

DART+ Depot Project Report

Appendix E – Kilcock Station Options Selection Report

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DART+ Depot

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Executive Summary

This report has been prepared to document the process of selecting the best alternative to provide Kilcock station with double track and two platforms.

Once reviewed and approved, the assessment included in this report will be included as part of the Option Selection Report for the Public Consultation event as part of the DART+ Depot project non-statutory consultation process.

For this reason, the policy context of the DART+ Depot is not included in this assessment which covers the engineering and environmental aspects of the optioneering undertaken to determine the best solution for the upgraded Kilcock Station.

1. Introduction

1.1 Purpose of This Report

This report has been prepared to document the process of and to set out the detail of options selection in respect of the preferred site for Kilcock Station upgrade for the proposed project.

1.2 References standards

The IE standards and main parameters establishing the design criteria for the alternatives proposed in this document are described below.

CCE-TMS-345 Engineering Requirements for Passenger Platforms and Barrow Paths

- Platform length 174 m
- Track gradient not steeper than 2.5 mm/m (1 in 400). For new platforms on existing lines, where the gradient of 1 in 400 cannot be achieved, approval must be sought from Chief Civil Engineer (CCE) Technical Manager. The absolute limit for gradients at new platforms on existing lines is 1 in 120 (8.3 mm/m)
- Platforms must be located preferably on straight horizontal alignment. For new platform, the minimum radius set out in the Technical Specifications for Interoperability (TSI) is 350 m radius. Where a new platform build cannot be located on a straight alignment, a risk assessment should be carried out to ensure that proposed mitigation measures are adequate.
- Single-faced platforms minimum wide: 2600 mm (3000 mm recommended)
- Platform lateral clearance: 760 mm (on straight alignment). Additional clearances must be applied in on curve alignment and in tracks with cant.

CCE-TMS-340 Horizontal Curvature Design

- Recommended that track cant should be restricted to 90 mm for tracks adjacent to passenger platforms

I-PWY-1101 Requirements for Tracks and Structures Clearances

- Standard clearance from the nearest running edge to new bridge abutment is 4500 mm or 2500 mm if the abutment being designed to resist notional impact forces
- Track spacing through modern track connections is 2000 mm

Note: The clearance and track spacing set out above refers to straight and level track. Additional clearances must be provided on curved track.

1.3 Abbreviations

Abbrev	Meaning	Abbrev	Meaning
AA	Appropriate Assessment	EIA	Environmental Impact Assessment
AACH	Architectural, Archaeological and Cultural Heritage	EIAR	Environmental Impact Assessment Report
AADT	Annual Average Daily Traffic	EMC	Electromagnetic compatibility
ABP	An Bord Pleanála	EMF	Electromagnetic field
AC	Alternating Current	EMI	Electromagnetic Interference
ACA	Architectural Conservation Area	EMR	Electromagnetic Radiation
ASP	Auxiliary Supply Point	EMRA	Eastern and Midland Regional Assembly
ATC	Automatic Traffic Count	EMU	Electric Multiple Unit
BGL	Below ground level	ERM	Eastern Regional Model
BRT	Bus Rapid Transit	ESB	Electricity Supply Board
CA	Conservation Area	FDP	Fingal Development Plan
CAF	Common Appraisal Framework	GDA	Greater Dublin Area
Cant	Superelevation / cross fall of the rails	GHG	Greenhouse gas
CAPEX	Capital expenditure	GI	Geotechnical Investigations (Same as Site Investigations)
CCRP	City Centre Re-signalling Project	GSM	Global System for Mobile communications (originally from the French: Groupe Spécial Mobile)
CDP	City Development Plan	GSM-R	As above, GSM – Railway
CCTV	Closed Circuit Television	GSWR	Great Southern & Western Railway
CIÉ	Córas Iompair Éireann	GUI	Graphical user interface
CRR	Commission for Railway Regulation	ha	Hectare
D&B	Design & Build	HGV	Heavy goods vehicle
DART	Dublin Area Rapid Transit (IE’s Electrified Network)	hr	Hour

Abbrev	Meaning	Abbrev	Meaning
DC	Direct Current	HV	High voltage
DCCDP	Dublin City Development Plan	IAMS	Infrastructure Asset Management System
DCHG	Department of Culture, Heritage, and the Gaeltacht	ICNIRP	International Commission on Non-Ionising Radiation Protection
DMRB	Design Manual for Roads and Bridges	IÉ/IR	Iarnród Éireann/Irish Rail
DMURS	Design Manual for Urban Roads and Streets	JTC	Junction Turning Count
DNO	Distribution Network Operator	KCCDP	Kildare County Development Plan
Down track	The track carrying trains travelling away from Dublin	LAP	Local Area Plan
DTTAS	Department of Transport, Tourism and Sport	LOC	Location cabinet
DU	DART Underground	LV	Low voltage
m	Metre	RO	railway order
MASP	Metropolitan Area Strategic Plan	RPG	Regional Planning Guidelines
MCA	Multi-Criteria Analysis	RPS	Record of Protected Structures
MDC	Multi-Disciplinary Consultant (i.e. IDOM)	RRV	Rail Road Vehicles
MEP	Multiple Equipment Provisioning	RSES	Regional Spatial and Economic Strategy
MGWR	Midlands Great Western Railway	SAC	Special Area of Conservation
min	Minute	SDRA	Strategic Development and Regeneration Area
MRI	Magnetic Resonance Imaging	SDZ	Strategic Development Zone
MV	Medium Voltage	SEB	Signalling Equipment Building
NAPSI	National Action Plan for Social Inclusion	SEM	Scanning Electron Microscope
NDP	National Development Plan 2018–2027	SER	Signalling Equipment Room
NHA	Natural Heritage Area	SET	Signalling, Electrical, Telecommunication
NIAH	National Inventory of Architectural Heritage	SIFLT	Strategic Investment Framework for Land Transport
NMI	National Museum of Ireland	SMR	Sites and Monuments Record

Abbrev	Meaning	Abbrev	Meaning
NPF	National Planning Framework	SPA	Special Protection Area
NSO	National Strategic Outcomes	T	Tesla
NTA	National Transport Authority	TBM	Tunnel Boring Machine
OB	Overbridge	TER	Telecommunication Equipment Room
ODMH	Ordnance Datum Malin Head	TII	Transport Infrastructure Ireland
OHLE	Overhead Line Equipment	TOD	Transit Oriented Development
OPEX	Operating expenses	TOR	Top of Rail
OSR	Option Selection Report	TPHPD	Trains Per Hour Per Direction
PC1	Public Consultation No.1	TSS	Train Service Specification
PC2	Public Consultation No.2	TTA	Traffic and Transport Assessment
PLUTO	Planning Land Use and Transport Outlook 2040	UPS	Uninterrupted Power Supply
pNHA	proposed Natural Heritage Area	Up track	The track carrying trains travelling towards Dublin
POSR	Preliminary Option Selection Report	V	Volt
PPT	Phoenix Park Tunnel	UIC	International Union of Railways (Union Internationale des Chemins de fer)
PSP	Principal Supply Point	WHO	World Health Organisation
QBC	Quality Bus Corridor	yd	Yard
RAM	Reliability, availability and maintainability	W	Watt
REB	Relocatable Equipment Building		
RMP	Record of Monuments and Places		

2. Kilcock Station

2.1 Kilcock Station Location

The original Kilcock station is sited at the west of Kilcock village, around OBG26 (Allen Bridge and R148 road).

The old station was closed in the middle of the 20th century and a new single platform station was opened in 1998, in the centre of the village and passes under Shaw bridge (OBG25).



Figure 2-1 Kilcock station location

2.2 Kilcock Station Constraints

The main constraints affecting the design of Kilcock station with two tracks and two platforms are described below.

2.2.1 OBG25 Shaw Bridge

Shaw Bridge has a clearance between abutments of 10.42 m, which currently carries a single track and the station platform.

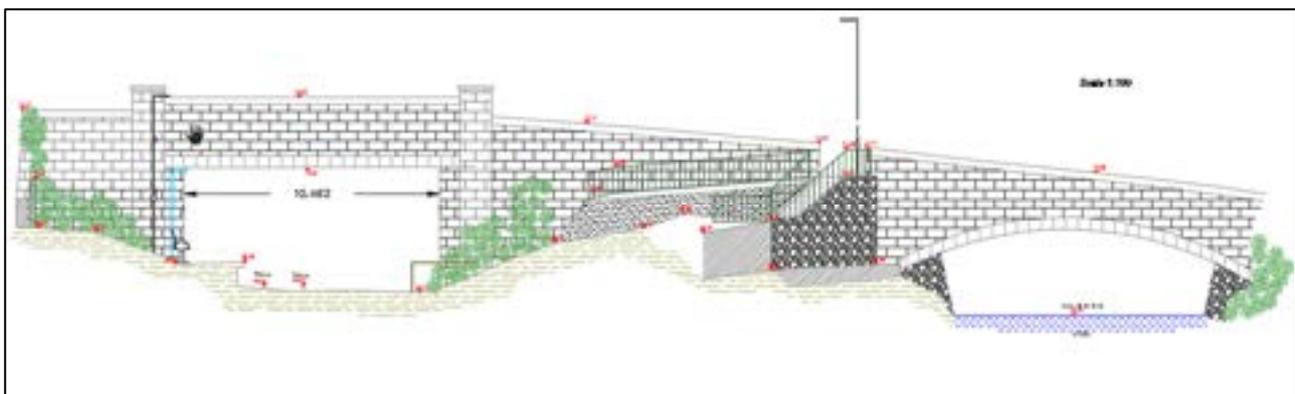


Figure 2-2 Current status of Kilcock station track and platform under OBG25

The clearance of this bridge was designed for the current track and a future double track, keeping the minimum 2.5 m of clearance between the tracks and the bridge abutment.

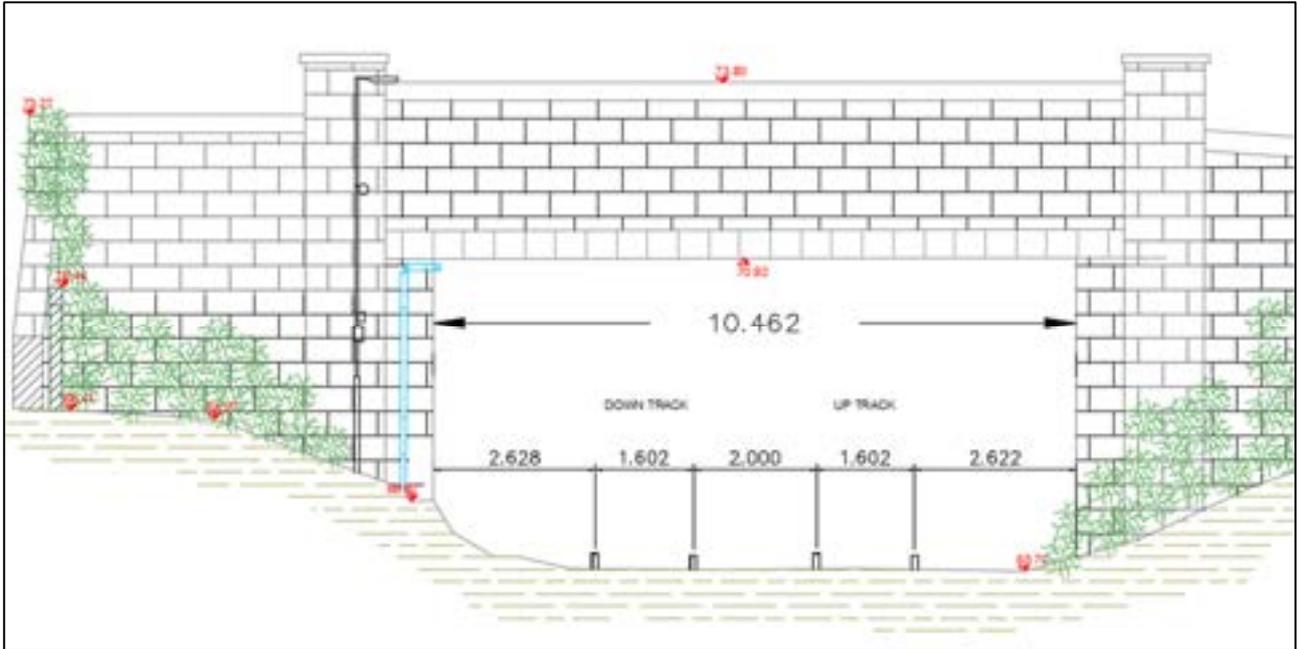


Figure 2-3 Configuration of the double track under the bridge without platforms

Due to the addition of a second track under the bridge, the abutments will be less than 4.5m from the running edge of the nearest rails. Train derailment risk assessment as Appendix F of UIC 777-2 will be carried out at Detailed Design Stage on the current situation and on the proposed situation and presented to CCE’s Technical Manager for consideration. This will be included in a technical note. The detailed design shall incorporate all of the instructions from CCE’s Technical Manager.

The bridge span does not allow to accommodate a double track with platforms on both sides. To provide enough clearance, it would be necessary to expand the current span 1.462 m, which would imply the reconstruction of the bridge.

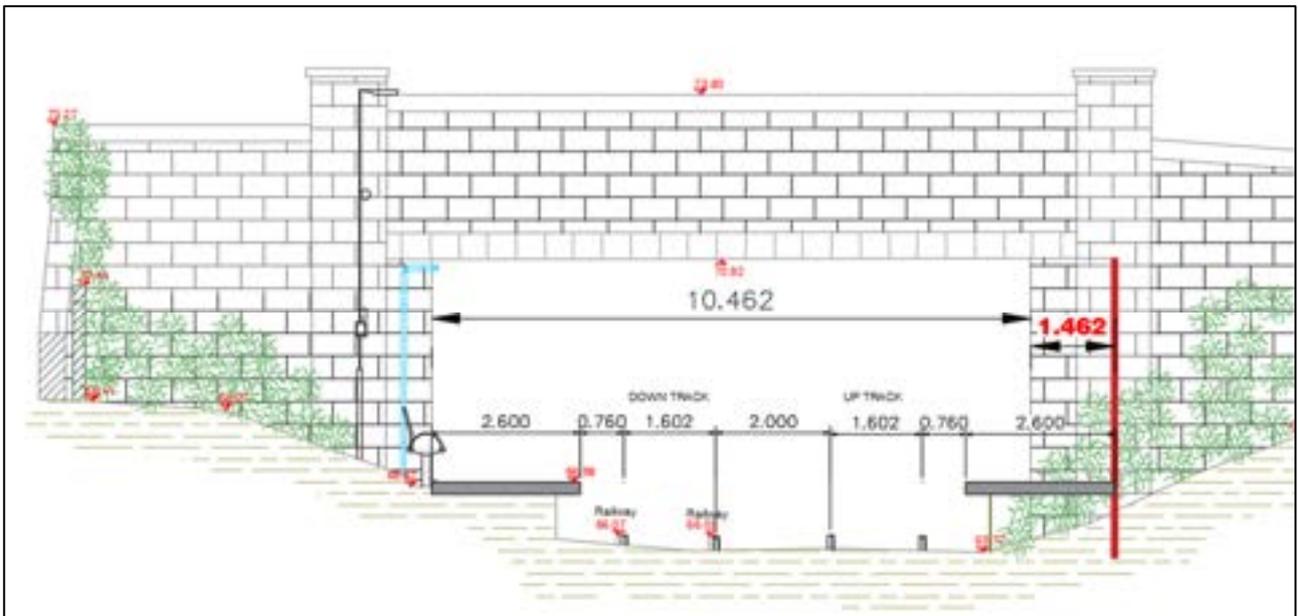


Figure 2-4 Configuration of the double track with platforms under the bridge

2.2.2 Horizontal and vertical alignment of Kilcock Station track

The geometry of the current track as it passes through Kilcock station is not ideal and fails to comply with certain aspects of the standard.

For this reason, from Ch 18 ½ to 18 ¾ when passing through Kilcock station, a permanent speed restriction (PSR) limits the speed through the station to 60 mph (95 km/h).



Figure 2-5 PSR from 18 ½ just before reaching Kilcock Station

- Horizontal Alignment: from the eastern end of the platform to OBG25, the track has a straight alignment, which changes to a curve with a radius of approximately 650 m from OBG25 to the western end of the platform. Between the straight alignment and the curve there is a transition curve.

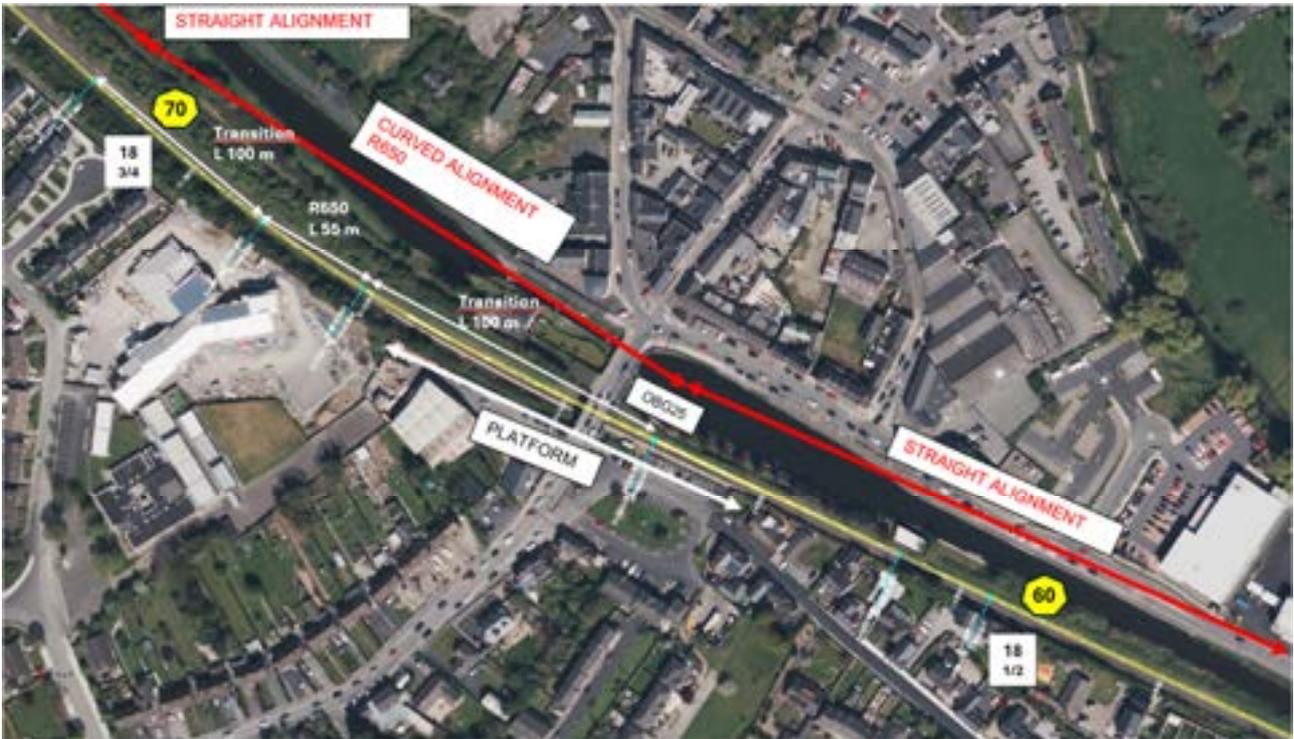


Figure 2-6 Track horizontal alignment in Kilcock Station area



Figure 2-7 Track straight to curve change of horizontal alignment in Kilcock Station platform

- Vertical Alignment: The track changes its vertical alignment as it passes through Kilcock station. From the end of the east platform to approximately OBG25, the gradient is constant at 1 in 2,500 (0.04%). In the OBG25 area, the gradient changes to 1 in 89 (1.12%).

The actual gradient of 1 in 89 (1.12%) is above the 1 in 400 (0.25%) recommended maximum gradient and the 1 in 120 (0.83%) absolute limit gradient for new platforms on existing lines.

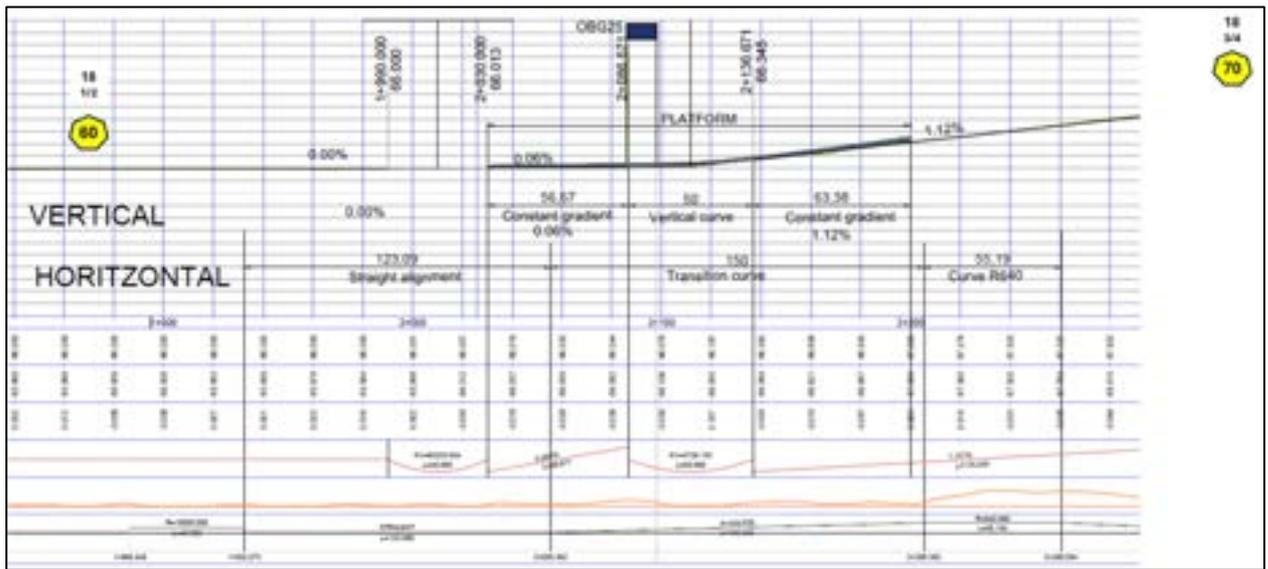


Figure 2-8 Actual station vertical alignment with a gradient of 1 in 89 above the standard limit

2.2.3 Geographic constraints. Urban layout and Royal Canal

Kilcock station, located in the centre of the town, is constrained by the Royal Canal to the north and the urban fabric to the south.

The railway tracks run parallel to the Royal Canal, which acts as a barrier that makes it difficult to double the current single track and build a second platform for this line.

2.2.4 Access and Accessibility constraints. Pedestrian footbridge

Regarding access to the station, the most convenient solution is to maintain access to the south platform from the station car park. In any of the options described below, access can be preserved from the same point currently used. Access will remain open and barrier-free, with no physical control gates. Passenger validation will be carried out through smart card readers (validators).

The introduction of the north platform presents a new challenge: ensuring a safe and accessible connection between platforms. One possibility considered was to establish this connection at urban level via the existing bridge OBG25, but its slope does not allow for it. There is a gradient of more than 8% on either side of the highest point of the road crossing the bridge.

The Irish standard for accessible urban pedestrian routes is outlined in the “Building for Everyone: A Universal Design Approach – Booklet 1: External Environment”, published by the Centre for Excellence in Universal Design, part of the National Disability Authority (NDA). According to this guidance, the slope should not exceed 5% to be considered accessible.

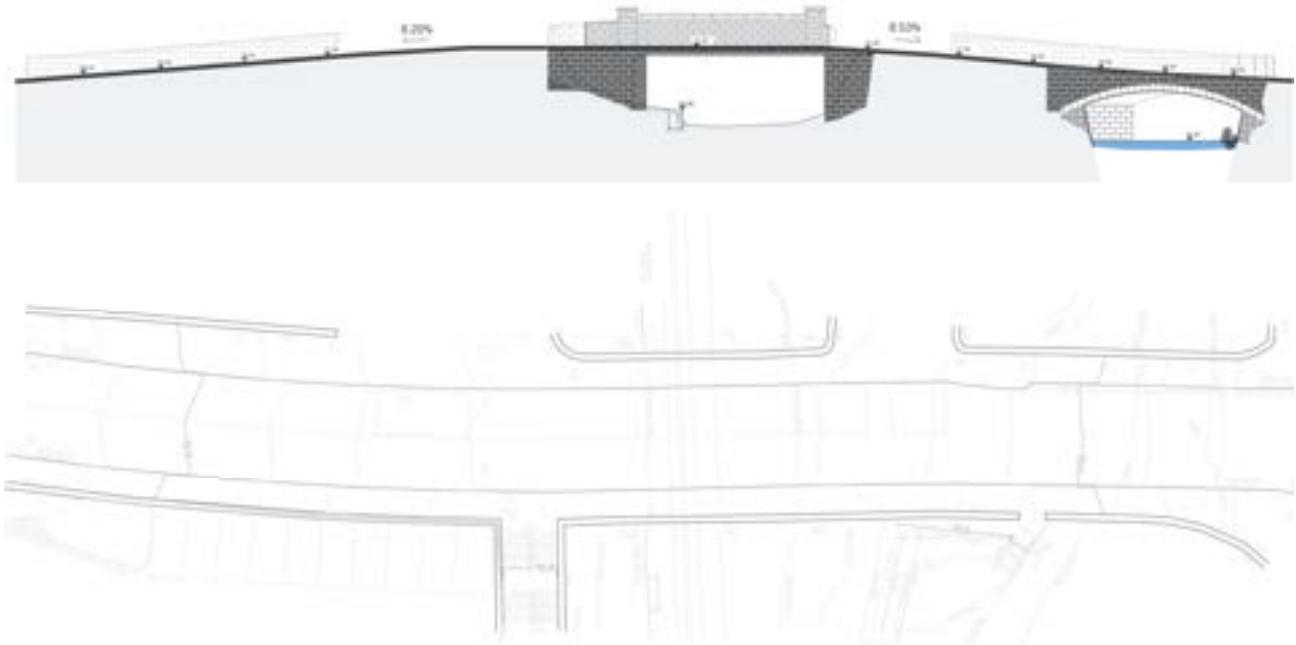


Figure 2-9 OBG25 bridge section and plan indicating the slope on each side from the highest point

For this reason, the bridge cannot function as an accessible crossing between platforms and the installation of a pedestrian bridge connecting both platforms with stairs and lifts must be considered. A stair width of 1.6 metres and a footbridge width of 2 metres have been considered in the design.

Regarding the platform width, beneath the bridge, the existing platform has a width of 2.49 metres, which does not comply with the TSI requirements (Technical Specifications for Interoperability).

A platform width of 2.6 metres is required in accordance with the persons with reduced mobility (PRM) TSI requirements. This includes a 1.6 metre usable area, free from fixed obstacles, and a 1.0 metre safety zone along the platform edge, which must remain clear to ensure safe boarding and alighting for all passengers, including those with reduced mobility. This configuration guarantees compliance with European accessibility standards while maintaining operational safety.

3. Kilcock Station Extension Options

Taking into account the constraints explained in the previous section, different alternatives have been studied for providing the station with two tracks and two platforms.

The three options considered are as follows:

3.1.1 Kilcock Station at the Current Location

This option maintains the current position of the station platform by duplicating a second track and a new platform on the north side (on the Royal Canal side).

The new track and platform will pass under Shaw Bridge (OBG25) in the same way as the current track and platform. This allows current access to the station to be maintained, in front of the station car park.

The width of the platforms is determined by the surrounding area: to the south by the current station entrance and car parks, and to the north by the park next to the Royal Canal and the access to the house next to Lock 16 on the Royal Canal.

In either case, platform widths of at least 3 metres are feasible.

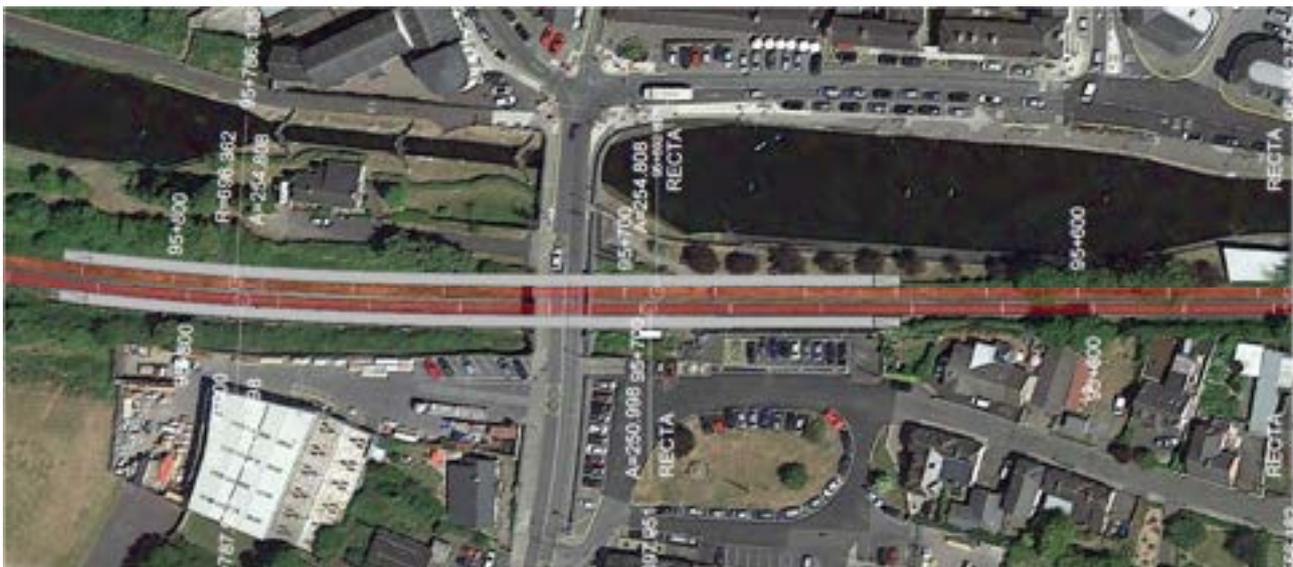


Figure 3-1 Kilcock Station Option 1 at current location proposal

The current clearance between the bridge abutments of 10.462 m does not allow for a station with a double track and two platforms, which is why it is necessary to demolish the bridge and build a new bridge with a clearance between abutments of approximately 12 m.

The demolition and reconstruction of the bridge will result in the closure of the R125 road for an extended period (4-6 months).

The current geometry of the track as it passes through the station platform presents situations that are less than ideal and others that do not comply with the standards:

Change in the horizontal alignment.

The actual horizontal alignment consists of a first straight section followed by a transition curve and a curved section.

Preferably, tracks in stations should be laid out in a straight horizontal alignment due to platforms along a transition curves require a constant changing platform clearance dimension.

The vertical alignment proposed maintains the actual straight-transition curve – curve configuration for the existing and the new platforms and tracks, with some minor adjustment in the final section.

Change in vertical alignment

The actual vertical alignment consists of a first section with a constant gradient of approximately 1 in 1667 (0.06%) with a change in gradient to 1 in 89 (1.12%) past OBG25.

Preferably, tracks in stations should be laid out in a constant gradient of less than 1 in 400 (0.25%) with an absolute limit for gradients at new platforms on existing lines of 1 in 120 (0.83%).

The last section of the platform, with a gradient of 1 in 89 (1.12%), does not comply with the standards. Therefore, this option involves demolishing the current platform and lowering the existing track in order to rebuild this part of the platform with the same gradient as the previous section and obtain a platform with a constant gradient.

On the other side, for the new track, the new platform will follow the same vertical alignment with the same gradient of 1 in 2,500 (0.04%).



Figure 3-2 Kilcock Station Option 1 vertical profile proposal

There may be the potential to reduce the need for some of the track lowering and retaining structures, if the maximum grade of 1:120 / 0.83% was used through the platforms; however, this would still not be ideal and would require CCE approval.

Structures and earthworks

Due to the need to maintain the horizontal alignment of the platform, the new tracks alignment must be lowered to a maximum of 1.70 m over a distance of 700 m. The existing track should be removed and two new track placed at the designed elevation. To prevent the excavation slopes from extending beyond the boundaries of the current railway corridor, retaining structures along both tracks sides are required:

- From Ch95+720 to 96+500 at the Up track (north side) structures up to 4,5 m high are required to prevent impacting the house road access adjacent to the Royal Canal Lock 16 and an access path. A retaining wall solution would impact the access road because the excavation required for its construction. Another type of structure, such as piles, is necessary to avoid the impacts
- From Ch95+720 to 95+820 at the Down track (south side) following the platform, structures up to 2,50 m are required to avoid impact on a parking area. The structure in view is a retaining wall along the platform.
- From Ch96+100 to 96+360 at the Down track (south side) structures up to 4,30 m are required to avoid impacting the property boundary of residential houses. A retaining wall solution would impact the property boundary because the excavation required for its construction. Another type of structure, such as piles, is necessary to avoid the impacts
- In this Option 1, due to the lowering of the tracks at the platform ends, the main earthworks involve excavation: The excavation and embankment volumes for this option are shown below:

The total volume of excavation required due to the lowering of the track at the end of the platform is **37,573 m³**.

The excavations and retaining structures will require the rail service disruption for six months, the same time as Option 2 and twice as long as Option 3.

Access and Pedestrian footbridge

The optimal location for the footbridge is as close as possible to the existing access point. In this option, it is positioned immediately to the left of the current entrance, between the access and the OBG25 bridge.

Both the stairs and the lift are recessed by 40 centimetres into the proposed platform width, maintaining a distance of 1.20 metres from the safety zone.



Figure 3-3 Kilcock Station Option 1 pedestrian footbridge

This option presents issues regarding platform width and compliance with the TSI requirements, as the existing platform width beneath the bridge measures 2.49 metres between the platform edge and the bridge abutment. This measurement falls short of the minimum required 2.6 metres to meet the TSI standards.

Passenger flows and station layout are generally clear and intuitive, although the bridge acts as a visual barrier, preventing a full understanding of the station layout at a glance.

The pedestrian bridge does not impact any buildings or structures, except possibly a slight interaction with an existing wall, which could be modified. Alternatively, the final section of the pedestrian bridge could be inclined to run parallel to the wall, avoiding any direct impact.

3.1.2 Kilcock Station Moved West of OBG25 (Shaw Bridge)

This option moves the station platforms west of Shaw Bridge (OBG25) in order to avoid its impact. The start of the platform is displaced approximately 60 metres from the current station entrance.

The width of the platforms is determined by the surrounding area: to the south by the car parks, and to the north by the access to the house next to Lock 16 on the Royal Canal.

In either case, platform widths of at least 3 metres are feasible.



Figure 3-4 Kilcock Station Option 2 proposal

The track alignment will be adjusted under OBG25 to allow twin-track without the need to reconstruct the bridge (the current structure clearance allow for a double track alignment, see also reference to a derailment assessment review note in Section 2.2.1 above).

The horizontal alignment is slightly modified to achieve a curved alignment with a radius of 871 m and sufficient length so that the entire platform remains within the curve and does not fall within the transition curves (not ideal).

There is the potential to have the platforms starting just west of the existing overbridge, however, the benefits of this would have to be weighed up against maintaining the platform on a horizontal curve, as opposed to a transition curve

The vertical alignment along the platform will have a gradient of 1 in 2,500 (0.04%), complying the standards values.

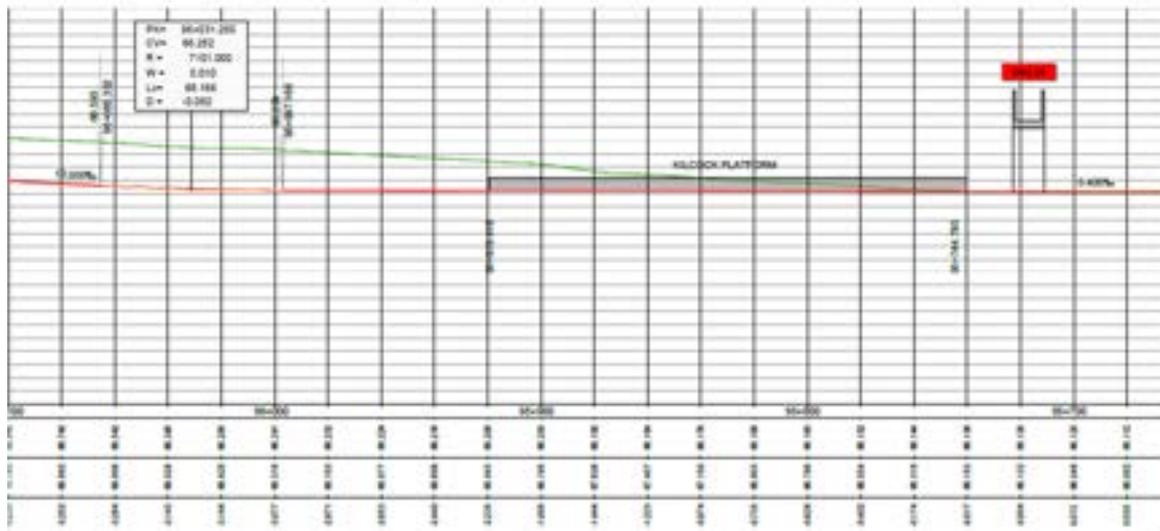


Figure 3-5 Kilcock Station Option 2 vertical profile proposal

The new tracks elevations at the platform ends are 2.24 cm below the current track level.

There may be the potential to reduce the need for some of the track lowering and retaining structures, if the maximum grade of 1:120 / 0.83% was used through the platforms; however, this would still not be ideal and would require CCE approval.

Structures and earthworks

The new tracks alignment must be lowered at maximum of 3.35 m over a distance of 700 m. The existing track should be removed and two new track placed at the designed elevation. To prevent the excavation slopes from extending beyond the boundaries of the current railway corridor, retaining structures along both tracks sides are required:

- From Ch95+720 to 96+500 at the Up track (north side) structures up to 5 m high are required to prevent impacting the house road access adjacent to the Royal Canal Lock 16 and an access path. A retaining wall solution would impact the access road because the excavation required for its construction. Another type of structure, such as piles, is necessary to avoid the impacts
- From Ch95+720 to 95+820 at the Down track (south side) following the platform, structures up to 2,50 m are required to avoid impact on a parking area. The structure in view is a retaining wall along the platform.
- From Ch96+100 to 96+360 at the Down track (south side) structures up to 5,60 m are required to avoid impacting the property boundary of residential houses. A retaining wall solution would impact the property boundary because the excavation required for its construction. Another type of structure, such as piles, is necessary to avoid the impacts

The total volume of excavation required due to keep the almost horizontal gradient till pass the new platforms station is **60,901 m³**.

The excavations and retaining structures will require the rail service disruption for six months, the same time as Option 1 and twice as long as Option 3.

Access and Pedestrian footbridge

In this option, the platforms are located further away from the entry point at the car park, increasing the walking distance for passengers to reach the platforms. To address this, the south platform would need to be extended to connect directly with the access point.



Figure 3-6 Kilcock Station Option 2 pedestrian footbridge

Passenger orientation is negatively affected, as the platforms are located on the opposite side of OBG25 relative to the access point. From the access, the view of the station is limited to the track area, making passenger flows less intuitive.

In this configuration, the pedestrian footbridge (with lifts) has the stairs on the south platform oriented towards the access point, while the stairs on the north platform are directed towards the wider section of the platform, with the aim of optimising passenger flows.

No impact is observed between the platforms or the pedestrian bridge and any existing buildings or structures.

3.1.3 Kilcock Station Moved East of OBG25 (Shaw Bridge)

This option moves the station platforms East of Shaw Bridge (OBG25) in order to avoid its impact.

The start of the platform is offset by approximately 20 metres from the current station entrance. This allows current access to the station to be maintained, in front of the station car park.

The width of the platforms is determined by the surrounding area: to the south by the current station entrance and car parks and properties boundaries, and to the north by the Royal Canal. The space available for locating the platforms is enough to achieve widths of 3 m, and in some sections, it will be necessary to reduce the width to 2.60 m.



Figure 3-7 Kilcock Station Option 3 proposal

The track alignment will be adjusted under OBG25 to allow twin-track without the need to reconstruct the bridge (the current structure clearance allow for a double track alignment, see also reference to a derailment assessment review note in Section 2.2.1 above).

The station platforms are located in an ideal alignment, straight horizontal alignment and vertical constant gradient of 1 in 2,500 (0.04%) complying the standards values.

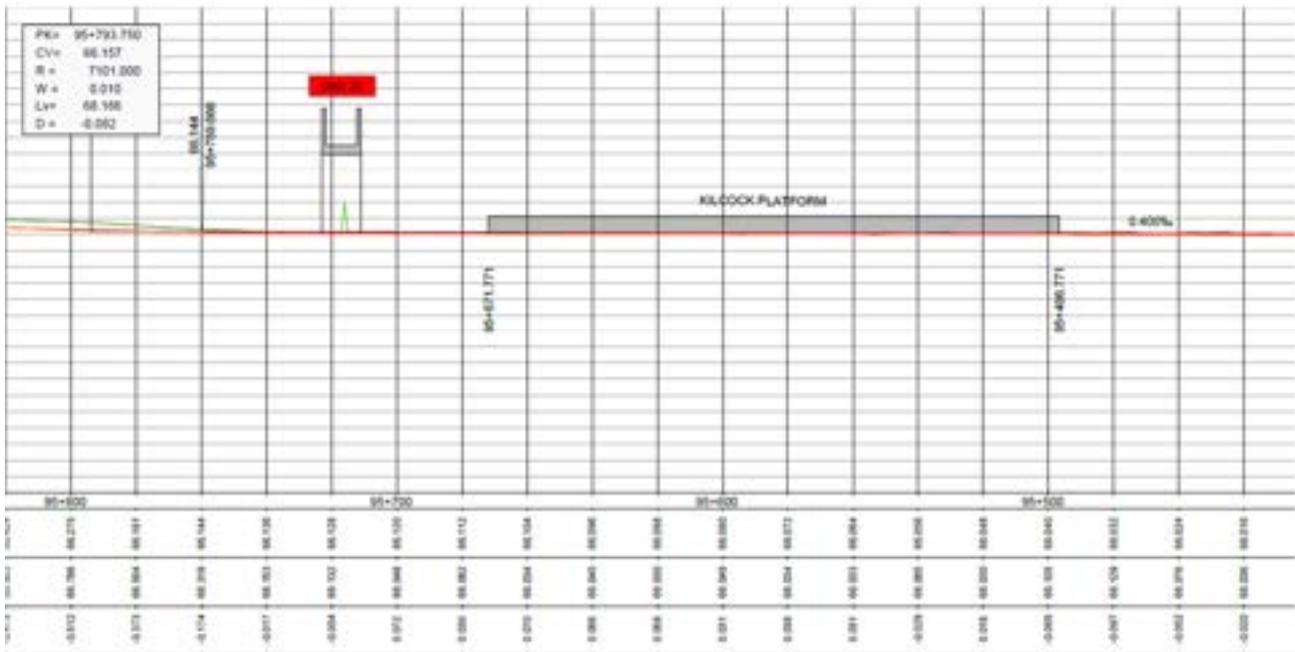


Figure 3-8 Kilcock Station Option 3 vertical profile proposal

Structures and earthworks

No earthworks are required in the area of the new station, as the track are designed at the current track elevation.

West of OBG25, the new tracks alignment must be lowered at maximum of 1 m over a distance of 600 m. The existing track should be removed and two new track placed at the designed elevation. To prevent the excavation slopes from extending beyond the boundaries of the current railway corridor, retaining structures along both tracks sides are required:

- From Ch95+720 to 95+980 at the Up track (north side) structures up to 4 m high are required to prevent impacting the house road access adjacent to the Royal Canal Lock 16 and an access path. A retaining wall solution would impact the access road because the excavation required for its construction. Another type of structure, such as piles, is necessary to avoid the impacts.
- From Ch96+300 to 96+500 at the Up track (north side) structures up to 3,6 m high are required to prevent impacting the path adjacent. A retaining wall solution would impact the access road because the excavation required for its construction. Another type of structure, such as piles, is necessary to avoid the impacts.
- From Ch95+720 to 95+820 at the Down track (south side) following the platform, structures up to 2,50 m are required to avoid impact on a parking area. The structure in view is a retaining wall along the platform.
- From Ch96+140 to 96+360 at the Down track (south side) structures up to 3,40 m are required to avoid impacting the property boundary of residential houses. A retaining wall solution would impact the property boundary because the excavation required for its construction. Another type of structure, such as piles, is necessary to avoid the impacts

The total volume of excavation required due to the lowering of the track pass OBG25 is **35,100 m³**.

The excavations and retaining wall works are incompatible with maintaining railway service during construction. The estimated time for rail service disruption is three months, half that of the other two options, as the necessary track lowering is smaller, and the length of sections with structures is almost half that of the other two options.

The construction of the new track and platform before OBG25 can be carried out while maintaining rail service, with some temporary restrictions.

Access and Pedestrian footbridge

In the last option, where the platforms are shifted eastward, the access point is located at the entry to the south platform. From this point, passengers can cross directly to the north platform via the pedestrian footbridge (with lifts), which is positioned to the left of the access.

In this case, passenger flows are highly intuitive, and the access point offers a full view of the station, enhancing passenger orientation.



Figure 3-9 Kilcock Station Option 3 pedestrian footbridge

In this configuration, both staircases are oriented towards the platforms but positioned outside their footprint, meaning there is no localised reduction in platform width, as occurs in the other two options.

The pedestrian bridge does not impact any buildings or structures, except possibly a slight interaction with an existing wall, which could be modified. Alternatively, the final section of the pedestrian bridge could be inclined to run parallel to the wall, avoiding any direct impact.

However, the north platform does slightly affect a small building used for storing recreational boats related to the canal.



Figure 3-10 Kilcock Station Option 3 Building that is impacted by the construction of the new platform

4. Site Options Assessment

4.1 Introduction

This section presents the outcome of the first stage of the option selection process. It concludes on a proposed shortlist of options for further design development prior to the second stage of assessment. The methodology for each of the Transport Appraisal Framework (TAF) criteria is outlined in Chapter 4 'Multi-Criteria Analysis and Comparators' of this report.

4.2 Transport User Benefits and Other Economic Impacts

4.2.1 Alignment with Customer Requirements Specification

The three options provide two platforms for the two tracks in accordance with standards for passenger platforms.

However, the horizontal alignment configurations of the three options are different, with Option 1 being the worst configuration and Option 3 being the best.

Option 1 Station at the current location

The current section of platform with a vertical alignment of 1 in 89 (1.12%) is corrected, as it exceeds the maximum values established by standards, and a constant gradient of 1 in 2,500 (0.04%) is maintained along the entire length of the platform.

The current horizontal alignment is maintained, consisting of a first straight section followed by a transition curve and a curved section.

This makes it difficult to maintain the distance between the track and the edge of the platform due to the change in the track radius and cant. A Risk assessment must be carried out to propose the adequate mitigation measures.

This option presents a clear improvement over the existing station in terms of platform width. The existing platform width beneath the bridge measures 2.49 metres between the platform edge and the bridge abutment. This measurement falls short of the minimum required 2.6 metres to meet the TSI standards. The new design in this option will feature a platform with a minimum width of 2.6 metres to comply with the TSI requirements.

Since this option eliminates the section of platform with vertical alignment that exceeds the standards values of the current platform configuration, and the upgrade of the platform width beneath the bridge, this option receives a score of '5' on the TAF impact scoring scale, as it will have a 'Slightly Positive Impact' on the customer requirement specifications.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

The new platform vertical alignment of 1 in 2,500 (0.04%) is proposed for the two new platforms, removing the existing 1 in 89 (1.12%) platform that it exceeds the maximum values established by standards.

The platforms are located on a horizontal curved alignment with a radius of 871 m, avoiding transition curves and the maintenance problems that these entail, as explained in Option 1.

Even so, as it is located on a curved alignment, a risk assessment must be carried out to propose the adequate mitigation measures.

This option presents a clear improvement over the existing station in terms of platform width. The existing platform width beneath the bridge measures 2.49 metres between the platform edge and the bridge abutment.

This measurement falls short of the minimum required 2.6 metres to meet the TSI standards. The new design in this option will feature a platform with a minimum width of 2.6 metres to comply with the TSI requirements.

Since this option eliminates the section of platform with vertical alignment that exceeds the standards values, the horizontal transition curve of the current platform configuration, and the substandard platform beneath the bridge, it receives a score of '6' on the TAF impact scoring scale, as it will have a 'Positive Impact' on the customer requirement specifications.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Both the current vertical alignment of 1 in 89 (1.12%), which exceeds the maximum value specified in the standards, and the undesirable straight-curve alignment are corrected.

The station platforms are located in an ideal alignment, straight horizontal alignment and vertical constant gradient of 1 in 2,500 (0.04%) complying with the standards values.

This option presents a clear improvement over the existing station in terms of platform width. The existing platform width beneath the bridge measures 2.49 metres between the platform edge and the bridge abutment. This measurement falls short of the minimum required 2.6 metres to meet the TSI standards. The new design in this option will feature a platform with a minimum width of 2.6 metres to comply with the TSI requirements.

Since this configuration have the ideal platform vertical and horizontal alignment, and also removes the substandard platform beneath the bridge, this option receives a score of '7' on the TAF impact scoring scale, as it will have a 'Highly Positive Impact' on the customer requirement specifications.

It eliminates the section of platform with vertical alignment that exceeds the standards values and the current configuration of the platform with horizontal curve.

4.2.1.1 Summary Assessment

Table 1 Alignment with Customer Requirements MCA Stage Assessment

Option	TAF Impact Scoring on Alignment with customer requirements specification
Option 1: Station at current location	5 – Slightly Positive Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	6 – Positive Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	7 – Highly positive Impact

4.2.2 Transport Costs

Capital and operational cost estimates were prepared for each option. The capital costs associated with the station are significantly higher than the operational cost differences and they consequently have greater impact. Costs in this report are presented on the basis of percentage relative to the least expensive option.

4.2.2.1 Capex Cost

This includes the cost of the infrastructure required for each station location, including:

- Station: including platforms, fittings, furnishings, equipment, security, communications, utilities, footbridge and two lifts
- Track realignment resulting from having platforms in almost horizontal alignment in accordance with standards. This results in 1,1 Km of new double track and related structures

Option 1 Station at the current location

Option 1 is 8 % more expensive than the lowest option (Option 3)

This option retains part of the current platform and track (approximately 85 m), requiring the demolition of the last 100 m of platform.

The Shaw Bridge (OBG25) must be demolished and rebuilt with greater horizontal clearance to allow for the passage of double tracks and two platforms.

A pile-type containment system is required along approximately 1,040 metres, the same length as in Option 2 but with slightly lower heights.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Option 2 is 25 % more expensive than the lowest option (Option 3)

This option requires the demolition of all existing platforms.

The Shaw Bridge (OBG25) is not impacted.

A pile-type containment system is required along approximately 1,040 metres, with heights greater than those in Option 1.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Option 3 is the least expensive option.

This option retains part of the current platform and track (approximately 30 m), requiring the demolition of the last 155 m of platform

The Shaw Bridge (OBG25) is not impacted.

A pile-type containment system is required along approximately 660 metres (580 m less than Option 1 and 2) and with heights much lower than those in Options 1 and 2.

4.2.2.2 Operational Cost

The extension of the Dart to Kilcock is considered to have a positive impact on operating costs, which is the same for all three options.

4.2.2.3 Summary Assessment

Table 2 Transport Costs MCA Stage 1 Assessment

Option	TAF Impact Scoring on Transport costs
Option 1: Station at current location	5 – Slightly Positive Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	6 – Positive Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	7 – Highly Positive Impact

4.2.3 Change of Land Value

The introduction of the DART+ service to Kilcock will lead to an increase in the value of properties near the railway line. The three options are very close to each other, so the result is independent of the location of the site. The assessment of the positive impact is common to all three options.

4.2.3.1 Summary Assessment

Table 3 Change of Land Value MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	7 – Highly positive Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	7 – Highly positive Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	7 – Highly positive Impact

4.2.4 Site Security

All options perform equivalently under site security. All options are rated Neutral Impact as a consequence.

4.2.4.1 Summary Assessment

Table 4 Site Security MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	4 – Neutral Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	4 – Neutral Impact

4.2.5 Transport User Benefits and Other Economic Impacts Summary Assessment

Table 5 Transport User Benefits MCA Assessment

Parameter	TAF Impact Scoring on Transport user benefits and other economic impacts			
	Alignment with Customer Requirements Specification	Transport Costs and Operational Characteristics	Change of Land Value	Site Security
Option 1: Station at current location	5 – Slightly Positive Impact	5 – Slightly Positive Impact	7 – Highly positive Impact	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	6 – Positive Impact	6 – Positive Impact	7 – Highly positive Impact	4 – Neutral Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	7 – Highly positive Impact	7 – Highly Positive Impact	7 – Highly positive Impact	4 – Neutral Impact

4.3 Accessibility Impacts

4.3.1 Impacts on Existing Accessibility

This section provides the appraisal of the 3 options for Kilcock Station to identify and positive or negative impact on:

- Accessibility to the station after the construction works
- the accessibility of the households to the key services such as education, healthcare, or employment opportunities

Accessibility to the existing station is resolved in a very simple way, as there is only one platform serving trains in both directions. Access is at grade level from a car park located to the south of the tracks. The introduction of a new platform to separately serve the two proposed tracks presents new challenges. The first is the crossing between platforms, which, as previously mentioned, is resolved with a pedestrian footbridge that includes lifts and is similar in terms of accessibility across all options. The second challenge arises when shifting the platforms either east or west, as the distance from the access point to the platforms may increase in some cases.

Accessibility of the households to the key services considers the impacts during the construction phase (after the construction phase, all options have no impact).

Option 1 Station at the current location

Station accessibility.

In the case of maintaining the station at the current location, the impact is neutral since the existing access is maintained, located approximately 40 metres from the end of the southern platform, meaning passengers do not need to walk from the station entrance to the platform.

Accessibility of the households to the key services

Option 1 requires the demolition of Shaw bridge, the only bridge that allow the connection between both town sides of the Royal Canal and railway.

This demolition negative impacts on the accessibility of the households to the key services.

For this reason, this option receives a score of ‘3’ on the TAF impact scoring scale, as it will have a ‘Slightly Negative Impact’ on the accessibility.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Station accessibility.

In the option where the station is shifted westward, the impact on platform accessibility is clearly negative. The beginning of the platforms is located approximately 60 metres from the station entrance, and passengers must pass through an underpass to reach them. This results in a longer walking distance for passengers, which worsens the overall accessibility of the station.

Accessibility of the households to the key services

Option 2 has not impacts on the accessibility of the households to the key services.

For this reason, this option receives a score of ‘2’ on the TAF impact scoring scale, as it will have a ‘Negative Impact’ on the accessibility.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Station accessibility.

In the option where the station is shifted east of Shaw Bridge, the impact on accessibility is slightly negative. Access to the station is no longer directly onto the platform; instead, passengers must walk approximately 15 metres to reach it. While this slightly worsens the current level of accessibility, the design effectively manages passenger flows, as the entrance naturally separates those heading to the north platform via the pedestrian footbridge from those accessing the south platform directly.

Accessibility of the households to the key services

Option 3 has not impacts on the accessibility of the households to the key services.

For this reason, this option receives a score of ‘3’ on the TAF impact scoring scale, as it will have a ‘Slightly Negative Impact’ on the accessibility.

4.3.1.1 Summary Assessment

Table 6 Impacts on Existing Accessibility MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	3 - Slightly Negative Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	2 – Negative Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact

4.3.2 Freight Access

Access for freight to freight facilities is not likely to be impacted by any of the options, and are therefore all scored as '4' on the TAF Impact scoring scale as they'll have 'Neutral Impact' on freight access.

4.3.2.1 Summary Assessment

Table 7 Impact on freight access MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	4 – Neutral Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	4 – Neutral Impact

4.3.3 Accessibility Impacts Summary Assessment

Table 8 Accessibility Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring on Accessibility Impacts	
	Existing Accessibility	Freight Access
Option 1: Station at current location	3 - Slightly Negative Impact	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	2 – Negative Impact	4 – Neutral Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact	4 – Neutral Impact

4.4 Social Impacts

Under the social impacts criteria, TAF looks to assess the potential impacts of the projects on accessibility of deprived groups, transport users with different mobility needs and gender impacts.

The Haase and Pratschke (HP) deprivation index measures the relative affluence or disadvantage of a particular geographical area. The index is based on census data, using 10 key indicators such as the proportion of skilled professionals, education levels, employment levels, age dependency, and lone parent rate found in an area. HP deprivation scores of 'Marginally Below Average', 'Disadvantaged', 'Very Disadvantaged', and 'Extremely Disadvantaged' represent socially disadvantaged geographical areas. The potential social impacts with regards to job opportunities on socially disadvantaged geographical areas (HP deprivation index) at Electoral Division (EDs) within 1km of the proposed Kilcock Station locations were considered.

4.4.1 Options Appraisal

All proposed Kilcock Station Options are located within the urban area of Kilcock. The majority of Kilcock is located within the Kilcock Electoral Division (ED) which has an HP deprivation score of Marginally Above Average. The towns northern periphery located in Rodanstown ED which is Affluent.

Option 1 Station at the current location

This option is likely to have positive social impacts, particularly on socially disadvantaged households. As part of this option, electrification will be extended to Kilcock which will increase the frequency of train services to places of employment, education and community facilities. The existing Kilcock station will be upgraded to include a footbridge and lifts to access platforms, having positive effects on all transport users, including those with varying mobility needs.

The demolition and reconstruction of the bridge will result in the closure of the R125 road for an extended period (4-6 months) which will result in significant diversions during this period restricting direct access to community facilities. The proposed works will also require excavation and retaining wall works which will affect the operation of the rail service at the existing station. Rail users will need to utilise nearby stations in Enfield and Maynooth.

Taking into consideration the short-term construction phase impacts and the improvements to the train station, platforms and frequency in rail service during operation phase, this option was given a TAF impact score of '5-Slightly Positive'.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

This option is likely to have positive social impacts, particularly on socially disadvantaged households. As part of this option, electrification will be extended to Kilcock which will increase the frequency of train services to places of employment, education and community facilities. The train station will be moved west of the existing by approximately 60 metres and as such, there will be no significant changes in the population cohort served by the new station. The new Kilcock station will provide footbridge and lifts to access platforms, having positive effects on all transport users, including those with varying mobility needs.

During construction, the proposed works will require excavation and retaining wall works which will affect the operation of the rail service at the existing station. Rail users will need to utilise the nearby stations in Enfield and Maynooth.

Taking into consideration the temporary social impacts during construction phase and the long-term improvements to the train station, platforms and the frequency in rail service during operation phase, this option was given a TAF impact score of '6-Positive'.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

This option is likely to have positive social impacts, particularly on socially disadvantaged households. As part of this option, electrification will be extended to Kilcock which will increase the frequency of train services to places of employment, education and community facilities. The train station will be moved east of the existing by approximately 20 metres and as such, there will be no significant changes in the population cohort served by the new station.

The new Kilcock station will provide footbridge and lifts to access platforms, having positive effects on all transport users, including those with varying mobility needs. During construction, the proposed works will require excavation and retaining wall works which will affect the operation of the rail service at the existing station. Rail users will need to utilise the nearby stations in Enfield and Maynooth.

Taking into consideration the temporary social impacts during construction phase and the long-term improvements to the train station, platforms and the frequency in rail service during operation phase, this option was given a TAF impact score of '6-Positive'.

4.4.2 Social impacts Summary Assessment

Table 9 Social Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	5 – Slightly Positive Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	6 – Positive Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	6 – Positive Impact

4.5 Land Use Impacts

4.5.1 Change in Quality of Public Realm

This section provides the appraisal of the three options for Kilcock Station to identify and change in quality of public realm. Under TAF, public realm is identified as areas containing streets, footpaths, parks, squares, bridges and public buildings and facilities. Existing public realm areas within or in the vicinity of the proposed Kilcock Station options have been identified, as appropriate, and the potential change in quality of the public realm areas has been assessed.

4.5.1.1 Options Appraisal

The proposed options are located in Kilcock, in proximity to the existing Kilcock train station. The urban area of Kilcock contains a number of streets, footpaths, parks, squares, bridges and public buildings and facilities. The R125 (Bridge Street) Regional Road is the only route in Kilcock providing access between the north and south side of the town over the Royal Canal. The closest bridge over the Royal Canal, is Allen Bridge which is located at the western periphery of the town, approximately 1km from the R125. The Royal Canal Way is routed on the north bank of the canal, opposite to the existing Kilcock train station. All options considered are located on the south side of the Royal Canal.

Option 1 Station at the current location

The proposed option will have temporary impacts on public realm areas near the existing Kilcock Station. Most significantly, this option will require the demolition and reconstruction of a bridge resulting in the closure of the R125 road for an extended period (between 4-6 months) which is one of the main routes through Kilcock. This will have significant effects on access to the R125 and public realm areas on either side of the bridge during construction phase. Following completion of construction phase, access will be reinstated and there will be no permanent effects on the R125. Access to the existing Kilcock Station may be temporarily impacted during specific construction works for a duration of approximately 6 months. A TAF impact score of 2 'Negative' is assigned as the impacts will cease once construction works are completed.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Access to the existing Kilcock Station may be temporarily impacted during specific construction works for a duration of approximately 6 months. No other areas of public realm will be affected. Access will be reinstated once works are complete.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Access to the existing Kilcock Station may be temporarily impacted during specific construction works for a duration of approximately 3 months.

4.5.1.2 Summary Assessment

Table 10 Change in Quality of Public Realm Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	2 – Negative Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact

4.5.2 Existing Transport Network and Service Impact

Option 1 Station at the current location

During the construction phase, Option 1 requires the reconstruction of the OBG25 to accommodate the new platform, causing a prolonged closure (4-6 months) of the R125 road in the centre of Kilcock. Also, the construction phase impacts on railway service (approximately 6 months of service disruption) because track lowering required and the construction of the retaining structures (piling). This option requires greater track lowering and longer and deeper retaining structures than Option 3.

For these reasons, this option receives a score of ‘1’ on the TAF impact scoring scale, as it will have a ‘High Negative Impact’ on the accessibility.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

During the construction phase, Option 2 impacts on railway service (approximately 6 months of service disruption) because track lowering required and the construction of the retaining structures (piling). This option requires greater track lowering and longer and deeper retaining structures than the other options.

For this reason, this option receives a score of ‘1’ on the TAF impact scoring scale, as it will have a ‘High Negative Impact’ on the accessibility.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

During the construction phase, Option 3 impacts on railway service (approximately 3 months of service disruption) because track lowering required and the construction of the retaining structures (piling). This option requires less track lowering and short length of retaining structures (almost half) than the other options.

For this reason, this option receives a score of ‘2’ on the TAF impact scoring scale, as it will have a ‘Negative Impact’ on the accessibility.

4.5.2.1 Summary Assessment

Table 11 Existing Transport Network and Service Impact MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	1 – Highly Negative Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	1 – Highly Negative Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	2 – Negative Impact

4.5.3 Material Assets: Property

This section deals with options selection in relation to Material Assets –Property. The options assessment will inform the Multi-Criteria Analysis (MCA) of options for Kilcock Station.

4.5.3.1 Methodology

A desktop review of the Kilcock Station options identified there will be direct effects on non-agricultural property.

The assessment comprises an evaluation of Kilcock Station options and the potential impact on non-agricultural property. This will involve assigning a value rating and an impact rating to each option based on the criteria in **Table 12 Options assessment**.

Table 12 Options assessment

Rating	Criteria	Rating
Value criteria	Type and quantity of non-agricultural property.	High, Medium, Low or Very Low
Impact criteria	Impacts on property, on residential, commercial, community and development property, on property curtilage, on property entrance / access. Identify significant impacts.	High, Medium, Low or Very Low
Significance of impact	Significance category and MCA score based on the combination of both the value and impact ratings. based.	

The value rating in **Table 12** is based on the qualitative and quantitative assessment of the option corridor with regards to the following non-agricultural property:

- Residential property.
- Commercial property.
- Community property – Public park, open space or lands that are used for public amenities and services; and
- Development land – Lands zoned for development and sites with planning permission.

The methodology for the options assessment comprises of a qualitative and quantitative appraisal of the station options and the impact on non-agricultural property in **Table 13**.

Table 13 Value rating criteria

Rating	Qualitative Criteria
High	Non-agricultural property – Residential, commercial, community and development property with zoning for development and planning permission is present.
Medium	Non-agricultural property – Residential, commercial, community and development property with zoning for development or planning permission is present.
Low	Non-agricultural property – Residential, commercial, community and development property with zoning for development or planning permission is present.
Very low	Non-agricultural property – Absent within the option site.

The qualitative assessment consists of an evaluation of non-agricultural property types for each option. The quantitative assessment considers the level of non-agricultural property types.

The impact rating in **Table 14** is based on the qualitative and quantitative assessment of the option under the following criteria:

- Land-take.
- Impact on dwelling houses / commercial / community buildings.
- Impact on entrance and access to property.
- Impact on property curtilage / property boundary.

The impact rating will consider the qualitative and quantitative criteria as presented in **Table 14** for the option.

Table 14 Impact rating criteria

Rating	Qualitative Criteria
High	Land-take and property impacts – on residential, commercial, community and development property with zoning for development and planning permission. Significant direct impacts involving property acquisition or a substantial area of curtilage / lands.
Medium	Impacts on residential, commercial, community and development property with zoning for development or planning permission. Direct impacts involving acquisition of areas of property curtilage / lands.
Low	Impacts on residential, commercial, community and development property with zoning for development or planning permission. Impacts on non-agricultural lands without planning permission. Direct impacts are not significant on property present.
Very low	There is no impact on non-agricultural property or direct impact involves acquisition of areas of public road / lands only.

The impact assessment considers the combined effects of land-take, direct impacts to properties and impacts on property access. The assessment of the option impact is based on the effect of the proposed option land-take boundary on non-agricultural property present.

A direct impact on residential, community or commercial property may be a significant negative impact on the property. On residential property, land-take may result in loss of property curtilage involving direct impacts to the dwelling / property entrance / access / property boundary and loss of garden area / mature planting. On commercial property, a loss of property curtilage may result in direct impacts to buildings / property entrance / property boundary and loss of staff parking / customer parking / commercial yard area. On community property,

land-take may result in a direct impact on community building / property entrance / property boundary and loss of amenity area, mature planting and public parking.

The option assessment has allowed for mitigation of the loss of property access involving the replacement of property entrances and access on a like-for-like basis. These will be considered on an individual basis and final mitigation will inform the assessment of the non-agricultural impact on individual properties.

The Multi-Criteria Analysis (MCA) impact category for the station options is determined from the value rating combined with the impact rating from the matrix in **Table 15**. There are four impact categories relevant to the assessment of the impact on non-agricultural property that comprise of ‘neutral impact’, slight negative impact’, ‘negative impact’ and ‘highly negative impact’. These categories are taken from the seven-point scale in TAF (2024).

Table 15 MCA Impact category and score

Value Rating	Impact Rating			
	High	Medium	Low	Very low
High	Highly negative impact Score 1	Negative impact Score 2	Slight negative impact Score 3	Slight negative impact Score 3
Medium	Highly negative impact Score 1	Negative impact Score 2	Slight negative impact Score 3	Slight negative impact Score 3
Low	Negative impact Score 2	Negative impact Score 2	Slight negative impact Score 3	Neutral impact Score 4
Very low	Neutral impact Score 4	Neutral impact Score 4	Neutral impact Score 4	Neutral impact Score 4

4.5.3.2 Options Appraisal

The assessment of impact on non-agricultural property has assumed, unless stated otherwise, that the following will apply to the station options:

- Works for the development of the proposed second line and platform will involve permanent land-take predominantly within Irish Rail lands.
- Temporary land-take information is not available at Phase 2.
- The impact on non-agricultural property mainly comprises of land-take on property curtilage, impact on property boundaries or impacts on existing property entrances.

Option 1 Station at the current location

Kilcock Station is maintained at its current location on either side of OBG25 / Shaw Bridge. The proposed works will involve the development of a second track and new platform on the northern side. Construction works will include demolition of Shaw Bridge and build a new bridge with adequate rail clearance.

Value criteria

Non-agricultural property is comprised of 1No. residential property and 2No. community properties (Irish Rail and local authority) along the Royal Canal. There are no Commercial properties identified within the option site boundary.

Impact criteria

There will be a temporary impact on access to the residential property during the construction period for the demolition and replacement of Shaw Bridge. There will be a minor direct impact on the amenity lands along the canal. There will be an impact on existing pedestrian access path to the canal bank and Kilcock Canoe Polo Club.

Option appraisal

Under the above criteria, Option 1 has an impact score of 2 based on a value rating of Medium and an Impact rating of Medium. This impact score is associated with a Negative impact level for non-agricultural property.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Kilcock Station is moved to the west side of OBG25 / Shaw Bridge. The proposed works will involve the development of a second track and new platform on the northern side. Construction works will not require the demolition of Shaw Bridge.

Value criteria

Non-agricultural property is comprised of public lands on 1No. community property (Irish Rail). There are no Residential or Commercial properties identified within the option site boundary.

Impact criteria

This option will comprise of construction works within the railway boundary.

Option appraisal

Under the above criteria, Option 2 has an impact score of 4 based on a value rating of Low and an Impact rating of Very Low. This impact score is associated with a Neutral impact level for non-agricultural property.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Kilcock Station is moved to the east side of OBG25 / Shaw Bridge. The proposed works will involve the development of a second track and new platform on the northern side. Construction works will not require the demolition of Shaw Bridge.

Value criteria

Non-agricultural property is comprised of public lands on 2No. community properties (Irish Rail and local authority) along the Royal Canal. There are no Residential or Commercial properties identified within the option site boundary.

Impact criteria

There will be direct impacts on amenity lands along the canal involving the existing pedestrian access to the canal bank and a direct impact on the Kilcock Canoe Polo Clubhouse.

Option appraisal

Under the above criteria, the Option 3 has an impact score of 4 based on a value rating of Low and an Impact rating of Medium. This impact score is associated with a Negative impact level for non-agricultural property.

4.5.3.3 Summary Assessment

Table 16 Material Assets: Property Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	2 – Negative impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	4 – Neutral Impact

Option	TAF Impact Scoring
Option 3: Station displaced East of OBG25 (Shaw Bridge)	2 – Negative impact

4.5.4 Built Services (Utilities)

This section analyses the services affected by each option.

Option 1 Station at the current location

Option 1 impacts the OBG25, which must be rebuilt, impacting the utilities that pass through the bridge. At present, it is known that a 150 mm water main pipe passes through it.

This results in a TAF impact score of 3 – Slightly Negative Impact from the perspective of built services.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

There is no known impact on utilities.

This results in a TAF impact score of 4 - Neutral Impact from the perspective of built services.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

There is no known impact on utilities.

This results in a TAF impact score of 4 - Neutral Impact from the perspective of built services.

4.5.4.1 Summary Assessment

Table 17 Built Services (Utilities) MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	3 – Slightly Negative Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	4 – Neutral Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	4 – Neutral Impact

4.5.5 Soils and Geology (incl. Waste)

4.5.5.1 Methodology

This section provides the outcome of the site selection process under the heading of soils and geology (including waste). The appraisal involves undertaking an impact assessment of proposed options for the Kilcock Station.

Desk study

A desktop assessment was carried out for the proposed options to establish baseline conditions using Geological maps, Geological Survey of Ireland (GSI), Historic Maps from the Ordnance Survey of Ireland,

Google Earth, Environmental Protection Agency (EPA) maps to identify and assess any likely landfill sites or waste facilities within the study area, and historical investigation reports.

The proposed Kilcock Station options are characterised by varying degrees of existing development to the south of railway track, with the Royal Canal located immediately to the north. According to the GSI database, the dominant soil types are Till derived from Limestone (TLs) and Urban with localized Alluvium (A) deposits. Alluvium deposits are anticipated along the Royal Canal particularly to the west of Shaw Bridge. However, the planned construction is going to be take place on the existing railway alignment.

The bedrock geology consists solely of the Lucan Formation (LU, dark limestone and shale (Calp)). This formation is defined as a sedimentary rock consists mainly of dark grey to black fine-grained, occasionally cherty, micritic limestones and typically ranges from 300 m to 800 m in thickness.

The Kilcock Station options are characterised by relatively flat and low-lying terrain with elevation ranging from approximately +64 mOD to +80 mOD. Based on GSI Quaternary Geomorphology database, Glaciofluvial Terrace belonging to Rye Water River system is identified in the north of the proposed options.

The proposed options do not encounter any significant geological constraints namely karst formation, geological heritage features, economic geology concerns related to quarries or mines, and landslides. According to the EPA, there are no waste facilities, industrial facilities, Special Areas of Conservation (SAC) and Special Protection Areas (SPA) present nearby the proposed options. Based on GSI Geologic Heritage Sites database, the closest heritage site is Kilbrook Spring (GSI Site Code: KE015, IGH Theme: IGH16, ITM Coordinates: 681448.970, 742215.902) which is approximately 7.5km away from the proposed option. Potential contamination risks may arise due to proximity to existing residential and commercial buildings, including the potential presence of asbestos in older infrastructure (constructed before 2000s). However, site-specific contamination data are not available at this stage. Overall, this assessment is primarily based on considerations of ground conditions, retaining structures and earthworks.

Historical Ground Investigations (GIs)

The historical site investigation report Kilcock, Maynooth, Leixlip By-Pass - N4 (1982) outlines the findings from GI works conducted to assess the subsurface conditions. The GI involved numerous points between Maynooth and Kilcock town centres but the ones that can be associated with the Kilcock Station are P.17, P.18, P.19, and P.56. Consistent sequence of soil layers was encountered based on GI logs. Topsoil, typically around 0.3m thick, overlies firm to stiff clays with gravel and occasional cobbles, extending to depths of 1.2m to 4.9m BGL. Below this, soft silty sandy clay with cobbles was encountered, particularly in P.17 where these layers were found below 1.2m BGL. Below this, stiff gravelly clay (boulder clay) with cobbles is presents from 2.4 to 5.1m BGL. Water levels were observed at varying depths, generally between 1.3 to 2.5m BGL.

Multi Criteria Assessment (MCA)

Upon review of the site conditions and project requirements, a Multi Criteria Assessment (MCA) matrix has been prepared (in accordance with the TII publication DN-03083 Managing Geotechnical Risk) with the prime objective of providing a Transport Appraisal Framework (TAF) scoring of Soils and Geology (including Waste) risks for each of the proposed options. The same TAF 7-point scale was used but the scale is adjusted from 1 to 4 rather than 1 to 7 based on respective baseline environments of the proposed options. These scores denote the impact of each option to its existing environment, when compared to its own baseline scenario. A slight change was made to Table 18 given below regarding "EW Volume Balance" as per the provided project information.

Table 18 Soils and Geology MCA Criteria

TAF 7-point Scale		Soft Ground	EW Volume Balance	Impacts on Slopes/ Earthworks / Structures Foundations	Landslide	Karst	Contaminated Soils	Quarry / Mine Resources	Geologic Heritage Sites
Impact Level	Score								
Neutral	4	Not present / insignificant impact	Minimal EW required, flat slope on good foundation soils	Little or no effects on adjacent lands or structure foundations	Not present / insignificant impact	Not present / insignificant impact	Not present / insignificant impact	Not present / insignificant impact	Not present / insignificant impact
Slightly Negative	3	<10% of the site area	EW total fill:bulk cut ratio 50% to 100% and 100% to 150% / overall import and disposal volumes	Some slopes near boundaries or minor works near foundations	Site <500m from recorded or suspected slope instability	Site impacts turloughs, springs and wells	Site impacts areas of local dumping <1000m ³ and <500m from possible area of contamination	Site <500m from existing quarry	Potential disturbance to feature from construction
Negative	2	10% to 50% of the site area	EW total fill:bulk cut ratio 100% to 150% and 150% to 200% / overall import and disposal volumes	Large slopes or retention structures near boundaries, or strengthening structures foundations	Site <100m from recorded or suspected slope instability	Site impacts minor sinkhole depressions <5m diameter and/or <100m distant	Site <500m from known area of contamination	Site <100m from existing quarry or restricts future resources	Partial removal of feature
Highly Negative	1	>50% of the site area	EW total fill:bulk cut ratio >150% or >200 / overall import and disposal volumes	Retention requiring anchors or other wayleaves on adjacent properties, demolition or condemning adjacent structures	Site impacts areas of recorded or suspected slope instability	Site impacts major sinkhole depressions >5m diameter or caves	Site impacts known landfill or area of contamination	Site impacts access or operations of existing quarry	Full removal of feature

4.5.5.2 Options Appraisal

Option 1 Station at the current location

Option 1 involves demolition and reconstruction of the Shaw Bridge along with realignment of tracks near existing station. The new tracks on west end of the platform are 0.73m below the existing track level. As part of realignment of tracks of western approach, retaining structures and slopes are proposed. On the Up track (north side), piled retaining walls up to 4.5 m in height are proposed over a length of about 780 m. On the Down track (south side), retaining walls up to 2.3 m high are considered near the parking area for about 100 m length, with another piled retaining walls up to 4.3 m high are proposed for a 260 m stretch. Piled retaining structures are suitable for constrained railway corridors. However, potential issues such as vibration impacts on nearby residential buildings, lateral deflection, seepage, pile toe levels and selection of suitable installation techniques must be carefully assessed. Access restrictions may arise due to the proximity of existing railway tracks and residential units, making pile installation more challenging.

On the east side of the Shaw bridge, the Royal Canal Way and railway track lie at similar elevations, between +66 mOD and +67 mOD. This raises a potential risk of lateral seepage requiring appropriate drainage measures to relieve pore pressure and water ingress, especially during fluctuating groundwater conditions and is expected to be consulted with the Waterways Ireland.

The cutting slope of 1V:2H is assumed at preliminary stage for all three options and is subjected to confirmation at later stage. Considering the steepness of the proposed slope, it is suggested to provide retaining structures at the toe to maintain the slope footprint within the railway boundary and provide additional stability. Further, retaining structure close to the station carpark and residential buildings, and any construction activities will need to manage vibration and settlements. This option is anticipated to be mainly in cut sections with estimated earthworks of approximately 37,573 m³.

Option 1 impacts the Shaw bridge as intrusive changes will occur to the structure. High retaining walls may require soil strengthening measures, and steep cutting slopes could be difficult to accommodate within the railway boundary and may pose sensitivity risks to adjacent structures.

A relatively thin layer of superficial soils (Urban) and/or glacial till (TL) is expected beneath the new track, station platforms and retaining structures are proposed. In other words, the proposed development may contain Made Ground and potentially soft soils. Therefore, the development is likely to involve replacing problematic soils (e.g. contaminated Made Ground or soft ground). Potential contamination may arise due to nearby existing infrastructure and presence of asbestos in older infrastructure (constructed before 2000s). In addition, there might be risk of hydrocarbon contamination (diesel and lubricating oils) on or near the tracks due to diesel operated trains. However, site-specific contamination data are not available at this stage.

Overall, Option 1 is assigned a *TAF Impact Score of 3 – Slightly Negative Impact*. Section provides details on this scoring and how the different factors involved.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Option 2 proposes relocating the station to the west of Shaw Bridge. This option includes realignment of tracks and construction of retaining structure on both sides of the alignment. The new tracks at the end of the platform are 2.24m below the existing track level. The elevation of the railway track is around +69 mOD, while the adjacent ground is approximately +71 mOD.

As part of realignment of tracks for proposed station platform, retaining structures and slopes are required. On the Up track (north side), piled retaining structure of up to 5.0 m in depth are proposed over a 780 m stretch. On the Down track (south side), a 2.5 m high retaining wall near the parking area (100 m length) and a piled retaining wall up to 5.6 m high for 260 m length are proposed. Piled retaining structure may encounter challenges due to vibration impacts, seepage, and installation difficulties in confined areas. Appropriate design measures such as provision of subsoil drainage and filters/membranes may be considered to mitigate seepage and ensure long term stability.

Cutting slopes are proposed near the station platforms and residential areas on the south side. Given the steepness and local sensitivity, retaining walls at the slope toe might be required for containment within railway boundaries. The proposed option is anticipated to be in mainly cut sections and estimated earthworks in terms of cut volume is around 60,901 m³. In this option, there is no impact on the Shaw bridge and nearby structures but high retaining walls and its strengthening, and large slopes may impact the adjacent lands.

Furthermore, a relatively thin layer of superficial soils (Urban), glacial till (TL) and/or Alluvium (A) is expected where the new track, station platforms and retaining structure are proposed. In other words, the proposed development may contain Made Ground and potentially soft soils. Therefore, the development is likely to involve replacing problematic soils (e.g. contaminated Made Ground or soft ground). Given the scale of the proposed retaining structure, settlement and/or stability (e.g., bearing capacity) are not expected to be an issue but these may need to be investigated at a later stage. Potential contamination for this option may arise due to the presence of diesel residues along the existing tracks. However, site-specific contamination data are not available at this stage.

Based on this, Option 2 is assigned a *TAF Impact Score of 3 – Slightly Negative Impact*. Section 4.5.5.1 provides details on this scoring and how the different factors involved.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Option 3 involves relocating the station platforms to the east of Shaw Bridge requiring minimal earthworks around the proposed station area. The railway track, Royal Canal Way and nearby buildings lie at similar elevations (+66 mOD and +67 mOD). As part of the realignment of the western approach to the proposed station platform, retaining structures and slopes are proposed. On the Up track (north side), piled retaining walls up to 4.0 m and 3.6 m high are proposed over lengths of approximately 260 m and 200 m, respectively. On the Down track (south side), a retaining wall up to 2.5 m high near the parking area (100 m length), and further west a 3.4 m high piled retaining wall over 220 m stretch are proposed. Pile installation near residential buildings and tracks may be difficult due to restricted access for rigs, and vibration impacts on nearby structures and land.

The major concern with this option is that the section near Chainage 95+600 (north side) is in close proximity to the quay wall structure of the existing Royal Canal Way. This proximity introduces potential risks of seepage and soft or saturated soil conditions, which might lead to stability and settlement issues during and after construction. Excavation, drilling or vibrations during construction may affect the integrity of the canal quay wall structure and will require careful monitoring.

The proposed steep cutting slopes may not be suitable where soft soils and/or canal embankment materials are encountered. Near Chainage 96+000 (Up track), slopes close to the canal may require flatter gradients or toe retaining walls for stability. The total volume of excavation required due to lowering of tracks is 35,100 m³. Reducing cutting depths through installation of low height retaining structures could further minimize earthworks. This option might affect the small building near Royal Canal Way for storing recreational boats and nearby boardwalk. There is large number of cutting slopes which can be problematic to fit within the boundary and might require the retaining structure at the toe of slope.

Potential contamination risks may arise due to proximity to existing buildings, older infrastructure (constructed before 2000s) and diesel residues on or nearby existing tracks.

Therefore, Option 3 is assigned a *TAF Impact Score of '3 – Slightly Negative Impact'*. Section 4.5.5.1 provides details on this scoring and how the different factors involved.

The excavated materials obtained could potentially be used on site, considering that the depot area has import requirements. If the excavated soils classify suitably as per the depot material specifications, they could be beneficially utilised.

4.5.5.3 Summary Assessment

The average TAF scoring of options are presented in Table 19. It should be noted that as the scores are not weighted, the average score at the end of this assessment will be indicative only and does not represent the final TAF impact scoring of the proposed sites in terms of Soils and Geology (including Waste) as given in the following subsection. The geotechnical data at this stage is limited for the assessment. It can be concluded that some factors are more important than others in helping to differentiate between site location options. In other words, 'Landslide', 'Karst', 'Quarry/Mine Resources' and 'Geological Heritage Sites' are less important than the other criteria, as they are not specific to the options.

As discussed at the beginning of this subsection, no quarry/mine resources could be associated with the proposed options. According to GSI Landslide Susceptibility and Groundwater Karst databases, the options are located in sites classified as having low landslide susceptibility and no karst features (e.g., caves) were found within footprints. Therefore, a *TAF Impact Score of 4 – Neutral Impact* is assigned to 'Landslide', 'Karst', 'Quarry / Mine Resources' and 'Geologic Heritage Sites' factors as summarised in Table 19.

The main factor causing impact for the options is the interaction of slopes and requirements for retaining structures to provide for the changes inside the property boundaries that would affect neighbouring ground and structures. In some cases, the proposals include significant lengths of retaining structure and platforms that may need installed very close to the adjacent properties, especially in the case of Option 3 in proximity to the canal quay wall and boardwalk. Where earthworks materials arise, these are likely to be feasible for reuse elsewhere within the project as there is an overall deficit requiring import. Design of the slopes and retaining structure is more impactful in terms of the need to construct to avoid impacts to adjacent properties.

Table 19 Average TAF scoring – Option-by-option MCA for Soils and Geology (including Waste) factors

Site Location Option #	TAF Scoring by Factor								TAF Average Scoring*	TAF Impact Scoring Description
	Soft Ground	EW Volume Balance	Impacts on Slopes/ Earthworks / Structures Foundations	Landslide	Karst	Contaminated Soils	Quarry / Mine Resources	Geologic Heritage Sites		
Option 1	4	3	2	4	4	3	4	4	3.0	Slightly Negative
Option 2	4	3	2	4	4	3	4	4	3.0	Slightly Negative
Option 3	3	4	2	4	4	3	4	4	3.0	Slightly Negative

Table 20 Soils and Geology (incl Waste) MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	3 – Slightly Negative
Option 2: Station displaced West of OBG25 (Shaw Bridge)	3 – Slightly Negative
Option 3: Station displaced East of OBG25 (Shaw Bridge)	3 – Slightly Negative

4.5.6 Planning Applications

This section provides the appraisal of 3 alternative options in terms of existing planning applications, under the DART + programme for provision of platform requirements at Kilcock Railway Station.

4.5.6.1 Methodology

The following methodology has been applied to the option sites¹.

- A defined research radius of 100m has been applied around each identified site.
- All planning applications within this radius have been reviewed and assessed.
- The assessment is based on publicly available data sourced from:
 - The National Planning Application Database (NPAD)
 - Local Authority planning application records
 - An Bord Pleanála (ABP) GIS data, where available (*manual search and mapping may be required where GIS data is unavailable*)

Planning applications were filtered, with the following cases excluded from further analysis:

- Expired permissions, unless an appeal was lodged.
- Consented extension of duration (EOD) permissions, where applicable.
- Invalidated or withdrawn applications.
- One-off housing developments and dwelling extensions

4.5.6.2 Options Appraisal

Option 1 Station at the current location

Planning applications within 100m of the site boundary have been considered, following the methodology outlined above. These are mapped below, with the details included in the following Table.

There are no planning applications within the site boundary and no significant applications within the study area relevant to the proposed development. The school building to the southwest permitted under Reg Ref 20 992 has been constructed and while the boundaries of the sites are close, the proposed station does not overlap.

Consideration to the users of the school will be necessary at planning application stage and may require some screening in terms of mitigating visual and noise effects.

¹ This methodology applies to all option sites being considered in this report.



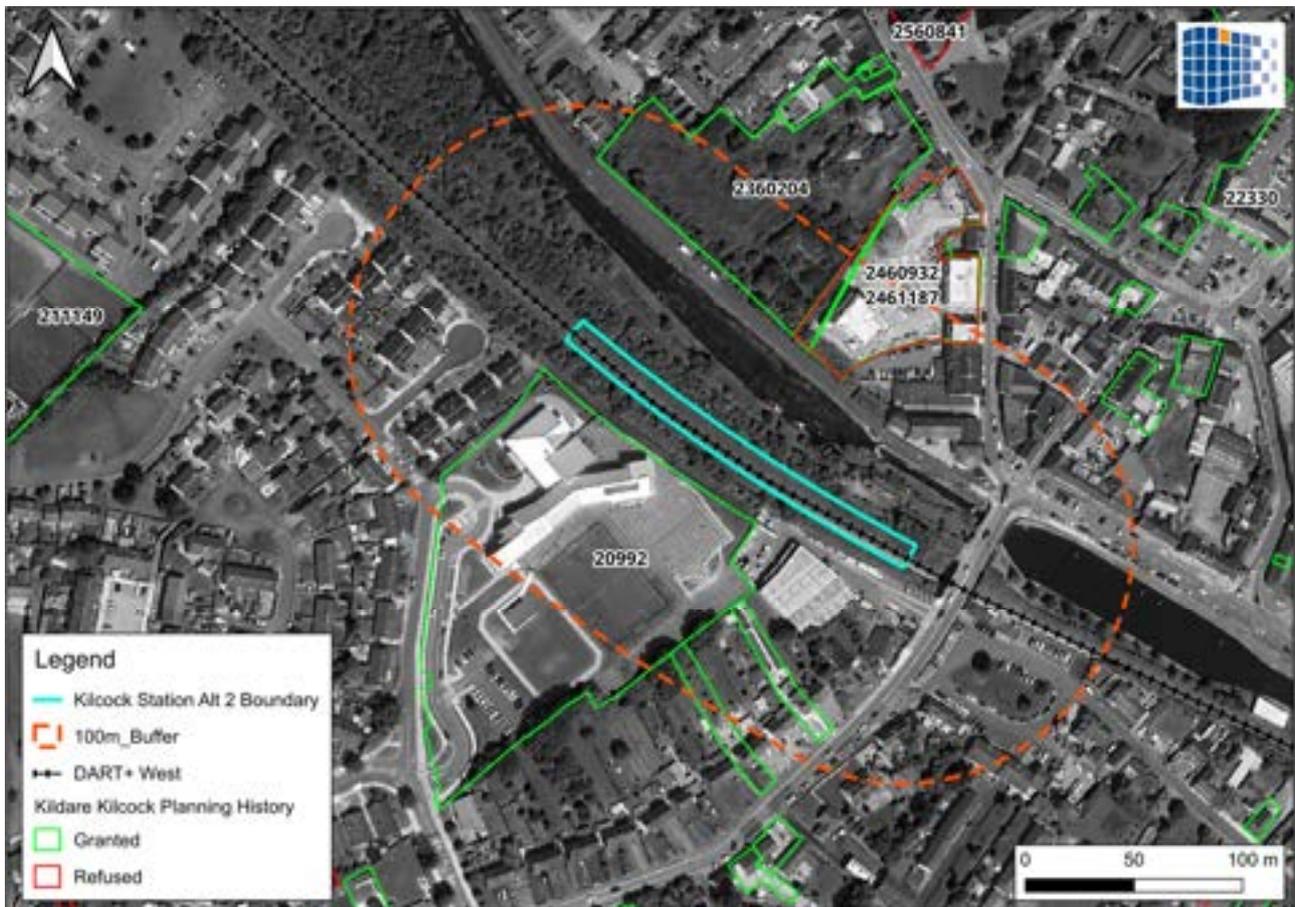
P.A. Ref	Description	P.A. Grant Date
2360204	demolition of existing disused buildings (including 1 no. former dwelling and non-original extension to the hotel building) on part of the site (total of c. 667 sqm), the extension and conversion of the former Coruscaddens Hotel (3 storeys), Church Street, Kilcock for 2 no. retail units and 2 no. residential apartments; discount food store retail and off-licence use	Granted 24/09/2024
2460932 2461187	Retention for works undertaken to The Lion House (former public house) which is a Protected Structure (RPS Ref. No. B05-20) fronting on to Church Street	Granted 03/01/2025
20992	Demolition of existing school, removal of temporary accommodation and construction of school building	Granted 20/10/2020

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Planning applications within 100m of the site boundary have been considered, following the methodology outlined above. These are mapped below, with the details included in the following Table.

There are no planning applications within the site boundary and no significant applications within the study area relevant to the proposed development. The proposed site is adjacent to a recent permission approved (and implemented) for the development of a school building (Reg Ref 20 992).

Consideration to the users of the school will be necessary at planning application stage and may require some screening in terms of mitigating visual and noise effects. Air quality effects would also need to be considered.



P.A. Ref	Description	P.A. Grant Date
2360204	demolition of existing disused buildings (including 1 no. former dwelling and non-original extension to the hotel building) on part of the site (total of c. 667 sqm), the extension and conversion of the former Corscaddens Hotel (3 storeys), Church Street, Kilcock for 2 no. retail units and 2 no. residential apartments; discount food store retail and off-licence use	Granted 24/09/2024
2460932 2461187	Retention for works undertaken to The Lion House (former public house) which is a Protected Structure (RPS Ref. No. B05-20) fronting on to Church Street	Granted 03/01/2025
20992	Demolition of existing school, removal of temporary accommodation and construction of school building	Granted 20/10/2020

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Planning applications within 100m of the site boundary have been considered, following the methodology outlined above. These are mapped below, with the details included in the following Table.

There are no planning applications within the site boundary and no significant applications within the study area relevant to the proposed development.

P.A. Ref	Description	P.A. Grant Date
211121 ABP-311751-21	for the demolition of a car showroom and construction of residential development of 75 no. units, ranging from 3 to 4 storeys in height.	Granted 17/04/2023
2461116	demolition of a car showroom/garage and associated shed on site.	05/02/2025
2460932	Retention for works undertaken to The Lion House (former public house) which is a Protected Structure (RPS Ref. No. B05-20) fronting on to Church Street	Granted 03/01/2025



4.5.6.3 Summary Assessment

The planning history search has not identified any applications within the boundaries of any of the options sites, and no significant permissions within the study area which would have a significant effect on the proposed development.

Where there are no significant interactions or impacts on existing / permitted developments, a neutral TAF rating is applicable. Option 2, west of Shaw Bridge, scored lower due to the potential impacts on the adjacent school in terms of noise and visual. Air quality would also need to be considered.

Table 21 - Planning Applications MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	3 – Slight Negative Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	4 – Neutral Impact

4.5.7 Zoned Land, Land Use Planning and Spatial Planning

This section provides the appraisal of 3 alternative options in terms of zoned land, land use planning and spatial planning, under the DART + programme for provision of platform requirements at Kilcock Railway Station.

4.5.7.1 Methodology

Policy Context

The policy context below applies to all 3 options at Kilcock.

The **Kildare County Development Plan (CDP) 2023-2029** includes a number of policies and objectives which supports the development of rail infrastructure in the county, as set out below. TMO50 is particularly relevant for the proposed development with this providing for ‘*the extension of the DART+ line to Kilcock*’.

Objective TM O1: “Support the NTA Draft Transport Strategy for the Greater Dublin Area (2022-2042) and facilitate and secure the implementation of projects identified within the Strategy.”

Objective TM O10: “Facilitate and secure the delivery/implementation of the public transport projects that relate to County Kildare as identified within the Integrated Implementation Plan (2019-2024), (or any superseding document), including the DART+ programme (Including DART+ West and DART+ South West), BusConnects and the light rail investments. The DART+ projects present an opportunity to improve journey time, reliability, and train frequency.”

Objective TM O13: “Promote and facilitate the implementation of public transport projects (bus and rail) and encourage transport providers and other agencies (e.g. NTA, developers etc.) to improve public transport (bus and rail) and to have regard to and support recently implemented and/or planned routes under NTA’s Bus Connects and proposed / planned routes under NTA’s Connecting Ireland Rural Mobility Plan; Including: 1. Kilcock, Maynooth and Leixlip into Dublin; 2. Celbridge into Dublin; 3. Maynooth to Naas; 4. Leixlip to Naas; 5. Celbridge to Naas; 6. Naas to Caragh. in addition to a range of rural transport routes. Such developments shall be subject to AA screening and where applicable, Stage 2 AA.”

Policy TM P3: *“Promote the sustainable development of the county by supporting and guiding national agencies in delivering major improvements to the public transport network and to encourage a shift from car-based travel to public transport that is accessible for all, regardless of age, physical mobility, or social disadvantage.”*

Objective TM O50: *“Facilitate and support the extension of the DART+ line to Kilcock, the extension of the DART+ Southwest line to Naas/Sallins (and promote a future extension to Newbridge and Kildare Town in the next DART + programme / GDA Transport Strategy Review) and the extension of the LUAS network, in co-operation with Irish Rail, the Department of Transport and the National Transport Authority.”*

4.5.7.2 Options Appraisal

The extension of the Dart + west line to Kilcock including a new station (at either of the 3 options presented) aligns with local and regional objectives and will enable the sustainable development of the town, with improved sustainable travel connections within the County and to the Greater Dublin Area.

This connectivity aligns with the concept of Transport-orientated development (TOD) and will promote more compact, sustainable communities, supporting housing delivery along existing and planned transport corridors, reducing sprawl and lowering dependence on cars.

This will have a *highly positive impact* (i.e. TAF rating 7 – ‘*likely to significantly improve conditions in the relevant criteria*’) on achieving strategic land use planning proposals at all levels.

Option 1 Station at the current location

Land Use Zoning

The lands are within the settlement boundary of Kilcock. The **Kilcock Local Area Plan (LAP) 2015-2021** has expired, however Kildare County Council have noted that they will continue to “*have regard*” to expired Local Area Plans until such time as it is reviewed or another plan made².

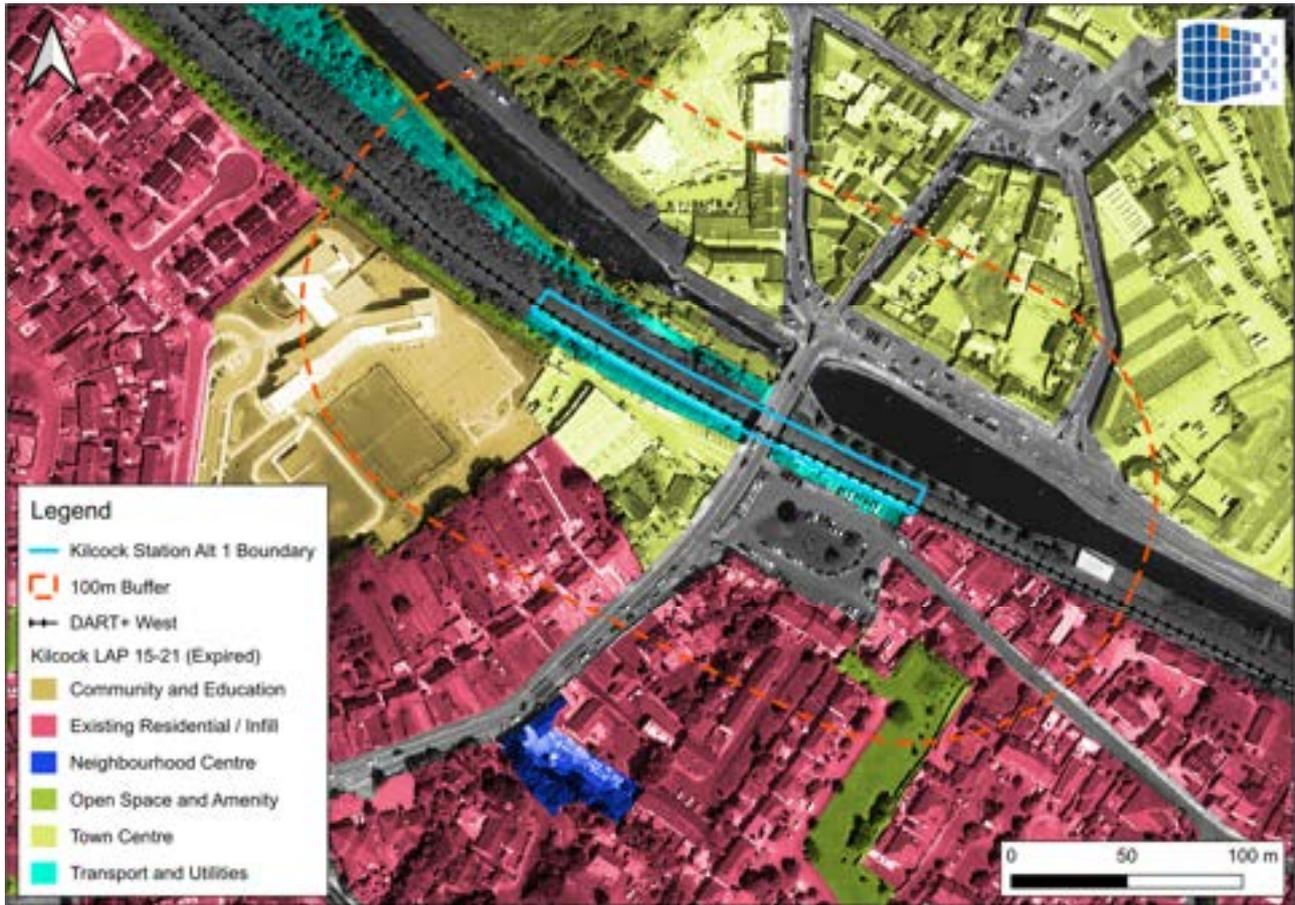
There is no previous zoning applied to the subject lands. This is not unusual given the site comprises of the existing rail line.

Lands immediately adjoining the site, north and south, were previously zoned ‘J - *Transport and utilities*’. *The objective of this zoning is noted in the LAP as*

‘To provide for and protect transportation and other lands for the provision of infrastructure and utilities.

***This zoning objective provides for the development of the railway station** (and associated access, car parking and bus stops), a park and ride facility, petrol stations, telecommunications sites and other such facilities.’*

² Source: <https://kildarecoco.ie/AllServices/Planning/LocalAreaPlans/CurrentLocalAreaPlans/> (Accessed on 17th October 2025)

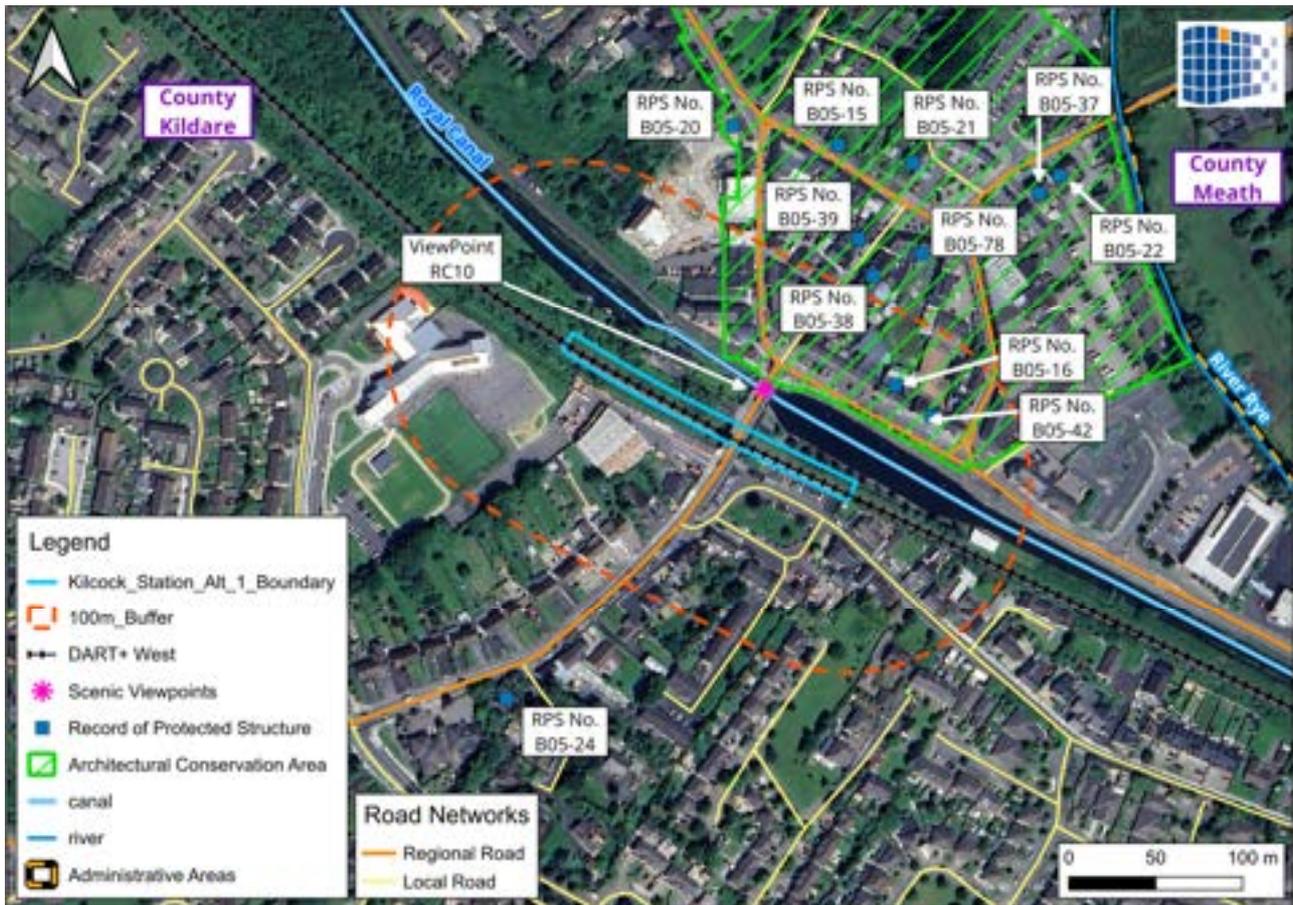


Site-specific policy objectives

There are no site specific objectives applicable to this site.

To the north of the site, on the opposite side of the Canal, an Architectural Heritage Area is designated and there are a number of protected structures identified also within the built up area of the town.

One scenic viewpoint is listed on Shaw Bridge, over the canal – RC10. Views to and from the bridge are protected.



Assessment

The redevelopment of the existing Kilcock station at its existing location will have no significant effects on zoned land, land use or spatial planning locally, as outlined in the policy and objectives of the Kilcock LAP and Kildare CDP.

On the basis that the development of the station is part of bringing Dart + West to Kilcock and this is deemed to have a positive impact on achieving strategic land use planning proposals at all levels, no change to the TAF rating outlined in the policy context section (i.e. 7 – highly positive impact) is proposed.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Land Use Zoning

The lands are within the settlement boundary of Kilcock. The **Kilcock Local Area Plan (LAP) 2015-2021** has expired, however Kildare County Council have noted that they will continue to “have regard” to expired Local Area Plans until such time as it is reviewed or another plan made³.

There is no previous zoning applied to the subject lands. This is not unusual given the site comprises of the existing rail line.

Lands immediately adjoining the site, north and south, were previously zoned ‘J - Transport and utilities’. The objective of this zoning is noted in the LAP as

³ Source: <https://kildarecoco.ie/AllServices/Planning/LocalAreaPlans/CurrentLocalAreaPlans/> (Accessed on 17th October 2025)

'To provide for and protect transportation and other lands for the provision of infrastructure and utilities.'

This zoning objective provides for the development of the railway station (and associated access, car parking and bus stops), a park and ride facility, petrol stations, telecommunications sites and other such facilities.'

There is also a piece of land running parallel to the southern boundary of the site and wider rail line previously zoned as *'F Open space and amenity - To protect and provide for recreation, open space and amenity provision'*.

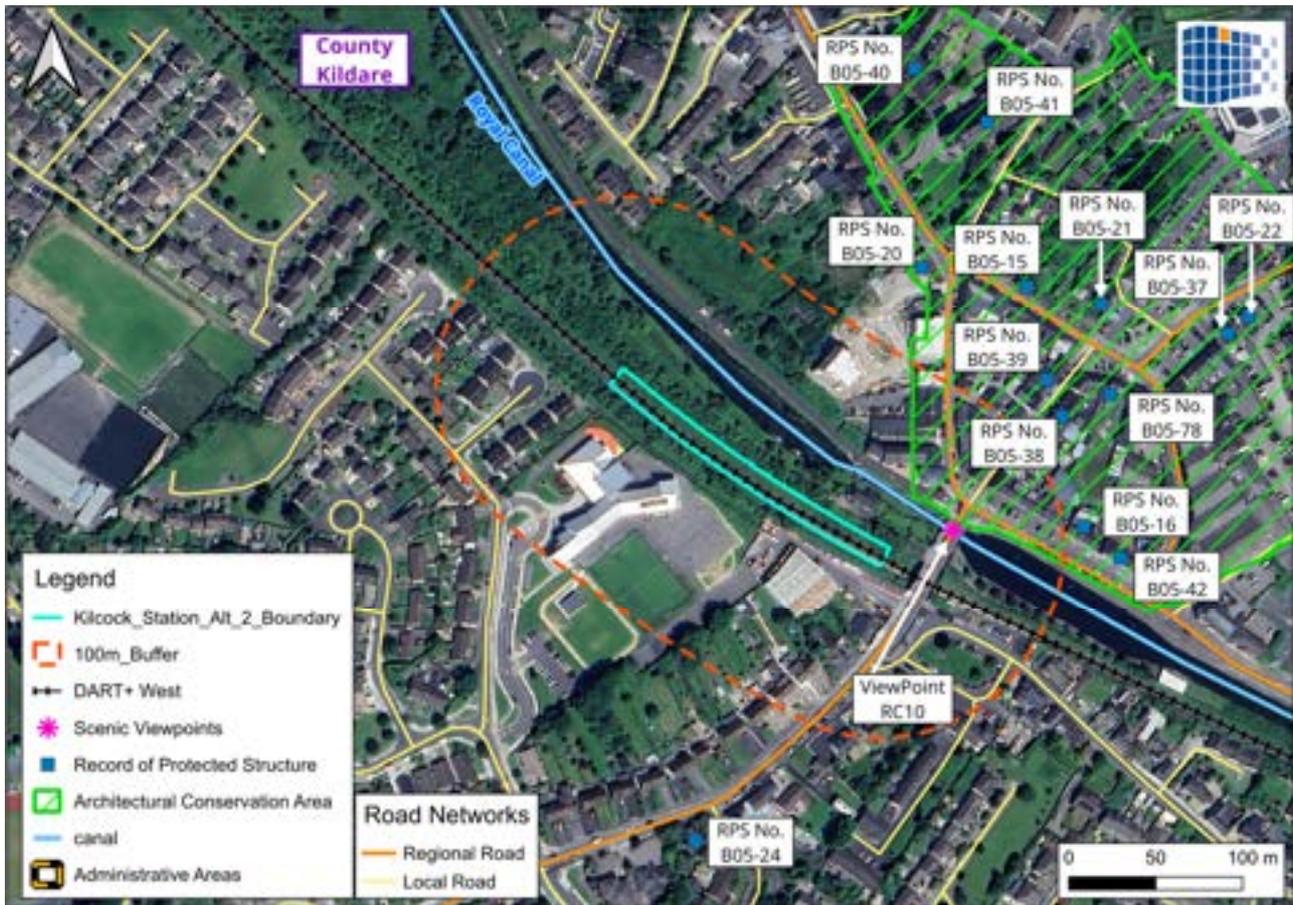


Site-specific policy objectives

There are no site specific objectives applicable to this site.

To the north east of the site, on the opposite side of the Canal, an Architectural Heritage Area is designated and there are a number of protected structures identified also within the built up area of the town.

One scenic viewpoint is listed on Shaw Bridge, over the canal – RC10. Views to and from the bridge are protected.



Assessment

The development of a new station west of Shaw bridge will have no significant effects on zoned land, land use or spatial planning locally, as outlined in the policy and objectives of the Kilcock LAP and Kildare CDP.

On the basis that the development of the station is part of bringing Dart + West to Kilcock and this is deemed to have a positive impact on achieving strategic land use planning proposals at all levels, no change to the TAF rating outlined in the policy context section (i.e. 7 – highly positive impact) is proposed.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Land Use Zoning

The lands are within the settlement boundary of Kilcock. The **Kilcock Local Area Plan (LAP) 2015-2021** has expired, however Kildare County Council have noted that they will continue to “have regard” to expired Local Area Plans until such time as it is reviewed or another plan made⁴.

There is no previous zoning applied to the subject lands. This is not unusual given the site comprises of the existing rail line.

Lands immediately adjoining the site, north and south, were previously zoned ‘J - Transport and utilities’. The objective of this zoning is noted in the LAP as

⁴ Source: <https://kildarecoco.ie/AllServices/Planning/LocalAreaPlans/CurrentLocalAreaPlans/> (Accessed on 17th October 2025)

'To provide for and protect transportation and other lands for the provision of infrastructure and utilities.'

'This zoning objective provides for the development of the railway station (and associated access, car parking and bus stops), a park and ride facility, petrol stations, telecommunications sites and other such facilities.'

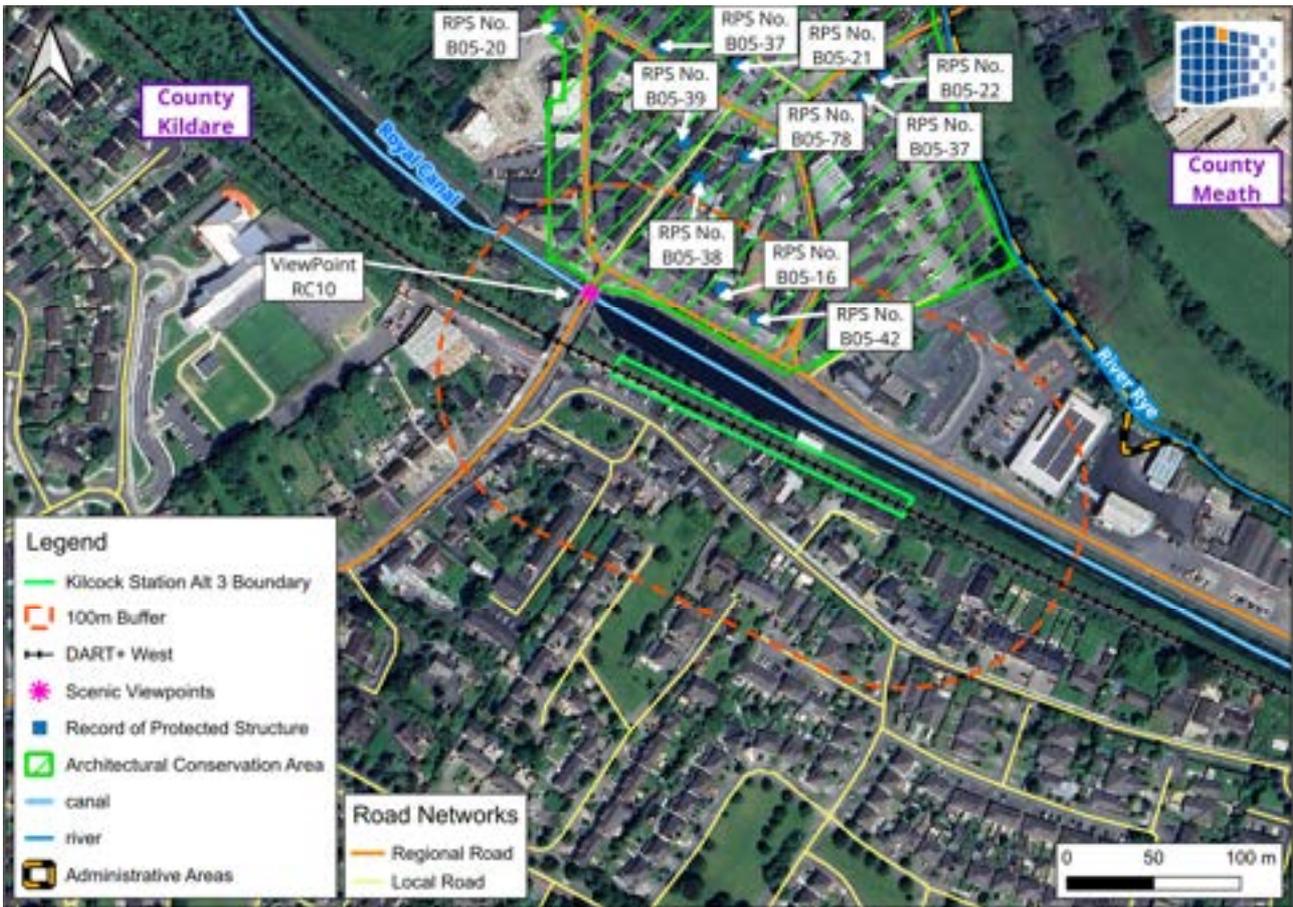


Site-specific policy objectives

There are no site specific objectives applicable to this site.

To the north of the site, on the opposite side of the Canal, an Architectural Heritage Area is designated and there are a number of protected structures identified also within the built up area of the town.

One scenic viewpoint is listed on Shaw Bridge, over the canal – RC10. Views to and from the bridge are protected.



Assessment

The development of a new station east of Shaw Bridge will have no significant effects on zoned land, land use or spatial planning locally, as outlined in the policy and objectives of the Kilcock LAP and Kildare CDP.

On the basis that the development of the station is part of bringing Dart + West to Kilcock and this is deemed to have a positive impact on achieving strategic land use planning proposals at all levels, no change to the TAF rating outlined in the policy context section (i.e. 7 – highly positive impact) is proposed.

4.5.7.3 Summary Assessment

None of the scheme options identified will have any significant effects on zoned land, land use or spatial planning locally, as outlined in the policy and objectives of the Kilcock LAP and Kildare CDP. The extension of the Dart + west line to Kilcock including a new station will however have a *highly positive impact* (TAF rating 7) on achieving strategic land use planning proposals at all levels including the promotion of more compact, sustainable communities, supporting housing delivery along existing and planned transport corridors, reducing sprawl and lowering dependence on cars.

Table 22 - Zoned Land, Land Use Planning and Spatial Planning MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	7- highly positive impact

Option	TAF Impact Scoring
Option 2: Station displaced West of OBG25 (Shaw Bridge)	7- highly positive impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	7- highly positive impact

4.5.8 Land Use Impacts Summary Assessment

Table 23 Land Use Impacts MCA Stage 1 Assessment

Parameter	TAF Impact Scoring on Land Use						
	Change in Quality of Public Realm	Existing Transport Network and Service Impact	Material Assets: Property	Built Services	Soils and geology	Planning Applications	Zoned Land, Land Use Planning and Spatial Planning
Option 1: Station at current location	2 – Negative Impact	1 – Highly Negative Impact	2 – Negative Impact	3 – Slightly Negative Impact	3 – Slightly Negative Impact	4 – Neutral Impact	7 – Highly Positive Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact	1 – Highly Negative Impact	4 – Neutral Impact	4 – Neutral Impact	3 – Slightly Negative Impact	3 – Slightly Negative Impact	7 – Highly Positive Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact	2 – Negative Impact	2 – Negative Impact	4 – Neutral Impact	3 – Slightly Negative Impact	4 – Neutral Impact	7 – Highly Positive Impact

4.6 Safety Impacts

4.6.1 Collisions and Related Impacts

Straight platforms are generally safer against impacts than curved platforms.

1. Better alignment of the train with the platform:
 - a. The train approaches in a more predictable and uniform manner.
 - b. Lower risk of the carriage hitting the edge of the platform or nearby structures.
2. Less space between the train and the platform
 - a. On curves, a ‘gap’ forms between the carriage and the platform, which can cause falls or entrapment.
 - b. On straight tracks, this gap is minimal and constant.
3. Greater efficiency of automatic systems
 - a. Automatic doors, proximity sensors and braking systems work better on straight tracks
 - b. Lower probability of approach errors or sudden braking.

4. Better visibility for the driver and safety personnel
 - a. On straight sections, the entire platform can be seen from the train or from the control cabin.
 - b. This allows for a quicker reaction to obstacles or people in dangerous areas.

Platforms on transition curves pose an even greater challenge because the horizontal clearance between the track and the platform edge varies depending on the curve radius and the track cant, i.e. the distance between the platform edge and the track varies throughout the transition curve, making maintenance difficult.

Option 1 Station at the current location

Option 1 proposes the current horizontal alignment for the two new platforms, with one straight section and one curved section with a transition curve between both alignments.

Due to the same platforms horizontal alignment configuration is maintained, this option receives a score of ‘4’ on the TAF impact scoring scale, as it will have a ‘Neutral Impact’ on the railway transport network.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Option 2 proposes a curved alignment for the two new platforms along its entire length.

Due to it eliminates the transition curve section of the current platform configuration, this option receives a score of ‘5’ on the TAF impact scoring scale, as it will have a ‘Slightly Positive Impact’ on the railway transport network.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Option 3 proposes a straight horizontal alignment for the two new platforms.

Due to it eliminates the curved alignment section of the current platform configuration, this option receives a score of ‘7’ on the TAF impact scoring scale, as it will have a ‘Highly Positive Impact’ on the railway transport network.

4.6.1.1 Summary Assessment

Table 24 Collisions and Related Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	5 - Slightly Positive Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	7 – Highly positive Impact

4.6.2 Other Safety Impacts

Straight platforms are generally safer:

- Better visibility: For both drivers and passengers, reducing the risk of accidents.
- Less space between train and platform: The distance is usually more uniform, which reduces the risk of falls.

Curved platforms are more risks, but they can be managed

- Greater distance between train and platform: On curves, especially sharp ones, a larger space is created that can be dangerous.
- Reduced visibility: The driver may have difficulty seeing the entire platform, and passengers may not be able to see the approaching train clearly.
- Greater technical complexity: Additional systems such as mirrors, cameras or sensors are required to improve safety.

Option 1 Station at the current location

Option 1 proposes the current horizontal alignment for the two new platforms, with one straight section and one curved section.

Due to the same platforms horizontal alignment configuration is maintained, this option receives a score of ‘4’ on the TAF impact scoring scale, as it will have a ‘Neutral Impact’ on the railway transport network.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Option 2 proposes a curved alignment for the two new platforms along its entire length.

Due to it eliminates the straight section of the current platform configuration, this option receives a score of ‘3’ on the TAF impact scoring scale, as it will have a ‘Slightly Negative Impact’ on the railway transport network.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Option 3 proposes a straight horizontal alignment for the two new platforms.

Due to it eliminates the curved alignment section of the current platform configuration, this option receives a score of ‘6’ on the TAF impact scoring scale, as it will have a ‘Positive Impact’ on the railway transport network.

4.6.2.1 Summary Assessment

Table 25 Collisions and Related Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	6 – Positive Impact

4.6.3 Safety Impacts Summary Assessment

Table 26 Safety Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring on Safety	
	Collision & Related Impacts	Other Safety Impacts
Option 1: Station at current location	4 – Neutral Impact	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	5 – Slightly Positive Impact	3 – Slightly Negative Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	7 – Highly positive Impact	6 – Positive Impact

4.7 Climate Change Impacts

This section describes the climate assessment of the options selection for Kilcock Station. The specific objectives of the climate assessment at this stage are to:

- Determine the existing climate baseline with reference to Ireland’s current Greenhouse Gas (GHG) emissions;
- Predict GHG emissions as a result of the station options;
- Assess the vulnerability or adaptation potential of the proposed station options due to potential future climate change.

4.7.1 Methodology

This assessment has been prepared based on the following TII Climate guidance:

- PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII 2022a);
- PE-ENV-01105: Climate Assessment of Proposed National Roads – Standard (TII 2022b); and
- GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (TII 2025).

The climate assessment is split into two aspects; the Climate Action Impact (i.e. the impact of the project on climate change) and the Climate Change Risk Assessment (i.e. the impact of climate change on the project).

4.7.1.1 Climate Action Impact

The primary aspects of the assessment relate to the greenhouse gas (GHG) emissions by quantifying carbon sources. This assessment is qualitative as quantitative data for each of the station options is not available at this stage. Key sources of emissions have been described for each station option, based on experience of similar schemes, and the differences in likely embodied carbon across the options assessed

Preference of route options is based on the qualitatively assessed lowest lifecycle GHG emissions. Consideration is also given to options which have higher potential for mitigation during further design.

Table 27 Greenhouse Gas Assessment Scoring Scale

Score	Description
Major or highly positive	7 Based on professional judgement the option would result in a potentially significantly positive improvement, providing a GHG reduction overall and positively contributing to Ireland's net zero trajectory. Mitigation measures are in place well beyond policy requirements.
Moderately positive	6 Based on professional judgement it is anticipated that the option would not result in a potentially significant positive improvement. However, the option has the potential to provide a moderate GHG reduction and will align with Ireland's net zero trajectory. Some mitigation measures are in place.
Minor or slightly positive	5 Based on professional judgement it is anticipated that the option would not result in a potentially significant positive improvement. However, the option has the potential to provide a small GHG reduction and will align with Ireland's net zero trajectory. Some mitigation measures are in place.
Not significant or neutral	4 Based on professional judgement it is anticipated that the option will align with Ireland's net zero trajectory. No mitigation measures are in place.
Minor or slightly negative	3 Based on professional judgement it is anticipated that the option has mitigation measures in place way beyond policy requirements, but it is likely that the project will produce some carbon emissions and fall short of Ireland's net zero trajectory.
Moderately negative	2 Based on professional judgement it is anticipated that the option has some mitigation measures in place, but it is likely that the project will produce carbon emissions and fall short of Ireland's net zero trajectory.
Major or highly negative	1 Based on professional judgement it is anticipated that the option has no mitigation measures in place, and it is likely that the project will produce carbon emissions and fall short of Ireland's net zero trajectory. Mitigation would be required for an option to progress.

4.7.1.2 Climate Change Adaptation

In addition to the greenhouse gas assessment, a screening climate change risk assessment has been conducted to consider the risk of future climate change impacts on the project receptors (i.e. drainage, road surfaces, utilities etc). Potential risks to these sensitive infrastructure receptors due to climate change include:

- Flooding (coastal, pluvial, fluvial) – including sea level rise and storm surge;
- Extreme heat (including wildfires and drought)– including extreme heat events and increasing temperatures overtime;
- Extreme cold – including frost and snow;
- Extreme wind;
- Lightning and hail;
- Landslides; and
- Fog.

The climate screening risk assessment comprises a sensitivity analysis which evaluates the project's vulnerability to climate change. This is completed by combining a sensitivity and exposure analysis. The sensitivity analysis first identifies the climate hazards relevant to the specific project type irrespective of its location (e.g., sea level rise will affect seaport projects regardless of specific location). TII (TII 2022a) describes the following as potential sensitive receptors; drainage, structures, earthworks, geotechnical, utilities, landscaping, signs, light posts and fences and buildings. These can be considered the on-site assets for road projects.

Sensitivity ratings are classed as:

- High Sensitivity: The climate hazard may have a significant impact on assets and processes, inputs, outputs and transport links. This is a sensitivity score of 3;
- Medium Sensitivity: The climate hazard may have a slight impact on assets and processes, inputs, outputs and transport links. This is a sensitivity score of 2; and
- Low Sensitivity: The climate hazard has no (or insignificant) impact. This is a sensitivity score of 1.

The exposure analysis identifies the climate hazards relevant to the planned project location irrespective of the project type, e.g., flooding could be a risk if the project location is next to a river in a floodplain. Exposure can be considered as high, medium or low:

- High exposure: It is almost certain or likely this climate hazard will occur at the project location i.e. might arise once to several times per year. This is an exposure score of 3;
- Medium exposure: It is possible this climate hazard will occur at the project location i.e. might arise a number of times in a decade. This is an exposure score of 2; and
- Low exposure: It is unlikely or rare this climate hazard will occur at the project location i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Once sensitivity and exposure are categorised, the vulnerability is calculated by multiplying the sensitivity and exposure, as shown in Table 28. The Multi-Criteria Analysis (MCA) scoring scale is detailed in Table 29.

The Climate Change Risk Assessment results will inform the comparative ranking in combination with the GHGA, while considering possible mitigation measures. Since the options are geographically close, the climate vulnerability is primarily distinguished by differences in flood risk and soil stability issues.

Given the location of all proposed options coastal erosion and flood risk are not a potential hazard.

Table 28 Screening Assessment: Vulnerability Analysis

Sensitivity	Exposure		
	High (3)	Medium (2)	Low (1)
High (3)	9 - High	6 - High	3 - Medium
Medium (2)	6 - High	4 - Medium	2 - Low
Low (1)	3 - Medium	2 - Low	2 - Low

Table 29 Climate Change Risk Assessment MCA Scoring Scale

Score	Description
Major or highly positive 7	Based on the vulnerability assessment undertaken for the project, the option has only low vulnerabilities to climate change risk across all climate hazards.
Moderately positive 6	Based on the vulnerability assessment undertaken for the project, the option has primarily low vulnerability to climate change risk, with medium vulnerability for one climate hazard.

Score	Description
Minor or slightly positive	5 Based on the vulnerability assessment undertaken for the project, the option has primarily low vulnerability to climate change risk, with medium vulnerability across up to three climate hazards.
Not significant or neutral	4 Based on the vulnerability assessment undertaken for the project, the option has only low and medium vulnerabilities to climate change risk across all hazards.
Minor or slightly negative	3 Based on the vulnerability assessment undertaken for the project, the option has high vulnerability to climate change risk for one climate hazard.
Moderately negative	2 Based on the vulnerability assessment undertaken for the project, the option has high vulnerability to climate change risk across more than one climate hazard.
Major or highly negative	1 Based on the vulnerability assessment undertaken for the project, the option has high vulnerability to climate change risk across three or more climate hazards.

4.7.2 Existing Environment

4.7.2.1 Climate Action

PE-ENV-01105 (TII 2022b) states that a baseline climate scenario should identify, consistent with the study area for the proposed development, GHG emissions without the proposed development for both the current and future baseline.

Given the circumstances of Ireland’s declaration of a climate and biodiversity emergency in May 2019, and the November 2019 European Parliament approval of a resolution declaring a climate and environment emergency in Europe, in conjunction with Ireland’s current failure to meet its EU binding targets under the GHG Regulation, beneficially or adverse changes in GHG emissions are of more significance than previously viewed prior to these declarations. Thus, the baseline climatic environment should be considered a highly sensitive environment for the assessment of impacts.

Data published in July 2025 (EPA 2025), indicates that Ireland exceeded, without the use of flexibilities, its 2024 annual limit set under EU’s Effort Sharing Decision (ESD) (EU 2018/842) by 1.03 Mt CO_{2e}. However, the 2024 emissions represent the second consecutive year in which Ireland’s emission were below (-4.2%) 1990 levels. ETS (Emissions Trading Scheme) emissions decreased (-7.4%) and ESR (Effort Sharing Regulation) emissions decreased (-0.5%). Ireland’s target is an emission reduction of 626 kt of CO_{2e} by 2030 on an average baseline of 2016 to 2018.

The EPA estimate that 2024 total national GHG emissions, excluding land use, land-use change and forestry (LULUCF), have decreased by 2.0% on 2023 levels to 53.75 Mt CO_{2e}, with a 0.7 Mt CO_{2e} (-8.9%) reduction in electricity industries alone. This was driven by a 39.6% share of energy from renewables in 2024 and the complete phase-out of peat for electricity generation. Manufacturing combustion and industrial processes decreased by 4.6% to 6.0 Mt CO_{2e} in 2024 due to declines in fossil fuel usage. The sector with the highest emissions in 2024 was agriculture at 38% of the total, followed by transport at 21.7%. For 2024, total national emissions (including LULUCF) were 57.65 Mt CO_{2e} (EPA 2025) (Table 30).

The current estimates of national greenhouse gas emissions (including LULUCF) in 2024 are 12.0% below 2018, well off the National Climate ambition of a 51% reduction by 2030. The data indicate that from 2021-2024 Ireland has used 82.5% of the 295 Mt CO_{2e} Carbon Budget for the five-year period 2021-2025. This leaves 17.5% of the budget available for 2025, requiring a substantial 10.3% annual emissions reduction for 2025 to stay within budget.

Table 30 Trends in total national GHG emissions 2022–2024.

Sector ^{Note 1}	2022 (Mt CO ₂ e)	2023 (Mt CO ₂ e)	2024 (Mt CO ₂ e)	Total Budget (Mt CO ₂ e) (2021-2025)	% Budget 2021-2025 Used	Annual Change 2023 to 2024
Electricity	9.69	7.57	6.95	40	85.25%	-8.19%
Transport	11.76	11.8	11.65	54	85.74%	-1.27%
Buildings (Residential)	5.75	5.35	5.61	29	81.31%	4.86%
Buildings (Commercial and Public)	1.45	1.39	1.49	7	82.43%	7.19%
Industry	6.62	6.31	6.01	30	86.77%	-4.75%
Agriculture	21.78	20.72	20.41	106	80.05%	-1.50%
Other ^{Note 2}	1.93	1.81	1.63	9	80.33%	-9.94%
LULUCF	3.98	3.89	3.89	–	–	0
Total including LULUCF	62.99	58.83	57.64	295	82.81%	-2.04%

Note 1 Reproduced from latest emissions data on the EPA website (EPA 2025).

Note 2 Other includes Petroleum refining, F-Gases and Waste (emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).

In relation to carbon budgets, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (as amended) states “A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a ‘budget period’)”.

The carbon budget is to be produced for 3 sequential budget periods, as shown in Table 31. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors.

The sectoral emission ceilings for 2030 were published in Climate Action Plan 2025 (CAP25) (DECC, 2025) and are shown in in Table 31. Electricity has a 75% reduction requirement and a 2030 emission ceiling of 3 Mt CO₂e (carbon dioxide equivalent), while the transport sector requires a 50% reduction and has a 2030 emissions ceiling of 6 Mt CO₂e. The industry sector requires a 35% reduction and has a 2030 emissions ceiling of 4 Mt CO₂e.

Table 31 2030 Sectoral Emissions Ceilings

Sector	Baseline (Mt CO ₂ e)	Carbon Budgets (Mt CO ₂ e)		2030 Emissions (Mt CO ₂ e)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP24 puts in place ambitious activity targets for the sector reflecting an EU-type approach.			
Total	68				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

The future baseline, with respect to the GHGA, can also be considered in relation to the future climate targets which the assessment results will be compared against. In line with TII (TII 2022b) and IEMA Guidance (IEMA, 2022) the future baseline is a trajectory towards net zero by 2050, “*whether it [the project] contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*”.

The future baseline will be determined by Ireland meeting its targets set out in the CAP25, and future CAPs, alongside binding 2030 EU targets.

4.7.2.2 Climate Change Adaptation

Met Éireann’s 2024 *Climate Statement* (Met Éireann 2025) states 2024’s average shaded air temperature in Ireland is provisionally 10.72 °C, which is 1.17°C above the 1961-1990 long-term average, or 0.55°C above the most recent 1991-2020 long-term average. This is the 4th warmest year on record with 2023 breaking previous records. Seven of the top ten warmest years have occurred since 2005. Record high sea surface temperatures (SST) were recorded in 2022, and in 2024 continued at or near record high levels. 2024 was overall drier than average; however, there were many instances of heavy or intense rainfall which led to flooding events. This trend is predicted to continue with climate change with an increase in both dry periods and heavy rainfall events.

The TRANSLATE research report (Met Éireann 2024) finds that night-time temperatures will warm more than day-time temperatures, with temperatures increases across all seasons but the highest in the summer, with an increase of 0.5°C to 3.5°C. Autumn is projected to have the highest increase in average minimum temperatures, with an increase of 1.1°C to 4.4°C. The variance is dependent on the scenario that is being reviewed. While these temperatures are projected across all of Ireland, they increase most in the east of the country compared to the west. With respect to rainfall, increases of 4% to 38% are projected. However, this will not be spread across the year as, during summer months, there are projected decreases in rainfall beyond the 2°C warming scenario.

The projections were echoed by the *Updated High-Resolution Climate Projections for Ireland Research Report: 471* (EPA, 2024) which was in broad agreement with previous research. The future autumn and winter months are projected to be up to 10% wetter, while summer is projected to be up to 8% drier.

4.7.3 Climate Action Impacts

This assessment is qualitative as quantitative data for each of the station options is not available at this stage. Key sources of emissions have been described for each station option, based on experience of similar schemes, and the differences in likely embodied carbon across the options assessed.

A preference rating and impact score, in line with the methodology presented in section 4.7.1, are shown below.

Option 1 Station at the current location

Assessment of this option considers the following activities which would generate or avoid GHG emissions:

- **Demolition** – Shaw Bridge would require demolition to accommodate the double track and two platform arrangement proposed as part of this option, resulting in GHG emissions associated with demolition.
- **Excavation** – the proposed new tracks would require lowering to a maximum of 1.70 m over a distance of 700 m, requiring excavation of a new railway trench, and resulting in GHG emissions associated with excavation and excavated material waste disposal.
- **Construction** – Shaw Bridge would require reconstruction, retaining walls would be required along both track sides and a second platform would be constructed, resulting in GHG emissions associated with materials required for bridge and retaining wall construction. The existing platform would be maintained.
- **Road traffic** – demolition of Shaw Bridge would result in the closure of the R125 road for an extended period (4-6 months), resulting in GHG emissions associated with additional vehicle kilometres from traffic rerouting.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Assessment of this option considers the following activities which would generate or avoid GHG emissions:

- **Demolition** – no demolition of Shaw Bridge is required as this option moves the station platforms west of the bridge. This would therefore avoid GHG emissions, relative to Option 1. However, the existing platform would need to be moved west of the bridge, resulting in GHG emissions associated with its demolition (which do not occur in Option 1).
- **Excavation** – the proposed new tracks would require lowering to a maximum of 3.35 m over a distance of 700 m, requiring excavation of a new railway trench and resulting in GHG emissions

associated with excavation and excavated material waste disposal. A greater amount of excavation would be required relative to Option 1.

- **Construction** – Retaining walls would be required along both track sides, as well as construction of two station platforms, resulting in GHG emissions associated with materials required for retaining wall and platform construction.
- **Road traffic** – the excavation and retaining wall works would prevent railway service during these activities, resulting in GHG emissions associated with additional vehicle kilometres from private car use to replace normal train trips.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Assessment of this option considers the following activities which would generate or avoid GHG emissions:

- **Demolition** – no demolition of Shaw Bridge is required as this option moves the station platforms west of the bridge. This would therefore avoid GHG emissions, relative to Option 1. However, the existing platform would need to be moved east of the bridge, resulting in GHG emissions associated with its demolition (which do not occur in Option 1).
- **Excavation** – No earthworks are required in the area of the new station for the tracks, and to the west of OBG25, the ground needs to be lowered by a maximum of 1 metre over a length of approximately 600 metres, resulting in GHG emissions associated with excavation and excavated material waste disposal. This is the least amount of excavation required relative to Options 1 and 2.
- **Construction** – Retaining walls would be required along both track sides, as well as construction of two station platforms, resulting in GHG emissions associated with materials required for retaining wall and platform construction.
- **Road traffic** – no significant additional vehicle kilometres from private car use to replace normal train trips are expected in this option, rail service can be maintained during the construction and earthworks activities for this option. This is the least amount of GHG emissions associated with traffic relative to Options 1 and 2.

All station options have been assigned a score of 4 – Not significant or neutral as there will be GHG emissions associated with them, however all options facilitate the drive to encourage modal shift to public travel and are in line with CAP25. There is the potential to improve this rating to a positive impact through the implementation of mitigation measures such as using low carbon intensive construction materials, reuse of site materials or increased planting to provide carbon sink opportunities for example.

There are no significant adverse impacts induced by the operational phase. The score is not significant or neutral. Under the Transport Appraisal Framework (TAF) Climate Change Scorecard the impact is also considered neutral.

4.7.3.1 Summary Assessment

All options facilitate the drive to encourage modal shift to public travel by supporting the DART network in growing from its current 50km in length to over 150km. Modal shift away from private car use to public transport, particularly those powered by renewable energy such as the proposed DART network, is encouraged. This is in line with CAP25 (DECC, 2025).

Option 3 Station displaced East of OBG25 (Shaw Bridge) is the most preferred as it will likely result in the lowest GHG emissions of the three options. Option 2 Station displaced West of OBG25 (Shaw Bridge) is the least preferred option as it will likely result in the highest GHG emissions of the three options. However, there is the potential to reduce GHG emissions from all options through the implementation of mitigation measures

such as using low carbon intensive construction materials, reuse of site materials or increased planting to provide carbon sink opportunities for example.

Table 32 Climate Action Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	4 – Neutral Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	4 – Neutral Impact

4.7.4 Climate Adaptation Impacts

When assessing adaptation to climate hazards, the resilience to extreme temperatures, wind, drought, and wildfire are considered to be stable across all options, given the limited geographic area. Flood risk, soil stability/landslide and potential have the greatest likelihood of changing across options and require adaptation of the design to mitigate risks. Therefore, during the below appraisal, these are the climate hazards that have been discussed to differentiate between options.

Option 1 Station at the current location

With regard to flood risk, the station is not within a flood zone, indicating no significant risk from fluvial flooding. The station site boundary area is currently under review with respect to Ireland's Catchment Flood Risk Assessment and Management (CFRAM) mapping. However, using available information, to build resilience and mitigate the potential for pluvial flood risk, it is proposed to use flood compensation storage areas (CSAs) to manage surface runoff during rainfall events. Flood risk from pluvial source can be managed adequately by implementing storm water controls and SuDS. Stormwater requirements will increase with climate change as more intense rainfall events occur over concentrated time periods. The projections account for climate change in RCP4.5, or an additional 20% for climate change. The design ensures that flood risk from pluvial source can be managed adequately by implementing storm water controls and SuDS. Stormwater requirements will increase with climate change with more intense rainfall events occurring over concentrated time periods. There is some residual risk in RCP8.5 in 2100. This may result in a requirement for further mitigation in detailed design or operational phase to ensure resilience, should climate projections indicate that the most likely future scenario aligns with RCP8.5.

The boundary for this option, including trackworks, is within areas of low susceptibility to landslide. Future climate change drought/flood cycles have the potential to increase the potential for landslides and, therefore, the risk associated with landslides. However, given the low risk the exposure likelihood remains low. This additional risk will apply to all areas of potential landslide susceptibility.

The flood risks are mitigated for RCP4.5 however there are some residual risks in RCP8.5. The TII score is *minor or slightly negative (3)*, based on the TII MCA criteria definition “*the option has high vulnerability to climate change risk for one climate hazard*”. The equivalent TAF score is considered *slightly negative*. With further mitigation during detailed design, this risk may be designed out and the score reduced to not significant or neutral.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

With regard to flood risk, the station is not within a flood zone, indicating no significant risk from fluvial flooding. The station site boundary area is currently under review with respect to Ireland's Catchment Flood Risk Assessment and Management (CFRAM) mapping. However, using available information, to build resilience and mitigate the potential for pluvial flood risk, it is proposed to use flood compensation storage areas (CSAs) to manage surface runoff during rainfall events. Flood risk from pluvial source can be managed adequately by implementing storm water controls and SuDS. Stormwater requirements will increase with climate change as more intense rainfall events occur over concentrated time periods. The projections account for climate change in RCP4.5, or an additional 20% for climate change. The design ensures that flood risk from pluvial source can be managed adequately by implementing storm water controls and SuDS. Stormwater requirements will increase with climate change with more intense rainfall events occurring over concentrated time periods. There is some residual risk in RCP8.5 in 2100. This may result in a requirement for further mitigation in detailed design or operational phase to ensure resilience, should climate projections indicate that the most likely future scenario aligns with RCP8.5.

The boundary for this option, including trackworks, is within areas of low susceptibility to landslide. Future climate change drought/flood cycles have the potential to increase the potential for landslides and, therefore, the risk associated with landslides. However, given the low risk the exposure likelihood remains low. This additional risk will apply to all areas of potential landslide susceptibility.

The flood risks are mitigated for RCP4.5 however there are some residual risks in RCP8.5. The TII score is *minor or slightly negative (3)*, based on the TII MCA criteria definition "*the option has high vulnerability to climate change risk for one climate hazard*". The equivalent TAF score is considered *slightly negative*. With further mitigation during detailed design, this risk may be designed out and the score reduced to not significant or neutral.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

With regard to flood risk, the station is not within a flood zone, indicating no significant risk from fluvial flooding. The station site boundary area is currently under review with respect to Ireland's Catchment Flood Risk Assessment and Management (CFRAM) mapping. However, using available information, to build resilience and mitigate the potential for pluvial flood risk, it is proposed to use flood compensation storage areas (CSAs) to manage surface runoff during rainfall events. Flood risk from pluvial source can be managed adequately by implementing storm water controls and SuDS. Stormwater requirements will increase with climate change as more intense rainfall events occur over concentrated time periods. The projections account for climate change in RCP4.5, or an additional 20% for climate change. The design ensures that flood risk from pluvial source can be managed adequately by implementing storm water controls and SuDS. Stormwater requirements will increase with climate change with more intense rainfall events occurring over concentrated time periods. There is some residual risk in RCP8.5 in 2100. This may result in a requirement for further mitigation in detailed design or operational phase to ensure resilience, should climate projections indicate that the most likely future scenario aligns with RCP8.5.

The boundary for this option, including trackworks, is within areas of low susceptibility to landslide. Future climate change drought/flood cycles have the potential to increase the potential for landslides and, therefore, the risk associated with landslides. However, given the low risk the exposure likelihood remains low. This additional risk will apply to all areas of potential landslide susceptibility.

The flood risks are mitigated for RCP4.5 however there are some residual risks in RCP8.5. The TII score is *minor or slightly negative (3)*, based on the TII MCA criteria definition "*the option has high vulnerability to climate change risk for one climate hazard*". The equivalent TAF score is considered *slightly negative*. With

further mitigation during detailed design, this risk may be designed out and the score reduced to not significant or neutral.

4.7.4.1 Summary Assessment

There is no significant difference in vulnerability to fluvial and pluvial flooding or level of mitigation required between the three options. All three options require some level of flood risk mitigation. All three options have similar low vulnerability all other climate change hazards. Maintenance will be conducted along the rail track to ensure the risk to the additional areas of electrification due to uncontrolled wildfire are mitigated and the asset is protected. Such mitigation measures will be required across the DART+ network.

Table 33 Climate Adaptation Impacts MCA Stage 1 Assessment

Parameter	TAF Impact Scoring
Option 1: Station at current location	3 – Slightly Negative Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact

4.7.5 Climate Change Impacts Summary Assessment

Table 34 Climate Change Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring on Climate	
	Climate Action Impacts	Climate Adaptation Impacts
Option 1: Station at current location	4 – Neutral Impact	3 – Slightly Negative Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	4 – Neutral Impact	3 – Slightly Negative Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	4 – Neutral Impact	3 – Slightly Negative Impact

4.8 Local Environmental Impacts

4.8.1 Biodiversity

This section provides the appraisal of the three Kilcock Station options, under the DART + programme under biodiversity.

4.8.1.1 Methodology

The resources consulted as part of the desk study include the following:

- Environmental Protection Agency – water bodies and water quality (www.epa.ie).
- Perrin, P.M., Daly, O.H., (2010) A provisional inventory of ancient and long-established woodland in Ireland. Irish Wildlife Manuals, No. 46. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

- The National Parks and Wildlife Service (NPWS) online database, consulted for designated sites of nature conservation interest in the study area, accessed October 2024 (www.npws.ie).
- Review of Ordnance Survey maps and orthophotography.

Study Area

The study area for the desk study to inform the option selection was defined as:

- The entire area within each option and a 100m buffer.
- All watercourses within the options, downstream and including estuaries and coastal waterbodies.

Criteria

The criteria related to Biodiversity against which the site location options were assessed as follows:

- The presence of European or other internationally designated sites within, hydrologically or functionally connected to each site.
- The presence of Nationally designated sites within, hydrologically or functionally connected to each site.
- The presence of habitats capable of supporting the Qualifying Interests of European sites within, hydrologically or functionally connected to each site.
- The presence of natural or semi-natural habitats within, hydrologically or functionally connected to each site.
- The presence of natural or semi-natural habitats capable of supporting rare and protected species within, hydrologically or functionally connected to each site.

4.8.1.2 Options Appraisal

The three options will require works within 20m of the Royal Canal pNHA. During the construction phase, there is potential for disturbance and water quality impacts. During the operational phase there could be light spill from the stations onto the Royal Canal pNHA. The options are located within an existing urban setting that is already subject to high levels of human disturbance and artificial lighting. The centre of Kilcock is immediately north of the canal, with extensive residential development and business premises to the south.

Option 1 Station at the current location

This option will require the construction of a new overbridge and new platforms that roughly centre on the bridge. They would involve a 4-6 month construction phase within 10m of the Royal Canal, and the associated noise, visual disturbance and vibration during this period may temporarily disturb species present in the area. There is potential for water quality impacts, however this can be mitigated through pollution prevention measures during the construction phase.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Option 2 will involve the construction of new platforms to the west of Shaw Bridge. The closest platform to the canal is c. 20m. This option will require the removal of a narrow strip of vegetation on each side of the tracks to accommodate the platforms, which are approximately 180m in length. Significant vegetation will remain in place between the new platforms and the canal which would provide visual and acoustic screening. There is potential for water quality impacts, however this can be mitigated through pollution prevention measures during the construction phase.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Option 3 will involve the construction of two new platforms east of Shaw Bridge. This will be required works outside Irish Rail land and <5m from the canal. The canal in this area is urban in character it is unlikely that the presence of a new platform would affect species including waterbirds and otter already present in the area. Artificial lighting from the station could increase the lux levels on the canal, however this area is already under

pressure from light spill from the urban area to the north, and with the use of appropriate lighting designs, the level of spill from the new platform could be minimised. There is potential for water quality impacts, however this can be mitigated through pollution prevention measures during the construction phase.

4.8.1.3 Summary Assessment

Table 35 Biodiversity Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring
Option 1: Station at current location	3 – Slightly Negative Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact

4.8.2 Water Resources

4.8.2.1 Flood Risk Methodology

This section provides the outcome of the site selection process under the heading flood risk. The appraisal involves undertaking an impact assessment of proposed options for the Kilcock Station.

Desk study

A desktop assessment was carried out for the proposed options to establish baseline conditions using Geological maps, Geological Survey of Ireland (GSI), Historic Maps from the Ordnance Survey of Ireland, Google Earth, Floodinfo.ie (OPW) maps to identify and assess any likely impacts of the development on flood risk.

The proposed Kilcock Station options are characterised by varying degrees of excavation adjacent to the Royal Canal. The canal acts as an informal recipient for surface water runoff but also has a significant influence on near surface ground water levels. The canal level can vary in flood conditions as overflows from the Ryewater and local tributaries feed the canal. The water levels are typically fixed by the lock gate structure and any overflows in the system. At Kilcock station the canal is some distance from the Ryewater River and local drainage systems either follow adjacent to the canal or drain directly to the Ryewater or are held within the combined foul system.

At Kilcock station the route for surface water to be drained away is to head east alongside the canal in an adjacent ditch and then discharge at Chambers Bridge. Some rainwater may go direct to the canal.

The soils under the station development are alluvial deposits and made ground. There is a glacial terrace to the north. The canal will act as an impermeable barrier for surface water and sub surface flows wanting to head north to the diverted Ryewater course. As a result, it is expected that any excavation alongside the canal as the track is lowered could interrupt these flow paths. It is possible that this groundwater could appear in the ballast.

Multi Criteria Assessment (MCA)

Upon review of the site conditions and project requirements, a Multi Criteria Assessment (MCA) matrix has been prepared (in accordance with the TII publication DN-03083 Managing Flood Risk) with the prime objective of providing a Transport Appraisal Framework (TAF) scoring of flooding risks for each of the proposed options. The same TAF 7-point scale was used but the scale is adjusted from 1 to 4 rather than 1 to 7 based on

respective baseline environments of the proposed options. These scores denote the impact of each option to its existing environment, when compared to its own baseline scenario.

Table 36 Flood risk MCA Criteria

TAF Scale	7-point		Intercepts groundwater flow paths	At risk of flooding as a result of a canal breach	Requires positive drainage through pumping	At pluvial risk
	Impact Level	Score				
Neutral	4	Not likely	No risk	Drainage can be outfalled by gravity receiving water body or drain	Accumulation of pluvial flood water not possible due to natural drainage outlets	
Slightly Negative	3	Minor change in foundation level of track based compared to existing	Minor depths of flooding predicted	Pumping station required to local outfall point	Accumulation of minor depths of pluvial flood water possible due to local depression compare with adjacent lands	
Negative	2	Significant change in foundation level of track based compared to existing (>0.5m)	Significant depths of flooding predicted	Pumping station required to remote outfall point	Accumulation of pluvial flood water possible due to local depression compared with local lands and steep slopes adjacent to track	
Highly Negative	1	Substantial change in foundation level of track based compared to existing (>1m)	Substantial depths of flooding predicted	Pumping station outfall not possible	Accumulation of significant depths of pluvial flood water possible due to local depression compared with local lands and steep slopes adjacent to track	

4.8.2.2 Options Appraisal

Option 1 Station at the current location

Flood Risk

Option 1 involves demolition and reconstruction of the Shaw Bridge along with realignment of tracks near existing station. The new tracks on west end of the platform are 0.73m below the existing track level. As part of realignment of tracks of western approach, retaining structures and slopes are proposed. On the Up track (north side), piled retaining walls up to 4.5 m in height are proposed over a length of about 780 m.

On the east side of the Shaw bridge, the Royal Canal Way and railway track lie at similar elevations, between +66 mOD and +67 mOD. This raises a potential risk of lateral seepage requiring appropriate drainage measures to relieve pore pressure and water ingress, especially during fluctuating groundwater conditions and Waterways Ireland is expected to be consulted with. This option is anticipated to be mainly in cut sections with estimated earthworks of approximately 37,573 m³.

A relatively thin layer of superficial soils (Urban) and/or glacial till (TL) is expected beneath the new track, station platforms and retaining structures are proposed. The reduction in line level is minor and may intercept ground water flow patterns. As the location is adjacent to the lower pound on the Royal Canal in Kilcock canal breach and pluvial flooding risks are minimised.

Overall, Option 1 is assigned a *TAF Impact Score of 3 – Slightly Negative Impact*. Section 4.8.2.1 provides details on this scoring and how the different factors involved.

Vulnerable Aquifers

The impact of station option 1 on groundwater has been assessed by considering the underlying aquifers, soils and groundwater using publicly available information obtained from EPA and GSI Maps.

Option 1 is underlain by a Locally Important Aquifer- Bedrock which is Moderately Productive only in Local Zones and there are no gravel aquifers or karst features nearby. Approximately 75% of the station option is underlain by Urban quaternary sediment (Made Ground), with the remaining 25% being underlain by Till derived from limestones. The subsoil permeability is low.

This option is underlain by the Dublin groundwater body, the WFD risk status of which is under review. It is underlain by groundwater of Moderate vulnerability and the average groundwater recharge rate is in the range of 51-100mm/yr. Option 1 is located directly atop borehole 2623SEW244, which has a location accuracy of 50m and is noted as being for domestic use only. The option comes within the accuracy ranges of three further boreholes: 2623SEW111 accurate to 500m with a yield class of 'good', 2623SEW119 accurate to 2km with a yield class of 'moderate' and 2623SEW120 accurate to 2km with a yield class of 'poor'.

There are no Public Water Supply Source Protection Areas or Group Water Scheme Zones of Contribution in the vicinity. The station option is located directly parallel to the Royal Canal which is designated as a proposed Natural Heritage Area (pNHA) due to the diversity of species it supports; no groundwater-dependent species have been identified. There are no Special Areas of Conservation (SAC) or Special Protection Areas (SPA) within 6km of the station option.

Option 1 is expected to have a 'Neutral Impact' on groundwater as there are no gravel aquifers, karst features, PWS Source Protection Areas, or protected groundwater-dependent habitats nearby. The underlying aquifers already have a fairly low groundwater recharge rate and the groundwater is classed as moderately vulnerable, meaning the works will likely only have an imperceptible magnitude of effect on groundwater flow and quality. The impact on groundwater is further minimised with option 1 as works are limited to one platform, rather than two with the other options. Although option 1 could affect borehole 2623SEW244, it is not anticipated to be affected any more than it currently is by the existing station.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Flood Risk

Option 2 proposes relocating the station to the west of Shaw Bridge. This option includes realignment of tracks and construction of retaining structure on both sides of the alignment. The new tracks at the end of the platform are 2.24m below the existing track level. The elevation of the railway track is around +69 mOD, while the adjacent ground is approximately +71 mOD.

As part of realignment of tracks for proposed station platform, retaining structures and slopes are required. On the Up track (north side), piled retaining structure of up to 5.0 m in depth are proposed over a 780 m stretch. On the Down track (south side), a 2.5 m high retaining wall near the parking area (100 m length) and a piled retaining wall up to 5.6 m high for 260 m length are proposed.

A relatively thin layer of superficial soils (Urban), glacial till (TL) and/or Alluvium (A) is expected where the new track, station platforms and retaining structure are proposed. Therefore, the development is likely to involve replacing problematic soils (e.g. contaminated Made Ground or soft ground). The site of the station is alongside

the higher pound upstream of the lock. The potential for local groundwater flooding is higher than the other options and the risk of significant depths of flood water in a pluvial event is also greater than the other options. Drainage will be harder to manage at this site option.

Based on this, Option 2 is assigned a *TAF Impact Score of 2 –Negative Impact*. Section 4.8.2.1 provides details on this scoring and how the different factors involved.

Vulnerable Aquifers

The impact of station option 2 on groundwater has been assessed by considering the underlying aquifers, soils and groundwater using publicly available information obtained from EPA and GSI Maps.

Option 2 is underlain by a Locally Important Aquifer- Bedrock which is Moderately Productive only in Local Zones and there are no gravel aquifers or karst features nearby. Approximately 20% of the station option is underlain by Urban quaternary sediment (Made Ground), with the remaining 80% being underlain by Till derived from limestones. The subsoil permeability is low.

This option is underlain by the Dublin groundwater body, the WFD risk status of which is under review. It is underlain by groundwater of Moderate vulnerability and the average groundwater recharge rate is in the range of 51-100mm/yr. Option 2 comes within the accuracy ranges of three boreholes: 2623SEW111 accurate to 500m with a yield class of 'good', 2623SEW119 accurate to 2km with a yield class of 'moderate' and 2623SEW120 accurate to 2km with a yield class of 'poor'.

There are no Public Water Supply Source Protection Areas or Group Water Scheme Zones of Contribution in the vicinity. The station option is located directly parallel to the Royal Canal which is designated as a proposed Natural Heritage Area (pNHA) due to the diversity of species it supports; no groundwater-dependent species have been identified. There are no Special Areas of Conservation (SAC) or Special Protection Areas (SPA) within 6km of the station option.

Option 2 is expected to have a 'Neutral Impact' on groundwater as there are no gravel aquifers, karst features, PWS Source Protection Areas, or protected groundwater-dependent habitats nearby. The underlying aquifers already have a fairly low groundwater recharge rate and the groundwater is classed as moderately vulnerable, meaning the works will likely only have an imperceptible magnitude of effect on groundwater flow and quality.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Flood Risk

Option 3 involves relocating the station platforms to the east of Shaw Bridge requiring minimal earthworks around the proposed station area. The railway track, Royal Canal Way and nearby buildings lie at similar elevations (+66 mOD and +67 mOD). As part of the realignment of the western approach to the proposed station platform, retaining structures and slopes are proposed. On the Up track (north side), piled retaining walls up to 4.0 m and 3.6 m high are proposed over lengths of approximately 260 m and 200 m, respectively. On the Down track (south side), a retaining wall up to 2.5 m high near the parking area (100 m length), and further west a 3.4 m high piled retaining wall over 220 m stretch are proposed.

The major concern with this option is that the section near Chainage 95+600 (north side) is in close proximity to the quay wall structure of the existing Royal Canal Way. This proximity introduces potential risks of seepage and soft or saturated soil conditions, which might lead to stability and settlement issues during and after construction. This will also be an area where pluvial and groundwater could pond causing minor flooding. However, the location and levels of the track are easier to secure a positive drainage outfall, without pumps.

Therefore, Option 3 is assigned a *TAF Impact Score of 4 – Neutral*. Section 4.8.2.1 provides details on this scoring and how the different factors involved.

The excavated materials obtained could potentially be used on site, considering that the depot area has import requirements. If the excavated soils classify suitably as per the depot material specifications, they could be beneficially utilised.

Vulnerable Aquifers

The impact of station option 3 on groundwater has been assessed by considering the underlying aquifers, soils and groundwater using publicly available information obtained from EPA and GSI Maps.

Option 3 is underlain by a Locally Important Aquifer- Bedrock which is Moderately Productive only in Local Zones and there are no gravel aquifers or karst features nearby. This station option is entirely underlain by Urban quaternary sediment (Made Ground) and the subsoil permeability is low.

This option is underlain by the Dublin groundwater body, the WFD risk status of which is under review. It is underlain by groundwater of Moderate vulnerability and the average groundwater recharge rate is in the range of 51-100mm/yr. Option 3 comes within the accuracy ranges of three boreholes: 2623SEW111 accurate to 500m with a yield class of 'good', 2623SEW119 accurate to 2km with a yield class of 'moderate' and 2623SEW120 accurate to 2km with a yield class of 'poor'.

There are no Public Water Supply Source Protection Areas or Group Water Scheme Zones of Contribution in the vicinity. The station option is located directly parallel to the Royal Canal which is designated as a proposed Natural Heritage Area (pNHA) due to the diversity of species it supports; no groundwater-dependent species have been identified. There are no Special Areas of Conservation (SAC) or Special Protection Areas (SPA) within 6km of the station option.

Option 3 is expected to have a 'Neutral Impact' on groundwater as there are no gravel aquifers, karst features, PWS Source Protection Areas, or protected groundwater-dependent habitats nearby. The underlying aquifers already have a fairly low groundwater recharge rate, and the groundwater is classed as moderately vulnerable, meaning the works will likely only have an imperceptible magnitude of effect on groundwater flow and quality. The impact on groundwater is further minimised with option 3 as Made Ground underlies the entire station option; construction works affecting Made Ground will have a lesser impact on groundwater.

4.8.2.3 Summary Assessment

The average TAF scoring of options are presented in Table 37. It should be noted that as the scores are not weighted, the average score at the end of this assessment will be indicative only and does not represent the final TAF impact scoring of the proposed sites in terms of Flood Risk as given in the following subsection. The geotechnical and local drainage data at this stage is limited for the assessment.

The main factor causing impact for the options is the interaction of slopes and requirements for retaining structures to provide for the changes inside the property boundaries that would affect neighbouring ground and structures. In some cases, the proposals include significant lengths of retaining structure and platforms that may need installed very close to the adjacent properties, especially in the case of Option 3 in proximity to the canal quay wall and boardwalk. Where earthworks materials arise, these are likely to be feasible for reuse elsewhere within the project as there is an overall deficit requiring import. Design of the slopes and retaining structure is more impactful in terms of the need to construct to avoid impacts to adjacent properties.

Table 37 Average TAF scoring – Option-by-option MCA Flood Risk factors

Site Location Option #	TAF Average Scoring*					TAF Impact Scoring Description
	Intercepts groundwater flow paths	At risk of flooding as a result of a canal breach	Requires positive drainage through pumping	At pluvial risk	Average score	
Option 1	<u>3</u>	<u>3</u>	<u>4</u>	3	3.0	Slightly Negative
Option 2	<u>2</u>	<u>2</u>	<u>2</u>	2	3.0	Negative
Option 3	<u>4</u>	<u>4</u>	<u>3</u>	4	4.0	Neutral

Table 38 Water Resources Impacts MCA Stage 1 Assessment

Option	TAF Impact overall Scoring for Flood Risk and Hydrology	TAF Impact overall Scoring for Hydrogeology
Option 1: Station at current location	3 – Slightly Negative	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	3 – Slightly Negative	4 – Neutral Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	4 – Neutral	4 – Neutral Impact

4.8.3 Landscape and Visual Quality

This section provides the appraisal of the landscape and visual impact of 3 alternative options, under the DART + programme for provision of platform requirements at Kilcock Railway Station.

4.8.3.1 Description of Existing Environment

The railway corridor runs in a southeast to northwest alignment immediately south of and parallel to the Royal Canal through the centre of Kilcock town. The R125 Bridge Street crosses both the canal and the railway corridor via the linked double bridging structure of Shaw Bridge (OBG25). The railway line is set low and runs through a deep cutting, with vegetated side slopes, west of Shaw Bridge. The Royal Canal Way follows the north bank of the canal through Kilcock Town.

Kilcock Railway Station is located south of the railway line and immediately east of Shaw Bridge over the railway. The existing railway platform is located on the south-side of the railway line and runs under and to either side of the bridge. A recorded monument (Market Cross KD005-030), and a water pump (NIAH 11802036) are located in the fair green open space at the Railway Station.

The double lock, known as the 16th Lock on the Royal Canal, is located north of the railway and immediately west of the Shaw Bridge. A residential bungalow (on the site of a former and smaller lock-keepers cottage), with a short access lane, is located between the railway and the canal locks. West of the residential property the railway and canal corridor diverge isolating an area of undeveloped / rough land, with scrub and trees, before the corridors recombine again passing under the R148 (former N4) overbridge at Allen’s Bridge (OBG26), west of Kilcock Town. A telecommunications mast is located close to and north of the railway c.160m from Allen’s Bridge, while farm outbuildings are located close to and south of the railway c.150m from Allen’s Bridge. Much of the lands south of the railway comprise established and new residential development, with farmland to the west.

The canal corridor widens east of Shaw Bridge to provide a small canal basin / mooring area at the centre of the town. The basin also acts as a canoe polo and general canal-based amenity area and Kilcock Canoe Club operates from a small attractive building near the east end of a well maintained canal-side open space amenity, with purple plum trees (*Prunus cerasifera*) picnic tables, and canal-side decked moorings / paths.

East of the R125 / Shaw Bridge the boundary between railway corridor and canal corridor is defined initially by a fine stone wall, leading to metal fencing with integrated planting continuing east. West of Shaw Bridge the boundary with the access lane to the property at the 16th Lock is defined by a stone wall with dense planting and some larger evergreen trees. Continuing west the railway boundary with the undeveloped land is metal fencing with scrub and other planting on both sides of the fence.

There is no specific zoning maps for lands in Kilcock in the current Kildare County Development Plan 2023-2029. However, for the most part, the south-side of the railway corridor comprises developed town lands, with a mix of existing and new residential lands, and associated areas of open space, transport utilises (*i.e.* Kilcock Railway Station), town centre (southwest of Shaw Bridge), and community and education (St. Joseph's National School). In the previous Kildare Development Plan 2015-2021 (expired), the undeveloped lands between the railway and the canal west of Shaw Bridge, were zoned partly transport utilises (eastern portion) and partly open space and amenity (western portion). The lands north of the canal in the centre of Kilcock (including the lands around the residential property at the 16th Lock), were zoned town centre.

Kilcock Local Area Plan 2015-2021 identified all of the lands between the railway and the canal for open space, recreation and amenity and with the canal, a core part of the green infrastructure within the town. The Plan also proposed an indicative route for the pedestrian / cycle connection from Shaw Bridge west through the lands between railway and the canal. Views and Prospects to be preserved are identified from Shaw Bridge and Allen's Bridge over the canal. These views are also included for protection in Table 13.7 Views to and from Bridges in the Kildare County Development Plan 2023-2029 under RC10 & RC11 respectively.

In relation to the Royal Canal, the Kildare County Development Plan 2023-2029 notes at Section 13.4.6, that:

"The canal corridors and their adjacent lands have been landscaped and enhanced along the sections where the canals flow through urban areas and with the development of Greenways and Blueways. Canal locks are distinctive features of these water corridors. The smooth terrain, generally gentle landform and low canal bank grassland that characterise the canal corridors allow vistas over long distances without disruption, where the canal flows in a straight-line direction. Consequently, development can have a disproportionate visual impact along the water corridor, and it can prove difficult for the existing topography to visually absorb development. The occurrence of natural vegetation, coniferous and mixed plantations adjacent to the water corridors can have shielding and absorbing qualities in landscape terms, by providing natural visual barriers.

Canal corridors are potentially vulnerable linear landscape features, as they are often highly distinctive in the context of the general landscape. In some cases, landscape sensitivities may be localised or site-specific."

4.8.3.2 Appraisal of the Options

Three options are proposed, and the potential landscape and visual impact of each option is set out in the following sections.

Option 1 Station at the current location

Option 1 locates the platforms in the general area of the existing platform and requires the following key interventions:

- Removal and reconstruction of Shaw Bridge;
- Removal of the western section of the existing platform, lowering the tracks and reconstruction of the platform;

- Lowering of the tracks by a maximum of 1.7m over a distance of length from west of Shaw Bridge, this will require retaining structures of between 2.5 and 4.5m along sections of both sides of the existing cutting;
- Provision of a new platform on the northern side of the railway;
- Provision of dual tracking and associated overhead electrical catenary through the full corridor;
- Provision of a new pedestrian bridge crossing of the railway line with lift, east of Shaw Bridge, with short pedestrian accesses from Shaw Bridge to the pedestrian bridge crossing.

East of Shaw Bridge the works will impact the boundary, including the stone wall boundary, with the adjoining Royal Canal amenity area. The works may also require removal of existing canal-side trees. The removal and reconstruction of Shaw Bridge and the widening of the cutting west of the bridge, will impact the existing boundary and associated trees, and potentially the short access lane to the canal-side residential property. Corridor widening and track lowering west of Shaw Bridge will also remove trees and vegetation on the cut slopes and potentially impact existing boundaries with residential development at The Paddocks, Brayton Park and Bawnogue immediately south of the railway.

The potential impact on the Royal Canal amenity area and the residential property at the 16th Lock is significant adverse during construction; moderate / significant adverse in the short-term thereafter; and moderate adverse long-term. Track widening and lowering west of Shaw Bridge will have moderate adverse impact in the short-term during construction and a slight / moderate adverse impact in the short-term post construction. The proposed development has the potential for significant adverse impact on the protected view of the canal from Shaw Bridge and for slight adverse impact on the protected view from Allen's Bridge.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Option 2 locates the platforms west of Shaw Bridge and requires the following key interventions:

- Retention of the existing Shaw Bridge;
- Removal of the existing platform, lowering of the tracks and reconstruction of platforms west of Shaw Bridge and c.2.25m lower than the existing track level;
- Lowering of the tracks by a maximum of 3.35m over a distance of 800m length from west of Shaw Bridge, this will require retaining structures of between 2.5 and 5.6m along sections of both sides of the existing cutting;
- Provision of a new platform on the northern side of the railway;
- Provision of dual tracking and associated overhead electrical catenary through the full corridor;
- Provision of a new pedestrian bridge crossing of the railway line with lift, west of Shaw Bridge, with pedestrian accesses from Shaw Bridge to the pedestrian bridge crossing.

East of Shaw Bridge the works should avoid impact on the boundary, including the stone wall, with the adjoining Royal Canal amenity area. The works to lower the track, and to provide the dual line and associated northern platform west of Shaw Bridge will impact the existing boundary and associated trees, and potentially the short access lane to the canal-side residential property. Corridor widening and track lowering west of Shaw Bridge will also remove trees and vegetation on the cut slopes and potentially impact existing boundaries with residential development at The Paddocks, Brayton Park and Bawnogue immediately south of the railway.

The potential impact on the residential property at the 16th Lock is significant adverse during construction; moderate / significant adverse in the short-term thereafter; and moderate adverse long-term. The location of the proposed pedestrian crossing has the potential to allow for overlooking of the residential property at the 16th Lock. Track widening and lowering west of Shaw Bridge will have moderate adverse impact in the short-term during construction and a slight / moderate adverse impact in the short-term post construction. The proposed development has the potential for slight adverse impact on the protected views of the canal from Shaw Bridge and from Allen's Bridge.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Option 3 locates the platforms east of Shaw Bridge and requires the following key interventions:

- Retention of the existing Shaw Bridge;
- Removal of the existing platform and reconstruction of platforms east of Shaw Bridge close to the existing track level;
- Lowering of the tracks by a maximum of 1m over a distance of 600m length from west of Shaw Bridge, this will require retaining structures of between 2.5 and 4.0m along sections of both sides of the existing cutting;
- Provision of a new platform on the northern side of the railway;
- Provision of dual tracking and associated overhead electrical catenary through the full corridor;
- Provision of a new pedestrian bridge crossing of the railway line with lift, east of Shaw Bridge, with short pedestrian accesses from Shaw Bridge to the pedestrian bridge crossing.

East of Shaw Bridge the works will impact the boundary, including the stone wall boundary, with the adjoining Royal Canal amenity area. The works will also require removal of existing canal-side trees and may directly impact the existing Kilcock Canoe Club facility. The works to lower the track, and to provide the dual line and associated northern platform west of Shaw Bridge will impact the existing boundary and associated trees, and potentially the short access lane to the canal-side residential property. Corridor widening and track lowering west of Shaw Bridge will also remove trees and vegetation on the cut slopes and potentially impact existing boundaries with residential development at The Paddocks, Brayton Park and Bawnogue immediately south of the railway.

The potential impact on the Royal Canal amenity area and the residential property at the 16th Lock is very significant adverse during construction; significant adverse in the short-term thereafter; and moderate significant adverse in the longer-term. Track widening and lowering west of Shaw Bridge will have moderate adverse impact in the short-term during construction and a slight / moderate adverse impact in the short-term post construction. The proposed development has the potential for significant adverse impact on the protected view of the canal from Shaw Bridge and for slight adverse impact on the protected view from Allen’s Bridge.

4.8.3.3 Summary Assessment

Table 39 Landscape and Visual Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring on Landscape and Visual Amenity
Option 1: Station at current location	2 – Negative Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	1 – Highly Negative Impact

4.8.4 Cultural and Heritage

This section provides the appraisal of the cultural heritage impact of 3 alternative options, under the DART + programme for provision of platform requirements at Kilcock Railway Station.

4.8.4.1 Methodology

A range of all available desktop sources of architectural and archaeological heritage information were consulted as part of the desk study to inform the assessment, including the following:

- The Historic Environment Viewer, National Inventory of Architectural Heritage (NIAH) and NIAH Garden Survey.
- Meath County Development Plan 2021-2027 (A06 Record of Protected Structures) (RPS and ACA).
- Kildare County Development Plan 2023-2029, The Record of Protected Structures (RPS and ACA).
- Record of Monuments and Places for Counties Dublin, Kildare, Meath;
- Sites and Monuments Record for Counties Dublin, Kildare, Meath;
- National Monuments in State Care Database;
- Preservation Orders List;
- Cartographic and aerial photographic sources;
- Excavations Bulletin (1970-2024)

The study area for this assessment consisted of the area within the proposed site depot locations, as well as the area extending 50m from the site locations. Structures of architectural, archaeological and cultural heritage significance close to that boundary but at a greater distance from the railway are included in the assessment. Measurements are taken from the proposed site location boundaries to the nearest point of a site or structure.

The quality and type of potential impacts can vary to include the following, as per TII's *Guidelines for Cultural Heritage Impact Assessment of TII National Road and Greenway Projects* (TII, 2024):

- Direct Effect - where a Cultural Heritage Receptor or its setting is physically located within the footprint of a project which would entail its removal in whole or in part. Direct effects can also be defined as those that are directly attributable to the proposed development.
- Indirect Effect - an effect that results indirectly from the proposed project, often occurring away from the development, or because of a sequence of interrelationships or a complex pathway.
- Positive Effect - a change which enhances or improves the quality of the Cultural Heritage Receptor.
- Negative Effect - a change which reduces the quality of the Cultural Heritage Receptor.

A five-level rating system was used to describe the importance of Cultural Heritage Receptors in accordance with the TII, 2024 Guidelines, as shown in the Table below.

Table 40 Rating of Cultural Heritage Receptors

Importance Cultural Heritage Receptors	
Very high	<ul style="list-style-type: none"> • Designated Built Heritage Receptors rated as being of international importance, including associated historic gardens and designed landscapes. • Designated features of international intangible heritage value. • Designated historic landscapes of international value. • National Monuments. • Sites with Preservation Orders • Other designated Cultural Heritage Receptors of international importance. • World Heritage Properties (including the tentative list)
High	<ul style="list-style-type: none"> • Architectural Conservation Areas. • Historic landscapes (designated or undesignated) of outstanding interest and of demonstrable national value. These will be well-preserved historic landscapes exhibiting considerable coherence, time depth, or other critical factors. • Other designated or undesignated Cultural Heritage Receptors of demonstrable national importance. • Places or features of national intangible heritage value. • Protected Structures. • Recorded Monuments (or sites and monuments scheduled for inclusion on the RMP). • Undesignated receptors of high quality and importance.
Medium	<ul style="list-style-type: none"> • NIAH structures • Historic landscapes of regional value (designated or undesignated). • Other designated or undesignated receptors of regional Cultural Heritage importance. • Places or features of regional intangible heritage value.

Importance Cultural Heritage Receptors

- Low
 - Historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations.
 - Other designated or undesignated Cultural Heritage Receptors of local importance.
 - Places or features of local intangible heritage value.
 - Receptors compromised by poor preservation of contextual associations with inherent, albeit limited, Cultural Heritage value.
 - Undesignated historic buildings of modest quality in their fabric or historical association.
- Negligible
 - Receptors/landscapes with very little surviving Cultural Heritage interest.

The importance of cultural heritage receptors in combination with the type of impact on each was used to inform the cultural impact assessment for each proposed option.

4.8.4.2 Options appraisal

Option 1 Station at the current location

This option will not result in any direct or indirect impacts on any recorded archaeological or architectural sites. It will necessitate the removal of a short section of masonry wall that is located along the northern side of the existing railway. The wall is associated with the original railway but is not subject to statutory protection and the impact would not be significant. The option will not impact any previously unrecorded archaeological remains, as any such remains will have been removed by previous ground works associated with the construction of the railway.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

This option will not result in any direct or indirect impacts on any recorded archaeological or architectural sites. The new station will be entirely located within the existing railway cutting and as such will not impact any previously unrecorded archaeological remains, as any such remains will have been removed by previous ground works.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

This option will not result in any direct or indirect impacts on any recorded archaeological or architectural sites. It will necessitate the removal of a section of masonry wall that is located along the northern side of the existing railway. The wall is associated with the original railway but is not subject to statutory protection and the impact would not be significant. The option will not impact any previously unrecorded archaeological remains, as any such remains will have been removed by previous ground works associated with the construction of the railway.

4.8.4.3 Summary Assessment

Table 41 Cultural Heritage Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring on Cultural Heritage
Option 1: Station at current location	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	4 – Neutral Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	4 – Neutral Impact

4.8.5 Noise and Vibration

4.8.5.1 Methodology

This section describes the noise and vibration assessment of the options selection for the Kilcock Station upgrade. The specific objectives of the noise and vibration assessment at this stage are to determine the existing noise environment, the most sensitive receptor locations in proximity to the proposed options, and the potential impacts as a result of the proposed options.

4.8.5.2 Methodology

In terms of potential impacts to noise and vibration, these are assessed with regard to the construction and operational phases which will have different effects over the short-term construction period and the longer term operational period.

During the construction phase, all options will necessitate works to the live rail line and hence will require night-time and weekend possessions to undertake the works. Depending on the option, there will be longer periods of potential night-time works associated with individual options and associated noise impacts. There will be potential for perceptible vibration impacts depending on the activities involved (e.g. track tamping, piling, excavation etc.)

During the operational phase, the presence of the train station and platform has the potential to change the character of the noise environment at NSLs in the immediate vicinity as a result of trains pulling in, idling and accelerating from the station. As part of the overall DART+ Programme, there will be additional DART trains extending between Kilcock and Maynooth over and above the existing fleet of commuter / intercity diesel trains. Whilst the DART trains have lower operational noise emissions compared to the diesel trains, there will be an element of audible noise sources associated with trains pulling in and out of the platform and any operational fixed sources such as fans etc. The specific timetable and fleet numbers are not progressed for this stage of the assessment so it is assumed that the same number of DART trains serving Maynooth will extend to Kilcock and it is assumed the existing DMU Intercity trains will also use the station platform.

The specific objectives at this stage are to determine the presence and density of noise sensitive receptor locations in proximity to the proposed options and the potential noise impacts associated with the construction and operational phases of each.

The assessment of potential noise impacts is based upon an assessment of the number of Noise Sensitive Locations (NSLs) in the vicinity of each option and its potential impact rating (PIR). An assessment of specific operational noise levels from changes in operational rail or road traffic noise on the surrounding environment has also been undertaken.

4.8.5.3 Potential Impact Rating

The prevailing noise environment is influenced by road traffic on the surrounding road network, local suburban activities and intermittent passing rail along the operational rail line.

Property counts of NSLs have been conducted within 300m of each of the option locations and have been quantified within the following bands from the site boundary:

- 0m to 50m.
- 50m to 100m.
- 100m to 200m.
- 200m to 300m.

Counted NSLs include residential units, education buildings, medical buildings (including nursing homes), and amenity areas; although at this stage of the assessment no further distinction is made between these different types of NSLs. During the specific impact assessment for the emerging preferred bridge option, any variation in NSL type will be identified and considered as appropriate. Any variation in type of NSL, however, would not be expected to materially affect the noise impact assessment

An assessment of potential noise impact based upon the number of noise sensitive receptors within specified distance bands from each of the station option under consideration has been undertaken. From the property counts a Potential Impact Rating (PIR) is calculated by weighting the property counts and summing the weighted value. A weighting factor of 4 is applied for the closest distance band (0 to 50m) down to 1 for the furthest distance band (200 to 300m). For the PIR assessment, the calculated weighted value within 300m from depot boundary sites is then determined. The option with the lowest PIR has the lowest nominal potential impact.

The calculated PIR within each distance band and for the total 300m assessment boundary is presented in Table 42 . The number of NSLs counted within each distance band is provided in parenthesis.

Table 42 Potential Impact Ratings (PIR)

Depot Option Site	Calculated PIR at each distance band				Total PIR
	0-50m	50-100m	100m-200m	200m-300m	
Kilcock Station Option 1	96 (24)	225 (75)	466 (233)	332 (332)	1,119
Kilcock Station Option 2	80 (20)	192 (64)	564 (282)	334 (334)	1,170
Kilcock Station Option 3	136 (34)	267 (89)	364 (182)	255 (255)	1,022

The PIR assessment has determined all options have comparable overall PIRs.

Option 3 has the lowest overall PIR compared to the other options but has the highest number of NSLs within 100m. Options 2 has the highest overall PIR compared to the other options but has the lowest number of NSLs within 100m.

4.8.5.4 Options Appraisal

Option 1 Station at the current location

This option maintains the current position of the station platform by duplicating a second track and a new platform on the north side (on the Royal Canal side). The new track and platform will pass under Shaw Bridge (OBG25) in the same way as the current track and platform.

During the construction phase the following activities are expected for this option

- **Demolition** – Shaw Bridge would require demolition to accommodate the double track and two platform arrangement proposed as part of this option
- **Rail works** – The proposed new tracks would require lowering to a maximum of 1.70 m over a distance of 700 m, requiring excavation of a new railway trench. Shaw Bridge would require reconstruction,

retaining walls would be required along both track sides and a second platform would be constructed. Due to works on the live rail line these will necessitate night-time and / or weekend possessions.

- **Road works** – demolition of Shaw Bridge would result in the closure of the R125 road for an extended period (4-6 months).

The Potential Impact Rating for this option is 1,119, with 24 NSLs located within 50m and 75 NSLs within 100m.

During the construction phase, there will be intrusive works required at Shaw Bridge and the excavation / lowering works and retaining wall works along the rail line west of the bridge which will result in temporary significant impacts to the adjacent NSLs to the north and south. The works will require night-time and weekend possessions which will result in associated construction noise impacts.

Once operational, the closest NSLs to trains pulling in and leaving the platform will be comparable to the existing scenario with the addition of DART trains. On balance, the construction phase of this option will have the most significant noise impacts but will affect the least number of NSLs. This option will also have the least significant change in the existing noise environment compared to the other 2 options.

This option is ranked as **Slightly Negative** on the basis of the above considerations.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Option 2 moves the station platforms to the west of Shaw Bridge (OBG25). The start of the platform is displaced approximately 20 metres from the current station entrance.

During the construction phase the following activities are expected for this option

- **Demolition** – There is no demolition required for this option.
- **Rail works** – The proposed new tracks would require lowering to a maximum of 3.35 m over a distance of 700 m, requiring excavation of a new railway trench. Retaining walls would be required along both track sides, as well as construction of two station platforms. Due to works on the live rail line these will necessitate night-time and / or weekend possessions.
- **Road works** – There are no road works required for this option as the Shaw Bridge will be maintained open for the duration of all works.

The Potential Impact Rating for this option is 1,170, with 20 NSLs located within 50m and 64 NSLs within 100m.

During the construction phase, there will be intrusive works required for the excavation / lowering works and retaining wall works along the rail line west of Shaw bridge which will result in temporary significant impacts to the adjacent NSLs to the north and south. The works will require night-time and weekend possessions which will result in associated construction noise impacts.

Once operational, the closest NSLs to trains pulling in and leaving the platform will be the NSL to the north, and residential and school NSLs to the south. On balance, the construction phase of this option will have the most significant noise impact to adjacent NSLs and the second lowest operational noise impact compared to the other 2 options.

Having regard to potential impacts during both phases, this option is categorised as having an overall **Negative Impact**

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Option 3 moves the station platforms to the east of Shaw Bridge (OBG25). The start of the platform is displaced approximately 60 metres from the current station entrance.

During the construction phase the following activities are expected for this option:

- **Demolition** – There is no demolition required for this option.
- **Rail works** – Retaining walls would be required along both track sides, as well as construction of two station platforms. To the west of OBG25, the ground needs to be lowered by a maximum of 1 metre over a length of approximately 600m. Due to works on the live rail line these will necessitate night-time and / or weekend possessions.
- **Road works** – There are no road works required for this option as the Shaw Bridge will be maintained open for the duration of all works.

The Potential Impact Rating for this option is 1,022, with 34 NSLs located within 50m and 89 NSLs within 100m.

During the construction phase, there will be intrusive works required for the track lowering works and retaining wall works along the rail line east of Shaw bridge and construction of the new platforms which will result in temporary significant impacts to the adjacent NSLs to the north and south. The works will require night-time and weekend possessions which will result in associated construction noise impacts. The duration of these works will be less compared to the other options.

Once operational, the closest NSLs to trains pulling in and leaving the platform are the NSL to the south which are within 10m of the platform edge. The addition of new DART trains and existing DMU trains pulling in, idling and pulling out from the platform at this location will affect the highest number of NSLs in closest proximity and hence has the highest potential longer term impacts.

On balance, the potential construction noise impacts will be least disruptive for this option, but will affect a higher number of NSLs. During the operational phase, the potential operational noise impacts will be most pronounced given the proximity and number of NSLs in proximity to the proposed platforms compared to the other 2 options. On balance, the construction phase of this option will have the least significant noise impact to adjacent NSLs but the highest potential operational noise impact compared to the other 2 options.

Having regard to potential impacts during both phases, this option is categorised as having an overall **Negative Impact**

4.8.5.5 Summary Assessment

Table 43 Noise and Vibration Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring on Noise and Vibration
Option 1: Station at current location	3 - Slightly Negative Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	2 - Negative Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	2 - Negative Impact

4.8.6 Air Quality

This section describes the air quality assessment of the station options selection for the Kilcock Station. The specific objectives of the air quality assessment at this stage are to determine the existing ambient air quality, the most sensitive receptor locations in proximity to the proposed station options, and the predicted air quality impact as a result of the proposed options. All options assist with the clean air strategy and working towards achieving Directive (EU) 2024/2881 by providing alternatives to private car use.

This chapter was completed by Tanmay Gojamgunde. Tanmay is an environmental consultant in the Air Quality & Climate section of AWN Consulting, a Trinity Consultants Company. He holds a MSc in Air Pollution Management and Control from the University of Birmingham and has also completed BTech in Environmental Engineering. As part of the MSc, he worked on 'The Impact of bus-fleet electrification on air quality in Birmingham' utilising advanced dispersion modelling tools and emission inventory toolkit. Prior to joining AWN, Tanmay contributed to several key environmental projects in India, including Delhi's first air quality monitoring program (R ASMAN), air quality and traffic planning assessments with IIT Kanpur, and an Environmental Impact Assessment Report (EIAR) for an industrial district in Kanpur. He also specialises in conducting air dispersion modelling assessments of emissions, emission inventories, R programming and extends to broader aspects of environmental engineering.

4.8.6.1 Methodology

This assessment has been prepared based on the following TII Air Quality guidance:

- PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects; (TII 2022a); and
- PE-ENV-01107: Air Quality Assessment Standard for Proposed National Roads (TII 2022b).

The primary aspects of the assessment relate to the existing ambient air quality, proximity of sensitive locations and a review of the overall significance of potential changes in air quality.

The objective at this stage of the station selection process is to indicate whether there are likely to be significant air quality impacts associated with the proposed station options. The evaluation methodology assesses the number of residential properties within 50m of the station option. Traffic data obtained for the Opening Year and Design Year have been used in the model as per the TII guidelines (2022a, 2022b). A comparison of the proposed routes can be carried out based on a calculation of the Index of the Overall Change in Exposure by human receptors to nitrogen oxides (NO_x) and particulate matter (PM₁₀ and PM_{2.5}) resulting from each individual route. The calculation of the Index of Overall Change in Exposure allows a comparison of the overall air quality impact on people from each route option to be carried out. The Index is based on identifying the number of sensitive receptor locations (e.g. residential properties, schools) within 50m of the carriageway of all road links that would experience a significant change in traffic for each of the routes and be classified as "affected". The change in emissions is influenced by changes in traffic flow, composition and speed. The analysis is carried out using the methodology of TII (2022a, 2022b) and using TII Road Emissions Model (REM) (GE-ENV-01107) (TII 2024).

The TII guidance (TII, 2022a) states that the following scoping criteria shall be used to determine whether a road link is classified as "affected":

- Road alignment will change by 5 m or more; or
- Annual average daily traffic (AADT) flows will change by 1,000 or more; or
- Heavy duty vehicle (HDV) (vehicles greater than 3.5 tonnes, including buses and coaches) flows will change by 200 AADT or more; or
- Daily average speed change by 10 kph or more; or
- Peak hour speed will change by 20 kph or more.

In addition to assessing the impact to people as a result of air quality, the impact to sensitive ecosystems must also be assessed as per the TII guidelines (TII 2022a, 2022b). The EC Directive 92/43/EEC on the

Conservation of Natural Habitats and of Wild Fauna and Flora (the “Habitats Directive”) requires an Appropriate Assessment to be carried out where there is likely to be a significant impact upon a European protected site. TII requires the Air Quality Specialist to liaise with an ecologist on schemes where there is a European protected site within 2km of the station options. However, as the potential impact of a scheme is limited to local level, detailed consideration need only be given to roads where there is a significant change to traffic flows (>5%) and the designated site lies within 200m of the road centre line. Where these two requirements are fulfilled, the assessment at the options selection stage involves a calculation of nitrogen oxides (NO_x) and ammonia (NH₃) concentrations, and acid deposition and nitrogen deposition rates using the methodology set out in TII Guidance document PE-ENV-01106 (TII 2022a).

The nature of the Proposed Development is to support the DART network as it grows from its current 50km in length to over 150km. The train station itself is not expected to result in any significant change in traffic volumes, during the operational phase, as traffic will be primarily associated with the local residents accessing the selected train station. Therefore, impacts due to road traffic in the operational phase are scoped out as there is no potential for significant impact on human or ecological receptors due to changes in pollutant concentrations as per the significance criteria in TII PE-ENV-01106.

The train station will have associated rail transport emissions. However, the trains associated with the train station will be electric rather than fuelled by a combustion engine. Therefore, the rail stock will not have the potential for significant localised impacts. Impacts due to rail traffic in the operational phase are scoped out as there is no potential for significant impact on human or ecological receptors due to changes in pollutant concentrations as per the significance criteria in TII PE-ENV-01106. There are no potentially significant sources of combustion emissions from the station itself in any of the options.

The most significant potential construction phase impacts relate to construction dust. Transport Infrastructure Ireland (TII) recommends the use of the IAQM guidance (2024) in the TII guidance document Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2022a). The train station is considered to have the potential for magnitudes of dust emissions in accordance with IAQM (IAQM 2024) Guidance for the demolition, earthworks, construction and trackout activities during the construction phase.

The potential for impact prior to mitigation is assessed by combining the magnitude of potential emissions with the sensitivity of the area.

The Institute of Air Quality Management in the UK (IAQM) guidance document ‘*Guidance on the Assessment of Dust from Demolition and Construction*’ (2024) outlines mitigation measures and to determine the level of site-specific mitigation required. Construction dust related impacts can be mitigated with best practice mitigation measures and are temporary in nature.

The train station will require some activities which have the potential to generate dust during operation. However, similar to construction stage dust, mitigation will ensure operational phase impacts with respect to dust nuisance. Health impacts and sensitive ecology do not have the potential for significant impacts.

The comparative evaluation of options was assisted by scoring of impacts to sensitive receptors using the Stage 2 Project Appraisal Matrix as per the Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis (TII 2016) and (TII 2022b). A qualitative assessment was undertaken of each option, with the quantitative assessment being scoped out due to lack of significant changes in traffic. Each impact is scored based on the seven-point scale, as detailed in the following table.

Table 44 Seven-Point Scale from AQ overarching guidance (TII 2022a)

Seven Point Scale	Stage 2: Local Air Quality (quantitative)	Stage 2: Index of Overall Change in Exposure (quantitative)
7 – Major or highly positive	Overall significant positive air quality effects are predicted at either human health receptors or sensitive designated habitats.	Negative index value
6 – Moderately positive	Overall significant positive air quality effects are not predicted at either human health receptors or sensitive designated habitats. However, the option has a higher potential for significant positive effects e.g. moderate impacts at individual receptors.	Negative index value
5 – Minor or slightly positive	Overall significant air quality effects are not predicted at either human health receptors or sensitive designated habitats. Only positive effects that are at worst slight at individual locations are predicted.	Negative index value
4 – Not significant or neutral	Overall significant air quality effects are not predicted at either human health receptors or sensitive designated habitats. Only effects that are Neutral at individual locations are predicted.	Low positive or negative index value (less than 100 for NOX and PM10)
3 – Minor or slightly negative	Overall significant air quality effects are not predicted at either human health receptors or sensitive designated habitats. Only negative effects that are at worst slight at individual locations are predicted.	Positive index value
2 –Moderately negative	Overall significant air quality effects are not predicted at either human health receptors or sensitive designated habitats. However, the option has a higher risk of significant effects e.g. moderate impacts at individual receptors.	Positive index value
1 – Major or highly negative	Overall significant adverse air quality effects are predicted at either human health receptors or sensitive designated habitats. This would be a showstopper, and mitigation would be required for a scheme/option to progress.	Positive index value

4.8.6.2 Existing Environment

4.8.6.2.1 Sensitive Receptors

The TII guidance (2022a) defines sensitive receptor locations as residential housing, schools, hospitals, places of worship, sports centres and shopping areas, i.e. locations where members of the public are likely to be regularly present. Private residential properties make up the majority of the sensitive receptors in the study area.

In addition to assessing the impact to people as a result of air quality, the impact to sensitive ecosystems must also be assessed as per the TII guidelines (2022a, 2022b). The TII PE-ENV-01106 guidance (2022a) states

that sensitive designated ecological sites within 2km of the study area should be identified. However, impacts are localised to ecological sites within 200m of the station options or 50m of the source in the case of construction dust emissions (IAQM, 2024). The following designed areas of sensitive ecology are within 2km of the study area:

- Royal Canal pNHA (Site Code : 002103).

4.8.6.2.2 Air Pollution Sources

As part of the implementation of the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022) ,as amended, four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2024). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D. In terms of air monitoring, the study area is categorised as Zone D (rural areas and towns with a population of less than 15,000).

Air quality monitoring programs have been undertaken throughout Ireland in recent years by the EPA and Local Authorities. The most recent EPA annual report on air quality monitoring undertaken throughout Ireland is entitled 'Air Quality in Ireland 2024' (EPA, 2025). The TII PE-ENV-01106 guidelines (2022a) state that the local air quality assessment should focus on NO₂, PM₁₀ and PM_{2.5} as these are the pollutants of greatest concern with respect to road traffic conditions. A review of data from representative Zone D locations in Ireland was used to provide an indication of the prevailing air quality conditions within the study area. It was found that all locations were below the current EU limit values.

4.8.6.3 Options Appraisal

Option 1 Station at the current location

The first station option maintains the current position of the station platform by duplicating a second track and a new platform on the north side (on the Royal Canal side). The new track and platform will pass under Shaw Bridge (OBG25) in the same way as the current track and platform. The station is situated in close proximity to the Royal Canal pNHA (Site Code: 002103).

During the construction phase the following activities are expected for this option – a magnitude of potential dust emissions has been identified for each activity as per the IAQM guidance (IAQM, 2024):

- **Demolition** – Shaw Bridge would require demolition to accommodate the double track and two platform arrangement proposed as part of this option, resulting in large dust emissions associated with demolition. The magnitude of potential dust emissions is considered medium.
- **Excavation** – The proposed new tracks would require lowering to a maximum of 1.70 m over a distance of 700 m, requiring excavation of a new railway trench, and resulting in dust emissions associated with excavations. The magnitude of potential dust emissions is considered medium.
- **Construction** – The existing platform would be maintained however, Shaw Bridge would require reconstruction, retaining walls would be required along both track sides and a second platform would be constructed, resulting in dust emissions associated with construction. The magnitude of potential dust emissions is considered medium.
- **Road traffic/trackout** – demolition of Shaw Bridge would result in the closure of the R125 road for an extended period (4-6 months), resulting in air emissions. The magnitude of potential dust emissions is considered medium.

Shaw Bridge would require reconstruction, retaining walls would be required along both track sides and a second platform would be constructed, resulting in dust emissions associated with reconstruction. However, the construction phase impacts related to construction dust can be mitigated with best practice, in

accordance with IAQM Guidance (IAQM 2024). This option will require additional construction compared to other options. Impacts of this are limited to the construction phase and, as a result of construction dust, can be mitigated.

Without mitigation, Kilcock Station Option 1 has a high sensitivity of dust soiling effects, low sensitivity to human health effects and high sensitivity to ecological effects. This is based on the number of sensitive receptors within specific distance bands (0-250m) from the redline boundary within which dust generating activities may occur. However, with mitigation, in line with IAQM Guidance (IAQM 2024), these impacts are considered **not significant**.

There is no potential for significant dust generation during the operational phase of the station. There are no significant adverse impacts induced by the operational phase.

Operational stage impacts due to road, rail traffic and combustion emissions associated with the train station have been scoped out as a source of potential significant impact.

- There are 24 no. of high sensitivity receptors within 50m of the proposed Kilcock station option 1.
- There are no projected changes in traffic associated with this station option.
- On nearby road links which have the potential to be affected due to rerouting of traffic are below the scoping criteria detailed in Section 9.10.1.
- There are no projected speed changes associated with this station option.

Therefore, the potential for impact is considered **not significant** and is scoped out.

Overall, no significant air quality effects are not predicted at either human health receptors or sensitive designated habitats. This aligns with the TII score of *Negative and Not Significant (4)*. The equivalent score under the Transport Appraisal Framework (TAF) Air Quality Scorecard for each option is considered *Neutral*.

All options facilitate the drive to encourage modal shift to public travel by supporting the DART network as it grows from its current 50km in length to over 150km. This assists with the clean air strategy and working towards achieving Directive (EU) 2024/2881 by providing alternatives to private car use.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

The second station moves the station platforms to the west of Shaw Bridge (OBG25). The start of the platform is displaced approximately 20 metres from the current station entrance. The station option is situated in close proximity to the Royal Canal pNHA (Site Code: 002103).

During the construction phase the following activities are expected for this option – a magnitude of potential dust emissions has been identified for each activity as per the IAQM guidance (IAQM, 2024):

- **Demolition** – No demolition of Shaw Bridge is required as this option moves the station platforms west of the bridge (which do not occur in Option 1). The magnitude of potential dust emissions is considered medium.
- **Excavation** – The proposed new tracks would require lowering to a maximum of 3.35 m over a distance of 700 m, requiring excavation of a new railway trench and resulting dust emissions associated with excavation. The magnitude of potential dust emissions is considered medium.
- **Construction** – Retaining walls would be required along both track sides, as well as construction of two station platforms, resulting dust emissions associated with construction. The magnitude of potential dust emissions is considered medium.
- **Road traffic/ trackout** – The excavation and retaining wall works would prevent railway service during these activities, resulting in emissions due to additional vehicle kilometres from private

car use to replace normal train trips. The magnitude of potential dust emissions is considered medium.

During construction phase the retaining walls would be required along both track sides, as well as construction of two station platforms, resulting dust emissions associated with construction. However, the construction phase impacts related to construction dust can be mitigated with best practice, in accordance with IAQM Guidance (IAQM 2024). Impacts of this are limited to the construction phase and, as a result of construction dust, can be mitigated.

Without mitigation, Kilcock Station Option 2 has a high sensitivity of dust soiling effects, low sensitivity to human health effects and high sensitivity to ecological effects. This is based on the number of sensitive receptors within specific distance bands (0-250m) from the redline boundary within which dust generating activities may occur. However, with mitigation, in line with IAQM Guidance (IAQM 2024), these impacts are considered **not significant**.

There is no potential for significant dust generation during the operational phase of the station. There are no significant adverse impacts induced by the operational phase.

Operational stage impacts due to road, rail traffic and combustion emissions associated with the train station have been scoped out as a source of potential significant impact.

- There are 20 no. of high sensitivity receptors within 50m of the proposed Kilcock station option 2.
- There are no projected changes in traffic associated with this station option.
- There are no projected speed changes associated with the road realignment.

Therefore, the potential for impact is considered **not significant** and is scoped out.

Overall, no significant air quality effects are not predicted at either human health receptors or sensitive designated habitats. This aligns with the TII score of *Negative and Not Significant (4)*. The equivalent score under the Transport Appraisal Framework (TAF) Air Quality Scorecard for each option is considered *Neutral*.

All options facilitate the drive to encourage modal shift to public travel by supporting the DART network as it grows from its current 50km in length to over 150km. This assists with the clean air strategy and working towards achieving Directive (EU) 2024/2881 by providing alternatives to private car use.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

The third station moves the station platforms to the east of Shaw Bridge (OBG25) in order to avoid its impact on the speed limit of trains passing. The start of the platform is displaced approximately 60 metres from the current station entrance. This station option brings the Royal Canal pNHA (Site Code: 002103) closest to the station of the three options.

During the construction phase the following activities are expected for this option – a magnitude of potential dust emissions has been identified for each activity as per the IAQM guidance (IAQM, 2024):

- **Demolition** – No demolition of Shaw Bridge is required as this option moves the station platforms west of the bridge (which do not occur in Option 1). The magnitude of potential dust emissions is considered medium.
- **Excavation** – No earthworks are required in the area of the new station for the tracks, and to the west of OBG25, the ground needs to be lowered by a maximum of 1 metre over a length of approximately 600 metres, resulting in dust emissions associated with excavation. This is the least amount of excavation required relative to Options 1 and 2. The magnitude of potential dust emissions is considered medium.

- **Construction** – Retaining walls would be required along both track sides, as well as construction of two station platforms, resulting in dust emissions associated with construction. The magnitude of potential dust emissions is considered medium.
- **Road traffic/ trackout** – No significant additional vehicle kilometres from private car use to replace normal train trips are expected in this option, rail services can be maintained during the construction and earthworks activities for this option. The magnitude of potential dust emissions is considered medium.

During construction phase the retaining walls would be required along both track sides, as well as construction of two station platforms resulting in dust emissions. However, the construction phase impacts related to construction dust can be mitigated with best practice, in accordance with IAQM Guidance (IAQM 2024). Impacts of this are limited to the construction phase and, as a result of construction dust, can be mitigated.

Without mitigation, Kilcock Station Option 3 has a high sensitivity of dust soiling effects, low sensitivity to human health effects and high sensitivity to ecological effects. This is based on the number of sensitive receptors within specific distance bands (0-250m) from the redline boundary within which dust generating activities may occur. However, with mitigation, in line with IAQM Guidance (IAQM 2024), these impacts are considered **not significant**.

There is no potential for significant dust generation during the operational phase of the station. There are no significant adverse impacts induced by the operational phase.

Operational stage impacts due to road, rail traffic and combustion emissions associated with the train station have been scoped out as a source of potential significant impact.

- There are 34 no. of high sensitivity receptors within 50m of the proposed Kilcock station option 2.
- There are no projected changes in traffic associated with this station option.
- There are no projected speed changes associated with the road realignment.

Therefore, the potential for impact is considered **not significant** and is scoped out.

Overall, no significant air quality effects are not predicted at either human health receptors or sensitive designated habitats. This aligns with the TII score of *Negative and Not Significant (4)*. The equivalent score under the Transport Appraisal Framework (TAF) Air Quality Scorecard for each option is considered *Neutral*.

All station options facilitate the drive to encourage modal shift to public travel by supporting the DART network as it grows from its current 50km in length to over 150km. This assists with the clean air strategy and working towards achieving Directive (EU) 2024/2881 by providing alternatives to private car use.

4.8.6.4 Summary Assessment

All options have the same rating due to the lack of potential for significant operational phase impacts. Ranking is based on minor differences in the potential for construction and operational phase dust impacts. However, these impacts can be mitigated and, therefore, do not affect the assessment score. Overall, no significant air quality effects are not predicted at either human health receptors or sensitive designated habitats. This aligns with the TII score of *Negative and Not Significant (4)*. The equivalent score under the Transport Appraisal Framework (TAF) Air Quality Scorecard for each option is considered *Neutral*.

Table 45 Air Quality MCA Stage 1 Assessment

Option	TAF Impact Scoring on Air Quality
Option 1: Station at current location	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	4 – Neutral Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	4 – Neutral Impact

4.8.7 Electromagnetic Compatibility

This section provides the appraisal of the three Kilcock Station options, under the DART + programme under electromagnetic compatibility.

4.8.7.1 Methodology

This assessment looks to examine the electromagnetic compatibility Impact.

The proposed Project will be required to comply with the requirements of the European Directive on Electromagnetic Compatibility (2014/30/EU), and European Standards EN 50121 (Parts 1-5), which address railway Electromagnetic Compatibility (EMC). In addition, all electrical and electronic products placed on the market or taken into service in the European Union must comply with all applicable directives which include the above EMC Directive, the Low Voltage Directive (2014/35/EU) and the Radio Equipment Directive (2014/53/EU). These directives have been transposed into Irish law under the following statutory instruments).

- S.I. No. 145/2016 - European Communities (Electromagnetic Compatibility) Regulations 2016
- S.I. No. 248/2017 - European Union (Radio Equipment) Regulations 2017
- S.I. No. 345/2016 - European Union (Low Voltage Electrical Equipment) Regulations 2016

It is proposed to assess the proposed Project’s required compliance in accordance with the above directives and standards in addition to guidelines on limiting exposures to electromagnetic fields as published by the International Commission on Non-Ionising Radiation Protection (ICNIRP) and the EU EMF Recommendation (1999/519/EC) when addressing human health effects.

The Electromagnetic Compatibility Directive (2014/30/EU) and the Radio Equipment Directive (2014/53/EU) do not cover emissions from DC and near DC fields which are also an interference risk to particularly sensitive equipment such as Scanning Electron Microscopes (SEMs) and Magnetic Resonance Imaging (MRI) equipment. Nonetheless an assessment of this type of Electromagnetic Interference (EMI) is included in the scope of the investigation.

Impacts from stray currents arising from the operation of the system will also be mitigated as per European Standard EN 50122-2.

4.8.7.2 Options Appraisal

The biggest contributor for the station, whichever option is chosen, will be the DC, Quasi-DC and AC harmonic fields associated with the electrification systems for the lines. In addition to this AC fields associated and RF fields associated with ancillary equipment such as station comms, lighting, ticketing, CCTV etc. All station options are proposed to be within the Kilcock urban environment such that any potentially impacts from EMI are evaluated equally regardless of which of the sites is chosen. The main reason for this is that all the systems

and subsystems are required to conform to the applicable European Directives with respect to electromagnetic compatibility and radio equipment at each location.

Option 1 Station at the current location

There are no positive nor negative impacts from an EMI perspective with Option 1. It is assessed as Neutral.

Option 2 Station displaced West of OBG25 (Shaw Bridge)

Option 2 moves the platforms slightly away from the main urban area of Kilcock. Electromagnetic emissions levels will be controlled by the governing directives (EMC and Radio Equipment) so while there are less receptors that may see a change within the baseline electromagnetic environment, that it measurable with specialised equipment, this would not be classed as positive or negative.

Option 3 Station displaced East of OBG25 (Shaw Bridge)

Option 3 moves the platforms closer to domestic dwellings in the main urban area of Kilcock. Electromagnetic emissions levels will be controlled by the governing directives (EMC and Radio Equipment) such that while these locations may see a change within the baseline electromagnetic environment, that is measurable with specialised equipment, this would not be classed as positive or negative.

4.8.7.3 Summary Assessment

Table 46 Electromagnetic Compatibility MCA Stage 1 Assessment

Option	TAF Impact Scoring on Electromagnetic Compatibility
Option 1: Station at current location	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	4 – Neutral Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	4 – Neutral Impact

4.8.8 Local Environment Summary Assessment

Table 47 Local Environmental Impacts MCA Stage 1 Assessment

Option	TAF Impact Scoring on Local Environment						
	Biodiversity	Water Resources	Landscape and Visual Quality	Cultural and Heritage	Noise and Vibration	Air Quality	Electromagnetic Compatibility
Option 1: Station at current location	3 – Slightly Negative Impact	3 – Slightly Negative Impact	2 – Negative Impact	4 – Neutral Impact	3 – Slightly Negative Impact	4 – Neutral Impact	4 – Neutral Impact
Option 2: Station displaced West of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact	3 – Slightly Negative Impact	3 – Slightly Negative Impact	4 – Neutral Impact	2 – Negative Impact	4 – Neutral Impact	4 – Neutral Impact
Option 3: Station displaced East of OBG25 (Shaw Bridge)	3 – Slightly Negative Impact	4 – Neutral Impact	1 – Highly Negative Impact	4 – Neutral Impact	2 – Negative Impact	4 – Neutral Impact	4 – Neutral Impact

5. Conclusion

The detail of the multi-criteria analysis of the options is included in Annex A.

A summary of the assessment is presented in Table 48 below.

Table 48 Multicriteria Analysis summary

Parameter	Option 1: Station at the current location	Option 2: Station displaced West of OBG25 (Shaw's Bridge)	Option 3: Station displaced East OBG25 (Shaw's Bridge)
1. Transport User Benefits and Other Economic Impacts	5 – Slightly Positive Impact	6 – Positive Impact	8 – Positive Impact
2. Accessibility Impacts	4 – Neutral Impact	3 – Slightly Negative Impact	3 – Slightly Negative Impact
3. Social Impacts	5 – Slightly Positive Impact	6 – Positive Impact	6 – Positive Impact
4. Land Use Impacts	2 – Slightly Negative Impact	2 – Slightly Negative Impact	2 – Slightly Negative Impact
5. Safety Impacts	4 – Neutral Impact	6 – Positive Impact	8 – Positive Impact
6. Climate Change Impacts	2 – Slightly Negative Impact	3 – Slightly Negative Impact	3 – Slightly Negative Impact
7. Local Environment Impacts	2 – Slightly Negative Impact	3 – Slightly Negative Impact	3 – Slightly Negative Impact
Overall Ranking	4 – Neutral Impact	4 – Neutral Impact	5 – Slightly Positive Impact

The outcome of the multi-criteria analysis indicates that Option 3 performs better than the other options. The principal distinguishing impacts associated with each of the options are summarised in Table 49 below:

Table 49 Multicriteria Analysis principal distinguishing impacts

Sub Criteria	Option 1: Station at current location	Option 2: Station displaced West of OBG25 (Shaw Bridge)	Option 3: Station displaced East of OBG25 (Shaw Bridge)
Alignment with CRS	5 – Slightly Positive Impact	6 – Positive Impact	7 – Highly Positive Impact
Transport Costs & Op Costs	5 – Slightly Positive Impact	6 – Positive Impact	7 – Highly Positive Impact
Change in Quality of Public Realm	2 – Negative Impact	3 – Slightly Negative Impact	3 – Slightly Negative Impact
Existing Transport Network and Service Impact	1 – Highly Negative Impact	1 – Highly Negative Impact	2 – Negative Impact
Material Assets: Property	2 – Negative Impact	4 – Neutral Impact	2 – Negative Impact
Safety Impacts	4 – Neutral Impact	4 – Neutral Impact	6 – Positive Impact
Water Resources and Soils	3 – Slightly Negative Impact	3 – Slightly Negative Impact	4 – Neutral Impact
Landscape and Visual Quality	2 – Negative Impact	3 – Slightly Negative Impact	1 – Highly Negative Impact
Noise and Vibration	3 – Slightly Negative Impact	2 – Negative Impact	2 – Negative Impact

From the above the following is evident:

- All three sites have a positive impact both in terms of alignment with CRS and Transport Costs, with option 3 being the one with the highest positive impact of them all;
- All three sites impact on the Quality of Public Realm with Options 2 and 3 performing worse than option 1 that leaves the station at its current location;
- Option 3 is the one with the less negative impact in the existing transport network;

- Options 1 and 3 have impact in properties, being Option 2 the only one which does not;
- Option 3 has a positive impact on Safety the other two options do not;
- Option 3 is the only option that has a neutral impact in Water Resources and Soils, options 1 and 2 have both slightly negative impacts;
- The only aspect where Option 3 scores worse than the other options is Landscape and Visual, which is qualified as moderate significant adverse in the longer-term for the impact on the Royal Canal amenity area.
- Option 2 and 3 score negatively for Noise and Vibration, slightly worse than option 1.

Based on the outcome of multi-criteria analysis, it is evident that Option 3 (Displacing the station platforms to the East) has emerged ahead of other competing sites, hence it is considered appropriate to propose this solution as the preferred one.

The main more significant impacts of this option, in terms of environmental aspects are:

- Material Assets: Property: There will be direct impacts on amenity lands along the canal involving the existing pedestrian access to the canal bank and a direct impact on the Kilcock Canoe Polo Clubhouse.
- Biodiversity: the construction of two new platforms east of Shaw Bridge will be required works outside Irish Rail land and <5m from the Royal Canal.
- LVIA: The proposed development has the potential for significant adverse impact on the protected view of the canal from Shaw Bridge and for slight adverse impact on the protected view from Allen's Bridge.
- Noise: On balance, the potential construction noise impacts will be least disruptive for this option but will affect a higher number of NSLs during the operational phase compared to the other 2 options.

The main advantages of this option are:

- Ideal and desired configuration for the station platforms: straight alignment in plan, which provides greater safety (better visibility to both passengers and drivers and a more uniform space between the train and the platform), more efficient operation and easier maintenance;
- The grade of the tracks is much better adjusted to the grade of the current track, making the earthwork and the containment structures necessary in this option much lower;
- No impact on Shaw Bridge (OBG25);
- The construction cost of this option is the cheapest of the three options and the one that requires the least track closure (approximately 3 months)

ANNEX A. Multi-criteria Analysis Matrix

ANNEX B. Options Drawings

CODE	TITLE	No. Sheets
DART-DEP-005-DR-IDOM-CE-0100	Kilcock St. Alternative 1. Layout	2
DART-DEP-005-DR-IDOM-CE-0110	Kilcock St. Alternative 1. Longitudinal Profiles	1
DART-DEP-005-DR-IDOM-CE-0120	Kilcock St. Alternative 1. Typical Cross Sections	1
DART-DEP-005-DR-IDOM-CE-0130	Kilcock St. Alternative 1. Cross Sections	4
DART-DEP-005-DR-IDOM-CE-0200	Kilcock St. Alternative 2. Layout	2
DART-DEP-005-DR-IDOM-CE-0210	Kilcock St. Alternative 2. Longitudinal Profiles	1
DART-DEP-005-DR-IDOM-CE-0220	Kilcock St. Alternative 2. Typical Cross Sections	1
DART-DEP-005-DR-IDOM-CE-0230	Kilcock St. Alternative 2. Cross Sections	4
DART-DEP-005-DR-IDOM-CE-0300	Kilcock St. Alternative 3. Layout	2
DART-DEP-005-DR-IDOM-CE-0310	Kilcock St. Alternative 3. Longitudinal Profiles	1
DART-DEP-005-DR-IDOM-CE-0320	Kilcock St. Alternative 3. Typical Cross Sections	1
DART-DEP-005-DR-IDOM-CE-0330	Kilcock St. Alternative 3. Cross Sections	4