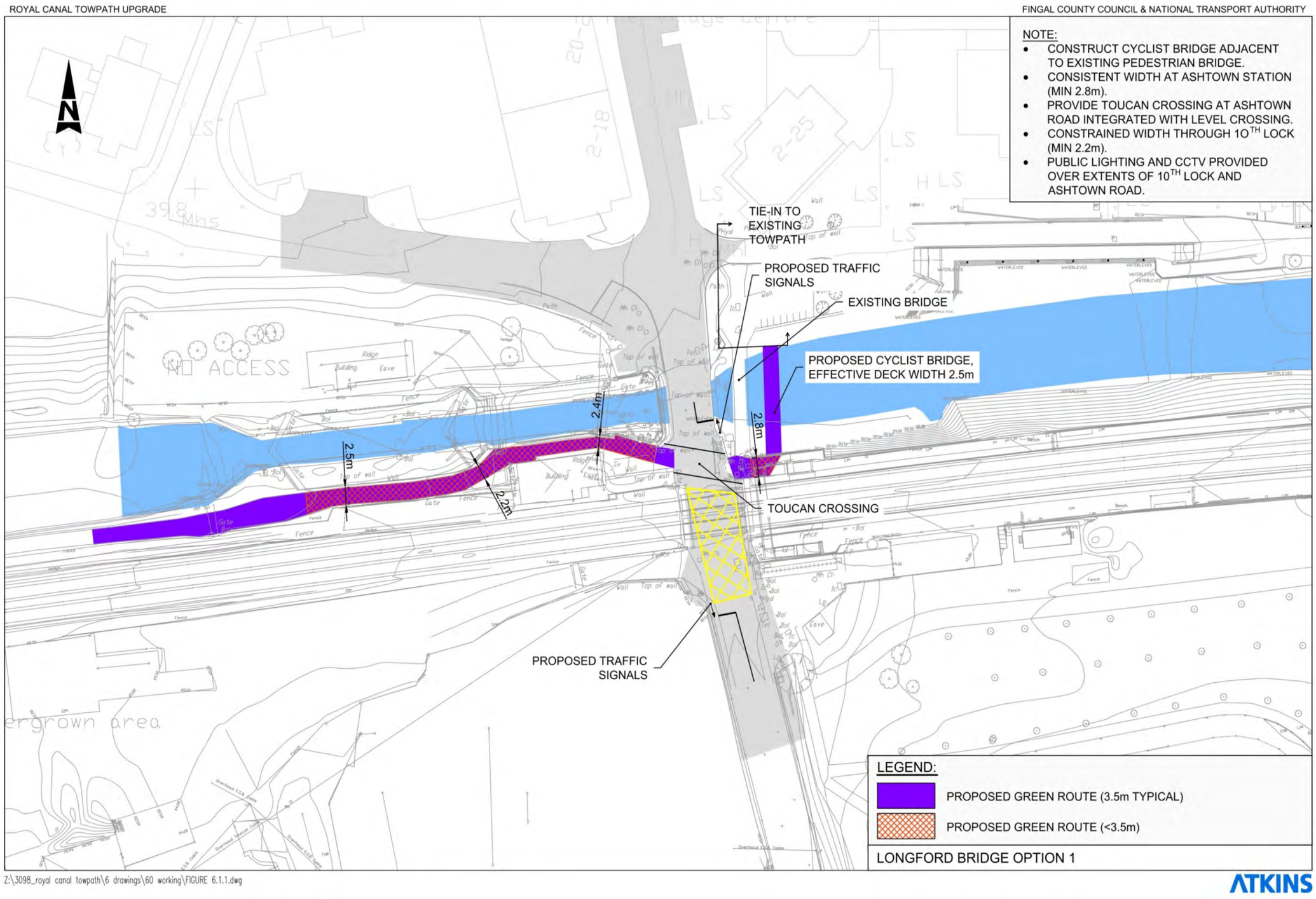


Figure 6.2 - Longford Bridge Option 1

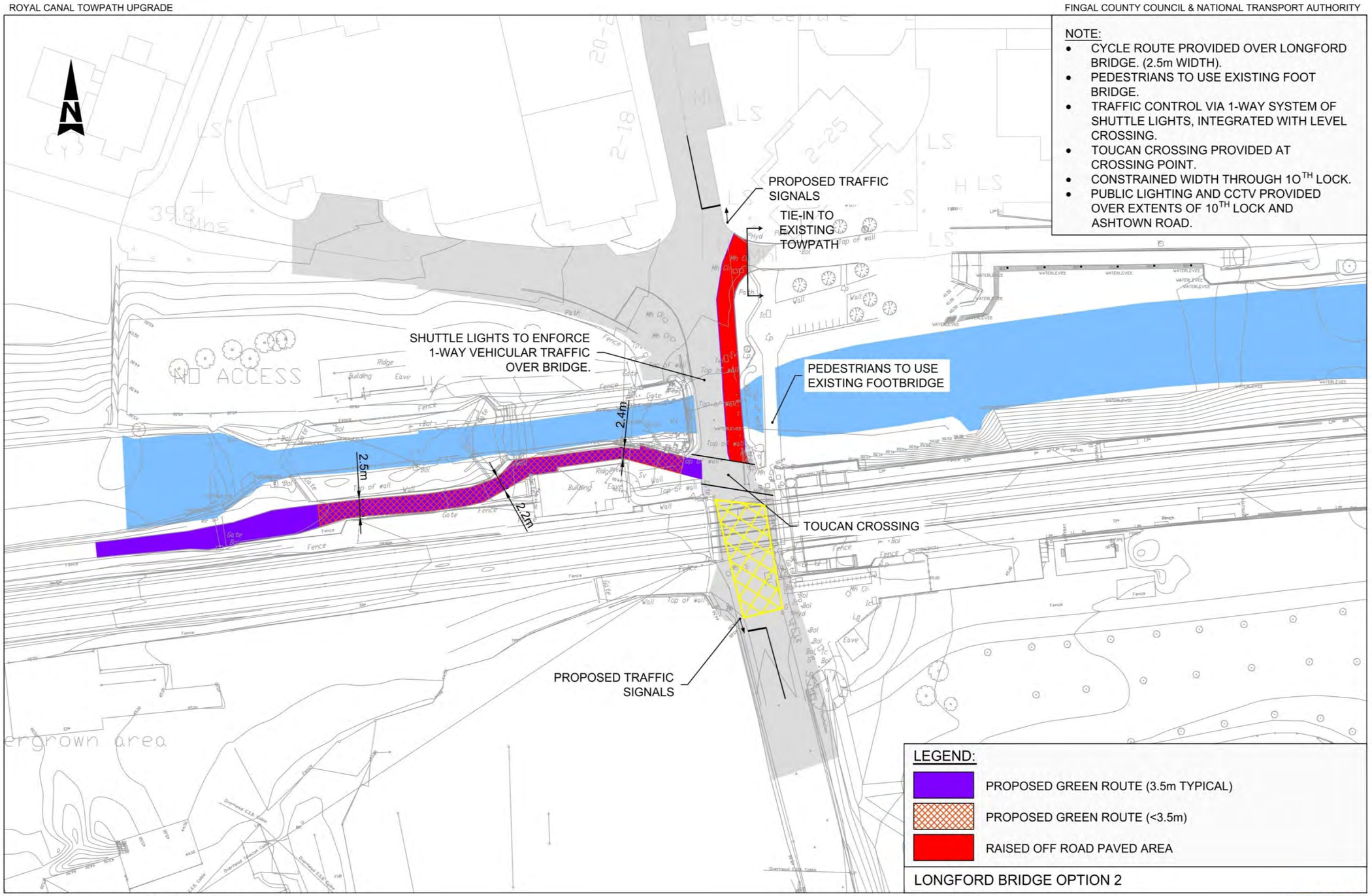


Figure 6.3 - Longford Bridge Option 2

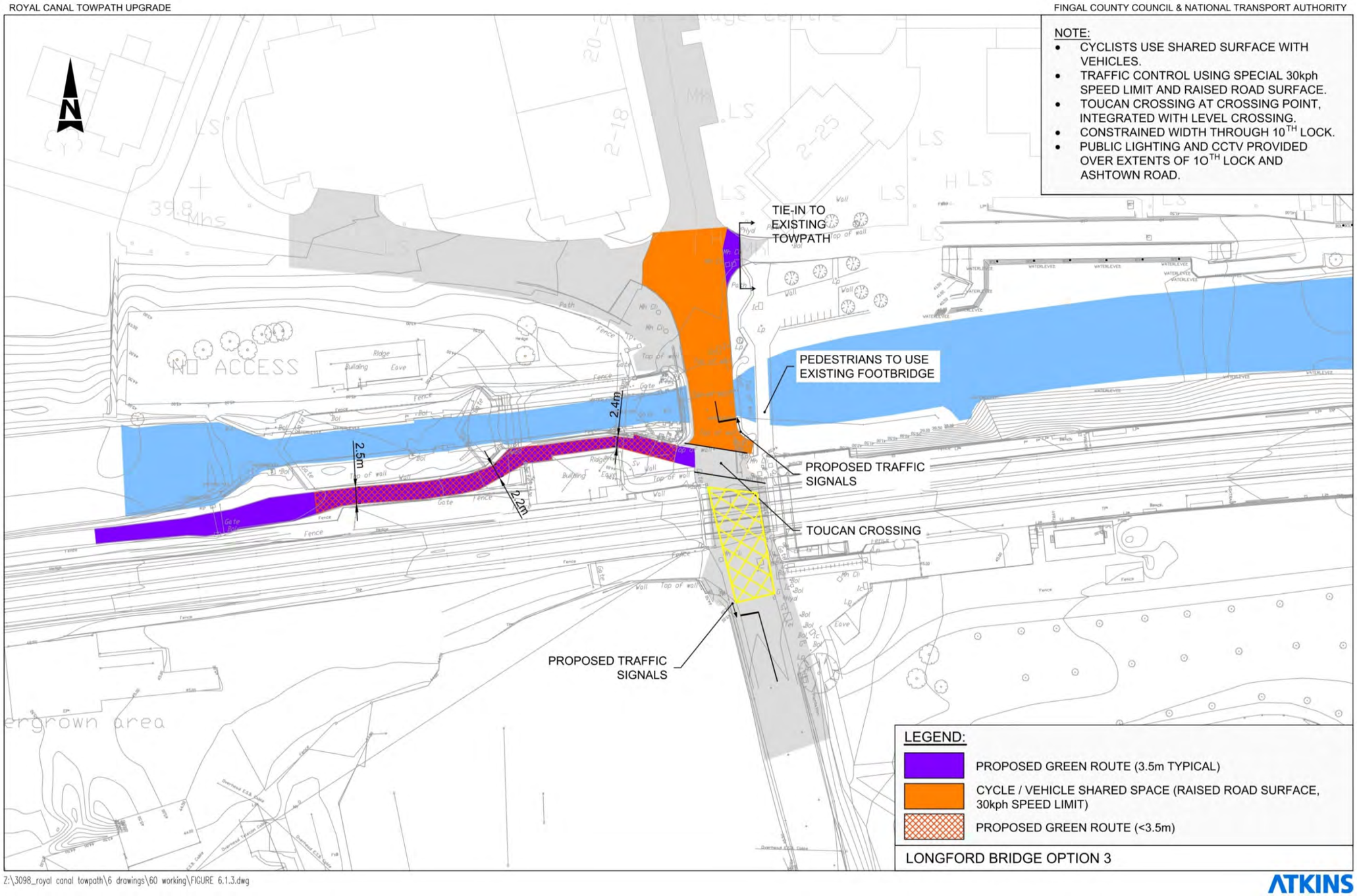


Figure 6.4 - Longford Bridge Option 3

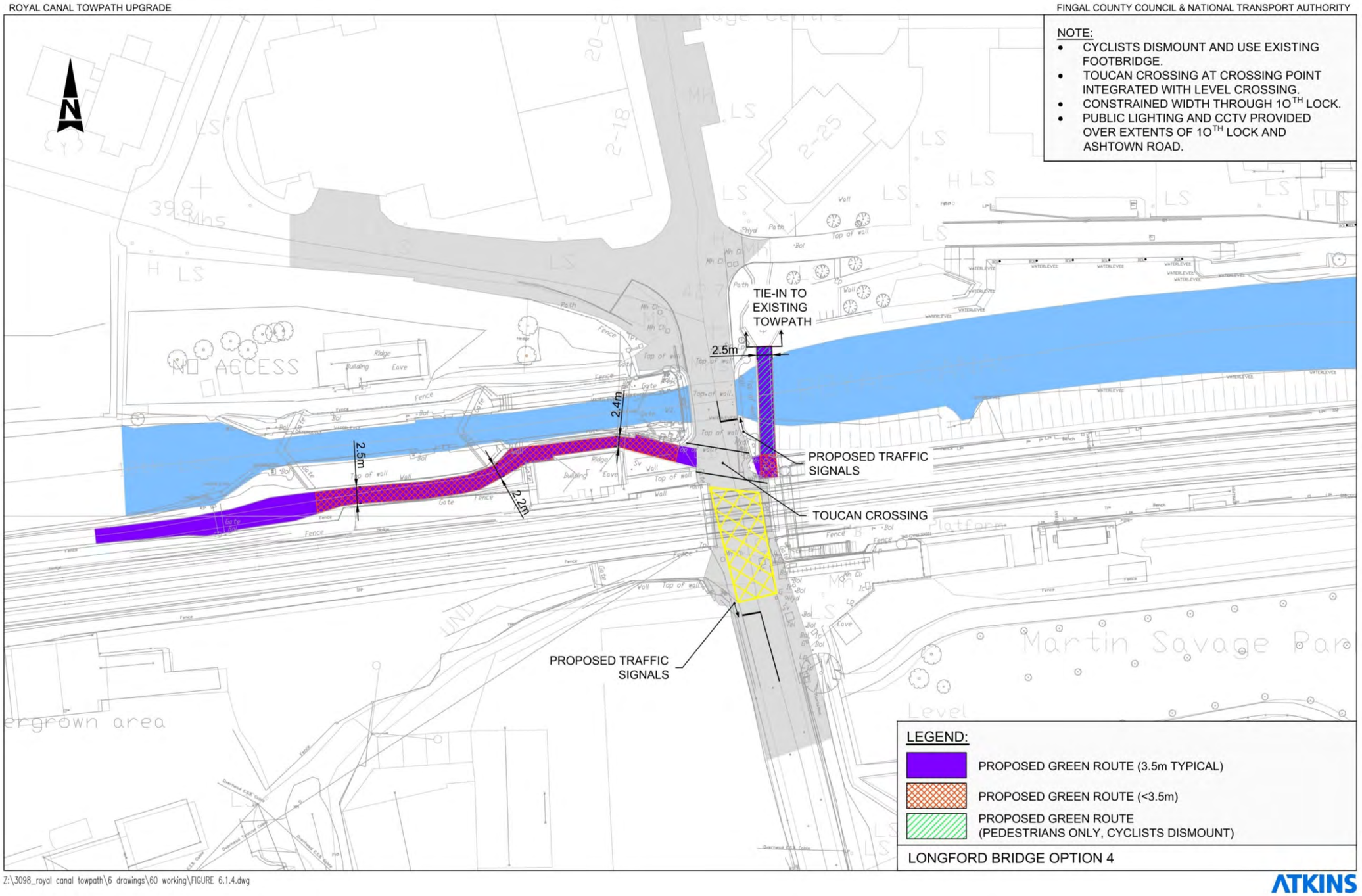


Figure 6.5 - Longford Bridge Option 4

Canal towpath, 10th Lock to M50 Aqueduct

6.52 In achieving the desired 3.5m wide surface, constraints in the available width will need to be addressed along the railway line immediately east of the 11th Lock.

6.53 In considering the options, while there is scope to achieve the required 3.5m, works would be required to retain the existing embankment height of circa 1.0m. Such works would be within the railway's zone of influence. Notwithstanding this, given the minor nature of the works, it would be reasonable to consider that agreement with Irish Rail could be reached to allow the works proceed.

6.54 The alternative is to leave the pinch point in place and provide a shared 2.8m (approx) wide surface. It is therefore considered that the favoured option in this instance is to widen the towpath to 3.5m.

6.55 All other areas between the 10th Lock and the M50 Aqueduct can be widened to 3.5m with minimal works required.

M50 Aqueduct

6.56 The M50 Aqueduct in its current state provides a major pinch-point along the proposed route. The canal and towpath cross the M50 motorway on a dedicated structure. Three options were considered:

6.57 **Option 1** Figure 6.6 - M50 Aqueduct Option 1 is provided below. It involves the construction of a separate cycle-only bridge across the M50 Motorway. The bridge would be located immediately south of the existing aqueduct, between the aqueduct and the railway bridge. The most efficient structure would be a prefabricated steel or precast concrete bridge which could be lifted into place in sections, depending on design. This would limit the amount of time required for lane closures on the motorway below.

6.58 Due to the length of crossing at this location, it is likely that central supporting piers would be required. These would be located within the M50 central median, the construction of which would cause significant traffic disruption to the M50 Motorway.

6.59 The construction of the main deck of the bridge would most likely require safety netting to be erected across the M50 traffic lanes so that the risk of construction stage debris falling onto the high speed traffic below would be eliminated.

6.60 Access for construction traffic and materials would be via Talbot Court to the west and River Road / Dunsink Lane in the east. The access from the east would be the most difficult as access across the canal would be limited. It would be reasonable to expect that significant cranage of materials across the canal would be required, with a crane situated adjacent to the eastern abutment of the aqueduct.

6.61 The close proximity of the railway bridge would also mean that consultations with Irish Rail would be key to the process.

6.62 This option will be an expensive option to consider. The construction of the bridge would attract a high level of capital cost while the construction sequence would be expected to be severely constrained due to the 6-lane live motorway below.

6.63 The benefits, however, would be evident in the high level of safety offered to the end user. The risks associated with the restricted width of the existing towpath across the aqueduct would be eliminated from the cycle route.

6.64 Impacts on the receiving environment are considered to be negligible, with minor impacts on existing planting at each landing point of the bridge.

6.65 Technically this option would offer the highest Level of Service for cyclists in terms of continuity and directness of route. Pedestrians would continue to uses the existing towpath across the aqueduct, thus removing any potential for conflict or disturbance to cyclists.

6.66 Given the location of this particular site, integration and accessibility factors are not considered for the overall evaluation of the options as the merits of all options would be identical.

6.67 **Option 2:** Figure 6.7 - M50 Aqueduct Option 2 is provided below. This option includes the widening of the existing towpath across the M50 aqueduct. This would be achieved by modifying the existing concrete structure by adding cantilevered structural sections along the southern edge of the bridge to effectively widen the existing towpath provision to 3.5m.

6.68 It would be both difficult to construct this option over a live carriageway and would be reasonably costly. The feasibility of this option would also need to be considered in detail, but based upon other similar operations elsewhere, this is likely to be feasible.

6.69 Taking the above construction stage concerns into account, this option would attract a significant cost premium and would be considered similar to the costs of Option 1. The erection of temporary scaffolding, supported from the existing bridge, to effectively provide a working platform across the M50 is likely to be required to satisfy safety issues and risk of personnel and / or construction stage debris falling onto the traffic lanes below. Such temporary structures tend to increase the overall construction costs.

6.70 Access to the site would also be difficult from the east, requiring the establishment of a crane to lift materials over the canal channel. As per Option 1, a crane could be positioned adjacent to the eastern abutment of the M50 Aqueduct and would be required for the majority of the construction period and this would need to be factored in to the estimated construction costs.

6.71 This option would provide a safe facility for both cyclists and pedestrians, although it is considered that a guardrail would be required along the water's edge to protect against accidental falls into the canal waters.

6.72 Effects on the environment would be considered minimal during the service life of this element. However, the construction stage would have a neutral impact on the environment.

6.73 The technical merits of this option would be similar to Option 1 in that the high Level of Service would be maintained through the structure in terms of continuity and directness of route. The widened bridge would provide a consistent width of 3.5m along the route. However, the construction of the facility would require more work (breaking out of existing parapet beam, falsework, formwork, concrete placement etc) over a live carriageway.

6.74 Given the location of this particular site, integration and accessibility factors are not considered for the overall evaluation of the options as the merits of all options would be identical.

6.75 **Option 3:** Figure 6.8 - M50 Aqueduct Option 3 is provided below. This option involves the widening of the existing towpath by reducing the navigation channel width. Structurally, this option is easier to construct (using cantilevers over the canal) than the previous options as there are no major modifications required to the outside of the bridge (over the motorway). Modifications to bridge to accommodate the cantilever would be required, as would replacement of the existing parapet to ensure adequate protection to cyclists.

6.76 However, a minimum of 1.5m of widening would be required which would effectively reduce the navigable channel by the same amount. Such measures would have obvious negative impacts on the canal navigation and its ability to accommodate many of the traditional barges and canal boats.

6.77 While the aqueduct is not listed on the Record of Protected Structures, this option would have implications for the historical / heritage uses of the canal.

6.78 The capital cost of this option would be reasonable given that a cantilever structure would be required, but not as expensive as previous options. However, replacement of the parapet would require special attention due to the presence of live traffic on the M50 Motorway below.

6.79 A guardrail would need to be erected along the water's edge to prevent any accidental falls into the canal. This would need to be factored into the overall costs of the proposed option.

6.80 The overall continuity and directness of the route would be maintained with this option leading to a high Level of Service.

6.81 The integration and accessibility merits for this option do not differ from other options due to the location of this particular site. However, there would be a quantifiable loss in the amenity value of the canal for water based traffic and recreational activities.

6.82 **Option 4:** Figure 6.9 - M50 Aqueduct Option 4 is provided below. This option represents the "do minimum".

6.83 The current layout would be maintained in situ. Signage would be provided instructing cyclists to dismount and use the existing 2.1m wide towpath across the extent of the aqueduct. While this would lead to a reduction in the Level of Service of the proposed cycle route, it would be an essential measure to ensure the safety of all users.

6.84 However, there is concern that cyclists would tend to ignore the requirement to dismount and would continue to cycle across the aqueduct, increasing the risk of conflict with pedestrians. Given that this project would be likely to generate an increase in pedestrian and cyclist traffic, it would be prudent to erect a guardrail along the water's edge of the existing towpath for obvious safety reasons.

6.85 The assessment of this option notes that the capital costs are the most favourable of all options considered given the minimal works required.

6.86 While the risk of falling into the canal waters would be addressed by the provision of edge protection along the canal waters, there is a high probability that cyclists would ignore signed requests to dismount and continue to cycle across the aqueduct. The risk of pedestrian / cyclist conflict on the narrow path is greatly increased. This option would therefore score less well than other options in terms of overall user safety.

6.87 The requirement to dismount and walk across the structure would have a negative impact on the Level of Service. While the directness of the route is maintained, continuity is compromised. Therefore, this option would be least preferred in terms of technical merit.

6.88 The impact on integration and accessibility is not applicable as per previous options given the location of this particular site.

Table 6.2 - M50 Aqueduct Option Evaluation Summary

Option Evaluation Summary M50 Aqueduct				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**1**	**2**	**4**	**3**
Economy	Significant cost premium due to provision of new dedicated bridge over the M50	Most expensive solution due to complexity of the proposals and extent of work required over live traffic	Reasonable cost involved in cantilevering over the canal.	Cheapest option considered.
Safety	Offers good levels of safety and personal security	Offers good levels of safety and personal security	Offers good levels of safety and personal security	There is risk that cyclists may ignore requirement to walk across the aqueduct thus increasing risk of collision with pedestrians and hence safety
Environment	Minimal impact during service and construction – site is located in centre of busy motorway interchange	Minimal impact during service and construction stage	Minimal impact during service stage. During construction stage there would be a need to coffer dam the canal and build a support structure which could affect ecology. Heritage issues inherent in the reduction of the canal channel width	Minimal impact on environment in service Least impacts for construction stage
Technical	High Level of Service in terms of continuity and directness of route.	High Level of Service in terms of continuity and directness of route.	High Level of Service in terms of continuity and directness of route, however there is significant loss of amenity of the canal as a result of the reduction in width, which is unlikely to be acceptable to Waterways Ireland.	Level of service compromised due to low width of passage being provided
Integration	N/A	N/A	N/A	N/A

6.89 **Conclusion:** Option 3 is the least preferred due to its adverse effect on the operation of the canal. This option would meet significant opposition from major stakeholders and is least desirable by all parties.

6.90 Options 1 and 2 provide the best solutions in terms of continuity of the facility and ensure a high Level of Service is achieved. Option 1 would be the preferred solution in terms of safety, especially in that less works are required above the live motorway. Option 1 is therefore preferred.

6.91 Option 4 requires cyclists to dismount before crossing the aqueduct. While this has obvious negative impacts on the required Level of Service, this option would provide a good compromise until funding to construct Options 1 or 2 is available.

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:
- PROVIDE NEW BRIDGE ACROSS M50 FOR DEDICATED CYCLEWAY.

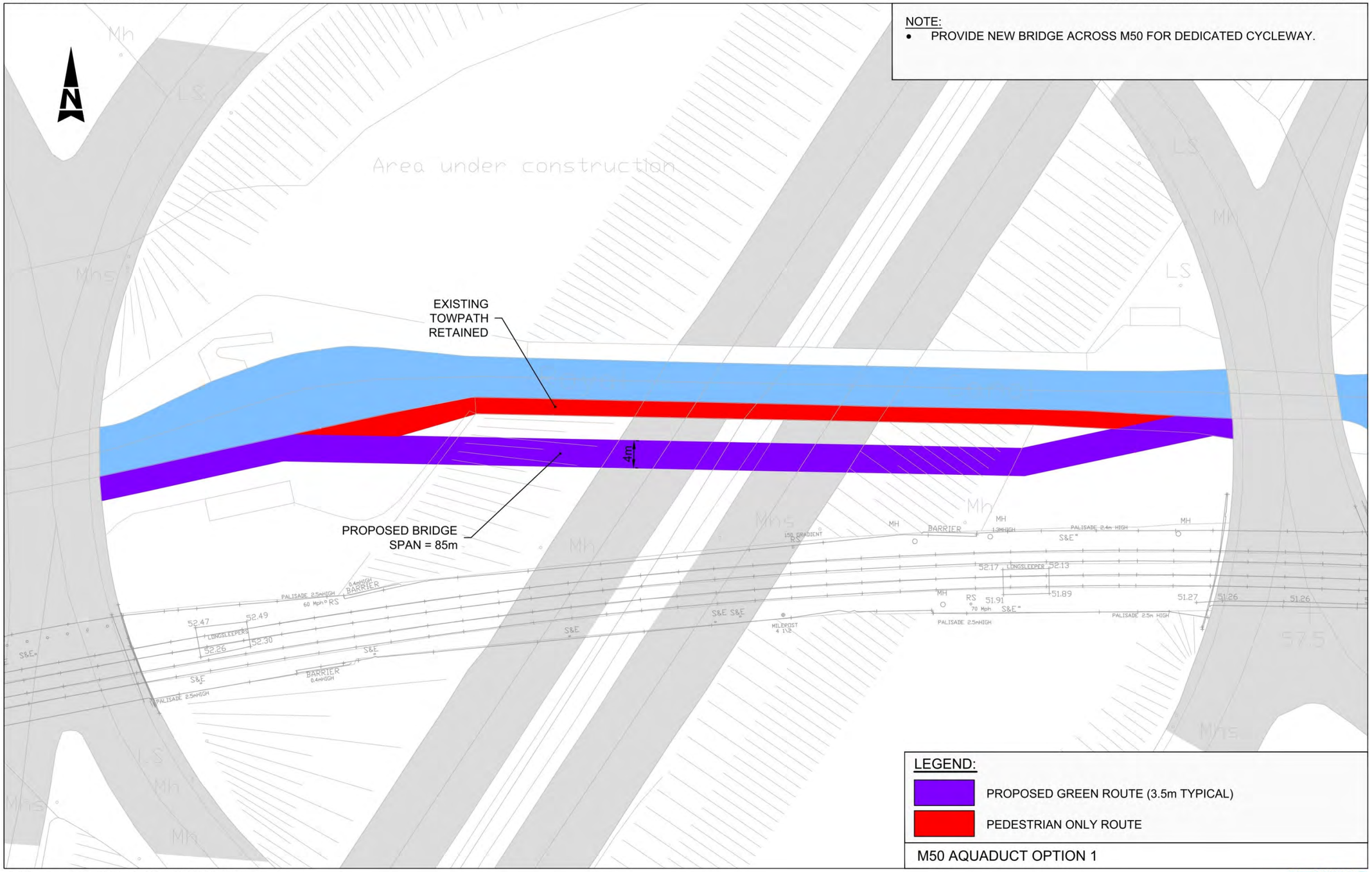


Figure 6.6 - M50 Aqueduct Option 1

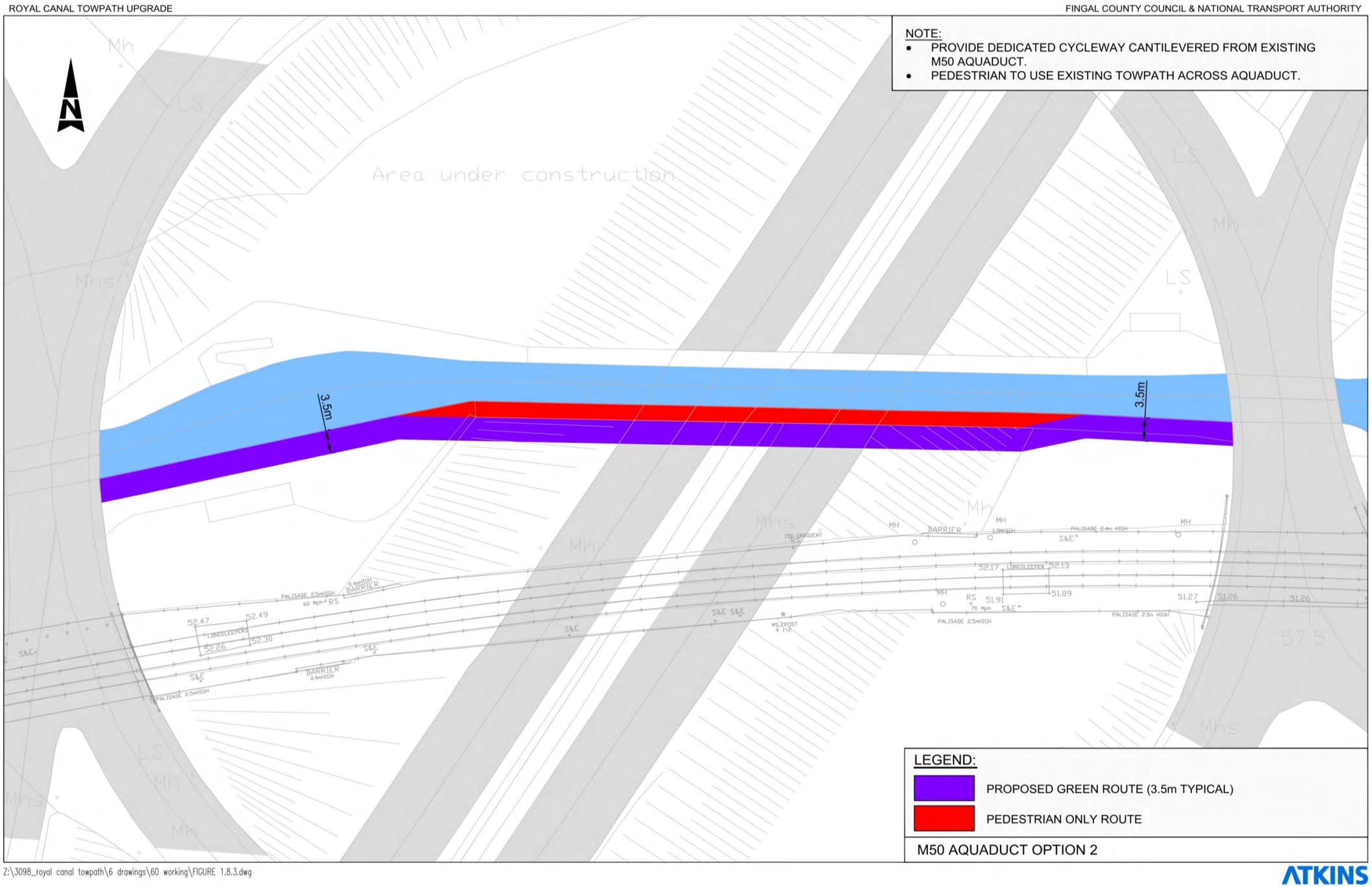
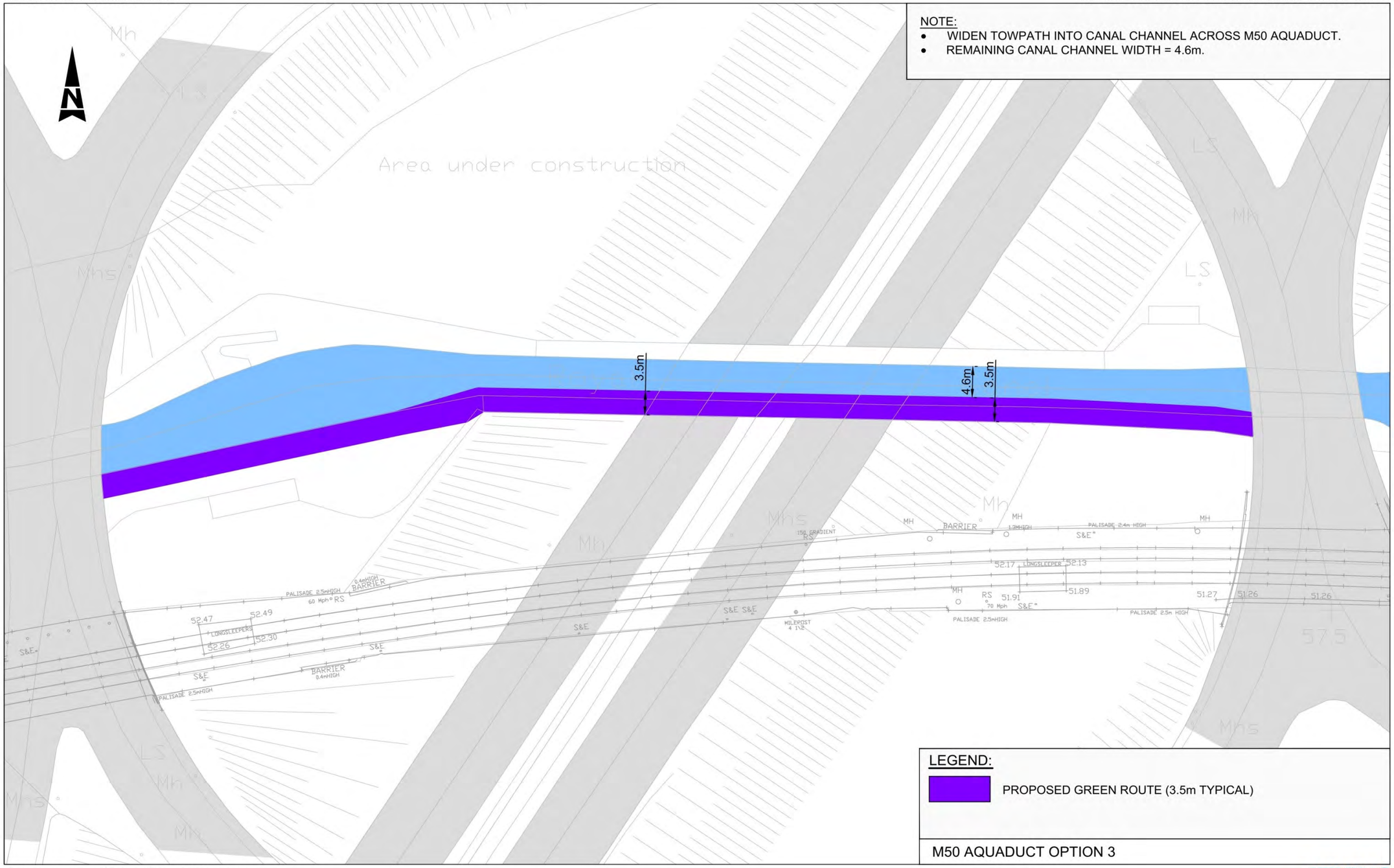


Figure 6.7 - M50 Aqueduct Option 2

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY



Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.8.2.dwg

Figure 6.8 - M50 Aqueduct Option 3

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:
- NO CHANGE TO EXISTING LAYOUT.
- PROVIDE SIGNAGE REQUIRING CYCLISTS TO DISMOUNT AND WALK ACROSS THE AQUADUCT.

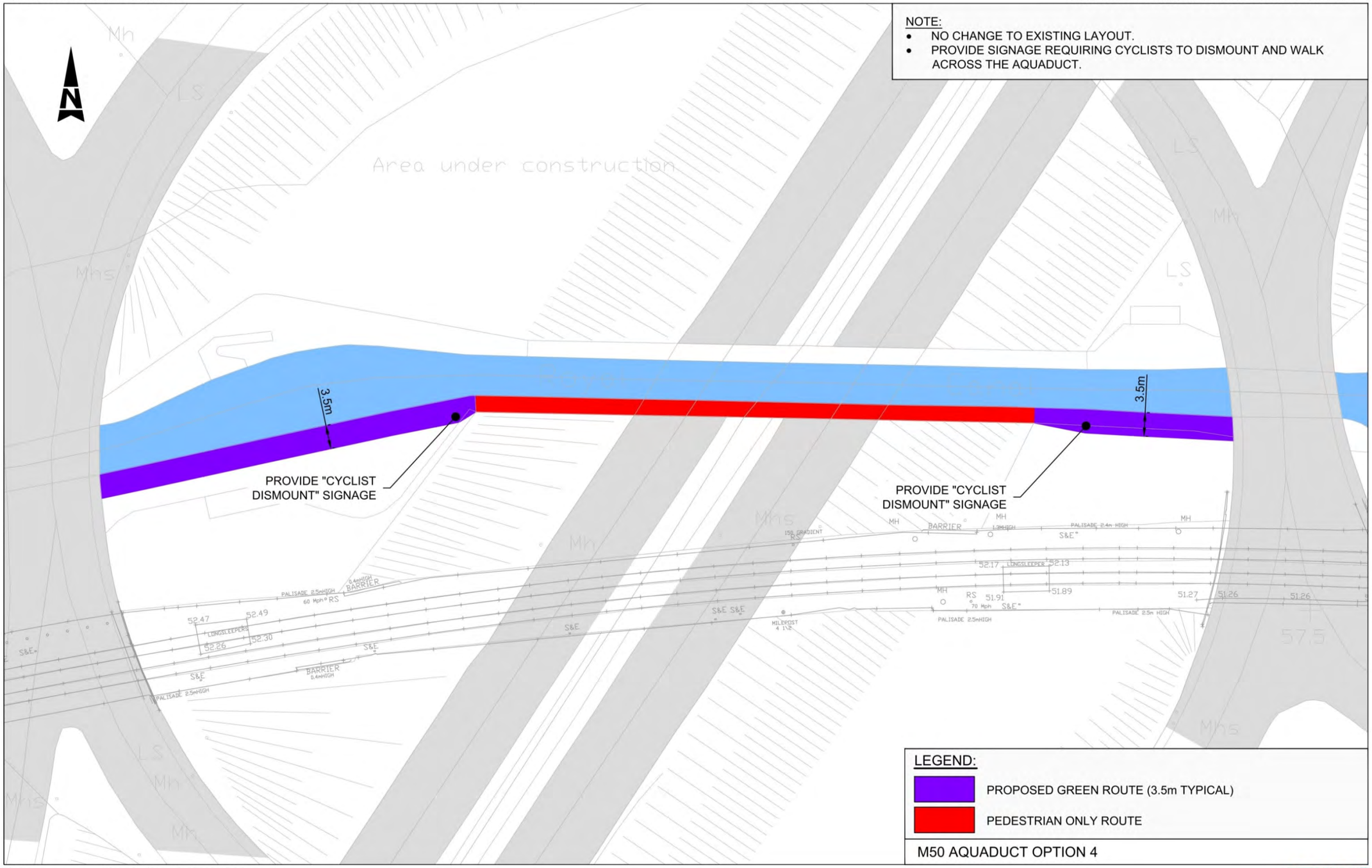


Figure 6.9 - M50 Aqueduct Option 4

Options at Talbot Bridge and towpath to Granard Bridge

6.92 All options at Talbot Bridge will seek to address the issues with accessibility and gradients to/from Old Navan Road.

6.93 The primary objective at this location is to provide a safe and effective method to ensure continuity of the proposed route is maximised. The approach to Talbot Bridge from the east is substandard, but there is sufficient space to improve this gradient up to current standards.

6.94 To the west of the bridge there is a lock with restricted space and steep gradients and the options presented have addressed this issue.

6.95 All options would link the canal cycleway with the existing cycle route between Blanchardstown and Old Navan Road, providing an alternative cycle route to the city centre via Auburn Avenue and the Phoenix Park.

6.96 **Option 1: Figure** 6.10 **- Talbot Bridge Option 1** is provided below. This option will require users to access the north canal-bank before using the original bridge to cross back to the south bank. This is necessary to avoid the private car park at the 12th Lock Hotel and the existing steps provided from Old Navan Road.

6.97 Given the low traffic volumes of traffic at Old Navan Road, it is proposed to provide a standard uncontrolled crossing facility at this location. This crossing would serve both pedestrians and cyclists.

6.98 In switching between the north and south banks of the canal, pedestrians will be required to use the existing footpaths. Cyclists will be accommodated through the provision of advisory on road cycle lanes between the accesses.

6.99 The proposed route through the 12th lock would be constrained to a minimum width of 2.5m until users have passed the 12th Lock Hotel buildings. Thereafter, a full width of 3.5m would be provided. These works would require widening to the existing bituminous surface in this area.

6.100 The capital costs for this option would be minimal with no major works elements to amend the existing infrastructure necessary.

6.101 The crossing of Old Navan Roadwould be expected to present minimal risk to users due to the very low vehicle movements at this location. Hence an uncontrolled crossing facility is selected. However, cyclists may choose to use the most direct route to access the towpath west of Talbot Bridge which is via the existing car park at the 12th Lock Hotel. Cyclists using the car park areas would be at risk of conflict with reversing vehicles.

6.102 This option would have minimal impacts on the receiving environment in both the construction stage and when in service as works required are minimal and the receiving environment is currently defined by the adjacent hotel premises, residential apartments and heavy pedestrian use.

6.103 Technically this option provides a good level of continuity. However, the directness is compromised due to the requirement for cyclists and mobility impaired to cross to the north bank and back again so that the car park and stepped access routes are avoided. In addition, the full desired width of 3.5m is not achievable through the 12th lock, thereby further compromising the Level of Service offered.

6.104 **Option 2:** Figure 6.11 - Talbot Bridge Option 2 is provided below. The proposed layout seeks to provide a direct access route to the southern towpath north of the 12th Lock Hotel car park. Acquisition of approximately 14 square meters of the 12th Lock Hotel car park would be required and a new footpath / cycleway access provided from Old Navan Road. A new boundary wall or fence would be provided along the new boundary line to the 12th Lock Hotel car park. This layout would equate to an approximate loss of three car parking spaces in the car park.

6.105 The proposed access would be used by both pedestrians and cyclists, who would cross Talbot Court via an uncontrolled crossing. An uncontrolled crossing facility would be deemed suitable given the low levels of vehicular traffic on the Old Navan Road.

6.106 As per Option 1 above, the route would pass through the 12th lock area via a path of constrained width of 2.5m until after the 12th Lock Hotel buildings, where a full width of 3.5m would be provided. These works would require widening to the existing bituminous surface in this area.

6.107 This option requires the purchase of circa 14 square meters of privately owned land at the 12th Lock Hotel car park. The level of construction activity required in terms of demolition of existing walls, construction of new boundary treatments, towpath access route and any associated accommodation works would be additional cost when compared to Option 1. The costs for this option would therefore be considered as moderate.

6.108 The level of safety offered by this option could be considered high given the low level of interaction with traffic and direct access to the towpath. Any issues with cyclists accessing the adjacent car park would be eliminated by this layout.

6.109 While considered minimal, the environmental impact of this option would be considered greater than Option 1 due to the greater scope of construction works required. Notwithstanding this, impacts on the receiving environment would be considered minimal in both the construction stage and when in service as works required are non intrusive and the receiving environment is currently defined by the adjacent hotel premises, residential apartments and heavy pedestrian use.

6.110 In terms of technical merit, this option would perform best due to the good continuity and directness of route. However, the restricted width through the 12th lock would impact on the comfort level achieved.

6.111 **Option 3:** Figure 6.12 - Talbot Bridge Option 3 is provided below. This option would direct cyclists onto the south bank of the canal at the 12th lock with access provided via the adjacent car park. This route would require agreement from the owners of the 12th Lock Hotel. There would be minimal loss of car parking area. However, there is a safety concern inherent in this solution as cyclists would be required to negotiate a car parking area where there are likely to be a significant number of reversing manoeuvres and visibility issues.

6.112 Pedestrians would be required to use the existing steps at Talbot Bridge, with all users required to cross Talbot Court via an uncontrolled crossing facility.

6.113 The route would continue through the 12th lock area via a path of constrained width of 2.5m. The path would extend to 3.5m wide immediately west of the hotel buildings. Works would be required to widen the existing bituminous path in this area.

6.114 This option would be considered as the “do minimum” scenario for this area. As such, implementation costs would be minimal. Construction works would only be required to widen the existing path in the area.

6.115 As noted previously, there would be safety concerns in directing cyclists to use the car park area where motorists would be executing a high number of reversing manoeuvres and where visibility would be restricted by other stationery vehicles. Therefore, this option would score poorly in terms of safety of end user.

6.116 This route would score highly in terms of continuity and directness of route although it would be considered inferior to Option 2 above. Similar issues in terms of the reduced width through the 12th lock area and the resultant impacts on comfort would be similar to other options under consideration.

6.117 **Option 4:** Figure 6.13 - Talbot Bridge Option 4 is provided below. This option would require users to access the north canal bank at Talbot Bridge.

6.118 Given the low traffic volumes on the Old Navan Road, a standard uncontrolled crossing facility would be provided at this location. The crossing would serve both pedestrians and cyclists. On-road advisory cycle lanes would be provided to assist and guide cyclists across the canal bridge as per Option 1 above.

6.119 The proposed route would follow the north bank of the canal through the 12th lock. The initial access route would consist of a reduced width of approximately 2.5m and steep gradient of 1:10. Options to overcome these constraints have been discounted due to the difficulties presented by the 12th lock chamber walls to the south (protected structures) and the grounds and boundary walls of The Mills residential development to the north (private property). The width would be further constrained by the space required for the operation of the lock gates at the upper level.

6.120 West of the lock, the full width of 3.5m would be provided through the adjacent parkland up to Castleknock Road.

6.121 The construction costs for this option would be considered low due to the minimal scope of works required. It would be considered to be marginally higher than options considered for the southern canal bank due to the marginally greater distance of widening required.

6.122 There would be a safety concern with respect to the existing steep gradient adjacent to the lower level of the 12th lock. Cyclists would be required to travel down this steep gradient generating potentially higher speeds at a potential conflict zone and accordingly would be considered undesirable. Similarly, mobility impaired may consider this hazardous for similar reasons where it may be difficult to control wheelchairs.

6.123 Environmental impacts would be negligible for this option and would be consistent with other options considered for this area.

6.124 The directness of route and continuity would be protected with this option. However, the reduced width and steep gradient at the western entrance from Old Navan Road would have a negative impact on the coherence and level comfort of the proposed route. Therefore, this option would be less favoured for these reasons.

6.125 This option would take users to the north side of the canal and would necessitate another crossing to the south at the next interface point, hence costs and interactions are deemed to be higher with this option.

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Table 6.3 - Talbot Bridge Option Evaluation Summary

Option Evaluation Summary Talbot Bridge, 12th Lock				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**#2**	**#1**	**#4**	**#3**
Economy	Low cost solution	Increased scope of works and requirement for acquisition of privately owned land equates to moderate level of cost	Low cost solution Will require legal agreements to enable cyclists to traverse private land.	Low cost solution
Safety	Offers good levels of safety and personal security. However, there is risk that cyclists may choose more direct route via existing car park, increasing risk of collision with reversing vehicles	Offers good levels of safety and personal security	Safety of cyclists compromised due to requirement to negotiate car park area and therefore cannot be recommended..	Safety concerns with steep gradient on eastbound approach to Talbot Court
Environment	Minimal impact in service and during construction	Minimal impact in service Higher scope of construction works required will have slightly increased construction stage impacts on surrounding environment	Minimal impact in service and during construction	Minimal impact in service and during construction
Technical	Minor negative impact on continuity of route. However, directness is significantly compromised. Lack of full width provision would also impact on comfort levels.	High Level of Service in terms of continuity and directness of route However, lack of full width provision through 12th lock would have negative impact on comfort levels.	Good Level of Service in terms of continuity and directness of route. Lack of full width provision would also impact on comfort levels.	Good Level of Service in terms of continuity and directness of route. Reduced width and steep gradient have negative impact in terms of comfort levels and coherence
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility	Good levels of integration and accessibility	Good levels of integration and accessibility

6.126 **Conclusion:** Option 3 has potential for conflicts between cyclists and manoeuvring vehicles in the car park and is least preferred on safety grounds. It represents the most likely existing situation in that cyclists and pedestrians are likely to be judging the safety of the car park before using it as the most direct route. However, this option cannot be recommended as the preferred route due to the conflicts mentioned above. It would also require agreement with the landowner.

6.127 Option 2 is preferred as it is the most direct route. However, this option requires a small area of land-take from the hotel car park.

6.128 Option 4 is constrained in terms of width and gradient and may pose difficulty for mobility impaired users. As this option directs users to the north side of the canal it will require a later crossing back to the south side.

6.129 Options 1, 2 and 3 utilise the south canal bank; this is preferable for the optimum layout at Granard Bridge (presented later), whereas option 4 requires crossing back to the south side to align with the preferred option at Granard Bridge.

6.130 Overall, Option 2 is preferred as it offers the best overall solution. However, should funding be limited than Option 1 will provide a low cost interim solution.

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:
- IMPROVED GRADIENT EAST OF BRIDGE.
- ADVISORY CYCLE LANES ON TALBOT COURT.
- UNCONTROLLED CROSSING AT TALBOT COURT.
- ACCESS TO SOUTH TOWPATH VIA NORTH BANK AND THEN ACCESS ORIGINAL BRIDGE.
- CONSTRAINED WIDTH THROUGH 12TH LOCK (2.0m MIN.)
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF 12TH LOCK AND TALBOT COURT.

N

The Mills

2.9m

2m

2.5m

2.5m

PRIVATE CAR PARK

CAR PARK ACCESS RETAINED

REGRADE TOWPATH

OVERGROWN

OVERGROWN

OVERGROWN

LEGEND:

PROPOSED GREEN ROUTE (3.5m)

ON ROAD CYCLE LANE (ADVISORY)

PROPOSED GREEN ROUTE (<3.5m)

TALBOT BRIDGE OPTION 1

Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.1.3.dwg

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Figure 6.10 - Talbot Bridge Option 1

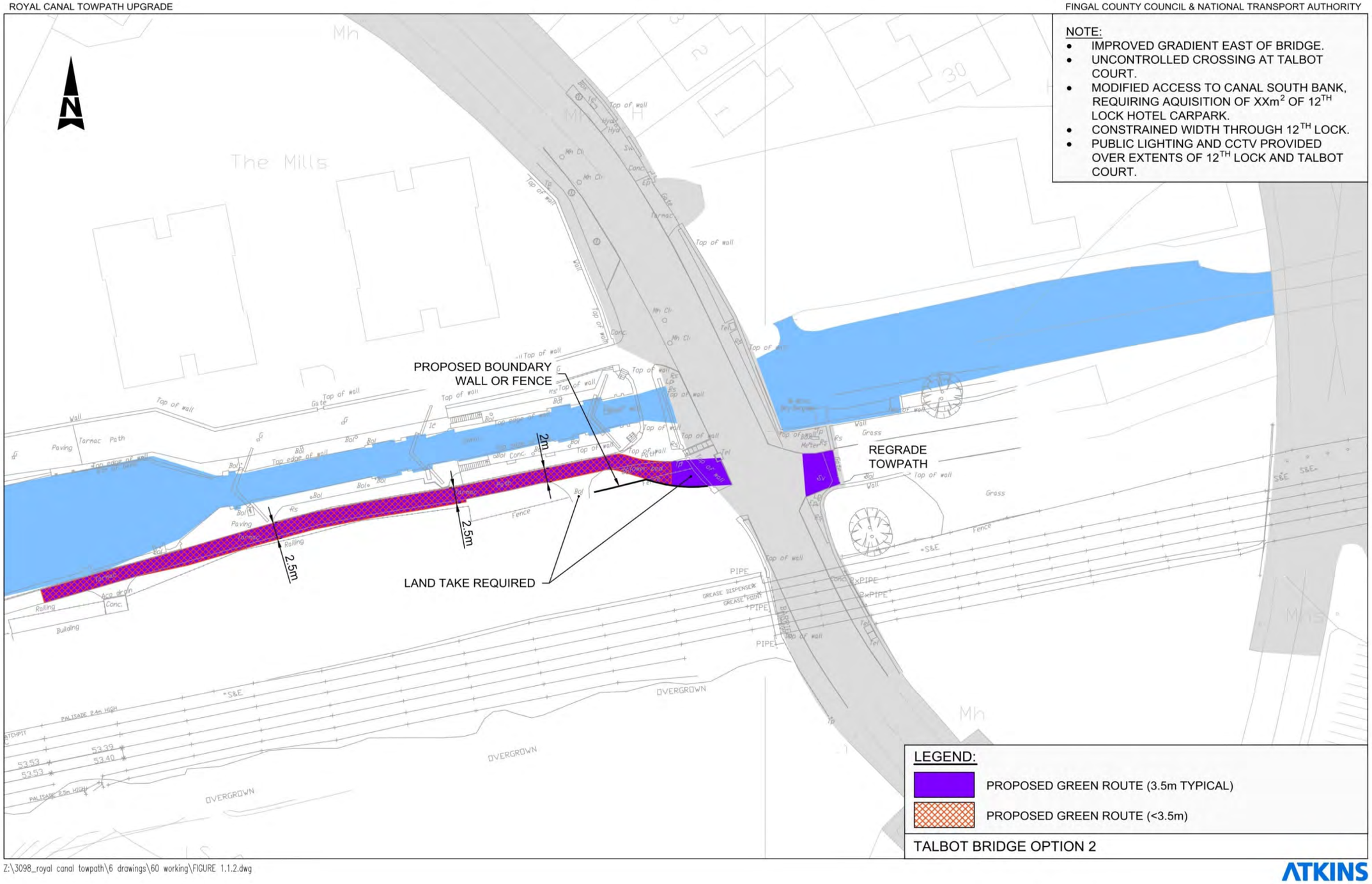


Figure 6.11 - Talbot Bridge Option 2

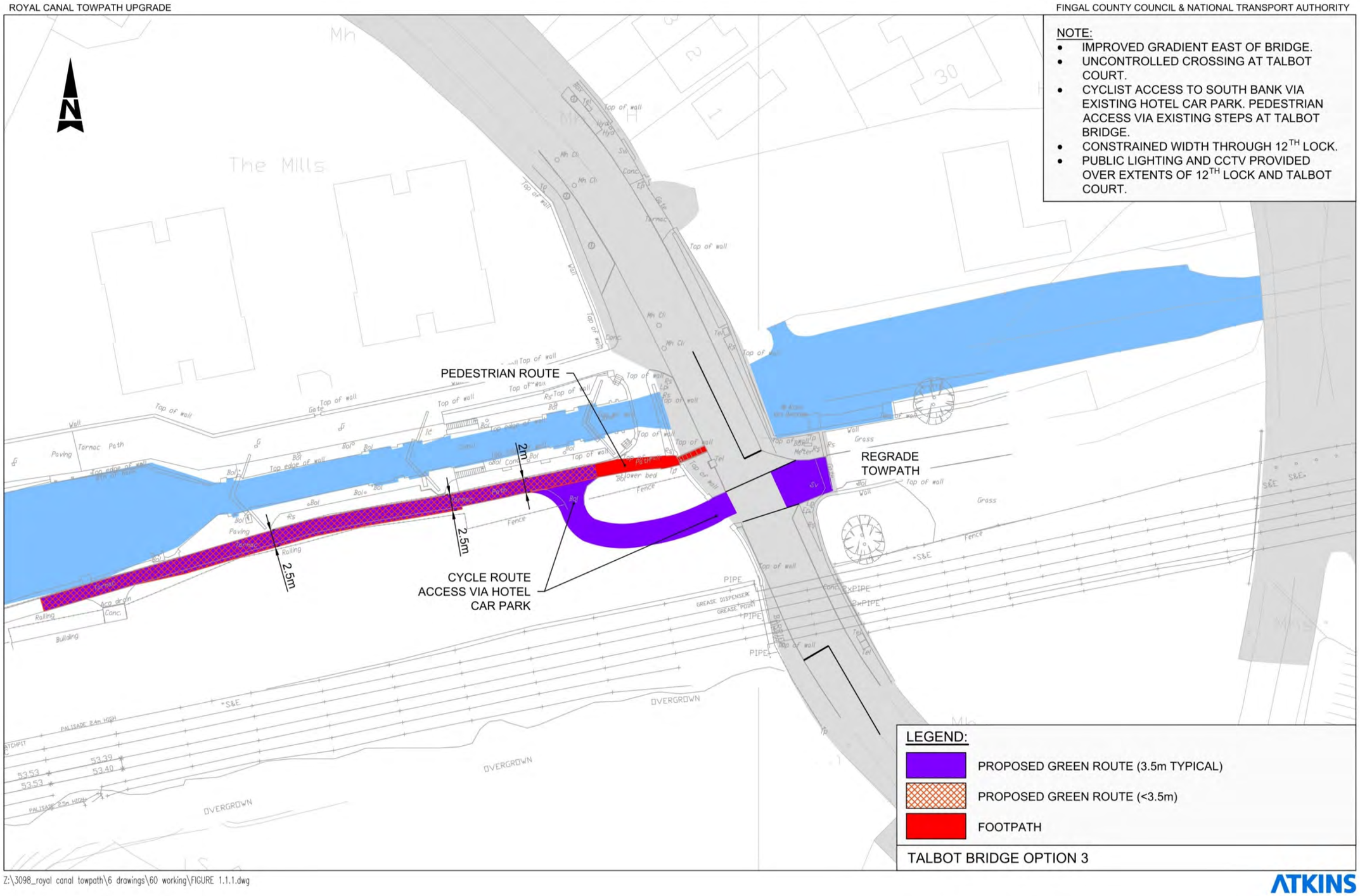
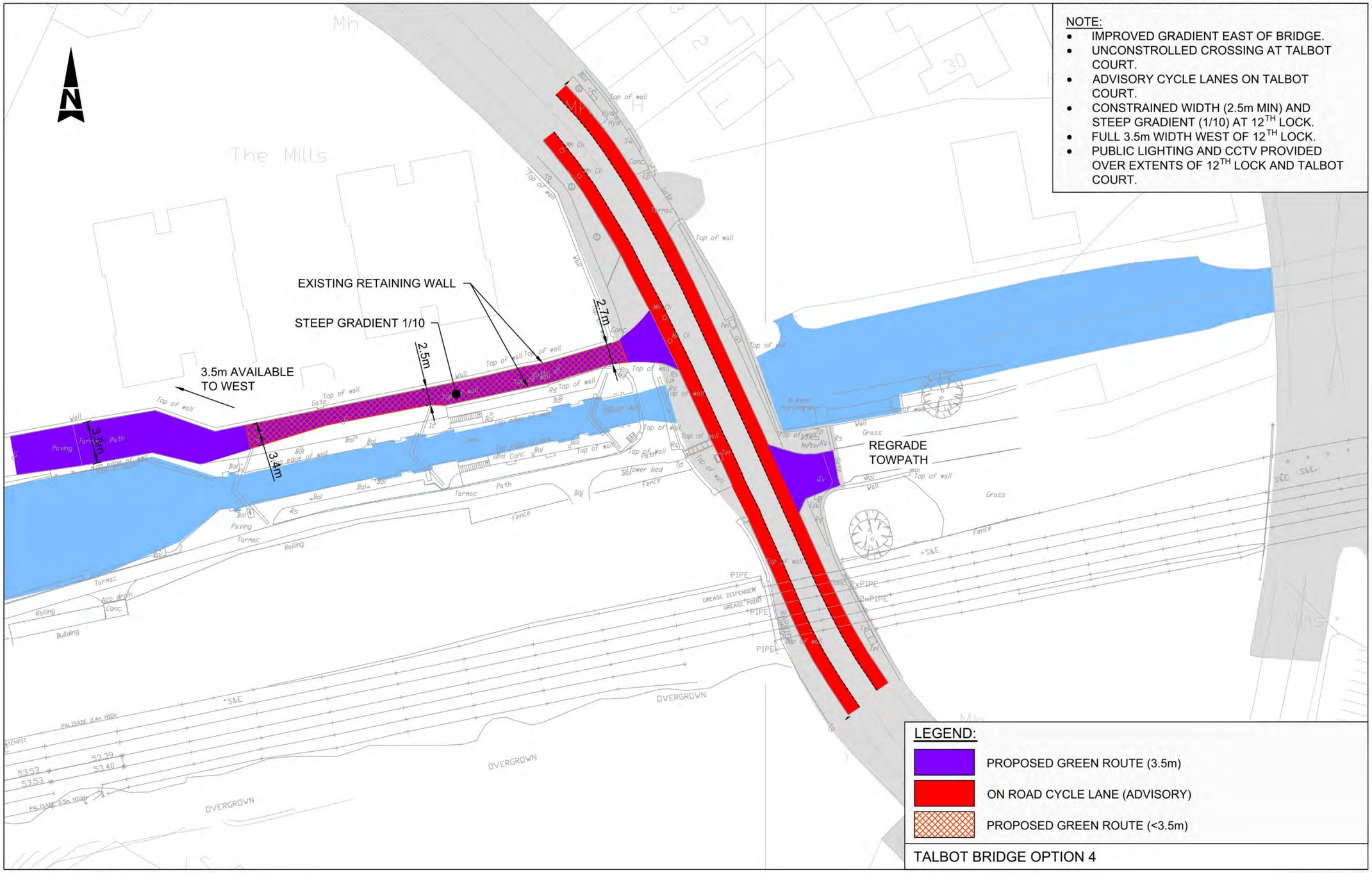


Figure 6.12 - Talbot Bridge Option 3

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY



Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.1.4.dwg

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Figure 6.13 - Talbot Bridge Option 4

Options at Granard Bridge

6.131 All options discussed here are dependent on the selected solution at Talbot Bridge and whether cyclists / pedestrians are directed onto the northern or southern towpath at Talbot Bridge.

6.132 All options assume that after passing Castleknock station, a full width of 3.5m would be provided on the existing bank up as far as the deep sinking, approximately 400m to the west of Castleknock Station.

6.133 A high level of integration with local bus and rail transport and with existing and planned cycle routes in the area would be provided with all options.

6.134 **Option 1:** Figure 6.14 - Granard Bridge Option 1 is provided below. This option assumes that the eastern approach to Granard Bridge would be via the northern bank. The proposed route would emerge onto Castleknock Road at the existing entrance point. Where the selected route at Talbot Bridge directs users to the southern bank of the canal, this layout would not be compatible.

6.135 The 3.5m wide cycleway would be continued across Granard Bridge by reclaiming the appropriate amount of carriageway space and converting this to a raised paved area. This would require a one-way traffic system at this location and it is proposed that this system would be achieved through the installation of a shuttle traffic light system.

6.136 As this is a major traffic route, the shuttle traffic lights would require connection to the Dublin City Council SCATS network. It is noted that all other signals on this route are currently controlled on the SCATS network.

6.137 A toucan crossing facility would be provided at the entrance to the railway station and integrated with the shuttle traffic lights.

6.138 This option would represent one of the more favourable options in terms of capital outlay. Implementation costs would be limited to cover the provision of the raised kerbed area across the bridge and the installation of traffic signals, with associated road markings and signage.

6.139 The proposed layout would also provide a safe route for cyclists and pedestrians using the canal towpath. The high volume of traffic on Castleknock Road would present an otherwise hazardous situation where users would be required to negotiate busy traffic and narrow footpaths. This proposed layout would address these concerns.

6.140 The minimal works required to construct this layout would result in minimal impacts on the local environment. However, the layout would have a significant impact on traffic on Castleknock Road and would be expected to add to existing congestion levels. This would have an indirect impact on the local environment.

6.141 This is a good option technically for the cycleway, but a poor option for the existing Castleknock Road users given the significant traffic impacts.

6.142 **Option 2:** Figure 6.15 - Granard Bridge Option 2 is provided below. This option assumes that the eastern approach to Granard Bridge would be via the northern bank. Where the selected option at Talbot Bridge directs users to the southern bank of the canal, this layout would not be compatible.

6.143 This option would provide a pedestrian / cycle bridge parallel to Granard Bridge and located immediately east of it. This would provide a safe means for users of the towpath to cross the canal. Pedestrians on Castleknock Road would also be directed to the bridge, effectively eliminating the safety concerns with the existing narrow footpaths across Granard Bridge.

6.144 A toucan crossing facility would be provided at the entrance to the railway station to provide a safe passage for pedestrians and cyclists across Castleknock Road. These signals would be required to link to the Dublin City Council SCATS network.

6.145 Given the high volume of traffic using this route, the introduction of a toucan crossing would be expected to adversely affect existing traffic congestion in the area.

6.146 As this option seeks the construction of a dedicated pedestrian / cycle bridge, it would attract a higher level of capital cost.

6.147 A safe route would be provided to the users of the canal towpath. Pedestrians along Castleknock Road would also benefit from the new bridge in terms of safety and adequacy of existing footpaths over Granard Bridge.

6.148 There would be potential for some heritage issues with respect to the construction of the footbridge and its impact on the existing Granard Bridge. The new bridge would eliminate views to the bridge from the east. However, there is precedence for the construction of such bridges as can be seen at Clonsilla and Coolmine Stations, where modifications to the masonry walls adjacent to the canal bridges has been carried out. Therefore, it would be reasonable to assume that similar works may be feasible.

6.149 The technical merits of this option would be good in that the continuity and directness of the route would be maintained, although users may experience some waiting time at the toucan crossing due to the high traffic volumes present.

6.150 **Option 3:** Figure 6.16 - Granard Bridge Option 3 is provided below. The 3.5m wide proposed route would approach from the east along the southern bank of the canal. This layout would be compatible with the preferred option at Talbot Bridge.

6.151 Direct access to Castleknock Road would be provided by construction of a new ramped access route.

6.152 A toucan crossing facility would be provided at the entrance to the railway station to provide a safe passage for pedestrians and cyclists across Castleknock Road. These signals would be linked to the Dublin City Council SCATS network as per current adjacent traffic signals along Castleknock Road.

6.153 This option would deliver a cost effective and value for money solution. The scope of works would include the construction of an embankment and paved path, with railing and landings for mobility impaired users. The installation of the toucan crossing would be comparable to other options considered for this location.

6.154 A safe route would be provided to the users of the canal towpath and pedestrian traffic along Castleknock Road would also benefit from the signalised crossing. However, this option does not offer any improvement of facilities for pedestrians / cyclists crossing over the canal via the existing narrow footpaths on Granard Bridge.

6.155 The impacts on the environment would be minimised with this option due to the reduced scope of works required. As there is no additional bridge structure required, the associated impacts on the Granard Bridge protected structure would be reduced. However, the requirement for the traffic signals at the proposed toucan crossing would have an adverse effect on existing traffic congestion in the immediate area.

6.156 Continuity and directness of the route would be maintained with this layout. However, users may experience some waiting time at the toucan crossing due to the high traffic volumes present.

6.157 **Option 4:** Figure 6.17 - Granard Bridge Option 4 is provided below. For this option the proposed route would approach from the east along the south bank of the canal. The full width of 3.5m would be provided. This layout would be compatible with the preferred option at Talbot Bridge.

6.158 An underpass would be constructed to allow the facility to pass below Castleknock Road. Links to the existing footpaths, including the existing access route to Castleknock Road (via existing steps) would be maintained.

6.159 To the west, the underpass would provide continuity of service and width to Castleknock Station and onward towards the Deep Sinking. Access to Castleknock Station would be maintained via a new ramped access upon which an approximate width of 4.0m would be provided to permit vehicular access to Castleknock Station and the proposed cycle route. This would be essential to allow access for maintenance and emergency response vehicles. This access ramp would be substandard in terms of gradient (as is currently provided) due to limited space.

6.160 The construction cost of this option would be the highest of all options generated at this location. Using traditional methods the installation of the underpass would be expected to cause major disruption to local traffic as the closure of Castleknock Road would be required for the duration of the works. It would be possible to minimise traffic diversion by limiting the construction period. This may necessitate a full closure of the road for a short period of time. Another potential option would be to 'jack' the structure through the existing embankment. However, given the likelihood of utilities at this location plus the reduced depth of cover above such a structure, the jacking option is not considered feasible.

6.161 The underpass would offer the highest levels of safety for the users of the towpath as interactions with traffic would be completely eliminated. There is a possibility that the new underpass would attract antisocial behaviour and may give rise to personal security issues, but this may be overcome by the use of CCTV surveillance.

6.162 The proposal to excavate so close to a protected structure is a major environmental constraint to this option. Discussions and agreement with the Department of Environment, Community and Local Government will be required prior to any works being accepted at this location.

6.163 This option would provide the best technical performance of all options examined in terms of the provision of service for the cycleway. The continuity and directness of the route would be uncompromised and there would be no interaction with traffic or delays at traffic signals. However, this option is technically difficult to implement and is likely to cause traffic problems during construction.

6.164 There is a significant impact upon Castleknock station, with the existing access requiring diversion closer to the rail line. During construction, access to the station will need to be diverted.

Table 6.4 - Granard Bridge Option Evaluation Summary

Option Evaluation Summary Granard Bridge, Castleknock Road				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**#4**	**#3**	**#2**	**#1**
Economy	Low capital cost outlay.	High capital cost outlay due to proposed footbridge	Low capital cost outlay. Easy to construct	High capital cost outlay.
Safety	Good level of safety as users are segregated from the busy traffic flows	Good level of safety as users are segregated from the busy traffic flows	Good level of safety as users have minimal interaction with busy traffic	Total segregation from traffic equates to best safety. Provides vehicular access to the towpath to the west for maintenance and emergency response.
Environment	Minimal impact in service and during construction	Minimal impact in service Higher scope of construction works required will have slightly increased construction stage impacts on surrounding environment Toucan crossing would add to traffic congestion.	Minimal impact in service and during construction The toucan crossing would be expected to add to existing levels of traffic congestion.	Minimal impact in service. Potential for major disruption to local traffic, depending on construction method chosen.
Technical	Good Level of Service achieved. Some delay may be experienced at toucan crossing due to high traffic volumes. The shuttle traffic control layout would significantly add to existing levels of traffic congestion. Not compatible with option for Talbot Bridge.	Good Level of Service achieved. Some delay may be experienced at toucan crossing due to high traffic volumes Not compatible with option for Talbot Bridge.	Good Level of Service achieved. Some delay may be experienced at toucan crossing due to high traffic volumes. Comfort levels compromised due to gradients and mobility impaired landings	Best performance in terms of Level of Service achieved. Substandard gradients on ramps provided. Short closure of road will be required to place the underpass which will impact upon traffic.
Integration	High levels of integration and accessibility			

6.165 **Conclusion:** Options 1 and 2 would be least preferred as they are not compatible with the preferred option at Talbot Bridge.

6.166 Option 1 would also have significant permanent impacts on traffic congestion at Castleknock Road. It is therefore deemed not suitable.

6.167 Option 2 would require a higher capital investment to provide a footbridge over the canal but reduced impacts on traffic would remain as a toucan crossing would be required. It would negatively impact views to the bridge on the east side.

6.168 Option 3 would have a negative impact on traffic congestion at Castleknock Road due to the provision of a toucan crossing, as per Option 2. The introduction of gradients and landings would have impacts on the comfort levels for cyclists and the gradients provided would fall short of published guidelines for recommended minimum gradients for mobility impaired.

6.169 Option 4 would have no impact on Castleknock Road during service and provides the highest Level of Service to the end user. Issues of safety and traffic congestion on Castleknock Road would be eliminated and the construction phase would include a short closure of the road, causing congestion during construction. This option would represent the best solution, but is expensive.

6.170 Given its merits in terms of overall safety, environmental impact and high level of service offered, it is proposed that Option 4 is brought forward as the preferred solution for this element of the scheme. Where funding is not immediately available, option 3 should be considered as an interim solution.

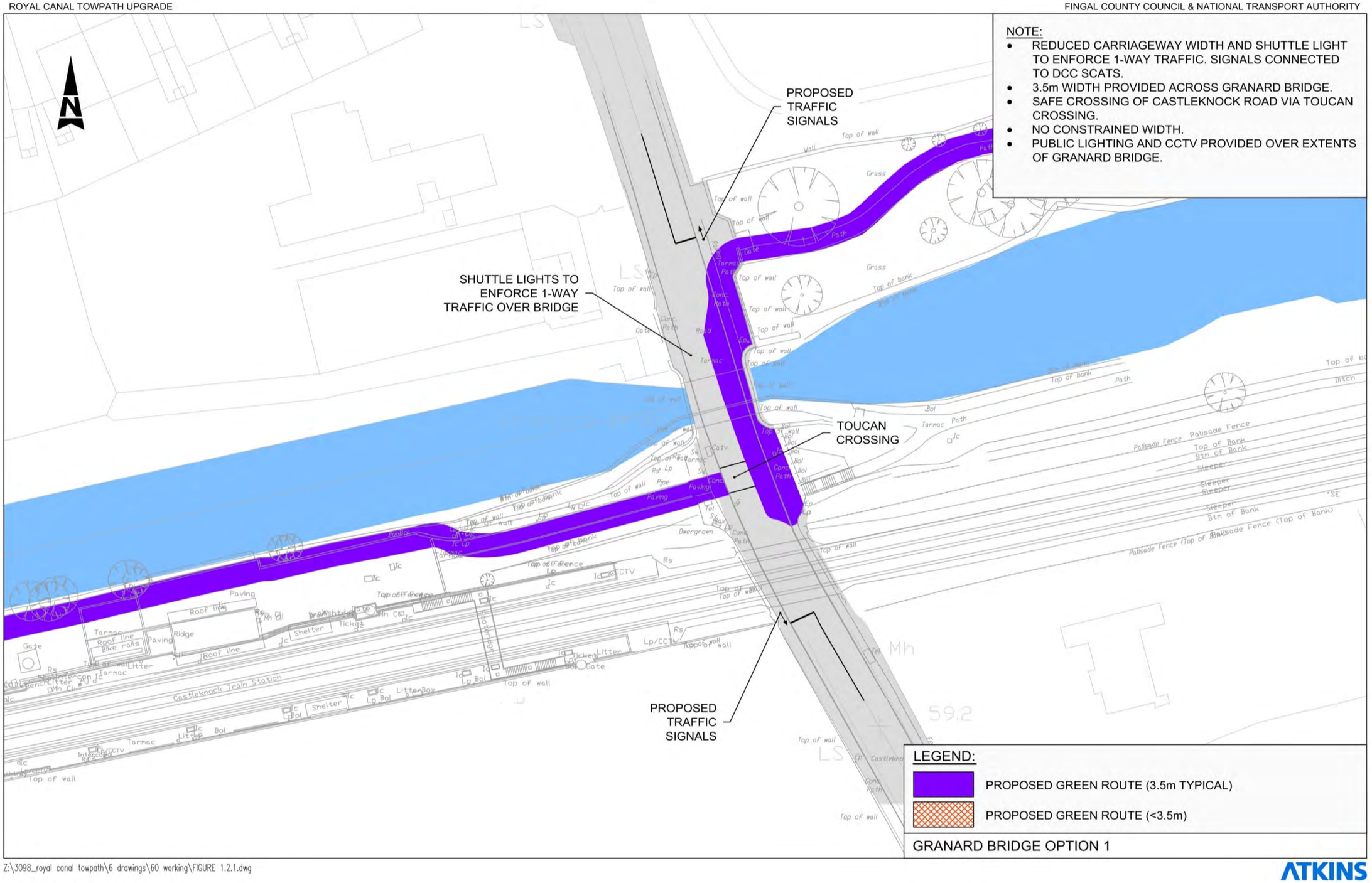

Figure 6.14 - Granard Bridge Option 1

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:

- 3.5m GREEN ROUTE APPROACHING ON NORTH BANK.
- NEW 4.0m FOOTBRIDGE ACROSS CANAL ADJACENT TO GRANARD BRIDGE.
- TOUCAN CROSSING AT ENTRANCE TO RAILWAY STATION. SIGNALS CONNECTED TO DCC SCATS.
- 3.5m GREEN ROUTE TO WEST PASSING RAILWAY STATION.
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF GRANARD BRIDGE.

PROPOSED TRAFFIC SIGNALS

TOUCAN CROSSING

RAISED BANK

TOUCAN CROSSING

PROPOSED TRAFFIC SIGNALS

LEGEND:

PROPOSED GREEN ROUTE (3.5m TYPICAL)

CYCLE / VEHICLE SHARED SPACE (RAISED ROAD SURFACE, 30kph SPEED LIMIT)

GRANARD BRIDGE OPTION 2

Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.2.3.dwg

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Figure 6.15 - Granard Bridge Option 2

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:
- 3.5m GREEN ROUTE APPROACHING ON SOUTH BANK.
- PROVIDE NEW RAMPED ACCESS TO EAST OF GRANARD BRIDGE. MAX. GRADE 1/12. ALLOW FOR GUARD RAILS AND REST AREA.
- TOUCAN CROSSING AT CASTLEKNOCK ROAD. SIGNALS CONNECTED TO DCC SCATS.
- 3.5m GREEN ROUTE TO WEST, PASSING RAILWAY STATION.
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF GRANARD BRIDGE.

PROPOSED TRAFFIC SIGNALS

PROPOSED RAMPED ACCESS. MAX. GRADE 1/12 FOR LENGTH OF 39m. PROVIDE GUARD RAILS AND REST AREA.

TOUCAN CROSSING

PROPOSED TRAFFIC SIGNALS

LEGEND:

PROPOSED GREEN ROUTE (3.5m TYPICAL)

PROPOSED GREEN ROUTE (<3.5m)

GRANARD BRIDGE OPTION 3

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Figure 6.16 - Granard Bridge Option 3

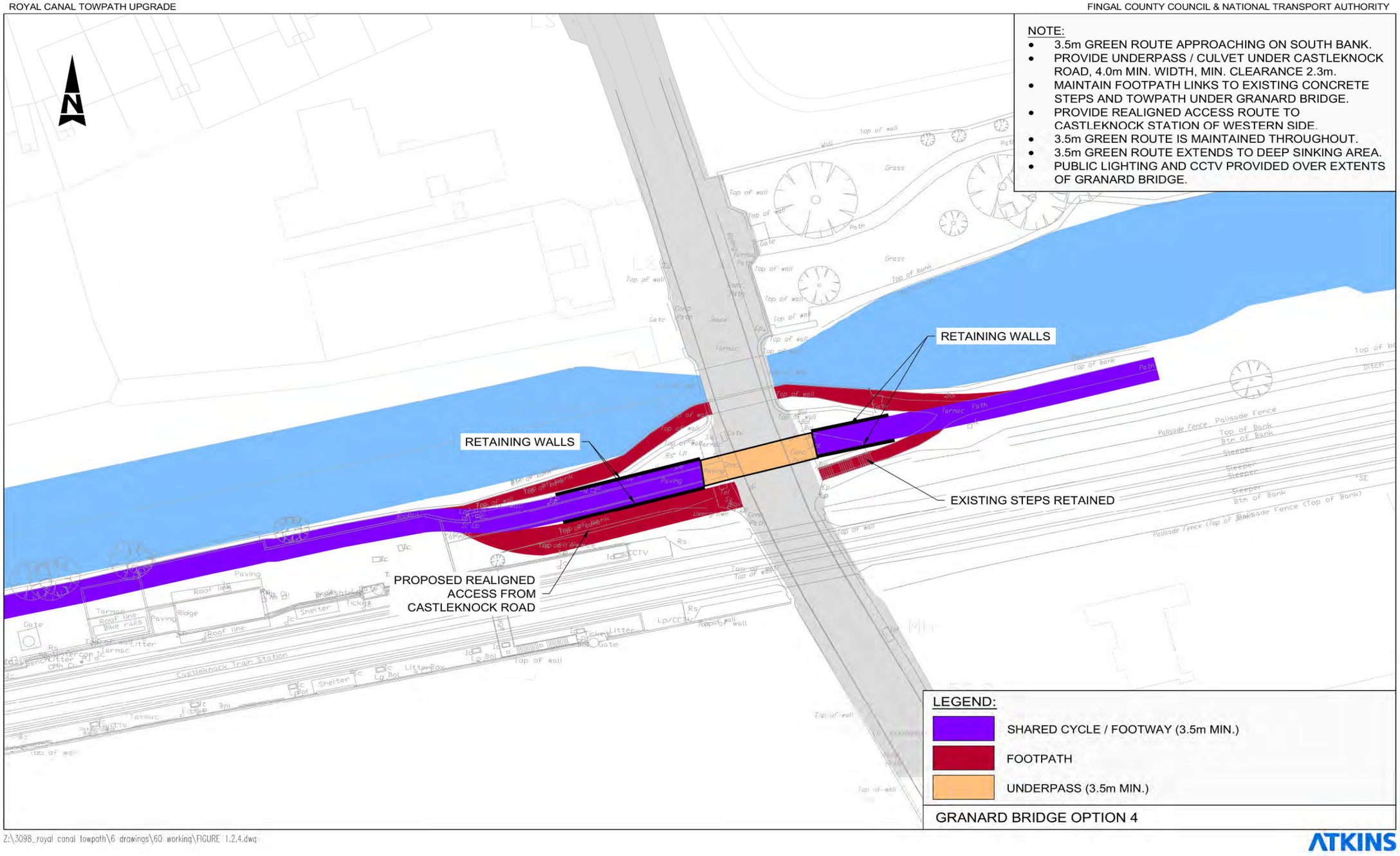

Figure 6.17 - Granard Bridge Option 4

Area 2: Granard Bridge (Castleknock Road) to Callaghan Bridge (Clonsilla Road)

The *"Deep Sinking"*

6.171 The "Deep Sinking" presents significant challenges to the provision of a continuous 3.5m cycling / walking route. The topography and layout of the existing towpath typically consists of a 2.0m wide track flanked by a deep cutting of 1.0 – 9.0m to the canal on one side and a varying height embankment supporting the Dublin – Sligo Railway on the other. There is a critical pinch point located approximately 400m west of Castleknock Station (*"Castleknock Pinch Point"*) where the towpath is particularly constrained due to the close proximity of the railway and an existing masonry retaining wall. The difference in level between the towpath and canal waters at this location is approximately 1.0 – 1.2m. The following options will address the general situation and give particular reference to the identified pinch point.

6.172 The Deep Sinking represents a unique snapshot of historical engineering and heritage. All options will seek to maximise opportunities to enhance awareness and promote the historical and heritage value of the canal. Seating areas will be provided at suitable locations co-located with information plaques and signage.

6.173 Good levels of integration and accessibility would be offered to all options in this area with the provision of the "opportunities" as outlined in Chapter 5 of this report. The erection of proposed bridges linking adjacent communities would provide a high level of integration and provide greater accessibility to the canal towpath together with other benefits of connectivity between otherwise severed communities.

6.174 A guardrail would be provided on the external edge of all options through this section for safety purposes. Hinged sections of the guardrail would be included in the design to enable the rail to be opened / removed to permit direct access to the waters for maintenance and rescue purposes.

6.175 Personal security would be a perceived concern through this area as the existing character is unlit and overgrown. However, the increased width, provision of additional access points to the adjacent residential areas and increased use of the facility in general would give rise to an increased level of passive surveillance. Notwithstanding this, CCTV surveillance would also be provided throughout.

6.176 **Option 1** would seek to construct a cantilevered boardwalk type facility, using the full available width throughout the "Deep Sinking" area.

6.177 This would require the installation of a series of mini-piles or anchors to provide support to structural walkway/cycleway. The full desirable width of 3.5m would be achieved throughout. This would be achieved by cantilevering the path out over the existing canal bank for a distance of 1.5m typically.

6.178 The proposed cantilevered boardwalk would be extended eastwards to address the issues at the Castleknock pinch point, created by the railway and the masonry retaining wall supporting it. However, as this location is at the eastern limit of the "Deep Sinking", the level difference between the towpath and the canal waters is relatively small at approximately 1.0m. Therefore, the construction of the cantilever boardwalk would impact on the existing vegetation along the canal bank (ie riparian zone) at this location and would protrude above the canal itself. This should not be too problematic as the canal width at this location is much wider than at other locations along its length.

6.179 The costs associated with this option would be significant. Installation of specialist mini piles/anchors would be required, the final extent of which would be informed by the prevailing ground conditions on site. Construction of the super-structure would then follow in a construction process which would be slow and difficult given the inaccessibility of the area for construction plant and machinery.

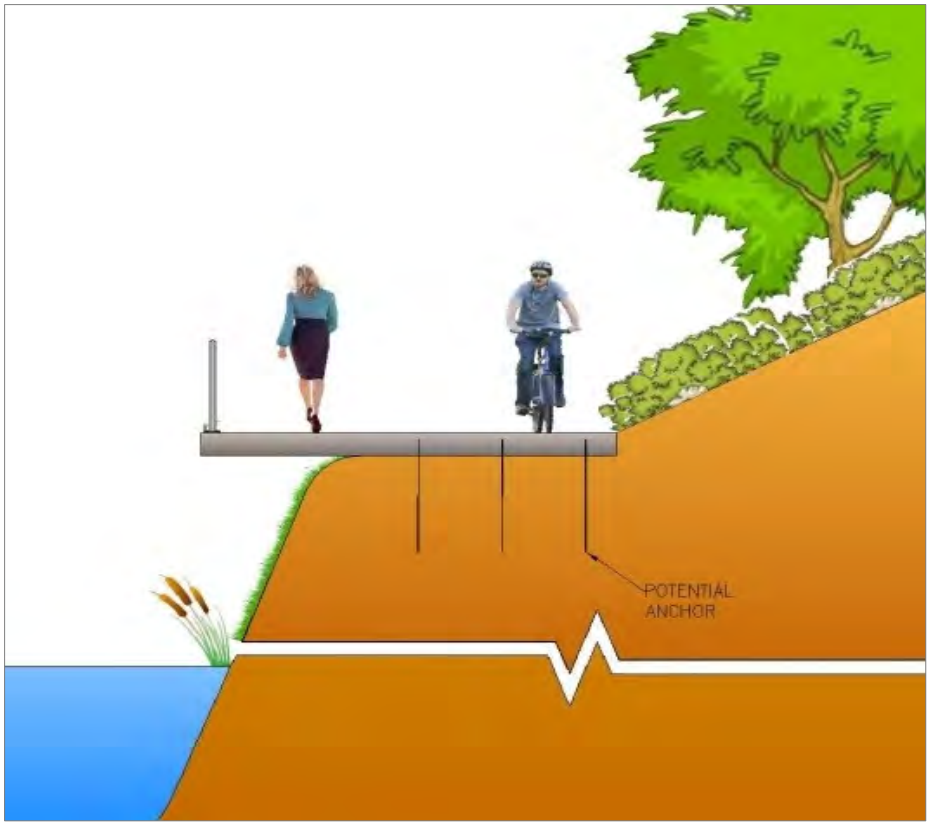

Figure 6.18 – Option 1 - Cantilever Boardwalk

6.180 The construction of this option would require the clearance of all existing young trees from the canal bank and lopping of others along the adjacent embankment. These trees are of low ecological value and therefore the impact on the receiving environment would be significantly lower than other options under consideration.

6.181 The existing riparian zone throughout the “Deep Sinking” would not be affected where the towpath level is in excess of approximately 1.5m above the canal water level. However, the treatment required at the Castleknock Pinch Point would necessitate the removal of existing vegetation within the riparian zone. Existing planting which is affected by the proposal should be transplanted to a more suitable nearby location, thereby preserving its ecological value. In addition to the above, the cantilever boardwalk would be designed to support vehicular access for both emergency and maintenance purposes.

6.182 **Option 2:** would involve the construction of a “King Post” retaining structure to permit widening into the adjacent embankment.

6.183 This would require the installation of a series of posts embedded in the ground at approximate 2.0m centres. Horizontal structural members would be installed to provide the lateral retaining element of the structure. A wide range of suitable materials are available for use, including railway sleepers, which would be sympathetic to the surrounding environment from an aesthetics perspective.

6.184 The constructability of this system, whilst constrained, would be relatively straightforward to achieve given the relative small sizes of the plant and equipment required. Any option to widen into the adjacent embankment would impact on the Zone of Influence of the adjacent railway and

would therefore be subject to agreement with Irish Rail. Consultations with Irish Rail have established that where works to the existing embankment would be necessary, this option for retaining the structural integrity of the embankment would be preferred over options which require more excavation of the embankment.

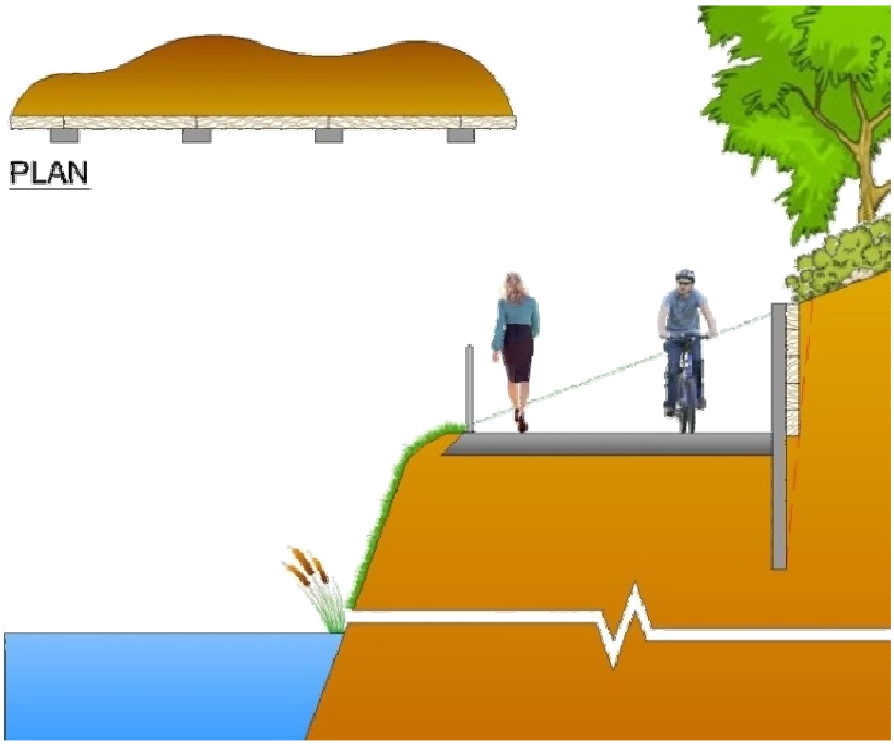

Figure 6.19 – Option 2: - "King Post" Earth Retaining Wall

6.185 The provision of a king post retaining structure would not be appropriate at the Castleknock Pinch Point. Therefore, a cantilever boardwalk would be proposed over this short section, as per Option 1 above.The construction of this option would also require the clearance of all existing young trees from the canal bank and lopping of others along the adjacent embankment. These trees are of low ecological value. However, this option would also necessitate the excavation and removal of a significant area of the existing embankment. The resulting impacts on the receiving environment would be higher than in Option 1 above.

6.186 Technically, as this option would provide the full desired width of 3.5m throughout the "Deep Sinking" area, it would provide a high Level of Service.

6.187 **Option 3:** The provision of a "traditional" cantilever retaining wall would permit widening into the embankment and, in engineering terms, would be the most efficient method of retaining the required level of material.

6.188 The installation would require the excavation and temporary removal of a large quantity of existing material to provide the working space to construct the wall. This would necessitate the removal of a large amount of the existing established trees and other vegetation currently located on the embankment. Consequently, the impacts on the surrounding environment and eco systems would be significant. The removal of this vegetation would also have a major impact on the existing character of the canal corridor in this area.

6.189 In addition, during the consultation phase of this study Irish Rail tabled concerns over this option as it would have the greatest risk of embankment failure during construction. As a result the methodology of construction would necessitate short sections being 'opened up' for construction

at any time, which would lead to extremely intensive work methods. In addition, the removal and replacement of large quantities of soil to construct the cantilever would add to the intensiveness of the work.

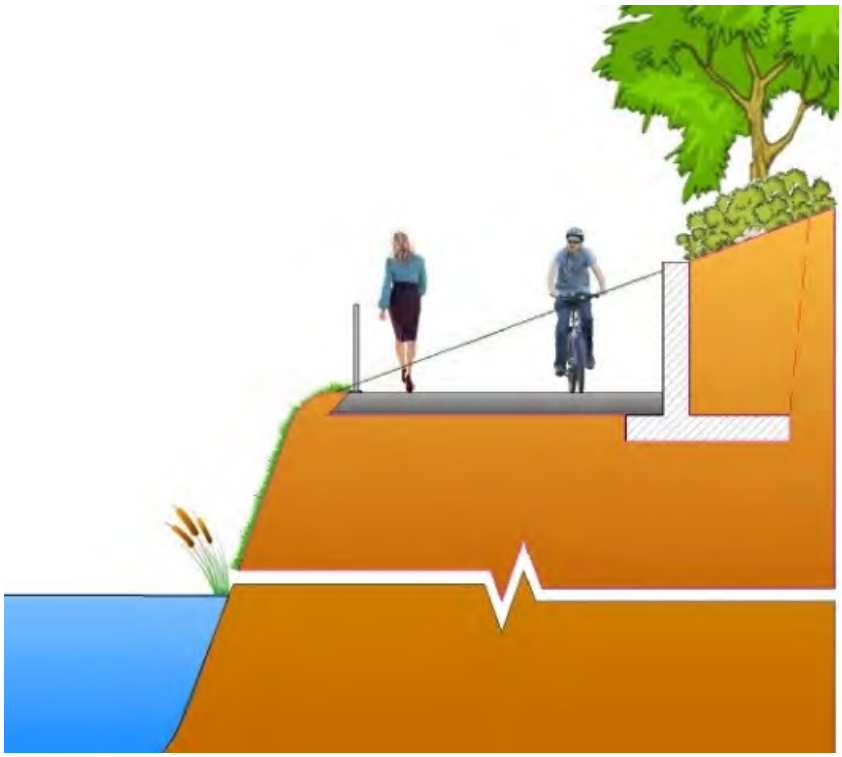

Figure 6.20 – Option 3 - Cantilever Retaining Wall

6.190 In addition, during the consultation phase of this study Irish Rail tabled concerns over this option as it would have the greatest risk of embankment failure during construction. As a result the methodology of construction would necessitate short sections being 'opened up' for construction at any time, which would lead to extremely intensive work methods. In addition, the removal and replacement of large quantities of soil to construct the cantilever would add to the intensiveness of the work.

6.191 The provision of this type of structure would not be appropriate at the Castleknock Pinch Point. Therefore, a cantilever boardwalk would be proposed over this short section, as per Option 1 above.

6.192 **Option 4:** The alternative option to developing the "Deep Sinking" area would be to provide a parallel route for cyclists through the adjacent residential areas. However, in doing this, it would still be of benefit to the local community (and all users of the canal) if the existing towpath was upgraded to the maximum width possible without resorting to the engineering measures described above.

6.193 The towpath would be upgraded on quality of surface only and no widening would be proposed.

6.194 Cyclists would be diverted away from the canal corridor at Granard Bridge and along one of the routes identified below**Error! Reference source not found.**. These routes have been selected due to their existing and/or proposed cyclist facilities or their low traffic / residential nature.

6.195 Three alternative sub-options are available as follows:

- Route 4A – From Granard Bridge, cyclists would be diverted northwards along Castleknock Road and then west along Roselawn Road. There are currently no formal cycle facilities along this section of road.

  From Roselawn Road, the route would follow an off-road section through existing parkland before joining Brompton Court. This section would also need work to upgrade the existing paths to a cycleway or shared standard.

  From Brompton Court, cyclists would be required to follow Delwood Road, Coolmine Road and Clonsilla Road where the route would rejoin the canal towpath. Current provision of cycle facilities along this route is poor.

- Route 4B – Cyclists would be diverted between Castleknock Road and Coolmine Road as per Route 4A above.

  At Coolmine Road, the route would turn southwards before heading west along Kirkpatrick Avenue, a narrow road with little traffic present. Further west, the route would be developed in conjunction with adjacent zone lands as far as Diswellstown Bridge.

  Passing under Diswellstown Bridge, extensive works would be required to establish the route as far west as Porterstown Road.

  The route would then follow Porterstown Road northwards before joining Clonsilla Road onward to Clonsilla Station where the route would rejoin the canal towpath. Current provision of cycle facilities along this route is very poor.

- Route 4C – From Granard Bridge, cyclists would be diverted southwards along Castleknock Road and then west along Park Lodge. The route would follow Carpenterstown Road and Riverwood Dale passing through several roundabouts before heading northwards on Diswellstown Road.

  The final section of this route would cross Diswellstown Bridge before turning west along Clonsilla Road and rejoining the canal towpath west of Clonsilla Station.

  This route seeks to use existing distributor roads through the Laurel Lodge and Carpenterstown residential areas where bus lanes and cycle facilities are currently provided. However, as per previous routes above, the current cycle facility provision along Clonsilla Road is poor.

6.196 Public lighting along the “Deep Sinking” section of the canal would not be provided between Castleknock Station and Callaghan Bridge as part of this option. However, in the interest of safety, a pedestrian guardrail would be provided as a precaution against accidental falls into the canal through the deeper sections of the “Deep Sinking”.

6.197 Depending on the selected route sub-options above, the overall final costs for this layout would vary. However, in considering all variants, this option would be the least costly of all options considered.

6.198 However, the reduced cost is commensurate to the reduction in safety and end user security. Cycle traffic would be required to negotiate the streets of the adjacent residential areas and distributor roads. Such routes would have obvious safety deficiencies over the traffic-free route along the canal towpaths. There would also be a significant risk of cyclists continuing along the proposed footpath through the “Deep Sinking” rather than taking the longer detour, thus increasing the potential for conflicts with pedestrians. Furthermore, the lack of public lighting along the towpath would have obvious negative implications on personal security.

6.199 This option would have a lesser impact on the receiving environment, although removal of trees along the canal bank and extensive lopping of others would still be necessary. The construction stage of this proposal would also be more favourable compared to that of other options above.

6.200 Technically, the Level of Service offered is significantly reduced. The directness and coherence of the route would be lost and the facility would not be attractive to commuter cyclists.

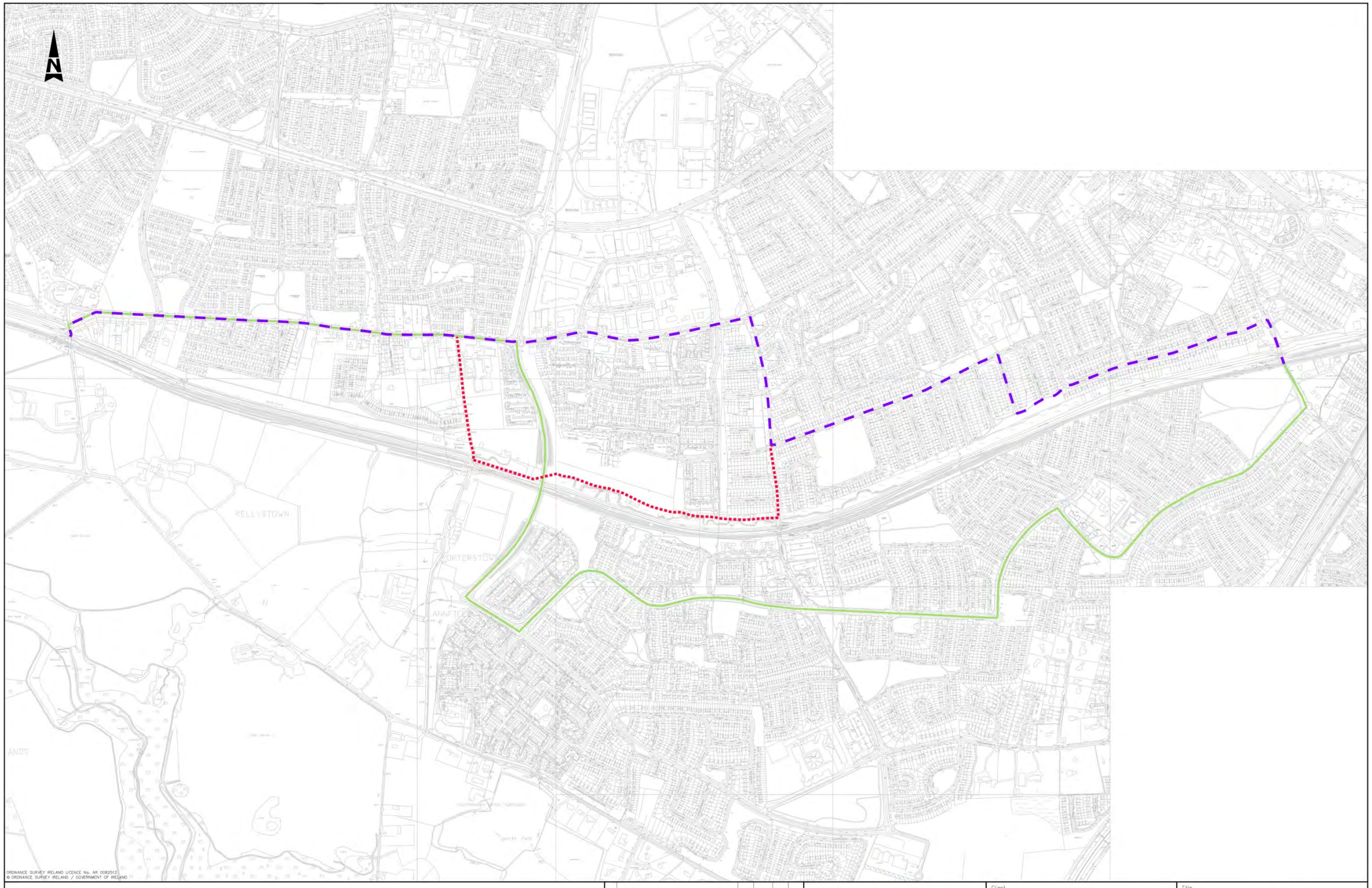

Figure 6.21 - Option 4 Deep Sinking - Alternative Route

Table 6.5 - "Deep Sinking" Option Evaluation Summary

Option Evaluation Summary "Deep Sinking" (Castleknock – Clonsilla)				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**#1**	**#2**	**#3**	**#4**
Economy	High cost – difficult to construct due to limited access	High cost – easy to construct but would be time consuming due to Zone of Influence of adjacent railway.	High cost – easy to construct but would be time consuming due to Zone of Influence of adjacent railway.	Lowest cost – scope of works significantly reduced
Safety	High levels of safety and personal security			Lesser levels of safety and personal security due to diversion of cycle traffic onto adjacent road and non-provision of public lighting along the towpath.
Environment	Minimal impact in service Moderate impact during construction Relocation of short length of riparian vegetation required at Castleknock Pinch Point	Minimal impact in service Excavations into adjacent embankment will result in higher impacts on the environment. Relocation of short length of riparian vegetation required at Castleknock Pinch Point	Minimal impact in service Major impacts during construction phase. Extensive loss of vegetation and trees, character of corridor likely affected. Relocation of short length of riparian vegetation required at Castleknock Pinch Point	Minimal impact in service. Least impact during construction.
Technical	High Level of Service achieved	High Level of Service achieved. No impact on Irish Rail embankment.	Less preferred by Irish Rail	Poor standards provided. Lack of coherence and directness Route likely to be unattractive for cyclists
Integration	High levels of integration and accessibility			

6.201 **Conclusion:** Option 4 represents the least level of financial investment but it falls short significantly in terms of safety and technical attributes. The "diversion" length is 1.2km and would not be seen as an attractive route for cyclists. It is likely that cyclists would continue along the reduced width path of the Deep Sinking, thus creating a safety issue for themselves and other users. It is therefore the least preferred option but would be a suitable interim solution until funding was in place to adopt the preferred option.

6.202 Option 3 represents significant construction costs and is likely to have considerable negative impacts on the local ecology. The high level of impact on the receiving local environment is likely to meet significant opposition from numerous stakeholders.

6.203 Option 2 would require works to the existing embankment supporting the Dublin – Sligo Railway. While Irish Rail has indicated that any works which could potentially affect the stability of the existing embankment would be undesirable, they would have a preference for this type of retaining structure over any other. The proposed methods of construction are likely to be highly restricted by Irish Rail as these works would occur within the Zone of Influence of the railway. This would most likely result in a slow and costly construction phase.

6.204 Option 1 is preferred over Option 2 as it has the least impact on the adjacent railway and the receiving environment although it is comparatively more expensive to construct. This option would provide the best solution in terms of achieving retaining the existing character of the canal corridor. On this basis, it is proposed that Option 1 is brought forward as the preferred solution for this element of the scheme.

Kirkpatrick Bridge

6.205 The existing Kirpatrick Bridge is narrow and pedestrian access across it is provided by means of a parallel footbridge on the eastern side. The approach path from the east is particularly difficult, with a steep, narrow footway meeting the existing footbridge at the crossing point of the bridge.

6.206 The western approach would require minor widening and the slope to be lessened and this is consistent across all options. At the access point to Coolmine Road, the existing wing wall would require modification to eliminate a local pinch point and provide unhindered access to / from the towpath. All options would require users to cross Coolmine Road.

6.207 A toucan crossing would be provided in this case which would enhance the safety aspect for those travelling along the canal. Personal security would not be of concern at this location due to the adjacent railway station, close proximity of adjacent residential areas and the corresponding levels of passive surveillance provided.

6.208 Continuity and directness of the route are maintained across all options.

6.209 Integration with local bus and train services would be provided at Coolmine Road and Coolmine Station for all options.

6.210 Accessibility standards would be provided on all approach paths across all options.

6.211 Crossing of Coolmine Road would be provided by means of a toucan crossing for all options. The new signals would need to be integrated with the adjacent automatic level crossing. The introduction of traffic signals would be expected to have some impact on traffic congestion on Coolmine Road, especially at peak traffic hours.

6.212 **Option 1:** Figure 6.22 - Kirkpatrick Bridge Option 1 is provided below. This option seeks to achieve the required 3.5m width by removing the existing wall between the towpath and the access route to the inbound platform at Coolmine Station ie widening the existing towpath footway to the south. The existing access control gate to the adjacent platform would be retained in its current position. To achieve this, an elevated walkway would be required to match the level of the station access footway. This walkway would gradually slope down to ground level over a significant length.

6.213 In removing the existing wall, the piers located at the southern abutment of the existing pedestrian bridge would not be affected. Therefore, no structural works would be required to this existing bridge on the east side.

6.214 This option would require a land purchase/agreement from/with Irish Rail (ie footpath access to inbound platform).

6.215 This option would have moderate impacts on the local environment with significant tree clearance required to facilitate the elevated walkway.

6.216 **Option 2:** Figure 6.23 - Kirkpatrick Bridge Option 2 is provided below. The approach path from the east would be constructed as an elevated boardwalk of 3.5m effective width, measured from the existing boundary wall of Coolmine Station i.e. widening to the north. A landing would be constructed at the interface of the new cycleway and the existing footbridge to facilitate the appropriate widths.

6.217 Option 2 is cheaper than option 1 as it does not rely on an extensive elevated section of walkway. It correspondingly does not affect the environment to the same extent.

6.218 This option also does not require agreement with Irish rail to use the existing footway to the platform. Option 2

Table 6.6 - Kirkpatrick Bridge Option Evaluation Summary

Option Evaluation Summary	Kirkparick Bridge (Coolmine Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#2**	**#1**
Economy	Higher cost	Lower cost
Safety	High levels of safety and personal security	
Environment	Less impact	More impact
Technical	Good Level of Service achieved Traffic lights have potential to increase traffic delays on Coolmine Road Agreement with Irish Rail required	Good Level of Service achieved Traffic lights have potential to increase traffic delays on Coolmine Road.
Integration	High levels of integration and accessibility	

6.219 **Conclusion:** Option 1 requires acquisition of land from Irish Rail. Hence, this option would be more expensive.

6.220 Option 2 is likely to result in more disruption during the construction phase although this would be marginal.

6.221 Both Options compare equally in terms of other headings.

6.222 Option 2 is the preferred solution in this case on the basis that it would be marginally cheaper to realise and any operation impact on Irish Rail during construction would be eliminated.

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:

- ON APPROACH FROM CASTLEKNOCK. EXISTING WALL BETWEEN TOWPATH AND PLATFORM ACCESS PATH TO PROVIDE SHARED PATH. EXISTING ACCESS CONTROL TO INBOUND PLATFORM TO BE RETAINED IN IT'S CURRENT POSITION.
- INTEGRATE WITH ABUTMENT OF EXISTING PEDESTRIAN BRIDGE, i.e. NO MODIFICATIONS TO BRIDGE REQUIRED.
- TRAFFIC CONTROL AT COOLMINE BRIDGE VIA TOUCAN CROSSING. TRAFFIC SIGNALS INTEGRATED WITH LEVEL CROSSING.
- 3.5m GREEN ROUTE ON APPROACH FROM WEST. MINOR MODIFICATION REQUIRED TO EXISTING BRIDGE PARAPET WALL AT ENTRANCE TO TOWPATH.

OPTION VARIES

EXISTING PEDESTRIAN BRIDGE

OPTION VARIES

PROPOSED TRAFFIC SIGNALS

WALL TO BE REMOVED

TOUCAN CROSSING

LAND TAKE FROM CIE, ALTERNATIVE PLATFORM ACCESS

PROPOSED TRAFFIC SIGNALS

EXISTING CAR PARK

LEGEND:

PROPOSED GREEN ROUTE (3.5m TYPICAL)

COOLMINE ROAD / KIRKPATRICK BRIDGE OPTION 1

Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.3.1.dwg

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Figure 6.22 - Kirkpatrick Bridge Option 1

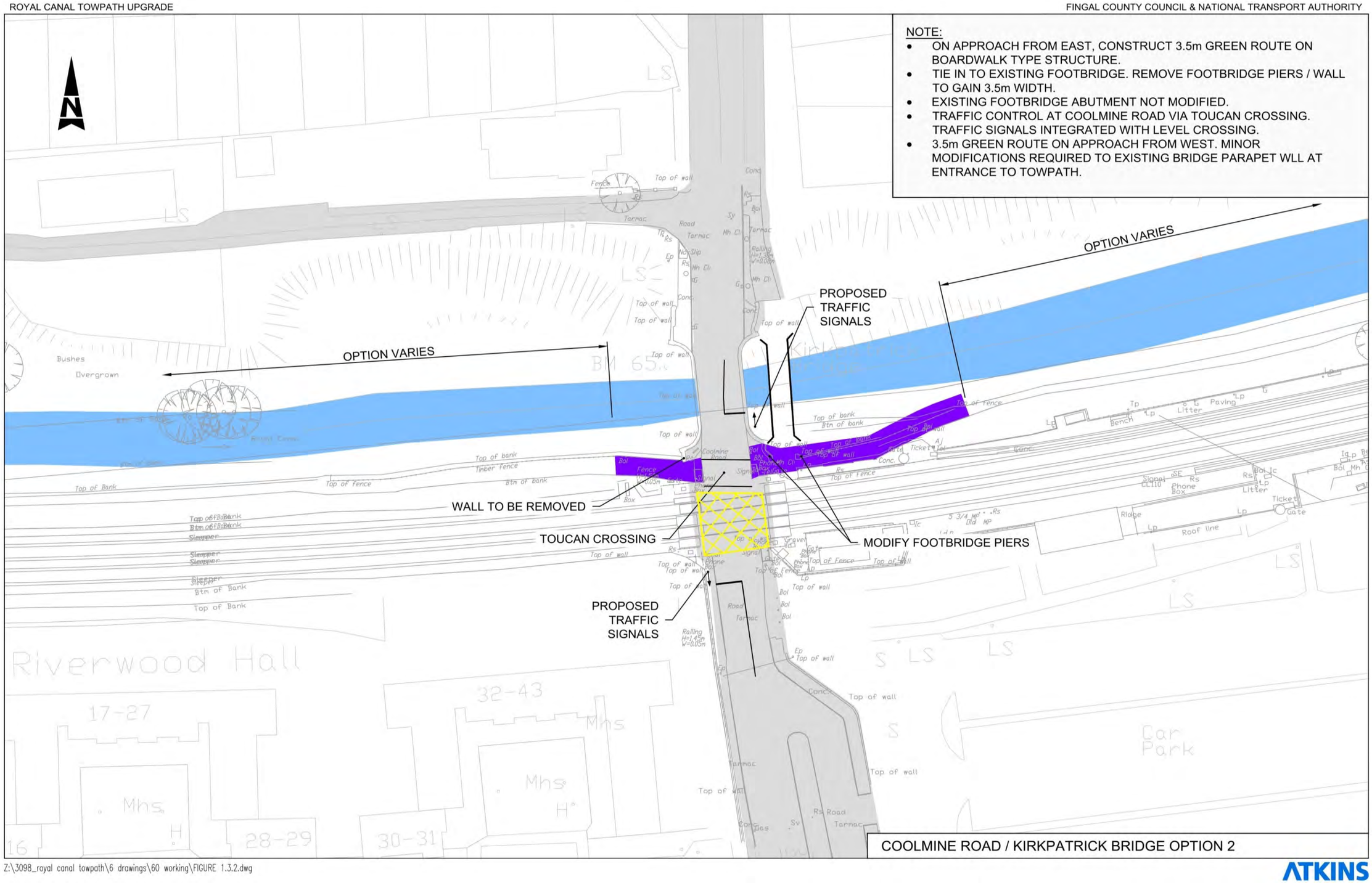

Figure 6.23 - Kirkpatrick Bridge Option 2

Kennan Bridge

6.223 Kennan Bridge is a narrow bridge with informal single way traffic operating across it. There is a level crossing to the south of the bridge. The road over the bridge (Porterstown Road) has been bypassed by a new road and it is proposed to close Kennan Bridge to vehicular traffic in the future. Option 2 describes this outcome as an option for clarity.

6.224 When the road is closed in the future, the level crossing will also be closed.

6.225 The existing situation is that the effective continuity along the towpath switches between provision on the south side of the canal to the east and on the north side to the west. The existing situation therefore relies on pedestrians and cyclists crossing Kennan Bridge to achieve continuity along the towpath.

6.226 Kennan Bridge has an effective width of 3.6m which is enough for single way traffic only and is not wide enough to support a footway and roadway together.

6.227 The approach from the east is narrow and would be widening in line with the preferred option for the deep sinking area.

6.228 The approach from the west has reasonable width, but would need to be widened slightly to incorporate the 3.5m desired width. It is considered that as this is not adjacent to the railway, as in the rest of the deep sinking area, that widening could be done relatively straightforwardly by regrading the embankment to the north of the path.

6.229 The two options presented are not comparable as they represent different scenarios, depending on whether the road is closed.

6.230 **Option 1:** Figure 6.24 - Kennan Bridge Option 1 is provided below. This is the only feasible option considered for this bridge whilst the road remains open. It includes for the widening on the approach from the east, which would necessitate a short length of retaining wall alongside the railway so that the full width of 3.5m could be provided.

6.231 As the existing road width across Kennan Bridge is narrow, it would be more suitable for a one-way traffic system. This option should be formalised to incorporate a shuttle traffic lights system to enforce a one-way shuttle layout. This is likely to create traffic delays, but as the road is only lightly used, the delays are not considered to be significant.

6.232 The crossing of Porterstown Road would be provided by means of an elongated toucan crossing, with push button units provided at the egress points of the towpath. The traffic signals would need to be integrated into the adjacent automatic level crossing signals.

6.233 The provision of the signals would greatly increase the level of safety for users of the towpath over the existing situation.

6.234 There would be minimal impacts on the local environment during construction and when in service. Diswellstown Road and bridge is now complete and opened to traffic. Hence, traffic volumes on Porterstown Road are now very low.

6.235 This option would offer a good Level of Service in terms of continuity and directness of route. However, there would be some delays experienced at the proposed toucan crossing.

6.236 There would be little integration with existing public transport links at this location. However, given the number of local schools in the immediate vicinity (existing and planned), there would be good links to adjacent cycle networks and the proposed route would provide safe traffic-free cycle routes between the schools and the local residential developments.

6.237 **Option 2:** Figure 6.24 - Kennan Bridge Option 1 is provided below. This option incorporates the closure of Kennan Bridge. With no traffic present, the proposed route would continue across Kennan Bridge without any interface with traffic.

6.238 The overall layout would be identical to Option 1. However, as Porterstown Road would be closed to traffic, the toucan crossing and traffic signals would not be required. In addition, traffic restriction bollards would be required on Porterstown Road immediately north of Kennan Bridge to eliminate the risk of an unfamiliar motorist inadvertently driving onto the proposed cycle route.

6.239 The safety of the proposed cycle route would be greatly enhanced with the removal of the interface with motorised traffic.

6.240 Overall merits in terms of environmental impact, technical suitability and social and transport integration are all identical for each option. However, in terms of integration, the layout assumes that a pedestrian and cyclist link would be provided by Irish Rail and/or the local authority so that access across the railway would be maintained following the closure of the level crossing.

Table 6.7 - Kennan Bridge Option Evaluation Summary

Option Evaluation Summary	Kennan Bridge (Porterstown Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#2**	**#1**
Economy	Low/moderate cost – retaining wall and toucan crossing provided	Low cost – traffic signals not required
Safety	Good levels of safety and personal security	Highest level of safety due to removal of traffic
Environment	Minimal impact in service Minimal impact during construction	
Technical	Good Level of Service achieved Delays likely to road traffic.	Higher Level of Service – no delays at toucan crossing
Integration	Moderate levels of integration and accessibility	Moderate levels of integration and accessibility – assumes new footbridge provided in lieu of level crossing

6.241 **Conclusion:** The two options presented are not comparable as they represent the two futures scenarios of with the road closure and without.

6.242 If the closure of the road is delayed, then Option 1 would be installed as an interim measure, until such time as the level crossing is closed to traffic.

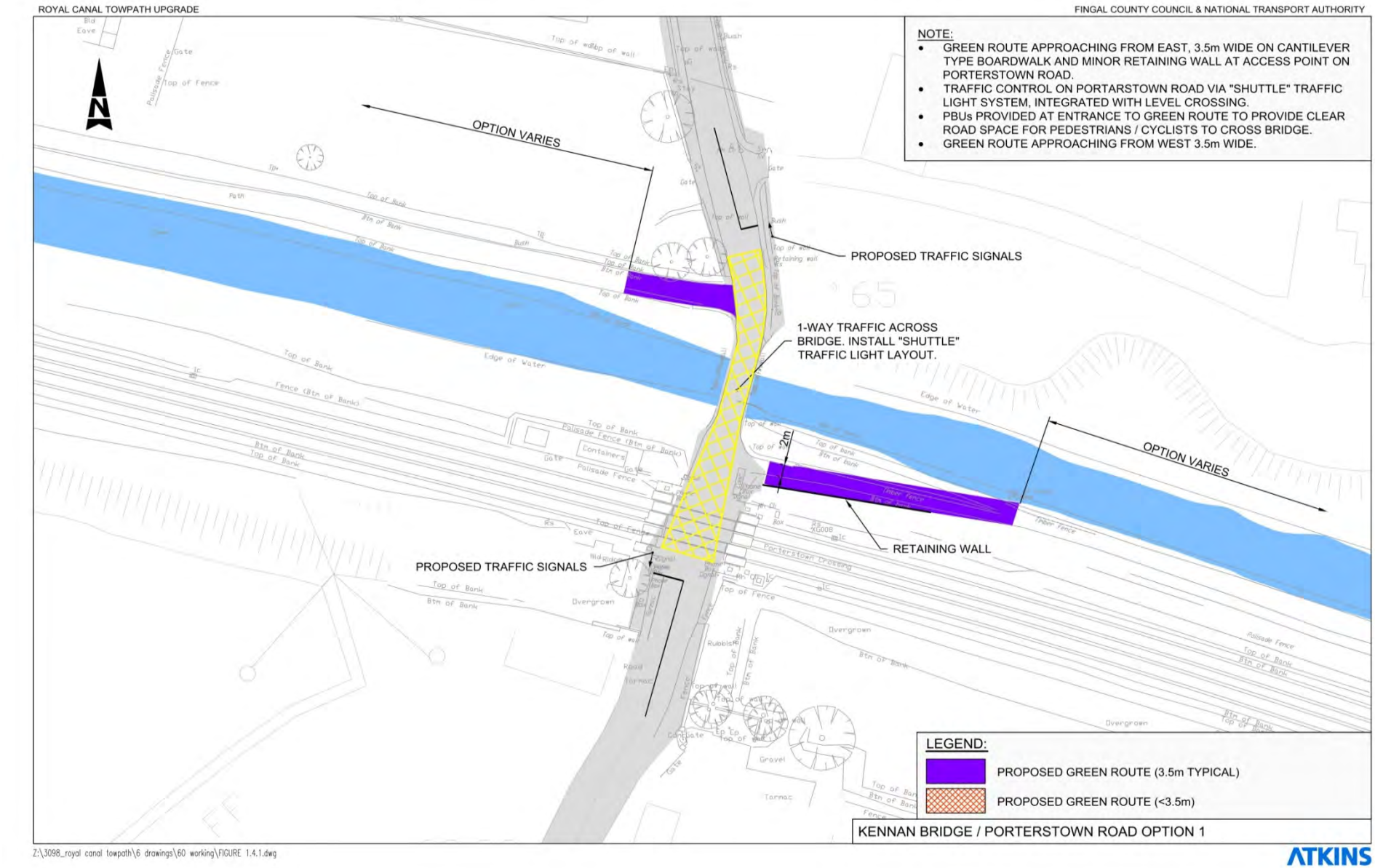

Figure 6.24 - Kennan Bridge Option 1

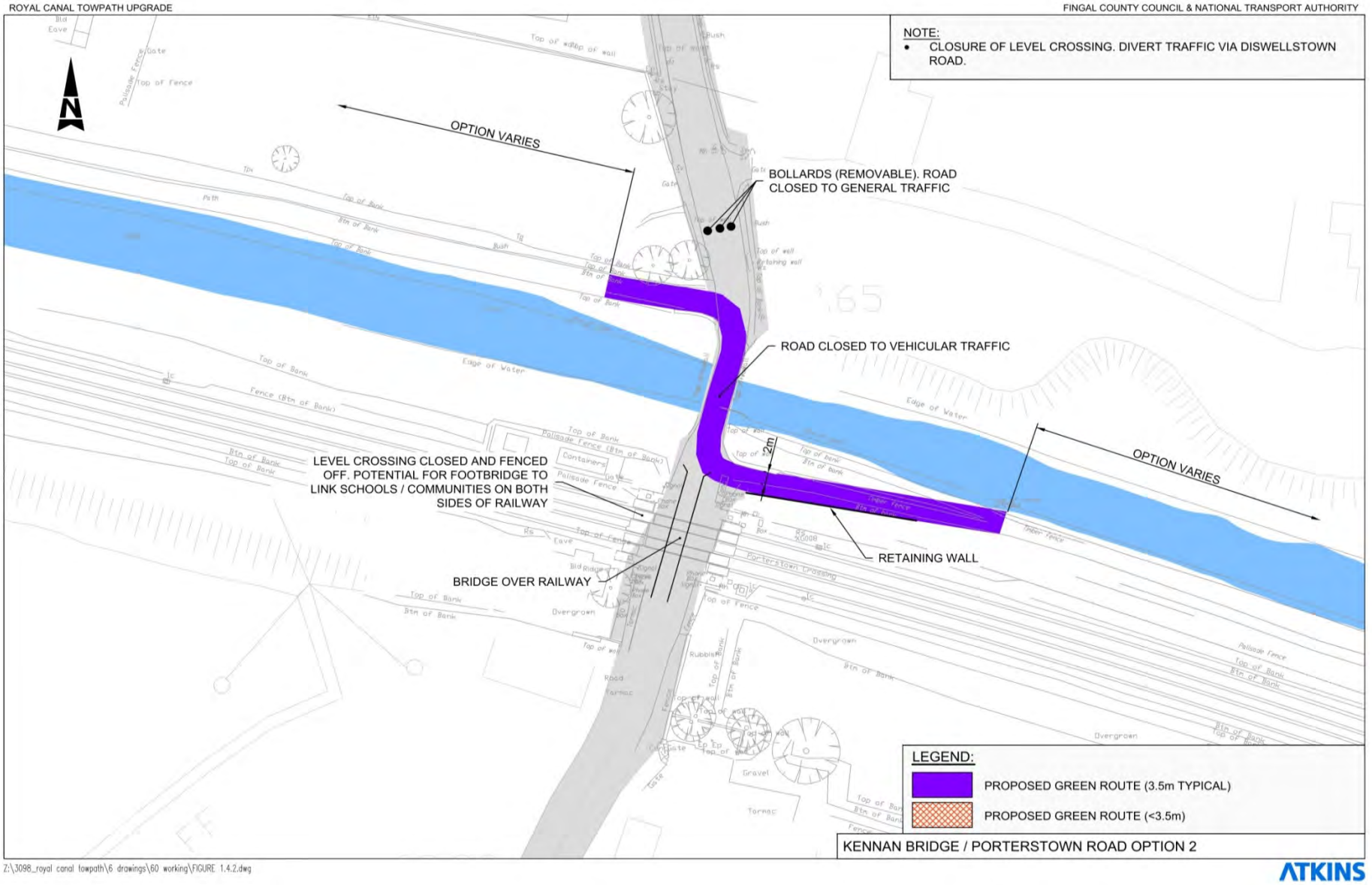

Figure 6.25 - Kennan Bridge Option 2

Callaghan Bridge

6.243 Callaghan Bridge presents a significant constraint to the provision of the cycleway. It is an arch bridge with a narrow (2.1m) footway beneath it, which would have substandard height clearance. The bridge is adjacent to Clonsilla train station and there is an associate level crossing to the south of the bridge. Adjacent to the existing bridge, on the west side is a pedestrian bridge.

6.244 A ramp up from the towpath to the road used to exist on the north side but this appears to have been removed recently.

6.245 A high level of integration with local transport modes and connectivity with adjacent residential areas would be achieved with all options.

6.246 **Option 1:** Figure 6.26 - Callaghan Bridge Option 1 is provided below. This option utilises the existing towpath under Callaghan Bridge. The existing 2.1m width of towpath would be inadequate for a shared cycle / pedestrian facility and therefore cyclists would be required to dismount and walk through this short section. In the interest of user safety, a guardrail would also be provided along the water's edge to protect against accidental falls into the canal.

6.247 Either side of the bridge, the towpath quickly reaches the required width to accommodate the full 3.5m wide facility. The effective length of this local pinch point would be approximately 20m.

6.248 Access to / from the towpath would be provided by removing the existing steps to Clonsilla Road to the west of the bridge, and replacing them with a ramped access route. This ramp would be designed to provide a suitable gradient for use by mobility impaired and disabled users.

6.249 This option represents a minimal scope of construction works and therefore a correspondingly low construction value. The works required would not be considered as complex or difficult to complete.

6.250 The proposed layout would provide a completely traffic-free route for cyclists and pedestrians while the erection of the safety guardrail would eliminate the potential for accidental falls into the water. However, the scheme would require cyclists to dismount and walk under Callaghan Bridge where the available width and headroom would be considered inadequate and there would be risk that cyclists would tend to ignore the posted signage and continue to cycle through the difficult area.

6.251 The risks to and impacts on the environment would be minimal during construction and while in service.

6.252 The continuity and directness of the route would be compromised due to the requirements for cyclists to dismount over this short section. Such impacts to the Level of Service offered would be minimal.

6.253 A high level of integration with local transport modes and connectivity with adjacent residential areas would be achieved.

6.254 **Option 2:** Figure 6.27 - Callaghan Bridge Option 2 is provided below. In addition to maintaining the existing underpass for pedestrian use, this layout includes for a crossing at road level.

6.255 The original access route to the towpath at Callaghan Bridge would be reopened and widened to give the full 3.5m width. A link would be provided at street level to access the existing pedestrian crossing, which will be upgraded to a Toucan crossing, at Clonsilla Road. It is estimated that approximately 150 square metres of private land would need to be acquired along the access route so ensure that the 3.5m width would be maintained up to street level and alongside the road to the Toucan crossing. A retaining wall would also be required to restrict the amount of private land to be acquired.

6.256 The existing pedestrian crossing would be utilised as part of this option.

6.257 To the West of the bridge, access to the towpath would be provided by removing the existing steps to Clonsilla Road and replacing them with a ramped access. This ramp would be designed to provide a suitable gradient for use by mobility impaired and disabled users.

6.258 Construction costs for this option would be significantly higher than those envisaged for Option 1 due to the higher and more complex scope of works required and the necessity for acquisition of private lands.

6.259 Cyclists would be directed to cross Clonsilla Road at the existing toucan crossing while pedestrians would have the option to continue below Callaghan Bridge along the original towpath. The safety score would be significantly impacted by the necessity for cyclists to interact with traffic and also due to the fact that cyclists would tend to use the original route under Callaghan Bridge, putting them at risk of conflict with pedestrians.

6.260 Impacts on the environment would be higher in comparison to Option 1 due to the significant works required to achieve the link to the existing toucan crossing and the construction stage and service impacts on traffic congestion levels.

6.261 The layout would be technically less preferable to that of Option 1, primarily due to the minor diversion required for cyclist traffic and the potential for delays at the toucan crossing. It would be expected that cyclists may opt to favour the pedestrian route under Callaghan Bridge.

Table 6.8 - Callaghan Bridge Option Evaluation Summary

Option Evaluation Summary	Callaghan Bridge (Clonsilla Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#1**	**#2**
Economy	Low cost – ease of construction	High cost – significant scope of works and requirement for land purchase
Safety	Good levels of safety and personal security	Good levels of safety and personal security, although cyclists may tend to use pedestrian path under Callaghan Bridge
Environment	Minimal impact in service Minimal impact during construction	Moderate impact in service Moderate / major impact on traffic and adjacent dwellings during construction
Technical	Compromise to Level of Service due to requirement for cyclists to dismount	Level of Service compromised due to requirement for cyclists to divert away from the towpath and potential for delays at the toucan crossing
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility

Conclusion:

6.262 Option 2 will cost significantly more than Option 1 to implement. It is also less direct and requires an interaction with vehicular traffic. There is a concern that cyclists will continue to use the footway beneath the bridge with Option 2 rather than take a detour, interact with traffic and potentially be delayed at the Toucan crossing. Therefore the same safety issues associated with the reduced width beneath the bridge are present with both options.

6.263 Option 1 will cause less disruption during both the construction and the operational phases and on this basis, it is proposed that Option 1 is brought forward as the preferred solution for this element of the scheme.

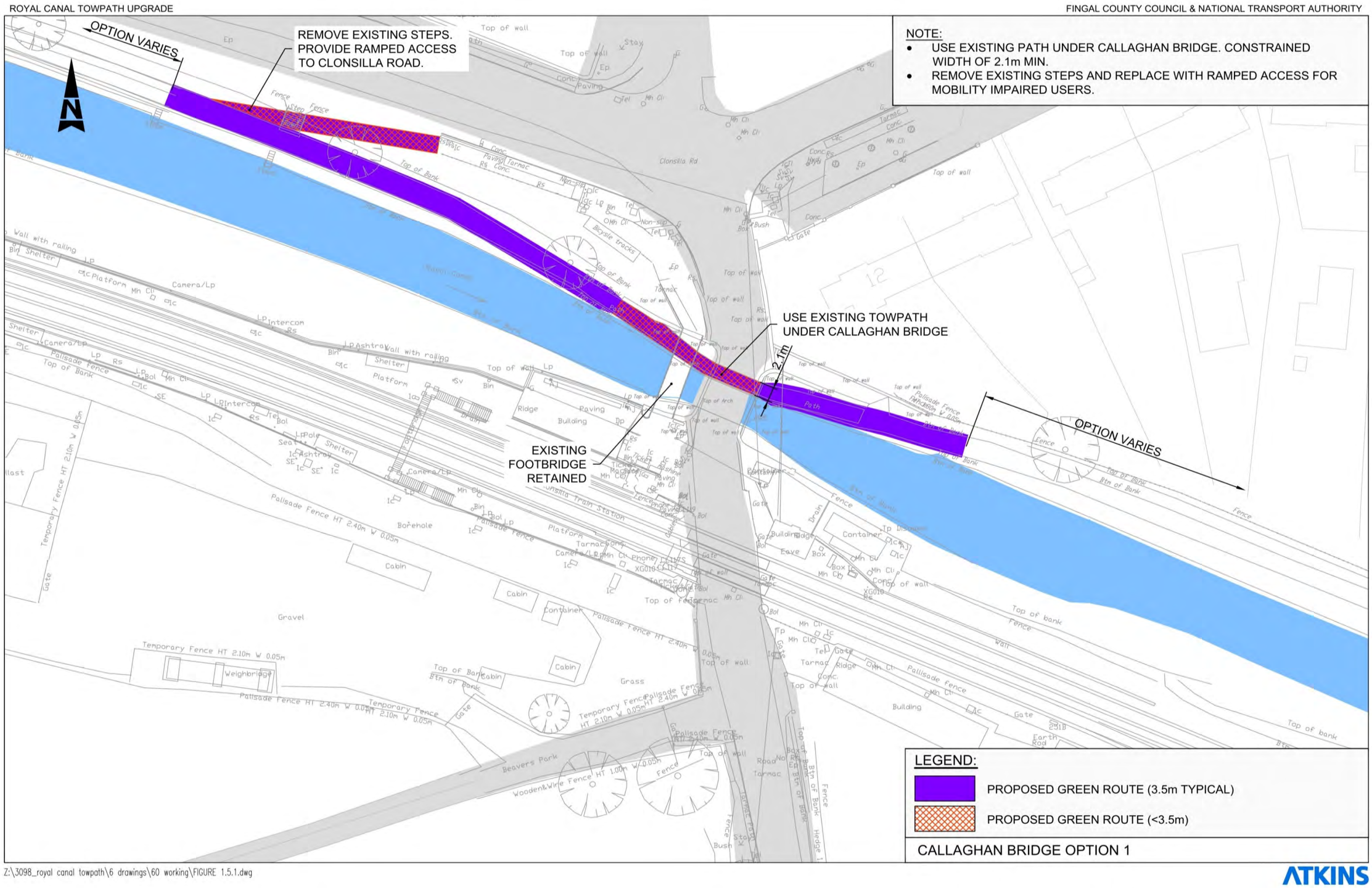

Figure 6.26 - Callaghan Bridge Option 1

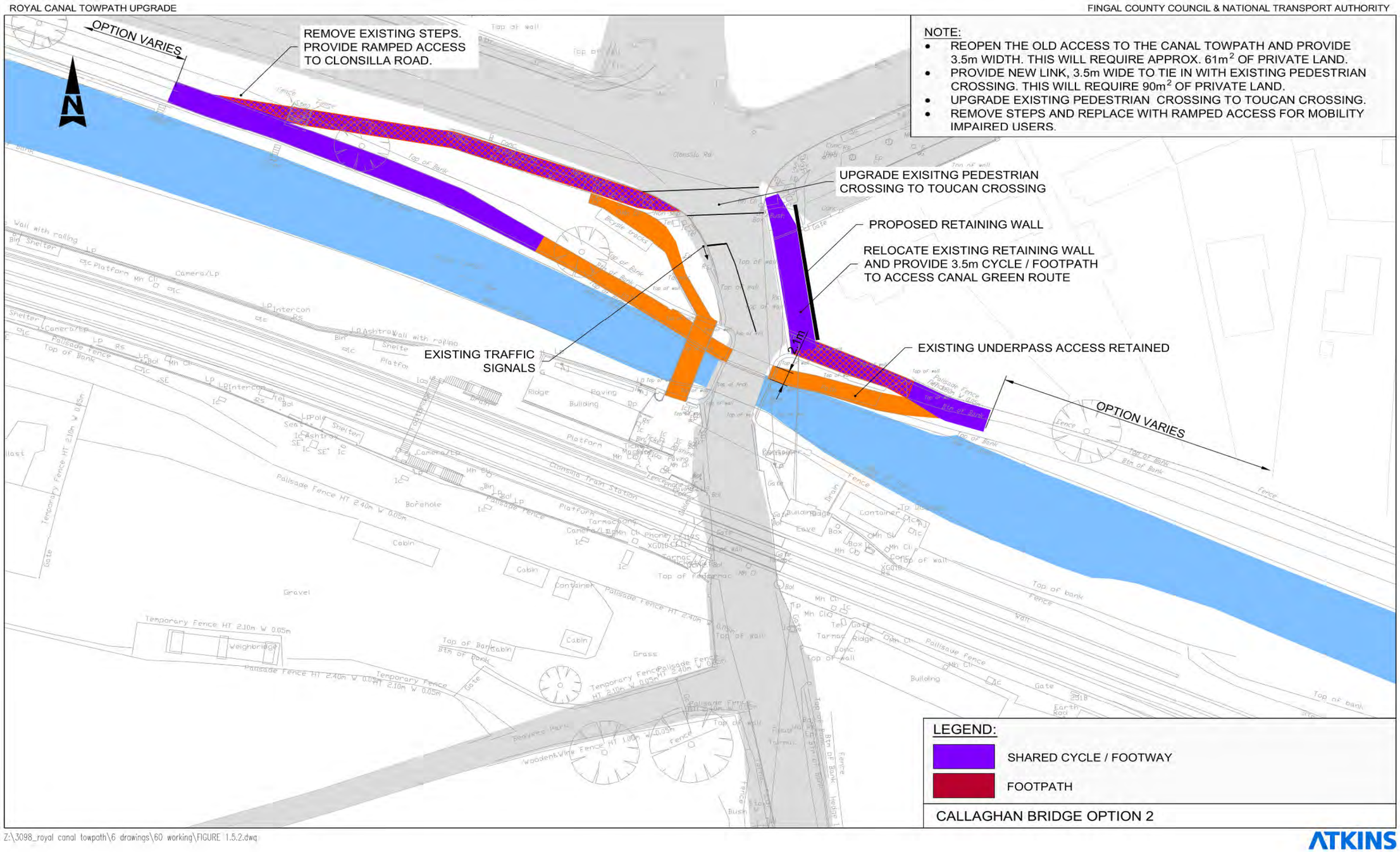

Figure 6.27 - Callaghan Bridge Option 2

Area 3: Callaghan Bridge to County Boundary

Pakenham Bridge

6.264 Pakenham Bridge is narrow and is situated on the bend of Barberstown Road and close to a junction. There is therefore a safety concern for users of the towpath trying to cross the road at this location as visibility is poor.

6.265 Both towpath approaches to Pakenham Bridge are currently outside the recommended guideline minimum gradients for mobility impaired users.

6.266 There is a level crossing adjacent to the bridge.

6.267 For both options considered, pedestrians and cyclists would enjoy a full 3.5m wide facility through this area. Access to the existing towpath under Pakenham Bridge would be maintained although it would be suitable for pedestrians only.

6.268 Both options would be well-integrated with the potential amenity area which is proposed for the wide towpath between Pakenham Bridge and the recently reinstated Dunboyne Spur Line bridge.

6.269 **Option 1:** Figure 6.28 - Pakenham Bridge Option 1 is provided below. This option includes the regrading of the towpaths on the approach to the bridge, thereby enabling the cycleway to comply with standards.

6.270 A toucan crossing would be provided to overcome visibility concerns at the crossing point. Advance warning signage and traffic calming would be provided to warn motorists of the traffic signals ahead.

6.271 Barberstown Road is currently a non-lit route. This option would propose to provide a number of lighting columns both upstream and downstream of the crossing to increase the motorists' awareness of the crossing during the hours of darkness.

6.272 Barberstown Road is a low traffic route. However, a "yellow box" road marking would be required across the level crossing so that in the event of queuing traffic, the level crossing would not be blocked by vehicles queuing back from the pedestrian signals.

6.273 The capital costs for this option would be the higher of the two options under consideration due to the installation of the signalised toucan crossing.

6.274 This option offers the best solution in terms of the safety of the end user. The signalised crossing would eliminate any safety concerns with respect to visibility to oncoming traffic. A high level of personal security would be provided via the proposed CCTV network.

6.275 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along Barberstown Road. The long term impacts of this proposal during service would be negligible.

6.276 There would be a very minor loss to the directness of route where cyclists are forced to wait at the signals.

6.277 **Option 2:** Figure 6.29 - Pakenham Bridge Option 2 is provided below. This option would be identical to Option 1 above for all aspects with the exception of the signalised crossing. This option proposes an uncontrolled crossing at this location.

6.278 In lieu of the traffic signals, a series of traffic calming measures would be provided to inform motorists of the presence of a pedestrian crossing ahead and to lower the approach speeds of vehicles.

6.279 The provision of the traffic calming measures in lieu of the toucan signalised facility would have a positive impact on the overall constructability and cost of the scheme. However, the safety levels offered to the end user would be compromised. It is acknowledged that traffic levels on

Barberstown Road are very low. Nevertheless, the poor visibility to oncoming traffic, in particular at the western side of the crossing, would not be favourable.

6.280 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along Barberstown Road. The long terms impacts of this proposal during service would be negligible.

6.281 The continuity of the route is maintained. However, the directness is somewhat compromised due to the requirement for cyclists to stop and negotiate the road crossing. Pedestrians would have the option to use the existing towpath route under the bridge.

6.282 This option would be well integrated with the potential amenity area which is proposed for the wide towpath between Pakenham Bridge and the recently reinstated Dunboyne Spur Line bridge.

Table 6.9 - Pakenham Bridge Option Evaluation Summary

Option Evaluation Summary	Pakenham Bridge (Barberstown Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#1**	**#2**
Economy	Low overall cost to develop. However, most expensive of the two options considered	Low cost "do minimum" option
Safety	Good levels of safety and personal security	End user safety compromised due to lack of inter-visibility between pedestrians and approaching motorists
Environment	Minimal impact in service Minimal impact during construction	Minimal impact in service Minimal impact during construction
Technical	Good Level of Service achieved	Level of Service compromised due to requirement for cyclists to negotiate uncontrolled crossing – potential for delays at the crossing
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility

6.283 **Conclusion:** Option 1 involves a higher construction cost than Option 2 but, due to poor visibility from the western side of the crossing, provides the safest option for the end user.

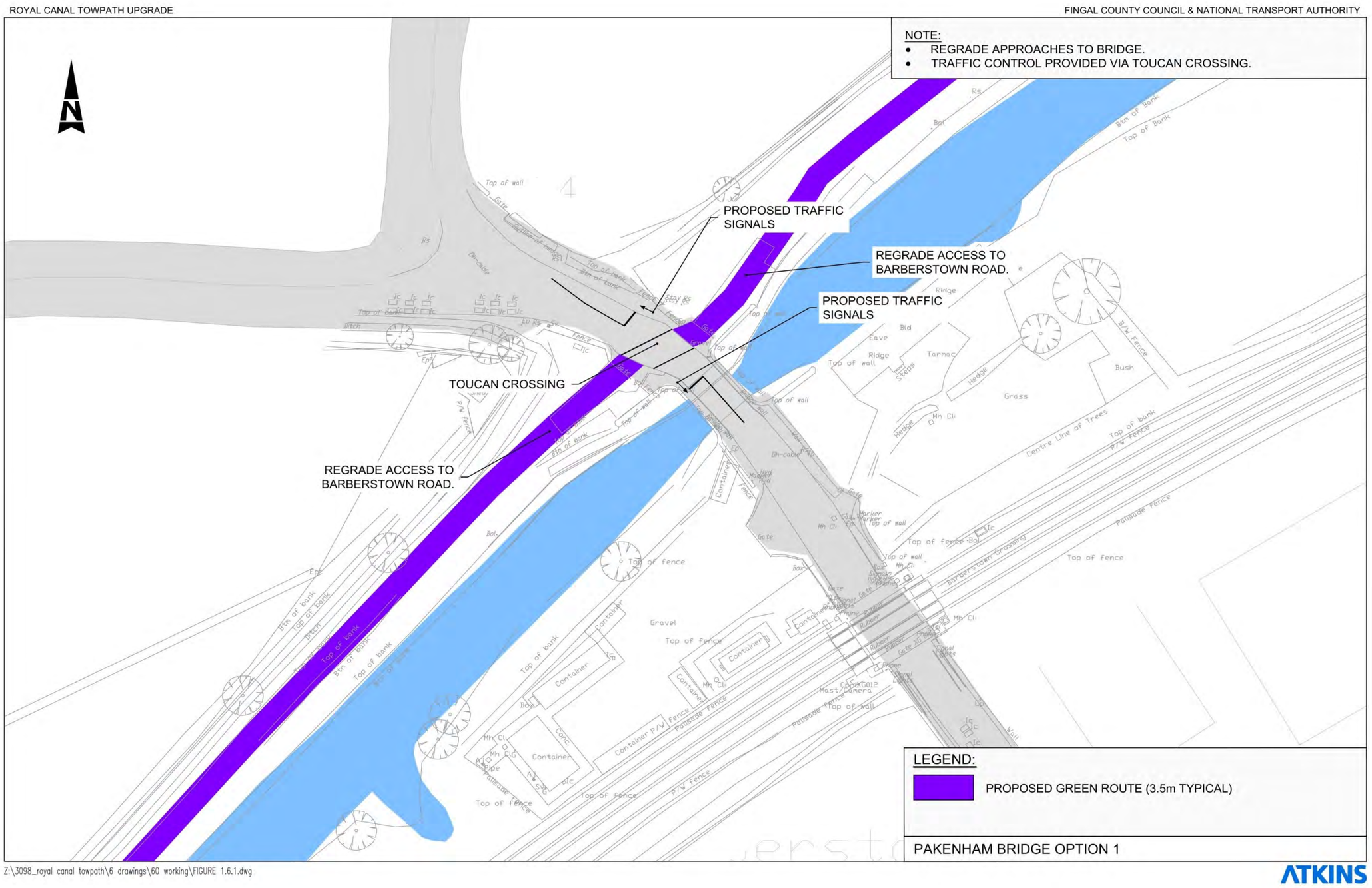

Figure 6.28 - Pakenham Bridge Option 1

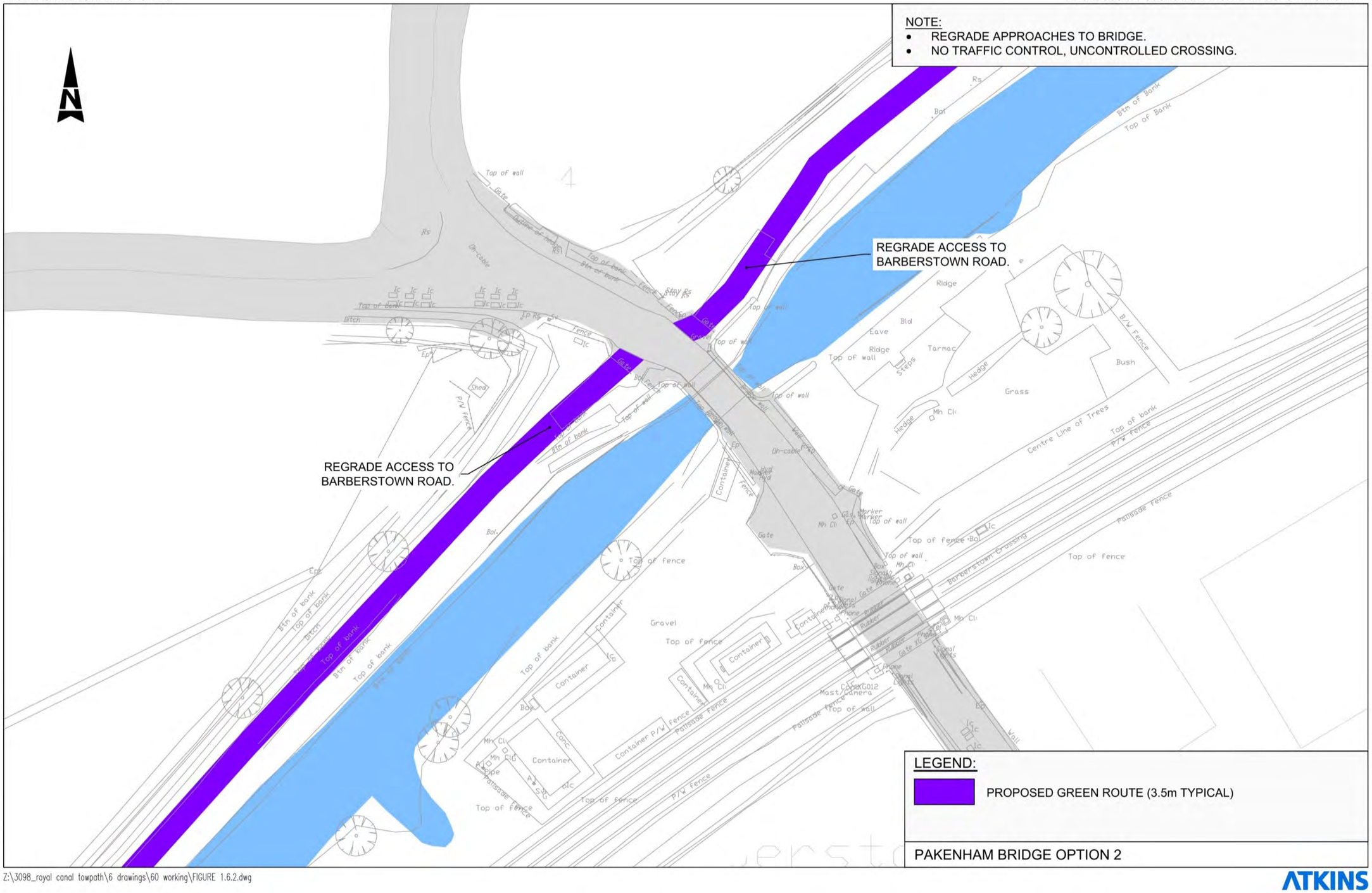

Figure 6.29 - Pakenham Bridge Option 2

Collins Bridge

6.284 Collins Bridge is a two-way road bridge over the canal. There are currently no footways across the bridge. The towpath links to the bridge along the north side of the canal with sub-standard gradients. There is a footway beneath the bridge, but clearance heights would be limited. The visibility from the towpath to vehicular traffic on the road (the R149) across the bridge is limited which is a safety concern.

6.285 The eastern entrance to St Catherine's Park is located approximately 500m south of the canal at this location but there is no safe means to walk/cycle to the Park from the existing towpath and instead access is gained by walking / cycling on the road. The options include for providing connectivity across the adjacent bridges to allow future connectivity along the R149.

6.286 All options address the substandard gradients with regraded approaches.

6.287 **Option 1:** Figure 6.30 - Collins Bridge Option 1 is provided below. This option would provide a signalised Toucan crossing so that users would be offered a safe method of crossing the road. Signal heads would be located such that adequate visibility to the signals would be achieved. Advance warning signage and traffic calming would be provided to warn motorists of the traffic signals ahead.

6.288 To provide effective linkage between the Royal Canal and St Catherine's Park, advisory on-road cycle lanes would be provided southwards across Collins Bridge. It is intended that these cycle lanes would eventually form a cycle link to Leixlip and Lucan via St Catherine's Park and would also form a substantial segment of the 'Canal 2 Canal Regional Cycle Route', ultimately linking the Royal and Grand Canals.

6.289 The R149 is currently a non-lit route. This option would propose to provide a number of lighting columns both upstream and downstream of the crossing to increase the motorists' awareness of the crossing during the hours of darkness.

6.290 Pedestrians and cyclists would enjoy a full 3.5m wide facility through this area. Access to the existing towpath under Collins Bridge would be maintained although it would be suitable for pedestrians only.

6.291 The capital costs for this option would be moderate due to the installation of the signalised toucan crossing. An effective system of traffic calming measures would be necessary due to a combination of the traffic volumes, high approach speeds and poor horizontal alignment along the R149 local to Collins Bridge. Such measures would add to the overall cost.

6.292 This option offers a good level of safety for the end user. The signalised crossing would eliminate any safety concerns with respect to visibility to oncoming traffic. A high level of personal security would be provided via the proposed CCTV network and public lighting. However, the on-road advisory lanes would have limited effect where the existing carriageway width is already narrow across the existing canal and railway bridges.

6.293 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along the adjacent road. The long term impacts of this proposal during service would be negligible.

6.294 From a technical perspective, the continuity and directness of the route would be maintained with this option. However, there would be a very minor loss to the directness of route where cyclists are forced to wait at the signals.

6.295 This option would be well integrated with St Catherine's Regional Park, located to the south of the canal. It would also provide good integration with future planned cycle routes, in particular the Canal 2 Canal Regional Route.

6.296 **Option 2:** Figure 6.31 - Collins Bridge Option 2 is provided below. In this option, a toucan crossing would be provided as per Option 1 above. However, the toucan signals would be

integrated into a one-way shuttle system. This would allow for reallocation of the existing road carriageway so that a dedicated off-road cycle track could be installed over the existing canal and railway bridges. This off-road track would form the beginning of the proposed link to St Catherine's Park and the Canal 2 Canal Regional Route. There would be potential for delays as a result of the shuttle traffic signals, which is seen as a major negative to this option.

6.297 Street lighting would be provided over the extents of the shuttle system layout and on both road approaches for safety purposes. The proposed lighting would effectively increase motorist awareness of the presence of vulnerable road users in the hours of darkness.

6.298 The costs for this option would be similar to Option 1 although a slight increase would be expected due to the additional works required to install the one-way system and the additional lengths of traffic signal ducting required.

6.299 This option offers a good level of safety. The signalised crossing and one-way traffic system would eliminate any safety concerns with respect to visibility and oncoming traffic. A high level of personal security would be provided via the proposed CCTV network and public lighting. The off-road cycle track would provide a significantly improved facility for cyclists and pedestrians when compared to Option 1.

6.300 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along the adjacent road. The long term impacts of this proposal during service would be negligible.

6.301 From a technical perspective, the continuity and directness of the route would be maintained with this option. However, there would be a very minor loss to the directness of route where cyclists are forced to wait at the signals.

6.302 This option would be well integrated with St Catherine's Regional Park, located south of the canal. It would also provide good integration with future planned cycle routes, namely the Canal 2 Canal Regional Route.

6.303 **Option 3:** Figure 6.32 - Collins Bridge Option 3 is provided below. For this option a toucan crossing would be installed as per Option 1. This would be supported by a scheme of traffic calming measures to increase driver awareness of the facility ahead and reduce traffic speeds on approach.

6.304 To provide the required linkage southwards to St Catherine's Park, a new pedestrian/cyclist bridge would be constructed over the canal and railway, immediately adjacent and to the west of Collins Bridge. The planned link to St Catherine's Park and the Canal 2 Canal Regional Route would connect to the proposed bridge immediately south of the railway. Purchase of land is likely to be required to facilitate this off-road route

6.305 All other elements in terms of CCTV ad street lighting would be provided as per Option 1 above**Error! Reference source not found.**.

6.306 The cost implications in providing a dedicated pedestrian / cyclist bridge across the canal and railway are high and this option would be the most expensive to construct. However, this layout would permit the delivery of the scheme on a phased basis. The proposed bridge could be delayed until such time as funding was made available and the adjacent schemes which it serves would be completed. In the short term, the proposed east-west corridor would be preserved and a good level of service provided.

6.307 This option also offers a high level of safety as it minimised the level of interaction between the cyclist and the motorist.

6.308 The construction of a new bridge would have a greater impact on the receiving environment throughout the construction stage. However, the impact when in service would be much less given that traffic impacts would be kept to a minimum.

6.309 The proposed layout would offer a high Level of Service as continuity, directness and comfort levels would be preserved.

6.310 This layout would offer greatest flexibility in terms of the phased delivery of the scheme and the integration with future planned cycle networks and amenity areas.

Table 6.10 - Collins Bridge Option Evaluation Summary

Option Evaluation Summary	Collins Bridge (R149)		
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**
Rank	**#2**	**#3**	**1**
Economy	Low cost "do minimum" option	Moderate cost option	High cost option, but conducive to phased delivery of facilities
Safety	Good levels of safety and personal security for towpath, but reduced level of safety for on-road connection across bridge	High levels of safety and personal security	High level of safety and personal security
Environment	Some impact on traffic on R149 in service Minimal impact during construction	High impact on traffic on R149 in service Minimal impact during construction	Some impact on traffic on R149 in service Moderate impact during construction
Technical	Good Level of Service achieved	High Level of Service achieved – less interaction with traffic for cyclists linking to destinations south of canal Significant effect on R149 Traffic	Highest level of Service achieved
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility	Good levels of integration and accessibility

6.311 **Conclusion:** Option 1 would be cheaper than Option 2 to construct; Option 3 would be the most expensive.

6.312 All options score identically in terms of proposed crossing facilities at the R149, although a shorter crossing would be provided on Option 2.

6.313 In terms of connecting with future cycle facilities in St. Catherine's Park, Option 3 is desirable as a completely segregated cycle facility offers the best Level of Service. However, land acquisition would be required to achieve this.

6.314 Option 3 could be delivered over time as and when adjacent schemes require it. Therefore, considering the above, Option 3 is the preferred option. Should funding not be available for this option, Option 1 should be adopted as it has least disruption to traffic on the R149. Option 2 should be avoided if possible due to the likely effect on traffic.

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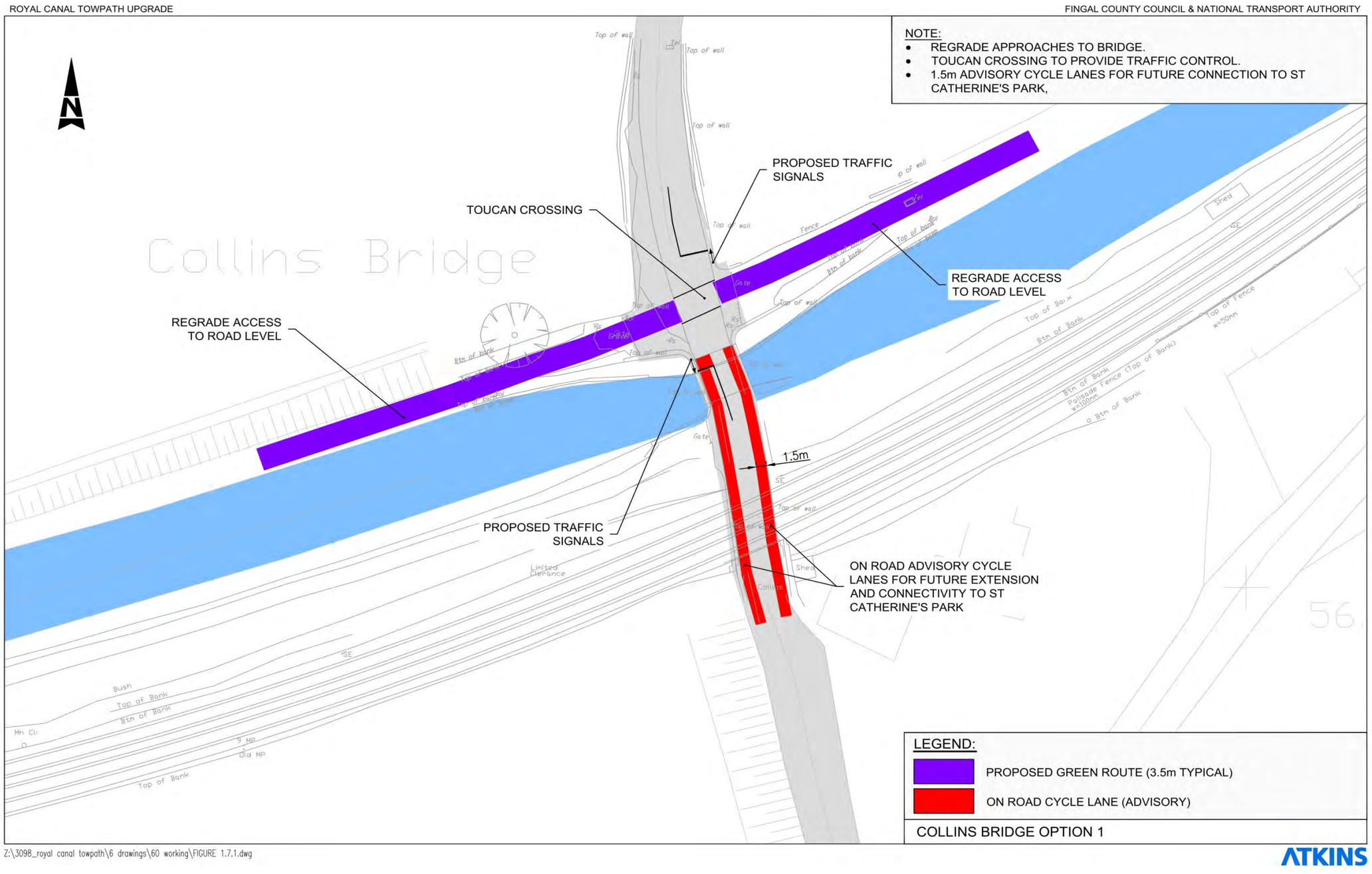

Figure 6.30 - Collins Bridge Option 1

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

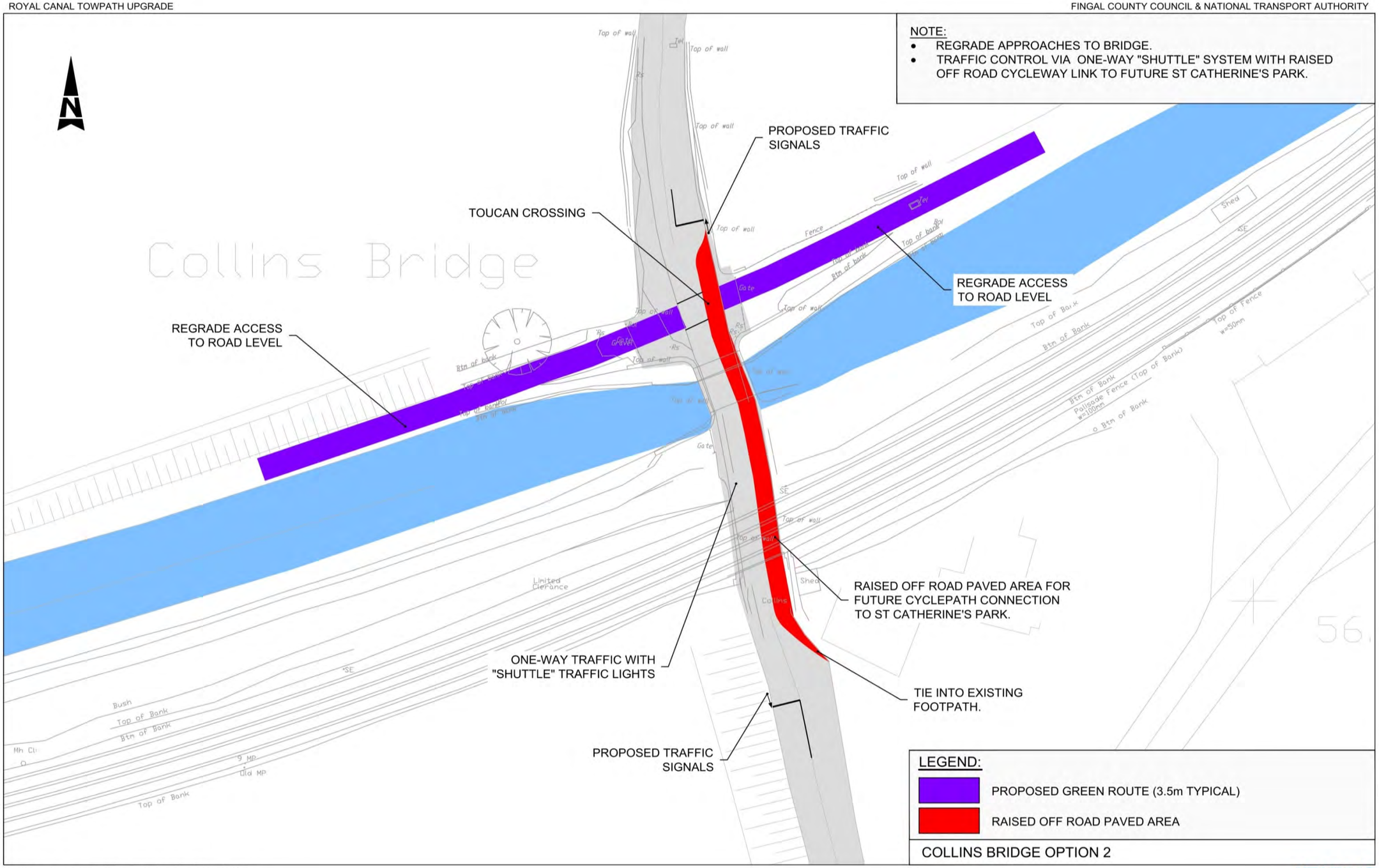

Figure 6.31 - Collins Bridge Option 2

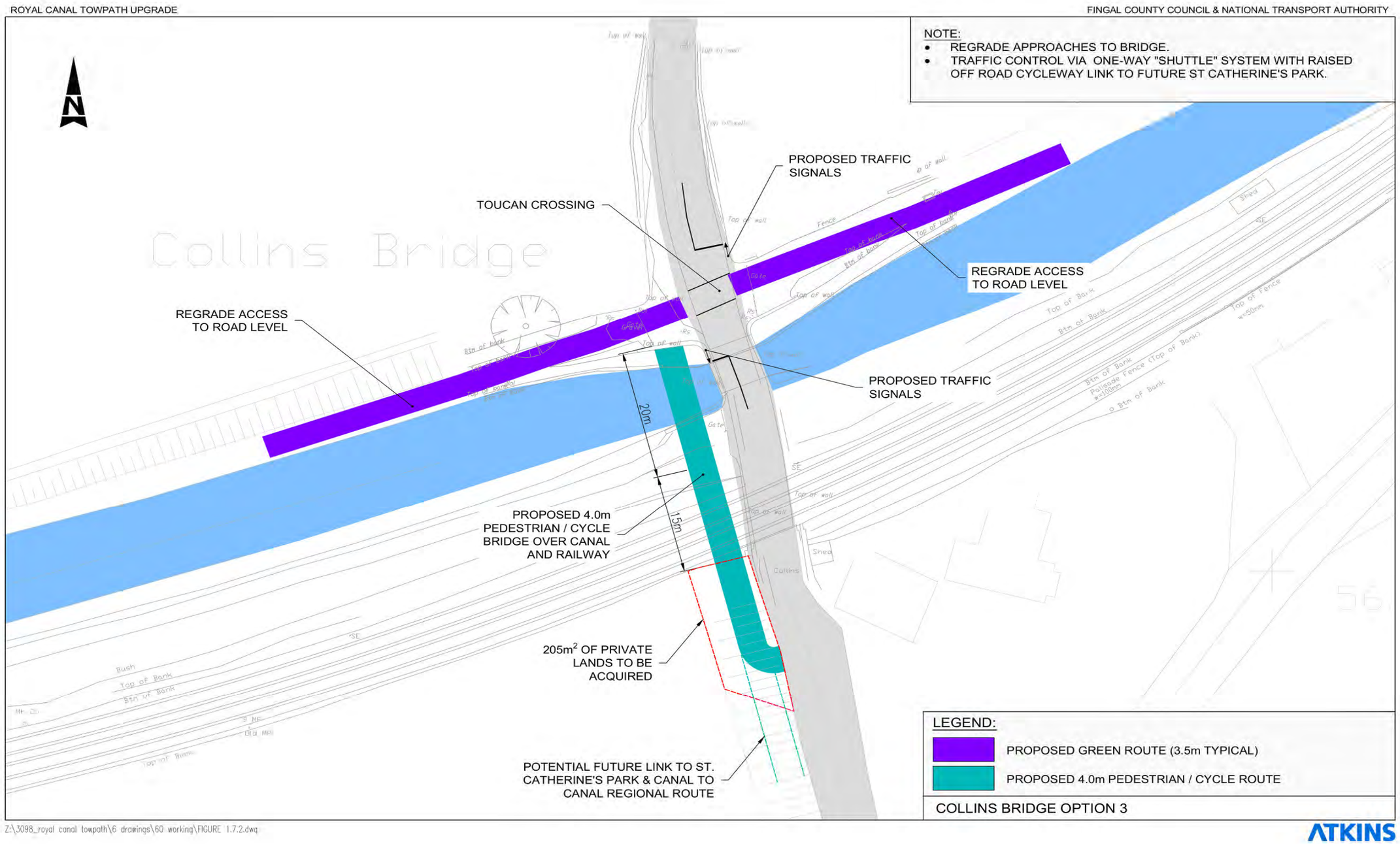

Figure 6.32 - Collins Bridge Option 3

7. Preferred Option & Estimated Cost

Preferred Option

7.1 Following the assessment of the options, the emerging preferred option can be summarised as follows. Overall route maps are included in Appendix A for information.

Area 1

7.2 A second bridge for the exclusive use of cyclists is to be provided so that total segregation is achieved. This will require a land purchase on the southern bank of the canal. A signalised toucan crossing at Ashtown Road will provide a safe means of crossing this busy road. This will facilitate the continuity of the proposed route and effectively connect the existing towpath along the canal's north bank at Rathborne to the proposed upgrade along the southern bank and west of Longford Bridge.

7.3 The toucan crossing will be located where the towpath emerges from the 10th lock on the southern canal bank. The effective crossing width will be approximately 3.5 – 4.0m.

7.4 The towpath width through the 10th lock will remain as per the existing layout, widening out to 3.5m thereafter.

7.5 A minor retaining wall of approximate retaining height <1.0m may be required along the railway line between Navan Road Parkway Station and the 11th lock.

7.6 It is proposed to provide a cycle-only bridge across the M50 Motorway. The bridge will be located immediately south of the existing aqueduct, between the aqueduct and the railway bridge.

7.7 An uncontrolled crossing is proposed at Talbot Bridge due to the low levels of traffic in the area. A direct access route to the southern towpath at the 12th Lock Hotel car park is also proposed. This may require the acquisition of lands at the 12th Lock Hotel car park and the construction of new boundary walls or fence. The proposed facility will be restricted to 2.5m width approximately through Castleknock Marina, widening out to 3.5m immediately west of the hotel.

A pedestrian / cycleway underpass will be provided at Castleknock Road to eliminate conflicts with busy traffic. Access to Castleknock Road will be maintained via the existing steps to the east and a new ramped access route to Castleknock Station to the west.**Area 2**

7.8 The Greenway will be 3.5m wide running past Castleknock Station and onwards towards the Deep Sinking.

7.9 Throughout the Deep Sinking, the 3.5m width will be continued through the provision of a structural walkway which will cantilever over the canal bank. Given the variable height differentials between the towpath and the canal waters, a pedestrian guardrail will be included for safety reasons.

7.10 At Kirkpatrick Bridge, minor works to the existing footbridge will be required to integrate with the widened towpath.

7.11 Crossing of Coolmine Road will be regulated by installing a signalised toucan crossing. These signals will be integrated with the adjacent automatic level crossing.

7.12 West of Kirkpatrick Bridge, the cantilevered walkway will continue to provide an effective width of 3.5m. Where required, existing deep drainage ditches along the railway embankment will be replaced with appropriate filter drains with existing culverted outfalls maintained under the towpath.

7.13 On approach to Kennan Bridge, a retaining wall will be required so that 3.5m width can be maintained without the need to amend the existing bridge wingwalls.

7.14 The current narrow carriageway across Kennan Bridge lends itself to the provision of a shuttle traffic light system, which shall be installed in the short term until the imminent closure of the level crossing is complete.

7.15 The proposed shuttle lights shall be complemented with an elongated toucan crossing providing a traffic-free crossing of the bridge for cyclist and pedestrian users.

7.16 The section between Kennan Bridge and Callaghan Bridge shall be 3.5m wide, utilising the cantilevered structure over the canal bank where the current towpath provision is less than the required width and where regrading of the embankment to the north is not possible.

7.17 The proposed route shall pass under Callaghan Bridge. The pinch point created by the bridge abutments will require cyclists to dismount and pass under the bridge on foot.

Area 3

7.18 West of Callaghan Bridge, a new ramped access will be provided in lieu of the existing steps.

7.19 The proposed route will continue westwards to Pakenham Bridge at a width of 3.5m utilising the existing underpass at the Dunboyne Spur Line and reducing to 2.5m to negotiate the pinch point created by the existing Clonsilla SW water main.

7.20 The two-tiered area immediately east of Pakenham Bridge will be earmarked for development as a recreational and picnic area for both land and water-based travellers.

7.21 A toucan crossing will be provided at Pakenham Bridge. This is required to permit the safe crossing of the road as the visibility splays are particularly poor at this location.

7.22 The facility will continue along the northern bank towards Collins Bridge at 3.5m wide.

7.23 A proposed toucan crossing will be installed at Collins Bridge providing a safe method of crossing the R149, which is subject to vehicles travelling at speed.

7.24 A dedicated cycle / foot bridge will be provided across the canal and railway to link with proposed connections to St Catherine's Park and the Canal 2 Canal Regional Cycle Route. Delivery of this aspect may be delayed until such time as appropriate funding is available.

7.25 West of Collins Bridge, the widened towpath will extend to the county boundary at the premises of the Royal Canal Amenity Group, where it is intended that the facility can be extended to Leixlip and Maynooth. The full 3.5m width can be achieved along this section, although consideration should be afforded to the health and safety risk associated with the adjacent drainage ditch which forms the northern boundary of the canal.

Cost Estimate

7.26 The table below summarises the current estimated capital costs of the project. Further detailed breakdown of these costs is provided at Appendix B of this report.

7.27 The figures stated are based on rates taken from recent projects of a similar size and nature in the Dublin region and from the *"Roadworks Unit Rate Database, Version 6 – Base Date May 2011"* published by the National Roads Authority. Given the current economic climate and associated volatility in the construction market, these estimates are only intended as a guide for appraisal purposes. These estimated costs are therefore provided with the caveat that actual construction costs may vary significantly.

7.28 Land acquisition costs are assumed at €500,000.00 per acre.

Table 7.1 - Cost Estimates

Royal Canal Greenway - Feasibility Stage Cost Estimate						
Item No	**Item Description**	**Area 1**	**Area 2**	**Area 3**	**Total**	**%**
		€	**€**	**€**	**€**	
0	**Preliminaries**	125,237.73	159,773.54	121,341.57	406,352.83	4.90%
1	**Structural**	641,969.60	3,412,492.20	400,000.00	4,454,461.80	53.76%
2	**Site Clearance**	362.11	462.19	648.99	1,473.29	0.02%
4	**Pedestrian Guardrail & Safety Barriers**	3,750.00	367,500.00	0.00	371,250.00	4.48%
5	**Service Ducts, PL & CCTV**	278,689.00	436,570.00	357,712.50	1,072,971.50	12.95%
6	**Earthworks**	8,365.48	2,046.75	3,801.85	14,214.09	0.17%
11	**Kerbs, Footways & Paved Areas**	304,511.50	406,898.50	411,162.75	1,122,572.75	13.55%
12	**Traffic Signs & Road Markings (incl. Traffic Signals)**	13,000.00	25,000.00	24,000.00	62,000.00	0.75%
98	**Land Acquisition**	1,729.56	0.00	25,325.70	27,055.26	0.33%
99	**General Contingency (10%)**	137,761.50	481,074.32	134,399.34	753,235.15	9.09%
	TOTAL ESTIMATE (GROSS)	**1,515,376.47**	**5,291,817.50**	**1,478,392.70**	**8,285,586.67**	100%
	VAT @ 13.5%	204,575.82	714,395.36	199,583.01	1,118,554.20	
	TOTAL ESTIMATE (NETT)	**1,719,952.30**	**6,006,212.86**	**1,677,975.71**	**9,404,140.87**	

7.29 The overall total capital cost for the preferred scheme is some €8.3 million net of value added tax. Given the current economic constraints and the limited availability of funding, the client may wish to examine the potential for a phased delivery of the project. To this end, the project can be divided into three constituent sections based on the natural division of areas 1, 2 and 3.

7.30 In addition, other opportunities have been identified where the scope of work can be reduced in the short term without adversely affecting the viability of the scheme. Under this process, the scheme could be provided immediately (subject to the available level of funding), with shortfalls in some areas, which can be improved with efficient use of funding as it becomes available. Hence, the long term vision of the project will not be lost.

7.31 The following table outlines the estimated costs for the preferred scheme with a number of elements removed from the scope of work for the short term. The removed items are listed below.

Table 7.2 - Reduced Scheme Cost estimate

Feasibility Stage Cost Estimate (Reduced Scheme)						
Item No	**Item Description**	**Area 1**	**Area 2**	**Area 3**	**Total**	**%**
		€	**€**	**€**	**€**	
0	**Preliminaries**	60,633.60	119,623.54	76,695.38	**256,952.73**	**4.12%**
1	**Structural**	0.00	2,812,492.20	0.00	**2,812,492.20**	**45.07%**
2	**Site Clearance**	362.11	462.19	648.99	**1,473.29**	**0.02%**
4	**Pedestrian Guardrail & Safety Barriers**	3,750.00	367,500.00	0.00	**371,250.00**	**5.95%**
5	**Service Ducts, PL & CCTV**	270,349.00	429,070.00	350,212.50	**1,049,631.50**	**16.82%**
6	**Earthworks**	8,365.48	2,046.75	3,801.85	**14,214.09**	**0.23%**
11	**Kerbs, Footways & Paved Areas**	299,511.50	405,898.50	388,290.50	**1,093,700.50**	**17.53%**
12	**Traffic Signs & Road Markings (inc. Traffic Signals)**	24,000.00	25,000.00	24,000.00	**73,000.00**	**1.17%**
98	**Land Acquisition**	0.00	0.00	0.00	**0.00**	**0.00%**
99	**General Contingency (10%)**	66,697.19	416,209.32	84,364.92	**567,271.43**	**9.09%**
	TOTAL ESTIMATE (ex VAT)	**733,669.09**	**4,578,302.50**	**928,014.15**	**6,239,985.74**	**100%**

7.32 Area 1 reductions are achieved through:

- Removal of proposed cycle bridge at Ashtown;
- Installation of CCTV infrastructure only (ie no cameras or poles provided);

- Removal of proposed fishing and picnic amenity areas;
- Removal of proposed footbridge linking to zoned lands west of N3 Navan Road Parkway Station;
- Removal of proposed cycle bridge across the M50 in the vicinity of the existing M50 Aqueduct;
- Removal of requirement for land purchase at 12th Lock Hotel car park;
- Provision of ramps and toucan crossing at Castleknock Road in lieu of proposed underpass.

7.33 Area 2 reductions are comprised of:

- Removal of proposed footbridges linking Laurel Lodge and Roselawn;
- Installation of CCTV infrastructure only (ie no cameras or poles provided);
- Removal of proposed footbridge link to zoned lands at Kellystown;
- Removal of proposed fishing amenities;

7.34 Area 3 reductions focus on:

- Removal of proposed footbridge linking Clonsilla and Beech Park;
- Installation of CCTV infrastructure only (ie no cameras or poles provided);
- Removal of proposed fishing and picnic amenities at Hansfield;
- Removal of proposed mooring point at Hansfield;
- Removal of proposed car parking at Pakenham Bridge and at the county boundary;
- Removal of proposed cycle / pedestrian bridge link to St Catherine's Park;
- Removal of requirement for land purchase at Collins Bridge with respect to the above bridge.

8. Statutory Approvals

8.1 Atkins produced a technical paper on "The Need for an Environmental Impact Assessment" for the Royal Canal Greenway Feasibility Study. This document examined the potential for an EIA against any of the "automatic" triggers per the Planning and Development Act, 2000 (Planning and Development Regulations, 2001-2011) and the Rods Act 1993.

8.2 This document is available at Appendix C of this report.

8.3 The paper found that, under the Planning and Development Act, 2000 or the Roads Act 1993 the project would not automatically require an EIA. However, it is recommended that the Client undertake an EIA Screening Report incorporating baseline ecological habitat surveys in accordance with *Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-threshold Development*, 2003, DEHLG. If the Screening Report predicts that significant adverse effects may result on the Royal Canal pNHA then the authority would be required to carry out an EIA in respect of the proposed works.

8.4 The paper concludes that the Client should consider commissioning ecological, habitat and biodiversity studies on the potential impacts of the scheme and how these can be best mitigated. Such a report would include the result of an EIA Screening Report, a Landscape Plan showing visual mitigation and any other studies requested through pre-planning consultation.

8.5 It is noted that there are a number of studies and surveys already completed for the eastern section of the Royal Canal between the county boundary at Ashtown and the 12th lock at Castleknock, i.e. Area 1. It is considered that this existing detailed information would form a satisfactory basis on which to determine whether an EIA is required for any future upgrading works to this easterly section of the Royal Canal in Fingal.

8.6 Where it is determined that the development does not require an EIA, the appropriate route for the Statutory Approval would be in accordance with Part 8 of the Planning and Development Regulations. An environmental report addressing the site development, including environmental concerns and proposing mitigation measures would also be recommended to accompany the planning submission.

9. Conclusions & Recommendations

Conclusion

9.1 This study examined the engineering feasibility of upgrading the existing towpath along the Royal Canal to meet the objectives as set out in Chapter 1 of this report.

9.2 The study included widespread consultations with identified key stakeholders and the general public.

9.3 The following is the list of bodies consulted on this project to date:

- Waterways Ireland
- Irish Rail
- Fingal County Council – Conservation & Heritage
- Inland Fisheries Ireland
- Inland Waterways Association of Ireland
- Royal Canal Amenity Group
- National Parks and Wildlife Service
- General Public & Interest Groups

9.4 A total of 24 submissions were received from the public, the majority of which were in favour of the scheme.

9.5 The consultation period revealed an overall level of support for the project but also highlighted that there are important environmental and ecological issues to be addressed.

9.6 A desktop study and numerous site visits were undertaken to establish the constraints and develop a working knowledge of the issues along the proposed route. A constraints map was produced to identify the critical matters and assist in the development of route options. The constraints study examined both the engineering and environmental aspects of the proposed route.

9.7 An opportunities map was also developed to identify areas where potential benefits of the project could be maximised. It was proposed that all “opportunity” items identified would be brought forward to the final emerging preferred route option.

9.8 Options were generated for the identified constrained areas along the route. These options were assessed against agreed criteria and their effectiveness in meeting the stated project objectives. The evaluation process permitted the emerging preferred option to be extracted from the data gathered and presented in Chapter 7 and Appendix A.

9.9 The overall capital cost of the emerging preferred option was estimated at circa €8.3 million exclusive of VAT. A reduced scheme would cost approximately €6.2m

9.10 The emerging preferred option was also subjected to a preliminary screening process to determine whether the proposals should be subjected to an Environmental Impact Assessment in accordance with prevailing legislation. A technical paper was commissioned which found that, the scheme is unlikely to require an EIA, but that the local authority should give appropriate consideration to the sensitivities of the receiving environment along the canal corridor in any future upgrading project.

9.11 The local authority, following consideration of the potential environmental impacts of an upgrading project, may deem the project to require an EIA. Where it is determined that the development does not require an EIA, the appropriate route for the Statutory Approval would be in accordance with Part 8 of the Planning and Development Regulations.

9.12 The paper also noted that there are a number of such studies already competed for the eastern section of the canal between the county boundary at Ashtown and the 12th lock at Castleknock and that this should provide a basis for determining if an EIA is required for any future upgrading work to this easterly section. For other sections west of the 12th lock, the paper recommends that detailed habitat surveys are carried out for these areas. A copy of this paper is included in Appendix C of this report.

Recommendations

9.13 It is recommended that detailed habitat studies and surveys are carried out along the canal corridor west of the 12th lock to better understand the potential environmental impacts and presence of protected species. Such studies will permit a more detailed opinion to be formed on the need for an EIA.

9.14 It is recommended that the project is delivered on a phased basis in accordance with the natural split between areas 1, 2 and 3. Dividing the project as such will allow a more flexible approach to be adopted in the delivery of the project given the current fiscal budgetary constraints.

9.15 Further short term cost-sensitive solutions are identified in Chapter 7 where the key benefits of the scheme can be delivered immediately without prejudice to the longer term project goals. This is aimed at achieving greatest value for money at a time when funding may not be immediately forthcoming.

Appendix A Preferred Option Route Maps

Appendix B Detailed Cost Estimate

Appendix C Project Need for EIA

Royal Canal Greenway

Feasibility Report

October 2012

Notice

This report was produced by *Atkins* for *Fingal County Council* for the specific purpose of *Royal Canal Greenway - Feasibility Study*.

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Appendices

Executive Summary

This study examined the engineering feasibility of upgrading the existing towpath along the Royal Canal to meet the objectives as set out in Chapter 1 of this report.

The study included widespread consultations with identified key stakeholders and the general public.

A total of 24 submissions were received from the public during the consultation period.

The consultation period revealed an overall level of support for the project but also highlighted that there are important environmental and ecological issues to be addressed.

A desktop study and numerous site visits were undertaken to establish the constraints and develop a working knowledge of the issues along the proposed route. A constraints map was produced to identify the critical matters and assist in the development of route options. The constraints study examined both the engineering and environmental aspects of the proposed route.

An opportunities map was also developed to identify areas where potential benefits of the project could be maximised. It was proposed that all "opportunity" items identified would be brought forward to the final emerging preferred route option.

Options were generated for the identified constrained areas along the route. These options were assessed against agreed criteria and their effectiveness in meeting the stated project objectives. The evaluation process permitted the emerging preferred option to be extracted from the data gathered and is presented in Chapter 7 and Appendix A.

The overall capital cost of the emerging preferred option was estimated at circa € 8.3 million exclusive of VAT. A reduced option would cost €6.2m.

The emerging preferred option was also subjected to a preliminary screening process to determine whether the proposals should be subjected to an Environmental Impact Assessment in accordance with prevailing legislation. A technical paper was commissioned which found that the scheme to date does not automatically require an EIA, but that the local authority should give appropriate consideration to the sensitivities of the receiving environment along the canal corridor in any future upgrading project.

The local authority, following consideration of the potential environmental impacts of an upgrading project, may deem the project to require an EIA. Where it is determined that the development does not require an EIA, the appropriate route for the Statutory Approval would be in accordance with Part 8 of the Planning and Development Regulations.

Detailed ecological information is currently available between 10th lock at Ashtown and 12th lock at Castleknock and this should provide a basis for determining if an EIA is required for any future upgrading works to this easterly section.

The study includes a costing for the emerging preferred option. However short term cost-sensitive solutions were identified where the key benefits of the scheme could be delivered immediately without prejudice to the longer term project goals.

1. Introduction

Background

1.1 Fingal County Council and the National Transport Authority have identified the Royal Canal as having the potential to become a strategic regional cycling route in the Greater Dublin Area. This report has been commissioned to examine the feasibility of upgrading the Royal Canal towpath within the Fingal County Council area to a shared cycle / pedestrian route in conjunction with Waterways Ireland who are the custodians of this important public asset.

1.2 The study area is defined as the Royal Canal corridor commencing at the eastern county boundary at the 10th Lock (Longford Bridge), Ashtown and continuing along the Royal Canal to the western county boundary at Confey, immediately east of Leixlip. This distance is approx. 11.5 km.

Proposed Scheme Objectives

1.3 The objectives for the scheme are out outlined as follows:

1.4 **Primary Objective** – to provide a premium quality cyclist and pedestrian route in order to encourage and promote cycling in the Dublin Region in accordance with the stated objectives of the National Cycle Policy Framework, Greater Dublin Area: Draft Transport Strategy, Regional Planning Guidelines for the GDA and Fingal County Development Plan 2011-17.

1.5 Secondary Objectives –

- To improve the canal corridor as a recreational cycle and pedestrian route;
- To improve connectivity between the canal and adjacent public transport;
- To improve inter-connectivity between the canal and adjacent (existing and proposed) residential neighbourhoods;
- To increase and promote the amenity value of the resource;
- To increase and promote the historical and heritage value of the resource;
- To increase the accessibility of the resource to all users.

Existing Situation

1.6 The Royal Canal is an important and historic feature in Dublin's urban fabric which connects the city centre with its western suburbs and the adjoining counties. The canal corridor in the Fingal area can be divided into three distinct geographical sections based on the existing character of the Royal Canal. These are as follows:

Area 1: Longford Bridge (Ashtown Road) to Granard Bridge (Castleknock Road)

1.7 The towpath in this area is generally constructed on a flat gravel/tarmac path along the southern side of the canal corridor. it has open views to urban development and major infrastructure on both sides of the canal. The towpath is generally at the grade of the canal itself and is located immediately adjoining to the Dublin-Sligo railway line to the south.

Area 2 – Granard Bridge (Castleknock Road) to Callaghan Bridge (Clonsilla Road)

1.8 The towpath comprises of a gravel path on a steep gradient at the various access points with the remainder being a narrow rough dirt track along the corridor. This section includes the Deep Sinking area where there is a significant grade difference between the towpaths and water surface

of the canal. In addition, the railway line is elevated above the level of the towpath with existing housing development present on both sides of the canal corridor.

Area 3 – Callaghan Bridge (Clonsilla Road) to County Boundary (Confey)

1.9 This section of the towpath on the northern bank consists of a dirt track on relatively flat lying ground with the exception of access points from the road network which are on a steep gradient. The path is flanked by mature hedgerows and the railway is elevated above the grade of the canal.

1.10 The current undeveloped character of this area is planned to change as the adjacent zoned residential lands are developed at Hansfield Strategic Development Zone (SDZ) and the Barnhill Local Area Plan.

1.11 All above areas are shown on drawing 3098SK042 Revision 0 overleaf.

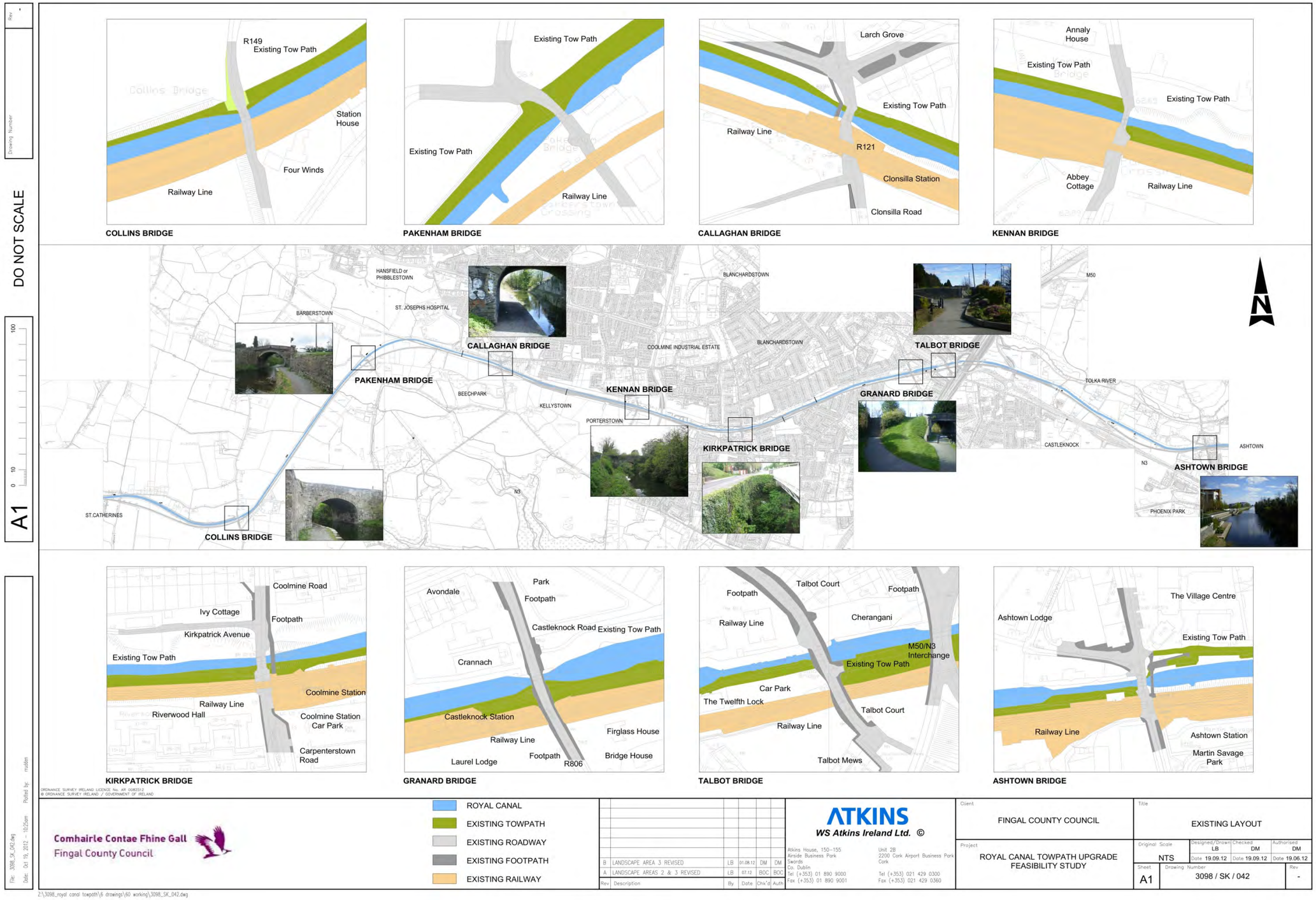


Figure 1.1 - Existing Layout

2. Scheme Context

Planning Policy & Guidance

2.1 In undertaking this feasibility study, a number of plans, guidance documents reports and project references were reviewed. This section summarises the main sources of reference starting with national, regional and local policy and then describing the various existing studies and best practice guidance documents published with regards to the Royal Canal Towpath and cyclepaths in general.

National Transport Policy

Smarter Travel and National Cycle Policy Framework

2.2 In February 2009, the Smarter Travel Policy document for achieving a sustainable transport system for Ireland was published, this document outlines a number of policies to encourage a modal shift away from private car use and promoting public transport, walking and cycling.

2.3 In April 2009, Ireland's first National Cycle Policy Framework (NCPF) was issued, the vision of the policy is "all cities, towns, villages and rural areas will be bicycle friendly. Cycling will be a normal way to get about, especially for short trips". The aim of this framework is to encourage a culture of cycling to the extent that 10% of all trips will be completed by bicycle by 2020.

2.4 The National Cycle Policy Framework also sets out the objective of creating a national cycle network around Ireland and using disused railway lines and canal/river towpaths as cycling and walking routes to achieve this.

Regional Cycling Policy

Strategy for the Development of Irish Cycle Tourism 2007

2.5 This document highlights the need for renewing the popularity of cycling in Ireland and how tourism generated through this sector can increase visitor spending in rural and urban areas. Guidance is also given on the types of roads suitable for a national cycle network along with the provision for cycling facilities eg. signage.

Regional Planning Guidelines for the Greater Dublin Area: 2010-2022

2.6 This document provides the development strategy for the Dublin and Mid-East regions over the plan period. It emphasizes the role of the capital city in future economic growth of the region and the need to ensure it is an attractive, vibrant location for industry, commerce, recreation and tourism. Development in the GDA shall be directly related to investment in high quality public transport and focused on achieving a compact urban form.

2.7 The strategy considers that a minimum of 10% of all trips should be by bicycle by 2020. It emphasizes the integration of cycle routes and infrastructure into new development and communities as key component of the delivery of greener transport travel patterns. Programmes to support this objective and create a culture of cycling should be pursued as well as promoting the tourism benefits of improved cycle networks within the GDA.

Greater Dublin Area: Draft Transport Strategy 2011-2030

2.8 The National Transport Authority was set up in 2009 to develop greater use of sustainable modes of transport across the country. The Authority's Greater Dublin Area Draft Transportation Strategy 2011-2030 sets out a vision for *"a competitive, sustainable city-region with a good quality of life for all"*.

2.9 The five overarching objectives for the Strategy to support this vision are:

- Build and strengthen communities

- Improve economic competitiveness
- Improve the built environment
- Respect and sustain the natural environment
- Reduce personal stress

2.10 The plan provides the transport strategy for the Greater Dublin area to 2030. It highlights the need to integrate land use and transport planning in achieving a consolidated urban area supported by non-private vehicle movement. The environment for pedestrians and cyclists needs to be improved to encourage a much greater proportion of trips to be made on foot, by bicycle or public transport. Dublin is to become a recognized walking and cycling city-region with a street environment that is attractive, safe and pedestrian/cyclist orientated in design.

2.11 Section 9.5 of the Strategy proposes identified measures to encourage and increase the share of cycling journeys including new routes, networks and infrastructural provision. Measure WCY 13 specifically seeks the provision of the Royal Canal as a cycle track for commuter and leisure cyclists.

County Policy

Fingal County Development Plan 2011-2017

2.12 The core strategy of the plan is to consolidate new development along defined corridors in accordance with the identified settlement strategy. Integration of land use and transport infrastructure is a key objective in achieving sustainable development within the county. The plan seeks the development of a green infrastructure network across the county including the transport aspects of such assets.

2.13 The Development Plan sets out to promote and facilitate movement within and to the County through the integration of land use with a sustainable transport system. Priority is given to public transport, walking and cycling. There is a dedicated section in Chapter 4 of the Development Plan that deals with Cycling and Walking. The emphasis in the Development Plan is on the promotion and facilitation of sustainable forms of transport of which cycling is a key component. Objective TO10 seeks to Promote and incorporate the objectives contained within the Government's National Cycle Policy Framework 2009 – 2020.

2.14 Cycling is also promoted in the Development Plan as a significant form of leisure. Section 8.4 Rural Enterprise, Cycling and Walking, seeks to promote the development of cycling in rural areas as a form of recreation.

2.15 Specifically Objective RE37 highlights the county's aim to 'investigate the possibility of developing named linear cycle routes within Fingal utilising existing natural or human-made corridors such as riversides and abandoned road and rail infrastructure'.

2.16 The Development Plan features an Objective AH34 'Protect and enhance the built and natural heritage of the Royal Canal and ensure that development within its vicinity is sensitively designed and does not have a detrimental effect on the character of the Canal, its built elements and its natural heritage values'. The canal corridor also has a Specific Objective as a Designated Nature Conservation Area.

2.17 Figure 2.1 Overleaf is an extract from the Fingal County Development Plan showing the overall planning context in terms of land use zoning.

2.18 Chapter VIII of the County Development Plan aims to improve the amenity and recreational value of the Royal Canal without causing significant disturbance to the Canal's natural heritage.

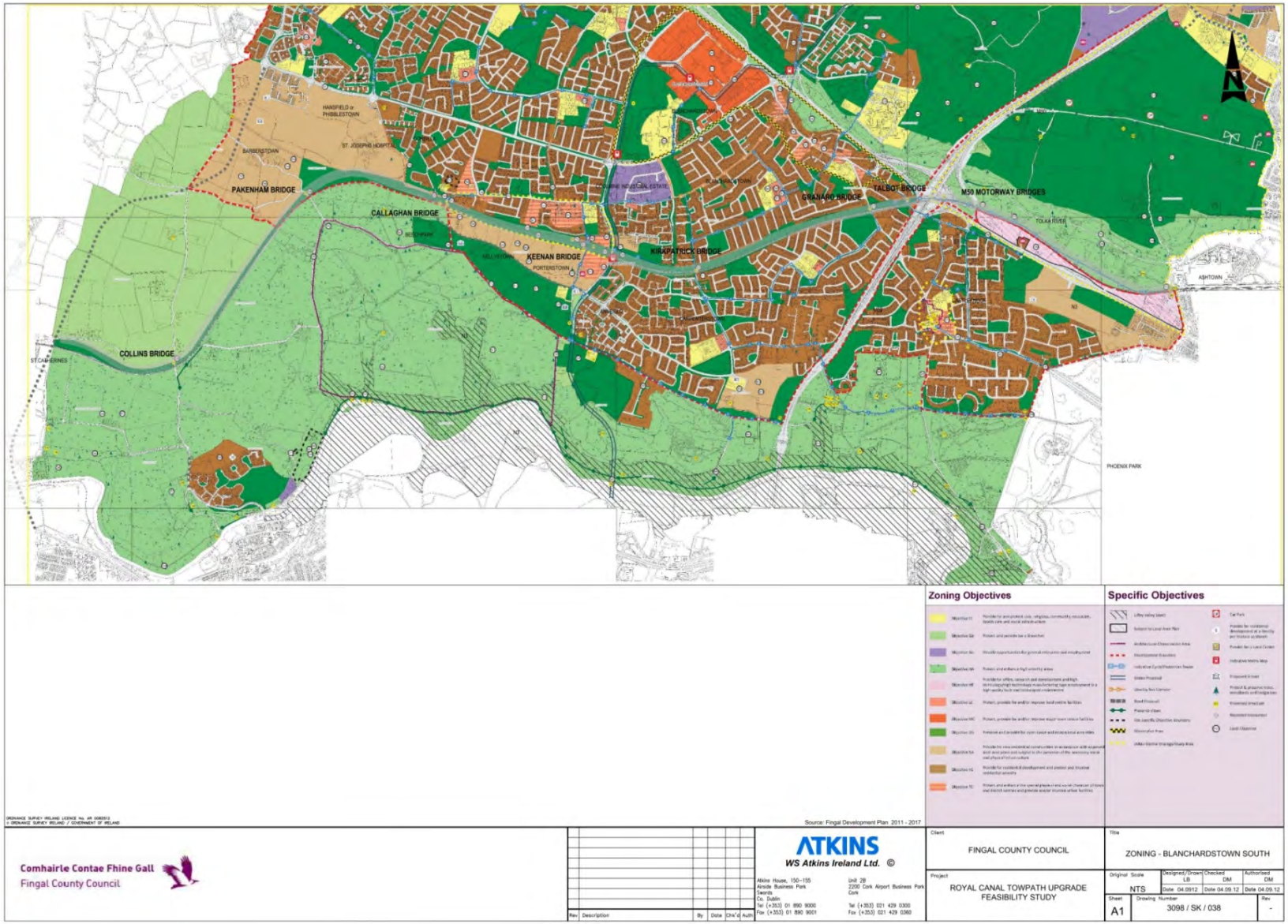


Figure 2.1 - Fingal County Development Plan, Land Use Zoning

Existing Studies

Royal Canal Planning and Development Strategy for Fingal 2008

2.19 The main objectives of the Planning and Development Strategy are to;

- Promote the royal canal as a site for education and enjoyment of the environment for all
- Support sustainable economic development that is compatible with the character of the royal canal
- Improve security and safety along the canal corridor
- Promote the royal canal as an recreational resource
- Establish a programme to implement and deliver the royal canal strategy

2.20 It is hoped that the above objectives will help achieve the vision that 'the royal canal will be a high quality, vibrant and attractive linear greenway recognised and protected as a recreational, historic and natural resource'.

Dublin City Canals – Recreational Tourism & Commercial Product Identification Study & Development of an Investment and Maintenance Framework July 2009

2.21 Scott Wilson were commissioned by Waterways Ireland with DCC, Failte Ireland and the Dublin Docklands Development Authority to undertake a recreational, tourism & commercial potential of the Dublin City Canals and associated docks within the Dublin City Council boundary. Through stakeholder consultation the following proposals for programmes were highlighted as helping achieve the overall vision of a healthier, wealthier, vibrant and attractive canal corridor;

- Canal corridor widening and parks integration programme
- Boundary enhancement and screening programme
- Canal Garden scheme
- Habitat and landscape enhancement programme
- Interpretation and signage programme
- Canal Arts and Culture programme
- Animation programme
- Pedestrian safety programme
- Canal wardening/ranger scheme

An Ecological Survey of the Grand & Royal Canals in Dublin 2011

2.22 This survey found that both canals supported a number of semi-natural habitats and important habitat corridors within a heavily urbanised area. The study also found only a few of the habitats were of high conservation importance in the broader sense but given their urbanised setting they were of great importance.

2.23 A number of protected species were noted, such as the otter and the opposite leaved pondweed and endangered species such as the snail *Myxas glutinosa* indicate the canals are of high value in maintaining biodiversity in the Dublin Area and beyond. It is believed that maintaining their populations in the canals in Dublin could be vital to their continued survival in Ireland.

2.24 Overall the report found 'the Grand and Royal Canal despite being man-made are now very important refuges for flora and fauna within Dublin and with careful management and protection can continue to provide amenity value to people while not compromising their value to nature conservation'.

Royal Canal Premium Cycle & Pedestrian Route 2011

2.25 A feasibility study for upgrading the existing Royal Canal towpath from Cross Guns Bridge (Westmoreland Bridge) to Reilly's Bridge (Ratoath Road Bridge) was carried out by Clifton Scannell Emerson Associates. This section of the canal is within the Dublin City Council area and would join two existing upgraded sections of the towpath.

2.26 Proposed future upgrading of this part of the canal (5th to 8th locks) includes the following;

- 3.5m wide shared pedestrian/cycle route kerbed on both sides
- Disabled access with ramps no steeper than 1:20
- Integrate new route with existing/proposed routes in locality
- New bridge & access at Shandon Park
- Public lighting
- CCTV system
- Security Fencing
- Landscape upgrade

2.27 Several constraints along the proposed route for the above upgrade were highlighted such as steep access points, anti-social behaviour, restricted head height for cycle access under bridges and protected species etc.

3. Stakeholder Consultation

Consultation

3.1 Consultation with all major stakeholders along the route including the general public took place as part of the feasibility study for the upgrade of the Royal Canal towpath. These consultations were undertaken between the 5th April 2012 to the 14th June 2012.

3.2 Given the environmental sensitivity of the canal corridor, it was agreed that individual meetings would be arranged with major stakeholders to effectively discuss and understand the major concerns and limitations on any feasible development options.

3.3 Other larger voluntary organisations with a vested interest in the conservation of the canal heritage and promoting the use of the canal were contacted and consultation meetings held.

3.4 Written submissions from smaller local interest groups and the general public would be invited via a public advertisement to be circulated in local newspapers and erected at selected entry points to the canal towpath within the study area.

3.5 A full summary of the stakeholder consultation process can be found in the Stakeholder Consultation Report (Atkins Document Reference: 3098DG008). A summary of the report is provided below.

Waterways Ireland

3.6 Meetings were held with Mr Mervyn Hamilton of Waterways Ireland on 5th April 2012 and 24th April 2012. Mr Hamilton noted that Waterways Ireland would be in favour of the project provided that the level or scale of development is consistent with the heritage character and cognisant of the environmental sensitivity of the existing canal corridor. Mr Hamilton also stated that conservation of the canal's heritage value is also a key concern of Waterways Ireland.

3.7 In developing the canal towpath, it would be of benefit to Waterways Ireland if the proposed path could be designed to accommodate existing Waterways Ireland maintenance machinery, including 20T wheeled excavators for effective dredging of the canal. However, it was agreed that smaller maintenance vehicles such as 4x4 jeeps or similar are accommodated as a minimum requirement and where feasible.

3.8 Further consultations were held with Ms Paula Treacy of Waterways Ireland's Environmental Department. Ms Treacy noted the environmental sensitivity of the canal corridor in general and its potential for protected species habitats. Specific information on the Royal Canal is available through the following publications:

- Ecological Survey of the Royal Canal Part 1 – 1990
- Ecological Survey of the Royal Canal Part 2 – 1990
- Fingal County Council Flora Report – 2004
- Fingal County Council Mammal Report – 2004
- The Royal Canal Architectural, Engineering and Industrial Heritage Assessment – 2007
- Survey of the Aquatic Mollusca of the Grand and Royal Canals – 2010
- Ecological Survey of the Grand and Royal Canals in Dublin – 2011 (From Ashtown to the M50)
- Various reports from Inland Fisheries Ireland

3.9 Following a site meeting with Dr Maurice Eakin of the National Parks and Wildlife Service (NPWS) (refer to paragraph 3.39), the options for widening the existing towpath into the canal water body was discussed with Mr Mervyn Hamilton. Mr Hamilton noted that Waterways Ireland tend not to agree to such measures but in this case, given the width of the canal channel, there was scope to consider such proposals as the net effect on the navigable channel would be negligible.

Irish Rail

3.10 Atkins met with Mr Nick West of Irish Rail on 1st May 2012. The consultation included a walk along the canal towpath between Ashtown Station (Longford Bridge) and Clonsilla Station (Callaghan Bridge).

3.11 Mr West's main concerns were as follows:

- Where the railway line borders the existing towpath (Longford Bridge to Kennan Bridge), security of the line with respect to trespassers. It was noted that there is a history of trespassing on the railway due to anti-social behaviour and underage drinking. Mr West noted that the existing fencing was lacking in some areas and that incidences of trespassing on the line would most likely increase should the towpath be developed.
- Through the area of the Deep Sinking, any future proposals to widen the towpath into the existing embankment would require careful consideration of the railway line above. Mr West requested that the channels of communication are maintained between the local authority and Irish Rail in this regard to ensure that all solutions can be considered at the earliest possible opportunity.
- Mr West noted Irish Rail's intent to close level crossings and provide alternative (and safer) routes to cross the railway. It was agreed that these proposals should be taken into account when developing design options for the feasibility study, where possible.

3.12 A further consultation with Mr West took place on 6th July 2012 at Pearse Station. At this meeting a number of options for the development of the towpath were presented to Mr West for comment. The options focussed on the difficult area of the Deep Sinking.

3.13 Mr West advised that Irish Rail would prefer if a cantilever boardwalk type option was adopted as it would have minimal impact on the adjacent embankment. Thereafter, where it is not feasible to avoid the embankment, a secant pile wall options is preferred followed by a king-post retaining system. Options which require large areas of excavation to be left open are least preferred.

3.14 At this second consultation, Mr West also suggested that the project seeks to improve the existing masonry retaining wall structures supporting the railway and provides for security fencing along the railway in the interest of deterring trespassers on the railway which is an ongoing safety concern for Irish Rail.

Fingal County Council – Conservation & Heritage

3.15 The development of the Royal Canal as a pedestrian and cyclist route is underpinned by the Fingal County Development Plan and by the Royal Canal Strategy (2008). To consult in relation to particular issues, a meeting with Mr Gerry Clabby, Fingal County Council Heritage Officer and Ms Helena Bergin, Fingal County Council Conservation Officer, was held on 12th June 2012.

3.16 Mr Clabby noted that any proposals should aim to retain the existing undeveloped character of the canal corridor as much as possible. Notwithstanding the above, it was also noted that there may need to be "trade-offs" between the level of development required and the existing natural environment at certain locations, e.g. at interfaces with existing roads where gradients will need to be amended to better accommodate the mobility impaired.

3.17 It was further noted that public lighting will be considered in the development of options for the Greenway. This is to ensure that the proposed route is an attractive option for the cyclist

commuter, especially during the winter months when the morning and evening commutes will most likely be in the hours of darkness. Mr Clabby advised that any such lighting system may have an adverse affect on bats which are a protected species under Irish legislation. However, it was considered that the lighting system could utilise modern auto-dimming technology, effectively turning the lights off during the night and early hours of the morning.

3.18 In terms of habitats, Mr Clabby noted that Fingal County Council has limited information and habitat mapping for the Royal Canal corridor and that this would be made available to the Consultant team. It is vital to the success of the project that habitats of protected species are known as early as possible so that appropriate measures can be taken and effective project planning maintained.

3.19 Ms Bergin advised that the entire canal should be carefully considered including the historic bridge structures. In this regard, works to the towpath and access points should be kept to the minimum required to achieve the project goals. It was also noted that where guidance for mobility impaired dictates that extensive works would be required; the project team are encouraged to enter into dialogue with the National Disability Authority to develop an acceptable compromise solution.

Inland Fisheries Ireland

3.20 Mr Paul McLoone of Inland Fisheries Ireland was consulted on 29th June 2012.

3.21 Mr McLoone noted that construction of a proposed cycle / pedestrian route would ideally leave a 1 - 2m marginal buffer along the canal bank. He also indicated that best practice should be used during any proposed construction process to ensure that disturbance of vegetation is minimised, special care is taken when working with deleterious materials (oils, fuels, wet concrete etc), and runoff is controlled to eliminate any risk of sedimentation of the waterbody.

3.22 With regard to angling activities, Mr McLoone indicated that parts of the canal are used by coarse anglers who sometimes use extended fishing poles (up to 12 m long). Mr McLoone indicated that there may be potential issues in some areas where the proposed facility may interfere with current angling practices.

Inland Waterways Association of Ireland

3.23 Mr Mick Kinahan of the Inland Waterways Association of Ireland (IWAI) was met on the 14th June 2012.

3.24 In general, Mr Kinahan noted that the IWAI was in favour of the project. He particularly welcomed the addition of amenity areas along the canal and would especially welcome additional jetties / marina facilities for boat users.

3.25 Mr Kinahan expressed a desire for the towpath to be opened up and the visibility between the canal and the towpath to be restored, especially in the area of the Deep Sinking where the canal banks are currently overgrown.

3.26 There was no objection to a possible public lighting system provided that it is habitat sensitive.

3.27 Mr Kinahan also noted the presence of protected species along the canal corridor, including Mandarin Duck and Kingfisher.

Royal Canal Amenity Group

3.28 Mr Noel Spaine of the Royal Canal Amenity Group (RCAG) was consulted on 14th May 2012.

3.29 Mr Spaine noted that the RCAG are 100% in favour of this project.

3.30 The RCAG had no objection to the potential 3.5m footpath / cycle track width.

3.31 While the difficulties in developing the towpath within the Deep Sinking area were acknowledged, Mr Spaine advised that he would still prefer to see a lesser path developed through this area rather than (or as well as) an alternative parallel route.

3.32 Areas at Hansfield and the 12th Lock were identified as potential amenity areas to facilitate boaters. A third area at the 11th Lock was also suggested, although this area has a history of frequent anti-social behaviour and is a known location where underage drinkers congregate.

3.33 Mr Spaine advised that the RCAG would also be providing a written submission in response to the public notice published in the local papers.

The Twelfth Lock Hotel / Castleknock Marina

3.34 Efforts to contact the reputed owner of the above premises were unsuccessful and consultations with the Twelfth Lock Hotel / Castleknock Marina were not possible.

National Parks and Wildlife Service

3.35 Department of the Arts, Heritage and the Gaeltacht (within which National Parks and Wildlife Service now resides) was consulted on 30th April 2012. Information on background ecological information regarding the Royal Canal corridor between Ashtown and Leixlip was requested.

3.36 It was noted that the canal is known to support consistent otter activity along its course although no formal information on this is currently available.

3.37 The woodland areas along the canal route are of an obvious value to bats. No detailed information on the existence of bat roosts is currently available.

3.38 The canal banks and margins support pockets of semi-natural grassland some of which are orchid rich.

3.39 A further consultation was held with Dr Maurice Eakin of the National Parks and Wildlife Service on 22nd August 2012. This consultation included a site walkover through the Deep Sinking area.

3.40 Dr Eakin was concerned about the potential removal of an approximate 200m stretch of riparian margin species. This stretch occurs at the pinch point between the railway retaining wall and the canal bank, located approximately 400m west of Castleknock Station. Potential solutions to maximise the retention of the riparian zone were discussed at length for inclusion in the study process.

3.41 Dry grassland supporting species of high importance was identified within the area of the Deep Sinking. The options for upgrading the towpath within this particular area were discussed. It was considered that option of the retaining wall along the length of the Deep Sinking could potentially have a major negative impact on such species. The cantilever option was favoured due to the minimal impact on the dry grassland and on the riparian margins at the water's edge below.

3.42 There were no issues anticipated with the proposed scheme either side of the Deep Sinking area. It was deemed unnecessary to extend the site visit to these areas.

3.43 With respect to the provision of public lighting along the route, Dr Eakin suggested that best practice, as provided on the recent Grand Canal route, should be followed. The Grand Canal route used various mitigation measures to minimise the impact on bats. Baffles and short column heights were included in the design to effectively limit the level of light spill onto the waterbody. A dimming system was also introduced so that lighting could be automatically dimmed or switched off during the hours of dawn and dusk, when bats are feeding and most active.

3.44 It was noted that the issue of bats and proposed lighting was only prevalent in the summer months as bats hibernate for the winter.

3.45 Otters are known to be active along the canal corridor and are a protected species. The proposed construction activities are unlikely to adversely affect any existing otter habitats. However, a detailed habitat survey for protected species would need to be carried out.

Dublin Fire Brigade

3.46 A consultation meeting was held with Dublin Fire Brigade on 10th August 2012 to discuss issues relating to the emergency response services.

3.47 Currently, emergency access to the canal is via existing adjacent properties and gardens. It was considered that any improvement in access would be very beneficial to the emergency services. Access for a fully loaded ambulance of approximate fully laden vehicle weight of 4.5 tonnes would be ideal. However, where such provision would be unfeasible, access for a standard vehicle such as a standard car or a 4x4 jeep would be sufficient.

3.48 It was also noted that the provision of location markers would be of great benefit. Such measures would allow a member of the public to pin point their location in the event of a call to the emergency services. Markers could be provided on lighting columns or life buoys, where present.

3.49 It was noted that some form of vehicle prohibition would be provided to ensure that unauthorised vehicles did not have access to the canal towpath. This would most likely be in the form of removable gates or bollards which would permit the occasional use by maintenance personnel and vehicles. While fire tenders do carry keys for local authority controlled facilities, any locks provided on removable bollards or gates must be accessible to bolt cutters to allow quick access in the event of an emergency.

3.50 In terms of access to the canal itself, the provision of the pedestrian guardrail throughout the area of the Deep Sinking would make access to/from the water difficult. It was discussed that some form of access point would be preferable where either an access hatch or ladder attachment could be incorporated into the design of the guardrail. For the cantilevered boardwalk option, this ideally would also include an emergency hatch in the “floor” where the difficulties of the boardwalk overhang could be eliminated.

3.51 Dublin Fire Brigade requested that ongoing consultations are carried out as the project progresses.

General Public & Local Interest Groups

3.52 It was decided the most appropriate method of seeking public engagement would be to put a public notice in local newspapers inviting observations and suggestions from the public.

3.53 A total of 24 (twenty-four) submissions were received from the public before the stated deadline of 27th May 2012. There was broad support for the use of the canal towpath as a pedestrian / cyclist route and its potential as a public amenity.

3.54 The main points of concern were as follows:

- Loss of rural character/environmental sensitivity
- Antisocial behaviour/rubbish
- Access
- Provision of signage & amenities
- Phasing of works
- Integration with local community
- Safety of users and local residents

3.55 It is recommended from the stakeholder consultation the following points are taken into account for the feasibility study:

- Consider the safety and antisocial behavioural security aspect of the canal towpath and how the provision of public lighting and/or remote CCTV monitoring might alleviate the problem.
- Provide adequate facilities to cater for all members of the public, including a carefully measured and balanced approach to maintaining the rural character of the canal corridor and protecting its environment and heritage.
- Provide a balance of amenities to promote the recreational aspect of the canal.
- Seek to create safe and unhindered access to the canal towpath through improvement of existing access points and provision of additional direct links to adjacent residential areas.
- Seek to protect and enhance the structural heritage of the canal, i.e. the existing canal bridges and the canal channel.
- Provide signage to communicate distances to key destinations along the canal corridor.
- Erect information plaques at various locations giving a brief history of the canal and its heritage.
- Consider where measures to assist in the reduction of littering and fly tipping can be incorporated into the development of scheme options.

4. Constraints

Constraints General

4.1 A constraints study was carried out comprising of a desktop study and review of existing literature and reports, and various site walkovers conducted by environmental, ecological and engineering consultants in April 2012.

4.2 The identified constraints were listed and discussed to form the Constraints Map provided at Figure 4.1 at the end of this chapter. These constraints are provided in detail below. The engineering constraints are followed by the environmental constraints and are described as travelling westwards from Longford Bridge / Ashtown Road.

Engineering Constraints

Area 1: Longford Bridge (Ashtown Road) to Granard Bridge (Castleknock Road)

4.3 **Longford Bridge:** Linkage between the recently completed upgrade of the towpath east of Longford Bridge at Rathbourne and the proposed Greenway will need to be addressed to ensure continuity of the facility. The towpath approaches from the east on the northern bank of the canal and switches to the southern bank at Longford Bridge. There is an existing footbridge crossing the canal immediately east of Longford Bridge which provides a safe pedestrian route to the adjacent Ashtown Railway Station. This existing footbridge measures 2.2m in width.

4.4 The road width across Longford Bridge is narrow at 6.3m; there are no footpaths present and there are no formal crossing facilities at the entrance to the canal towpaths. The road is heavily trafficked although traffic speeds are low due to the constrained alignment across the bridge and adjacent level crossing which is manually operated.

4.5 **10th Lock:** On entering the canal towpath at Longford Bridge, the path passes between the lower chamber of the 10th Lock and the adjacent private dwelling with a maximum available width of 3.0m.

4.6 Thereafter, the towpath passes the upper chamber of the lock and continues westwards along the southern bank of the canal. The towpath width at this point is approximately 3.2m with potential to widen to 3.5m towards to lock wall.

4.7 The gradients of the towpath through the lock are approximately 7% (1:14) which would not be in accordance with current recommendations for 5% or 1:20.

4.8 **10th Lock to 11th Lock:** The width of the existing towpath along this section varies from 2.4m to 2.8m in width. It is bordered with a 0.6m buffer on the canal bank side and a grass verge of varying width on the railway side. There is good potential to widen to 3.5m along this stretch of the canal; the most constrained area being between the Navan Road Parkway Station and the 11th Lock, where the existing (minimum) 1.8m verge increases in height by approximately 1.0m as it approaches the railway boundary at its narrowest point.

4.9 **11th Lock:** The path through the 11th Lock is currently 2.8m wide and there is potential to achieve the desired 3.5m. However, the longitudinal gradient would need to be checked for compliance with current accessibility requirements.

4.10 **11th Lock to Talbot Bridge:** There is potential to achieve the desired width of 3.5 m along this section of the towpath, although the gradients at Ranelagh Bridge will need to be assessed in detail to achieve acceptable accessibility limits.

4.11 Thereafter, moving westwards along the canal, there is a pinch point in the towpath width across the M50 Aqueduct where the current footpath provision in terms of available width is reduced to 2.2m.

4.12 The approach to Talbot Bridge is sufficiently wide and there is scope for potential widening of the towpath to achieve the required 3.5m. On the immediate approach to the bridge, the towpath rises to meet the existing road level on Talbot Court above. The gradient on this section of the path is currently 1:10

4.13 **Talbot Bridge:** the Old Navan Road is a quiet vehicular cul-de-sac which consists of the entrance to the 12th Lock Hotel carpark and a small number of private dwellings. Traffic volumes across the bridge are correspondingly low. At the end of the cul-de-sac, there is access to an existing pedestrian and cyclist bridge route over the M50 motorway to continue along the Old Navan Road to the city.

4.14 There are currently no formal pedestrian crossing facilities at Talbot Bridge.

4.15 **Talbot Bridge to Granard Bridge:** A towpath is provided along both banks of the canal over this short section.

4.16 Access to the southern bank is via a series of shallow steps at Talbot Bridge or via the privately owned car parking area of the 12th Lock Hotel. The existing path is surfaced in tarmac and is approximately 2.0m wide. Passing the hotel and 12th lock, the potential for widening is limited to circa 2.5m due to the retaining wall and service entrance to the adjacent hotel on the south and the 12th lock structure on the north.

4.17 Further west and past the hotel, there is an open grassed area between the existing towpath and the railway with minimal constraint in widening to the desired 3.5m. The approach to Granard Bridge and access to Castleknock Road above is via existing concrete steps. However, there is evidence that the adjacent grassed area is commonly used by both pedestrians and cyclists to access the towpath despite the existing steep gradient of approximately 1:10.

4.18 Access to the northern bank is via an existing access lane which is 3.0m wide and includes a steep gradient of 1:10 to reach the upper level of the adjacent canal lock. Any increase in width would be difficult due to the retaining walls on both sides which form the boundary with the 12th lock to the south and the private grounds of the Talbot Mill residential development to the north.

4.19 Heading westwards past the 12th lock, the existing path meanders into open parkland and emerges onto Castleknock Road immediately north of Granard Bridge. The desired 3.5m width can be achieved in this area with minimal work required.

4.20 **Granard Bridge:** Granard Bridge carries the Castleknock Road which is the main thoroughfare between Blanchardstown and Castleknock Villages. It is a busy road with heavy traffic volumes especially during peak hours. The immediate location is comprised of numerous residential developments and the Castleknock Railway Station is located immediately west of the bridge. Adjacent junctions accessing these residential areas are signalised and controlled under the Dublin City Council SCATS system.

4.21 The towpath along the canal passes under the bridge. The path width under the bridge is approximately 2.0m and vertical clearance is considerably less than the 2.3m required for cyclists. Notwithstanding this, there is a pinch point along the route of 0.95m where the towpath rejoins the railway access ramp from Castleknock Road.

4.22 Continuity of the towpath route would therefore require users to cross Castleknock Road at Talbot Bridge. Visibility of oncoming traffic is poor and there is currently no formal crossing facility at the entrance to the canal towpath. Existing footpath provision across Granard Bridge is also poor with a minimum width currently at 0.7m.

Area 2: Granard Bridge (Castleknock Road) to Callaghan Bridge (Clonsilla Road) – "The Deep Sinking"

4.23 **Granard Bridge to Kirkpatrick Bridge:** Castleknock Railway Station is located immediately west of Granard Bridge. Access to the station is provided from Castleknock Road via a purpose built ramp which was constructed at a gradient of 1:10. Thereafter, the towpath continues to the west,

past the station on a less formal grass path. A narrow muddy trail indicates the most trafficked areas of the towpath. The grassed area is of sufficient width to accommodate a 3.5m wide shared facility. Existing signage along this section of the towpath informs users that they are entering the Deep Sinking.

4.24 Approximately 400m west of Castleknock Station, the railway passes extremely close to the existing towpath creating a pinch point. The railway level is approximately 1.5m above the towpath level and is supported by a masonry retaining wall structure. This structure is in a poor state of repair. The total towpath width through this pinch point is typically 1.5 – 1.7m. Further west level difference between the towpath surface and the canal water level gradually increases as one enters the Deep Sinking. This level difference is at circa 1.0m at this pinch point.

4.25 Continuing westwards, the lateral clearance to the railway increases to a typical value of 10m before decreasing again in the vicinity of Coolmine Station. The towpath width is typically 2.0m through this section with a circa 5.0m high embankment dividing it from the railway. The existing towpath is located within the area of influence of the railway line. At this point in the Deep Sinking, the canal waters are approximately 5.0m below the towpath level, with a steep canal bank consisting of rock outcrops and overgrown vegetation and trees which, due to the limited access, prevents maintenance from being carried out on the canal towpath and banks.

4.26 The approach to Kirkpatrick Bridge is both narrow and steep as it emerges onto Coolmine Road. The adjacent access to the inbound platform at Coolmine Station also merges with the towpath at Coolmine Road. At this point, a pedestrian bridge providing safe linkage between Coolmine Station and the existing residential area to the north of the canal meets the towpath and access to Coolmine Station. The southern abutment of this bridge creates a pinch point on the towpath, limiting its width to approximately 1.6m.

4.27 **Kirkpatrick Bridge** carries Coolmine Road across the canal. An automatic level crossing is located immediately south of the bridge. The existing carriageway width across the bridge is approximately 6.3m and there are no footpaths provided for pedestrians. On emerging from the canal towpath pedestrians have good visibility of oncoming traffic, primarily due to the low height of the bridge parapet walls. The carpark serving the railway station is located immediately south of the level crossing.

4.28 Coolmine Road is a local distributor road serving local residential developments in the Coolmine and Carpenterstown areas. It is therefore especially busy with traffic at peak times.

4.29 **Kirkpatrick Bridge to Kennan Bridge:** The towpath west of Kirkpatrick Bridge consists of a typically 2.5m wide path, with protection provided from the deep canal channel by means of a timber post and rail fence erected at the top of the canal bank. The initial 30m of the path is located on a gradient of 1:11.

4.30 In general, this section of the towpath is typical of the Deep Sinking where a narrow towpath width is provided with steep embankments. The width of the path through this section is typically 2.0 to 2.5m with the adjacent embankments falling within the railway's zone of influence.

4.31 Thereafter, the railway and canal towpath tend to merge to create a local 1.9m wide pinch point on the towpath for a length of approximately 50m. A retaining wall is provided between the towpath and the railway, which is covered with overgrown vegetation.

4.32 Further west, the distance between the railway and towpath increases and a drainage ditch is provided in this area. The ditch is approximately 1.6m deep. This provides a causeway effect with the narrow 2.0m towpath bounded on both sides with a deep cutting. The drainage ditch outfalls to the canal waters via an existing culvert under the towpath. The structural integrity of this culvert is unknown.

4.33 In the vicinity of Kennan Bridge, the towpath rises to meet Porterstown Road. Similar to the approaches at Kirkpatrick Bridge, the path is approximately 1.5m and the gradient 1:12.

Waterways Ireland has carried out some minor maintenance of the towpath in this area, including clearance of vegetation and localised widening of the entrances to the towpath.

4.34 **Kennan Bridge:** The carriageway across Kennan Bridge is narrow at just 3.7m. Horizontal alignment is poor and the bridge is a hazardous location for motorists given the poor forward visibility, narrow carriageway and the automatic level crossing located immediately south of the bridge. The towpath also switches from the southern bank to the northern bank of the canal at this point, requiring users to use the bridge to cross the canal. There are no footpaths provided.

4.35 Despite the number of existing and planned schools on Porterstown Road, traffic levels are low primarily due to the fact that Diswellstown Road/Bridge is now open to traffic and provides a better link to communities across the canal. Diswellstown Road provides an important link between the commercial and retail centres in Blanchardstown, the surrounding residential communities and major trunk roads via the N3 dual carriageway.

4.36 It should also be noted that Diswellstown Road and bridge crossing the Royal Canal and the railway provides the link between Clonsilla Road and Luttrelstown Road and are intended to replace the level crossing at Porterstown Road. The closure of this level crossing will effectively eliminate motorised traffic from using Kennan Bridge. However, there is no fixed date as to when this will occur. Hence, the closure of the level crossing has been ignored for the purposes of this study.

4.37 **Kennan Bridge to Callaghan Bridge:** While still within the Deep Sinking, the existing towpath along this section is typically 3.0m wide. The level difference between the towpath and the canal is approximately 3.0m, gradually reducing on approach to Callaghan Bridge at Clonsilla. Waterways Ireland recently carried out extensive works to clear overgrown vegetation and widen the towpath to achieve the typical width of 3.0m.

4.38 The northern boundary of the towpath consists of a minor earthwork embankment of varying height, typically varying from 1.0 to 2.2m. Approaching Callaghan Bridge, a number of private residential gardens form the boundary with the towpath. The existing width at this location is typically 5.0m minimum.

4.39 **Callaghan Bridge:** There is currently no direct access to street level at Callaghan Bridge. Pedestrians are required to proceed under the bridge and reach the street level via concrete steps provided some 75m to the west of the bridge. The path under the bridge is limited in width to 1.8m at its minimum, thus creating a pinch point.

4.40 Clonsilla Station is located adjacent to the bridge and access to the station is provided by means of a pedestrian bridge linking directly from Clonsilla Road to the inbound platform.

4.41 Callaghan Bridge carries Clonsilla Road over the canal. The total available width of 6.5m is used for traffic lanes and there are no footpaths provided.

4.42 Immediately south of the bridge is a partially automated level crossing. Immediately north of the bridge, traffic signals have been installed recently to increase the capacity of the junction and enhance user safety. It is proposed to link these signals to the level crossing in the near future.

Area 3: Callaghan Bridge (Clonsilla Road) to Fingal County Boundary (Confey)

4.43 **Callaghan Bridge to Pakenham Bridge:** Heading west from Callaghan Bridge, the canal emerges from the Deep Sinking. Initially, there is a section of the existing towpath which has been recently surfaced and widened to approximately 3.0m. A maintenance access is provided at the end of the improved section, which is approximately 350m west of Callaghan Bridge.

4.44 Further west and towards the railway over bridge, the towpath resembles an informal track on a grass bank. The available width is 3.0 to 3.5m typical. However, the northern abutment of the

Clonsilla SW watermain pipe-bridge represents a significant pinch point, where the available width is reduced to 2.5m.

4.45 Where the Dunboyne spur line of the railway crosses the canal, a pedestrian underpass has been provided. The internal width and height of this underpass exceed 4.0m and 2.3m respectively. Therefore, the underpass is suitable for a shared cycle / pedestrian track.

4.46 Between the railway overbridge and Pakenham Bridge, the canal bank widens to form a two-tiered towpath. The upper and lower tiers are generous in terms of their available widths, measuring approximately 12m in total available width.

4.47 To access the road at Pakenham Bridge, the towpath rises at a gradient of 1:17. The available width at this location is in excess of 10m.

4.48 **Pakenham Bridge:** This bridge is located on the Barberstown Road which connects westwards to the Lucan Barnhill Road (R149). The alignment of the road is poor both horizontally and vertically and visibility is compromised as a result. There are no footpaths provided in the vicinity.

4.49 The railway also crosses this road at an automatic level crossing located approximately 30m south of the canal. There are two private entrances located within this 30m.

4.50 The towpath splits at Pakenham Bridge and provides an option to proceed under the bridge, although the footpath width is limited to 2.0m minimum and headroom is restricted, making it unsuitable for cyclists.

4.51 An important fibre optic network known as Dublin's T-50 network crosses the canal within the deck of Pakenham Bridge. This consists of a large number of ducts carrying high speed data cables and links Dublin business parks with existing sub marine data cables to Europe and the United States. A branch of the T-50 network uses the canal corridor to link with Leixlip and a number of ducts are therefore present along the towpath westwards from Pakenham Bridge. The exact location, depth and number of ducts are unknown but would be unlikely to present any impact on the proposed upgrade works.

4.52 **Pakenham Bridge to Collins Bridge:** Immediately west of Pakenham Bridge, the towpath descends to meet the canal bank at a gradient of 1:15 and continues towards Collins Bridge. The towpath throughout this section is wide and free of obstacles. However, there are numerous fishing stands visible along the canal bank which are used occasionally for angling competitions.

4.53 The approach to Collins bridge is typical in that an approximate gradient of 1:10 is provided to access the road level above.

4.54 **Collins Bridge:** similar to Pakenham Bridge, Collins Bridge is distinctively rural in character, although traffic levels are notably higher on the R149 which links Clonee/Dunboyne to Lucan. The existing carriageway is circa 5.4m wide. The horizontal and vertical alignments are poor and typical of a rural "hump-back" bridge. Forward visibility for motorists is poor and where the towpath emerges onto the road, visibility of oncoming traffic is particularly poor. There are no footpaths across the bridge although a footpath is provided towards Lucan village, commencing approximately 20m beyond the adjacent railway bridge.

4.55 The towpath splits at Collins Bridge to offer an alternative route under the bridge although due to insufficient width and headroom, this would be unsuitable for cyclists.

4.56 **Collins Bridge to Fingal County Boundary:** The final section of the route descends to the canal bank on a gradient of 1:9. The towpath width remains favourable throughout this section, with a pinch point evident at the back of private gardens on the approach to the county boundary. The available width at this pinch point is approximately 3.5 to 4.0m. However, there is an existing drainage ditch along the back of the towpath at this location which is approximately 2.0m deep. The safety implication of this would need to be carefully considered for the end user of the upgraded towpath.

4.57 The route will finish close to the premises of the Royal Canal Amenity Group where access to the adjacent public road is achievable.

Environmental Constraints

Designations

4.58 The Royal Canal is a protected area of national importance. It is designated as a proposed Natural Heritage Area (pNHA) and a Water Framework Directive Register of Protected Areas site (WFDRPA)

Proposed Natural Heritage Areas (pNHA)

4.59 Under the Wildlife (Amendment) Act, 2000 Natural Heritage Areas (NHAs) are being designated to conserve species and habitats of national importance.

4.60 Under the Wildlife Amendment Act, 2000 the entire Royal Canal is formally designated a proposed Natural Heritage Area (pNHA) under site code 002103. The Royal Canal pNHA is defined by the National Parks and Wildlife Service (NPWS) to include the central channel and adjoining banks, hedgerows, towpath, grassland, open water, related scrub and woodland features. The pNHA designation indicates that the site has a B rating and is of national importance. According to the report accompanying the pNHA designation, the ecological value of the canal lies in the diversity of species along its linear habitats.

Biodiversity

4.61 The conservation of biodiversity in Ireland is a legislative imperative. Many species of national and international importance have been identified within the Royal Canal corridor. In particular, within Fingal, species identified have included the Otter (Lutra lutra), bats and the Kingfisher (Alcedo atthis). Under the Wildlife Acts (1976-2000) it is illegal to disturb of harm Protected Species and their habitats.

4.62 FCC is the appropriate planning authority for any changes which affect the Royal Canal. FCC will normally only grant permission where it is clearly demonstrated that a proposal will have no significant adverse impact on the habitats and species of interest in the designated area and its ecological integrity.

Register of Protected Areas under the Water Framework Directive

4.63 In accordance with the requirements of the Water Framework Directive and the associated national regulations, the Environment and Heritage Service (EHS) and the Environmental Protection Agency have compiled Registers of Protected Areas. Under this legislation, EHS and EPA are further required to maintain and update the register as needed.

4.64 The protected areas are identified as those requiring special protection under existing national or European legislation, either to protect their surface water or groundwater, or to conserve habitats or species that directly depend on those waters.

4.65 The register consists of an inventory of protected area sites representing the protected area categories outlined below:

- Waters used for the abstraction of drinking water;
- Areas designated to protect economically significant aquatic species;
- Recreational Waters;
- Nutrient Sensitive Areas; and
- Areas designated for the protection of habitats or species.

4.66 The Royal canal is a protected areas designated for the protection of habitats or species' category. These are areas designated for the protection of habitats or species where the

maintenance or improvement of the status of water is an important factor in their protection. These are designated under the Birds Directive (79/409/EEC) and the Habitats Directive (92/43/EEC).

Landscape Character Types and Values

4.67 The Landscape Character Assessment for Fingal as reported in chapter 5 of the Fingal County Development Plan divides the County into 6 Landscape Character Types. Each landscape type is given a value through the consideration of such elements as aesthetics, ecology, historical, cultural, religious or mythological.

4.68 A value can range from low to exceptional. The Landscape Character Types are:

- Rolling Hills Character Type;
- High Lying Character Type;
- Low Lying Character Type;
- Estuary Character Type;
- Coastal Character Type; and
- River Valleys and Canal Character Type.

River Valleys and Canal Character Type

4.69 The Royal Canal corridor is included in the River Valleys and Canal Character Type zone. The canal and its corridors provide valuable habitat for fish and other species. The canal itself and the many bridges and other structures associated with it are an integral part of the County's architectural heritage.

4.70 The Character Type is categorised as having a high value, due to the visual and recreation qualities contained therein. This is evident by virtue of the High Amenity zoning and Special Amenity Area designation in the area in addition to the dense tree belts and steep river valley slopes. The river valleys and the canal are also important for their ecology and biodiversity.

Landscape character types – sensitivity

4.71 Where a wide range of developments would sit comfortably in a particular landscape and would not interfere with a character or interfere or eliminate a value, such a landscape is deemed to be of low to medium sensitivity. On the other hand, where any proposed development would seriously damage a character or eliminate or seriously damage an irreplaceable value, such a landscape would be considered to be highly sensitive.

Highly sensitive character types

4.72 The following four character types are identified, in general, as having a high sensitivity to development:

- High Lying Character Type
- Estuary Character Type
- Coastal Character Type
- River Valleys & Canal Character Type

4.73 There are areas contained within these four character types which are identified in the County Development Plan as highly sensitive areas, these areas have a low capacity to absorb new development without damage resulting to the very characteristics that make them attractive such as nature conservation or scenic qualities.

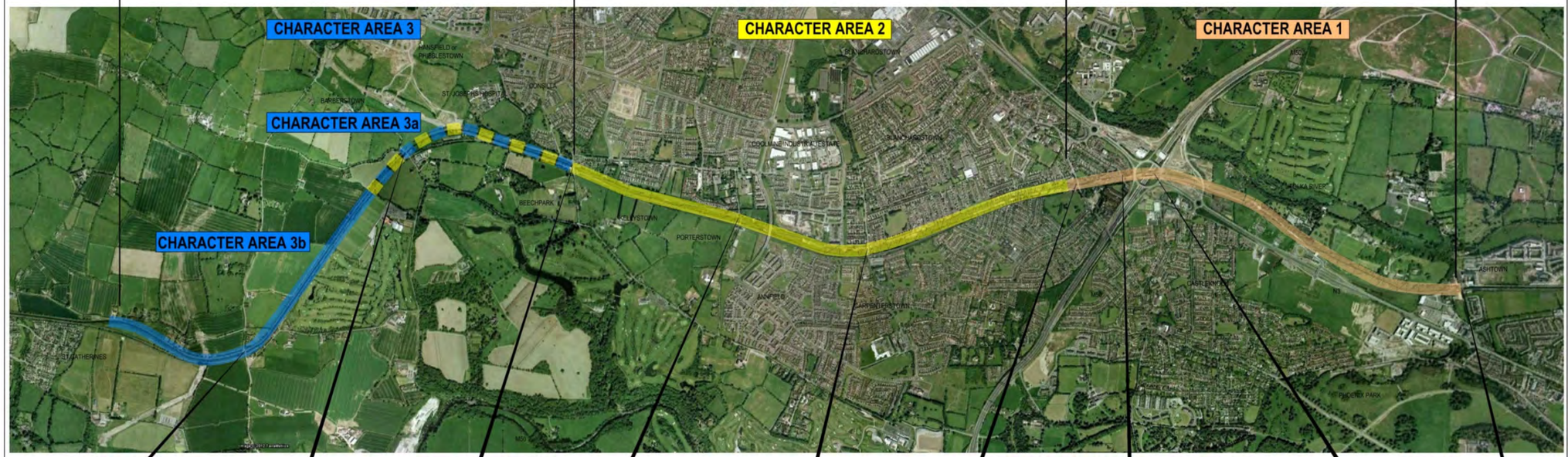
Character area 3 - Callaghan Bridge to Collins Bridge at St. Catherine's
Links with adjacent land: Intermittent views through hedgerow of adjacent flat countryside and scattered dwellings
Gradients: Generally flat rough tracks, no constructed footpaths
Biodiversity in canal corridor: Proposed greenway footprint comprises amenity grassland flanked by mature hedgerows and treelines of low to moderate ecological importance.

Note: Area 3a will be subject to development of adjacent zoned lands

Character area 2 - Granard Bridge to Callaghan Bridge in Porterstown
Links with adjacent land: Enclosed wooded canal corridor including the Deep Sinking area, glimpse views out of corridor only
Gradients: Narrow steep rough tracks, no constructed footpaths
Biodiversity in canal corridor: Both sides of the canal support linear mixed broadleaved woodland and scrub areas with the northern bank supporting more continuous and extensive woodland / scrub areas. Footprint of proposed greenway comprised of semi-natural / rough grassland and bare ground bordered by treelines and pockets of scrub. This section of the canal corridor is of moderate to high local importance and may be of particular importance to species such as bats, badger and passerine birds.

Character area 1 - Ashtown to Granard Bridge /Lock11
Links with adjacent land: Views to adjacent canal corridor with open views to urban development and major infrastructure on both sides of canal
Gradients: Generally flat constructed footpaths
Biodiversity in canal corridor: Proposed greenway footprint comprises amenity grassland and bare ground - habitats of low ecological value. Fringing wet grassland and marsh habitats near Phoenix Park railway station and mature mixed broadleaved woodland on the canal's northern bank represent habitats that are of moderate to high local importance.

N

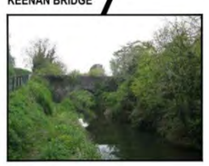


COLLINS BRIDGE

PAKENHAM BRIDGE

CALLAGHAN BRIDGE

KEENAN BRIDGE



KIRKPATRICK BRIDGE

GRANARD BRIDGE

TALBOT BRIDGE

M50 MOTORWAY BRIDGES

ASHTOWN

Comhairle Contae Fhine Gall
Fingal County Council

Rev	Description	By	Date	Chk'd	Auth
C	Landscape Character Area 3a & b revised	LB	29.08.12	DM	DM
B	Landscape Character Area 3 revised	LB	01.08.12	DM	DM
A	Landscape Character Areas 2 & 3 revised	LB	07.12	BOC	BOC

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Client: FINGAL COUNTY COUNCIL
Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY
Title: LANDSCAPE CHARACTER AREAS

Original Scale	Designed/Drawn	Checked	Authorised
NTS	LB Date 18.06.12	BOC Date 19.06.12	BOC Date 19.06.12

Sheet: A1
Drawing Number: 3098 / SK / 020
Rev: C

Figure 4.1 - Existing Layout

4.74 The Royal Canal Corridor is included in the River Valleys and Canal Character Type. The Canal has particular qualities, including steep banks and mature woodland, which makes it particularly sensitive to development.

4.75 The principles for development as detailed in the Fingal County Development Plan which relate to the Royal Canal are:

- Skylines, horizon and ridgelines should be protected from development;
- Field and roadside hedgerows should be retained. Proposals necessitating the removal of extensive field and roadside hedgerows should not be permitted;
- The retention and active management of trees and woodland blocks should be promoted;
- The use of trees and woodlands to contain new development should be encouraged. Strong planting schemes using native species, to integrate development into these sensitive landscapes, will be required. New planting needs to be carefully located and selected outside urban areas, the major river corridors should be protected and improved by leaving a minimum 30 metre wide margin, on each side of these rivers, undeveloped and encouraging planting where appropriate, to enhance the landscape and habitat value of these corridors (see Objective BD24, Section on Ecological Corridors and Stepping Stones); and
- Estuary margins and any hedgerows along the margins must not be disturbed

Architectural / Heritage

4.76 The six bridges listed below over the Royal Canal are included within the Record of Protected Structures included within Appendix 3 of the Fingal County Development Plan 2011-2017:

- Longford Bridge (RPS No. 693), Stone single-arched bridge over Royal Canal at Ashtown Road Railway Station;
- Ranelagh Bridge, (RPS No. 694), Stone arched bridge over Royal Canal.
- Talbot Bridge (RPS No. 695), Stone arched bridge over Royal Canal. Also known as Old Bridge;
- Granard Bridge (RPS No. 696), Stone arched bridge over Royal Canal;
- Kirkpatrick Bridge (RPS No. 697), Stone arched bridge over Royal Canal;
- Kennan Bridge (RPS No. 698), Bridge over Royal Canal;
- Callaghan Bridge (RPS No. 701), Bridge over Royal Canal.
- Pakenham Bridge (RPS No. 711), Stone single arched road bridge over the Royal Canal at Barberstown railway crossing; and
- Collins Bridge (RPS No. 693), Bridge over Royal Canal.

4.77 As such it will be important in this study to note that the land in the immediate environs of the bridge is also protected and needs consultation with Development Application Unit of Department of the Arts, Heritage and the Gaeltacht (DAHG) to agree any alterations required as part of the canal improvements.

Further Studies Required

4.78 Further environmental studies will be required to identify the exact location of sensitive habitats and species along the Royal Canal to inform the preliminary design process of the Tow Path upgrade. Thereafter the effects of the proposed Tow Path upgrade on the sensitive environments can be assessed, and mitigation agreed in association with the key environmental stakeholders i.e. Waterways Ireland, Fingal County Council (Conservation & Heritage Sections), Inland

Fisheries Ireland, Inland Waterways Association of Ireland, Development Application Unit of Department of the Arts, Heritage and the Gaeltacht (DAHG) for Cultural Heritage and Department of the Arts, Heritage and the Gaeltacht (within which National Parks and Wildlife Service now resides) for aspects of nature conservation.

4.79 It is noted that detailed ecological information is currently available between the 10th lock at Ashtown and the 12th lock at Castleknock and this should provide a basis for determining if an EIA is required for any future upgrading works to this easterly section.

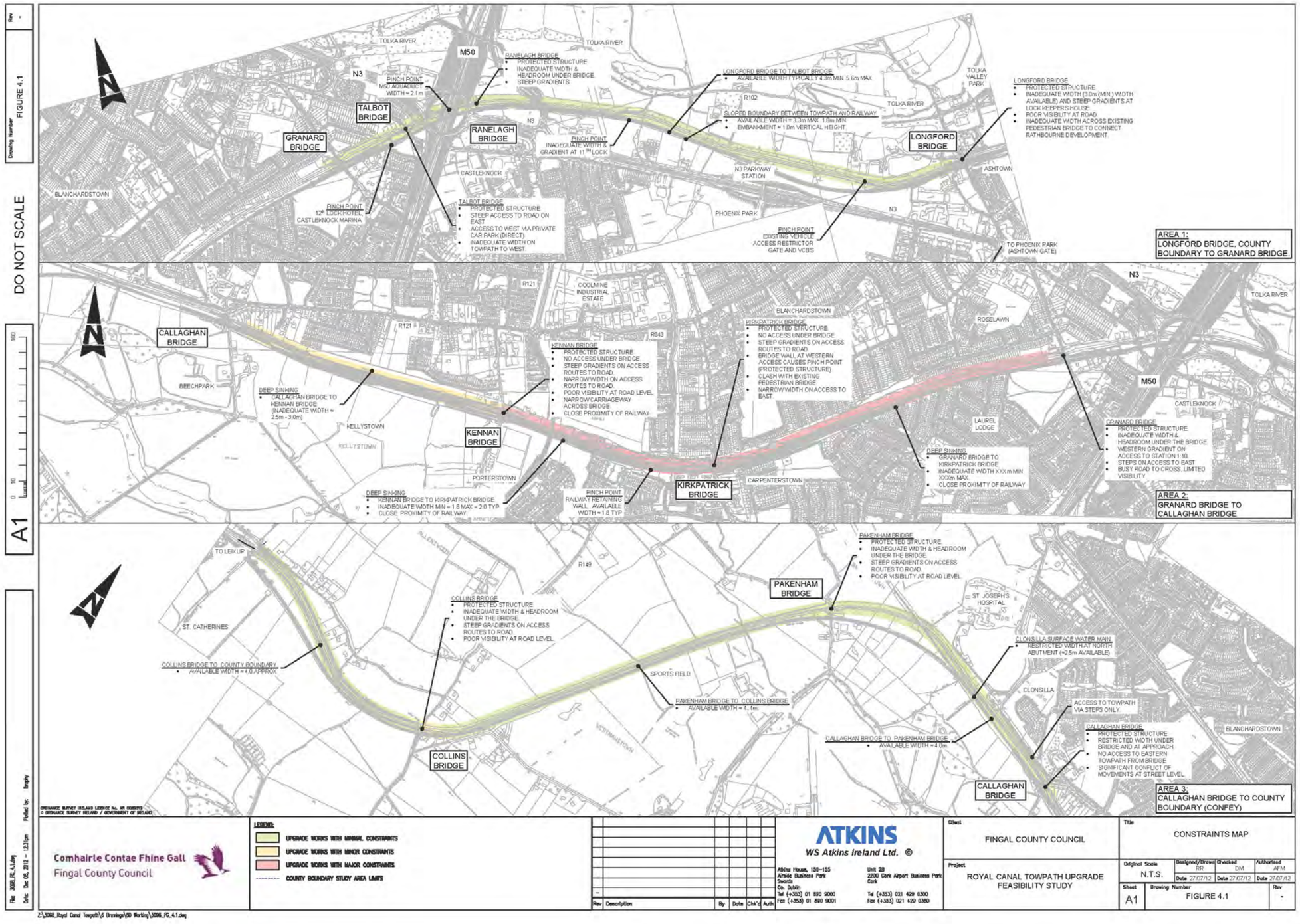


Figure 4.2 - Constraints Map

5. Opportunities

Secondary Objectives

5.1 In accordance with the study brief, further opportunities to enhance the canal environment and how these could be realised as part of any scheme have been considered. These have been identified as the secondary scheme objectives.

5.2 Items such as improved access points and accessibility for mobility impaired users were considered. It is recognised that any potential facility must be easily accessible for all to maximise the potential for its use.

5.3 Similarly, ease of access from adjacent existing (and proposed) residential areas was assessed and areas for potential additional linkage to the towpath are identified on the attached Opportunities Map. Such locations would potentially include:

- Proposed footbridge near 11th Lock – linkage to zoned lands to south of railway line adjacent to N3;
- Proposed footbridge to link Brompton Court (Roselawn) and Maple Green (Laurel Lodge);
- Proposed footbridge between Kennan Bridge and Callaghan Bridge to link Clonsilla on the north with zoned lands at Kellystown on the south;
- Proposed footbridge to link Clonsilla and Beechpark Regional Park;
- Linkage to Hansfield Strategic Development Zone (SDZ) to north of the canal (no bridge required).

5.4 Throughout the consultation stage of the study, the provision of additional (and betterment of existing) recreational facilities along the route was a recurring theme. In addressing this, a number of locations were identified where the following facilities could potentially be located:

- Off-road car parking facilities in the vicinities of Collins Bridge and Pakenham Bridge to facilitate recreational anglers and walkers along the adjacent stretches of the canal towpath;
- The potential for retention and/or betterment of existing formal angling posts was examined. These are located along the towpath westwards from Pakenham bridge. Further angling posts could be provided immediately west of Castleknock Station and in the area between the 10th and 11th locks;
- Picnic areas potentially located immediately east of Pakenham Bridge and adjacent to the 12th Lock Hotel, Castleknock. Ideally, these areas would be co-located with existing and proposed boat mooring points;
- Potential locations for coffee shops and the like were identified along the route at Clonsilla Station, Kennan Bridge and the 12th Lock.

5.5 In recognition of the overall thrust of this study, the connectivity of the proposed pedestrian and cycle route with other sustainable transport modes and cycle networks (existing and proposed) was considered throughout the study area. The study seeks to maximise such integration to provide an ease of access which would favour the use of bus, rail, cycling and walking.

5.6 *Royal Canal to Grand Canal Regional Cycle Route Connection* - Regionally the Royal Canal has the potential to integrate with other emerging strategic cycle routes within the Greater Dublin Area. In particular, the connection can be made southwards across the Liffey Valley and via Lucan and Griffeen Park to the Grand Canal north of Grangecastle which has been upgraded to a Green Route in 2010. This cycle connection has the potential to create a regional cycle loop within the Dublin Metropolitan area joining the city centre and docklands with established suburban areas

along the canals with planned new residential communities in West Dublin such as the Adamstown, Clonburris and Hansfield Strategic Development Zones.

5.7 This Identified link could be provided as follows:

- Collins Bridge on the Royal Canal (Barnhill Road) southwards to Laraghcon housing development. This would pass the eastern entrance to St. Catherine's Regional Park which facilitates cycle routes to Leixlip and west Lucan.
- Laraghcon Housing Estate southwards to Lucan Bridge on the River Liffey utilizing existing off-road cycle facilities
- Lucan Bridge through Lucan Village and crossing the M4 to Griffeen Valley Park
- Griffeen Valley Park southwards crossing the Kildare Rail line and joining to the Grand Canal via the new bridge north of Grangecastle Business Park

5.8 The potential route is illustrated on Figure 5.1 - Canal 2 Canal Regional Cycle Route

5.9 In addition to the above items, opportunities to enhance awareness and promote the historical and heritage value of the canal will be maximised through the provision of street furniture in the form of seating areas and information signage and plaques at appropriate locations, It is intended that such information points would give interesting snippets of information on the canal and its environment.

5.10 The overall Opportunities Map provided below highlights the areas where the above benefits can be brought to the proposed scheme to improve accessibility to the canal towpath and improve the amenity and recreational value of the project.

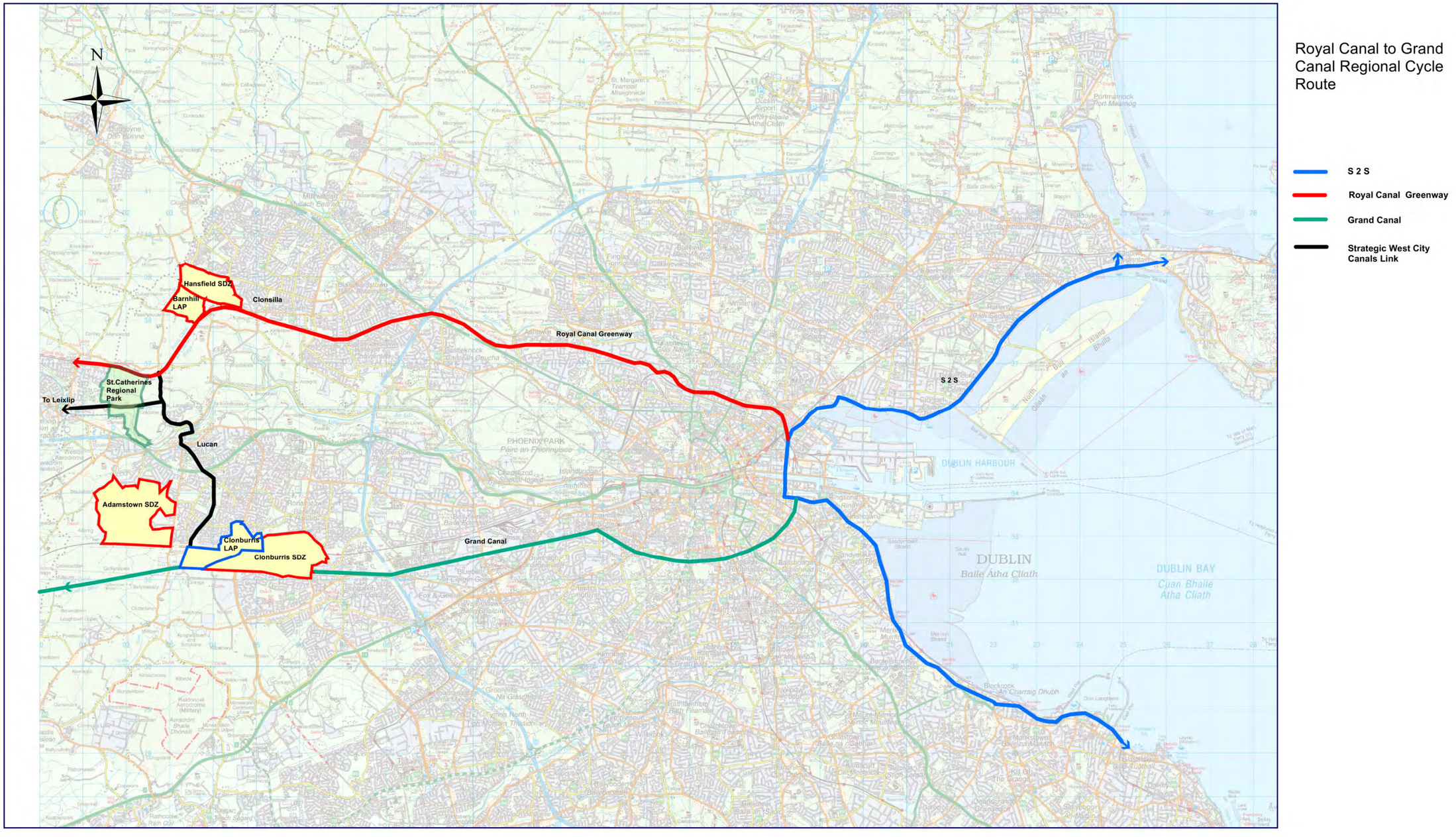


Figure 5.1 - Canal 2 Canal Regional Cycle Route

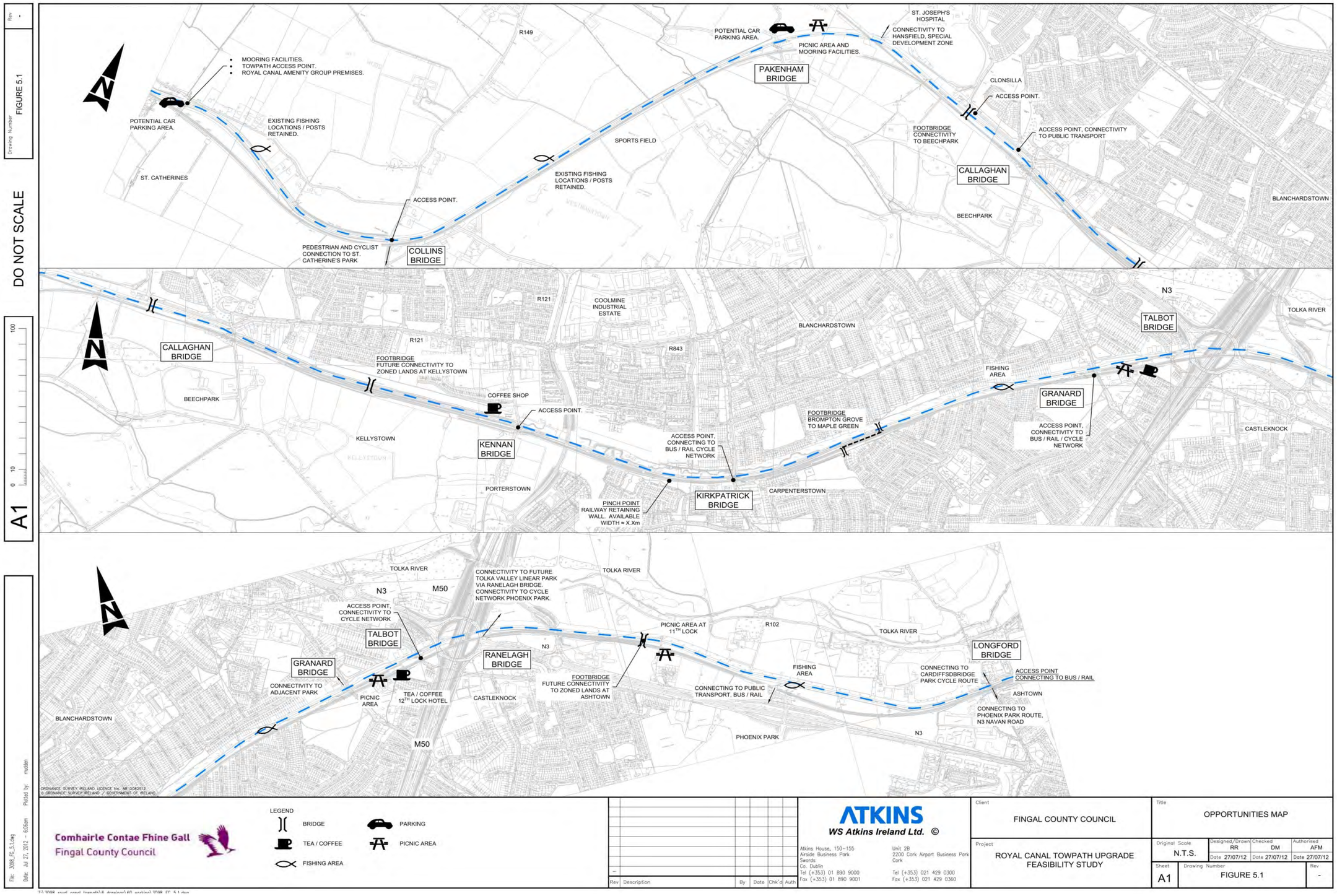


Figure 5.2 - Opportunities Map

6. Option Development & Evaluation

General

6.1 The Client's primary objective is to provide a premium quality cycle and pedestrian route along the existing canal towpath. The potential facility should be inherently safe and suitable for use as a cycle commuter and recreational route.

6.2 Secondary objectives can be realised through application of the 'opportunities' identified in Chapter 5 of this report. It is intended that in order to maximise the level of 'gain' and improvement in facilities which will benefit all users, all opportunities identified shall be applied to the final preferred route.

6.3 This chapter examines all available options to overcome the identified constraints within specified areas. An evaluation of the options is carried out against selected criteria to arrive at a favoured solution in each case.

Evaluation Criteria and Methodology

6.4 All of the options considered have been subjected to a comparative assessment against five key criteria, namely:

- Economy;
- Safety;
- Environment;
- Technical, and
- Integration.

6.5 The full assessment criteria are presented in Table 6.1.

General Assumptions Common To All Options

6.6 Given the Client's primary objective to provide a premium quality cycle and pedestrian route to encourage and promote commuter cycling, the options have been generated with a view to providing a high quality bound surface along the whole length of the route. Access to the facility would be controlled by installing removable bollards at access points which would effectively prohibit unauthorised vehicular access but ensure minimal delays to cyclists.

6.7 For security reasons, it has been assumed that CCTV will be required along the whole length of the route.

6.8 Given the primary objective for the cycleway to be a commuter route, lighting will be required along its length.

6.9 Where there is a height difference between the cycleway and surrounding ground, a pedestrian railing (to the appropriate height for cycles) has been assumed to be required.

6.10 A 3.5m width will be provided where feasible and it is assumed that this is achievable along the whole route, except where detailed below. Where constraints exist along the route, these are discussed below with options presented on how they can be overcome or otherwise.

6.11 All options consider upgrading the existing towpath along the canal banks. Consideration was given to development of the opposite bank in all cases. However, this was deemed unfeasible and undesirable due to the proximity of the adjacent railway line, scope of work required and the likely environmental and ecological impacts, land ownership issues and topographical constraints.

Table 6.1 – Assessment Criteria

Route Assessment Criteria	
Assessment Criterion	**Criterion Elements**
Economy	Comparison of cost levels for: • Land Acquisition Costs • Construction Costs • Operation & Maintenance Costs
Safety	Comparison of level of safety offered in terms of: • Interaction with live traffic & nature of traffic control facilities offered • Personal security, levels of public lighting and surveillance offered
Environment	Comparison on level of impact on the environment in terms of: • Air Quality • Noise & Vibration • Landscape & Visual • Biodiversity / Ecology • Cultural, Archaeological & Architectural Heritage • Land Use, Soils & Geology • Water Resources
Technical	Comparison of technical merits in terms of: • Cycleway Level of Service offered o Surface Quality / Comfort o Gradient o Continuity of Route o Directness (Waiting time at signals, detours) • Accessibility (mobility impaired)
Integration	Comparison of level of integration and inter-connectivity offered in terms of: • Connectivity to public transport (bus and rail) • Connectivity to wider cycle network • Inter-connectivity of adjacent residential communities (existing and planned) • Provision of car parking areas at access points / key amenity areas • Connectivity to adjacent recreational & amenity areas (existing and planned)

Option Evaluation

6.12 The following sections present the options available and provide a brief analysis of the evaluation of these options. The preferred solution for each area is brought forward for inclusion in the overall preferred route and presented as the preferred scheme.

Area 1: Longford Bridge (Ashtown) to Granard Bridge (Castleknock)

Longford Bridge

6.13 The proposed scheme will commence at Longford Bridge, Ashtown. In considering the previously upgraded section of the towpath at Rathborne, connectivity between the new existing facility and the proposed upgrade to the canal towpath west of Longford Bridge is key to the success of the overall project.

6.14 The overriding requirement is to provide a safe and efficient means of access from the east to the west of Longford Bridge. Ashtown Road is a busy local road, dominated by vehicular traffic.

6.15 To obtain a 3.5m width through the 10th lock, it would be necessary to acquire the adjacent private dwelling. This is considered impractical given the benefits would only be realised for an approximate length of 25m. All options propose a width of between 2.4m and 3.0m through this short section and would require added protection to the lower chamber of the adjacent lock to eliminate all risks of falling into the canal waters.

6.16 All options at this location offer good connectivity to adjacent public transport (bus and rail) networks and onward cycle connections to the Phoenix Park, Tolka Valley Cycle Route and adjacent residential areas. However, given the high density development of the area, provision of additional car parking is not feasible or desirable.

6.17 Whilst not considered as an option, Irish Rail's proposal to close the existing level crossing at Ashtown is noted. If this proposal were to proceed, Longford Bridge would be effectively "traffic-free". At that stage, users of the towpath may favour the easier, more spacious route of crossing the canal via Longford Bridge over the dedicated cycle bridge. The options presented at this location would then become somewhat redundant.

6.18 A number of options have been considered as follows:

6.19 **Option 1:** *Figure 6.2 - Longford Bridge Option 1* is provided below. This option will require the construction of a second bridge across the canal which would be located adjacent to the existing footbridge. The proposed bridge would be intended for the exclusive use of cyclists along the proposed route.

6.20 Continuity across Ashtown Road will be provided by the installation of a signal controlled toucan crossing. The controlled crossing would effectively eliminate any risks associated with the busy traffic and poor visibility at the crossing location. In addition, appropriate detection systems could be incorporated so that cyclists would trigger the lights on approach and thus eliminate the need to dismount and wait.

6.21 The signal controller for the toucan crossing would need to be fully integrated with the adjacent level crossing.

6.22 In assessing this option, the construction of a dedicated cyclist bridge across the canal would be of obvious benefit to all users. However, this would require a land purchase on the southern bank of the canal at Ashtown Station. For these reasons this option may attract a significant cost premium.

6.23 The provision of the bridge would, however, provide a safe means for all users to cross from the north bank to the south bank of the canal on segregated facilities. The proposed toucan crossing would provide a safe route across Ashtown Road where users would be required to interact with live traffic. Traffic along Ashtown Road is often heavy, especially at peak hours when the cyclist commuter route would also be expected to be busy.

6.24 The environmental impact of this option would be considered to be low during service. However, depending on the final design of the proposed bridge, construction stage impacts would need to be examined in detail.

6.25 The implementation of this option would have no impact on Longford Bridge. However, the introduction of a toucan crossing would have obvious impacts on traffic at Ashtown Road. Therefore, the success of this option would be contingent on a detailed assessment of the impact on traffic.

6.26 The layout would address the requirement to provide a high Level of Service in terms of continuity and directness of the route. However, the proposed gradients through the 10th lock would fall short of the recommended minima for mobility impaired users. It would not, however, preclude mobility impaired users from accessing the facility.**Option 2:** *Figure 6.3 - Longford Bridge Option 2* is provided below. "Shuttle lights" are proposed so that a one-way traffic system can be enforced across Longford Bridge. The carriageway width would be reduced from 6.3m to 3.8m, providing a 2.5m cycle route across the bridge. This cycle route would be physically segregated from the traffic lane by means of a raised kerb. Increased delineation could be achieved through the installation of pencil bollards adjacent to the new kerbline if warranted.

6.27 Pedestrians would use the existing footbridge, as per the existing situation.

6.28 The "shuttle" traffic signals would require synchronisation with the adjacent level crossing so that all traffic is stopped when trains are approaching. Ashtown Road can have significant tailbacks during peak times due to the level crossing being closed. If this situation was to be exacerbated by the introduction of shuttle working at the bridge it is possible that queuing could extend to both the Navan Road and the River Road on each side of the level crossing.

6.29 At the access to the western towpath, a signalised toucan crossing would be installed to provide a safe means of crossing Ashtown Road. The length of crossing provided would be reduced to 3.8m in accordance with the traffic lane reductions. The toucan crossing would need to be linked to the 'shuttle lights' and the level crossing.

6.30 The layout would also provide a safe route for all users due to the segregation from vehicular traffic. The provision of the toucan crossing would further enhance the safety aspects of the layout.

6.31 Impacts on the receiving environment would be minimal. While construction activities would be required to modify the surface layout across Longford Bridge, there would be no structural modifications required. Similarly, the impacts of the layout in service would be negligible. However, the proposed shuttle traffic control system would be likely to increase traffic congestion locally on Ashtown Road.

6.32 Technically, this layout would offer a high Level of Service as the continuity and directness of the route would be preserved. However, as per Option 1, the proposed gradients through the 10th lock would fall short of the recommended minima for mobility impaired users. It would not, however, preclude mobility impaired users from accessing the facility.

6.33 **Option 3:** *Figure 6.4 - Longford Bridge Option 3 is provided* below.

6.34 For this option a raised traffic surface linking the towpath entrance points would be constructed. This surface would be shared with motorised traffic. Traffic speeds would be restricted through the establishment of a special 30kph speed limit and "town centre" character within Ashtown Village.

6.35 Pedestrians would be directed to use the footbridge as per the current layout.

6.36 A toucan crossing would be provided at the entrance to the western towpath to permit pedestrians and the less confident cyclists to cross the road in a safe manner. More experienced and competent cyclists may choose to wait in the carriageway and give way to oncoming traffic before

turning onto the towpath at this location, although this would be considered hazardous given the narrow carriageway width.

6.37 The proposed toucan crossing signals would need to be synchronised with the adjacent level crossing.

6.38 The capital outlay in providing this option would be comparable to that of Option 2. Works to the road carriageway across Longford Bridge would be necessary to increase driver awareness of the shared surface and presence of cyclists on the road.

6.39 The safety of the end user, in particular the cyclist, would be compromised due to the proposed shared surface which relies on the awareness / astuteness of motorists and their adherence to the proposed 30 km/h special speed limit.

6.40 The impact on the environment would be negligible both for the construction stage and when in service. The proposed works would not require any structural modifications to Longford Bridge. However, the introduction of a 30 km/h special speed limit would be expected to have some negative impact on traffic locally. The exact impacts would need to be understood through a detailed assessment of traffic

6.41 Continuity and directness of the route would be compromised with this option. The layout would also be less favourable to cyclists as the requirement to "mix" with motorised traffic would be less attractive. Option 3 would therefore be less favourable in terms of technical merit.

6.42 **Option 4:** *Figure 6.5 - Longford Bridge Option 4 is provided* below. This option is the "do minimum" scenario. Cyclists would be required to dismount on the approach to the existing pedestrian bridge and walk across the canal.

6.43 A pedestrian crossing would be installed to provide a safe means of crossing Ashtown Road. As with previous options, the traffic signals would be integrated with the adjacent level crossing. The existing road layout would remain unchanged and motorists would have right of way over pedestrians and cyclists.

6.44 As this would be the "do minimum" option, it would also be the cheapest to implement and construct. With the exception of the proposed pedestrian crossing, there would be no further modifications required to the existing layout.

6.45 It is unlikely that cyclists will follow the instructions to dismount and walk across the pedestrian bridge. It would be highly probable that cyclists would either elect to cycle across the pedestrian bridge or join the narrow traffic lanes at Longford Bridge. Either decision would put cyclists at risk of conflict with other users, thus reducing the level of safety offered.

6.46 This option would have negligible negative effect on the receiving environment.

6.47 While the proposed pedestrian crossing would offer some level of segregation from motorised traffic, the overall level of service is compromised in terms of continuity, directness and comfort.

Figure 6.1 - Longford Bridge Option Evaluation Summary

Option Evaluation Summary Longford Bridge, Ashtown				
	Option 1	**Option 2**	**Option 3**	**Option 4**
Rank	**#1**	**#4**	**#2**	**#3**
Economy	Cost premium due to provision of dedicated cyclist bridge and acquisition of land at Ashtown Station.	Cost effective option for both short and long term scenarios Comparable to Option 3	Cost effective option for both short and long term scenarios Comparable to Option 2	"Do minimum" scenario – therefore cheapest alternative available while providing some benefit / improvement
Safety	Offers good levels of safety and personal security	Offers good levels of safety and personal security	Shared surface with motorised vehicles means safety is compromised	Requires cyclists to dismount and walk across pedestrian bridge – cyclists unlikely to comply, therefore increased risk of conflicts with pedestrians and/or vehicles
Environment	No impacts on Longford Bridge. Minimal impact in service, although toucan crossing has potential to increase traffic congestion locally. Construction of bridge abutments may potentially have impacts, but these are considered to be minor at this stage.	No structural modifications required to Longford Bridge. Minimal impact in service, although shuttle traffic control has potential to increase traffic congestion locally.	No structural modifications required to Longford Bridge Minimal impact in service and during construction. Lesser impact on local traffic	Least impact on environment
Technical	High Level of Service in terms of continuity and directness of route. Gradients offered would fall short of recommended minima for mobility impaired. Does not affect traffic in the same way as reducing effective road width would. Requires Purchase of land to facilitate the new bridge	High Level of Service in terms of continuity and directness of route. Gradients offered would fall short of recommended minima for mobility impaired. Is likely to severely disrupt traffic in the area.	Continuity compromised due to the requirement to mix with vehicular traffic – probable delays for cyclists negotiating traffic	Least preferred as Level of Service is not significantly improved over a 'do nothing' scenario
Integration	High level of integration and accessibility. No adjacent car parking area feasible.	High level of integration and accessibility. No adjacent car parking area feasible.	High level of integration and accessibility. No adjacent car parking area feasible.	High level of integration and accessibility. No adjacent car parking area feasible.

6.48 **Conclusion:** Option 1 provides the highest level of service in that there is segregated cycleway.

6.49 Option 2 also provides segregated cycleway but is reliant on the road width for Ashtown Road being reduced. This is likely to exacerbate an already congested area (when the level crossing is closed for trains) and the congestion could lead back to the Navan Road and River Road. As a result, this is the least preferred option.

6.50 Option 3 allows some continuity of service but is compromised by direct interaction with the road traffic.

6.51 Option 4 is a do-minimum scenario with the introduction of a toucan crossing being the main proposal. It has least provision of service. Overall, Option 1 would be preferred in that the service provision is high and it would not overly affect traffic in the area. If Option 1 was not possible, then Option 3 should be considered, as it provides a level of service which is reasonably high, without affecting traffic. Option 4 should be considered if Options 1 and 3 are too expensive.

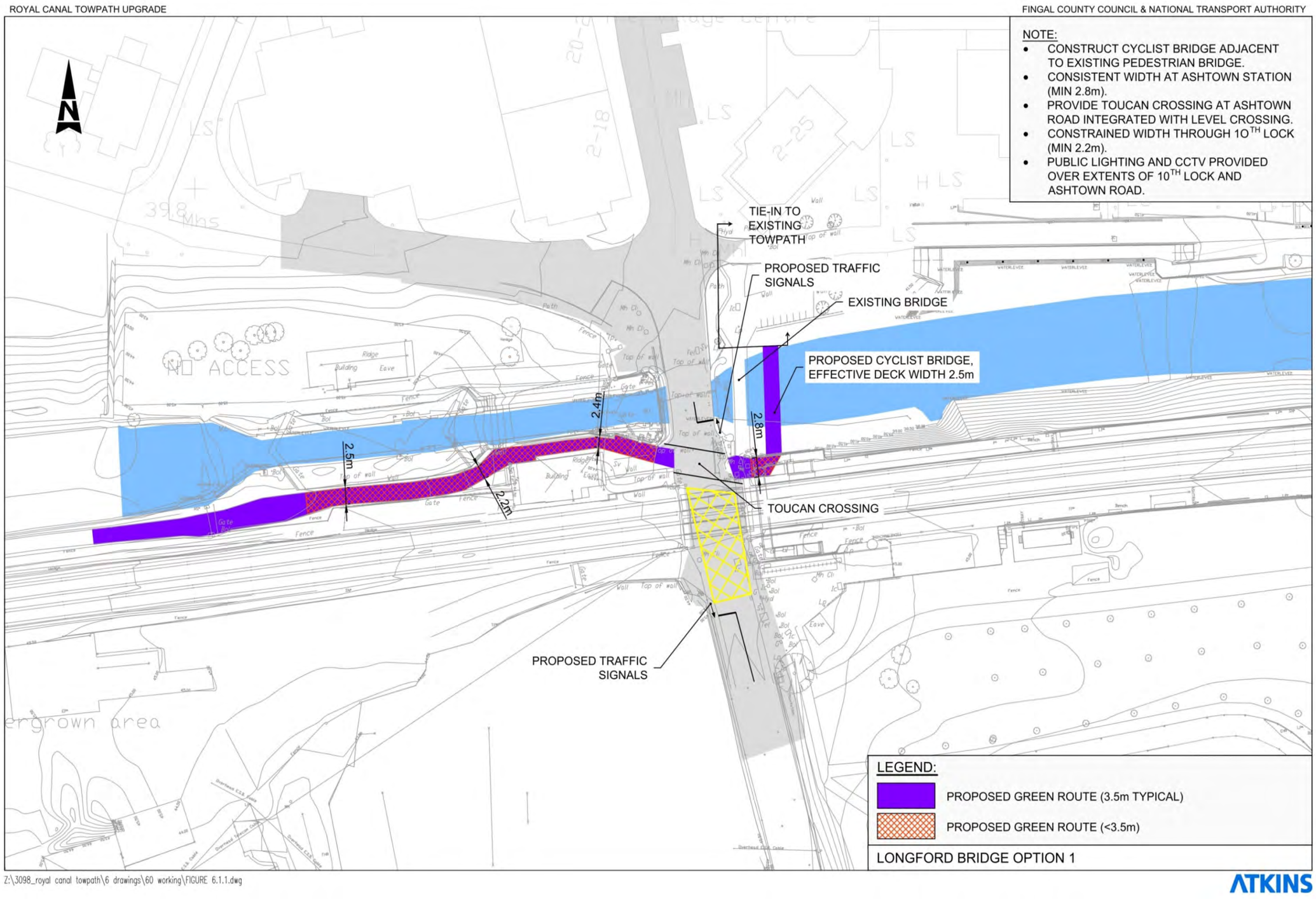


Figure 6.2 - Longford Bridge Option 1

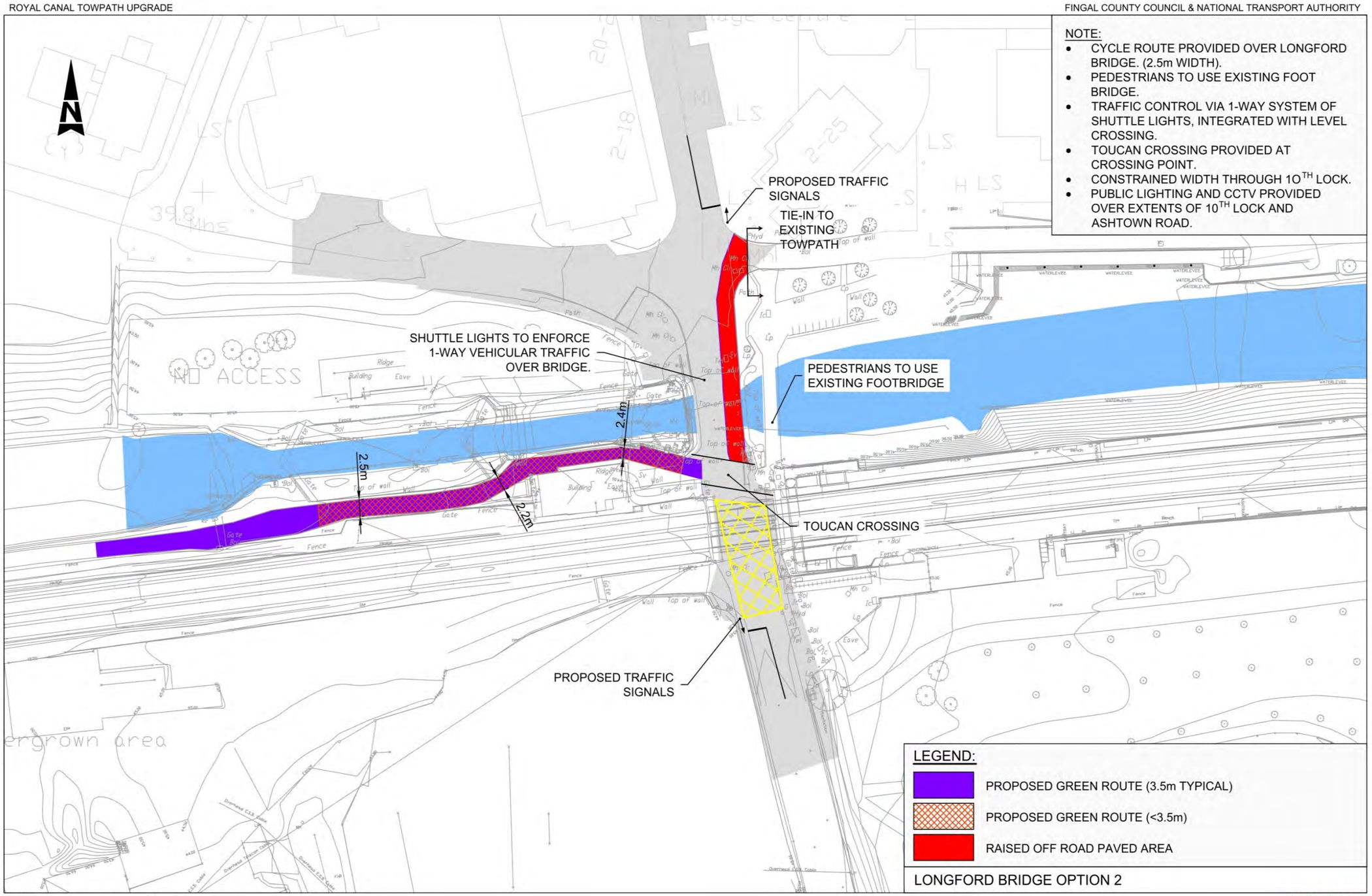


Figure 6.3 - Longford Bridge Option 2

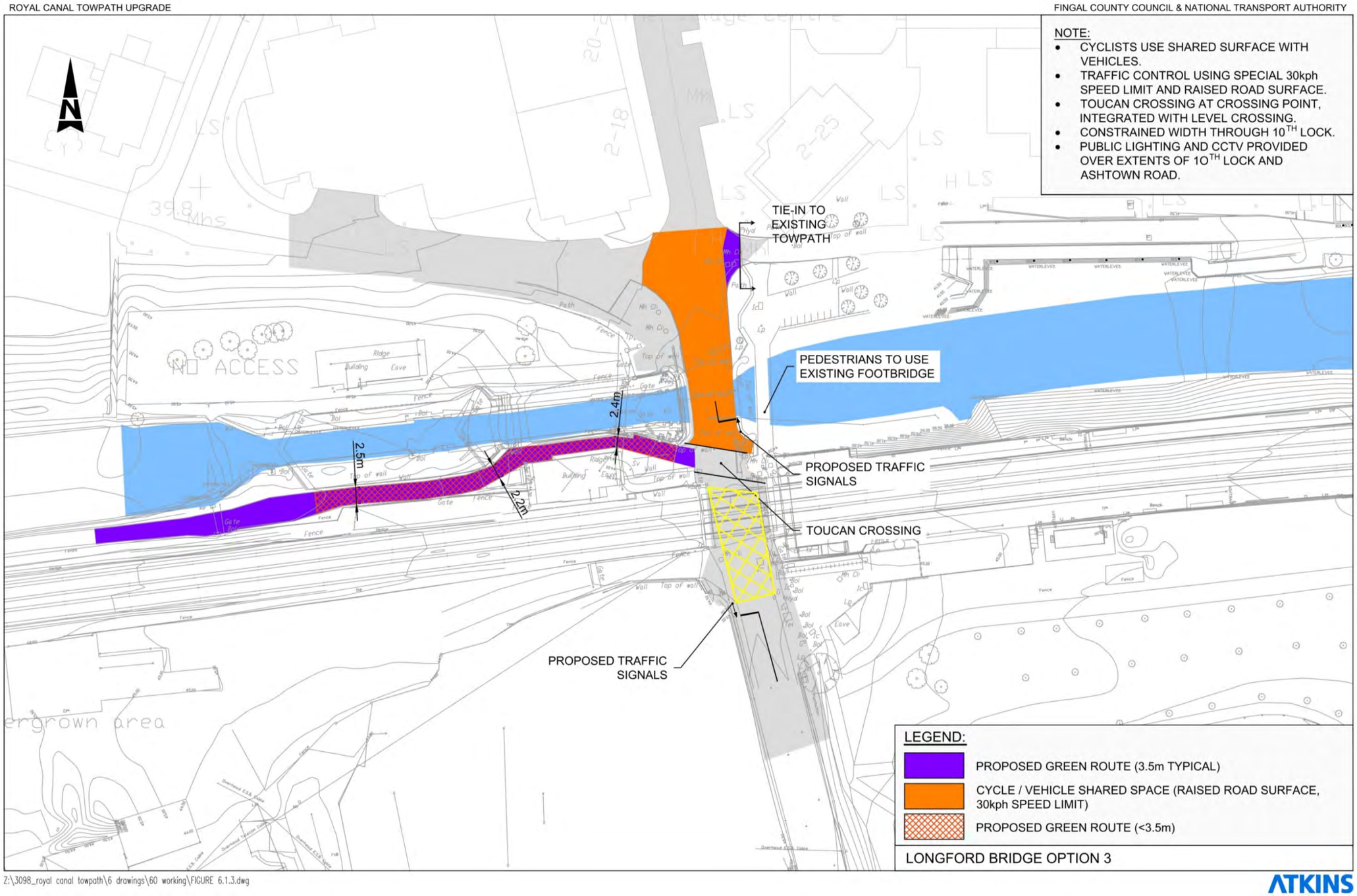


Figure 6.4 - Longford Bridge Option 3

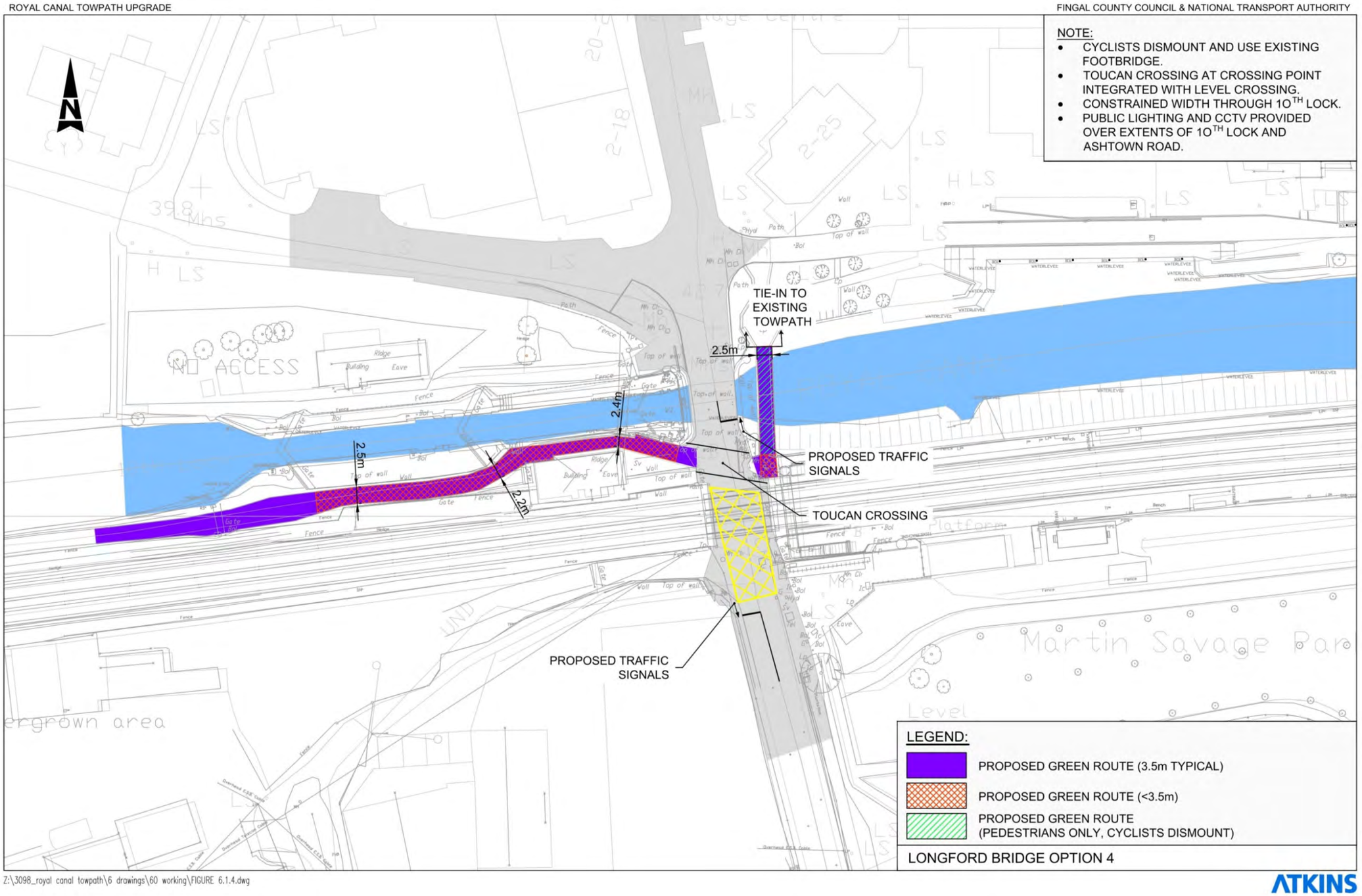


Figure 6.5 - Longford Bridge Option 4

Canal towpath, 10th Lock to M50 Aqueduct

6.52 In achieving the desired 3.5m wide surface, constraints in the available width will need to be addressed along the railway line immediately east of the 11th Lock.

6.53 In considering the options, while there is scope to achieve the required 3.5m, works would be required to retain the existing embankment height of circa 1.0m. Such works would be within the railway's zone of influence. Notwithstanding this, given the minor nature of the works, it would be reasonable to consider that agreement with Irish Rail could be reached to allow the works proceed.

6.54 The alternative is to leave the pinch point in place and provide a shared 2.8m (approx) wide surface. It is therefore considered that the favoured option in this instance is to widen the towpath to 3.5m.

6.55 All other areas between the 10th Lock and the M50 Aqueduct can be widened to 3.5m with minimal works required.

M50 Aqueduct

6.56 The M50 Aqueduct in its current state provides a major pinch-point along the proposed route. The canal and towpath cross the M50 motorway on a dedicated structure. Three options were considered:

6.57 **Option 1** Figure 6.6 - M50 Aqueduct Option 1 is provided below. It involves the construction of a separate cycle-only bridge across the M50 Motorway. The bridge would be located immediately south of the existing aqueduct, between the aqueduct and the railway bridge. The most efficient structure would be a prefabricated steel or precast concrete bridge which could be lifted into place in sections, depending on design. This would limit the amount of time required for lane closures on the motorway below.

6.58 Due to the length of crossing at this location, it is likely that central supporting piers would be required. These would be located within the M50 central median, the construction of which would cause significant traffic disruption to the M50 Motorway.

6.59 The construction of the main deck of the bridge would most likely require safety netting to be erected across the M50 traffic lanes so that the risk of construction stage debris falling onto the high speed traffic below would be eliminated.

6.60 Access for construction traffic and materials would be via Talbot Court to the west and River Road / Dunsink Lane in the east. The access from the east would be the most difficult as access across the canal would be limited. It would be reasonable to expect that significant cranage of materials across the canal would be required, with a crane situated adjacent to the eastern abutment of the aqueduct.

6.61 The close proximity of the railway bridge would also mean that consultations with Irish Rail would be key to the process.

6.62 This option will be an expensive option to consider. The construction of the bridge would attract a high level of capital cost while the construction sequence would be expected to be severely constrained due to the 6-lane live motorway below.

6.63 The benefits, however, would be evident in the high level of safety offered to the end user. The risks associated with the restricted width of the existing towpath across the aqueduct would be eliminated from the cycle route.

6.64 Impacts on the receiving environment are considered to be negligible, with minor impacts on existing planting at each landing point of the bridge.

6.65 Technically this option would offer the highest Level of Service for cyclists in terms of continuity and directness of route. Pedestrians would continue to uses the existing towpath across the aqueduct, thus removing any potential for conflict or disturbance to cyclists.

6.66 Given the location of this particular site, integration and accessibility factors are not considered for the overall evaluation of the options as the merits of all options would be identical.

6.67 **Option 2:** Figure 6.7 - M50 Aqueduct Option 2 is provided below. This option includes the widening of the existing towpath across the M50 aqueduct. This would be achieved by modifying the existing concrete structure by adding cantilevered structural sections along the southern edge of the bridge to effectively widen the existing towpath provision to 3.5m.

6.68 It would be both difficult to construct this option over a live carriageway and would be reasonably costly. The feasibility of this option would also need to be considered in detail, but based upon other similar operations elsewhere, this is likely to be feasible.

6.69 Taking the above construction stage concerns into account, this option would attract a significant cost premium and would be considered similar to the costs of Option 1. The erection of temporary scaffolding, supported from the existing bridge, to effectively provide a working platform across the M50 is likely to be required to satisfy safety issues and risk of personnel and / or construction stage debris falling onto the traffic lanes below. Such temporary structures tend to increase the overall construction costs.

6.70 Access to the site would also be difficult from the east, requiring the establishment of a crane to lift materials over the canal channel. As per Option 1, a crane could be positioned adjacent to the eastern abutment of the M50 Aqueduct and would be required for the majority of the construction period and this would need to be factored in to the estimated construction costs.

6.71 This option would provide a safe facility for both cyclists and pedestrians, although it is considered that a guardrail would be required along the water's edge to protect against accidental falls into the canal waters.

6.72 Effects on the environment would be considered minimal during the service life of this element. However, the construction stage would have a neutral impact on the environment.

6.73 The technical merits of this option would be similar to Option 1 in that the high Level of Service would be maintained through the structure in terms of continuity and directness of route. The widened bridge would provide a consistent width of 3.5m along the route. However, the construction of the facility would require more work (breaking out of existing parapet beam, falsework, formwork, concrete placement etc) over a live carriageway.

6.74 Given the location of this particular site, integration and accessibility factors are not considered for the overall evaluation of the options as the merits of all options would be identical.

6.75 **Option 3:** Figure 6.8 - M50 Aqueduct Option 3 is provided below. This option involves the widening of the existing towpath by reducing the navigation channel width. Structurally, this option is easier to construct (using cantilevers over the canal) than the previous options as there are no major modifications required to the outside of the bridge (over the motorway). Modifications to bridge to accommodate the cantilever would be required, as would replacement of the existing parapet to ensure adequate protection to cyclists.

6.76 However, a minimum of 1.5m of widening would be required which would effectively reduce the navigable channel by the same amount. Such measures would have obvious negative impacts on the canal navigation and its ability to accommodate many of the traditional barges and canal boats.

6.77 While the aqueduct is not listed on the Record of Protected Structures, this option would have implications for the historical / heritage uses of the canal.

6.78 The capital cost of this option would be reasonable given that a cantilever structure would be required, but not as expensive as previous options. However, replacement of the parapet would require special attention due to the presence of live traffic on the M50 Motorway below.

6.79 A guardrail would need to be erected along the water's edge to prevent any accidental falls into the canal. This would need to be factored into the overall costs of the proposed option.

6.80 The overall continuity and directness of the route would be maintained with this option leading to a high Level of Service.

6.81 The integration and accessibility merits for this option do not differ from other options due to the location of this particular site. However, there would be a quantifiable loss in the amenity value of the canal for water based traffic and recreational activities.

6.82 **Option 4:** Figure 6.9 - M50 Aqueduct Option 4 is provided below. This option represents the "do minimum".

6.83 The current layout would be maintained in situ. Signage would be provided instructing cyclists to dismount and use the existing 2.1m wide towpath across the extent of the aqueduct. While this would lead to a reduction in the Level of Service of the proposed cycle route, it would be an essential measure to ensure the safety of all users.

6.84 However, there is concern that cyclists would tend to ignore the requirement to dismount and would continue to cycle across the aqueduct, increasing the risk of conflict with pedestrians. Given that this project would be likely to generate an increase in pedestrian and cyclist traffic, it would be prudent to erect a guardrail along the water's edge of the existing towpath for obvious safety reasons.

6.85 The assessment of this option notes that the capital costs are the most favourable of all options considered given the minimal works required.

6.86 While the risk of falling into the canal waters would be addressed by the provision of edge protection along the canal waters, there is a high probability that cyclists would ignore signed requests to dismount and continue to cycle across the aqueduct. The risk of pedestrian / cyclist conflict on the narrow path is greatly increased. This option would therefore score less well than other options in terms of overall user safety.

6.87 The requirement to dismount and walk across the structure would have a negative impact on the Level of Service. While the directness of the route is maintained, continuity is compromised. Therefore, this option would be least preferred in terms of technical merit.

6.88 The impact on integration and accessibility is not applicable as per previous options given the location of this particular site.

Table 6.2 - M50 Aqueduct Option Evaluation Summary

Option Evaluation Summary M50 Aqueduct				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**1**	**2**	**4**	**3**
Economy	Significant cost premium due to provision of new dedicated bridge over the M50	Most expensive solution due to complexity of the proposals and extent of work required over live traffic	Reasonable cost involved in cantilevering over the canal.	Cheapest option considered.
Safety	Offers good levels of safety and personal security	Offers good levels of safety and personal security	Offers good levels of safety and personal security	There is risk that cyclists may ignore requirement to walk across the aqueduct thus increasing risk of collision with pedestrians and hence safety
Environment	Minimal impact during service and construction – site is located in centre of busy motorway interchange	Minimal impact during service and construction stage	Minimal impact during service stage. During construction stage there would be a need to coffer dam the canal and build a support structure which could affect ecology. Heritage issues inherent in the reduction of the canal channel width	Minimal impact on environment in service Least impacts for construction stage
Technical	High Level of Service in terms of continuity and directness of route.	High Level of Service in terms of continuity and directness of route.	High Level of Service in terms of continuity and directness of route, however there is significant loss of amenity of the canal as a result of the reduction in width, which is unlikely to be acceptable to Waterways Ireland.	Level of service compromised due to low width of passage being provided
Integration	N/A	N/A	N/A	N/A

6.89 **Conclusion:** Option 3 is the least preferred due to its adverse effect on the operation of the canal. This option would meet significant opposition from major stakeholders and is least desirable by all parties.

6.90 Options 1 and 2 provide the best solutions in terms of continuity of the facility and ensure a high Level of Service is achieved. Option 1 would be the preferred solution in terms of safety, especially in that less works are required above the live motorway. Option 1 is therefore preferred.

6.91 Option 4 requires cyclists to dismount before crossing the aqueduct. While this has obvious negative impacts on the required Level of Service, this option would provide a good compromise until funding to construct Options 1 or 2 is available.

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:
- PROVIDE NEW BRIDGE ACROSS M50 FOR DEDICATED CYCLEWAY.

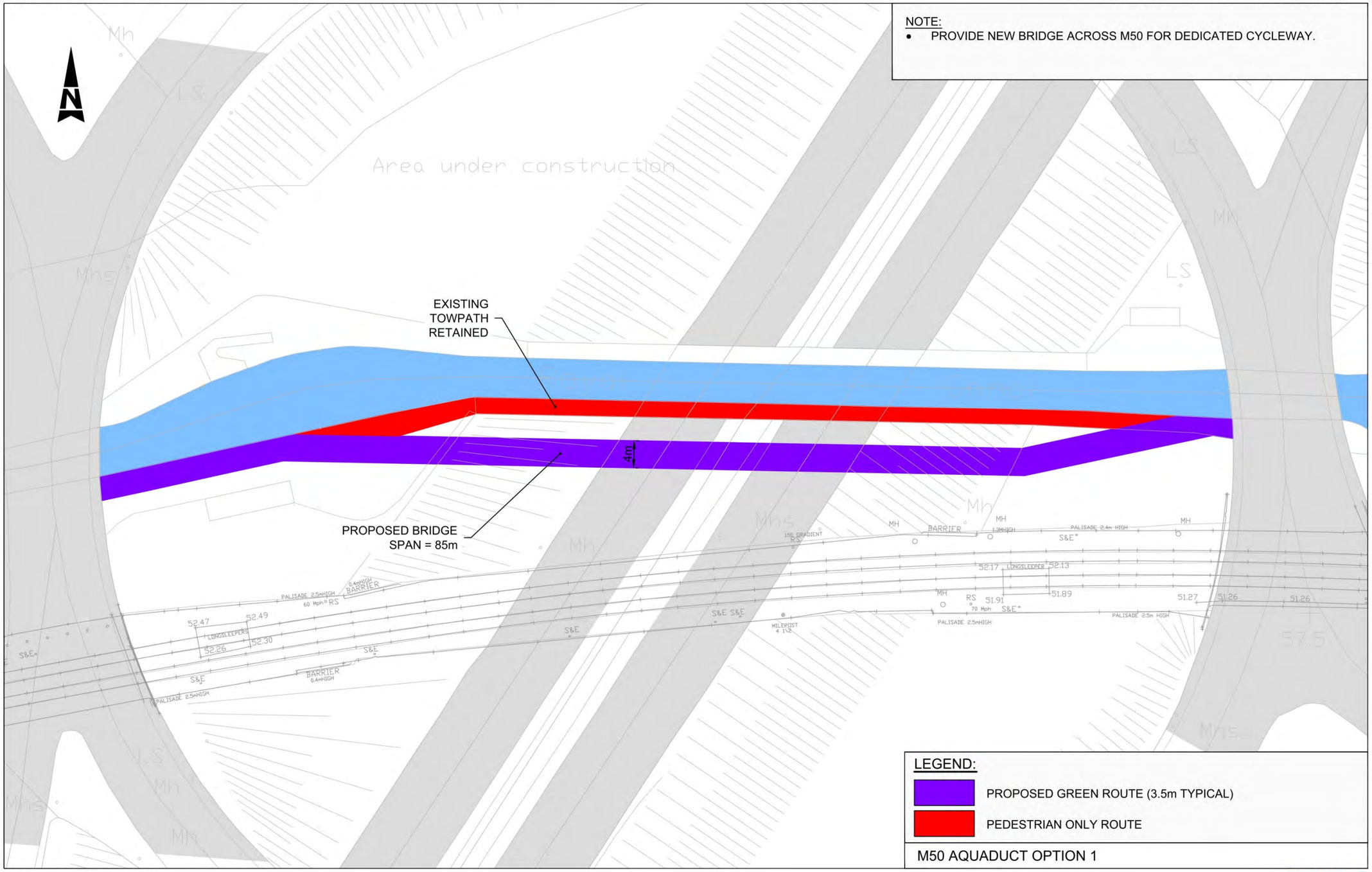


Figure 6.6 - M50 Aqueduct Option 1

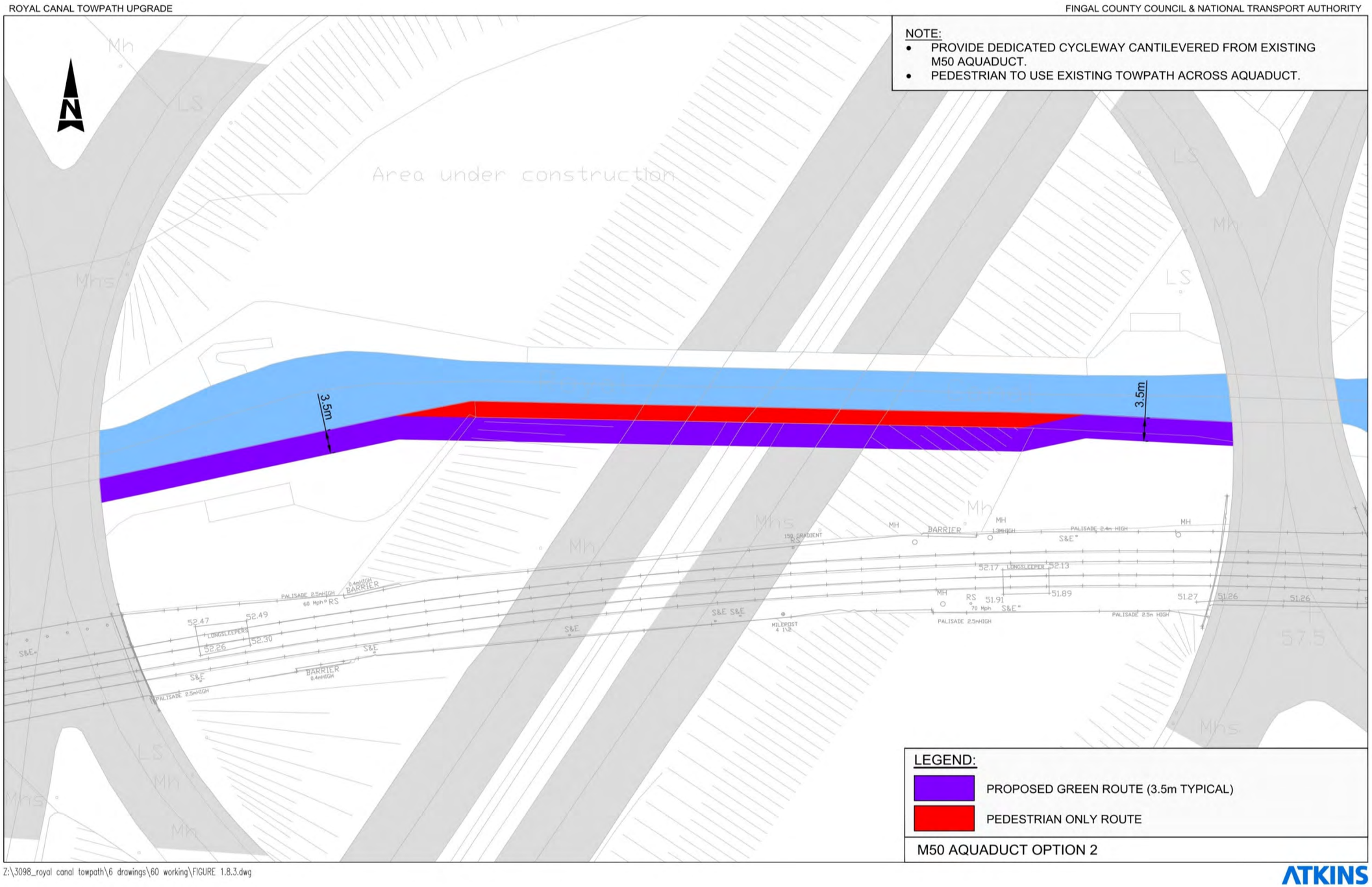
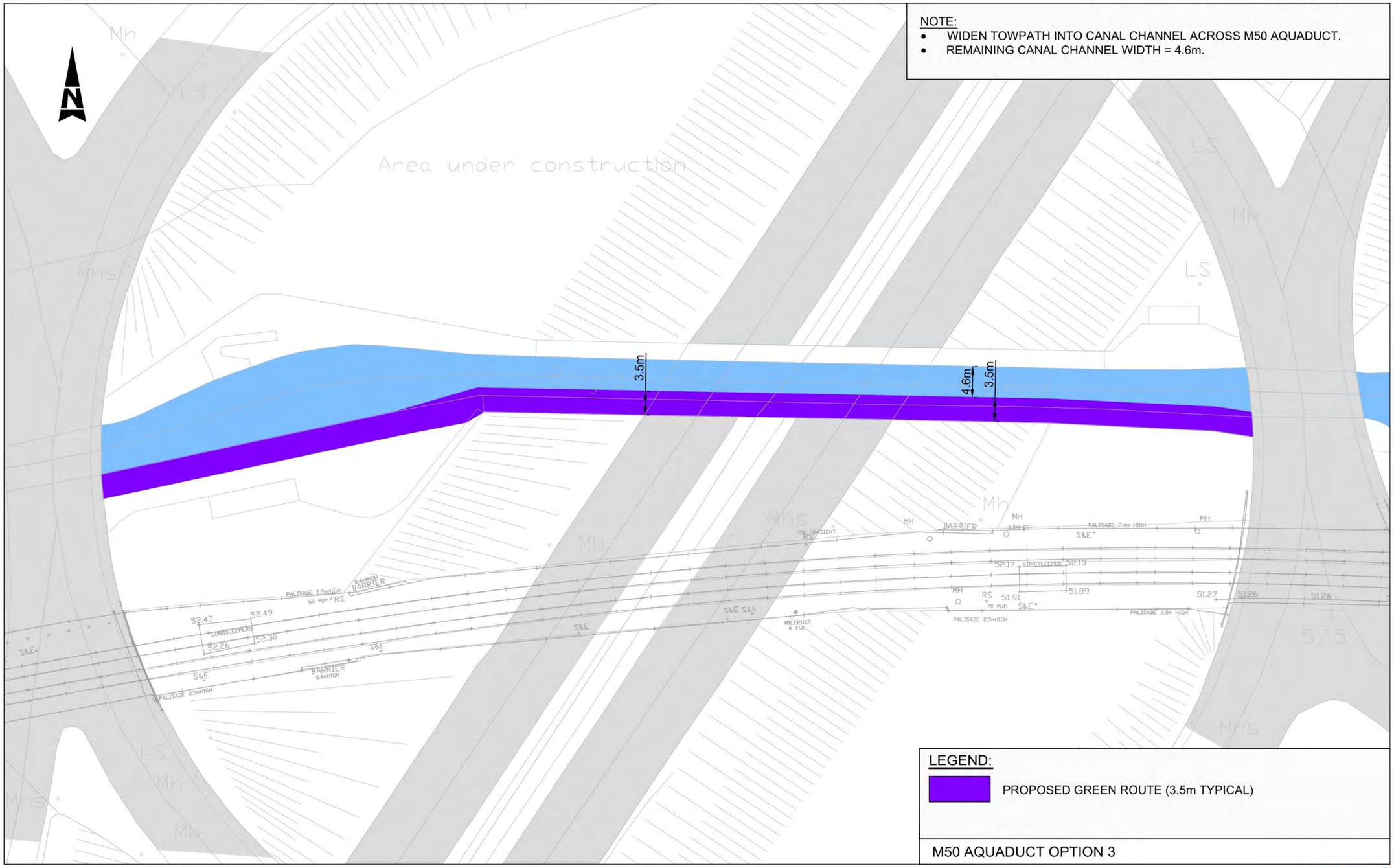


Figure 6.7 - M50 Aqueduct Option 2

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY



Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.8.2.dwg

Figure 6.8 - M50 Aqueduct Option 3

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:
- NO CHANGE TO EXISTING LAYOUT.
- PROVIDE SIGNAGE REQUIRING CYCLISTS TO DISMOUNT AND WALK ACROSS THE AQUADUCT.

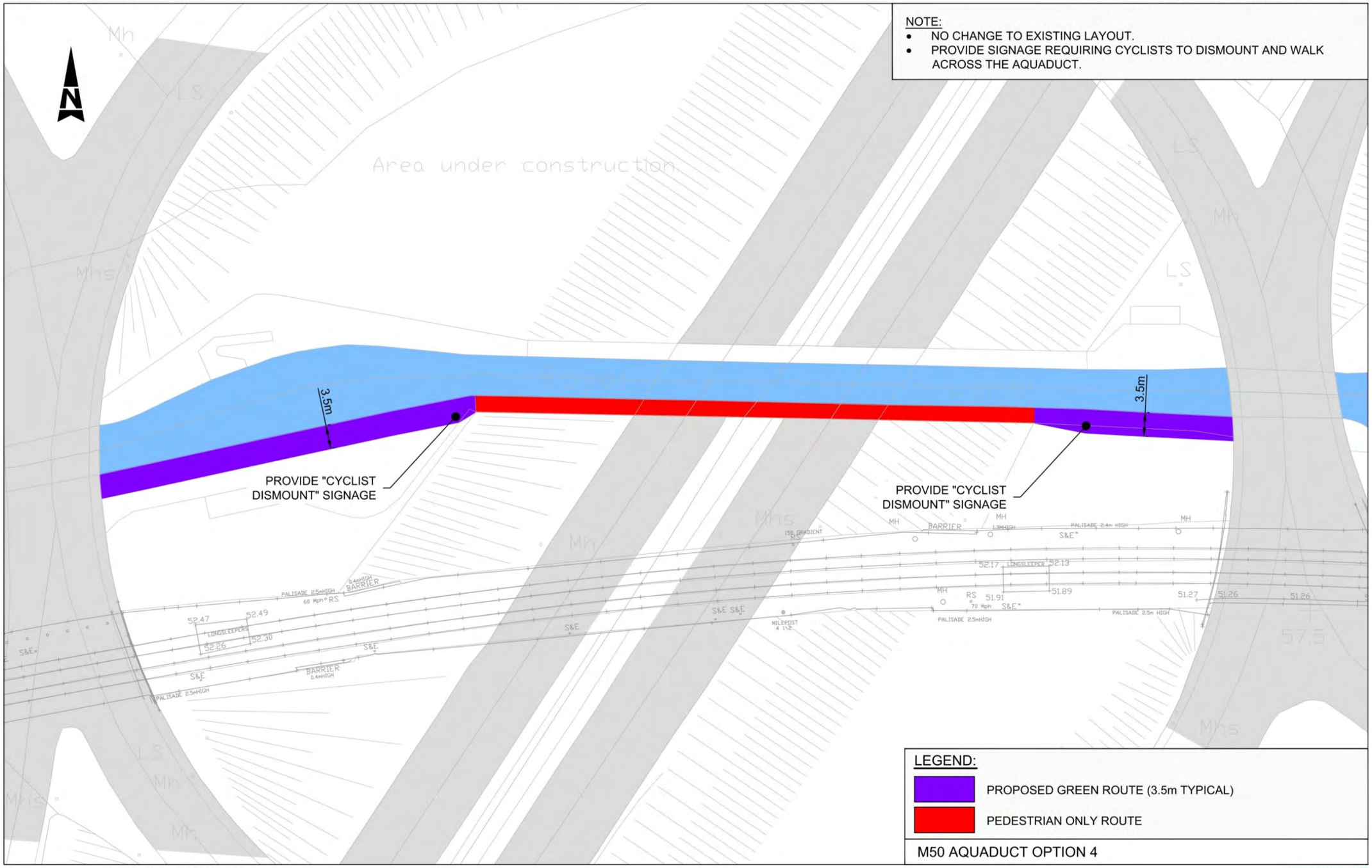


Figure 6.9 - M50 Aqueduct Option 4

Options at Talbot Bridge and towpath to Granard Bridge

6.92 All options at Talbot Bridge will seek to address the issues with accessibility and gradients to/from Old Navan Road.

6.93 The primary objective at this location is to provide a safe and effective method to ensure continuity of the proposed route is maximised. The approach to Talbot Bridge from the east is substandard, but there is sufficient space to improve this gradient up to current standards.

6.94 To the west of the bridge there is a lock with restricted space and steep gradients and the options presented have addressed this issue.

6.95 All options would link the canal cycleway with the existing cycle route between Blanchardstown and Old Navan Road, providing an alternative cycle route to the city centre via Auburn Avenue and the Phoenix Park.

6.96 **Option 1: Figure** 6.10 **- Talbot Bridge Option 1** is provided below. This option will require users to access the north canal-bank before using the original bridge to cross back to the south bank. This is necessary to avoid the private car park at the 12th Lock Hotel and the existing steps provided from Old Navan Road.

6.97 Given the low traffic volumes of traffic at Old Navan Road, it is proposed to provide a standard uncontrolled crossing facility at this location. This crossing would serve both pedestrians and cyclists.

6.98 In switching between the north and south banks of the canal, pedestrians will be required to use the existing footpaths. Cyclists will be accommodated through the provision of advisory on road cycle lanes between the accesses.

6.99 The proposed route through the 12th lock would be constrained to a minimum width of 2.5m until users have passed the 12th Lock Hotel buildings. Thereafter, a full width of 3.5m would be provided. These works would require widening to the existing bituminous surface in this area.

6.100 The capital costs for this option would be minimal with no major works elements to amend the existing infrastructure necessary.

6.101 The crossing of Old Navan Roadwould be expected to present minimal risk to users due to the very low vehicle movements at this location. Hence an uncontrolled crossing facility is selected. However, cyclists may choose to use the most direct route to access the towpath west of Talbot Bridge which is via the existing car park at the 12th Lock Hotel. Cyclists using the car park areas would be at risk of conflict with reversing vehicles.

6.102 This option would have minimal impacts on the receiving environment in both the construction stage and when in service as works required are minimal and the receiving environment is currently defined by the adjacent hotel premises, residential apartments and heavy pedestrian use.

6.103 Technically this option provides a good level of continuity. However, the directness is compromised due to the requirement for cyclists and mobility impaired to cross to the north bank and back again so that the car park and stepped access routes are avoided. In addition, the full desired width of 3.5m is not achievable through the 12th lock, thereby further compromising the Level of Service offered.

6.104 **Option 2:** Figure 6.11 - Talbot Bridge Option 2 is provided below. The proposed layout seeks to provide a direct access route to the southern towpath north of the 12th Lock Hotel car park. Acquisition of approximately 14 square meters of the 12th Lock Hotel car park would be required and a new footpath / cycleway access provided from Old Navan Road. A new boundary wall or fence would be provided along the new boundary line to the 12th Lock Hotel car park. This layout would equate to an approximate loss of three car parking spaces in the car park.

6.105 The proposed access would be used by both pedestrians and cyclists, who would cross Talbot Court via an uncontrolled crossing. An uncontrolled crossing facility would be deemed suitable given the low levels of vehicular traffic on the Old Navan Road.

6.106 As per Option 1 above, the route would pass through the 12th lock area via a path of constrained width of 2.5m until after the 12th Lock Hotel buildings, where a full width of 3.5m would be provided. These works would require widening to the existing bituminous surface in this area.

6.107 This option requires the purchase of circa 14 square meters of privately owned land at the 12th Lock Hotel car park. The level of construction activity required in terms of demolition of existing walls, construction of new boundary treatments, towpath access route and any associated accommodation works would be additional cost when compared to Option 1. The costs for this option would therefore be considered as moderate.

6.108 The level of safety offered by this option could be considered high given the low level of interaction with traffic and direct access to the towpath. Any issues with cyclists accessing the adjacent car park would be eliminated by this layout.

6.109 While considered minimal, the environmental impact of this option would be considered greater than Option 1 due to the greater scope of construction works required. Notwithstanding this, impacts on the receiving environment would be considered minimal in both the construction stage and when in service as works required are non intrusive and the receiving environment is currently defined by the adjacent hotel premises, residential apartments and heavy pedestrian use.

6.110 In terms of technical merit, this option would perform best due to the good continuity and directness of route. However, the restricted width through the 12th lock would impact on the comfort level achieved.

6.111 **Option 3:** Figure 6.12 - Talbot Bridge Option 3 is provided below. This option would direct cyclists onto the south bank of the canal at the 12th lock with access provided via the adjacent car park. This route would require agreement from the owners of the 12th Lock Hotel. There would be minimal loss of car parking area. However, there is a safety concern inherent in this solution as cyclists would be required to negotiate a car parking area where there are likely to be a significant number of reversing manoeuvres and visibility issues.

6.112 Pedestrians would be required to use the existing steps at Talbot Bridge, with all users required to cross Talbot Court via an uncontrolled crossing facility.

6.113 The route would continue through the 12th lock area via a path of constrained width of 2.5m. The path would extend to 3.5m wide immediately west of the hotel buildings. Works would be required to widen the existing bituminous path in this area.

6.114 This option would be considered as the “do minimum” scenario for this area. As such, implementation costs would be minimal. Construction works would only be required to widen the existing path in the area.

6.115 As noted previously, there would be safety concerns in directing cyclists to use the car park area where motorists would be executing a high number of reversing manoeuvres and where visibility would be restricted by other stationery vehicles. Therefore, this option would score poorly in terms of safety of end user.

6.116 This route would score highly in terms of continuity and directness of route although it would be considered inferior to Option 2 above. Similar issues in terms of the reduced width through the 12th lock area and the resultant impacts on comfort would be similar to other options under consideration.

6.117 **Option 4:** Figure 6.13 - Talbot Bridge Option 4 is provided below. This option would require users to access the north canal bank at Talbot Bridge.

6.118 Given the low traffic volumes on the Old Navan Road, a standard uncontrolled crossing facility would be provided at this location. The crossing would serve both pedestrians and cyclists. On-road advisory cycle lanes would be provided to assist and guide cyclists across the canal bridge as per Option 1 above.

6.119 The proposed route would follow the north bank of the canal through the 12th lock. The initial access route would consist of a reduced width of approximately 2.5m and steep gradient of 1:10. Options to overcome these constraints have been discounted due to the difficulties presented by the 12th lock chamber walls to the south (protected structures) and the grounds and boundary walls of The Mills residential development to the north (private property). The width would be further constrained by the space required for the operation of the lock gates at the upper level.

6.120 West of the lock, the full width of 3.5m would be provided through the adjacent parkland up to Castleknock Road.

6.121 The construction costs for this option would be considered low due to the minimal scope of works required. It would be considered to be marginally higher than options considered for the southern canal bank due to the marginally greater distance of widening required.

6.122 There would be a safety concern with respect to the existing steep gradient adjacent to the lower level of the 12th lock. Cyclists would be required to travel down this steep gradient generating potentially higher speeds at a potential conflict zone and accordingly would be considered undesirable. Similarly, mobility impaired may consider this hazardous for similar reasons where it may be difficult to control wheelchairs.

6.123 Environmental impacts would be negligible for this option and would be consistent with other options considered for this area.

6.124 The directness of route and continuity would be protected with this option. However, the reduced width and steep gradient at the western entrance from Old Navan Road would have a negative impact on the coherence and level comfort of the proposed route. Therefore, this option would be less favoured for these reasons.

6.125 This option would take users to the north side of the canal and would necessitate another crossing to the south at the next interface point, hence costs and interactions are deemed to be higher with this option.

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Table 6.3 - Talbot Bridge Option Evaluation Summary

Option Evaluation Summary Talbot Bridge, 12th Lock				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**#2**	**#1**	**#4**	**#3**
Economy	Low cost solution	Increased scope of works and requirement for acquisition of privately owned land equates to moderate level of cost	Low cost solution Will require legal agreements to enable cyclists to traverse private land.	Low cost solution
Safety	Offers good levels of safety and personal security. However, there is risk that cyclists may choose more direct route via existing car park, increasing risk of collision with reversing vehicles	Offers good levels of safety and personal security	Safety of cyclists compromised due to requirement to negotiate car park area and therefore cannot be recommended..	Safety concerns with steep gradient on eastbound approach to Talbot Court
Environment	Minimal impact in service and during construction	Minimal impact in service Higher scope of construction works required will have slightly increased construction stage impacts on surrounding environment	Minimal impact in service and during construction	Minimal impact in service and during construction
Technical	Minor negative impact on continuity of route. However, directness is significantly compromised. Lack of full width provision would also impact on comfort levels.	High Level of Service in terms of continuity and directness of route However, lack of full width provision through 12th lock would have negative impact on comfort levels.	Good Level of Service in terms of continuity and directness of route. Lack of full width provision would also impact on comfort levels.	Good Level of Service in terms of continuity and directness of route. Reduced width and steep gradient have negative impact in terms of comfort levels and coherence
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility	Good levels of integration and accessibility	Good levels of integration and accessibility

6.126 **Conclusion:** Option 3 has potential for conflicts between cyclists and manoeuvring vehicles in the car park and is least preferred on safety grounds. It represents the most likely existing situation in that cyclists and pedestrians are likely to be judging the safety of the car park before using it as the most direct route. However, this option cannot be recommended as the preferred route due to the conflicts mentioned above. It would also require agreement with the landowner.

6.127 Option 2 is preferred as it is the most direct route. However, this option requires a small area of land-take from the hotel car park.

6.128 Option 4 is constrained in terms of width and gradient and may pose difficulty for mobility impaired users. As this option directs users to the north side of the canal it will require a later crossing back to the south side.

6.129 Options 1, 2 and 3 utilise the south canal bank; this is preferable for the optimum layout at Granard Bridge (presented later), whereas option 4 requires crossing back to the south side to align with the preferred option at Granard Bridge.

6.130 Overall, Option 2 is preferred as it offers the best overall solution. However, should funding be limited than Option 1 will provide a low cost interim solution.

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:
- IMPROVED GRADIENT EAST OF BRIDGE.
- ADVISORY CYCLE LANES ON TALBOT COURT.
- UNCONTROLLED CROSSING AT TALBOT COURT.
- ACCESS TO SOUTH TOWPATH VIA NORTH BANK AND THEN ACCESS ORIGINAL BRIDGE.
- CONSTRAINED WIDTH THROUGH 12TH LOCK (2.0m MIN.)
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF 12TH LOCK AND TALBOT COURT.

N

The Mills

2.9m

2m

2.5m

2.5m

PRIVATE CAR PARK

CAR PARK ACCESS RETAINED

REGRADE TOWPATH

OVERGROWN

OVERGROWN

OVERGROWN

LEGEND:

PROPOSED GREEN ROUTE (3.5m)

ON ROAD CYCLE LANE (ADVISORY)

PROPOSED GREEN ROUTE (<3.5m)

TALBOT BRIDGE OPTION 1

Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.1.3.dwg

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Figure 6.10 - Talbot Bridge Option 1

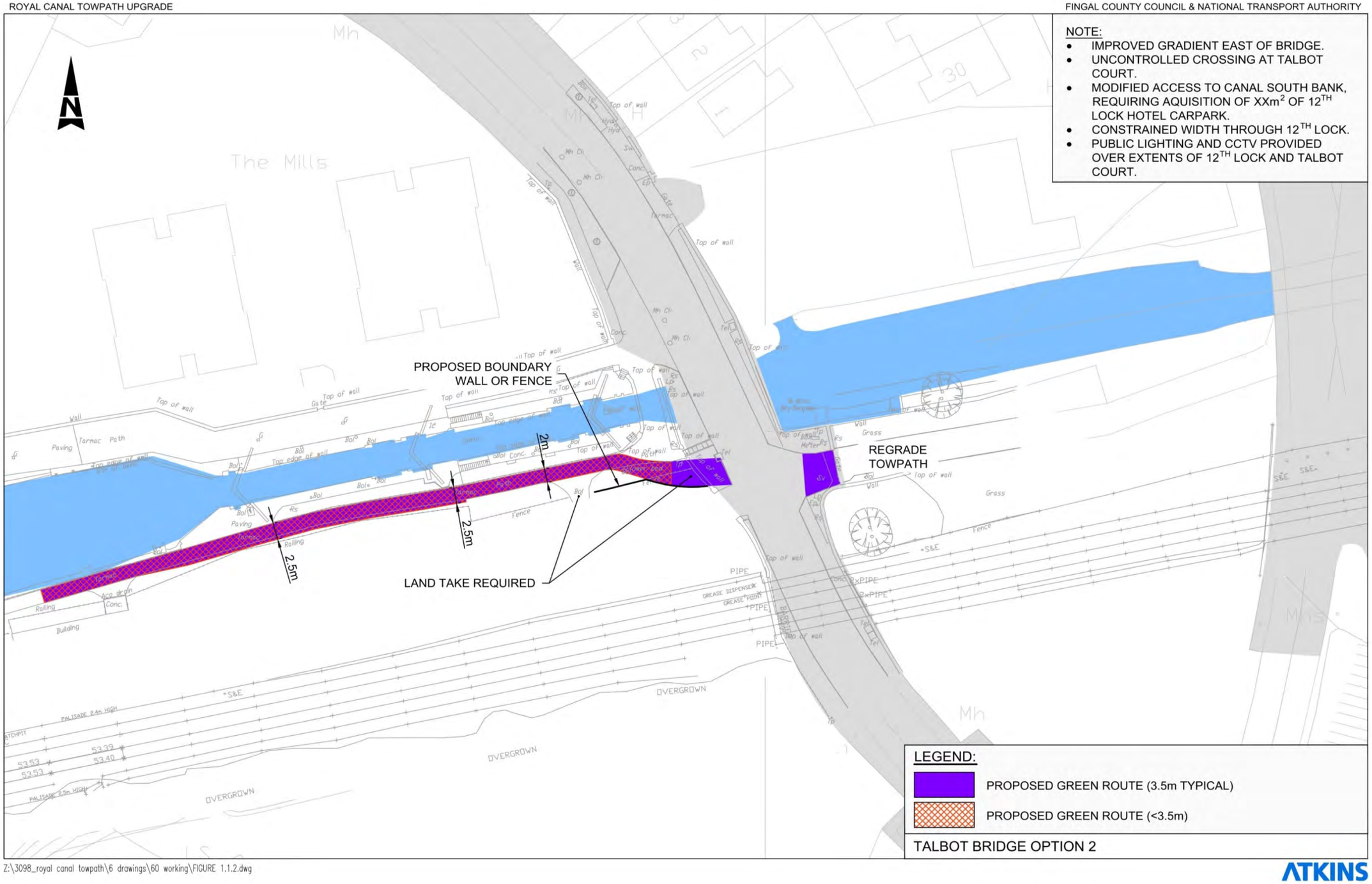


Figure 6.11 - Talbot Bridge Option 2

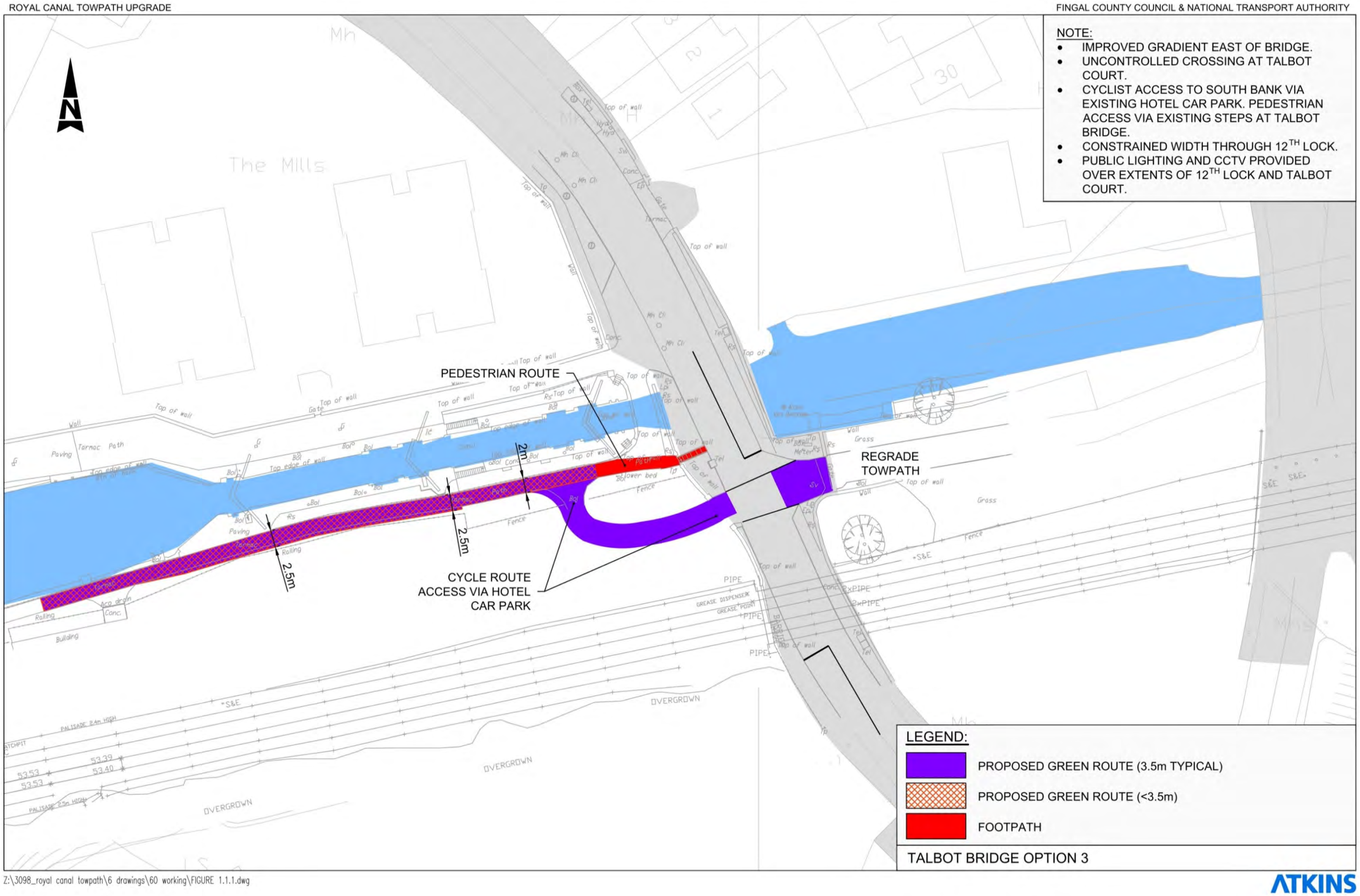
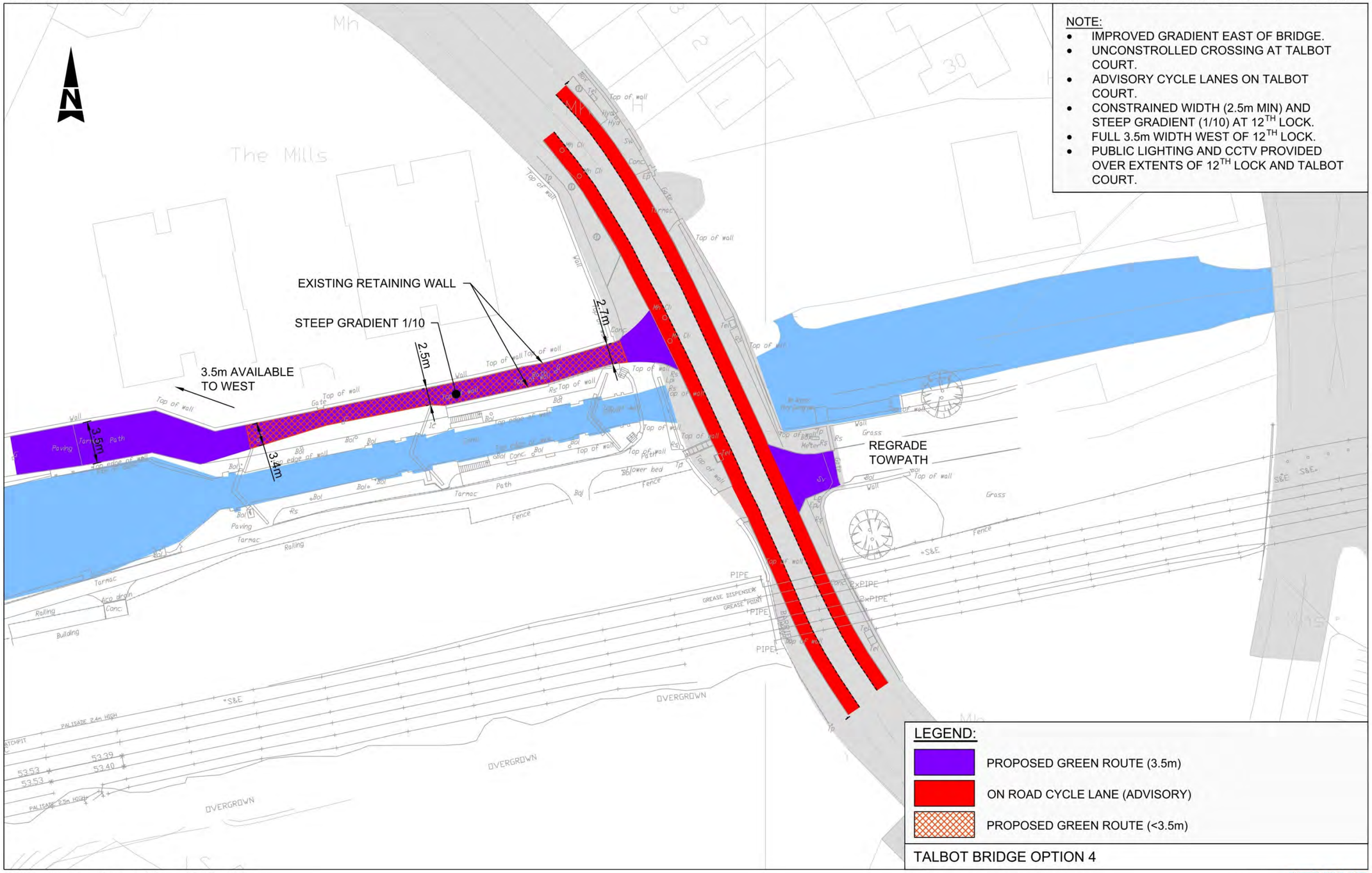


Figure 6.12 - Talbot Bridge Option 3

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY



Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.1.4.dwg

ATKINS

Figure 6.13 - Talbot Bridge Option 4

Options at Granard Bridge

6.131 All options discussed here are dependent on the selected solution at Talbot Bridge and whether cyclists / pedestrians are directed onto the northern or southern towpath at Talbot Bridge.

6.132 All options assume that after passing Castleknock station, a full width of 3.5m would be provided on the existing bank up as far as the deep sinking, approximately 400m to the west of Castleknock Station.

6.133 A high level of integration with local bus and rail transport and with existing and planned cycle routes in the area would be provided with all options.

6.134 **Option 1:** Figure 6.14 - Granard Bridge Option 1 is provided below. This option assumes that the eastern approach to Granard Bridge would be via the northern bank. The proposed route would emerge onto Castleknock Road at the existing entrance point. Where the selected route at Talbot Bridge directs users to the southern bank of the canal, this layout would not be compatible.

6.135 The 3.5m wide cycleway would be continued across Granard Bridge by reclaiming the appropriate amount of carriageway space and converting this to a raised paved area. This would require a one-way traffic system at this location and it is proposed that this system would be achieved through the installation of a shuttle traffic light system.

6.136 As this is a major traffic route, the shuttle traffic lights would require connection to the Dublin City Council SCATS network. It is noted that all other signals on this route are currently controlled on the SCATS network.

6.137 A toucan crossing facility would be provided at the entrance to the railway station and integrated with the shuttle traffic lights.

6.138 This option would represent one of the more favourable options in terms of capital outlay. Implementation costs would be limited to cover the provision of the raised kerbed area across the bridge and the installation of traffic signals, with associated road markings and signage.

6.139 The proposed layout would also provide a safe route for cyclists and pedestrians using the canal towpath. The high volume of traffic on Castleknock Road would present an otherwise hazardous situation where users would be required to negotiate busy traffic and narrow footpaths. This proposed layout would address these concerns.

6.140 The minimal works required to construct this layout would result in minimal impacts on the local environment. However, the layout would have a significant impact on traffic on Castleknock Road and would be expected to add to existing congestion levels. This would have an indirect impact on the local environment.

6.141 This is a good option technically for the cycleway, but a poor option for the existing Castleknock Road users given the significant traffic impacts.

6.142 **Option 2:** Figure 6.15 - Granard Bridge Option 2 is provided below. This option assumes that the eastern approach to Granard Bridge would be via the northern bank. Where the selected option at Talbot Bridge directs users to the southern bank of the canal, this layout would not be compatible.

6.143 This option would provide a pedestrian / cycle bridge parallel to Granard Bridge and located immediately east of it. This would provide a safe means for users of the towpath to cross the canal. Pedestrians on Castleknock Road would also be directed to the bridge, effectively eliminating the safety concerns with the existing narrow footpaths across Granard Bridge.

6.144 A toucan crossing facility would be provided at the entrance to the railway station to provide a safe passage for pedestrians and cyclists across Castleknock Road. These signals would be required to link to the Dublin City Council SCATS network.

6.145 Given the high volume of traffic using this route, the introduction of a toucan crossing would be expected to adversely affect existing traffic congestion in the area.

6.146 As this option seeks the construction of a dedicated pedestrian / cycle bridge, it would attract a higher level of capital cost.

6.147 A safe route would be provided to the users of the canal towpath. Pedestrians along Castleknock Road would also benefit from the new bridge in terms of safety and adequacy of existing footpaths over Granard Bridge.

6.148 There would be potential for some heritage issues with respect to the construction of the footbridge and its impact on the existing Granard Bridge. The new bridge would eliminate views to the bridge from the east. However, there is precedence for the construction of such bridges as can be seen at Clonsilla and Coolmine Stations, where modifications to the masonry walls adjacent to the canal bridges has been carried out. Therefore, it would be reasonable to assume that similar works may be feasible.

6.149 The technical merits of this option would be good in that the continuity and directness of the route would be maintained, although users may experience some waiting time at the toucan crossing due to the high traffic volumes present.

6.150 **Option 3:** Figure 6.16 - Granard Bridge Option 3 is provided below. The 3.5m wide proposed route would approach from the east along the southern bank of the canal. This layout would be compatible with the preferred option at Talbot Bridge.

6.151 Direct access to Castleknock Road would be provided by construction of a new ramped access route.

6.152 A toucan crossing facility would be provided at the entrance to the railway station to provide a safe passage for pedestrians and cyclists across Castleknock Road. These signals would be linked to the Dublin City Council SCATS network as per current adjacent traffic signals along Castleknock Road.

6.153 This option would deliver a cost effective and value for money solution. The scope of works would include the construction of an embankment and paved path, with railing and landings for mobility impaired users. The installation of the toucan crossing would be comparable to other options considered for this location.

6.154 A safe route would be provided to the users of the canal towpath and pedestrian traffic along Castleknock Road would also benefit from the signalised crossing. However, this option does not offer any improvement of facilities for pedestrians / cyclists crossing over the canal via the existing narrow footpaths on Granard Bridge.

6.155 The impacts on the environment would be minimised with this option due to the reduced scope of works required. As there is no additional bridge structure required, the associated impacts on the Granard Bridge protected structure would be reduced. However, the requirement for the traffic signals at the proposed toucan crossing would have an adverse effect on existing traffic congestion in the immediate area.

6.156 Continuity and directness of the route would be maintained with this layout. However, users may experience some waiting time at the toucan crossing due to the high traffic volumes present.

6.157 **Option 4:** Figure 6.17 - Granard Bridge Option 4 is provided below. For this option the proposed route would approach from the east along the south bank of the canal. The full width of 3.5m would be provided. This layout would be compatible with the preferred option at Talbot Bridge.

6.158 An underpass would be constructed to allow the facility to pass below Castleknock Road. Links to the existing footpaths, including the existing access route to Castleknock Road (via existing steps) would be maintained.

6.159 To the west, the underpass would provide continuity of service and width to Castleknock Station and onward towards the Deep Sinking. Access to Castleknock Station would be maintained via a new ramped access upon which an approximate width of 4.0m would be provided to permit vehicular access to Castleknock Station and the proposed cycle route. This would be essential to allow access for maintenance and emergency response vehicles. This access ramp would be substandard in terms of gradient (as is currently provided) due to limited space.

6.160 The construction cost of this option would be the highest of all options generated at this location. Using traditional methods the installation of the underpass would be expected to cause major disruption to local traffic as the closure of Castleknock Road would be required for the duration of the works. It would be possible to minimise traffic diversion by limiting the construction period. This may necessitate a full closure of the road for a short period of time. Another potential option would be to 'jack' the structure through the existing embankment. However, given the likelihood of utilities at this location plus the reduced depth of cover above such a structure, the jacking option is not considered feasible.

6.161 The underpass would offer the highest levels of safety for the users of the towpath as interactions with traffic would be completely eliminated. There is a possibility that the new underpass would attract antisocial behaviour and may give rise to personal security issues, but this may be overcome by the use of CCTV surveillance.

6.162 The proposal to excavate so close to a protected structure is a major environmental constraint to this option. Discussions and agreement with the Department of Environment, Community and Local Government will be required prior to any works being accepted at this location.

6.163 This option would provide the best technical performance of all options examined in terms of the provision of service for the cycleway. The continuity and directness of the route would be uncompromised and there would be no interaction with traffic or delays at traffic signals. However, this option is technically difficult to implement and is likely to cause traffic problems during construction.

6.164 There is a significant impact upon Castleknock station, with the existing access requiring diversion closer to the rail line. During construction, access to the station will need to be diverted.

Table 6.4 - Granard Bridge Option Evaluation Summary

Option Evaluation Summary Granard Bridge, Castleknock Road				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**#4**	**#3**	**#2**	**#1**
Economy	Low capital cost outlay.	High capital cost outlay due to proposed footbridge	Low capital cost outlay. Easy to construct	High capital cost outlay.
Safety	Good level of safety as users are segregated from the busy traffic flows	Good level of safety as users are segregated from the busy traffic flows	Good level of safety as users have minimal interaction with busy traffic	Total segregation from traffic equates to best safety. Provides vehicular access to the towpath to the west for maintenance and emergency response.
Environment	Minimal impact in service and during construction	Minimal impact in service Higher scope of construction works required will have slightly increased construction stage impacts on surrounding environment Toucan crossing would add to traffic congestion.	Minimal impact in service and during construction The toucan crossing would be expected to add to existing levels of traffic congestion.	Minimal impact in service. Potential for major disruption to local traffic, depending on construction method chosen.
Technical	Good Level of Service achieved. Some delay may be experienced at toucan crossing due to high traffic volumes. The shuttle traffic control layout would significantly add to existing levels of traffic congestion. Not compatible with option for Talbot Bridge.	Good Level of Service achieved. Some delay may be experienced at toucan crossing due to high traffic volumes Not compatible with option for Talbot Bridge.	Good Level of Service achieved. Some delay may be experienced at toucan crossing due to high traffic volumes. Comfort levels compromised due to gradients and mobility impaired landings	Best performance in terms of Level of Service achieved. Substandard gradients on ramps provided. Short closure of road will be required to place the underpass which will impact upon traffic.
Integration	High levels of integration and accessibility			

6.165 **Conclusion:** Options 1 and 2 would be least preferred as they are not compatible with the preferred option at Talbot Bridge.

6.166 Option 1 would also have significant permanent impacts on traffic congestion at Castleknock Road. It is therefore deemed not suitable.

6.167 Option 2 would require a higher capital investment to provide a footbridge over the canal but reduced impacts on traffic would remain as a toucan crossing would be required. It would negatively impact views to the bridge on the east side.

6.168 Option 3 would have a negative impact on traffic congestion at Castleknock Road due to the provision of a toucan crossing, as per Option 2. The introduction of gradients and landings would have impacts on the comfort levels for cyclists and the gradients provided would fall short of published guidelines for recommended minimum gradients for mobility impaired.

6.169 Option 4 would have no impact on Castleknock Road during service and provides the highest Level of Service to the end user. Issues of safety and traffic congestion on Castleknock Road would be eliminated and the construction phase would include a short closure of the road, causing congestion during construction. This option would represent the best solution, but is expensive.

6.170 Given its merits in terms of overall safety, environmental impact and high level of service offered, it is proposed that Option 4 is brought forward as the preferred solution for this element of the scheme. Where funding is not immediately available, option 3 should be considered as an interim solution.

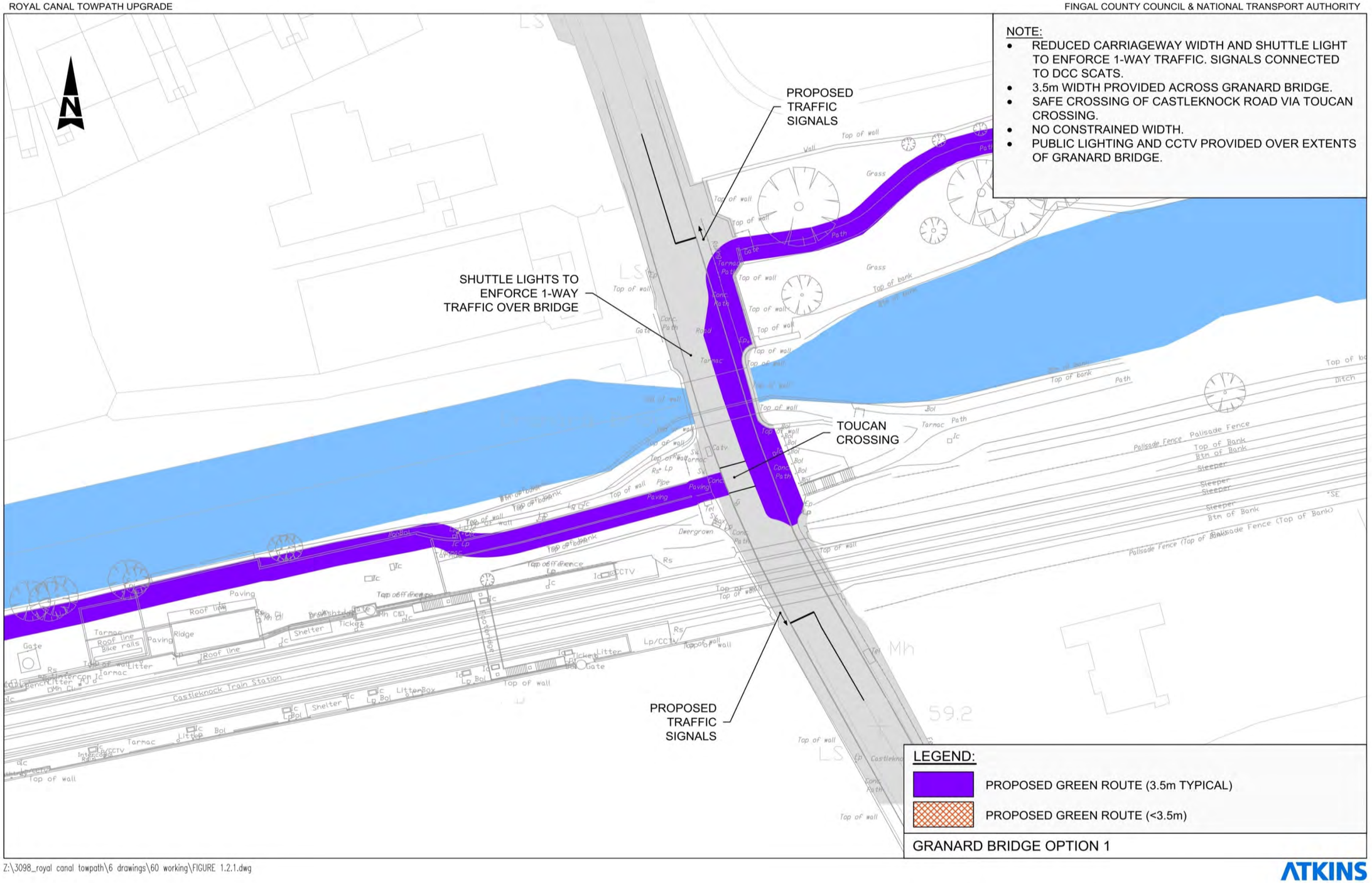


Figure 6.14 - Granard Bridge Option 1

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:

- 3.5m GREEN ROUTE APPROACHING ON NORTH BANK.
- NEW 4.0m FOOTBRIDGE ACROSS CANAL ADJACENT TO GRANARD BRIDGE.
- TOUCAN CROSSING AT ENTRANCE TO RAILWAY STATION. SIGNALS CONNECTED TO DCC SCATS.
- 3.5m GREEN ROUTE TO WEST PASSING RAILWAY STATION.
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF GRANARD BRIDGE.

PROPOSED TRAFFIC SIGNALS

TOUCAN CROSSING

RAISED BANK

TOUCAN CROSSING

PROPOSED TRAFFIC SIGNALS

LEGEND:

PROPOSED GREEN ROUTE (3.5m TYPICAL)

CYCLE / VEHICLE SHARED SPACE (RAISED ROAD SURFACE, 30kph SPEED LIMIT)

GRANARD BRIDGE OPTION 2

Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.2.3.dwg

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Figure 6.15 - Granard Bridge Option 2

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:
- 3.5m GREEN ROUTE APPROACHING ON SOUTH BANK.
- PROVIDE NEW RAMPED ACCESS TO EAST OF GRANARD BRIDGE. MAX. GRADE 1/12. ALLOW FOR GUARD RAILS AND REST AREA.
- TOUCAN CROSSING AT CASTLEKNOCK ROAD. SIGNALS CONNECTED TO DCC SCATS.
- 3.5m GREEN ROUTE TO WEST, PASSING RAILWAY STATION.
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF GRANARD BRIDGE.

PROPOSED TRAFFIC SIGNALS

PROPOSED RAMPED ACCESS. MAX. GRADE 1/12 FOR LENGTH OF 39m. PROVIDE GUARD RAILS AND REST AREA.

TOUCAN CROSSING

PROPOSED TRAFFIC SIGNALS

LEGEND:

PROPOSED GREEN ROUTE (3.5m TYPICAL)

PROPOSED GREEN ROUTE (<3.5m)

GRANARD BRIDGE OPTION 3

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Figure 6.16 - Granard Bridge Option 3

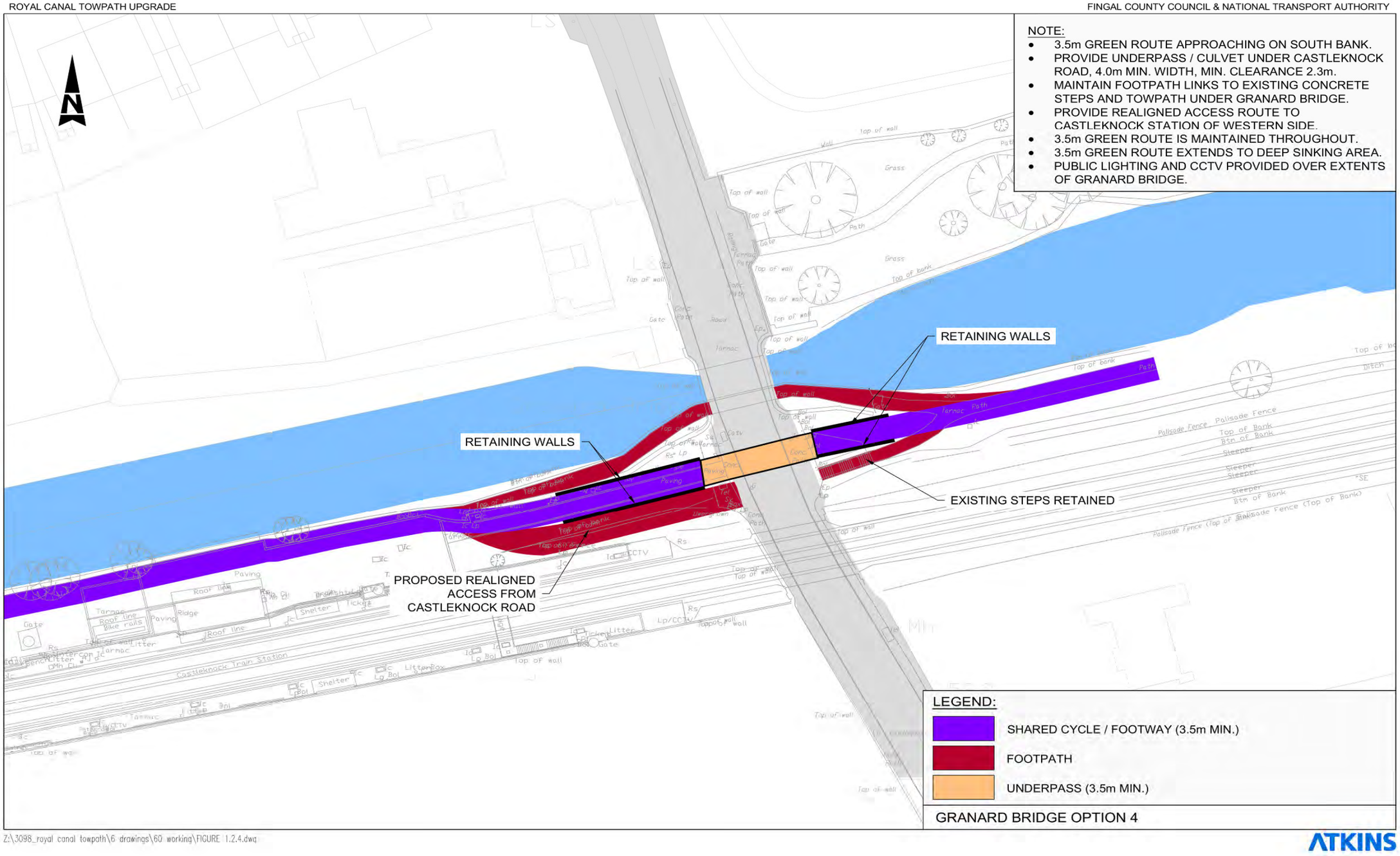

Figure 6.17 - Granard Bridge Option 4

Area 2: Granard Bridge (Castleknock Road) to Callaghan Bridge (Clonsilla Road)

The *"Deep Sinking"*

6.171 The "Deep Sinking" presents significant challenges to the provision of a continuous 3.5m cycling / walking route. The topography and layout of the existing towpath typically consists of a 2.0m wide track flanked by a deep cutting of 1.0 – 9.0m to the canal on one side and a varying height embankment supporting the Dublin – Sligo Railway on the other. There is a critical pinch point located approximately 400m west of Castleknock Station (*"Castleknock Pinch Point"*) where the towpath is particularly constrained due to the close proximity of the railway and an existing masonry retaining wall. The difference in level between the towpath and canal waters at this location is approximately 1.0 – 1.2m. The following options will address the general situation and give particular reference to the identified pinch point.

6.172 The Deep Sinking represents a unique snapshot of historical engineering and heritage. All options will seek to maximise opportunities to enhance awareness and promote the historical and heritage value of the canal. Seating areas will be provided at suitable locations co-located with information plaques and signage.

6.173 Good levels of integration and accessibility would be offered to all options in this area with the provision of the "opportunities" as outlined in Chapter 5 of this report. The erection of proposed bridges linking adjacent communities would provide a high level of integration and provide greater accessibility to the canal towpath together with other benefits of connectivity between otherwise severed communities.

6.174 A guardrail would be provided on the external edge of all options through this section for safety purposes. Hinged sections of the guardrail would be included in the design to enable the rail to be opened / removed to permit direct access to the waters for maintenance and rescue purposes.

6.175 Personal security would be a perceived concern through this area as the existing character is unlit and overgrown. However, the increased width, provision of additional access points to the adjacent residential areas and increased use of the facility in general would give rise to an increased level of passive surveillance. Notwithstanding this, CCTV surveillance would also be provided throughout.

6.176 **Option 1** would seek to construct a cantilevered boardwalk type facility, using the full available width throughout the "Deep Sinking" area.

6.177 This would require the installation of a series of mini-piles or anchors to provide support to structural walkway/cycleway. The full desirable width of 3.5m would be achieved throughout. This would be achieved by cantilevering the path out over the existing canal bank for a distance of 1.5m typically.

6.178 The proposed cantilevered boardwalk would be extended eastwards to address the issues at the Castleknock pinch point, created by the railway and the masonry retaining wall supporting it. However, as this location is at the eastern limit of the "Deep Sinking", the level difference between the towpath and the canal waters is relatively small at approximately 1.0m. Therefore, the construction of the cantilever boardwalk would impact on the existing vegetation along the canal bank (ie riparian zone) at this location and would protrude above the canal itself. This should not be too problematic as the canal width at this location is much wider than at other locations along its length.

6.179 The costs associated with this option would be significant. Installation of specialist mini piles/anchors would be required, the final extent of which would be informed by the prevailing ground conditions on site. Construction of the super-structure would then follow in a construction process which would be slow and difficult given the inaccessibility of the area for construction plant and machinery.

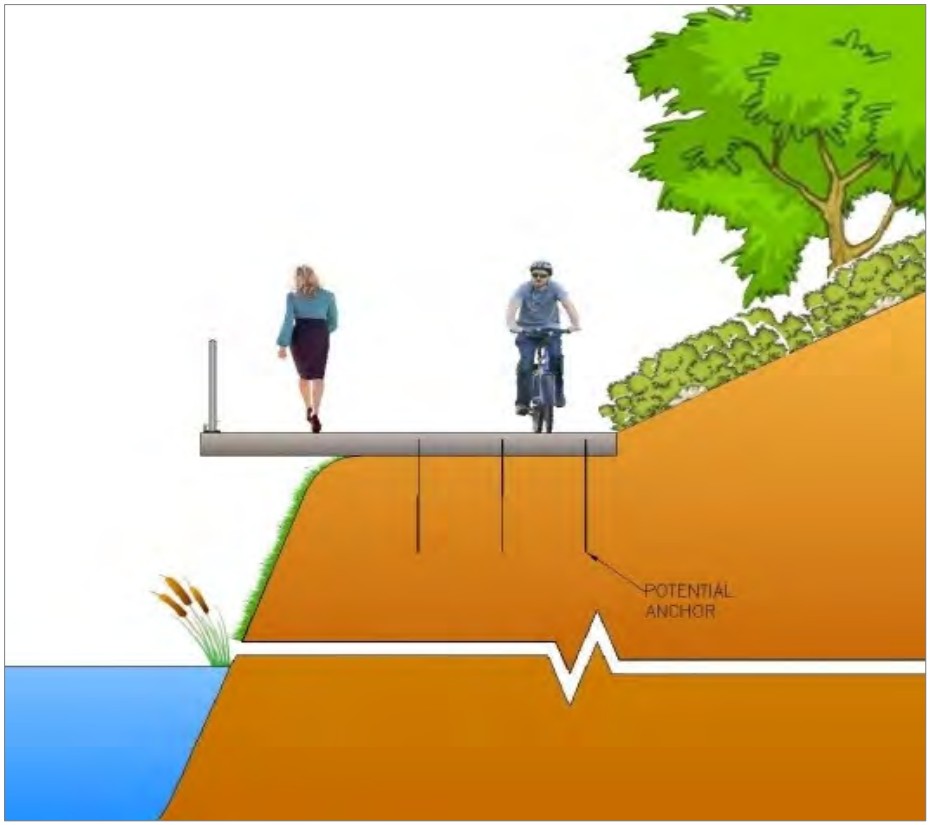

Figure 6.18 – Option 1 - Cantilever Boardwalk

6.180 The construction of this option would require the clearance of all existing young trees from the canal bank and lopping of others along the adjacent embankment. These trees are of low ecological value and therefore the impact on the receiving environment would be significantly lower than other options under consideration.

6.181 The existing riparian zone throughout the “Deep Sinking” would not be affected where the towpath level is in excess of approximately 1.5m above the canal water level. However, the treatment required at the Castleknock Pinch Point would necessitate the removal of existing vegetation within the riparian zone. Existing planting which is affected by the proposal should be transplanted to a more suitable nearby location, thereby preserving its ecological value. In addition to the above, the cantilever boardwalk would be designed to support vehicular access for both emergency and maintenance purposes.

6.182 **Option 2:** would involve the construction of a “King Post” retaining structure to permit widening into the adjacent embankment.

6.183 This would require the installation of a series of posts embedded in the ground at approximate 2.0m centres. Horizontal structural members would be installed to provide the lateral retaining element of the structure. A wide range of suitable materials are available for use, including railway sleepers, which would be sympathetic to the surrounding environment from an aesthetics perspective.

6.184 The constructability of this system, whilst constrained, would be relatively straightforward to achieve given the relative small sizes of the plant and equipment required. Any option to widen into the adjacent embankment would impact on the Zone of Influence of the adjacent railway and

would therefore be subject to agreement with Irish Rail. Consultations with Irish Rail have established that where works to the existing embankment would be necessary, this option for retaining the structural integrity of the embankment would be preferred over options which require more excavation of the embankment.

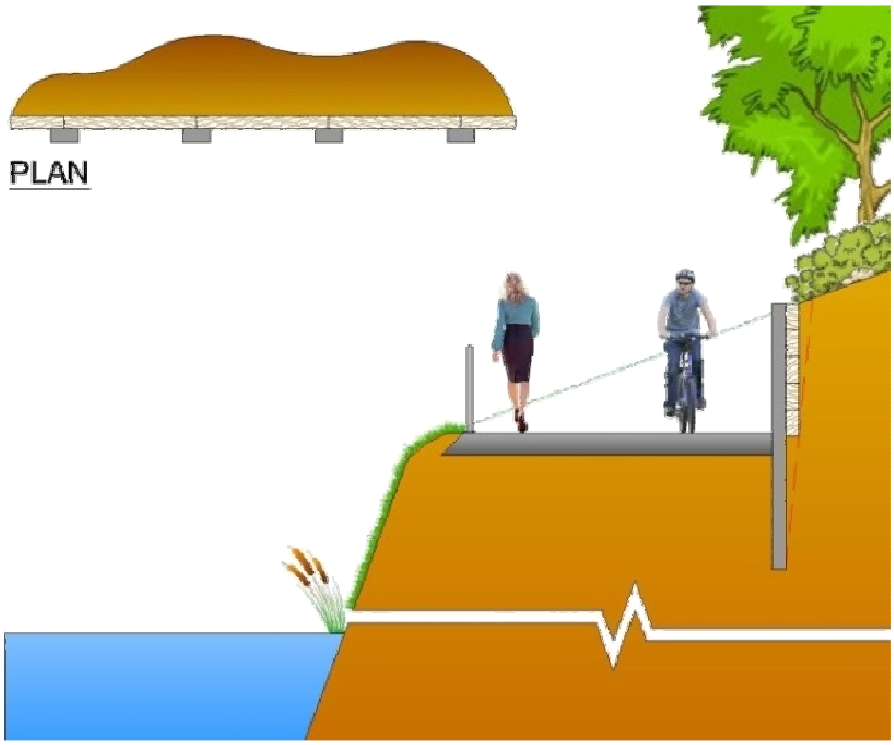

Figure 6.19 – Option 2: - "King Post" Earth Retaining Wall

6.185 The provision of a king post retaining structure would not be appropriate at the Castleknock Pinch Point. Therefore, a cantilever boardwalk would be proposed over this short section, as per Option 1 above.The construction of this option would also require the clearance of all existing young trees from the canal bank and lopping of others along the adjacent embankment. These trees are of low ecological value. However, this option would also necessitate the excavation and removal of a significant area of the existing embankment. The resulting impacts on the receiving environment would be higher than in Option 1 above.

6.186 Technically, as this option would provide the full desired width of 3.5m throughout the "Deep Sinking" area, it would provide a high Level of Service.

6.187 **Option 3:** The provision of a "traditional" cantilever retaining wall would permit widening into the embankment and, in engineering terms, would be the most efficient method of retaining the required level of material.

6.188 The installation would require the excavation and temporary removal of a large quantity of existing material to provide the working space to construct the wall. This would necessitate the removal of a large amount of the existing established trees and other vegetation currently located on the embankment. Consequently, the impacts on the surrounding environment and eco systems would be significant. The removal of this vegetation would also have a major impact on the existing character of the canal corridor in this area.

6.189 In addition, during the consultation phase of this study Irish Rail tabled concerns over this option as it would have the greatest risk of embankment failure during construction. As a result the methodology of construction would necessitate short sections being 'opened up' for construction

at any time, which would lead to extremely intensive work methods. In addition, the removal and replacement of large quantities of soil to construct the cantilever would add to the intensiveness of the work.

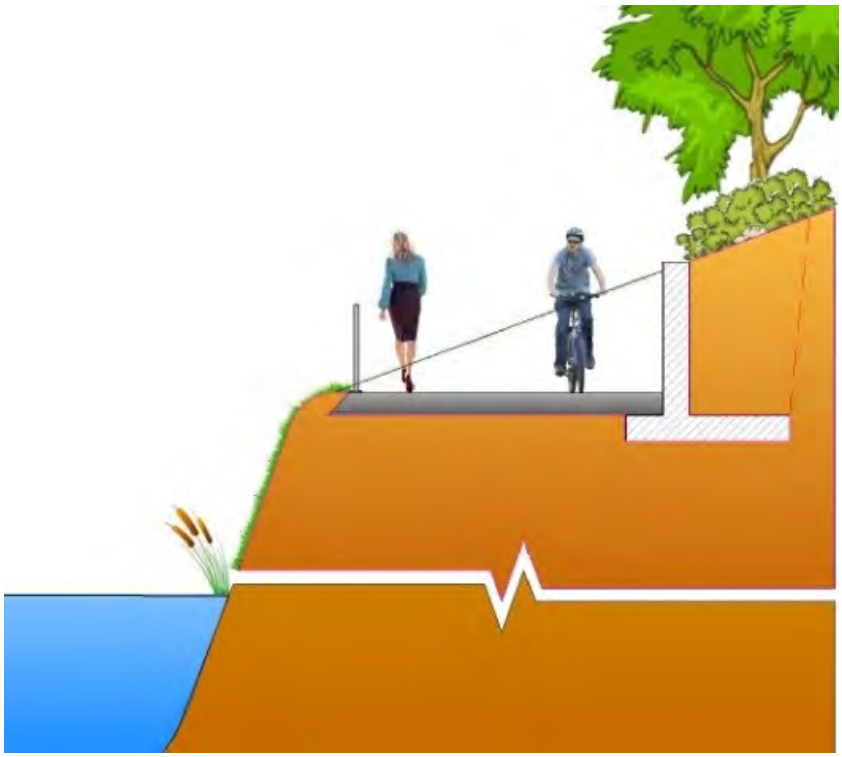

Figure 6.20 – Option 3 - Cantilever Retaining Wall

6.190 In addition, during the consultation phase of this study Irish Rail tabled concerns over this option as it would have the greatest risk of embankment failure during construction. As a result the methodology of construction would necessitate short sections being 'opened up' for construction at any time, which would lead to extremely intensive work methods. In addition, the removal and replacement of large quantities of soil to construct the cantilever would add to the intensiveness of the work.

6.191 The provision of this type of structure would not be appropriate at the Castleknock Pinch Point. Therefore, a cantilever boardwalk would be proposed over this short section, as per Option 1 above.

6.192 **Option 4:** The alternative option to developing the "Deep Sinking" area would be to provide a parallel route for cyclists through the adjacent residential areas. However, in doing this, it would still be of benefit to the local community (and all users of the canal) if the existing towpath was upgraded to the maximum width possible without resorting to the engineering measures described above.

6.193 The towpath would be upgraded on quality of surface only and no widening would be proposed.

6.194 Cyclists would be diverted away from the canal corridor at Granard Bridge and along one of the routes identified below**Error! Reference source not found.**. These routes have been selected due to their existing and/or proposed cyclist facilities or their low traffic / residential nature.

6.195 Three alternative sub-options are available as follows:

- Route 4A – From Granard Bridge, cyclists would be diverted northwards along Castleknock Road and then west along Roselawn Road. There are currently no formal cycle facilities along this section of road.

  From Roselawn Road, the route would follow an off-road section through existing parkland before joining Brompton Court. This section would also need work to upgrade the existing paths to a cycleway or shared standard.

  From Brompton Court, cyclists would be required to follow Delwood Road, Coolmine Road and Clonsilla Road where the route would rejoin the canal towpath. Current provision of cycle facilities along this route is poor.

- Route 4B – Cyclists would be diverted between Castleknock Road and Coolmine Road as per Route 4A above.

  At Coolmine Road, the route would turn southwards before heading west along Kirkpatrick Avenue, a narrow road with little traffic present. Further west, the route would be developed in conjunction with adjacent zone lands as far as Diswellstown Bridge.

  Passing under Diswellstown Bridge, extensive works would be required to establish the route as far west as Porterstown Road.

  The route would then follow Porterstown Road northwards before joining Clonsilla Road onward to Clonsilla Station where the route would rejoin the canal towpath. Current provision of cycle facilities along this route is very poor.

- Route 4C – From Granard Bridge, cyclists would be diverted southwards along Castleknock Road and then west along Park Lodge. The route would follow Carpenterstown Road and Riverwood Dale passing through several roundabouts before heading northwards on Diswellstown Road.

  The final section of this route would cross Diswellstown Bridge before turning west along Clonsilla Road and rejoining the canal towpath west of Clonsilla Station.

  This route seeks to use existing distributor roads through the Laurel Lodge and Carpenterstown residential areas where bus lanes and cycle facilities are currently provided. However, as per previous routes above, the current cycle facility provision along Clonsilla Road is poor.

6.196 Public lighting along the “Deep Sinking” section of the canal would not be provided between Castleknock Station and Callaghan Bridge as part of this option. However, in the interest of safety, a pedestrian guardrail would be provided as a precaution against accidental falls into the canal through the deeper sections of the “Deep Sinking”.

6.197 Depending on the selected route sub-options above, the overall final costs for this layout would vary. However, in considering all variants, this option would be the least costly of all options considered.

6.198 However, the reduced cost is commensurate to the reduction in safety and end user security. Cycle traffic would be required to negotiate the streets of the adjacent residential areas and distributor roads. Such routes would have obvious safety deficiencies over the traffic-free route along the canal towpaths. There would also be a significant risk of cyclists continuing along the proposed footpath through the “Deep Sinking” rather than taking the longer detour, thus increasing the potential for conflicts with pedestrians. Furthermore, the lack of public lighting along the towpath would have obvious negative implications on personal security.

6.199 This option would have a lesser impact on the receiving environment, although removal of trees along the canal bank and extensive lopping of others would still be necessary. The construction stage of this proposal would also be more favourable compared to that of other options above.

6.200 Technically, the Level of Service offered is significantly reduced. The directness and coherence of the route would be lost and the facility would not be attractive to commuter cyclists.

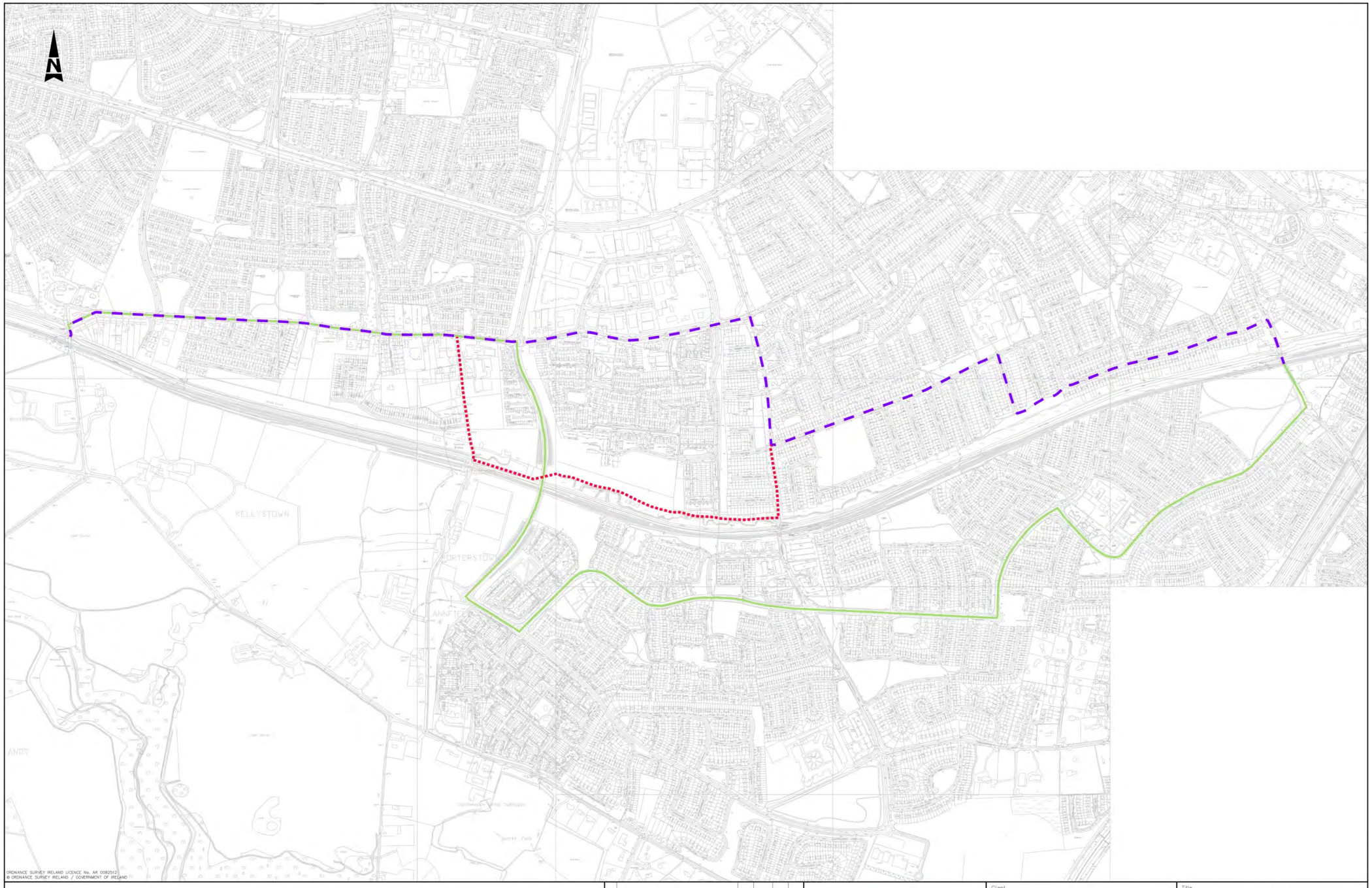

Figure 6.21 - Option 4 Deep Sinking - Alternative Route

Table 6.5 - "Deep Sinking" Option Evaluation Summary

Option Evaluation Summary "Deep Sinking" (Castleknock – Clonsilla)				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**#1**	**#2**	**#3**	**#4**
Economy	High cost – difficult to construct due to limited access	High cost – easy to construct but would be time consuming due to Zone of Influence of adjacent railway.	High cost – easy to construct but would be time consuming due to Zone of Influence of adjacent railway.	Lowest cost – scope of works significantly reduced
Safety	High levels of safety and personal security			Lesser levels of safety and personal security due to diversion of cycle traffic onto adjacent road and non-provision of public lighting along the towpath.
Environment	Minimal impact in service Moderate impact during construction Relocation of short length of riparian vegetation required at Castleknock Pinch Point	Minimal impact in service Excavations into adjacent embankment will result in higher impacts on the environment. Relocation of short length of riparian vegetation required at Castleknock Pinch Point	Minimal impact in service Major impacts during construction phase. Extensive loss of vegetation and trees, character of corridor likely affected. Relocation of short length of riparian vegetation required at Castleknock Pinch Point	Minimal impact in service. Least impact during construction.
Technical	High Level of Service achieved	High Level of Service achieved. No impact on Irish Rail embankment.	Less preferred by Irish Rail	Poor standards provided. Lack of coherence and directness Route likely to be unattractive for cyclists
Integration	High levels of integration and accessibility			

6.201 **Conclusion:** Option 4 represents the least level of financial investment but it falls short significantly in terms of safety and technical attributes. The "diversion" length is 1.2km and would not be seen as an attractive route for cyclists. It is likely that cyclists would continue along the reduced width path of the Deep Sinking, thus creating a safety issue for themselves and other users. It is therefore the least preferred option but would be a suitable interim solution until funding was in place to adopt the preferred option.

6.202 Option 3 represents significant construction costs and is likely to have considerable negative impacts on the local ecology. The high level of impact on the receiving local environment is likely to meet significant opposition from numerous stakeholders.

6.203 Option 2 would require works to the existing embankment supporting the Dublin – Sligo Railway. While Irish Rail has indicated that any works which could potentially affect the stability of the existing embankment would be undesirable, they would have a preference for this type of retaining structure over any other. The proposed methods of construction are likely to be highly restricted by Irish Rail as these works would occur within the Zone of Influence of the railway. This would most likely result in a slow and costly construction phase.

6.204 Option 1 is preferred over Option 2 as it has the least impact on the adjacent railway and the receiving environment although it is comparatively more expensive to construct. This option would provide the best solution in terms of achieving retaining the existing character of the canal corridor. On this basis, it is proposed that Option 1 is brought forward as the preferred solution for this element of the scheme.

Kirkpatrick Bridge

6.205 The existing Kirpatrick Bridge is narrow and pedestrian access across it is provided by means of a parallel footbridge on the eastern side. The approach path from the east is particularly difficult, with a steep, narrow footway meeting the existing footbridge at the crossing point of the bridge.

6.206 The western approach would require minor widening and the slope to be lessened and this is consistent across all options. At the access point to Coolmine Road, the existing wing wall would require modification to eliminate a local pinch point and provide unhindered access to / from the towpath. All options would require users to cross Coolmine Road.

6.207 A toucan crossing would be provided in this case which would enhance the safety aspect for those travelling along the canal. Personal security would not be of concern at this location due to the adjacent railway station, close proximity of adjacent residential areas and the corresponding levels of passive surveillance provided.

6.208 Continuity and directness of the route are maintained across all options.

6.209 Integration with local bus and train services would be provided at Coolmine Road and Coolmine Station for all options.

6.210 Accessibility standards would be provided on all approach paths across all options.

6.211 Crossing of Coolmine Road would be provided by means of a toucan crossing for all options. The new signals would need to be integrated with the adjacent automatic level crossing. The introduction of traffic signals would be expected to have some impact on traffic congestion on Coolmine Road, especially at peak traffic hours.

6.212 **Option 1:** Figure 6.22 - Kirkpatrick Bridge Option 1 is provided below. This option seeks to achieve the required 3.5m width by removing the existing wall between the towpath and the access route to the inbound platform at Coolmine Station ie widening the existing towpath footway to the south. The existing access control gate to the adjacent platform would be retained in its current position. To achieve this, an elevated walkway would be required to match the level of the station access footway. This walkway would gradually slope down to ground level over a significant length.

6.213 In removing the existing wall, the piers located at the southern abutment of the existing pedestrian bridge would not be affected. Therefore, no structural works would be required to this existing bridge on the east side.

6.214 This option would require a land purchase/agreement from/with Irish Rail (ie footpath access to inbound platform).

6.215 This option would have moderate impacts on the local environment with significant tree clearance required to facilitate the elevated walkway.

6.216 **Option 2:** Figure 6.23 - Kirkpatrick Bridge Option 2 is provided below. The approach path from the east would be constructed as an elevated boardwalk of 3.5m effective width, measured from the existing boundary wall of Coolmine Station i.e. widening to the north. A landing would be constructed at the interface of the new cycleway and the existing footbridge to facilitate the appropriate widths.

6.217 Option 2 is cheaper than option 1 as it does not rely on an extensive elevated section of walkway. It correspondingly does not affect the environment to the same extent.

6.218 This option also does not require agreement with Irish rail to use the existing footway to the platform. Option 2

Table 6.6 - Kirkpatrick Bridge Option Evaluation Summary

Option Evaluation Summary	Kirkparick Bridge (Coolmine Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#2**	**#1**
Economy	Higher cost	Lower cost
Safety	High levels of safety and personal security	
Environment	Less impact	More impact
Technical	Good Level of Service achieved Traffic lights have potential to increase traffic delays on Coolmine Road Agreement with Irish Rail required	Good Level of Service achieved Traffic lights have potential to increase traffic delays on Coolmine Road.
Integration	High levels of integration and accessibility	

6.219 **Conclusion:** Option 1 requires acquisition of land from Irish Rail. Hence, this option would be more expensive.

6.220 Option 2 is likely to result in more disruption during the construction phase although this would be marginal.

6.221 Both Options compare equally in terms of other headings.

6.222 Option 2 is the preferred solution in this case on the basis that it would be marginally cheaper to realise and any operation impact on Irish Rail during construction would be eliminated.

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:

- ON APPROACH FROM CASTLEKNOCK. EXISTING WALL BETWEEN TOWPATH AND PLATFORM ACCESS PATH TO PROVIDE SHARED PATH. EXISTING ACCESS CONTROL TO INBOUND PLATFORM TO BE RETAINED IN IT'S CURRENT POSITION.
- INTEGRATE WITH ABUTMENT OF EXISTING PEDESTRIAN BRIDGE, i.e. NO MODIFICATIONS TO BRIDGE REQUIRED.
- TRAFFIC CONTROL AT COOLMINE BRIDGE VIA TOUCAN CROSSING. TRAFFIC SIGNALS INTEGRATED WITH LEVEL CROSSING.
- 3.5m GREEN ROUTE ON APPROACH FROM WEST. MINOR MODIFICATION REQUIRED TO EXISTING BRIDGE PARAPET WALL AT ENTRANCE TO TOWPATH.

OPTION VARIES

EXISTING PEDESTRIAN BRIDGE

OPTION VARIES

PROPOSED TRAFFIC SIGNALS

WALL TO BE REMOVED

TOUCAN CROSSING

LAND TAKE FROM CIE, ALTERNATIVE PLATFORM ACCESS

PROPOSED TRAFFIC SIGNALS

EXISTING CAR PARK

LEGEND:

PROPOSED GREEN ROUTE (3.5m TYPICAL)

COOLMINE ROAD / KIRKPATRICK BRIDGE OPTION 1

Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.3.1.dwg

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Figure 6.22 - Kirkpatrick Bridge Option 1

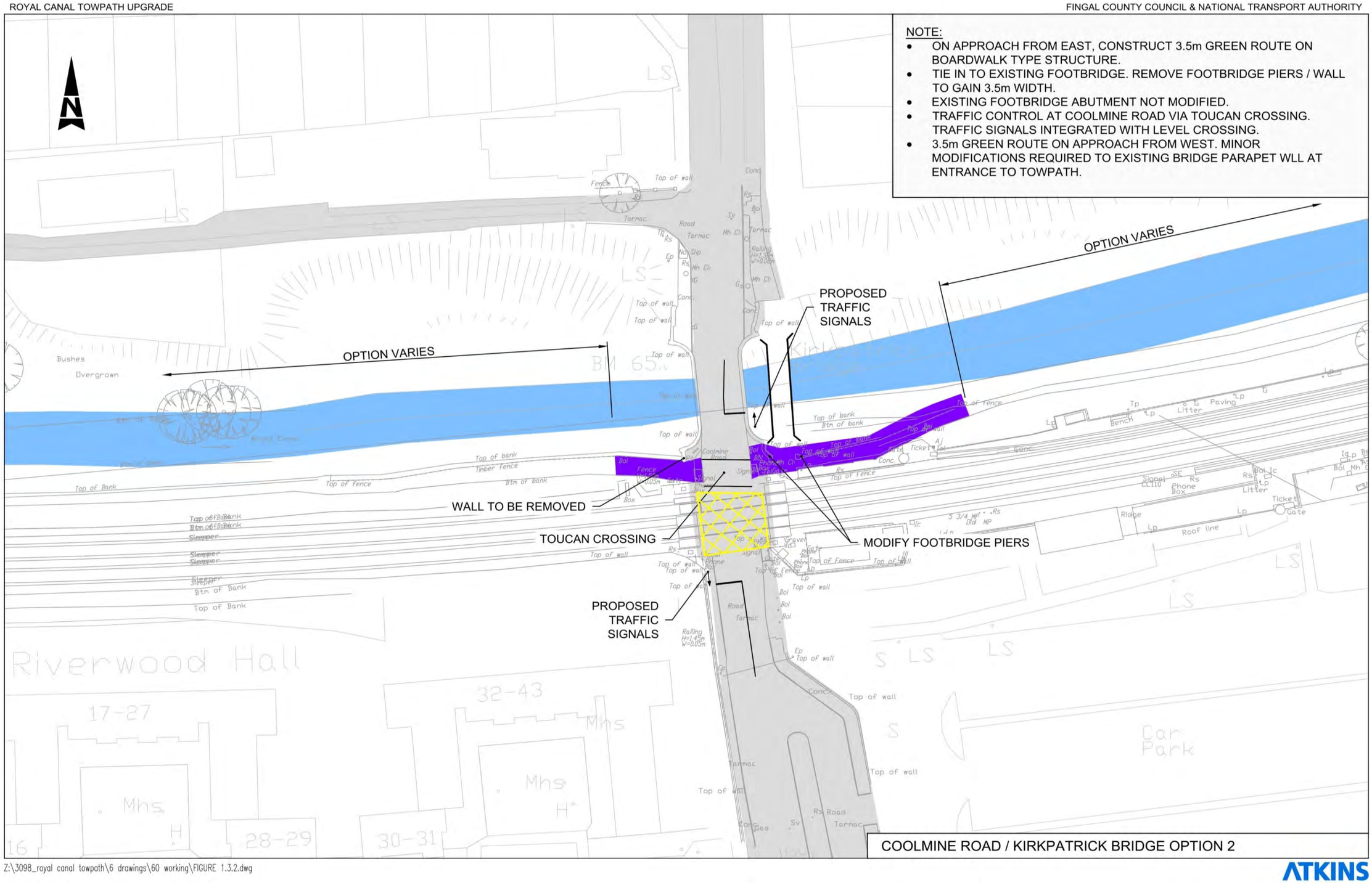

Figure 6.23 - Kirkpatrick Bridge Option 2

Kennan Bridge

6.223 Kennan Bridge is a narrow bridge with informal single way traffic operating across it. There is a level crossing to the south of the bridge. The road over the bridge (Porterstown Road) has been bypassed by a new road and it is proposed to close Kennan Bridge to vehicular traffic in the future. Option 2 describes this outcome as an option for clarity.

6.224 When the road is closed in the future, the level crossing will also be closed.

6.225 The existing situation is that the effective continuity along the towpath switches between provision on the south side of the canal to the east and on the north side to the west. The existing situation therefore relies on pedestrians and cyclists crossing Kennan Bridge to achieve continuity along the towpath.

6.226 Kennan Bridge has an effective width of 3.6m which is enough for single way traffic only and is not wide enough to support a footway and roadway together.

6.227 The approach from the east is narrow and would be widening in line with the preferred option for the deep sinking area.

6.228 The approach from the west has reasonable width, but would need to be widened slightly to incorporate the 3.5m desired width. It is considered that as this is not adjacent to the railway, as in the rest of the deep sinking area, that widening could be done relatively straightforwardly by regrading the embankment to the north of the path.

6.229 The two options presented are not comparable as they represent different scenarios, depending on whether the road is closed.

6.230 **Option 1:** Figure 6.24 - Kennan Bridge Option 1 is provided below. This is the only feasible option considered for this bridge whilst the road remains open. It includes for the widening on the approach from the east, which would necessitate a short length of retaining wall alongside the railway so that the full width of 3.5m could be provided.

6.231 As the existing road width across Kennan Bridge is narrow, it would be more suitable for a one-way traffic system. This option should be formalised to incorporate a shuttle traffic lights system to enforce a one-way shuttle layout. This is likely to create traffic delays, but as the road is only lightly used, the delays are not considered to be significant.

6.232 The crossing of Porterstown Road would be provided by means of an elongated toucan crossing, with push button units provided at the egress points of the towpath. The traffic signals would need to be integrated into the adjacent automatic level crossing signals.

6.233 The provision of the signals would greatly increase the level of safety for users of the towpath over the existing situation.

6.234 There would be minimal impacts on the local environment during construction and when in service. Diswellstown Road and bridge is now complete and opened to traffic. Hence, traffic volumes on Porterstown Road are now very low.

6.235 This option would offer a good Level of Service in terms of continuity and directness of route. However, there would be some delays experienced at the proposed toucan crossing.

6.236 There would be little integration with existing public transport links at this location. However, given the number of local schools in the immediate vicinity (existing and planned), there would be good links to adjacent cycle networks and the proposed route would provide safe traffic-free cycle routes between the schools and the local residential developments.

6.237 **Option 2:** Figure 6.24 - Kennan Bridge Option 1 is provided below. This option incorporates the closure of Kennan Bridge. With no traffic present, the proposed route would continue across Kennan Bridge without any interface with traffic.

6.238 The overall layout would be identical to Option 1. However, as Porterstown Road would be closed to traffic, the toucan crossing and traffic signals would not be required. In addition, traffic restriction bollards would be required on Porterstown Road immediately north of Kennan Bridge to eliminate the risk of an unfamiliar motorist inadvertently driving onto the proposed cycle route.

6.239 The safety of the proposed cycle route would be greatly enhanced with the removal of the interface with motorised traffic.

6.240 Overall merits in terms of environmental impact, technical suitability and social and transport integration are all identical for each option. However, in terms of integration, the layout assumes that a pedestrian and cyclist link would be provided by Irish Rail and/or the local authority so that access across the railway would be maintained following the closure of the level crossing.

Table 6.7 - Kennan Bridge Option Evaluation Summary

Option Evaluation Summary	Kennan Bridge (Porterstown Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#2**	**#1**
Economy	Low/moderate cost – retaining wall and toucan crossing provided	Low cost – traffic signals not required
Safety	Good levels of safety and personal security	Highest level of safety due to removal of traffic
Environment	Minimal impact in service Minimal impact during construction	
Technical	Good Level of Service achieved Delays likely to road traffic.	Higher Level of Service – no delays at toucan crossing
Integration	Moderate levels of integration and accessibility	Moderate levels of integration and accessibility – assumes new footbridge provided in lieu of level crossing

6.241 **Conclusion:** The two options presented are not comparable as they represent the two futures scenarios of with the road closure and without.

6.242 If the closure of the road is delayed, then Option 1 would be installed as an interim measure, until such time as the level crossing is closed to traffic.

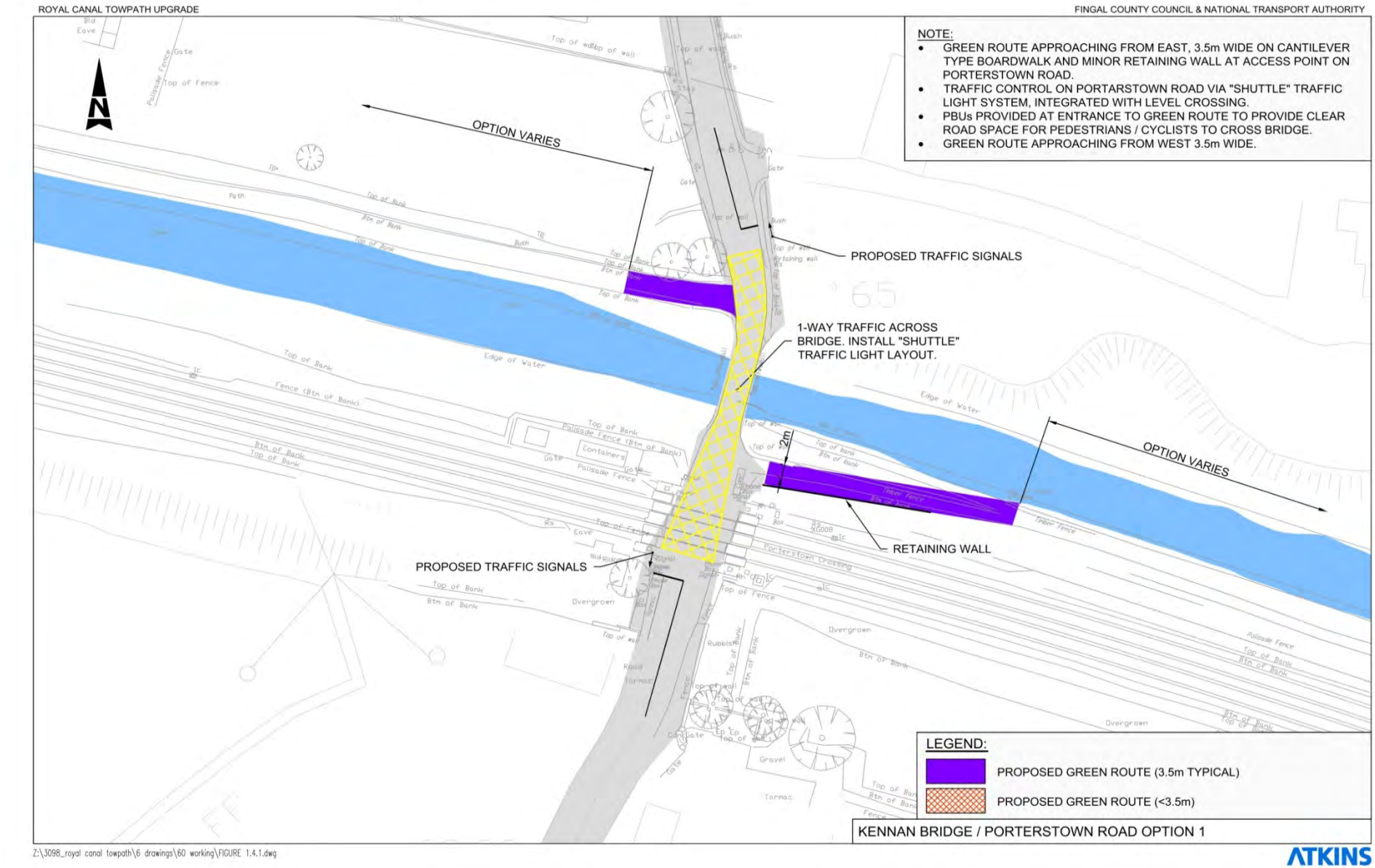

Figure 6.24 - Kennan Bridge Option 1

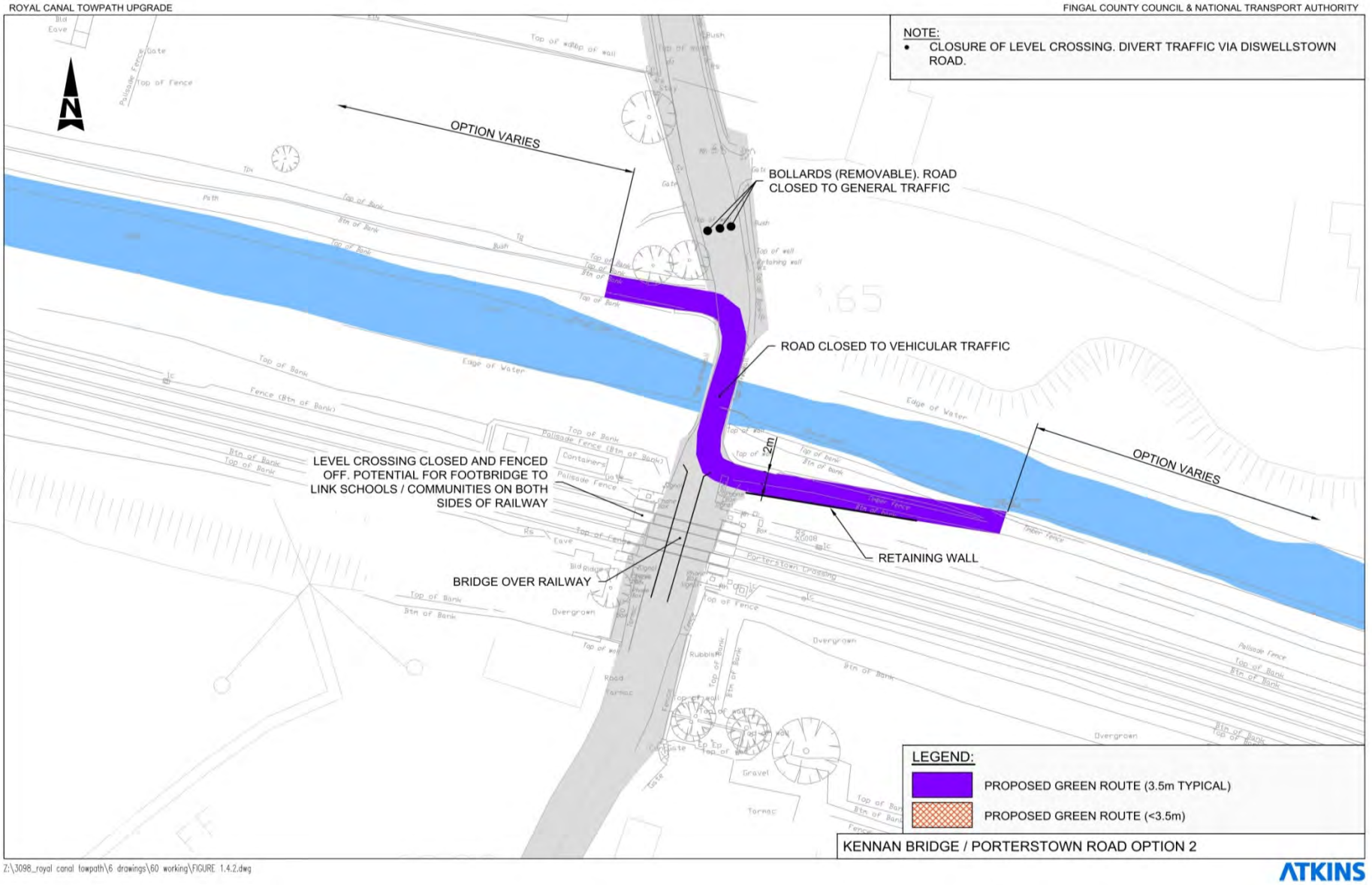

Figure 6.25 - Kennan Bridge Option 2

Callaghan Bridge

6.243 Callaghan Bridge presents a significant constraint to the provision of the cycleway. It is an arch bridge with a narrow (2.1m) footway beneath it, which would have substandard height clearance. The bridge is adjacent to Clonsilla train station and there is an associate level crossing to the south of the bridge. Adjacent to the existing bridge, on the west side is a pedestrian bridge.

6.244 A ramp up from the towpath to the road used to exist on the north side but this appears to have been removed recently.

6.245 A high level of integration with local transport modes and connectivity with adjacent residential areas would be achieved with all options.

6.246 **Option 1:** Figure 6.26 - Callaghan Bridge Option 1 is provided below. This option utilises the existing towpath under Callaghan Bridge. The existing 2.1m width of towpath would be inadequate for a shared cycle / pedestrian facility and therefore cyclists would be required to dismount and walk through this short section. In the interest of user safety, a guardrail would also be provided along the water's edge to protect against accidental falls into the canal.

6.247 Either side of the bridge, the towpath quickly reaches the required width to accommodate the full 3.5m wide facility. The effective length of this local pinch point would be approximately 20m.

6.248 Access to / from the towpath would be provided by removing the existing steps to Clonsilla Road to the west of the bridge, and replacing them with a ramped access route. This ramp would be designed to provide a suitable gradient for use by mobility impaired and disabled users.

6.249 This option represents a minimal scope of construction works and therefore a correspondingly low construction value. The works required would not be considered as complex or difficult to complete.

6.250 The proposed layout would provide a completely traffic-free route for cyclists and pedestrians while the erection of the safety guardrail would eliminate the potential for accidental falls into the water. However, the scheme would require cyclists to dismount and walk under Callaghan Bridge where the available width and headroom would be considered inadequate and there would be risk that cyclists would tend to ignore the posted signage and continue to cycle through the difficult area.

6.251 The risks to and impacts on the environment would be minimal during construction and while in service.

6.252 The continuity and directness of the route would be compromised due to the requirements for cyclists to dismount over this short section. Such impacts to the Level of Service offered would be minimal.

6.253 A high level of integration with local transport modes and connectivity with adjacent residential areas would be achieved.

6.254 **Option 2:** Figure 6.27 - Callaghan Bridge Option 2 is provided below. In addition to maintaining the existing underpass for pedestrian use, this layout includes for a crossing at road level.

6.255 The original access route to the towpath at Callaghan Bridge would be reopened and widened to give the full 3.5m width. A link would be provided at street level to access the existing pedestrian crossing, which will be upgraded to a Toucan crossing, at Clonsilla Road. It is estimated that approximately 150 square metres of private land would need to be acquired along the access route so ensure that the 3.5m width would be maintained up to street level and alongside the road to the Toucan crossing. A retaining wall would also be required to restrict the amount of private land to be acquired.

6.256 The existing pedestrian crossing would be utilised as part of this option.

6.257 To the West of the bridge, access to the towpath would be provided by removing the existing steps to Clonsilla Road and replacing them with a ramped access. This ramp would be designed to provide a suitable gradient for use by mobility impaired and disabled users.

6.258 Construction costs for this option would be significantly higher than those envisaged for Option 1 due to the higher and more complex scope of works required and the necessity for acquisition of private lands.

6.259 Cyclists would be directed to cross Clonsilla Road at the existing toucan crossing while pedestrians would have the option to continue below Callaghan Bridge along the original towpath. The safety score would be significantly impacted by the necessity for cyclists to interact with traffic and also due to the fact that cyclists would tend to use the original route under Callaghan Bridge, putting them at risk of conflict with pedestrians.

6.260 Impacts on the environment would be higher in comparison to Option 1 due to the significant works required to achieve the link to the existing toucan crossing and the construction stage and service impacts on traffic congestion levels.

6.261 The layout would be technically less preferable to that of Option 1, primarily due to the minor diversion required for cyclist traffic and the potential for delays at the toucan crossing. It would be expected that cyclists may opt to favour the pedestrian route under Callaghan Bridge.

Table 6.8 - Callaghan Bridge Option Evaluation Summary

Option Evaluation Summary	Callaghan Bridge (Clonsilla Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#1**	**#2**
Economy	Low cost – ease of construction	High cost – significant scope of works and requirement for land purchase
Safety	Good levels of safety and personal security	Good levels of safety and personal security, although cyclists may tend to use pedestrian path under Callaghan Bridge
Environment	Minimal impact in service Minimal impact during construction	Moderate impact in service Moderate / major impact on traffic and adjacent dwellings during construction
Technical	Compromise to Level of Service due to requirement for cyclists to dismount	Level of Service compromised due to requirement for cyclists to divert away from the towpath and potential for delays at the toucan crossing
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility

Conclusion:

6.262 Option 2 will cost significantly more than Option 1 to implement. It is also less direct and requires an interaction with vehicular traffic. There is a concern that cyclists will continue to use the footway beneath the bridge with Option 2 rather than take a detour, interact with traffic and potentially be delayed at the Toucan crossing. Therefore the same safety issues associated with the reduced width beneath the bridge are present with both options.

6.263 Option 1 will cause less disruption during both the construction and the operational phases and on this basis, it is proposed that Option 1 is brought forward as the preferred solution for this element of the scheme.

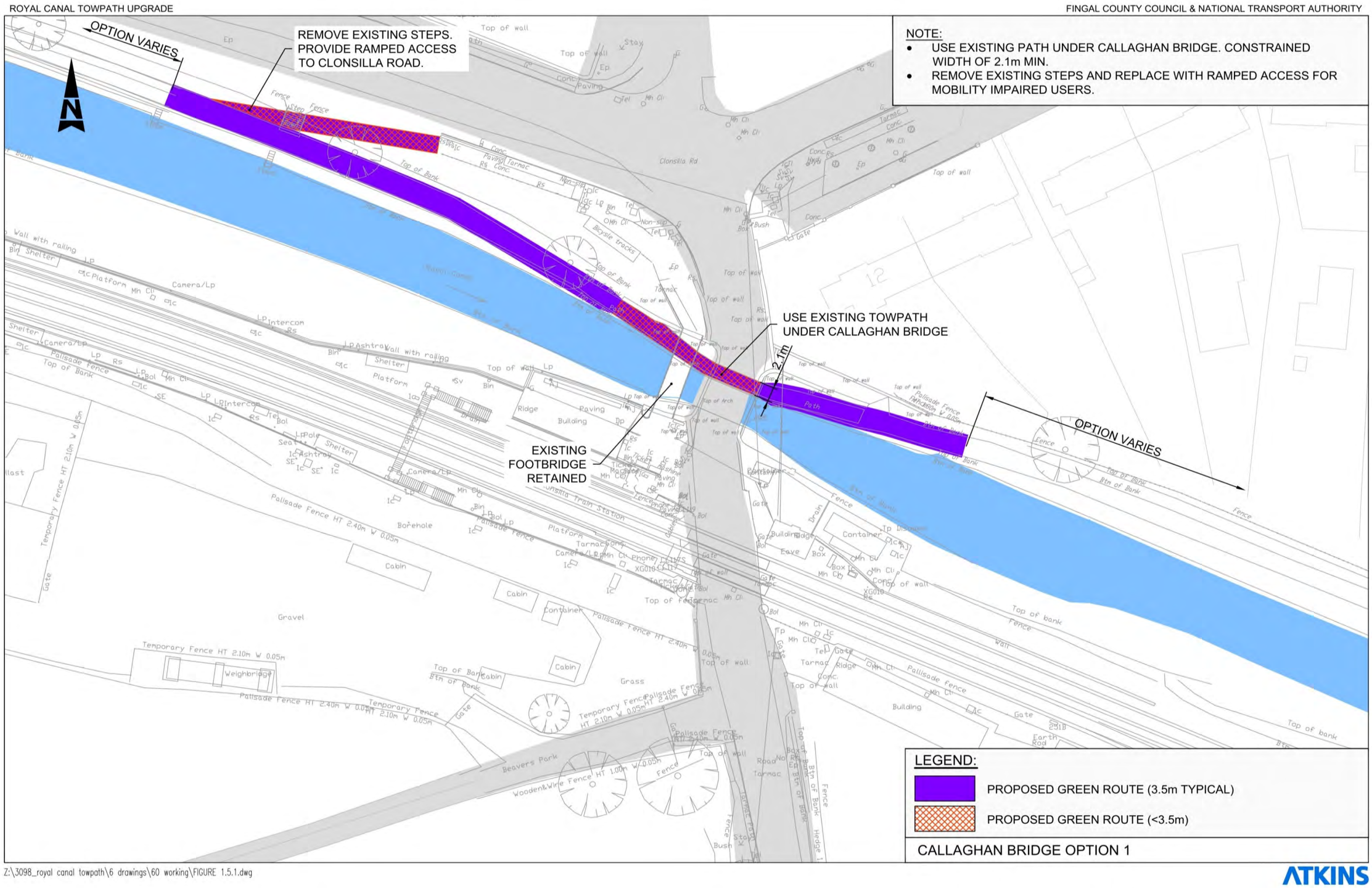

Figure 6.26 - Callaghan Bridge Option 1

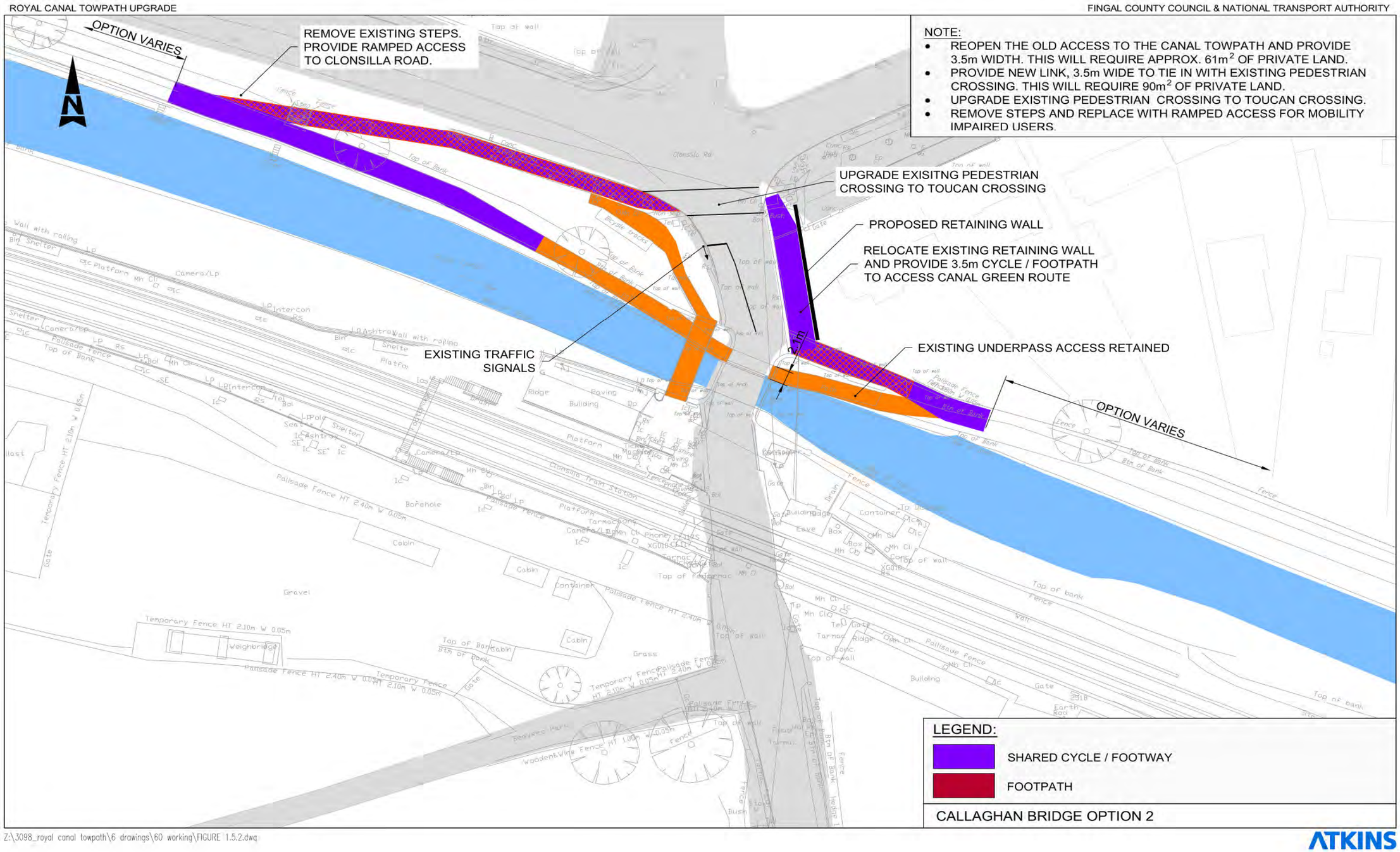

Figure 6.27 - Callaghan Bridge Option 2

Area 3: Callaghan Bridge to County Boundary

Pakenham Bridge

6.264 Pakenham Bridge is narrow and is situated on the bend of Barberstown Road and close to a junction. There is therefore a safety concern for users of the towpath trying to cross the road at this location as visibility is poor.

6.265 Both towpath approaches to Pakenham Bridge are currently outside the recommended guideline minimum gradients for mobility impaired users.

6.266 There is a level crossing adjacent to the bridge.

6.267 For both options considered, pedestrians and cyclists would enjoy a full 3.5m wide facility through this area. Access to the existing towpath under Pakenham Bridge would be maintained although it would be suitable for pedestrians only.

6.268 Both options would be well-integrated with the potential amenity area which is proposed for the wide towpath between Pakenham Bridge and the recently reinstated Dunboyne Spur Line bridge.

6.269 **Option 1:** Figure 6.28 - Pakenham Bridge Option 1 is provided below. This option includes the regrading of the towpaths on the approach to the bridge, thereby enabling the cycleway to comply with standards.

6.270 A toucan crossing would be provided to overcome visibility concerns at the crossing point. Advance warning signage and traffic calming would be provided to warn motorists of the traffic signals ahead.

6.271 Barberstown Road is currently a non-lit route. This option would propose to provide a number of lighting columns both upstream and downstream of the crossing to increase the motorists' awareness of the crossing during the hours of darkness.

6.272 Barberstown Road is a low traffic route. However, a "yellow box" road marking would be required across the level crossing so that in the event of queuing traffic, the level crossing would not be blocked by vehicles queuing back from the pedestrian signals.

6.273 The capital costs for this option would be the higher of the two options under consideration due to the installation of the signalised toucan crossing.

6.274 This option offers the best solution in terms of the safety of the end user. The signalised crossing would eliminate any safety concerns with respect to visibility to oncoming traffic. A high level of personal security would be provided via the proposed CCTV network.

6.275 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along Barberstown Road. The long term impacts of this proposal during service would be negligible.

6.276 There would be a very minor loss to the directness of route where cyclists are forced to wait at the signals.

6.277 **Option 2:** Figure 6.29 - Pakenham Bridge Option 2 is provided below. This option would be identical to Option 1 above for all aspects with the exception of the signalised crossing. This option proposes an uncontrolled crossing at this location.

6.278 In lieu of the traffic signals, a series of traffic calming measures would be provided to inform motorists of the presence of a pedestrian crossing ahead and to lower the approach speeds of vehicles.

6.279 The provision of the traffic calming measures in lieu of the toucan signalised facility would have a positive impact on the overall constructability and cost of the scheme. However, the safety levels offered to the end user would be compromised. It is acknowledged that traffic levels on

Barberstown Road are very low. Nevertheless, the poor visibility to oncoming traffic, in particular at the western side of the crossing, would not be favourable.

6.280 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along Barberstown Road. The long terms impacts of this proposal during service would be negligible.

6.281 The continuity of the route is maintained. However, the directness is somewhat compromised due to the requirement for cyclists to stop and negotiate the road crossing. Pedestrians would have the option to use the existing towpath route under the bridge.

6.282 This option would be well integrated with the potential amenity area which is proposed for the wide towpath between Pakenham Bridge and the recently reinstated Dunboyne Spur Line bridge.

Table 6.9 - Pakenham Bridge Option Evaluation Summary

Option Evaluation Summary	Pakenham Bridge (Barberstown Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#1**	**#2**
Economy	Low overall cost to develop. However, most expensive of the two options considered	Low cost "do minimum" option
Safety	Good levels of safety and personal security	End user safety compromised due to lack of inter-visibility between pedestrians and approaching motorists
Environment	Minimal impact in service Minimal impact during construction	Minimal impact in service Minimal impact during construction
Technical	Good Level of Service achieved	Level of Service compromised due to requirement for cyclists to negotiate uncontrolled crossing – potential for delays at the crossing
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility

6.283 **Conclusion:** Option 1 involves a higher construction cost than Option 2 but, due to poor visibility from the western side of the crossing, provides the safest option for the end user.

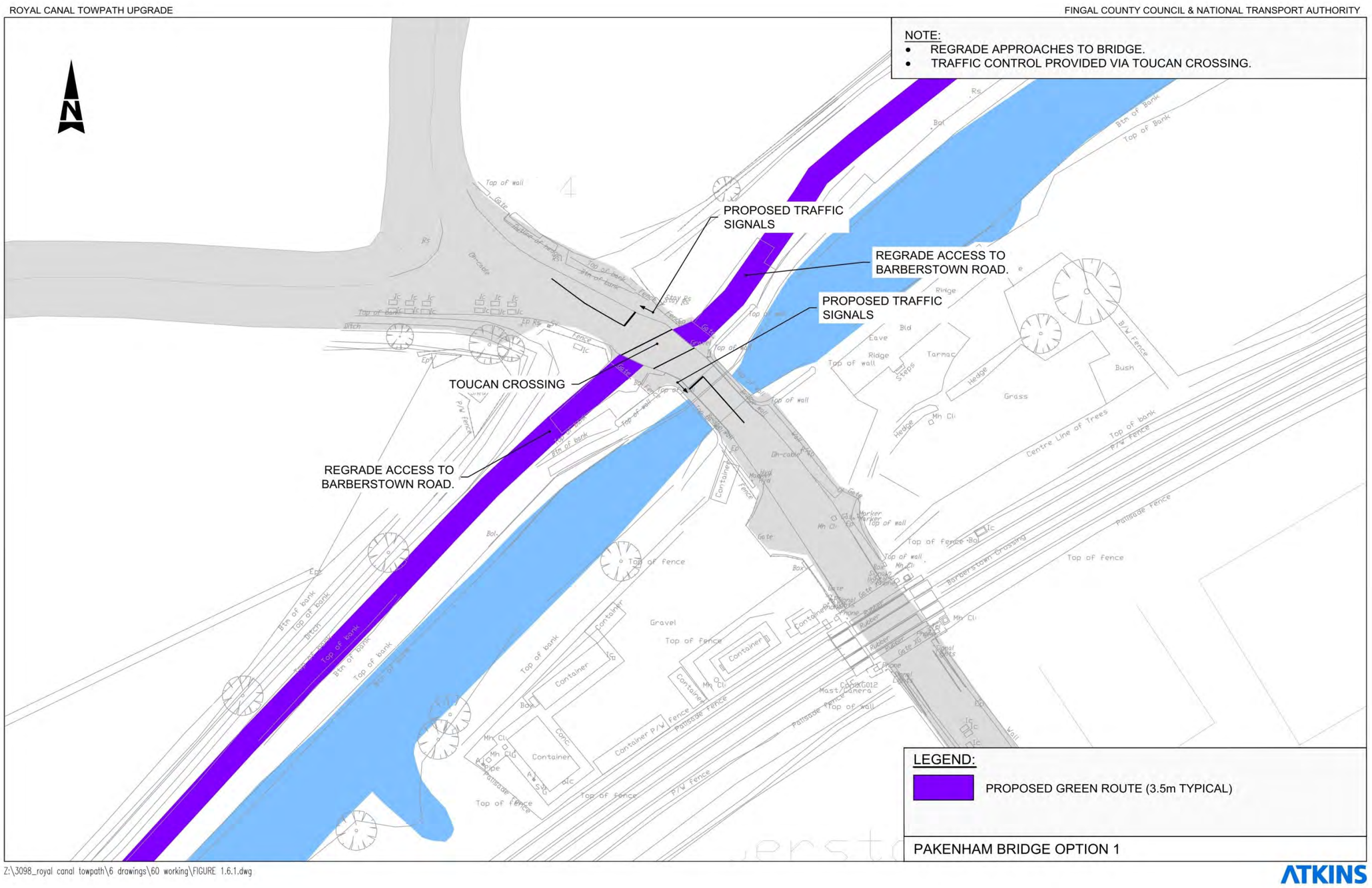

Figure 6.28 - Pakenham Bridge Option 1

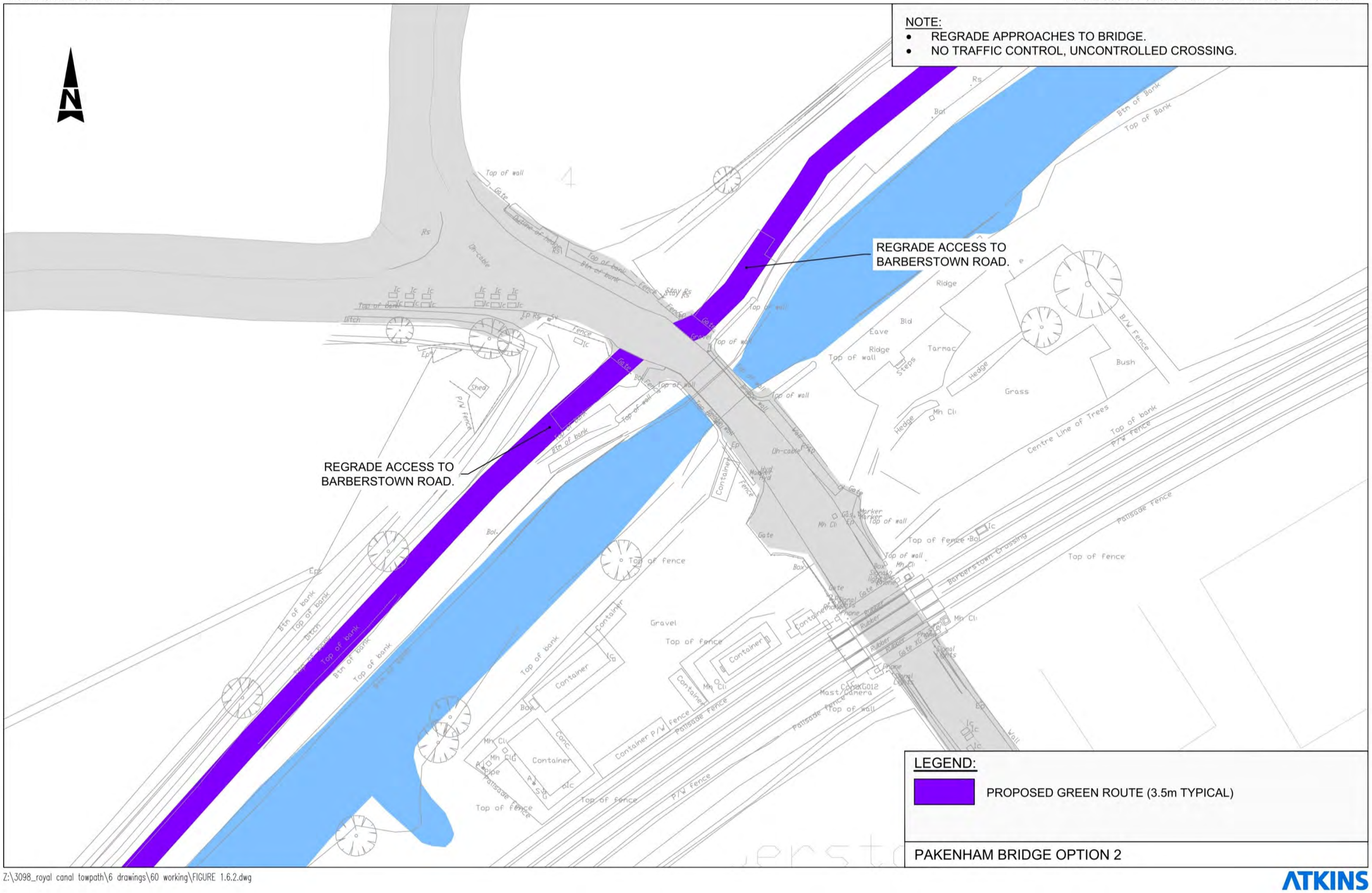

Figure 6.29 - Pakenham Bridge Option 2

Collins Bridge

6.284 Collins Bridge is a two-way road bridge over the canal. There are currently no footways across the bridge. The towpath links to the bridge along the north side of the canal with sub-standard gradients. There is a footway beneath the bridge, but clearance heights would be limited. The visibility from the towpath to vehicular traffic on the road (the R149) across the bridge is limited which is a safety concern.

6.285 The eastern entrance to St Catherine's Park is located approximately 500m south of the canal at this location but there is no safe means to walk/cycle to the Park from the existing towpath and instead access is gained by walking / cycling on the road. The options include for providing connectivity across the adjacent bridges to allow future connectivity along the R149.

6.286 All options address the substandard gradients with regraded approaches.

6.287 **Option 1:** Figure 6.30 - Collins Bridge Option 1 is provided below. This option would provide a signalised Toucan crossing so that users would be offered a safe method of crossing the road. Signal heads would be located such that adequate visibility to the signals would be achieved. Advance warning signage and traffic calming would be provided to warn motorists of the traffic signals ahead.

6.288 To provide effective linkage between the Royal Canal and St Catherine's Park, advisory on-road cycle lanes would be provided southwards across Collins Bridge. It is intended that these cycle lanes would eventually form a cycle link to Leixlip and Lucan via St Catherine's Park and would also form a substantial segment of the 'Canal 2 Canal Regional Cycle Route', ultimately linking the Royal and Grand Canals.

6.289 The R149 is currently a non-lit route. This option would propose to provide a number of lighting columns both upstream and downstream of the crossing to increase the motorists' awareness of the crossing during the hours of darkness.

6.290 Pedestrians and cyclists would enjoy a full 3.5m wide facility through this area. Access to the existing towpath under Collins Bridge would be maintained although it would be suitable for pedestrians only.

6.291 The capital costs for this option would be moderate due to the installation of the signalised toucan crossing. An effective system of traffic calming measures would be necessary due to a combination of the traffic volumes, high approach speeds and poor horizontal alignment along the R149 local to Collins Bridge. Such measures would add to the overall cost.

6.292 This option offers a good level of safety for the end user. The signalised crossing would eliminate any safety concerns with respect to visibility to oncoming traffic. A high level of personal security would be provided via the proposed CCTV network and public lighting. However, the on-road advisory lanes would have limited effect where the existing carriageway width is already narrow across the existing canal and railway bridges.

6.293 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along the adjacent road. The long term impacts of this proposal during service would be negligible.

6.294 From a technical perspective, the continuity and directness of the route would be maintained with this option. However, there would be a very minor loss to the directness of route where cyclists are forced to wait at the signals.

6.295 This option would be well integrated with St Catherine's Regional Park, located to the south of the canal. It would also provide good integration with future planned cycle routes, in particular the Canal 2 Canal Regional Route.

6.296 **Option 2:** Figure 6.31 - Collins Bridge Option 2 is provided below. In this option, a toucan crossing would be provided as per Option 1 above. However, the toucan signals would be

integrated into a one-way shuttle system. This would allow for reallocation of the existing road carriageway so that a dedicated off-road cycle track could be installed over the existing canal and railway bridges. This off-road track would form the beginning of the proposed link to St Catherine's Park and the Canal 2 Canal Regional Route. There would be potential for delays as a result of the shuttle traffic signals, which is seen as a major negative to this option.

6.297 Street lighting would be provided over the extents of the shuttle system layout and on both road approaches for safety purposes. The proposed lighting would effectively increase motorist awareness of the presence of vulnerable road users in the hours of darkness.

6.298 The costs for this option would be similar to Option 1 although a slight increase would be expected due to the additional works required to install the one-way system and the additional lengths of traffic signal ducting required.

6.299 This option offers a good level of safety. The signalised crossing and one-way traffic system would eliminate any safety concerns with respect to visibility and oncoming traffic. A high level of personal security would be provided via the proposed CCTV network and public lighting. The off-road cycle track would provide a significantly improved facility for cyclists and pedestrians when compared to Option 1.

6.300 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along the adjacent road. The long term impacts of this proposal during service would be negligible.

6.301 From a technical perspective, the continuity and directness of the route would be maintained with this option. However, there would be a very minor loss to the directness of route where cyclists are forced to wait at the signals.

6.302 This option would be well integrated with St Catherine's Regional Park, located south of the canal. It would also provide good integration with future planned cycle routes, namely the Canal 2 Canal Regional Route.

6.303 **Option 3:** Figure 6.32 - Collins Bridge Option 3 is provided below. For this option a toucan crossing would be installed as per Option 1. This would be supported by a scheme of traffic calming measures to increase driver awareness of the facility ahead and reduce traffic speeds on approach.

6.304 To provide the required linkage southwards to St Catherine's Park, a new pedestrian/cyclist bridge would be constructed over the canal and railway, immediately adjacent and to the west of Collins Bridge. The planned link to St Catherine's Park and the Canal 2 Canal Regional Route would connect to the proposed bridge immediately south of the railway. Purchase of land is likely to be required to facilitate this off-road route

6.305 All other elements in terms of CCTV ad street lighting would be provided as per Option 1 above**Error! Reference source not found.**.

6.306 The cost implications in providing a dedicated pedestrian / cyclist bridge across the canal and railway are high and this option would be the most expensive to construct. However, this layout would permit the delivery of the scheme on a phased basis. The proposed bridge could be delayed until such time as funding was made available and the adjacent schemes which it serves would be completed. In the short term, the proposed east-west corridor would be preserved and a good level of service provided.

6.307 This option also offers a high level of safety as it minimised the level of interaction between the cyclist and the motorist.

6.308 The construction of a new bridge would have a greater impact on the receiving environment throughout the construction stage. However, the impact when in service would be much less given that traffic impacts would be kept to a minimum.

6.309 The proposed layout would offer a high Level of Service as continuity, directness and comfort levels would be preserved.

6.310 This layout would offer greatest flexibility in terms of the phased delivery of the scheme and the integration with future planned cycle networks and amenity areas.

Table 6.10 - Collins Bridge Option Evaluation Summary

Option Evaluation Summary	Collins Bridge (R149)		
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**
Rank	**#2**	**#3**	**1**
Economy	Low cost "do minimum" option	Moderate cost option	High cost option, but conducive to phased delivery of facilities
Safety	Good levels of safety and personal security for towpath, but reduced level of safety for on-road connection across bridge	High levels of safety and personal security	High level of safety and personal security
Environment	Some impact on traffic on R149 in service Minimal impact during construction	High impact on traffic on R149 in service Minimal impact during construction	Some impact on traffic on R149 in service Moderate impact during construction
Technical	Good Level of Service achieved	High Level of Service achieved – less interaction with traffic for cyclists linking to destinations south of canal Significant effect on R149 Traffic	Highest level of Service achieved
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility	Good levels of integration and accessibility

6.311 **Conclusion:** Option 1 would be cheaper than Option 2 to construct; Option 3 would be the most expensive.

6.312 All options score identically in terms of proposed crossing facilities at the R149, although a shorter crossing would be provided on Option 2.

6.313 In terms of connecting with future cycle facilities in St. Catherine's Park, Option 3 is desirable as a completely segregated cycle facility offers the best Level of Service. However, land acquisition would be required to achieve this.

6.314 Option 3 could be delivered over time as and when adjacent schemes require it. Therefore, considering the above, Option 3 is the preferred option. Should funding not be available for this option, Option 1 should be adopted as it has least disruption to traffic on the R149. Option 2 should be avoided if possible due to the likely effect on traffic.

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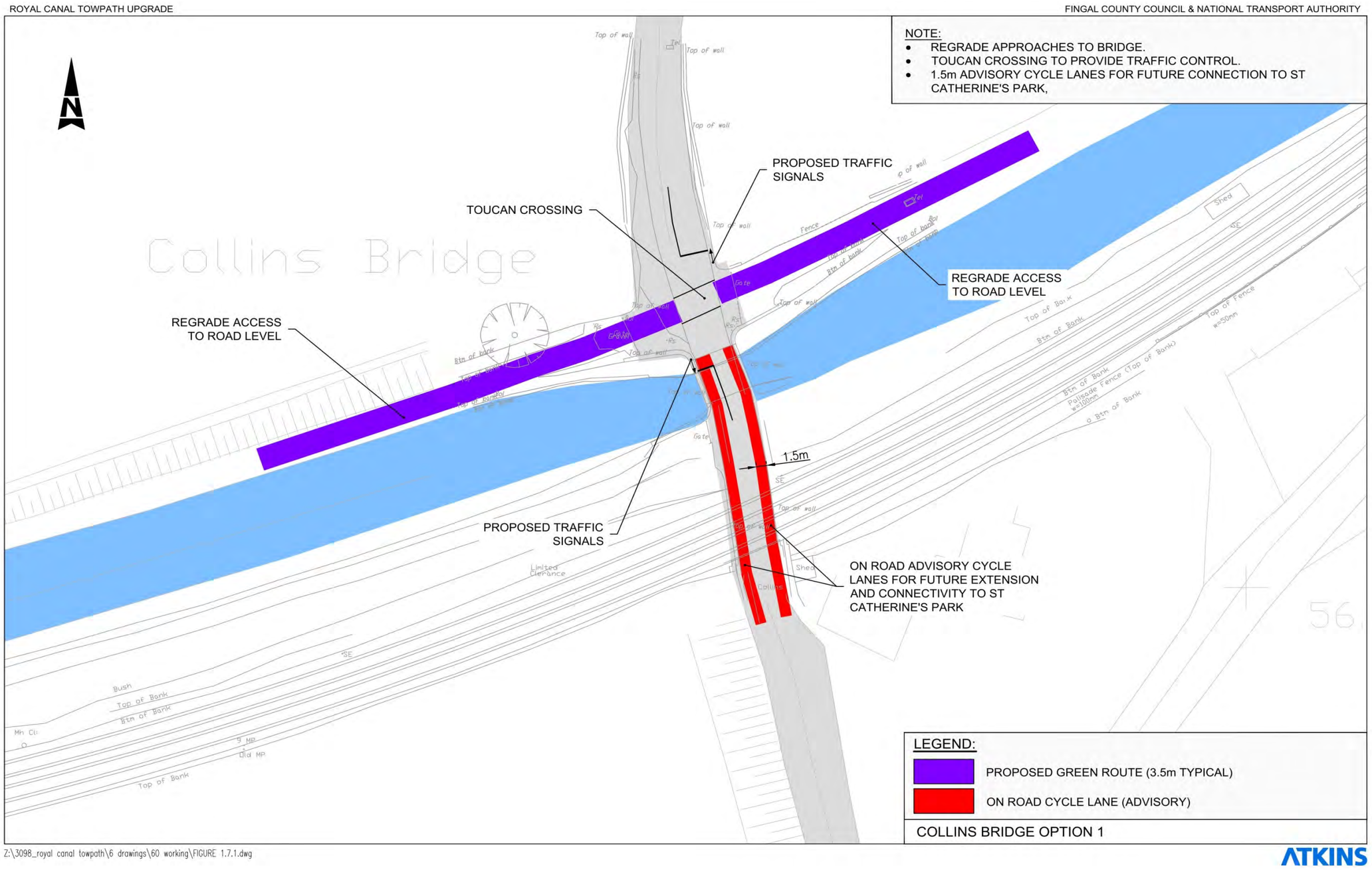

Figure 6.30 - Collins Bridge Option 1

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

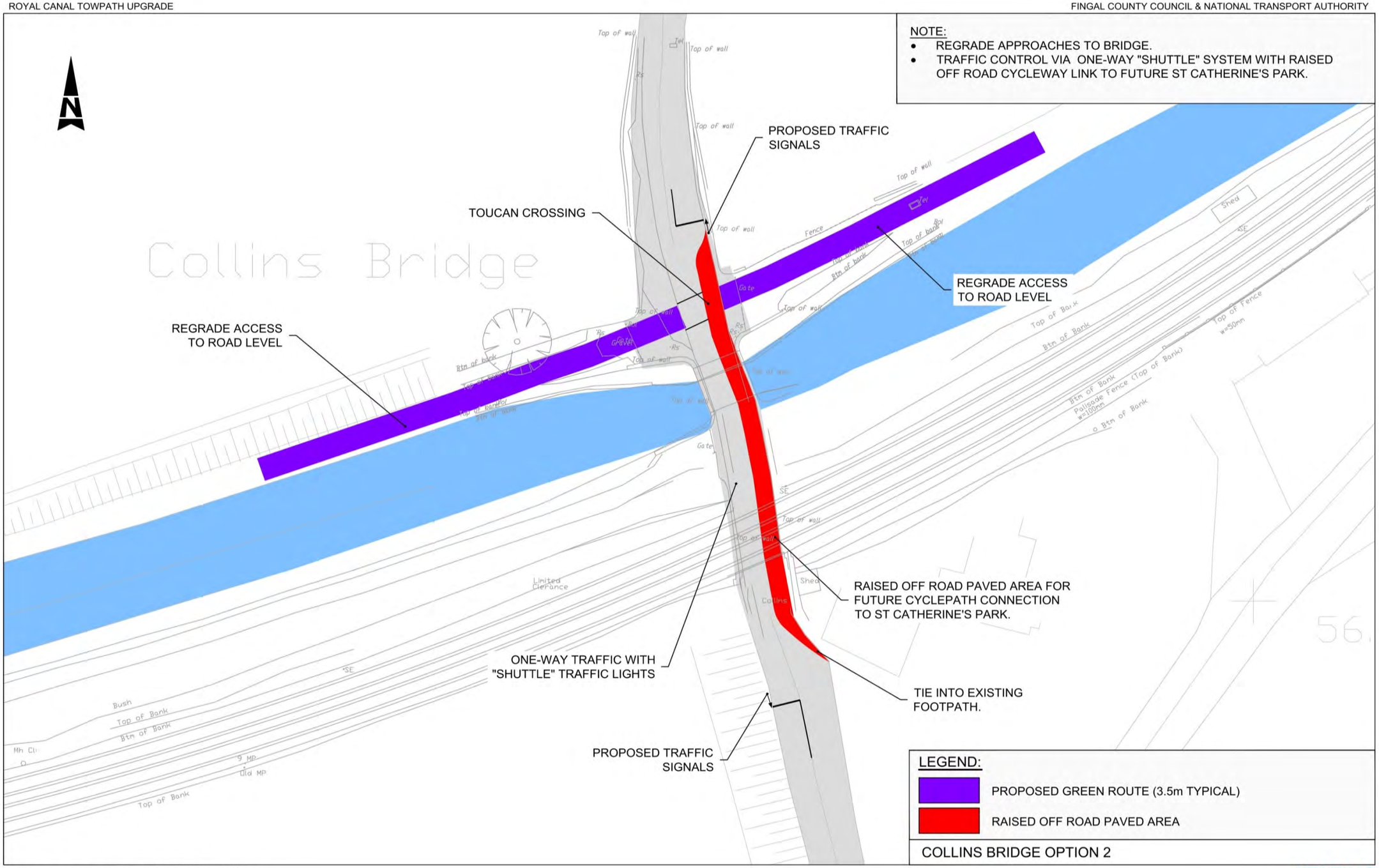

Figure 6.31 - Collins Bridge Option 2

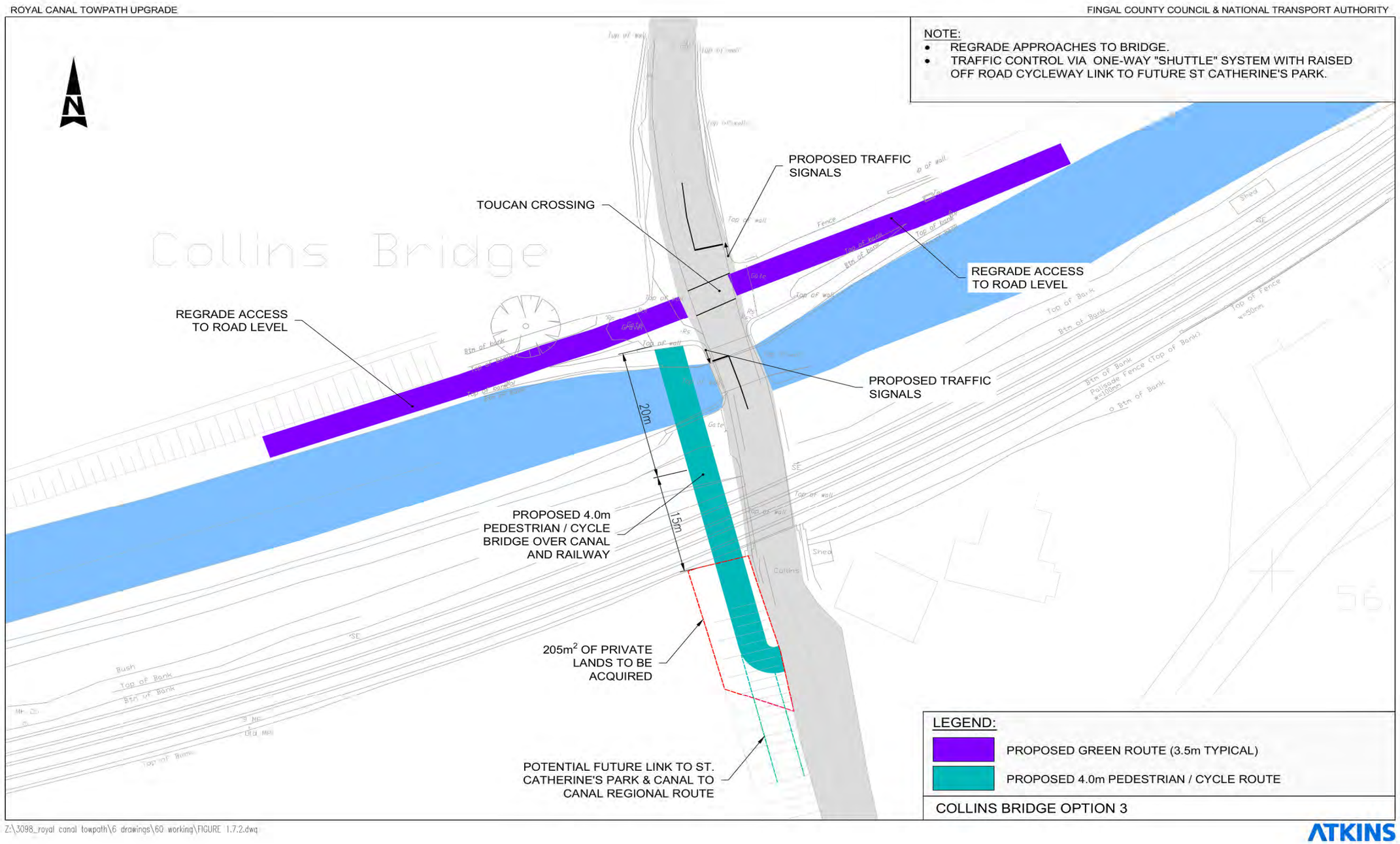

Figure 6.32 - Collins Bridge Option 3

7. Preferred Option & Estimated Cost

Preferred Option

7.1 Following the assessment of the options, the emerging preferred option can be summarised as follows. Overall route maps are included in Appendix A for information.

Area 1

7.2 A second bridge for the exclusive use of cyclists is to be provided so that total segregation is achieved. This will require a land purchase on the southern bank of the canal. A signalised toucan crossing at Ashtown Road will provide a safe means of crossing this busy road. This will facilitate the continuity of the proposed route and effectively connect the existing towpath along the canal's north bank at Rathborne to the proposed upgrade along the southern bank and west of Longford Bridge.

7.3 The toucan crossing will be located where the towpath emerges from the 10th lock on the southern canal bank. The effective crossing width will be approximately 3.5 – 4.0m.

7.4 The towpath width through the 10th lock will remain as per the existing layout, widening out to 3.5m thereafter.

7.5 A minor retaining wall of approximate retaining height <1.0m may be required along the railway line between Navan Road Parkway Station and the 11th lock.

7.6 It is proposed to provide a cycle-only bridge across the M50 Motorway. The bridge will be located immediately south of the existing aqueduct, between the aqueduct and the railway bridge.

7.7 An uncontrolled crossing is proposed at Talbot Bridge due to the low levels of traffic in the area. A direct access route to the southern towpath at the 12th Lock Hotel car park is also proposed. This may require the acquisition of lands at the 12th Lock Hotel car park and the construction of new boundary walls or fence. The proposed facility will be restricted to 2.5m width approximately through Castleknock Marina, widening out to 3.5m immediately west of the hotel.

A pedestrian / cycleway underpass will be provided at Castleknock Road to eliminate conflicts with busy traffic. Access to Castleknock Road will be maintained via the existing steps to the east and a new ramped access route to Castleknock Station to the west.**Area 2**

7.8 The Greenway will be 3.5m wide running past Castleknock Station and onwards towards the Deep Sinking.

7.9 Throughout the Deep Sinking, the 3.5m width will be continued through the provision of a structural walkway which will cantilever over the canal bank. Given the variable height differentials between the towpath and the canal waters, a pedestrian guardrail will be included for safety reasons.

7.10 At Kirkpatrick Bridge, minor works to the existing footbridge will be required to integrate with the widened towpath.

7.11 Crossing of Coolmine Road will be regulated by installing a signalised toucan crossing. These signals will be integrated with the adjacent automatic level crossing.

7.12 West of Kirkpatrick Bridge, the cantilevered walkway will continue to provide an effective width of 3.5m. Where required, existing deep drainage ditches along the railway embankment will be replaced with appropriate filter drains with existing culverted outfalls maintained under the towpath.

7.13 On approach to Kennan Bridge, a retaining wall will be required so that 3.5m width can be maintained without the need to amend the existing bridge wingwalls.

7.14 The current narrow carriageway across Kennan Bridge lends itself to the provision of a shuttle traffic light system, which shall be installed in the short term until the imminent closure of the level crossing is complete.

7.15 The proposed shuttle lights shall be complemented with an elongated toucan crossing providing a traffic-free crossing of the bridge for cyclist and pedestrian users.

7.16 The section between Kennan Bridge and Callaghan Bridge shall be 3.5m wide, utilising the cantilevered structure over the canal bank where the current towpath provision is less than the required width and where regrading of the embankment to the north is not possible.

7.17 The proposed route shall pass under Callaghan Bridge. The pinch point created by the bridge abutments will require cyclists to dismount and pass under the bridge on foot.

Area 3

7.18 West of Callaghan Bridge, a new ramped access will be provided in lieu of the existing steps.

7.19 The proposed route will continue westwards to Pakenham Bridge at a width of 3.5m utilising the existing underpass at the Dunboyne Spur Line and reducing to 2.5m to negotiate the pinch point created by the existing Clonsilla SW water main.

7.20 The two-tiered area immediately east of Pakenham Bridge will be earmarked for development as a recreational and picnic area for both land and water-based travellers.

7.21 A toucan crossing will be provided at Pakenham Bridge. This is required to permit the safe crossing of the road as the visibility splays are particularly poor at this location.

7.22 The facility will continue along the northern bank towards Collins Bridge at 3.5m wide.

7.23 A proposed toucan crossing will be installed at Collins Bridge providing a safe method of crossing the R149, which is subject to vehicles travelling at speed.

7.24 A dedicated cycle / foot bridge will be provided across the canal and railway to link with proposed connections to St Catherine's Park and the Canal 2 Canal Regional Cycle Route. Delivery of this aspect may be delayed until such time as appropriate funding is available.

7.25 West of Collins Bridge, the widened towpath will extend to the county boundary at the premises of the Royal Canal Amenity Group, where it is intended that the facility can be extended to Leixlip and Maynooth. The full 3.5m width can be achieved along this section, although consideration should be afforded to the health and safety risk associated with the adjacent drainage ditch which forms the northern boundary of the canal.

Cost Estimate

7.26 The table below summarises the current estimated capital costs of the project. Further detailed breakdown of these costs is provided at Appendix B of this report.

7.27 The figures stated are based on rates taken from recent projects of a similar size and nature in the Dublin region and from the *"Roadworks Unit Rate Database, Version 6 – Base Date May 2011"* published by the National Roads Authority. Given the current economic climate and associated volatility in the construction market, these estimates are only intended as a guide for appraisal purposes. These estimated costs are therefore provided with the caveat that actual construction costs may vary significantly.

7.28 Land acquisition costs are assumed at €500,000.00 per acre.

Table 7.1 - Cost Estimates

Royal Canal Greenway - Feasibility Stage Cost Estimate						
Item No	**Item Description**	**Area 1**	**Area 2**	**Area 3**	**Total**	**%**
		€	**€**	**€**	**€**	
0	**Preliminaries**	125,237.73	159,773.54	121,341.57	406,352.83	4.90%
1	**Structural**	641,969.60	3,412,492.20	400,000.00	4,454,461.80	53.76%
2	**Site Clearance**	362.11	462.19	648.99	1,473.29	0.02%
4	**Pedestrian Guardrail & Safety Barriers**	3,750.00	367,500.00	0.00	371,250.00	4.48%
5	**Service Ducts, PL & CCTV**	278,689.00	436,570.00	357,712.50	1,072,971.50	12.95%
6	**Earthworks**	8,365.48	2,046.75	3,801.85	14,214.09	0.17%
11	**Kerbs, Footways & Paved Areas**	304,511.50	406,898.50	411,162.75	1,122,572.75	13.55%
12	**Traffic Signs & Road Markings (incl. Traffic Signals)**	13,000.00	25,000.00	24,000.00	62,000.00	0.75%
98	**Land Acquisition**	1,729.56	0.00	25,325.70	27,055.26	0.33%
99	**General Contingency (10%)**	137,761.50	481,074.32	134,399.34	753,235.15	9.09%
	TOTAL ESTIMATE (GROSS)	**1,515,376.47**	**5,291,817.50**	**1,478,392.70**	**8,285,586.67**	100%
	VAT @ 13.5%	204,575.82	714,395.36	199,583.01	1,118,554.20	
	TOTAL ESTIMATE (NETT)	**1,719,952.30**	**6,006,212.86**	**1,677,975.71**	**9,404,140.87**	

7.29 The overall total capital cost for the preferred scheme is some €8.3 million net of value added tax. Given the current economic constraints and the limited availability of funding, the client may wish to examine the potential for a phased delivery of the project. To this end, the project can be divided into three constituent sections based on the natural division of areas 1, 2 and 3.

7.30 In addition, other opportunities have been identified where the scope of work can be reduced in the short term without adversely affecting the viability of the scheme. Under this process, the scheme could be provided immediately (subject to the available level of funding), with shortfalls in some areas, which can be improved with efficient use of funding as it becomes available. Hence, the long term vision of the project will not be lost.

7.31 The following table outlines the estimated costs for the preferred scheme with a number of elements removed from the scope of work for the short term. The removed items are listed below.

Table 7.2 - Reduced Scheme Cost estimate

Feasibility Stage Cost Estimate (Reduced Scheme)						
Item No	**Item Description**	**Area 1**	**Area 2**	**Area 3**	**Total**	**%**
		€	**€**	**€**	**€**	
0	**Preliminaries**	60,633.60	119,623.54	76,695.38	**256,952.73**	**4.12%**
1	**Structural**	0.00	2,812,492.20	0.00	**2,812,492.20**	**45.07%**
2	**Site Clearance**	362.11	462.19	648.99	**1,473.29**	**0.02%**
4	**Pedestrian Guardrail & Safety Barriers**	3,750.00	367,500.00	0.00	**371,250.00**	**5.95%**
5	**Service Ducts, PL & CCTV**	270,349.00	429,070.00	350,212.50	**1,049,631.50**	**16.82%**
6	**Earthworks**	8,365.48	2,046.75	3,801.85	**14,214.09**	**0.23%**
11	**Kerbs, Footways & Paved Areas**	299,511.50	405,898.50	388,290.50	**1,093,700.50**	**17.53%**
12	**Traffic Signs & Road Markings (inc. Traffic Signals)**	24,000.00	25,000.00	24,000.00	**73,000.00**	**1.17%**
98	**Land Acquisition**	0.00	0.00	0.00	**0.00**	**0.00%**
99	**General Contingency (10%)**	66,697.19	416,209.32	84,364.92	**567,271.43**	**9.09%**
	TOTAL ESTIMATE (ex VAT)	**733,669.09**	**4,578,302.50**	**928,014.15**	**6,239,985.74**	**100%**

7.32 Area 1 reductions are achieved through:

- Removal of proposed cycle bridge at Ashtown;
- Installation of CCTV infrastructure only (ie no cameras or poles provided);

- Removal of proposed fishing and picnic amenity areas;
- Removal of proposed footbridge linking to zoned lands west of N3 Navan Road Parkway Station;
- Removal of proposed cycle bridge across the M50 in the vicinity of the existing M50 Aqueduct;
- Removal of requirement for land purchase at 12th Lock Hotel car park;
- Provision of ramps and toucan crossing at Castleknock Road in lieu of proposed underpass.

7.33 Area 2 reductions are comprised of:

- Removal of proposed footbridges linking Laurel Lodge and Roselawn;
- Installation of CCTV infrastructure only (ie no cameras or poles provided);
- Removal of proposed footbridge link to zoned lands at Kellystown;
- Removal of proposed fishing amenities;

7.34 Area 3 reductions focus on:

- Removal of proposed footbridge linking Clonsilla and Beech Park;
- Installation of CCTV infrastructure only (ie no cameras or poles provided);
- Removal of proposed fishing and picnic amenities at Hansfield;
- Removal of proposed mooring point at Hansfield;
- Removal of proposed car parking at Pakenham Bridge and at the county boundary;
- Removal of proposed cycle / pedestrian bridge link to St Catherine's Park;
- Removal of requirement for land purchase at Collins Bridge with respect to the above bridge.

8. Statutory Approvals

8.1 Atkins produced a technical paper on "The Need for an Environmental Impact Assessment" for the Royal Canal Greenway Feasibility Study. This document examined the potential for an EIA against any of the "automatic" triggers per the Planning and Development Act, 2000 (Planning and Development Regulations, 2001-2011) and the Rods Act 1993.

8.2 This document is available at Appendix C of this report.

8.3 The paper found that, under the Planning and Development Act, 2000 or the Roads Act 1993 the project would not automatically require an EIA. However, it is recommended that the Client undertake an EIA Screening Report incorporating baseline ecological habitat surveys in accordance with *Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-threshold Development*, 2003, DEHLG. If the Screening Report predicts that significant adverse effects may result on the Royal Canal pNHA then the authority would be required to carry out an EIA in respect of the proposed works.

8.4 The paper concludes that the Client should consider commissioning ecological, habitat and biodiversity studies on the potential impacts of the scheme and how these can be best mitigated. Such a report would include the result of an EIA Screening Report, a Landscape Plan showing visual mitigation and any other studies requested through pre-planning consultation.

8.5 It is noted that there are a number of studies and surveys already completed for the eastern section of the Royal Canal between the county boundary at Ashtown and the 12th lock at Castleknock, i.e. Area 1. It is considered that this existing detailed information would form a satisfactory basis on which to determine whether an EIA is required for any future upgrading works to this easterly section of the Royal Canal in Fingal.

8.6 Where it is determined that the development does not require an EIA, the appropriate route for the Statutory Approval would be in accordance with Part 8 of the Planning and Development Regulations. An environmental report addressing the site development, including environmental concerns and proposing mitigation measures would also be recommended to accompany the planning submission.

9. Conclusions & Recommendations

Conclusion

9.1 This study examined the engineering feasibility of upgrading the existing towpath along the Royal Canal to meet the objectives as set out in Chapter 1 of this report.

9.2 The study included widespread consultations with identified key stakeholders and the general public.

9.3 The following is the list of bodies consulted on this project to date:

- Waterways Ireland
- Irish Rail
- Fingal County Council – Conservation & Heritage
- Inland Fisheries Ireland
- Inland Waterways Association of Ireland
- Royal Canal Amenity Group
- National Parks and Wildlife Service
- General Public & Interest Groups

9.4 A total of 24 submissions were received from the public, the majority of which were in favour of the scheme.

9.5 The consultation period revealed an overall level of support for the project but also highlighted that there are important environmental and ecological issues to be addressed.

9.6 A desktop study and numerous site visits were undertaken to establish the constraints and develop a working knowledge of the issues along the proposed route. A constraints map was produced to identify the critical matters and assist in the development of route options. The constraints study examined both the engineering and environmental aspects of the proposed route.

9.7 An opportunities map was also developed to identify areas where potential benefits of the project could be maximised. It was proposed that all “opportunity” items identified would be brought forward to the final emerging preferred route option.

9.8 Options were generated for the identified constrained areas along the route. These options were assessed against agreed criteria and their effectiveness in meeting the stated project objectives. The evaluation process permitted the emerging preferred option to be extracted from the data gathered and presented in Chapter 7 and Appendix A.

9.9 The overall capital cost of the emerging preferred option was estimated at circa €8.3 million exclusive of VAT. A reduced scheme would cost approximately €6.2m

9.10 The emerging preferred option was also subjected to a preliminary screening process to determine whether the proposals should be subjected to an Environmental Impact Assessment in accordance with prevailing legislation. A technical paper was commissioned which found that, the scheme is unlikely to require an EIA, but that the local authority should give appropriate consideration to the sensitivities of the receiving environment along the canal corridor in any future upgrading project.

9.11 The local authority, following consideration of the potential environmental impacts of an upgrading project, may deem the project to require an EIA. Where it is determined that the development does not require an EIA, the appropriate route for the Statutory Approval would be in accordance with Part 8 of the Planning and Development Regulations.

9.12 The paper also noted that there are a number of such studies already competed for the eastern section of the canal between the county boundary at Ashtown and the 12th lock at Castleknock and that this should provide a basis for determining if an EIA is required for any future upgrading work to this easterly section. For other sections west of the 12th lock, the paper recommends that detailed habitat surveys are carried out for these areas. A copy of this paper is included in Appendix C of this report.

Recommendations

9.13 It is recommended that detailed habitat studies and surveys are carried out along the canal corridor west of the 12th lock to better understand the potential environmental impacts and presence of protected species. Such studies will permit a more detailed opinion to be formed on the need for an EIA.

9.14 It is recommended that the project is delivered on a phased basis in accordance with the natural split between areas 1, 2 and 3. Dividing the project as such will allow a more flexible approach to be adopted in the delivery of the project given the current fiscal budgetary constraints.

9.15 Further short term cost-sensitive solutions are identified in Chapter 7 where the key benefits of the scheme can be delivered immediately without prejudice to the longer term project goals. This is aimed at achieving greatest value for money at a time when funding may not be immediately forthcoming.

Appendix A Preferred Option Route Maps

Appendix B Detailed Cost Estimate

Appendix C Project Need for EIA

Royal Canal Greenway

Feasibility Report

October 2012

Notice

This report was produced by *Atkins* for *Fingal County Council* for the specific purpose of *Royal Canal Greenway - Feasibility Study*.

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Appendices

Executive Summary

This study examined the engineering feasibility of upgrading the existing towpath along the Royal Canal to meet the objectives as set out in Chapter 1 of this report.

The study included widespread consultations with identified key stakeholders and the general public.

A total of 24 submissions were received from the public during the consultation period.

The consultation period revealed an overall level of support for the project but also highlighted that there are important environmental and ecological issues to be addressed.

A desktop study and numerous site visits were undertaken to establish the constraints and develop a working knowledge of the issues along the proposed route. A constraints map was produced to identify the critical matters and assist in the development of route options. The constraints study examined both the engineering and environmental aspects of the proposed route.

An opportunities map was also developed to identify areas where potential benefits of the project could be maximised. It was proposed that all "opportunity" items identified would be brought forward to the final emerging preferred route option.

Options were generated for the identified constrained areas along the route. These options were assessed against agreed criteria and their effectiveness in meeting the stated project objectives. The evaluation process permitted the emerging preferred option to be extracted from the data gathered and is presented in Chapter 7 and Appendix A.

The overall capital cost of the emerging preferred option was estimated at circa € 8.3 million exclusive of VAT. A reduced option would cost €6.2m.

The emerging preferred option was also subjected to a preliminary screening process to determine whether the proposals should be subjected to an Environmental Impact Assessment in accordance with prevailing legislation. A technical paper was commissioned which found that the scheme to date does not automatically require an EIA, but that the local authority should give appropriate consideration to the sensitivities of the receiving environment along the canal corridor in any future upgrading project.

The local authority, following consideration of the potential environmental impacts of an upgrading project, may deem the project to require an EIA. Where it is determined that the development does not require an EIA, the appropriate route for the Statutory Approval would be in accordance with Part 8 of the Planning and Development Regulations.

Detailed ecological information is currently available between 10th lock at Ashtown and 12th lock at Castleknock and this should provide a basis for determining if an EIA is required for any future upgrading works to this easterly section.

The study includes a costing for the emerging preferred option. However short term cost-sensitive solutions were identified where the key benefits of the scheme could be delivered immediately without prejudice to the longer term project goals.

1. Introduction

Background

1.1 Fingal County Council and the National Transport Authority have identified the Royal Canal as having the potential to become a strategic regional cycling route in the Greater Dublin Area. This report has been commissioned to examine the feasibility of upgrading the Royal Canal towpath within the Fingal County Council area to a shared cycle / pedestrian route in conjunction with Waterways Ireland who are the custodians of this important public asset.

1.2 The study area is defined as the Royal Canal corridor commencing at the eastern county boundary at the 10th Lock (Longford Bridge), Ashtown and continuing along the Royal Canal to the western county boundary at Confey, immediately east of Leixlip. This distance is approx. 11.5 km.

Proposed Scheme Objectives

1.3 The objectives for the scheme are out outlined as follows:

1.4 **Primary Objective** – to provide a premium quality cyclist and pedestrian route in order to encourage and promote cycling in the Dublin Region in accordance with the stated objectives of the National Cycle Policy Framework, Greater Dublin Area: Draft Transport Strategy, Regional Planning Guidelines for the GDA and Fingal County Development Plan 2011-17.

1.5 Secondary Objectives –

- To improve the canal corridor as a recreational cycle and pedestrian route;
- To improve connectivity between the canal and adjacent public transport;
- To improve inter-connectivity between the canal and adjacent (existing and proposed) residential neighbourhoods;
- To increase and promote the amenity value of the resource;
- To increase and promote the historical and heritage value of the resource;
- To increase the accessibility of the resource to all users.

Existing Situation

1.6 The Royal Canal is an important and historic feature in Dublin's urban fabric which connects the city centre with its western suburbs and the adjoining counties. The canal corridor in the Fingal area can be divided into three distinct geographical sections based on the existing character of the Royal Canal. These are as follows:

Area 1: Longford Bridge (Ashtown Road) to Granard Bridge (Castleknock Road)

1.7 The towpath in this area is generally constructed on a flat gravel/tarmac path along the southern side of the canal corridor. it has open views to urban development and major infrastructure on both sides of the canal. The towpath is generally at the grade of the canal itself and is located immediately adjoining to the Dublin-Sligo railway line to the south.

Area 2 – Granard Bridge (Castleknock Road) to Callaghan Bridge (Clonsilla Road)

1.8 The towpath comprises of a gravel path on a steep gradient at the various access points with the remainder being a narrow rough dirt track along the corridor. This section includes the Deep Sinking area where there is a significant grade difference between the towpaths and water surface

of the canal. In addition, the railway line is elevated above the level of the towpath with existing housing development present on both sides of the canal corridor.

Area 3 – Callaghan Bridge (Clonsilla Road) to County Boundary (Confey)

1.9 This section of the towpath on the northern bank consists of a dirt track on relatively flat lying ground with the exception of access points from the road network which are on a steep gradient. The path is flanked by mature hedgerows and the railway is elevated above the grade of the canal.

1.10 The current undeveloped character of this area is planned to change as the adjacent zoned residential lands are developed at Hansfield Strategic Development Zone (SDZ) and the Barnhill Local Area Plan.

1.11 All above areas are shown on drawing 3098SK042 Revision 0 overleaf.

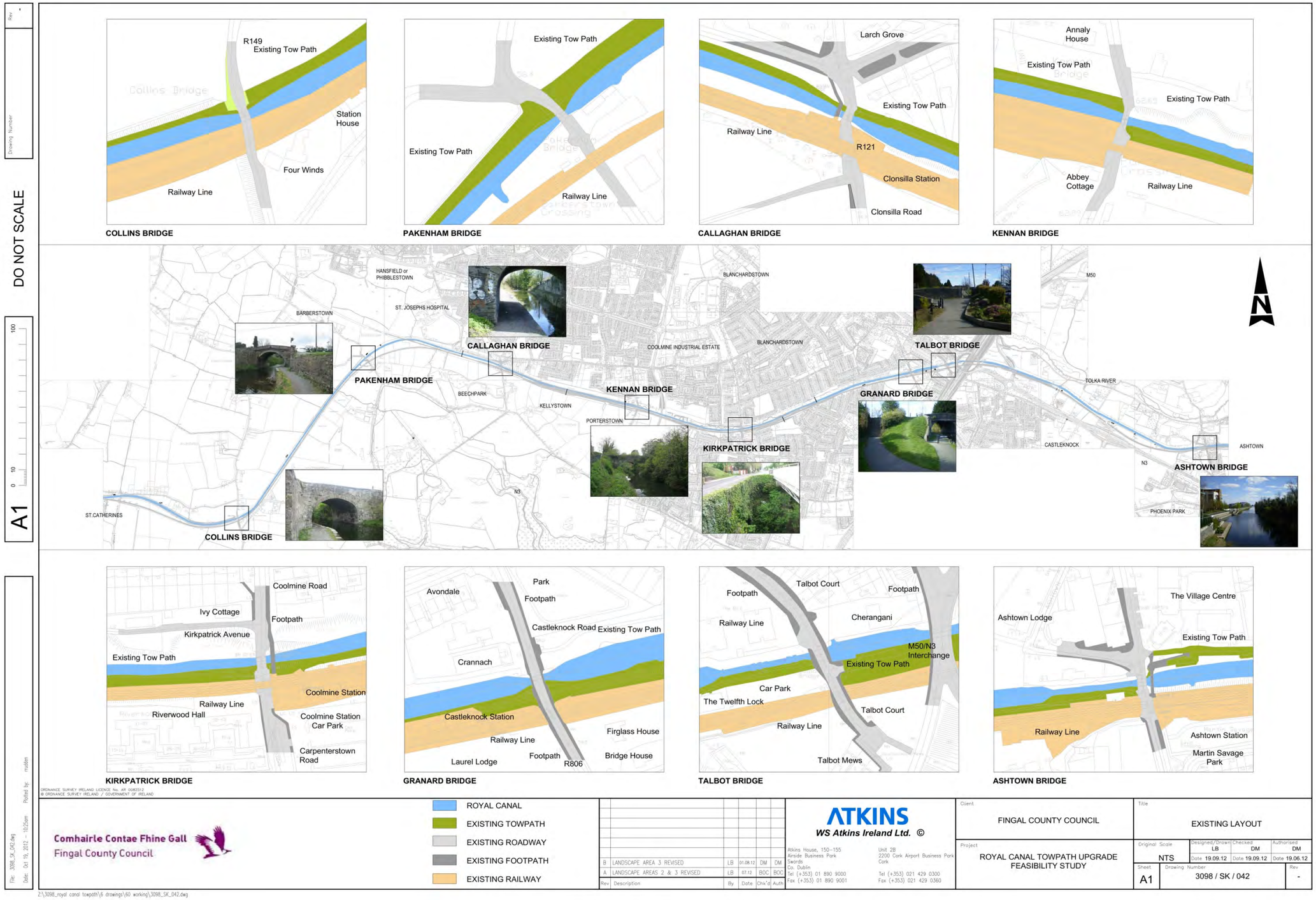


Figure 1.1 - Existing Layout

2. Scheme Context

Planning Policy & Guidance

2.1 In undertaking this feasibility study, a number of plans, guidance documents reports and project references were reviewed. This section summarises the main sources of reference starting with national, regional and local policy and then describing the various existing studies and best practice guidance documents published with regards to the Royal Canal Towpath and cyclepaths in general.

National Transport Policy

Smarter Travel and National Cycle Policy Framework

2.2 In February 2009, the Smarter Travel Policy document for achieving a sustainable transport system for Ireland was published, this document outlines a number of policies to encourage a modal shift away from private car use and promoting public transport, walking and cycling.

2.3 In April 2009, Ireland's first National Cycle Policy Framework (NCPF) was issued, the vision of the policy is "all cities, towns, villages and rural areas will be bicycle friendly. Cycling will be a normal way to get about, especially for short trips". The aim of this framework is to encourage a culture of cycling to the extent that 10% of all trips will be completed by bicycle by 2020.

2.4 The National Cycle Policy Framework also sets out the objective of creating a national cycle network around Ireland and using disused railway lines and canal/river towpaths as cycling and walking routes to achieve this.

Regional Cycling Policy

Strategy for the Development of Irish Cycle Tourism 2007

2.5 This document highlights the need for renewing the popularity of cycling in Ireland and how tourism generated through this sector can increase visitor spending in rural and urban areas. Guidance is also given on the types of roads suitable for a national cycle network along with the provision for cycling facilities eg. signage.

Regional Planning Guidelines for the Greater Dublin Area: 2010-2022

2.6 This document provides the development strategy for the Dublin and Mid-East regions over the plan period. It emphasizes the role of the capital city in future economic growth of the region and the need to ensure it is an attractive, vibrant location for industry, commerce, recreation and tourism. Development in the GDA shall be directly related to investment in high quality public transport and focused on achieving a compact urban form.

2.7 The strategy considers that a minimum of 10% of all trips should be by bicycle by 2020. It emphasizes the integration of cycle routes and infrastructure into new development and communities as key component of the delivery of greener transport travel patterns. Programmes to support this objective and create a culture of cycling should be pursued as well as promoting the tourism benefits of improved cycle networks within the GDA.

Greater Dublin Area: Draft Transport Strategy 2011-2030

2.8 The National Transport Authority was set up in 2009 to develop greater use of sustainable modes of transport across the country. The Authority's Greater Dublin Area Draft Transportation Strategy 2011-2030 sets out a vision for *"a competitive, sustainable city-region with a good quality of life for all"*.

2.9 The five overarching objectives for the Strategy to support this vision are:

- Build and strengthen communities

- Improve economic competitiveness
- Improve the built environment
- Respect and sustain the natural environment
- Reduce personal stress

2.10 The plan provides the transport strategy for the Greater Dublin area to 2030. It highlights the need to integrate land use and transport planning in achieving a consolidated urban area supported by non-private vehicle movement. The environment for pedestrians and cyclists needs to be improved to encourage a much greater proportion of trips to be made on foot, by bicycle or public transport. Dublin is to become a recognized walking and cycling city-region with a street environment that is attractive, safe and pedestrian/cyclist orientated in design.

2.11 Section 9.5 of the Strategy proposes identified measures to encourage and increase the share of cycling journeys including new routes, networks and infrastructural provision. Measure WCY 13 specifically seeks the provision of the Royal Canal as a cycle track for commuter and leisure cyclists.

County Policy

Fingal County Development Plan 2011-2017

2.12 The core strategy of the plan is to consolidate new development along defined corridors in accordance with the identified settlement strategy. Integration of land use and transport infrastructure is a key objective in achieving sustainable development within the county. The plan seeks the development of a green infrastructure network across the county including the transport aspects of such assets.

2.13 The Development Plan sets out to promote and facilitate movement within and to the County through the integration of land use with a sustainable transport system. Priority is given to public transport, walking and cycling. There is a dedicated section in Chapter 4 of the Development Plan that deals with Cycling and Walking. The emphasis in the Development Plan is on the promotion and facilitation of sustainable forms of transport of which cycling is a key component. Objective TO10 seeks to Promote and incorporate the objectives contained within the Government's National Cycle Policy Framework 2009 – 2020.

2.14 Cycling is also promoted in the Development Plan as a significant form of leisure. Section 8.4 Rural Enterprise, Cycling and Walking, seeks to promote the development of cycling in rural areas as a form of recreation.

2.15 Specifically Objective RE37 highlights the county's aim to 'investigate the possibility of developing named linear cycle routes within Fingal utilising existing natural or human-made corridors such as riversides and abandoned road and rail infrastructure'.

2.16 The Development Plan features an Objective AH34 'Protect and enhance the built and natural heritage of the Royal Canal and ensure that development within its vicinity is sensitively designed and does not have a detrimental effect on the character of the Canal, its built elements and its natural heritage values'. The canal corridor also has a Specific Objective as a Designated Nature Conservation Area.

2.17 Figure 2.1 Overleaf is an extract from the Fingal County Development Plan showing the overall planning context in terms of land use zoning.

2.18 Chapter VIII of the County Development Plan aims to improve the amenity and recreational value of the Royal Canal without causing significant disturbance to the Canal's natural heritage.

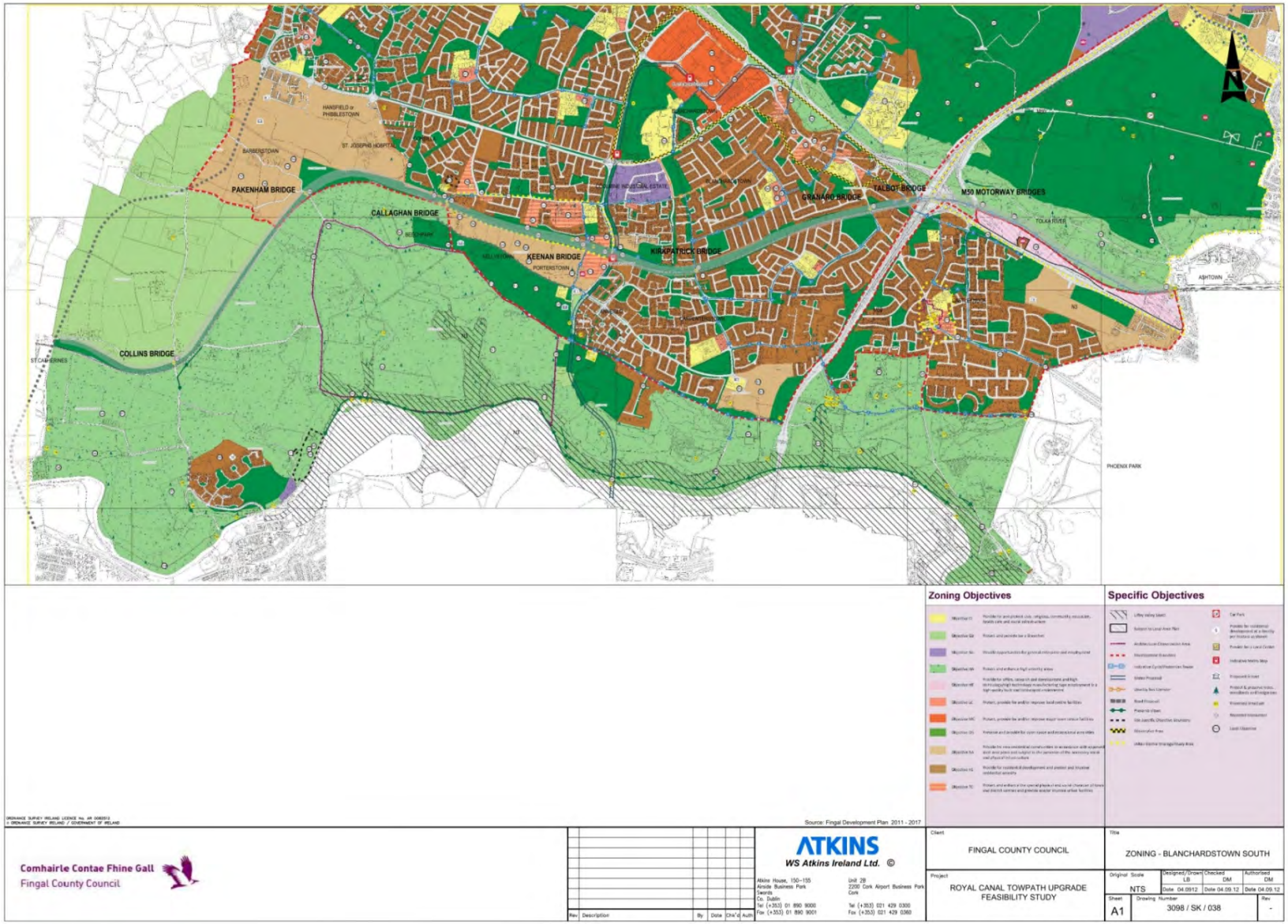


Figure 2.1 - Fingal County Development Plan, Land Use Zoning

Existing Studies

Royal Canal Planning and Development Strategy for Fingal 2008

2.19 The main objectives of the Planning and Development Strategy are to;

- Promote the royal canal as a site for education and enjoyment of the environment for all
- Support sustainable economic development that is compatible with the character of the royal canal
- Improve security and safety along the canal corridor
- Promote the royal canal as an recreational resource
- Establish a programme to implement and deliver the royal canal strategy

2.20 It is hoped that the above objectives will help achieve the vision that 'the royal canal will be a high quality, vibrant and attractive linear greenway recognised and protected as a recreational, historic and natural resource'.

Dublin City Canals – Recreational Tourism & Commercial Product Identification Study & Development of an Investment and Maintenance Framework July 2009

2.21 Scott Wilson were commissioned by Waterways Ireland with DCC, Failte Ireland and the Dublin Docklands Development Authority to undertake a recreational, tourism & commercial potential of the Dublin City Canals and associated docks within the Dublin City Council boundary. Through stakeholder consultation the following proposals for programmes were highlighted as helping achieve the overall vision of a healthier, wealthier, vibrant and attractive canal corridor;

- Canal corridor widening and parks integration programme
- Boundary enhancement and screening programme
- Canal Garden scheme
- Habitat and landscape enhancement programme
- Interpretation and signage programme
- Canal Arts and Culture programme
- Animation programme
- Pedestrian safety programme
- Canal wardening/ranger scheme

An Ecological Survey of the Grand & Royal Canals in Dublin 2011

2.22 This survey found that both canals supported a number of semi-natural habitats and important habitat corridors within a heavily urbanised area. The study also found only a few of the habitats were of high conservation importance in the broader sense but given their urbanised setting they were of great importance.

2.23 A number of protected species were noted, such as the otter and the opposite leaved pondweed and endangered species such as the snail *Myxas glutinosa* indicate the canals are of high value in maintaining biodiversity in the Dublin Area and beyond. It is believed that maintaining their populations in the canals in Dublin could be vital to their continued survival in Ireland.

2.24 Overall the report found 'the Grand and Royal Canal despite being man-made are now very important refuges for flora and fauna within Dublin and with careful management and protection can continue to provide amenity value to people while not compromising their value to nature conservation'.

Royal Canal Premium Cycle & Pedestrian Route 2011

2.25 A feasibility study for upgrading the existing Royal Canal towpath from Cross Guns Bridge (Westmoreland Bridge) to Reilly's Bridge (Ratoath Road Bridge) was carried out by Clifton Scannell Emerson Associates. This section of the canal is within the Dublin City Council area and would join two existing upgraded sections of the towpath.

2.26 Proposed future upgrading of this part of the canal (5th to 8th locks) includes the following;

- 3.5m wide shared pedestrian/cycle route kerbed on both sides
- Disabled access with ramps no steeper than 1:20
- Integrate new route with existing/proposed routes in locality
- New bridge & access at Shandon Park
- Public lighting
- CCTV system
- Security Fencing
- Landscape upgrade

2.27 Several constraints along the proposed route for the above upgrade were highlighted such as steep access points, anti-social behaviour, restricted head height for cycle access under bridges and protected species etc.

3. Stakeholder Consultation

Consultation

3.1 Consultation with all major stakeholders along the route including the general public took place as part of the feasibility study for the upgrade of the Royal Canal towpath. These consultations were undertaken between the 5th April 2012 to the 14th June 2012.

3.2 Given the environmental sensitivity of the canal corridor, it was agreed that individual meetings would be arranged with major stakeholders to effectively discuss and understand the major concerns and limitations on any feasible development options.

3.3 Other larger voluntary organisations with a vested interest in the conservation of the canal heritage and promoting the use of the canal were contacted and consultation meetings held.

3.4 Written submissions from smaller local interest groups and the general public would be invited via a public advertisement to be circulated in local newspapers and erected at selected entry points to the canal towpath within the study area.

3.5 A full summary of the stakeholder consultation process can be found in the Stakeholder Consultation Report (Atkins Document Reference: 3098DG008). A summary of the report is provided below.

Waterways Ireland

3.6 Meetings were held with Mr Mervyn Hamilton of Waterways Ireland on 5th April 2012 and 24th April 2012. Mr Hamilton noted that Waterways Ireland would be in favour of the project provided that the level or scale of development is consistent with the heritage character and cognisant of the environmental sensitivity of the existing canal corridor. Mr Hamilton also stated that conservation of the canal's heritage value is also a key concern of Waterways Ireland.

3.7 In developing the canal towpath, it would be of benefit to Waterways Ireland if the proposed path could be designed to accommodate existing Waterways Ireland maintenance machinery, including 20T wheeled excavators for effective dredging of the canal. However, it was agreed that smaller maintenance vehicles such as 4x4 jeeps or similar are accommodated as a minimum requirement and where feasible.

3.8 Further consultations were held with Ms Paula Treacy of Waterways Ireland's Environmental Department. Ms Treacy noted the environmental sensitivity of the canal corridor in general and its potential for protected species habitats. Specific information on the Royal Canal is available through the following publications:

- Ecological Survey of the Royal Canal Part 1 – 1990
- Ecological Survey of the Royal Canal Part 2 – 1990
- Fingal County Council Flora Report – 2004
- Fingal County Council Mammal Report – 2004
- The Royal Canal Architectural, Engineering and Industrial Heritage Assessment – 2007
- Survey of the Aquatic Mollusca of the Grand and Royal Canals – 2010
- Ecological Survey of the Grand and Royal Canals in Dublin – 2011 (From Ashtown to the M50)
- Various reports from Inland Fisheries Ireland

3.9 Following a site meeting with Dr Maurice Eakin of the National Parks and Wildlife Service (NPWS) (refer to paragraph 3.39), the options for widening the existing towpath into the canal water body was discussed with Mr Mervyn Hamilton. Mr Hamilton noted that Waterways Ireland tend not to agree to such measures but in this case, given the width of the canal channel, there was scope to consider such proposals as the net effect on the navigable channel would be negligible.

Irish Rail

3.10 Atkins met with Mr Nick West of Irish Rail on 1st May 2012. The consultation included a walk along the canal towpath between Ashtown Station (Longford Bridge) and Clonsilla Station (Callaghan Bridge).

3.11 Mr West's main concerns were as follows:

- Where the railway line borders the existing towpath (Longford Bridge to Kennan Bridge), security of the line with respect to trespassers. It was noted that there is a history of trespassing on the railway due to anti-social behaviour and underage drinking. Mr West noted that the existing fencing was lacking in some areas and that incidences of trespassing on the line would most likely increase should the towpath be developed.
- Through the area of the Deep Sinking, any future proposals to widen the towpath into the existing embankment would require careful consideration of the railway line above. Mr West requested that the channels of communication are maintained between the local authority and Irish Rail in this regard to ensure that all solutions can be considered at the earliest possible opportunity.
- Mr West noted Irish Rail's intent to close level crossings and provide alternative (and safer) routes to cross the railway. It was agreed that these proposals should be taken into account when developing design options for the feasibility study, where possible.

3.12 A further consultation with Mr West took place on 6th July 2012 at Pearse Station. At this meeting a number of options for the development of the towpath were presented to Mr West for comment. The options focussed on the difficult area of the Deep Sinking.

3.13 Mr West advised that Irish Rail would prefer if a cantilever boardwalk type option was adopted as it would have minimal impact on the adjacent embankment. Thereafter, where it is not feasible to avoid the embankment, a secant pile wall options is preferred followed by a king-post retaining system. Options which require large areas of excavation to be left open are least preferred.

3.14 At this second consultation, Mr West also suggested that the project seeks to improve the existing masonry retaining wall structures supporting the railway and provides for security fencing along the railway in the interest of deterring trespassers on the railway which is an ongoing safety concern for Irish Rail.

Fingal County Council – Conservation & Heritage

3.15 The development of the Royal Canal as a pedestrian and cyclist route is underpinned by the Fingal County Development Plan and by the Royal Canal Strategy (2008). To consult in relation to particular issues, a meeting with Mr Gerry Clabby, Fingal County Council Heritage Officer and Ms Helena Bergin, Fingal County Council Conservation Officer, was held on 12th June 2012.

3.16 Mr Clabby noted that any proposals should aim to retain the existing undeveloped character of the canal corridor as much as possible. Notwithstanding the above, it was also noted that there may need to be "trade-offs" between the level of development required and the existing natural environment at certain locations, e.g. at interfaces with existing roads where gradients will need to be amended to better accommodate the mobility impaired.

3.17 It was further noted that public lighting will be considered in the development of options for the Greenway. This is to ensure that the proposed route is an attractive option for the cyclist

commuter, especially during the winter months when the morning and evening commutes will most likely be in the hours of darkness. Mr Clabby advised that any such lighting system may have an adverse affect on bats which are a protected species under Irish legislation. However, it was considered that the lighting system could utilise modern auto-dimming technology, effectively turning the lights off during the night and early hours of the morning.

3.18 In terms of habitats, Mr Clabby noted that Fingal County Council has limited information and habitat mapping for the Royal Canal corridor and that this would be made available to the Consultant team. It is vital to the success of the project that habitats of protected species are known as early as possible so that appropriate measures can be taken and effective project planning maintained.

3.19 Ms Bergin advised that the entire canal should be carefully considered including the historic bridge structures. In this regard, works to the towpath and access points should be kept to the minimum required to achieve the project goals. It was also noted that where guidance for mobility impaired dictates that extensive works would be required; the project team are encouraged to enter into dialogue with the National Disability Authority to develop an acceptable compromise solution.

Inland Fisheries Ireland

3.20 Mr Paul McLoone of Inland Fisheries Ireland was consulted on 29th June 2012.

3.21 Mr McLoone noted that construction of a proposed cycle / pedestrian route would ideally leave a 1 - 2m marginal buffer along the canal bank. He also indicated that best practice should be used during any proposed construction process to ensure that disturbance of vegetation is minimised, special care is taken when working with deleterious materials (oils, fuels, wet concrete etc), and runoff is controlled to eliminate any risk of sedimentation of the waterbody.

3.22 With regard to angling activities, Mr McLoone indicated that parts of the canal are used by coarse anglers who sometimes use extended fishing poles (up to 12 m long). Mr McLoone indicated that there may be potential issues in some areas where the proposed facility may interfere with current angling practices.

Inland Waterways Association of Ireland

3.23 Mr Mick Kinahan of the Inland Waterways Association of Ireland (IWAI) was met on the 14th June 2012.

3.24 In general, Mr Kinahan noted that the IWAI was in favour of the project. He particularly welcomed the addition of amenity areas along the canal and would especially welcome additional jetties / marina facilities for boat users.

3.25 Mr Kinahan expressed a desire for the towpath to be opened up and the visibility between the canal and the towpath to be restored, especially in the area of the Deep Sinking where the canal banks are currently overgrown.

3.26 There was no objection to a possible public lighting system provided that it is habitat sensitive.

3.27 Mr Kinahan also noted the presence of protected species along the canal corridor, including Mandarin Duck and Kingfisher.

Royal Canal Amenity Group

3.28 Mr Noel Spaine of the Royal Canal Amenity Group (RCAG) was consulted on 14th May 2012.

3.29 Mr Spaine noted that the RCAG are 100% in favour of this project.

3.30 The RCAG had no objection to the potential 3.5m footpath / cycle track width.

3.31 While the difficulties in developing the towpath within the Deep Sinking area were acknowledged, Mr Spaine advised that he would still prefer to see a lesser path developed through this area rather than (or as well as) an alternative parallel route.

3.32 Areas at Hansfield and the 12th Lock were identified as potential amenity areas to facilitate boaters. A third area at the 11th Lock was also suggested, although this area has a history of frequent anti-social behaviour and is a known location where underage drinkers congregate.

3.33 Mr Spaine advised that the RCAG would also be providing a written submission in response to the public notice published in the local papers.

The Twelfth Lock Hotel / Castleknock Marina

3.34 Efforts to contact the reputed owner of the above premises were unsuccessful and consultations with the Twelfth Lock Hotel / Castleknock Marina were not possible.

National Parks and Wildlife Service

3.35 Department of the Arts, Heritage and the Gaeltacht (within which National Parks and Wildlife Service now resides) was consulted on 30th April 2012. Information on background ecological information regarding the Royal Canal corridor between Ashtown and Leixlip was requested.

3.36 It was noted that the canal is known to support consistent otter activity along its course although no formal information on this is currently available.

3.37 The woodland areas along the canal route are of an obvious value to bats. No detailed information on the existence of bat roosts is currently available.

3.38 The canal banks and margins support pockets of semi-natural grassland some of which are orchid rich.

3.39 A further consultation was held with Dr Maurice Eakin of the National Parks and Wildlife Service on 22nd August 2012. This consultation included a site walkover through the Deep Sinking area.

3.40 Dr Eakin was concerned about the potential removal of an approximate 200m stretch of riparian margin species. This stretch occurs at the pinch point between the railway retaining wall and the canal bank, located approximately 400m west of Castleknock Station. Potential solutions to maximise the retention of the riparian zone were discussed at length for inclusion in the study process.

3.41 Dry grassland supporting species of high importance was identified within the area of the Deep Sinking. The options for upgrading the towpath within this particular area were discussed. It was considered that option of the retaining wall along the length of the Deep Sinking could potentially have a major negative impact on such species. The cantilever option was favoured due to the minimal impact on the dry grassland and on the riparian margins at the water's edge below.

3.42 There were no issues anticipated with the proposed scheme either side of the Deep Sinking area. It was deemed unnecessary to extend the site visit to these areas.

3.43 With respect to the provision of public lighting along the route, Dr Eakin suggested that best practice, as provided on the recent Grand Canal route, should be followed. The Grand Canal route used various mitigation measures to minimise the impact on bats. Baffles and short column heights were included in the design to effectively limit the level of light spill onto the waterbody. A dimming system was also introduced so that lighting could be automatically dimmed or switched off during the hours of dawn and dusk, when bats are feeding and most active.

3.44 It was noted that the issue of bats and proposed lighting was only prevalent in the summer months as bats hibernate for the winter.

3.45 Otters are known to be active along the canal corridor and are a protected species. The proposed construction activities are unlikely to adversely affect any existing otter habitats. However, a detailed habitat survey for protected species would need to be carried out.

Dublin Fire Brigade

3.46 A consultation meeting was held with Dublin Fire Brigade on 10th August 2012 to discuss issues relating to the emergency response services.

3.47 Currently, emergency access to the canal is via existing adjacent properties and gardens. It was considered that any improvement in access would be very beneficial to the emergency services. Access for a fully loaded ambulance of approximate fully laden vehicle weight of 4.5 tonnes would be ideal. However, where such provision would be unfeasible, access for a standard vehicle such as a standard car or a 4x4 jeep would be sufficient.

3.48 It was also noted that the provision of location markers would be of great benefit. Such measures would allow a member of the public to pin point their location in the event of a call to the emergency services. Markers could be provided on lighting columns or life buoys, where present.

3.49 It was noted that some form of vehicle prohibition would be provided to ensure that unauthorised vehicles did not have access to the canal towpath. This would most likely be in the form of removable gates or bollards which would permit the occasional use by maintenance personnel and vehicles. While fire tenders do carry keys for local authority controlled facilities, any locks provided on removable bollards or gates must be accessible to bolt cutters to allow quick access in the event of an emergency.

3.50 In terms of access to the canal itself, the provision of the pedestrian guardrail throughout the area of the Deep Sinking would make access to/from the water difficult. It was discussed that some form of access point would be preferable where either an access hatch or ladder attachment could be incorporated into the design of the guardrail. For the cantilevered boardwalk option, this ideally would also include an emergency hatch in the “floor” where the difficulties of the boardwalk overhang could be eliminated.

3.51 Dublin Fire Brigade requested that ongoing consultations are carried out as the project progresses.

General Public & Local Interest Groups

3.52 It was decided the most appropriate method of seeking public engagement would be to put a public notice in local newspapers inviting observations and suggestions from the public.

3.53 A total of 24 (twenty-four) submissions were received from the public before the stated deadline of 27th May 2012. There was broad support for the use of the canal towpath as a pedestrian / cyclist route and its potential as a public amenity.

3.54 The main points of concern were as follows:

- Loss of rural character/environmental sensitivity
- Antisocial behaviour/rubbish
- Access
- Provision of signage & amenities
- Phasing of works
- Integration with local community
- Safety of users and local residents

3.55 It is recommended from the stakeholder consultation the following points are taken into account for the feasibility study:

- Consider the safety and antisocial behavioural security aspect of the canal towpath and how the provision of public lighting and/or remote CCTV monitoring might alleviate the problem.
- Provide adequate facilities to cater for all members of the public, including a carefully measured and balanced approach to maintaining the rural character of the canal corridor and protecting its environment and heritage.
- Provide a balance of amenities to promote the recreational aspect of the canal.
- Seek to create safe and unhindered access to the canal towpath through improvement of existing access points and provision of additional direct links to adjacent residential areas.
- Seek to protect and enhance the structural heritage of the canal, i.e. the existing canal bridges and the canal channel.
- Provide signage to communicate distances to key destinations along the canal corridor.
- Erect information plaques at various locations giving a brief history of the canal and its heritage.
- Consider where measures to assist in the reduction of littering and fly tipping can be incorporated into the development of scheme options.

4. Constraints

Constraints General

4.1 A constraints study was carried out comprising of a desktop study and review of existing literature and reports, and various site walkovers conducted by environmental, ecological and engineering consultants in April 2012.

4.2 The identified constraints were listed and discussed to form the Constraints Map provided at Figure 4.1 at the end of this chapter. These constraints are provided in detail below. The engineering constraints are followed by the environmental constraints and are described as travelling westwards from Longford Bridge / Ashtown Road.

Engineering Constraints

Area 1: Longford Bridge (Ashtown Road) to Granard Bridge (Castleknock Road)

4.3 **Longford Bridge:** Linkage between the recently completed upgrade of the towpath east of Longford Bridge at Rathbourne and the proposed Greenway will need to be addressed to ensure continuity of the facility. The towpath approaches from the east on the northern bank of the canal and switches to the southern bank at Longford Bridge. There is an existing footbridge crossing the canal immediately east of Longford Bridge which provides a safe pedestrian route to the adjacent Ashtown Railway Station. This existing footbridge measures 2.2m in width.

4.4 The road width across Longford Bridge is narrow at 6.3m; there are no footpaths present and there are no formal crossing facilities at the entrance to the canal towpaths. The road is heavily trafficked although traffic speeds are low due to the constrained alignment across the bridge and adjacent level crossing which is manually operated.

4.5 **10th Lock:** On entering the canal towpath at Longford Bridge, the path passes between the lower chamber of the 10th Lock and the adjacent private dwelling with a maximum available width of 3.0m.

4.6 Thereafter, the towpath passes the upper chamber of the lock and continues westwards along the southern bank of the canal. The towpath width at this point is approximately 3.2m with potential to widen to 3.5m towards to lock wall.

4.7 The gradients of the towpath through the lock are approximately 7% (1:14) which would not be in accordance with current recommendations for 5% or 1:20.

4.8 **10th Lock to 11th Lock:** The width of the existing towpath along this section varies from 2.4m to 2.8m in width. It is bordered with a 0.6m buffer on the canal bank side and a grass verge of varying width on the railway side. There is good potential to widen to 3.5m along this stretch of the canal; the most constrained area being between the Navan Road Parkway Station and the 11th Lock, where the existing (minimum) 1.8m verge increases in height by approximately 1.0m as it approaches the railway boundary at its narrowest point.

4.9 **11th Lock:** The path through the 11th Lock is currently 2.8m wide and there is potential to achieve the desired 3.5m. However, the longitudinal gradient would need to be checked for compliance with current accessibility requirements.

4.10 **11th Lock to Talbot Bridge:** There is potential to achieve the desired width of 3.5 m along this section of the towpath, although the gradients at Ranelagh Bridge will need to be assessed in detail to achieve acceptable accessibility limits.

4.11 Thereafter, moving westwards along the canal, there is a pinch point in the towpath width across the M50 Aqueduct where the current footpath provision in terms of available width is reduced to 2.2m.

4.12 The approach to Talbot Bridge is sufficiently wide and there is scope for potential widening of the towpath to achieve the required 3.5m. On the immediate approach to the bridge, the towpath rises to meet the existing road level on Talbot Court above. The gradient on this section of the path is currently 1:10

4.13 **Talbot Bridge:** the Old Navan Road is a quiet vehicular cul-de-sac which consists of the entrance to the 12th Lock Hotel carpark and a small number of private dwellings. Traffic volumes across the bridge are correspondingly low. At the end of the cul-de-sac, there is access to an existing pedestrian and cyclist bridge route over the M50 motorway to continue along the Old Navan Road to the city.

4.14 There are currently no formal pedestrian crossing facilities at Talbot Bridge.

4.15 **Talbot Bridge to Granard Bridge:** A towpath is provided along both banks of the canal over this short section.

4.16 Access to the southern bank is via a series of shallow steps at Talbot Bridge or via the privately owned car parking area of the 12th Lock Hotel. The existing path is surfaced in tarmac and is approximately 2.0m wide. Passing the hotel and 12th lock, the potential for widening is limited to circa 2.5m due to the retaining wall and service entrance to the adjacent hotel on the south and the 12th lock structure on the north.

4.17 Further west and past the hotel, there is an open grassed area between the existing towpath and the railway with minimal constraint in widening to the desired 3.5m. The approach to Granard Bridge and access to Castleknock Road above is via existing concrete steps. However, there is evidence that the adjacent grassed area is commonly used by both pedestrians and cyclists to access the towpath despite the existing steep gradient of approximately 1:10.

4.18 Access to the northern bank is via an existing access lane which is 3.0m wide and includes a steep gradient of 1:10 to reach the upper level of the adjacent canal lock. Any increase in width would be difficult due to the retaining walls on both sides which form the boundary with the 12th lock to the south and the private grounds of the Talbot Mill residential development to the north.

4.19 Heading westwards past the 12th lock, the existing path meanders into open parkland and emerges onto Castleknock Road immediately north of Granard Bridge. The desired 3.5m width can be achieved in this area with minimal work required.

4.20 **Granard Bridge:** Granard Bridge carries the Castleknock Road which is the main thoroughfare between Blanchardstown and Castleknock Villages. It is a busy road with heavy traffic volumes especially during peak hours. The immediate location is comprised of numerous residential developments and the Castleknock Railway Station is located immediately west of the bridge. Adjacent junctions accessing these residential areas are signalised and controlled under the Dublin City Council SCATS system.

4.21 The towpath along the canal passes under the bridge. The path width under the bridge is approximately 2.0m and vertical clearance is considerably less than the 2.3m required for cyclists. Notwithstanding this, there is a pinch point along the route of 0.95m where the towpath rejoins the railway access ramp from Castleknock Road.

4.22 Continuity of the towpath route would therefore require users to cross Castleknock Road at Talbot Bridge. Visibility of oncoming traffic is poor and there is currently no formal crossing facility at the entrance to the canal towpath. Existing footpath provision across Granard Bridge is also poor with a minimum width currently at 0.7m.

Area 2: Granard Bridge (Castleknock Road) to Callaghan Bridge (Clonsilla Road) – "The Deep Sinking"

4.23 **Granard Bridge to Kirkpatrick Bridge:** Castleknock Railway Station is located immediately west of Granard Bridge. Access to the station is provided from Castleknock Road via a purpose built ramp which was constructed at a gradient of 1:10. Thereafter, the towpath continues to the west,

past the station on a less formal grass path. A narrow muddy trail indicates the most trafficked areas of the towpath. The grassed area is of sufficient width to accommodate a 3.5m wide shared facility. Existing signage along this section of the towpath informs users that they are entering the Deep Sinking.

4.24 Approximately 400m west of Castleknock Station, the railway passes extremely close to the existing towpath creating a pinch point. The railway level is approximately 1.5m above the towpath level and is supported by a masonry retaining wall structure. This structure is in a poor state of repair. The total towpath width through this pinch point is typically 1.5 – 1.7m. Further west level difference between the towpath surface and the canal water level gradually increases as one enters the Deep Sinking. This level difference is at circa 1.0m at this pinch point.

4.25 Continuing westwards, the lateral clearance to the railway increases to a typical value of 10m before decreasing again in the vicinity of Coolmine Station. The towpath width is typically 2.0m through this section with a circa 5.0m high embankment dividing it from the railway. The existing towpath is located within the area of influence of the railway line. At this point in the Deep Sinking, the canal waters are approximately 5.0m below the towpath level, with a steep canal bank consisting of rock outcrops and overgrown vegetation and trees which, due to the limited access, prevents maintenance from being carried out on the canal towpath and banks.

4.26 The approach to Kirkpatrick Bridge is both narrow and steep as it emerges onto Coolmine Road. The adjacent access to the inbound platform at Coolmine Station also merges with the towpath at Coolmine Road. At this point, a pedestrian bridge providing safe linkage between Coolmine Station and the existing residential area to the north of the canal meets the towpath and access to Coolmine Station. The southern abutment of this bridge creates a pinch point on the towpath, limiting its width to approximately 1.6m.

4.27 **Kirkpatrick Bridge** carries Coolmine Road across the canal. An automatic level crossing is located immediately south of the bridge. The existing carriageway width across the bridge is approximately 6.3m and there are no footpaths provided for pedestrians. On emerging from the canal towpath pedestrians have good visibility of oncoming traffic, primarily due to the low height of the bridge parapet walls. The carpark serving the railway station is located immediately south of the level crossing.

4.28 Coolmine Road is a local distributor road serving local residential developments in the Coolmine and Carpenterstown areas. It is therefore especially busy with traffic at peak times.

4.29 **Kirkpatrick Bridge to Kennan Bridge:** The towpath west of Kirkpatrick Bridge consists of a typically 2.5m wide path, with protection provided from the deep canal channel by means of a timber post and rail fence erected at the top of the canal bank. The initial 30m of the path is located on a gradient of 1:11.

4.30 In general, this section of the towpath is typical of the Deep Sinking where a narrow towpath width is provided with steep embankments. The width of the path through this section is typically 2.0 to 2.5m with the adjacent embankments falling within the railway's zone of influence.

4.31 Thereafter, the railway and canal towpath tend to merge to create a local 1.9m wide pinch point on the towpath for a length of approximately 50m. A retaining wall is provided between the towpath and the railway, which is covered with overgrown vegetation.

4.32 Further west, the distance between the railway and towpath increases and a drainage ditch is provided in this area. The ditch is approximately 1.6m deep. This provides a causeway effect with the narrow 2.0m towpath bounded on both sides with a deep cutting. The drainage ditch outfalls to the canal waters via an existing culvert under the towpath. The structural integrity of this culvert is unknown.

4.33 In the vicinity of Kennan Bridge, the towpath rises to meet Porterstown Road. Similar to the approaches at Kirkpatrick Bridge, the path is approximately 1.5m and the gradient 1:12.

Waterways Ireland has carried out some minor maintenance of the towpath in this area, including clearance of vegetation and localised widening of the entrances to the towpath.

4.34 **Kennan Bridge:** The carriageway across Kennan Bridge is narrow at just 3.7m. Horizontal alignment is poor and the bridge is a hazardous location for motorists given the poor forward visibility, narrow carriageway and the automatic level crossing located immediately south of the bridge. The towpath also switches from the southern bank to the northern bank of the canal at this point, requiring users to use the bridge to cross the canal. There are no footpaths provided.

4.35 Despite the number of existing and planned schools on Porterstown Road, traffic levels are low primarily due to the fact that Diswellstown Road/Bridge is now open to traffic and provides a better link to communities across the canal. Diswellstown Road provides an important link between the commercial and retail centres in Blanchardstown, the surrounding residential communities and major trunk roads via the N3 dual carriageway.

4.36 It should also be noted that Diswellstown Road and bridge crossing the Royal Canal and the railway provides the link between Clonsilla Road and Luttrelstown Road and are intended to replace the level crossing at Porterstown Road. The closure of this level crossing will effectively eliminate motorised traffic from using Kennan Bridge. However, there is no fixed date as to when this will occur. Hence, the closure of the level crossing has been ignored for the purposes of this study.

4.37 **Kennan Bridge to Callaghan Bridge:** While still within the Deep Sinking, the existing towpath along this section is typically 3.0m wide. The level difference between the towpath and the canal is approximately 3.0m, gradually reducing on approach to Callaghan Bridge at Clonsilla. Waterways Ireland recently carried out extensive works to clear overgrown vegetation and widen the towpath to achieve the typical width of 3.0m.

4.38 The northern boundary of the towpath consists of a minor earthwork embankment of varying height, typically varying from 1.0 to 2.2m. Approaching Callaghan Bridge, a number of private residential gardens form the boundary with the towpath. The existing width at this location is typically 5.0m minimum.

4.39 **Callaghan Bridge:** There is currently no direct access to street level at Callaghan Bridge. Pedestrians are required to proceed under the bridge and reach the street level via concrete steps provided some 75m to the west of the bridge. The path under the bridge is limited in width to 1.8m at its minimum, thus creating a pinch point.

4.40 Clonsilla Station is located adjacent to the bridge and access to the station is provided by means of a pedestrian bridge linking directly from Clonsilla Road to the inbound platform.

4.41 Callaghan Bridge carries Clonsilla Road over the canal. The total available width of 6.5m is used for traffic lanes and there are no footpaths provided.

4.42 Immediately south of the bridge is a partially automated level crossing. Immediately north of the bridge, traffic signals have been installed recently to increase the capacity of the junction and enhance user safety. It is proposed to link these signals to the level crossing in the near future.

Area 3: Callaghan Bridge (Clonsilla Road) to Fingal County Boundary (Confey)

4.43 **Callaghan Bridge to Pakenham Bridge:** Heading west from Callaghan Bridge, the canal emerges from the Deep Sinking. Initially, there is a section of the existing towpath which has been recently surfaced and widened to approximately 3.0m. A maintenance access is provided at the end of the improved section, which is approximately 350m west of Callaghan Bridge.

4.44 Further west and towards the railway over bridge, the towpath resembles an informal track on a grass bank. The available width is 3.0 to 3.5m typical. However, the northern abutment of the

Clonsilla SW watermain pipe-bridge represents a significant pinch point, where the available width is reduced to 2.5m.

4.45 Where the Dunboyne spur line of the railway crosses the canal, a pedestrian underpass has been provided. The internal width and height of this underpass exceed 4.0m and 2.3m respectively. Therefore, the underpass is suitable for a shared cycle / pedestrian track.

4.46 Between the railway overbridge and Pakenham Bridge, the canal bank widens to form a two-tiered towpath. The upper and lower tiers are generous in terms of their available widths, measuring approximately 12m in total available width.

4.47 To access the road at Pakenham Bridge, the towpath rises at a gradient of 1:17. The available width at this location is in excess of 10m.

4.48 **Pakenham Bridge:** This bridge is located on the Barberstown Road which connects westwards to the Lucan Barnhill Road (R149). The alignment of the road is poor both horizontally and vertically and visibility is compromised as a result. There are no footpaths provided in the vicinity.

4.49 The railway also crosses this road at an automatic level crossing located approximately 30m south of the canal. There are two private entrances located within this 30m.

4.50 The towpath splits at Pakenham Bridge and provides an option to proceed under the bridge, although the footpath width is limited to 2.0m minimum and headroom is restricted, making it unsuitable for cyclists.

4.51 An important fibre optic network known as Dublin's T-50 network crosses the canal within the deck of Pakenham Bridge. This consists of a large number of ducts carrying high speed data cables and links Dublin business parks with existing sub marine data cables to Europe and the United States. A branch of the T-50 network uses the canal corridor to link with Leixlip and a number of ducts are therefore present along the towpath westwards from Pakenham Bridge. The exact location, depth and number of ducts are unknown but would be unlikely to present any impact on the proposed upgrade works.

4.52 **Pakenham Bridge to Collins Bridge:** Immediately west of Pakenham Bridge, the towpath descends to meet the canal bank at a gradient of 1:15 and continues towards Collins Bridge. The towpath throughout this section is wide and free of obstacles. However, there are numerous fishing stands visible along the canal bank which are used occasionally for angling competitions.

4.53 The approach to Collins bridge is typical in that an approximate gradient of 1:10 is provided to access the road level above.

4.54 **Collins Bridge:** similar to Pakenham Bridge, Collins Bridge is distinctively rural in character, although traffic levels are notably higher on the R149 which links Clonee/Dunboyne to Lucan. The existing carriageway is circa 5.4m wide. The horizontal and vertical alignments are poor and typical of a rural "hump-back" bridge. Forward visibility for motorists is poor and where the towpath emerges onto the road, visibility of oncoming traffic is particularly poor. There are no footpaths across the bridge although a footpath is provided towards Lucan village, commencing approximately 20m beyond the adjacent railway bridge.

4.55 The towpath splits at Collins Bridge to offer an alternative route under the bridge although due to insufficient width and headroom, this would be unsuitable for cyclists.

4.56 **Collins Bridge to Fingal County Boundary:** The final section of the route descends to the canal bank on a gradient of 1:9. The towpath width remains favourable throughout this section, with a pinch point evident at the back of private gardens on the approach to the county boundary. The available width at this pinch point is approximately 3.5 to 4.0m. However, there is an existing drainage ditch along the back of the towpath at this location which is approximately 2.0m deep. The safety implication of this would need to be carefully considered for the end user of the upgraded towpath.

4.57 The route will finish close to the premises of the Royal Canal Amenity Group where access to the adjacent public road is achievable.

Environmental Constraints

Designations

4.58 The Royal Canal is a protected area of national importance. It is designated as a proposed Natural Heritage Area (pNHA) and a Water Framework Directive Register of Protected Areas site (WFDRPA)

Proposed Natural Heritage Areas (pNHA)

4.59 Under the Wildlife (Amendment) Act, 2000 Natural Heritage Areas (NHAs) are being designated to conserve species and habitats of national importance.

4.60 Under the Wildlife Amendment Act, 2000 the entire Royal Canal is formally designated a proposed Natural Heritage Area (pNHA) under site code 002103. The Royal Canal pNHA is defined by the National Parks and Wildlife Service (NPWS) to include the central channel and adjoining banks, hedgerows, towpath, grassland, open water, related scrub and woodland features. The pNHA designation indicates that the site has a B rating and is of national importance. According to the report accompanying the pNHA designation, the ecological value of the canal lies in the diversity of species along its linear habitats.

Biodiversity

4.61 The conservation of biodiversity in Ireland is a legislative imperative. Many species of national and international importance have been identified within the Royal Canal corridor. In particular, within Fingal, species identified have included the Otter (Lutra lutra), bats and the Kingfisher (Alcedo atthis). Under the Wildlife Acts (1976-2000) it is illegal to disturb of harm Protected Species and their habitats.

4.62 FCC is the appropriate planning authority for any changes which affect the Royal Canal. FCC will normally only grant permission where it is clearly demonstrated that a proposal will have no significant adverse impact on the habitats and species of interest in the designated area and its ecological integrity.

Register of Protected Areas under the Water Framework Directive

4.63 In accordance with the requirements of the Water Framework Directive and the associated national regulations, the Environment and Heritage Service (EHS) and the Environmental Protection Agency have compiled Registers of Protected Areas. Under this legislation, EHS and EPA are further required to maintain and update the register as needed.

4.64 The protected areas are identified as those requiring special protection under existing national or European legislation, either to protect their surface water or groundwater, or to conserve habitats or species that directly depend on those waters.

4.65 The register consists of an inventory of protected area sites representing the protected area categories outlined below:

- Waters used for the abstraction of drinking water;
- Areas designated to protect economically significant aquatic species;
- Recreational Waters;
- Nutrient Sensitive Areas; and
- Areas designated for the protection of habitats or species.

4.66 The Royal canal is a protected areas designated for the protection of habitats or species' category. These are areas designated for the protection of habitats or species where the

maintenance or improvement of the status of water is an important factor in their protection. These are designated under the Birds Directive (79/409/EEC) and the Habitats Directive (92/43/EEC).

Landscape Character Types and Values

4.67 The Landscape Character Assessment for Fingal as reported in chapter 5 of the Fingal County Development Plan divides the County into 6 Landscape Character Types. Each landscape type is given a value through the consideration of such elements as aesthetics, ecology, historical, cultural, religious or mythological.

4.68 A value can range from low to exceptional. The Landscape Character Types are:

- Rolling Hills Character Type;
- High Lying Character Type;
- Low Lying Character Type;
- Estuary Character Type;
- Coastal Character Type; and
- River Valleys and Canal Character Type.

River Valleys and Canal Character Type

4.69 The Royal Canal corridor is included in the River Valleys and Canal Character Type zone. The canal and its corridors provide valuable habitat for fish and other species. The canal itself and the many bridges and other structures associated with it are an integral part of the County's architectural heritage.

4.70 The Character Type is categorised as having a high value, due to the visual and recreation qualities contained therein. This is evident by virtue of the High Amenity zoning and Special Amenity Area designation in the area in addition to the dense tree belts and steep river valley slopes. The river valleys and the canal are also important for their ecology and biodiversity.

Landscape character types – sensitivity

4.71 Where a wide range of developments would sit comfortably in a particular landscape and would not interfere with a character or interfere or eliminate a value, such a landscape is deemed to be of low to medium sensitivity. On the other hand, where any proposed development would seriously damage a character or eliminate or seriously damage an irreplaceable value, such a landscape would be considered to be highly sensitive.

Highly sensitive character types

4.72 The following four character types are identified, in general, as having a high sensitivity to development:

- High Lying Character Type
- Estuary Character Type
- Coastal Character Type
- River Valleys & Canal Character Type

4.73 There are areas contained within these four character types which are identified in the County Development Plan as highly sensitive areas, these areas have a low capacity to absorb new development without damage resulting to the very characteristics that make them attractive such as nature conservation or scenic qualities.

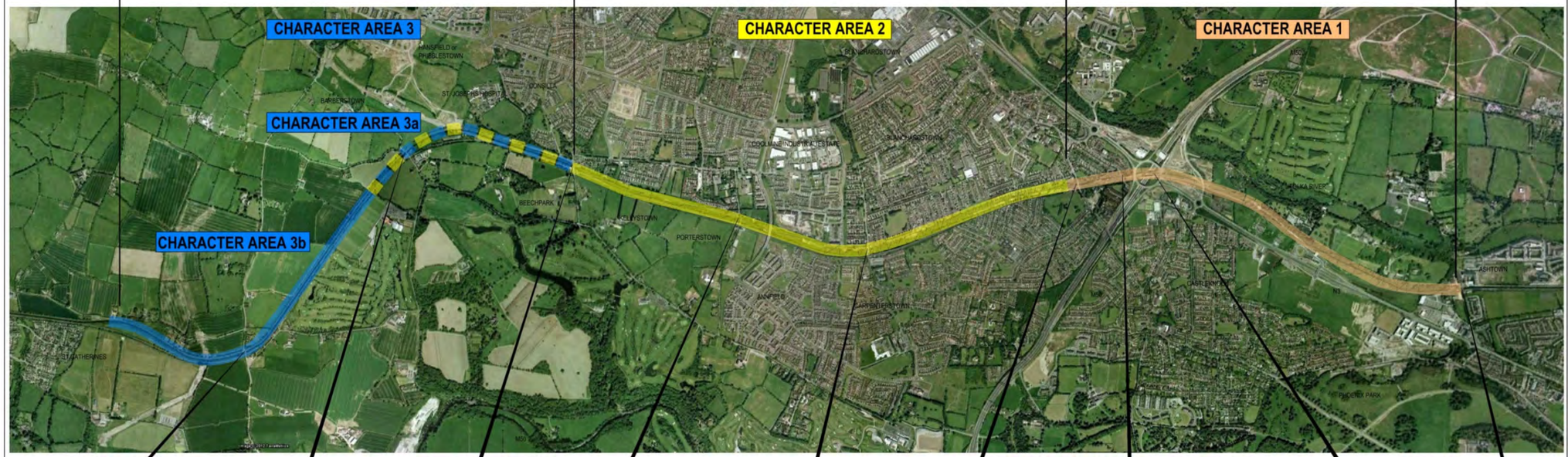
Character area 3 - Callaghan Bridge to Collins Bridge at St. Catherine's
Links with adjacent land: Intermittent views through hedgerow of adjacent flat countryside and scattered dwellings
Gradients: Generally flat rough tracks, no constructed footpaths
Biodiversity in canal corridor: Proposed greenway footprint comprises amenity grassland flanked by mature hedgerows and treelines of low to moderate ecological importance.

Note: Area 3a will be subject to development of adjacent zoned lands

Character area 2 - Granard Bridge to Callaghan Bridge in Porterstown
Links with adjacent land: Enclosed wooded canal corridor including the Deep Sinking area, glimpse views out of corridor only
Gradients: Narrow steep rough tracks, no constructed footpaths
Biodiversity in canal corridor: Both sides of the canal support linear mixed broadleaved woodland and scrub areas with the northern bank supporting more continuous and extensive woodland / scrub areas. Footprint of proposed greenway comprised of semi-natural / rough grassland and bare ground bordered by treelines and pockets of scrub. This section of the canal corridor is of moderate to high local importance and may be of particular importance to species such as bats, badger and passerine birds.

Character area 1 - Ashtown to Granard Bridge /Lock11
Links with adjacent land: Views to adjacent canal corridor with open views to urban development and major infrastructure on both sides of canal
Gradients: Generally flat constructed footpaths
Biodiversity in canal corridor: Proposed greenway footprint comprises amenity grassland and bare ground - habitats of low ecological value. Fringing wet grassland and marsh habitats near Phoenix Park railway station and mature mixed broadleaved woodland on the canal's northern bank represent habitats that are of moderate to high local importance.

N

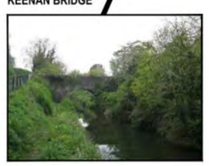


COLLINS BRIDGE

PAKENHAM BRIDGE

CALLAGHAN BRIDGE

KEENAN BRIDGE



KIRKPATRICK BRIDGE

GRANARD BRIDGE

TALBOT BRIDGE

M50 MOTORWAY BRIDGES

ASHTOWN

Comhairle Contae Fhine Gall
Fingal County Council

Rev	Description	By	Date	Chk'd	Auth
C	Landscape Character Area 3a & b revised	LB	29.08.12	DM	DM
B	Landscape Character Area 3 revised	LB	01.08.12	DM	DM
A	Landscape Character Areas 2 & 3 revised	LB	07.12	BOC	BOC

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Client: FINGAL COUNTY COUNCIL
Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY
Title: LANDSCAPE CHARACTER AREAS

Original Scale	Designed/Drawn	Checked	Authorised
NTS	LB Date 18.06.12	BOC Date 19.06.12	BOC Date 19.06.12

Sheet: A1
Drawing Number: 3098 / SK / 020
Rev: C

Figure 4.1 - Existing Layout

4.74 The Royal Canal Corridor is included in the River Valleys and Canal Character Type. The Canal has particular qualities, including steep banks and mature woodland, which makes it particularly sensitive to development.

4.75 The principles for development as detailed in the Fingal County Development Plan which relate to the Royal Canal are:

- Skylines, horizon and ridgelines should be protected from development;
- Field and roadside hedgerows should be retained. Proposals necessitating the removal of extensive field and roadside hedgerows should not be permitted;
- The retention and active management of trees and woodland blocks should be promoted;
- The use of trees and woodlands to contain new development should be encouraged. Strong planting schemes using native species, to integrate development into these sensitive landscapes, will be required. New planting needs to be carefully located and selected outside urban areas, the major river corridors should be protected and improved by leaving a minimum 30 metre wide margin, on each side of these rivers, undeveloped and encouraging planting where appropriate, to enhance the landscape and habitat value of these corridors (see Objective BD24, Section on Ecological Corridors and Stepping Stones); and
- Estuary margins and any hedgerows along the margins must not be disturbed

Architectural / Heritage

4.76 The six bridges listed below over the Royal Canal are included within the Record of Protected Structures included within Appendix 3 of the Fingal County Development Plan 2011-2017:

- Longford Bridge (RPS No. 693), Stone single-arched bridge over Royal Canal at Ashtown Road Railway Station;
- Ranelagh Bridge, (RPS No. 694), Stone arched bridge over Royal Canal.
- Talbot Bridge (RPS No. 695), Stone arched bridge over Royal Canal. Also known as Old Bridge;
- Granard Bridge (RPS No. 696), Stone arched bridge over Royal Canal;
- Kirkpatrick Bridge (RPS No. 697), Stone arched bridge over Royal Canal;
- Kennan Bridge (RPS No. 698), Bridge over Royal Canal;
- Callaghan Bridge (RPS No. 701), Bridge over Royal Canal.
- Pakenham Bridge (RPS No. 711), Stone single arched road bridge over the Royal Canal at Barberstown railway crossing; and
- Collins Bridge (RPS No. 693), Bridge over Royal Canal.

4.77 As such it will be important in this study to note that the land in the immediate environs of the bridge is also protected and needs consultation with Development Application Unit of Department of the Arts, Heritage and the Gaeltacht (DAHG) to agree any alterations required as part of the canal improvements.

Further Studies Required

4.78 Further environmental studies will be required to identify the exact location of sensitive habitats and species along the Royal Canal to inform the preliminary design process of the Tow Path upgrade. Thereafter the effects of the proposed Tow Path upgrade on the sensitive environments can be assessed, and mitigation agreed in association with the key environmental stakeholders i.e. Waterways Ireland, Fingal County Council (Conservation & Heritage Sections), Inland

Fisheries Ireland, Inland Waterways Association of Ireland, Development Application Unit of Department of the Arts, Heritage and the Gaeltacht (DAHG) for Cultural Heritage and Department of the Arts, Heritage and the Gaeltacht (within which National Parks and Wildlife Service now resides) for aspects of nature conservation.

4.79 It is noted that detailed ecological information is currently available between the 10th lock at Ashtown and the 12th lock at Castleknock and this should provide a basis for determining if an EIA is required for any future upgrading works to this easterly section.

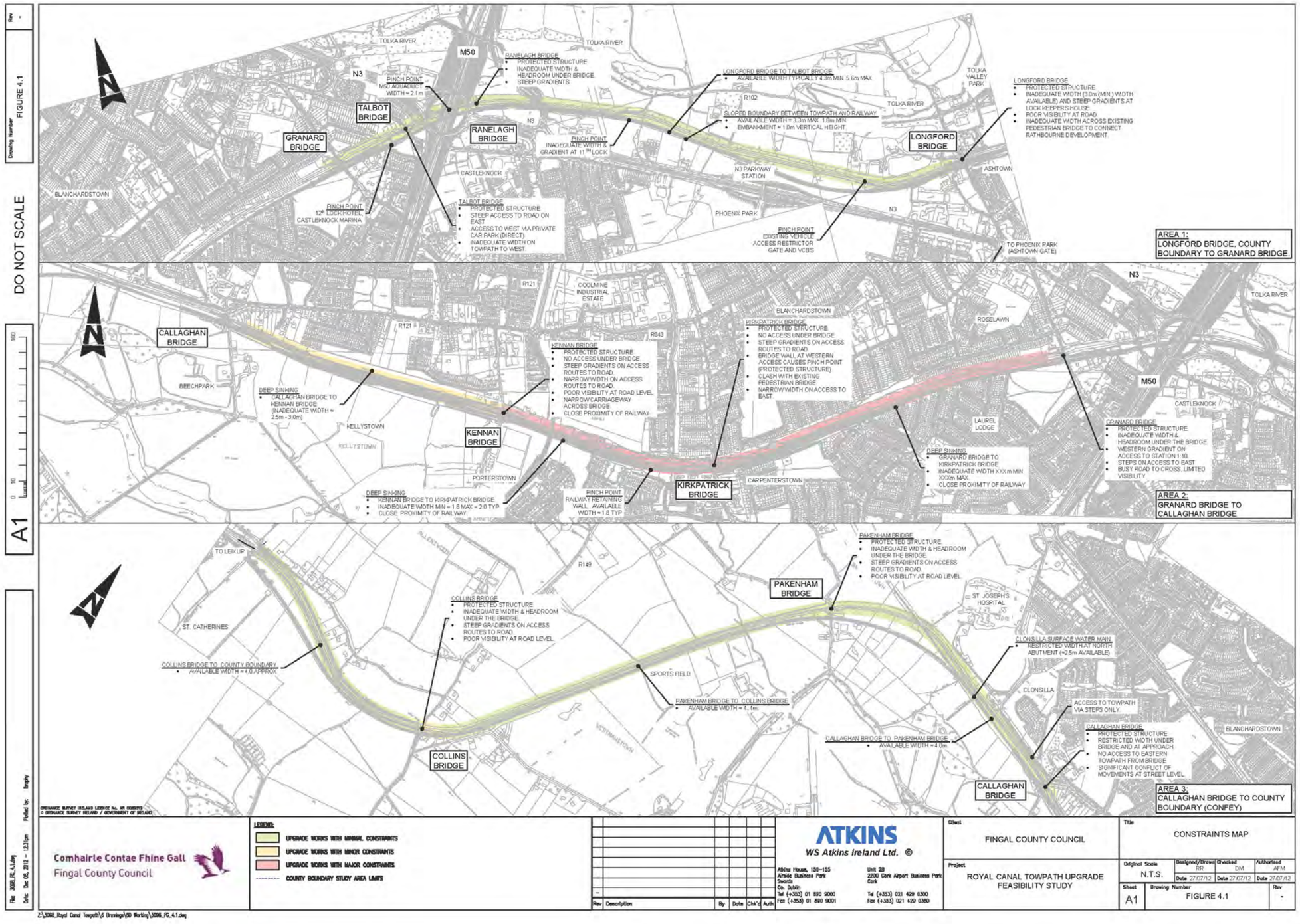

Figure 4.2 - Constraints Map

5. Opportunities

Secondary Objectives

5.1 In accordance with the study brief, further opportunities to enhance the canal environment and how these could be realised as part of any scheme have been considered. These have been identified as the secondary scheme objectives.

5.2 Items such as improved access points and accessibility for mobility impaired users were considered. It is recognised that any potential facility must be easily accessible for all to maximise the potential for its use.

5.3 Similarly, ease of access from adjacent existing (and proposed) residential areas was assessed and areas for potential additional linkage to the towpath are identified on the attached Opportunities Map. Such locations would potentially include:

- Proposed footbridge near 11th Lock – linkage to zoned lands to south of railway line adjacent to N3;
- Proposed footbridge to link Brompton Court (Roselawn) and Maple Green (Laurel Lodge);
- Proposed footbridge between Kennan Bridge and Callaghan Bridge to link Clonsilla on the north with zoned lands at Kellystown on the south;
- Proposed footbridge to link Clonsilla and Beechpark Regional Park;
- Linkage to Hansfield Strategic Development Zone (SDZ) to north of the canal (no bridge required).

5.4 Throughout the consultation stage of the study, the provision of additional (and betterment of existing) recreational facilities along the route was a recurring theme. In addressing this, a number of locations were identified where the following facilities could potentially be located:

- Off-road car parking facilities in the vicinities of Collins Bridge and Pakenham Bridge to facilitate recreational anglers and walkers along the adjacent stretches of the canal towpath;
- The potential for retention and/or betterment of existing formal angling posts was examined. These are located along the towpath westwards from Pakenham bridge. Further angling posts could be provided immediately west of Castleknock Station and in the area between the 10th and 11th locks;
- Picnic areas potentially located immediately east of Pakenham Bridge and adjacent to the 12th Lock Hotel, Castleknock. Ideally, these areas would be co-located with existing and proposed boat mooring points;
- Potential locations for coffee shops and the like were identified along the route at Clonsilla Station, Kennan Bridge and the 12th Lock.

5.5 In recognition of the overall thrust of this study, the connectivity of the proposed pedestrian and cycle route with other sustainable transport modes and cycle networks (existing and proposed) was considered throughout the study area. The study seeks to maximise such integration to provide an ease of access which would favour the use of bus, rail, cycling and walking.

5.6 *Royal Canal to Grand Canal Regional Cycle Route Connection* - Regionally the Royal Canal has the potential to integrate with other emerging strategic cycle routes within the Greater Dublin Area. In particular, the connection can be made southwards across the Liffey Valley and via Lucan and Griffeen Park to the Grand Canal north of Grangecastle which has been upgraded to a Green Route in 2010. This cycle connection has the potential to create a regional cycle loop within the Dublin Metropolitan area joining the city centre and docklands with established suburban areas

along the canals with planned new residential communities in West Dublin such as the Adamstown, Clonburris and Hansfield Strategic Development Zones.

5.7 This Identified link could be provided as follows:

- Collins Bridge on the Royal Canal (Barnhill Road) southwards to Laraghcon housing development. This would pass the eastern entrance to St. Catherine's Regional Park which facilitates cycle routes to Leixlip and west Lucan.
- Laraghcon Housing Estate southwards to Lucan Bridge on the River Liffey utilizing existing off-road cycle facilities
- Lucan Bridge through Lucan Village and crossing the M4 to Griffeen Valley Park
- Griffeen Valley Park southwards crossing the Kildare Rail line and joining to the Grand Canal via the new bridge north of Grangecastle Business Park

5.8 The potential route is illustrated on Figure 5.1 - Canal 2 Canal Regional Cycle Route

5.9 In addition to the above items, opportunities to enhance awareness and promote the historical and heritage value of the canal will be maximised through the provision of street furniture in the form of seating areas and information signage and plaques at appropriate locations, It is intended that such information points would give interesting snippets of information on the canal and its environment.

5.10 The overall Opportunities Map provided below highlights the areas where the above benefits can be brought to the proposed scheme to improve accessibility to the canal towpath and improve the amenity and recreational value of the project.

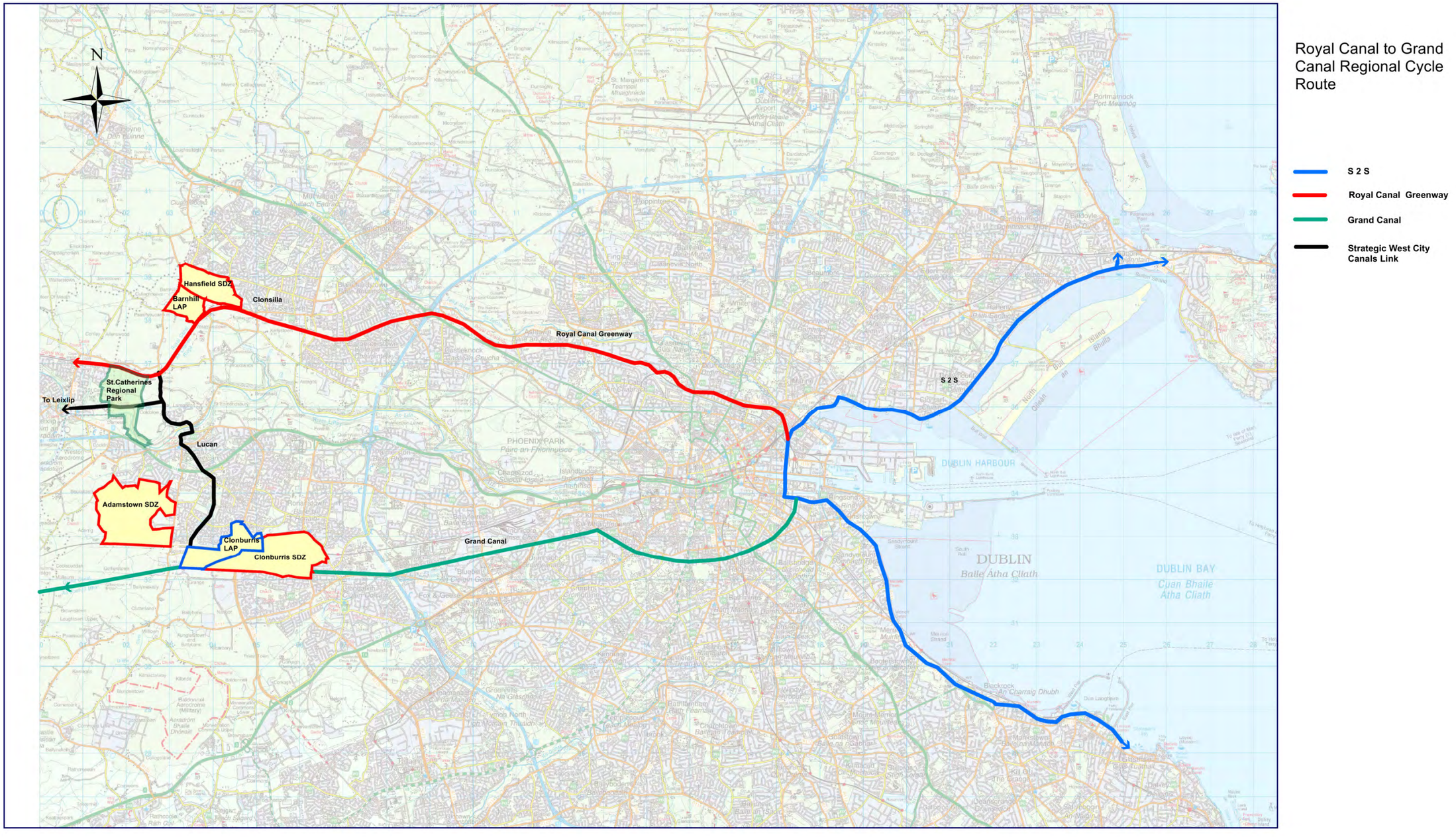

Figure 5.1 - Canal 2 Canal Regional Cycle Route

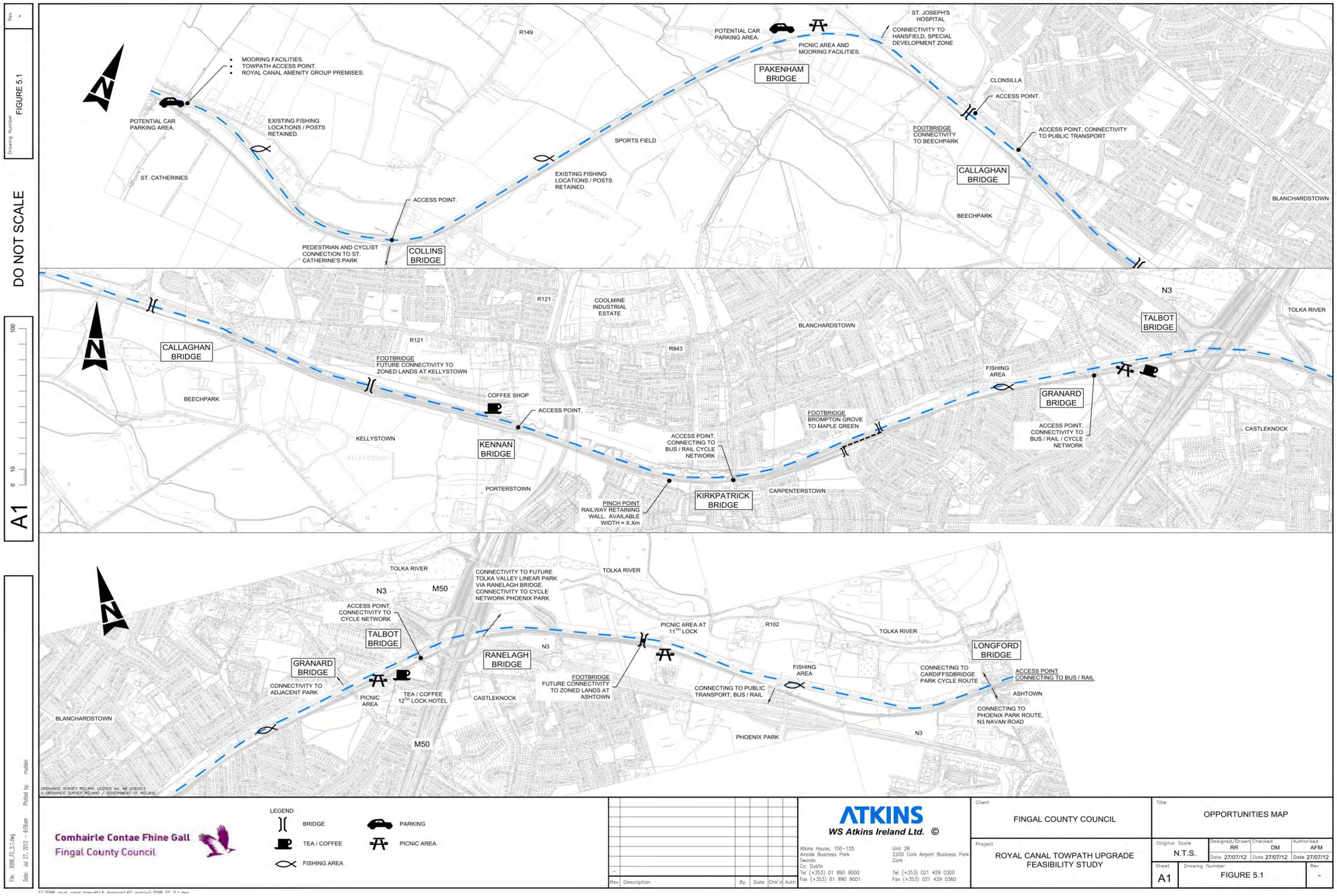

Figure 5.2 - Opportunities Map

6. Option Development & Evaluation

General

6.1 The Client's primary objective is to provide a premium quality cycle and pedestrian route along the existing canal towpath. The potential facility should be inherently safe and suitable for use as a cycle commuter and recreational route.

6.2 Secondary objectives can be realised through application of the 'opportunities' identified in Chapter 5 of this report. It is intended that in order to maximise the level of 'gain' and improvement in facilities which will benefit all users, all opportunities identified shall be applied to the final preferred route.

6.3 This chapter examines all available options to overcome the identified constraints within specified areas. An evaluation of the options is carried out against selected criteria to arrive at a favoured solution in each case.

Evaluation Criteria and Methodology

6.4 All of the options considered have been subjected to a comparative assessment against five key criteria, namely:

- Economy;
- Safety;
- Environment;
- Technical, and
- Integration.

6.5 The full assessment criteria are presented in Table 6.1.

General Assumptions Common To All Options

6.6 Given the Client's primary objective to provide a premium quality cycle and pedestrian route to encourage and promote commuter cycling, the options have been generated with a view to providing a high quality bound surface along the whole length of the route. Access to the facility would be controlled by installing removable bollards at access points which would effectively prohibit unauthorised vehicular access but ensure minimal delays to cyclists.

6.7 For security reasons, it has been assumed that CCTV will be required along the whole length of the route.

6.8 Given the primary objective for the cycleway to be a commuter route, lighting will be required along its length.

6.9 Where there is a height difference between the cycleway and surrounding ground, a pedestrian railing (to the appropriate height for cycles) has been assumed to be required.

6.10 A 3.5m width will be provided where feasible and it is assumed that this is achievable along the whole route, except where detailed below. Where constraints exist along the route, these are discussed below with options presented on how they can be overcome or otherwise.

6.11 All options consider upgrading the existing towpath along the canal banks. Consideration was given to development of the opposite bank in all cases. However, this was deemed unfeasible and undesirable due to the proximity of the adjacent railway line, scope of work required and the likely environmental and ecological impacts, land ownership issues and topographical constraints.

Table 6.1 – Assessment Criteria

Route Assessment Criteria	
Assessment Criterion	**Criterion Elements**
Economy	Comparison of cost levels for: • Land Acquisition Costs • Construction Costs • Operation & Maintenance Costs
Safety	Comparison of level of safety offered in terms of: • Interaction with live traffic & nature of traffic control facilities offered • Personal security, levels of public lighting and surveillance offered
Environment	Comparison on level of impact on the environment in terms of: • Air Quality • Noise & Vibration • Landscape & Visual • Biodiversity / Ecology • Cultural, Archaeological & Architectural Heritage • Land Use, Soils & Geology • Water Resources
Technical	Comparison of technical merits in terms of: • Cycleway Level of Service offered o Surface Quality / Comfort o Gradient o Continuity of Route o Directness (Waiting time at signals, detours) • Accessibility (mobility impaired)
Integration	Comparison of level of integration and inter-connectivity offered in terms of: • Connectivity to public transport (bus and rail) • Connectivity to wider cycle network • Inter-connectivity of adjacent residential communities (existing and planned) • Provision of car parking areas at access points / key amenity areas • Connectivity to adjacent recreational & amenity areas (existing and planned)

Option Evaluation

6.12 The following sections present the options available and provide a brief analysis of the evaluation of these options. The preferred solution for each area is brought forward for inclusion in the overall preferred route and presented as the preferred scheme.

Area 1: Longford Bridge (Ashtown) to Granard Bridge (Castleknock)

Longford Bridge

6.13 The proposed scheme will commence at Longford Bridge, Ashtown. In considering the previously upgraded section of the towpath at Rathborne, connectivity between the new existing facility and the proposed upgrade to the canal towpath west of Longford Bridge is key to the success of the overall project.

6.14 The overriding requirement is to provide a safe and efficient means of access from the east to the west of Longford Bridge. Ashtown Road is a busy local road, dominated by vehicular traffic.

6.15 To obtain a 3.5m width through the 10th lock, it would be necessary to acquire the adjacent private dwelling. This is considered impractical given the benefits would only be realised for an approximate length of 25m. All options propose a width of between 2.4m and 3.0m through this short section and would require added protection to the lower chamber of the adjacent lock to eliminate all risks of falling into the canal waters.

6.16 All options at this location offer good connectivity to adjacent public transport (bus and rail) networks and onward cycle connections to the Phoenix Park, Tolka Valley Cycle Route and adjacent residential areas. However, given the high density development of the area, provision of additional car parking is not feasible or desirable.

6.17 Whilst not considered as an option, Irish Rail's proposal to close the existing level crossing at Ashtown is noted. If this proposal were to proceed, Longford Bridge would be effectively "traffic-free". At that stage, users of the towpath may favour the easier, more spacious route of crossing the canal via Longford Bridge over the dedicated cycle bridge. The options presented at this location would then become somewhat redundant.

6.18 A number of options have been considered as follows:

6.19 **Option 1:** *Figure 6.2 - Longford Bridge Option 1* is provided below. This option will require the construction of a second bridge across the canal which would be located adjacent to the existing footbridge. The proposed bridge would be intended for the exclusive use of cyclists along the proposed route.

6.20 Continuity across Ashtown Road will be provided by the installation of a signal controlled toucan crossing. The controlled crossing would effectively eliminate any risks associated with the busy traffic and poor visibility at the crossing location. In addition, appropriate detection systems could be incorporated so that cyclists would trigger the lights on approach and thus eliminate the need to dismount and wait.

6.21 The signal controller for the toucan crossing would need to be fully integrated with the adjacent level crossing.

6.22 In assessing this option, the construction of a dedicated cyclist bridge across the canal would be of obvious benefit to all users. However, this would require a land purchase on the southern bank of the canal at Ashtown Station. For these reasons this option may attract a significant cost premium.

6.23 The provision of the bridge would, however, provide a safe means for all users to cross from the north bank to the south bank of the canal on segregated facilities. The proposed toucan crossing would provide a safe route across Ashtown Road where users would be required to interact with live traffic. Traffic along Ashtown Road is often heavy, especially at peak hours when the cyclist commuter route would also be expected to be busy.

6.24 The environmental impact of this option would be considered to be low during service. However, depending on the final design of the proposed bridge, construction stage impacts would need to be examined in detail.

6.25 The implementation of this option would have no impact on Longford Bridge. However, the introduction of a toucan crossing would have obvious impacts on traffic at Ashtown Road. Therefore, the success of this option would be contingent on a detailed assessment of the impact on traffic.

6.26 The layout would address the requirement to provide a high Level of Service in terms of continuity and directness of the route. However, the proposed gradients through the 10th lock would fall short of the recommended minima for mobility impaired users. It would not, however, preclude mobility impaired users from accessing the facility.**Option 2:** *Figure 6.3 - Longford Bridge Option 2* is provided below. "Shuttle lights" are proposed so that a one-way traffic system can be enforced across Longford Bridge. The carriageway width would be reduced from 6.3m to 3.8m, providing a 2.5m cycle route across the bridge. This cycle route would be physically segregated from the traffic lane by means of a raised kerb. Increased delineation could be achieved through the installation of pencil bollards adjacent to the new kerbline if warranted.

6.27 Pedestrians would use the existing footbridge, as per the existing situation.

6.28 The "shuttle" traffic signals would require synchronisation with the adjacent level crossing so that all traffic is stopped when trains are approaching. Ashtown Road can have significant tailbacks during peak times due to the level crossing being closed. If this situation was to be exacerbated by the introduction of shuttle working at the bridge it is possible that queuing could extend to both the Navan Road and the River Road on each side of the level crossing.

6.29 At the access to the western towpath, a signalised toucan crossing would be installed to provide a safe means of crossing Ashtown Road. The length of crossing provided would be reduced to 3.8m in accordance with the traffic lane reductions. The toucan crossing would need to be linked to the 'shuttle lights' and the level crossing.

6.30 The layout would also provide a safe route for all users due to the segregation from vehicular traffic. The provision of the toucan crossing would further enhance the safety aspects of the layout.

6.31 Impacts on the receiving environment would be minimal. While construction activities would be required to modify the surface layout across Longford Bridge, there would be no structural modifications required. Similarly, the impacts of the layout in service would be negligible. However, the proposed shuttle traffic control system would be likely to increase traffic congestion locally on Ashtown Road.

6.32 Technically, this layout would offer a high Level of Service as the continuity and directness of the route would be preserved. However, as per Option 1, the proposed gradients through the 10th lock would fall short of the recommended minima for mobility impaired users. It would not, however, preclude mobility impaired users from accessing the facility.

6.33 **Option 3:** *Figure 6.4 - Longford Bridge Option 3 is provided* below.

6.34 For this option a raised traffic surface linking the towpath entrance points would be constructed. This surface would be shared with motorised traffic. Traffic speeds would be restricted through the establishment of a special 30kph speed limit and "town centre" character within Ashtown Village.

6.35 Pedestrians would be directed to use the footbridge as per the current layout.

6.36 A toucan crossing would be provided at the entrance to the western towpath to permit pedestrians and the less confident cyclists to cross the road in a safe manner. More experienced and competent cyclists may choose to wait in the carriageway and give way to oncoming traffic before

turning onto the towpath at this location, although this would be considered hazardous given the narrow carriageway width.

6.37 The proposed toucan crossing signals would need to be synchronised with the adjacent level crossing.

6.38 The capital outlay in providing this option would be comparable to that of Option 2. Works to the road carriageway across Longford Bridge would be necessary to increase driver awareness of the shared surface and presence of cyclists on the road.

6.39 The safety of the end user, in particular the cyclist, would be compromised due to the proposed shared surface which relies on the awareness / astuteness of motorists and their adherence to the proposed 30 km/h special speed limit.

6.40 The impact on the environment would be negligible both for the construction stage and when in service. The proposed works would not require any structural modifications to Longford Bridge. However, the introduction of a 30 km/h special speed limit would be expected to have some negative impact on traffic locally. The exact impacts would need to be understood through a detailed assessment of traffic

6.41 Continuity and directness of the route would be compromised with this option. The layout would also be less favourable to cyclists as the requirement to "mix" with motorised traffic would be less attractive. Option 3 would therefore be less favourable in terms of technical merit.

6.42 **Option 4:** *Figure 6.5 - Longford Bridge Option 4 is provided* below. This option is the "do minimum" scenario. Cyclists would be required to dismount on the approach to the existing pedestrian bridge and walk across the canal.

6.43 A pedestrian crossing would be installed to provide a safe means of crossing Ashtown Road. As with previous options, the traffic signals would be integrated with the adjacent level crossing. The existing road layout would remain unchanged and motorists would have right of way over pedestrians and cyclists.

6.44 As this would be the "do minimum" option, it would also be the cheapest to implement and construct. With the exception of the proposed pedestrian crossing, there would be no further modifications required to the existing layout.

6.45 It is unlikely that cyclists will follow the instructions to dismount and walk across the pedestrian bridge. It would be highly probable that cyclists would either elect to cycle across the pedestrian bridge or join the narrow traffic lanes at Longford Bridge. Either decision would put cyclists at risk of conflict with other users, thus reducing the level of safety offered.

6.46 This option would have negligible negative effect on the receiving environment.

6.47 While the proposed pedestrian crossing would offer some level of segregation from motorised traffic, the overall level of service is compromised in terms of continuity, directness and comfort.

Figure 6.1 - Longford Bridge Option Evaluation Summary

Option Evaluation Summary Longford Bridge, Ashtown				
	Option 1	**Option 2**	**Option 3**	**Option 4**
Rank	**#1**	**#4**	**#2**	**#3**
Economy	Cost premium due to provision of dedicated cyclist bridge and acquisition of land at Ashtown Station.	Cost effective option for both short and long term scenarios Comparable to Option 3	Cost effective option for both short and long term scenarios Comparable to Option 2	"Do minimum" scenario – therefore cheapest alternative available while providing some benefit / improvement
Safety	Offers good levels of safety and personal security	Offers good levels of safety and personal security	Shared surface with motorised vehicles means safety is compromised	Requires cyclists to dismount and walk across pedestrian bridge – cyclists unlikely to comply, therefore increased risk of conflicts with pedestrians and/or vehicles
Environment	No impacts on Longford Bridge. Minimal impact in service, although toucan crossing has potential to increase traffic congestion locally. Construction of bridge abutments may potentially have impacts, but these are considered to be minor at this stage.	No structural modifications required to Longford Bridge. Minimal impact in service, although shuttle traffic control has potential to increase traffic congestion locally.	No structural modifications required to Longford Bridge Minimal impact in service and during construction. Lesser impact on local traffic	Least impact on environment
Technical	High Level of Service in terms of continuity and directness of route. Gradients offered would fall short of recommended minima for mobility impaired. Does not affect traffic in the same way as reducing effective road width would. Requires Purchase of land to facilitate the new bridge	High Level of Service in terms of continuity and directness of route. Gradients offered would fall short of recommended minima for mobility impaired. Is likely to severely disrupt traffic in the area.	Continuity compromised due to the requirement to mix with vehicular traffic – probable delays for cyclists negotiating traffic	Least preferred as Level of Service is not significantly improved over a 'do nothing' scenario
Integration	High level of integration and accessibility. No adjacent car parking area feasible.	High level of integration and accessibility. No adjacent car parking area feasible.	High level of integration and accessibility. No adjacent car parking area feasible.	High level of integration and accessibility. No adjacent car parking area feasible.

6.48 **Conclusion:** Option 1 provides the highest level of service in that there is segregated cycleway.

6.49 Option 2 also provides segregated cycleway but is reliant on the road width for Ashtown Road being reduced. This is likely to exacerbate an already congested area (when the level crossing is closed for trains) and the congestion could lead back to the Navan Road and River Road. As a result, this is the least preferred option.

6.50 Option 3 allows some continuity of service but is compromised by direct interaction with the road traffic.

6.51 Option 4 is a do-minimum scenario with the introduction of a toucan crossing being the main proposal. It has least provision of service. Overall, Option 1 would be preferred in that the service provision is high and it would not overly affect traffic in the area. If Option 1 was not possible, then Option 3 should be considered, as it provides a level of service which is reasonably high, without affecting traffic. Option 4 should be considered if Options 1 and 3 are too expensive.

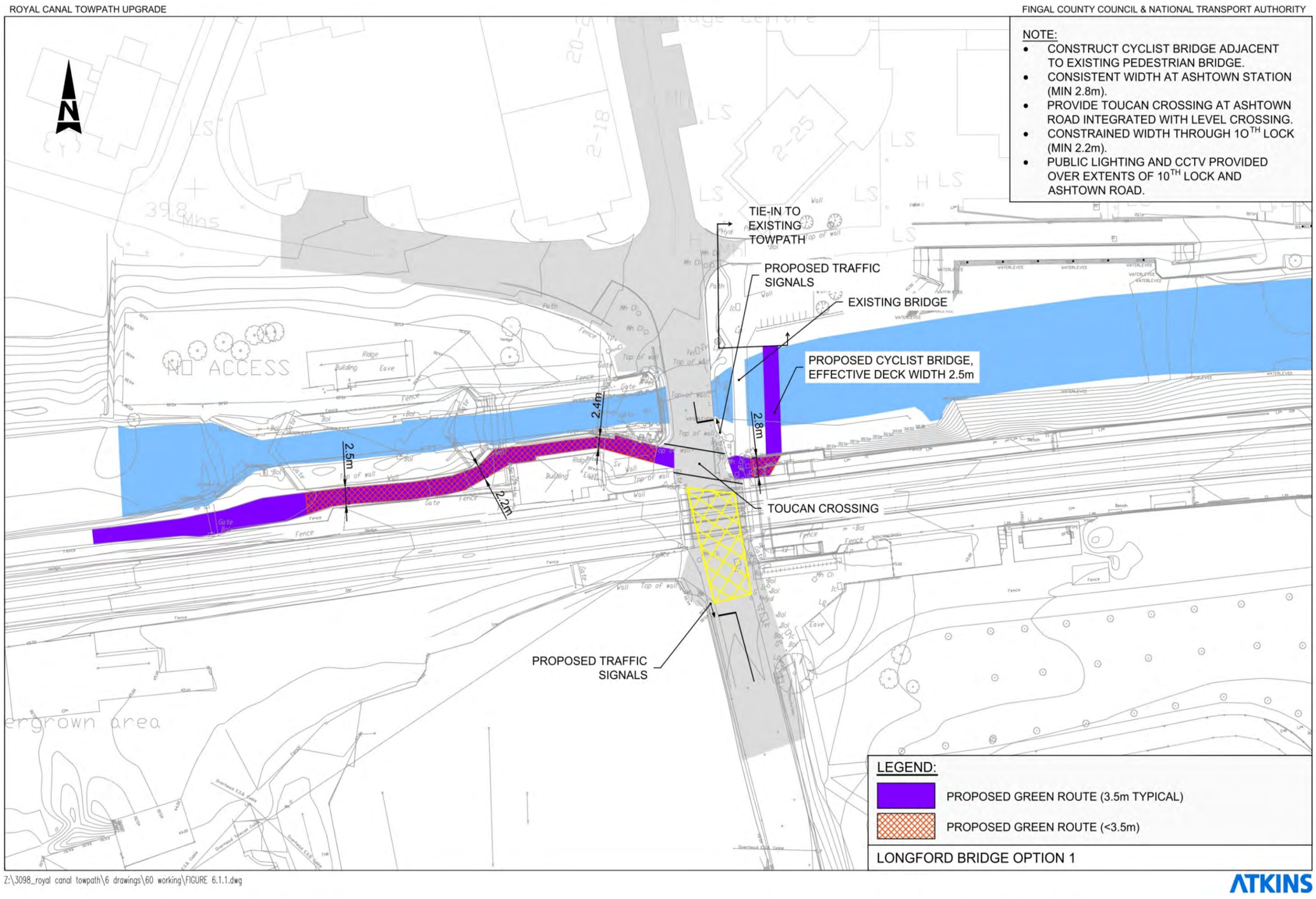

Figure 6.2 - Longford Bridge Option 1

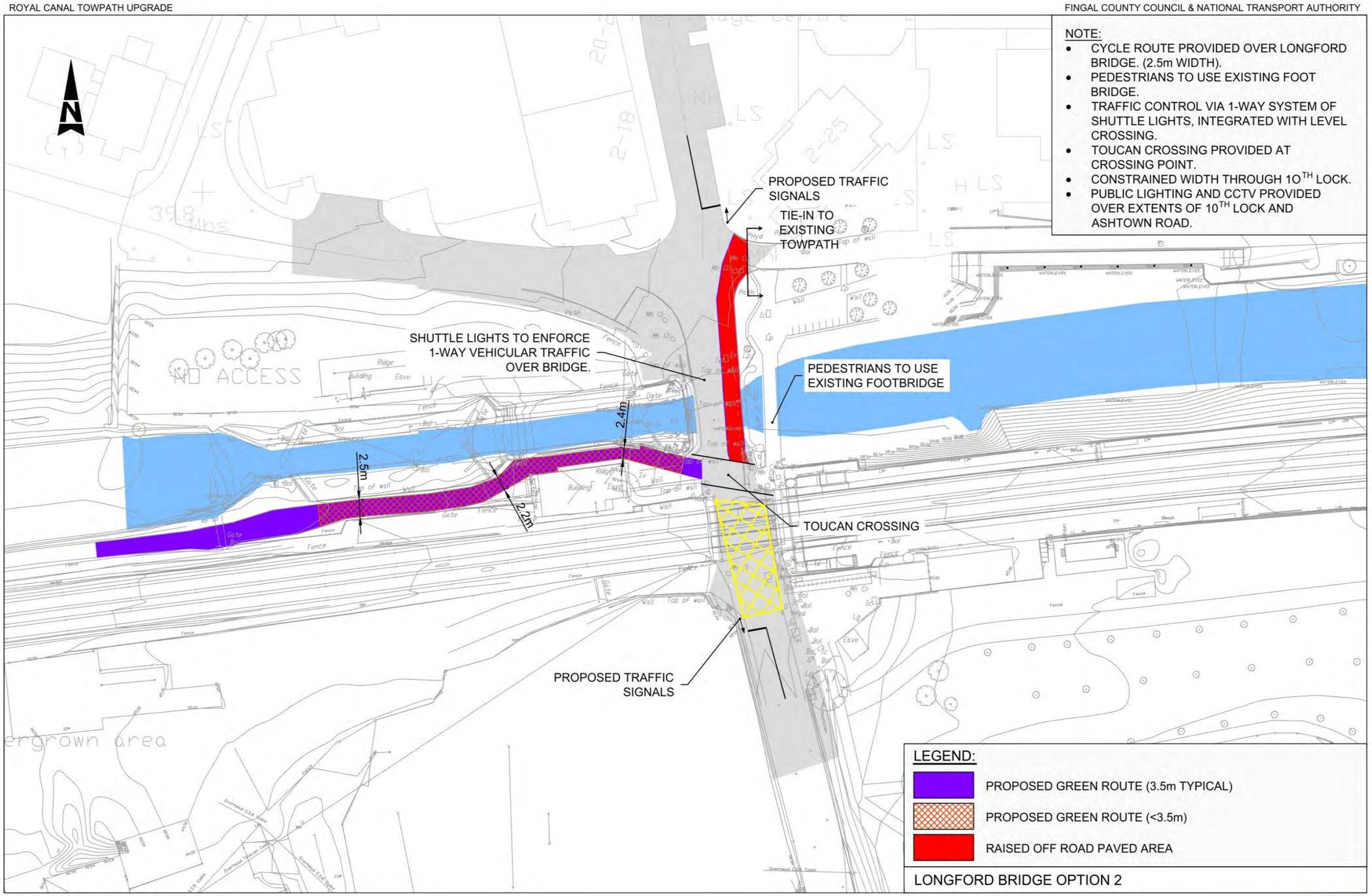

Figure 6.3 - Longford Bridge Option 2

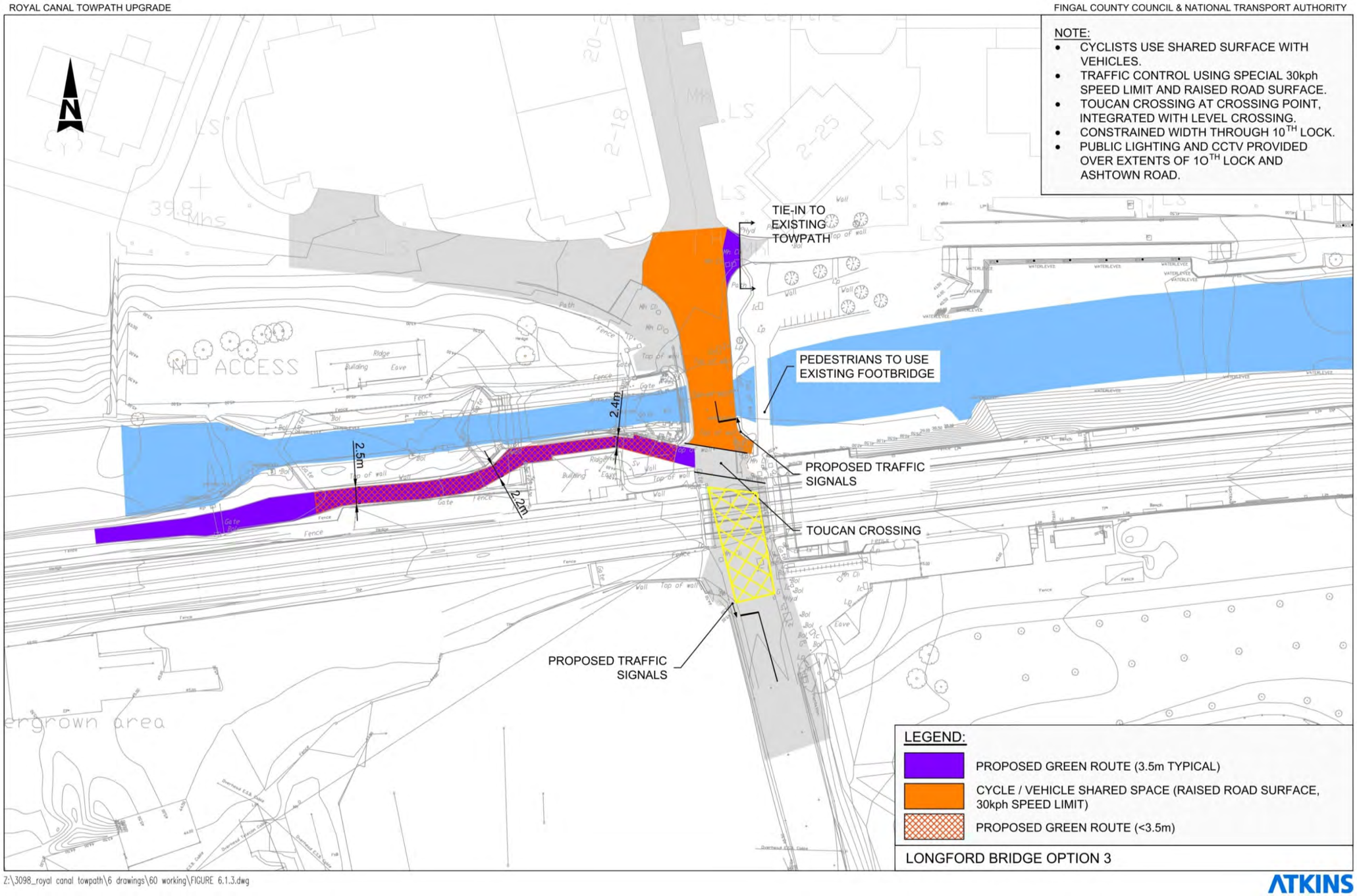

Figure 6.4 - Longford Bridge Option 3

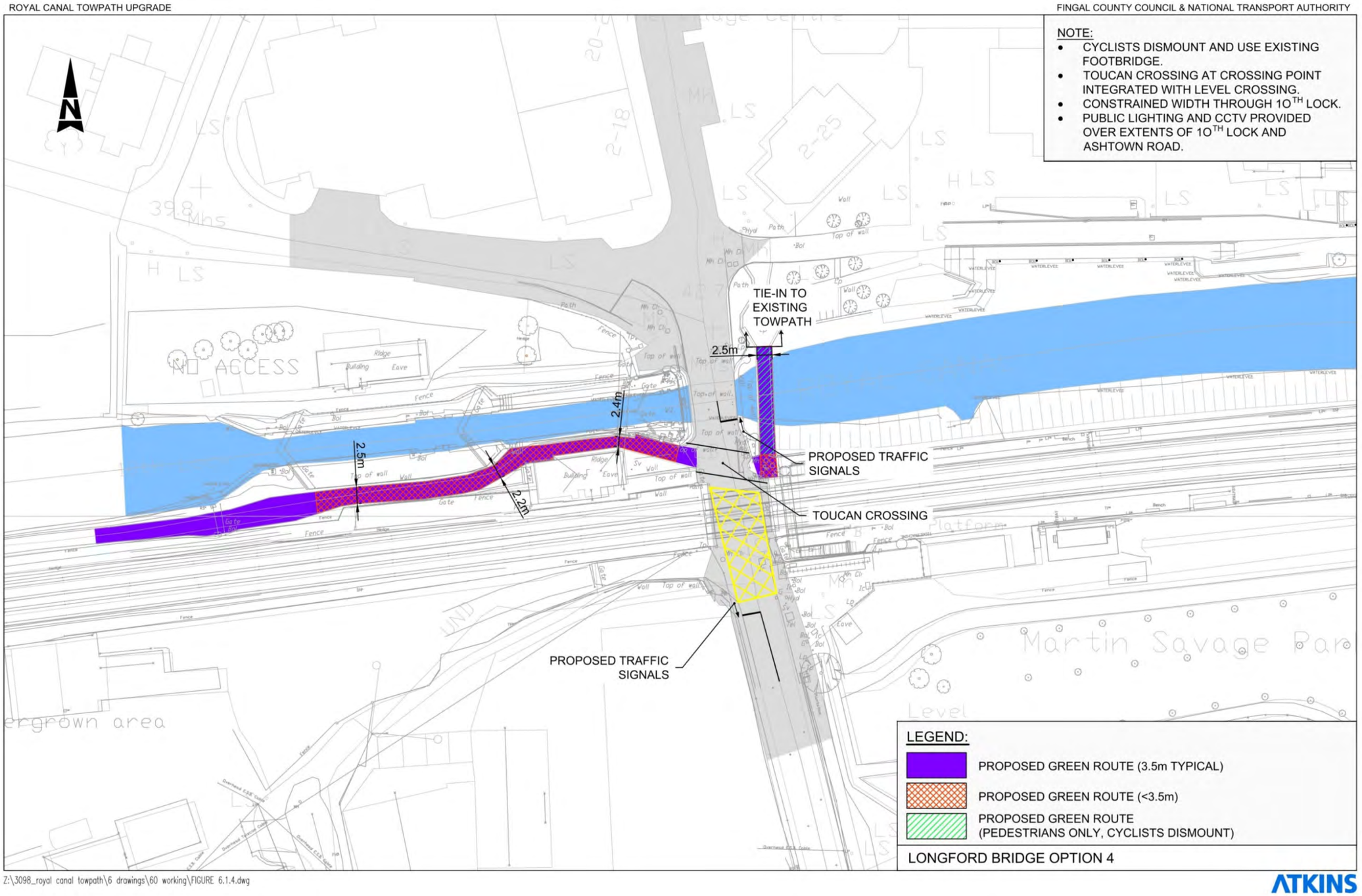

Figure 6.5 - Longford Bridge Option 4

Canal towpath, 10th Lock to M50 Aqueduct

6.52 In achieving the desired 3.5m wide surface, constraints in the available width will need to be addressed along the railway line immediately east of the 11th Lock.

6.53 In considering the options, while there is scope to achieve the required 3.5m, works would be required to retain the existing embankment height of circa 1.0m. Such works would be within the railway's zone of influence. Notwithstanding this, given the minor nature of the works, it would be reasonable to consider that agreement with Irish Rail could be reached to allow the works proceed.

6.54 The alternative is to leave the pinch point in place and provide a shared 2.8m (approx) wide surface. It is therefore considered that the favoured option in this instance is to widen the towpath to 3.5m.

6.55 All other areas between the 10th Lock and the M50 Aqueduct can be widened to 3.5m with minimal works required.

M50 Aqueduct

6.56 The M50 Aqueduct in its current state provides a major pinch-point along the proposed route. The canal and towpath cross the M50 motorway on a dedicated structure. Three options were considered:

6.57 **Option 1** Figure 6.6 - M50 Aqueduct Option 1 is provided below. It involves the construction of a separate cycle-only bridge across the M50 Motorway. The bridge would be located immediately south of the existing aqueduct, between the aqueduct and the railway bridge. The most efficient structure would be a prefabricated steel or precast concrete bridge which could be lifted into place in sections, depending on design. This would limit the amount of time required for lane closures on the motorway below.

6.58 Due to the length of crossing at this location, it is likely that central supporting piers would be required. These would be located within the M50 central median, the construction of which would cause significant traffic disruption to the M50 Motorway.

6.59 The construction of the main deck of the bridge would most likely require safety netting to be erected across the M50 traffic lanes so that the risk of construction stage debris falling onto the high speed traffic below would be eliminated.

6.60 Access for construction traffic and materials would be via Talbot Court to the west and River Road / Dunsink Lane in the east. The access from the east would be the most difficult as access across the canal would be limited. It would be reasonable to expect that significant cranage of materials across the canal would be required, with a crane situated adjacent to the eastern abutment of the aqueduct.

6.61 The close proximity of the railway bridge would also mean that consultations with Irish Rail would be key to the process.

6.62 This option will be an expensive option to consider. The construction of the bridge would attract a high level of capital cost while the construction sequence would be expected to be severely constrained due to the 6-lane live motorway below.

6.63 The benefits, however, would be evident in the high level of safety offered to the end user. The risks associated with the restricted width of the existing towpath across the aqueduct would be eliminated from the cycle route.

6.64 Impacts on the receiving environment are considered to be negligible, with minor impacts on existing planting at each landing point of the bridge.

6.65 Technically this option would offer the highest Level of Service for cyclists in terms of continuity and directness of route. Pedestrians would continue to uses the existing towpath across the aqueduct, thus removing any potential for conflict or disturbance to cyclists.

6.66 Given the location of this particular site, integration and accessibility factors are not considered for the overall evaluation of the options as the merits of all options would be identical.

6.67 **Option 2:** Figure 6.7 - M50 Aqueduct Option 2 is provided below. This option includes the widening of the existing towpath across the M50 aqueduct. This would be achieved by modifying the existing concrete structure by adding cantilevered structural sections along the southern edge of the bridge to effectively widen the existing towpath provision to 3.5m.

6.68 It would be both difficult to construct this option over a live carriageway and would be reasonably costly. The feasibility of this option would also need to be considered in detail, but based upon other similar operations elsewhere, this is likely to be feasible.

6.69 Taking the above construction stage concerns into account, this option would attract a significant cost premium and would be considered similar to the costs of Option 1. The erection of temporary scaffolding, supported from the existing bridge, to effectively provide a working platform across the M50 is likely to be required to satisfy safety issues and risk of personnel and / or construction stage debris falling onto the traffic lanes below. Such temporary structures tend to increase the overall construction costs.

6.70 Access to the site would also be difficult from the east, requiring the establishment of a crane to lift materials over the canal channel. As per Option 1, a crane could be positioned adjacent to the eastern abutment of the M50 Aqueduct and would be required for the majority of the construction period and this would need to be factored in to the estimated construction costs.

6.71 This option would provide a safe facility for both cyclists and pedestrians, although it is considered that a guardrail would be required along the water's edge to protect against accidental falls into the canal waters.

6.72 Effects on the environment would be considered minimal during the service life of this element. However, the construction stage would have a neutral impact on the environment.

6.73 The technical merits of this option would be similar to Option 1 in that the high Level of Service would be maintained through the structure in terms of continuity and directness of route. The widened bridge would provide a consistent width of 3.5m along the route. However, the construction of the facility would require more work (breaking out of existing parapet beam, falsework, formwork, concrete placement etc) over a live carriageway.

6.74 Given the location of this particular site, integration and accessibility factors are not considered for the overall evaluation of the options as the merits of all options would be identical.

6.75 **Option 3:** Figure 6.8 - M50 Aqueduct Option 3 is provided below. This option involves the widening of the existing towpath by reducing the navigation channel width. Structurally, this option is easier to construct (using cantilevers over the canal) than the previous options as there are no major modifications required to the outside of the bridge (over the motorway). Modifications to bridge to accommodate the cantilever would be required, as would replacement of the existing parapet to ensure adequate protection to cyclists.

6.76 However, a minimum of 1.5m of widening would be required which would effectively reduce the navigable channel by the same amount. Such measures would have obvious negative impacts on the canal navigation and its ability to accommodate many of the traditional barges and canal boats.

6.77 While the aqueduct is not listed on the Record of Protected Structures, this option would have implications for the historical / heritage uses of the canal.

6.78 The capital cost of this option would be reasonable given that a cantilever structure would be required, but not as expensive as previous options. However, replacement of the parapet would require special attention due to the presence of live traffic on the M50 Motorway below.

6.79 A guardrail would need to be erected along the water's edge to prevent any accidental falls into the canal. This would need to be factored into the overall costs of the proposed option.

6.80 The overall continuity and directness of the route would be maintained with this option leading to a high Level of Service.

6.81 The integration and accessibility merits for this option do not differ from other options due to the location of this particular site. However, there would be a quantifiable loss in the amenity value of the canal for water based traffic and recreational activities.

6.82 **Option 4:** Figure 6.9 - M50 Aqueduct Option 4 is provided below. This option represents the "do minimum".

6.83 The current layout would be maintained in situ. Signage would be provided instructing cyclists to dismount and use the existing 2.1m wide towpath across the extent of the aqueduct. While this would lead to a reduction in the Level of Service of the proposed cycle route, it would be an essential measure to ensure the safety of all users.

6.84 However, there is concern that cyclists would tend to ignore the requirement to dismount and would continue to cycle across the aqueduct, increasing the risk of conflict with pedestrians. Given that this project would be likely to generate an increase in pedestrian and cyclist traffic, it would be prudent to erect a guardrail along the water's edge of the existing towpath for obvious safety reasons.

6.85 The assessment of this option notes that the capital costs are the most favourable of all options considered given the minimal works required.

6.86 While the risk of falling into the canal waters would be addressed by the provision of edge protection along the canal waters, there is a high probability that cyclists would ignore signed requests to dismount and continue to cycle across the aqueduct. The risk of pedestrian / cyclist conflict on the narrow path is greatly increased. This option would therefore score less well than other options in terms of overall user safety.

6.87 The requirement to dismount and walk across the structure would have a negative impact on the Level of Service. While the directness of the route is maintained, continuity is compromised. Therefore, this option would be least preferred in terms of technical merit.

6.88 The impact on integration and accessibility is not applicable as per previous options given the location of this particular site.

Table 6.2 - M50 Aqueduct Option Evaluation Summary

Option Evaluation Summary M50 Aqueduct				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**1**	**2**	**4**	**3**
Economy	Significant cost premium due to provision of new dedicated bridge over the M50	Most expensive solution due to complexity of the proposals and extent of work required over live traffic	Reasonable cost involved in cantilevering over the canal.	Cheapest option considered.
Safety	Offers good levels of safety and personal security	Offers good levels of safety and personal security	Offers good levels of safety and personal security	There is risk that cyclists may ignore requirement to walk across the aqueduct thus increasing risk of collision with pedestrians and hence safety
Environment	Minimal impact during service and construction – site is located in centre of busy motorway interchange	Minimal impact during service and construction stage	Minimal impact during service stage. During construction stage there would be a need to coffer dam the canal and build a support structure which could affect ecology. Heritage issues inherent in the reduction of the canal channel width	Minimal impact on environment in service Least impacts for construction stage
Technical	High Level of Service in terms of continuity and directness of route.	High Level of Service in terms of continuity and directness of route.	High Level of Service in terms of continuity and directness of route, however there is significant loss of amenity of the canal as a result of the reduction in width, which is unlikely to be acceptable to Waterways Ireland.	Level of service compromised due to low width of passage being provided
Integration	N/A	N/A	N/A	N/A

6.89 **Conclusion:** Option 3 is the least preferred due to its adverse effect on the operation of the canal. This option would meet significant opposition from major stakeholders and is least desirable by all parties.

6.90 Options 1 and 2 provide the best solutions in terms of continuity of the facility and ensure a high Level of Service is achieved. Option 1 would be the preferred solution in terms of safety, especially in that less works are required above the live motorway. Option 1 is therefore preferred.

6.91 Option 4 requires cyclists to dismount before crossing the aqueduct. While this has obvious negative impacts on the required Level of Service, this option would provide a good compromise until funding to construct Options 1 or 2 is available.

ROYAL CANAL TOWPATH UPGRADE

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NOTE:
- PROVIDE NEW BRIDGE ACROSS M50 FOR DEDICATED CYCLEWAY.

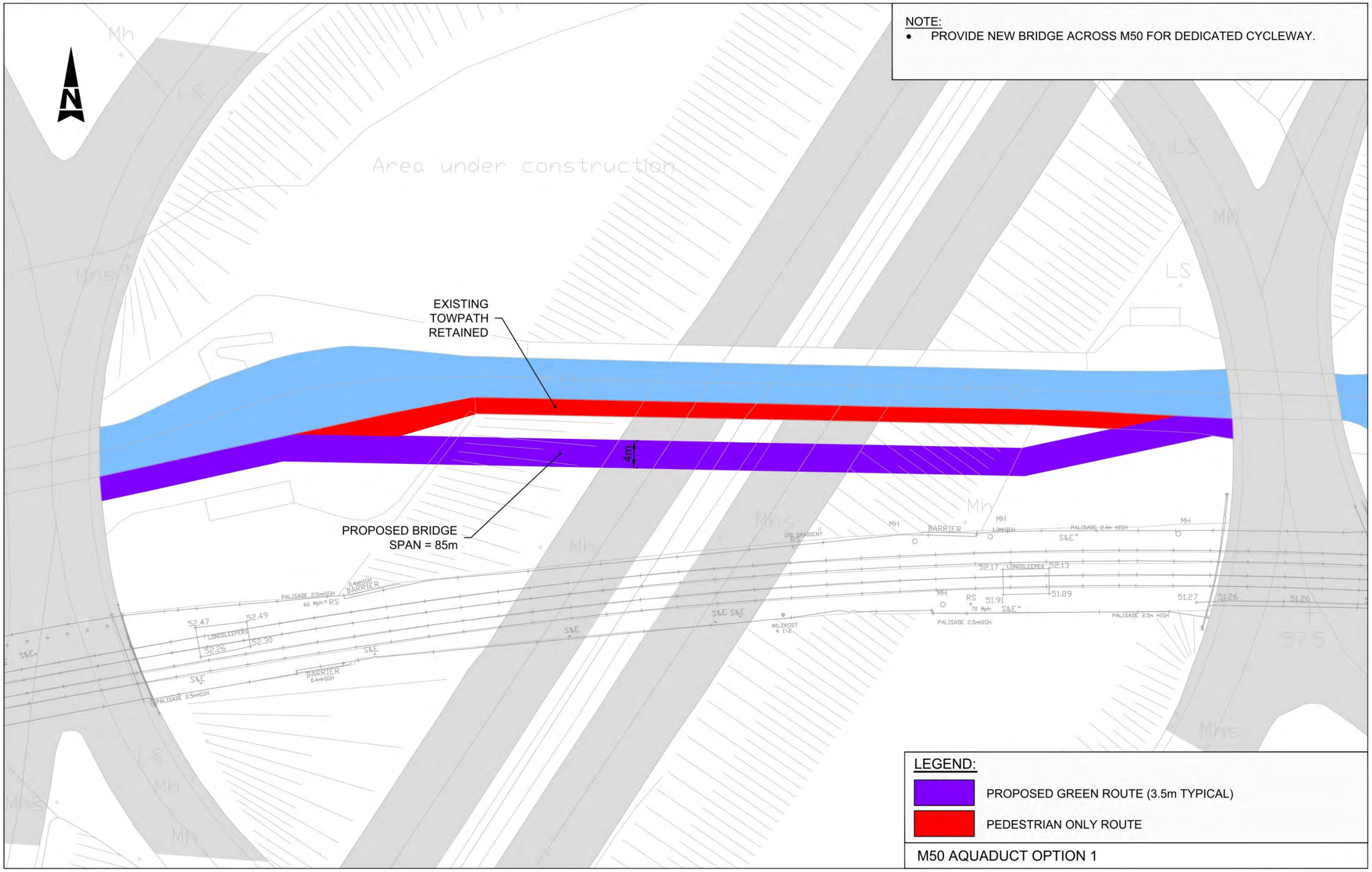

Figure 6.6 - M50 Aqueduct Option 1

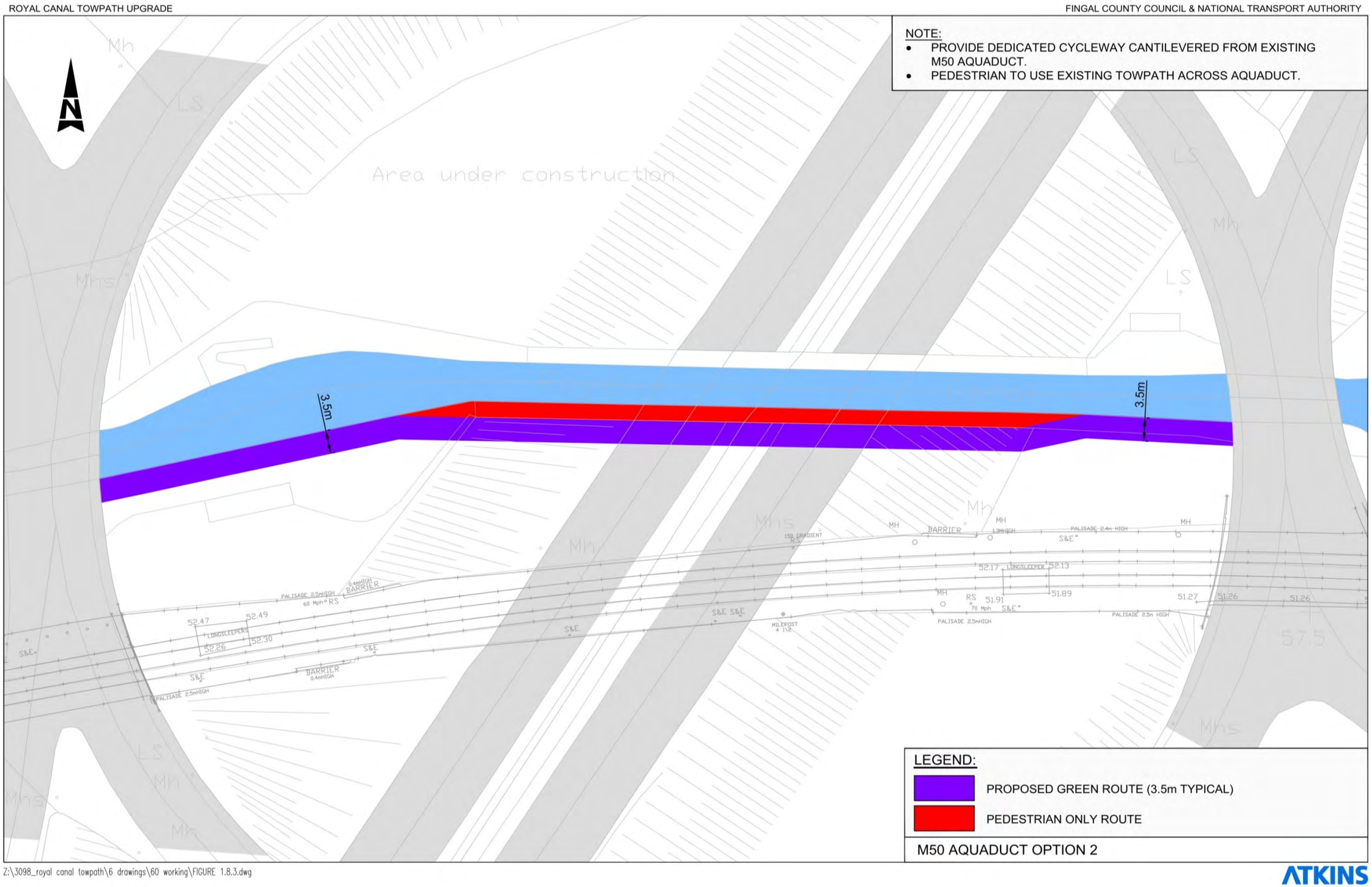

Figure 6.7 - M50 Aqueduct Option 2

ROYAL CANAL TOWPATH UPGRADE

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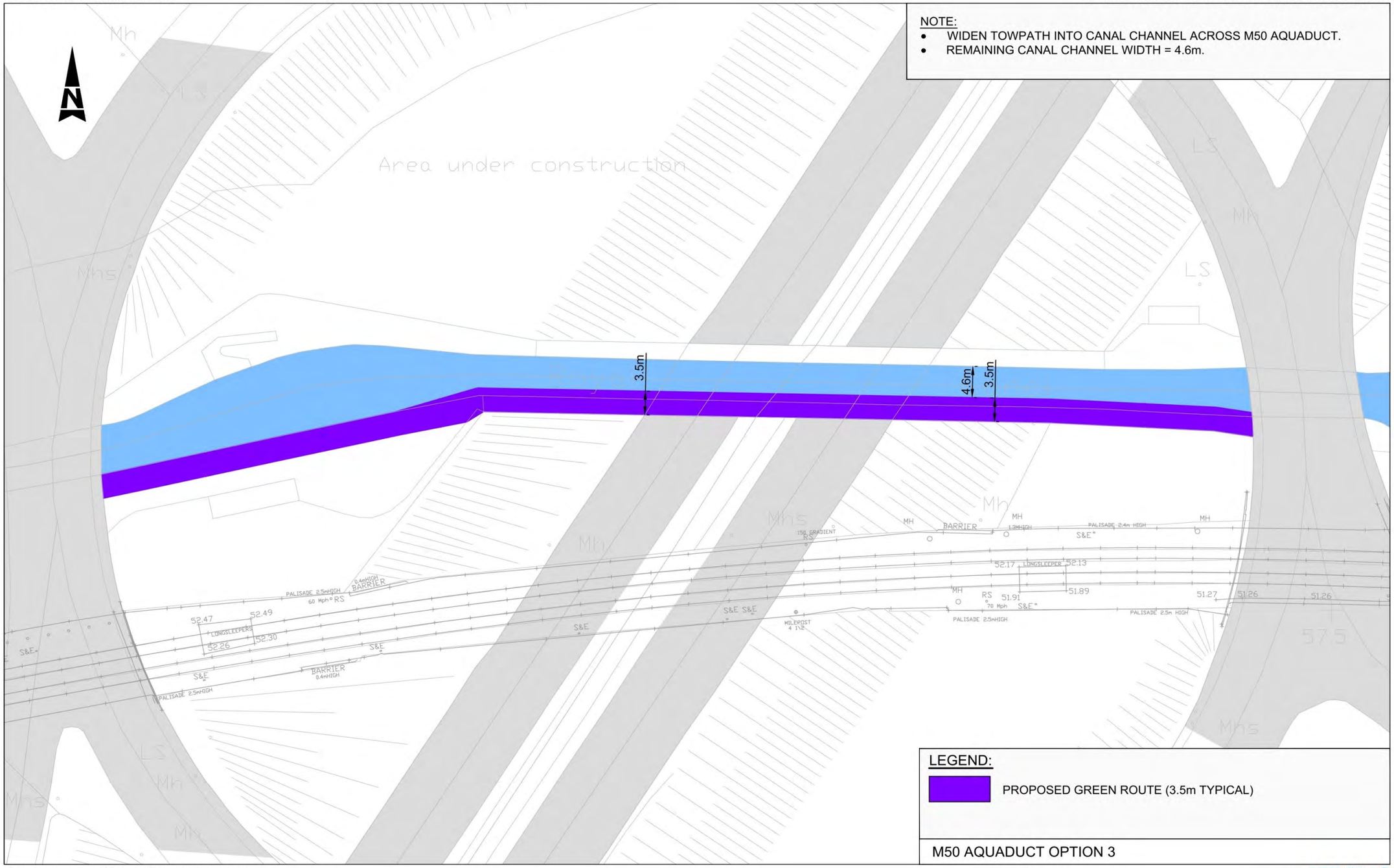

Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.8.2.dwg

Figure 6.8 - M50 Aqueduct Option 3

ROYAL CANAL TOWPATH UPGRADE

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NOTE:
- NO CHANGE TO EXISTING LAYOUT.
- PROVIDE SIGNAGE REQUIRING CYCLISTS TO DISMOUNT AND WALK ACROSS THE AQUADUCT.

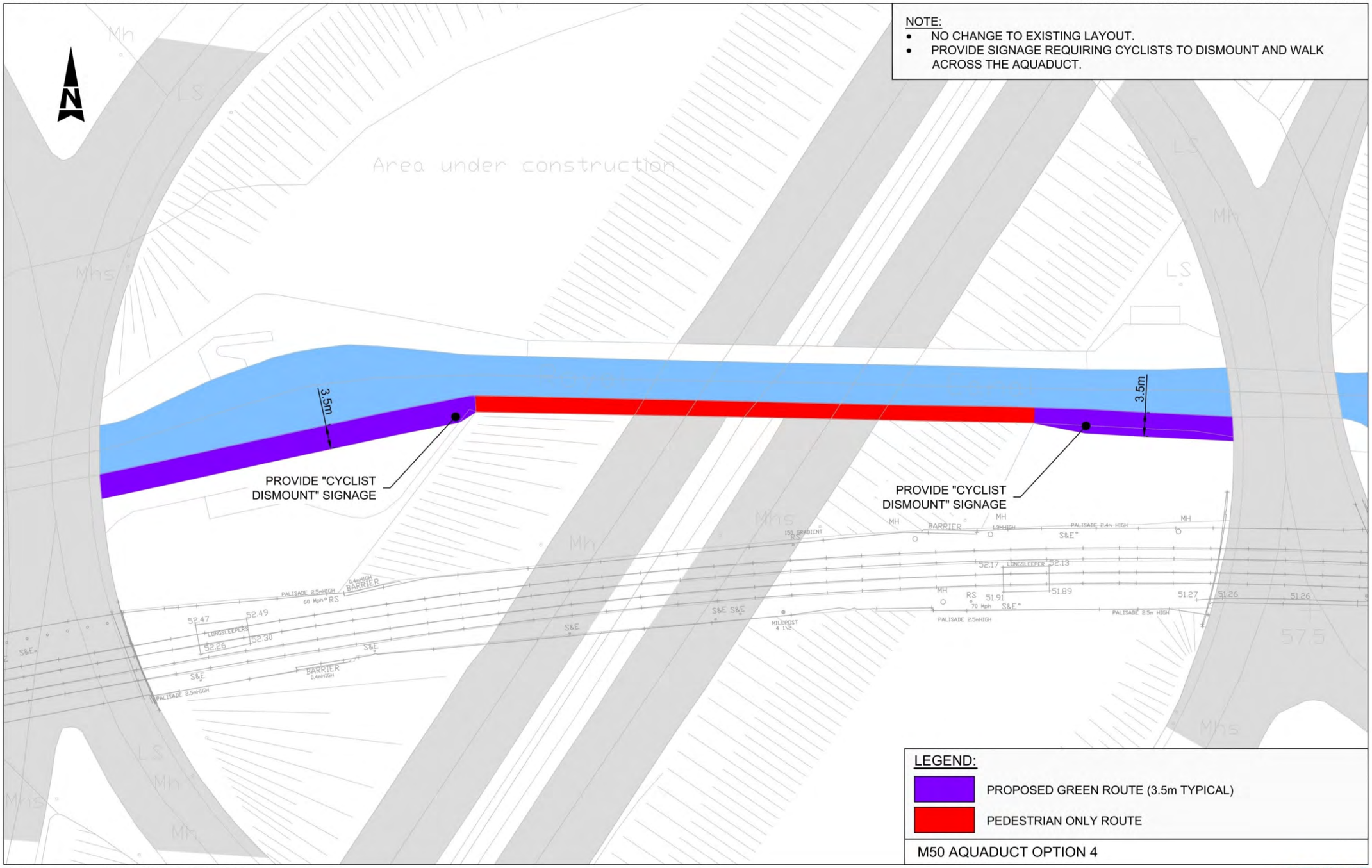

Figure 6.9 - M50 Aqueduct Option 4

Options at Talbot Bridge and towpath to Granard Bridge

6.92 All options at Talbot Bridge will seek to address the issues with accessibility and gradients to/from Old Navan Road.

6.93 The primary objective at this location is to provide a safe and effective method to ensure continuity of the proposed route is maximised. The approach to Talbot Bridge from the east is substandard, but there is sufficient space to improve this gradient up to current standards.

6.94 To the west of the bridge there is a lock with restricted space and steep gradients and the options presented have addressed this issue.

6.95 All options would link the canal cycleway with the existing cycle route between Blanchardstown and Old Navan Road, providing an alternative cycle route to the city centre via Auburn Avenue and the Phoenix Park.

6.96 **Option 1: Figure** 6.10 **- Talbot Bridge Option 1** is provided below. This option will require users to access the north canal-bank before using the original bridge to cross back to the south bank. This is necessary to avoid the private car park at the 12th Lock Hotel and the existing steps provided from Old Navan Road.

6.97 Given the low traffic volumes of traffic at Old Navan Road, it is proposed to provide a standard uncontrolled crossing facility at this location. This crossing would serve both pedestrians and cyclists.

6.98 In switching between the north and south banks of the canal, pedestrians will be required to use the existing footpaths. Cyclists will be accommodated through the provision of advisory on road cycle lanes between the accesses.

6.99 The proposed route through the 12th lock would be constrained to a minimum width of 2.5m until users have passed the 12th Lock Hotel buildings. Thereafter, a full width of 3.5m would be provided. These works would require widening to the existing bituminous surface in this area.

6.100 The capital costs for this option would be minimal with no major works elements to amend the existing infrastructure necessary.

6.101 The crossing of Old Navan Roadwould be expected to present minimal risk to users due to the very low vehicle movements at this location. Hence an uncontrolled crossing facility is selected. However, cyclists may choose to use the most direct route to access the towpath west of Talbot Bridge which is via the existing car park at the 12th Lock Hotel. Cyclists using the car park areas would be at risk of conflict with reversing vehicles.

6.102 This option would have minimal impacts on the receiving environment in both the construction stage and when in service as works required are minimal and the receiving environment is currently defined by the adjacent hotel premises, residential apartments and heavy pedestrian use.

6.103 Technically this option provides a good level of continuity. However, the directness is compromised due to the requirement for cyclists and mobility impaired to cross to the north bank and back again so that the car park and stepped access routes are avoided. In addition, the full desired width of 3.5m is not achievable through the 12th lock, thereby further compromising the Level of Service offered.

6.104 **Option 2:** Figure 6.11 - Talbot Bridge Option 2 is provided below. The proposed layout seeks to provide a direct access route to the southern towpath north of the 12th Lock Hotel car park. Acquisition of approximately 14 square meters of the 12th Lock Hotel car park would be required and a new footpath / cycleway access provided from Old Navan Road. A new boundary wall or fence would be provided along the new boundary line to the 12th Lock Hotel car park. This layout would equate to an approximate loss of three car parking spaces in the car park.

6.105 The proposed access would be used by both pedestrians and cyclists, who would cross Talbot Court via an uncontrolled crossing. An uncontrolled crossing facility would be deemed suitable given the low levels of vehicular traffic on the Old Navan Road.

6.106 As per Option 1 above, the route would pass through the 12th lock area via a path of constrained width of 2.5m until after the 12th Lock Hotel buildings, where a full width of 3.5m would be provided. These works would require widening to the existing bituminous surface in this area.

6.107 This option requires the purchase of circa 14 square meters of privately owned land at the 12th Lock Hotel car park. The level of construction activity required in terms of demolition of existing walls, construction of new boundary treatments, towpath access route and any associated accommodation works would be additional cost when compared to Option 1. The costs for this option would therefore be considered as moderate.

6.108 The level of safety offered by this option could be considered high given the low level of interaction with traffic and direct access to the towpath. Any issues with cyclists accessing the adjacent car park would be eliminated by this layout.

6.109 While considered minimal, the environmental impact of this option would be considered greater than Option 1 due to the greater scope of construction works required. Notwithstanding this, impacts on the receiving environment would be considered minimal in both the construction stage and when in service as works required are non intrusive and the receiving environment is currently defined by the adjacent hotel premises, residential apartments and heavy pedestrian use.

6.110 In terms of technical merit, this option would perform best due to the good continuity and directness of route. However, the restricted width through the 12th lock would impact on the comfort level achieved.

6.111 **Option 3:** Figure 6.12 - Talbot Bridge Option 3 is provided below. This option would direct cyclists onto the south bank of the canal at the 12th lock with access provided via the adjacent car park. This route would require agreement from the owners of the 12th Lock Hotel. There would be minimal loss of car parking area. However, there is a safety concern inherent in this solution as cyclists would be required to negotiate a car parking area where there are likely to be a significant number of reversing manoeuvres and visibility issues.

6.112 Pedestrians would be required to use the existing steps at Talbot Bridge, with all users required to cross Talbot Court via an uncontrolled crossing facility.

6.113 The route would continue through the 12th lock area via a path of constrained width of 2.5m. The path would extend to 3.5m wide immediately west of the hotel buildings. Works would be required to widen the existing bituminous path in this area.

6.114 This option would be considered as the “do minimum” scenario for this area. As such, implementation costs would be minimal. Construction works would only be required to widen the existing path in the area.

6.115 As noted previously, there would be safety concerns in directing cyclists to use the car park area where motorists would be executing a high number of reversing manoeuvres and where visibility would be restricted by other stationery vehicles. Therefore, this option would score poorly in terms of safety of end user.

6.116 This route would score highly in terms of continuity and directness of route although it would be considered inferior to Option 2 above. Similar issues in terms of the reduced width through the 12th lock area and the resultant impacts on comfort would be similar to other options under consideration.

6.117 **Option 4:** Figure 6.13 - Talbot Bridge Option 4 is provided below. This option would require users to access the north canal bank at Talbot Bridge.

6.118 Given the low traffic volumes on the Old Navan Road, a standard uncontrolled crossing facility would be provided at this location. The crossing would serve both pedestrians and cyclists. On-road advisory cycle lanes would be provided to assist and guide cyclists across the canal bridge as per Option 1 above.

6.119 The proposed route would follow the north bank of the canal through the 12th lock. The initial access route would consist of a reduced width of approximately 2.5m and steep gradient of 1:10. Options to overcome these constraints have been discounted due to the difficulties presented by the 12th lock chamber walls to the south (protected structures) and the grounds and boundary walls of The Mills residential development to the north (private property). The width would be further constrained by the space required for the operation of the lock gates at the upper level.

6.120 West of the lock, the full width of 3.5m would be provided through the adjacent parkland up to Castleknock Road.

6.121 The construction costs for this option would be considered low due to the minimal scope of works required. It would be considered to be marginally higher than options considered for the southern canal bank due to the marginally greater distance of widening required.

6.122 There would be a safety concern with respect to the existing steep gradient adjacent to the lower level of the 12th lock. Cyclists would be required to travel down this steep gradient generating potentially higher speeds at a potential conflict zone and accordingly would be considered undesirable. Similarly, mobility impaired may consider this hazardous for similar reasons where it may be difficult to control wheelchairs.

6.123 Environmental impacts would be negligible for this option and would be consistent with other options considered for this area.

6.124 The directness of route and continuity would be protected with this option. However, the reduced width and steep gradient at the western entrance from Old Navan Road would have a negative impact on the coherence and level comfort of the proposed route. Therefore, this option would be less favoured for these reasons.

6.125 This option would take users to the north side of the canal and would necessitate another crossing to the south at the next interface point, hence costs and interactions are deemed to be higher with this option.

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Table 6.3 - Talbot Bridge Option Evaluation Summary

Option Evaluation Summary Talbot Bridge, 12th Lock				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**#2**	**#1**	**#4**	**#3**
Economy	Low cost solution	Increased scope of works and requirement for acquisition of privately owned land equates to moderate level of cost	Low cost solution Will require legal agreements to enable cyclists to traverse private land.	Low cost solution
Safety	Offers good levels of safety and personal security. However, there is risk that cyclists may choose more direct route via existing car park, increasing risk of collision with reversing vehicles	Offers good levels of safety and personal security	Safety of cyclists compromised due to requirement to negotiate car park area and therefore cannot be recommended..	Safety concerns with steep gradient on eastbound approach to Talbot Court
Environment	Minimal impact in service and during construction	Minimal impact in service Higher scope of construction works required will have slightly increased construction stage impacts on surrounding environment	Minimal impact in service and during construction	Minimal impact in service and during construction
Technical	Minor negative impact on continuity of route. However, directness is significantly compromised. Lack of full width provision would also impact on comfort levels.	High Level of Service in terms of continuity and directness of route However, lack of full width provision through 12th lock would have negative impact on comfort levels.	Good Level of Service in terms of continuity and directness of route. Lack of full width provision would also impact on comfort levels.	Good Level of Service in terms of continuity and directness of route. Reduced width and steep gradient have negative impact in terms of comfort levels and coherence
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility	Good levels of integration and accessibility	Good levels of integration and accessibility

6.126 **Conclusion:** Option 3 has potential for conflicts between cyclists and manoeuvring vehicles in the car park and is least preferred on safety grounds. It represents the most likely existing situation in that cyclists and pedestrians are likely to be judging the safety of the car park before using it as the most direct route. However, this option cannot be recommended as the preferred route due to the conflicts mentioned above. It would also require agreement with the landowner.

6.127 Option 2 is preferred as it is the most direct route. However, this option requires a small area of land-take from the hotel car park.

6.128 Option 4 is constrained in terms of width and gradient and may pose difficulty for mobility impaired users. As this option directs users to the north side of the canal it will require a later crossing back to the south side.

6.129 Options 1, 2 and 3 utilise the south canal bank; this is preferable for the optimum layout at Granard Bridge (presented later), whereas option 4 requires crossing back to the south side to align with the preferred option at Granard Bridge.

6.130 Overall, Option 2 is preferred as it offers the best overall solution. However, should funding be limited than Option 1 will provide a low cost interim solution.

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:
- IMPROVED GRADIENT EAST OF BRIDGE.
- ADVISORY CYCLE LANES ON TALBOT COURT.
- UNCONTROLLED CROSSING AT TALBOT COURT.
- ACCESS TO SOUTH TOWPATH VIA NORTH BANK AND THEN ACCESS ORIGINAL BRIDGE.
- CONSTRAINED WIDTH THROUGH 12TH LOCK (2.0m MIN.)
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF 12TH LOCK AND TALBOT COURT.

N

The Mills

2.9m

2m

2.5m

2.5m

PRIVATE CAR PARK

CAR PARK ACCESS RETAINED

REGRADE TOWPATH

OVERGROWN

OVERGROWN

OVERGROWN

LEGEND:

PROPOSED GREEN ROUTE (3.5m)

ON ROAD CYCLE LANE (ADVISORY)

PROPOSED GREEN ROUTE (<3.5m)

TALBOT BRIDGE OPTION 1

Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.1.3.dwg

ATKINS

Figure 6.10 - Talbot Bridge Option 1

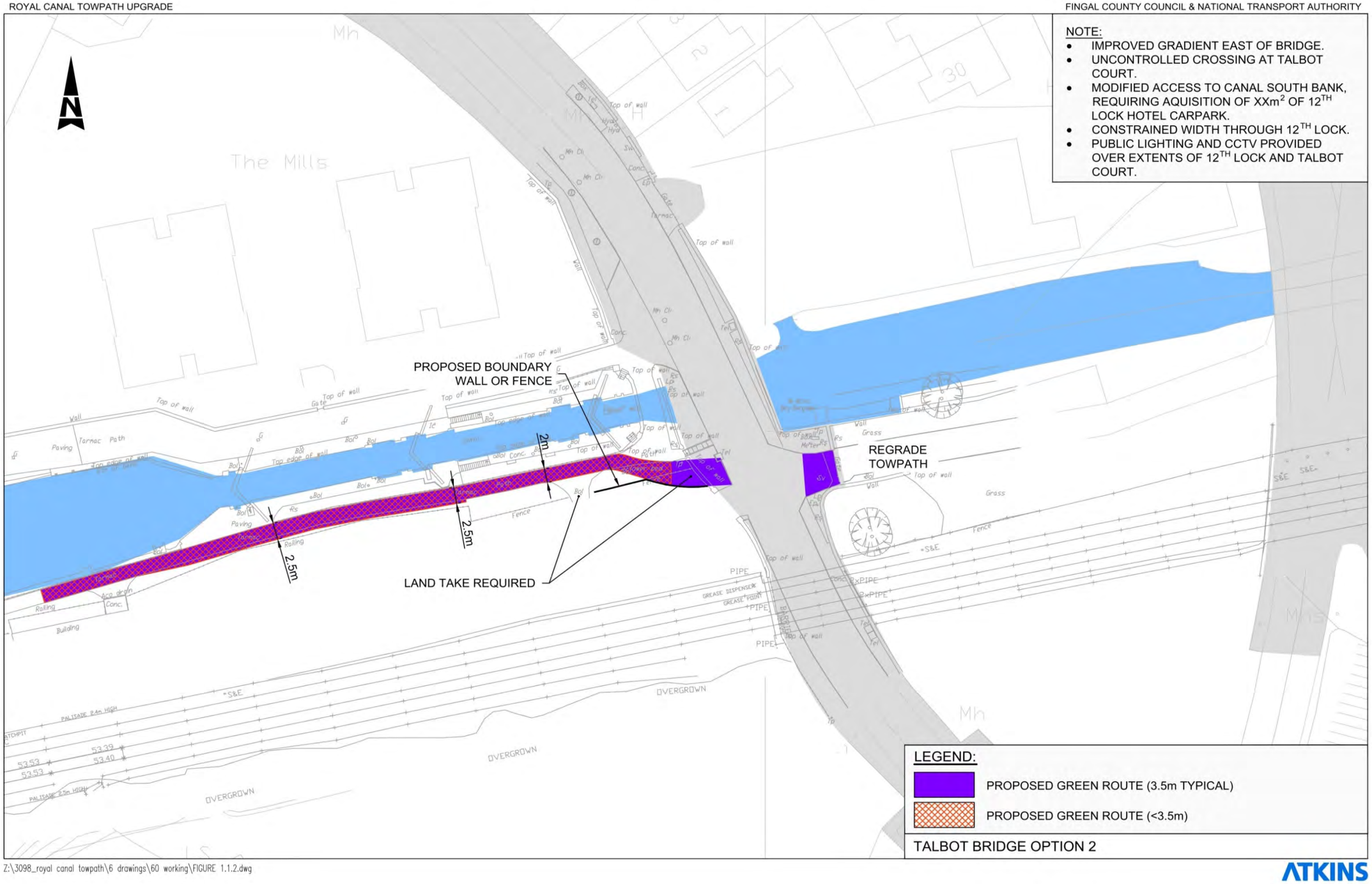


Figure 6.11 - Talbot Bridge Option 2

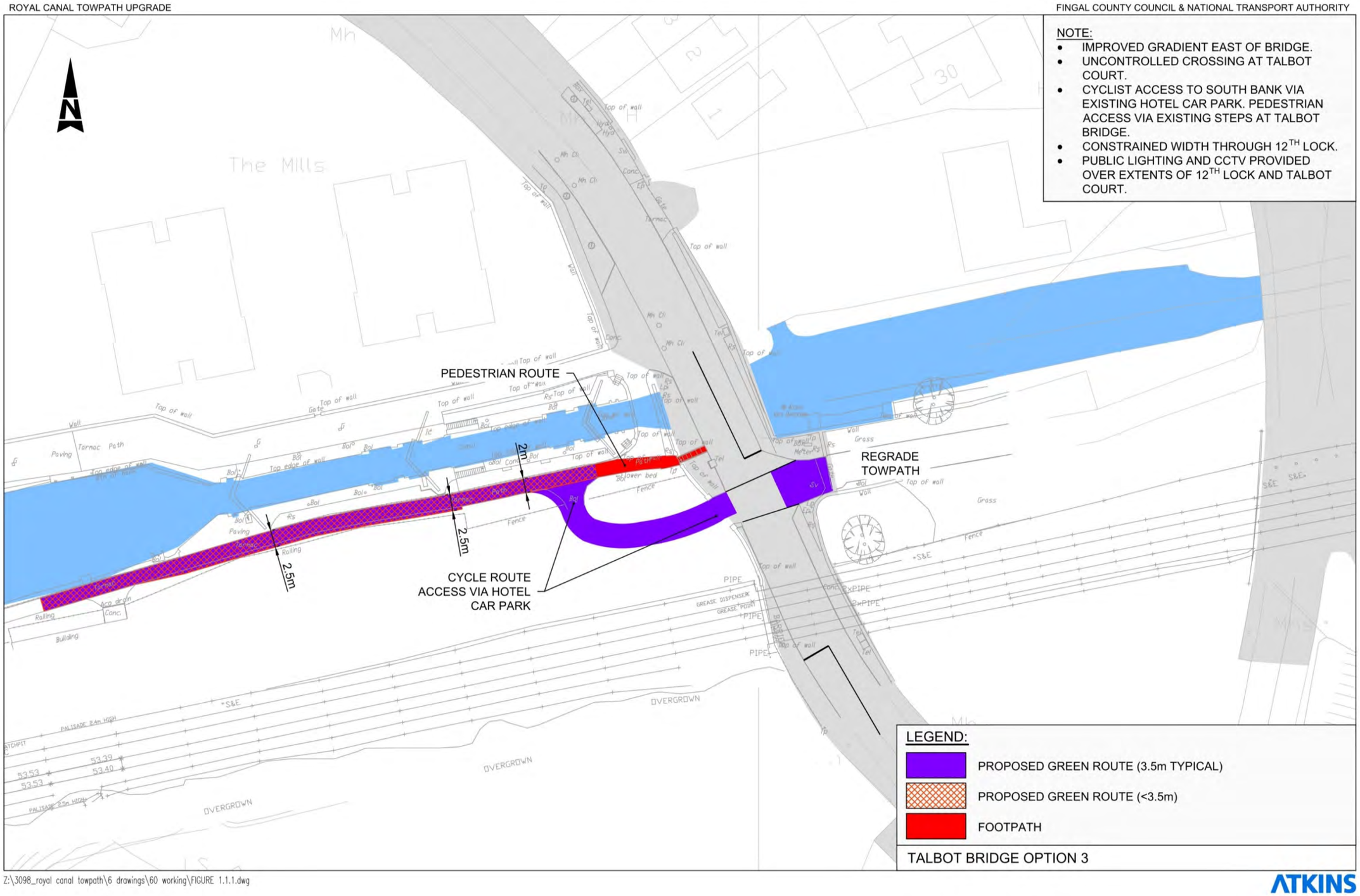
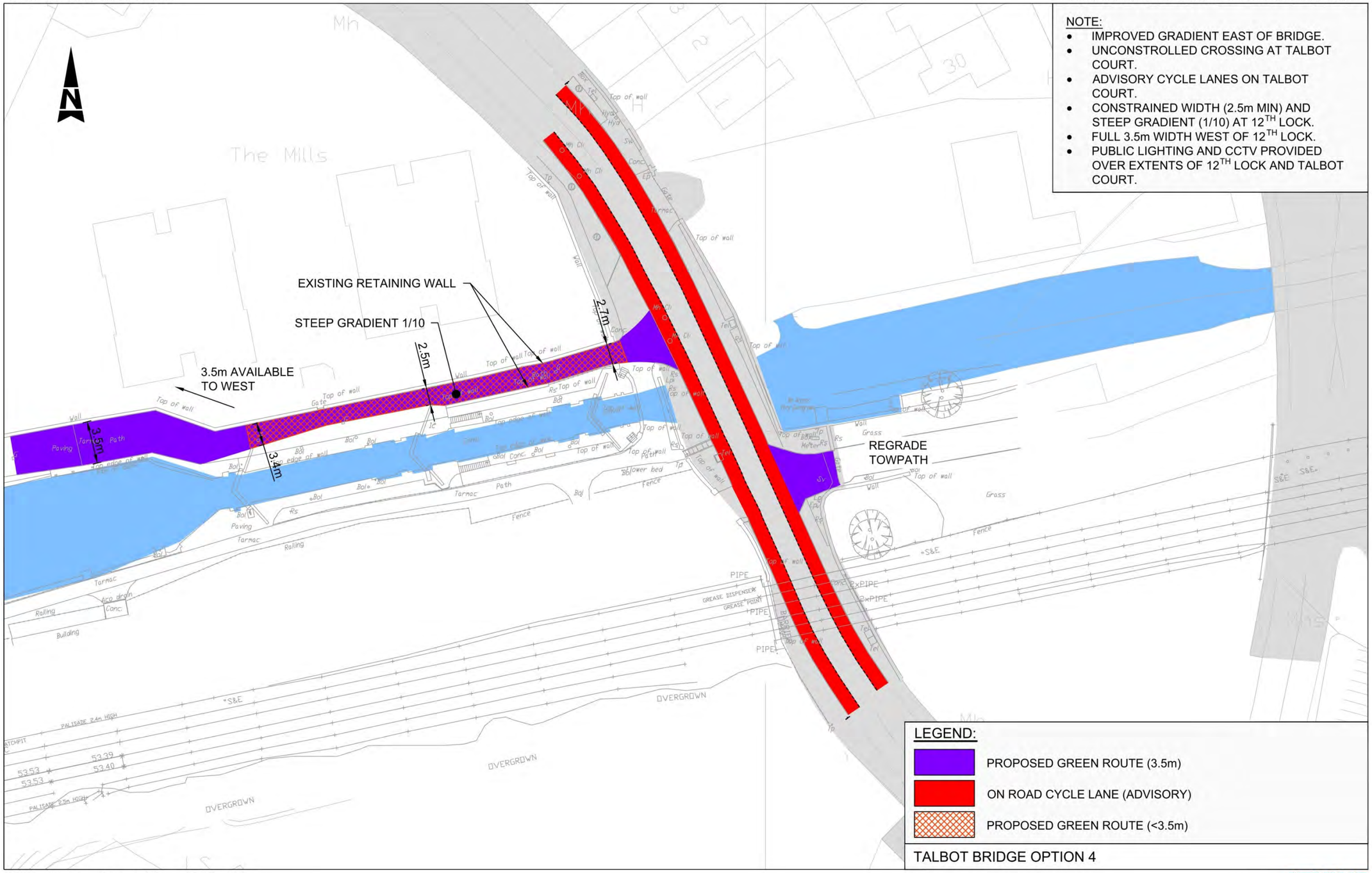


Figure 6.12 - Talbot Bridge Option 3

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY



Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.1.4.dwg

ATKINS

Figure 6.13 - Talbot Bridge Option 4

Options at Granard Bridge

6.131 All options discussed here are dependent on the selected solution at Talbot Bridge and whether cyclists / pedestrians are directed onto the northern or southern towpath at Talbot Bridge.

6.132 All options assume that after passing Castleknock station, a full width of 3.5m would be provided on the existing bank up as far as the deep sinking, approximately 400m to the west of Castleknock Station.

6.133 A high level of integration with local bus and rail transport and with existing and planned cycle routes in the area would be provided with all options.

6.134 **Option 1:** Figure 6.14 - Granard Bridge Option 1 is provided below. This option assumes that the eastern approach to Granard Bridge would be via the northern bank. The proposed route would emerge onto Castleknock Road at the existing entrance point. Where the selected route at Talbot Bridge directs users to the southern bank of the canal, this layout would not be compatible.

6.135 The 3.5m wide cycleway would be continued across Granard Bridge by reclaiming the appropriate amount of carriageway space and converting this to a raised paved area. This would require a one-way traffic system at this location and it is proposed that this system would be achieved through the installation of a shuttle traffic light system.

6.136 As this is a major traffic route, the shuttle traffic lights would require connection to the Dublin City Council SCATS network. It is noted that all other signals on this route are currently controlled on the SCATS network.

6.137 A toucan crossing facility would be provided at the entrance to the railway station and integrated with the shuttle traffic lights.

6.138 This option would represent one of the more favourable options in terms of capital outlay. Implementation costs would be limited to cover the provision of the raised kerbed area across the bridge and the installation of traffic signals, with associated road markings and signage.

6.139 The proposed layout would also provide a safe route for cyclists and pedestrians using the canal towpath. The high volume of traffic on Castleknock Road would present an otherwise hazardous situation where users would be required to negotiate busy traffic and narrow footpaths. This proposed layout would address these concerns.

6.140 The minimal works required to construct this layout would result in minimal impacts on the local environment. However, the layout would have a significant impact on traffic on Castleknock Road and would be expected to add to existing congestion levels. This would have an indirect impact on the local environment.

6.141 This is a good option technically for the cycleway, but a poor option for the existing Castleknock Road users given the significant traffic impacts.

6.142 **Option 2:** Figure 6.15 - Granard Bridge Option 2 is provided below. This option assumes that the eastern approach to Granard Bridge would be via the northern bank. Where the selected option at Talbot Bridge directs users to the southern bank of the canal, this layout would not be compatible.

6.143 This option would provide a pedestrian / cycle bridge parallel to Granard Bridge and located immediately east of it. This would provide a safe means for users of the towpath to cross the canal. Pedestrians on Castleknock Road would also be directed to the bridge, effectively eliminating the safety concerns with the existing narrow footpaths across Granard Bridge.

6.144 A toucan crossing facility would be provided at the entrance to the railway station to provide a safe passage for pedestrians and cyclists across Castleknock Road. These signals would be required to link to the Dublin City Council SCATS network.

6.145 Given the high volume of traffic using this route, the introduction of a toucan crossing would be expected to adversely affect existing traffic congestion in the area.

6.146 As this option seeks the construction of a dedicated pedestrian / cycle bridge, it would attract a higher level of capital cost.

6.147 A safe route would be provided to the users of the canal towpath. Pedestrians along Castleknock Road would also benefit from the new bridge in terms of safety and adequacy of existing footpaths over Granard Bridge.

6.148 There would be potential for some heritage issues with respect to the construction of the footbridge and its impact on the existing Granard Bridge. The new bridge would eliminate views to the bridge from the east. However, there is precedence for the construction of such bridges as can be seen at Clonsilla and Coolmine Stations, where modifications to the masonry walls adjacent to the canal bridges has been carried out. Therefore, it would be reasonable to assume that similar works may be feasible.

6.149 The technical merits of this option would be good in that the continuity and directness of the route would be maintained, although users may experience some waiting time at the toucan crossing due to the high traffic volumes present.

6.150 **Option 3:** Figure 6.16 - Granard Bridge Option 3 is provided below. The 3.5m wide proposed route would approach from the east along the southern bank of the canal. This layout would be compatible with the preferred option at Talbot Bridge.

6.151 Direct access to Castleknock Road would be provided by construction of a new ramped access route.

6.152 A toucan crossing facility would be provided at the entrance to the railway station to provide a safe passage for pedestrians and cyclists across Castleknock Road. These signals would be linked to the Dublin City Council SCATS network as per current adjacent traffic signals along Castleknock Road.

6.153 This option would deliver a cost effective and value for money solution. The scope of works would include the construction of an embankment and paved path, with railing and landings for mobility impaired users. The installation of the toucan crossing would be comparable to other options considered for this location.

6.154 A safe route would be provided to the users of the canal towpath and pedestrian traffic along Castleknock Road would also benefit from the signalised crossing. However, this option does not offer any improvement of facilities for pedestrians / cyclists crossing over the canal via the existing narrow footpaths on Granard Bridge.

6.155 The impacts on the environment would be minimised with this option due to the reduced scope of works required. As there is no additional bridge structure required, the associated impacts on the Granard Bridge protected structure would be reduced. However, the requirement for the traffic signals at the proposed toucan crossing would have an adverse effect on existing traffic congestion in the immediate area.

6.156 Continuity and directness of the route would be maintained with this layout. However, users may experience some waiting time at the toucan crossing due to the high traffic volumes present.

6.157 **Option 4:** Figure 6.17 - Granard Bridge Option 4 is provided below. For this option the proposed route would approach from the east along the south bank of the canal. The full width of 3.5m would be provided. This layout would be compatible with the preferred option at Talbot Bridge.

6.158 An underpass would be constructed to allow the facility to pass below Castleknock Road. Links to the existing footpaths, including the existing access route to Castleknock Road (via existing steps) would be maintained.

6.159 To the west, the underpass would provide continuity of service and width to Castleknock Station and onward towards the Deep Sinking. Access to Castleknock Station would be maintained via a new ramped access upon which an approximate width of 4.0m would be provided to permit vehicular access to Castleknock Station and the proposed cycle route. This would be essential to allow access for maintenance and emergency response vehicles. This access ramp would be substandard in terms of gradient (as is currently provided) due to limited space.

6.160 The construction cost of this option would be the highest of all options generated at this location. Using traditional methods the installation of the underpass would be expected to cause major disruption to local traffic as the closure of Castleknock Road would be required for the duration of the works. It would be possible to minimise traffic diversion by limiting the construction period. This may necessitate a full closure of the road for a short period of time. Another potential option would be to 'jack' the structure through the existing embankment. However, given the likelihood of utilities at this location plus the reduced depth of cover above such a structure, the jacking option is not considered feasible.

6.161 The underpass would offer the highest levels of safety for the users of the towpath as interactions with traffic would be completely eliminated. There is a possibility that the new underpass would attract antisocial behaviour and may give rise to personal security issues, but this may be overcome by the use of CCTV surveillance.

6.162 The proposal to excavate so close to a protected structure is a major environmental constraint to this option. Discussions and agreement with the Department of Environment, Community and Local Government will be required prior to any works being accepted at this location.

6.163 This option would provide the best technical performance of all options examined in terms of the provision of service for the cycleway. The continuity and directness of the route would be uncompromised and there would be no interaction with traffic or delays at traffic signals. However, this option is technically difficult to implement and is likely to cause traffic problems during construction.

6.164 There is a significant impact upon Castleknock station, with the existing access requiring diversion closer to the rail line. During construction, access to the station will need to be diverted.

Table 6.4 - Granard Bridge Option Evaluation Summary

Option Evaluation Summary Granard Bridge, Castleknock Road				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**#4**	**#3**	**#2**	**#1**
Economy	Low capital cost outlay.	High capital cost outlay due to proposed footbridge	Low capital cost outlay. Easy to construct	High capital cost outlay.
Safety	Good level of safety as users are segregated from the busy traffic flows	Good level of safety as users are segregated from the busy traffic flows	Good level of safety as users have minimal interaction with busy traffic	Total segregation from traffic equates to best safety. Provides vehicular access to the towpath to the west for maintenance and emergency response.
Environment	Minimal impact in service and during construction	Minimal impact in service Higher scope of construction works required will have slightly increased construction stage impacts on surrounding environment Toucan crossing would add to traffic congestion.	Minimal impact in service and during construction The toucan crossing would be expected to add to existing levels of traffic congestion.	Minimal impact in service. Potential for major disruption to local traffic, depending on construction method chosen.
Technical	Good Level of Service achieved. Some delay may be experienced at toucan crossing due to high traffic volumes. The shuttle traffic control layout would significantly add to existing levels of traffic congestion. Not compatible with option for Talbot Bridge.	Good Level of Service achieved. Some delay may be experienced at toucan crossing due to high traffic volumes Not compatible with option for Talbot Bridge.	Good Level of Service achieved. Some delay may be experienced at toucan crossing due to high traffic volumes. Comfort levels compromised due to gradients and mobility impaired landings	Best performance in terms of Level of Service achieved. Substandard gradients on ramps provided. Short closure of road will be required to place the underpass which will impact upon traffic.
Integration	High levels of integration and accessibility			

6.165 **Conclusion:** Options 1 and 2 would be least preferred as they are not compatible with the preferred option at Talbot Bridge.

6.166 Option 1 would also have significant permanent impacts on traffic congestion at Castleknock Road. It is therefore deemed not suitable.

6.167 Option 2 would require a higher capital investment to provide a footbridge over the canal but reduced impacts on traffic would remain as a toucan crossing would be required. It would negatively impact views to the bridge on the east side.

6.168 Option 3 would have a negative impact on traffic congestion at Castleknock Road due to the provision of a toucan crossing, as per Option 2. The introduction of gradients and landings would have impacts on the comfort levels for cyclists and the gradients provided would fall short of published guidelines for recommended minimum gradients for mobility impaired.

6.169 Option 4 would have no impact on Castleknock Road during service and provides the highest Level of Service to the end user. Issues of safety and traffic congestion on Castleknock Road would be eliminated and the construction phase would include a short closure of the road, causing congestion during construction. This option would represent the best solution, but is expensive.

6.170 Given its merits in terms of overall safety, environmental impact and high level of service offered, it is proposed that Option 4 is brought forward as the preferred solution for this element of the scheme. Where funding is not immediately available, option 3 should be considered as an interim solution.

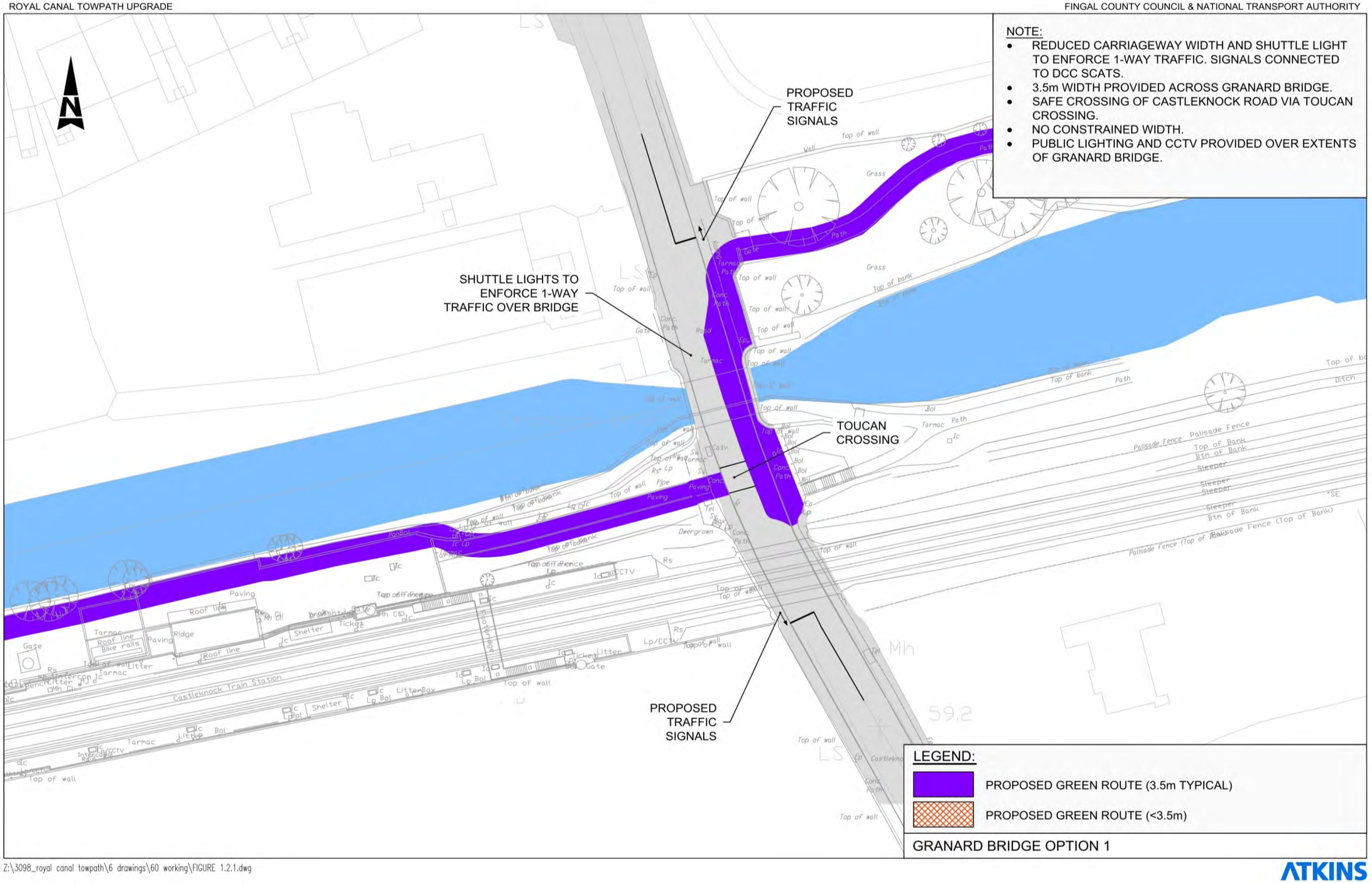


Figure 6.14 - Granard Bridge Option 1

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:

- 3.5m GREEN ROUTE APPROACHING ON NORTH BANK.
- NEW 4.0m FOOTBRIDGE ACROSS CANAL ADJACENT TO GRANARD BRIDGE.
- TOUCAN CROSSING AT ENTRANCE TO RAILWAY STATION. SIGNALS CONNECTED TO DCC SCATS.
- 3.5m GREEN ROUTE TO WEST PASSING RAILWAY STATION.
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF GRANARD BRIDGE.

PROPOSED TRAFFIC SIGNALS

TOUCAN CROSSING

RAISED BANK

TOUCAN CROSSING

PROPOSED TRAFFIC SIGNALS

LEGEND:

PROPOSED GREEN ROUTE (3.5m TYPICAL)

CYCLE / VEHICLE SHARED SPACE (RAISED ROAD SURFACE, 30kph SPEED LIMIT)

GRANARD BRIDGE OPTION 2

Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.2.3.dwg

ATKINS

Figure 6.15 - Granard Bridge Option 2

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:
- 3.5m GREEN ROUTE APPROACHING ON SOUTH BANK.
- PROVIDE NEW RAMPED ACCESS TO EAST OF GRANARD BRIDGE. MAX. GRADE 1/12. ALLOW FOR GUARD RAILS AND REST AREA.
- TOUCAN CROSSING AT CASTLEKNOCK ROAD. SIGNALS CONNECTED TO DCC SCATS.
- 3.5m GREEN ROUTE TO WEST, PASSING RAILWAY STATION.
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF GRANARD BRIDGE.

PROPOSED TRAFFIC SIGNALS

PROPOSED RAMPED ACCESS. MAX. GRADE 1/12 FOR LENGTH OF 39m. PROVIDE GUARD RAILS AND REST AREA.

TOUCAN CROSSING

PROPOSED TRAFFIC SIGNALS

LEGEND:

PROPOSED GREEN ROUTE (3.5m TYPICAL)

PROPOSED GREEN ROUTE (<3.5m)

GRANARD BRIDGE OPTION 3

Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.2.2.dwg

ATKINS

Figure 6.16 - Granard Bridge Option 3

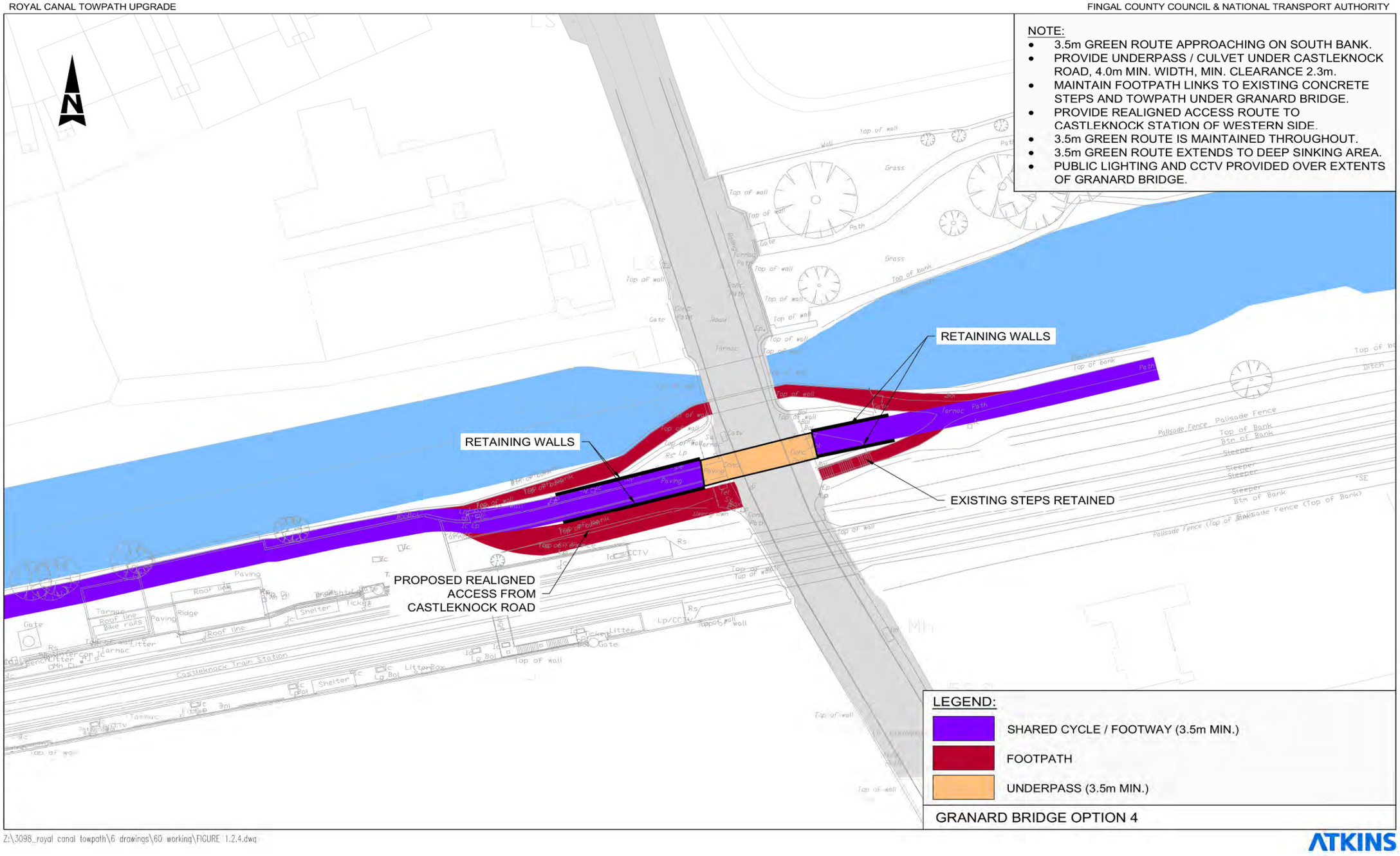


Figure 6.17 - Granard Bridge Option 4

Area 2: Granard Bridge (Castleknock Road) to Callaghan Bridge (Clonsilla Road)

The *"Deep Sinking"*

6.171 The "Deep Sinking" presents significant challenges to the provision of a continuous 3.5m cycling / walking route. The topography and layout of the existing towpath typically consists of a 2.0m wide track flanked by a deep cutting of 1.0 – 9.0m to the canal on one side and a varying height embankment supporting the Dublin – Sligo Railway on the other. There is a critical pinch point located approximately 400m west of Castleknock Station (*"Castleknock Pinch Point"*) where the towpath is particularly constrained due to the close proximity of the railway and an existing masonry retaining wall. The difference in level between the towpath and canal waters at this location is approximately 1.0 – 1.2m. The following options will address the general situation and give particular reference to the identified pinch point.

6.172 The Deep Sinking represents a unique snapshot of historical engineering and heritage. All options will seek to maximise opportunities to enhance awareness and promote the historical and heritage value of the canal. Seating areas will be provided at suitable locations co-located with information plaques and signage.

6.173 Good levels of integration and accessibility would be offered to all options in this area with the provision of the "opportunities" as outlined in Chapter 5 of this report. The erection of proposed bridges linking adjacent communities would provide a high level of integration and provide greater accessibility to the canal towpath together with other benefits of connectivity between otherwise severed communities.

6.174 A guardrail would be provided on the external edge of all options through this section for safety purposes. Hinged sections of the guardrail would be included in the design to enable the rail to be opened / removed to permit direct access to the waters for maintenance and rescue purposes.

6.175 Personal security would be a perceived concern through this area as the existing character is unlit and overgrown. However, the increased width, provision of additional access points to the adjacent residential areas and increased use of the facility in general would give rise to an increased level of passive surveillance. Notwithstanding this, CCTV surveillance would also be provided throughout.

6.176 **Option 1** would seek to construct a cantilevered boardwalk type facility, using the full available width throughout the "Deep Sinking" area.

6.177 This would require the installation of a series of mini-piles or anchors to provide support to structural walkway/cycleway. The full desirable width of 3.5m would be achieved throughout. This would be achieved by cantilevering the path out over the existing canal bank for a distance of 1.5m typically.

6.178 The proposed cantilevered boardwalk would be extended eastwards to address the issues at the Castleknock pinch point, created by the railway and the masonry retaining wall supporting it. However, as this location is at the eastern limit of the "Deep Sinking", the level difference between the towpath and the canal waters is relatively small at approximately 1.0m. Therefore, the construction of the cantilever boardwalk would impact on the existing vegetation along the canal bank (ie riparian zone) at this location and would protrude above the canal itself. This should not be too problematic as the canal width at this location is much wider than at other locations along its length.

6.179 The costs associated with this option would be significant. Installation of specialist mini piles/anchors would be required, the final extent of which would be informed by the prevailing ground conditions on site. Construction of the super-structure would then follow in a construction process which would be slow and difficult given the inaccessibility of the area for construction plant and machinery.

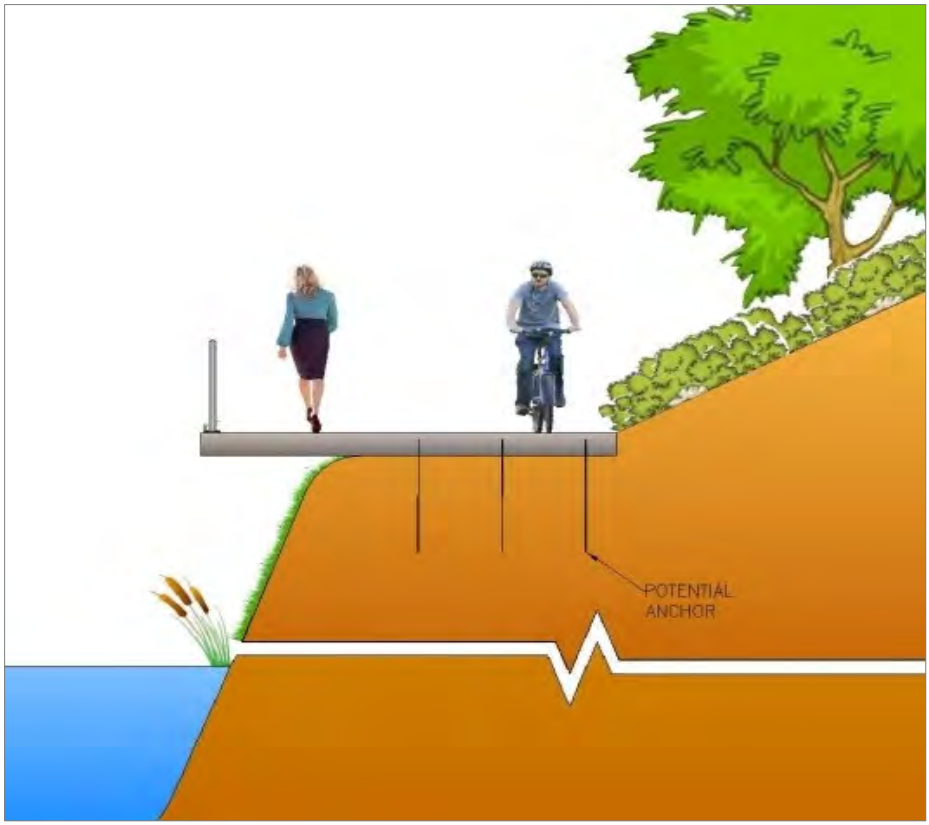


Figure 6.18 – Option 1 - Cantilever Boardwalk

6.180 The construction of this option would require the clearance of all existing young trees from the canal bank and lopping of others along the adjacent embankment. These trees are of low ecological value and therefore the impact on the receiving environment would be significantly lower than other options under consideration.

6.181 The existing riparian zone throughout the “Deep Sinking” would not be affected where the towpath level is in excess of approximately 1.5m above the canal water level. However, the treatment required at the Castleknock Pinch Point would necessitate the removal of existing vegetation within the riparian zone. Existing planting which is affected by the proposal should be transplanted to a more suitable nearby location, thereby preserving its ecological value. In addition to the above, the cantilever boardwalk would be designed to support vehicular access for both emergency and maintenance purposes.

6.182 **Option 2:** would involve the construction of a “King Post” retaining structure to permit widening into the adjacent embankment.

6.183 This would require the installation of a series of posts embedded in the ground at approximate 2.0m centres. Horizontal structural members would be installed to provide the lateral retaining element of the structure. A wide range of suitable materials are available for use, including railway sleepers, which would be sympathetic to the surrounding environment from an aesthetics perspective.

6.184 The constructability of this system, whilst constrained, would be relatively straightforward to achieve given the relative small sizes of the plant and equipment required. Any option to widen into the adjacent embankment would impact on the Zone of Influence of the adjacent railway and

would therefore be subject to agreement with Irish Rail. Consultations with Irish Rail have established that where works to the existing embankment would be necessary, this option for retaining the structural integrity of the embankment would be preferred over options which require more excavation of the embankment.

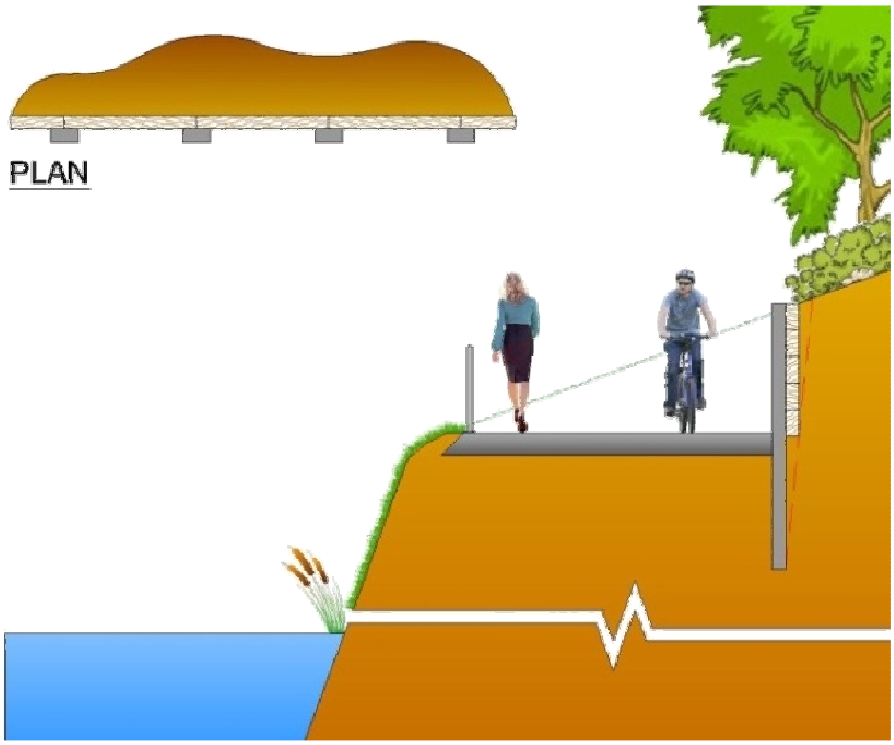


Figure 6.19 – Option 2: - "King Post" Earth Retaining Wall

6.185 The provision of a king post retaining structure would not be appropriate at the Castleknock Pinch Point. Therefore, a cantilever boardwalk would be proposed over this short section, as per Option 1 above.The construction of this option would also require the clearance of all existing young trees from the canal bank and lopping of others along the adjacent embankment. These trees are of low ecological value. However, this option would also necessitate the excavation and removal of a significant area of the existing embankment. The resulting impacts on the receiving environment would be higher than in Option 1 above.

6.186 Technically, as this option would provide the full desired width of 3.5m throughout the "Deep Sinking" area, it would provide a high Level of Service.

6.187 **Option 3:** The provision of a "traditional" cantilever retaining wall would permit widening into the embankment and, in engineering terms, would be the most efficient method of retaining the required level of material.

6.188 The installation would require the excavation and temporary removal of a large quantity of existing material to provide the working space to construct the wall. This would necessitate the removal of a large amount of the existing established trees and other vegetation currently located on the embankment. Consequently, the impacts on the surrounding environment and eco systems would be significant. The removal of this vegetation would also have a major impact on the existing character of the canal corridor in this area.

6.189 In addition, during the consultation phase of this study Irish Rail tabled concerns over this option as it would have the greatest risk of embankment failure during construction. As a result the methodology of construction would necessitate short sections being 'opened up' for construction

at any time, which would lead to extremely intensive work methods. In addition, the removal and replacement of large quantities of soil to construct the cantilever would add to the intensiveness of the work.

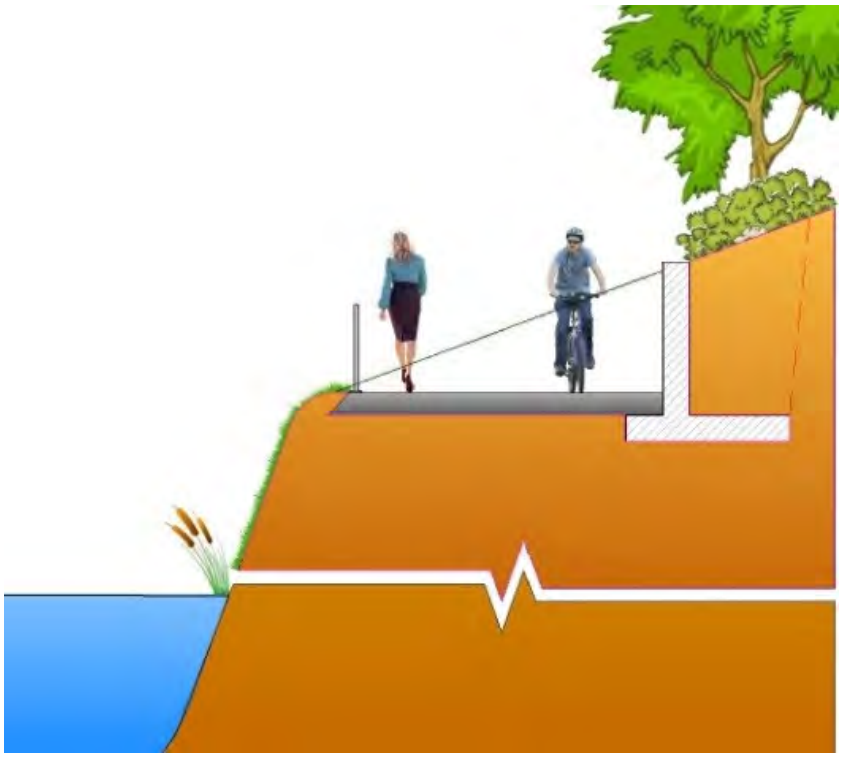


Figure 6.20 – Option 3 - Cantilever Retaining Wall

6.190 In addition, during the consultation phase of this study Irish Rail tabled concerns over this option as it would have the greatest risk of embankment failure during construction. As a result the methodology of construction would necessitate short sections being 'opened up' for construction at any time, which would lead to extremely intensive work methods. In addition, the removal and replacement of large quantities of soil to construct the cantilever would add to the intensiveness of the work.

6.191 The provision of this type of structure would not be appropriate at the Castleknock Pinch Point. Therefore, a cantilever boardwalk would be proposed over this short section, as per Option 1 above.

6.192 **Option 4:** The alternative option to developing the "Deep Sinking" area would be to provide a parallel route for cyclists through the adjacent residential areas. However, in doing this, it would still be of benefit to the local community (and all users of the canal) if the existing towpath was upgraded to the maximum width possible without resorting to the engineering measures described above.

6.193 The towpath would be upgraded on quality of surface only and no widening would be proposed.

6.194 Cyclists would be diverted away from the canal corridor at Granard Bridge and along one of the routes identified below**Error! Reference source not found.**. These routes have been selected due to their existing and/or proposed cyclist facilities or their low traffic / residential nature.

6.195 Three alternative sub-options are available as follows:

- Route 4A – From Granard Bridge, cyclists would be diverted northwards along Castleknock Road and then west along Roselawn Road. There are currently no formal cycle facilities along this section of road.

  From Roselawn Road, the route would follow an off-road section through existing parkland before joining Brompton Court. This section would also need work to upgrade the existing paths to a cycleway or shared standard.

  From Brompton Court, cyclists would be required to follow Delwood Road, Coolmine Road and Clonsilla Road where the route would rejoin the canal towpath. Current provision of cycle facilities along this route is poor.

- Route 4B – Cyclists would be diverted between Castleknock Road and Coolmine Road as per Route 4A above.

  At Coolmine Road, the route would turn southwards before heading west along Kirkpatrick Avenue, a narrow road with little traffic present. Further west, the route would be developed in conjunction with adjacent zone lands as far as Diswellstown Bridge.

  Passing under Diswellstown Bridge, extensive works would be required to establish the route as far west as Porterstown Road.

  The route would then follow Porterstown Road northwards before joining Clonsilla Road onward to Clonsilla Station where the route would rejoin the canal towpath. Current provision of cycle facilities along this route is very poor.

- Route 4C – From Granard Bridge, cyclists would be diverted southwards along Castleknock Road and then west along Park Lodge. The route would follow Carpenterstown Road and Riverwood Dale passing through several roundabouts before heading northwards on Diswellstown Road.

  The final section of this route would cross Diswellstown Bridge before turning west along Clonsilla Road and rejoining the canal towpath west of Clonsilla Station.

  This route seeks to use existing distributor roads through the Laurel Lodge and Carpenterstown residential areas where bus lanes and cycle facilities are currently provided. However, as per previous routes above, the current cycle facility provision along Clonsilla Road is poor.

6.196 Public lighting along the “Deep Sinking” section of the canal would not be provided between Castleknock Station and Callaghan Bridge as part of this option. However, in the interest of safety, a pedestrian guardrail would be provided as a precaution against accidental falls into the canal through the deeper sections of the “Deep Sinking”.

6.197 Depending on the selected route sub-options above, the overall final costs for this layout would vary. However, in considering all variants, this option would be the least costly of all options considered.

6.198 However, the reduced cost is commensurate to the reduction in safety and end user security. Cycle traffic would be required to negotiate the streets of the adjacent residential areas and distributor roads. Such routes would have obvious safety deficiencies over the traffic-free route along the canal towpaths. There would also be a significant risk of cyclists continuing along the proposed footpath through the “Deep Sinking” rather than taking the longer detour, thus increasing the potential for conflicts with pedestrians. Furthermore, the lack of public lighting along the towpath would have obvious negative implications on personal security.

6.199 This option would have a lesser impact on the receiving environment, although removal of trees along the canal bank and extensive lopping of others would still be necessary. The construction stage of this proposal would also be more favourable compared to that of other options above.

6.200 Technically, the Level of Service offered is significantly reduced. The directness and coherence of the route would be lost and the facility would not be attractive to commuter cyclists.

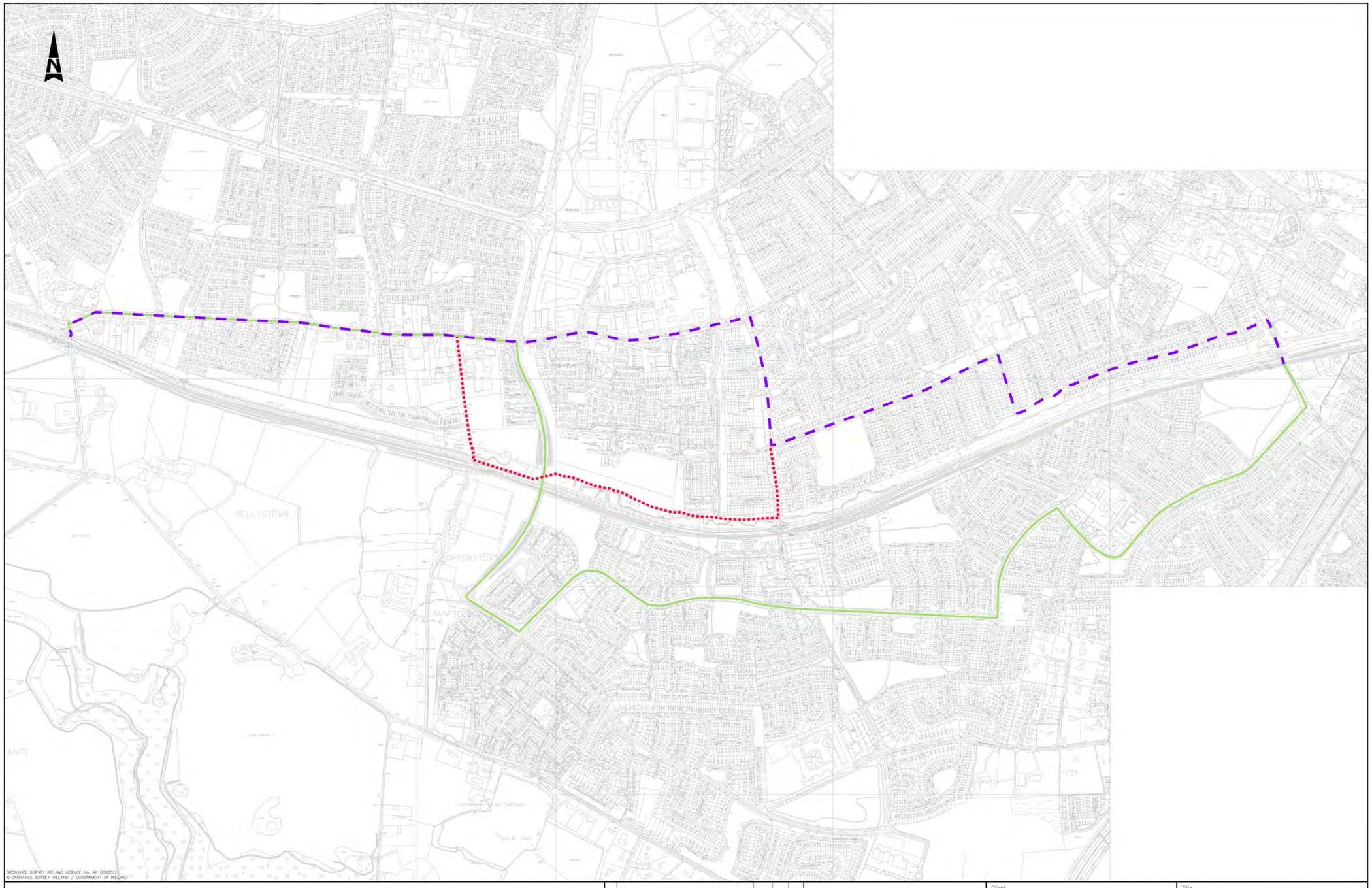


Figure 6.21 - Option 4 Deep Sinking - Alternative Route

Table 6.5 - "Deep Sinking" Option Evaluation Summary

Option Evaluation Summary "Deep Sinking" (Castleknock – Clonsilla)				
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**	**Option 4**
Rank	**#1**	**#2**	**#3**	**#4**
Economy	High cost – difficult to construct due to limited access	High cost – easy to construct but would be time consuming due to Zone of Influence of adjacent railway.	High cost – easy to construct but would be time consuming due to Zone of Influence of adjacent railway.	Lowest cost – scope of works significantly reduced
Safety	High levels of safety and personal security			Lesser levels of safety and personal security due to diversion of cycle traffic onto adjacent road and non-provision of public lighting along the towpath.
Environment	Minimal impact in service Moderate impact during construction Relocation of short length of riparian vegetation required at Castleknock Pinch Point	Minimal impact in service Excavations into adjacent embankment will result in higher impacts on the environment. Relocation of short length of riparian vegetation required at Castleknock Pinch Point	Minimal impact in service Major impacts during construction phase. Extensive loss of vegetation and trees, character of corridor likely affected. Relocation of short length of riparian vegetation required at Castleknock Pinch Point	Minimal impact in service. Least impact during construction.
Technical	High Level of Service achieved	High Level of Service achieved. No impact on Irish Rail embankment.	Less preferred by Irish Rail	Poor standards provided. Lack of coherence and directness Route likely to be unattractive for cyclists
Integration	High levels of integration and accessibility			

6.201 **Conclusion:** Option 4 represents the least level of financial investment but it falls short significantly in terms of safety and technical attributes. The "diversion" length is 1.2km and would not be seen as an attractive route for cyclists. It is likely that cyclists would continue along the reduced width path of the Deep Sinking, thus creating a safety issue for themselves and other users. It is therefore the least preferred option but would be a suitable interim solution until funding was in place to adopt the preferred option.

6.202 Option 3 represents significant construction costs and is likely to have considerable negative impacts on the local ecology. The high level of impact on the receiving local environment is likely to meet significant opposition from numerous stakeholders.

6.203 Option 2 would require works to the existing embankment supporting the Dublin – Sligo Railway. While Irish Rail has indicated that any works which could potentially affect the stability of the existing embankment would be undesirable, they would have a preference for this type of retaining structure over any other. The proposed methods of construction are likely to be highly restricted by Irish Rail as these works would occur within the Zone of Influence of the railway. This would most likely result in a slow and costly construction phase.

6.204 Option 1 is preferred over Option 2 as it has the least impact on the adjacent railway and the receiving environment although it is comparatively more expensive to construct. This option would provide the best solution in terms of achieving retaining the existing character of the canal corridor. On this basis, it is proposed that Option 1 is brought forward as the preferred solution for this element of the scheme.

Kirkpatrick Bridge

6.205 The existing Kirpatrick Bridge is narrow and pedestrian access across it is provided by means of a parallel footbridge on the eastern side. The approach path from the east is particularly difficult, with a steep, narrow footway meeting the existing footbridge at the crossing point of the bridge.

6.206 The western approach would require minor widening and the slope to be lessened and this is consistent across all options. At the access point to Coolmine Road, the existing wing wall would require modification to eliminate a local pinch point and provide unhindered access to / from the towpath. All options would require users to cross Coolmine Road.

6.207 A toucan crossing would be provided in this case which would enhance the safety aspect for those travelling along the canal. Personal security would not be of concern at this location due to the adjacent railway station, close proximity of adjacent residential areas and the corresponding levels of passive surveillance provided.

6.208 Continuity and directness of the route are maintained across all options.

6.209 Integration with local bus and train services would be provided at Coolmine Road and Coolmine Station for all options.

6.210 Accessibility standards would be provided on all approach paths across all options.

6.211 Crossing of Coolmine Road would be provided by means of a toucan crossing for all options. The new signals would need to be integrated with the adjacent automatic level crossing. The introduction of traffic signals would be expected to have some impact on traffic congestion on Coolmine Road, especially at peak traffic hours.

6.212 **Option 1:** Figure 6.22 - Kirkpatrick Bridge Option 1 is provided below. This option seeks to achieve the required 3.5m width by removing the existing wall between the towpath and the access route to the inbound platform at Coolmine Station ie widening the existing towpath footway to the south. The existing access control gate to the adjacent platform would be retained in its current position. To achieve this, an elevated walkway would be required to match the level of the station access footway. This walkway would gradually slope down to ground level over a significant length.

6.213 In removing the existing wall, the piers located at the southern abutment of the existing pedestrian bridge would not be affected. Therefore, no structural works would be required to this existing bridge on the east side.

6.214 This option would require a land purchase/agreement from/with Irish Rail (ie footpath access to inbound platform).

6.215 This option would have moderate impacts on the local environment with significant tree clearance required to facilitate the elevated walkway.

6.216 **Option 2:** Figure 6.23 - Kirkpatrick Bridge Option 2 is provided below. The approach path from the east would be constructed as an elevated boardwalk of 3.5m effective width, measured from the existing boundary wall of Coolmine Station i.e. widening to the north. A landing would be constructed at the interface of the new cycleway and the existing footbridge to facilitate the appropriate widths.

6.217 Option 2 is cheaper than option 1 as it does not rely on an extensive elevated section of walkway. It correspondingly does not affect the environment to the same extent.

6.218 This option also does not require agreement with Irish rail to use the existing footway to the platform. Option 2

Table 6.6 - Kirkpatrick Bridge Option Evaluation Summary

Option Evaluation Summary	Kirkparick Bridge (Coolmine Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#2**	**#1**
Economy	Higher cost	Lower cost
Safety	High levels of safety and personal security	
Environment	Less impact	More impact
Technical	Good Level of Service achieved Traffic lights have potential to increase traffic delays on Coolmine Road Agreement with Irish Rail required	Good Level of Service achieved Traffic lights have potential to increase traffic delays on Coolmine Road.
Integration	High levels of integration and accessibility	

6.219 **Conclusion:** Option 1 requires acquisition of land from Irish Rail. Hence, this option would be more expensive.

6.220 Option 2 is likely to result in more disruption during the construction phase although this would be marginal.

6.221 Both Options compare equally in terms of other headings.

6.222 Option 2 is the preferred solution in this case on the basis that it would be marginally cheaper to realise and any operation impact on Irish Rail during construction would be eliminated.

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

NOTE:

- ON APPROACH FROM CASTLEKNOCK. EXISTING WALL BETWEEN TOWPATH AND PLATFORM ACCESS PATH TO PROVIDE SHARED PATH. EXISTING ACCESS CONTROL TO INBOUND PLATFORM TO BE RETAINED IN IT'S CURRENT POSITION.
- INTEGRATE WITH ABUTMENT OF EXISTING PEDESTRIAN BRIDGE, i.e. NO MODIFICATIONS TO BRIDGE REQUIRED.
- TRAFFIC CONTROL AT COOLMINE BRIDGE VIA TOUCAN CROSSING. TRAFFIC SIGNALS INTEGRATED WITH LEVEL CROSSING.
- 3.5m GREEN ROUTE ON APPROACH FROM WEST. MINOR MODIFICATION REQUIRED TO EXISTING BRIDGE PARAPET WALL AT ENTRANCE TO TOWPATH.

OPTION VARIES

EXISTING PEDESTRIAN BRIDGE

OPTION VARIES

PROPOSED TRAFFIC SIGNALS

WALL TO BE REMOVED

TOUCAN CROSSING

LAND TAKE FROM CIE, ALTERNATIVE PLATFORM ACCESS

PROPOSED TRAFFIC SIGNALS

EXISTING CAR PARK

LEGEND:

PROPOSED GREEN ROUTE (3.5m TYPICAL)

COOLMINE ROAD / KIRKPATRICK BRIDGE OPTION 1

Z:\3098_royal canal towpath\6 drawings\60 working\FIGURE 1.3.1.dwg

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Figure 6.22 - Kirkpatrick Bridge Option 1

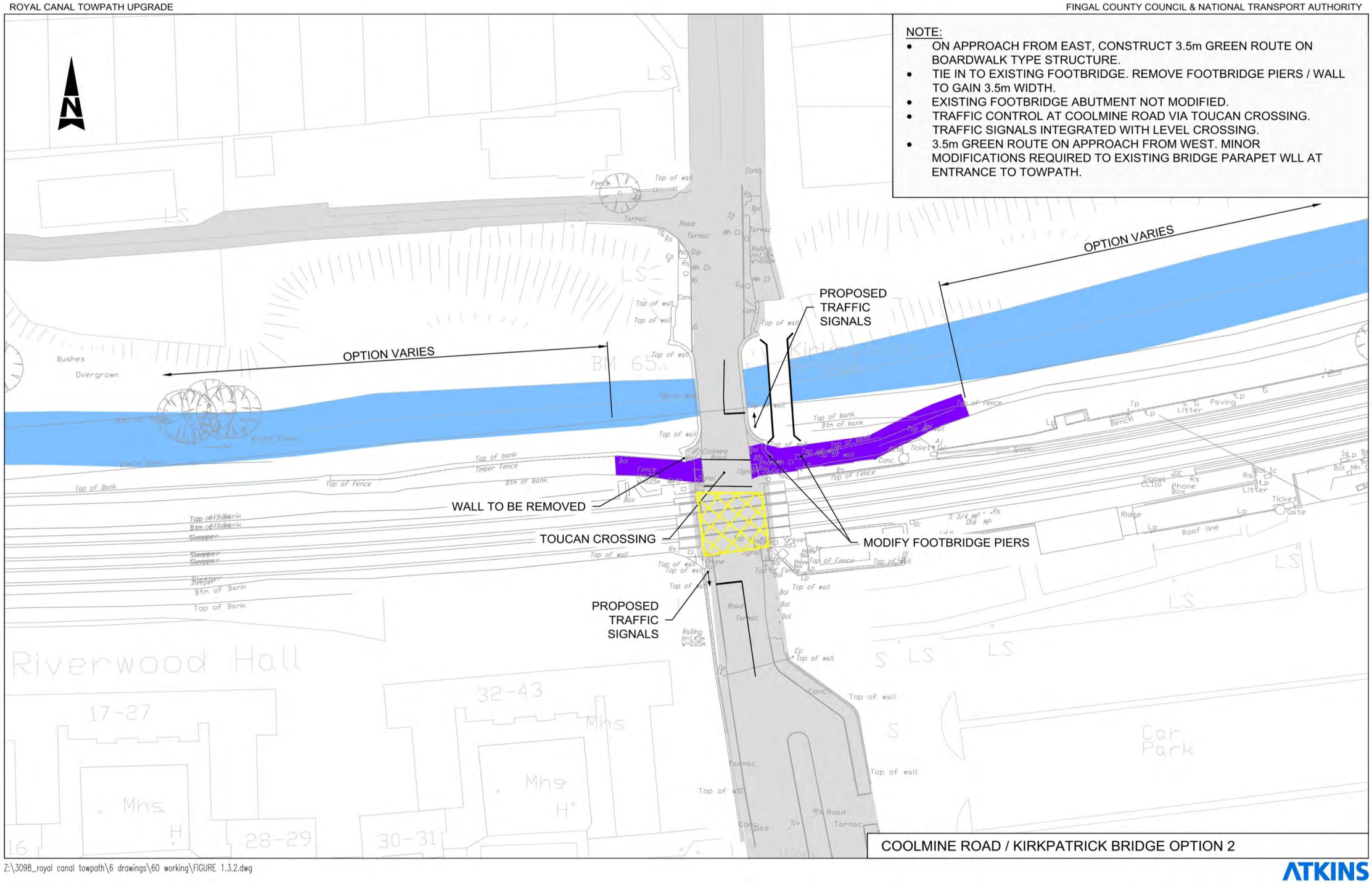

Figure 6.23 - Kirkpatrick Bridge Option 2

Kennan Bridge

6.223 Kennan Bridge is a narrow bridge with informal single way traffic operating across it. There is a level crossing to the south of the bridge. The road over the bridge (Porterstown Road) has been bypassed by a new road and it is proposed to close Kennan Bridge to vehicular traffic in the future. Option 2 describes this outcome as an option for clarity.

6.224 When the road is closed in the future, the level crossing will also be closed.

6.225 The existing situation is that the effective continuity along the towpath switches between provision on the south side of the canal to the east and on the north side to the west. The existing situation therefore relies on pedestrians and cyclists crossing Kennan Bridge to achieve continuity along the towpath.

6.226 Kennan Bridge has an effective width of 3.6m which is enough for single way traffic only and is not wide enough to support a footway and roadway together.

6.227 The approach from the east is narrow and would be widening in line with the preferred option for the deep sinking area.

6.228 The approach from the west has reasonable width, but would need to be widened slightly to incorporate the 3.5m desired width. It is considered that as this is not adjacent to the railway, as in the rest of the deep sinking area, that widening could be done relatively straightforwardly by regrading the embankment to the north of the path.

6.229 The two options presented are not comparable as they represent different scenarios, depending on whether the road is closed.

6.230 **Option 1:** Figure 6.24 - Kennan Bridge Option 1 is provided below. This is the only feasible option considered for this bridge whilst the road remains open. It includes for the widening on the approach from the east, which would necessitate a short length of retaining wall alongside the railway so that the full width of 3.5m could be provided.

6.231 As the existing road width across Kennan Bridge is narrow, it would be more suitable for a one-way traffic system. This option should be formalised to incorporate a shuttle traffic lights system to enforce a one-way shuttle layout. This is likely to create traffic delays, but as the road is only lightly used, the delays are not considered to be significant.

6.232 The crossing of Porterstown Road would be provided by means of an elongated toucan crossing, with push button units provided at the egress points of the towpath. The traffic signals would need to be integrated into the adjacent automatic level crossing signals.

6.233 The provision of the signals would greatly increase the level of safety for users of the towpath over the existing situation.

6.234 There would be minimal impacts on the local environment during construction and when in service. Diswellstown Road and bridge is now complete and opened to traffic. Hence, traffic volumes on Porterstown Road are now very low.

6.235 This option would offer a good Level of Service in terms of continuity and directness of route. However, there would be some delays experienced at the proposed toucan crossing.

6.236 There would be little integration with existing public transport links at this location. However, given the number of local schools in the immediate vicinity (existing and planned), there would be good links to adjacent cycle networks and the proposed route would provide safe traffic-free cycle routes between the schools and the local residential developments.

6.237 **Option 2:** Figure 6.24 - Kennan Bridge Option 1 is provided below. This option incorporates the closure of Kennan Bridge. With no traffic present, the proposed route would continue across Kennan Bridge without any interface with traffic.

6.238 The overall layout would be identical to Option 1. However, as Porterstown Road would be closed to traffic, the toucan crossing and traffic signals would not be required. In addition, traffic restriction bollards would be required on Porterstown Road immediately north of Kennan Bridge to eliminate the risk of an unfamiliar motorist inadvertently driving onto the proposed cycle route.

6.239 The safety of the proposed cycle route would be greatly enhanced with the removal of the interface with motorised traffic.

6.240 Overall merits in terms of environmental impact, technical suitability and social and transport integration are all identical for each option. However, in terms of integration, the layout assumes that a pedestrian and cyclist link would be provided by Irish Rail and/or the local authority so that access across the railway would be maintained following the closure of the level crossing.

Table 6.7 - Kennan Bridge Option Evaluation Summary

Option Evaluation Summary	Kennan Bridge (Porterstown Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#2**	**#1**
Economy	Low/moderate cost – retaining wall and toucan crossing provided	Low cost – traffic signals not required
Safety	Good levels of safety and personal security	Highest level of safety due to removal of traffic
Environment	Minimal impact in service Minimal impact during construction	
Technical	Good Level of Service achieved Delays likely to road traffic.	Higher Level of Service – no delays at toucan crossing
Integration	Moderate levels of integration and accessibility	Moderate levels of integration and accessibility – assumes new footbridge provided in lieu of level crossing

6.241 **Conclusion:** The two options presented are not comparable as they represent the two futures scenarios of with the road closure and without.

6.242 If the closure of the road is delayed, then Option 1 would be installed as an interim measure, until such time as the level crossing is closed to traffic.

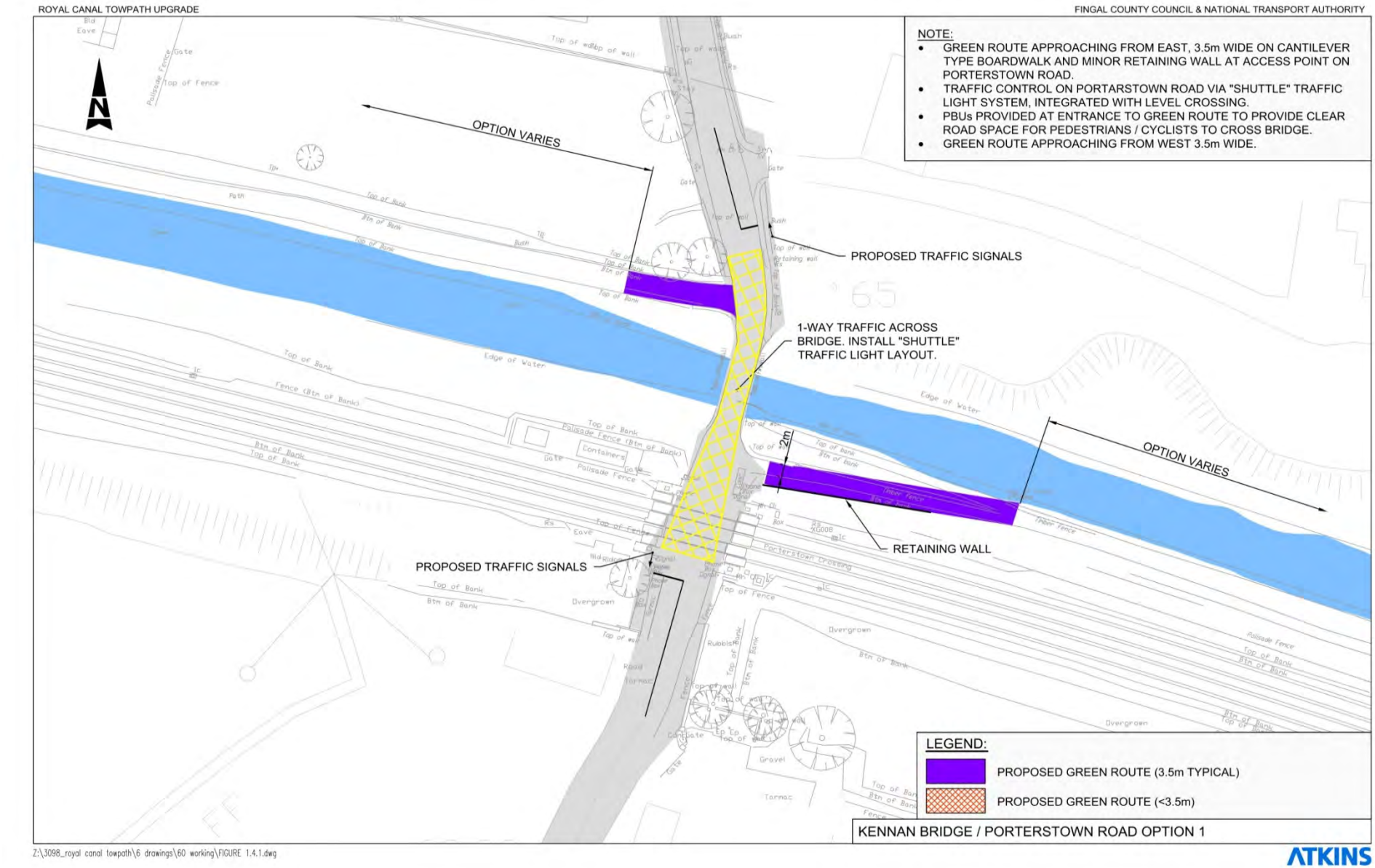

Figure 6.24 - Kennan Bridge Option 1

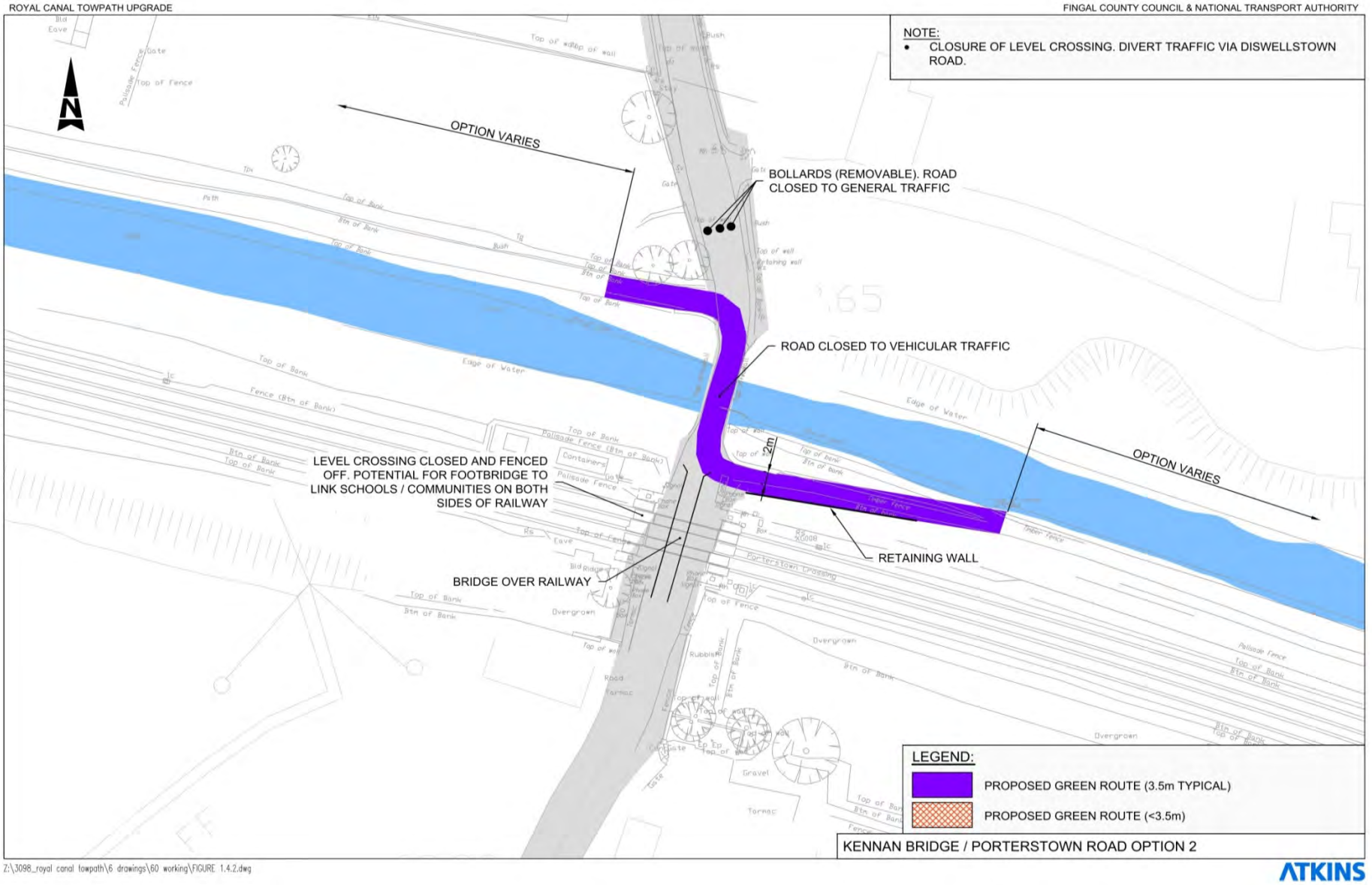

Figure 6.25 - Kennan Bridge Option 2

Callaghan Bridge

6.243 Callaghan Bridge presents a significant constraint to the provision of the cycleway. It is an arch bridge with a narrow (2.1m) footway beneath it, which would have substandard height clearance. The bridge is adjacent to Clonsilla train station and there is an associate level crossing to the south of the bridge. Adjacent to the existing bridge, on the west side is a pedestrian bridge.

6.244 A ramp up from the towpath to the road used to exist on the north side but this appears to have been removed recently.

6.245 A high level of integration with local transport modes and connectivity with adjacent residential areas would be achieved with all options.

6.246 **Option 1:** Figure 6.26 - Callaghan Bridge Option 1 is provided below. This option utilises the existing towpath under Callaghan Bridge. The existing 2.1m width of towpath would be inadequate for a shared cycle / pedestrian facility and therefore cyclists would be required to dismount and walk through this short section. In the interest of user safety, a guardrail would also be provided along the water's edge to protect against accidental falls into the canal.

6.247 Either side of the bridge, the towpath quickly reaches the required width to accommodate the full 3.5m wide facility. The effective length of this local pinch point would be approximately 20m.

6.248 Access to / from the towpath would be provided by removing the existing steps to Clonsilla Road to the west of the bridge, and replacing them with a ramped access route. This ramp would be designed to provide a suitable gradient for use by mobility impaired and disabled users.

6.249 This option represents a minimal scope of construction works and therefore a correspondingly low construction value. The works required would not be considered as complex or difficult to complete.

6.250 The proposed layout would provide a completely traffic-free route for cyclists and pedestrians while the erection of the safety guardrail would eliminate the potential for accidental falls into the water. However, the scheme would require cyclists to dismount and walk under Callaghan Bridge where the available width and headroom would be considered inadequate and there would be risk that cyclists would tend to ignore the posted signage and continue to cycle through the difficult area.

6.251 The risks to and impacts on the environment would be minimal during construction and while in service.

6.252 The continuity and directness of the route would be compromised due to the requirements for cyclists to dismount over this short section. Such impacts to the Level of Service offered would be minimal.

6.253 A high level of integration with local transport modes and connectivity with adjacent residential areas would be achieved.

6.254 **Option 2:** Figure 6.27 - Callaghan Bridge Option 2 is provided below. In addition to maintaining the existing underpass for pedestrian use, this layout includes for a crossing at road level.

6.255 The original access route to the towpath at Callaghan Bridge would be reopened and widened to give the full 3.5m width. A link would be provided at street level to access the existing pedestrian crossing, which will be upgraded to a Toucan crossing, at Clonsilla Road. It is estimated that approximately 150 square metres of private land would need to be acquired along the access route so ensure that the 3.5m width would be maintained up to street level and alongside the road to the Toucan crossing. A retaining wall would also be required to restrict the amount of private land to be acquired.

6.256 The existing pedestrian crossing would be utilised as part of this option.

6.257 To the West of the bridge, access to the towpath would be provided by removing the existing steps to Clonsilla Road and replacing them with a ramped access. This ramp would be designed to provide a suitable gradient for use by mobility impaired and disabled users.

6.258 Construction costs for this option would be significantly higher than those envisaged for Option 1 due to the higher and more complex scope of works required and the necessity for acquisition of private lands.

6.259 Cyclists would be directed to cross Clonsilla Road at the existing toucan crossing while pedestrians would have the option to continue below Callaghan Bridge along the original towpath. The safety score would be significantly impacted by the necessity for cyclists to interact with traffic and also due to the fact that cyclists would tend to use the original route under Callaghan Bridge, putting them at risk of conflict with pedestrians.

6.260 Impacts on the environment would be higher in comparison to Option 1 due to the significant works required to achieve the link to the existing toucan crossing and the construction stage and service impacts on traffic congestion levels.

6.261 The layout would be technically less preferable to that of Option 1, primarily due to the minor diversion required for cyclist traffic and the potential for delays at the toucan crossing. It would be expected that cyclists may opt to favour the pedestrian route under Callaghan Bridge.

Table 6.8 - Callaghan Bridge Option Evaluation Summary

Option Evaluation Summary	Callaghan Bridge (Clonsilla Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#1**	**#2**
Economy	Low cost – ease of construction	High cost – significant scope of works and requirement for land purchase
Safety	Good levels of safety and personal security	Good levels of safety and personal security, although cyclists may tend to use pedestrian path under Callaghan Bridge
Environment	Minimal impact in service Minimal impact during construction	Moderate impact in service Moderate / major impact on traffic and adjacent dwellings during construction
Technical	Compromise to Level of Service due to requirement for cyclists to dismount	Level of Service compromised due to requirement for cyclists to divert away from the towpath and potential for delays at the toucan crossing
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility

Conclusion:

6.262 Option 2 will cost significantly more than Option 1 to implement. It is also less direct and requires an interaction with vehicular traffic. There is a concern that cyclists will continue to use the footway beneath the bridge with Option 2 rather than take a detour, interact with traffic and potentially be delayed at the Toucan crossing. Therefore the same safety issues associated with the reduced width beneath the bridge are present with both options.

6.263 Option 1 will cause less disruption during both the construction and the operational phases and on this basis, it is proposed that Option 1 is brought forward as the preferred solution for this element of the scheme.

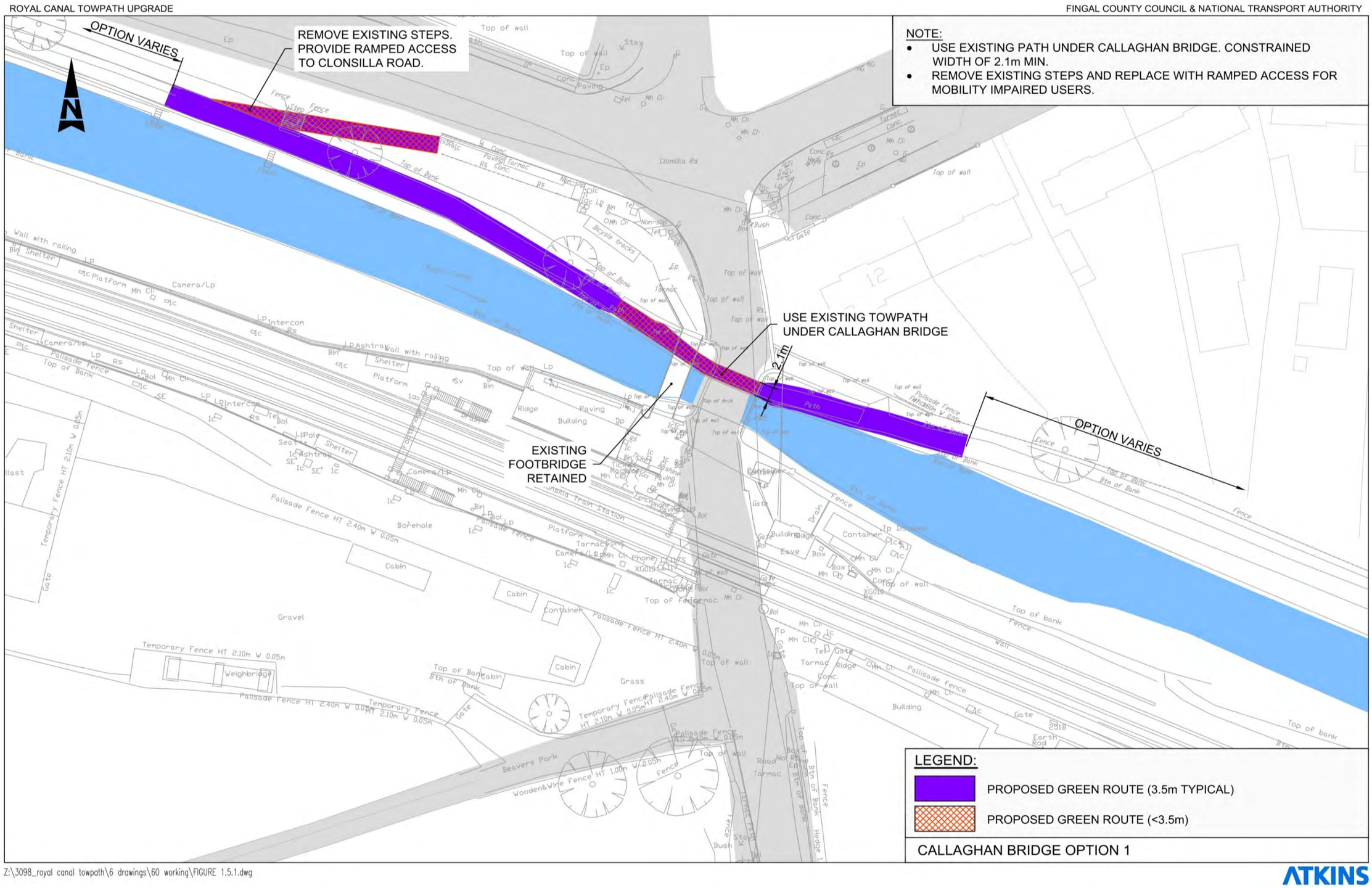

Figure 6.26 - Callaghan Bridge Option 1

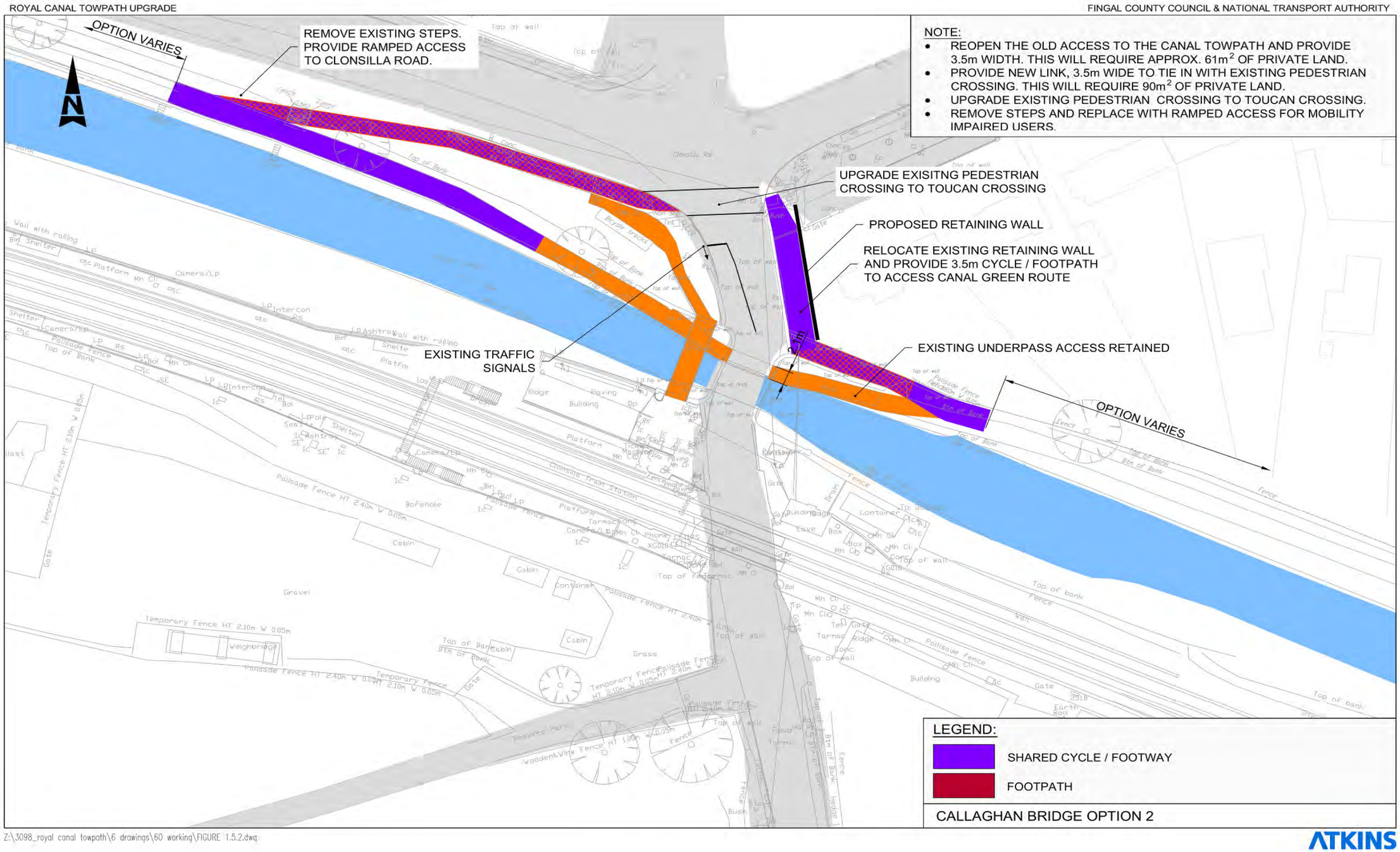

Figure 6.27 - Callaghan Bridge Option 2

Area 3: Callaghan Bridge to County Boundary

Pakenham Bridge

6.264 Pakenham Bridge is narrow and is situated on the bend of Barberstown Road and close to a junction. There is therefore a safety concern for users of the towpath trying to cross the road at this location as visibility is poor.

6.265 Both towpath approaches to Pakenham Bridge are currently outside the recommended guideline minimum gradients for mobility impaired users.

6.266 There is a level crossing adjacent to the bridge.

6.267 For both options considered, pedestrians and cyclists would enjoy a full 3.5m wide facility through this area. Access to the existing towpath under Pakenham Bridge would be maintained although it would be suitable for pedestrians only.

6.268 Both options would be well-integrated with the potential amenity area which is proposed for the wide towpath between Pakenham Bridge and the recently reinstated Dunboyne Spur Line bridge.

6.269 **Option 1:** Figure 6.28 - Pakenham Bridge Option 1 is provided below. This option includes the regrading of the towpaths on the approach to the bridge, thereby enabling the cycleway to comply with standards.

6.270 A toucan crossing would be provided to overcome visibility concerns at the crossing point. Advance warning signage and traffic calming would be provided to warn motorists of the traffic signals ahead.

6.271 Barberstown Road is currently a non-lit route. This option would propose to provide a number of lighting columns both upstream and downstream of the crossing to increase the motorists' awareness of the crossing during the hours of darkness.

6.272 Barberstown Road is a low traffic route. However, a "yellow box" road marking would be required across the level crossing so that in the event of queuing traffic, the level crossing would not be blocked by vehicles queuing back from the pedestrian signals.

6.273 The capital costs for this option would be the higher of the two options under consideration due to the installation of the signalised toucan crossing.

6.274 This option offers the best solution in terms of the safety of the end user. The signalised crossing would eliminate any safety concerns with respect to visibility to oncoming traffic. A high level of personal security would be provided via the proposed CCTV network.

6.275 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along Barberstown Road. The long term impacts of this proposal during service would be negligible.

6.276 There would be a very minor loss to the directness of route where cyclists are forced to wait at the signals.

6.277 **Option 2:** Figure 6.29 - Pakenham Bridge Option 2 is provided below. This option would be identical to Option 1 above for all aspects with the exception of the signalised crossing. This option proposes an uncontrolled crossing at this location.

6.278 In lieu of the traffic signals, a series of traffic calming measures would be provided to inform motorists of the presence of a pedestrian crossing ahead and to lower the approach speeds of vehicles.

6.279 The provision of the traffic calming measures in lieu of the toucan signalised facility would have a positive impact on the overall constructability and cost of the scheme. However, the safety levels offered to the end user would be compromised. It is acknowledged that traffic levels on

Barberstown Road are very low. Nevertheless, the poor visibility to oncoming traffic, in particular at the western side of the crossing, would not be favourable.

6.280 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along Barberstown Road. The long terms impacts of this proposal during service would be negligible.

6.281 The continuity of the route is maintained. However, the directness is somewhat compromised due to the requirement for cyclists to stop and negotiate the road crossing. Pedestrians would have the option to use the existing towpath route under the bridge.

6.282 This option would be well integrated with the potential amenity area which is proposed for the wide towpath between Pakenham Bridge and the recently reinstated Dunboyne Spur Line bridge.

Table 6.9 - Pakenham Bridge Option Evaluation Summary

Option Evaluation Summary	Pakenham Bridge (Barberstown Road)	
Evaluation Matrix	**Option 1**	**Option 2**
Rank	**#1**	**#2**
Economy	Low overall cost to develop. However, most expensive of the two options considered	Low cost "do minimum" option
Safety	Good levels of safety and personal security	End user safety compromised due to lack of inter-visibility between pedestrians and approaching motorists
Environment	Minimal impact in service Minimal impact during construction	Minimal impact in service Minimal impact during construction
Technical	Good Level of Service achieved	Level of Service compromised due to requirement for cyclists to negotiate uncontrolled crossing – potential for delays at the crossing
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility

6.283 **Conclusion:** Option 1 involves a higher construction cost than Option 2 but, due to poor visibility from the western side of the crossing, provides the safest option for the end user.

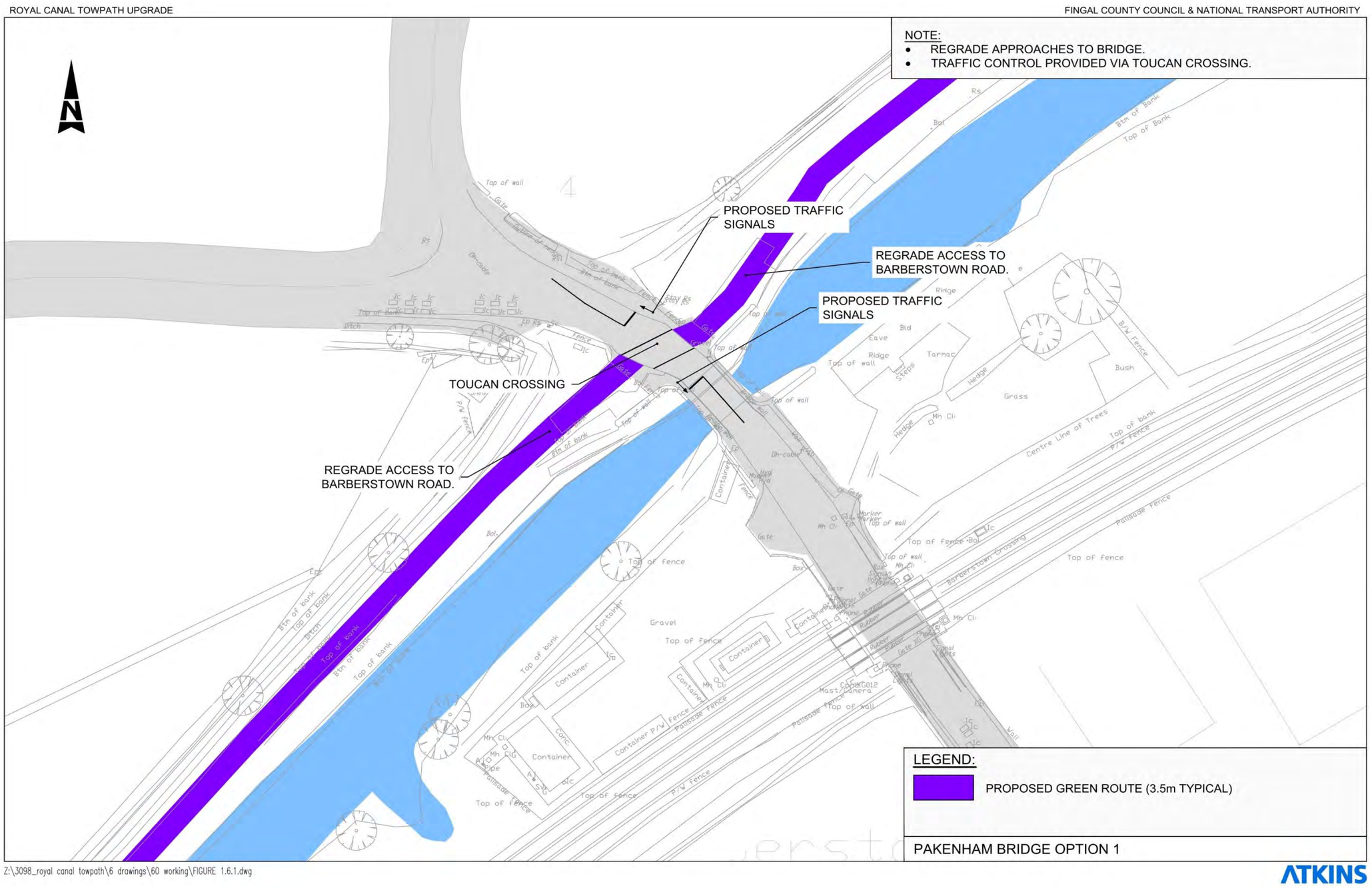

Figure 6.28 - Pakenham Bridge Option 1

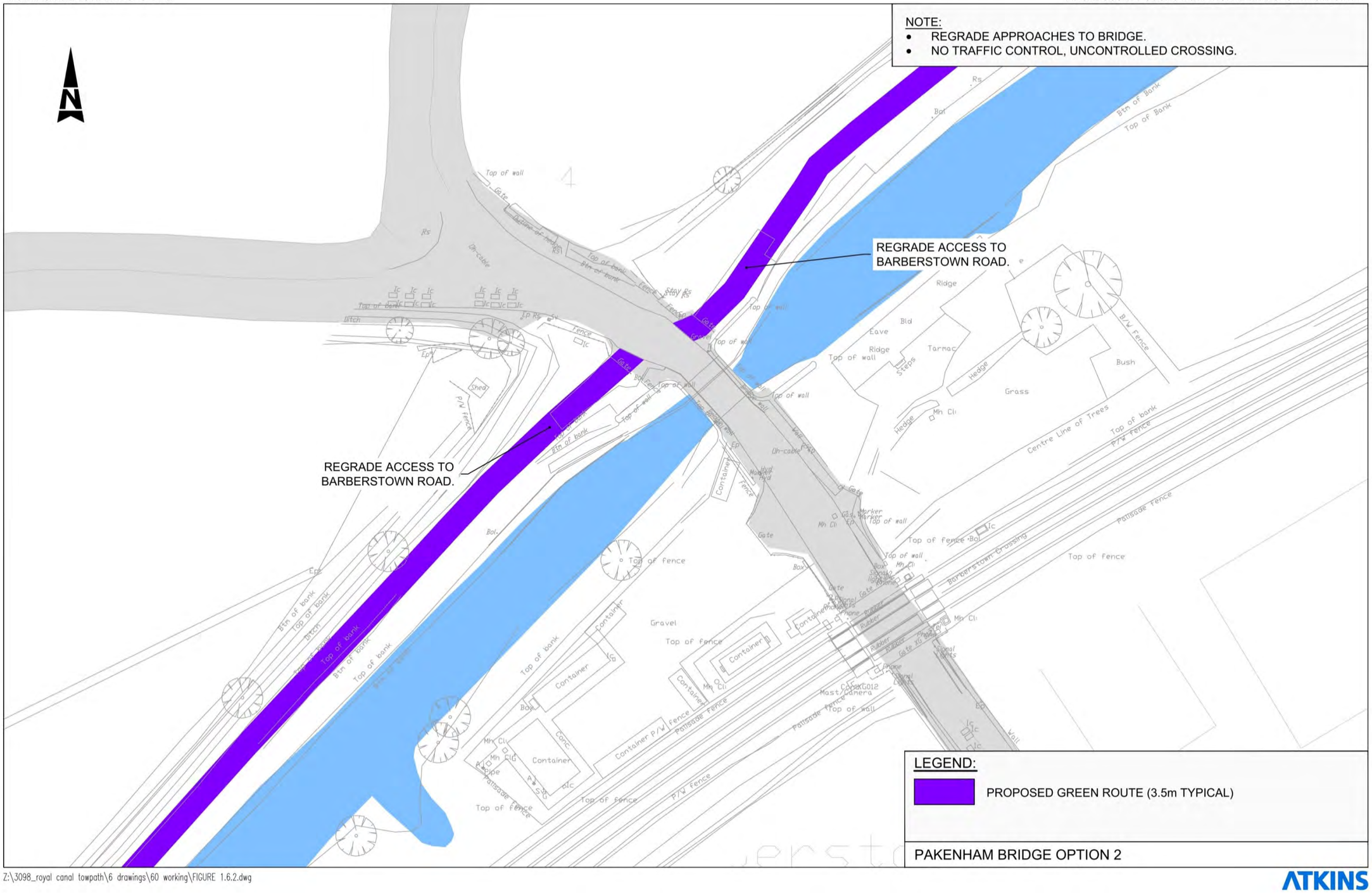

Figure 6.29 - Pakenham Bridge Option 2

Collins Bridge

6.284 Collins Bridge is a two-way road bridge over the canal. There are currently no footways across the bridge. The towpath links to the bridge along the north side of the canal with sub-standard gradients. There is a footway beneath the bridge, but clearance heights would be limited. The visibility from the towpath to vehicular traffic on the road (the R149) across the bridge is limited which is a safety concern.

6.285 The eastern entrance to St Catherine's Park is located approximately 500m south of the canal at this location but there is no safe means to walk/cycle to the Park from the existing towpath and instead access is gained by walking / cycling on the road. The options include for providing connectivity across the adjacent bridges to allow future connectivity along the R149.

6.286 All options address the substandard gradients with regraded approaches.

6.287 **Option 1:** Figure 6.30 - Collins Bridge Option 1 is provided below. This option would provide a signalised Toucan crossing so that users would be offered a safe method of crossing the road. Signal heads would be located such that adequate visibility to the signals would be achieved. Advance warning signage and traffic calming would be provided to warn motorists of the traffic signals ahead.

6.288 To provide effective linkage between the Royal Canal and St Catherine's Park, advisory on-road cycle lanes would be provided southwards across Collins Bridge. It is intended that these cycle lanes would eventually form a cycle link to Leixlip and Lucan via St Catherine's Park and would also form a substantial segment of the 'Canal 2 Canal Regional Cycle Route', ultimately linking the Royal and Grand Canals.

6.289 The R149 is currently a non-lit route. This option would propose to provide a number of lighting columns both upstream and downstream of the crossing to increase the motorists' awareness of the crossing during the hours of darkness.

6.290 Pedestrians and cyclists would enjoy a full 3.5m wide facility through this area. Access to the existing towpath under Collins Bridge would be maintained although it would be suitable for pedestrians only.

6.291 The capital costs for this option would be moderate due to the installation of the signalised toucan crossing. An effective system of traffic calming measures would be necessary due to a combination of the traffic volumes, high approach speeds and poor horizontal alignment along the R149 local to Collins Bridge. Such measures would add to the overall cost.

6.292 This option offers a good level of safety for the end user. The signalised crossing would eliminate any safety concerns with respect to visibility to oncoming traffic. A high level of personal security would be provided via the proposed CCTV network and public lighting. However, the on-road advisory lanes would have limited effect where the existing carriageway width is already narrow across the existing canal and railway bridges.

6.293 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along the adjacent road. The long term impacts of this proposal during service would be negligible.

6.294 From a technical perspective, the continuity and directness of the route would be maintained with this option. However, there would be a very minor loss to the directness of route where cyclists are forced to wait at the signals.

6.295 This option would be well integrated with St Catherine's Regional Park, located to the south of the canal. It would also provide good integration with future planned cycle routes, in particular the Canal 2 Canal Regional Route.

6.296 **Option 2:** Figure 6.31 - Collins Bridge Option 2 is provided below. In this option, a toucan crossing would be provided as per Option 1 above. However, the toucan signals would be

integrated into a one-way shuttle system. This would allow for reallocation of the existing road carriageway so that a dedicated off-road cycle track could be installed over the existing canal and railway bridges. This off-road track would form the beginning of the proposed link to St Catherine's Park and the Canal 2 Canal Regional Route. There would be potential for delays as a result of the shuttle traffic signals, which is seen as a major negative to this option.

6.297 Street lighting would be provided over the extents of the shuttle system layout and on both road approaches for safety purposes. The proposed lighting would effectively increase motorist awareness of the presence of vulnerable road users in the hours of darkness.

6.298 The costs for this option would be similar to Option 1 although a slight increase would be expected due to the additional works required to install the one-way system and the additional lengths of traffic signal ducting required.

6.299 This option offers a good level of safety. The signalised crossing and one-way traffic system would eliminate any safety concerns with respect to visibility and oncoming traffic. A high level of personal security would be provided via the proposed CCTV network and public lighting. The off-road cycle track would provide a significantly improved facility for cyclists and pedestrians when compared to Option 1.

6.300 Impacts on the environment would be minimal due to the relatively minor nature of the works required and due to the fact that the majority of works would be required along the adjacent road. The long term impacts of this proposal during service would be negligible.

6.301 From a technical perspective, the continuity and directness of the route would be maintained with this option. However, there would be a very minor loss to the directness of route where cyclists are forced to wait at the signals.

6.302 This option would be well integrated with St Catherine's Regional Park, located south of the canal. It would also provide good integration with future planned cycle routes, namely the Canal 2 Canal Regional Route.

6.303 **Option 3:** Figure 6.32 - Collins Bridge Option 3 is provided below. For this option a toucan crossing would be installed as per Option 1. This would be supported by a scheme of traffic calming measures to increase driver awareness of the facility ahead and reduce traffic speeds on approach.

6.304 To provide the required linkage southwards to St Catherine's Park, a new pedestrian/cyclist bridge would be constructed over the canal and railway, immediately adjacent and to the west of Collins Bridge. The planned link to St Catherine's Park and the Canal 2 Canal Regional Route would connect to the proposed bridge immediately south of the railway. Purchase of land is likely to be required to facilitate this off-road route

6.305 All other elements in terms of CCTV ad street lighting would be provided as per Option 1 above**Error! Reference source not found.**.

6.306 The cost implications in providing a dedicated pedestrian / cyclist bridge across the canal and railway are high and this option would be the most expensive to construct. However, this layout would permit the delivery of the scheme on a phased basis. The proposed bridge could be delayed until such time as funding was made available and the adjacent schemes which it serves would be completed. In the short term, the proposed east-west corridor would be preserved and a good level of service provided.

6.307 This option also offers a high level of safety as it minimised the level of interaction between the cyclist and the motorist.

6.308 The construction of a new bridge would have a greater impact on the receiving environment throughout the construction stage. However, the impact when in service would be much less given that traffic impacts would be kept to a minimum.

6.309 The proposed layout would offer a high Level of Service as continuity, directness and comfort levels would be preserved.

6.310 This layout would offer greatest flexibility in terms of the phased delivery of the scheme and the integration with future planned cycle networks and amenity areas.

Table 6.10 - Collins Bridge Option Evaluation Summary

Option Evaluation Summary	Collins Bridge (R149)		
Evaluation Matrix	**Option 1**	**Option 2**	**Option 3**
Rank	**#2**	**#3**	**1**
Economy	Low cost "do minimum" option	Moderate cost option	High cost option, but conducive to phased delivery of facilities
Safety	Good levels of safety and personal security for towpath, but reduced level of safety for on-road connection across bridge	High levels of safety and personal security	High level of safety and personal security
Environment	Some impact on traffic on R149 in service Minimal impact during construction	High impact on traffic on R149 in service Minimal impact during construction	Some impact on traffic on R149 in service Moderate impact during construction
Technical	Good Level of Service achieved	High Level of Service achieved – less interaction with traffic for cyclists linking to destinations south of canal Significant effect on R149 Traffic	Highest level of Service achieved
Integration	Good levels of integration and accessibility	Good levels of integration and accessibility	Good levels of integration and accessibility

6.311 **Conclusion:** Option 1 would be cheaper than Option 2 to construct; Option 3 would be the most expensive.

6.312 All options score identically in terms of proposed crossing facilities at the R149, although a shorter crossing would be provided on Option 2.

6.313 In terms of connecting with future cycle facilities in St. Catherine's Park, Option 3 is desirable as a completely segregated cycle facility offers the best Level of Service. However, land acquisition would be required to achieve this.

6.314 Option 3 could be delivered over time as and when adjacent schemes require it. Therefore, considering the above, Option 3 is the preferred option. Should funding not be available for this option, Option 1 should be adopted as it has least disruption to traffic on the R149. Option 2 should be avoided if possible due to the likely effect on traffic.

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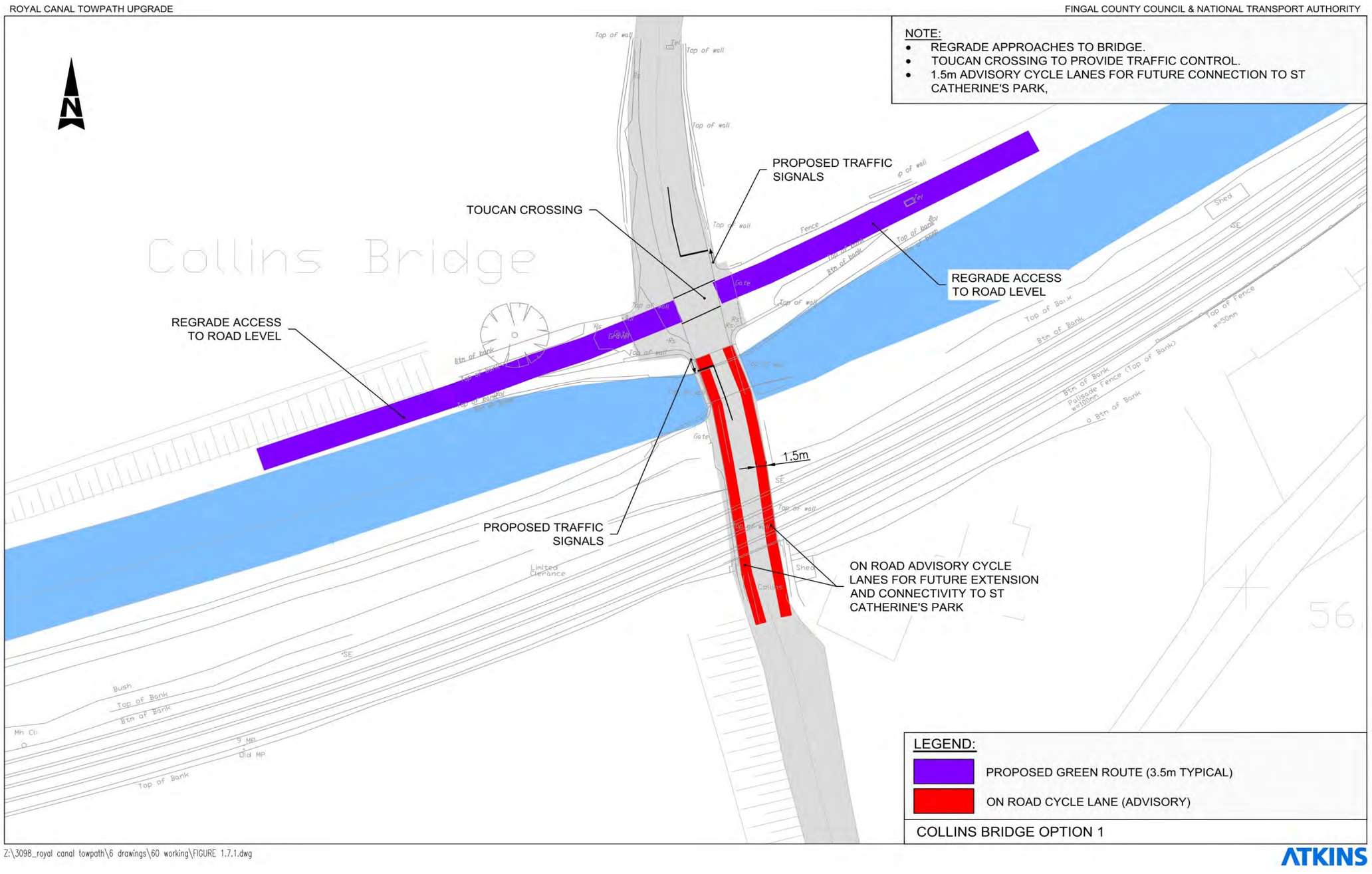

Figure 6.30 - Collins Bridge Option 1

ROYAL CANAL TOWPATH UPGRADE

FINGAL COUNTY COUNCIL & NATIONAL TRANSPORT AUTHORITY

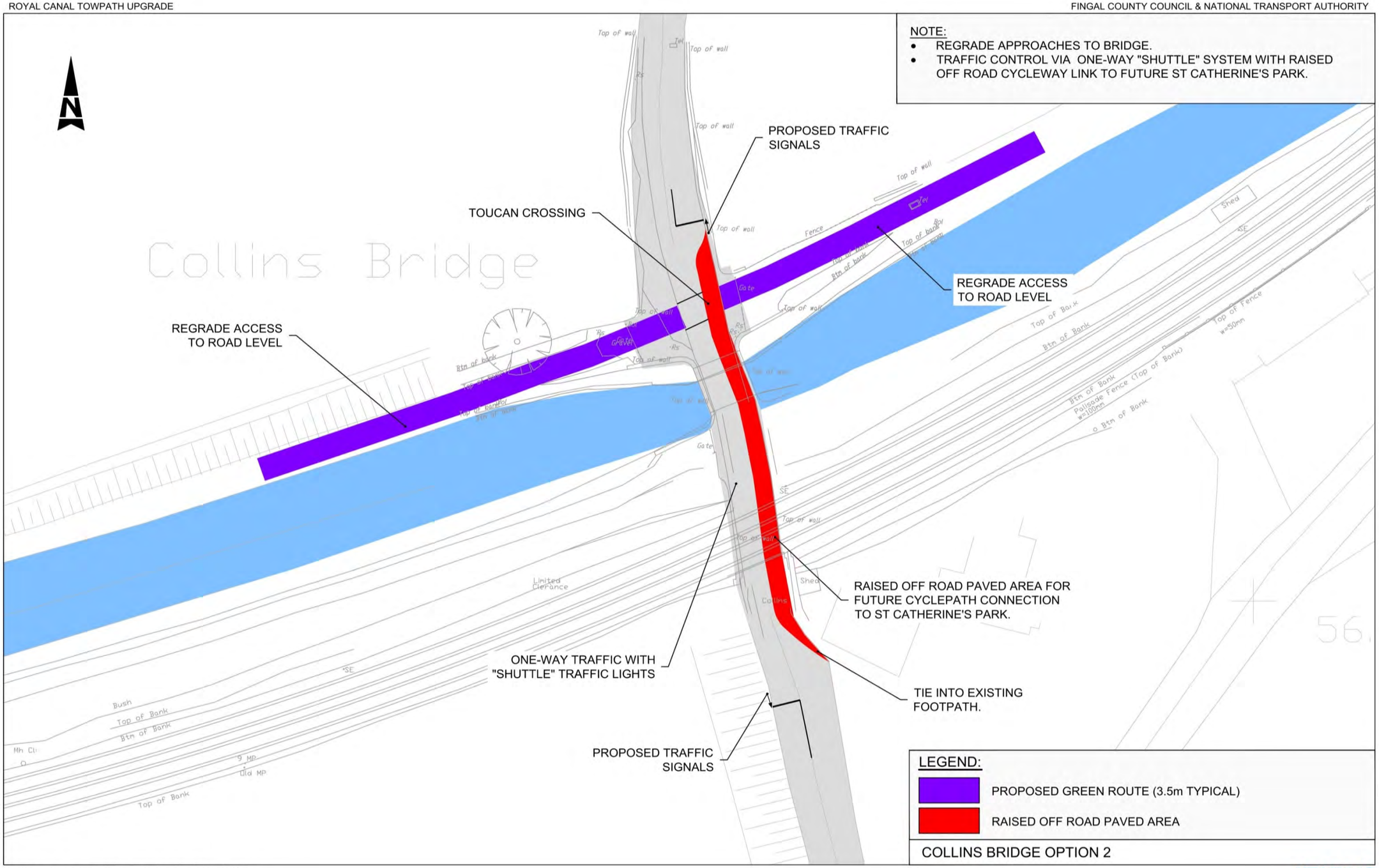

Figure 6.31 - Collins Bridge Option 2

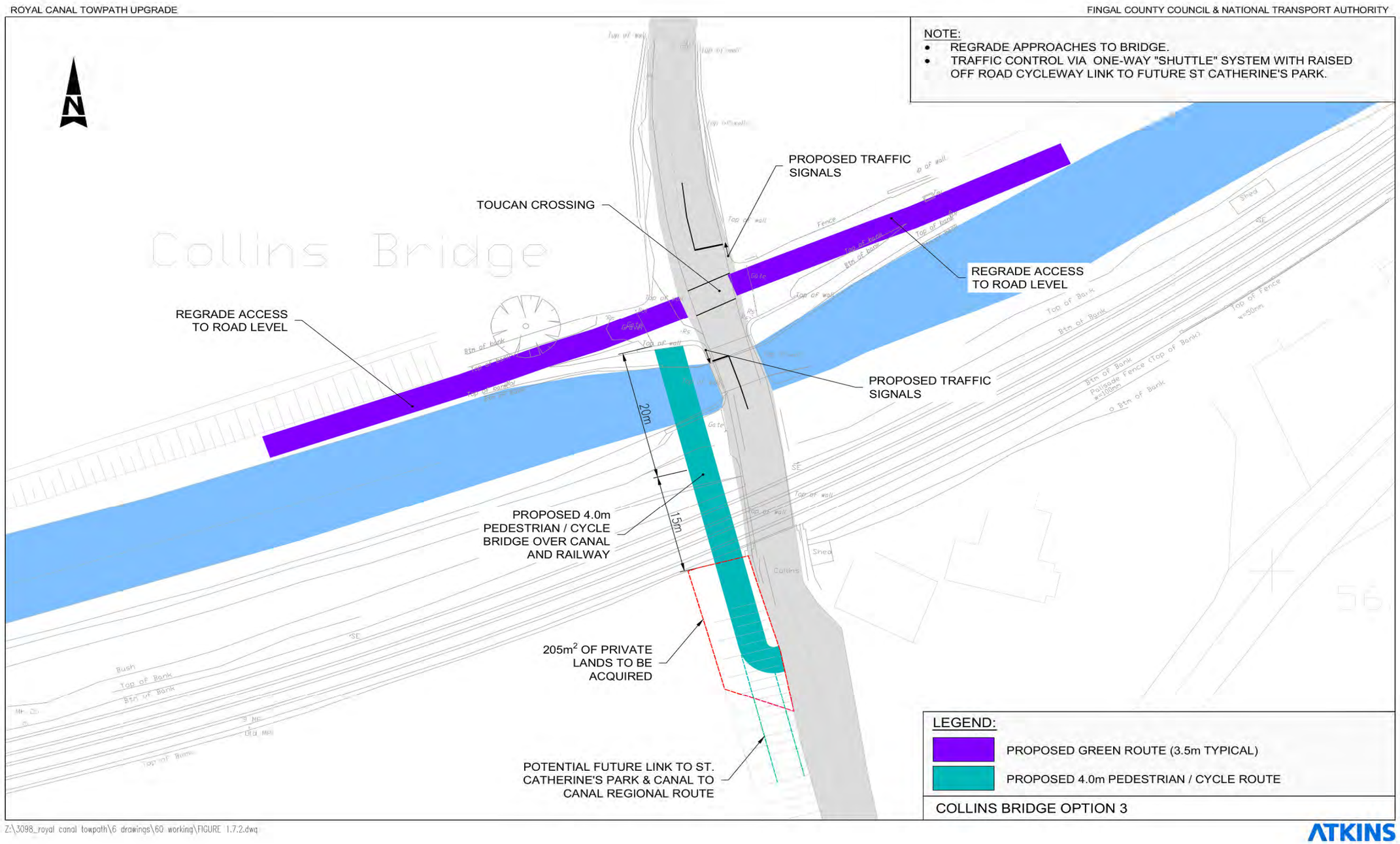

Figure 6.32 - Collins Bridge Option 3

7. Preferred Option & Estimated Cost

Preferred Option

7.1 Following the assessment of the options, the emerging preferred option can be summarised as follows. Overall route maps are included in Appendix A for information.

Area 1

7.2 A second bridge for the exclusive use of cyclists is to be provided so that total segregation is achieved. This will require a land purchase on the southern bank of the canal. A signalised toucan crossing at Ashtown Road will provide a safe means of crossing this busy road. This will facilitate the continuity of the proposed route and effectively connect the existing towpath along the canal's north bank at Rathborne to the proposed upgrade along the southern bank and west of Longford Bridge.

7.3 The toucan crossing will be located where the towpath emerges from the 10th lock on the southern canal bank. The effective crossing width will be approximately 3.5 – 4.0m.

7.4 The towpath width through the 10th lock will remain as per the existing layout, widening out to 3.5m thereafter.

7.5 A minor retaining wall of approximate retaining height <1.0m may be required along the railway line between Navan Road Parkway Station and the 11th lock.

7.6 It is proposed to provide a cycle-only bridge across the M50 Motorway. The bridge will be located immediately south of the existing aqueduct, between the aqueduct and the railway bridge.

7.7 An uncontrolled crossing is proposed at Talbot Bridge due to the low levels of traffic in the area. A direct access route to the southern towpath at the 12th Lock Hotel car park is also proposed. This may require the acquisition of lands at the 12th Lock Hotel car park and the construction of new boundary walls or fence. The proposed facility will be restricted to 2.5m width approximately through Castleknock Marina, widening out to 3.5m immediately west of the hotel.

A pedestrian / cycleway underpass will be provided at Castleknock Road to eliminate conflicts with busy traffic. Access to Castleknock Road will be maintained via the existing steps to the east and a new ramped access route to Castleknock Station to the west.**Area 2**

7.8 The Greenway will be 3.5m wide running past Castleknock Station and onwards towards the Deep Sinking.

7.9 Throughout the Deep Sinking, the 3.5m width will be continued through the provision of a structural walkway which will cantilever over the canal bank. Given the variable height differentials between the towpath and the canal waters, a pedestrian guardrail will be included for safety reasons.

7.10 At Kirkpatrick Bridge, minor works to the existing footbridge will be required to integrate with the widened towpath.

7.11 Crossing of Coolmine Road will be regulated by installing a signalised toucan crossing. These signals will be integrated with the adjacent automatic level crossing.

7.12 West of Kirkpatrick Bridge, the cantilevered walkway will continue to provide an effective width of 3.5m. Where required, existing deep drainage ditches along the railway embankment will be replaced with appropriate filter drains with existing culverted outfalls maintained under the towpath.

7.13 On approach to Kennan Bridge, a retaining wall will be required so that 3.5m width can be maintained without the need to amend the existing bridge wingwalls.

7.14 The current narrow carriageway across Kennan Bridge lends itself to the provision of a shuttle traffic light system, which shall be installed in the short term until the imminent closure of the level crossing is complete.

7.15 The proposed shuttle lights shall be complemented with an elongated toucan crossing providing a traffic-free crossing of the bridge for cyclist and pedestrian users.

7.16 The section between Kennan Bridge and Callaghan Bridge shall be 3.5m wide, utilising the cantilevered structure over the canal bank where the current towpath provision is less than the required width and where regrading of the embankment to the north is not possible.

7.17 The proposed route shall pass under Callaghan Bridge. The pinch point created by the bridge abutments will require cyclists to dismount and pass under the bridge on foot.

Area 3

7.18 West of Callaghan Bridge, a new ramped access will be provided in lieu of the existing steps.

7.19 The proposed route will continue westwards to Pakenham Bridge at a width of 3.5m utilising the existing underpass at the Dunboyne Spur Line and reducing to 2.5m to negotiate the pinch point created by the existing Clonsilla SW water main.

7.20 The two-tiered area immediately east of Pakenham Bridge will be earmarked for development as a recreational and picnic area for both land and water-based travellers.

7.21 A toucan crossing will be provided at Pakenham Bridge. This is required to permit the safe crossing of the road as the visibility splays are particularly poor at this location.

7.22 The facility will continue along the northern bank towards Collins Bridge at 3.5m wide.

7.23 A proposed toucan crossing will be installed at Collins Bridge providing a safe method of crossing the R149, which is subject to vehicles travelling at speed.

7.24 A dedicated cycle / foot bridge will be provided across the canal and railway to link with proposed connections to St Catherine's Park and the Canal 2 Canal Regional Cycle Route. Delivery of this aspect may be delayed until such time as appropriate funding is available.

7.25 West of Collins Bridge, the widened towpath will extend to the county boundary at the premises of the Royal Canal Amenity Group, where it is intended that the facility can be extended to Leixlip and Maynooth. The full 3.5m width can be achieved along this section, although consideration should be afforded to the health and safety risk associated with the adjacent drainage ditch which forms the northern boundary of the canal.

Cost Estimate

7.26 The table below summarises the current estimated capital costs of the project. Further detailed breakdown of these costs is provided at Appendix B of this report.

7.27 The figures stated are based on rates taken from recent projects of a similar size and nature in the Dublin region and from the *"Roadworks Unit Rate Database, Version 6 – Base Date May 2011"* published by the National Roads Authority. Given the current economic climate and associated volatility in the construction market, these estimates are only intended as a guide for appraisal purposes. These estimated costs are therefore provided with the caveat that actual construction costs may vary significantly.

7.28 Land acquisition costs are assumed at €500,000.00 per acre.

Table 7.1 - Cost Estimates

Royal Canal Greenway - Feasibility Stage Cost Estimate						
Item No	**Item Description**	**Area 1**	**Area 2**	**Area 3**	**Total**	**%**
		€	**€**	**€**	**€**	
0	**Preliminaries**	125,237.73	159,773.54	121,341.57	406,352.83	4.90%
1	**Structural**	641,969.60	3,412,492.20	400,000.00	4,454,461.80	53.76%
2	**Site Clearance**	362.11	462.19	648.99	1,473.29	0.02%
4	**Pedestrian Guardrail & Safety Barriers**	3,750.00	367,500.00	0.00	371,250.00	4.48%
5	**Service Ducts, PL & CCTV**	278,689.00	436,570.00	357,712.50	1,072,971.50	12.95%
6	**Earthworks**	8,365.48	2,046.75	3,801.85	14,214.09	0.17%
11	**Kerbs, Footways & Paved Areas**	304,511.50	406,898.50	411,162.75	1,122,572.75	13.55%
12	**Traffic Signs & Road Markings (incl. Traffic Signals)**	13,000.00	25,000.00	24,000.00	62,000.00	0.75%
98	**Land Acquisition**	1,729.56	0.00	25,325.70	27,055.26	0.33%
99	**General Contingency (10%)**	137,761.50	481,074.32	134,399.34	753,235.15	9.09%
	TOTAL ESTIMATE (GROSS)	**1,515,376.47**	**5,291,817.50**	**1,478,392.70**	**8,285,586.67**	100%
	VAT @ 13.5%	204,575.82	714,395.36	199,583.01	1,118,554.20	
	TOTAL ESTIMATE (NETT)	**1,719,952.30**	**6,006,212.86**	**1,677,975.71**	**9,404,140.87**	

7.29 The overall total capital cost for the preferred scheme is some €8.3 million net of value added tax. Given the current economic constraints and the limited availability of funding, the client may wish to examine the potential for a phased delivery of the project. To this end, the project can be divided into three constituent sections based on the natural division of areas 1, 2 and 3.

7.30 In addition, other opportunities have been identified where the scope of work can be reduced in the short term without adversely affecting the viability of the scheme. Under this process, the scheme could be provided immediately (subject to the available level of funding), with shortfalls in some areas, which can be improved with efficient use of funding as it becomes available. Hence, the long term vision of the project will not be lost.

7.31 The following table outlines the estimated costs for the preferred scheme with a number of elements removed from the scope of work for the short term. The removed items are listed below.

Table 7.2 - Reduced Scheme Cost estimate

Feasibility Stage Cost Estimate (Reduced Scheme)						
Item No	**Item Description**	**Area 1**	**Area 2**	**Area 3**	**Total**	**%**
		€	**€**	**€**	**€**	
0	**Preliminaries**	60,633.60	119,623.54	76,695.38	**256,952.73**	**4.12%**
1	**Structural**	0.00	2,812,492.20	0.00	**2,812,492.20**	**45.07%**
2	**Site Clearance**	362.11	462.19	648.99	**1,473.29**	**0.02%**
4	**Pedestrian Guardrail & Safety Barriers**	3,750.00	367,500.00	0.00	**371,250.00**	**5.95%**
5	**Service Ducts, PL & CCTV**	270,349.00	429,070.00	350,212.50	**1,049,631.50**	**16.82%**
6	**Earthworks**	8,365.48	2,046.75	3,801.85	**14,214.09**	**0.23%**
11	**Kerbs, Footways & Paved Areas**	299,511.50	405,898.50	388,290.50	**1,093,700.50**	**17.53%**
12	**Traffic Signs & Road Markings (inc. Traffic Signals)**	24,000.00	25,000.00	24,000.00	**73,000.00**	**1.17%**
98	**Land Acquisition**	0.00	0.00	0.00	**0.00**	**0.00%**
99	**General Contingency (10%)**	66,697.19	416,209.32	84,364.92	**567,271.43**	**9.09%**
	TOTAL ESTIMATE (ex VAT)	**733,669.09**	**4,578,302.50**	**928,014.15**	**6,239,985.74**	**100%**

7.32 Area 1 reductions are achieved through:

- Removal of proposed cycle bridge at Ashtown;
- Installation of CCTV infrastructure only (ie no cameras or poles provided);

- Removal of proposed fishing and picnic amenity areas;
- Removal of proposed footbridge linking to zoned lands west of N3 Navan Road Parkway Station;
- Removal of proposed cycle bridge across the M50 in the vicinity of the existing M50 Aqueduct;
- Removal of requirement for land purchase at 12th Lock Hotel car park;
- Provision of ramps and toucan crossing at Castleknock Road in lieu of proposed underpass.

7.33 Area 2 reductions are comprised of:

- Removal of proposed footbridges linking Laurel Lodge and Roselawn;
- Installation of CCTV infrastructure only (ie no cameras or poles provided);
- Removal of proposed footbridge link to zoned lands at Kellystown;
- Removal of proposed fishing amenities;

7.34 Area 3 reductions focus on:

- Removal of proposed footbridge linking Clonsilla and Beech Park;
- Installation of CCTV infrastructure only (ie no cameras or poles provided);
- Removal of proposed fishing and picnic amenities at Hansfield;
- Removal of proposed mooring point at Hansfield;
- Removal of proposed car parking at Pakenham Bridge and at the county boundary;
- Removal of proposed cycle / pedestrian bridge link to St Catherine's Park;
- Removal of requirement for land purchase at Collins Bridge with respect to the above bridge.

8. Statutory Approvals

8.1 Atkins produced a technical paper on "The Need for an Environmental Impact Assessment" for the Royal Canal Greenway Feasibility Study. This document examined the potential for an EIA against any of the "automatic" triggers per the Planning and Development Act, 2000 (Planning and Development Regulations, 2001-2011) and the Rods Act 1993.

8.2 This document is available at Appendix C of this report.

8.3 The paper found that, under the Planning and Development Act, 2000 or the Roads Act 1993 the project would not automatically require an EIA. However, it is recommended that the Client undertake an EIA Screening Report incorporating baseline ecological habitat surveys in accordance with *Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-threshold Development*, 2003, DEHLG. If the Screening Report predicts that significant adverse effects may result on the Royal Canal pNHA then the authority would be required to carry out an EIA in respect of the proposed works.

8.4 The paper concludes that the Client should consider commissioning ecological, habitat and biodiversity studies on the potential impacts of the scheme and how these can be best mitigated. Such a report would include the result of an EIA Screening Report, a Landscape Plan showing visual mitigation and any other studies requested through pre-planning consultation.

8.5 It is noted that there are a number of studies and surveys already completed for the eastern section of the Royal Canal between the county boundary at Ashtown and the 12th lock at Castleknock, i.e. Area 1. It is considered that this existing detailed information would form a satisfactory basis on which to determine whether an EIA is required for any future upgrading works to this easterly section of the Royal Canal in Fingal.

8.6 Where it is determined that the development does not require an EIA, the appropriate route for the Statutory Approval would be in accordance with Part 8 of the Planning and Development Regulations. An environmental report addressing the site development, including environmental concerns and proposing mitigation measures would also be recommended to accompany the planning submission.

9. Conclusions & Recommendations

Conclusion

9.1 This study examined the engineering feasibility of upgrading the existing towpath along the Royal Canal to meet the objectives as set out in Chapter 1 of this report.

9.2 The study included widespread consultations with identified key stakeholders and the general public.

9.3 The following is the list of bodies consulted on this project to date:

- Waterways Ireland
- Irish Rail
- Fingal County Council – Conservation & Heritage
- Inland Fisheries Ireland
- Inland Waterways Association of Ireland
- Royal Canal Amenity Group
- National Parks and Wildlife Service
- General Public & Interest Groups

9.4 A total of 24 submissions were received from the public, the majority of which were in favour of the scheme.

9.5 The consultation period revealed an overall level of support for the project but also highlighted that there are important environmental and ecological issues to be addressed.

9.6 A desktop study and numerous site visits were undertaken to establish the constraints and develop a working knowledge of the issues along the proposed route. A constraints map was produced to identify the critical matters and assist in the development of route options. The constraints study examined both the engineering and environmental aspects of the proposed route.

9.7 An opportunities map was also developed to identify areas where potential benefits of the project could be maximised. It was proposed that all “opportunity” items identified would be brought forward to the final emerging preferred route option.

9.8 Options were generated for the identified constrained areas along the route. These options were assessed against agreed criteria and their effectiveness in meeting the stated project objectives. The evaluation process permitted the emerging preferred option to be extracted from the data gathered and presented in Chapter 7 and Appendix A.

9.9 The overall capital cost of the emerging preferred option was estimated at circa €8.3 million exclusive of VAT. A reduced scheme would cost approximately €6.2m

9.10 The emerging preferred option was also subjected to a preliminary screening process to determine whether the proposals should be subjected to an Environmental Impact Assessment in accordance with prevailing legislation. A technical paper was commissioned which found that, the scheme is unlikely to require an EIA, but that the local authority should give appropriate consideration to the sensitivities of the receiving environment along the canal corridor in any future upgrading project.

9.11 The local authority, following consideration of the potential environmental impacts of an upgrading project, may deem the project to require an EIA. Where it is determined that the development does not require an EIA, the appropriate route for the Statutory Approval would be in accordance with Part 8 of the Planning and Development Regulations.

9.12 The paper also noted that there are a number of such studies already competed for the eastern section of the canal between the county boundary at Ashtown and the 12th lock at Castleknock and that this should provide a basis for determining if an EIA is required for any future upgrading work to this easterly section. For other sections west of the 12th lock, the paper recommends that detailed habitat surveys are carried out for these areas. A copy of this paper is included in Appendix C of this report.

Recommendations

9.13 It is recommended that detailed habitat studies and surveys are carried out along the canal corridor west of the 12th lock to better understand the potential environmental impacts and presence of protected species. Such studies will permit a more detailed opinion to be formed on the need for an EIA.

9.14 It is recommended that the project is delivered on a phased basis in accordance with the natural split between areas 1, 2 and 3. Dividing the project as such will allow a more flexible approach to be adopted in the delivery of the project given the current fiscal budgetary constraints.

9.15 Further short term cost-sensitive solutions are identified in Chapter 7 where the key benefits of the scheme can be delivered immediately without prejudice to the longer term project goals. This is aimed at achieving greatest value for money at a time when funding may not be immediately forthcoming.

Appendix A Preferred Option Route Maps

Rev A

Drawing Number 3098 / SK 022

DO NOT SCALE

A1

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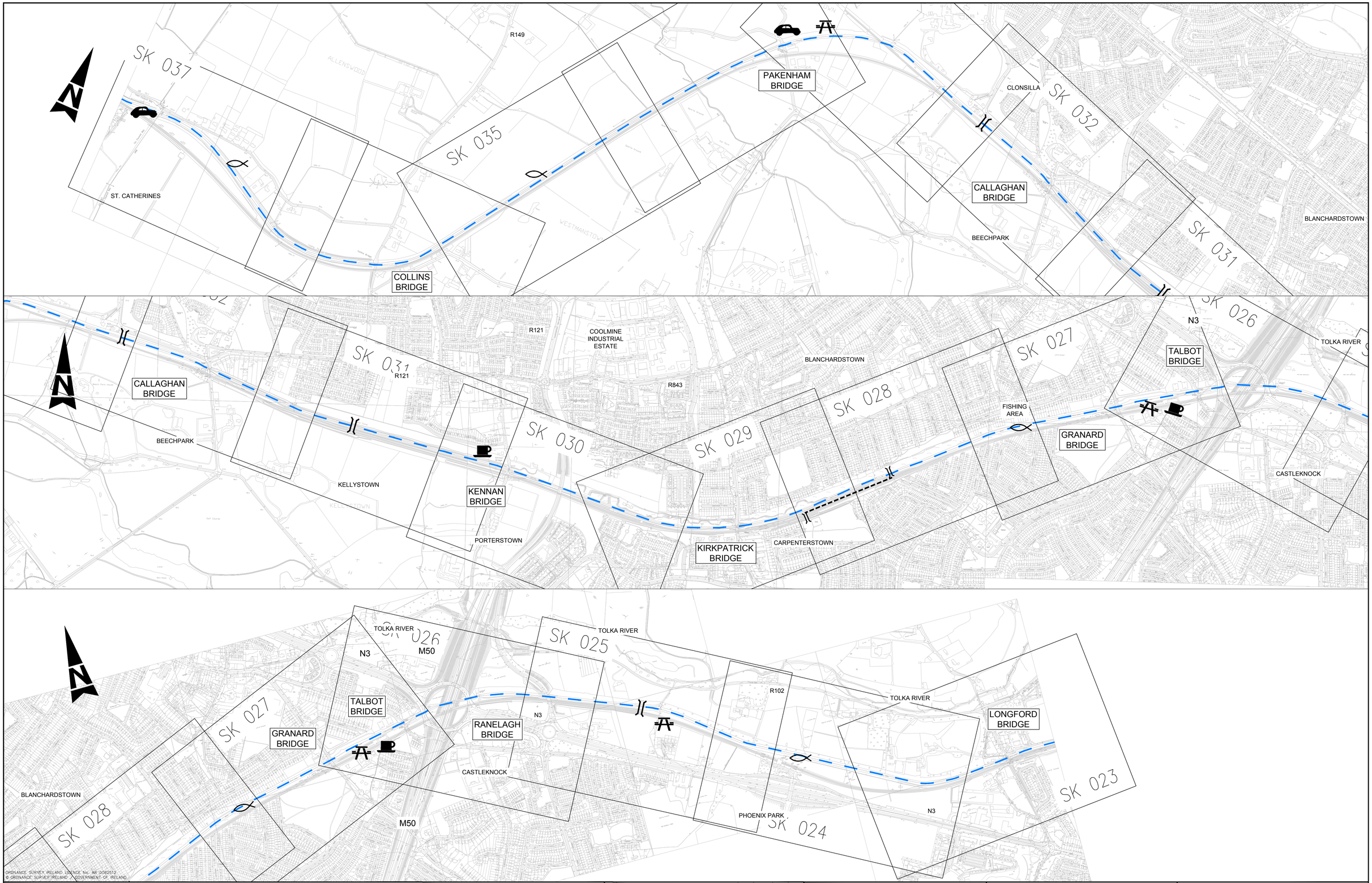

Comhairle Contae Fhine Gall
Fingal County Council

LEGEND

- BRIDGE
- TEA / COFFEE
- FISHING AREA
- PARKING
- PICNIC AREA
- ROYAL CANAL

Rev	Description	By	Date	Chk'd	Auth
A	FOR INFORMATION	RR	02/11/12	DM	AFM
–	FOR INFORMATION	RR	13/08/12	DM	DM

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Client: FINGAL COUNTY COUNCIL

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Title:

Original Scale: A1

Designed/Drawn	Checked	Authorised
RR	DM	DM
Date 13/08/12	Date 13/08/12	Date 13/08/12

Sheet: A1

Drawing Number: 3098 / SK 022

Rev: A

File: 3098_SK_022.dwg
Date: Nov 02, 2012 - 10:37am
Plotted by: rrudden

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Rev A

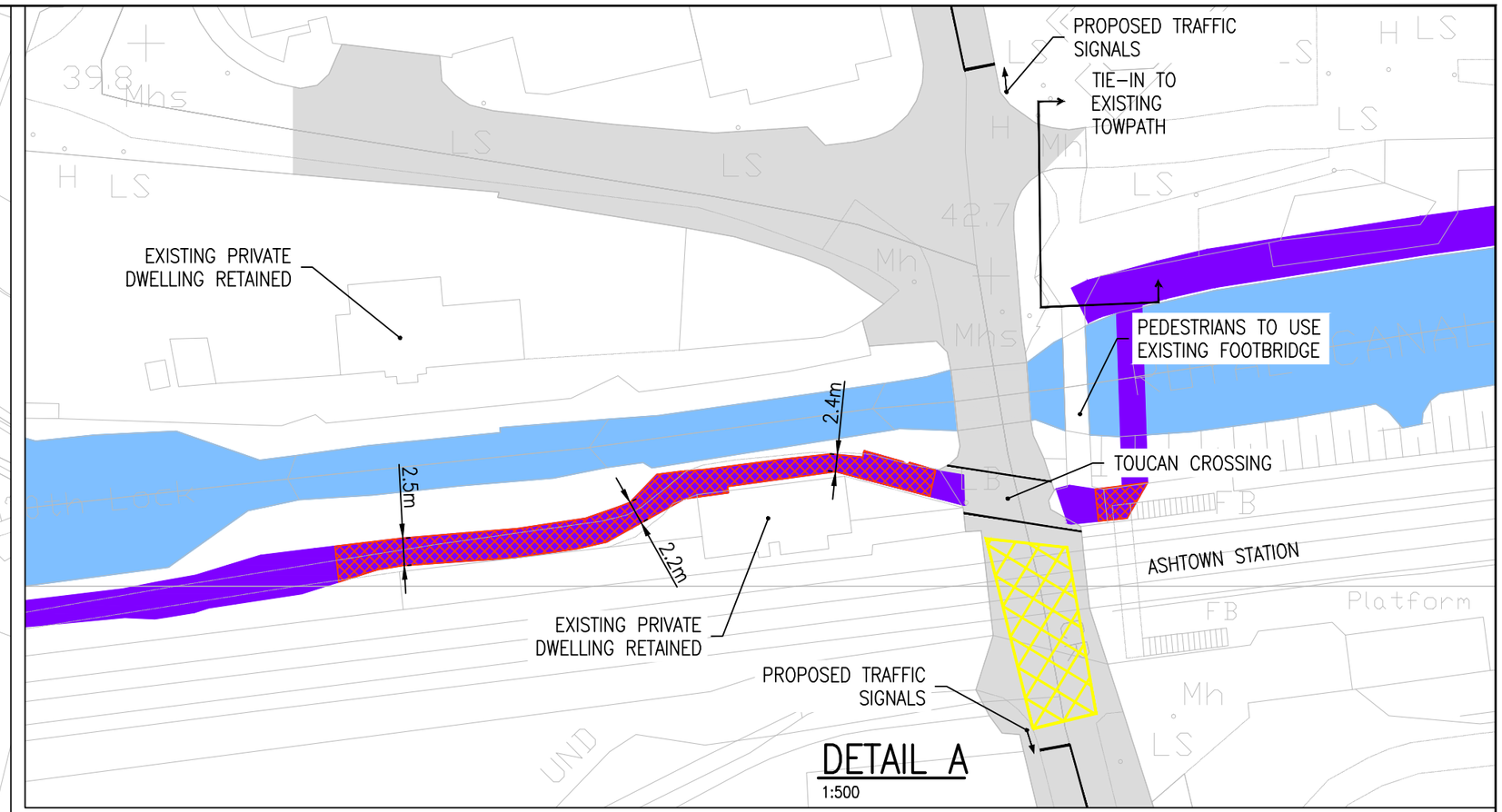
Drawing Number 3098 / SK / 23

DO NOT SCALE

A3

NOTES:

- CONSTRUCT CYCLIST BRIDGE ADJACENT TO EXISTING PEDESTRIAN BRIDGE.
- CONSISTENT WIDTH AT ASHTOWN STATION (MIN 2.8m).
- PROVIDE TOUCAN CROSSING AT ASHTOWN ROAD INTEGRATED WITH LEVEL CROSSING.
- CONSTRAINED WIDTH THROUGH 10TH LOCK (MIN 2.2m).
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF 10TH LOCK AND ASHTOWN ROAD.



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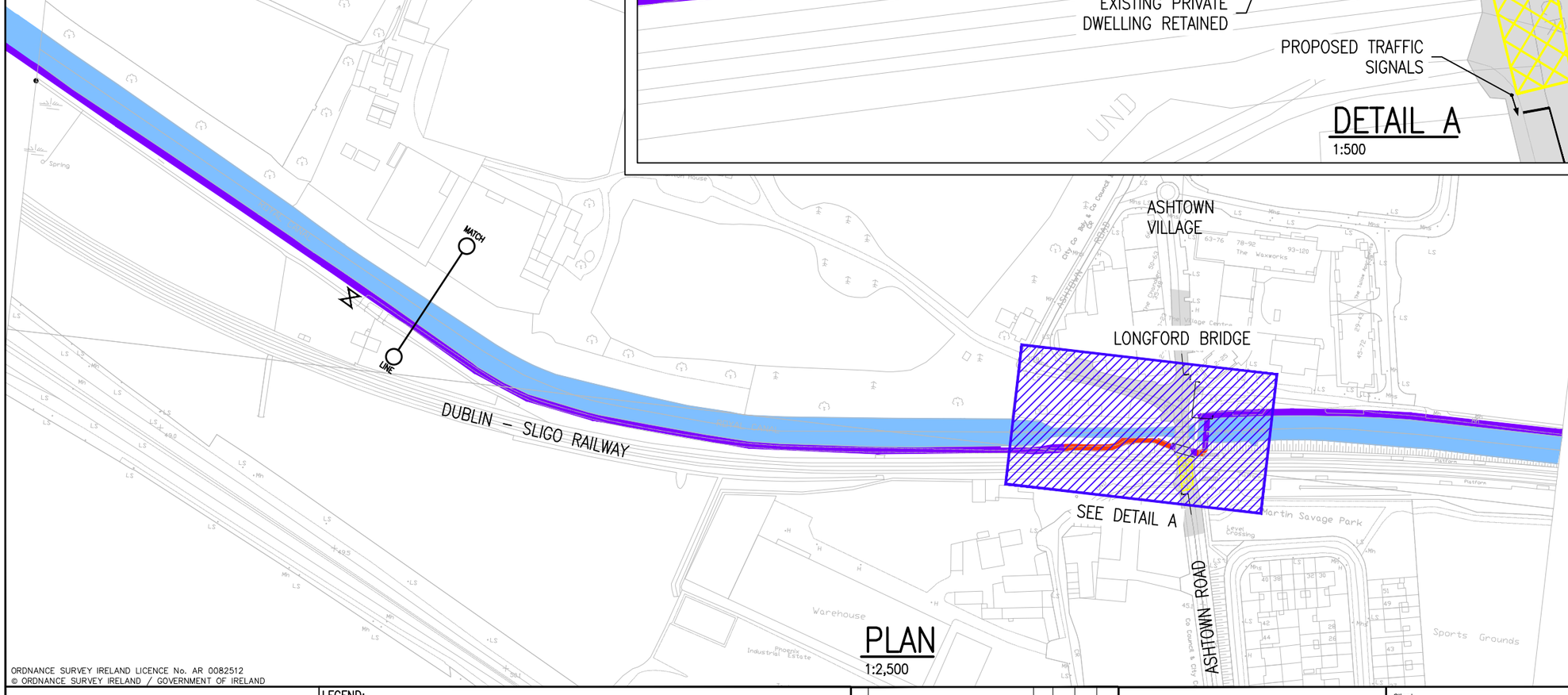

PLAN
1:2,500

Comhairle Contae Fhine Gall
Fingal County Council

LEGEND:

- EXISTING CANAL
- PROPOSED GREEN ROUTE (3.5m TYPICAL)
- PROPOSED GREEN ROUTE (<3.5m)
- PROPOSED ON ROAD CYCLEROUTE
- PROPOSED PEDESTRIAN ONLY ROUTE
- PROPOSED RETAINING WALL
- UNDERPASS
- PROPOSED COFFEE SHOP
- PROPOSED FISHING AREA
- PROPOSED PARKING AREA
- PROPOSED PEDESTRIAN BRIDGE
- PROPOSED PICNIC AREA
- PROPOSED ACCESS CONTROL – REMOVABLE BOLLARD

Rev	Description	By	Date	Chk'd	Auth
B	TEXT EDIT	LB	12/12	DM	AFM
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Client: FINGAL COUNTY COUNCIL

Title: SHEET 1 OF 15

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR Date 13/08/12	DM Date 13/08/12	DM Date 13/08/12

Sheet: A3 | Drawing Number: 3098 / SK / 23 | Rev: B

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Date: Dec 06, 2012 - 1:39pm Plotted by: Brophy

Rev A

Drawing Number 3098 / SK / 024

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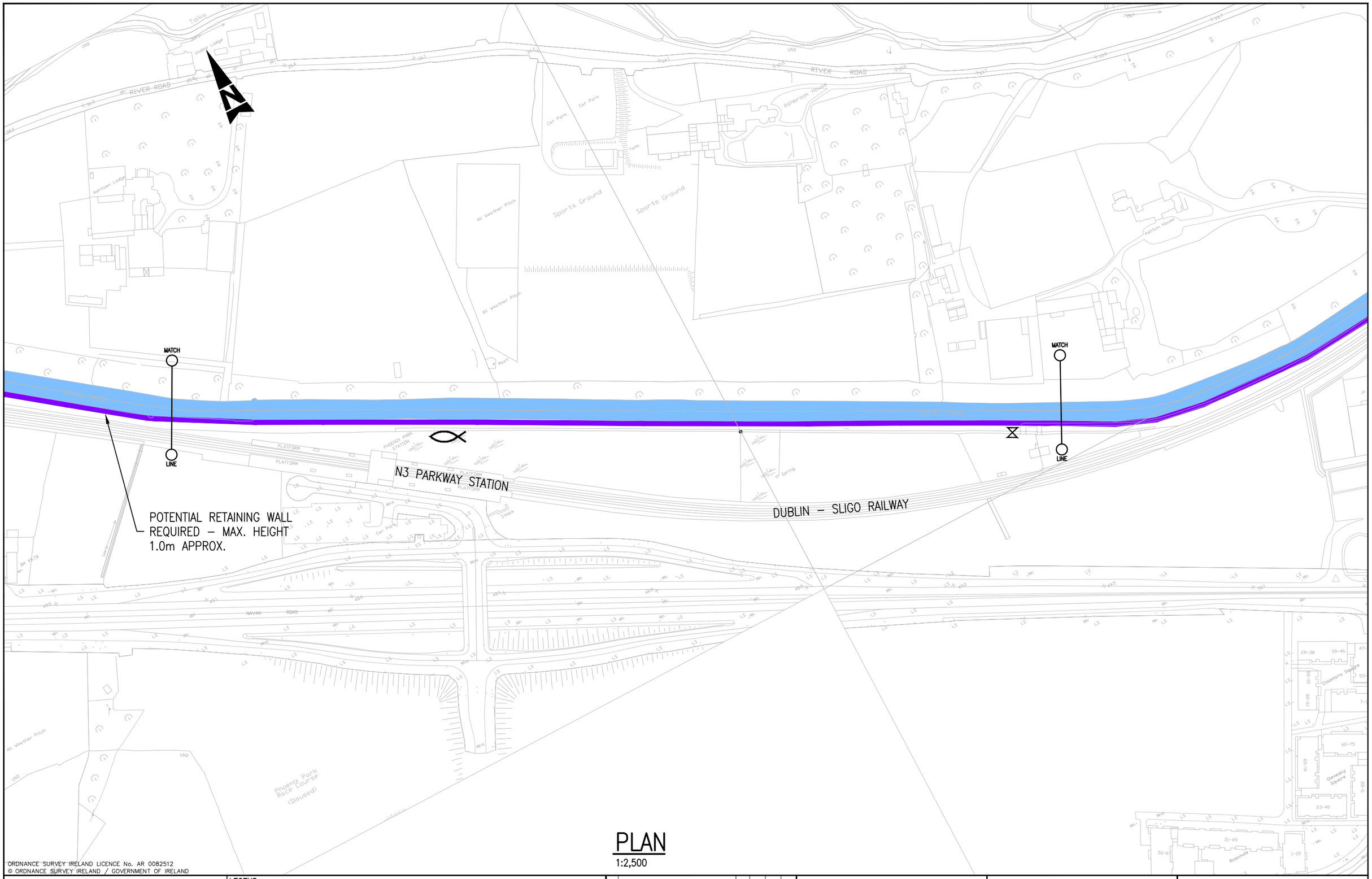

PLAN

1:2,500

Comhairle Contae Fhine Gall
Fingal County Council

LEGEND:

- EXISTING CANAL
- PROPOSED GREEN ROUTE (3.5m TYPICAL)
- PROPOSED GREEN ROUTE (<3.5m)
- PROPOSED ON ROAD CYCLEROUTE
- PROPOSED PEDESTRIAN ONLY ROUTE
- PROPOSED RETAINING WALL
- UNDERPASS
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- PROPOSED PARKING AREA
- PROPOSED PEDESTRIAN BRIDGE
- PROPOSED PICNIC AREA
- PROPOSED ACCESS CONTROL – REMOVABLE BOLLARD

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Client: FINGAL COUNTY COUNCIL

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Title: SHEET 2 OF 15

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR Date 13/08/12	DM Date 13/08/12	DM Date 13/08/12

Sheet	Drawing Number	Rev
A3	3098 / SK / 024	A

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Rev A

Drawing Number 3098 / SK / 025

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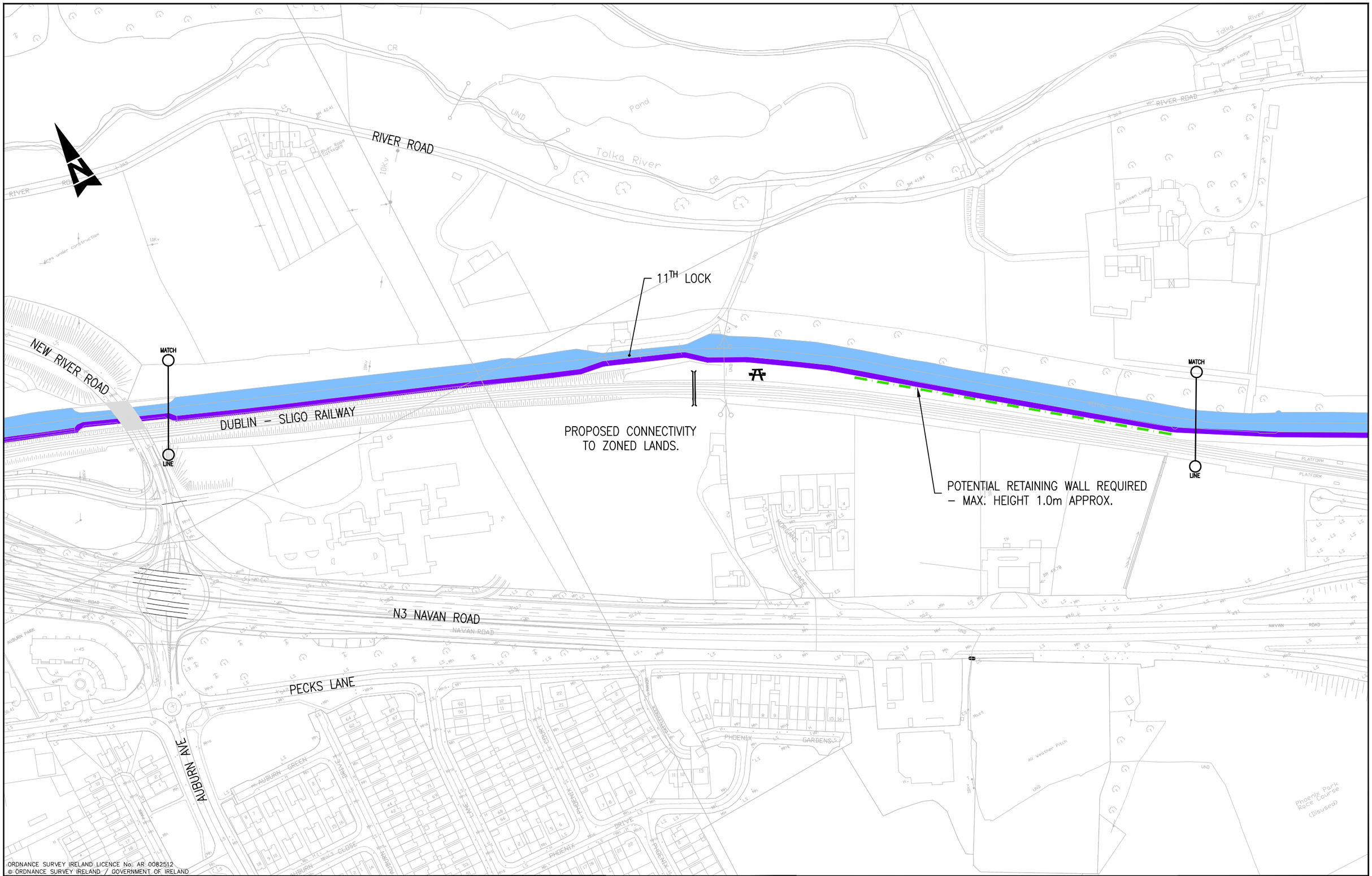

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Date: Dec 06, 2012 - 1:07pm Plotted by: Ronphy

Comhairle Contae Fhine Gall
Fingal County Council

LEGEND:

- EXISTING CANAL
- PROPOSED GREEN ROUTE (3.5m TYPICAL)
- PROPOSED GREEN ROUTE (<3.5m)
- PROPOSED ON ROAD CYCLEROUTE
- PROPOSED PEDESTRIAN ONLY ROUTE
- PROPOSED RETAINING WALL
- UNDERPASS
- PROPOSED COFFEE SHOP
- PROPOSED FISHING AREA
- PROPOSED PARKING AREA
- PROPOSED PEDESTRIAN BRIDGE
- PROPOSED PICNIC AREA
- PROPOSED ACCESS CONTROL – REMOVABLE BOLLARD

Rev	Description	By	Date	Chk'd	Auth
B	RETAINING WALL ADDED	LB	12/12	DM	AFM
A	FINAL ISSUE	DC	10/12	DM	AFM
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Client: FINGAL COUNTY COUNCIL

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Title: SHEET 3 OF 15

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR Date 13/08/12	DM Date 13/08/12	DM Date 13/08/12

Sheet: A3 Drawing Number: 3098 / SK / 025 Rev: B

Rev A

Drawing Number 3098 / SK / 026

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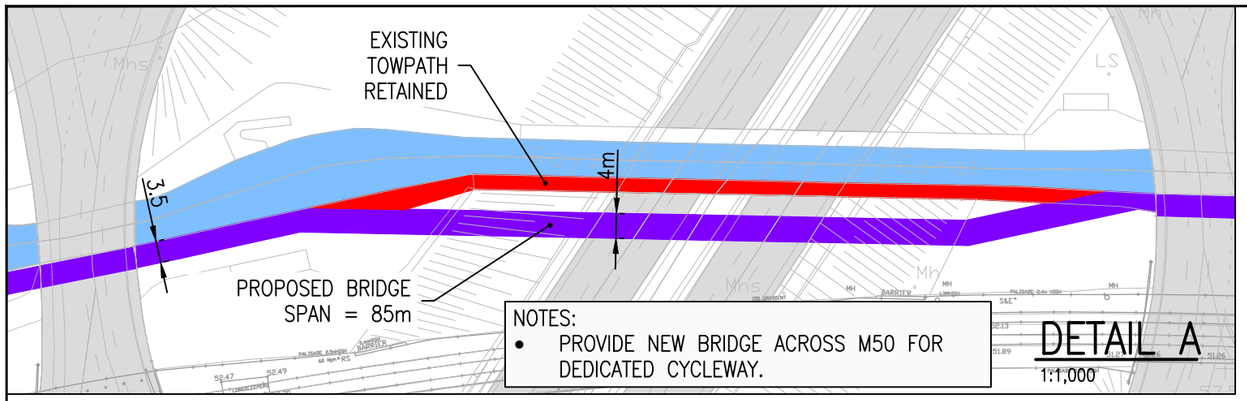
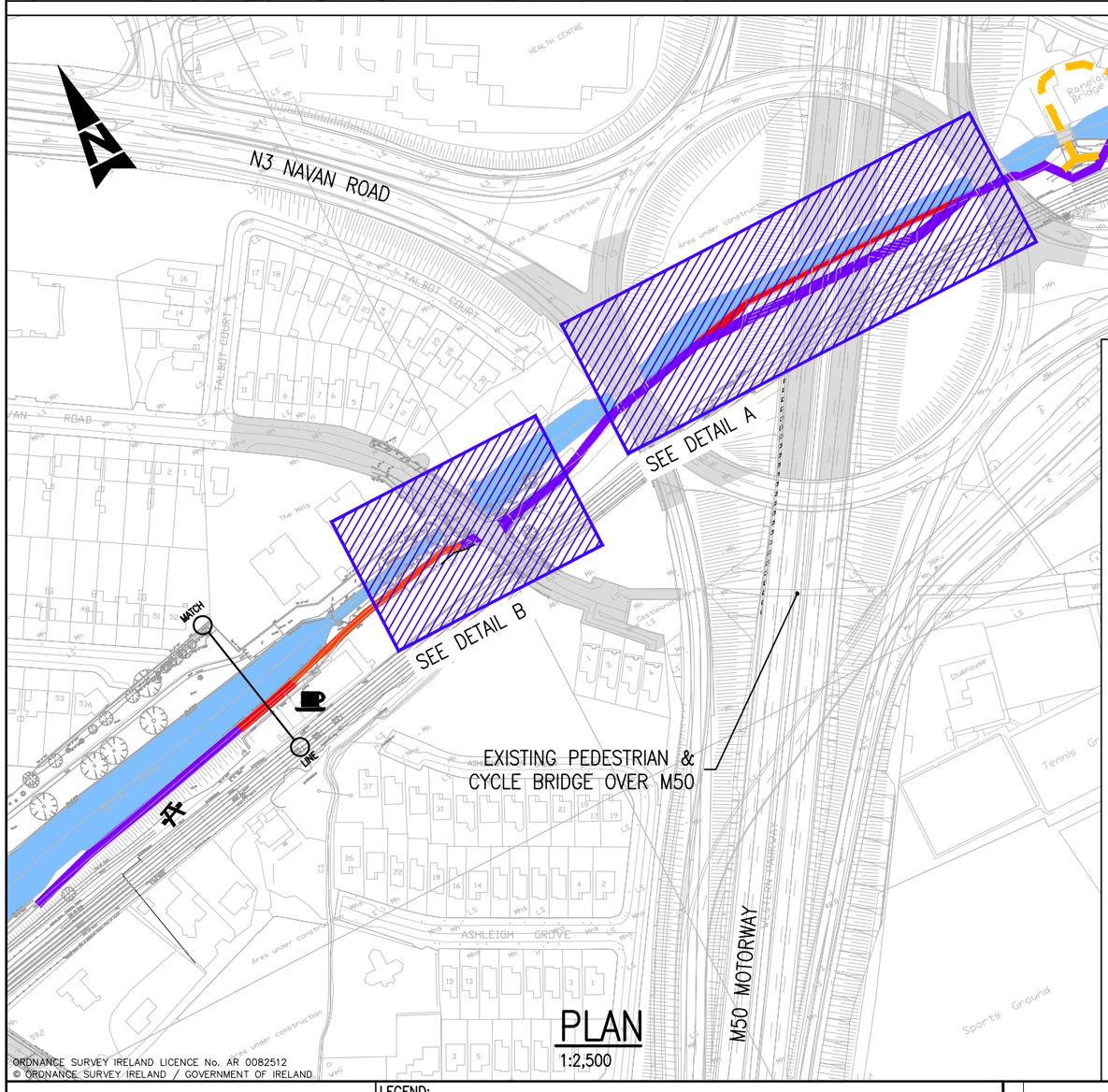


NOTES:
- PROVIDE NEW BRIDGE ACROSS M50 FOR DEDICATED CYCLEWAY.

DETAIL A
1:1,000



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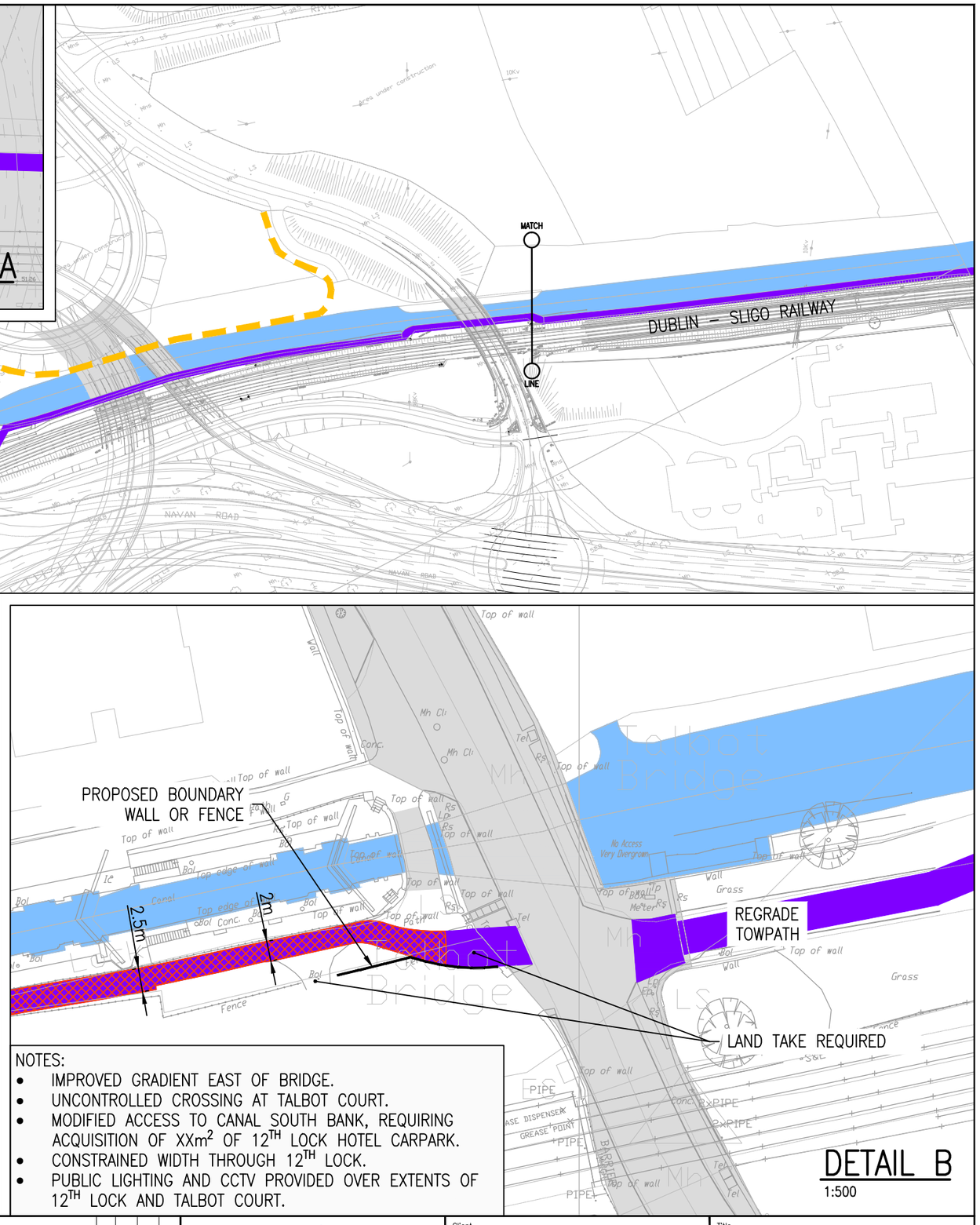

NOTES:
- IMPROVED GRADIENT EAST OF BRIDGE.
- UNCONTROLLED CROSSING AT TALBOT COURT.
- MODIFIED ACCESS TO CANAL SOUTH BANK, REQUIRING ACQUISITION OF XXm^2 OF 12TH LOCK HOTEL CARPARK.
- CONSTRAINED WIDTH THROUGH 12TH LOCK.
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF 12TH LOCK AND TALBOT COURT.

DETAIL B
1:500

LEGEND:

- EXISTING CANAL
- PROPOSED GREEN ROUTE (3.5m TYPICAL)
- PROPOSED GREEN ROUTE (<3.5m)
- PROPOSED ON ROAD CYCLEROUTE
- PROPOSED PEDESTRIAN ONLY ROUTE
- PROPOSED RETAINING WALL
- UNDERPASS
- PROPOSED COFFEE SHOP
- PROPOSED FISHING AREA
- PROPOSED PARKING AREA
- PROPOSED PEDESTRIAN BRIDGE
- PROPOSED PICNIC AREA
- PROPOSED ACCESS CONTROL – REMOVABLE BOLLARD

Comhairle Contae Fhine Gall
Fingal County Council

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Client: FINGAL COUNTY COUNCIL

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Title: SHEET 4 OF 15

Original Scale	Designed/Drawn	Checked	Authorised
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Sheet	Drawing Number	Rev
A3	3098 / SK / 026	A

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Date: Nov 02, 2012 - 9:59am Plotted by: rrudden

Rev A

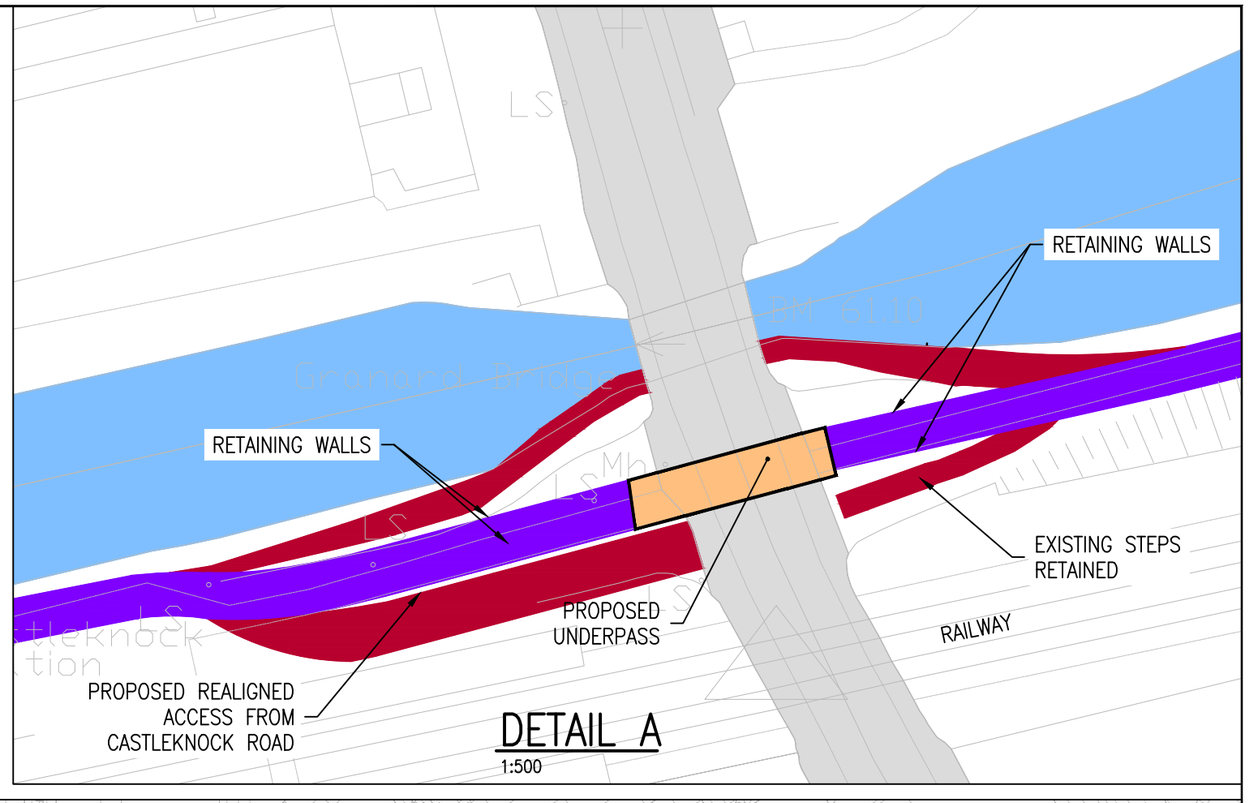
Drawing Number 3098 / SK / 027

DO NOT SCALE

A3

NOTES:

- 3.5m GREEN ROUTE APPROACHING ON SOUTH BANK.
- PROVIDE UNDERPASS / CULVERT UNDER CASTLEKNOCK ROAD, 4.0m MIN. WIDTH, MIN. CLEARANCE 2.3m.
- MAINTAIN FOOTPATH LINKS TO EXISTING CONCRETE STEPS AND TOWPATH UNDER GRANARD BRIDGE.
- PROVIDE REALIGNED ACCESS ROUTE TO CASTLEKNOCK STATION OF WESTERN SIDE.
- 3.5m GREEN ROUTE IS MAINTAINED THROUGHOUT.
- 3.5m GREEN ROUTE EXTENDS TO DEEP SINKING AREA.
- PUBLIC LIGHTING AND CCTV PROVIDED OVER EXTENTS OF GRANARD BRIDGE.



DETAIL A
1:500

PLAN
1:2,500

Comhairle Contae Fhine Gall
Fingal County Council

LEGEND:

- EXISTING CANAL
- PROPOSED GREEN ROUTE (3.5m TYPICAL)
- PROPOSED GREEN ROUTE (<3.5m)
- PROPOSED ON ROAD CYCLEROUTE
- PROPOSED PEDESTRIAN ONLY ROUTE
- PROPOSED RETAINING WALL
- UNDERPASS
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- PROPOSED PARKING AREA
- PROPOSED PEDESTRIAN BRIDGE
- PROPOSED PICNIC AREA
- PROPOSED ACCESS CONTROL – REMOVABLE BOLLARD

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Client: FINGAL COUNTY COUNCIL

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

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Sheet: A3 | Drawing Number: 3098 / SK / 027 | Rev: A

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Date: Nov 02, 2012 – 9:59am Plotted by: rmadden

Rev A

Drawing Number 3098 / SK / 028

DO NOT SCALE

A3

ROSE LAWN

PROPOSED BRIDGE OVER CANAL TO AID CONNECTIVITY BETWEEN COMMUNITIES

EXISTING RIPARIAN BUFFER STRIP TO BE REMOVED & REPLANTED.

MATCH

MATCH

DUBLIN – SLIGO RAILWAY

LINE

LINE

PROPOSED CANTILEVERED WALKWAY THROUGH DEEP SINKING.

TYPICAL CYCLEPATH CONSTRUCTION

PROPOSED BRIDGE OVER RAILWAY TO AID CONNECTIVITY BETWEEN COMMUNITIES

LAUREL LODGE

Comhairle Contae Fhine Gall
Fingal County Council

LEGEND:

- EXISTING CANAL
- PROPOSED GREEN ROUTE (3.5m TYPICAL)
- PROPOSED GREEN ROUTE (<3.5m)
- PROPOSED ON ROAD CYCLEROUTE
- PROPOSED PEDESTRIAN ONLY ROUTE
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- PROPOSED ACCESS CONTROL – REMOVABLE BOLLARD

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Client: FINGAL COUNTY COUNCIL

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

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Sheet: A3 | Drawing Number: 3098 / SK / 028 | Rev: A

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Date: Nov 02, 2012 - 9:59am Plotted by: rrudden

Rev A

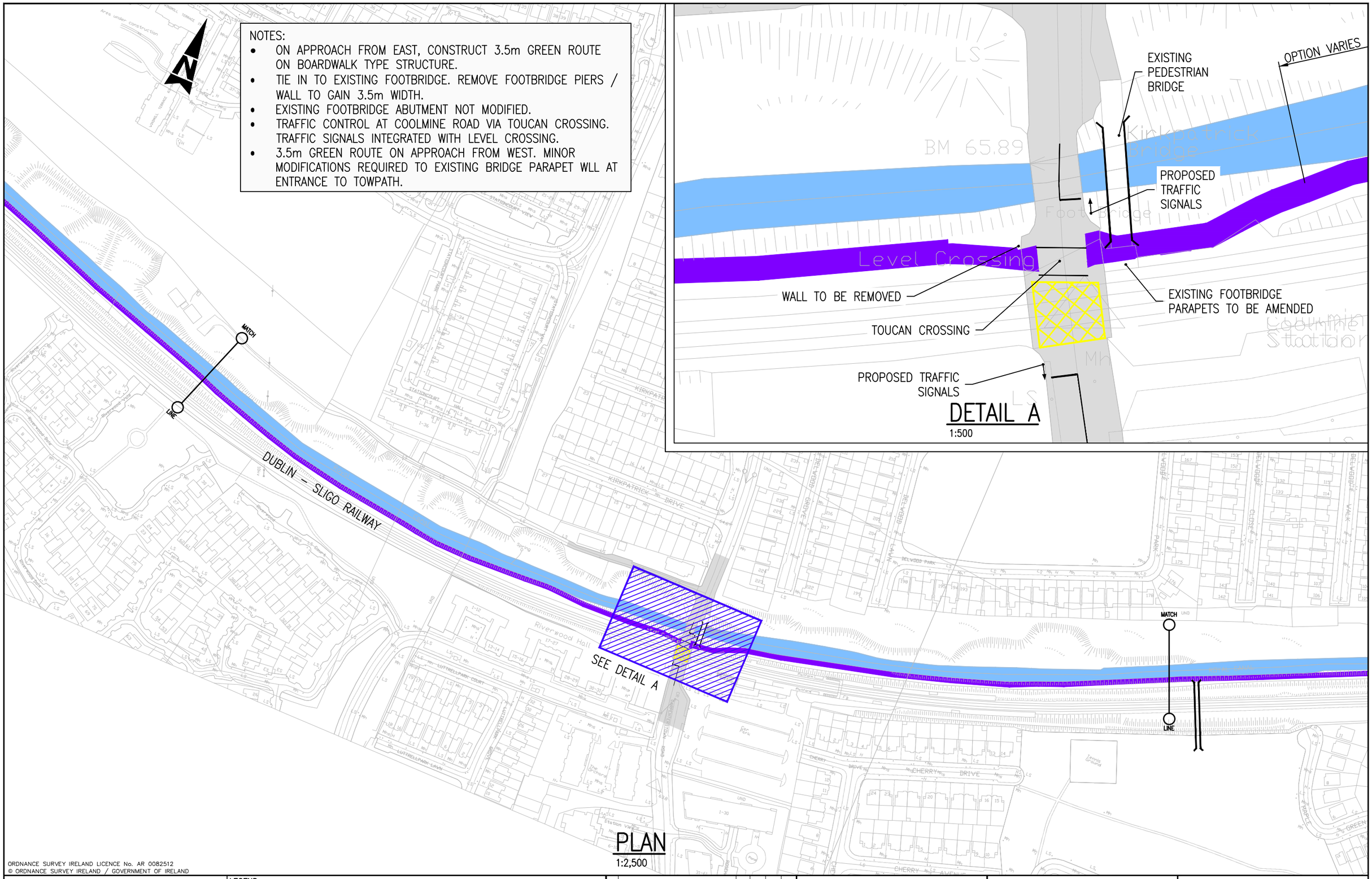
Drawing Number 3098 / SK / 029

DO NOT SCALE

A3

NOTES:

- ON APPROACH FROM EAST, CONSTRUCT 3.5m GREEN ROUTE ON BOARDWALK TYPE STRUCTURE.
- TIE IN TO EXISTING FOOTBRIDGE. REMOVE FOOTBRIDGE PIERS / WALL TO GAIN 3.5m WIDTH.
- EXISTING FOOTBRIDGE ABUTMENT NOT MODIFIED.
- TRAFFIC CONTROL AT COOLMINE ROAD VIA TOUCAN CROSSING. TRAFFIC SIGNALS INTEGRATED WITH LEVEL CROSSING.
- 3.5m GREEN ROUTE ON APPROACH FROM WEST. MINOR MODIFICATIONS REQUIRED TO EXISTING BRIDGE PARAPET WLL AT ENTRANCE TO TOWPATH.



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LEGEND:

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- PROPOSED GREEN ROUTE (<3.5m)
- PROPOSED ON ROAD CYCLEROUTE
- PROPOSED PEDESTRIAN ONLY ROUTE
- PROPOSED RETAINING WALL
- UNDERPASS
- PROPOSED COFFEE SHOP
- PROPOSED FISHING AREA
- PROPOSED PARKING AREA
- PROPOSED PEDESTRIAN BRIDGE
- PROPOSED PICNIC AREA
- PROPOSED ACCESS CONTROL – REMOVABLE BOLLARD

Comhairle Contae Fhine Gall
Fingal County Council

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Client: FINGAL COUNTY COUNCIL

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Title: SHEET 7 OF 15

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR Date 13/08/12	DM Date 13/08/12	DM Date 13/08/12

Sheet: A3 | Drawing Number: 3098 / SK / 029 | Rev: B

File: Z:\3098_royal canal towpath\6 drawings\60 working\3098_SK_029.dwg
Date: Dec 06, 2012 - 1:12pm Plotted by: lbrophy

Rev A

Drawing Number 3098 / SK / 030

DO NOT SCALE

A3

0 10 50

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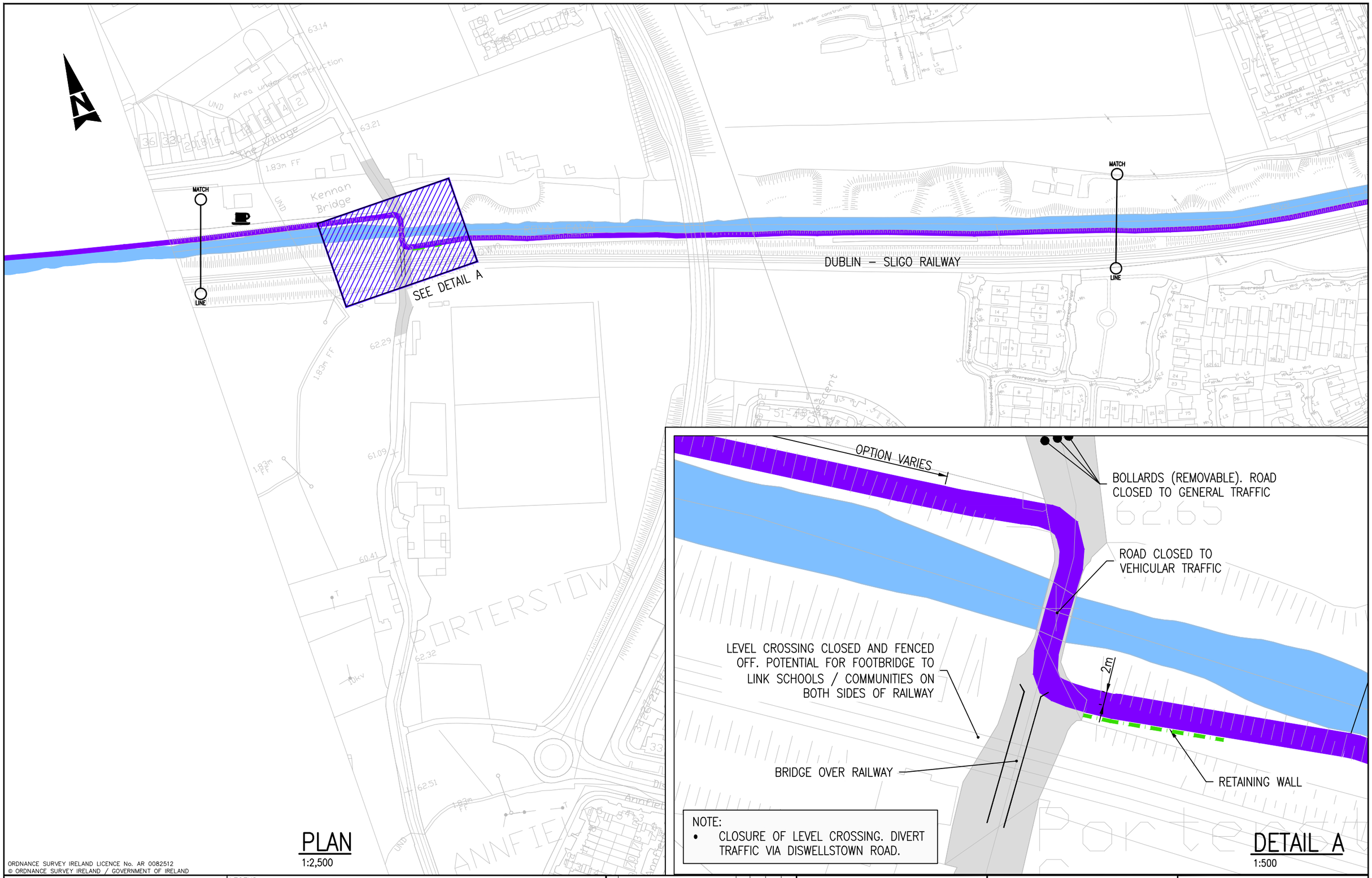
Date: Dec 06, 2012 - 1:18pm Plotted by: lkrophy



PLAN
1:2,500

DETAIL A
1:500

Comhairle Contae Fhine Gall
Fingal County Council

LEGEND:

- EXISTING CANAL
- PROPOSED GREEN ROUTE (3.5m TYPICAL)
- PROPOSED GREEN ROUTE (<3.5m)
- PROPOSED ON ROAD CYCLEROUTE
- PROPOSED PEDESTRIAN ONLY ROUTE
- PROPOSED RETAINING WALL
- UNDERPASS
- PROPOSED COFFEE SHOP
- PROPOSED FISHING AREA
- PROPOSED PARKING AREA
- PROPOSED PEDESTRIAN BRIDGE
- PROPOSED PICNIC AREA
- PROPOSED ACCESS CONTROL – REMOVABLE BOLLARD

Rev	Description	By	Date	Chk'd	Auth
B	RETAINING WALL ADDED	LB	12/12	DM	AFM
A	FINAL ISSUE	DC	10/12	DM	AFM
–	FOR INFORMATION	RR	08/12	DM	DM

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Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Title: SHEET 8 OF 15

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR Date 13/08/12	DM Date 13/08/12	DM Date 13/08/12

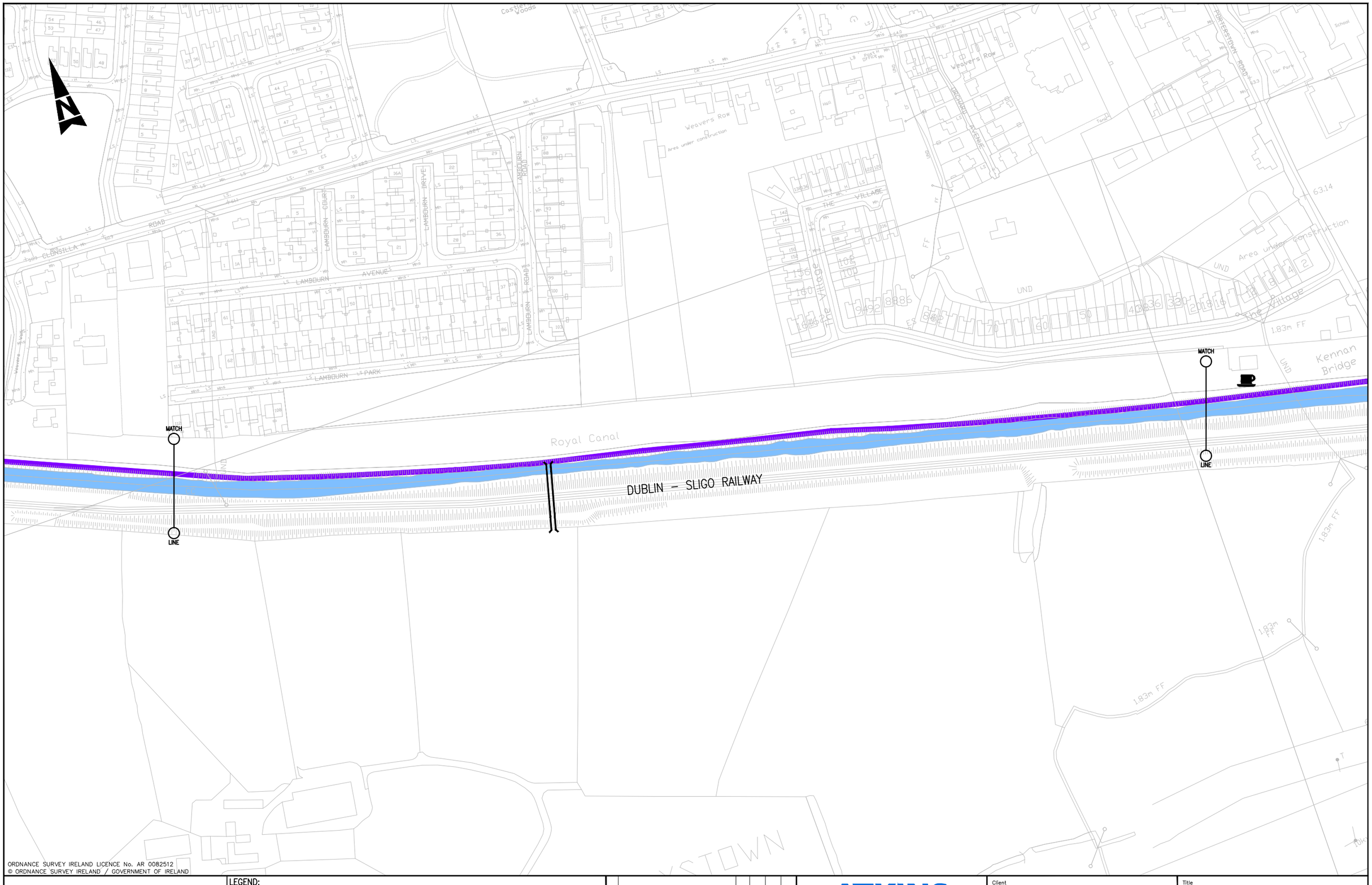
Sheet	Drawing Number	Rev
A3	3098 / SK / 030	B

Rev A

Drawing Number 3098 / SK / 031

DO NOT SCALE

A3



LEGEND:

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- PROPOSED GREEN ROUTE (3.5m TYPICAL)
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Comhairle Contae Fhine Gall
Fingal County Council

Rev	Description	By	Date	Chk'd	Auth
A	FINAL ISSUE	DC	10/12	DM	AFM
–	FOR INFORMATION	RR	08/12	DM	DM

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Client: FINGAL COUNTY COUNCIL

Title: SHEET 9 OF 15

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR Date 13/08/12	DM Date 13/08/12	DM Date 13/08/12

Sheet A3 | Drawing Number 3098 / SK / 031 | Rev A

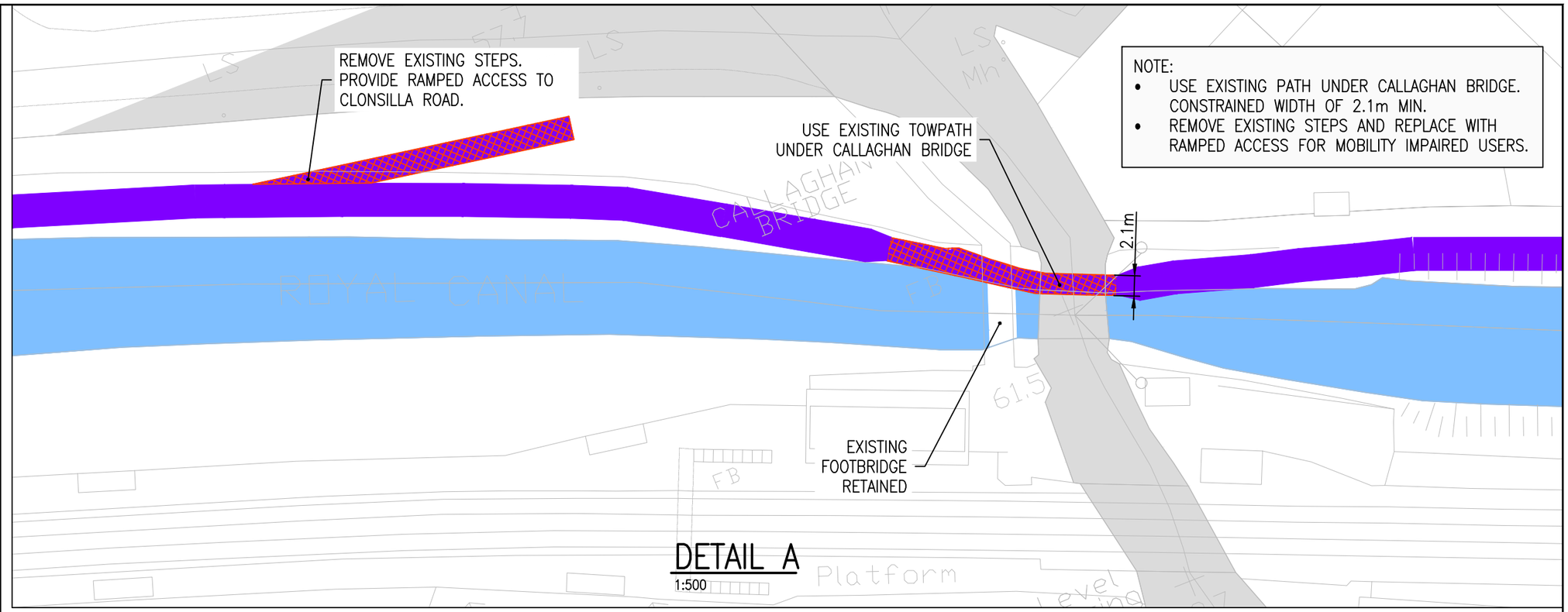
File: Z:\3098_royal canal towpath\6 drawings\60 working\3098_SK_031.dwg
Date: Nov 02, 2012 - 10:00am Plotted by: mulden

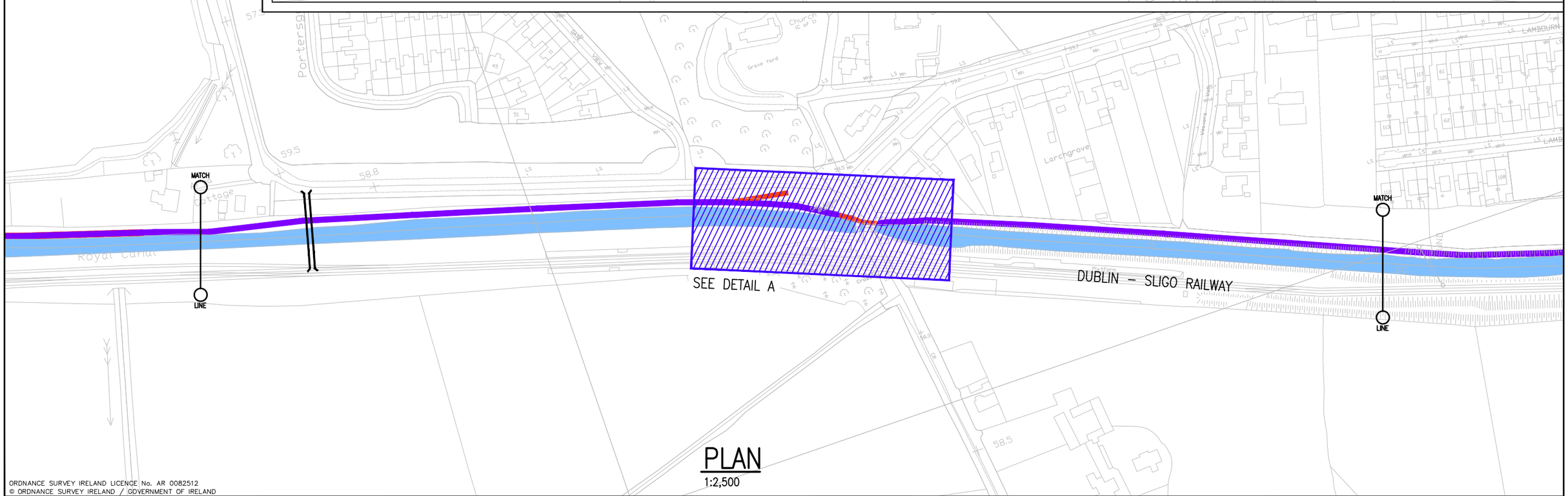
Rev A

Drawing Number 3098 / SK / 032

DO NOT SCALE

A3





Comhairle Contae Fhine Gall
Fingal County Council

LEGEND:

- EXISTING CANAL
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Rev	Description	By	Date	Chk'd	Auth
B	TEXT EDITS	LB	12/12	DM	AFM
A	FINAL ISSUE	DC	10/12	DM	AFM
–	FOR INFORMATION	RR	08/12	DM	DM

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Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Title: SHEET 10 OF 15

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR Date 13/08/12	DM Date 13/08/12	DM Date 13/08/12

Sheet: A3 | Drawing Number: 3098 / SK / 032 | Rev: B

File: Z:\3098_Royal Canal Towpath\6 Drawings\60 Working\3098_SK_032.dwg
Date: Dec 06, 2012 - 1:21pm Plotted by: lbrophy

Rev A

Drawing Number 3098 / SK / 033

DO NOT SCALE

A3

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File: Z:\3098_royal canal towpath\6 drawings\60 working\3098_SK_033.dwg

Date: Nov 02, 2012 - 10:00am Plotted by: mudden

N

Area under construction

BARBERSTOWN

DUBLIN – SLIGO RAILWAY

Royal Canal

Clonsilla

Portersgate

Beech Park House

Barberstown

Lake Bridge

MATCH

LINE

10KV

1.83m FF

UND

CC

SP

58.8 58.6 57.5 59.5 59.6 58.4

Comhairle Contae Fhine Gall
Fingal County Council

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Rev	Description	By	Date	Chk'd	Auth
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Client: FINGAL COUNTY COUNCIL

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Title: SHEET 11 OF 15

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR	DM	DM
	Date 13/08/12	Date 13/08/12	Date 13/08/12

Sheet	Drawing Number	Rev
A3	3098 / SK / 033	A

Rev A

Drawing Number 3098 / SK / 034

DO NOT SCALE

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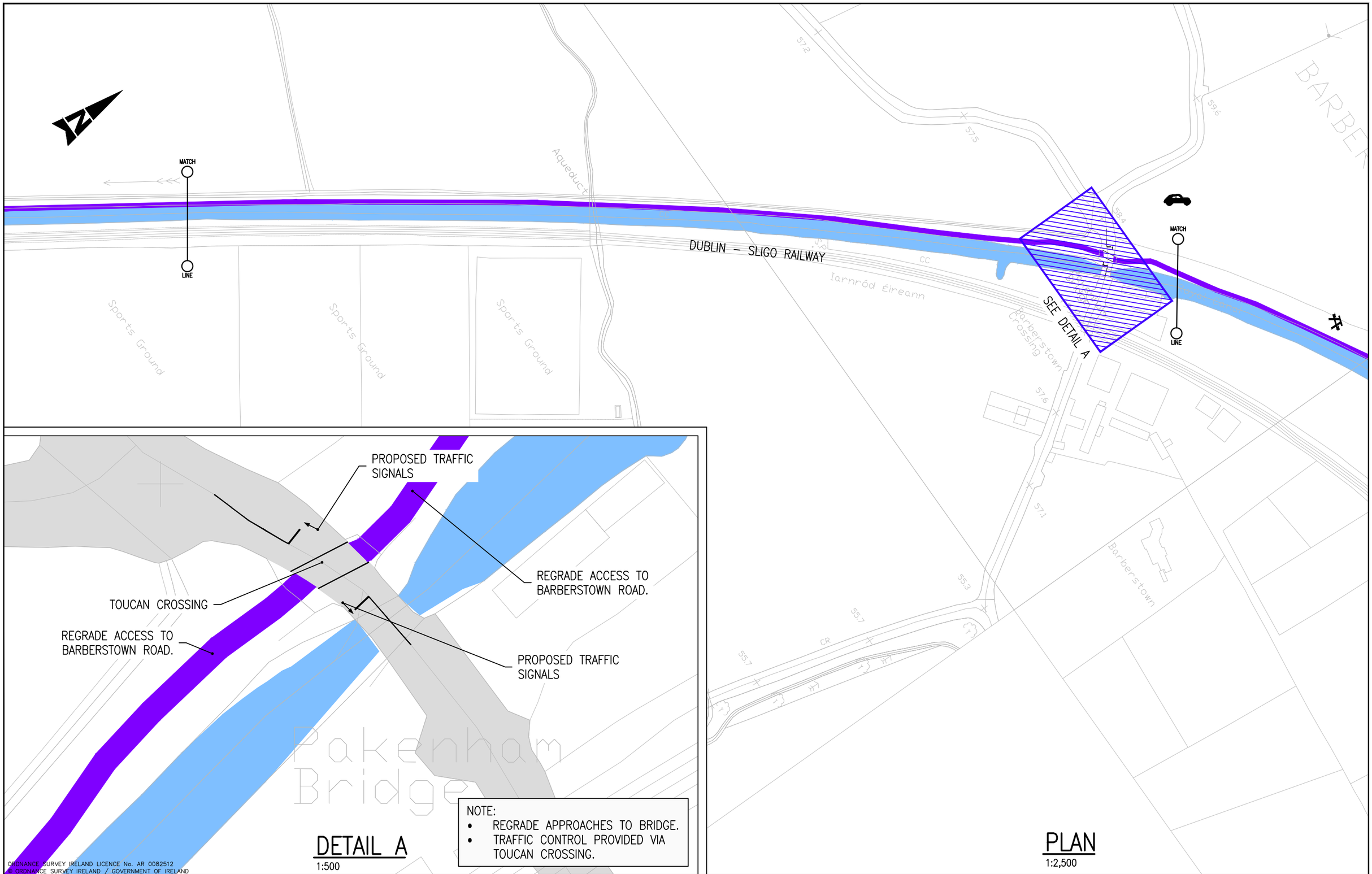

DETAIL A
1:500

PLAN
1:2,500

NOTE:
- REGRADE APPROACHES TO BRIDGE.
- TRAFFIC CONTROL PROVIDED VIA TOUCAN CROSSING.

Comhairle Contae Fhine Gall
Fingal County Council

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Rev	Description	By	Date	Chk'd	Auth
A	FINAL ISSUE	DC	10/12	DM	AFM
–	FOR INFORMATION	RR	08/12	DM	DM

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Client: FINGAL COUNTY COUNCIL

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Title: SHEET 12 OF 15

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR Date 13/08/12	DM Date 13/08/12	DM Date 13/08/12

Sheet: A3 Drawing Number: 3098 / SK / 034 Rev: A

Rev A

Drawing Number 3098 / SK / 035

DO NOT SCALE

A3

0 10 50

File: Z:\3098_royal canal towpath\6 drawings\6b working\3098_SK_035.dwg
Date: Nov 02, 2012 - 10:00am Plotted by: mudden

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Fingal County Council

LEGEND:

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Rev	Description	By	Date	Chk'd	Auth
A	FINAL ISSUE	DC	10/12	DM	AFM
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Title: SHEET 13 OF 15

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR Date 13/08/12	DM Date 13/08/12	DM Date 13/08/12

Sheet: A3 Drawing Number: 3098 / SK / 035 Rev: A

Rev A

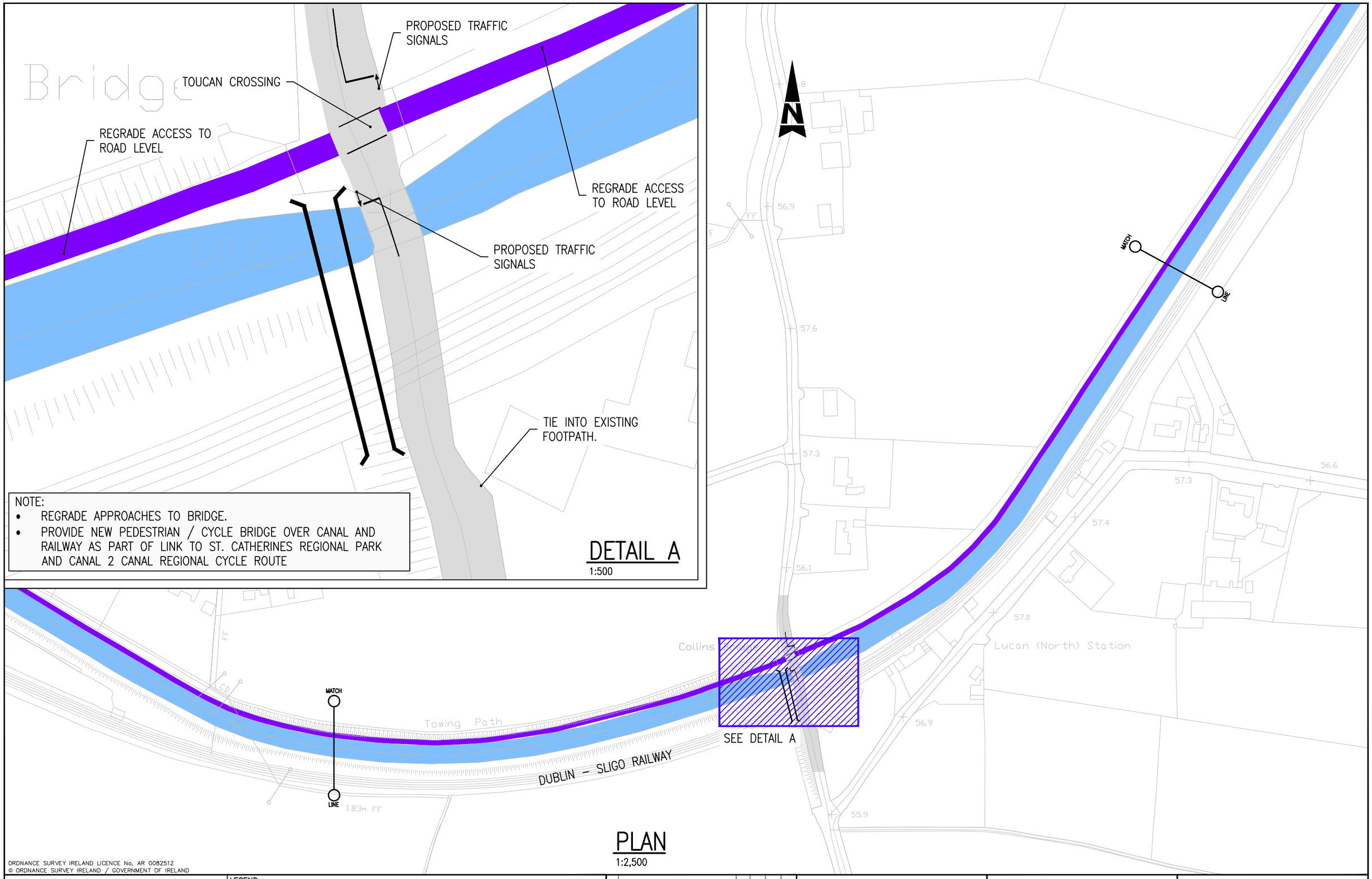
Drawing Number 3098 / SK / 036

DO NOT SCALE

A3

NOTE:
- REGRADE APPROACHES TO BRIDGE.
- PROVIDE NEW PEDESTRIAN / CYCLE BRIDGE OVER CANAL AND RAILWAY AS PART OF LINK TO ST. CATHERINES REGIONAL PARK AND CANAL 2 CANAL REGIONAL CYCLE ROUTE

DETAIL A
1:500



PLAN
1:2,500

Comhairle Contae Fhine Gall
Fingal County Council

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Rev	Description	By	Date	Chk'd	Auth
B	FOOTBRIDGE ADDED	LB	12/12	DM	AFM
A	FINAL ISSUE	DC	10/12	DM	AFM
–	FOR INFORMATION	RR	08/12	DM	DM

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Client: FINGAL COUNTY COUNCIL

Title: SHEET 14 OF 15

Project: ROYAL CANAL TOWPATH UPGRADE FEASIBILITY STUDY

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR Date 13/08/12	DM Date 13/08/12	DM Date 13/08/12

Sheet: A3 | Drawing Number: 3098 / SK / 036 | Rev: B

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Date: Dec 06, 2012 - 1:35pm Plotted by: lbrophy

Rev A

Drawing Number 3098 / SK / 037

DO NOT SCALE

A3

0 10 50

File: Z:\3098_royal canal towpath\6 drawings\60 working\3098_SK_037.dwg

Date: Nov 02, 2012 - 10:00am Plotted by: mulden

Comhairle Contae Fhine Gall
Fingal County Council

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Rev	Description	By	Date	Chk'd	Auth
A	FINAL ISSUE	DC	10/12	DM	AFM
–	FOR INFORMATION	RR	08/12	DM	DM

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Title: SHEET 15 OF 15

Original Scale	Designed/Drawn	Checked	Authorised
AS SHOWN	RR Date 13/08/12	DM Date 13/08/12	DM Date 13/08/12

Sheet	Drawing Number	Rev
A3	3098 / SK / 037	A

Appendix B Detailed Cost Estimate

Royal Canal Towpath - Area 1: Longford Bridge (Ashtown) to Granard Bridge (Castleknock)

Item No	Item Description	Quantity	Unit	Rate	Cost
				€	€
0.1	Preliminaries (10%)				125,237.73
	A - LONGFORD BRIDGE				
1	**Structural**				
1.1	New cycle bridge	1	nr.	200000	200,000.00
2	**Site Clearance**				
2.1	General Site Clearance	0.04	ha	350	14.33
5	**Drainage and Service Ducts**				
5.1	CCTV Ducting	184	lin.m	17	3,128.00
11	**Kerbs, Footways and Paved Areas**				
11.1	Kerbs	20	lin.m	20	400.00
11.2	Cycleway 25mm wearing course on 50mm basecourse on 150mm subbase	55	m2	25	1,375.00
12	**Traffic Signs and Road Markings.**				
12.1	Retrofelctive Traffic Sign	4	sum	250	1,000.00
12.3	Toucan Crossing	1	sum	11,000	11,000.00
	B - 10th LOCK				
2	**Site Clearance**				
2.1	General Site Clearance	0.02	ha	350	7.11
4	**Safety fencing and Barriers**				
4.1	Safety Barrier	30	lin.m	125	3,750.00
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	116	lin.m	13	1,508.00
5.3	CCCTV Ducting	116	lin.m	17	1,972.00
5.5	PL Poles	1	nr.	1500	2,175.00
6	**Earthworks**				
6.1	Excavate Topsoil	30	cu.m	1	30.45
6.2	Import fill	202	cu.m	6.5	1,315.60
6.3	Compaction of Fill	202	cu.m	2.5	506.00
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	203	m2	31	6,293.00

	C - 10th LOCK TO 11th LOCK				
2	**Site Clearance**				
2.1	General Site Clearance	0.47	ha	350	164.64
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	2688	lin.m	13	34,944.00
5.3	CCCTV Ducting	2688	lin.m	17	45,696.00
5.5	PL Poles	34	nr.	1500	51,000.00
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
6	**Earthworks**				
6.1	Excavate topsoil	706	cu.m	1	705.60
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	4704	m2	31	145,824.00
11.2	Fishing Stand	1	nr.	1000	1,000.00
	D - 11th LOCK				
2	**Site Clearance**				
2.1	General Site Clearance	0.03	ha	350	11.76
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	96	lin.m	40	3,840.00
5.2	100 dia. Public Lighting duct	192	lin.m	13	2,496.00
5.3	CCCTV Ducting	192	lin.m	17	3,264.00
5.5	PL Poles	2	nr.	1500	3,600.00
6	**Earthworks**				
6.1	Excavate topsoil	50	cu.m	1	50.40
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	336	m2	31	10,416.00
11.2	Picnic Area	1	nr.	2000	2,000.00
	E - 11th LOCK TO M50 AQUEDUCT				
1	**Structural**				
1.1	Pedestrian Footbridge	1	nr.	200000	200,000.00
2	**Site Clearance**				
2.1	General Site Clearance	0.23	ha	350	78.89
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	1288	lin.m	13	16,744.00
5.3	CCCTV Ducting	1288	lin.m	17	21,896.00
5.5	PL Poles	16	nr.	1500	24,150.00
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
6	**Earthworks**				
6.1	Excavate topsoil	338	cu.m	1	338.10
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	2254	m2	31	69,874.00

	F - M50 AQUEDUCT				
1	**Structural**				
1.1	New cycle bridge over M50	1	nr.	200000	200,000.00
2	**Site Clearance**				
2.1	General Site Clearance	0.05	ha	350	17.64
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	288	lin.m	13	3,744.00
5.3	CCCTV Ducting	288	lin.m	17	4,896.00
5.5	PL Poles	4	nr.	1500	5,400.00
6	**Earthworks**				
6.1	Excavate topsoil	76	cu.m	1	75.60
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	504	m2	31	15,624.00
	G - TALBOT BRIDGE				
2	**Site Clearance**				
2.1	General Site Clearance	0.09	ha	350	30.14
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	202	lin.m	13	2,626.00
5.3	CCCTV Ducting	270	lin.m	17	4,590.00
5.5	PL Poles	3	nr.	1500	3,787.50
5.6	PL Chamber	2	nr.	400	800.00
6	**Earthworks**				
6.1	Excavate topsoil	129	cu.m	1	129.15
6.2	Import fill	75	cu.m	6.5	484.80
6.3	Compaction of Fill	75	cu.m	2.5	186.46
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	354	m2	31	10,958.50
11.2	Cycleway 25mm wearing course on 50mm basecourse on 150mm subbase	218	m2	25	5,437.50
12	**Traffic Signs and Road Markings.**				
12.1	Retroflective Traffic Sign	4	sum	250	1,000.00
98	**Land Acquisition**				
98.1	Car park purchase 12th lock hotel	14	m2	123.54	1,729.56

	H - TALBOT BRIDGE TO GRANARD BRIDGE				
2	**Site Clearance**				
2.1	General Site Clearance	0.07	ha	350	25.11
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	410	lin.m	13	5,330.00
5.3	CCCTV Ducting	410	lin.m	17	6,970.00
5.5	PL Poles	5	nr.	1500	7,687.50
6	**Earthworks**				
6.1	Excavate topsoil	108	cu.m	1	107.63
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	718	m2	31	22,242.50
11.2	Picnic Area	1	nr.	2000	2,000.00
	J - GRANARD BRIDGE				
1	**Structural**				
1.1	Underpass	26202	sum	1	26,201.60
1.2	Retaining Walls	15768	sum	1	15,768.00
2	**Site Clearance**				
2.1	General Site Clearance	0.04	ha	350	12.50
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	204	lin.m	13	2,652.00
5.3	CCCTV Ducting	204	lin.m	17	3,468.00
5.5	PL Poles	3	nr.	1500	3,825.00
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
5.8	PL Chambers	2	nr.	400	800.00
6	**Earthworks**				
6.1	Excavate topsoil	876	cu.m	1	875.65
6.2	Import fill	396	cu.m	6.5	2,571.14
6.3	Compaction of Fill	396	cu.m	2.5	988.90
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	357	m2	31	11,067.00

	SUMMARY: AREA 1				
	Preliminaries		125,237.73		
	1 Structural				
	A - LONGFORD BRIDGE	200000			
	E - 11th LOCK TO M50 AQUEDUCT	200000			
	F - M50 AQUEDUCT	200000			
	J - GRANARD BRIDGE	41970			
			641970		
	2 Site Clearance				
	A - LONGFORD BRIDGE	14			
	B - 10th LOCK	7			
	C - 10th LOCK TO 11th LOCK	165			
	D - 11th LOCK	12			
	E - 11th LOCK TO M50 AQUEDUCT	79			
	F - M50 AQUEDUCT	18			
	G - TALBOT BRIDGE	30			
	H- TALBOT BRIDGE TO GRANDARD BRIDGE	25			
	J - GRANARD BRIDGE	12			
			362		
	4 Safety Fencing & Barriers				
	B - 10th LOCK	3750			
			3750		
	5 Drainage & Service Ducts				
	A - LONGFORD BRIDGE	3128			
	B - 10th LOCK	5655			
	C - 10th LOCK TO 11th LOCK	133540			
	D - 11th LOCK	13200			
	E - 11th LOCK TO M50 AQUEDUCT	64690			
	F - M50 AQUEDUCT	14040			
	G - TALBOT BRIDGE	11804			
	H- TALBOT BRIDGE TO GRANDARD BRIDGE	19988			
	J - GRANARD BRIDGE	12645			
			278689		
	6 Earthworks				
	B - 10th LOCK	1852			
	C - 10th LOCK TO 11th LOCK	706			
	D - 11th LOCK	50			
	E - 11th LOCK TO M50 AQUEDUCT	338			
	F - M50 AQUEDUCT	76			
	G - TALBOT BRIDGE	800			
	H- TALBOT BRIDGE TO GRANDARD BRIDGE	108			
	J - GRANARD BRIDGE	4436			
			8365		
	11 Kerbs, Footways & Paved Areas				
	A - LONGFORD BRIDGE	1775			
	B - 10th LOCK	6293			
	C - 10th LOCK TO 11th LOCK	146824			
	D - 11th LOCK	12416			
	E - 11th LOCK TO M50 AQUEDUCT	69874			
	F - M50 AQUEDUCT	15624			
	G - TALBOT BRIDGE	16396			
	H- TALBOT BRIDGE TO GRANDARD BRIDGE	24243			
	J - GRANARD BRIDGE	11067			
			304512		
	12 Traffic Signs & Road Markings				
	A - LONGFORD BRIDGE	12000			
	G - TALBOT BRIDGE	1000			
			13000		
	98 Land Acquisition				
	G - TALBOT BRIDGE	1730			
			1730		
	Provisional Sums and Prime Cost Items				
	General Contingency (10%)				137,761.50

TOTAL **€1,515,376.47**

TOTAL	**€1,515,376.47**
VAT @ 13.5%	**€204,575.82**
NET TOTAL	**€1,719,952.30**

Royal Canal Towpath - Area 2: Granard Bridge (Castleknock) to Callaghan Bridge (Clonsilla) - "The Deep Si

Item No	Item Description	Quantity	Unit	Rate	Cost
				€	€
0.1	Preliminaries (10%)				159,773.54
	A - GRANARD BRIDGE TO KIRKPATRICK BRIDGE				
1	**Structural**				
1.1	Cantilever Boardwalk	832	lin.m	956.63	795,916.16
1.2	Pedestrian Footbridge	2	nr.	200000	400,000.00
2	**Site Clearance**				
2.1	General Site Clearance	0.50	ha	350	175.42
4	**Safety Fencing and Barriers**				
4.1	Pedestrian Guardrail	832	lin.m	125	104,000.00
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	2864	lin.m	13	37,232.00
5.3	CCCTV Ducting	2864	lin.m	17	48,688.00
5.5	PL Poles	36	nr.	1500	53,700.00
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
6	**Earthworks**				
6.1	Excavate topsoil	752	cu.m	1	751.80
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	5012	m2	31	155,372.00
11.2	Fishing Stand	1000	nr.	1	1,000.00
	B - KIRKPATRICK BRIDGE				
1	**Structural**				
1.1	Cantilever boardwalk	97	lin.m	956.63	92,793.11
2	**Site Clearance**				
2.1	General Site Clearance	0.03	ha	350	11.88
4	**Safety Fencing and Barriers**				
4.1	Pedestrian Guardrail	97.00	lin.m	125	12,125.00
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	97	lin.m	40	3,880.00
5.2	100 dia. Public Lighting duct	208	lin.m	13	2,704.00
5.3	CCCTV Ducting	208	lin.m	17	3,536.00
5.5	PL Poles	3	nr.	1500	3,900.00
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
5.8	PL Chambers	2	nr.	400	800.00
6	**Earthworks**				
6.1	Excavate topsoil	51	cu.m	1	50.95
6.2	Import fill	9	cu.m	6.5	59.73
6.3	Compaction of Fill	9	cu.m	2.5	22.97
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	340	m2	31	10,524.50
12	**Traffic Signs and Road Markings.**				
12.1	Retrofelctive Traffic Sign	4	sum	250	1,000.00
12.2	Shuttle Light System	1	sum	11000	11,000.00
	C - KIRKPATRICK BRIDGE TO KENNAN BRIDGE				
1	**Structural**				
1.1	Cantilever Boardwalk	810	lin.m	956.63	774,870.30
2	**Site Clearance**				
2.1	General Site Clearance	0.28	ha	350	99.23
4	**Safety Fencing and Barriers**				
4.1	Pedestrian Guardrail	810	lin.m	125	101,250.00
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	1620	lin.m	13	21,060.00
5.3	CCCTV Ducting	1620	lin.m	17	27,540.00
5.5	PL Poles	20	nr.	1500	30,375.00
6	**Earthworks**				
6.1	Excavate topsoil	425	cu.m	1	425.25
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	2835	m2	31	87,885.00

	D - KENNAN BRIDGE				
1	**Structural**				
1.1	Cantilever Boardwalk	96	lin.m	956.63	91,836.48
2	**Site Clearance**				
2.1	General Site Clearance	0.04	ha	350	15.68
4	**Safety Fencing and Barriers**				
4.1	Pedestrian Guardrail	96	lin.m	125	12,000.00
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	256	lin.m	13	3,328.00
5.3	CCCTV Ducting	256	lin.m	17	4,352.00
5.5	PL Poles	3	nr.	1500	4,800.00
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
5.8	PL Chambers	2	nr.	400	800.00
6	**Earthworks**				
6.1	Excavate topsoil	50	cu.m	1	50.40
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	336	m2	31	10,416.00
12	**Traffic Signs and Road Markings.**				
12.1	Retrofelctive Traffic Sign	4	sum	250	1,000.00
12.2	Shuttle Light System	1	sum	11000	11,000.00
					-
	E - KENNAN BRIDGE TO CALLAGHAN BRIDGE				
1	**Structural**				
1.1	Cantilever Boardwalk	1105	lin.m	956.63	1,057,076.15
1.2	Pedestrian Footbridge	1	nr.	200000	200,000.00
2	**Site Clearance**				
2.1	General Site Clearance	0.39	ha	350	135.36
4	**Safety Fencing and Barriers**				
4.1	Pedestrian Guardrail	1105	lin.m	125	138,125.00
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	1105	lin.m	40	44,200.00
5.2	100 dia. Public Lighting duct	2210	lin.m	13	28,730.00
5.3	CCCTV Ducting	2210	lin.m	17	37,570.00
5.5	PL Poles	28	nr.	1500	41,437.50
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
6	**Earthworks**				
6.1	Excavate topsoil	580	cu.m	1	580.13
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	3868	m2	31	119,892.50
	F - CALLAGHAN BRIDGE				
2	**Site Clearance**				
2.1	General Site Clearance	0.07	ha	350	24.62
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	201	lin.m	40	8,040.00
5.2	100 dia. Public Lighting duct	402	lin.m	13	5,226.00
5.3	CCCTV Ducting	402	lin.m	17	6,834.00
5.5	PL Poles	5	nr.	1500	7,537.50
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
5.8	PL Chambers	2	nr.	400	800.00
6	**Earthworks**				
6.1	Excavate topsoil	106	cu.m	1	105.53
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	704	m2	31	21,808.50
12	**Traffic Signs and Road Markings.**				
12.1	Retrofelctive Traffic Sign	4	sum	250	1,000.00

	SUMMARY: AREA 2				
	Preliminaries		159,773.54		
	1 Structural				
	A - GRANARD BRIDGE TO KIRKPATRICK BRIDGE	1195916			
	B - KIRKPATRICK BRIDGE	92793			
	C - KIRKPATRICK BRIDGE TO KENNAN BRIDGE	774870			
	D - KENNAN BRIDGE	91836			
	E - KENNAN BRIDGE TO CALLAGHAN BRIDGE	1257076			
			3412492		
	2 Site Clearance				
	A - GRANARD BRIDGE TO KIRKPATRICK BRIDGE	175			
	B - KIRKPATRICK BRIDGE	12			
	C - KIRKPATRICK BRIDGE TO KENNAN BRIDGE	99			
	D - KENNAN BRIDGE	16			
	E - KENNAN BRIDGE TO CALLAGHAN BRIDGE	135			
	F - CALLAGHAN BRIDGE	25			
			462		
	4 Safety Fencing & Barriers				
	A - GRANARD BRIDGE TO KIRKPATRICK BRIDGE	104000			
	B - KIRKPATRICK BRIDGE	12125			
	C - KIRKPATRICK BRIDGE TO KENNAN BRIDGE	101250			
	D - KENNAN BRIDGE	12000			
	E - KENNAN BRIDGE TO CALLAGHAN BRIDGE	138125			
			367500		
	5 Drainage & Service Ducts				
	A - GRANARD BRIDGE TO KIRKPATRICK BRIDGE	141520			
	B - KIRKPATRICK BRIDGE	16720			
	C - KIRKPATRICK BRIDGE TO KENNAN BRIDGE	78975			
	D - KENNAN BRIDGE	15180			
	E - KENNAN BRIDGE TO CALLAGHAN BRIDGE	153838			
	F - CALLAGHAN BRIDGE	30338			
			436570		
	6 Earthworks				
	A - GRANARD BRIDGE TO KIRKPATRICK BRIDGE	752			
	B - KIRKPATRICK BRIDGE	134			
	C - KIRKPATRICK BRIDGE TO KENNAN BRIDGE	425			
	D - KENNAN BRIDGE	50			
	E - KENNAN BRIDGE TO CALLAGHAN BRIDGE	580			
	F - CALLAGHAN BRIDGE	106			
			2047		
	11 Kerbs, Footways & Paved Areas				
	A - GRANARD BRIDGE TO KIRKPATRICK BRIDGE	156372			
	B - KIRKPATRICK BRIDGE	10525			
	C - KIRKPATRICK BRIDGE TO KENNAN BRIDGE	87885			
	D - KENNAN BRIDGE	10416			
	E - KENNAN BRIDGE TO CALLAGHAN BRIDGE	119893			
	F - CALLAGHAN BRIDGE	21809			
			406899		
	12 Traffic Signs & Road Markings				
	B - KIRKPATRICK BRIDGE	12000			
	D - KENNAN BRIDGE	12000			
	F - CALLAGHAN BRIDGE	1000			
			25000		
	98 Land Acquisition				
	G - TALBOT BRIDGE	0			
			0		
	Provisional Sums and Prime Cost Items				
	General Contingency (10%)				481,074.32

TOTAL **€5,291,817.50**

TOTAL	**€5,291,817.50**
VAT @ 13.5%	**€714,395.36**
NET TOTAL	**€6,006,212.86**

Royal Canal Towpath - Area 3: Callaghan Bridge (Clonsilla) to Fingal County Boundary (Confey)

Item No	Item Description	Quantity	Unit	Rate	Cost
				€	€
0.1	Preliminaries (10%)				121,341.57
	A - CALLAGHAN BRIDGE TO PAKENHAM BRIDGE				
1	**Structural**				
1.1	Pedestrian Footbridge	1	nr.	200000	200,000.00
2	**Site Clearance**				
2.1	General Site Clearance	0.39	ha	350	136.71
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	2232	lin.m	13	29,016.00
5.3	CCCTV Ducting	2232	lin.m	17	37,944.00
5.5	PL Poles	28	nr.	1500	41,850.00
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
6	**Earthworks**				
6.1	Excavate topsoil	596	cu.m	1	596.40
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	3906	m2	31	121,086.00
11.2	Picnic Area	1	nr.	2000	2,000.00
	B - PAKENHAM BRIDGE				
2	**Site Clearance**				
2.1	General Site Clearance	0.03	ha	350	11.27
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	184	lin.m	13	2,392.00
5.3	CCCTV Ducting	184	lin.m	17	3,128.00
5.5	PL Poles	2	nr.	1500	3,450.00
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
5.8	PL Chambers	2	nr.	400	800.00
6	**Earthworks**				
6.1	Excavate topsoil	241	cu.m	1	240.88
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	294	m2	31	9,114.00
11.2	Kerbs	86	lin.m	20	1,711.20
11.3	50mm Wearing Course	321	m2	8	2,567.68
11.4	100mm Road Base	321	m2	8.77	2,814.82
11.5	150mm Sub Base	48	m3	24.5	1,179.53
11.6	300mm 6F1 Capping	96	m3	10	962.90
12	**Traffic Signs and Road Markings.**				
12.1	Retrofelctive Traffic Sign	4	sum	250	1,000.00
12.3	Toucan Crossing	11000	sum	1	11,000.00

	C - PAKENHAM BRIDGE TO COLLINS BRIDGE				
2	**Site Clearance**				
2.1	General Site Clearance	0.59	ha	350	208.01
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	2210	lin.m	13	28,730.00
5.3	CCCTV Ducting	2210	lin.m	17	37,570.00
5.5	PL Poles	28	nr.	1500	41,437.50
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
6	**Earthworks**				
6.1	Excavate topsoil	888	cu.m	1	888.30
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	3868	m2	31	119,892.50
11.2	Fishing Stand	1	nr.	1000	1,000.00
	D - COLLINS BRIDGE				
1	**Structural**				
1.1	Footbridge	1	nr.	200000	200,000.00
2	**Site Clearance**				
2.1	General Site Clearance	0.43	ha	350	151.03
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	166	lin.m	13	2,158.00
5.3	CCCTV Ducting	166	lin.m	17	2,822.00
5.5	PL Poles	2	nr.	1500	3,112.50
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
5.8	PL Chambers	2	nr.	400	800.00
6	**Earthworks**				
6.1	Excavate topsoil	44	cu.m	1	43.58
6.2	Import fill	137	cu.m	6.5	889.53
6.3	Compaction of Fill	137	cu.m	2.5	342.13
11	**Kerbs, Footways and Paved Areas**				
11.1	Kerbs	70	lin.m	20	1,400.00
11.2	Combined Cycle/Footway	277	m2	31	8,571.50
11.3	Cycleway 25mm wearing course on 50mm basecourse on 150mm subbase	155	m2	25	3,875.00
12	**Traffic Signs and Road Markings.**				
12.1	Retrofelctive Traffic Sign	4	sum	250	1,000.00
12.4	Shuttle Light System	1	sum	11000	11,000.00
98	**Land Acquisition**				
98.1	Car park purchase 12th lock hotel	205	m2	123.54	25,325.70

	E - COLLINS BRIDGE TO FINGAL COUNTY COUNCIL BOUNDARY				
2	**Site Clearance**				
2.1	General Site Clearance	0.41	ha	350	141.98
5	**Drainage and Service Ducts**				
5.1	225mm Type A Filter Drain	0	lin.m	40	-
5.2	100 dia. Public Lighting duct	2318	lin.m	13	30,134.00
5.3	CCCTV Ducting	2318	lin.m	17	39,406.00
5.5	PL Poles	29	nr.	1500	43,462.50
5.6	CCCTV Cameras & Pole	1	nr.	1500	1,500.00
5.7	CCTV Chambers	1	nr.	400	400.00
6	**Earthworks**				
6.1	Excavate topsoil	801	cu.m	1	801.05
11	**Kerbs, Footways and Paved Areas**				
11.1	Combined Cycle/Footway	4057	m2	31	125,751.50
11.2	Kerbs	86	lin.m	20	1,711.20
11.3	50mm Wearing Course	321	m2	8	2,567.68
11.4	100mm Road Base	321	m2	8.77	2,814.82
11.5	150mm Sub Base	48	m3	24.5	1,179.53
11.6	300mm 6F1 Capping	96	m3	10	962.90
	SUMMARY: AREA 3				
	Preliminaries		121,341.57		
	1 Structural				
	A - CALLAGHAN BRIDGE TO PAKENHAM BRIDGE	200000			
	D - COLLINS BRIDGE	200000			
			400,000.00		
	2 Site Clearance				
	A - CALLAGHAN BRIDGE TO PAKENHAM BRIDGE	137			
	B - PAKENHAM BRIDGE	11			
	C - PAKENHAM BRIDGE TO COLLINS BRIDGE	208			
	D - COLLINS BRIDGE	151			
	E - COLLINS BRIDGE TO FINGAL COUNTY COUNCIL BORDER	142			
			649		
	5 Drainage & Service Ducts				
	A - CALLAGHAN BRIDGE TO PAKENHAM BRIDGE	110710			
	B - PAKENHAM BRIDGE	11670			
	C - PAKENHAM BRIDGE TO COLLINS BRIDGE	109638			
	D - COLLINS BRIDGE	10793			
	E - COLLINS BRIDGE TO FINGAL COUNTY COUNCIL BORDER	114903			
			357713		
	6 Earthworks				
	A - CALLAGHAN BRIDGE TO PAKENHAM BRIDGE	596			
	B - PAKENHAM BRIDGE	241			
	C - PAKENHAM BRIDGE TO COLLINS BRIDGE	888			
	D - COLLINS BRIDGE	1275			
	E - COLLINS BRIDGE TO FINGAL COUNTY COUNCIL BORDER	801			
			3802		
	11 Kerbs, Footways & Paved Areas				
	A - CALLAGHAN BRIDGE TO PAKENHAM BRIDGE	123086			
	B - PAKENHAM BRIDGE	18350			
	C - PAKENHAM BRIDGE TO COLLINS BRIDGE	120893			
	D - COLLINS BRIDGE	13847			
	E - COLLINS BRIDGE TO FINGAL COUNTY COUNCIL BORDER	134988			
			411163		
	12 Traffic Signs & Road Markings				
	B - PAKENHAM BRIDGE	12000			
	D - COLLINS BRIDGE	12000			
			24000		
	98 Land Acquisition				
	G - TALBOT BRIDGE	25326			
			25326		
	Provisional Sums and Prime Cost Items				
	General Contingency (10%)				134,399.34

TOTAL **€1,478,392.70**

TOTAL	**€1,478,392.70**
VAT @ 13.5%	**€199,583.01**
NET TOTAL	**€1,677,975.71**

Royal Canal Towpath - Cost Estimate Summary

Item No	Item Description	Area 1	Area 2	Area 3	Total	%
		€	€	€	€	
0	**Preliminaries**	125,237.73	159,773.54	121,341.57	406,352.83	4.90%
1	**Structural**	641,969.60	3,412,492.20	400,000.00	4,454,461.80	53.76%
2	**Site Clearance**	362.11	462.19	648.99	1,473.29	0.02%
4	**Pedestrian Guardrail & Safety Barriers**	3,750.00	367,500.00	0.00	371,250.00	4.48%
5	**Drainage, Service Ducts, PL & CCTV**	278,689.00	436,570.00	357,712.50	1,072,971.50	12.95%
6	**Earthworks**	8,365.48	2,046.75	3,801.85	14,214.09	0.17%
11	**Kerbs, Footways & Paved Areas**	304,511.50	406,898.50	411,162.75	1,122,572.75	13.55%
12	**Traffic Signs & Road Markings (inc. Traffic Signals)**	13,000.00	25,000.00	24,000.00	62,000.00	0.75%
98	**Land Acquisition**	1,729.56	0.00	25,325.70	27,055.26	0.33%
99	**General Contingency**	137,761.50	481,074.32	134,399.34	753,235.15	9.09%
	TOTAL ESTIMATE	**1,515,376.47**	**5,291,817.50**	**1,478,392.70**	**8,285,586.67**	100.00%
	Vat @ 13.5%	204,575.82	714,395.36	199,583.01	1,118,554.20	
	Net Total	**1,719,952.30**	**6,006,212.86**	**1,677,975.71**	**9,404,140.87**	

Appendix C Project Need for EIA

Royal Canal Towpath Upgrade Feasibility Study

The Need For An Environmental Impact Assessment

Notice

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1. Introduction

Aims

1.1 The aim of this report is to provide an opinion on the need or otherwise for an Environmental Impact Assessment for the potential upgrade works to the Royal Canal towpath within the jurisdiction of Fingal County Council (FCC)

1.2 The findings of this report relate solely to the preferred option as described in the Feasibility Report for the scheme.

Background

1.3 Atkins has been commissioned by Fingal County Council to examine the engineering feasibility of upgrading the existing Royal Canal towpaths to provide a high quality cycle / pedestrian route suitable for commuter and recreational use.

1.4 FCC has requested that the study includes an opinion on the requirement for an Environmental Impact Assessment. This document seeks to address this request.

1.5 The proposed development site is located along the Royal Canal and stretches approximately 11km from the county boundary at Ashtown in the east to the county boundary at Leixlip to the west.

1.6 The canal passes through three main character areas shown on drawing 3098SK020 Revision B and included at Figure 1.1 below:

Area 1: Longford Bridge (Ashtown Road) to Granard Bridge (Castleknock Road)

1.7 The towpath in this area is generally constructed on a flat gravel/tarmac path along the canal corridor; it has open views to urban development and major infrastructure on both sides of the canal. The general area has low ecological value comprising of grassland and bare ground with the wet grassland and marshland near Phoenix Park and the woodland on the canal's northern bank representing habitats of moderate to high local importance.

Area 2 – Granard Bridge (Castleknock Road) to Callaghan Bridge (Clonsilla Road)

1.8 The towpath comprises of a gravel path on a steep gradient at the various access points with the remainder being a narrow rough dirt track along the corridor. This section includes the Deep Sinking area, a 4km length of the canal which is 'cut' approximately 7-9m into the bedrock. Both sides of the canal support woodland and scrub areas that are of moderate to high local importance and may be of particular importance to species such as bats, badger and passerine birds.

Area 3 – Callaghan Bridge (Clonsilla Road) to County Boundary (Confey)

1.9 This section of the towpath consists of a dirt track on relatively flat-lying ground with the exception of access points which are on a steep gradient. The path is flanked by mature hedgerows and treelines of low to moderate ecological importance, offering views of surrounding agricultural lands. The character of this area is likely to change over time as the adjacent zoned lands are developed. Lands are currently zoned for residential development as part of the Hansfield Strategic Development Zone (SDZ). Lands closer to Pakenham Bridge are zoned for *"open space and recreational amenities"*.

1.10 The site location in the context of the Royal Canal is shown below in Figure 1.1.

1.11 The development will require the following potential works to create the upgraded towpath:

- Widening of the towpath through the Deep Sinking area, which will include excavation of potentially sensitive areas, construction of new paved surfaces and cantilevered walkway structures;
- Erection of pedestrian guardrails where required;
- Upgrading of the road network local to the scheme including provision of traffic calming signs / markings and signal controlled toucan crossing facilities;
- Provision of new foot and cycle bridges and / or underpasses at select locations, which will include potential temporary road closures and / or temporary railway speed restrictions and possessions;
- Installation of additional facilities to improve the amenity value of the canal (picnic tables, jetties, benches, information plaques, fishing stands etc);
- Provision of public lighting, CCTV cameras and associated ducts/masts.

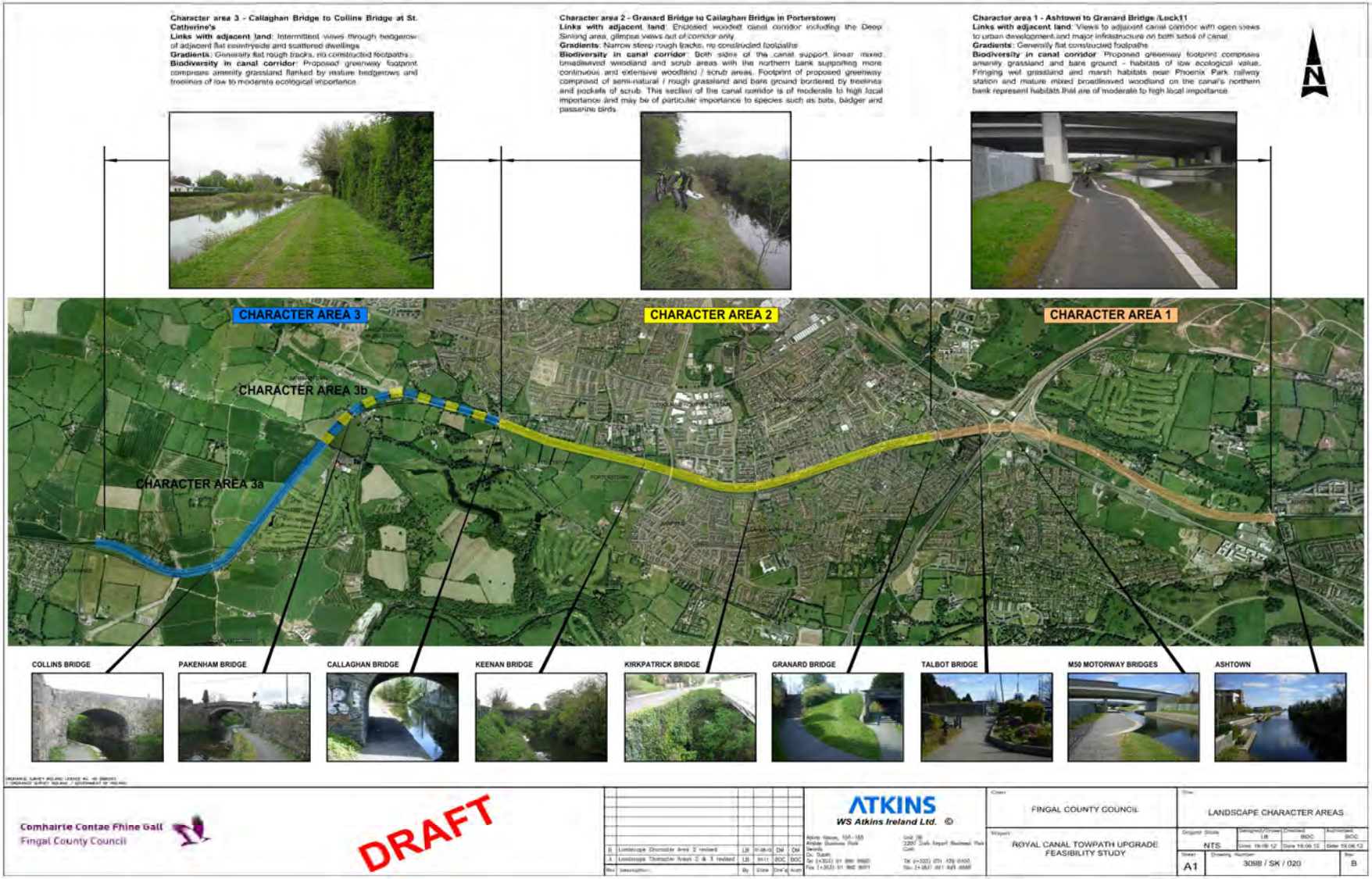

Figure 1.1 –Site Location

Previous studies

1.12 There are no previous reports prepared with respect to screening for an EIA in the study area. However, the following ecological studies have been undertaken in recent years:

- The "Study of the Royal Canal Vascular Plant Flora" was conducted by BEC Consultants in 2004 on behalf of Fingal County Council. It consisted of a botanical survey of the Royal Canal and focussed mainly on the central channel and the banks on either side of the canal. A list of vascular plant species was compiled and habitat types were identified and mapped. Other biodiversity features, such as badger setts, were also mapped. The study provides recommendations for the conservation management of the site.

- "An Ecological Survey of the Grand and Royal Canals in Dublin" was prepared by Ecoserve Ltd on behalf of Waterways Ireland in late 2011. The study area along the Royal Canal was limited to the area between Spencer Dock in Dublin City Centre and the 12th lock at Blanchardstown / Castleknock. The study found that 18 habitats were recorded following a detailed survey according to Fossitt Habitat Classification Scheme (Fossitt, 2000). The most botanically interesting habitats are GS1 Dry calcareous and neutral grassland at the aqueduct over the railway west of the 6th Lock, and WD1 (Mixed) broadleaved woodland main woodland was located on the north bank of the canal west of Longford.

  A total of 19 bird species were recorded along the Royal canal within the Study Area including 2 birds of high conservation concern (Black-headed Gull and the Herring Gull) classified as 'Red List' status by the Birds of Conservation Concern in Ireland (BoCCI). No signs of mammal activity were recorded along the Royal Canal in the course of the current study although terrestrial mammals including Brown rat, Grey squirrel, Rabbit, Fox and Otter have previously been recorded at the Canal.

  The Royal Canal also provide sites suitable habitats for bat roosting. Surveys were carried out under the Daubenton's Bat Waterway Survey just east of the M50 in the years 2006-2011, Daubenton's bats were recorded in 2007 and 2009-2011. Other species of bat that have been recorded along the Royal Canal within the Study Area include the Soprano pipistrelle, Common pipistrelle, Leisler's bat, Brown long-eared bat and Whiskered/Brandt's bat. All of these species are protected under the Wildlife Acts (1976 and 2000), both sets of legislation make it an offence to intentionally harm a bat or disturb its resting place.

  Sampling of the aquatic macroinvertebrate community of the Royal Canal was carried out by the Central Fisheries Board (now Inland Fisheries Ireland) in 1999. The results of the surveys undertaken indicated that diverse groups of taxa were represented within the Royal Canal including crustaceans, worms, leeches, bivalves, snails, mayflies, caddisflies and spiders. Although diverse taxa were recorded within the Royal Canal many groups represented were present in low abundances and no species was dominant across all sites throughout all years.

2. Need for an Environmental Impact Assessment

2.1 The main legislation under which an Environmental Impact Assessment (EIA) may be required for various developments is the Planning and Development Act 2000 (incorporating the Planning and Development Regulations 2001). This project interfaces with roads along its length so potentially the Roads Act1993 (incorporating the Roads Regulations 1994) could also trigger an EIA.

2.2 Both pieces of legislation are examined below as to whether an EIA would potentially be required for this project.

The Planning and Development Act, 2000 (Planning and Development Regulations, 2001)

2.3 It is acknowledged that the majority of potential works for this scheme could be deemed exempt in accordance with Class 35 of Schedule 2, Part 1 (Exempted Development) of the Planning and Development Regulations, 2001. However, as the works interface with the road and rail network the whole project may not be considered exempt.

2.4 The requirement (or otherwise) for an EIA, is determined by the inclusion of the development type as listed in Article 93 and Schedule 5 of the Planning and Development Regulations 2001-2011. Schedule 5 Part 1 and 2 lists various types of development which require an EIA to be carried out, none of which include the development of a canal towpath.

2.5 However, in accordance with Article 103 of the Planning and Development Regulations 2001 where the development would be located on or in an area, site, etc. as set out in Article 103(2) – (see below), the planning authority shall decide whether the development would or would not be likely to have significant effects on the environment of such site, area or land etc. The implication is that if the authority decides that it would be likely to have significant effects on the environment, it can invoke its powers to request an EIA. Article 103(2) sites comprise:-

(a) a 'European Site';

(b) an area the subject of a notice under section 16(2) (b) of the Wildlife (Amendment)

Act, 2000;

(c) an area designated as a Natural Heritage Area under section 18 of the Wildlife (Amendment) Act, 2000;

(d) land established or recognised as a nature reserve within the meaning of section 15 or 16 of the Wildlife Act, 1976 as amended by sections 26 and 27 of the Wildlife (Amendment) Act, 2000;

or

(e) land designated as a refuge for flora or as a refuge for fauna under section 17 of the Wildlife Act, 1976 as amended by section 28 of the Wildlife (Amendment) Act, 2000.

2.6 The Royal Canal is formally designated a proposed Natural Heritage Area (pNHA) under the Wildlife Amendment Act, 2000 (site code 002103) and not a Natural Heritage Area as listed under Article 103(2)(c) shown above. However an EIA Screening Report incorporating baseline ecological habitat surveys should be carried out in accordance with *Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding Sub-threshold Development*, 2003, DEHLG. If the Screening Report predicts that significant effects may result on the Royal Canal pNHA then the planning authority may request an EIA in spite of the 'proposed' status of the Royal Canal.

Roads Act 1993

2.7 Under the Roads Act 1993 Part IV, section 50, an EIA is required for '*the construction of a motorway, a bus lane, or for any prescribed type of proposed road development consisting of the construction of a proposed public road or the improvement of an existing public road*.'

2.8 *In addition where the Minister considers that any proposed road development (other than development above i.e. a motorway, a bus lane or for any prescribed type of roadway) consisting of the construction of a proposed public road or the improvement of an existing public road would be likely to have significant effects on the environment, he shall direct the road authority to prepare an environmental impact statement in respect of such proposed road development and the authority shall comply with such direction*'.

2.9 Also '*where the Minister considers that any proposed road development (other than development above) consisting of the construction of a proposed public road or the improvement of an existing public road would be likely to have significant effects on the environment, he shall direct the road authority to prepare an environmental impact statement in respect of such proposed road development and the authority shall comply with such direction*'.

2.10 The Roads Regulations 1994, PART V. Environmental Impact Assessment, section 8, clarifies the meaning of a '*prescribed road*' as described in the Roads Act 1993. The Regulations state that, '*The prescribed types of proposed road development for the purposes of subsection (1) (a) (iii) of section 50 of the Act (Roads Act 1993) shall be-*

a) *the construction of a new road of four or more lanes or the realignment or widening of an existing road so as to provide four or more lanes, where such new, realigned or widened road would be eight kilometres or more in length in a rural area, or 500 metres or more in length in an urban area*

b) *the construction of a new bridge or tunnel which would be 100m or more in length*.

2.11 Article 14 of European Communities (Environmental Impact Assessment) (Amendment) Regulations 1999 SI No. 93 of 1999 amends the requirements by the insertion after paragraph (*c*) of subsection (1) of section 50 thereof of the following paragraphs—

(d) '*Where a proposed road development….consisting of the construction of a proposed public road or the improvement of an existing public road would be located on:*

i) a special area of conservation,

ii) a site notified in accordance with Regulation 4 of the European Communities (Natural Habitats) Regulations, 1997 (S.I. No. 94 of 1997),

iii) an area classified pursuant to paragraph (1) of (2) of article 4 of Council Directive No. 79/409/EEC of 2 April, 1979, on the conservation of wild birds (O.J. No. L 103, 25 April, 1979),

iv) a site where consultation has been initiated in accordance with article 5 of Council Directive 92/43/EEC of 21 May, 1992, on the conservation of natural habitats and of wild fauna and flora (O.J. No. L 206, 22 July, 1992),

v) land established or recognised as a nature reserve within the meaning of section 15 or 16 of the Wildlife Act, 1976 (No. 39 of 1976),

vi) land designated as a refuge for fauna under section 17 of the Wildlife Act, 1976 (No. 39 of 1976),

the road authority concerned shall decide whether the proposed road development would or would not be likely to have significant effects on the environment, and if the authority decides that

the proposed road development would be likely to have such effects, paragraph (c) shall apply accordingly.'.

2.12 The Royal Canal is not located on any of the wildlife designation listed in Article 14 (i)- (vi) above and as such the development does not require and EIA to be carried out under the Roads Act.

3. Statutory Approval

3.1 It is considered, based on the information available at this time, that an EIA will not be required automatically as part of the Planning and Development Act 2000 (Planning and Development Regulations, 2001) for this development. Under the Roads Act the development does not require and EIA to be carried out. However, appropriate consideration should be given to the sensitivities of the receiving environment along the canal corridor. In this regard, it would be prudent of the authority to commission ecological, habitat and biodiversity studies on the potential impacts of the scheme and how these can be best mitigated. It would be envisaged that such a report would include the result of an EIA Screening Report, a Landscape Plan showing visual mitigation and any other studies requested through pre-planning consultation.

3.2 The Local Authority, following the completion of these studies, may deem the project to require an EIA. If it is deemed that the development does not require and EIA, the appropriate route for the Statutory Approval would be in accordance with Part 8 of the Planning and Development Regulations. An environmental report addressing the site development, including environmental concerns and proposing mitigation measures would also be recommended to accompany the planning submission.

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