CELBRIDGE TO HAZELHATCH LINK ROAD

Preliminary Options Assessment Report

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1 INTRODUCTION AND DESCRIPTION

1.1 General

In March 2020, RPS were commissioned by Kildare County Council (KCC) to provide the engineering and consultancy services required to deliver the Celbridge to Hazelhatch Link Road scheme through Phases 1 to 4 of the TII Project Management Guidelines (TII PMG 2019), including Concept and Feasibility, Options Selection, Design and Environmental Evaluation and the Statutory Processes.

This document forms the Stage 1 Preliminary Options Assessment which is a deliverable under Phase 2 – Options Selection of the TII PMG 2019. The purpose of the Preliminary Options Assessment is to develop a number of feasible options and carry out a Multi-Criteria Analysis (MCA) under the assessment criteria of Engineering, Environment and Economy. This will result in a refined number of options to carry forward to Project Appraisal and the selection of a Preferred Option.

1.2 Overview of the Proposed Project

1.2.1 Context

Celbridge, a town of 20,288 people (Census 2016) is located in north-east Kildare and is a bridging point over the River Liffey.

Celbridge lies approximately 3km to the west of the Kildare/Dublin county boundary and approximately 20km to the west of Dublin city centre. The northern Kildare towns of Maynooth and Leixlip are situated approximately 7km to the north and are separated from Celbridge by the M4 motorway. Naas, Sallins and Clane are located within 20km to the southwest. **Figure 1-1** illustrates the location of Celbridge within the wider context of the major urban areas and employment centres that surround the town.

A 2020 report by Kildare County Council (A High-level Analysis of Bridge Infrastructure in Large Towns Located on Major Rivers in Ireland) found that Celbridge was one of only two Irish towns (the other being Newbridge) situated on a major waterway with a population range between 17,100 and 30,200 that was connected by a single bridge crossing of the major river. The single river crossing is required to take all vehicular traffic travelling from Celbridge town centre to destinations south of the town centre.

The proposed scheme consists of a second river crossing of the River Liffey and carriageway with adjacent cycle and pedestrian facilities linking Celbridge to Hazelhatch train station. The scheme will include appropriate junction forms at crossing points with existing regional and local roads to allow the continued flow of traffic on the existing road network.

The proposed scheme aims to fulfil project objectives detailed in section 1.2.3. The proposed multi modal transport link will provide improved access to train station for all road users, facilitate the development of Key Development Areas southeast of the River Liffey, improve safety and reduce traffic congestion.

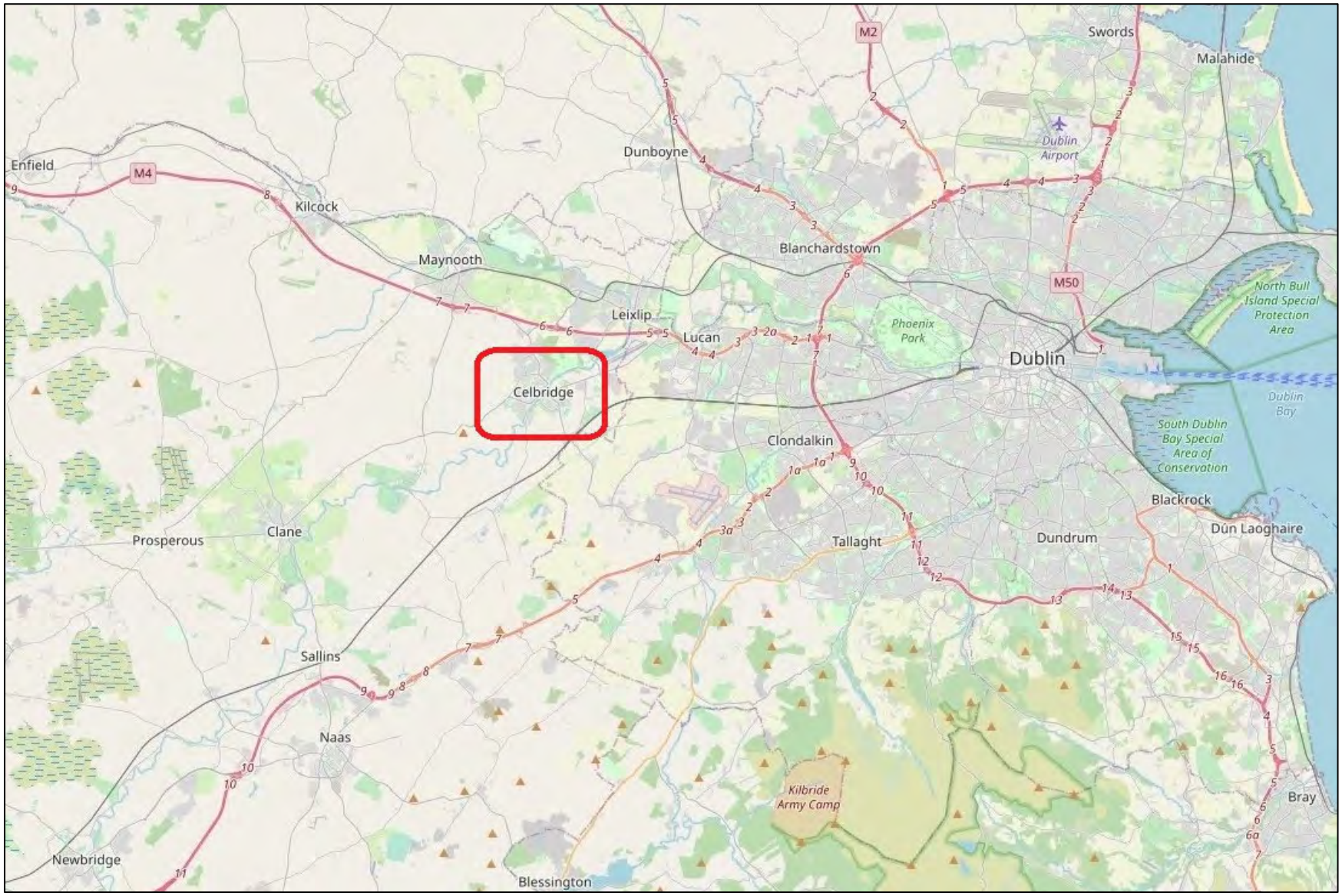


Figure 1-1: Celbridge & Surrounding Geographical Area

1.2.2 Overview of Scheme Development to Date

A number of previous studies have been undertaken to examine the traffic issues in Celbridge and each has highlighted the need for a second crossing of the River Liffey. These studies include:

- Traffic Management Plan for Celbridge (TPI, 2009)
- Celbridge: River Crossing Feasibility Report (RPS, 2015)
- Celbridge Liffey Crossing: Pedestrian and Cycle Improvements - Options Report (Clifton Scannell Emerson Associates, 2018)
- Kildare Integrated Services Programme (ISP) Celbridge Plan 2016-2020 (Kildare Local Community Development Committee, 2016)
- Celbridge Local Area Plan (LAP) 2017-2023 (Kildare County Council, 2017)

Upon appointment in March 2020, RPS progressed the scheme through Phase 1 – Concept and Feasibility of the TII PMG 2019.

During Phase 1, a Feasibility Report was developed which reviewed previous work on the scheme and determined that the need for the scheme is still there, a second river crossing and link road to Hazelhatch train station is still feasible and that consideration of scheme options, alongside appraisal of traffic management alternatives, is likely to lead to a fully justified and worthwhile scheme, designed in accordance with applicable design standards to achieve appropriate levels of service.

A Project Brief was also developed which examined the need for the scheme, the strategic fit and priority at a national, regional and local level, the likely constraints to the project, interfaces with other planned and existing transport projects and objectives and operational outcomes that would provide good value for money. The Project Brief concluded that a need for the scheme exists.

A Phase 1 Road Safety Impact Assessment determined that the ‘Do Something’ option would provide a safer route between Celbridge and Hazelhatch train station, provide a better solution to the traffic congestion, provide sufficient facilities for vulnerable road users and best addresses the safety objectives for the scheme when compare to a ‘Do Nothing’ scenario.

A study area was identified for the scheme to ensure that several option alternatives could be assessed and that all constraints to the scheme could be examined. The study area for the proposed scheme is shown in **Figure 1-2** and in more detail in Appendix C.

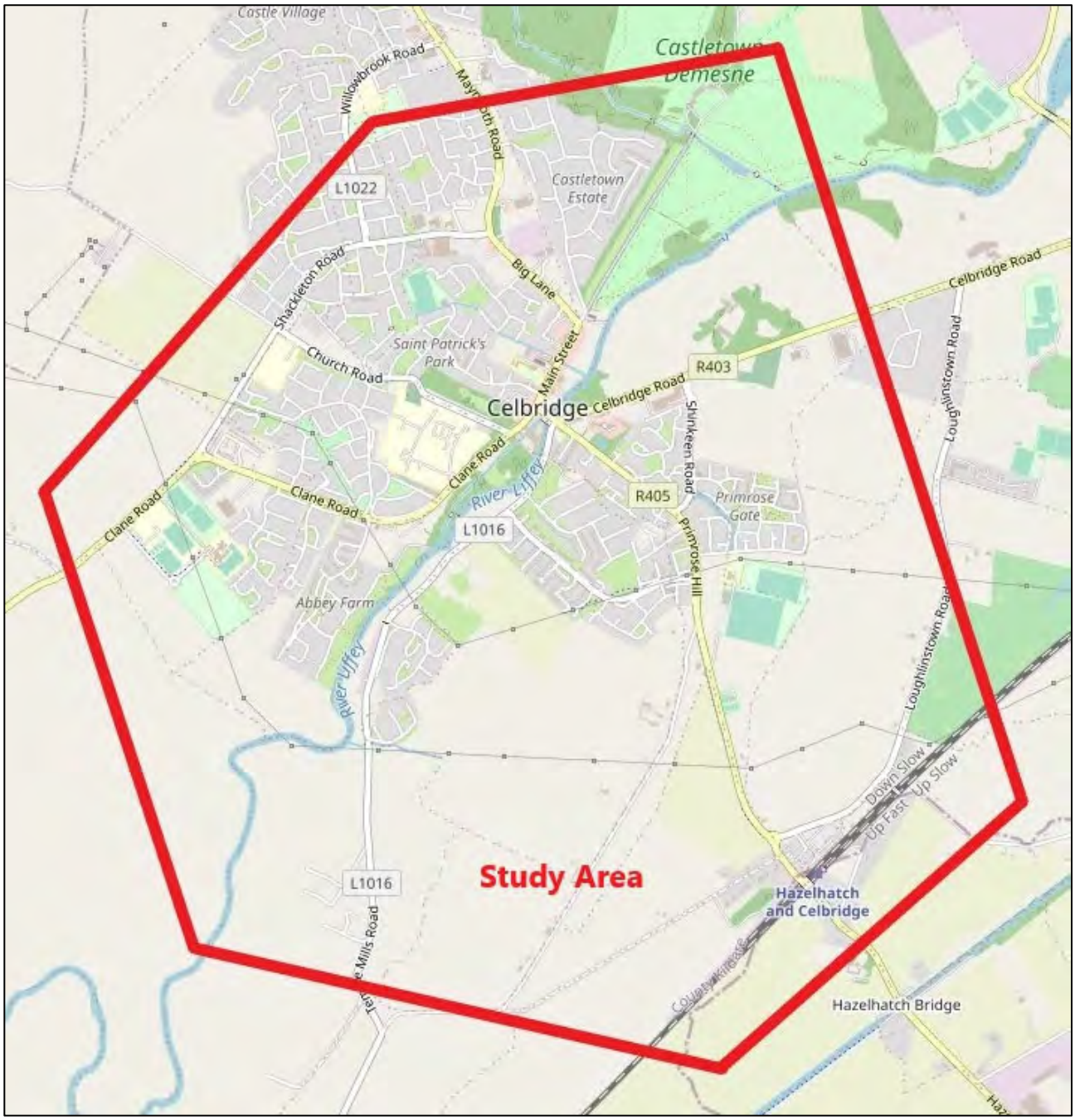


Figure 1-2: Scheme Study Area

1.2.3 Project Objectives

The objectives for the Celbridge to Hazelhatch Link Road scheme are listed below in **Table 1-1.**

Table 1-1: Celbridge to Hazelhatch Link Road Project Objectives

Project Objectives	
Economy:	• To encourage economic activity by reducing the costs of travel between the endpoints of the scheme at an investment cost that offers good value for money. • To facilitate the future reduction of traffic congestion in Celbridge Town Centre by adding a second bridge crossing of the River Liffey, so as to reduce journey times, improve journey time reliability and to facilitate future public realm improvements in the town centre.
Safety:	• To support the RSA Road Safety Strategy 2021-2030 by reducing the number of personal injuries caused by road collisions within the study area, particularly collisions involving vulnerable road users.
Integration:	• Improve multi-modal transport integration by reducing car journey times between Celbridge Town and Hazelhatch Train Station. • To facilitate the development of Key Development Areas southeast of the River Liffey in Celbridge, in line with the Local Area Plan.
Environment:	• Avoid, minimise and mitigate the impact of the scheme on the natural environment, particularly impacts to local watercourses. • To reduce the level of traffic nuisance - traffic noise and vibration, traffic pollution and severance - in Celbridge Town Centre.
Accessibility and Social Inclusion:	• To reduce social exclusion by enhancing accessibility to rail services for non-car-owners within the study area.
Physical Activity:	• To increase Active Travel within the study area by improving journey ambience for pedestrian and cycle journeys within the study area.

1.3 Existing Conditions

1.3.1 Existing Key Road Alignments and Cross Sections

The key link roads that lead to and from the existing River Liffey bridge in Celbridge are the R403, R405 and the L1016. The speed limits reduce from 60km/h to 50km/h as they approach Celbridge. Maynooth Road has a speed limit of 50km/h from its starting point at the northern roundabout junction between the R405 and the R449. These roads are reflecting their origins, era of construction and the staged nature of road improvements over the years. The existing cross sections vary from narrow carriageway lanes bound by kerbed footpaths to wider lanes with hard strips and advisory cycle lanes in places. Pedestrian facilities are also inconsistent in width and finish, often pinch pointed by the historic boundary walls. Speed limit transition locations and link roads are illustrated in **Figure 1-3**.

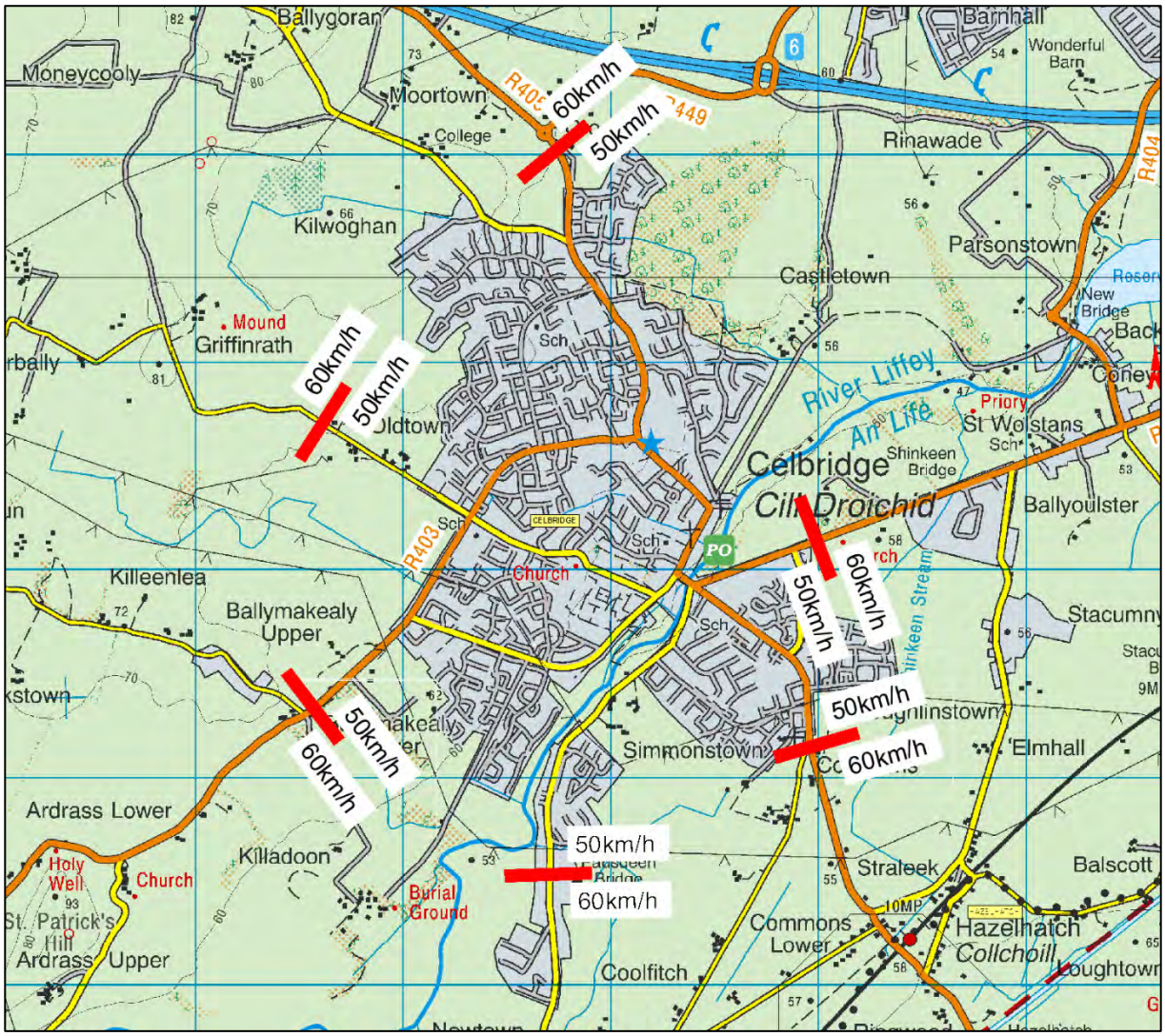


Figure 1-3: Key Roads and Speed Limit Changes

The R403 approaches from the west as Clane Road and English Row and from the east as Dublin Road. Within the town centre English Row forms part of the commercial centre of the town and is characterised as an historic urban street with narrow traffic lanes and footpaths. Clane Road is similarly narrow as it runs parallel to the River Liffey with high historic walls along both sides. Clane Road straightens and widens as it turns westwards towards Shackleton Road with additional lane width and narrow hard strips less than 0.5m wide developing and a variable width verge along the eastern side. Hard shoulders or hard strips are not present in the section parallel to the River Liffey.

Dublin Road is generally straight with narrow hard strips less than 0.5m wide on both sides. A footpath and a high stone wall are present along the northern side with a grass verge developing approximately 1.3km east of the existing bridge. Pedestrian facilities along the southern side of Dublin Road are limited with a footpath present in some locations and a grass verge present in-between.

The R405 approaches from the north-west of the town as the Maynooth Road / Main Street. Main Street forms the core part of the commercial centre of the town and has large numbers of pedestrian traffic. The 350m section of Main Street parallel to the River Liffey comprises two traffic lanes with intermittent parking and generally wide footpaths on both sides. There are a number of traffic calming measures including refuge traffic islands and raised pedestrian crossings. As the road turns away from the River Liffey north-west towards Maynooth, namely the Maynooth Road, the traffic lane and footpath widths vary and are generally narrower. On-road advisory cycle lanes are introduced at the junction with Shackleton Road travelling north along the R405 Maynooth Road.

The existing R405 from Celbridge town centre travelling towards Hazelhatch train station, namely the Hazelhatch Road, is predominately urban in nature. Travelling further south-east along the R405 the route

has a more rural setting surrounded by agricultural fields. The northern end of Hazelhatch Road forms part of a poorly aligned junction with the R403 immediately south of the existing river crossing, while the southern end of Hazelhatch Road connects to a roundabout adjacent to Hazelhatch train station. Cross sectional widths and elements vary along the route. Pedestrian facilities are present along the western side of Hazelhatch Road in the form of a footpath in the northern section and a shared path south of Hazelhatch Park. An intermittent footpath is present along parts of the eastern side and intermittent verges are present on both sides. Hard strips less than 0.5m wide develop in the southern section along with cycle facilities which are located on the western side.

The L1016 Newtown Road (also known locally as the Ardclough Road) approaches Celbridge from the southwest. It is generally comprised of a two-lane road with narrow hard strips less than 0.5m wide and a footpath along the eastern side. It also has a number of constantly varying cross sectional elements such as different widths of verges, an intermittent footpath along the western side and a high stone wall immediately adjacent to the hard strip in sections. Newtown Road also contains a narrow section of road approximately 450m in length without centreline markings starting to the west of Simmonstown Manor approximately 500m from the existing river crossing.

The existing River Liffey bridge is a protected structure and the views upstream and downstream are protected views and therefore the improvements that can be undertaken are limited. The bridge is sub-standard in terms of cross-sectional width, vertical geometry, and junction layout on both the north and south sides. Traffic counts undertaken in May 2019 show that the existing bridge carries over 15,500 vehicles per day and generates significant queuing in the AM and PM peak periods. Celbridge's single river crossing point results in a lack of circulation and permeability within the town centre and throughout the general road network in the study area.

The general topography of Celbridge is flat to undulating and hence the vertical geometry of the road network is largely of a high standard. The horizontal geometry is sub-standard at numerous points through the existing road network but particularly along R405 Main Street / Maynooth Rd and L1016 Newtown Road where the constricted existing conditions result in tighter radius curves.

There are a large number of direct access points to homes, commercial properties and farms/fields throughout the network. **Figure 1-4** to **Figure 1-10** show examples of substandard alignment, substandard cross section, concealed access points and substandard junction layouts at various points throughout the existing road network.

Figure 1-4: Clane Rd & English Row - Substandard Cross Section *(Google Maps)*

Figure 1-5: Newtown Rd & Existing River Liffey Bridge - Substandard Alignment and Cross Section *(Google Maps)*

Figure 1-6: Hazelhatch Rd & Dublin Rd - Substandard Cross Section and Concealed Property Access *(Google Maps)*

Figure 1-7: Junctions at Existing River Liffey Bridge - Substandard Junction Alignment *(Google Maps)*

Figure 1-8: Main St & Maynooth Rd - Substandard Alignment and Cross Section and Concealed Property Accesses *(Google Maps)*

Figure 1-9: Main St & Celbridge Bridge – Congestion Issues

Figure 1-10: Dublin Rd & Celbridge Bridge – Narrow Traffic Lanes and Congestion Issues

1.3.2 Vulnerable Road Users

There are limited facilities for vulnerable road users on the road network within the study area. In particular, facilities for cyclists are noticeably absent except for cycle tracks and lanes to the north of the study area between the town centre and Leixlip and a partial link along the R405 Hazelhatch Road. On and off road cycle facilities are present along Shackleton Road and from the junction of Maynooth Road/Shackleton Road northwards towards the M4 and onwards to Leixlip. The facilities on the R405 Hazelhatch Road vary between space shared with pedestrians and a segregated off-road cycle track. The path/track, which is generally narrow, is limited to the final 1.3km on the approach to Hazelhatch train station. In general, Celbridge cyclists are required to share the traffic lanes with motorised vehicles.

Pedestrians are limited to the same river crossing point as vehicular traffic plus a second pedestrian only bridge immediately to the west of the existing bridge. It was noted in the NTA's Celbridge Liffey Crossing: Pedestrian and Cycle Improvements - Options Report (Clifton Scannell Emerson Associates, 2018), the pedestrian only bridge is not on the desire line for pedestrians travelling to and from the town centre which results in many pedestrians choosing to use the narrow footpath on the existing bridge. The proximity of these crossing points converges pedestrians close to the same location and the lack of alternative crossing points limits the range that pedestrians are willing to walk adding a further constraint to the efficient movement of people.

The cross section of the existing vehicular bridge includes two traffic lanes and a footpath along the eastern side. The narrow overall width of the bridge (min. 7.5m from inside of parapet to inside of parapet) creates safety issues for pedestrians especially when large vehicles are turning onto the bridge from the southern approach and/or when pedestrians travelling in opposite directions meet on the bridge.

There are numerous locations along the key roads in Celbridge that contain narrow pedestrian pinch points largely due to a localised narrowing of the cross section (e.g. buildings jutting into the footpath) or to the placement of utility and traffic sign poles in the footpaths and consequently pose dangers for vulnerable road users.

1.3.3 Junctions and Direct Access

As could be expected for a town of Celbridge's size and historic origins many of the roads within the urban area have a high number of junctions and accesses. The frequency of junctions and accesses on the key routes within the study area are shown in **Table 1-2**:

Table 1-2: Frequency of Junctions and Direct Accesses

Section	Length	No. of Junctions	No. of Direct Accesses
R403 - River Liffey Bridge to Shackleton Rd (west)	1.5km	10	13
R405 - River Liffey Bridge to Shackleton Rd (east)	850m	5	52
R405 - River Liffey Bridge to Rbt at Hazelhatch Station	1.9km	11	28
R403 - River Liffey Bridge to Loughlinstown Road	1.6km	5	28
L1016 Newtown Rd - River Liffey Bridge to Laburnum Grove	1.9km	4	57

Each junction and direct access represents a potential hazard for all road users. A junction or direct access provides a conflict area between motorists which may result in collisions. The main collisions associated with junctions are rear end shunt collisions and turning movement collisions. The collision hazard is increased because of the reduced levels of sightlines at many of these access points.

The existing numbers of junctions and accesses is considered high. As traffic volumes increase and additional development occurs, the further proliferation of direct accesses will likely result in an increase in frustrated motorists taking undue risk when trying to enter or exit the road network at junctions and access points along the key roads within Celbridge.

1.3.4 Analysis of Collision Data

There are a high number of road junctions and direct access on the main routes through Celbridge town. There is also limited opportunities available for safe overtaking which can lead to illegal or unsafe manoeuvres by frustrated drivers.

Historic road collision data for Celbridge has been obtained from the Road Safety Authority (RSA) for the period 2008 to 2016. For the purposes of this collision analysis, the study area was taken as that shown in Figure 1-2. A total of 87 personal injury collisions occurred within the study area of which one (1) resulted in a fatality. There were also eight (8) serious injury collisions and seventy-eight (78) collisions resulting in minor injury for the same period. A breakdown of these statistics is provided in **Table 1-3**.

Table 1-3: Road Collision Data 2008 - 2016

Collision Type	Fatal Collision	Serious Injury Collision	Minor Injury Collision
Single Vehicle	1	5	10
Head-on Conflict		1	6
Angle, Both Straight			3
Angle, Right Turn			2
Pedestrian			17

Collision Type	Fatal Collision	Serious Injury Collision	Minor Injury Collision
Head-on Right Turn			1
Rear End, Right Turn			
Rear End, Straight			14
Not Stated		2	25
Total	**1**	**8**	**78**

Collision data for the most recent period, i.e. from 2017 to 2019 is currently not available.

The number of fatal and serious injury collisions is not considered excessive for a town of Celbridge's size. The fatal and serious injury collisions are generally single vehicle collisions and are located away from the existing bridge and hence further from areas experiencing significant traffic congestion and queuing. This may signify that speed is a factor in a portion of these collisions. The number of minor injury collisions are considered to be high. A significant grouping of the minor collisions are located along Main Street and English Row, indicating that the heavy congestion and narrow roads in the centre of Celbridge is contributing to the high number of minor collisions.

The locations of the personal injury accidents (fatal, serious and minor injuries) are shown in Appendix A.

Material Damage collisions were supplied for the period 2008 – 2016 and indicated a total of 394 occurring within the study area. A breakdown of material damage collisions per year is provided in **Table 1-4**

Table 1-4: Material Damage Collisions per Year 2008 - 2016

	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Total	**27**	**18**	**47**	**48**	**70**	**56**	**38**	**45**	**45**	**394**

Material damage collision data for the most recent period, i.e. from 2017 to 2019 has currently not been published.

The number of material damage collisions within Celbridge is considered to be very high. A significant portion of the material damage collisions are located along the narrow and heavily congested streets in the centre of the town such as Maynooth Road, Main Street, English Row and the existing River Liffey bridge. Similarly to the number and locations of minor collisions, the grouping of material damage collisions in the centre of town may indicate that the heavy congestion and narrow roads in the centre of Celbridge is contributing to the high number of material damage collisions.

1.4 Purpose of Preliminary Options Assessment Report

The Preliminary Options Assessment Report is a deliverable of Stage 1 in Phase 2 of Option Selection Process. The purpose of Stage 1 Preliminary Option Assessment is to develop a number of feasible options and carry out a Multi-Criteria Analysis (MCA) under the criteria of Engineering, Environment and Economy.

This report presents the assessment in accordance with TII Guidelines. Information is presented in this report to provide clarity on the decision-making process which has resulted in a refined number of options being carried forward to Stage 2 Project Appraisal.

The main elements in Phase 2 are:

- Stage 1 – Preliminary Options Assessment
- Stage 2 – Project Appraisal Matrix
- Stage 3 – Selection of Preferred Option

The TII Guidelines sets out the implementation of the first three stages of the option selection process leading to the selection of the Preferred Option. This process is illustrated in **Figure 1-11**.

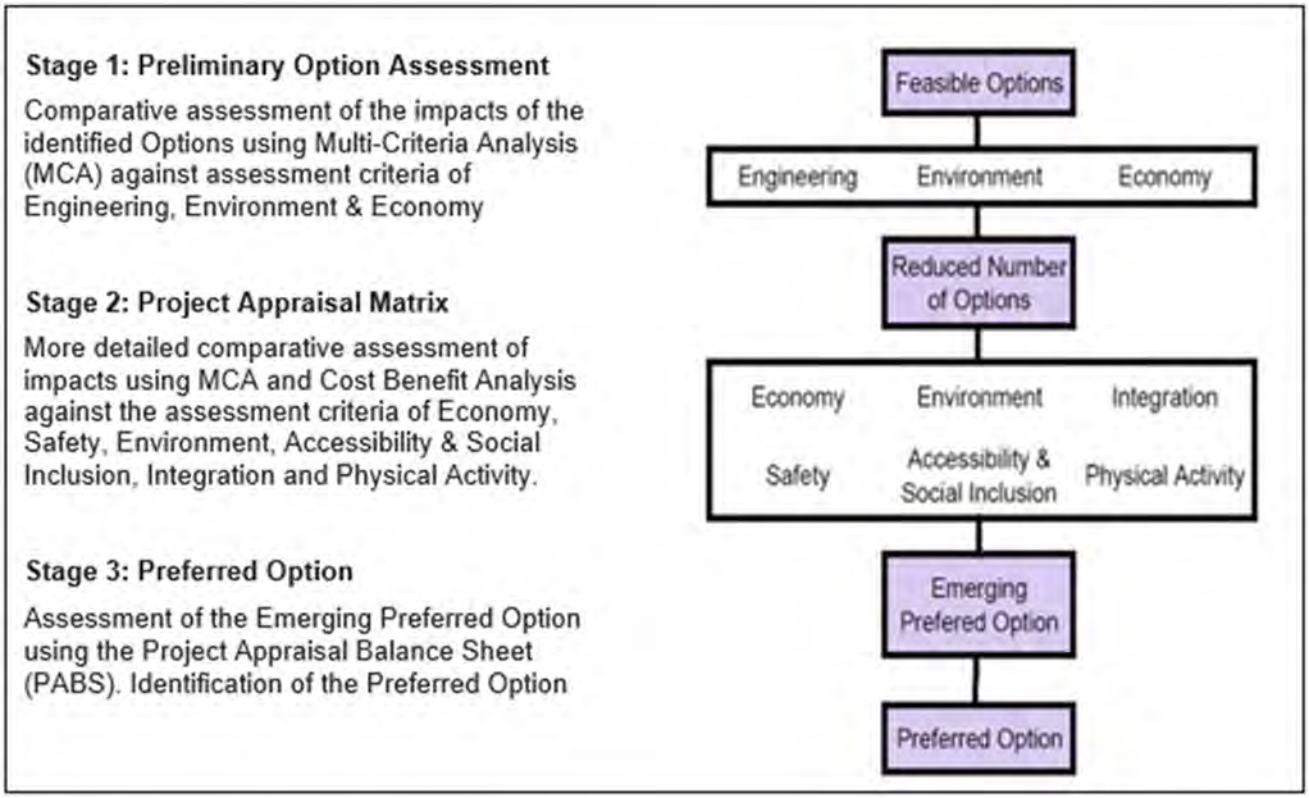


Figure 1-11: Stages of the Option Selection Process (TII PMG)

2 IDENTIFICATION OF NEED

2.1 Strategic Fit and Priority

The proposed scheme is consistent and compatible with local, regional and national policy documents, details of which are outlined within this chapter.

The plans & policy documents that this scheme aligns with are listed below.

2.2 National Policy

2.2.1 Project Ireland 2040 National Planning Framework (NPF)

The National Planning Framework (NPF) "Project Ireland 2040" was published in February 2018 and sets out the long-term context for Ireland's physical development and associated progress in economic, social and environmental terms. The NPF details ten National Strategic Outcomes (NSOs) of which the Celbridge to Hazelhatch Link Road is compatible with five:

NSO 1: Compact Growth – The careful management of the sustainable growth of compact cities, towns and villages in order to add value and create more attractive places in which people can live and work.

A second river crossing and link road to Hazelhatch Train Station will transform the potential for sustainable, compact growth in Celbridge over the coming years. The Celbridge LAP 2017-2023 identifies five Key Development Areas (KDAs) with capacity to accommodate significant growth over the LAP period. Two of these, KDA 2 Ballyoulster and KDA 5 Simmonstown, are located south of the River and are directly impacted by or dependant on a number of the feasible route options. For the location of the KDAs see **Figure 2-1** below.

KDA 2 Ballyoulster and KDA 5 Simmonstown are the two largest KDAs and have the capacity to accommodate circa. 2000 housing units along with community and educational facilities, in close proximity to both the town centre and Hazelhatch Train Station. The Celbridge LAP placed phasing requirements on the development of the KDAs to ensure the delivery of priority infrastructure in tandem with the development of each KDA.

Requirements for KDA 5 Simmonstown, include a new vehicular bridge over the River Liffey which must be completed prior to the commencement of any development in this KDA. The delivery of a second bridge as part of this proposal is therefore vital to unlocking the development potential in KDA 5 Simmonstown and facilitating compact, sustainable growth in Celbridge.

Requirements for KDA 2 Ballyoulster, include a new pedestrian and cycle bridge crossing of the River Liffey, or improved pedestrian and cycle facilities on the existing Liffey Bridge, and are required prior to the occupation of units. The delivery of a second bridge as part of this proposal, which will include dedicated pedestrian and cyclist facilities, will therefore also assist in unlocking the potential for compact, sustainable growth in KDA 2.

NSO 2: Enhanced Regional Accessibility – The enhancement of accessibility between key urban centres of population and their regions.

Celbridge is located in the Dublin Metropolitan Area, less than 20 kilometres from Dublin City Centre, and maintains strong economic and social links to Dublin. Celbridge is in the fortunate position of having good accessibility to Dublin, with the M4 motorway running just north of the town and the Dublin-Cork rail line running through Hazelhatch just south of the town. According to Census 2016 data, Celbridge has a working population of approx. 10,000 persons and almost 50% of workers commute to employment destinations in Dublin City and suburbs daily. The vast majority of these

workers, c.70%, (approx. 4,500) commute by private car, 12% commute by bus and only 3% commute by train.
The NSO for enhanced regional accessibility includes ensuring that urban areas have a high degree of accessibility to Dublin. The proposed project will strengthen accessibility between Celbridge and Dublin by providing improved access to Hazelhatch Train Station, particularly for residents in north Celbridge, and by facilitating compact urban development in close proximity to the train station. By improving accessibility to Hazelhatch Train Station, the project will provide a significant opportunity to increase the modal share of rail users from Celbridge. This is particularly important in light of Iarnród Éireann's plans to expand DART services to Hazelhatch by 2027 under the National Development Plan.

The DART Expansion project will increase rail services on the Kildare Line from the current 12 trains per hour per direction to 26 trains per hour per direction by 2027. This will increase the capacity on the line from the current 4,500 passengers per hour per direction to 16,750 passengers per hour per direction by 2027. Iarnród Éireann are very supportive of the Celbridge to Hazelhatch Link Road scheme as it will improve access to their public transport network. In a letter of support (C7003-MAY-RO-105) dated 28th April 2020, Iarnród Éireann expressed their backing of the application for continued UDRF support for the scheme and stated that the "*road scheme would be a welcome infrastructural development in that it has the potential to increase the customer accessibility to Hazelhatch Station in a safe and sustainable manner*".

NSO 4: Sustainable Mobility – The transition from polluting and carbon intensive transport systems to new cleaner technologies such as electric vehicles.

The project is consistent with this strategic objective in that one of its core aims is to facilitate the future reduction of traffic congestion and its associated adverse environmental impacts in the town centre. The project is consistent with this strategic objective by providing high-quality infrastructure for pedestrians and cyclists to increase the attractiveness of these active travel, zero carbon transport modes.

In addition, in terms of general sustainable mobility principles, the project will:

- enhance connectivity to public transport. The project will increase the ability of the transport network to support connectivity with Hazelhatch Train Station;
- facilitate the implementation of the National Greenways Strategy in the area;
- enhance the ability of the transport network to support local connectivity. The accessibility of employment will be greatly improved. The scheme will provide high quality walking and cycling linkages from residential areas to employment thereby increasing the permeability of the area;
- improve connectivity to lands, providing access to the poorly served region of the town for development proposals;
- complete a key missing road link while also addressing critical road safety issues (e.g. the existing, and single, crossing of the River Liffey cannot accommodate the increasing number of daily west-east trips; this may result in an increased risk of road collisions); and
- improve the quality of life, being consistent with environmental, climate and biodiversity objectives, including those arising from the EU Habitats Directive.

NSO 7 Enhanced Amenity and Heritage – To ensure that our cities, towns and villages are attractive and can offer a good quality of life.

Celbridge is steeped in history, having developed around an ancient crossing point on the River Liffey. As such it has a rich built heritage including a number of significant demesnes at Castletown

House, Celbridge Abbey, Oakley Park, Donaghcumper and St. Wolstan's. The project will facilitate the protection and enhancement of Celbridge's rich built heritage.

New natural amenity areas, cultural and sporting opportunities will also be triggered by the project and in doing so the character and attractiveness of Celbridge as a place to live will be boosted (e.g. new park amenities by the River Liffey can be created and reached with the provision of the second crossing road link). New areas of natural amenity provide the opportunity for nature conservation, biodiversity and sustainable recreational tourism and eco-tourism (e.g. access to the historic demesne of Castletown). The proposal will facilitate the future reduction of town centre congestion which will in turn facilitate public realm improvements in the town centre. This will significantly improve the attractiveness of the town and the quality of life of its residents.

NSO 10 Access to Quality Childcare, Educational and Health Services – To facilitate good access to a range of quality education and health services, relative to the scale of a region, city, town, neighbourhood or community.

NSO 10 states that access to quality education and health services is a defining characteristic of attractive, successful and competitive places. The majority of community facilities within Celbridge are located north of the river, including all churches and most health facilities. Six of the eight schools in the town, including all secondary schools, are also located north of the river. At present, access to these facilities is being impeded by the single bridge crossing and lack of permeability in the transport network. New educational, health and community facilities will be provided within the new KDAs when developed. By improving the transport network in Celbridge and facilitating the development of KDAs south of the River Liffey, the project will enhance access to all community facilities and services within the town thus fulfilling the objective of NSO 10. The location of school and crèche facilities in Celbridge is shown on **Figure 2-1**.

The National Planning Framework seeks to incrementally improve regional accessibility. Building on a more compact approach to urban development requirements and enhancing connectivity between centres of population of scale will support the objectives of National Planning Framework. The proposed Celbridge to Hazelhatch Link Road is compatible with a number of the NPF National Strategic Outcomes (NSOs), as outlined above, and will enable the sustainable development of Celbridge over the coming years and enhance the liveability and quality of life for the 20,000+ residents of Celbridge.

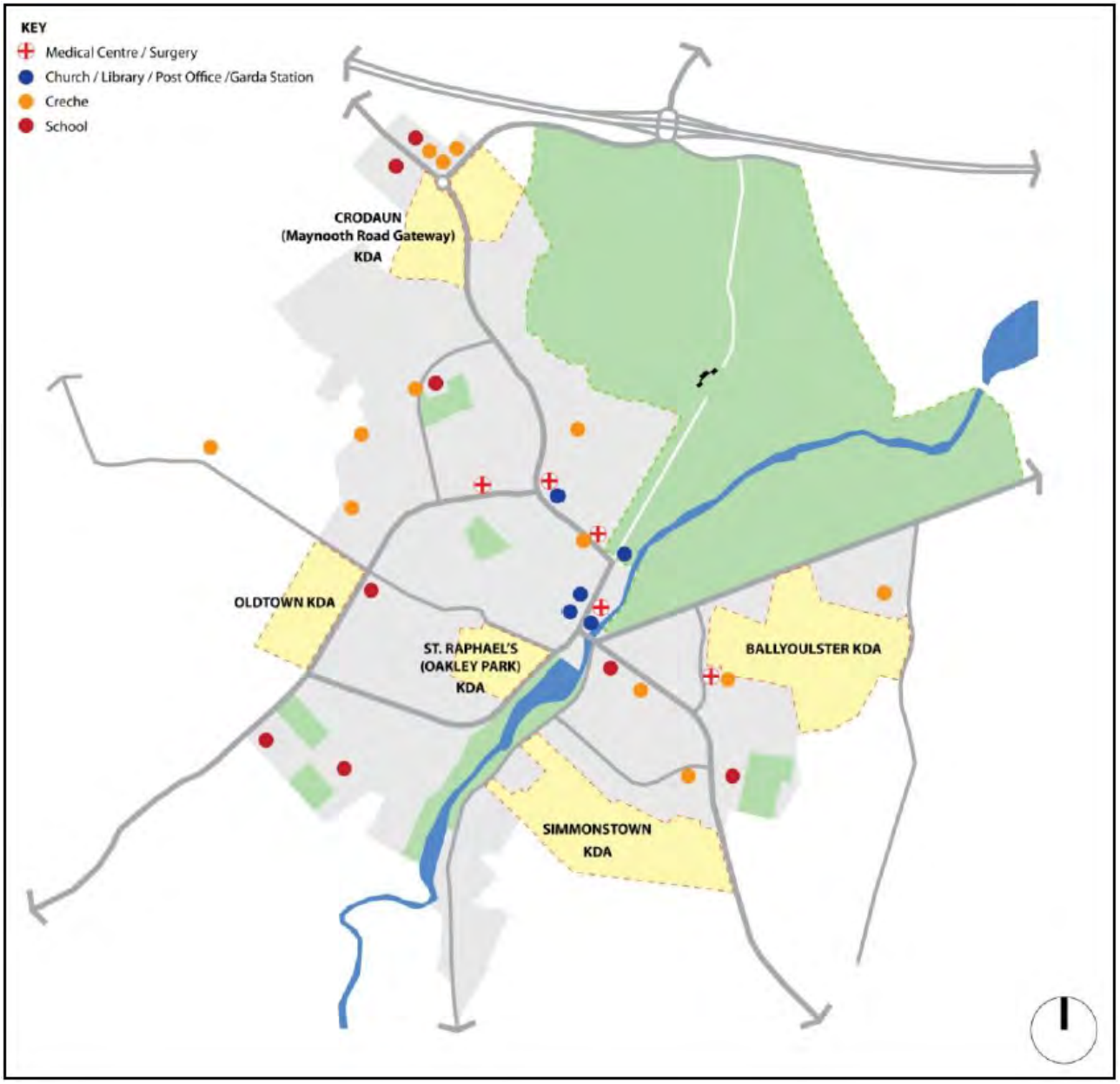


Figure 2-1: KDA Locations and Community Facilities

2.2.2 Climate Action Plan 2019

Agenda 2030 and the Paris Agreement on climate change require a transformational shift of our economies and societies towards climate resilient and sustainable development. Ireland and the international community is responding to this requirement, setting out a profound change in the systems and practices which support our lifestyle. In line with the UN Sustainable Development Goals, climate action must be seen as complementary to other important policy objectives, such as promoting sustainable economic development pathways, improving energy security, and addressing air pollution impacts on human health.

Climate Action Plan 2019 sets out targets and measures to achieve the necessary change to avert climate emergency. One of the targets of Climate Action Plan 2019 under Chapter 10 - Transport is:

'Reduce CO2 eq. emissions from the (transport) sector by 45-50% relative to 2030 pre-NDP projections'.

Measures proposed to achieve this target include transport modal shift: *'We want to make sure that we provide good public transport, cycling and walking infrastructure, so people are less reliant on their cars, and we can cut congestion. We have already committed to an additional 500,00 public transport and active travel journeys by 2035*.'

Celbridge to Hazelhatch Link Road is compatible with the Climate Action Plan 2019 measures by providing safe and attractive cycling and pedestrian link to Hazelhatch Train Station. The new link road to the train station will complement the proposed DART+ South West project and the government Park and Ride strategy. It will encourage a modal shift in commuting traffic between Celbridge and Dublin city centre from one reliant on car to one using electrified trains.

2.2.3 National Development Plan (2021-2030)

The National Development Plan –2021-2030 (NDP) sets out the investment priorities that will underpin the implementation of the National Planning Framework (NPF) up to the year 2030.

As set out in the National Development Plan (NDP), there will be increased levels of investment in road and rail programmes. The expansion of DART services to Hazelhatch has been identified in the National Development Plan. The scheme is proposed under the NDP to be fully implemented by 2027.

The development of the proposed link road will maximise the utility of the proposed DART+ service for Celbridge residents and is therefore compatible with the NDP strategy.

2.2.4 Housing for All – a New Housing Plan for Ireland 2021

'Housing for All - a New Housing Plan for Ireland' is the government's housing plan to 2030.

It is a multi-annual, multi-billion euro plan which will improve Ireland's housing system and deliver more homes of all types for people with different housing needs.

The government's overall objective is that every citizen in the State should have access to good quality homes:

- to purchase or rent at an affordable price
- built to a high standard and in the right place
- offering a high quality of life

The government's vision for the housing system over the longer term is to achieve a steady supply of housing in the right locations with economic, social and environmental sustainability built into the system.

Housing for All provides four pathways to achieving four overarching objectives:

- Supporting Homeownership and Increasing Affordability;
- Eradicating Homelessness, Increasing Social Housing Delivery and Supporting Social Inclusion;
- Increasing New Housing Supply; and
- Addressing Vacancy and Efficient Use of Existing Stock.

The first steps described in the Policy for achieving an Increased Supply Objective include: 'focus on adequate supply of serviced zoned lands to meet housing need'.

The Celbridge to Hazelhatch Link Road project supports Housing for All objective of Increasing New Housing Supply by providing access and opening Key Development Areas southeast of the River Liffey in Celbridge. The lands of KDA Simmonstown cannot be developed without the proposed road and second river crossing as stated in Local Area Plan. Providing a second bridge along the River Liffey as well as providing a high quality arterial/link type road connecting town centre with Hazelhatch Train Station will facilitate the use of the 35ha of zoned lands and provision of estimated 1050 residential units. The lands of KDA 2 Ballyoulster, cannot be developed without a new pedestrian and cycle bridge crossing of the River Liffey, or improved pedestrian and cycle facilities on the existing Liffey Bridge. The delivery of a second bridge as part of this proposal, which will include dedicated pedestrian and cyclist facilities, will therefore assist in unlocking the potential of KDA 2 estimated at 885 residential units on 29.5ha of zoned land.

2.2.5 National Investment Framework for Transport in Ireland (NIFTI) 2021

The National Investment Framework for Transport in Ireland (NIFTI) 2021 (which replaced the Strategic Investment Framework for Land Transport - SIFLT) is the Department of Transport's high-level strategic framework for future investment in the land transport network.

Future transport investment projects and programmes as identified in investment will have to demonstrate their fit with NIFTI and, by extension, with the National Strategic Outcomes (NSOs) that underpin the National Planning Framework. Transport investment should meet one or more of the NSOs and the Celbridge to Hazelhatch Link Road scheme will contribute to meeting the following NSOs;

- NSO 3 – Strengthened Rural Economies and Communities
    - The scheme will provide easier and more efficient commuting options (including utilising proposed DART+) to Dublin and other employment centres. This will support local community and economy
- NSO 4 – Sustainable Mobility
    - The scheme includes for the provision of high quality cycle/pedestrian facilities that will create an attractive sustainable route between Celbridge town and the train station. This will encourage transport modal shift to a more sustainable rail alternative to the existing car centred commute options.

Within the context of the above NSOs the Celbridge to Hazelhatch scheme is a clear fit with the framework for investment as set out by NIFTI.

2.2.6 Road Safety Strategy 2021-2030

The Government's strategy for road safety sets out the plan to reduce the number of collisions occurring on Irish roads. The main target of this plan is to provide a reduction of road collision fatalities on Irish roads by 50% by 2030 and to continue to close the gap between Ireland and the safest countries in the EU. This means reducing deaths from 144 to 72 or fewer by 2030. A provisional target for the reduction of serious injuries by 50% also from 1,259 to 630 or fewer by 2030

As stated in the strategy document the cost benefit of preventing a fatality from a road collision amounts to €3.2 million at 2019 prices with a total cost of road collisions in Ireland of €1.29 billion in 2019. There were five road fatalities in Kildare in 2020 compared to four in 2019, four in 2018, five in 2017 and seven in 2016.

The strategy has five (5) key elements to its proposed Safe System Priority Intervention; safe roads & roadsides, safe speeds, safe vehicles, safe road use, and post-crash response.

The development of this scheme will enhance the safety of the road network in Celbridge and thus aligns with the objectives of the Road Safety Strategy.

2.2.7 Smarter Travel: A Sustainable Transport Future

Smarter Travel: A Sustainable Transport Future published by the Department of Transport in 2009 sets clear targets for the promotion of sustainable transport modes. Building sustainable communities in which people can access a wide range of services locally and increasing development in locations with high capacity public transport linkages are key to promoting sustainable transport modes. The vision of the policy document is summarised in five key goals:

- "Improve quality of life and accessibility to transport for all and, in particular, for people with reduced mobility and those who may experience isolation due to lack of transport;
- Improve economic competitiveness through maximising the efficiency of the transport system and alleviating congestion and infrastructural bottlenecks;
- Minimise the negative impacts of transport on the local and global environment through reducing localised air pollutants and greenhouse gas emissions;
- Reduce overall travel demand and commuting distances travelled by the private car; and
- Improve security of energy supply by reducing dependency on imported fossil fuels."

The Department of Transport Tourism and Sport (DTTAS) and the Department Environment, Community and Local Government (DECLG) introduced the Design Manual for Urban Roads and Streets (DMURS) as a key step in implementing the policies on promoting the use of more sustainable transportation proposed in

Smarter Travel. Guidelines of DMURS will be incorporated into the Celbridge to Hazelhatch Link Road design principles.

The Celbridge to Hazelhatch Link Road fulfils a number of the identified goals of the Smarter Travel policy. By providing high quality cycle and pedestrian facilities linking the town centre and the train station it will facilitate a transport modal shift, provide sustainable alternative to the private car journeys, enable easier access to public transport for non-car owners, and promote active travel within the area.

2.2.8 National Cycle Policy Framework (2009-2020)

The National Cycle Policy Framework (NCPF) was prepared by Smarter Travel and commissioned in 2009 by the Minister for Transport. The vision of this framework is to “create a strong cycling culture in Ireland”. It sets out objectives and actions aimed to ensure the development of a cycling culture where 10% of all journeys in Ireland will be by bike. A specific objective of this framework is for the provision of designated rural cycle facilities, especially for tourist and recreational cycling.

The Framework identifies the need for inter urban cycling routes in the form of a National Cycling Network that delivers high quality routes to encourage cycling for transport, leisure, and recreational purposes. This policy recommends that cycle friendly planning principles are to be incorporated into all national, regional, and local plans. The Celbridge to Hazelhatch Link Road will provide a high quality cycle route connection between Celbridge and Hazelhatch train station. Creation of this infrastructure will encourage modal shift in commuter journeys combining cycling and DART services for commuting to major employment hubs in the area including Dublin City.

2.3 Regional Policy

2.3.1 Regional Spatial & Economic Strategy

The Regional Spatial and Economic Strategy 2019-2031 (RSES) for the Eastern and Midland Region was adopted in June 2019 and is a strategic plan and investment framework to shape the future development of the region to 2031 and beyond. The Regional Spatial and Economic Strategy replaced the Regional Planning Guidelines and outlines 16 Regional Strategic Outcomes (RSOs), which align with national planning policy. The Celbridge to Hazelhatch Link Road is directly compatible with three of the RSOs as follows:

RSO 2 Compact Growth and Urban Regeneration

RSO 2 gives effect to NSO 1 Compact Growth of the National Planning Framework, to ensure compact growth and urban regeneration is achieved at a regional level. The project will transform the potential for sustainable, compact growth in Celbridge over the coming years. The construction of a second bridge and link road to Hazelhatch Train Station will assist in unlocking the development potential of Key Development Areas located southeast of the River Liffey. KDA 2 Ballyoulster estimated capacity is 885 residential units and KDA 5 Simmonstown estimated capacity is 1050 residential units as stated in Celbridge Local Area Plan. The project also aims to alleviate town centre congestion which will help unlock the significant potential for town centre development and public realm improvements.

RSO 4 Healthy Communities

RSO 4 is closely related to NSO 10 of the National Planning Framework which aims to ensure good access to a range of quality education and health services. RSO 4 also has the objective of protecting and enhancing the quality of our built and natural environment to support active lifestyles including walking and cycling and ensuring cleaner air. The project will include the provision of high-quality walking and cycling infrastructure in accordance with current design standards and best practice which will increase the attractiveness of these active travel modes.

By providing a second bridge crossing, the project will also significantly improve permeability and circulation in the transport network. This will increase the catchment for pedestrians and cyclists, providing them with more direct routes and reducing journey times, all of which will further increase the attractiveness of these modes for all trip types. The reduction of town centre congestion will improve air quality and provide the opportunity for increased protection and enhancement of the built heritage within the town centre.

RSO 6 Integrated Transport and Land Use

According to Census 2016 data nearly half of workers in Celbridge commute into Dublin city and suburbs and almost 70% (approx. 4,500) of these workers commute by private car. This is likely due to number of factors including the following:

- restricted access to Hazelhatch Train Station, particularly during peak periods, due to town centre congestion caused by the single river crossing and high traffic volumes;
- lack of permeability/circulation in the existing transport network in the town, due to the single river crossing, which leads to more circuitous routes and longer distances and journey times to access public transport services in the town centre and Hazelhatch Train Station;
- poor journey time reliability for buses due to town centre congestion; and
- significant proportion of residents living north of the town centre with straightforward access to the M4 at Junction 6.

By providing improved permeability within the town and improving access to Hazelhatch Train Station, the project aims to provide the opportunity to significantly increase the modal share of commuters using public transport to travel into Dublin. This will be achieved by:

- adding a second bridge crossing of the River Liffey to facilitate the future reduction of traffic congestion in the town centre thereby improving bus journey time reliability;
- increasing the permeability of the transport network to reduce journey times to access public transport services;
- providing alternative, direct access to Hazelhatch Train Station for all modes, including high quality pedestrians and cyclists facilities, thereby increasing the attractiveness of rail travel; and
- putting the necessary roads infrastructure in place to capitalise on the planned DART+ expansion to Hazelhatch Train Station

In addition to RSOs no. 2, 4 and 6 which are directly compatible the scheme, the Celbridge to Hazelhatch Link Road is also consistent with a number of transport strategy objectives as outlined in the RSES.

Objective RPO 8.2 seeks to manage and enhance the capacity and safety of the region's strategic land transport networks. As one of the primary objectives of this proposal is to improve access to Hazelhatch train station and increase the modal share of rail commuters, this proposal will divert a section of commuters currently using private cars as a means to access Dublin City onto the rail network. This reduction in road-based transport will assist in managing the capacity, safety and strategic function of the wider road network and in particular the M4 motorway.

Objective RPO 8.3 seeks to ensure that future development is planned and designed in a manner which maximises the efficiency and protects the strategic capacity of the metropolitan area transport network, both existing and planned, and to protect and maintain regional accessibility. The two largest Key Development Areas identified in the Celbridge LAP (KDAs 2 and 5) are to be located south of the River Liffey between the

town centre and Hazelhatch train station. The development of both of these KDAs would be consistent with RPO 8.2 and both are dependent on the provision of a second river crossing.

2.3.2 Transport Strategy for the Greater Dublin Area (2016-2035)

The Transport Strategy for the Greater Dublin Area provides a framework for the planning and delivery of transport infrastructure and services in the Greater Dublin Area (GDA) until 2035. It also provides a transport planning policy around which other agencies involved in land use planning, environmental protection and delivery of other infrastructure such as housing, water and power can align their investment priorities. It is, therefore, an essential component, along with investment programmes in other sectors, for the orderly development of the Greater Dublin Area over the next 15 years.

The proposed Celbridge to Hazelhatch Link Road project is consistent with a number of aspects of the NTA Transport Strategy including its objectives to:

- Develop orbital roads around town centres accompanied by, and facilitating, enhanced public transport, cycling and pedestrian facilities in the relevant centre;
- Develop appropriate road links to service development areas; and
- Address localised traffic delay locations, including on radial routes inside the M50 C-Ring, in cases where the primary reason for intervention is to address safety or public transport issues at such locations.

Section 5.8.3 of the Transport Strategy outlines a number of principles for the development of road schemes within the Greater Dublin Area (GDA). As national transport policy seeks a reduction in the growth in car travel and an increase in the use of public transport, cycling and walking, these principles for road development are important to ensure that only certain road schemes are advanced within the GDA, so as not to detract from national sustainable transport policy. One of the principles for road development is as follows:

- That alternative solutions, such as public transport provision, traffic management or demand management measures, cannot effectively and satisfactorily address the particular circumstances prompting the road proposal or are not applicable or appropriate.

This principle is particularly relevant to the current proposal. A number of previous transportation studies were undertaken for Celbridge and each of these studies has highlighted the need for a second vehicular river crossing in the town to adequately address the current traffic situation and improve the circulation of the road network. The single vehicular bridge crossing in Celbridge is inadequate for a town of its size. The congestion and a lack of circulation in the road network as a result of the single bridge crossing severely restricts the options available for alternative solutions to address the transportation issues in the town.

The Transport Strategy also contains a number of points relevant to the DART Expansion at Hazelhatch and the wider cycle network in the area. The increased passenger carrying capacity of trains at Hazelhatch station is likely to create a significant increase in trips from Celbridge town in the coming years. The proposed scheme will allow faster and more reliable access to Hazelhatch train station without adding to the existing congestion in the town centre.

- Celbridge, along with other commuter towns, falls within the catchment of commuter rail services on the Kildare line. The opening of the Phoenix Park Rail Tunnel and future expansion of DART services to Hazelhatch will offer increased capacity, service frequency and enhanced destination choice particularly from the eastern side of Dublin City Centre; and
- It is proposed that Hazelhatch will be one of the four termini of a future expanded rail network, therefore enhancing the attractiveness of Hazelhatch station to commuters.

2.3.2.1 Greater Dublin Area Cycle Network Plan

In 2013, the NTA published the Greater Dublin Area Cycle Network Plan, consisting of the Urban Network, Inter-Urban Network and Green Route Network for each of the seven Local Authority areas comprising the Greater Dublin Area (GDA):

- Dublin City Council (DCC)
- South Dublin County Council (SDCC)

- Dun Laoghaire Rathdown County Council (DLRCC)
- Fingal County Council (FCC)
- Meath County Council (MCC)
- Kildare County Council (KCC)
- Wicklow County Council (WCC)

The Cycle Network Plan identified and determined in a consistent, clear and logical manner, the following cycle networks within the GDA:

- The Urban Cycle Network at the Primary, and Secondary (shown in orange) and Feeder level (shown in purple);
- The Inter-Urban Cycle Network (shown in blue), linking the relevant sections of the Urban Network and including the elements of the National Cycle Network within the GDA. The Inter-Urban Network also includes linkages to key transport locations outside of urban areas such as airports and ports; and
- The Green Route Network (shown in green) that are cycle routes developed predominately for tourist, recreational and leisure purposes.

These routes in the Celbridge Area are illustrated on **Figure 2.2**

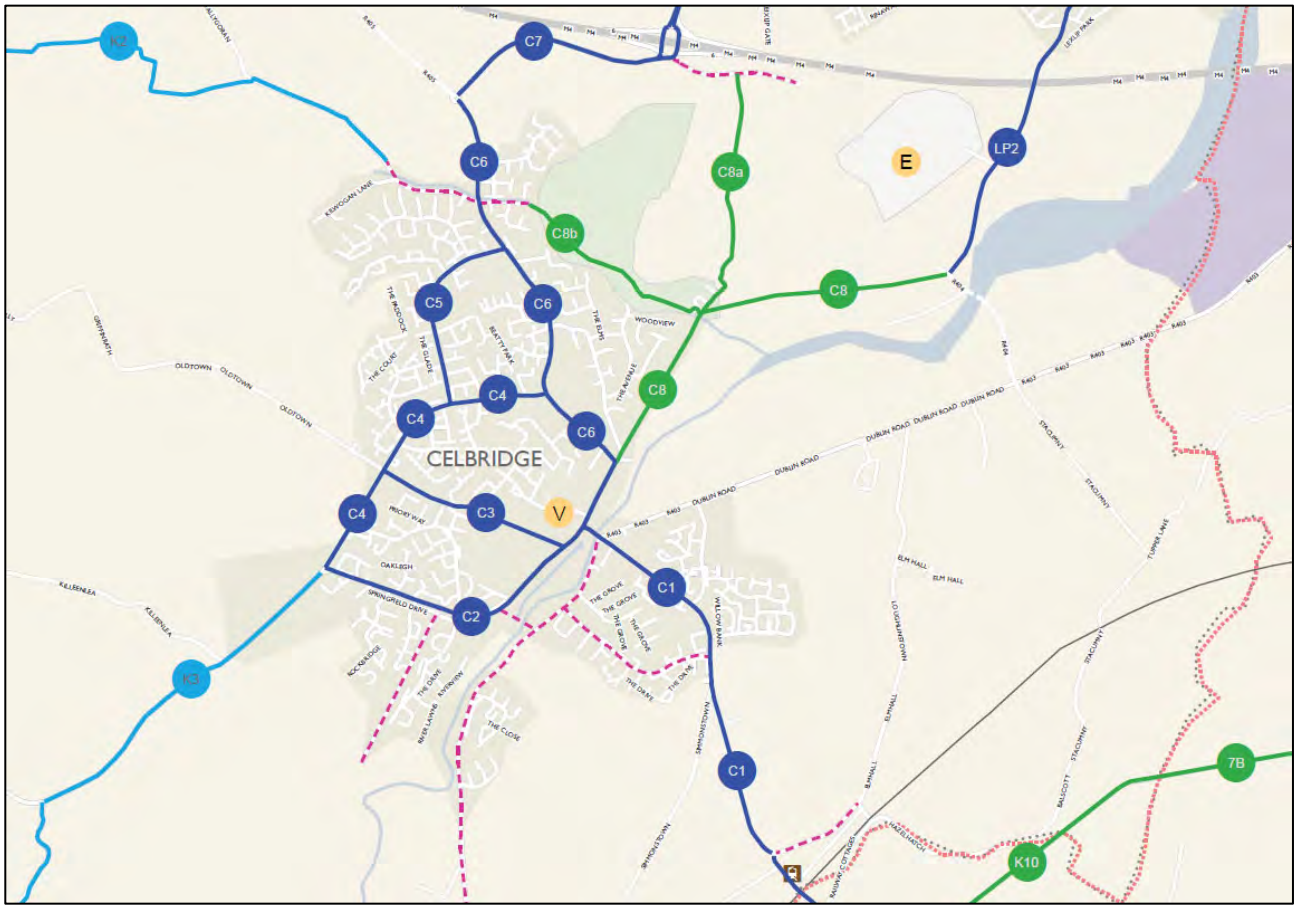


Figure 2-2: Proposed Cycle Network in Celbridge (NTA)

Celbridge is located within the North Kildare Sector Town Cycle Network. The inter-urban cycle routes identified in the plan relevant to the Celbridge urban area are K2 (Celbridge to Maynooth) and the K3 (Celbridge to Clane). The primary route relevant to the Celbridge area is the C1 Newcastle Road to Hazelhatch Station route, C2 Clane Road to Main Street, and the K10/7B Grand Canal Greenway.

The proposed Celbridge to Hazelhatch Link Road scheme will benefit the overall Town Cycle Network by providing a second river crossing in Celbridge and linking the primary cycle routes C1, C2 and K3 (depending on the route option selected). Connection of the primary cycle routes by the high quality cycle infrastructure that forms part of the proposed scheme will enhance the utility of the whole network and

encourage more cycle trips, making cycling an attractive mode of transport for local trips and for commuting, especially when paired with higher capacity DART+ services.

2.4 Local Policy

2.4.1 Kildare County Development Plan (2017-2023)

The Kildare County Development Plan (CDP) aims to respond in a coherent, sustainable and spatial fashion to the challenges facing the county. The CDP designates Celbridge a Moderate Sustainable Growth Town and as such '*future growth is related to the capacity of high-quality public transport connections and the capacity of social and physical infrastructure. Connectivity to adjoining suburbs / towns and employment locations within the Metropolitan area is also a key requirement particularly focused on local bus / cycle / pedestrian routes.'*

The stated aim of the Kildare County Development Plan (CDP) in terms of Transportation and Movement is to *"promote ease of movement within and access to County Kildare, by integrating sustainable land use planning with a high-quality integrated transport system; to support improvements to the road, rail and public transport network, together with cycleway and pedestrian facilities".*

The proposed second river crossing and link road directly address one of the priority projects contained in Table 6.1 *Priority Road and Bridge Projects* of the CDP. This table lists a new bridge crossing in Celbridge as one of the 21 priority projects in County Kildare. The upgrade of the existing bridge in Celbridge is also listed here as a priority project. Upgrading of the existing bridge will be facilitated by the construction of a second crossing.

2.4.1.1 Movement and Transport

The proposed Celbridge to Hazelhatch Link Road is compatible with a number of policy objectives included in Chapter 6 of County Development Plan 'Movement and Transport' across headings such as Movement and Transport, Public Transport, Walking and Cycling, Road and Street Network, Regional Roads and Local Roads. The specific policies identified within this plan relevant to the proposed scheme are as follows:

Movement and Transport

- **MT 1:** "Promote the sustainable development of the county through the creation of an appropriately phased integrated transport network that services the needs of communities and businesses."
- **MT 2:** "Support sustainable modes of transport by spatially arranging activities around existing and planned high quality public transport systems."
- **MT 3:** "Influence people's travel behaviour and choices towards more sustainable options by working closely with relevant organisations in improving and accessing public transport facilities."
- **MT 4:** "Develop sustainable transport solutions within and around the major towns in the county that encourage a transition towards more sustainable modes of transport, whilst also ensuring sufficient road capacity for trips which continue to be taken by private vehicles."
- **MT 5:** "Prioritise the development of new urban distributor/link/arterial roads to provide access to new communities and employment development to support the economic development of the county."
- **MT 7:** "Focus on improvements to the national, regional and local network that provide additional capacity in order to reduce congestion and provide for current and future demand."
- **MT 8:** "Seek to address urban congestion with particular emphasis on facilitating improved bus transport movement and reliability and improved links to bus and railway stations."
- **MT 10:** "Provide better connectivity across the River Liffey, River Barrow, the canals and the railways."

- **MT 11:** "Focus on improvements to the local road and street network that better utilise existing road space and encourage a transition toward more sustainable modes of transport, while ensuring sufficient road capacity exists for trips which will continue to be taken by private vehicle."

- **MT 12:** "Assess all rail, road and river/canal bridges and underpasses for capacity to meet transport needs and develop solutions to address any identified deficits in conjunction with all relevant authorities."

The Celbridge to Hazelhatch link road will transform Celbridge from a town reliant on a single constrained river crossing that struggles to meet the needs of its inhabitants by enabling a redistribution of traffic within the town and increasing the overall capacity of the road network. Removing a portion of traffic from the town centre will allow better use of the existing road space, reduce congestion and promote the regeneration of the town centre. Providing a faster more reliable route to Hazelhatch train station will facilitate improved bus links and hence encourage a transition towards more sustainable modes of transport. An alternative river crossing that links well with the existing road network will provide better connectivity across the River Liffey and better permeability for existing road users. The proposed link road will enable future development south of the River Liffey and provide an integrated transport network that services the needs of these future communities.

Public Transport

- **PT 1:** "Promote the sustainable development of the county by supporting and guiding national agencies including the National Transport Authority in delivering major improvements to the public transport network and to encourage public transport providers to provide an attractive and convenient alternative to the car."

- **PT 2:** "Generate additional demand for public transport services by strengthening development around existing and planned high capacity transport routes and interchanges throughout the county."

- **PT 7:** "Improve access to public transport as part of road improvement projects where possible."

- **PT 8:** "Increase the catchment of public transport services by reducing walking and cycling distances through the implementation of Local Permeability Improvements."

- **PT 10:** "Support and encourage the development and expansion of rural transport initiatives in conjunction with other statutory and development agencies."

- **PT 11:** "Promote access to bus and rail services for people with disabilities."

The proposed link road will allow faster and more reliable access to Hazelhatch train station from areas north and south of the river as well as from planned future developments areas thus promoting public transport as a means of travelling within Celbridge and to the commuter areas of Dublin City and suburbs. A more reliable public transport network with improved access to Hazelhatch train station coupled with the additional capacity being added to the rail network at Hazelhatch under the DART Upgrade programme will generate additional demand for public transport services.

Walking and Cycling

- **WC 1:** "Prioritise sustainable modes of travel by the development of high-quality walking and cycling facilities within a safe street environment."

- **WC 2:** "Promote the development of safe and convenient walking and cycling routes."

- **WC 3:** "Ensure that connectivity for pedestrians and cyclists is maximised in new communities and improved within the existing areas in order to maximise access to town centres, local shops, schools, public transport services and other amenities."

- **WC 4:** "Ensure that all new roads and cycle routes implement the National Cycle Manual, with a focus on a high level of service for cyclists and encouraging a modal shift from car to cycling."

- **WC 7:** "Provide for safer routes to schools within the county and promote walking and cycling as suitable modes of transport as part of the Green Schools Programme and other local traffic management improvements."

Cycling and walking facilities will be a core part of the proposed design and will contribute to the promotion of walking and cycling as safe and viable options in accessing Hazelhatch train station and the town centre. New developments will connect with the proposed link road to maximise catchment areas and increase access for pedestrians and cyclists encouraging a modal shift from car to walking and cycling. New cycling and pedestrian facilities will allow safer access to schools and services in areas underserved by bicycle amenities.

Road and Street Network / Regional Roads / Local Roads

- **RS 1:** "Ensure ongoing competitiveness and the efficient movement of people and goods in the county through the improvement and expansion of the road and street network within the county to support economic development and provide access to existing communities, new communities, employment areas and development."

- **RS 2:** "Improve safety on the road and street network and manage congestion."

- **RR 1:** "Maintain and improve the capacity, safety and function of the regional road network (as finance becomes available) and to ensure that it is planned for and managed to enable the sustainable economic development of the county and wider area while encouraging a shift towards more sustainable travel and transport ..."

- **LR 1:** "Ensure that the safety and capacity of the local road network is maintained and improved where funding allows and to ensure that local streets and roads within the county are designed to a suitable standard to accommodate the future needs of the county. The design of these roads and streets should balance the needs of place and movement with providing a safe street environment for all road users."

The Celbridge to Hazelhatch link road will help to address issues of safety and congestion in Celbridge by providing a high-quality facility, designed to current standards, which will redistribute traffic away from the town centre. The proposed road will provide greater access to existing and future communities through integration with proposed Key Development Areas south of the River Liffey and by allowing greater permeability of traffic through the town. The link road will also provide easier access to employment areas within Celbridge and to commuter areas such as Dublin city through easier access to Hazelhatch train station and the improvement in network permeability.

2.4.1.2 Core Strategy

The aim of the Core Strategy of the Kildare County Development Plan is '*to respond in a coherent sustainable spatial fashion to the challenges facing the county, while building on its strengths and providing a more focused approach to planning for the future growth. The Core Strategy facilitates a more consolidated compact urban form, maintenance and improvement of sustainable economic base, and a creation of sustainable and integrated communities…'* The following Core Strategy Policies are directly supporting the Celbridge to Hazelhatch Link Road scheme:

- **CS1:** "Provide new housing provision in accordance with the County Settlement Strategy"
- **CS2:** "Direct appropriate levels of growth into the designated growth centres and moderate sustainable growth towns".
- **CS4:** "Deliver sustainable compact urban areas through a plan-lead approach"
- **CS9:** "Promote and facilitate the development of sustainable communities through land use planning"
- **CS10:** "Ensure the developments are accessible to and meet needs of all individuals and local community"

- **CS11**: "Seek the delivery of physical and community infrastructure including strategic open space and recreational areas in conjunction with high quality residential developments to create quality living environments"

The Celbridge to Hazelhatch Link Road project in its core is fulfilling the above policies by providing access and to the Key Development Areas identified in Local Area Plan for Celbridge. It is a condition of LAP that the KDA 2 Ballyoulster and KDA 5 Simmonstown are not in a position to be used for high quality development without the prior provision of the link road and second River Liffey crossing point. The Celbridge to Hazelhatch Link Road, when constructed, will not only open the KDA lands for development but will also enhance the area with the high quality pedestrian and cycle infrastructure. It would set up a sustainable standard to be followed by for the future housing developments.

2.4.1.3 Settlement Strategy

The Core Strategy of Kildare County Development Plan 2017-2023 identifies a likely need for approximately 32,497 housing units in the county. The settlement strategy in the CDP provides a strategic direction to the management of growth, investment and resources in accordance with the Core Strategy of the Plan. It sets out the Settlement Hierarchy for the development of the towns in the Kildare County. Celbridge is classified as a Moderate Sustainable Growth Town in Metropolitan Area with allocated growth in housing consisting of 10% of the overall growth for the County (3,250 units in the years 2016-2023).

One of the Celbridge to Hazelhatch Link Road project's objectives is to 'facilitate the development of Key Development Areas southeast of the River Liffey in Celbridge, in line with the Local Area Plan'. Construction of the proposed link road is vital to opening the KDA land and making them viable for development and therefore support the following Settlement Strategy Objectives:

- **SO1:** "Support the sustainable long-term growth of the Metropolitan Area towns of Leixlip, Maynooth, Celbridge and Kilcock"
- **SO3:** "Facilitate the implementation of the settlement strategy through the prioritisation of key strategic infrastructure"
- **SO4:** "Ensure that the scale and form of development envisaged within towns and villages is appropriate to their position within the overall Settlement Hierarchy

2.4.2 Celbridge Local Area Plan (2017-2023)

One of the aims of the Celbridge Local Area Plan 2017-2023 is to set out a framework for enhancement of the towns existing transport network by increasing permeability, particularly for sustainable modes of transport, improving access to public transport and providing a new Liffey crossing to relieve the current heavily trafficked crossing through the town centre.

Section 8.3 Roads and Street Network states that, "*Road infrastructure is being progressively improved throughout the town, but the bridge remains as a major cause of congestion to traffic flow in the town. Congestion is a significant problem in the town centre and one of the key priorities of this plan is the provision for enhanced crossings of the River Liffey. The transportation objectives provide for the upgrade of the existing bridge for pedestrians and the possible construction of two (one vehicular bridge and one pedestrian/cyclist bridge) new bridges in order to satisfy the need for a new river crossing. This would significantly relieve congestion issues, create improved connectivity within the urban environment and provide resilience for the town from a movement perspective."*

The proposed scheme will directly address the need for a new vehicular river crossing and will include facilities for pedestrians and cyclists. The additional capacity added to the road network will contribute towards reducing traffic congestion issues, create improved connectivity within the urban environment and provide resilience for the town from a movement perspective.

The strategic objectives outlined in section 3.2 underpin the overall vision for Celbridge and include the following strategic aims which are directly related the proposed link road:

- To accommodate 10% of Kildare's housing growth over the period 2017-2023 in accordance with the County Development Plan Core Strategy;

- To enhance the quality, ambience and vitality of Celbridge Town Centre through renewal and extension and to promote its role as a vibrant retail, cultural and community centre that is integrated with the wider heritage assets of the town;
- To support and facilitate the development of high quality, integrated residential neighbourhoods and deliver social and community infrastructure and facilities in tandem with new housing.
- To enhance the existing transport network by increasing permeability and connectivity for pedestrians, cyclists and vehicles, in order to enable access to key land uses such as community facilities, public transport nodes and the town centre, as well as the crossing of the River Liffey;
- To phase future growth in line with the capacity of supporting physical infrastructure and to ensure that it occurs in accordance with proper planning and sustainable development;
- To protect and enhance the unique built and natural heritage as the defining character of Celbridge and a pillar for sustainable growth, by promoting the enhancement, management and understanding of these assets;
- To phase new development to ensure that it occurs in an orderly and efficient manner in accordance with proper planning and sustainable development.

As part of the objective to accommodate 10% of Kildare's housing growth the Celbridge LAP outlines five Key Development Areas (KDAs) which when complete will accommodate over 3000 housing units. **Figure 2-1** shows a map of the Key Development Areas. The two largest development areas, KDA 5 Simmonstown and KDA 2 Ballyoulster, will accommodate approximately 1050 and 885 housing units respectively and are located southeast of the River Liffey. The LAP states that the commencement of KDA 2 is dependent on a new pedestrian and cycle bridge and the commencement of KDA 5 is dependent on the completion of an additional vehicular river crossing. Therefore, the proposed second river crossing, which will include dedicated pedestrian and cyclist facilities, is required, to meet the housing objectives of the LAP. This sequence of infrastructure and development completion will lend itself to the phasing of future growth in line with the capacity of the supporting infrastructure and to ensure that it occurs in an orderly and efficient manner.

The scheme will also help to enhance the quality, ambiance and vitality of the town centre by redistributing traffic away from the town centre and thereby reducing the significant levels of traffic congestion in the vicinity of the existing bridge. The reduction in traffic and congestion in the town centre will facilitate the objectives of protecting and enhancing the built heritage in the town itself.

Section 4 - Core Strategy of the Celbridge Local Area Plan details the specific objectives that support the Celbridge to Hazelhatch Link Road scheme:

- **CSO1.2:** "To support new residential development in Key Development Areas (KDAs) in tandem with the delivery of supporting physical and social infrastructure"
- **CSO1.5:** "To support and facilitate the development on zoned lands based on the policies and objectives of the Kildare County Development Plan 2017-2023 and the Celbridge Local Area Plan 2017-2023

Section 6 - Housing and Community of the Celbridge Local Area Plan details following objectives supporting the scheme:

- **RDO1.1:** "To promote and facilitate the phased development of identified Key Development Areas in accordance with the guidance"
- **RDO1.4:** "To focus the majority of new housing in Celbridge within walking or cycling distance of a school cluster, the town centre, neighbourhood centre or transport routes.

Section 8 - Movement & Transport of the Celbridge Local Area Plan details the specific objectives of the council and include:

Walking and Cycling

- **MTO 1.2:** To facilitate and encourage cycle as a more convenient and safe method of transport through the development of new or improved cycle facilities in Celbridge with a particular focus on the routes identified in the National Transport Authority (NTA) Greater Dublin Area Cycle Network Plan to link population, commercial, community facilities, schools and transport nodes

- **MTO 1.6:** To facilitate a new pedestrian / cycling bridge across the Liffey linking to Celbridge Town Centre, in conjunction with any new development at KDA2 – Donaghcumper and new residential areas to the south;

- **MTO 1.7:** To promote enhanced permeability for pedestrians and cyclists within the urban environment in order to improve access to local shops, schools, public transport services and other amenities; and

- **MTO 1.9:** To upgrade existing pedestrian and cycle facilities across the River Liffey.

The completion of a second river crossing and link road to Hazelhatch would provide a much-needed expansion of cycle and pedestrian infrastructure in Celbridge. The new facilities would increase permeability for pedestrians and cyclists, would be direct, safer and more amenable and would encourage greater take up of cycling and walking as a means of transport.

Public Transport

- **MTO 2.1:** To create an interlinked public transport network that maximises the efficiency of existing services, reduces overall journey times and facilitates easy exchanges between modes and/or routes;

- **MTO 2.4:** To provide greater opportunities for modal shift to public transport through the appropriate management of development particularly in lands to the south of Celbridge Town Centre;

- **MTO 2.5:** To work with all agencies to improve and develop public transport facilities in the area and to link such facilities with Celbridge Town Centre and other nearby towns and to ensure that developments are carried out in accordance with the requirements of this plan and relevant legislation; and

- **MTO 2.6:** To promote alternative routes of the bus service to Hazelhatch Train Station so that it serves Main Street, Maynooth Road, Shackleton Road and Clane Road.

The proposed scheme would provide a new high-quality route from Celbridge town to Hazelhatch train station which would in turn generate further demand for public transport as a means to connect with rail services at Hazelhatch. The new route would allow alternative bus routes and additional services to service Celbridge and ensure public transport is accessible, efficient and well connected, thereby providing opportunity for greater modal shift towards sustainable public transport.

Roads and Street Network

- **MTO 3.3:** To maintain, and improve as required, the local road network to ensure a high standard of road quality and safety in accordance with the requirements of this plan and relevant legislation;

- **MTO 3.5:** To secure the provision of the strategic road objectives identified on Map 8.1, which provides access to new communities and Key Development Areas within the town;

- **MTO 3.9:** To facilitate the construction of a road from Hazelhatch Park to Newtown Road in tandem with development of KDA 5 and in the interim to protect this route from development;

- **MTO 3.10:** To facilitate the construction of a road from Primrose Hill to Loughlinstown Road in tandem with the development of KDA 2 and in the interim to protect this route from development;

- **MTO 3.12:** To facilitate the construction of a new vehicular river crossing between the Clane Road and Newtown Road within either of the two protected corridors, as indicated on Map 8.1 (see **Figure 3-1** below), subject to environmental assessment;

- **MTO 3.13:** To protect from development a route for a potential new road (including a new bridge over the River Liffey) between Clane Road (near the Celbridge North Kildare Educate Together School) and Hazelhatch Park; and

- **MTO 3.16:** To improve junctions and to upgrade traffic signals where appropriate throughout the town.

The proposed scheme is compatible with a number of new roads cited in the Celbridge LAP, described in objectives 3.5, 3.9, 3.10, 3.12 and 3.13 above and shown in **Figure 2-3** below. The proposed link road will allow greater access to new developments and will also need to integrate with the above mentioned roads linked to those developments.

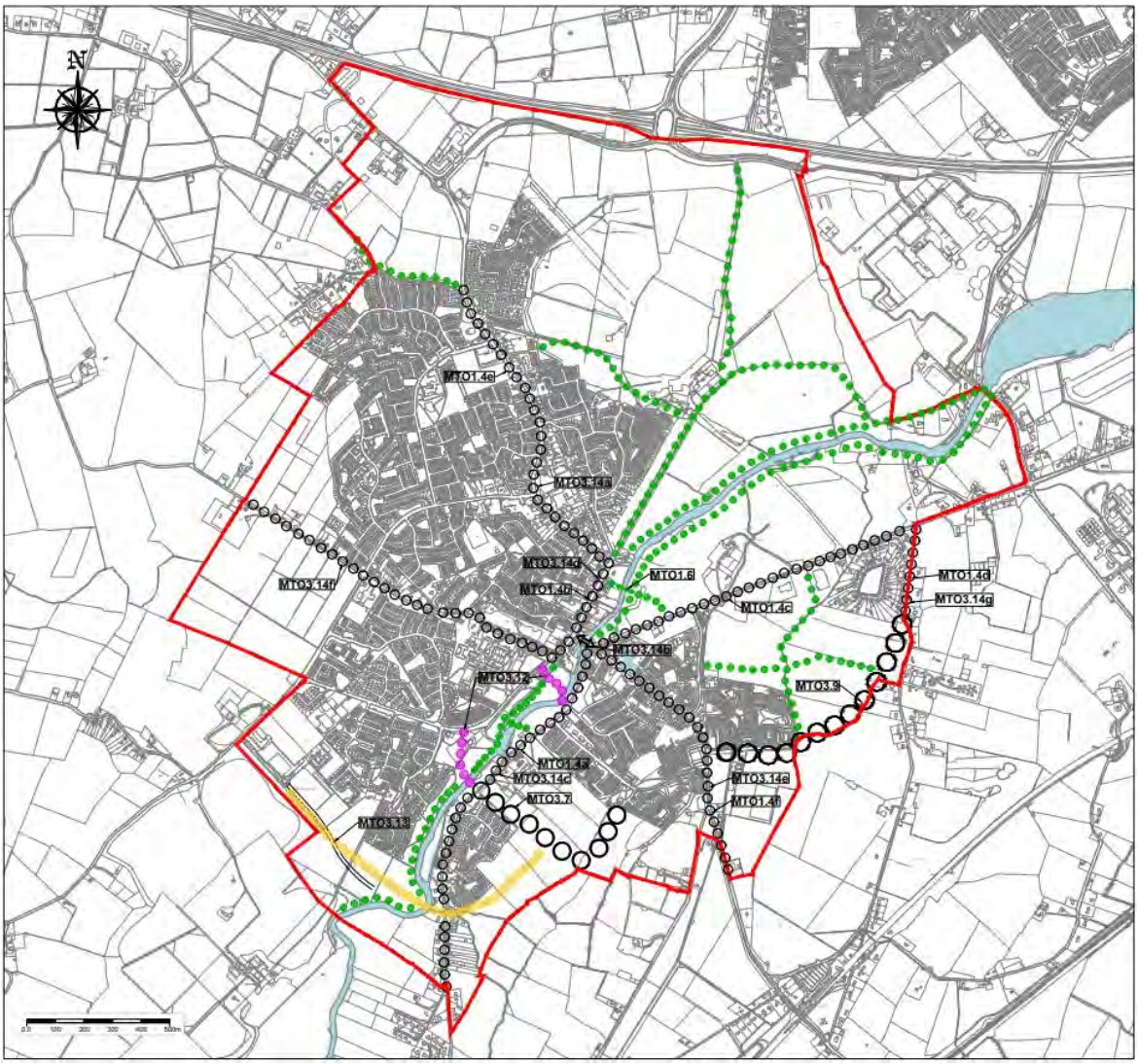


Figure 2-3: Celbridge Local Area Plan 2017-2023 (Map 8.1)

2.5 Scheme Specific Need

Fundamentally, this project addresses the objective of improving the strategic transport network in Celbridge.

The proposed improvements are required to address the sub-standard road network infrastructure and improve the road safety performance of Celbridge. The scheme will increase pedestrian and cyclist travel within the study area while also improving safety of vulnerable road users. It will improve multi-modal transport integration by reducing journey times between Celbridge and Hazelhatch train station encouraging a more sustainable public transport option of commuting. The objective of facilitating the future reduction of congestion in Celbridge town centre so as to reduce journey times and improve journey time reliability will also be addressed.

The project also aims to facilitate local and national housing policy by opening up and making Key Development Areas located southeast of the River Liffey viable for development in accordance with Local Area Plan.

As outlined in Chapter 2 above, the project objectives are aligned and strongly supported by policy at a national, regional, and local level.

3 TRAFFIC ASSESSMENT AND ROAD CROSS SECTION

3.1 Introduction

The following sections outline the traffic assessment undertaken to inform the selection of a cross section type for the proposed Celbridge to Hazelhatch Link Road Scheme.

Traffic surveys were undertaken in April and May 2019 at various locations throughout Celbridge. These surveys comprised of the following methods:

- 12-hour video junction turning counts at 16 junctions as shown in **Figure 3-1** and **Figure 3-2**.
- 12-hour Automatic Number Plate Recognition (ANPR) surveys on 11 links as shown in **Figure 3-3** and **Figure 3-4**. These are co-located with 7-day automatic traffic counts using pneumatic tube counters.

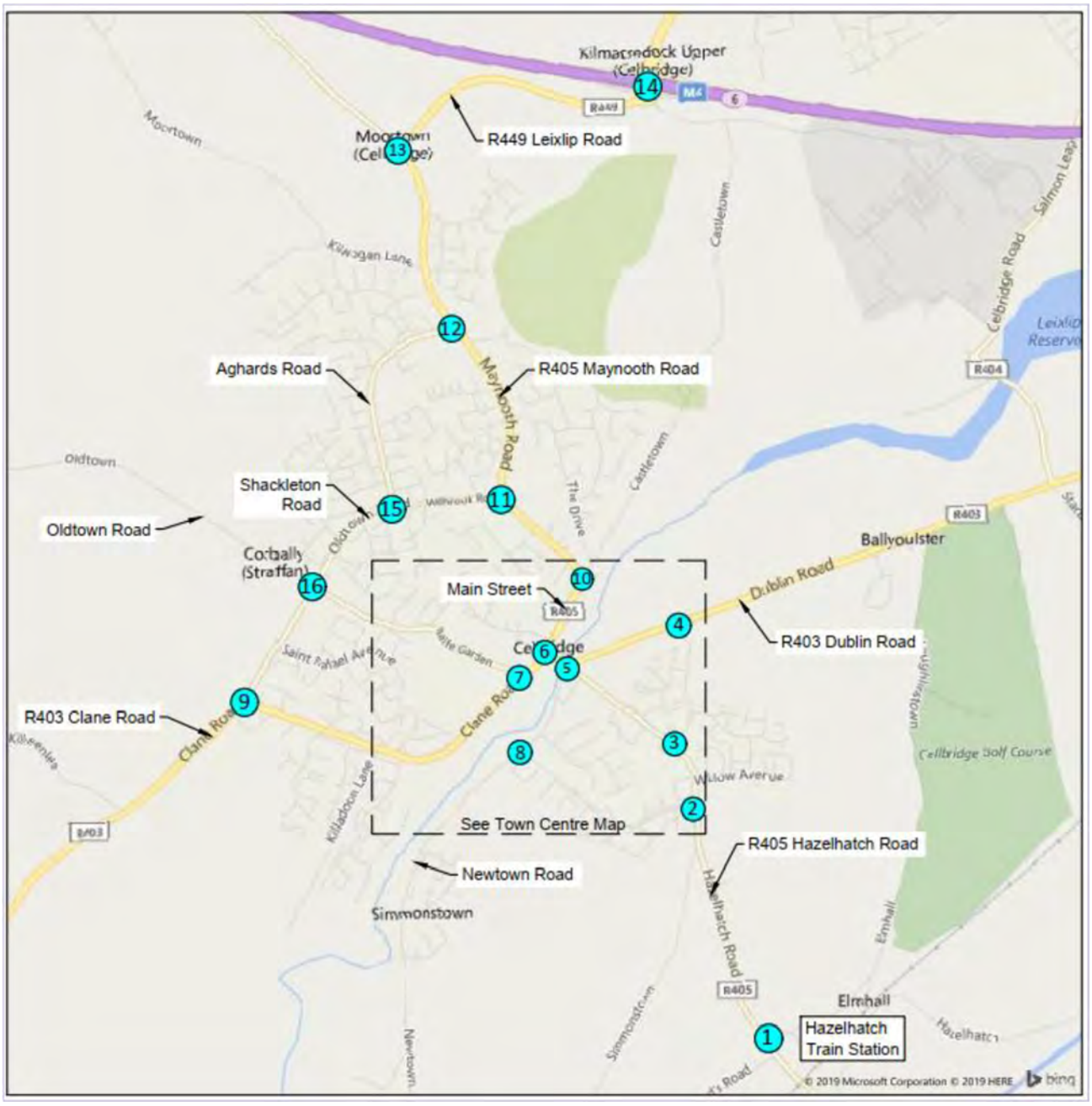


Figure 3-1: Location of Vehicular Junction Turning Counts

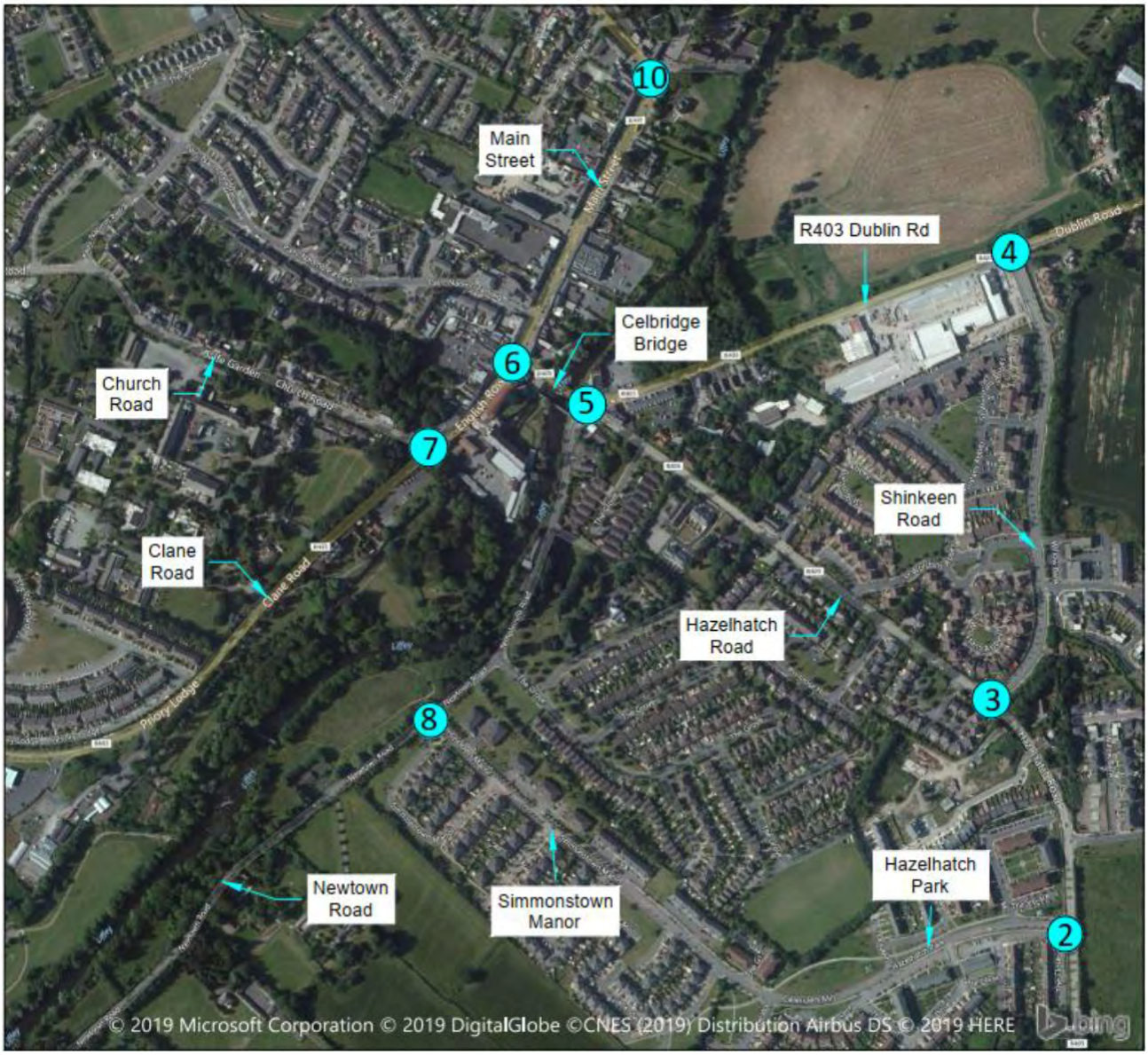


Figure 3-2: Location of Vehicular Junction Turning Counts (Town Centre)

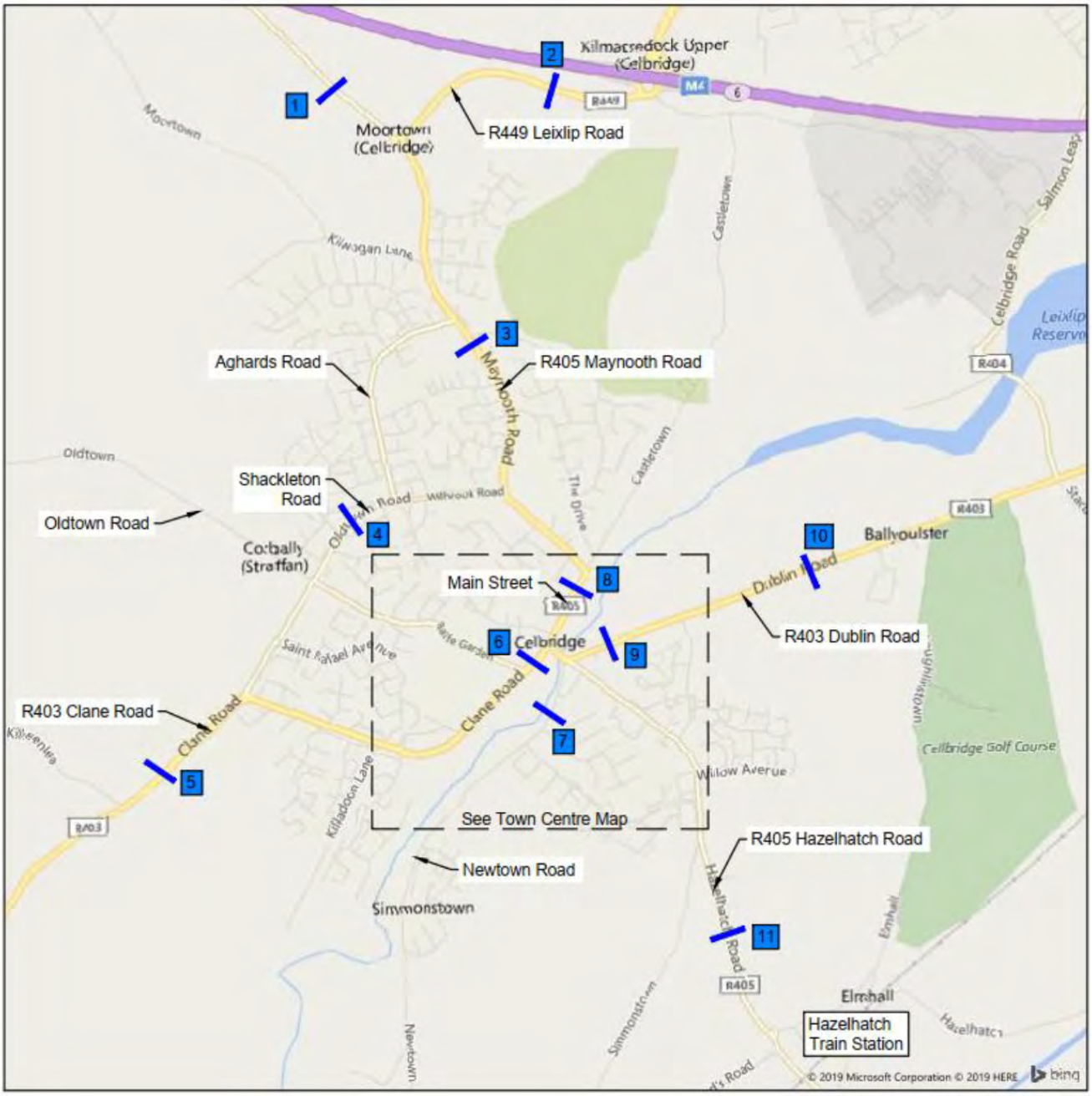


Figure 3-3: Location of Automatic Traffic Counts & Origin-Destination Traffic Surveys

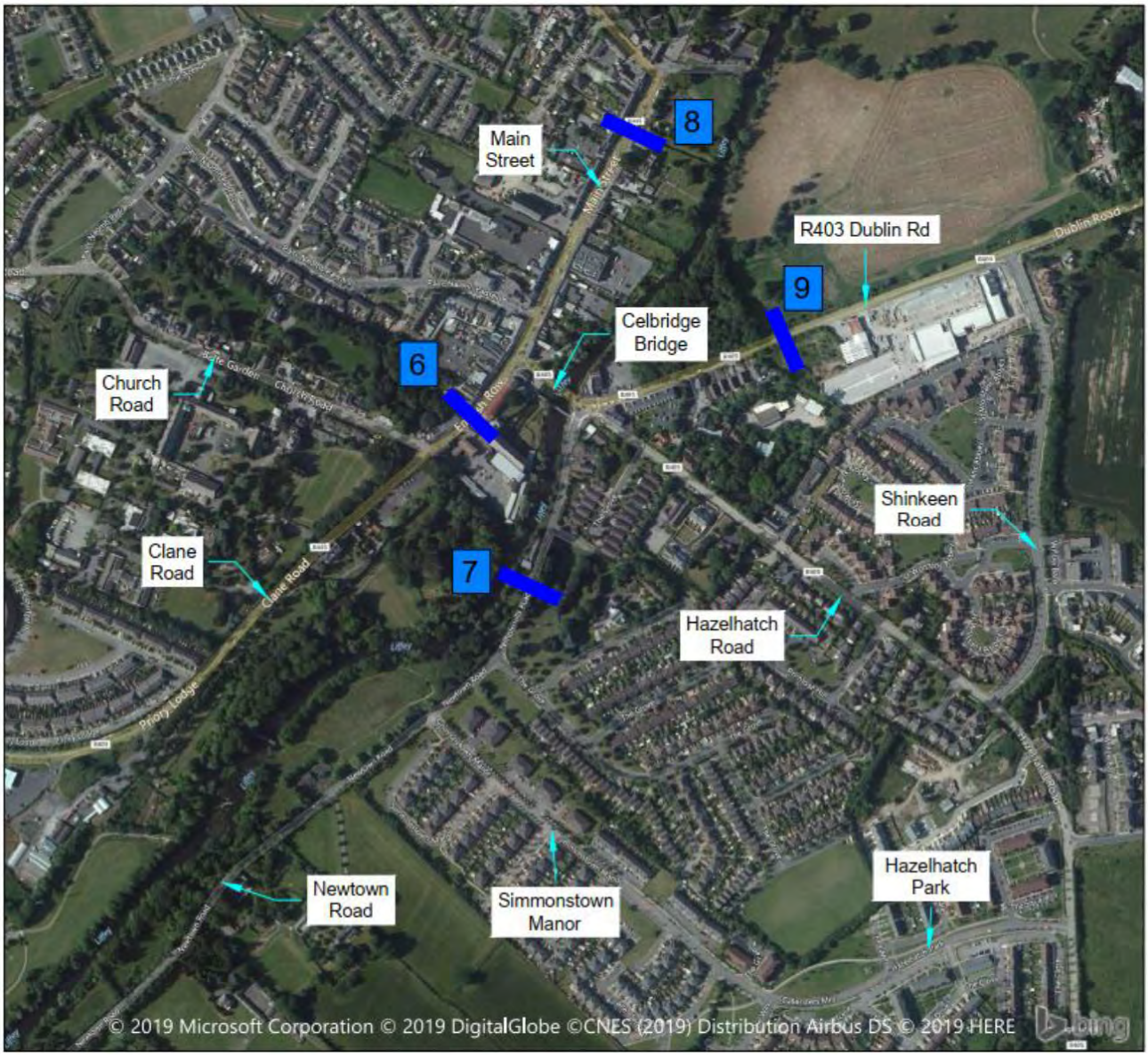


Figure 3-4: Location of Automatic Traffic Counts & Origin-Destination Traffic Surveys (Town Centre)

3.2 Traffic Data Analysis

3.2.1 Annual Average Daily Traffic (AADT)

Annual Average Daily Traffic (AADT) is the standard unit in which traffic model results are presented, in other words the mean daily flow taken over a whole year. The traffic survey data was analysed to determine base year two-way AADT flows. **Figure 3-5** shows the results of this analysis.

Figure 3-5: Observed Base Year AADT Flows

In order to estimate AADT on the proposed Celbridge to Hazelhatch Link Road, the most direct existing road was selected and a percentage of its base year AADT was reassigned to the proposed road. In this case Hazelhatch Road is the most direct existing road between Celbridge town centre and Hazelhatch train station. Base year AADTs varies along the 2km length of Hazelhatch Road from the River Liffey to the roundabout at Hazelhatch train station. For the purposes of this assessment, it was assumed that 70% of the AADT figure on Hazelhatch Road immediately north of the roundabout at Hazelhatch train station would redirect to the proposed Link Road. From **Figure 3-5**, 70% of 7,285 vehicles were redistributed to the proposed Link Road. The resulting estimate of AADT is 5,100 and is outlined in **Table 3-1**:

Table 3-1: Estimate of AADT on the Proposed Celbridge to Hazelhatch Link Road (2019)

	2019
AADT	5,100

For the purpose of comparative analysis **Table 3-2** shows the indicative capacity of single carriageways in rural setting as per the TII DN-GEO-03031. Capacity of carriageway is a function of its width but also of the expected speed of travel as stated in DMURS Figure 3.26.

Table 3-2: Indicative Capacity of Rural Roads at Level of Service D

	Type 1 Single (7.3m) Carriageway S2	Type 2 Single (7.0m) Carriageway S2	Type 3 Single (6.0m) Carriageway S2
AADT	**11,600**	**8,600**	**5,000**

3.2.2 Forecasting

Traffic forecasting was undertaken using the data set out in **Table 3-2** and the link-based growth procedure prescribed within PAG Unit 5.3 Travel Demand Projections for the following years:

- Opening Year (assumed): 2025
- Opening Year +5: 2030
- Opening Year +15: 2040

Using PAG Unit 5.3 Travel Demand Projections, central growth factors were extracted for the Dublin Metropolitan Area and have been presented in **Table 3-3**.

Table 3-3: TII Growth Rates

Dublin Metropolitan Area	Light Vehicles (LV)	Heavy Vehicles (HV)
2019-2025	1.1012	1.1906
2025-2030	1.1934	1.3769
2030-2040	1.2556	1.5760

Using a base year of 2019 with an ADDT of 5,100 as per **Table 3-3**, Opening Year, Opening Year +5 and Opening Year +15 forecasts were generated using the growth factors set out above. The forecasting results generated are summarised in **Table 3-4**.

Table 3-4: Forecasted ADDT Growth

Stage	Year	Predicted AADT (Central Growth)
Opening Year (assumed)	2025	5,616
Opening Year +5	2030	6,702
Opening Year +15	2040	8,415

As shown above, the highest predicted AADT of 8,415 will occur during the 2040 Design Year +15 scenario.

3.2.3 Selection of Road Type

The forecasted traffic flows as presented in **Table 3-4** were compared against the capacity specified for each type of cross section listed within Table 6.1 of DN-GEO-03031 (June 2017) for a Level of Service (LOS) of 'D'. In accordance with Table 6.1 of DN-GEO-03031, a Type 2 single carriageway has a capacity of 8,600 AADT for a LOS D.

Based on the highest predicted AADT of 8,415 a Type 2 single carriageway would be the appropriate road type to carry that amount of traffic in the rural setting. Taking into account the local or regional classification of the proposed road, its function as a link road to Hazelhatch train station and its use as a facility to encourage cyclist and pedestrian activity it is deemed that it would likely be operating more as an Arterial/Link road as designated in DMURS. In an effort to provide the best fit for the role of the proposed

road both sets of regulation were considered and the cross section of the proposed road was proposed as 7.0m wide single carriageway with kerbs on both sides, 2.0m wide green verges with a 2.0m cycle track and 2.0m footpath on both sides as shown on **Figure 3-6**

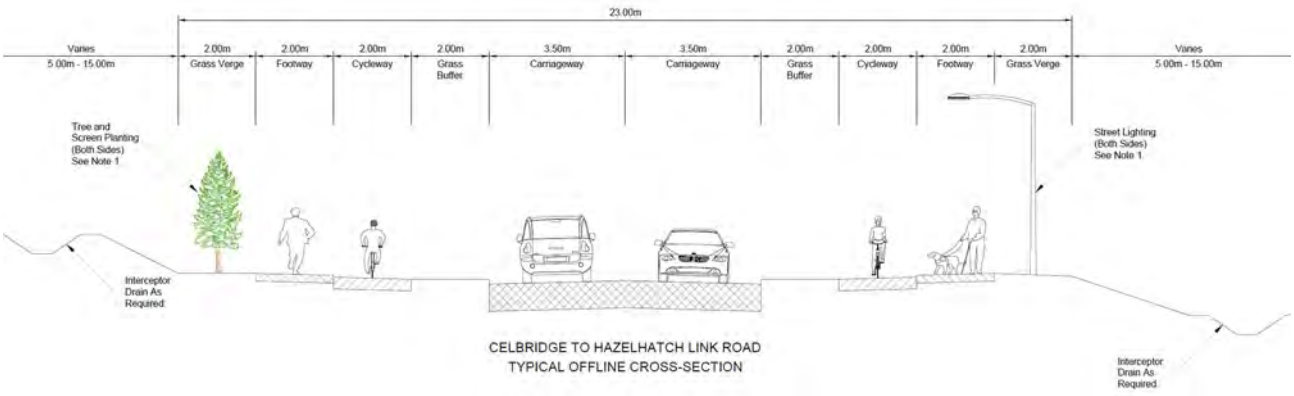


Figure 3-6 Proposed link road cross section

The proposed carriageway cross sections are shown in detail in Appendix B.

3.2.4 Junction and Access Treatment

As part of the Option Selection process, it was necessary to determine requirements for junctions providing access on and off the proposed scheme. A junction strategy has been developed with analysis at this stage being of a preliminary nature with further detailed analysis to be undertaken at the Phase 3 Design Stage for the Preferred Option. This may lead to alternative locations or layouts for junctions being proposed.

Whilst it is acknowledged that further consideration will have to be given to junction strategy and the detailed layouts of each individual junction, sufficient assessment has been undertaken at this stage to determine the general line of each alignment for the purpose of selecting the Preferred Option. It is recognised that refinement of the Preferred Option in terms of horizontal and vertical alignment as well as development of the detailed layouts of each junction arrangement will be necessary during preliminary and detailed design.

The junction strategy considered scheme tie-in locations / constraints to the existing road network, traffic analysis and consistency.

Taking account of the TII DN-GEO-03031 and Design Manual for Urban Roads and Streets (DMURS) the following types of junctions will be considered in Phase 3 depending on the location and existing road network requirements:

Junction Treatment at Minor Roads

- Priority junctions

Junction Treatment at Major Roads

- Priority junctions, roundabouts, and compact roundabouts.

Access to private lands and houses off the proposed mainline carriageway will be avoided by diverting either the house access or access tracks onto the local road network. By limiting the number of accesses onto the new proposed mainline carriageway the overall safety of the road will be improved. Where access cannot be gained to private land or houses via local roads or access tracks, consideration may be given to the use of left in / left out junctions. Where an option proposes to upgrade an existing road, the existing house accesses along that section of road will remain in place.

The type and location of junctions will be further assessed during Phase 3 Design and may be changed from what is proposed at Phase 2 Option Selection.

4 CONSULTATIONS

4.1 Public Consultation

A Non-Statutory Public Consultation No 1 event for the Celbridge to Hazelhatch Link Road Scheme is scheduled to occur between Stage 1 Preliminary Options Assessment and Stage 2 Project Appraisal of Options. A shortlisted set of Route Options will be presented to the public inviting feedback on the presented options. The feedback from the Public Consultation No.1 will be taken into consideration in the development of the Options Selection Report and identification of the Emerging Preferred Route.

Following the appraisal process of all the shortlisted options, an Emerging Preferred Route will be identified and presented to the public during a Non-Statutory Public Consultation No.2 event. The public will be invited to comment on the proposed Emerging Preferred Route Option. The feedback gathered during the Public Consultation No.2 will be taken into consideration in Stage 3 of the Route Selection Process - Selection of Preferred Route Corridor.

4.2 Statutory Consultation

Consultation was undertaken with various statutory bodies as outlined in **Table 4-1**.

Table 4-1: List of Statutory Consultees Contacted

Consultee	Consultee	Consultee
Department of Housing, Planning & Local Government	Department of Transport, Tourism and Sport	Department of Communications, Climate Action & Environment
Department of Culture Heritage and the Gaeltacht - Development Applications Unit	National Monuments Service (Part of DCHG)	Department of Finance
Eastern and Midland Regional Assembly	Office of Public Works	Irish Aviation Authority
National Museum of Ireland	The Heritage Council	An Taisce
An Bord Pleanala	Failte Ireland	The Arts Council
Royal Irish Academy - Culture and Heritage Working Group	National Parks and Wildlife Service	Inland Fisheries Ireland
BirdWatch Ireland	Environmental Protection Agency	Geological Survey of Ireland – Heritage Programme
Kildare County Council	Kildare County Council - Heritage Officer	South Dublin County Council
South Dublin County Council - Heritage Officer	Waterways Ireland	Transport Infrastructure Ireland (TII) - Environmental Unit
National Transport Authority (NTA)	Irish Rail (TFI)	Bus Eireann
Ervia	Irish Water	Sustainable Energy Authority Ireland (SEAI)
Celbridge Tourism & Heritage Forum	Chamber of Commerce (Naas)	Kildare Archaeological Society
Health Service Executive	HSE National Office - Health and Wellbeing	The Discovery Programme
ICOMOS Ireland	ESB Fisheries Office	ESB Head Office
Dublin City Council	Fingal County Council	Department of Defence
Irish Georgian Society	North Kildare Trout & Salmon Anglers Association	Clane Trout & Salmon Anglers Association
Dublin Trout Anglers Association	Dublin and District Salmon Anglers Association	The Kildare Hotel & Country Club

5 CONSTRAINTS STUDY

A Constraints Study was undertaken in order to identify key constraints within the study area and to examine alternative options for the proposed Celbridge to Hazelhatch Link Road. These constraints and their assessment informed the decision-making process in terms of the preliminary options assessment and the appraisal of feasible options. The Constraints Study is made up of the Environmental Constraints Study (report no. MDT0902-RPS-00-XX-RP-Z-0010), the Cultural Heritage Constraints Study (report no. CHLR_Constraints Study_Cultural Heritage_10-01-2021) and the Architectural Heritage Constraints Study (report no. C-H AHC Final (A) 210114).

The Constraints Study considered the natural constraints (landscapes and features), physical constraints (the built environment) as well as the external constraints (design standards, policy, legal issues), in accordance with the TII Project Management Guidelines.

The natural and physical constraints were assessed in terms of the environmental factors as per Section 171A(b)(i) of the Planning and Development Act (2000) as amended by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

External constraints were considered in terms of alignment with design standards, achieving the objectives of EU, national and local policies, and meeting legal requirements, e.g. protecting the integrity of SAC and SPA designated sites.

The Constraints Study examined all of the relevant environmental aspects likely to be potentially impacted by any new road developed within the defined study area. Notable key constraints which have been identified in relation to the environment are:

- Population:
    - Community Severance;
- Human Health
    - Residential dwellings, schools, creches, hospitals and care homes affected by changes in traffic patterns;
- Biodiversity
    - A number of distinct woodland features ranging from small discrete woodlands to long established demesne woodlands;
    - Hydrological/hydrogeological connectivity with designated sites outside the study area;
- Agronomy
    - Agricultural activities;
- Hydrology/Hydrogeology
    - Flooding and recurring flood events are common in the study area;
    - The groundwater vulnerability across the study area ranges from Moderate to Extreme where bedrock or sub-crop is at or close to the surface;
    - River Liffey, Simmonstown Stream, Hazelhatch Stream, Ballymakealy Stream and Shinkeen Stream;
- Soils and Geology
    - The west of the site is expected to be underlain by made-ground and urban subsoils in the vicinity of Celbridge Town;
    - The east and south of the study area are expected to be underlain by deep well drained, mainly basic mineral soils and poorly drained, mainly basic mineral soils. These soils are expected to be underlain by till derived from limestone;
    - Beneath the River Liffey, the soils and subsoils are expected to be alluvium deposits;

  - The bedrock beneath the study area is expected to be the Lucan formation comprising of dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. The bedrock is expected to be encountered between the surface and <10mbgl;

- Utilities
  - High, medium and low voltage overhead ESB lines;
  - GNI High and Medium Pressure pipes;
  - Water mains along existing roads;
  - Various telecommunications lines;
- Cultural Heritage and Conservation Architecture
  - Record of Monuments and Places (RMP) protected sites;
- Landscape and Visual
  - Various Protected Views and Scenic Routes;
  - Landscape Character Areas (LCAs) – Class 4: River Liffey; and
  - Celbridge town centre is proposed as an Architectural Conservation Area (ACA) and it is the policy of the Council to preserve the special landscape character of historic landscapes within Celbridge.

A summary composite map of a number of selected environmental constraints identified within the study area is presented in **Figure 5-1** below.

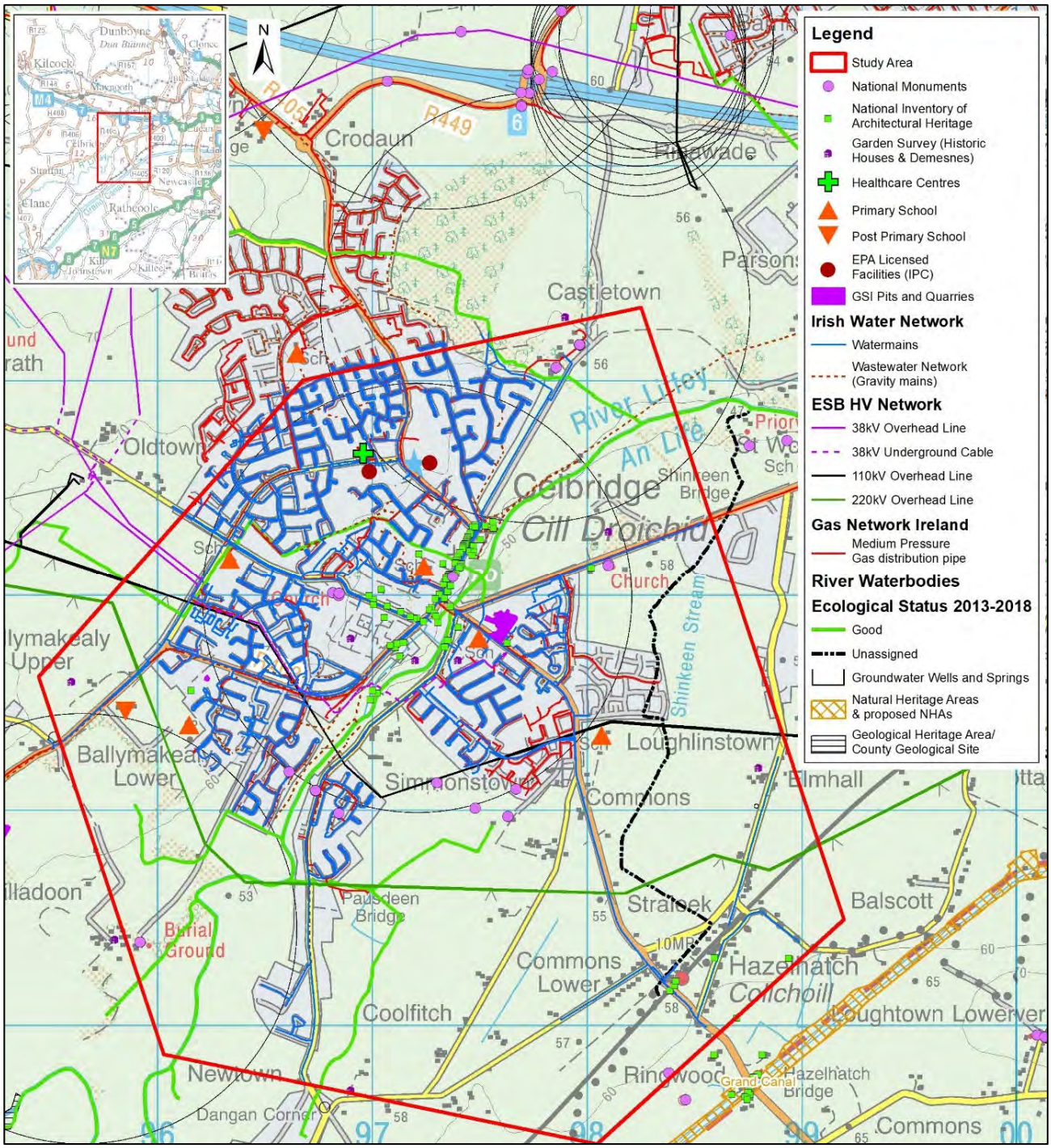


Figure 5-1: Composite Map of Environmental Constraints

6 CONSIDERATION OF ALTERNATIVES

6.1 Do-Nothing Alternative

The Do-Nothing option represents the retention of the existing road network without improvement. This option would mean continuing with the existing road infrastructure and its ability to meet future demands for traffic and road safety without any upgrade or junction improvement works, other than routine maintenance.

The Do-Nothing option (i.e. the existing road network) does not meet the project objectives for the following reasons:

- Traffic congestion in Celbridge Town Centre will increase and corresponding journey times and journey reliability will not improve;
- The continued traffic congestion will act to discourage additional economic growth in Celbridge Town Centre;
- Multi-modal transport integration would not be improved due to no improvement in journey times between Celbridge Town and Hazelhatch train station;
- A new Link Road is required to facilitate the Key Development Areas south of the River Liffey;
- Currently there are no dedicated cyclist facilities between Celbridge Town Centre and Hazelhatch train station resulting in safety issues for cyclists across the existing route;
- Active Travel within the study area may not improve without improving journey ambiance for pedestrian and cycle journeys;
- There is a significant number of direct accesses onto all of the approach roads leading to Celbridge; and
- Existing traffic nuisance (traffic noise and vibration, traffic pollution and severance) will not be reduced in Celbridge Town Centre.

There is a strong policy basis for the construction of a Celbridge to Hazelhatch Link Road as examined previously in Section 2. The implementation of a Do-Nothing option does not meet the various national, regional and local policies.

Given the overall deficiencies described above, the 'Do-Nothing' is not considered a viable alternative in providing a 'safe' and 'efficient' local road network.

6.2 Do-Minimum Alternative

The Do-Minimum alternative provides the baseline for establishing the economic, integration, safety, environmental and accessibility impacts of alternatives. The PAG Unit 4.0 indicates that the Do-Minimum alternative should include maintenance of the existing infrastructure and any additional transportation facilities or services that are committed within the appraisal period.

In the case of the Celbridge to Hazelhatch Link Road scheme, the Do Minimum scenario involves maintaining the existing road network as it currently is. There are no committed schemes in the Study Area as defined in PAG Unit 4.0.

Planned schemes in the Study Area include NTA upgrades to existing river Liffey crossing consisting of construction of a new pedestrian/cycle bridge adjacent to the existing vehicular bridge and changes to the adjacent junctions' layout. This planned scheme is not included in the Do-Minimum alternative as it is at an early stage of design and planning with a number of unknowns to consider it a committed scheme. Impacts of the planned NTA scheme is likely to impact on Celbridge to Hazelhatch Link Road scheme appraisal and it may be necessary to undertake a sensitivity test of this proposal in the further stages of the appraisal process.

Taking into account that there are no committed schemes in the Study Area the Do-Minimum alternative is equal to the Do-Nothing alternative and therefore Do-Nothing Option is considered a Base Case scenario for the appraisal process as per the CAF. The Base Case scenario Do-Nothing Option will be assessed through a Multi Criteria Analysis (MCA) under the assessment criteria of Engineering, Environment and Economy in Stage 1 of Phase 2 Option Selection Process.

6.3 Traffic Management Alternative

PAG Unit 4.0 requires consideration of a Management Option "which seeks to utilise the existing asset where feasible… …designed to represent the "best" that can be done using existing infrastructure".

This Option seeks to obtain value for money by responding to transportation problems in low-cost ways that maximise the value of existing infrastructure rather than by major investment in new infrastructure.

It is noted that at the time of writing the NTA is progressing a scheme to improve the flow of traffic at the existing river crossing. The scheme may include widening of the existing traffic lanes on the bridge by converting the existing footpath to roadway, construction of a pedestrian only bridge immediately downstream of the existing vehicular bridge, signalisation of the junctions at the north and south ends of the existing bridge and closing off of Hazelhatch Road where it connects to Dublin Road.

For this project, the feasible alternative to a major road investment scheme would be a combination of lower-cost measures comprising some or all of the following:

- Widening of the carriageway at targeted locations within the existing road boundary to avoid expensive land acquisition;
- Treatment of accident blackspots along the route; and
- Additional warning signage and road markings to enhance safety.

The aim is to identify a package of such measures that will achieve most of what a major scheme would achieve, but at a much lower cost, thus delivering improved value for money.

However, in the case of the Celbridge to Hazelhatch Link Road Scheme, no such package of measures is possible. The scope for on-line widening of the existing key roads within Celbridge is limited due to tight existing alignments, residential buildings and boundary walls running in close proximity to the road edge. Extensive widening and realignment works would be required on the existing River Liffey bridge and the adjoining junctions to achieve reduction in traffic and increase safety of all road users making it unsustainable solution as a Management Option.

It was concluded that, having exercised due diligence in seeking to identify alternatives, no meaningful Traffic Management Alternative could be defined for this scheme.

6.4 Public Transport Alternative

Public transport can generally be defined as transport available for shared use by the general public. The study has considered whether investment in modes of transport other than the private motor vehicle could provide an alternative means of meeting the objectives of the scheme.

6.4.1 Rail

It is considered that rail investment could contribute to meeting some of the objectives of the project.

For example, if the DART+ project were to terminate not at Hazelhatch station but at a new station in Celbridge, this would make improved accessibility from Celbridge to Hazelhatch station unnecessary.

Such a scheme would be expensive and would not necessarily reduce traffic levels within Celbridge Town Centre. Significant car parking space would be required in the vicinity of a new train station in Celbridge town centre which would act to attract additional private vehicle traffic into Celbridge. A rail line would not provide access to developments lands south of the River Liffey and would not act to increase active travel.

It is considered that a rail line alone would not meet the objectives of the scheme.

6.4.2 Bus

There is considered to be no scope for meeting the objectives of the scheme by an alternative that consists only of improved bus services along existing roads. Such a bus service would not attract sufficient mode-switching to offer any significant traffic relief to Celbridge Town Centre.

6.4.3 Tram

This alternative would use a technology that is intermediate between bus and rail – some form of light rail or tram or guided bus – operating as a single-vehicle shuttle on a dedicated right-of-way between Celbridge and the existing Hazelhatch station. Such a scheme could conceivably contribute to meeting the objectives of the project.

Such a scheme would be less expensive than the heavy-rail alternative, but also less attractive in that it requires passengers to interchange between the tram system and the train at Hazelhatch station. Similar to a heavy rail alternative, significant car parking would need to be constructed in the vicinity of a tram stop in Celbridge town centre. A tram line would provide some access to developments lands south of the river but would not act to open these areas to future development and would also not act to increase active travel.

It is considered that a light rail line alone would not meet the objectives of the scheme.

6.4.4 Cycling and Walking

Provision of a footway/cycleway as part of a new link road scheme will be considered as part of the design process. This section considers whether a footway/cycleway between Celbridge and Hazelhatch station would be sufficient to meet the objectives of the project without a new link road, as an alternative to the scheme.

The existing R405 road between the Liffey bridge and the station has a footpath along the entire length. The distance is approximately 2.1km. As a rule of thumb, the maximum distance that the majority of people would walk for the purpose of accessing a railway station is estimated to be 2.5km equivalent to a half-hour walk at a speed of 5kph.

Guided by this rule of thumb, it is considered that:

- from central and southern Celbridge, existing walking routes to the station are relatively direct and not unpleasant, therefore a new route is unlikely to attract significantly greater numbers of walkers than the present situation.
- from northern Celbridge, the distances to the station are too great for walkers to be attracted in significant numbers, regardless of the quality of the route.
- there are parts of western Celbridge where a new pedestrian bridge over the Liffey would shorten the walking route to the station significantly to a figure less than 2.5km, so there is potential to attract a limited number of walking journeys from this area. But not enough to significantly reduce motor vehicle traffic within Celbridge.

There are proposals for another pedestrian bridge over the Liffey in Celbridge. It is understood that this is likely to be at or near the existing bridge and will not significantly change walking distances within the study area.

For cycling the situation is different. The existing R405 between the Liffey bridge and the station has sections with no cycleway, sections with a cycleway adjacent to the carriageway in one direction, and sections where a relatively wide footpath is marked for use by both pedestrians and cyclists. Taken as a whole, this is a possible but unattractive route for cyclists. All of Celbridge is within easy cycling distance of the station. Research has shown that cyclists place a significant value on having a traffic-free (off-road) route rather than a route adjacent to heavily-trafficked roads.

Whilst it is noted that a dedicated cycle route from Celbridge to Hazelhatch would likely increase cyclist numbers travelling between Celbridge and Hazelhatch it would not generate the volume of cyclist traffic required to significantly reduce traffic congestion in Celbridge town centre and on the existing main routes to and from Celbridge.

6.5 Do Something Alternatives

The Do Something Alternative or Scheme Investment Alternative includes a number of route options and is considered within the assessment outlined in Section 7 to Section 9.

7 STAGE 1 PRELIMINARY OPTIONS ASSESSMENT

7.1 Introduction

The following section outlines the findings of the Stage 1 Preliminary Options Assessment of the Celbridge to Hazelhatch Link Road scheme. Stage 1 is a comparative Multi-Criteria Analysis (MCA) of the potential impacts of the preliminary options and examines their relative success in achieving the project objectives under the headings of Engineering, Environment and Economy in accordance with *PAG Unit 7.0 Multi Criteria Analysis.*

In accordance with *PAG Unit 4.0 Consideration of Alternatives and Options*, the Do-Nothing and Do-Minimum options as well as at least three Do-Something options shall be brought forward from the Stage 1 (Preliminary Options Assessment) process. In the case of the Celbridge to Hazelhatch Link Road scheme, the Do Minimum scenario involves maintaining the existing road network as it currently is. There are no committed schemes in the Study Area as defined in PAG Unit 4.0. and therefore, the Do-Minimum alternative is equal to the Do-Nothing option.

The Do-Nothing option represents the retention of the existing road network without improvement. This option comprises the existing road infrastructure on the key routes in and around Celbridge (i.e. existing single carriageways) and the road networks ability to meet future demands for traffic and road safety without any upgrade or junction improvement works, other than routine maintenance. For the purpose of the Stage 1 assessment, the Do-Minimum and Do-Nothing scenario were considered equal and as such the Do-Nothing was considered as the Base Case during the Stage 1 assessment undertaken as outlined within *PAG Unit 4.0.*

7.2 Preliminary Options

An objective of option selection is to identify an alignment which would avoid, where possible, impacts on the environment at early stages of project planning and design. This is achieved in the first instance through the avoidance of the major constraints identified during the Constraints Study. Where avoidance is not possible, every effort is made to ensure that any interaction is minimised.

Consideration was given to the constraints within the study area, as identified in the Constraints Study. The ten preliminary options (including two sub-options) developed are illustrated below in **Figure 7-1** and are shown with additional detail in Appendix C. Detailed drawings of each preliminary alignment option, including long sections, are shown in Appendix D.

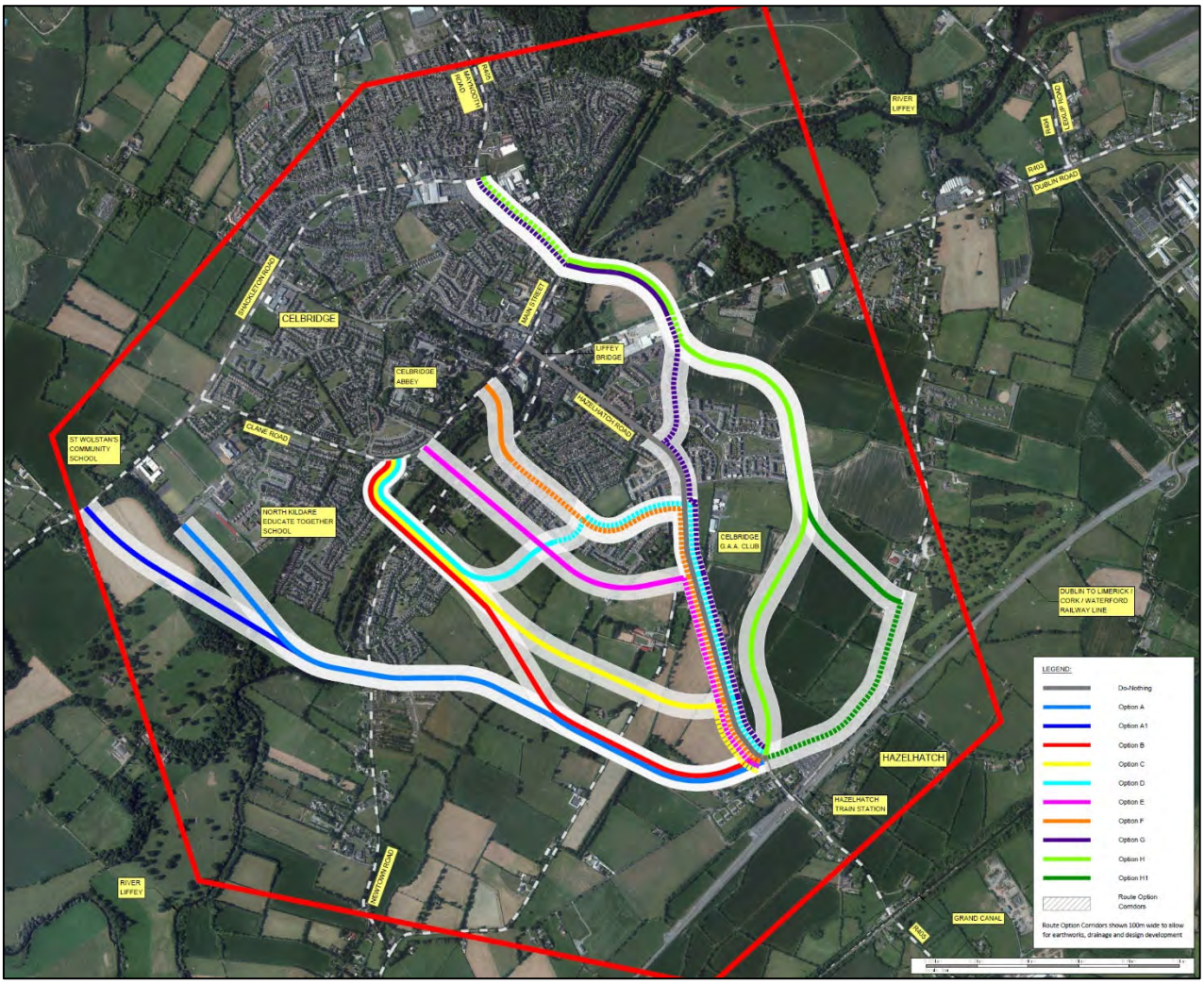


Figure 7-1: Stage 1 Preliminary Options

A description of each option has been provided in **Table 7-1** below.

Table 7-1: Stage 1 Preliminary Option Descriptions

Option	Length	Description
Do-Nothing (Base Case)	**-**	Do-Nothing option represents the retention of the existing road network without improvement. This option comprises the existing road network infrastructure (i.e. existing single carriageways) in the study area and this networks ability to meet future demands for traffic and road safety without any upgrade or junction improvement works, other than routine maintenance.
A	**2635m**	Option A commences at the roundabout between St. Wolstan's Community School and the North Kildare Educate Together School. From here it travels in a south-easterly direction and crosses the River Liffey adjacent to the Pausdeen Stream. The alignment crosses Newtown Road at the Pausdeen Bridge and continues between the Pausdeen Stream and the Chelmsford Housing Estate towards Hazelhatch. Option A crosses Simmonstown Manor/The Drive immediately south-west of Simmonstown Lodge before connecting to the roundabout on Hazelhatch Road adjacent to Hazelhatch train station. Option A runs entirely offline. The proposed cross section incorporates two 3.5m wide traffic lanes, a 2.0m grassed separation width (including kerbs), a 2.0m cycle path, a 2.0m footpath and a 2.0m grass verge.

Option	Length	Description
A1	**2975m**	Option A1 is a sub-option of Option A. It commences at Clane Road between Killadoon Park Road and St. Wolstan's Community School. From here it travels to the south-east for approx. 1km before continuing on the same alignment as Option A. Option A1 runs entirely offline. The proposed cross section incorporates two 3.5m wide traffic lanes, a 2.0m grassed separation width (including kerbs), a 2.0m cycle path, a 2.0m footpath and a 2.0m grass verge.
B	**2180m**	Option B commences at Clane Road between the service station and the garden centre adjacent to Celbridge Abbey. The alignment begins by travelling to the south-west before turning south-east between the garden centre and the Abbeyfarm housing estate. Option B then crosses the River Liffey and Newtown Road before heading in a south-easterly direction. Option B crosses Simmonstown Manor/The Drive immediately south-west of Simmonstown Lodge before connecting to the roundabout on Hazelhatch Road adjacent to Hazelhatch train station. Option B runs entirely offline. The proposed cross section incorporates two 3.5m wide traffic lanes, a 2.0m grassed separation width (including kerbs), a 2.0m cycle path, a 2.0m footpath and a 2.0m grass verge.
C	**2105m**	Similar to Option B, Option C commences at Clane Road between the service station and the garden centre adjacent to Celbridge Abbey. The alignment begins by travelling to the south-west before turning south-east between the garden centre and the Abbeyfarm housing estate. Option C then crosses the River Liffey and Newtown Road before heading in a south-easterly direction. Option C crosses Simmonstown Manor/The Drive between Simmonstown Lodge and Simmonstown Stud before connecting to Hazelhatch Road. Option C continues along Hazelhatch Road to the roundabout at Hazelhatch train station. Option C runs offline for approx. 1,830m before running on existing roads for approx. 275m. The proposed cross section incorporates two 3.5m wide traffic lanes, a 2.0m grassed separation width (including kerbs), a 2.0m cycle path, a 2.0m footpath and a 2.0m grass verge.
D	**2670m**	Similar to Options B and C, Option D commences at Clane Road between the service station and the garden centre adjacent to Celbridge Abbey. The alignment begins by travelling to the south-west before turning south-east between the garden centre and the Abbeyfarm housing estate. Option D then crosses the River Liffey and Newtown Road before heading in a south-easterly direction for approx. 350mm before turning north-eastwards and connecting to the existing road stub on Callenders Mill. Option D continues along Callenders Mill before turning south on Hazelhatch Road to the roundabout at Hazelhatch train station. Option D runs offline for approx. 1,045m before running on existing roads for approx. 1,625m. The proposed cross section incorporates two 3.5m wide traffic lanes, a 2.0m grassed separation width (including kerbs), a 2.0m cycle path, a 2.0m footpath and a 2.0m grass verge.
E	**2040m**	Option E commences at Clane Road at the southern western extent of the Celbridge Abbey grounds. The route heads in a south-easterly direction before crossing the southern end of the Mill Race (which runs through Celbridge Abbey Gardens) and the River Liffey. The route continues south-east before turning eastwards to connect with Hazelhatch Road. Option E continues along Hazelhatch Road to the roundabout at Hazelhatch train station. Option E runs offline for approx. 1,250m before running on existing roads for approx. 790m. The proposed cross section incorporates two 3.5m wide traffic lanes, a 2.0m grassed

Option	Length	Description
		separation width (including kerbs), a 2.0m cycle path, a 2.0m footpath and a 2.0m grass verge.
F	**2170m**	Option F commences at Clane Road at the Celbridge Abbey car park. The route travels through Celbridge Abbey gardens in a southerly direction before crossing the River Liffey and connecting to Newtown Road at the junction with Simmonstown Manor. Option F continues along Simmonstown Manor and Callenders Mill before turning south on Hazelhatch Road to the roundabout at Hazelhatch train station. Option F runs offline for approx. 320m before running on existing roads for approx. 1850m. The proposed cross section incorporates two 3.5m wide traffic lanes, a 2.0m grassed separation width (including kerbs), a 2.0m cycle path, a 2.0m footpath and a 2.0m grass verge.
G	**2830m**	Option G commences at the junction of Maynooth Road and Shackleton Road. This option incorporates online upgrades of Maynooth Road from Shackleton Road to Main Street. From Main Street the alignment runs eastwards adjacent to The Slip before crossing the River Liffey and turning southwards to the junction of Dublin Road and Shinkeen Road. Option G continues along Shinkeen Road before turning south on Hazelhatch Road to the roundabout at Hazelhatch train station. Option G runs offline for approx. 470m and runs on existing roads for approx. 2360m. The proposed cross section incorporates two 3.5m wide traffic lanes, a 2.0m grassed separation width (including kerbs), a 2.0m cycle path, a 2.0m footpath and a 2.0m grass verge.
H	**3040m**	Similar to Option G, Option H commences at the junction of Maynooth Road and Shackleton Road. This option incorporates online upgrades of Maynooth Road from Shackleton Road to Main Street. From Main Street the alignment runs eastwards adjacent to The Slip before crossing the River Liffey and turning southwards to the junction of Dublin Road and Shinkeen Road. Option H continues along approx. 120m of Shinkeen Road before turning eastwards and then southwards past the Primrose Gate housing estate. The alignment continues southwards following the Shinkeen Stream to the tie-in point at the roundabout at Hazelhatch train station. Option H runs offline for approx. 2,485m and runs on existing roads for approx. 555m. The proposed cross section incorporates two 3.5m wide traffic lanes, a 2.0m grassed separation width (including kerbs), a 2.0m cycle path, a 2.0m footpath and a 2.0m grass verge.
H1	**3410m**	Option H1 is a sub-option of Option H. Option H1 travels on the same alignment as Option H from the junction of Maynooth Road and Shackleton Road to immediately south of the Primrose Hill housing estate. Option H1 deviates from Option H at this point by turning to the south-east to connect to Loughlinstown Road approx. 600m to the east of the entrance to Hazelhatch train station. The alignment then continues on Loughlinstown Road to the roundabout at Hazelhatch train station. Option H1 runs offline for approx. 1,975m and runs on existing roads for approx. 1435m. The proposed cross section incorporates two 3.5m wide traffic lanes, a 2.0m grassed separation width (including kerbs), a 2.0m cycle path, a 2.0m footpath and a 2.0m grass verge.

7.3 Engineering Assessment

The purpose of the Engineering Assessment is to provide a method and a process by which information about the engineering elements relating to each of the options is collected, assessed and used within the option selection process. The following topics have been considered in this assessment:

- Traffic Assessment & Cross-Section;
- Compliance with Technical Standards;
- Constructability;
- Junction & Access Strategy;
- Structures;
- Earthworks;
- Road Safety Assessment;
- Drainage; and
- Utilities.

7.3.1 Traffic Assessment & Cross Section

Traffic Assessment

From the traffic forecasting and assessment carried out in section 3.2.2, the highest predicted AADT is 8,415, which is for the design year 2040. Taking into account TII Publication DN-GEO-03031 (June 2017) a single carriageway 7.0m in width was selected as the appropriate carriageway width to accommodate vehicular traffic.

Cross Section

The cross section of the proposed road was determined using TII and DMURS guidelines to accommodate not only vehicular traffic, but also expected pedestrian and cycle volumes as well as its role as Arterial/Link road within the future development of the area. The proposed road will consist of 7.0m wide carriageway, with 2.0m wide green verges, 2.0m wide footpaths and 2.0m wide cycle tracks on both sides.

Further design work to establish the necessary footprint of the project will be carried out in the Design, Environmental Evaluation and Statutory Process phase of the project.

Side road cross sections are usually based on the existing side road cross-section, with standard dimensions applied where practical. Accommodation/Access Roads cross sections, if required, will be designed in accordance with TII DN-GEO-03060 in rural settings and in accordance with DMURS in more urban settings as appropriate to fit within existing road network.

7.3.1.1 Conclusion

This assessment found that all ten preliminary options and sub-options will have the same proposed cross section; therefore, they are all ranked similarly as ‘Preferred’. The Do-Nothing option existing cross section is a single carriageway with widths varying along the road. Substandard width forms part of the existing River Liffey bridge and therefore the Do-Nothing option is classified as Intermediate under this criterion. A summary of the preference ranking for each option with respect to Traffic Assessment & Cross Section is shown in **Table 7-2**.

Table 7-2: Traffic Assessment & Cross Section Preference Rating

Option	Preference Ranking
Do-Nothing	Intermediate
Option A	Preferred
Option A1	Preferred

Option	Preference Ranking
Option B	Preferred
Option C	Preferred
Option D	Preferred
Option E	Preferred
Option F	Preferred
Option G	Preferred
Option H	Preferred
Option H1	Preferred

7.3.2 Compliance with Technical Standards

The design standards for the project are based on those outlined in TII Publications including, DN-GEO-03031 (Rural Road Link Design, June 2017), DN-GEO-03036 (Cross Sections & Headroom, May 2019) and DN-GEO-03060 (Geometric Design of Junctions), as well as the Design Manual for Urban Roads and Streets (DMURS). The overall design speed adopted when developing the ten options was 60 km/h which dictated the geometric parameters for the design, in the form of acceptable horizontal and vertical alignment geometry. The 60 km/h design speed was deemed appropriate based on the current speed limit zones as shown in **Figure 1-3** and on the speed limit review currently being undertaken by Kildare County Council which if implemented may extend the current 50 km/h zone to the limits that will be determined by the KCC as part of the speed limit review.

Preliminary horizontal and vertical alignments were developed for each option to establish an indicative road footprint and earthworks quantities. The preliminary alignments were designed using TII standards for rural road link design. The proposed route alignments will be refined during further stages of the project and the distinction between rural and urban sections of the route may be developed requiring the use of different set of design recommendations including DMURS.

For the purpose of route options comparison, TII standards were used to assess the routes compliance with technical standards. The compliance with standards shows corelations with ease of constructability of the options, safety of the option due to geometry and safety due to the number of possible points of conflict (proposed junctions). Options that run mostly offline provide most flexibility in their design and therefore will score better on the compliance with standards. Options that consist of upgrade to the existing road are limited by the multiple constraints of the existing road and therefore score poorly on the compliance with technical standards.

The main engineering elements as well as relaxations and departures from standard of each option are outlined in **Table 7-3** below.

Table 7-3: Compliance with Technical Standards

Engineering Element	Do-Nothing	Opt A	Op A1	Opt B	Opt C	Opt D	Opt E	Opt F	Opt G	Opt H	Opt H1
Length (m)	1993	2635	2975	2180	2105	2670	2040	2170	2830	3040	3410
Minimum Horizontal Radius (m)	115	360	360	40	40	40	90	90	50	50	50
No. of Horizontal Radii requiring a Relaxation	4	0	0	0	1	5	1	6	10	3	4
No. of Horizontal Radii requiring a Departure	1	0	0	2	3	5	1	1	3	2	2
No. of Band C Horizontal Radii	0	0	0	0	0	0	0	0	0	0	0
Minimum Vertical Crest K Value	2.5	17	17	20	17	5.5	30	4.5	10	10	10
Minimum Vertical Sag K Value	5.5	20	20	20	20	4.4	21.4	7.8	13	13	13
No. of Vertical Curves requiring a Relaxation	2	0	0	0	0	4	0	3	1	1	1
No. of Vertical Curves requiring a Departure	1	0	0	0	0	1	0	1	0	0	0
Maximum Superelevation (%)	5.0	3.5	3.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Maximum Vertical Gradient (%)	5.0	2.5	3.0	2.0	2.5	2.0	1.6	2.5	2.0	2.0	2.0
Combinations of Relaxations requiring a Departure	0	0	0	0	0	3	0	1	1	1	1
Offline Overtaking Southbound (%)	N/A	18	0	0	0	0	0	0	0	0	0
Online Overtaking Southbound (%)	63	N/A	N/A	N/A	0	36	63	32	25	0	0
Offline Overtaking Northbound (%)	N/A	0	18	0	28	0	0	0	0	0	0
Online Overtaking Northbound (%)	63	N/A	N/A	N/A	0	36	63	32	25	0	0
No. of Departures due to Overtaking	0	1	1	1	1	1	1	1	1	1	1
Total No. of Relaxations from Standard	**6**	**0**	**0**	**0**	**1**	**9**	**1**	**9**	**11**	**4**	**5**
Total No. of Departures from Standard	**2**	**1**	**1**	**3**	**4**	**10**	**2**	**4**	**5**	**4**	**4**

All of the options have varying engineering characteristics on the alignment. The Do-Nothing Option has horizontal radii below desirable minimum in the northern part of the route and satisfactory geometrical alignment along southern part of Hazelhatch Road. Options C to H1 involve sections requiring an upgrade of an existing road with the resulting horizontal and vertical geometry closely matching existing conditions on the south part. Options B, D, E, G and H achieve a maximum horizontal radius of either 255m or 360m (band D curves). Whereas Options A, A1, C, F and H1 achieve a maximum horizontal radius greater than or equal to 1020m (band B curves).

Radii less than desirable minimum are required at a number of locations along sections of roads to be upgraded and hence require relaxations (Options C, D, E, F, G, H, and H1). Radii less than three steps below desirable minimum are also required along sections of the online upgrades and at the approach to junctions and the proposed bridge. These radii will require departures from standard (Options B, C, D, G, H, and H1).

For the purposes of an overtaking assessment, sections of online improvements are considered separately to new build alignments. The overtaking percentage length required for a Type 2 single carriageway is 15% for online improvements and 50% for new build alignments as outlined in DN-GEO-03031 (June 2017). None of the alignments satisfies this percentage overtaking requirement. This results in all of the do something options requiring a departure from standard for overtaking.

It is also seen from **Table 7-3** that all the options satisfy the desirable maximum grade with gradients less than a 5% as outlined in DN-GEO-03031 (June 2017).

Combinations of relaxations resulting in departures occur on the online sections of D, F, G H and H1.

Further departures from standard may be required at Phase 3 Design during the design development of the project.

7.3.2.1 Conclusion

This assessment found that Options A and A1 are considered as Preferred options at this stage in regard to compliance with technical standards as they require one alignment departure from standard which is due to non-compliance with overtaking standards. Option E is considered an Intermediate as it requires two departures from standard and one relaxation. The Do-Nothing Option is considered an Intermediate with the northern section of the route substandard. All other options have more than two departures from standard and/or more than three combined departures and relaxations and are therefore ranked similarly as Least Preferred**.**

A summary of the preference ranking for each option with respect to Compliance with Technical Standards is shown in **Table 7-4.**

Table 7-4: Compliance with Technical Standards Preference Rating

Option	Preference Ranking
Do-Nothing	Intermediate
Option A	Preferred
Option A1	Preferred
Option B	Least Preferred
Option C	Least Preferred
Option D	Least Preferred
Option E	Intermediate
Option F	Least Preferred
Option G	Least Preferred
Option H	Least Preferred
Option H1	Least Preferred

7.3.3 Constructability

Constructability of all the options will be complex in certain areas due to the extent and location of existing watercourses, residential houses, farms, utility services, local roads and accesses within the study area. This assessment of constructability has been considered primarily in regard to the comparative ease of construction and traffic management requirements of each option. Disruption to residences and local traffic will need to be minimised throughout the construction period. Detailed consideration and assessment of these impacts will be carried out during Phase 3 Design, Evaluation and Statutory Processes.

It follows that options with the greatest length of on-line construction may have the greatest impact on the operation of the existing local road network and therefore will be the most difficult to construct. In addition, it is likely that in certain cases temporary diversions of traffic will be required which will have impacts on journey times and amenity of local roads.

Table 7-5 below sets out the assessment of each option with respect to the length of online and offline construction expected.

Table 7-5: Constructability (Offline v Online)

	Opt A	Opt A1	Opt B	Opt C	Opt D	Opt E	Opt F	Opt G	Opt H	Opt H1
Total Length (m)	2635	2975	2180	2105	2670	2040	2170	2830	3040	3410
Offline Length (m)	2635	2975	2180	1830	1045	1250	320	470	2485	1975
Online Length (m)	0	0	0	275	1625	790	1850	2360	555	1435

The above table shows that Options D, F, G and H1 have the longest sections of online construction and therefore will result in more difficulties during the construction stage due to their interaction with the existing road network, and their corresponding impact on its traffic. Options C, E and H require between 285m and 805m of online construction. Options A, A1 and B have no sections of online construction. These options will therefore reduce interactions with the existing alignment and therefore have benefits from a constructability perspective.

Additional notable constructability issues are likely to arise for Options A and A1. The available corridor width is restricted from the proposed River Liffey bridge to approximately 250m east of the proposed river crossing. The extent of the Chelmsford housing estate to the north and the Chelmsford Manor housing estate to the south results in a narrow corridor through which Options A and A1 must pass. This corridor already contains the Pausdeen Stream and Pausdeen Bridge, 220kv overhead power lines and pylon, access roads to Chelmsford and Chelmsford Manor estates and an additional access to a private dwelling.

The Do-Nothing Option does not require any construction works and was therefore classified as Preferred.

7.3.3.1 Conclusion

Options D, F, G and H1 have the longest sections of online construction and therefore are likely to be more difficult to construct. As a result, they are considered the ‘Least Preferred’ options.

Option C, E and H require shorter sections of online construction and are therefore considered to be of intermediate preference. Options A and A1 have no lengths of online upgrading but are likely to have constructability issues due to space restrictions and are considered to be of intermediate preference. Option B has no length of online construction and is therefore considered the ‘Preferred’ option.

A summary of the preference ranking for each option is shown in **Table 7-6**.

Table 7-6: Constructability Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Intermediate

Option	Preference Ranking
Option A1	Intermediate
Option B	Preferred
Option C	Intermediate
Option D	Least Preferred
Option E	Intermediate
Option F	Least Preferred
Option G	Least Preferred
Option H	Intermediate
Option H1	Least Preferred

7.3.4 Junction & Access Strategy

The new single carriageway road should be designed such that a minimal number of junctions are required, with consistency in design in order to avoid driver confusion. Reducing the likelihood of collisions and improved operational performance is achieved by keeping the number of road connections onto the proposed road to a minimum. It is noted that the predicted design year traffic flows dictate that no grade separation is required, therefore all junctions will be at grade. The design of the junctions will be carried out in the further stages of the process and depending on rural or urban nature of the selected route, the TII Publications or DMURS will be used as appropriate to guide the design.

At the southern end of the scheme each of the options will tie-in to the existing roundabout at Hazelhatch train station. At the Celbridge end of the scheme the various options will tie-in to either the R403 Clane Road / English Row or the R405 Main Street / Maynooth Road with the exception of Option A which ties-in to the roundabout at St. Wolstan's Community School.

At this stage in the assessment the position and number of minor road and laneway tie-ins has not been determined. **Table 7-7** below sets out the assessment of each option with respect to an assessment of the number of new junctions with significant existing roads, the number of potential new junctions with minor existing roads and laneways, the number of existing junctions on roads that are proposed to be upgraded and the number of private direct accesses to dwellings to roads that are proposed to be upgraded. The figures include the tie-in points at the ends of the scheme.

Table 7-7: Number of Proposed Junctions & Accesses

	Do-Nothing	Opt A	Opt A1	Opt B	Opt C	Opt D	Opt E	Opt F	Opt G	Opt H	Opt H1
New Junctions with Significant Roads	N/A	4	4	4	4	2	4	2	2	4	4
Potential New Junctions with Minor Roads and Laneways	N/A	3	3	0	0	0	0	0	0	0	0
Existing Junctions on Online Sections	11	0	0	0	1	12	2	18	24	13	17

	Do-Nothing	Opt A	Opt A1	Opt B	Opt C	Opt D	Opt E	Opt F	Opt G	Opt H	Opt H1
Existing Direct Accesses to Dwellings on Online Sections	28	0	0	0	1	19	4	5	40	29	40
Total	**39**	**7**	**7**	**4**	**6**	**33**	**10**	**25**	**66**	**46**	**61**

7.3.4.1 Conclusion

This assessment found that the potential number of junctions and accesses varied between 4 (Option B) and 66 (Option G). Options with 10 or fewer potential junctions or accesses were ranked as “Preferred”. Options with between 10 and 20 junctions and accesses were ranked as “Intermediate” and options with 20 or more junctions or accesses were ranked as “Least Preferred”.

A summary of the preference ranking for each option with respect to Junction & Access Strategy is shown in **Table 7-8.**

Table 7-8: Junction & Access Strategy Preference Rating

Option	Preference Ranking
Do-Nothing	Least Preferred
Option A	Preferred
Option A1	Preferred
Option B	Preferred
Option C	Preferred
Option D	Least Preferred
Option E	Preferred
Option F	Least Preferred
Option G	Least Preferred
Option H	Least Preferred
Option H1	Least Preferred

7.3.5 Structures

This section assesses the major structures anticipated along the ten option alignments. At this stage in the assessment the precise number and locations of side road structures, agricultural/accommodation underpasses, and culverts have not been identified and is subject to development throughout the preliminary design phase.

The likely major structures along the alignments will be river and watercourse crossings along each of the ten options. **Table 7-9** below sets out the likely number and type of river and watercourses that will require structures and the likely bridge lengths for each option.

Table 7-9: Structure requirements

	Opt A	Opt A1	Opt B	Opt C	Opt D	Opt E	Opt F	Opt G	Opt H	Opt H1
No of River Crossings	1	1	1	1	1	1	2	1	1	1
Bridge Length (m)	45	45	40	40	40	65	40 & 20	40	40	40
No. of other Watercourse Crossings	6	6	4	3	1	1	1	1	4	5

Table 7-9 shows that all options will require one crossing of the River Liffey.

Options E and F cross the River Liffey at Celbridge Abbey where an existing mill race results in the extension of the Option E bridge and an additional bridge for Option F.

Options A, A1, B and C cross the Pausdeen Stream network and the Hazelhatch Stream network with Options A and A1 also crossing one watercourse north of the River Liffey along Killadoon Lane

Options D, E, F and G will require widening of the existing culvert on Hazelhatch Road at the crossing point of the Hazelhatch Stream.

Options H and H1 cross the Hazelhatch Stream and the Shinkeen Stream with Option H1 requiring widening of the existing culverts on Loughlinstown Road at both crossing points of the Shinkeen Stream.

The requirement for agricultural underpasses or box/pipe culverts will not be finalised until the Phase 3, design stage. Additional culverts may be required to maintain overland flow paths in areas subject to flooding.

7.3.5.1 Conclusion

This assessment found that Options D and G are ranked as ‘Preferred’ as it is expected they will require 2 new structures each and have the equal shortest new bridge requirements. All other options are ranked as ‘Intermediate’ as it is expected they will require more than 2 new structures each or, as with Options E and F, will require a longer total length of bridge structure over the River Liffey. The Do-Nothing Option requires no new structures for watercourse crossing and was classified as Preferred.

A summary of the preference ranking for each option with respect to Structures is shown in **Table 7-10**.

Table 7-10: Structures Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Intermediate
Option A1	Intermediate
Option B	Intermediate
Option C	Intermediate
Option D	Preferred
Option E	Intermediate
Option F	Intermediate

Option	Preference Ranking
Option G	Preferred
Option H	Intermediate
Option H1	Intermediate

7.3.6 Earthworks

The topography of the study area is relatively flat with gentle slopes. Subsoils vary across the study area with those in Celbridge Town in the north west, described as urban ground associated with the made / built ground associated with urbanised towns and cities. The River Liffey flows from the south west of the study area to the north east. The subsoils surrounding the river are Alluvium sediments with bedrock or sub-crop exposed within the Alluvium deposits on the north bank of the River Liffey in the north of the study area. In the south of the study area, east of the River Liffey is a region of gravels derived from limestones subsoils adjacent to the Alluvium deposits. The remainder of the site is underlain by till derived from limestone subsoils with isolated regions of bedrock or sub-crop at the surface in the east and west of the study area.

In assessing the earthworks, preliminary cut/fill volumes were estimated and are shown in **Table 7-11**. A theoretical earthworks balance for each option was also determined. For the purposes of this stage 1 assessment, it was assumed that sections of online upgrades would result in no additional earthworks. It should also be noted these are estimated quantities only, based on the current option alignments, and are likely to change during the design development. However, the quantities are indicative of the existing terrain and as such are considered valid for the purposes of comparison at this stage.

Table 7-11: Earthworks

	Opt A	Opt A1	Opt B	Opt C	Opt D	Opt E	Opt F	Opt G	Opt H	Opt H1
Total Length (m)	2635	2975	2180	2105	2670	2040	2170	2830	3040	3410
Offline Length (m)	2635	2975	2180	1830	1045	1250	320	470	2485	1975
Volume Cut (m^3)	5,465	6,315	6,540	7,975	15,980	8,685	14,380	18,540	12,055	17,370
Volume Fill (m^3)	102,270	102,915	72,615	60,485	24,840	52,640	17,680	25,380	96,985	56,875
Theoretical Earthworks Cut / Fill balance (m^3)	-96,805	-96,600	-66,075	-52,510	-8,860	-43,955	-3,300	-6,840	-84,930	-39,505

In assessing each option, both the overall quantity of cut and fill, along with the overall earthworks balance are considered. This is to avoid an assessment based on earthworks balance alone, which tends to ignore the overall extent of earthworks movement i.e. an option with a low (favourable) earthworks balance, may still have significant cut and fill requirements (less favourable).

As shown above all of the options require the importation of fill material. Option F has the best theoretical balance between cut and fill quantities of all the options and is also the alignment with the shortest offline section. This is closely followed by Options D and G which have the next lowest cut/fill balance. These three options form a low cut/fill balance grouping of between 3,000 to 9,000m^3 of fill material.

Options E, H1, C and B follow in a mid-level grouping with cut/fill balances between 39,000 and 67,000m^3. Options H, A and A1 have the highest theoretical imbalance between cut and fill quantities. These three options form a high cut/fill balance grouping between 84,000 to 97,000m^3.

7.3.6.1 Conclusion

The earthworks assessment found that Options D, F and G are ranked as 'Preferred' as they achieve the best balances between cut and fill. Options B, C, E and H1 are considered 'Intermediate' as they have a moderate cut/fill imbalance while Options A, A1 and H are considered 'Least Preferred' as they have the poorest cut/fill balance and the most onerous requirement for imported fill material.

The Do-Nothing Option require no construction works and was classified as Preferred.

A summary of the preference ranking for each option with respect to Earthworks is shown in **Table 7-12**.

Table 7-12: Earthworks Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Least Preferred
Option A1	Least Preferred
Option B	Intermediate
Option C	Intermediate
Option D	Preferred
Option E	Intermediate
Option F	Preferred
Option G	Preferred
Option H	Least Preferred
Option H1	Intermediate

7.3.7 Road Safety Assessment

Road Safety Impact Assessments (RSIA) are described in the EU Directive on Road Infrastructure Safety Management (EU RISM) as a strategic assessment of the impact of different planning options for a new road, or for substantial modifications to an existing road, on the safety performance of the road network. A standalone RSIA report has been developed for this scheme in accordance with TII publication PE-PMG-02001.

In this section a road safety assessment has been undertaken to examine the safety benefits which each of the ten options may bring. A review of the collision analysis (detailed in the RSIA) of the available collision records from the Road Safety Authority found a total of 87 collisions over a 9-year period within the study area, equating to an average of 9.7 collisions per year. The 87 collisions comprise 14 single vehicle collisions, 15 rear end collisions, 3 angle collisions, 6 head-on collisions, 18 collisions involving a cyclist, 17 collisions involving a pedestrian, 4 collisions involving a motorcyclist and 10 collision types were not specified. 39 collisions (44.8%) involved a vulnerable road user including pedestrians, cyclists or motorcyclists and of these 3 collisions were between a cyclist and a goods vehicle or bus. Six collision clusters were identified within the study area on the R403 Clane Road, English Row, the River Liffey Bridge, Main Street and Maynooth Road which comprise three or more collisions of the same collision type in close proximity to each other.

The ten route options developed for this scheme address capacity and safety issues on the existing road network such as limited pedestrian and cyclist facilities, sub-standard alignment, reduced cross section, restricted forward visibility and visibility to direct accesses.

All ten options require departures from standard and/or relaxations of standard due to constraints within the study area. Options A and A1 require one alignment departure which is a non-compliance with the required percentage of overtaking. Option E requires two departures and one relaxation. All other options have more than two departures and/or more than three combined departures and relaxations.

Options A, A1, B and C are primarily off-line and require 7 or less junctions and accesses to be facilitated on the new alignments. Option E proposes a proportion of alignment on the existing Hazelhatch Road, however this existing section has a relatively consistent alignment and there is a total of 10 junctions and accesses along the overall route length. Options D, F, G, H and H1 need greater integration into the existing road network and require at least over 25 junctions and accesses to be facilitated on the alignments.

Options B, C, D, E, F, G, H and H1 provide a relatively similar level of connectivity for pedestrians and cyclists between Hazelhatch train station and Celbridge town. However, Options A and A1 connect the Hazelhatch train station to the R403 Clane Road west of Celbridge town and are outside the main commercial and residential areas and so may be less likely to be utilised by pedestrians or cyclists.

7.3.7.1 Conclusion

This assessment found that Options A, A1 and E are Preferred as they propose the lowest number of departures and relaxations (Option A and A1, followed by Option E), have less than 10 junctions or accesses required and Option E presents direct connectivity between Celbridge town and Hazelhatch.

Option B and C are considered Intermediate as they require 3 and 4 departures from standard respectively, provide a similar level of connectivity for pedestrians and cyclists between Celbridge town and Hazelhatch but require less than 10 junctions or accesses.

Option D, F, G, H and H1 are considered Least Preferred at this stage of the assessment as they require the highest number of departures from standard and relaxations of standard and require at least more than 25 junctions or accesses to be facilitated.

The Do-Nothing option does not improve existing safety conditions in any way and therefore is classified as Least Preferred Option.

A summary of the preference ranking for each option with respect to Road Safety is shown in **Table 7-13** below.

Table 7-13: Road Safety Rating

Option	Preference Rating
Do-Nothing	Least Preferred
Option A	Preferred
Option A1	Preferred
Option B	Intermediate
Option C	Intermediate
Option D	Least Preferred
Option E	Preferred
Option F	Least Preferred
Option G	Least Preferred
Option H	Least Preferred
Option H1	Least Preferred

7.3.8 Drainage

The main objectives of the drainage design for all routes are to speedily remove surface water from the road to provide increased safety for the road user, maximise the pavement life of the road and minimise the impact of the runoff on the receiving environment. With this in mind, the impacts of the drainage design upon each option is considered below.

7.3.8.1 Road Drainage & Outfalls

The road drainage system will outfall to existing watercourses at the attenuated greenfield runoff rate in areas of new build road construction and will be attenuated to existing runoff rates in any areas of online

upgrade works. The watercourses listed in Section 7.4.7 are all potential outfall watercourses together with additional existing land drains visible on OSI 25" maps. Works on, or crossings, of rivers, major and minor watercourses and land drains which are visible on OSI 25" maps will all need Section 50 approval by OPW under the 1945 Arterial Drainage Act.

7.3.8.2 Drainage Options

The route options considered consist of a combination of offline and online sections or offline sections entirely. The offline section represents a new section of road through existing greenfield. The online section represents an existing road to be utilised as part of the scheme. It is assumed for the purpose of the drainage assessment that the online sections existing drainage systems may require upgrading to accommodate additional hardstanding area (i.e. road/footpath widening) to meet the design criteria for the scheme.

All options must ensure that there is effective and efficient drainage for the entire scheme and to have minimal impact on flood risk. Given that sections of the proposed route options are within potential flood prone areas, a preliminary assessment was completed for each route to determine the lengths that transverse or intersects potential floodplains. An assumption was made at this stage to determine the lengths based on where there is predicted flooding indicated on flood maps from the following studies;

- Eastern Catchment Flood Risk Assessment Management Study
- Hazelhatch Flood Study

The number of potential locations for attenuation features and associated outfall locations were reviewed with the vertical alignment for the routes to assess potential implications for the drainage. The number of watercourse crossings and also the number of Section 50 approvals required for each route option was reviewed. The results of the drainage assessment are summarised in **Table 7-14**.

Table 7-14: Drainage

	Section	Opt A	Opt A1	Opt B	Opt C	Opt D	Opt E	Opt F	Opt G	Opt H	Opt H1
Total Approximate Length (m)	Online	0	0	0	300	1620	787	1852	2374	490	1358
	Offline	2631	2972	2177	1800	1047	1250	315	455	2546	2049
Length within flood risk areas (m)	Online	0	0	0	267	1059	775	1059	1143	391	663
	Offline	1705	1705	1435	410	100	200	100	107	107	239
Number of Potential Attenuation Features & Associated Outfalls	Online	0	0	0	1	3	2	3	4	1	2
	Offline	6	6	4	3	2	2	2	2	6	2
Number of Watercourse Crossings	Online	0	0	0	0	1	1	2	1	0	2
	Offline	7	7	5	4	1	1	1	1	5	4

	Section	Opt A	Opt A1	Opt B	Opt C	Opt D	Opt E	Opt F	Opt G	Opt H	Opt H1
Number of Section 50 Approvals	Online	0	0	0	0	1	1	1	1	0	2
	Offline	3	3	3	3	1	1	1	1	4	3

The results of the drainage assessment indicate Options A, A1 and B have the highest impact on flood risk from the adjacent watercourses. Options C, H and H1 have the lower impact on flood risk in comparison to the other options.

It was assumed as a conservative measure for the purpose of this assessment that the existing drainage systems, including the outfalls, for the online sections will have to be upgraded to accommodate the proposed link road for each option. Options A, A1. G and H have the most options for outfall locations for attenuation features to accommodate the proposed drainage systems whilst ensuring the depths for the pipework can be kept to a minimum. Options B, C and H1have the least number of options for outfall locations for attenuation features. Hence these options may require pipework installed at deep depths (>3m) due to the limited options for outfall locations.

Options H and H1 require the most Section 50 approvals for the watercourse crossings. Options D, E, F and G require the least number of Section 50 approvals.

7.3.8.3 Conclusion

The results of the drainage assessment indicate Options A, A1 and B to be the most obstructive in terms of potential impact on flood risk. Options C, H and H1 are considered to be the least obstructive. The potential impact of each option on flood risk is deemed a significant factor in the assessment. Hence the options are ranked accordingly.

The Do-Nothing Option is considered a Preferred Option as it does not increase existing risk of flooding and does not require any additional drainage works.

A summary of the preference ranking for each option with respect to Hydrology and Hydrogeology is shown in **Table 7-15**.

Table 7-15: Drainage Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Least Preferred
Option A1	Least Preferred
Option B	Least Preferred
Option C	Intermediate
Option D	Intermediate
Option E	Intermediate
Option F	Intermediate
Option G	Intermediate
Option H	Intermediate
Option H1	Intermediate

7.3.9 Utilities

As part of this assessment utility requests were made and information examined from GNI, ESB, Irish Water, ENet, EIR, BT, Virgin Media, Vodafone, Viatel, GTT, Colt, Magnet, Siro, Zayo, EU-Networks and Kildare Co. Co. to ascertain the number of diversions which may be required for each of the ten options. At this stage, services for GNI, ESB, Irish Water, EIR, BT, Virgin Media and Kildare Co. Co. were identified in the study area. ENet, Vodafone, Viatel, GTT, Colt, Zayo and EU-Networks confirmed they currently have no services in the study area. Correspondence was issued to Magnet and Siro requesting information on their services, but no response was received at the time of this assessment.

At this stage the exact requirements for utility diversions for each option are not known as they are dependent on the final alignment, however an indication of the extent to which these utilities may be affected has been estimated.

Electricity supply network is mainly comprised of Medium and Low Voltage (MV/LV – 10kV/20kV and 230V/400V) lines servicing individual properties or public lighting. A number of substations are located in close proximity to Celbridge including the 110kV Griffinrath Substation and the 220kV Maynooth Substation northwest of the town centre and the 38kV Celbridge Substation on Hazelhatch Road. As a result there are three High Voltage (HV) lines generally running east - west through the study area.

- A 38kV underground line running from the Griffinrath Substation southwards to Celbridge Abbey before turning eastwards towards the Celbridge Substation;
- A 110kV overhead line following the 38kV line to Celbridge Abbey, crossing the River Liffey towards Temple Manor before turning eastwards and crossing Hazelhatch Road north of the GAA grounds; and
- A 220kV overhead line entering the study area north of St. Wolstan's Community School and travelling southwards. Turning eastwards as it crosses the River Liffey and crossing Hazelhatch Road south of Celbridge Tennis Club.

The GNI network in the study area covers all the residential areas of Celbridge town and is comprised of low and medium pressure underground pipelines. Services run along the full length of Clane Road, English Row, Main Street, Maynooth Road, Shinkeen Road and Dublin Road. Along Newtown Road the network runs to Chelmsford Manor and along Hazelhatch Road the network extends to Primrose Gate and Hazelhatch Park.

EIR services were found to be extensive in built-up areas connecting into the majority of residential properties within the study area and extend along all the major regional roads connected to Celbridge.

Virgin Media services are concentrated in a number of areas in Celbridge. North of the River Liffey concentrations exist in the developments along Clane Road between Shackleton Road and Celbridge Abbey and in the developments north and south of Shackleton Road as it approaches Maynooth Road. The majority of services located south of the river are in the built-up areas off Hazelhatch Road, Shinkeen Road and Simmonstown Manor. Some Virgin cables were also identified along Newtown Road and into Chelmsford Manor.

Water supply, storm water and foul sewer networks cover the built-up areas within Celbridge town. The water supply pressurised mains network covers all the built-up areas of Celbridge and continues along Clane Road, Newtown Road, Hazelhatch Road, Loughlinstown Road, Dublin Road and Maynooth Road to the extents of the study area. The storm water gravity and foul sewer network generally covers the same extents north of the river Liffey but with reduced coverage on the south side along Newtown Road and Hazelhatch Road with services finishing at Laburnum Grove and Shinkeen Road respectively.

BT services are located in the north east section of the study area and do not affect the stage 1 route options.

The estimated number of utility impacts for each option is shown in **Table 7-16**.

Table 7-16: Expected Utility Impacts

	Opt A	Opt A1	Opt B	Opt C	Opt D	Opt E	Opt F	Opt G	Opt H	Opt H1
ESB – LV / MV	6	6	6	6	15	6	18	27	24	27
ESB – HV	1	1	2	2	3	1	1	0	0	0
GNI	2	3	2	2	9	2	12	12	9	9
EIR	3	4	4	4	11	5	13	23	18	19
Virgin Media	1	1	1	1	5	1	8	3	1	1
Water Supply	3	4	3	3	10	4	13	20	13	14
Storm Water / Foul Sewer	2	3	5	5	5	3	4	12	12	12

For the purposes of this assessment, it was considered that conflicts with ESB HV were more significant than conflicts with ESB LV/MV and that all ESB conflicts were more significant than conflicts with telecommunication services.

Options that require the upgrading of existing roads generally clash with multiple transverse and/or parallel services along part of all of the upgrade section and are scored lower accordingly. The proposed options impact existing utility services as follows:

Do-Nothing

- No impact on existing utilities

Options A and A1

- Options A and A1 impact 5 LV/MV ESB lines at Chelmsford Manor and an additional line at the tie-in to the Hazelhatch roundabout.
- Although Options A and A1 cross under the 220kV HV lines in 2 locations it is considered that they will only impact the line as they pass adjacent to the pylon at Chelmsford Manor.
- Options A and A1 impact GNI Gas pipelines in two locations at Chelmsford Manor with Option A1 impacting an additional service at the tie-in to Clane Road.
- Options A and A1 impact the EIR network at the tie-in to Hazelhatch roundabout and in two locations at Chelmsford Manor with Option A1 impacting an additional service at the tie-in to Clane Road. Virgin Media services are impacted in one location at Chelmsford Manor.
- Options A and A1 impact the water supply pressurised mains network at the tie-in to Hazelhatch roundabout and in two locations at Chelmsford Manor with Option A1 impacting an additional service at the tie-in to Clane Road.
- The storm and sewer gravity main networks are impacted by Options A and A1 in 2 locations at Chelmsford Manor and by Option A1 at the tie-in to Clane Road

Option B

- Option B impacts 3 LV/MV ESB lines at the tie-in point on Clane Road and one at the tie-in point at Hazelhatch roundabout. It impacts two further lines, one along Newtown Road and one approximately 80m southeast of Newtown Road.
- Option B impacts HV ESB lines in two locations. The first is at the tie-in point on Clane Road where it crosses the underground 38kV line and the second is at the proposed River Liffey crossing point where it is proposed to cross under the 110kV overhead line. Option B also crosses under the 110kV line and the 220kV line in one additional location each however it is not considered that the lines will be impacted at these locations.
- Option B impacts two GNI Gas pipelines, one along Newtown Road and the second at the tie-in to Clane Road.
- Option B impacts the EIR network at the tie-in to Hazelhatch roundabout, at two locations at the tie-in to Clane Road and one location along Newtown Road. Virgin Media services are impacted in one location at the tie-in point of Clane Road.
- Option B impacts the water supply pressurised mains network at three locations. Once each at the tie-in points at Hazelhatch roundabout and Clane Road and a further impact along Newtown Road.
- The storm and sewer gravity main networks are impacted by Option B in 5 location. Two services at the Clane Road tie-in point, two services between Clane Road and the River Liffey and a further service on the south bank of the river Liffey.

Option C

- Option C impacts 3 LV/MV ESB lines at the tie-in point on Clane Road and one at the tie-in point at Hazelhatch roundabout. It impacts two further lines, one along Newtown Road and one approximately 80m southeast of Newtown Road.
- Option C impacts HV ESB lines in two locations. The first is at the tie-in point on Clane Road where it crosses the underground 38kV line and the second is at the proposed River Liffey crossing point where it is proposed to cross under the 110kV overhead line. Option C also crosses under the 110kV line and the 220kV line in one additional location each however it is not considered that the lines will be impacted at these locations.
- Option C impacts two GNI Gas pipelines, one along Newtown Road and the second at the tie-in to Clane Road.
- Option C impacts the EIR network along the length of the proposed upgrade works to Hazelhatch Road, at two locations at the tie-in to Clane Road and one location along Newtown Road. Virgin Media services are impacted in one location at the tie-in point of Clane Road.
- Option C impacts the water supply pressurised mains network at three locations. Once at the tie-in point at Clane Road, once at the crossing point of Newtown Road and along the length of the proposed upgrade works of Hazelhatch Road.
- The storm and sewer gravity main networks are impacted by Option C in 5 location. Two services at the Clane Road tie-in point, two services between Clane Road and the River Liffey and a further service on the south bank of the river Liffey.

Option D

- Option D impacts 13 LV/MV ESB lines. Once at the tie-in point on Clane Road and once at the tie-in point at Hazelhatch roundabout. Option D impacts two further lines, one along Newtown Road and one approximately 80m southeast of Newtown Road before it connects with the existing road network at Callenders Mill. Option D impacts one parallel service along the full length of Callenders Mill and one further transverse service. Option D impacts two parallel services along part of Simmonstown Manor and six further transverse services. Option D impacts one further transverse service along Hazelhatch Road.
- Option D impacts HV ESB lines in three locations. The first is at the tie-in point on Clane Road where it crosses the underground 38kV line. The second is at the proposed River Liffey crossing point where it is proposed to cross under the 110kV overhead line and the third is at the 110kV pylon along Callenders

Mill. Option D also crosses under the 220kV line in one location and the 110kV line in two additional locations however it is not considered that the lines will be impacted at these locations.

- Option D impacts two GNI Gas pipelines at the northern end of the scheme, once along Newtown Road and the second at the tie-in to Clane Road. Option D also impacts existing gas services at two locations on Callenders Mill, one parallel pipeline along the full length of Callenders Mill and four transverse pipelines. Option D impacts gas services a further five times along Simmonstown Manor, one parallel service along the full length of the road and four transverse services.
- Option D impacts the EIR network at two locations at the tie-in to Clane Road, along the length of the proposed upgrade works to Hazelhatch Road and at one location along Newtown Road. Option D also impacts EIR services at two locations on Callenders Mill, one of which is a parallel service along the majority of the existing alignment and the second is a transverse service. Option D impacts parallel services along the majority of both sides of Simmonstown Manor in addition to three transverse services.
- Option D impacts Virgin Media services at two locations along Callenders Mill and at two locations along Simmonstown Manor – one partial parallel and one transverse service in each instance. Virgin Media services are also impacted by Option D in one location at the tie-in point of Clane Road.
- Option D impacts the water supply pressurised mains network in ten locations. Once at the tie-in point at Clane Road and once at the crossing point of Newtown Road. Option D impacts water supply services at two locations on Callenders Mill, one of which is a parallel service along the full length of the existing alignment and the second is a transverse service. Option D impacts two parallel services along the full length of the proposed upgrade works of Simmonstown Manor as well as two transverse services. One water supply pipeline will be impacted along the full length of the proposed upgrade works of Hazelhatch Road plus one additional transverse service.
- The storm and sewer gravity main networks are impacted by Option D in 5 location. Two services at the Clane Road tie-in point, two services between Clane Road and the River Liffey and a further service on the south bank of the river Liffey.

Option E

- Option E impacts six LV/MV ESB lines. One at the tie-in point on Clane Road, three at the crossing point location at Newtown Road, one transverse crossing of Hazelhatch Road and one at the tie-in point at Hazelhatch roundabout.
- Option E impacts one HV ESB line. The 38kV underground is impacted immediately south of the tie-in point at Clane Road. Option E also crosses under the 110kV line and the 220kV line in one additional location each however it is not considered that the lines will be impacted at these locations.
- Option E impacts two GNI Gas pipelines, one along Newtown Road and the second at the tie-in to Clane Road.
- Option E impacts the EIR network in five locations, along the length of the proposed upgrade works to Hazelhatch Road, at one location immediately west of the proposed junction with Hazelhatch Road, at two locations at the tie-in to Clane Road and one location along Newtown Road. Virgin Media services are impacted in one location at the tie-in point of Clane Road.
- Option E impacts the water supply pressurised mains network at four locations. Once at the tie-in point at Clane Road, once at the crossing point of Newtown Road, along the length of the proposed upgrade works of Hazelhatch Road and a further transverse crossing of Hazelhatch Road.
- The storm and sewer gravity main networks are impacted by Option E in three location. Two services at the Clane Road tie-in point and a further pipeline between Clane Road and the River Liffey.

Option F

- Option F impacts 18no. LV/MV ESB lines. Once at the tie-in point on Clane Road and once at the tie-in point at Hazelhatch roundabout. It impacts two further lines along Newtown Road and one transverse service on Hazelhatch Road. Along Simmonstown Manor Option F impacts ten transverse services and three parallel services.

- Option F impacts one HV ESB line. The 38kV underground is impacted along Newtown Road as it crosses Simmonstown Manor. Option F also crosses under the 110kV line and the 220kV line in one location each however it is not considered that the lines will be impacted at these locations.
- Option F impacts GNI Gas pipelines at one location on Clane Road and one location on Newtown Road. Option F also impacts existing gas services on Simmonstown Manor at three locations that run parallel to the existing road as well as seven transverse services.
- Option F impacts two EIR services at the tie-in to Clane Road, one service along Newtown Road, parallel services along both sides of the proposed upgrade section of Simmonstown Road in addition to seven transverse crossings and a parallel service along the length of the proposed upgrade works to Hazelhatch Road.
- Option F impacts Virgin Media services at one location at the tie-in point of Clane Road and at seven locations along Simmonstown Manor – two partial parallel services and five transverse services.
- Option F impacts the water supply pressurised mains network in 13 locations. Twice at the tie-in point at Clane Road and twice at the crossing point of Newtown Road. Option F impacts two parallel services along the full length of the proposed upgrade works of Simmonstown Manor as well as five transverse services. One parallel water supply pipeline will be impacted along the full length of the proposed upgrade works of Hazelhatch Road plus one additional transverse service.
- The storm and sewer gravity main networks are impacted by Option F in four locations. Two services at the Clane Road tie-in point, one services along Newtown Road and one parallel service that runs along Simmonstown Manor for approximately a quarter of the proposed upgrade section.

Option G

- Option G impacts 27 LV/MV ESB lines. Along the proposed upgrade section of Maynooth Road/Main Street a total of 12 transverse and 2 parallel services are impacted with one of the parallel services present along the full length of the upgrade section. Three services are impacted in the offline section between Main Street and Dublin Road with a further five transverse and one relatively short parallel service impacted along Shinkeen Road. Option G impacts four transverse services along the upgrade section of Hazelhatch Road.
- Option G crosses under the 220kV line and the 110kV line along Hazelhatch Road however it is not considered that the lines will be impacted at these locations.
- Option G impacts a total of 12 GNI Gas pipelines. Along Maynooth Road/Main Street a total of four transverse and one parallel service are impacted with the parallel service present along the majority of Maynooth Road. One service is affected along Dublin Road. Two transverse and two parallel services are impacted on Shinkeen Road including one parallel service located along the full length of the road. Option G impacts one short length of parallel pipeline and one transverse service along Hazelhatch Road.
- Option G impacts the EIR network in 23 locations. Along Maynooth Road/Main Street a total of seven transverse services are impacted along with three parallel services including two parallel services that span the full length of the upgrade section. Three services are impacted on Dublin Road and a further five transverse and two full length parallel services are impacted along Shinkeen Road. Option G also impacts two transverse and one full length parallel service along Hazelhatch Road.
- Option G impacts Virgin Media services at one location along Maynooth Road and at two locations along Hazelhatch Road – one partial parallel and one transverse service in each instance.
- Option G impacts the water supply pressurised mains network in 20 locations. Along Maynooth Road/Main Street a total of six transverse services are impacted along with one parallel service that spans the full length of the upgrade section. Two services are impacted on Dublin Road and a further six transverse and one full length parallel services are impacted along Shinkeen Road. Option G also impacts two transverse and two parallel services along Hazelhatch Road one of which spans the full length of the upgrade works.
- Option G impacts the storm and sewer gravity main network in 12 locations. Nine transverse services and one full length parallel service are affected along Maynooth Road/Main Street. A further service is affected between Main Street and the River Liffey. Option G also affects one additional service on Dublin Road.

Option H

- Option H impacts 24 LV/MV ESB lines. Along the proposed upgrade section of Maynooth Road/Main Street a total of 12 transverse and 2 parallel services are impacted with one of the parallel services present along the full length of the upgrade section. Three services are impacted in the offline section between Main Street and Dublin Road with a further two transverse and one parallel service impacted along Shinkeen Road. Option H impacts four additional services in the offline section between Shinkeen Road and the roundabout at Hazelhatch.
- Option H crosses under the 220kV line and the 110kV line in the offline section between Shinkeen Road and the roundabout at Hazelhatch however it is not considered that the lines will be impacted at these locations.
- Option H impacts a total of 9 GNI Gas pipelines. Along Maynooth Road/Main Street a total of four transverse and one parallel service are impacted with the parallel service present along the majority of Maynooth Road. One service is affected along Dublin Road. One parallel and two transverse services are impacted on Shinkeen Road.
- Option H impacts the EIR network in 18 locations. Along Maynooth Road/Main Street a total of seven transverse services are impacted along with three parallel services including two parallel services that span the full length of the upgrade section. Three services are impacted on Dublin Road and a further three transverse and two parallel services are impacted along Shinkeen Road.
- Option H impacts Virgin Media services at one location along Maynooth Road.
- Option H impacts the water supply pressurised mains network in 13 locations. Along Maynooth Road/Main Street a total of six transverse services are impacted along with one parallel service that spans the full length of the upgrade section. Two services are impacted on Dublin Road and a further three transverse and one parallel services are impacted on Shinkeen Road.
- Option H impacts the storm and sewer gravity main network in 12 locations. Nine transverse services and one full length parallel service are affected along Maynooth Road/Main Street. A further service is affected between Main Street and the River Liffey. Option H also affects one additional service on Dublin Road.

Option H1

- Option H1 impacts LV/MV ESB lines. Along the proposed upgrade section of Maynooth Road/Main Street a total of 12 transverse and 2 parallel services are impacted with one of the parallel services present along the full length of the upgrade section. Three services are impacted in the offline section between Main Street and Dublin Road with a further two transverse and one parallel service impacted along Shinkeen Road. Option H1 impacts one services in the offline section between Shinkeen Road and the roundabout at Hazelhatch. Along Loughlinstown Road an additional four transverse and two parallel services are impacted.
- Option H1 crosses under the 220kV line along the upgraded section of Loughlinstown Road and the 110kV line in the offline section between Shinkeen Road and the roundabout at Hazelhatch however it is not considered that the lines will be impacted at these locations.
- Option H1 impacts a total of 9 GNI Gas pipelines. Along Maynooth Road/Main Street a total of four transverse and one parallel service are impacted with the parallel service present along the majority of Maynooth Road. One service is affected along Dublin Road. One parallel and two transverse services are impacted on Shinkeen Road.
- Option H1 impacts the EIR network in 19 locations. Along Maynooth Road/Main Street a total of seven transverse services are impacted along with three parallel services including two parallel services that span the full length of the upgrade section. Three services are impacted on Dublin Road and a further three transverse and two parallel services are impacted along Shinkeen Road. One full length parallel service is impacted along Loughlinstown Road.
- Option H1 impacts Virgin Media services at one location along Maynooth Road.
- Option H1 impacts the water supply pressurised mains network in 14 locations. Along Maynooth Road/Main Street a total of six transverse services are impacted along with one parallel service that spans the full length of the upgrade section. Two services are impacted on Dublin Road and a further

three transverse and one parallel services are impacted on Shinkeen Road. One parallel service is impacted along approximately half of the proposed upgrade section of Loughlinstown Road.

- Option H1 impacts the storm and sewer gravity main network in 12 locations. Nine transverse services and one full length parallel service are affected along Maynooth Road/Main Street. A further service is affected between Main Street and the River Liffey. Option H1 also affects one additional service on Dublin Road.

7.3.9.1 Conclusion

In conclusion, for this assessment the options with a higher number of conflicts with existing services, particularly on 110kV and 220kV overhead ESB cables, are ranked lower.

It was found in this assessment that Option E has the lowest impact on utility services and was ranked as 'Preferred'. Although Option E impacts the 38kV ESB HV underground line it was found that the impacts were less that the impacts of those options affecting the 110kV and 220kV overhead network. The Do-Nothing Option has no impact on existing utilities and is classified as Preferred as well.

All other options were ranked as 'Intermediate' as they had either a higher impact on the existing HV electricity services or had impacts on a greater number of existing services.

A summary of the preference ranking for each option with respect to Utilities is shown in **Table 7-17**.

Table 7-17: Utilities Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Intermediate
Option A1	Intermediate
Option B	Intermediate
Option C	Intermediate
Option D	Intermediate
Option E	Preferred
Option F	Intermediate
Option G	Intermediate
Option H	Intermediate
Option H1	Intermediate

7.3.10 Engineering Assessment Summary

The engineering assessment preference ratings described in the previous sections are summarised in the form of a matrix in **Table 7-19,** where each option is given a preference (preferred, intermediate and least preferred) with regards to each particular engineering criterion as per **Table 7-18**. The overall engineering assessment preference ratings have been derived by assessing the number of preferences for each option across the eight engineering topics.

The overall engineering preferred option is Option E as this option is the preferred option for 5 of the 9 criteria with the remaining 4 criteria classed as intermediate.

The table illustrates that Options D, F, G, H and H1 are considered least preferred across between 5 and 6 of the 9 disciplines and as a consequence these options are considered least preferred for engineering.

The remaining Options A, A1, B and C are classed as intermediate with each of these options having between 2 and 3 criteria rated as preferred, between and 5 rated as intermediate and between 2 and 3 rated

as least preferred. The Do-Nothing Option is classified as Intermediate due to mixed scoring that contain 2no. Least Preferred scorings, as well as 5 no. Preferred scores.

Table 7-18: Engineering Options Ranking

	Preferred
	Intermediate
	Least Preferred

Table 7-19: Overall Engineering Summary

Option	Traffic Assessment & Cross Section	Compliance with Technical Standards	Constructability	Junction & Access Strategy	Structures	Earthworks	Road Safety Assessment	Drainage	Utilities	Overall
Do-Nothing										Intermediate
Option A										Intermediate
Option A1										Intermediate
Option B										Intermediate
Option C										Intermediate
Option D										Least Preferred
Option E										Preferred
Option F										Least Preferred
Option G										Least Preferred
Option H										Least Preferred
Option H1										Least Preferred

7.4 Environmental Assessment

7.4.1 Population and Human Health

The following section examines the potential impacts that each option will pose on Population and Human Health within the study area.

7.4.1.1 Existing Constraints

Various constraints were identified within the study area in terms of population and human health and this appraisal considers both properties (residential and commercial) and community facilities, centres and amenities (schools, care homes, sports grounds, churches, playgrounds etc.). In terms of properties, **Table 7-20** presents the number of properties identified within 500m of each route option derived from the GeoDirectory (2020).

Table 7-20: Property Count Breakdown (Source: GeoDirectory, 2020)

Buffer Band*		0-50m	50-100m	100-200m	200-300m	300-500m	Total
Do-Nothing	Residential	130	203	408	483	776	**2,287**
	Commercial	27	45	45	28	43	
	Both	9	21	37	15	8	
	Unknown	1	2	4	0	3	
	Total	**167**	**271**	**494**	**526**	**829**	
Option A	Residential	8	65	194	341	698	**1,359**
	Commercial	0	0	2	6	17	
	Both	0	0	1	3	12	
	Unknown	0	1	2	2	7	
	Total	**8**	**66**	**199**	**352**	**734**	
Option A1	Residential	8	65	162	276	548	**1,117**
	Commercial	0	0	2	6	18	
	Both	0	0	1	4	14	
	Unknown	0	1	3	3	6	
	Total	**8**	**66**	**168**	**289**	**586**	
Option B	Residential	22	102	302	490	1270	**2,242**
	Commercial	1	3	4	7	17	
	Both	0	2	2	5	12	
	Unknown	0	0	0	0	3	
	Total	**23**	**107**	**308**	**502**	**1302**	
Option C	Residential	23	97	297	489	1312	**2,277**
	Commercial	1	3	5	7	18	
	Both	0	2	3	5	12	
	Unknown	0	0	0	0	3	
	Total	**24**	**102**	**305**	**501**	**1345**	
Option D	Residential	180	257	715	1149	2214	**4,615**
	Commercial	3	4	7	13	30	
	Both	0	2	2	8	20	
	Unknown	0	0	2	2	7	
	Total	**183**	**263**	**726**	**1172**	**2271**	
Option E	Residential	20	160	399	654	1557	**2,897**

Buffer Band*		0-50m	50-100m	100-200m	200-300m	300-500m	Total
	Commercial	1	1	2	9	72	
	Both	0	0	0	2	16	
	Unknown	0	0	0	0	4	
	Total	**21**	**161**	**401**	**665**	**1649**	
Option F	Residential	227	252	559	883	1780	**4,154**
	Commercial	2	14	65	113	192	
	Both	0	1	7	17	30	
	Unknown	0	0	2	2	8	
	Total	**229**	**267**	**633**	**1015**	**2010**	
Option G	Residential	277	223	749	1317	2812	**6,014**
	Commercial	43	40	88	147	244	
	Both	6	2	4	15	31	
	Unknown	1	1	3	3	8	
	Total	**327**	**266**	**844**	**1482**	**3095**	
Option H	Residential	101	183	599	1093	2449	**5,038**
	Commercial	38	37	86	141	250	
	Both	4	0	3	12	31	
	Unknown	1	0	0	2	8	
	Total	**144**	**220**	**688**	**1248**	**2738**	
Option H1	Residential	110	189	615	1113	2416	**5,060**
	Commercial	39	37	86	142	250	
	Both	5	0	3	12	30	
	Unknown	2	1	1	2	7	
	Total	**156**	**227**	**705**	**1269**	**2703**	

7.4.1.2 Assessment

7.4.1.2.1 The Do-Nothing Option

In the case of the Celbridge to Hazelhatch Link Road scheme, the Do-Nothing option represents the retention of the existing road network without improvement. This option comprises the existing road network infrastructure (i.e. existing single carriageways) in the study area and this networks ability to meet future demands for traffic and road safety without any upgrade or junction improvement works, other than routine maintenance.

This option currently has a potential impact on 2,287 properties that lie within 500m of the road with a more pronounced impact on 167 properties within 50m of the road. These property counts are moderate when viewed in relation to the other routes as presented in **Table 7-20**.

This option is considered intermediate in that while the absence of any construction impact on the community is a positive, this route option currently impacts on a moderate number of properties with the potential for a moderate traffic impact.

7.4.1.2.2 Route Option A

Option A is fully offline and has the second lowest number of properties located within 500m of the route, at 1,359 properties, and approximately 8 properties located within 50m of the route. Of these, 1,306 are residential, 25 are commercial, 16 are both residential and commercial and 12 are unknown status. The route passes closest to properties at Rockbridge, Ballymakealy Lawns, Abbeyfarm, Celbridge Abbey, L1016 (Newtown/Templemills Road), Pausdeen, Chelmsford, Chelmsford Manor (traverses the entrance to this residential estate), Simmonstown, Commons Lower, and Hazelhatch Road.

Option A commences at the roundabout between two schools; St. Wolstan's Community School and North Kildare Educate Together School, each located c.170m and c.200m from the routes starting location respectively. Pitches and courts associated with St. Wolstan's School are located c.40m and c.135m from the start of Option A respectively. Celbridge Athletic Club is situated immediately east of the route as it traverses along the western boundary of the club's track and field.

No churches or places of worship were identified close to the route. Option A will impact or traverse the following existing roads and accesses at several points including; the two schools identified above, Killadoon Lane, L1016 (at Templemills/Pausdeen), Chelmsford, Chelmsford Manor, Simmonstown Manor, and R405 (Hazelhatch Road) and Hazelhatch Roundabout.

Relative to the other options, Option A is considered one of the preferred options given the relatively lower impact on the community and the number of properties potentially directly impacted by traffic on this option. While the high offline nature of this option would be adverse in terms of construction, the positive operation phase impacts outweigh the temporary construction impact.

7.4.1.2.3 Route Option A1

Similar to Option A, Option A1 runs fully offline and commences at the R405 (Clane Road) at Ballymakealy Lower, c.220m south-west of the junction/turn for St. Wolstan's Community School and North Kildare Educate Together School, with these schools c.250m and c.480m from this option's starting location respectively.

There are 1,117 properties within 500m of this route and, of the ten route options proposed, this is the lowest number of properties identified for any route. Approximately 8 properties are within 50m of the route. Of the 1,117 properties identified, 1,059 are residential, 26 are commercial, 19 are both, and 13 are unknown status. The route passes through lands close to properties at Killadoon, Abbeyfarm, Celbridge Abbey, Chelmsford, Chelmsford Manor (traverses the entrance of this residential estate), Simmonstown, and Commons Lower. Option A1 follows same alignment as Option A between Celbridge Abbey through to Hazelhatch Roundabout.

Sports facilities, some associated with the schools mentioned above, are also close to this route, including;

- Celbridge Athletic Club grounds - c.200m east;
- Pitch and courts at St. Wolstan's School - c.230m east; and
- Celbridge Town AFC Schoolboy Pitches (Clane Road (R403) at Ballymakealy Lower) - c.400m east.

A bed and breakfast and a hotel are also located close to this route option at Ballymakealy lower;

- Celbridge Manor Hotel - c.500m north-east; and
- Springfield House Bed and breakfast - c.400m north-east.

No churches or places of worship were identified along this route option. Option A1 will impact local access at the following points; the R403/Clane Road (where the route commences), as well as where it shares its alignment with Option A at Killadoon Lane, the L1016 (Newtown Road/ Templemills Road), Chelmsford, Chelmsford Manor, Simmonstown Manor, and Hazelhatch Road-Roundabout.

Similar to Option A, Option A1 is one of the preferred options given the relatively lower impact on the community and the number of properties potentially directly impacted by traffic during operation on this option. Again, while the high offline nature of this option would be adverse in terms of construction, the positive operation phase impacts outweigh the temporary construction impact than other more online options.

7.4.1.2.4 Route Option B

Option B is the seventh longest proposed route and is the same length as Option F (2,180m). This option follows the same alignment as Options C and D at varying lengths between R403 (Clane Road) and Simmonstown, where it diverges and follows the same alignment as Options A and A1 for c.790m between Simmonstown and the Hazelhatch Roundabout.

Option B has the third lowest number of properties within 500m of the route at 2,242, with 23 properties within 50m of the route. Of the total properties identified, 2,186 are residential, 32 are commercial, 21 are noted at both and 3 are unknown status.

The route passes close to properties at Priory Lodge (St Raphael's Manor), Clane Road (R403) (Service Station), Celbridge Abbey (Garden Centre), River View Abbeyfarm, L1016 (Newtown Road), Temple Manor, Simmonstown (Simmonstown Lodge), Commons Lower and Hazelhatch Road. No churches or places of worship were identified close to the route. No sports or recreational grounds were identified along this option. No childcare facilities, schools, or places of worship were identified along this route.

Option B will impact local access where it traverses existing routes including; the R403 (Clane Road) (where the route commences at the service station), as well as where it shares alignment with Options C and D traversing the L1016 (Newtown Road/Templemills Road) and passing the eastern boundary of Temple Manor (Residential Estate), and where is shares alignment with Options A and A1 at Simmonstown Manor and Hazelhatch Road-Roundabout.

Option B is classed as intermediate preference given the moderate number of properties impacted by traffic on this route option during the operation stage. Again, this option is fully offline so there is potential for a more significant construction impact.

7.4.1.2.5 Route Option C

Option C is the second shortest options of the ten route options proposed (2,105m) and runs offline for c.1,830m before running on existing roads for c.275m. This route option commences at the same location as Option B and D at R403 (Clane Road), between the service station and the Celbridge Abbey Garden Centre adjacent to Celbridge Abbey.

Option C has the seventh highest amount of properties in proximity of the route; 2,277 properties were identified within 500m of this route, with 24 of these being within 50m of its alignment. Of the total properties identified, 2,218 are residential, 34 commercial, 22 both, and 3 are unknown status.

This route passes closest to properties at Priory Lodge (St Raphael's Manor), the R403 (Clane Road) (Service Station and Celbridge Abbey Garden Centre), Abbeyfarm, the L1016 (Newtown Road/Templemills Road), Temple Manor, Simmonstown Manor/The Drive (at Simmonstown Lodge and Simmonstown Stud), and the R405 (Hazelhatch Road).

Option C will impact local access where it traverses existing routes, including; the R403 (Clane Road) (where the route commences), the L1016 (Newtown Road/ Templemills Road), Simmonstown Manor/The Drive, and the R405 (Hazelhatch Road) and Hazelhatch Roundabout.

No sports grounds or recreational facilities were identified along this option; the nearest identified are Celbridge GAA Club (c.450m north) and Celbridge & District Tennis Club (c.260m north) of where this route joins with Hazelhatch Road (R405). No childcare facilities, schools, or places of worship were identified along this route.

Option C is classed as intermediate preference given the moderate number of properties impacted by traffic on this route option during the operation stage. The option is predominately offline so there is potential for a more significant construction impact than other more online options.

7.4.1.2.6 Route Option D

Option D is the fifth longest of the ten route options proposed (2,670m). 4,615 properties were identified within 500m of the proposed route, with 183 of these properties identified as being within 50m. Of the total properties identified, 4,515 are residential, 57 are commercial, 32 are both and 11 are unknown status.

Like Option B and C, this route passes close to properties at the R403 (Clane Road) (Priory Lodge/St Raphael's Manor), the L1016 (Newtown Road/Templemills Road), and Temple Manor. This route diverges north-east at Temple Manor and passes through the residential areas at Callenders Mill, Hazelhatch Park, and the R405 (Hazelhatch Road).

This route will impact local access where it traverses existing routes, including; the R403 (Clane Road), where it shares its alignment with Option B and C at the L1016 (Newtown Road/Templemills Road) and Temple Manor, and at Callenders Mill, Hazelhatch Park, and along the R405 (Hazelhatch Road) through to Hazelhatch Roundabout.

One childcare facility was identified along this route at Hazelhatch Park. A school was identified close to this route, St. Patrick's Primary School, c.100m east of where the route meets the junction of Hazelhatch Park and Hazelhatch Road (R405). No places of worship were identified along this route. Sports facilities were

identified along this option where it passes along Hazelhatch Road (R405); Celbridge GAA Club and Celbridge & District Tennis Club.

Option D is classed as least preferred given the high volume of properties potentially impacted by this route. It is noted that this route is predominately online which would reduce some construction impact.

7.4.1.2.7 Route Option E

Option E is the shortest route of the ten options proposed (2,040m) and commences at Clane Road (R403) at the southern western extent of the Celbridge Abbey grounds. 2,897 properties were identified within 500m of this option, and 21 of these are within 50m of the route. Of the total properties identified, 2,790 properties are residential, 85 are commercial, 18 are both, and 4 are unknown status.

This route passes close to properties on the R403 (Clane Road) close to Priory Lodge (St. Raphael's Manor), where it traverses the L1016 (Newtown Road/Templemills Road), lands at Simmonstown (Callenders Mill, Hazelhatch Park and Simmonstown Manor/The Drive), and The Commons, and where it travels along Hazelhatch Road (R405).

The majority of the Option E route is offline; however, it will impact local access where it traverses existing roads, including; the R403 (Clane Road), the L1016 (Newtown Road), Simmonstown Manor/The Drive, and the R405 (Hazelhatch Road). Access to Saint Raphael's Special School and St. John of God Celbridge is located c.120m north east from where this route commences on the R403. The Mill, Celbridge Community Centre, is situated c.430m north-east from where Option E begins. No places of worship were identified along the route; the closest place of worship identified was RCCG Emmanuel's House, situated c.430m north-east at The Mill Community Centre. Recreational areas are present at Celbridge Abbey, including Celbridge Abbey Gardens, a playground, and Celbridge Abbey Car Park.

Sports facilities were identified close to this option on Hazelhatch Road (R405); Celbridge GAA Club (c.90m south to GAA Grounds entrance) and Celbridge and District Lawn Tennis Club (c.200m south). No childcare facilities were identified along this route. A primary school, Saint Patrick's National School, is located c.250m north-east of where Option E joins Hazelhatch Road (R405).

Option E is classed as intermediate preference given the moderate number of properties impacted by traffic on this route option during the operation stage. The option is predominately offline so there is potential for a more significant construction impact than other more online options.

7.4.1.2.8 Route Option F

Option F is the third shortest route of the ten options proposed (2,170m), and commences at Clane Road at the Celbridge Abbey Car Park. This option has the fifth highest number of properties within 500m of its route at 4,154, and 229 of these are within 50m of this option. Of the total properties identified, 3,701 are residential, 386 are commercial, 55 are both, and 12 are unknown status. This route passes close to properties where it commences on the R403 (Clane Road) and passes along the L1016 (Newtown Road/ Templemills Road), Simmonstown Manor/Hazelhatch Park, Primrose Hill, and the R405 (Hazelhatch Road).

Option F commences close to main shopping streets in the central area of the town, including Tea Lane, English Row, and Celbridge Main Street (c.100m north-east), a main retail area in the town, with multiple shops and services present. Recreational areas are present close to this option at Celbridge Abbey, including Celbridge Abbey Gardens, a playground, and Celbridge Abbey Car Park, where the proposed route begins and traverses. The entrance to Saint Raphael's Special School and Saint John of God is located c.180m south-west from this route on the R403. One childcare facility was identified along this route at Hazelhatch Park. Two primary schools were identified within the vicinity of the route; Primrose Hill National School (c.200m north-east on the R405) and St Patrick's National School (c.100m east off the R405).

The Mill, Celbridge Community Centre, is located within c.100m (east) of this route option. No places of worship were identified along the route; however, two churches are present on Celbridge Main Street (St Patrick's Catholic Church (c.350m north-east) and Christ Church (c.600m north-east) and another place of worship, RCCG Emmanuel's House, is situated at The Mill Community Centre (c.100m east).

Sports facilities were identified along this route at Hazelhatch Road (R405); Celbridge GAA Club and Celbridge and District Lawn Tennis Club. Option F will impact local access where it traverses the following existing routes; R403/Clane Road, the L1016 (Newtown/Templemills Road), Simmonstown Manor/Hazelhatch Park, Primrose Hill, and the R405 (Hazelhatch Road).

Option F is classed as least preferred given the high volume of properties potentially impacted by this route. It is noted that this route is predominately online which would reduce some construction impact.

7.4.1.2.9 Route Option G

Option G is the fourth longest route of the proposed options (2,830m) and commences at the junction of Maynooth Road (R405) and Shackleton Road. Of the ten options proposed, Option G has the highest number of properties within 500m of its route at 6,014. Of these, 327 are within 50m of the route. Of the total properties identified, 4,425 properties were identified as residential, 552 as commercial, 50 are both, and 11 are unknown status. This route passes close to properties located along Maynooth Road (R405), Celbridge Main Street, Castletown, the R403 (Dublin Road), Shinkeen Road, Primrose Hill (R405), and Hazelhatch Road (R405).

This route passes between Christ Church Celbridge and Celbridge Parish Office and Parochial house located on Celbridge Main Street. Celbridge Montessori School is also situated c.50m north of where the route passes at this point. St. Patrick's Church is situated on the Main Street, c.200m south-west of the route. Castletown Round House and Gate House, a historical building, which is operated as self-catering accommodation and managed by the Irish Landmark Trust, is situated where this option passes at the junction of Maynooth Road (R405) and Celbridge Main Street.

Multiple commercial and retail properties are present along this route. Where the route begins and along Maynooth Road, there are multiple retail units, cafes, services and shopping areas present, including for example; Celbridge Industrial Estate, Celbridge Shopping Centre (including Tesco, Ulster Bank etc.), Monatrea Industrial Estate, Colourtrend (Paint Supplies), and Celbridge Veterinary Centre.

Celbridge Garda Station is located along the route on Maynooth Road (R405). Celbridge HSE Primary Health Care Centre is located c.50m east of the routes start point on Maynooth Road; Celbridge Medical (Centric Health), Riverside Dental Practice, Care Plus Pharmacy are also situated here. Access to this centre is located c.100m north of the junction where the proposed route commences. Other health facilities are located on Shackleton Road; KDoc Celbridge (c.140m west) and Oaktree Clinic (c.200m west).

Option G also traverses Celbridge Main Street, a main retail area in the town, with multiple shops and services. Another shopping centre, Wolstan's Shopping Centre (which includes Nally's SuperValu, Costa Coffee, a fitness club, and a pharmacy), is present c.20m west of this route where it passes at the junction of R403 (Dublin Road) and Shinkeen Road. Retail units and businesses are also present at Willow Court on Shinkeen Road.

One school was identified along this route, St. Patrick's National School, located off Hazelhatch Road (R405). Other schools in the vicinity of the route include Saint Brigid's Girls National School c.250m south-west on Celbridge Main Street and Primrose Hill National School c.400m north-west of the route at Primrose Hill (Hazelhatch Road/R405).

Several childcare facilities/services were identified within the vicinity of this option include; Kiddies Choice Childcare (Maynooth Road), Celbridge Montessori School (Main Street), Primrose Montessori School (Primrose Hill), Treehouse Childcare (Primrose Gate), and Cocoon Childcare (Hazelhatch Park). This route passes Celbridge GAA Club and Celbridge & District Tennis Club on Hazelhatch Road (R405). Another club identified close to the route is the Celbridge Town AFC Senior Pitches, situated at St. Patrick's Park, c.280m west of Maynooth Road.

Option G is classed as least preferred given the high volume of properties potentially impacted by this route. It is noted that this route is predominately online which would reduce some construction impact.

7.4.1.2.10 Route Option H

Option H is the second longest option of the routes proposed (3,040m). Similar to Option G, Option H commences at the junction of Maynooth Road and Shackleton Road. Option H runs offline for c.2,425m and runs on existing roads for c.605m.

Option H has the third highest number of properties within 500m of the route at 5,038; of these, 144 are within 50m of the route. Of the total properties identified, 4,425 are residential, 552 are commercial, 50 are both, and 11 are unknown status. This route passes close to properties at Maynooth Road (R405), Celbridge Main Street, R403 (Dublin Road), Shinkeen Road, Primrose Hill, and Hazelhatch Road (R405).

As Option H shares the same route as Option G between its starting point on Maynooth Road (R405) through to St. Wolstan's Court on Shinkeen Road (before Option H diverges east), it passes the same

receptors mentioned under Option G above within this section of its route. From the point where it diverges east, Option H then passes the following receptors:

- Passes through agricultural lands with Donaghcumper Cemetery c.220m to the north and Primrose Gate Residential estate c.110m to the south.
- It then passes along the eastern boundary of the Primrose Gate (Willow Lawn and Willow Avenue), St. Patrick's School, Celbridge GAA Club Grounds, and Celbridge and District Tennis Club.
- Passes though lands to the rear of detached residential properties on Hazelhatch Road before reaching Hazelhatch Roundabout.

A nursing home, Elm Hall Nursing Home, is situated c.580m east (on Loughlinstown Road) of this route where it passes through the lands at Donaghcumper.

Option H is classed as least preferred given the high volume of properties potentially impacted by this route as well as the predominately offline nature of this route.

7.4.1.2.11 Route Option H1

Option H1 is the longest of the ten do-something route options proposed (3,410m) and is a sub-option of Option H, following the same alignment as Option H from the junction of Maynooth Road and Shackleton Road to south-east of the Primrose Gate housing estate.

Option H1 has the second highest number of properties within 500m of the route at 5,060; of these 156 are within 50m of the route. Of the total properties identified, 4,443 are residential, 554 are commercial, 50 are both, and 13 are unknown status. This route passes close to properties at Maynooth Road (R405), Celbridge Main Street, R403 (Dublin Road), Shinkeen Road, Primrose Gate, and Loughlinstown Road.

As Option H1 shares the same route as Options G and H between its starting point on Maynooth Road (R405) through to St. Wolstan's Court on Shinkeen Road (before Option H and H1 diverge east), it passes the same receptors mentioned under Option G above within this section of its route.

From the point where it diverges east, it passes the same receptors mentioned under Option H above, between Shinkeen Road, through to where Option H1 diverges south-east from Option H at the eastern boundary of Celbridge GAA Club. From here, Option H1 traverses lands in Loughlinstown in a south-easterly direction for c.600m before meeting Loughlinstown Road, where it diverges south-west, following this road south-west through to Hazelhatch Roundabout. Elm Hall Nursing Home is situated c.840m north of where Option H joins Loughlinstown Road. On Loughlinstown Road, Option H1 passes several detached residential properties on each side of the route, as well as Elm Hall Golf Course. This option also passes the existing access to Celbridge Train Station and Car Park.

Option H1 is classed as least preferred given the high volume of properties potentially impacted by this route as well as the predominately offline nature of this route.

7.4.1.3 Conclusion

Table 7-21 provides a summary of the appraisal of each of the six route options for the Celbridge to Hazelhatch Link Road Scheme in terms of Population and Human Health. Impacts are described as 'Preferred', 'Least Preferred', or 'Intermediate'.

Table 7-21: Population and Human Health Preference Rating

Option	Preference Ranking
Do-Nothing	Intermediate
Option A	Preferred
Option A1	Preferred
Option B	Intermediate
Option C	Intermediate

Option	Preference Ranking
Option D	Least Preferred
Option E	Intermediate
Option F	Least Preferred
Option G	Least Preferred
Option H	Least Preferred
Option H1	Least Preferred

7.4.2 Material Assets (Non-Agricultural)

The following section examines the potential impacts that each option will pose on non-agricultural material assets within the study area.

7.4.2.1 Existing Constraints

Various material asset constraints have been identified within the study area, including utilities and transport infrastructure. The study area contains a road network comprising of a number of regional and local roads including; R403, R405, L1022, and L1016. No motorways traverse the study area. The nearest motorway is the M4, located c.1.5km north of the study area boundary. This motorway is linked to Celbridge by the R449 and R405 Maynooth Road. Celbridge Town is served by an intercity rail service, serving Hazelhatch and Celbridge Station. This railway line traverses the southern section of the study area in an north east to south west direction. Several Bus Éireann and Dublin Bus routes operate in the study area and serve Celbridge Town.

The major utility services have been identified and mapped where data is available. Electricity (ESB), Gas Networks Ireland (GNI), Irish Water, and Telecommunications Network Infrastructure were all identified with in the study area. The exact locations of utility service infrastructure (such as for gas, electricity, telecoms, water mains and wastewater) will be identified as the project progresses. No licenced waste facilities were identified within the study area. The Celbridge LAP states that a site has been identified north of Celbridge town for the provision of a recycling centre to serve North Kildare: (Objective INFO4.2); a site has been identified south of the M4 Motorway, to the west of the M4 Exit 6 and the R449, a central position to serve Celbridge, Leixlip, Maynooth and Kilcock.

No Industrial Emissions (IE) Licence holders were identified within the study area. There are two EPA licenced sites in Celbridge; HDS Energy Limited (IPC P0286), located at Celbridge Industrial Estate, and General Paints Limited (P0229), located on Maynooth Road (R405). Two ‘Section 4’ wastewater discharge licences were also identified in the area, one for St Patrick’s National School (WP286/09), located within the study area on Hazelhatch Road, and the second at Elm Hall Nursing Home (WP232/06), located at immediately east of the study area boundary on Loughlinstown Road. A brewing company (Rye River Brewing) located within the east of the study area on the Dublin Road (R403).

The principal material asset constraints in the area are the utilities and existing transport infrastructure. The identified key constraints which will need to be considered include:

- Electricity Infrastructure - 38kV, 110kV, and 220kV overhead and underground distribution lines identified within the study area;
- Watermains along the existing road network;
- Wastewater (Gravity Mains) Infrastructure;
- Gas Network Ireland Medium Pressure distribution pipelines;
- Location of future Civic Amenity Facility in north Celbridge to serve North Kildare;
- EPA Licensed Sites identified; and
- The cut fill/balance and the calculation of materials suitable for reuse for each option brought forward to route selection stage (as per Section 6.3.6).

7.4.2.2 Assessment

7.4.2.2.1 The Do-Nothing Option

The Do-Nothing scenario will not alter the existing impacts and constraints in relation to non-agricultural material assets within the study area and a neutral impact is predicted.

7.4.2.2.2 Route Option A (Blue)

Option A, runs entirely offline and begins at the roundabout between two schools, St. Wolstan's Community School and North Kildare Educate Together School and ends at Hazelhatch Road (R405) / Hazelhatch Roundabout, and interacts with utilities at several points:

- Option A crosses Gas Network Infrastructure (GNI) Medium Pressure (MP) distribution pipelines at two locations; the L1016 (Templemills Road) and Chelmsford Manor.
- This route traverses Gravity Main (wastewater) infrastructure at the L1016 (Templemills Road).
- This option crosses existing watermains infrastructure on the L1016 (Templemills Road), and watermains are present where this route ends at Hazelhatch Roundabout.
- Option A passes close to or traverses 220kV ESB Overhead Lines (OHL) at several points along its alignment including; Celbridge Athletic Club, Celbridge Abbey, Pausdeen/Templemills Road, Chelmsford Manor, and lands at Simmonstown.

7.4.2.2.3 Route Option A1 (Dark Blue)

Option A1 is a sub-option of Option A and runs entirely offline. The route commences at Clane Road (R403) between Killadoon Park Road and St. Wolstan's Community School. This option crosses utility infrastructure at multiple points:

- Option A1 traverses GNI MP distribution pipelines at two locations; L1016 (Templemills Road) and Chelmsford Manor (as with Option A).
- Gravity Main (wastewater) infrastructure is present at approximately two points; where the route commences at Clane Road and where the route crosses the L1016 (Templemills Road) (as with Option A).
- Watermains are present where Option A1 commences on Clane Road (R403), and where the route crosses the L1016 (Templemills Road) and where the route ends at Hazelhatch Roundabout (as with Option A).
- This route, like Option A, passes close to or traverses 220kV ESB OHLs at several points along its alignment, including at; Celbridge Abbey, Pausdeen/Templemills Road, Chelmsford Manor, and lands at Simmonstown.

7.4.2.2.4 Route Option B (Red)

Option B follows the same alignment as Options C and D for varying lengths between R403 (Clane Road) and Simmonstown, and follows the same alignment as Options A and A1 for c.790m between Simmonstown and the Hazelhatch Roundabout. This option passes close to or traverses utility infrastructure at multiple points:

- This route crosses GNI MP distribution pipelines at several locations; the junction of the R403 and the service station entrance and the lands to the rear of the service station, and where it crosses the L1016 (Templemills/Newtown Road). GNI MP lines are also situated close to this route at the Garden Centre to the east of the service station, but not traversed by the alignment.
- Option B traverses Gravity Main infrastructure at approximately four points; where the route commences at the service station on the R403 (Clane Road), at the lands to the rear of the service station, and at two points where this route crosses the River Liffey (on both the north and south bank of the river).
- Watermains are present where this Option B commences on the R403 (Clane Road), where it crosses the L1016 (Templemills/Newtown Road), and where it ends at Hazelhatch Roundabout.

- Option B Crosses 110kV OHL at lands to the rear of the service station off the R403, where it traverses the River Liffey and Templemills Road (L1016), and also runs adjacent to and crosses this 110kV OHL at Temple Manor. Option B traverses 220kV OHLs at lands at Simmonstown.

7.4.2.2.5 Route C (Yellow)

Option C commences at the same location as Option B and D at the R403 (Clane Road) between the service station and the garden centre at Celbridge Abbey. This option passes close to or traverses utilities at several points, including:

- As with Options B and D, Option C crosses two GNI MP distribution pipelines at the R403 and service station, and is close to the GNI lines are also situated at Garden Centre to the east of the service station.
- Like Option B, Gravity Main infrastructure at approximately four points along Option C; where the route commences at the service station on the R403 (Clane Road), at the lands to the rear of the service station, and two points where this route crosses the River Liffey.
- Watermains are present where this route commences on the R403 (Clane Road), where it crosses the L1016 (Templemills/Newtown Road), and ends at the R405 (Hazelhatch Road).
- Like Option B, Option C traverses 110kV OHLs at lands to the rear of the service station off the R403, at the River Liffey and Templemills Road (L1016), and also runs adjacent to and crosses this 110kV OHL at Temple Manor. Option C crosses a 220kV OHL at lands where it traverses Simmonstown Manor/The Drive road.

7.4.2.2.6 Route Option D (Light Blue)

Option D runs offline for c.1,045m before running online with existing roads for c.1,625m. This option commences at the same location as Option B and C and interacts with/traverses utilities at several points, including:

- As with Options B and C, Option D crosses two GNI MP distribution pipelines at the R403 and service station, and passes close to the GNI lines situated at Garden Centre to the east of the service station. After Option D diverges from Option B and C, it runs adjacent to and traverses GNI MP lines at Callenders Mill, and crosses paths with GNI MP lines at approximately four points on Hazelhatch Park Road.
- Like Option B and C, Gravity Main infrastructure at approximately four points along Option D; where the route commences at the service station on the R403 (Clane Road), at the lands to the rear of the service station, and two points where this route crosses the River Liffey.
- Watermains are present where this route commences on the R403 (Clane Road), where it crosses the L1016 (Templemills Road), at Callenders Mill, along Hazelhatch Park (it crosses mains at several points along this section of the route), and along the extent of the R405 (Hazelhatch Road) through to the Hazelhatch Roundabout, where this route ends.
- Like Option B and C, Option D traverses 110kV OHLs at lands to the rear of the service station off the R403, at the River Liffey and Templemills Road (L1016), and also runs adjacent to and crosses this 110kV OHL at Temple Manor. Option D diverts here and traverses the 110kV OHL again at the lands just south of Callenders Mill, and at approximately three points along Hazelhatch Park. Option D traverses the 220kV OHL within the study area along the existing alignment of the R405 (at the same point as Options E, F, and G).

7.4.2.2.7 Route Option E (Pink)

Option E commences at Clane Road at the southern western extent of the Celbridge Abbey grounds.

- Option E interacts with GNI MP pipeline at approximately two locations; where the route commences on the R403 at Priory Lodge, and where it traverses the L1016 (Templemills Road).
- This route option crosses Gravity Main infrastructure at two points; where the route commences on the R403 (Clane Road) and at Celbridge Abbey (north side of the River Liffey).

- Watermains are present where this route commences on the R403 (Clane Road), crosses the L1016 (Templemills Road), and along the R405 (Hazelhatch Road) through to where the route ends.
- Option E traverses an ESB 110kV OHL at the lands adjacent to Callenders Mill, and traverses the 220kV OHL along the existing alignment of the R405 (at the same point as Options D, F, and G).

7.4.2.2.8 Route Option F (Orange)

Option F commences at Clane Road at the Celbridge Abbey car park where a GNI medium pressure pipeline is present.

- This option traverses GNI MP lines at approximately eight locations; one at the junction of Simmonstown Manor and the L1016 (Templemills Road) and seven points along Simmonstown Manor and Hazelhatch Park.
- Gravity Mains (wastewater) are present where the route commences on the R403 (Clane Road), where the route crosses the L1016 (Templemills Road), the route also runs adjacent to gravity mains present along Simmonstown Manor.
- Watermains are present where this route commences on the R403 (Clane Road), where it crosses the L1016 (Templemills Road), and along Simmonstown Manor and Hazelhatch Park, where it crosses mains at several points along this road/section of the route, as well as along the extent of the R405 (Hazelhatch Road) through to the Hazelhatch Roundabout, where this route ends.
- Like Option D, Option F crosses 110kV OHL at three points along Hazelhatch Park and also traverses the 220kV OHL along the existing alignment of the R405 (at the same point as Options D, E, and G).

7.4.2.2.9 Route Option G (Purple)

Option G commences at the junction of Maynooth Road (R405) and Shackleton Road.

- GNI MP lines are present along the length of Maynooth Road (R405) and this option crosses approximately four lines on this stretch, and crosses MP lines at approximately four further locations, at the R403/Shinkeen Road junction, on Shinkeen Road (two locations), and on Hazelhatch Road (R405).
- Gravity Mains are present along the length of Maynooth Road (R405) from where the route commences, through to its junction with Celbridge Main Street. This route then crosses gravity mains at three further locations; at Celbridge Main Street, the lands at the Church Office/Parochial House, and at the R403 (Dublin Road) junction with Shinkeen Road. Gravity mains are also present off Shinkeen Road at The Avenue (St. Wolstan's Abbey).
- Watermains are present at various locations along Option G's route, including; along Maynooth Road (R405) (crosses mains at several points along this road), Celbridge Main Street (crosses mains here), the R403 (Dublin Road), Shinkeen Road, and the length of the R405 (Hazelhatch Road) through to Hazelhatch Roundabout.
- Option G crosses 110kV OHL on the R405 (immediately north of the R405/Hazelhatch Park Junction) and also traverses the 220kV OHL along the existing alignment of the R405 (at the same point as Options D, E, and F).

7.4.2.2.10 Route Option H (Light Green)

Similar to Option G, Option H commences at the junction of Maynooth Road and Shackleton Road. Option H runs offline for c.2,485m and runs on existing roads for c.555m.

- GNI Medium Pressure distribution pipelines are present along the majority of the Maynooth Road (R405), and Option H crosses pipelines at approximately four locations along this road. This option also crosses GNI pipelines at the R403/Shinkeen Road junction and at two locations on Shinkeen Road before it diverges east.
- Gravity Mains are present along the length of Maynooth Road (R405) from where the route commences, through to its junction with Celbridge Main Street. Like Option G, this route crosses three gravity mains at Celbridge Main Street, the lands at the Church Office/Parochial House, and at the R403 (Dublin Road) junction with Shinkeen Road.

- Like Option G, watermains are present along the Option H route where it travels along Maynooth Road (R405), Celbridge Main Street, and the R403 (Dublin Road)/Shinkeen Road.
- Option H traverses ESB 110kV OHLs at lands to the east of the Celbridge GAA Club. Option H also traverses a 220kV OHL situated to the east of the R405.

7.4.2.2.11 Route Option H1 (Dark Green)

Option H1 travels the same alignment as Option H from the junction of Maynooth Road and Shackleton Road to immediately south of the Primrose Hill housing estate.

- Like Options G and H, Option H1 crosses four GNI pipelines along Maynooth Road. This option also crosses GNI pipelines at the junction of the R403 and Shinkeen Road and at one location on Shinkeen Road before diverging east.
- As with Options G and H, Gravity Main infrastructure is present along Option H1 at Maynooth Road (R405) through to its junction with Celbridge Main Street. This route then crosses three gravity mains locations at the same locations as described for Option H.
- On this route, watermains are present along the Maynooth Road (R405) (crosses mains at several points along this road), Celbridge Main Street (crosses mains here), the R403 (Dublin Road), Shinkeen Road, and along Loughlinstown Road.
- Like Option H, Option H1 traverses 110kV OHLs at lands to the east of the Celbridge GAA Club. Option H also traverses a 220kV OHL that crosses Loughlinstown Road.

7.4.2.3 Conclusion

Table 7-22 provides a summary of the appraisal of each of the route options for the Celbridge to Hazelhatch Link Road Scheme in terms of non-agricultural material assets. In addition, **Figure 7-2** shows the route options presented relative to the material asset constraints identified in the constraints study.

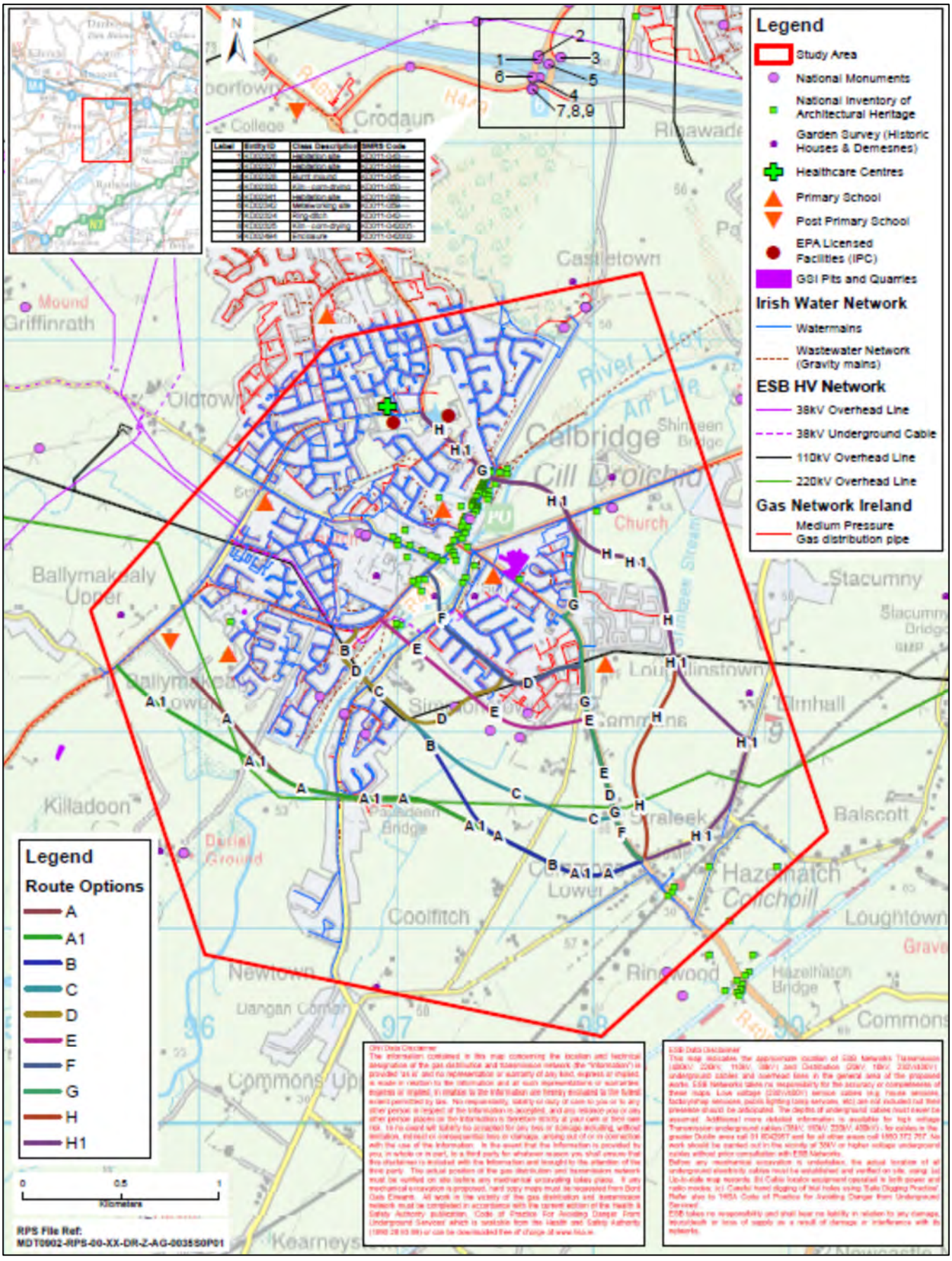


Figure 7-2: Map showing the Route Options over the Material Assets Constraints

Overall, the results indicate that Options G, H, and H1 have the potential to impact on the greatest number of material assets (utilities) identified relative to the other options and these options are classed as least preferred.

Options B, C, D, E, and F are ranked as intermediate as these interact with a number of utilities along each option, however, the level is lower than those outlined as least preferred above. The Do-Nothing scenario and Options A and A1, have been ranked as preferred, as these options will result in limited to no impact on material assets (utilities) identified when compared to all other route options proposed.

Table 7-22: Material Assets (Non-Ag) Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Preferred
Option A1	Preferred
Option B	Intermediate
Option C	Intermediate
Option D	Intermediate
Option E	Intermediate
Option F	Intermediate
Option G	Least Preferred
Option H	Least Preferred
Option H1	Least Preferred

7.4.3 Material Assets (Agricultural Land Use)

The following section examines the potential impacts that each option will pose on Agricultural Land Use within the study area.

7.4.3.1 Existing Constraints

The land use in the study area is a mix of urban (residential and commercial/industrial) and rural (agricultural and recreational). The residential, commercial and industrial areas and their associated properties/buildings identified in Celbridge and the study area are typical of a town of this size. Rural lands identified during the constraints desk top appraisal are typical of Irish agricultural land uses. Anecdotal evidence suggests farms within this area are mainly grass based and are mainly involved in dry stock (sheep and cattle) and tillage.

While dry stock farms do require moving cattle on a regular basis, the frequency of movement is measured in days rather than hours as may be found in dairy farms, and as such, are better able to absorb the effects of a new road. With regard to tillage, these farms tend to be associated with larger fields and better able to absorb the affects, if any, of a new road. In terms of horse breeding and equestrian land uses, one stud farm was identified in the of the study area at Simmonstown. Anecdotal evidence suggests that this stud farm has been sold, however it still appears to be occupied by thoroughbred horses which will need to be considered. Another apparent area of land used for equestrian activity was identified off Newtown Road based on available aerial photography (appears to be stables/horse-riding). There are no other obvious active riding schools or training stables with associated gallops in the area.

Other land uses including demesnes, green spaces and parks, community facilities, pitches and clubs, which support community recreation and amenity activity in the area, are also an important constraint. Any loss of these facilities or amenities could have direct and indirect negative effects in the area.

7.4.3.2 Assessment

7.4.3.2.1 The Do-Nothing Option

The Do-Nothing scenario will not alter the existing impacts and constraints in relation to agricultural material assets within the study area and a neutral impact is predicted.

7.4.3.2.2 Route Option A

Option A is 100% offline and will mainly traverse rural lands, with a mixture of land use areas (i.e. tillage, dry stock, residential, recreational) across lands at Ballymakealy Lower, Celbridge Abbey, Simmonstown, and Commons Lower.

This route traverses agricultural lands, including those accessed by existing routes including Killadoon Lane, L1016 (Newtown Road), Simmonstown Road/The Drive, Hazelhatch Road, and the Lords Road. As this route is completely offline, Option A may potentially result in significant changes to, or impacts on, any existing agricultural operations present where it traverses. Large scale land take and/or property severance will be required with this option.

7.4.3.2.3 Route Option A1

Option A1, a sub-option of Option A, is 100% offline, and like Option A, will traverse mainly agricultural and rural land, with a mixture of land use areas, at Ballymakealy Lower, Celbridge Abbey, Simmonstown, and Commons Lower.

This route traverses agricultural lands and natural areas, including those accessed by existing routes including the R403 (Clane Road), Killadoon Lane, the L1016 (Newtown Road/Templemills Road), Simmonstown Road/The Drive, Hazelhatch Road, and the Lords Road. As this option is completely offline, Option A1 may potentially result in significant changes to, or impacts on, any existing agricultural operations present along its route. Large scale land take and/or property severance will be required with this option.

7.4.3.2.4 Route Option B

Option B runs 100% offline and will traverse mainly rural land between Celbridge Abbey, Simmonstown, and Commons Lower. This option follows the same alignment as Option A and A1 between lands at Simmonstown and Hazelhatch roundabout. Land traversed with this option are a mixture of land use types, including tillage, dry stock and close to some residential areas.

This route traverses agricultural lands accessed by existing routes including the R403 (Clane Road), the L1016 (Newtown Road/Templemills Road), Simmonstown Road/The Drive, Hazelhatch Road, and the Lords Road. This route traverses equestrian lands off Newtown Road, immediately north east of Temple Manor, where there appears to be stables and horse riding activity, observed on aerial photography. As Option B is completely offline, may potentially result in significant changes to, or impacts on, existing agricultural operations or equestrian activity present where it traverses. Large scale land take and/or property severance will be required with this option.

7.4.3.2.5 Route Option C

The offline section of the Option C represents 1,830m and mainly traverses through lands between Celbridge Abbey and Simmonstown (where it joins Hazelhatch Road). The online section represents c.275m of the route, and mainly accounts for the section where this route joins the Hazelhatch Road and runs south through to Hazelhatch Roundabout. Land traversed in the offline section of this route consists of mainly dry stock and tillage, with evidence of cattle present from recent aerial photography. Like Option B, this route traverses the equestrian lands identified off Newtown Road. As this route is largely offline, Option C may potentially result in changes to, or impacts on, existing agricultural operations it traverses, and will require large scale land take and/or property severance. Existing roads or access impacted and/or traversed by this route include; the R403 (Clane Road), the L1016 (Newtown Road/Templemills Road), Simmonstown Road/The Drive, and Hazelhatch Road.

7.4.3.2.6 Route Option D

The offline section of Option D is 1,045m of the route, while the online section (1,625m) of the route runs along the existing road network. The offline section traverses lands at Celbridge Abbey and Simmonstown before diverging north-east to more built up/residential areas. Like Option B and C, this route traverses the equestrian lands identified off Newtown Road. While there would be no requirement for large scale land or property severance, there would be small scale land take required where this route traverses agricultural or equestrian lands, and for properties along existing online alignment to increase the road width. Existing roads or access impacted and/or traversed by this route include; the R403 (Clane Road), the L1016 (Newtown Road/Templemills Road), Callenders Mill, Simmonstown Manor, Hazelhatch Park, and the R405 (Hazelhatch Road).

7.4.3.2.7 Route Option E

Approximately 1,250m of Option E runs offline, and traverses agricultural lands along its route between Celbridge Abbey, Simmonstown and Commons, before joining the R405 (Hazelhatch Road). Option E also traverses lands immediately north of the stud farm identified at Simmonstown (situated off Simmonstown Manor/The Drive Road). While there would be no requirement for large scale land or property severance, land take will be required where this route traverses agricultural lands, and small scale land take in terms of properties along the existing online alignment. Existing roads or access impacted and/or traversed by this route include; the R403 (Clane Road), the L1016 (Newtown Road/Templemills Road), Simmonstown Manor/The Drive, and the R405 (Hazelhatch Road).

7.4.3.2.8 Route Option F

Option F is largely online (85%), with only 15% of this option offline. Where the route briefly runs offline, it traverses land at Celbridge Abbey, close to Celbridge Abbey Gardens and through an existing playground. The majority of this route option runs along the existing road network. There would be no requirement for large scale land or property severance, however, small scale land take will be required for properties along existing alignment to increase the road width.

7.4.3.2.9 Route Option G

Option G will result in limited changes to, or impacts on, existing agricultural operations, as this route is largely online, running along the existing road network. The online sections of the route represent approximately 83% and the offline section, which represents c.16%, traverses lands for a brief stretch between Celbridge Main Street and the R405 (Dublin Road). This land appears to consist of mainly dry stock, with evidence of cattle present from recent aerial photography. This route may impact access to these lands. While there would be no requirement for large scale land or property severance, there would be land take required in terms of the offline area outlined above, and small-scale land take required for properties present along existing online section of the alignment.

7.4.3.2.10 Route Option H

Option H runs largely offline; c.2,485m through a mixture of land use areas across lands at Donaghcumper, Commons, Loughlinstown, and Elmhall. This route also passes along eastern boundary of Celbridge GAA Club and Celbridge & District Tennis Club. As the route is largely offline, Option H may potentially result in significant changes to, or impacts on, existing agricultural operations it traverses. This option will require large scale land take and severance relating to the agricultural lands present, as well as small scale land take for properties along existing road alignment (e.g. Maynooth Road).

7.4.3.2.11 Route Option H1

Approximately 58% of route H1 runs offline (1,975m) and follows the same alignment as Option H between Maynooth Road through to agricultural lands at Commons (located to the east of the GAA Club). The overall length of the offline section of this route is shorter compared Option H. Option H1 traverses agricultural lands at Donaghcumper, Commons, Loughlinstown, and Elmhall, before joining Loughlinstown Road, passing close to Elmhall Golf Club. This route may impact access to these lands and will require land take and severance where it traverses the lands identified, as well as small scale land take for properties along where this route follows existing road alignments.

7.4.3.3 Conclusion

Table 7-23 provides a summary of the length of each of the route options along with an overview of the extent of the offline alignment and the breakdown between online/offline fractions for each route. This information has been employed to inform the option assessment for this discipline.

Table 7-23: Land Use (Agricultural): Online/Offline % Breakdown for Each Route Option

Option	Total Route Length (m)	Online	Offline	Offline Length
Option A	2,635	0%	100%	2,635
Option A1	2,975	0%	100%	2,975
Option B	2,180	0%	100%	2,180
Option C	2,105	13%	87%	1,830
Option D	2,670	61%	39%	1,045
Option E	2,040	39%	61%	1,250
Option F	2,170	85%	15%	320
Option G	2,830	83%	17%	470
Option H	3,040	18%	82%	2,485
Option H1	3,410	42%	58%	1,975

Table 7-24 provides a summary of the appraisal of each of the ten route options in terms of agricultural land use. The Do-Nothing option is preferred given that this route will have no additional impact on agricultural properties under the existing alignment. Based on the analysis, Options A, A1, B, C, H, and H1 have been ranked as least preferred based on review of each option in terms of different factors, including land type present and being traversed, the percentage offline, and length (m) offline of each route option. The preference for Option D and Option E have been ranked as intermediate given that these routes have moderate offline section lengths with a potential lower impact on agricultural properties. While there is some impact over the Do-Nothing option, the preferred do something route options are Option F and G, due to the short length of each options online section, and minimal interaction with agricultural lands in the study area.

Table 7-24: Land Use (Agricultural) Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Least Preferred
Option A1	Least Preferred
Option B	Least Preferred
Option C	Least Preferred
Option D	Intermediate
Option E	Intermediate
Option F	Preferred
Option G	Preferred
Option H	Least Preferred
Option H1	Least Preferred

7.4.4 Air Quality

The following section examines the potential impacts that each option will pose on Air Quality within the study area.

7.4.4.1 Existing Constraints

The following key constraints have been identified from the baseline environment appraisal that will need to be considered further at route selection stage:

- The possible impact of increased air emissions within the study area;
- Residential properties affected by changes in traffic patterns and transport emissions;
- Sensitive receptors including schools (e.g. St. Raphael's Special School and St Patrick's National School), creches, hospitals, care and nursing homes (e.g. Elm Hall Nursing Home) etc. where more vulnerable members of the community may be located;
- Other commercial operations and community centres; and
- Sensitive ecosystems which are particularly sensitive to nitrogen deposition. This may include both EU and nationally designated sites as well as non-designated habitats.

7.4.4.2 Assessment

In terms of air quality, the focus of the preliminary option assessment relates to the number of properties within 50m of each alignment as per the Transport Infrastructure Ireland (TII) Guidelines. Properties within 50m have the greatest for potential impact to human health from road traffic emissions and hence the focus on this zone of influence. The property data used to inform this assessment is that presented in **Table 7-20** and the relevant data sets have been reproduced for this assessment in **Table 7-25.**

Table 7-25: Number of properties within 50 metres of each option

Route Option	Total Route Length (m)	No. of Receptors less than 50m
Do-Nothing	-	167
Option A	2,635	8
Option A1	2,975	8
Option B	2,180	23
Option C	2,105	24
Option D	2,670	183
Option E	2,040	21
Option F	2,170	229
Option G	2,830	327
Option H	3,040	144
Option H1	3,410	156

7.4.4.2.1 The Do-Nothing Option

This option currently has a potential impact on 167 properties that lie within 50m of the existing alignment and this is moderate when viewed in relation to the other routes. The following are the higher sensitivity receptors located along the existing regional road network:

- St. Raphael's Special School on the R403 in Celbridge Town;
- Primrose Hill National School on the R404 in Celbridge Town;
- Celbridge Montessori, Slip Hall;
- Memory Lane Preschool on Main Street;

- St. Wolstan's Community School on the R403 to the west of Celbridge;
- Celbridge Medical Centre, Main Street; and
- HSE Primary Care Centre on the R405.

This option is considered intermediate in that this route option currently impacts on a moderate number of properties with the potential for a moderate traffic impact.

7.4.4.2.2 Route Option A

Option A will potentially impact on a very low number of properties within 50m of the alignment (8 properties) which is the lowest of all options under consideration. Option A connects to the R403 at the roundabout between two schools; St. Wolstan's Community School and North Kildare Educate Together School, but only the St. Wolstan's Community School lies within the 50m zone of influence. The other two schools noted in the Do-Nothing option will experience a reduction in traffic impact as a result of this option. This is one of the preferred options for air quality given the very low number of properties impacted relative to other options.

7.4.4.2.3 Route Option A1

Similar to Option A, Option A1, only 8 properties are within 50m of the route making these options the lowest impact on properties of all route options. Furthermore, Option A1 connects with the R403 further west of St. Wolstan's Community School and ensures that the school lies outside of the 50m zone of influence. In addition, the other schools noted for the Do-Nothing impact would experience a net benefit under this option through reduced traffic. In this regard, Option A1 is preferable to Option A but both are classed as the preferred options relative to the other options.

7.4.4.2.4 Route Option B

Option B potentially impacts on 23 properties which lie within 50m of the route alignment. No childcare facilities, schools, or places of worship were identified along this route option. Option B would also divert traffic away from St. Raphael's Special School and Primrose Hill National School in Celbridge Town but given the return to the existing R403 alignment, the existing impact on St. Wolstan's Community School would remain. While not a low as Option A/A1, Option B is classed as preferred given the low number of properties impacted by traffic on this route option during the operation stage.

7.4.4.2.5 Route Option C

Option C potentially impacts on 24 properties which lie within 50m of the route alignment. As with Option B, no childcare facilities, schools, or places of worship were identified along this route and this option would also divert traffic away from St. Raphael's Special School and Primrose Hill National School in Celbridge Town. However, given the return to the existing R403 alignment, the existing impact on St. Wolstan's Community School would remain unchanged. Option B is classed as preferred given the moderate number of properties impacted by traffic on this route option during the operation stage.

7.4.4.2.6 Route Option D

Option D potentially impacts on a greater number of properties with 183 identified within the 50m impact zone of this option and these are principally in the area of Hazelhatch Park. One childcare facility (Cocoon Childcare) has been identified within 50m this route at Hazelhatch Park which may experience an impact from traffic on this route. This route option would also divert traffic away from St. Raphael's Special School and Primrose Hill National School in Celbridge Town but the existing impact on St. Wolstan's Community School would remain unchanged. Option D is classed as intermediate given the moderate volume of properties potentially impacted by this route.

7.4.4.2.7 Route Option E

Option E impacts on a low number of properties (21 within 50 metres) as this option avoids the larger residential areas to the south of Celbridge. This option also diverts traffic away from St. Raphael's Special School and Primrose Hill National School in Celbridge Town but retains the current impact on St. Wolstan's

Community School. Option E is classed as preferred given the low number of properties impacted by traffic on this route option during the operation stage.

7.4.4.2.8 Route Option F

Option F potentially impacts on 229 properties within 50m of this route option which is greater than the Do-Nothing option. In addition, this option connects to the R403 east of the access to St. Raphael's Special School so the traffic volumes at this school will remain. The Primrose Hill National School is avoided but as with the other routes to the west of the town the current impact on St. Wolstan's Community School is retained. Option F is classed as least preferred given the high number of properties impacted by traffic on this route option during the operation stage relative to other options.

7.4.4.2.9 Route Option G

Option G which runs to the east of the town potentially impacts on the highest number of properties within 50m of its route at 327. While this option avoids much of the main street (including Memory Lane Preschool and Celbridge Medical Centre) it retains and potentially increases the current impact on the Celbridge Montessori in Slip Hall and the HSE Primary Care Centre on the R405. Option G, also diverts the traffic to within 50m of the Primrose Gate Medical Centre. Option G is classed as least preferred given the high volume of properties potentially impacted by traffic on this route.

7.4.4.2.10 Route Option H

Option H has 144 properties located within 50m of the route and avoids the Primrose Gate area impacted by Route G. the is option is aligned with Route Option G from the R403 so the receptors identified above at Celbridge Montessori in Slip Hall and the HSE Primary Care Centre are also relevant to this route option. A nursing home, Elm Hall Nursing Home, is situated c.580m east of this route but outside of the zone of influence for air quality. Option H is classed as intermediate given the moderate volume of properties potentially impacted by this route.

7.4.4.2.11 Route Option H1

Like Option H, Option H1 impacts on a moderate number of properties with 156 within 50m of the route. The sensitive properties bypassed and potentially impacted by this route are analogous to those listed for Option H. For this reason, Option H is classed as intermediate given the moderate volume of properties potentially impacted by this route.

7.4.4.3 Conclusion

Table 7-26 provides a summary of the appraisal of each of the ten route options for the Celbridge to Hazelhatch Link Road Scheme in terms of Air Quality. Options A, A1, B, C and E are considered the preferred options given that each of these options will potentially impact on less than 30 properties which represents a net benefit from the current impact level. The Do-Nothing is intermediate given the higher number of properties impacted along with Options D, H and H1 while options F and G are considered least preferred given that each will impact on a significantly greater number of properties than the current route.

Table 7-26: Air Quality Preference Rating

Option	Preference Ranking
Do-Nothing	Intermediate
Option A	Preferred
Option A1	Preferred
Option B	Preferred
Option C	Preferred
Option D	Intermediate

Option	Preference Ranking
Option E	Preferred
Option F	Least Preferred
Option G	Least Preferred
Option H	Intermediate
Option H1	Intermediate

7.4.5 Climate

The following section examines the potential impacts that each option will pose on Climate within the study area.

7.4.5.1 Existing Constraints

Climate is less subject to geographical constraints as climate emissions have a more regional or national impact. In this regard, there are no identified constraints pertaining to climate emissions and mitigation identified within the study area. With respect to climate adaption, the siting of the final alignment away from climate risk areas, such as flood risk areas, will be a constraint.

7.4.5.2 Assessment

Climate impact during construction arises as a result of energy use for construction operations and transport as well as through embodied carbon in construction materials and wastes. The levels of energy use and material required is directly related to the length of new pavement for each option and the longer the road the greater the levels of Greenhouse Gas (GHG) emissions.

The World Bank provides estimates that for a national road, the construction stage will generate 794 tonnes of CO_2 per km constructed. While this is a global average and GHG emissions within the Irish construction sector are typically higher, this estimate is used to assess the potential significance of the construction stage of the route options at this preliminary stage. For the purposes of assessing the proposed development, the extent of offline construction has the above World Bank factor applied (794 tonnes of CO_2 per km constructed).

Any online upgrades for the Do Something alignments will also generate GHG emissions but to a lesser extent based on the existing materials in place and the lower need for materials, works and waste generation. As such, the online sections have 50% of the World Bank factor applied (397 tonnes of CO_2 per km constructed) for this preliminary assessment. The results for the construction phase impact are presented in **Table 7-27** for all route options.

Operation phase climate impacts relates to traffic volumes, average speed, % HGV and total kilometres travelled. It has been assessed for this preliminary assessment that the traffic implications for greenhouse gas generation on each route will be similar, so operation phase impacts are not included in this option assessment

Table 7-27: Potential Climate Impact at Construction

Route Option	Link Length (m)	Online Length (m)	Offline Length (m)	Construction Phase GHG (tonnes CO_2)
Do-Nothing	-	-	0	0
Option A	2,635	0	2,635	2,092
Option A1	2,975	0	2,975	2,362
Option B	2,180	0	2,180	1,731
Option C	2,105	285	1,830	1,453
Option D	2,670	1,645	1,045	830
Option E	2,040	805	1,250	993

Option F	2,170	1,860	320	255
Option G	2,830	2,340	470	374
Option H	3,040	605	2,485	1,973
Option H1	3,410	1,475	1,975	1,569

7.4.5.3 Conclusion

Table 7-28 provides a summary of the appraisal of each of the route options for the Celbridge to Hazelhatch Link Road Scheme in terms of Climate. The Do-Nothing option is the preferred option given that there will be no climate impact associated with this route which has been constructed. Options D, E, F and G are classed as intermediate as each of these options have shorter offline sections and will therefore result in a reduced carbon impact from construction relative to the longer offline options of A, A1, B, C, H and H1 which are classed as least preferred.

Table 7-28: Climate Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Least Preferred
Option A1	Least Preferred
Option B	Least Preferred
Option C	Least Preferred
Option D	Intermediate
Option E	Intermediate
Option F	Intermediate
Option G	Intermediate
Option H	Least Preferred
Option H1	Least Preferred

7.4.6 Noise and Vibration

The following section examines the potential impacts that each option will pose in terms of Noise and Vibration within the study area.

7.4.6.1 Existing Constraints

The following key constraints have been identified from the baseline environment appraisal for consideration in terms of route selection:

- Residential properties or developments are at the greatest risk for traffic noise impact at both day and night-time;
- Other sensitive human receptors for noise including schools (for example; St. Raphael's Special School and St Patrick's National School), creches, hospitals, care and nursing homes (for example; Elm Hall Nursing Home) etc. where more vulnerable members of the community are located;
- Other commercial operations, community centres, recreational areas, existing/proposed quiet areas;
- Protected buildings, site or monuments of cultural or archaeological significance; and
- Sensitive species which are particularly sensitive to noise such as birds. This may include birds associated with EU and nationally designated sites.

7.4.6.2 Assessment

The TII '*Guidelines for the Treatment of Noise and Vibration in National Road Projects*' was followed for this assessment which focuses on the potential impact of the route options on sensitive receptors within the study area. The assessment of potential impact is based primarily upon property counts and the proximity of each alignment to those properties. The property data used to inform this assessment is that presented in **Table 7-20** for population and human health.

The analysis focusses on the number of properties potentially sensitive to noise and/or vibration within four bands either side of the centreline of each route option, i.e. 0 to 50m, 50 to 100m, 100 to 200m and 200 to 300m were identified. Sensitive properties include residential units, schools and commercial units although at this stage of the assessment no further distinction has been made between these different types of property. The total number of receptors in each band is multiplied by a rating factor.

The rating factor is 4 for Band 1 (0 to 50m), 3 for Band 2 (50 to 100m), 2 for Band 3 (100 to 200m) and 1 for Band 4 (200 to 300m). The resultant values are summed to give a single number for each route option, termed the Potential Impact Rating (PIR). The route option with the lowest PIR is the one with the lowest predicted impact and is assigned the highest preference in relation to noise and vibration.

The results of the PIR assessment are shown in **Table 7-29** and show that the PIR ranges from 531 for Option A1 up to 2995 for the Do-Nothing option. The options with the lowest PIR, i.e. Options A and A1 (PIR of 625 and 531 respectively), are predicted to have the lowest community noise impact, followed by those with a moderate PIR, i.e. Options B, C and E (PIR of 940, 932, and 1250 respectively). Those with the highest PIR, i.e. Options D, F, G, H, H1 and the Do-Nothing option are predicted to pose the greatest community noise impact (PIR for these options falls between 2000 and 3000).

Table 7-29: Noise and Vibration Predicted Impact Ratings

Route Option	Band	Rating Factor (A)	No. of Receptors* (B)	A X B	PIR
Do-Nothing	1	4	167	668	2995
	2	3	271	813	
	3	2	494	988	
	4	1	526	526	
Option A	1	4	8	32	625
	2	3	66	198	
	3	2	199	398	
	4	1	352	352	
Option A1	1	4	8	32	531
	2	3	66	198	
	3	2	168	336	
	4	1	289	289	
Option B	1	4	23	92	940
	2	3	107	321	
	3	2	308	616	
	4	1	502	502	
Option C	1	4	24	96	932
	2	3	102	306	
	3	2	305	610	
	4	1	501	501	
Option D	1	4	183	732	2344
	2	3	263	789	
	3	2	726	1452	
	4	1	1172	1172	
Option E	1	4	21	84	1248
	2	3	161	483	
	3	2	401	802	
	4	1	665	665	
Option F	1	4	229	916	2144
	2	3	267	801	
	3	2	633	1266	
	4	1	1015	1015	
Option G	1	4	327	1308	2919
	2	3	266	798	

Route Option	Band	Rating Factor (A)	No. of Receptors* (B)	A X B	PIR
	3	2	844	1688	
	4	1	1482	1482	
Option H	1	4	144	576	2300
	2	3	220	660	
	3	2	688	1376	
	4	1	1248	1248	
Option H1	1	4	156	624	2357
	2	3	227	681	
	3	2	705	1410	
	4	1	1269	1269	

7.4.6.3 Conclusion

Table 7-30 provides a summary of the appraisal of each of the route options for the Celbridge to Hazelhatch Link Road Scheme in terms of Noise and Vibration. Overall, the results indicate that the Do-Nothing and Options D, F, G, H and H1 have the highest PIR and potential to impact on the greatest number of properties, in terms of noise and vibration relative to the other options and therefore these ranked as least preferred'. Options A and A1 have the lowest PIR ratings and are least likely to result in impacts in terms of noise and vibration and so are considered the preferred options. The remaining Options B, C and E are ranked as 'Intermediate' due to their mid-range PIR ratings.

Table 7-30: Noise and Vibration Preference Rating

Option	Preference Ranking
Do-Nothing	Least Preferred
Option A	Preferred
Option A1	Preferred
Option B	Intermediate
Option C	Intermediate
Option D	Least Preferred
Option E	Intermediate
Option F	Least Preferred
Option G	Least Preferred
Option H	Least Preferred
Option H1	Least Preferred

7.4.7 Biodiversity (Terrestrial and Aquatic Ecology)

This following section examines the potential impacts that each route option may pose to the ecological environment. Each of the proposed route options has been considered in respect of the following ecological features; designated sites, habitats, protected species, as well as connectivity to or intersection with watercourses or wetlands.

7.4.7.1 Existing Constraints

The ecological constraints affecting the study area can be described in terms of both terrestrial and aquatic ecology. Existing constraints include direct intersection of all routes with a major watercourse, the River Liffey, which is an important fisheries habitat. This would be seen as a significant ecological constraint. The River Liffey also provides connectivity to a number wetland habitats and designated sites, particularly those

coastal designated sites within Dublin Bay. A number of 'steppingstones' that provide ecological connectivity such as hedgerows, trees and wooded areas would also suffer fragmentation or removal. Habitat removal may directly impact a number of species and cause disturbance.

It should be noted that this assessment is purely a desk based study and only with adequate field surveys can the presence/absence of ecological features (e.g. invasive species, bat roost potential, mammal activity, etc.) be confirmed.

7.4.7.2 Assessment

7.4.7.2.1 The Do-Nothing Option

The Do-Nothing option represents the retention of the existing road network without improvement. As this option would not comprise of any upgrades or junction improvement works, other than routine maintenance, it would not warrant any significant changes or impacts to the existing ecological environment. If impact were to occur as a result of routine maintenance, this would likely represent a very low level of impact due to the nature of roadway maintenance works. This is the preferred option with a low likely impact expected to existing ecological receptors.

7.4.7.2.2 Route Option A

Route Option A is situated in the west of the study area, running entirely offline for 2,635m. It requires a considerable green field development and intersects Simmonstown Manor/The Drive to the south of Celbridge. Option A intersects approximately 15 hedgerows, one riparian treeline, an unmapped drainage ditch, two tributaries of the River Liffey (Liffey_140) and the main channel of the River Liffey which intersects a narrow riparian treeline. Furthermore, Option A travels closely alongside an area of wooded habitat. The severing of multiple hedgerows increases the potential interaction with bats such as potential for roosting habitat and commuting routes, this would be a particular constraint for bat species and other mammals such as badger where wooded habitat or mature trees are intersected or disturbed. There is also potential that the riparian margin running along the main channel of the River Liffey could represent Alluvial Woodland habitat. There is additionally potential for breeding bird activity within these greenfield sites.

Two tributaries and the main channel of the River Liffey are intersected by this option. The River Liffey and its tributaries provide significant important fisheries habitat. Correspondence with Inland Fisheries Ireland (IFI) confirms that the River Liffey supports Atlantic salmon (*Salmo salar*, listed under Annex II and V of the EU Habitats Directive) and Sea trout (*Salmo trutta trutta*) in addition to some resident Brown trout (*Salmo trutta*) populations. It is also known to support European eel and Lamprey (River and Brook).

Through professional experience, Otter (*Lutra lutra*) is known to occur throughout the Liffey catchment and is dependent on both riparian and fisheries habitat. White-clawed Crayfish (*Austropotamobius pallipes)* is also noted to occur within the River Liffey at Celbridge. This is an important population in terms of Crayfish plague as to date, there has been no outbreak of the disease within the River Liffey Catchment. It is also noted, that until further bridge design is confirmed (e.g. clear span bridge versus modular support, etc.), there is potential for this option to impact spawning habitat.

The sensitivity of the local watercourses in the study area and the Liffey catchment as a whole is emphasised. The River Liffey and the two tributaries intersected by this route are currently at Good WFD Status (2013-2018). The River Liffey provides downstream connectivity to South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC and Liffey Valley pNHA.

As this route runs entirely offline for a considerable distance, it would require extensive land take and intersection with a mosaic of multiple habitat types and therefore, is a least preferred option with moderately negative impact expected to existing ecological receptors.

7.4.7.2.3 Route Option A1

Route Option A1 is situated in the west of the study area, running entirely offline for 2,975m. The ecological footprint for Option A1 is similar to that presented for Option A. As this route runs entirely offline for a considerable distance, it would require extensive land take, fragmentation of woodland habitat and intersection with a mosaic of multiple habitat types, and therefore, is a least preferred option with a major or highly negative impact expected to existing ecological receptors.

7.4.7.2.4 Route Option B

Route Option B is situated in the west-central region of the study area and cross cuts multiple greenfield sites connecting with the existing Clane Road, north of the River Liffey and runs entirely offline thereafter for 2,180m. It intersects approximately 12 hedgerows, one tributary of the River Liffey (Liffey_140), an unmapped drainage ditch, the main channel of the River Liffey (Liffey_140) with a well-developed wooded riparian margin and would involve the removal of one complete hedgerow. The severing or removal of hedgerows and/or treelines increases the potential interaction with bats such as potential for roosting habitat and commuting routes. This would be a particular constraint for bat species where mature trees are intersected or disturbed which may provide connectivity to larger woodlands. Potential mammal and breeding bird activity would also be a concern within these greenfield sites. There is also potential that the well-developed riparian margin running along the main channel of the River Liffey could represent Alluvial Woodland habitat.

One tributary and the main channel of the River Liffey are intersected by this option. The River Liffey and its tributaries provide significant important fisheries habitat. Correspondence with Inland Fisheries Ireland (IFI) confirms that the River Liffey supports Atlantic salmon (*Salmo salar*, listed under Annex II and V of the EU Habitats Directive) and Sea trout (*Salmo trutta trutta*) in addition to some resident Brown trout (*Salmo trutta*) populations. It is also known to support European eel and Lamprey (River and Brook).

Through professional experience, Otter (*Lutra lutra*) is known to occur throughout the Liffey catchment and is dependent on both riparian and fisheries habitat. White-clawed Crayfish (*Austropotamobius pallipes)* is also noted to potentially occur within the River Liffey at Celbridge. This is an important population in terms of cray-fish plaque as to date, there has been no outbreak of the disease within the River Liffey Catchment. It is also noted, that until further bridge design is confirmed (e.g. clear span bridge versus modular support etc.), there is potential for this option to impact spawning habitat.

The sensitivity of the local watercourses in the study area and the Liffey catchment as a whole is emphasised. The River Liffey and the one tributary intersected by this route are currently at Good WFD Status (2013-2018). The River Liffey provides downstream connectivity to South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC and Liffey Valley pNHA.

This option is additionally located <0.25km from Celbridge Abbey/Simmonstown House Ponds which are known to have moderate local conservation value. Owing to its close proximity to the River Liffey (<0.1km), there is potential the ponds may be utilised by a number of wintering birds and/or otter and other protected species.

As this route runs entirely offline it would require considerable land take. It has the potential to impact Alluvial Woodland habitat and intersect a mosaic of multiple habitat types and therefore, is a least preferred option with a major or highly negative impact expected to existing ecological receptors.

7.4.7.2.5 Route Option C

Route Option C is situated in the central region of the study area. Option C runs offline through greenfield sites for approximately 1,830m before running on existing roads for approximately 275m. It intersects approximately 15 hedgerows, the main channel of the River Liffey (Liffey_140) with well-developed wooded riparian margin, one tributary of the River Liffey (Liffey_140), an unmapped drainage ditch and would involve the removal of two complete hedgerow. The severing or removal of hedgerows and/or treelines increases the potential interaction with bats such as potential for roosting habitat and commuting routes. This would be a particular constraint for bat species where mature trees are intersected or disturbed which may provide connectivity to larger woodlands. There is also potential that the well-developed riparian margin running along the main channel of the River Liffey could represent Alluvial Woodland habitat. There is additionally potential for breeding bird activity within these greenfield sites.

One tributary and the main channel of the River Liffey are intersected by this option. The River Liffey and its tributaries provide significant important fisheries habitat. Correspondence with Inland Fisheries Ireland (IFI) confirms that the River Liffey supports Atlantic salmon (*Salmo salar*, listed under Annex II and V of the EU Habitats Directive) and Sea trout (*Salmo trutta trutta*) in addition to some resident Brown trout (*Salmo trutta*) populations. It is also known to support European eel and Lamprey (River and Brook).

Through professional experience, Otter (*Lutra lutra*) is known to occur throughout the Liffey catchment and is dependent on both riparian and fisheries habitat. White-clawed Crayfish (*Austropotamobius pallipes)* is also noted to potentially occur within the River Liffey at Celbridge. This is an important population in terms of cray-fish plaque as to date, there has been no outbreak of the disease within the River Liffey Catchment. It is

also noted, that until further bridge design is confirmed (e.g. clear span bridge versus modular support etc.), there is potential for this option to impact spawning habitat.

The sensitivity of the local watercourses in the study area and the Liffey catchment as a whole is emphasised. The River Liffey and the one tributary intersected by this route are currently at Good WFD Status (2013-2018). The River Liffey provides downstream connectivity to South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC and Liffey Valley pNHA.

This option is additionally located <0.18km from Celbridge Abbey/Simmonstown House Ponds which are known to have moderate local conservation value. Owing to its close proximity to the River Liffey (<0.1km), there is potential the ponds may be utilised by a number of wintering birds and/or otter and other protected species

As this route is predominately offline it would require considerable land take. It has the potential to impact Alluvial Woodland habitat and intersect a mosaic of multiple habitat types and therefore, is a least preferred option with a major or highly negative impact expected to existing ecological receptors.

7.4.7.2.6 Route Option D

Route Option D is situated in the central region of the study area and cross cuts multiple greenfield sites connecting with the existing Clane Road, north of the River Liffey running on existing roads for approximately 1,625m and running offline for approximately 1,045m. It intersects approximately seven hedgerows, the main channel of the River Liffey (Liffey_140) with a well-developed wooded riparian margin, one wooded area and may involve the removal of one complete hedgerow/treeline along the existing R405 and a number of treelines within Simmonstown Manor. The severing or removal of hedgerows and/or treelines increases the potential interaction with bats such as potential for roosting habitat and commuting routes. This would be a particular constraint for bat species and other mammals such as badger where wooded habitat or mature trees are intersected or disturbed. There is also potential that the well-developed riparian margin running along the main channel of the River Liffey could represent Alluvial Woodland habitat. There is additionally potential for bird breeding activity within these greenfield sites.

The main channel and one tributary of the River Liffey is intersected by this option. The River Liffey and its tributaries provide significant important fisheries habitat. Correspondence with Inland Fisheries Ireland (IFI) confirms that the River Liffey supports Atlantic salmon (*Salmo salar*, listed under Annex II and V of the EU Habitats Directive) and Sea trout (*Salmo trutta trutta*) in addition to some resident Brown trout (*Salmo trutta*) populations. It is also known to support European eel and Lamprey (River and Brook).

Through professional experience, Otter (*Lutra lutra*) is known to occur throughout the Liffey catchment and is dependent on both riparian and fisheries habitat. White-clawed Crayfish (*Austropotamobius pallipes)* is also noted to potentially occur within the River Liffey at Celbridge. This is an important population in terms of cray-fish plaque as to date, there has been no outbreak of the disease within the River Liffey Catchment. It is also noted, that until further bridge design is confirmed (e.g. clear span bridge versus modular support etc.), there is potential for this option to impact spawning habitat.

The sensitivity of the local watercourses in the study area and the Liffey catchment as a whole is emphasised. The River Liffey and the one tributary intersected by this route are currently at Good WFD Status (2013-2018). The River Liffey provides downstream connectivity to South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC and Liffey Valley pNHA.

This option is additionally located <0.18km from Celbridge Abbey/Simmonstown House Ponds which are known to have moderate local conservation value. Owing to its close proximity to the River Liffey (<0.1km), there is potential the ponds may be utilised by a number of wintering birds and/or otter and other protected species.

Although a large proportion of this route is along existing road networks, a large proportion is also along greenfield sites. This section of the route would require considerable land take, potential to impact Alluvial Woodland habitat and intersection with a mosaic of multiple habitat types and therefore, is a least preferred option with a high likely impact expected to existing ecological receptors.

7.4.7.2.7 Route Option E

Route Option E is situated in the central region of the study area and intersects a number of greenfield sites connecting with the existing Clane Road, north of the River Liffey. It runs on existing roads for approximately 790m and runs offline for approximately 1,250m. It largely follows the existing R405 but intersects

approximately 13 hedgerows, the main channel of the River Liffey (Liffey_140) with a well-developed and wide wooded riparian margin, one wooded area (surrounds Hazelhatch Road) and may involve the removal of one complete hedgerow/treeline along the existing R405. The severing or removal of hedgerows and/or treelines increases the potential interaction with bats such as potential for roosting habitat and commuting routes. This would be a particular constraint for bat species and other mammals such as badger where wooded habitat or mature trees are intersected or disturbed. As the wooded riparian area that surrounds the River Liffey is not only well-developed but covers a broad area, there is good potential that it could represent Alluvial Woodland habitat. There is additionally potential for breeding bird activity within these greenfield sites.

The main channel of the River Liffey is intersected by this option. The River Liffey and its tributaries provide significant important fisheries habitat. Correspondence with Inland Fisheries Ireland (IFI) confirms that the River Liffey supports Atlantic salmon (*Salmo salar*, listed under Annex II and V of the EU Habitats Directive) and Sea trout (*Salmo trutta trutta*) in addition to some resident Brown trout (*Salmo trutta*) populations. It is also known to support European eel and Lamprey (River and Brook).

Through professional experience, Otter (*Lutra lutra*) is known to occur throughout the Liffey catchment and is dependent on both riparian and fisheries habitat. White-clawed Crayfish (*Austropotamobius pallipes)* is also noted to potentially occur within the River Liffey at Celbridge. This is an important population in terms of cray-fish plaque as to date, there has been no outbreak of the disease within the River Liffey Catchment. It is also noted, that until further bridge design is confirmed (e.g. clear span bridge versus modular support etc.), there is potential for this option to impact spawning habitat.

The sensitivity of the local watercourses in the study area and the Liffey catchment as a whole is emphasised. The River Liffey (main channel) intersected by this route is currently at Good WFD Status (2013-2018). The River Liffey provides downstream connectivity to South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC and Liffey Valley pNHA.

This option is additionally located <0.1 km from Celbridge Abbey/Simmonstown House Ponds which are known to have moderate local conservation value. Owing to its close proximity to the River Liffey (<0.1km), there is potential the ponds may be utilised by a number of wintering birds and/or otter and other protected species.

Although this option does not run entirely offline, this route would sever a large section of woodland habitat and potential Alluvial Woodland habitat. It would require land take and intersection with a number of important ecological features and is therefore, a least preferred option with a major or highly negative impact expected to existing ecological receptors.

7.4.7.2.8 Route Option F

Route Option F is situated in the east-central region of the study area, the road largely follows the existing R405 regional road, Simmonstown Road and Callenders Mill roads. Option F runs offline for approximately 320m before running on existing roads for approximately 1,850m. It intersects approximately 9 hedgerows, the main channel of the River Liffey (Liffey_150) with a well-developed and wide wooded riparian margin, one wooded area (surrounds Hazelhatch Road) and may involve the removal of one complete hedgerow/treeline along the existing R405. The severing or removal of hedgerows and/or treelines increases the potential interaction with bats such as potential for roosting habitat and commuting routes. This would be a particular constraint for bat species and other mammals such as badger where wooded habitat or mature trees are intersected or disturbed. As the wooded riparian area that surrounds the River Liffey is not only well-developed but covers a broad area, there is good potential that it could represent Alluvial Woodland habitat. There is additionally potential for breeding bird activity within these greenfield sites.

The main channel of the River Liffey is intersected by this option. The River Liffey and several of its tributaries provide significant important fisheries habitat. Correspondence with Inland Fisheries Ireland (IFI) confirms that the River Liffey supports Atlantic salmon (*Salmo salar*, listed under Annex II and V of the EU Habitats Directive) and Sea trout (*Salmo trutta trutta*) in addition to some resident Brown trout (*Salmo trutta*) populations. It is also known to support European eel and Lamprey (River and Brook).

Through professional experience, Otter (*Lutra lutra*) is known to occur throughout the Liffey catchment and is dependent on both riparian and fisheries habitat. White-clawed Crayfish (*Austropotamobius pallipes)* is also noted to potentially occur within the River Liffey at Celbridge. This is an important population in terms of cray-fish plaque as to date, there has been no outbreak of the disease within the River Liffey Catchment. It is also noted, that until further bridge design is confirmed (e.g. clear span bridge versus modular support etc.), there is potential for this option to impact spawning habitat.

The sensitivity of the local watercourses in the study area and the Liffey catchment as a whole is emphasised. The River Liffey (main channel) intersected by this route is currently at Good WFD Status (2013-2018). The River Liffey provides downstream connectivity to South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC and Liffey Valley pNHA.

This option is additionally located <0.3km from Celbridge Abbey/Simmonstown House Ponds and 0.4km from Quarry Pond Celbridge which are known to have moderate local conservation value. Owing to their close proximity to the River Liffey (<0.1km and <0.25km), there is potential these ponds may be utilised by a number of wintering birds and/or otter and other protected species.

This option runs offline for a very short distance. It has the potential to intersect important woodland habitat that surrounds both the River Liffey and Hazelhatch road. This route would require land take and intersection with a mosaic of multiple habitat types and therefore, is a least preferred option with a moderately negative impact expected to existing ecological receptors.

7.4.7.2.9 Route Option G

Route Option G is situated in the east and central region of the study area, the road largely follows the existing R405 regional road, Maynooth Road, Shackleton Road and Main Street. Option G runs offline for approximately 470m and runs on existing roads for approximately 2,360m. It intersects approximately 10 hedgerows, the main channel of the River Liffey (Liffey_150) with a narrow riparian treeline three wooded patches (throughout the urban surrounds) and may involve the removal of several complete hedgerows/treelines along the existing R405 and above-mentioned roads. The severing or removal of hedgerows and/or treelines increases the potential interaction with bats such as potential for roosting habitat and commuting routes for bats and other species. This would be a particular constraint for bat species and other mammals such as badger where wooded habitat or mature trees are intersected or disturbed. There is also potential that the riparian margin running along the main channel of the River Liffey could represent Alluvial Woodland habitat.

The main channel of the River Liffey is intersected by this option. The River Liffey and several of its tributaries provide significant important fisheries habitat. Correspondence with Inland Fisheries Ireland (IFI) confirms that the River Liffey supports Atlantic salmon (*Salmo salar*, listed under Annex II and V of the EU Habitats Directive) and Sea trout (*Salmo trutta trutta*) in addition to some resident Brown trout (*Salmo trutta*) populations. It is also known to support European eel and Lamprey (River and Brook).

Through professional experience, Otter (*Lutra lutra*) is known to occur throughout the Liffey catchment and is dependent on both riparian and fisheries habitat. White-clawed Crayfish (*Austropotamobius pallipes)* is also noted to occur within the River Liffey at Celbridge. This is an important population in terms of cray-fish plaque as to date, there has been no outbreak of the disease within the River Liffey Catchment. It is also noted, that until further bridge design is confirmed (e.g. clear span bridge versus modular support etc.), there is potential for this option to impact spawning habitat.

The sensitivity of the local watercourses in the study area and the Liffey catchment as a whole is emphasised. The River Liffey (main channel) intersected by this route is currently at Good WFD Status (2013-2018). The River Liffey provides downstream connectivity to South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC and Liffey Valley pNHA.

This option is additionally located <0.4km from Quarry Pond Celbridge which are known to have moderate local conservation value. Owing to its close proximity to the River Liffey (<0.25km), there is potential these ponds may be utilised by a number of wintering birds and/or otter and other protected species.

This option runs predominantly online with impact to ecological receptors are seen as intermediate with a minor slightly negative impact expected to existing ecological receptors. This is largely due to the dominant built environment throughout this route. However, this option still intersects the River Liffey, an area of important fisheries habitat.

7.4.7.2.10 Route Option H

Route Option H is situated in the eastern region of the study area, the route utilises a section of the Loughlinstown Road before branching off to the north west. Option H runs offline for approximately 2,485m and runs on existing roads for approximately 555m. It intersects approximately 10 hedgerows, the main channel of the River Liffey (Liffey_150) with a narrow riparian treeline, two intersections of the same tributary River Liffey (Liffey_150), and may involve the removal of several complete hedgerows/treelines along the existing R405 and the above mentioned roads. The severing or removal of hedgerows and/or treelines

increases the potential interaction with bats such as potential for roosting habitat and commuting routes. This would be a particular constraint for bat species and other mammals such as badger where wooded habitat or mature trees are intersected or disturbed. There is also potential that the riparian margin running along the main channel of the River Liffey could represent Alluvial Woodland habitat. There is additionally potential for breeding bird activity within these greenfield sites.

The main channel of the River Liffey is intersected by this option and one tributary is intersected twice. The River Liffey and several of its tributaries provide significant important fisheries habitat. Correspondence with Inland Fisheries Ireland (IFI) confirms that the River Liffey supports Atlantic salmon (*Salmo salar*, listed under Annex II and V of the EU Habitats Directive) and Sea trout (*Salmo trutta trutta*) in addition to some resident Brown trout (*Salmo trutta*) populations. It is also known to support European eel and Lamprey (River and Brook).

Through professional experience, Otter (*Lutra lutra*) is known to occur throughout the Liffey catchment and is dependent on both riparian and fisheries habitat. White-clawed Crayfish (*Austropotamobius pallipes)* is also noted to occur within the River Liffey at Celbridge. This is an important population in terms of cray-fish plaque as to date, there has been no outbreak of the disease within the River Liffey Catchment. It is also noted, that until further bridge design is confirmed (e.g. clear span bridge versus modular support etc.), there is potential for this option to impact spawning habitat.

The sensitivity of the local watercourses in the study area and the Liffey catchment as a whole is emphasised. The River Liffey (main channel) intersected by this route is currently at Good WFD Status (2013-2018). The River Liffey provides downstream connectivity to South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC and Liffey Valley pNHA.

This option is additionally located <0.4km from Quarry Pond Celbridge which are known to have moderate local conservation value. Owing to its close proximity to the River Liffey (<0.25km), there is potential these ponds may be utilised by a number of wintering birds and/or otter and other protected species.

As this route runs almost entirely offline for a considerable distance, it would require extensive land take and intersection with a mosaic of multiple habitat types and therefore, is a least preferred option with a major or highly negative impact expected to existing ecological receptors.

7.4.7.2.11 Route Option H1

Route Option H1 is situated in the eastern region of the study area. Option H1 runs offline for approximately 1,975m and runs on existing roads for approximately 1,435m. It intersects approximately 13 hedgerows, the main channel of the River Liffey (Liffey_150) with a narrow riparian treeline, two intersections of the same tributary of the River Liffey (Liffey_150), one wooded area (golf course) and may involve the removal of several complete hedgerows/treelines along the existing R405 and the above mentioned roads. The severing or removal of hedgerows and/or treelines increases the potential occurrence of bats such as potential for roosting habitat and commuting routes. This would be a particular constraint for bat species and other mammals such as badger where wooded habitat or mature trees are intersected or disturbed. There is also potential that the riparian margin running along the main channel of the River Liffey could represent Alluvial Woodland habitat. There is additionally potential for breeding bird activity within these greenfield sites.

The main channel of the is intersected by this option and one tributary is intersected twice. The River Liffey and several of its tributaries provide significant important fisheries habitat. Correspondence with Inland Fisheries Ireland (IFI) confirms that the River Liffey supports Atlantic salmon (*Salmo salar*, listed under Annex II and V of the EU Habitats Directive) and Sea trout (*Salmo trutta trutta*) in addition to some resident Brown trout (*Salmo trutta*) populations. It is also known to support European eel and Lamprey (River and Brook).

Through professional experience, Otter (*Lutra lutra*) is known to occur throughout the Liffey catchment and is dependent on both riparian and fisheries habitat. White-clawed Crayfish (*Austropotamobius pallipes)* is also noted to occur within the River Liffey at Celbridge. This is an important population in terms of cray-fish plaque as to date, there has been no outbreak of the disease within the River Liffey Catchment. It is also noted, that until further bridge design is confirmed (e.g. clear span bridge versus modular support etc.), there is potential for this option to impact spawning habitat.

The sensitivity of the local watercourses in the study area and the Liffey catchment as a whole is emphasised. The River Liffey (main channel) intersected by this route is currently at Good WFD Status (2013-2018). The River Liffey provides downstream connectivity to South Dublin Bay SAC, Howth Head SAC, Rockabill to Dalkey Island SAC and Liffey Valley pNHA.

This option is additionally located <0.4km from Quarry Pond Celbridge which are known to have moderate local conservation value. Owing to its close proximity to the River Liffey (<0.25km), there is potential these ponds may be utilised by a number of wintering birds and/or otter and other protected species.

As this route runs almost entirely offline for a considerable distance, it would require extensive land take and intersection with a mosaic of multiple habitat types and therefore, is a least preferred option with a major or highly negative impact expected to existing ecological receptors.

7.4.7.3 Conclusion

Table 7-31 provides a summary of the appraisal of each of the ten route options for the Celbridge to Hazelhatch Link Road Scheme in terms of Biodiversity. As outlined in the text, the Do-Nothing is preferred given the absence of any significant ecological impact with this option. Only option G is classed as intermediate given that this option is largely through existing artificial environment with low ecological potential. All other options are classed as least preferred given the range of potential ecological impacts.

Table 7-31: Biodiversity Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Least Preferred
Option A1	Least Preferred
Option B	Least Preferred
Option C	Least Preferred
Option D	Least Preferred
Option E	Least Preferred
Option F	Least Preferred
Option G	Intermediate
Option H	Least Preferred
Option H1	Least Preferred

7.4.8 Soils and Geology

The following section examines the potential impacts that each option will pose on soils, subsoils, geology and geological structure within the study area. Where these interact with or have the potential to be impacted by any of the route options is highlighted in the following section.

7.4.8.1 Existing Constraints

The geological constraints affecting the study area include the soft ground present in the centre and east of the study area, i.e. alluvium, particularly where sloping ground or substrate are also present. Certain soil types and structures, for example alluvium deposits may necessitate extensive civil works to ensure stability and these works may result in additional resource usage and the potential for increased pollution risk and noise and traffic impacts.

There are no GSI listed geological heritage sites, past landslides, economic geological resources or karst features within the study area.

7.4.8.2 Assessment

7.4.8.2.1 The Do-Nothing Option

The Do-Nothing scenario option represents the retention of the existing road network without improvement. This option would not result in any major changes to, or impacts on, the existing soils and geology identified within the study area and would limit the amount of cut and fill material required. The existing route is underlain by varied soil types, including urban made ground, alluvium, deep well drained and poorly drained mineral soils. This route overlies alluvium, made ground and till derived from limestone Quaternary Sediments. The bedrock geology underlying the site is entirely the Lucan Formation (dark limestone and shale) and does not crosscut any GSI listed faults or areas where bedrock is at the surface.

The proposed earthworks for the Do-Nothing option are minimal and hence this option is preferred from a soils and geology perspective.

7.4.8.2.2 Route Option A

Route Option A is situated in the west of the study area and crosscuts multiple greenfield sites and a small housing development in the Newtown townland and runs entirely offline. The route is underlain by varied soil types, including urban made ground, alluvium, deep well drained and poorly drained mineral soils. This route overlies alluvium and till derived from limestone Quaternary Sediments. The bedrock geology underlying the site is entirely the Lucan Formation (dark limestone and shale) and does not crosscut any GSI listed faults or areas where bedrock is at the surface.

As this route runs entirely offline it will require 5,465m^3 of material to be cut and this excess material will require management off-site with potential for indirect impact. There is also a requirement for 102,270m^3 of material to be used as fill, this material is to be imported and requires management to ensure it is suitable for the existing environment. Along with Option A1, this represents the poorest cut/fill balance of all options.

7.4.8.2.3 Route Option A1

Route Option A1 is situated in the west of the study area and crosscuts multiple greenfield sites and a small housing development in the Newtown townland, this route deviates to the west of the Route Option A and runs entirely offline. The route is underlain by varied soil types, including urban made ground, alluvium, deep well drained and poorly drained mineral soils. This route overlies alluvium and till derived from limestone Quaternary Sediments. The bedrock geology underlying the site is entirely the Lucan Formation (dark limestone and shale) and does not crosscut any GSI listed faults or areas where bedrock is at the surface.

As this route runs entirely offline it will require 6,315m^3 of material to be cut and this excess material will require management off-site with potential for indirect impact. There is also a requirement for 102,915m^3 of material to be used as fill, this material is to be imported and requires management to ensure it is suitable for the existing environment. Along with Option A, this represents the poorest cut/fill balance of all options.

7.4.8.2.4 Route Option B

Route Option B is situated in the west-central region of the study area and crosscuts multiple greenfield sites and connects with the existing Clane Road, north of the River Liffey and runs entirely offline. The route is underlain by varied soil types, including urban made ground, alluvium, deep well drained and poorly drained mineral soils. This route overlies alluvium and till derived from limestone Quaternary Sediments. The bedrock geology underlying the site is entirely the Lucan Formation (dark limestone and shale) and does not crosscut any GSI listed faults or areas where bedrock is at the surface.

As this route runs entirely offline it will require 6,540m^3 of material to be cut and this excess material will require management off-site with potential for indirect impact. There is also a requirement for 72,615m^3 of material to be used as fill, this material is to be imported and requires management to ensure it is suitable for the existing environment. This is also one of the poorest cut/fill balance for routes running entirely offline.

7.4.8.2.5 Route Option C

Route Option C is situated in the central region of the study area. Option C runs offline through greenfield sites for approximately 1,830m, before running on existing roads for approximately 275m. The route is underlain by varied soil types, including urban made ground, alluvium, deep well drained and poorly drained

mineral soils. This route overlies alluvium and till derived from limestone Quaternary Sediments. The bedrock geology underlying the site is entirely the Lucan Formation (dark limestone and shale) and does not crosscut any GSI listed faults or areas where bedrock is at the surface.

As the majority of this route runs offline it will require 7,975m^3 of material to be cut and this excess material will require management off-site with potential for indirect impact. There is also a requirement for 60,485m^3 of material to be used as fill, this material is to be imported and requires management to ensure it is suitable for the existing environment. The cut/fill balance for this route is regarded as intermediate relative to other options.

7.4.8.2.6 Route Option D

Route Option D is situated in the central region of the study area, the road largely follows the existing R405 regional road and Hazelhatch Avenue. Option D runs offline for approximately 1,045m before running on existing roads for approximately 1,625m. The route is underlain by varied soil types, including urban made ground, alluvium, deep well drained and poorly drained mineral soils. This route overlies urban (made ground), alluvium and till derived from limestone Quaternary Sediments. The bedrock geology underlying the site is entirely the Lucan Formation (dark limestone and shale) and does not crosscut any GSI listed faults or areas where bedrock is at the surface.

This option will require 15,980m^3 of material to be cut and this excess material will require management off-site with potential for indirect impact. There is also a requirement for 24,840m^3 of material to be used as fill, this material is to be imported and requires management to ensure it is suitable for the existing environment. This route has a relatively good cut/fill balance relative to other routes.

7.4.8.2.7 Route Option E

Route Option E is situated in the central region of the study area, the road largely follows the existing R405 regional road and diverges west across greenfield sites before joining the existing Clane Road, north of the River Liffey. Option E runs offline for approximately 1,250m before running on existing roads for approximately 795m. The route is underlain by varied soil types, including alluvium, deep well drained and poorly drained mineral soils. This route overlies alluvium and till derived from limestone Quaternary Sediments. The bedrock geology underlying the site is entirely the Lucan Formation (dark limestone and shale) and does not crosscut any GSI listed faults or areas where bedrock is at the surface.

Approximately 1,260m of this route option runs offline, it will require 8,685m^3 of material to be cut and this excess material will require management off-site with potential for indirect impact. There is also a requirement for 52,640m^3 of material to be used as fill, this material is to be imported and requires management to ensure it is suitable for the existing environment. The cut/fill balance for this route is regarded as intermediate relative to other options.

7.4.8.2.8 Route Option F

Route Option F is situated in the east-central region of the study area, the road largely follows the existing R405 regional road and Hazelhatch Avenue and Callenders Mill roads. Option F runs offline for approximately 320m before running on existing roads for approximately 1,850m. The route is underlain by varied soil types, including urban made ground, alluvium, deep well drained and poorly drained mineral soils. This route overlies urban (made ground), alluvium and till derived from limestone Quaternary Sediments. The bedrock geology underlying the site is entirely the Lucan Formation (dark limestone and shale) and does not crosscut any GSI listed faults or areas where bedrock is at the surface.

Route Option F largely utilises existing roads and approximately 320m runs offline, it will require 14,380m^3 of material to be cut and this excess material will require management off-site with potential for indirect impact. There is also a requirement for 17,680m^3 of material to be used as fill, this material is to be imported and requires management to ensure it is suitable for the existing environment. This route has the optimum cut/fill balance of all routes assessed.

7.4.8.2.9 Route Option G

Route Option G is situated in the east and central region of the study area, the road largely follows the existing R405 regional road, Maynooth Road, Shackleton Road and Main Street. Option G runs offline for approximately 470m and runs on existing roads for approximately 2,360m. The route is underlain by varied

soil types, including urban made ground, alluvium and poorly drained mineral soils. This route overlies urban (made ground), alluvium and till derived from limestone Quaternary Sediments. The bedrock geology underlying the site is entirely the Lucan Formation (dark limestone and shale) and does not crosscut any GSI listed faults. Towards the centre of the route, the option overlies a 350m section where bedrock is at the surface.

Route Option G largely utilises existing roads and approximately 470m runs offline, it will require 18,540m^3 of material to be cut and this excess material will require management off-site with potential for indirect impact. There is also a requirement for 25,380m^3 of material to be used as fill, this material is to be imported and requires management to ensure it is suitable for the existing environment. This route has a relatively good cut/fill balance similar to that for Options D and F.

7.4.8.2.10 Route Option H

Route Option H is situated in the eastern region of the study area, the route utilises a section of the Loughlinstown Road before branching off to the north west. Option H runs offline for approximately 2,485m and runs on existing roads for approximately 555m. The route is underlain by varied soil types, including urban made ground, alluvium and poorly drained mineral soils. This route overlies urban (made ground), alluvium and till derived from limestone Quaternary Sediments. The bedrock geology underlying the site is entirely the Lucan Formation (dark limestone and shale) and does not crosscut any GSI listed faults. Towards the centre of the route, the option overlies a 40m section where bedrock is at the surface.

As the majority of this route runs offline it will require 12,055m^3 of material to be cut and this excess material will require management off-site with potential for indirect impact. There is also a requirement for 96,985m^3 of material to be used as fill, this material is to be imported and requires management to ensure it is suitable for the existing environment. The cut/fill balance for this route is regarded as poor relative to other options.

7.4.8.2.11 Route Option H1

Route Option H1 is situated in the eastern region of the study area. Option H1 runs offline for approximately 1,975m and runs on existing roads for approximately 1,435m. The route is underlain by varied soil types, including urban made ground, alluvium and poorly drained mineral soils. This route overlies urban (made ground), alluvium and till derived from limestone Quaternary Sediments. The bedrock geology underlying the site is entirely the Lucan Formation (dark limestone and shale) and does not crosscut any GSI listed faults. Towards the centre of the route, the option overlies a 40m section where bedrock is at the surface.

As the majority of this route runs offline it will require 17,370m^3 of material to be cut and this excess material will require management off-site with potential for indirect impact. There is also a requirement for 56,875m^3 of material to be used as fill, this material is to be imported and requires management to ensure it is suitable for the existing environment. The cut/fill balance for this route is regarded as intermediate relative to other options.

7.4.8.3 Conclusion

Table 7-32 provides a summary of the appraisal of each of the route options in terms of soils and geology. Given the largely similar baseline characteristics and subsequent impacts on the natural underlying soils and geology, the key attribute for determining preference is the cut fill balance. In this regard, the Do-Nothing option is the preferred option given the absence for any major works. Options D, F and G represent the optimum routes for the Do Something alignments as these routes have the greatest balance between cut and fill. While options such as C, E and H1 have a better balance that the remaining options (A, A1, B and H) all of these options are classed as least preferred for soils and geology.

Table 7-32: Soils and Geology Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Least Preferred
Option A1	Least Preferred
Option B	Least Preferred

Option	Preference Ranking
Option C	Least Preferred
Option D	Intermediate
Option E	Least Preferred
Option F	Intermediate
Option G	Intermediate
Option H	Least Preferred
Option H1	Least Preferred

7.4.9 Hydrology and Hydrogeology

The following section examines the potential impacts that each option will pose on the water environment (hydrology and hydrogeology) within the study area. This appraisal considers Water Framework Directive status and risk, nutrient sensitivity, protected areas, flooding potential, aquifer classification and characteristics, groundwater vulnerability and proximity to groundwater resources. Where these interact with or have the potential to be impacted by any of the route options is highlighted in the following sections.

7.4.9.1 Existing Constraints

The Water Framework Directive (WFD, 2000/60/EC) has directed water management in the EU. The WFD requires that all Member States implement the necessary measures to prevent deterioration of the status of all waterbodies (surface waters including rivers, lakes, transitional and coastal, as well as groundwater) and to protect, enhance and restore all waters with the aim of achieving at least Good Status. The objectives of the WFD requires no further deterioration of status, as such, the waterbodies are considered at risk. The EPA listed rivers and the Kildare County Council (KCC) watercourses are displayed in **Figure 7-3**.

Under the WFD Register of Protected Areas (RPA), the Liffey River WFD Catchment is classed as a nutrient sensitive catchment of interest (IERI_EA_1994_0004). The Liffey_140 and Liffey_150 river waterbodies are classed as rivers in nutrient sensitive areas and the River Liffey is a nutrient sensitive river and a nutrient sensitive area under the Urban Wastewater Treatment Directive.

Flooding can be exacerbated through development by accelerating and increasing surface water run-off, altering watercourses and removing floodplain storage. The constraints study area encompasses an area prone to fluvial flooding along the River Liffey and associated streams. The roundabout in the south east of the study area is situated in a low to high probability river flooding zone.

There are no European Sites with aquatic qualifying interests within the study area, the closest European Site is the Rye Water Valley/Carton Special Area of Conservation located approximately 3km north east of the site (Site Code: 001398). North Dublin Bay SAC (Site Code: 000206), South Dublin SAC (Site Code: 000210), North Bull Island Special Protected Area (SPA) (Site Code: 004006) and South Dublin Bay and River Tolka SPA (Site Code: 004024) are hydrologically connected to the study area by the River Liffey and are approximately 20km downgradient of the site.

There are no rivers designated as salmonid rivers under the Salmonid Regulations (S.I. 293) within the study area.

The area is underlain by a Locally Important bedrock aquifer with a Moderate to Extreme (E and X) vulnerability to pollution. There is potential for draw-down of groundwater where any road cuttings are required and there is a risk of impacts to groundwater abstraction where groundwater wells are present.

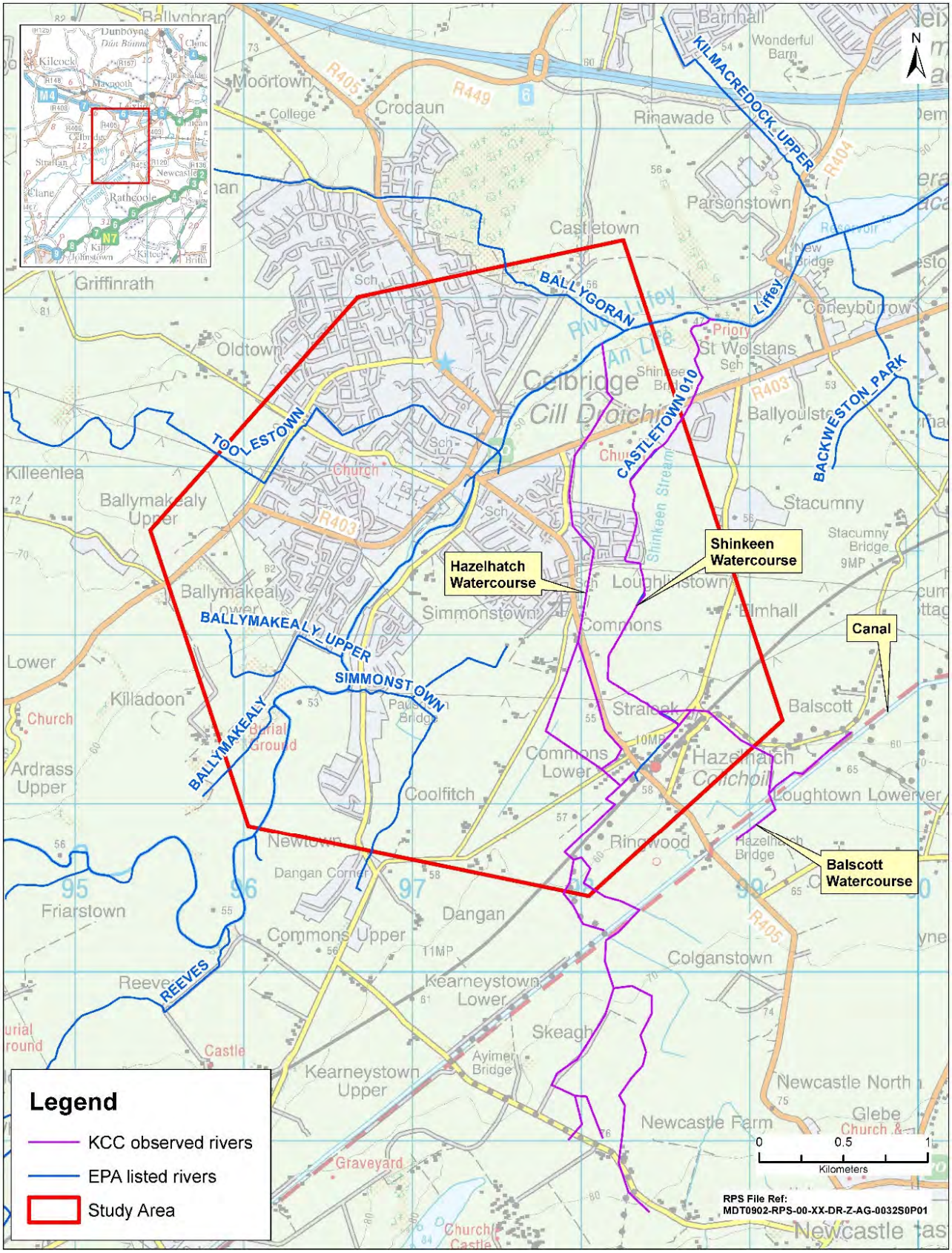


Figure 7-3: EPA Listed Rivers and KCC Observed Rivers

7.4.9.2 Assessment

7.4.9.2.1 The Do-Nothing Option

The Do-Nothing base case scenario option represents the retention of the existing road network without improvement. This option would not result in any major changes to, or impacts on, the existing water environment identified within the study area. The existing road network crosses the River Liffey at the existing bridge located on the R405 Regional Road and requires the least material to be excavated and an equally low level of fill representing a relatively low level of impact.

7.4.9.2.2 Route Option A

Route Option A is situated in the west of the study area and cross cuts multiple greenfield sites and a small housing development in the Newtown townland. The route is situated in the Liffey and Dublin Bay WFD Catchment (EPA Code: 09) (a nutrient sensitive catchment of interest), the southern section of the route is within the Liffey_SC_070 WFD Sub-Catchment and the northern section of the route is within the Liffey_SC_050 WFD Sub-Catchment.

Route Option A will require seven watercourse crossings including the Simmonstown Stream (EPA Code: 09_1579) and the Ballymakealy Upper Steam (EPA Code: 09_1126). Both streams are tributaries of the River Liffey (Liffey_140) and are rivers in nutrient sensitive areas. The route also intersects the River Liffey (EPA Code: IE_EA_09L011700) (Good 2013-2018 WFD Status, Not at Risk). The River Liffey south of Celbridge town has a low (0.1% and 0.5% AEP (Annual Exceedance Probability)) to high (10% AEP) probability of flooding up to 750m north of the riverbank, affecting the areas around the Killadoon and Newtown townlands. The Simmonstown Stream has a low to high probability of flooding in the south of the site in the townlands of Simmonstown and Commons Upper, the low probability flood zone extends up to 100m east and west of the stream's bank. The route also intersects the Hazelhatch Watercourse (listed by KCC) in the south of the site, this watercourse has a low to high probability of flooding areas up to 500m north east and south west of the riverbank.

The route overlies the Dublin Groundwater Body (GWB) (EPA Code: IE_EA_G_008) (Good 2013-2018 WFD Status, Not at Risk), a nutrient sensitive GWB. The site overlies a Locally Important Bedrock Aquifer (bedrock which is Moderately Productive only in Local Zones) and will require 1,705m of sealed drainage. The GSI groundwater vulnerability map indicates that the route overlies regions of 'Moderate' and 'High' groundwater vulnerability.

7.4.9.2.3 Route Option A1

Route Option A1 is situated in the west of the study area and cross cuts multiple greenfield sites and a small housing development in the Newtown townland, this route deviates to the west of the Route Option A. The route is situated in the Liffey and Dublin Bay WFD Catchment, the southern section of the route is within the Liffey_SC_070 WFD Sub-Catchment and the northern section of the route is within the Liffey_SC_050 WFD Sub-Catchment. Route Option A1 requires the same seven water course crossings as those described for Option A.

The route overlies the Dublin Groundwater Body, a nutrient sensitive GWB and a Locally Important Bedrock Aquifer and will also require 1,705m of sealed drainage. The GSI groundwater vulnerability map indicates that the route overlies regions of 'Moderate' and 'High' groundwater vulnerability.

7.4.9.2.4 Route Option B

Route Option B is situated in the west-central region of the study area and crosscuts multiple greenfield sites and connects with the existing Clane Road, north of the River Liffey. The route is situated in the Liffey and Dublin Bay WFD Catchment, the southern section of the route is within the Liffey_SC_070 WFD Sub-Catchment and the northern section of the route is within the Liffey_SC_050 WFD Sub-Catchment.

Route Option B has five river crossings and intersects the Loughlinstown Stream (EPA Code: 09_727), a tributary of the River Liffey, both of which are rivers in nutrient sensitive areas. The section of the route that crosses the Loughlinstown Stream and the River Liffey have a low to high probability of flooding. The high probability flood zones are localised to the riverbanks and the low probability zone extends up to 20m away from the waterbodies. The route also intersects the Hazelhatch Watercourse (listed by KCC) in the south of

the site, this watercourse has a low to high probability of flooding areas up to 500m north east and south west of the riverbank.

The route overlies the Dublin Groundwater Body, a nutrient sensitive GWB and a Locally Important Bedrock Aquifer and will require 1,435m of sealed drainage. The GSI groundwater vulnerability map indicates that the route overlies regions of primarily 'Moderate' groundwater vulnerability and overlies a region 'High' groundwater vulnerability in the northern section of the route.

7.4.9.2.5 Route Option C

Route Option C is situated in the central region of the study area. The route is situated in the Liffey and Dublin Bay WFD Catchment, the southern section of the route is within the Liffey_SC_070 WFD Sub-Catchment and the northern section of the route is within the Liffey_SC_050 WFD Sub-Catchment.

Route Option C has four watercourse crossings and intersects the Loughlinstown Stream, a tributary of the River Liffey, both of which are rivers in nutrient sensitive areas. The section of the route that crosses the Loughlinstown Stream and the River Liffey have a low to high probability of flooding. The high probability flood zones is localised to the riverbanks and the low probability zone extends up to 20m away from the surface waterbodies. The route also intersects the Hazelhatch Watercourse (listed by KCC) in the south of the site. Approximately, the first 500m of this route is located within the low probability flood zone associated with the Hazelhatch Watercourse.

The route overlies the Dublin Groundwater Body, a nutrient sensitive GWB and a Locally Important Bedrock Aquifer and will require 677m of sealed drainage. The GSI groundwater vulnerability map indicates that the route overlies regions of primarily 'Moderate' groundwater vulnerability and overlies a region of 'High' groundwater vulnerability in the northern section of the route.

7.4.9.2.6 Route Option D

Route Option D is situated in the central region of the study area, the road largely follows the existing R405 regional road and Hazelhatch Avenue. The route is situated in the Liffey and Dublin Bay WFD Catchment, the southern section of the route is within the Liffey_SC_070 WFD Sub-Catchment and the northern section of the route is within the Liffey_SC_050 WFD Sub-Catchment.

Route Option D only requires two watercourse crossings including the River Liffey, a nutrient sensitive river. The section of the route that intersects the River Liffey has a low to high probability of flooding. The high probability flood zones are localised to the riverbanks and the low probability zone extends up to 20m away from the waterbody. The route also intersects the Hazelhatch Watercourse (listed by KCC) in the east of the site. Approximately, the first 600m of this route is located within the low probability flood zone associated with the Hazelhatch Watercourse.

The route overlies the Dublin Groundwater Body, a nutrient sensitive GWB and a Locally Important Bedrock Aquifer and will require 1,159m of sealed drainage. The GSI groundwater vulnerability map indicates that the route overlies regions of primarily 'Moderate' groundwater vulnerability and overlies a region of 'High' groundwater vulnerability in the northern section of the route.

7.4.9.2.7 Route Option E

Route Option E is situated in the central region of the study area, the road largely follows the existing R405 regional road and diverges west across greenfield sites before joining the existing Clane Road, north of the River Liffey. The route is situated in the Liffey and Dublin Bay WFD Catchment, the southern section of the route is within the Liffey_SC_070 WFD Sub-Catchment and the northern section of the route is within the Liffey_SC_050 WFD Sub-Catchment.

Route Option E intersects two water courses including the River Liffey, a nutrient sensitive river. The section of the route that intersects the River Liffey has a low to high probability of flooding. The high probability flood zones are localised to the riverbanks and the low probability zone extends up to 20m away from the waterbody. The route also intersects the Hazelhatch Watercourse (listed by KCC) in the east of the site. Approximately, the first 600m of this route is located within the low probability flood zone associated with the Hazelhatch Watercourse.

The route overlies the Dublin Groundwater Body, a nutrient sensitive GWB and a Locally Important Bedrock Aquifer and will require 975m of sealed drainage. The GSI groundwater vulnerability map indicates that the

route overlies regions of primarily ‘Moderate’ groundwater vulnerability and overlies a region of ‘High’ groundwater vulnerability in the northern section of the route.

7.4.9.2.8 Route Option F

Route Option F is situated in the east-central region of the study area, the road largely follows the existing R405 regional road and Hazelhatch Avenue and Callenders Mill roads. The route is situated in the Liffey and Dublin Bay WFD Catchment, the southern section of the route is within the Liffey_SC_070 WFD Sub-Catchment and the northern section of the route is within the Liffey_SC_050 WFD Sub-Catchment.

Route Option F has three watercourse crossings including the River Liffey, a nutrient sensitive river. The section of the route that intersects the River Liffey has a low to high probability of flooding. The high probability flood zones is localised to the riverbanks and the low probability zone extends up to 20m away from the waterbody. The route also intersects the Hazelhatch Watercourse (listed by KCC) in the east of the site. Approximately, the first 600m of this route is located within the low probability flood zone associated with the Hazelhatch Watercourse.

The route overlies the Dublin Groundwater Body, a nutrient sensitive GWB and a Locally Important Bedrock Aquifer and will require 1,159m of sealed drainage. The GSI groundwater vulnerability map indicates that the route overlies regions of primarily ‘Moderate’ groundwater vulnerability and overlies a region of ‘High’ groundwater vulnerability in the northern section of the route.

7.4.9.2.9 Route Option G

Route Option G is situated in the east and central region of the study area, the road largely follows the existing R405 regional road, Maynooth Road, Shackleton Road and Main Street. The route is situated in the Liffey and Dublin Bay WFD Catchment, the southern section of the route boarders the Liffey_SC_070 WFD and Liffey_SC_090 Sub-Catchment and the northern section of the route is within the Liffey_SC_080 WFD Sub-Catchment.

Route Option G intersects the River Liffey, a nutrient sensitive river. The section of the route that intersects the River Liffey has a low to high probability of flooding. The high probability flood zones is localised to the riverbanks and the low probability zone extends up to 20m away from the waterbody. The route also intersects the Hazelhatch Watercourse (listed by KCC) in the east of the site. Approximately, the first 600m of this route is located within the low probability flood zone associated with the Hazelhatch Watercourse.

The route overlies the Dublin Groundwater Body, a nutrient sensitive GWB and a Locally Important Bedrock Aquifer and will require 1,250m of sealed drainage. The GSI groundwater vulnerability map indicates that the route overlies regions of primarily ‘Moderate’ groundwater vulnerability and overlies a region of ‘Moderate’ groundwater vulnerability in the southern section of the site and a ‘High’ groundwater vulnerability in the northern section of the site. The route passes through approximately 350m of ‘Extreme’ (X and E) groundwater vulnerability in the central to northern section of the route.

7.4.9.2.10 Route Option H

Route Option H is situated in the eastern region of the study area, the route utilises a section of the Loughlinstown Road before branching off to the north west. The route is situated in the Liffey and Dublin Bay WFD Catchment, the southern section of the route is within the Liffey_SC_090 WFD Sub-Catchment and the northern section of the route is within the Liffey_SC_080 WFD Sub-Catchment.

Route Option H will require five watercourse crossings. The route follows and intersects the Castletown_010 Stream (EPA Code: 09_501) in the southern section of the route. The Castletown_010 Stream is not a nutrient sensitive waterbody, however, it is a tributary of the River Liffey which is a nutrient sensitive river. The section of the route that crosses the Castletown_010 Stream and the River Liffey has a low to high probability of flooding. The high probability flood zones is localised to the riverbanks and the low probability zone extends up to 20m away from the waterbodies. This route also intersects the KCC listed Shinkeen Watercourse twice in the east of the site and the Hazelhatch Watercourse in the north east of the site.

The route overlies the Dublin Groundwater Body, a nutrient sensitive GWB and a Locally Important Bedrock Aquifer and will require 498m of sealed drainage. The GSI groundwater vulnerability map indicates that the route overlies regions of primarily ‘Moderate’ groundwater vulnerability and overlies a region of ‘Moderate’ groundwater vulnerability in the southern section of the site and a ‘High’ groundwater vulnerability in the

northern section of the site. The route passes through approximately 100m of 'Extreme' (X and E) groundwater vulnerability in the northern section of the route.

7.4.9.2.11 Route Option H1

Route Option H1 is situated in the eastern region of the study area. The route is situated in the Liffey and Dublin Bay WFD Catchment, the southern section of the route is within the Liffey_SC_090 WFD Sub-Catchment and the northern section of the route is within the Liffey_SC_080 WFD Sub-Catchment.

Route Option H1 has six water crossings and intersects the Castletown_010 Stream in the southern section of the route. The Castletown_010 Stream is not a nutrient sensitive waterbody, however, it is a tributary of the River Liffey which is a nutrient sensitive river. The section of the route that crosses the Castletown_010 Stream and the River Liffey has a low to high probability of flooding. The high probability flood zones are localised to the riverbanks and the low probability zone extends up to 20m away from the waterbodies. This route also intersects the KCC listed Shinkeen Watercourse and Balscott Watercourse in the south east of the site and intersects the Hazelhatch Watercourse and the Shinkeen Watercourse for a second time in the north east of the site. The route is situated within a region of low flooding probability in the south east of the site associated with the Balscott Watercourse.

The route overlies the Dublin Groundwater Body, a nutrient sensitive GWB and a Locally Important Bedrock Aquifer and will require 902m of sealed drainage. The GSI groundwater vulnerability map indicates that the route overlies regions of 'Moderate' and 'High' in the southern section of the site and borders a region of 'Extreme' (E) groundwater vulnerability in the south east of the section. In the northern section of the route, the route overlies a 'High' groundwater vulnerability region. The route passes through approximately 100m of 'Extreme' (X and E) groundwater vulnerability in the northern section of the route.

7.4.9.3 Conclusion

Table 7-33 provides a summary of the appraisal of each of the route options in terms of water. The Do-Nothing option represents the lowest potential impact on water quality as no new water crossings are required and the existing drainage infrastructure is in place, hence, this is the preferred water quality option. Options A, A1 and B have the highest of sealed drainage required, the greatest number of crossings and the highest impact on flood risk from the adjacent watercourse so these are considered the least preferred options.

Table 7-33: Water Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Least Preferred
Option A1	Least Preferred
Option B	Least Preferred
Option C	Intermediate
Option D	Intermediate
Option E	Intermediate
Option F	Intermediate
Option G	Intermediate
Option H	Intermediate
Option H1	Intermediate

7.4.10 Cultural and Archaeological Heritage

This following section examines the potential impacts that each route option may pose to the cultural heritage environment. Where these routes interact with, or have the potential to be impacted, is highlighted in the following sections.

7.4.10.1 Existing Constraints

The preliminary archaeology and cultural heritage route option study appraisal considered the following heritage designations: National Monuments (including Preservation Orders), tentative World Heritage Sites (WHS), the Record of Monuments and Places (RMP), Sites and Monuments Record (SMR), the Record of Protected Structures (RPS) (and demesne settings were relevant) and National Inventory of Architectural Heritage (NIAH) sites. A high-level qualitative appraisal included the consideration of the length of each route through greenfield areas, the crossing of watercourses, crossing of designed landscapes or proximity to clusters of recorded sites.

Notwithstanding the above, one of the most significant constraints within the study area are the intact designed landscapes associated with Castletown, Donaghcumper and St Wolstan's. These demesnes form a distinctive and harmonious designed landscape setting on the banks of the River Liffey at the eastern end of Celbridge town.

In addition, the connection and interrelationship between the historic town of Celbridge and Castletown House and demesne is highly significant. The principal gated entrance into Castletown Demesne at the eastern end of Main Street frames a long treelined avenue into Castletown House. Main Street is deliberately aligned on this avenue and the linear approach to the gates from Main Street is a significant part of the experience of the demesne. This area is further enhanced by a number of protected structures which form part of the distinctive character of the historic town. The axial view along the avenue is safeguarded as part of the Castletown- Donaghcumper protection area in the County Development Plan (2017-2023) and the Celbridge Local Area Plan (2017-2023). Route Options G, H and H1 will run past the southwestern entrance into the demesne in this sensitive part of the town. It will sever the connection to the town and will impact on the collective setting of these structures. It is considered that the historic environment in this location would be incapable of absorbing the development of a link road. These route options also impact on Donaghcumper Demesne. Given the sensitivity of this area the three easternmost routes Options G, H and H1 should not be considered an option from a cultural heritage perspective and should not be explored any further in the development of a link road.

7.4.10.2 Assessment

7.4.10.2.1 The Do Nothing Option

The Do-Nothing option represents the retention of the existing road network without improvement. As this option would not comprise of any upgrades or junction improvement works, other than routine maintenance, it would not warrant any significant changes or impacts to the existing cultural heritage environment. This is the preferred option.

7.4.10.2.2 Route Option A

Route Option A has a direct impact on a prehistoric barrow site (KD011-066) in the townland of Celbridge Abbey. The site is on flat grassland with a ditch barrow (KD011-067) approx. 50m to north-northeast of it. Barrow sites generally occur in groups and there is a potential that further sites are located in the vicinity.

The route crosses the River Liffey and two of its tributaries. The barrow sites in the vicinity of the river and other recorded sites along its course indicate the archaeological potential of the lands in proximity to it.

Route Option A runs entirely offline through green fields for 2,635m and as such there is a general greenfield archaeological potential to reveal previously unknown subsurface archaeological sites along this option.

On the basis of the potential direct impact on the barrow site this route option is considered to be one of the least preferred route options. However, should the route be amended to avoid an impact on the RMP site it would be a preferred option from a cultural heritage perspective.

7.4.10.2.3 Route Option A1

Route Option A1 crosses through the north-eastern parkland of the intact 18th century Killadoon Demesne (NIAH Garden Survey ref:1918). It cuts through its northern walled boundary (comprising a tall roughly coursed limestone wall) and a wooded shelterbelt. Its entrance and gate lodge (RPS B11-21) are over 50m east of the route option. Whilst the principal protected structure (RPS B11-07) is over 600m from the route, the house and its associated demesne lands and enclosing boundary is considered as a single heritage unit.

Two tributaries and the main channel of the River Liffey are crossed by this option. The route runs offline through greenfield for 2,975m and as such there is a general greenfield archaeological potential to reveal previously unknown subsurface archaeological sites along this option. There are recorded barrow sites to the north of the route in Celbridge Abbey, this site type generally occurs in clusters and there is a potential that further sites would be present in the area on the sloping river valley.

On the basis of the potential direct impact on the recorded an intact 18th century demesne this route option is considered to be one of the least preferred route options.

7.4.10.2.4 Route Option B

There are no RMP sites or RPS within 100m Route Option B.

The route option crosses the southernmost area of the former demesne lands of Celbridge Abbey located on both sides of the River Liffey. On the northern river bank the land is now used as a public park, and on the southern bank it comprises an overgrown woodland which is bounded to the south from the Newtown Road by the original demesne wall (roughly coursed rubble limestone) that is in various states of repair.

One tributary and the main channel of the River Liffey is crossed by this option. This route runs entirely offline for 2,180m and as such there is a general greenfield archaeological potential to reveal previously unknown subsurface archaeological sites along this option.

Route option B does not impact on recorded heritage features and for that reason it is considered to be a preferred corridor. A field inspection will establish if there are any relict features associated with the former demesne of Celbridge Abbey (such as the demesne wall) where it crosses the southern side of the river Liffey.

7.4.10.2.5 Route Option C

There are no RMP sites or RPS within 100m Route Option C.

The route option crosses the southernmost area of the former demesne lands of Celbridge Abbey located on both sides of the River Liffey. On the northern river bank the land is now used as a public park, and on the southern bank it comprises an overgrown woodland which is bounded to the south from the Newtown Road by the original demesne wall (roughly coursed rubble limestone) that is in various states of repair.

One tributary and the main channel of the River Liffey is crossed by this option. This route runs predominantly offline for 1,830m and as such there is a general greenfield archaeological potential to reveal previously unknown subsurface archaeological sites along this option.

Route option C does not impact on recorded heritage features and for that reason it is considered to be a preferred corridor. A field inspection will establish if there are any relict features associated with the former demesne of Celbridge Abbey (such as the demesne wall) where it crosses the southern side of the river Liffey.

7.4.10.2.6 Route Option D

Route Option D is c.30m from an enclosure site in Simmonstown (KD011-063) which is visible on aerial survey. The option runs just outside its zone of archaeological potential for the site, c.30m from its visible extent on aerial survey (measured from what appears to be an ditch outlier). There may be subsurface features associated with this site that run beyond this visible extent and potentially along the path of the route option.

The route option crosses the southernmost area of the former demesne lands of Celbridge Abbey located on both sides of the River Liffey. On the northern river bank the land is now used as a public park, and on the southern bank it comprises an overgrown woodland which is bounded to the south from the Newtown Road by the original demesne wall (roughly coursed rubble limestone) that is in various states of repair.

The option crosses the main channel and one tributary of the River Liffey. There is a general greenfield archaeological potential along this option where the route runs offline for approximately 1,045m.

Route option D has no direct impacts on recorded heritage features and for that reason it is considered to be a preferred corridor. Archaeological investigations are recommended where the route runs south of the enclosure site in Simmonstown to ensure that it does not extend into the route corridor. A field inspection will establish if there are any relict features associated with the former demesne of Celbridge Abbey (such as the demesne wall) where it crosses the southern side of the river Liffey.

7.4.10.2.7 Route Option E

Route Option E commences in the former demesne lands associated with Celbridge Abbey. It crosses an historic mill race in the immediate vicinity of a Sluice/Sluice Gate (B11-112/ 11805080) and stone weir. The sluice regulated the flow of the canalised section of the River Liffey into the main section of the River Liffey to south. It was built as part of the planned Celbridge Abbey estate (c.1775) and is associated with milling further upstream. The route also crosses c.50m downstream of two footbridges.

The route will have a direct impact on the western side of an enclosure site (RMP KD011-063) in Simmonstown, which is visible on aerial survey. The site is c 60m in diameter and may have associated features that extend outside its visible extent on aerial photography.

The route also runs offline through greenfield areas (1,250m), and runs in the area between a number of recorded monuments, two enclosure sites (KD011-029, KD011-016) and a castle (KD011-030). Whilst it avoids these sites there is a potential that associated features may be extend subsurface into the area in which the route runs.

Given the impact of the route on the recorded industrial heritage features at the River Liffey crossing and also on a recorded monument it is considered to be a least preferred option.

7.4.10.2.8 Route Option F

The northern end of the route option Route Option F commences within the Zone of Archaeological Potential for the Historic Town of Celbridge (KD011-012). Within this area there is an increased archaeological potential to reveal previously unknown subsurface archaeological features associated with the development of the town.

Though Celbridge Abbey cannot be described as an intact demesne, the route option subdivides the former demesne and its main structures (RPS B11-24, B11-24A and B11-24B) from Celbridge town, to which it is inextricably linked (physically, historically, and socially). The route also crosses a mill race associated with former mills upstream. This canalised section of the River Liffey was built as part of the planned Celbridge Abbey estate (c.1775).

The route runs offline into greenfield areas for approximately 320m, this substantially reduces the greenfield archaeological potential along its corridor in comparison with the other route options.

Route option F runs through the ZAP for Celbridge, a recorded archaeological site, it will also separate Celbridge Abbeys former demesne and protected structures from the town, for these reasons it is considered least preferred option.

7.4.10.2.9 Route Option G

Route Option G runs through the Zone of Archaeological Potential for the Historic Town of Celbridge (KD011-012). Within this area there is an increased archaeological potential to reveal previously unknown subsurface archaeological features associated with the development of the town.

Where the route option interacts with the Main Street, it passes in the immediate vicinity of several protected structures (i.e., RPS B11-39, B11-85, B11-105, B11-92, B11-91 and B11-90), it also runs past the entrance into Castletown House and severs its connection to the town. Celbridge Main Street is deliberately aligned on the tree lined entrance avenue of Castletown Demesne. The street layout and buildings in the vicinity of the entrance have an ‘estate town’ character and collectively support the experience of the approach to Castletown House and of the designed axial view into the demesne. The axial view along the avenue is safeguarded as part of the Castletown- Donaghcumper protection area in the County Development Plan (2017-2023) and the Celbridge Local Area Plan (2017-2023).

The route also subdivides the southwestern section of Donaghcumper Demesne. This intact demesne is associated with the designed landscapes of Castletown and St Wolstan's to the north and east. Whilst the principal protected structure (B11-54) is just under 300m from the route, the house and its associated demesne is considered as a single unit.

The main channel of the River Liffey is crossed by this option, this section of the Liffey is part of the designed landscapes associated with the three demesnes of Castletown, Donaghcumper and St Wolston's.

The route runs offline into greenfield areas for approximately 470m, this substantially reduces the greenfield archaeological potential along its corridor in comparison with the other route options.

This option it is not considered a preferred option. The route runs through the ZAP for Celbridge a recorded archaeological site and subdivides the intact Donaghcumper Demesne lands. Crucially it will sever the connection between Castletown Demesne and Celbridge town.

As detailed in the introduction, of the least preferred options the easternmost routes are significantly challenging from a heritage perspective and it is recommended that they are not considered any further.

7.4.10.2.10 Route Option H

Route Option H runs through the Zone of Archaeological Potential for the Historic Town of Celbridge (KD011-012). Within this area there is an increased archaeological potential to reveal previously unknown subsurface archaeological features associated with the development of the town.

Where the route option interacts with the Main Street, it passes in the immediate vicinity of several protected structures (i.e., RPS B11-39, B11-85, B11-105, B11-92, B11-91 and B11-90), it also runs past the entrance into Castletown House and severs its connection to the town. Celbridge Main Street is deliberately aligned on the tree lined entrance avenue of Castletown Demesne. The street layout and buildings in the vicinity of the entrance have an 'estate town' character and collectively support the experience of the approach to Castletown House and of the designed axial view into the demesne. The axial view along the avenue is safeguarded as part of the Castletown- Donaghcumper protection area in the County Development Plan (2017-2023) and the Celbridge Local Area Plan (2017-2023).

The route also subdivides the southwestern section of Donaghcumper Demesne. This intact demesne is associated with the designed landscapes of Castletown and St Wolstan's to the north and east. Whilst the principal protected structure (B11-54) is just under 300m from the route, the house and its associated demesne is considered as a single unit.

The main channel of the River Liffey is intersected by this option, this section of the Liffey is part of the designed landscapes associated with the three demesnes of Castletown, Donaghcumper and St Wolston's. The route is comparatively long and runs offline through green fields for 2,485m where there is a general greenfield archaeological potential.

This option it is not considered a preferred option. The route runs through the ZAP for Celbridge a recorded archaeological site and subdivides the intact Donaghcumper Demesne lands. Crucially it will sever the connection between Castletown Demesne and Celbridge town.

Of the least preferred options the easternmost routes are significantly challenging from a heritage perspective and it is recommended that they are not considered any further.

7.4.10.2.11 Route Option H1

Route Option H1 runs through the Zone of Archaeological Potential for the Historic Town of Celbridge (KD011-012). Within this area there is an increased archaeological potential to reveal previously unknown subsurface archaeological features associated with the development of the town.

Where the route option interacts with the Main Street it passes in the immediate vicinity of several protected structures (i.e., RPS B11-39, B11-85, B11-105, B11-92, B11-91 and B11-90), it also runs past the entrance into Castletown House and severs its connection to the town. Celbridge Main Street is deliberately aligned on the tree lined entrance avenue of Castletown Demesne. The street layout and buildings in the vicinity of the entrance have an 'estate town' character and collectively support the experience of the approach to Castletown House and of the designed axial view into the demesne. The axial view along the avenue is safeguarded as part of the Castletown- Donaghcumper protection area in the County Development Plan (2017-2023) and the Celbridge Local Area Plan (2017-2023).

The route also subdivides the southwestern section of Donaghcumper Demesne. This intact demesne is associated with the designed landscapes of Castletown and St Wolstan's to the north and east. Whilst the principal protected structure (B11-54) is just under 300m from the route, the house and its associated demesne is considered as a single unit.

The main channel of the River Liffey is intersected by this option, this section of the Liffey is part of the designed landscapes associated with the three demesnes of Castletown, Donaghcumper and St Wolston's. The route is comparatively long and runs offline through green fields for 1,435m and as such there is a general greenfield archaeological potential to reveal previously unknown subsurface archaeological sites along this option.

This option it is not considered a preferred option. The route runs through the ZAP for Celbridge a recorded archaeological site and subdivides the intact Donaghcumper Demesne lands. Crucially it will sever the connection between Castletown Demesne and Celbridge town.

Of the least preferred options the easternmost routes are significantly challenging from a heritage perspective and it is recommended that they are not considered any further.

7.4.10.3 Conclusion

Table 7-34 provides a summary of the appraisal of each of the ten route options for the Celbridge to Hazelhatch Link Road Scheme in terms of Cultural Heritage. The preferences are based on the rationale presented in the previous paragraphs. As noted earlier, Route Options G, H and H1 run past the southwestern entrance to Castletown demesne and sever the connection of the demesne with the town. Given the sensitivity of this area the three easternmost routes Options G, H and H1 should not be considered an option from a cultural heritage perspective and should not be explored any further in the development of a link road.

Table 7-34: Cultural Heritage Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Least Preferred
Option A1	Least Preferred
Option B	Preferred
Option C	Preferred
Option D	Preferred
Option E	Least Preferred
Option F	Least Preferred
Option G	Least Preferred
Option H	Least Preferred
Option H1	Least Preferred

7.4.11 Architectural Heritage

This chapter analyses the potential impacts of each route option on the architectural heritage of the receiving environment.

7.4.11.1 Existing Constraints

The initial architectural heritage route option appraisal considered the Record of Protected Structures (RPS) National Inventory of Architectural Heritage (NIAH) sites together with historic demesne settings where relevant.

Though technically not related to architectural heritage alone, one of the most significant constraints within the study area are the historic designed landscapes of Castletown, Donaghcumper and St. Wolstan's, which are of high significance and are often considered as one collective heritage unit. These demesnes form a distinctive, contiguous and harmonious designed landscape setting on the banks of the River Liffey, at the eastern end of Celbridge town. In particular, the symbiotic relationship between the town of Celbridge and Castletown House and demesne is of considerable significance. At the eastern end of Main Street, elegant neo-classical stone gate piers mark the principal entrance into Castletown Demesne. These frame a long tree-lined avenue of mature lime trees that create an impressive approach to Castletown House. The construction of Castletown House and the creation of the vast demesne laid out around it, transformed a small bridge-head village into an impressive planned town, the main street of which was deliberately planned to align with this avenue. Consequently, the formal linear approach to the gates from Main Street sets the tone that confers a part of the sense of arrival and is a significant part of the overall experience of the demesne.

The town is further enhanced by a number of protected structures, which reinforce its distinctive character and appearance. Similarly, the formal axial view along the avenue is protected as part of the Castletown - Donaghcumper protection area in the County Development Plan (2017-2023) and the Celbridge Local Area Plan (2017-2023). Proposed route options G, H and H1 would run past the main south-western entrance leading into the demesne in this sensitive part of the town, resulting in the severance of symbiotic connection between the estate and the town. This would have a negative impact on the collective settings of several protected structures. In view of the significance and sensitivity of this area, options G, H and H1 should not be considered any further as part of the proposed link road scheme.

7.4.11.2 Assessment

7.4.11.2.1 The Do-Nothing Option

This option would mean the existing road network would stay as it is, without improvement. As this option would not involve upgrades or junction improvement works - other than routine maintenance - it would therefore not require any significant changes or impacts to the existing architectural heritage, so is therefore the preferred option.

7.4.11.2.2 Route Option A

Route Option A would not affect any architectural heritage and as such would be considered one of the preferred options from an architectural heritage perspective.

7.4.11.2.3 Route Option A1

Route Option A1 cuts through the tall, rubble limestone boundary wall, on the north side of the intact Killadoon Demesne, which was also laid out during the eighteenth century. The entrance and gate lodge (RPS B11-21) are located some 50m east of the course of this route option. While the principal protected structure of Killadoon House (RPS B11-07) is situated over 600m from the proposed route, the house and its associated demesne lands together with the enclosing boundary wall, collectively form as a single heritage unit on the RPS. As a result of the potential direct impact on the eighteenth-century demesne, which is integral to the setting of the house, this route option is one of the least preferred of the route options.

7.4.11.2.4 Route Option B

Route Option B does not impact on any recorded architectural heritage features, consequently it is considered to be one of the preferred options.

7.4.11.2.5 Route Option C

There are no RPS structures within 100m of Route Option C, which crosses the southernmost area of the former demesne lands of Celbridge Abbey, which is located on both sides of the River Liffey. As this route option does not impact on any recorded architectural heritage features, it can be considered as one of the preferred options.

7.4.11.2.6 Route Option D

Route Option D has no direct impacts on recorded architectural heritage structures and for that reason it is considered to be as one of the preferred route options.

7.4.11.2.7 Route Option E

Route Option E starts in the former demesne lands associated with Celbridge Abbey. It crosses an historic mill race and is adjacent to a feature that is described as a 'Sluice/Sluice Gate' (RPS B11-112 / NIAH 11805080) and a stone weir. Historically, the sluice gate regulated the flow of a mill race that is given a 'regional' rating on the NIAH for its technical, social and historical interest. It was built around 1800 as part of the planned Celbridge Abbey estate (c.1775) and is associated with milling activity that formerly occurred further upstream. Some 50m downstream of this proposed route are two historic footbridges. The first (RPS B11-112 / NIAH 11805079) is an attractive rubble stone structure characterised by its two elliptical arches, which have retained their original mid-eighteenth century form, and are of both technical and engineering merit. Also protected is the second, known as Rock Bridge (RPS B11-B112 / NIAH 11805078E7), which was constructed around 1750 as part of the planned Celbridge Abbey Estate. Constructed of rubble stone, in the form of four impressive arches the structure is reputed to be one of the earliest surviving bridges on the River Liffey. Rock Bridge is also of merit for its technical, architectural, historical and social interest.

Given the impact of the route on the recorded industrial heritage features at the River Liffey crossing, this route option is considered to be amongst the least preferred options.

7.4.11.2.8 Route Option F

This route option proposes to cut across and subdivide the former Celbridge Abbey Demesne from some of the principal structures in Celbridge Town, to which it is inextricably linked - physically, historically, and socially. The buildings impacted by this proposal include - the former Celbridge Abbey (RPS B11-24 / NIAH 11805074), which is given a rating of national significance by the NIAH, together with the gates, railings and boundary walls of the Abbey, (B11-24A / NIAH 11805075 and B11-24B / 11805076). This route also crosses the mill race associated with former mills upstream referred to in route option E above, which dates from around 1775.

As the proposed Route Option F would separate Celbridge Abbey's former demesne and protected structures from the town, it is considered to be one of the least preferred options.

7.4.11.2.9 Route Option G

Where Route Option G meets the Main Street, it passes in the immediate vicinity of six protected structures (RPS B11-39, B11-85, B11-105, B11-92, B11-91 and B11-90). It also runs past the main eastern entrance to Castletown House and severs its connection to the town, which was planned formally, as an estate town, on the axis of the tree-lined entrance avenue of Castletown Demesne.

The street layout and buildings in the vicinity of the entrance have an 'estate town' character and collectively form part of the axial approach to Castletown House. This composition creates a strong and memorable sense of arrival and departure and is consequently, a significant part of the overall experience of visiting the demesne.

Route Option G also subdivides the intact south-western section of Donaghcumper Demesne, which is associated with the designed landscapes of Castletown and St. Wolstan's to the north and east. Whilst the principal protected structure (Donaghcumper House / B11-54) stands less than 300m from the route, the house and its associated demesne is considered as a single unit in heritage designation terms.

The main channel of the River Liffey is crossed by this option and cuts through the former historic demesne lands of Castletown, St. Wolstan's and Donaghcumper. Consequently, this is not a preferred option. As set out in the introduction, of the least preferred options, the easternmost routes all present significant challenges to the existing built heritage and it is recommended that they be disregarded.

7.4.11.2.10 Route Option H

The proposed route of Option H passing through Celbridge, is similar to that of Option G and is therefore one of the least preferred options.

7.4.11.2.11 Route Option H1

The proposed route of Option H1 passing through Celbridge, is similar to that of Option G and H is therefore one of the least preferred options.

7.4.11.3 Conclusion

Table 7-35 provides a summary of the appraisal of each of the ten route options for the Celbridge to Hazelhatch Link Road Scheme in terms of Architectural Heritage. As set out in the assessment, Route Options G, H and H1 run through the historic town of Celbridge and past the south-western entrance to Castletown demesne and break the planned and interdependent connection between it and Celbridge town. Given the sensitivity of this area, these three easternmost routes - Options G, H and H1 - should not be given any further consideration in the development of a link road.

Table 7-35: Architectural Heritage Preference Rating

Option	Preference Ranking
'Do Nothing'	Preferred
Option A	Preferred
Option A1	Least Preferred
Option B	Preferred
Option C	Preferred
Option D	Preferred
Option E	Least Preferred
Option F	Least Preferred
Option G	Least Preferred
Option H	Least Preferred
Option H1	Least Preferred

7.4.12 Landscape and Visual

This report presents a desk based comparative assessment of the potential impact and effect of the route options on landscape elements, landscape character and visual amenity.

7.4.12.1 Existing Environment

A desk based comparative assessment of the potential impact and effect of the route options on landscape and visual amenity was undertaken. It was informed by published data in the Kildare County Development Plan 2017-2023 and the Celbridge Local Area Plan 2017-2023 and aerial photography. GeoDirectory data was referenced to ascertain the extent of residential dwellings. The findings of the comparative assessment are indicative, subject to verification in the field. The route options are evaluated in the following sections.

7.4.12.2 Assessment

7.4.12.2.1 The Do-Nothing Option

The existing infrastructure and built environment encompasses the current landscape of the area and residents have been accustomed to the existing visual impact of the road. In this regard, the impact is largely accepted and this route option is considered the preferred route option.

7.4.12.2.2 Option A

In terms of landscape impact, the following is noted for Route Option A:

- No effects on designated landscapes; and
- 2,635m of offline road alignment resulting in severance of existing landscape.

In relation to visual amenity, the following are noted in relation to Route Option A:

- No significant effects on designated scenic routes or protected views; and
- Potential significant effects on small number of viewers (residents) at Chelmsford Manor and Hazelhatch.

Option A is not expected to affect designated landscapes, protected views or scenic routes. A relatively small number of residents of dwellings may experience significant visual effects for this option and hence the preference is considered the preferred option of the Do Something scenarios.

7.4.12.2.3 Option A1

In terms of landscape impact, the following are noted for Route Option A1:

- No effects on designated landscapes; and
- 2,975m of offline road alignment resulting in severance of existing landscape.

In relation to visual amenity, the following are noted in relation to Route Option A1:

- No significant effects on designated scenic routes or protected views; and
- Potential significant effects on small number of viewers (residents) at Chelmsford Manor and Hazelhatch.

Like Option A, Option A1 is not expected to affect designated landscapes, protected views or scenic routes. A relatively small number of residents of dwellings may experience significant visual effects for this option and therefore it's considered a preferred option. Option A1 is slightly longer than Option A in terms of severance of the wider landscape and mature woody vegetation will be lost at the northern end of Option A1 but this option is still considered preferred in comparison to other options.

7.4.12.2.4 Option B

In terms of landscape impact, the following are noted for Route Option B:

- Direct impact (severance) of designated Historic Landscape near Celbridge Abbey; and
- 2,180m of offline road alignment resulting in severance of existing landscape.

In relation to visual amenity, the following are noted in relation to Route Option B:

- No significant effects on designated scenic routes or protected views; and
- Potential significant effects on small number of viewers (residents) at Hazelhatch and small number of isolated dwellings.

Option B will result in severance of the designated historic landscape near Celbridge Abbey so this option is classed as intermediate.

7.4.12.2.5 Option C

In terms of landscape impact, the following are noted for Route Option C:

- Direct impact (severance) of designated Historic Landscape near Celbridge Abbey; and
- 1,830m of offline road alignment resulting in severance of existing landscape and 275m of alignment on existing road.

In relation to visual amenity, the following are noted in relation to Route Option C:

- No significant effects on designated scenic routes or protected views; and

- Limited significant visual impacts on individual isolated residents of dwellings.

Option C will result in severance of the designated historic landscape near Celbridge Abbey so this option is classed as intermediate.

7.4.12.2.6 Option D

In terms of landscape impact, the following are noted for Route Option D:

- Direct impact (severance) of designated Historic Landscape near Celbridge Abbey; and
- 1,045m of offline road alignment resulting in severance of existing landscape and 1,625m of alignment on existing road.

In relation to visual amenity, the following are noted in relation to Route Option D:

- No significant effects on designated scenic routes or protected views; and
- Potential significant visual impacts on residents of dwellings due to required road widening at Callenders Mill.

Option D will result in severance of the designated historic landscape near Celbridge Abbey so this option is classed as intermediate.

7.4.12.2.7 Option E

In terms of landscape impact, the following are noted for Route Option E:

- Direct impact (severance) of designated Historic Landscape near Celbridge Abbey; and
- 1,250m of offline road alignment resulting in severance of existing landscape and 790m of alignment on existing road.

In relation to visual amenity, the following are noted in relation to Route Option E:

- No significant effects on designated scenic routes or protected views; and
- Potential significant visual impacts on residents from rear of dwellings at Callenders Mill.

Option E will result in severance of the designated historic landscape near Celbridge Abbey so this option is classed as intermediate.

7.4.12.2.8 Option F

In terms of landscape impact, the following are noted for Route Option F:

- Direct impact (severance) of designated Historic Landscape near Celbridge Abbey; and
- 320m of offline road alignment resulting in severance of existing landscape and 1,850m of alignment on existing road.

In relation to visual amenity, the following are noted in relation to Route Option F:

- Potential effect on the protected view RL3 south west from Celbridge Bridge; and
- Potential significant visual impacts on residents of dwellings due to required road widening at Callenders Mill (1,850m length of route on existing road) and also isolated individual dwellings.

Option F will result in severance of the designated historic landscape near Celbridge Abbey so this option is classed as intermediate.

7.4.12.2.9 Option G

In terms of landscape impact, the following are noted for Route Option G:

- Direct impact (severance) of designated Historic Landscape near St Wolstan's / Donaghcumper;
- Direct impact on proposed Celbridge ACA - route crosses the Main Street;

- Impact on the setting of Castletown designed landscape - route option interrupts the vista to and from the Main Street and the tree lined avenue in the Castletown Landscape; and
- 470m of offline road alignment resulting in severance of existing landscape and 2,360m of alignment on existing road.

In relation to visual amenity, the following are noted in relation to Route Option G:

- Direct impact (severance) of the designated Scenic Route No 32 along the R403 Road Route;
- Potential effect on the protected view RL3 north east from Celbridge Bridge; and
- Potential significant visual impacts on residents of dwellings due to required road widening on the R405 north of the River Liffey (470m) and Shinkeen Road and the R405 south of the River Liffey (approximate length 1,000m) and also isolated individual dwellings.

Option G will result in severance of the designated historic landscape near Celbridge Abbey so this option is classed as least preferred. In addition, Option G will cross the Main Street in Celbridge resulting in effects on the proposed Architectural Conservation Area (ACA) and effects on the setting of the designed landscape at Castletown. Significant visual impacts may arise with all of these options in particular due to the required widening of existing roads and at locations where the route alignment passes close to or through housing areas.

7.4.12.2.10 Option H

In terms of landscape impact, the following are noted for Route Option H:

- Direct impact (severance) of designated Historic Landscape near St Wolstan's / Donaghcumper;
- Direct impact on proposed Celbridge ACA – route crosses the Main Street;
- Impact on the setting of Castletown designed landscape – route option interrupts the vista to and from the Main Street and the tree lined avenue in the Castletown Landscape; and
- 2,485m of offline road alignment resulting in severance of existing landscape and 555m of alignment on existing road.

In relation to visual amenity, the following are noted in relation to Route Option H:

- Direct impact (severance) of the designated Scenic Route No 32 along the R403 Road Route;
- Potential effect on the protected view RL3 north east from Celbridge Bridge; and
- Potential significant visual impacts on residents of dwellings due to required road widening on the R405 north of the River Liffey (555m).

Option H will result in severance of the designated historic landscape near Celbridge Abbey so this option is classed as least preferred. Like Option G, this option will also cross the Main Street in Celbridge resulting in effects on the proposed Architectural Conservation Area (ACA) and effects on the setting of the designed landscape at Castletown. Significant visual impacts may arise with all of these options in particular due to the required widening of existing roads and at locations where the route alignment passes close to or through housing areas.

7.4.12.2.11 Option H1

In terms of landscape impact, the following are noted for Route Option H1:

- Direct impact (severance) of designated Historic Landscape near St Wolstan's / Donaghcumper;
- Direct impact on proposed Celbridge ACA – route crosses the Main Street;
- Impact on the setting of Castletown designed landscape – route option interrupts the vista to and from the Main Street and the tree lined avenue in the Castletown Landscape; and
- 1,975m of offline road alignment resulting in severance of existing landscape and 1,435m of alignment on existing road.

In relation to visual amenity, the following are noted in relation to Route Option H1:

- Direct impact (severance) of the designated Scenic Route No 32 along the R403 Road Route;

- Potential effect on the protected view RL3 north east from Celbridge Bridge; and
- Potential significant visual impacts on residents of dwellings due to required road widening on the R405 north of the River Liffey (1,435m).

Option H1 will result in severance of the designated historic landscape near Celbridge Abbey and will have effects on the proposed Architectural Conservation Area (ACA) and effects on the setting of the designed landscape at Castletown. Like Option G and H, Option H1 is classed as least preferred.

7.4.12.3 Conclusion

Table 7-36 provides a summary of the appraisal of each of the route options for the Celbridge Link Road in terms of landscape and visual impact. The Do-Nothing option is the preferred scenario given that the existing road has been absorbed into the landscape of the area and no additional impact s are predicted.

Options A and A1 are not expected to affect designated landscapes, protected views or scenic routes. A relatively small number of residents of dwellings may experience significant visual effects for both options. Option A1 is slightly longer than Option A in terms of severance of the wider landscape. Mature woody vegetation will be lost at the northern end of Option A1. Hence option A is preferable but both are classed as preferred in this analysis relative to the other options.

All other options B, C, D, E, F, G, H ad H1 will result in some severance of a designated historic landscape. In addition, options G, H and H1 will cross the Main Street in Celbridge resulting in effects on the proposed Architectural Conservation Area (ACA) and effects on the setting of the designed landscape at Castletown. Significant visual impacts may arise with all of these options in particular due to the required widening of existing roads and at locations where the route alignment passes close to or through housing areas. As a consequence, Options G, H and H1 are classed as least preferred with the other options considered intermediate.

Table 7-36: Landscape and Visual Preference Rating

Option	Preference Rating
Do-Nothing	Preferred
Option A	Preferred
Option A1	Preferred
Option B	Intermediate
Option C	Intermediate
Option D	Intermediate
Option E	Intermediate
Option F	Intermediate
Option G	Least Preferred
Option H	Least Preferred
Option H1	Least Preferred

7.4.13 Environmental Assessment Summary

The Stage 1 Preliminary Option Assessment has been undertaken for all environmental criteria required under the EIA Directive and the preferences for each route has been documented in the preceding sections. These preferences are summarised in **Table 7-37** which shows the preferred, intermediate and least preferred options for each discipline as we all as the overall environmental preference. The table illustrates that Options H and H1 are considered least preferred across 10 of the 12 disciplines to date and as a consequence these options are considered the least preferred for environment. Furthermore, these options are considered to present potential for significant impact to the entrance to Castletown Demesne from the Main Street and, as such, these options should be ruled out from further consideration on environmental grounds.

Option G, presents a similar potential for significant impact to the entrance to Castletown Demesne and while this option presents a relatively positive preference for material assets (agriculture) and a moderate

score for climate, biodiversity, soils/geology and water quality, this option should be ruled out from further consideration on cultural heritage grounds.

The overall environmental preferred option is the Do Nothing option as this option has the lowest overall impact on the natural and built environment and is the preferred option for 9 of the 12 criteria to date. While this option has one of the greater impacts on the human environment (noise, air, population) by keeping the traffic close to the properties, the overall analysis indicates that this is the preferred option for environment.

All other options are classed as intermediate and these pose some positives and negatives across the 12 criteria.

Table 7-37: Overall Environmental Summary

Option	Population and Human Health	Material Assets (Non-Ag)	Material Assets (Ag)	Air Quality	Climate	Noise and Vibration	Bio-diversity	Soils and Geology	Water Quality	Cultural and Archaeological Heritage	Architectural Heritage	Landscape and Visual	Overall Environmental Preference
Do-Nothing													Preferred
Option A													Intermediate
Option A1													Intermediate
Option B													Intermediate
Option C													Intermediate
Option D													Intermediate
Option E													Intermediate
Option F													Intermediate
Option G													Least Preferred
Option H													Least Preferred
Option H1													Least Preferred

7.5 Economic Assessment

7.5.1 Methodology

The TII Project Managers Manual for Major National Road Projects (PE-PMG-02042) states that the economy assessment as part of Stage 1 Preliminary Options Assessment shall comprise the preparation of Option Comparison Estimates (OCE's) in accordance with the requirements of the TII CMM and PAG Unit: 6.2 Preparation of Scheme Costs.

The following section outlines the OCE's generated in accordance with TII PAG Unit 6.2 and examines the subsequent preference rating for each option with respect to Economy.

7.5.2 Assessment

Cost estimates at this stage are preliminary and indicative of the order of magnitude likely to be required to implement the scheme. When the Preferred Option is developed in more detail, the cost estimates will be refined taking account of greater accuracy of the design and the extent and character of the land acquisition. It should therefore be noted that these cost estimates are approximate only and created for the purposes of comparison between the options.

Table 7-38 below sets of the OCE's for each option in units of €1 million in accordance with the procedure outlined within TII PAG Unit: 6.2 Preparation of Scheme Costs.

Table 7-38: Option Comparison Estimates to TII PAG Unit 6.2

Base Costs (€m) *(Incl. VAT and Project-specific contingency*	Option A	Option A1	Option B	Option C	Option D	Option E	Option F	Option G	Option H	Option H1
Main Contract Construction	€19.15	€20.23	€15.76	€14.84	€16.91	€15.96	€19.85	€20.72	€22.98	€23.14
Main Contract Supervision	€1.25	€1.32	€1.03	€0.96	€1.13	€1.04	€1.29	€1.35	€1.49	€1.50
Archaeology	€0.71	€0.81	€0.59	€0.57	€0.72	€0.55	€0.59	€0.77	€0.82	€0.92
Advance Works & Other Contracts	€0.26	€0.29	€0.21	€0.21	€0.26	€0.20	€0.21	€0.28	€0.30	€0.33
Residual Network	€0.19	€0.20	€0.16	€0.15	€0.17	€0.16	€0.20	€0.21	€0.23	€0.23
Land & Property	€6.95	€6.99	€4.83	€4.36	€5.00	€7.90	€0.38	€0.55	€6.85	€6.70
Planning & Design	€2.12	€2.12	€2.12	€2.12	€2.12	€2.12	€2.12	€2.12	€2.12	€2.12
Subtotal	€30.62	€31.96	€24.69	€23.21	€26.27	€27.93	€24.65	€25.98	€34.80	€34.96
Total Inflation Allowance	€2.70	€2.82	€2.18	€2.04	€2.31	€2.46	€2.17	€2.29	€3.07	€3.08
TII Programme Risk	€1.53	€1.60	€1.23	€1.16	€1.31	€1.40	€1.23	€1.30	€1.74	€1.75
Options Comparison Cost Estimate	**€34.85**	**€36.38**	**€28.10**	**€26.41**	**€29.90**	**€31.79**	**€28.05**	**€29.57**	**€39.60**	**€39.79**

Table 7-38 above shows that Options A, A1, H and H1 are the most expensive options with cost estimates ranging from €34.85m to €39.79m. This was found to be significantly influenced by a combination of greater overall length combined with high land and property costs. Options A, A1 and H have the worst theoretical balance between cut and fill quantities which results in the need to import additional fill to construct each alignment and also acts to increase the footprint of each option leading to direct impacts on property within the study area.

With estimated costs of €26.41m, Option C was found to be the least expensive of Do-Something Options as this option has the lowest main contract construction costs resulting from its relatively short overall length at 2.105km, therefore reducing the length of new carriageway and land take required.

This is followed by Options F, B, G, D and E which were found to cost in the range €28.05m to €31.79m. Option E has one of the lowest main contract construction costs but has the highest costs for land and property due to its interaction with land zoned residential. Option G has relatively high main contract construction costs but low land and property costs due to its higher proportion of online upgrade works. Option F has the lowest land and property costs but along with Option E, has higher bridge costs resulting from the need to cross the mill race adjacent to the River Liffey.

7.5.2.1 Conclusion

The assessment set out in **Table 7-39** found that Options A, A1, H and H1 (costing €34.85m, €36.38m, €39.60m and €39.79m respectively) are the most expensive options to deliver due primarily to a combination of greater overall length combined with high land and property costs. As a result, it is considered that Options A, A1, H and H1 are ranked as the 'Least Preferred' options under economy.

Option C was found to be the least expensive option at €26.41m and is therefore ranked as the 'Preferred' option. This was then followed by Options F, B, G, D and E which were found to cost in the range €28.05m to €31.79m. These options are therefore ranked as 'Intermediate' preference.

Do-Nothing option was classified as Preferred under this criterion as it's cost is zero.

A summary of the preference rating for each option with respect to economy is shown in **Table 7-39**.

Table 7-39: Economy Preference Rating

Option	Preference Ranking
Do-Nothing	Preferred
Option A	Least Preferred
Option A1	Least Preferred
Option B	Intermediate
Option C	Preferred
Option D	Intermediate
Option E	Intermediate
Option F	Intermediate
Option G	Intermediate
Option H	Least Preferred
Option H1	Least Preferred

8 STAGE 1 FRAMEWORK MULTI-CRITERIA ASSESSMENT

An overall preference ranking was derived from a collective qualitative assessment of the Engineering, Environmental and Economic parameters to each of the preliminary options.

The results of the assessment are presented below in **Table 8-1.**

Table 8-1: Preliminary Options Assessment

Option	Engineering	Environment	Economy	Progress to Stage 2
Do-Nothing				YES
Option A				YES
Option A1				YES
Option B				YES
Option C				YES
Option D				NO
Option E				YES
Option F				NO
Option G				NO
Option H				NO
Option H1				NO

Options G, H and H1 were found to be of low preference. These options were found to be least preferred under Engineering and under Environment with Options H and H1 shown to be among the most expensive of all the options. All three options scored particularly poorly in terms of Cultural and Archaeological Heritage due to their interaction with Castletown House. For these reasons, it is considered that Options G, H and H1 shall not proceed to Stage 2.

Options D and F were all found to be of low preference with each option ranking as least preferred under Engineering and scoring as intermediate under Environment and Economy. These options scored particularly poorly in terms of compliance with technical standards, constructability, junction & access strategy and road safety due to having long online upgrade sections through housing estates. For this reason, it is considered that Options D and F shall not proceed to Stage 2.

Options C and E were found to be the most preferred options collectively under the Engineering, Environmental and Economic parameters from Do-Something options. These are then followed by Option B which is rated as intermediate under all three assessment criteria. Finally Options A and A1, although ranked

least preferred options under economy are ranked as intermediate under Engineering and Environment. Therefore, it is proposed that Option A, A1, B, C and E should proceed to Stage 2.

Do-Nothing option was found to be preferred under the Environmental and Economy assessment with Intermediate scoring under the Engineering criteria. It is proposed that Do-Nothing option should proceed to Stage 2 also.

9 STAGE 1 OPTIONS ASSESSMENT RECOMMENDATIONS

Ten preliminary Do-Something options were defined for the Celbridge to Hazelhatch Link Road scheme, two passing to the outer south-west of the town centre (Options A and A1), five aligned in a central corridor between the town centre and Hazelhatch (Options B, C, D, E and F) and three that passed to the east of the town centre (Options G, H and H1). Each option was then examined using a Stage 1 Multi-Criteria Analysis (MCA) which assessed the potential impacts of each option and its relative success in achieving the project objectives under the headings of Engineering, Environment and Economy in accordance with PAG Unit 7.0 Multi Criteria Analysis.

This assessment found that all options vary in preference with respect to Engineering, Environment and Economy. It was however shown that Options A, A1, B, C and E are of the highest preference with respect to the combined criteria examined. These options also achieve the project objectives by providing an improved road that will reduce journey times while improving journey time reliability. These options will provide a facility that is 'fit for purpose' for all road users, that provides enhanced accessibility to public transport and to Key Development Areas, improved road consistency and safety, and provides an improved pedestrian and cycling experience in an environmentally sensitive manner. For this reason, it is proposed that Options A, A1, B, C and E should proceed to Stage 2 – Project Appraisal.

The Do-Nothing Option was also assessed using a Stage 1 Multi-Criteria Analysis (MCA) under the headings of Engineering, Environment and Economy and scored favourably in accordance with PAG Unit 7.1 Multi Criteria Analysis. The Do-Nothing Option does not achieve the majority of the project objectives including improving traffic, safety and provision for vulnerable road users. Regardless, the Do-Nothing Option should proceed to further analysis in Stage 2 as a Base Case option as per the PAG Unit 7.1 Multi Criteria Analysis.

Figure 9-1 below illustrates Options A, A1, B, C and E within the study area. These options are shown in greater detail in Appendix F.

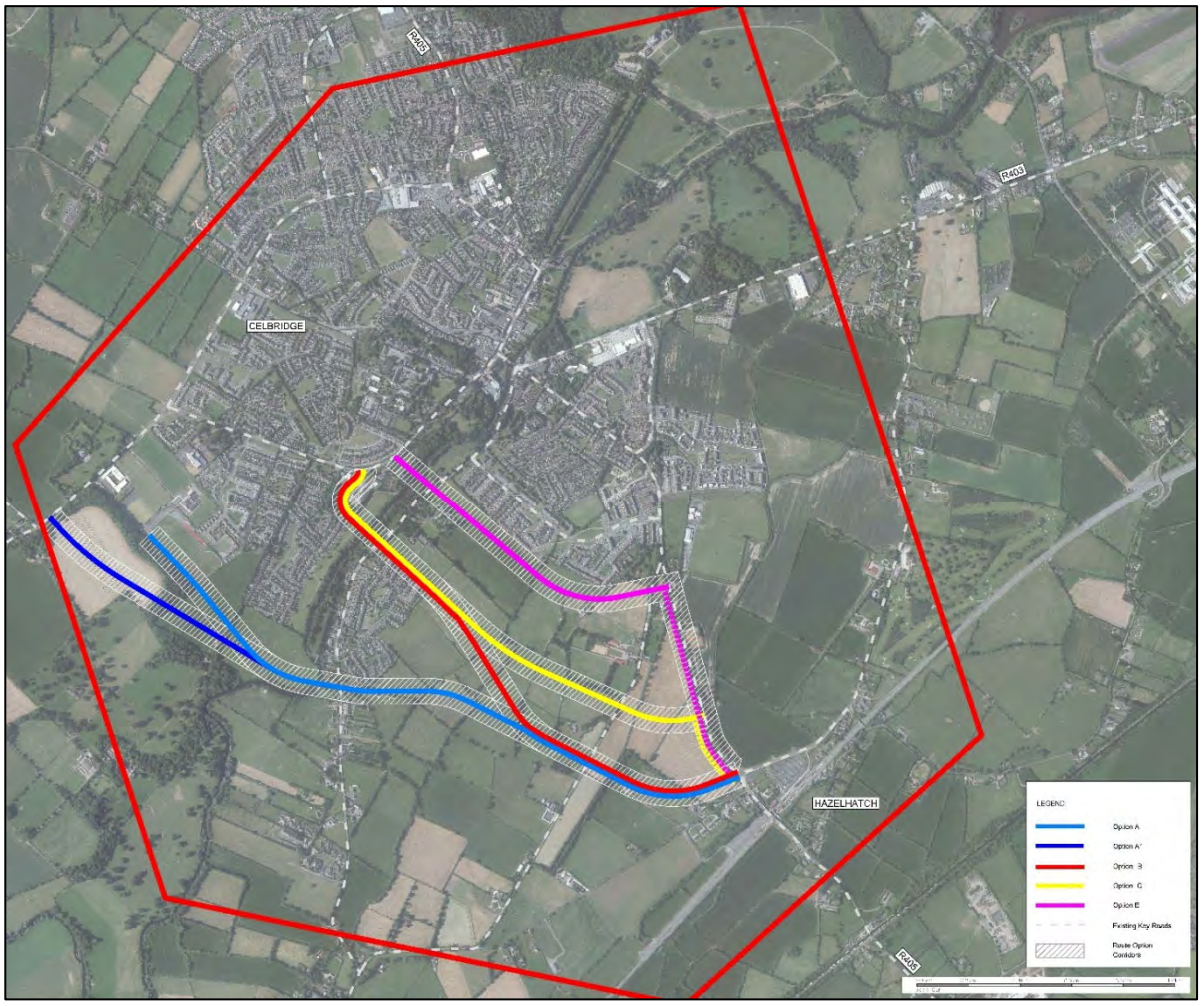
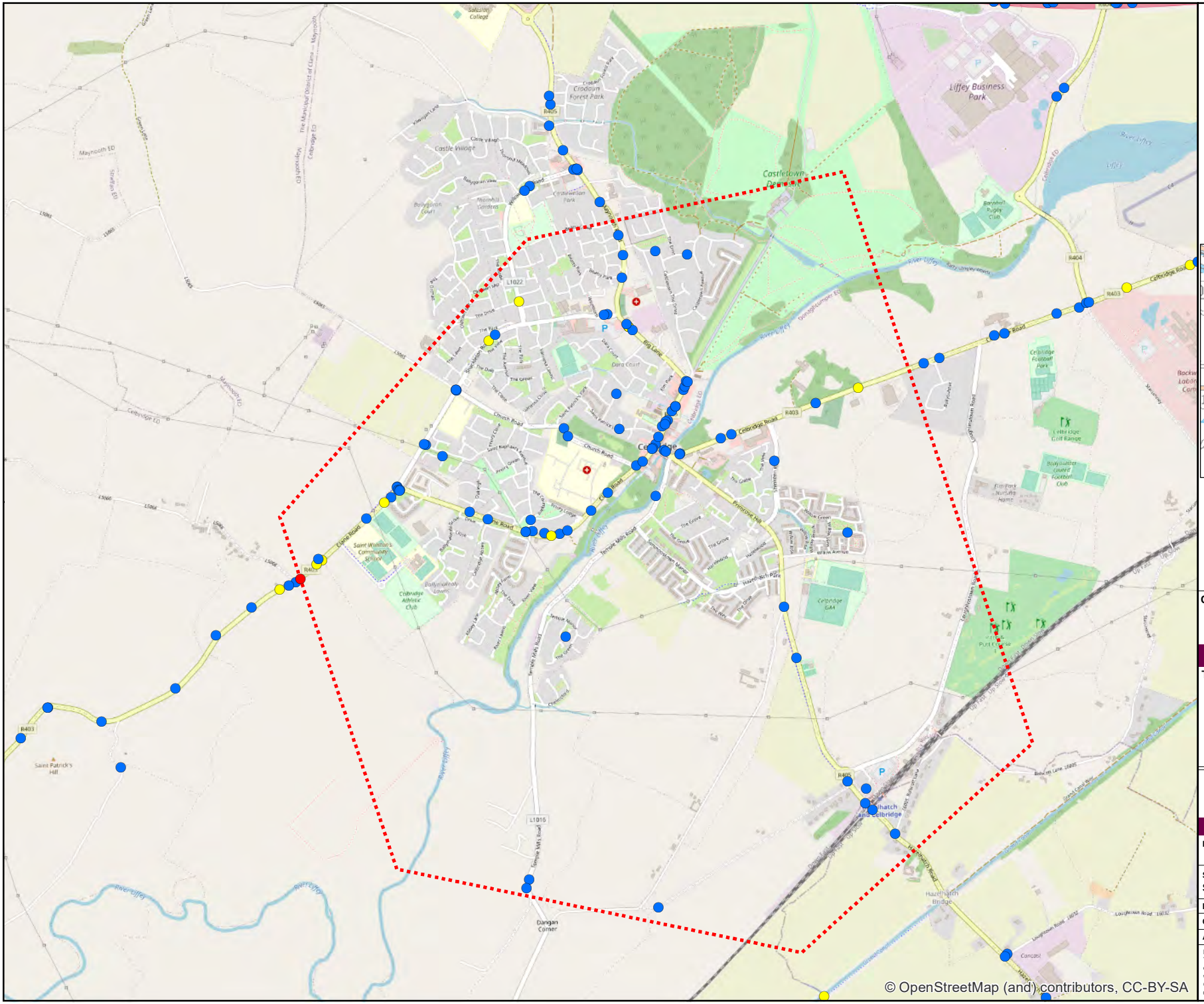


Figure 9-1: Options Progressing to Stage 2 Assessment

Appendix A
Location of Personal Injury Accidents



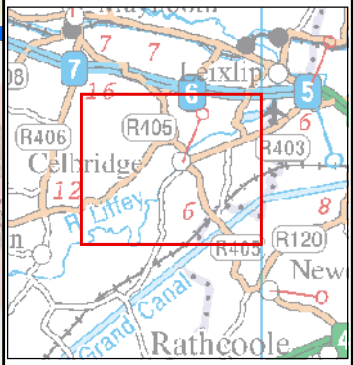
Legend

Study Area

RSA Data

- Fatal
- Serious
- Minor

Data source:
Road Safety Authority (RSA)



N
W E
S

0 0.25 0.5
Kilometers

Client

Kildare County Council

Celbridge to Hazelhatch Link Road

Title

RSA Collision Data (2008 - 2016)

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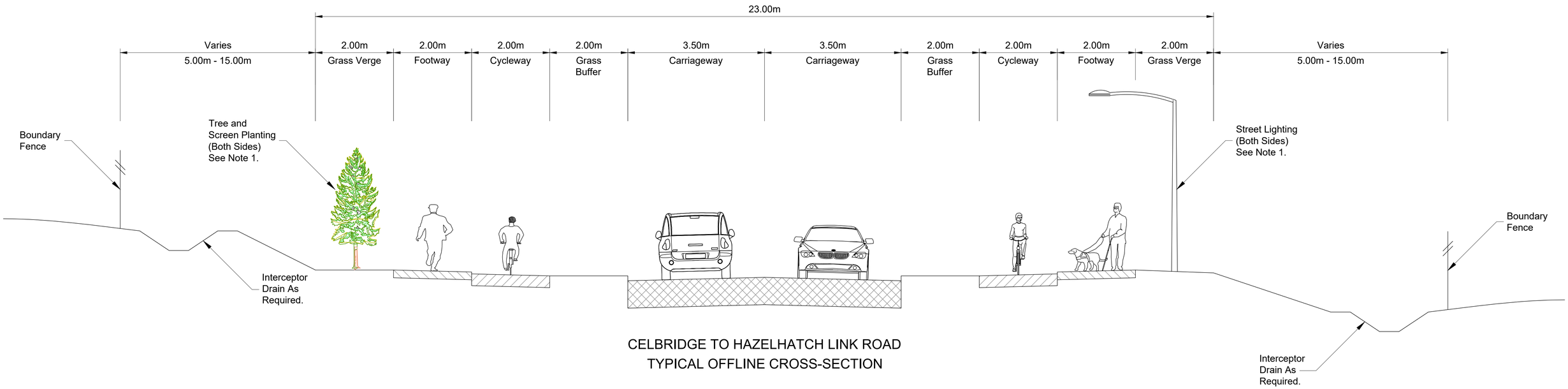
Issue Details

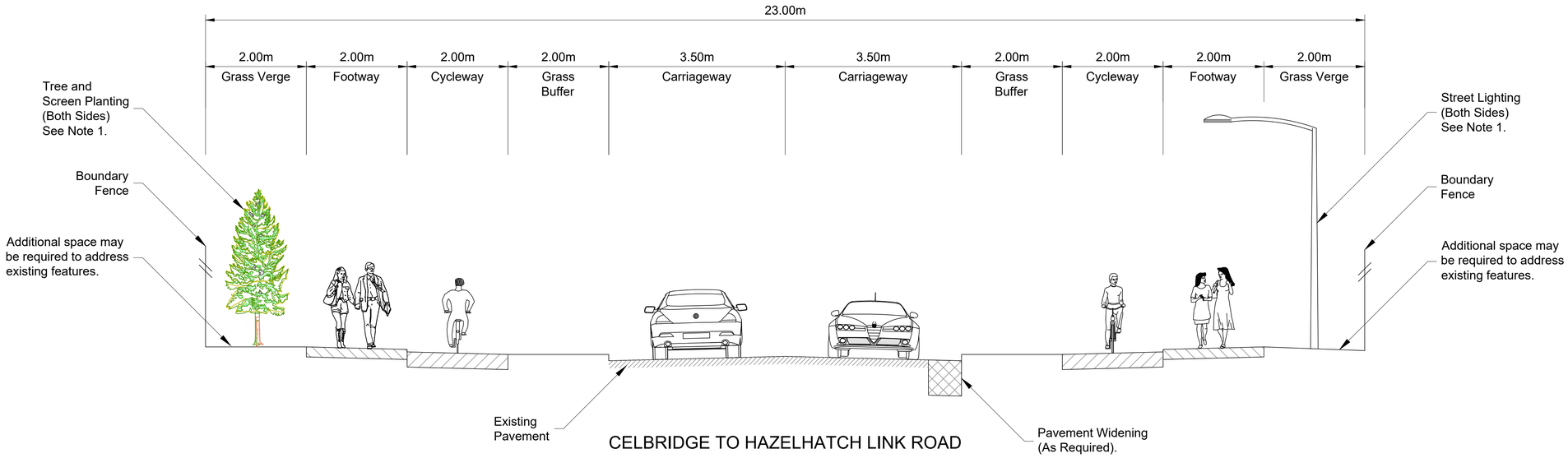
File Identifier: MDT0902-RPS-00-XX-DR-Z-AG-0005		
Status: S0	**Rev:** P02	**Model File Identifier:** MDT0902-RPS-00-XX-M3-D-XM0102 to MDT0902-RPS-00-XX-M3-D-XM0109
Drawn: SK		**Date:** 15/10/2020
Checked: PW		**Scale:** 1:25,000 (A4)
Approved: MC		**Projection:** IRENET95 - ITM

Appendix B
Typical Cross Sections

NOTES:
1. Street Lighting and Tree Planting to be inter-spaced within the 2.00m Grass Verge.



CELBRIDGE TO HAZELHATCH LINK ROAD
TYPICAL OFFLINE CROSS-SECTION



CELBRIDGE TO HAZELHATCH LINK ROAD
TYPICAL ONLINE CROSS-SECTION

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0000 - Typical Cross Section.dwg

Client

Ilkanna agus Mianach

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Rev	Date	Dm Chk	Amendment / Issue	App
P01.02	11/01/21	JBR PW	WORK IN PROGRESS	MN
P01.01	03/12/20	JBR PW	WORK IN PROGRESS	MN

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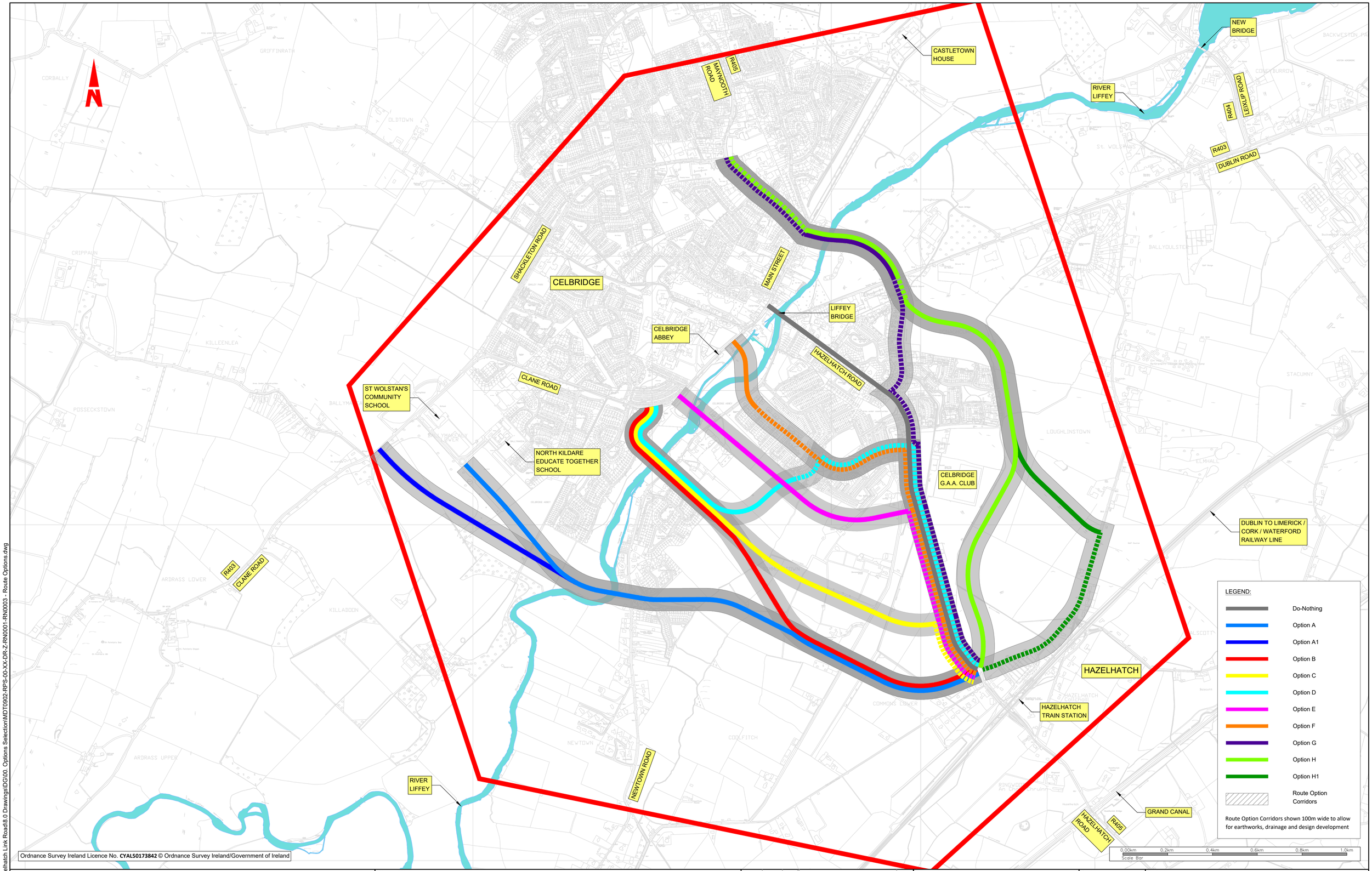
Model File Identifier

Scale	Project
1: 50 @ A1 1:100 @ A3	CELBRIDGE TO HAZELHATCH LINK ROAD
Created on: 03/12/2020	Title: TYPICAL CROSS-SECTIONS
Sheets: 01 of 01	

File Identifier	Status	Rev
MDT0902-RPS-00-XX-DR-Z- RN0000	S0	P01.02

Appendix C
Plan of Options Considered in Stage 1



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Client

Ináirma Ághas Mianraigh

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P01	02/11/21	AJ	SF	FOR INFORMATION	MN

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Model File Identifier

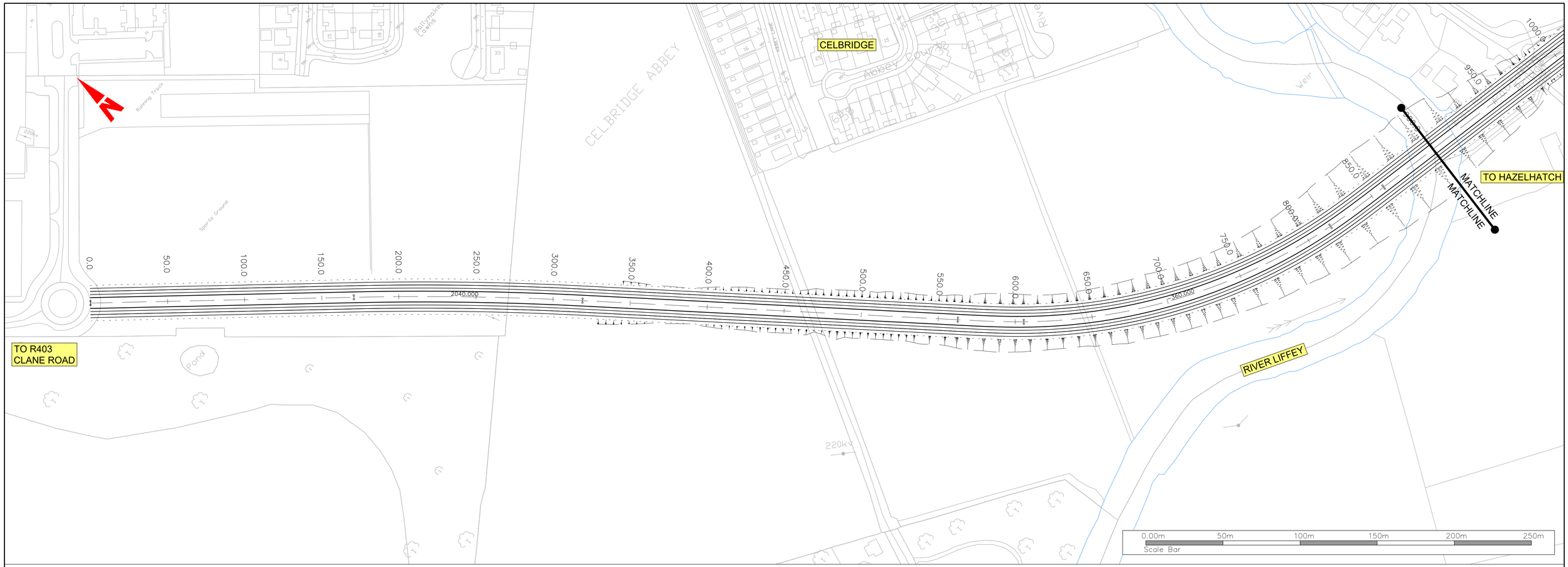
Scale	7,500 @ A1 15,000 @ A3
Created on	02/11/2021
Sheets	01 of 01

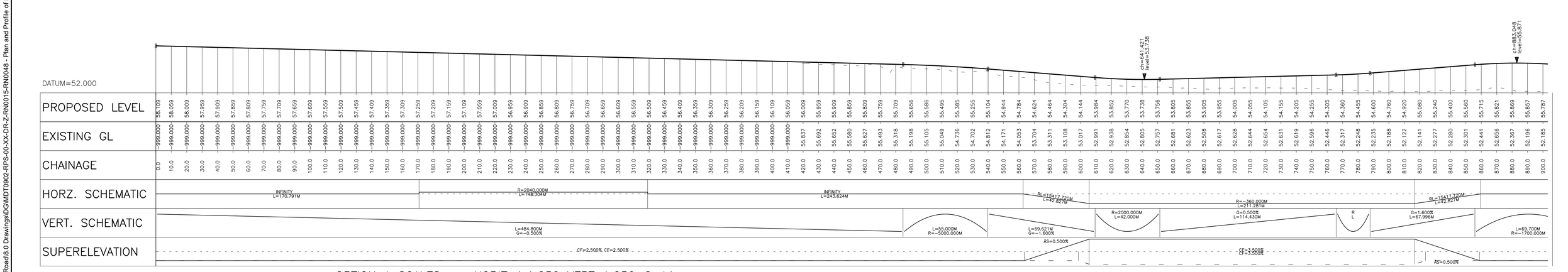
Project: CELBRIDGE TO HAZELHATCH LINK ROAD

Title: STAGE 1 OPTIONS SELECTION
ROUTE OPTIONS

File Identifier	Status	Rev
MDT0902-RPS-00-XX-DR-Z- RN0001	S2	P01

Appendix D
Option Alignment Drawings





OPTION A SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

Inchiama Aghas Mhaigeach

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P01.01	12/01/21	JBR PW	WORK IN PROGRESS	MN

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Model File Identifier

Scale 1:1,250 @ A1
1:2,500 @ A3

Created on 04/12/2020

Sheets 01 of 03

Project CELBRIDGE TO HAZELHATCH LINK ROAD

Title STAGE 1 OPTIONS
OPTION A

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0015

Status S0

Rev P01.01

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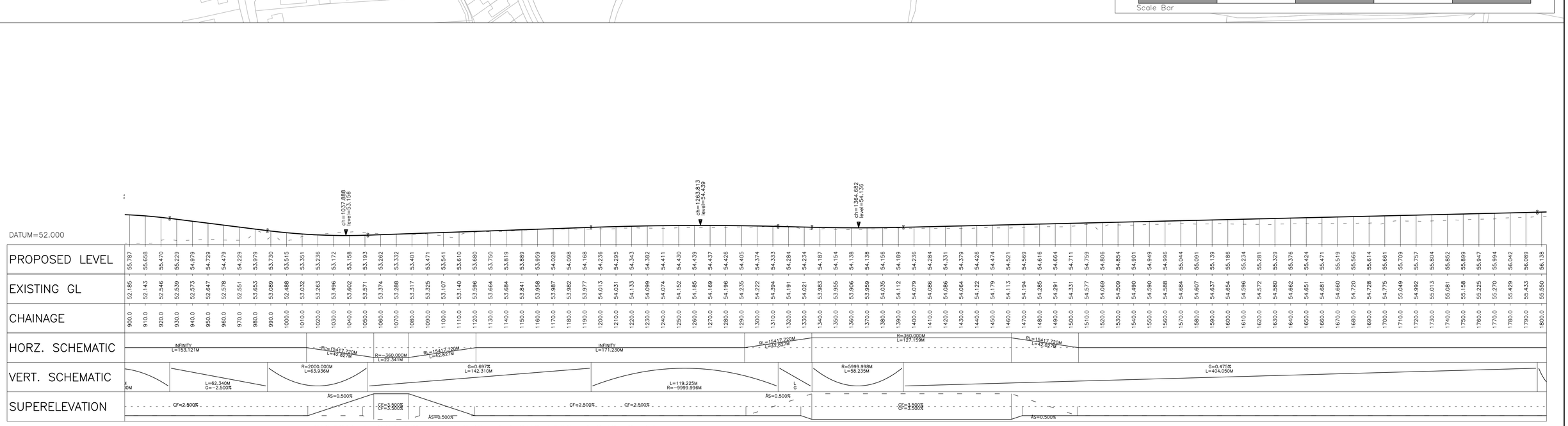

OPTION A SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\6.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

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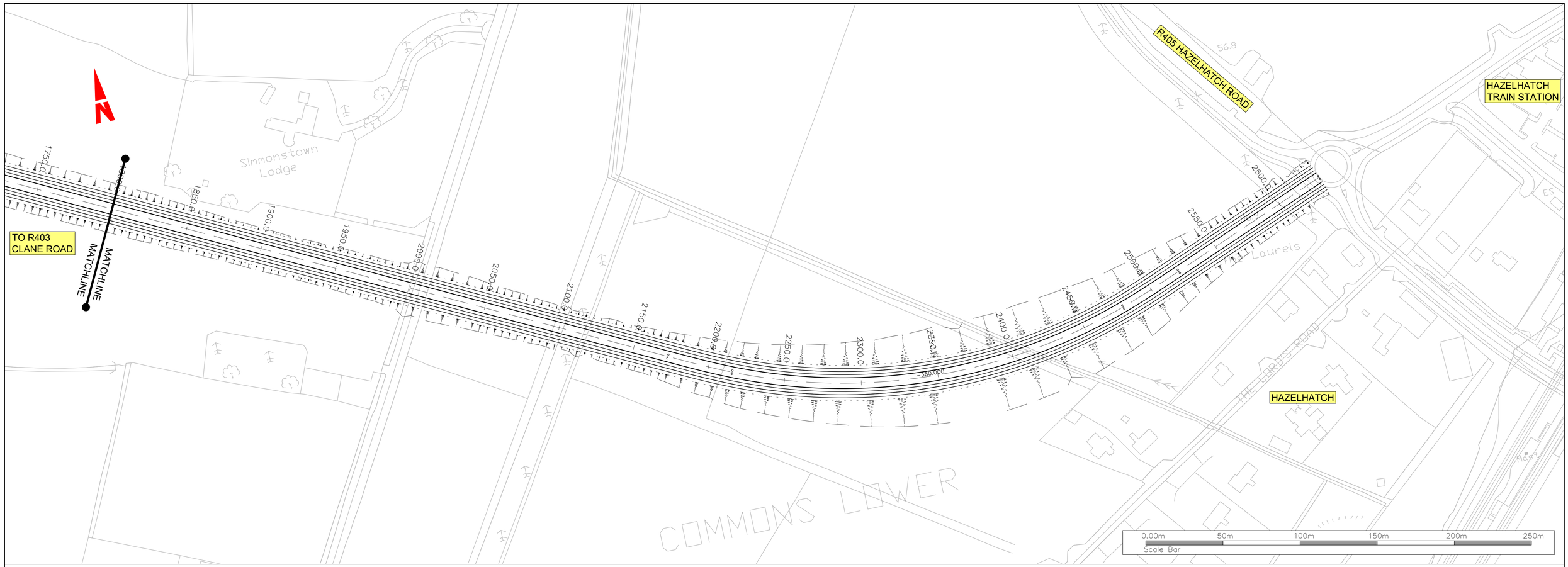
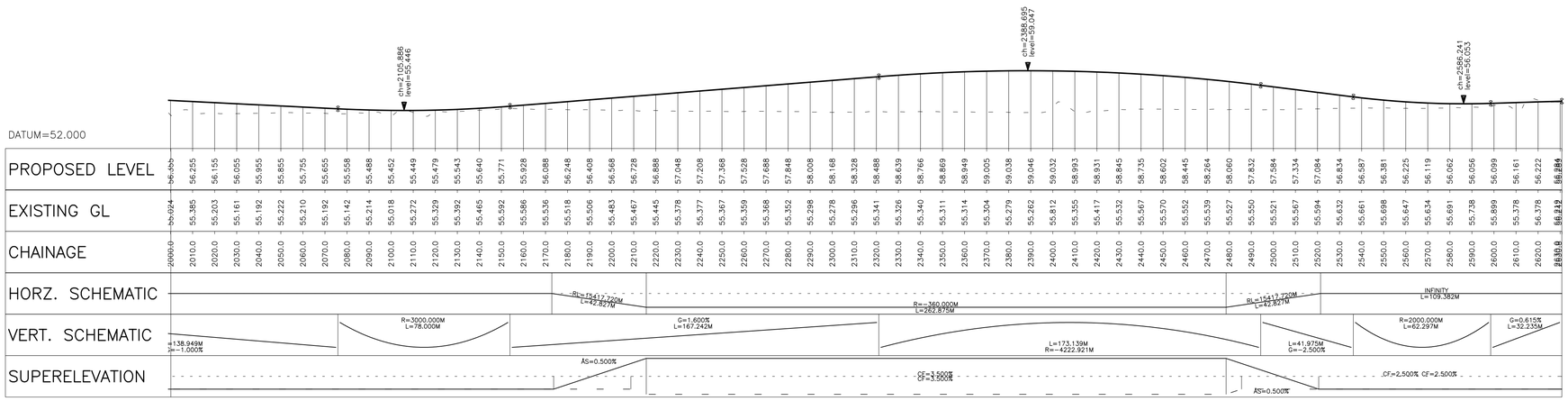
Model File Identifier

Scale	1:1,250 @ A1 1:2,500 @ A3
Created on	04/12/2020
Sheets	02 of 03
Project	CELBRIDGE TO HAZELHATCH LINK ROAD
Title	STAGE 1 OPTIONS OPTION A
File Identifier	MDT0902-RPS-00-XX-DR-Z- RN0016
Status	S0
Rev	P01.01





HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

OPTION A SCALES:–

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

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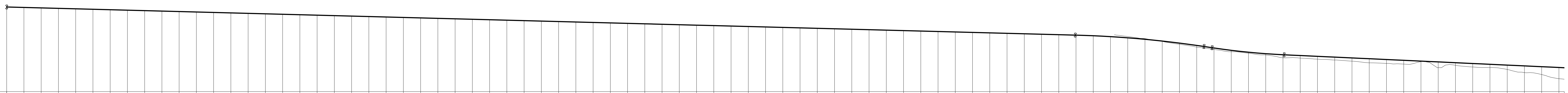
Scale	Project
1:1,250 @ A1 1:2,500 @ A3	CELBRIDGE TO HAZELHATCH LINK ROAD
Created on 04/12/2020	Title STAGE 1 OPTIONS OPTION A
Sheets 03 of 03	

File Identifier	Status	Rev
MDT0902-RPS-00-XX-DR-Z- RN0017	S0	P01.01



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EXISTING GL	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000
CHAINAGE	0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0

PROPOSED LEVEL	61.155	61.102	61.050	60.997	60.944	60.891	60.839	60.786	60.733	60.680	60.627	60.575	60.522
EXISTING GL	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000
CHAINAGE	130.0	140.0	150.0	160.0	170.0	180.0	190.0	200.0	210.0	220.0	230.0	240.0	250.0

PROPOSED LEVEL	60.469	60.416	60.364	60.311	60.258	60.205	60.152	60.100	60.047	59.994	59.941	59.888	59.836
EXISTING GL	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000
CHAINAGE	260.0	270.0	280.0	290.0	300.0	310.0	320.0	330.0	340.0	350.0	360.0	370.0	380.0

PROPOSED LEVEL	59.783	59.730	59.677	59.625	59.572	59.519	59.466	59.413	59.361	59.308	59.255	59.202	59.150
EXISTING GL	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000
CHAINAGE	390.0	400.0	410.0	420.0	430.0	440.0	450.0	460.0	470.0	480.0	490.0	500.0	510.0

PROPOSED LEVEL	59.097	59.044	58.991	58.938	58.886	58.833	58.780	58.727	58.675	58.622	58.569	58.498	58.394
EXISTING GL	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000	-999.000
CHAINAGE	520.0	530.0	540.0	550.0	560.0	570.0	580.0	590.0	600.0	610.0	620.0	630.0	640.0

PROPOSED LEVEL	58.256	58.085	57.881	57.644	57.373	57.074	56.803	56.582	56.411	56.290	56.197	56.104	56.012
EXISTING GL	58.414	58.168	57.836	57.507	57.175	56.903	56.636	56.462	56.260	55.935	55.903	55.777	55.677
CHAINAGE	650.0	660.0	670.0	680.0	690.0	700.0	710.0	720.0	730.0	740.0	750.0	760.0	770.0

PROPOSED LEVEL	55.919	55.826	55.733	55.641	55.548	55.455	55.362	55.270	55.177	55.084	54.992	54.899	54.806
EXISTING GL	55.542	55.349	55.284	55.202	55.486	54.787	55.064	54.866	54.794	54.574	54.211	53.988	53.501
CHAINAGE	780.0	790.0	800.0	810.0	820.0	830.0	840.0	850.0	860.0	870.0	880.0	890.0	900.0

HORZ. SCHEMATIC
INFINITY L=52.070M
R=-1100.000M L=321.588M
INFINITY L=653.993M

VERT. SCHEMATIC
L=619.564M G=-0.528%
L=74.633M R=-3000.001M
L G
R=2000.001M L=41.768M
L=276.099M G=-0.927%

SUPERELEVATION
CF=2.500% CF=2.500%

OPTION A1 SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DG\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

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Rev	Date	Drn Chk	Amendment / Issue	App
P01.01	12/01/21	JBR PW	WORK IN PROGRESS	MN

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Model File Identifier

Scale
1:1,250 @ A1
1:2,500 @ A3

Created on
04/12/2020

Sheets
01 of 04

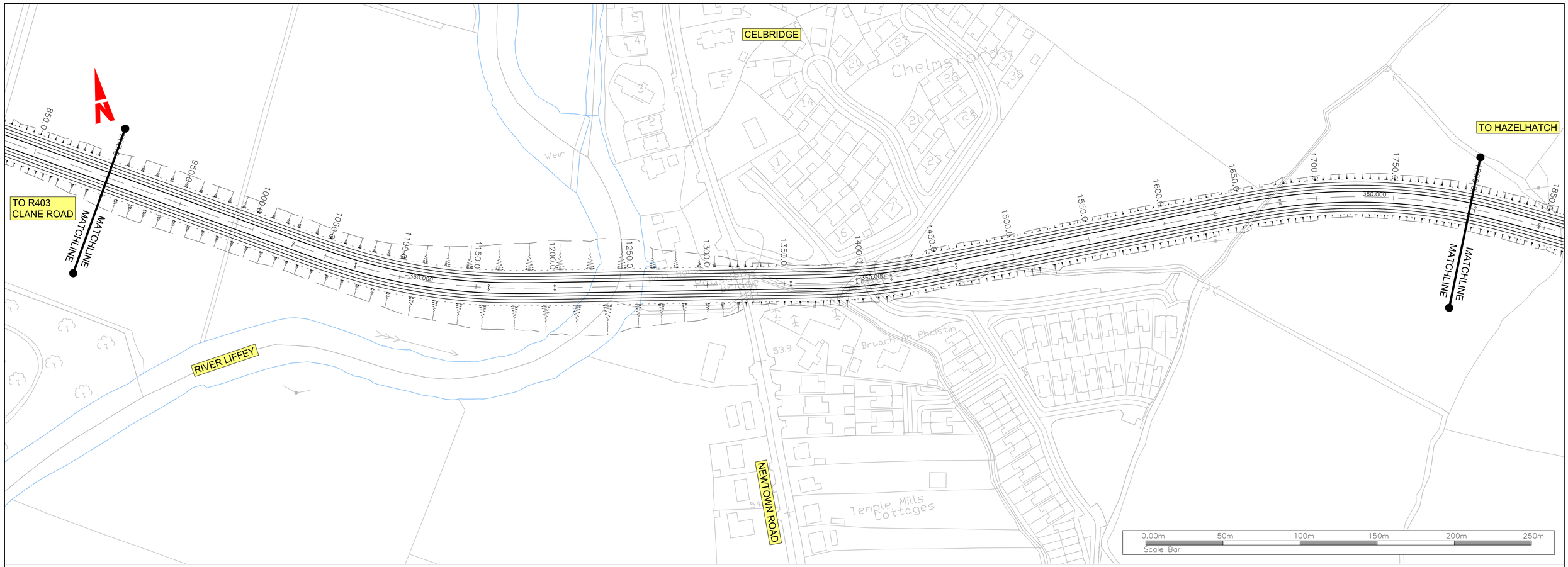
Project
CELBRIDGE TO HAZELHATCH LINK ROAD

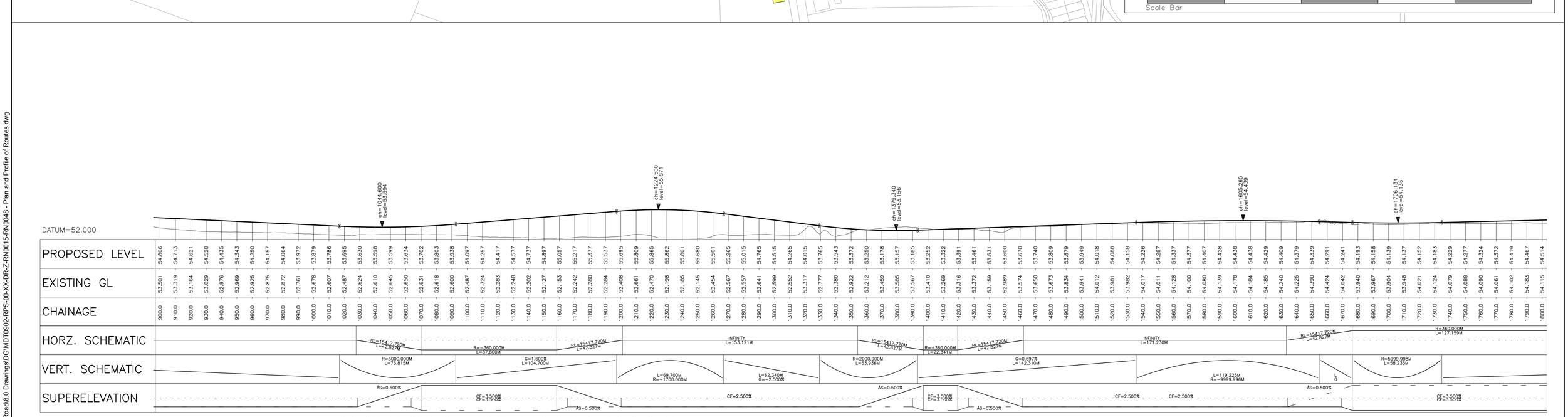
Title
STAGE 1 OPTIONS
OPTION A1

File Identifier
MDT0902-RPS-00-XX-DR-Z- RN0018

Status
S0

Rev
P01.01





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HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\6.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

Maithma agus Misneach

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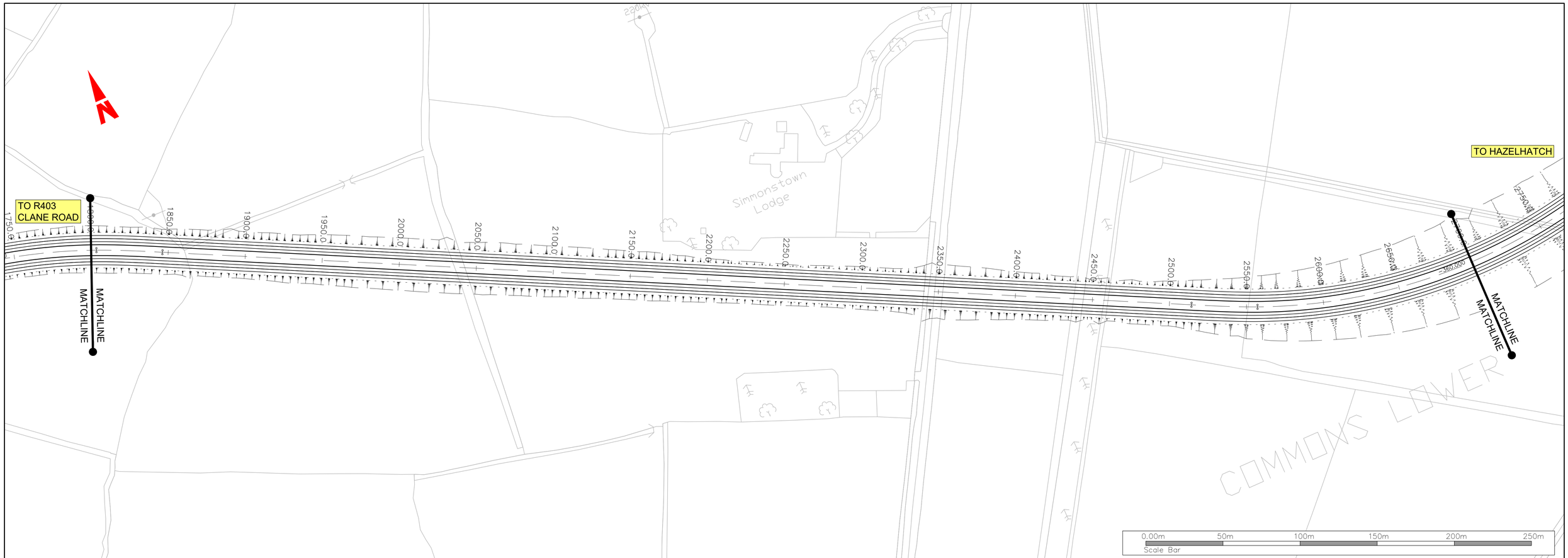
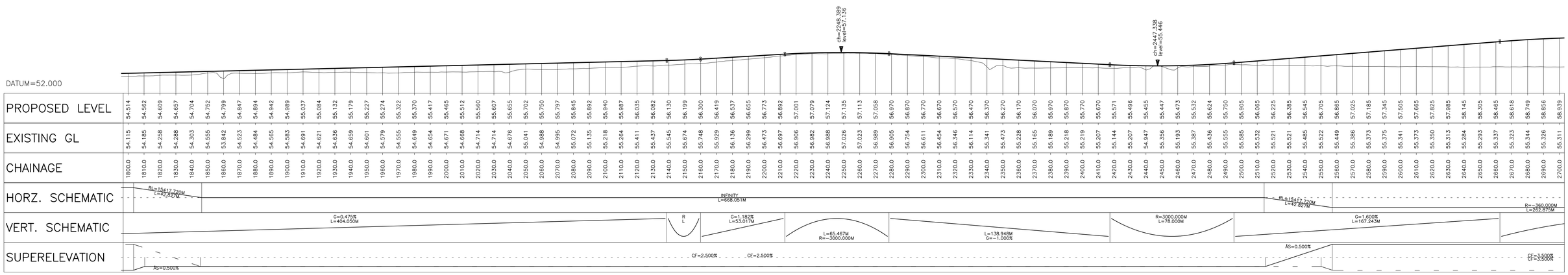
Model File Identifier

Scale	1:1,250 @ A1 1:2,500 @ A3
Created on	04/12/2020
Sheets	02 of 04
Project	CELBRIDGE TO HAZELHATCH LINK ROAD
Title	STAGE 1 OPTIONS OPTION A1
File Identifier	MDT0902-RPS-00-XX-DR-Z- RN0019
Status	S0
Rev	P01.01





OPTION A1 SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

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(v) All Levels refer to Ordnance Survey Datum, Malin Head.

Rev	Date	Drn	Chk	Amendment / Issue	App
P01.01	12/01/21	JBR	PW	WORK IN PROGRESS	MN

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Model File Identifier

Scale 1:1,250 @ A1
1:2,500 @ A3

Created on 04/12/2020

Sheets 03 of 04

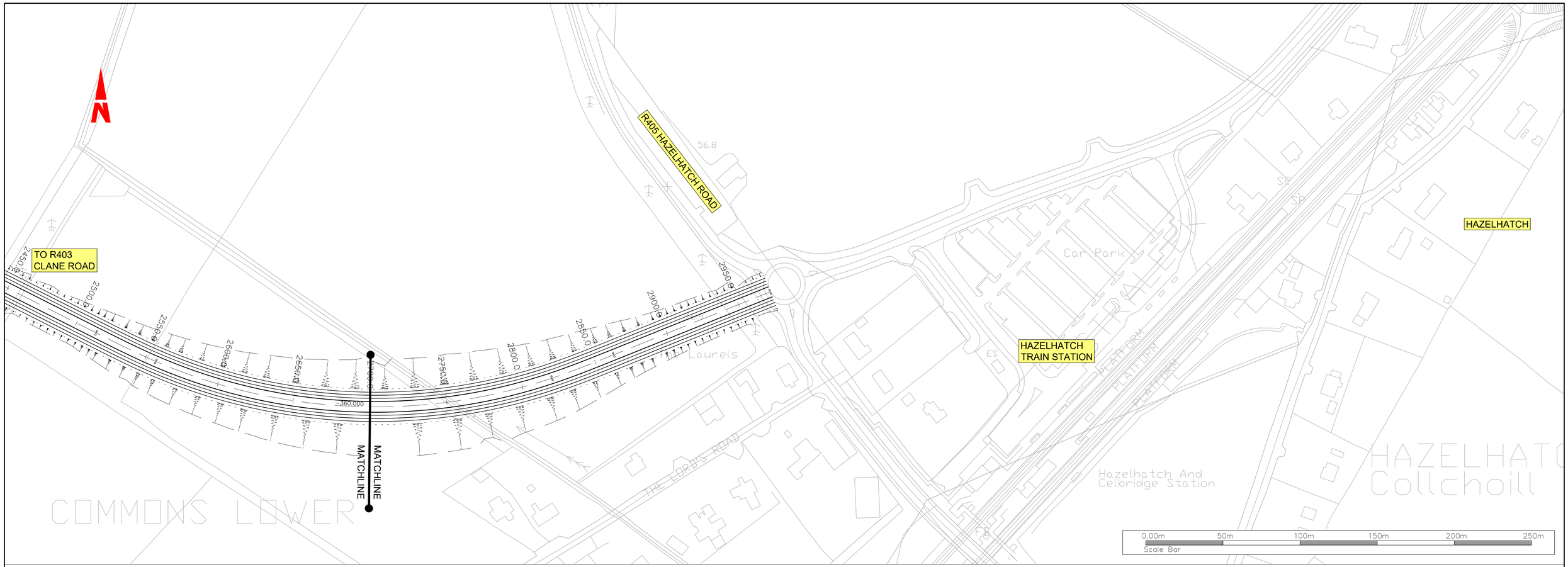
Project CELBRIDGE TO HAZELHATCH LINK ROAD

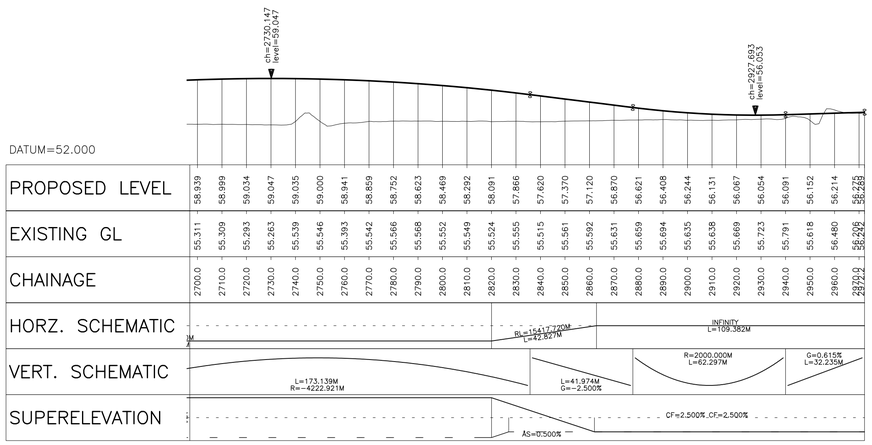
Title STAGE 1 OPTIONS
OPTION A1

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0020

Status S0

Rev P01.01





OPTION A1 SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

Inchanna agus Mianraoin

General Notes

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Rev	Date	Drn / Chk	Amendment / Issue	App
P01.01	12/01/21	JBR / PW	WORK IN PROGRESS	MN

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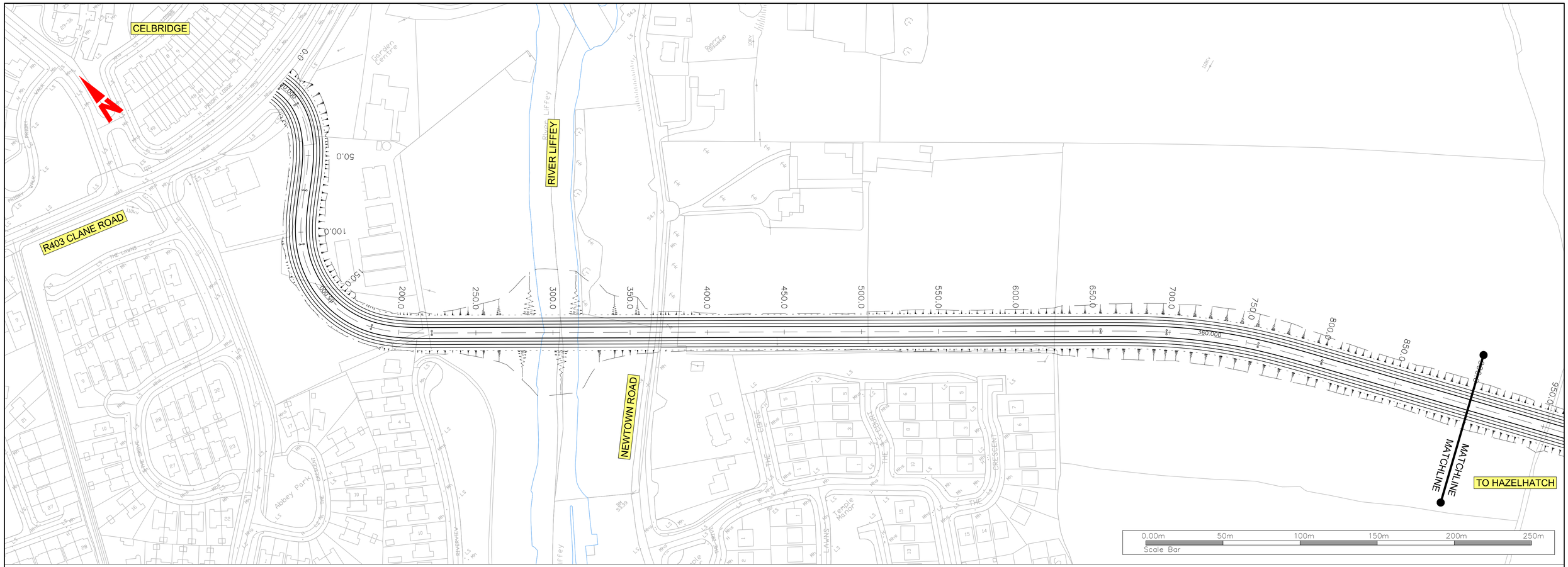
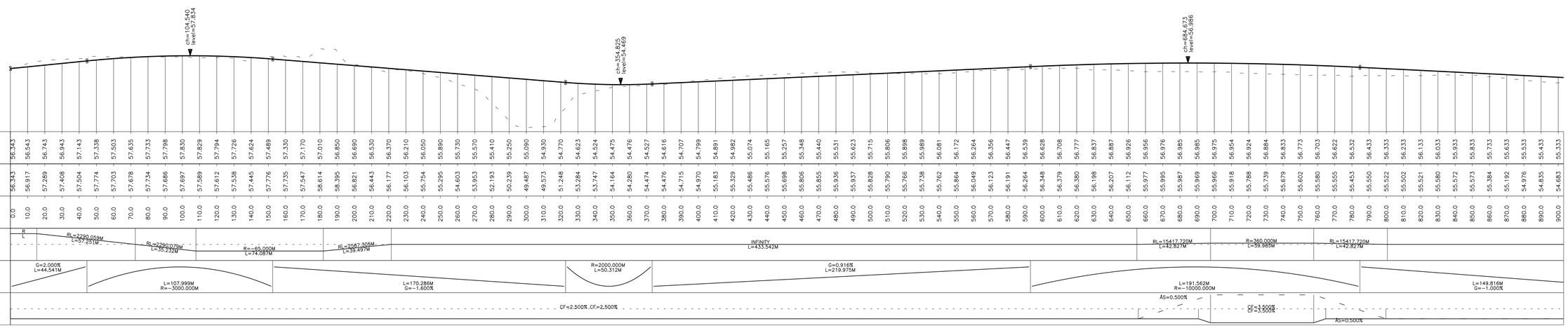
Model File Identifier

Scale	Project
1:1,250 @ A1 1:2,500 @ A3	CELBRIDGE TO HAZELHATCH LINK ROAD
Created on: 04/12/2020	Title: STAGE 1 OPTIONS OPTION A1
Sheets: 04 of 04	

File Identifier	Status	Rev
MDT0902-RPS-00-XX-DR-Z- RN0021	S0	P01.01

R:\MDT0902 - Celbridge to Hazelhatch Link Road\6.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg





OPTION B SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\6.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

General Notes

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Rev	Date	Drn	Chk	Amendment / Issue	App
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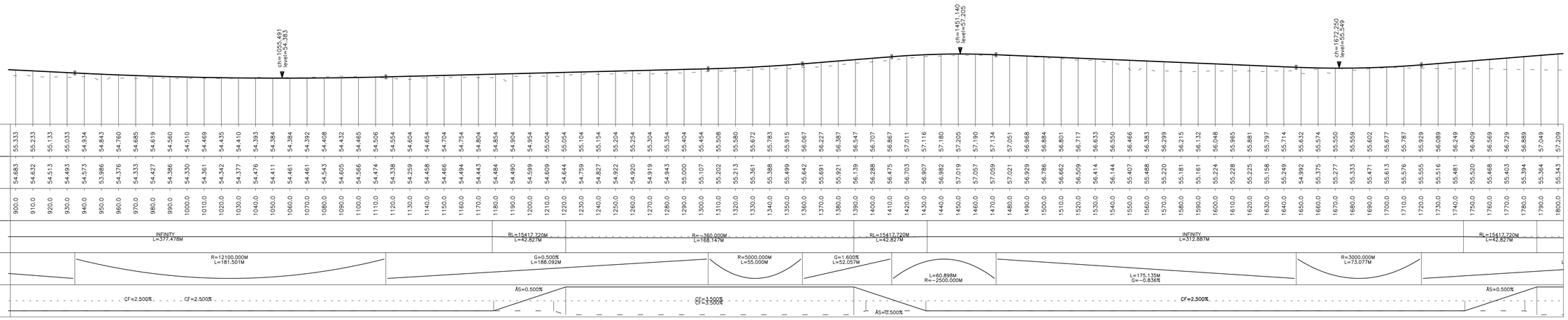
Model File Identifier

Scale	Project
1:1,250 @ A1 1:2,500 @ A3	CELBRIDGE TO HAZELHATCH LINK ROAD
Created on 04/12/2020	Title: STAGE 1 OPTIONS OPTION B
Sheets 01 of 03	

File Identifier	Status	Rev
MDT0902-RPS-00-XX-DR-Z- RN0022	S0	P01.01



OPTION B SCALES:— HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

Mealtma Idhe Mhenath

General Notes

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Rev	Date	Drn Chk	Amendment / Issue	App
P01.01	12/01/21	JBR PW	WORK IN PROGRESS	MN

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Model File Identifier

Scale 1:1,250 @ A1
1:2,500 @ A3

Created on 04/12/2020

Sheets 02 of 03

Project CELBRIDGE TO HAZELHATCH LINK ROAD

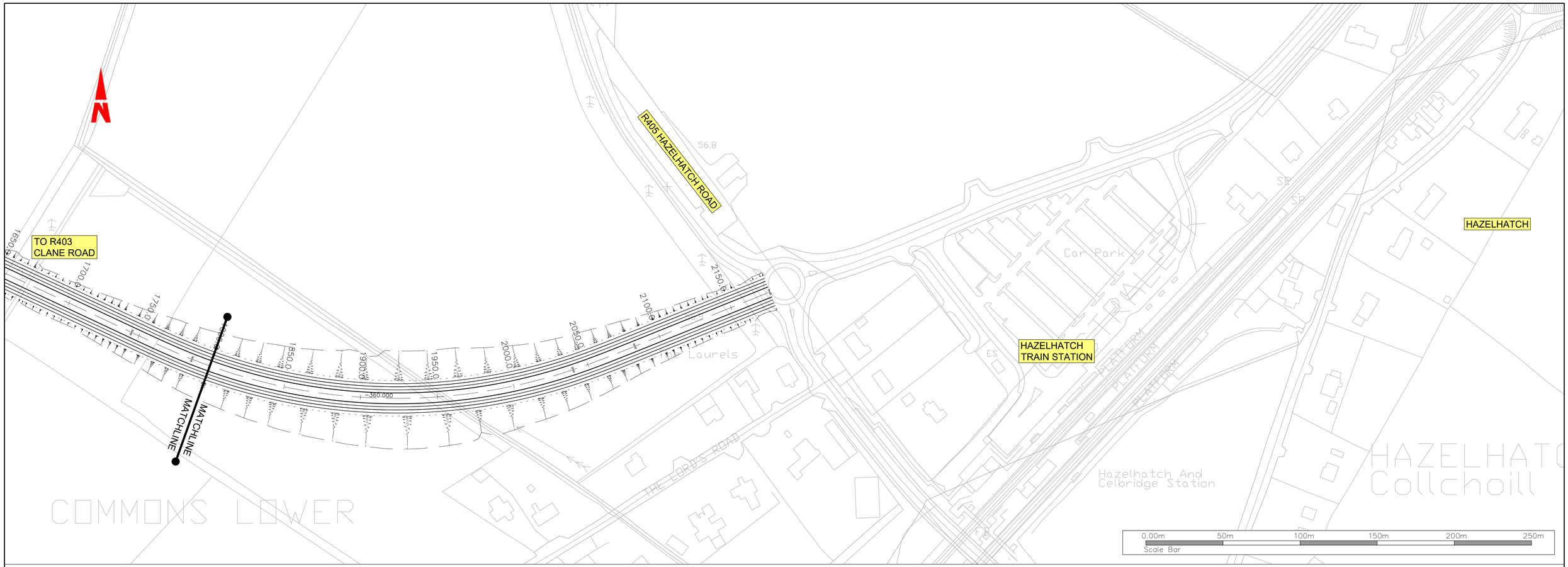
Title STAGE 1 OPTIONS
OPTION B

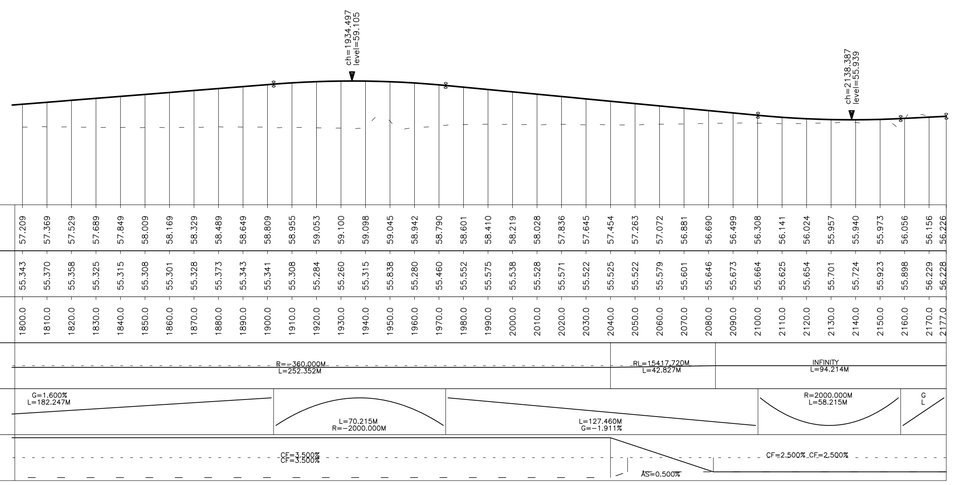
File Identifier MDT0902-RPS-00-XX-DR-Z- RN0023

Status S0

Rev P01.01

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DGI\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg





OPTION B SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

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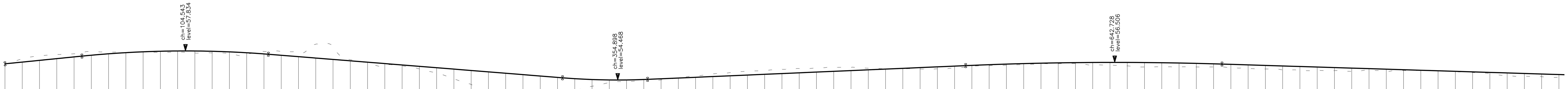
Scale	1:1,250 @ A1 1:2,500 @ A3
Created on	04/12/2020
Sheets	03 of 03
Project	CELBRIDGE TO HAZELHATCH LINK ROAD
Title	STAGE 1 OPTIONS OPTION B
Model File Identifier	
File Identifier	MDT0902-RPS-00-XX-DR-Z- RN0024
Status	S0
Rev	P01.01



DATUM=49.000

PROPOSED LEVEL	56.343	56.543	56.743	56.943	57.143	57.338	57.503	57.635	57.733	57.798	57.830	57.829	57.794	57.726	57.624	57.489
EXISTING GL	56.343	56.917	57.289	57.408	57.504	57.774	57.703	57.678	57.734	57.686	57.697	57.589	57.612	57.538	57.445	57.776
CHAINAGE	0.0	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0

PROPOSED LEVEL	57.330	57.170	57.010	56.850	56.690	56.530	56.370	56.210	56.050	55.890	55.730	55.570	55.410	55.250	55.090	54.930
EXISTING GL	57.735	57.547	58.614	58.395	56.821	56.444	56.177	56.103	55.753	55.295	54.602	53.952	52.192	50.238	49.487	49.573
CHAINAGE	160.0	170.0	180.0	190.0	200.0	210.0	220.0	230.0	240.0	250.0	260.0	270.0	280.0	290.0	300.0	310.0

PROPOSED LEVEL	54.770	54.623	54.524	54.474	54.475	54.525	54.610	54.697	54.783	54.869	54.956	55.042	55.128	55.215	55.301	55.387
EXISTING GL	51.249	53.284	53.747	54.164	54.280	54.474	54.476	54.715	54.970	55.184	55.329	55.486	55.576	55.698	55.806	55.855
CHAINAGE	320.0	330.0	340.0	350.0	360.0	370.0	380.0	390.0	400.0	410.0	420.0	430.0	440.0	450.0	460.0	470.0

PROPOSED LEVEL	55.474	55.560	55.646	55.733	55.819	55.905	55.992	56.078	56.164	56.241	56.309	56.367	56.415	56.452	56.480	56.498
EXISTING GL	55.936	55.937	55.828	55.790	55.766	55.738	55.762	55.864	56.050	56.124	56.191	56.264	56.348	56.379	56.379	56.198
CHAINAGE	480.0	490.0	500.0	510.0	520.0	530.0	540.0	550.0	560.0	570.0	580.0	590.0	600.0	610.0	620.0	630.0

PROPOSED LEVEL	56.505	56.503	56.491	56.469	56.436	56.394	56.342	56.281	56.219	56.157	56.095	56.032	55.970	55.908	55.846	55.784
EXISTING GL	56.207	56.111	55.977	55.995	55.991	55.979	55.983	55.922	55.806	55.746	55.640	55.608	55.564	55.549	55.480	55.634
CHAINAGE	640.0	650.0	660.0	670.0	680.0	690.0	700.0	710.0	720.0	730.0	740.0	750.0	760.0	770.0	780.0	790.0

PROPOSED LEVEL	55.722	55.660	55.598	55.536	55.473	55.411	55.349	55.287	55.225	55.163	55.101
EXISTING GL	55.456	55.574	55.547	55.532	55.450	55.340	55.228	54.980	54.905	54.854	54.802
CHAINAGE	800.0	810.0	820.0	830.0	840.0	850.0	860.0	870.0	880.0	890.0	900.0

HORZ. SCHEMATIC

R
L
RL=2289.567M
L=57.239M
RL=2289.588M
L=35.224M
R=−65.000M
L=74.091M
RL=2567.305M
L=39.497M
INFINITY
L=625.233M
R
L=24.002M

VERT. SCHEMATIC

G=2.000%
L=44.544M
L=108.000M
R=−3000.000M
L=170.355M
G=−1.600%
R=2000.000M
L=49.267M
G=0.863%
L=184.231M
L=148.445M
R=−10000.000M
L=252.573M
G=−0.621%

SUPERELEVATION

CF=2.500% CF=2.500%

OPTION C SCALES:− HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

General Notes

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Model File Identifier

Scale
1:1,250 @ A1
1:2,500 @ A3

Created on
04/12/2020

Sheets
01 of 03

Project
CELBRIDGE TO HAZELHATCH LINK ROAD

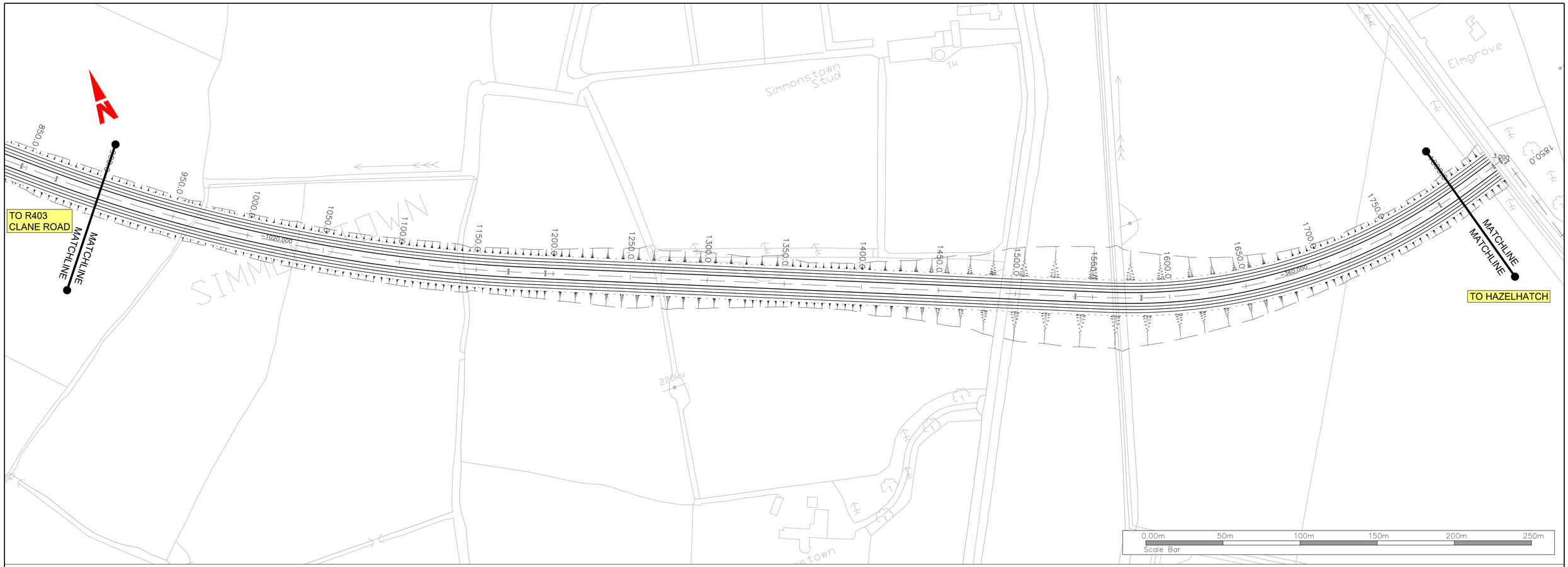
Title
STAGE 1 OPTIONS
OPTION C

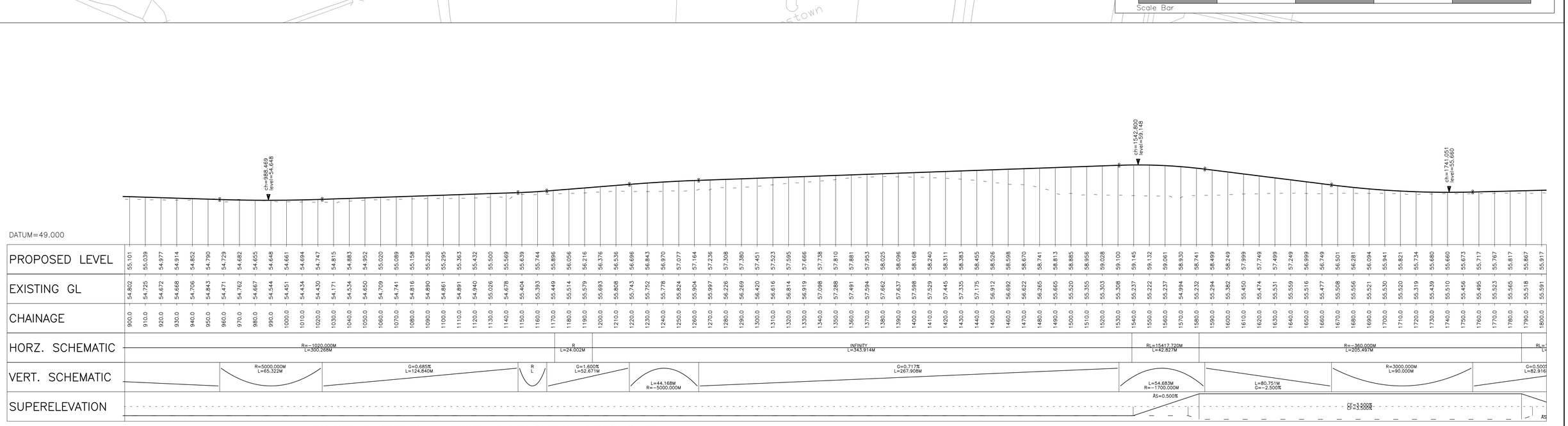
File Identifier
MDT0902-RPS-00-XX-DR-Z- RN0025

Status
S0

Rev
P01.01

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DG\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg





OPTION C SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\6.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

Míle Cliathna Agus Mianraoch

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Model File Identifier

Scale 1:1,250 @ A1
1:2,500 @ A3

Created on 04/12/2020

Sheets 02 of 03

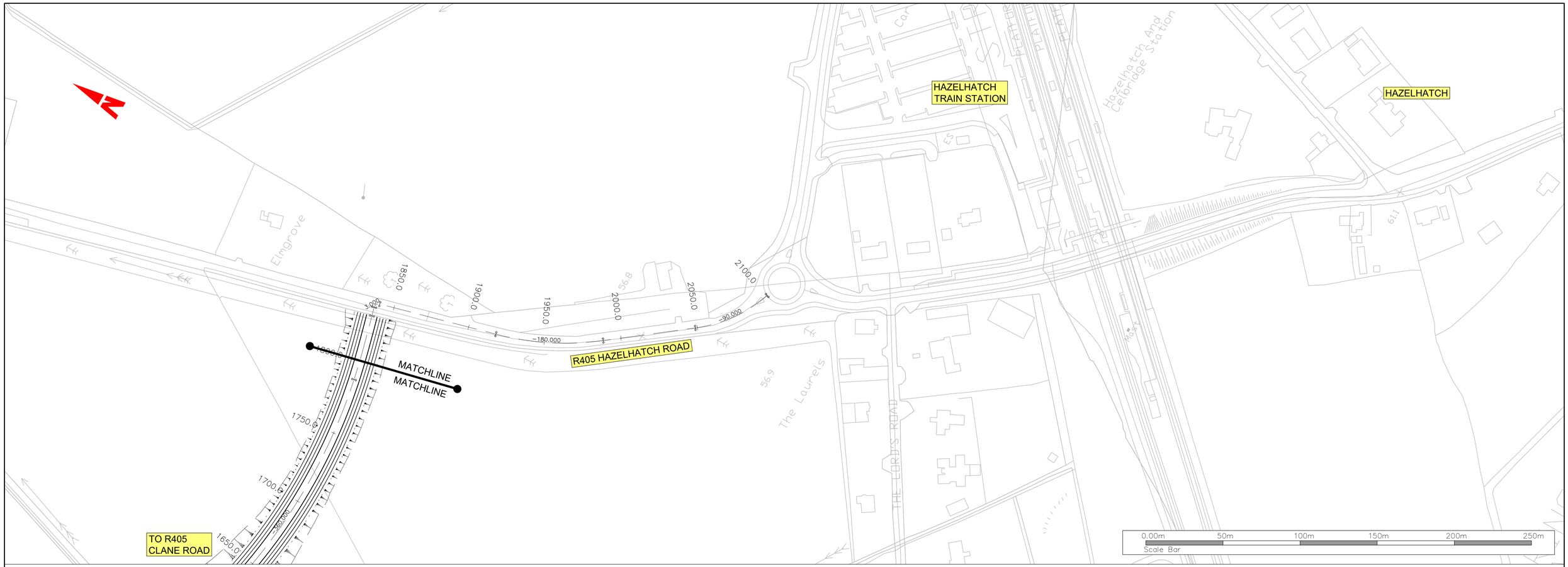
Project CELBRIDGE TO HAZELHATCH LINK ROAD

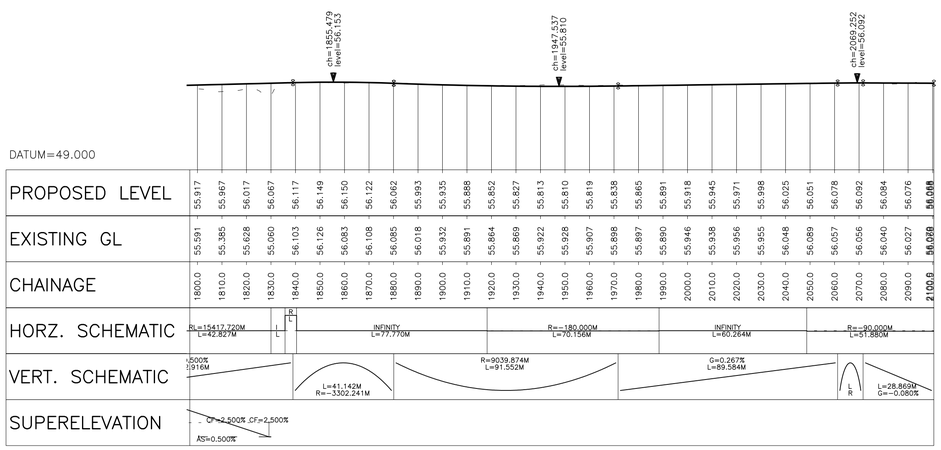
Title STAGE 1 OPTIONS
OPTION C

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0026

Status S0

Rev P01.01





OPTION C SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

Mhaigh Eo Abú

General Notes

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P01.01	12/01/21	JBR PW	WORK IN PROGRESS	MN

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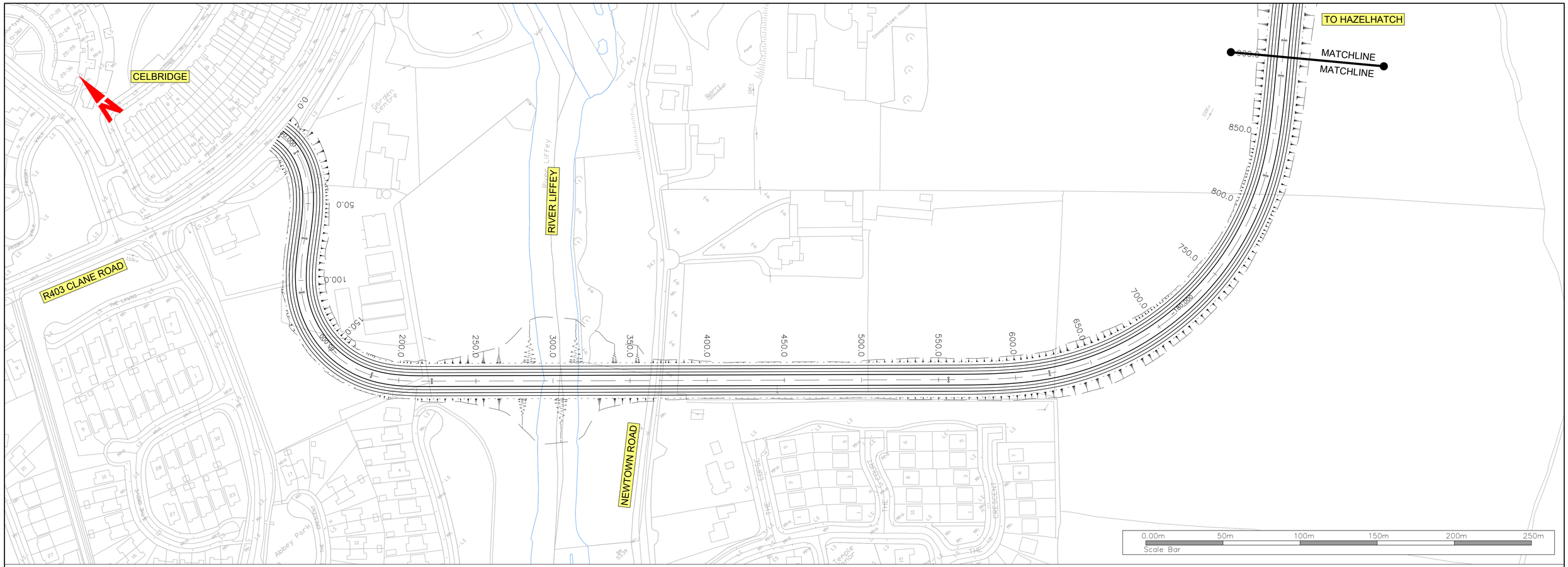
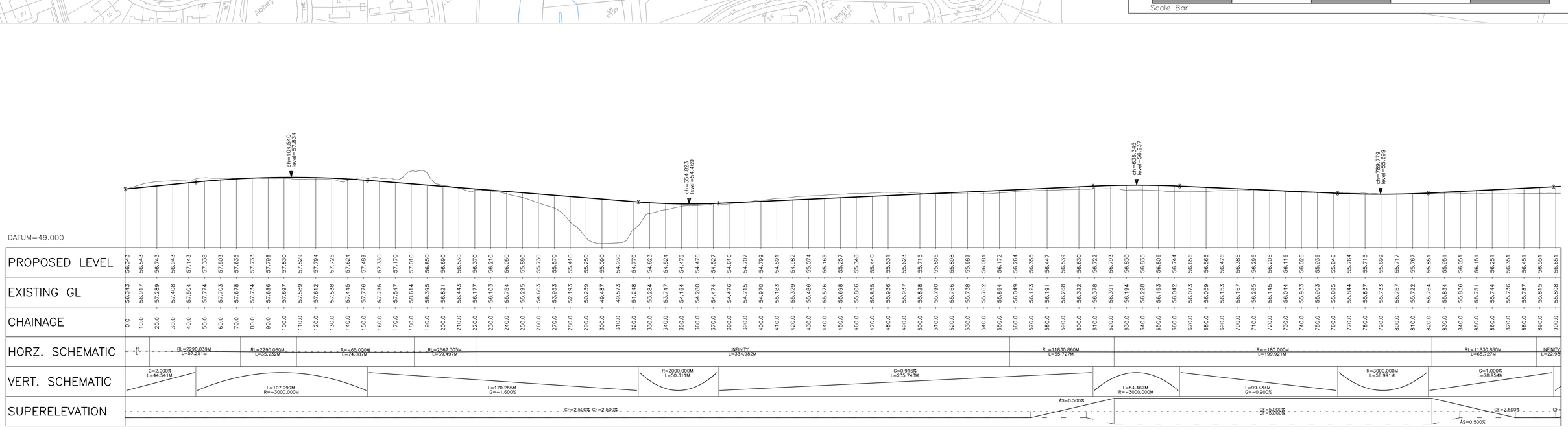
Model File Identifier

Scale	Project
1:1,250 @ A1 1:2,500 @ A3	CELBRIDGE TO HAZELHATCH LINK ROAD
Created on 04/12/2020	Title: STAGE 1 OPTIONS OPTION C
Sheets 03 of 03	

File Identifier	Status	Rev
MDT0902-RPS-00-XX-DR-Z- RN0027	S0	P01.01

R:\MDT0902 - Celbridge to Hazelhatch Link Road\6.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg





OPTION D SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\6.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

General Notes

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Model File Identifier

Scale 1:1,250 @ A1 1:2,500 @ A3

Created on 04/12/2020

Sheets 01 of 03

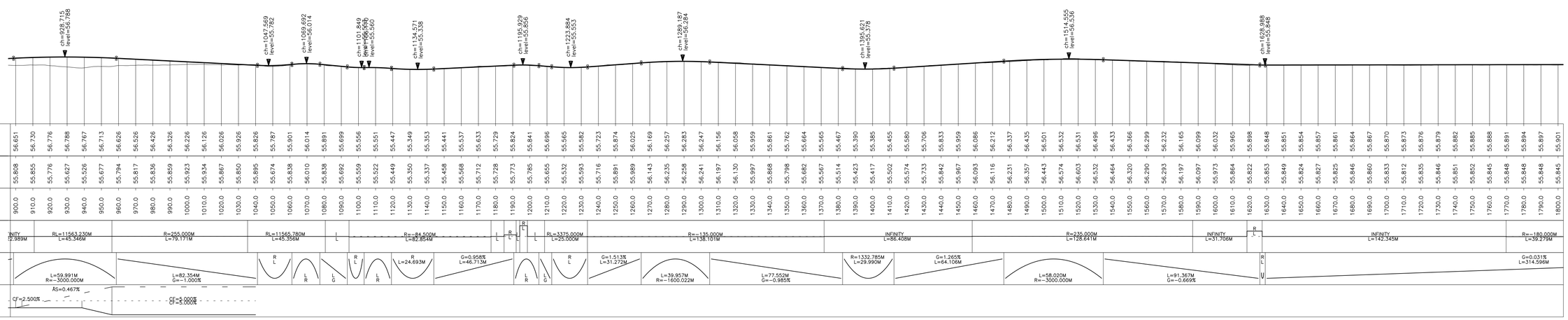
Project CELBRIDGE TO HAZELHATCH LINK ROAD

Title STAGE 1 OPTIONS OPTION D

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0028

Status S0

Rev P01.01



DATUM=49.000

CHAINAGE	EXISTING GL	PROPOSED LEVEL
900.0	55.808	56.651
910.0	55.855	56.730
920.0	55.776	56.776
930.0	55.627	56.788
940.0	55.526	56.767
950.0	55.677	56.713
960.0	55.784	56.626
970.0	55.817	56.526
980.0	55.836	56.426
990.0	55.859	56.326
1000.0	55.923	56.226
1010.0	55.934	56.126
1020.0	55.867	56.026
1030.0	55.850	55.926
1040.0	55.895	55.826
1050.0	55.674	55.787
1060.0	55.838	55.901
1070.0	56.010	56.014
1080.0	55.838	55.891
1090.0	55.692	55.699
1100.0	55.559	55.556
1110.0	55.522	55.551
1120.0	55.449	55.447
1130.0	55.350	55.349
1140.0	55.337	55.353
1150.0	55.458	55.441
1160.0	55.568	55.537
1170.0	55.712	55.633
1180.0	55.728	55.729
1190.0	55.773	55.824
1200.0	55.785	55.841
1210.0	55.655	55.696
1220.0	55.532	55.565
1230.0	55.593	55.582
1240.0	55.716	55.723
1250.0	55.891	55.874
1260.0	55.989	56.025
1270.0	56.143	56.169
1280.0	56.235	56.257
1290.0	56.258	56.283
1300.0	56.241	56.247
1310.0	56.197	56.156
1320.0	56.130	56.058
1330.0	55.997	55.959
1340.0	55.868	55.861
1350.0	55.798	55.762
1360.0	55.682	55.664
1370.0	55.567	55.565
1380.0	55.514	55.467
1390.0	55.423	55.390
1400.0	55.417	55.385
1410.0	55.502	55.455
1420.0	55.574	55.580
1430.0	55.733	55.706
1440.0	55.842	55.833
1450.0	55.967	55.959
1460.0	56.093	56.086
1470.0	56.116	56.212
1480.0	56.231	56.337
1490.0	56.357	56.435
1500.0	56.443	56.501
1510.0	56.574	56.532
1520.0	56.603	56.531
1530.0	56.532	56.496
1540.0	56.464	56.433
1550.0	56.320	56.366
1560.0	56.290	56.299
1570.0	56.293	56.232
1580.0	56.197	56.165
1590.0	56.097	56.099
1600.0	55.973	56.032
1610.0	55.864	55.965
1620.0	55.822	55.898
1630.0	55.853	55.848
1640.0	55.849	55.851
1650.0	55.824	55.854
1660.0	55.827	55.857
1670.0	55.825	55.861
1680.0	55.846	55.864
1690.0	55.860	55.867
1700.0	55.833	55.870
1710.0	55.812	55.873
1720.0	55.835	55.876
1730.0	55.846	55.879
1740.0	55.851	55.882
1750.0	55.852	55.885
1760.0	55.845	55.888
1770.0	55.848	55.891
1780.0	55.848	55.894
1790.0	55.848	55.897
1800.0	55.845	55.901

HORZ. SCHEMATIC: INFINITY R=2.989M; RL=11563.230M L=45.346M; R=255.000M L=79.171M; RL=11565.780M L=45.356M; L L; R=−84.500M L=82.854M; L L; R L; R L; RL=1375.000M L=25.000M; L L; R=−135.000M L=138.101M; INFINITY L=86.408M; R=235.000M L=128.641M; INFINITY L=31.706M; R L; INFINITY L=142.345M; R=−180.000M L=39.279M

VERT. SCHEMATIC: L=59.991M R=−3000.000M; L=82.354M G=−1.000%; R L; R L; L G; R L; L R; R L=24.693M; G=0.958% L=46.713M; R L; L G; R L; L G; R L; G=1.513% L=31.272M; L=39.957M R=−1600.022M; L=77.552M G=−0.985%; R=1332.785M L=29.990M; G=1.265% L=64.106M; L=58.020M R=−3000.000M; L=91.367M G=−0.669%; R L; G=0.031% L=314.596M

SUPERELEVATION: CF=2.500%; AS=0.467%; CF=5.000% CF=5.000%

OPTION D SCALES:− HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

General Notes

(i) Hard copies, dwf and pdf will form a controlled issue of the drawing. All other formats (dwg etc.) are deemed to be an uncontrolled issue and any work carried out based on these files is at the recipients own risk. RPS will not accept any responsibility for any errors from the use of these files, either by human error by the recipient, listing of the un-dimensioned measurements, compatibility with the recipients software, and any errors arising when these files are used to aid the recipients drawing production, or setting out on site.

(ii) DO NOT SCALE, use figured dimensions only.

(iv) Information including topographical survey, geotechnical investigation and utility detail used in the design have been provided by others.

(v) All Levels refer to Ordnance Survey Datum, Malin Head.

Rev	Date	Drn / Chk	Amendment / Issue	App
P01.01	12/01/21	JBR / PW	WORK IN PROGRESS	MN

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Model File Identifier

Scale 1:1,250 @ A1
1:2,500 @ A3

Created on 04/12/2020

Sheets 02 of 03

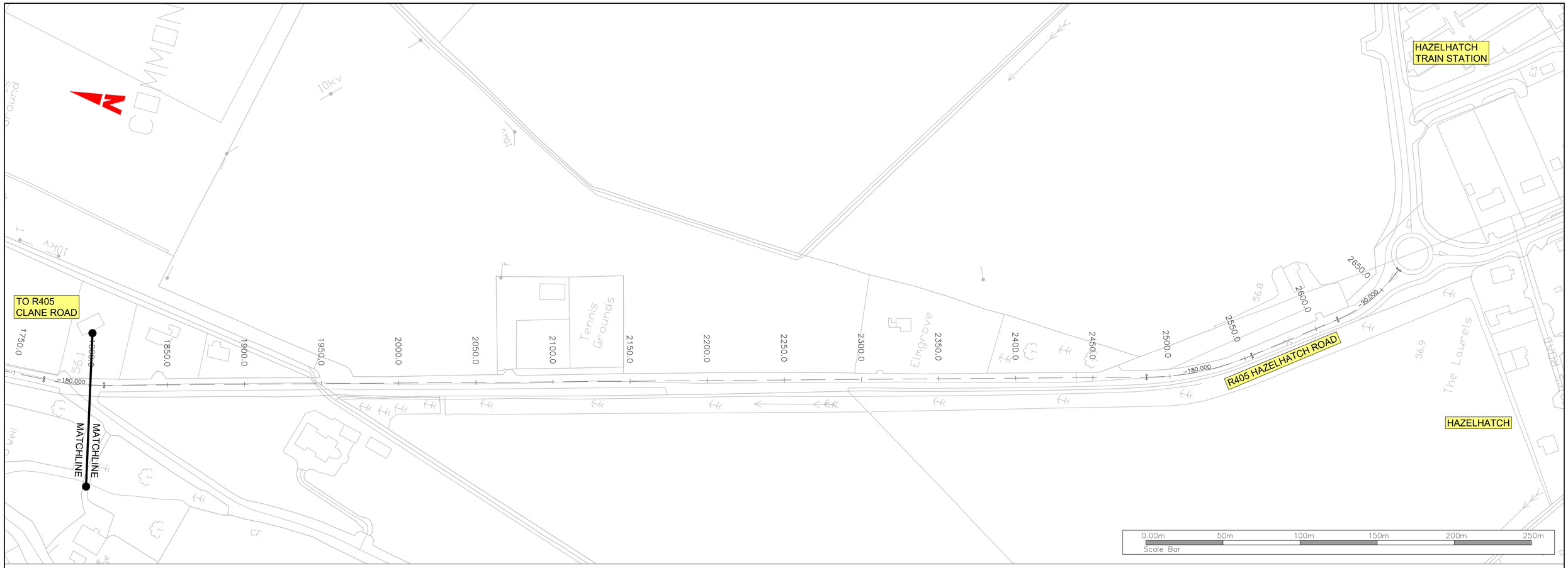
Project CELBRIDGE TO HAZELHATCH LINK ROAD

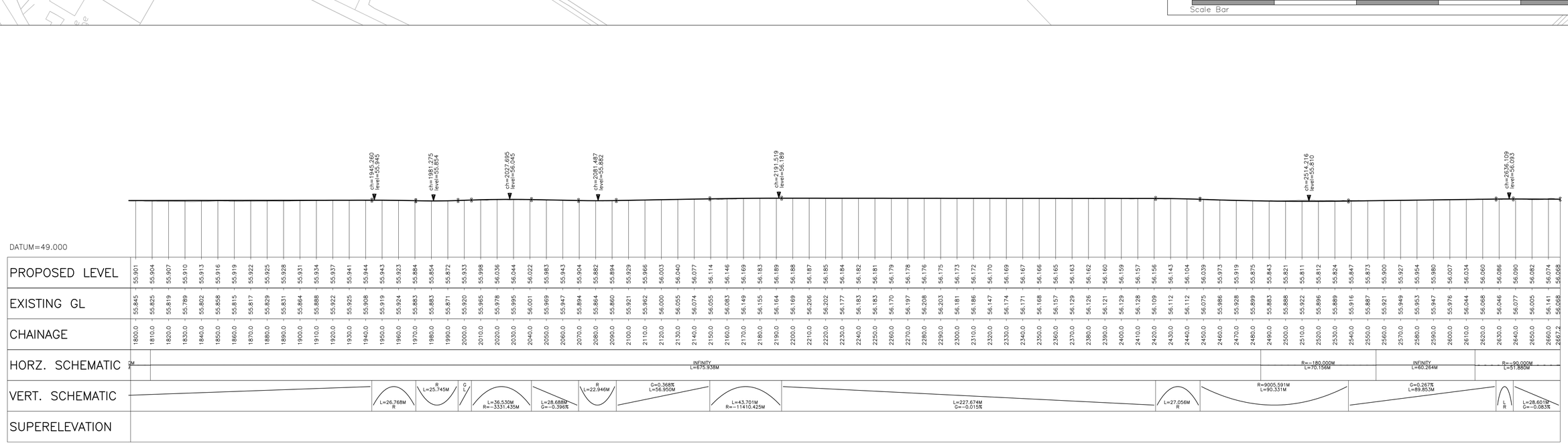
Title STAGE 1 OPTIONS
OPTION D

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0029

Status S0

Rev P01.01





OPTION D SCALES:— HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

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Model File Identifier

Scale	1:1,250 @ A1 1:2,500 @ A3
Created on	04/12/2020
Sheets	03 of 03
Project	CELBRIDGE TO HAZELHATCH LINK ROAD
Title	STAGE 1 OPTIONS OPTION D
File Identifier	MDT0902-RPS-00-XX-DR-Z- RN0030
Status	S0
Rev	P01.01

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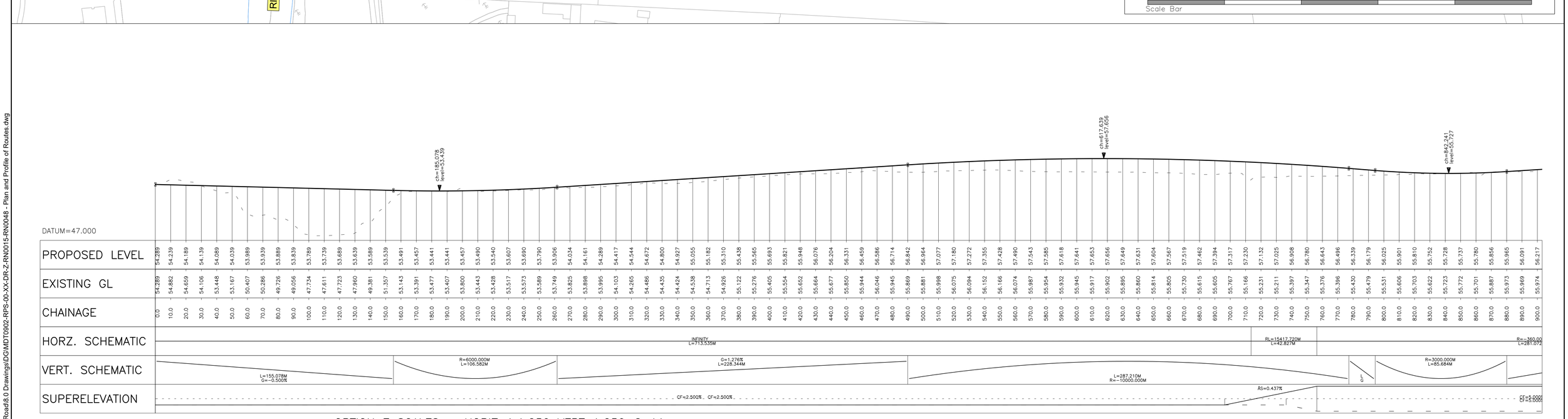

OPTION E SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

Meánma Idir Mhaigh

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Model File Identifier

Scale 1:1,250 @ A1
1:2,500 @ A3

Created on 04/12/2020

Sheets 01 of 03

Project CELBRIDGE TO HAZELHATCH LINK ROAD

Title STAGE 1 OPTIONS
OPTION E

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0031

Status S0

Rev P01.01

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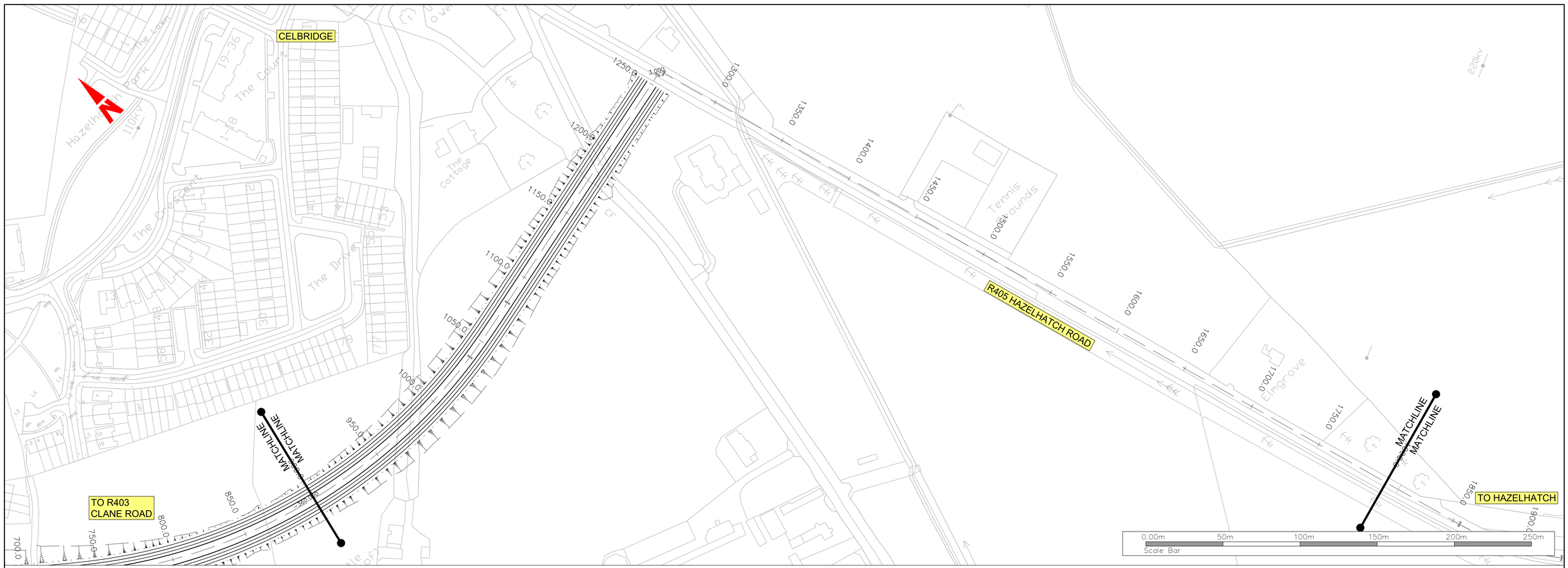

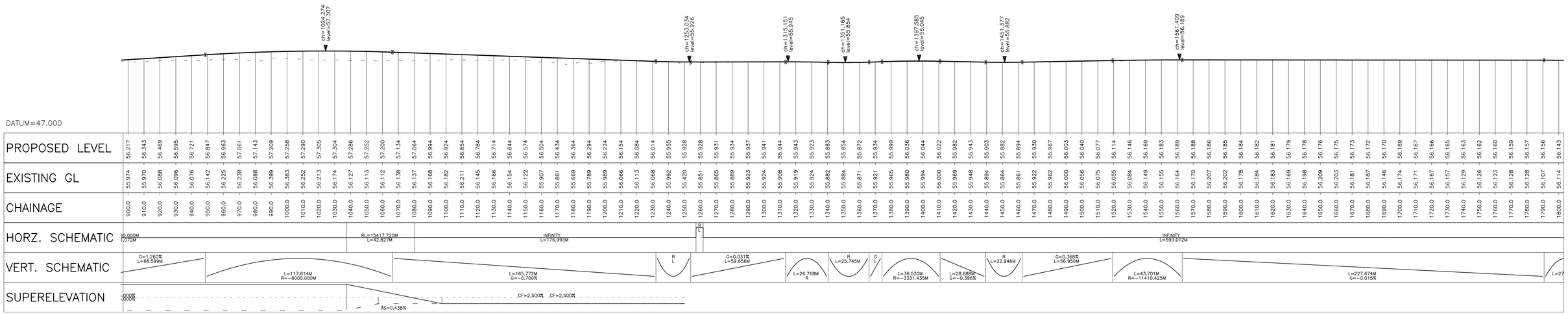

OPTION E SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

General Notes

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Rev	Date	Drn Chk	Amendment / Issue	App
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Model File Identifier

Scale	1:1,250 @ A1 1:2,500 @ A3
Created on	04/12/2020
Sheets	02 of 03

Project: CELBRIDGE TO HAZELHATCH LINK ROAD

Title: STAGE 1 OPTIONS
OPTION E

File Identifier	Status	Rev
MDT0902-RPS-00-XX-DR-Z- RN0032	S0	P01.01

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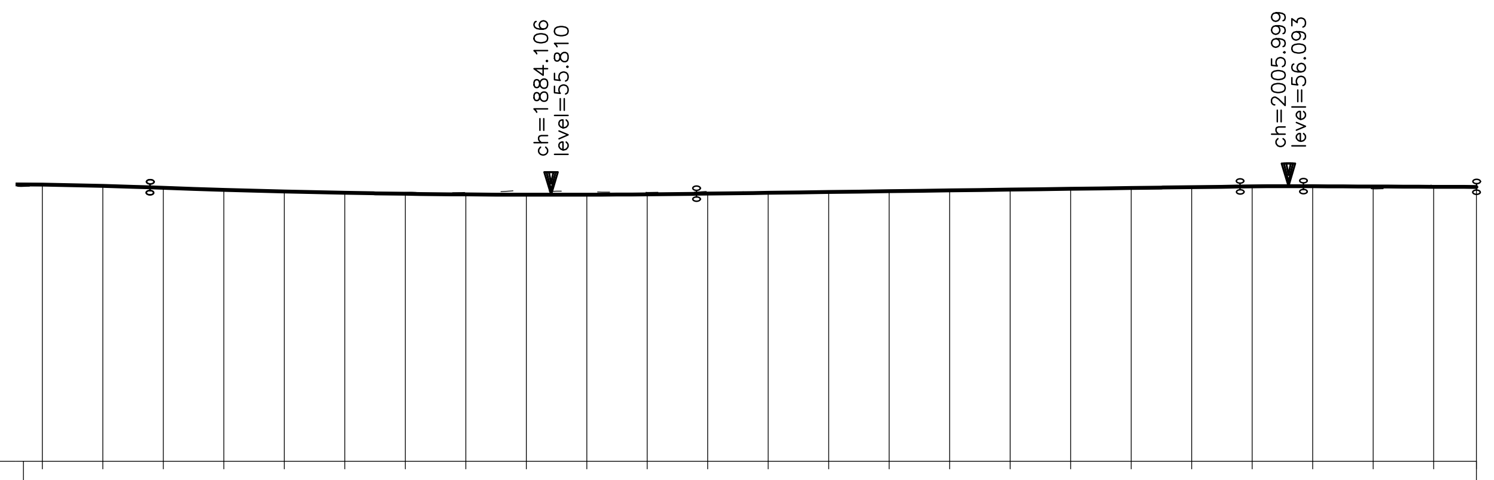

DATUM=47.000

PROPOSED LEVEL	56.143	56.103	56.038	55.973	55.918	55.875	55.842	55.821	55.811	55.812	55.824	55.847	55.874	55.900	55.927	55.954	55.981	56.007	56.034	56.061	56.087	56.090	56.082	56.074	56.068
EXISTING GL	56.114	56.112	56.075	55.987	55.928	55.899	55.885	55.888	55.921	55.897	55.888	55.915	55.887	55.921	55.949	55.953	55.949	55.978	56.044	56.066	56.045	56.077	56.005	56.145	56.068
CHAINAGE	1800.0	1810.0	1820.0	1830.0	1840.0	1850.0	1860.0	1870.0	1880.0	1890.0	1900.0	1910.0	1920.0	1930.0	1940.0	1950.0	1960.0	1970.0	1980.0	1990.0	2000.0	2010.0	2020.0	2030.0	2037.1

HORZ. SCHEMATIC: R=−180.000M L=70.156M; INFINITY L=60.264M; R=−90.000M L=51.880M

VERT. SCHEMATIC: L=27.056M R; R=9005.591M L=90.331M; G=0.267% L=89.853M; L R; L=28.601M G=−0.083%

SUPERELEVATION

OPTION E SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DG\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

General Notes

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Model File Identifier

Scale
1:1,250 @ A1
1:2,500 @ A3

Created on
04/12/2020

Sheets
03 of 03

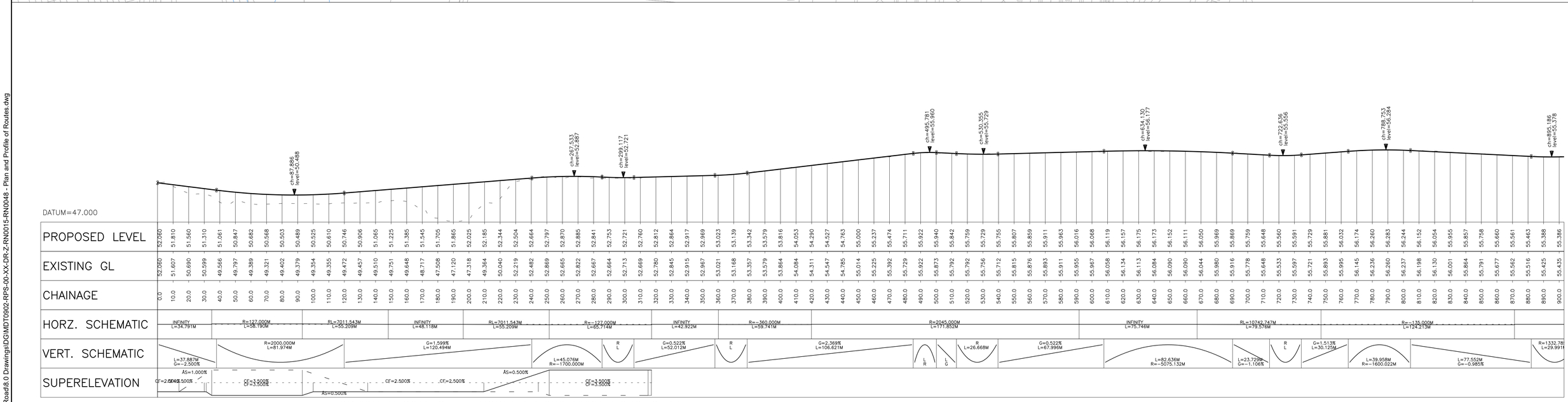
Project
CELBRIDGE TO HAZELHATCH LINK ROAD

Title
STAGE 1 OPTIONS
OPTION E

File Identifier
MDT0902-RPS-00-XX-DR-Z- RN0033

Status
S0

Rev
P01.01



OPTION F SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

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Rev	Date	Drn Chk	Amendment / Issue	App
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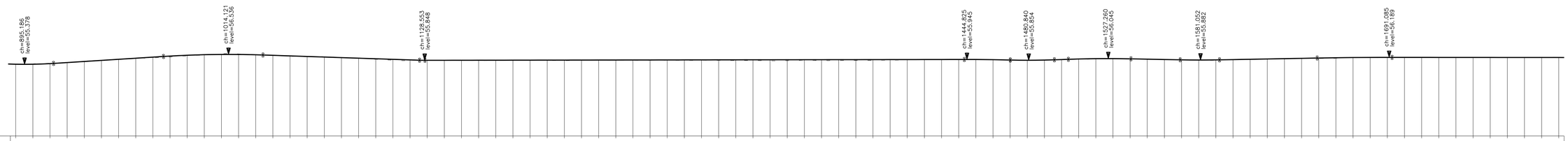
Scale	1:1,250 @ A1 1:2,500 @ A3
Created on	04/12/2020
Sheets	01 of 03
Project	CELBRIDGE TO HAZELHATCH LINK ROAD
Title	STAGE 1 OPTIONS OPTION F
Model File Identifier	
File Identifier	MDT0902-RPS-00-XX-DR-Z- RN0034
Status	S0
Rev	P01.01



DATUM=47.000

PROPOSED LEVEL	55.388 55.386 55.460 55.585 55.712 55.838 55.965 56.091 56.218 56.342 56.439 56.503 56.533 56.530 56.494 56.430 56.363 56.296 56.229 56.163 56.096 56.029 55.962 55.895 55.848 55.851 55.855 55.858 55.861 55.864 55.867 55.870 55.873 55.876 55.879 55.882 55.885 55.888 55.891 55.895 55.898 55.901 55.904 55.907 55.910 55.913 55.916 55.919 55.922 55.925 55.928 55.931 55.934 55.938 55.941 55.944 55.942 55.922 55.882 55.854 55.874 55.936 56.000 56.037 56.044 56.021 55.981 55.941 55.902 55.882 55.895 55.931 55.968 56.005 56.041 56.078 56.115 56.147 56.170 56.184 56.189 56.188 56.186 56.185 56.184 56.182 56.181 56.179 56.178 56.176 56.175
EXISTING GL	55.425 55.435 55.499 55.589 55.742 55.842 55.974 56.094 56.121 56.229 56.360 56.452 56.576 56.594 56.530 56.460 56.315 56.284 56.288 56.190 56.095 55.964 55.860 55.826 55.849 55.846 55.825 55.826 55.849 55.862 55.832 55.813 55.833 55.847 55.850 55.852 55.847 55.848 55.845 55.851 55.844 55.823 55.819 55.785 55.802 55.856 55.815 55.816 55.831 55.832 55.866 55.890 55.924 55.922 55.907 55.917 55.925 55.880 55.882 55.854 55.869 55.926 55.965 55.985 55.994 55.995 55.968 55.949 55.894 55.862 55.863 55.924 55.963 55.999 56.057 56.075 56.055 56.087 56.149 56.156 56.166 56.170 56.188 56.205 56.201 56.179 56.188 56.183 56.165 56.198 56.210 56.204
CHAINAGE	890.0 900.0 910.0 920.0 930.0 940.0 950.0 960.0 970.0 980.0 990.0 1000.0 1010.0 1020.0 1030.0 1040.0 1050.0 1060.0 1070.0 1080.0 1090.0 1100.0 1110.0 1120.0 1130.0 1140.0 1150.0 1160.0 1170.0 1180.0 1190.0 1200.0 1210.0 1220.0 1230.0 1240.0 1250.0 1260.0 1270.0 1280.0 1290.0 1300.0 1310.0 1320.0 1330.0 1340.0 1350.0 1360.0 1370.0 1380.0 1390.0 1400.0 1410.0 1420.0 1430.0 1440.0 1450.0 1460.0 1470.0 1480.0 1490.0 1500.0 1510.0 1520.0 1530.0 1540.0 1550.0 1560.0 1570.0 1580.0 1590.0 1600.0 1610.0 1620.0 1630.0 1640.0 1650.0 1660.0 1670.0 1680.0 1690.0 1700.0 1710.0 1720.0 1730.0 1740.0 1750.0 1760.0 1770.0 1780.0 1790.0
HORZ. SCHEMATIC	INFINITY L=86.408M; R=235.000M L=128.641M; INFINITY L=31.706M; R L; INFINITY L=142.345M; R=−180.000M L=39.279M; INFINITY L=675.938M
VERT. SCHEMATIC	R=1332.785M L=29.991M; G=1.265% L=64.106M; L=58.020M R=−3000.000M; L=91.367M G=−0.669%; R L V; G=0.031% L=314.596M; L=26.769M R; R L=25.745M; G L; L=36.531M R=−3331.435M; L=28.689M G=−0.396%; R L=22.945M; G=0.368% L=56.953M; L=43.700M R=−11410.425M
SUPERELEVATION	

OPTION F SCALES:− HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

Meánma Idir Mhíreoch

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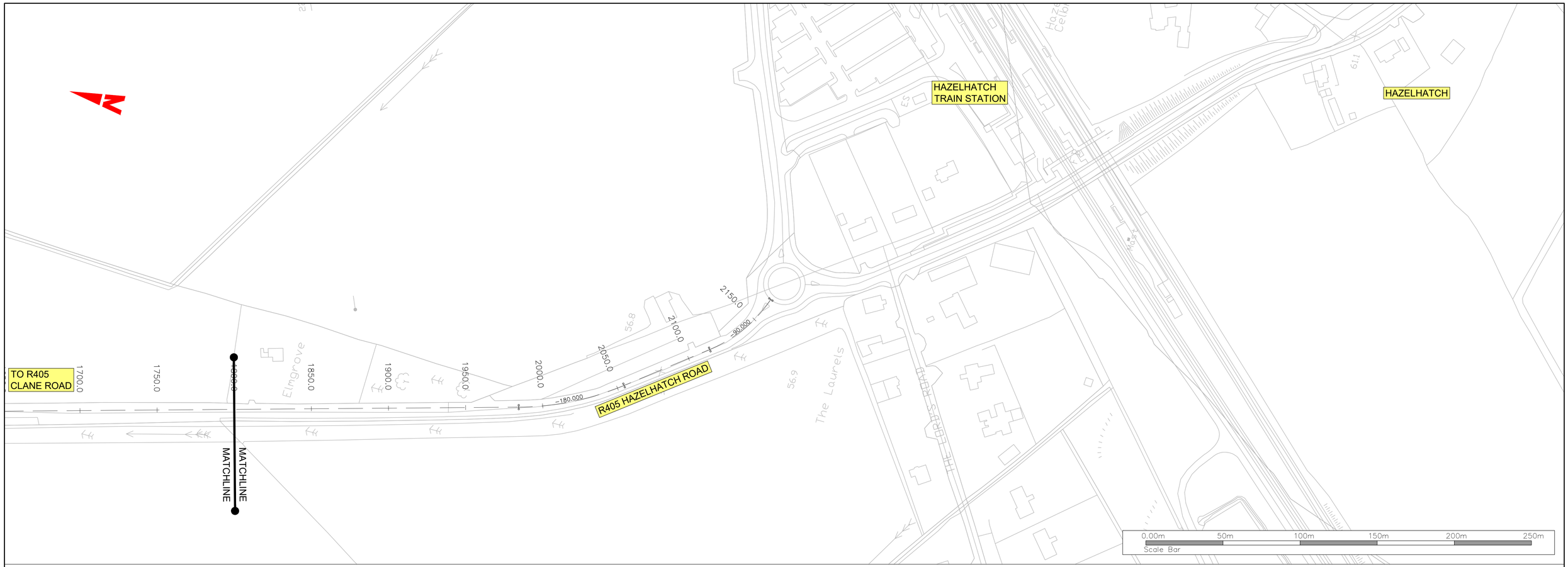
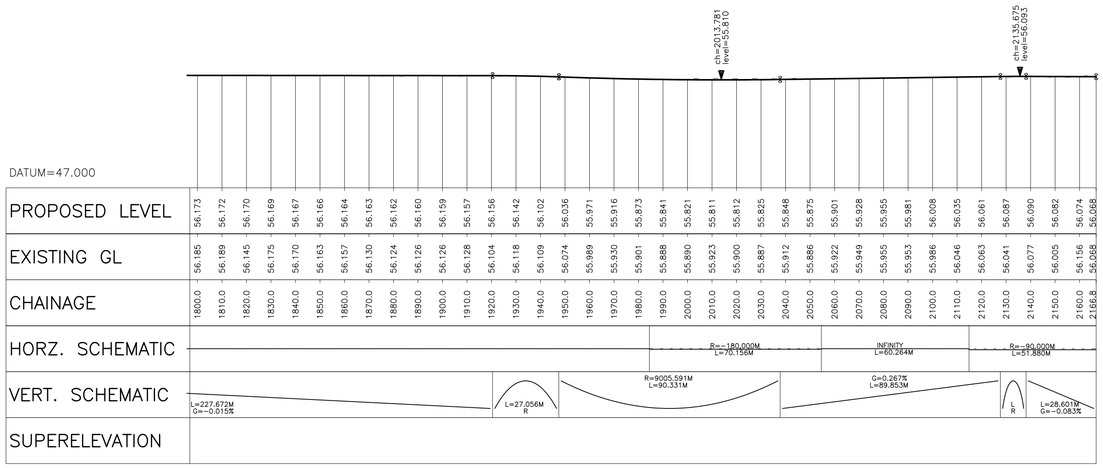
Model File Identifier

Scale	1:1,250 @ A1 1:2,500 @ A3
Created on	04/12/2020
Sheets	02 of 03
Project	CELBRIDGE TO HAZELHATCH LINK ROAD
Title	STAGE 1 OPTIONS OPTION F
File Identifier	MDT0902-RPS-00-XX-DR-Z- RN0035
Status	S0
Rev	P01.01

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DGI\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg





OPTION F SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

General Notes

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(v) All Levels refer to Ordnance Survey Datum, Malin Head.

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P01.01	12/01/21	JBR PW	WORK IN PROGRESS	MN

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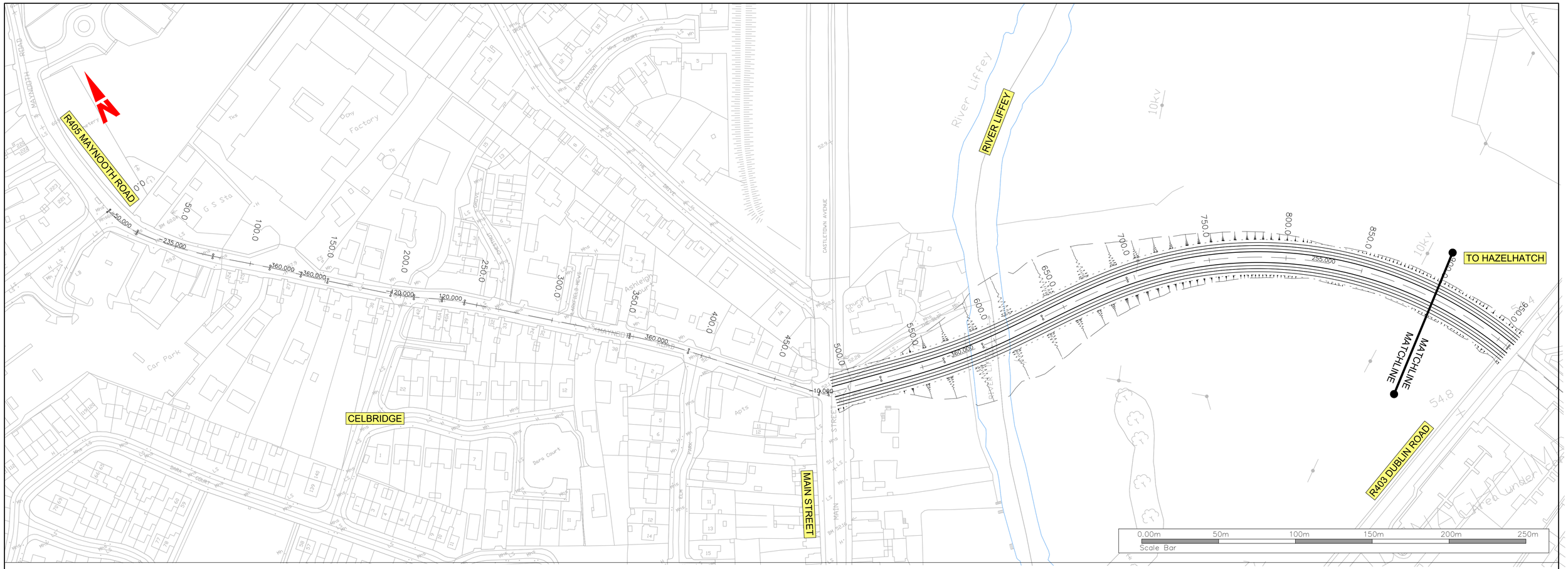
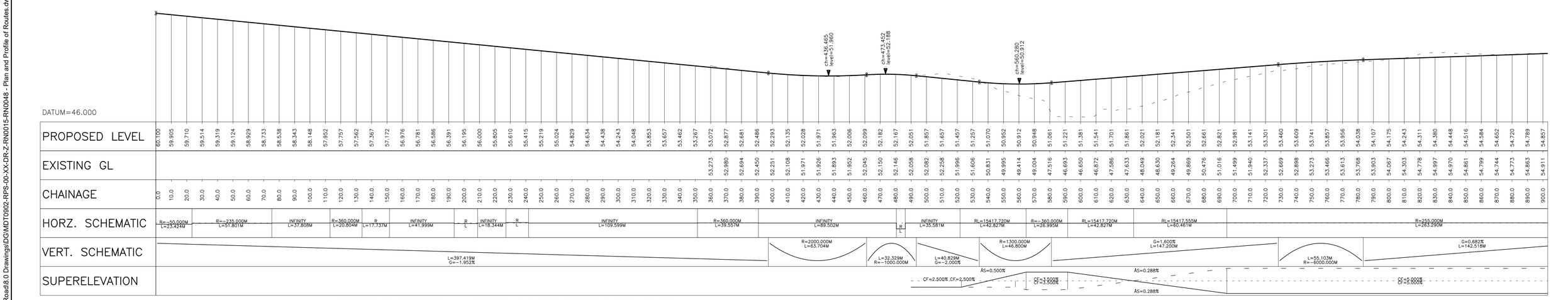
Model File Identifier

Scale	Project
1:1,250 @ A1 1:2,500 @ A3	CELBRIDGE TO HAZELHATCH LINK ROAD
Created on 04/12/2020	Title: STAGE 1 OPTIONS OPTION F
Sheets 03 of 03	

File Identifier	Status	Rev
MDT0902-RPS-00-XX-DR-Z- RN0036	S0	P01.01

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg





OPTION G SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DG\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

General Notes

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Model File Identifier

Scale 1:1,250 @ A1
1:2,500 @ A3

Created on 04/12/2020

Sheets 01 of 04

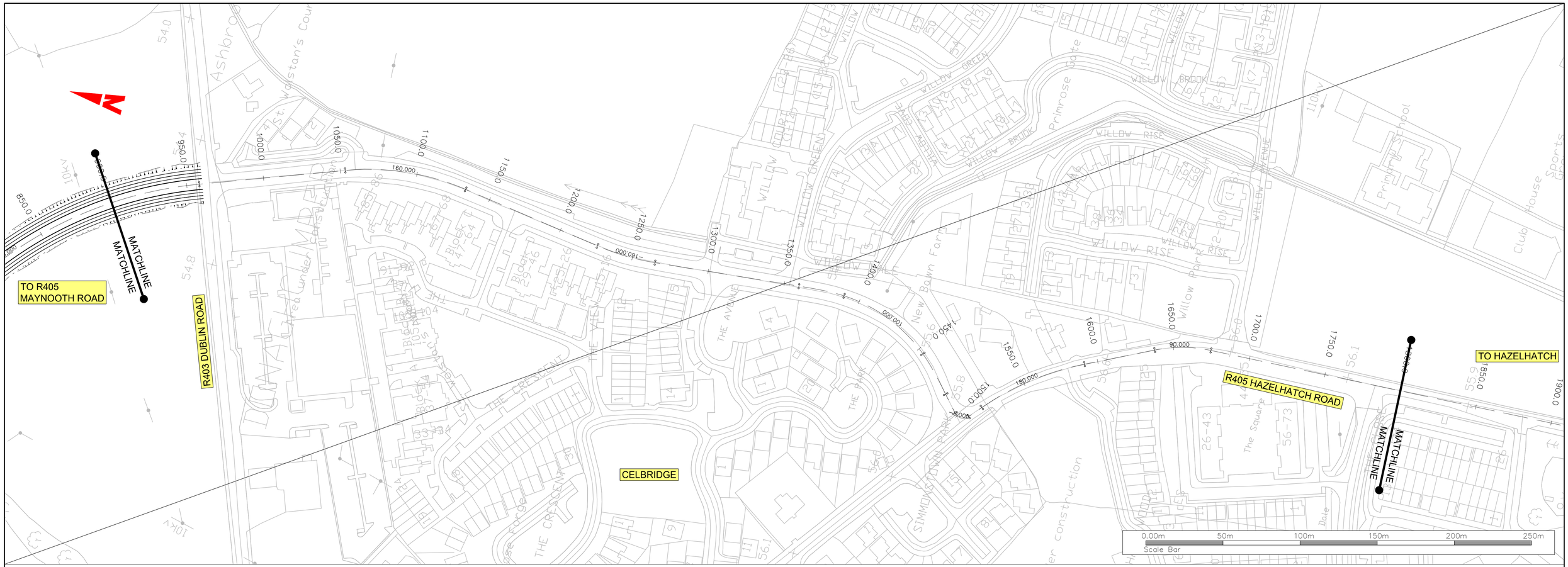
Project CELBRIDGE TO HAZELHATCH LINK ROAD

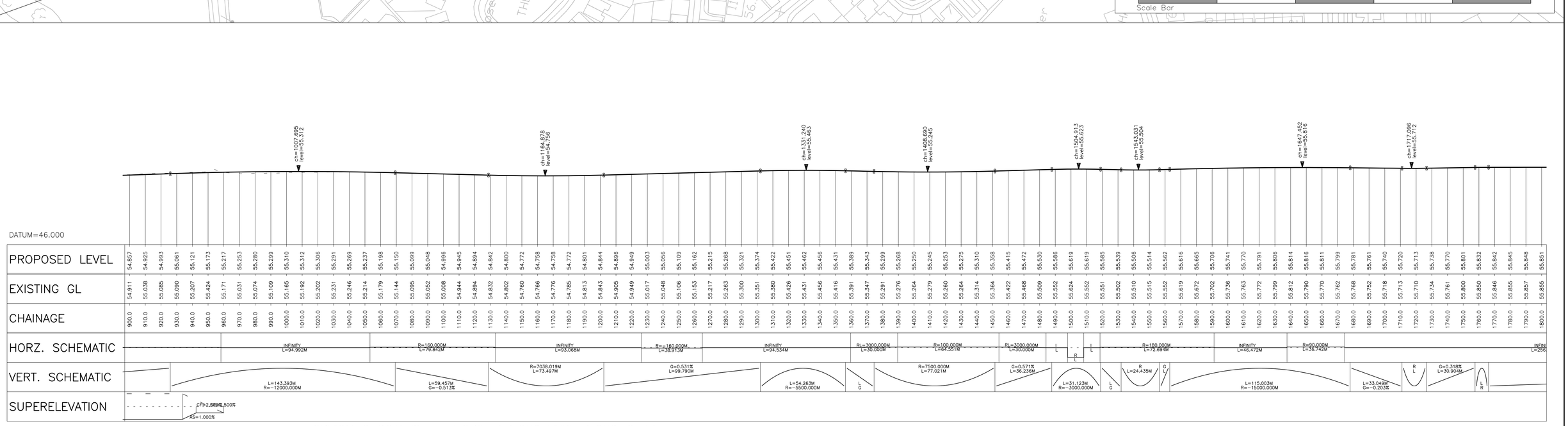
Title STAGE 1 OPTIONS
OPTION G

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0037

Status S0

Rev P01.01





OPTION G SCALES:— HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

Mhaitma Agus Mistreach

General Notes

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Rev	Date	Drn Chk	Amendment / Issue	App
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Model File Identifier

Scale 1:1,250 @ A1
1:2,500 @ A3

Created on 04/12/2020

Sheets 02 of 04

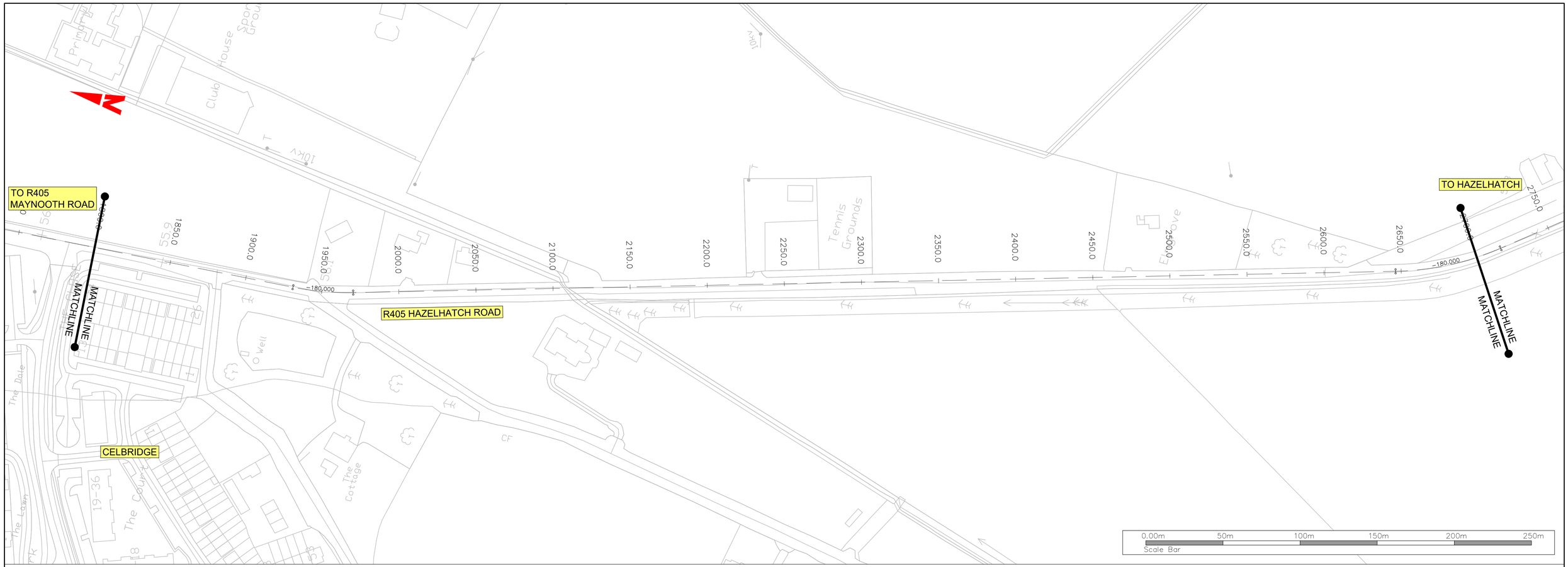
Project CELBRIDGE TO HAZELHATCH LINK ROAD

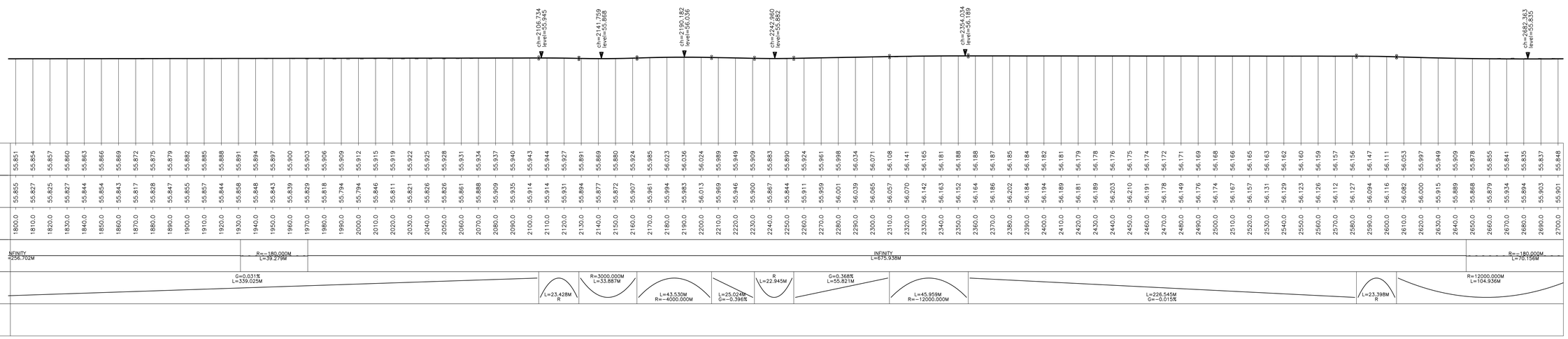
Title STAGE 1 OPTIONS
OPTION G

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0038

Status S0

Rev P01.01





OPTION G SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

General Notes

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Model File Identifier

Scale 1:1,250 @ A1
1:2,500 @ A3

Created on 04/12/2020

Sheets 03 of 04

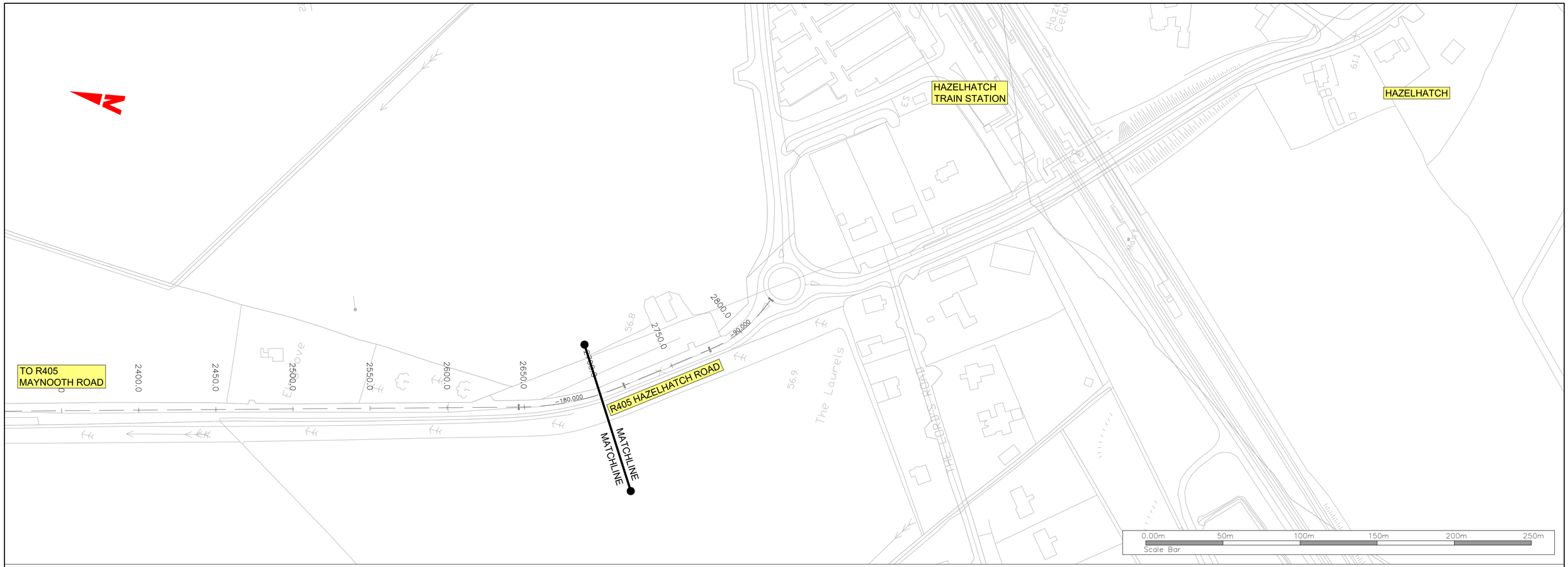
Project CELBRIDGE TO HAZELHATCH LINK ROAD

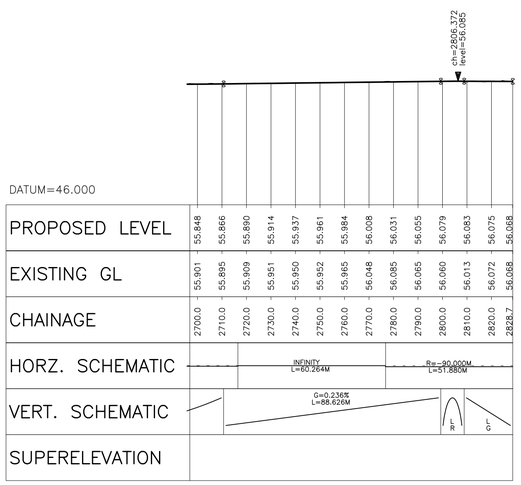
Title STAGE 1 OPTIONS
OPTION G

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0039

Status S0

Rev P01.01





OPTION G SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\6.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

General Notes

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Model File Identifier

Scale 1:1,250 @ A1
1:2,500 @ A3

Created on 04/12/2020

Sheets 04 of 04

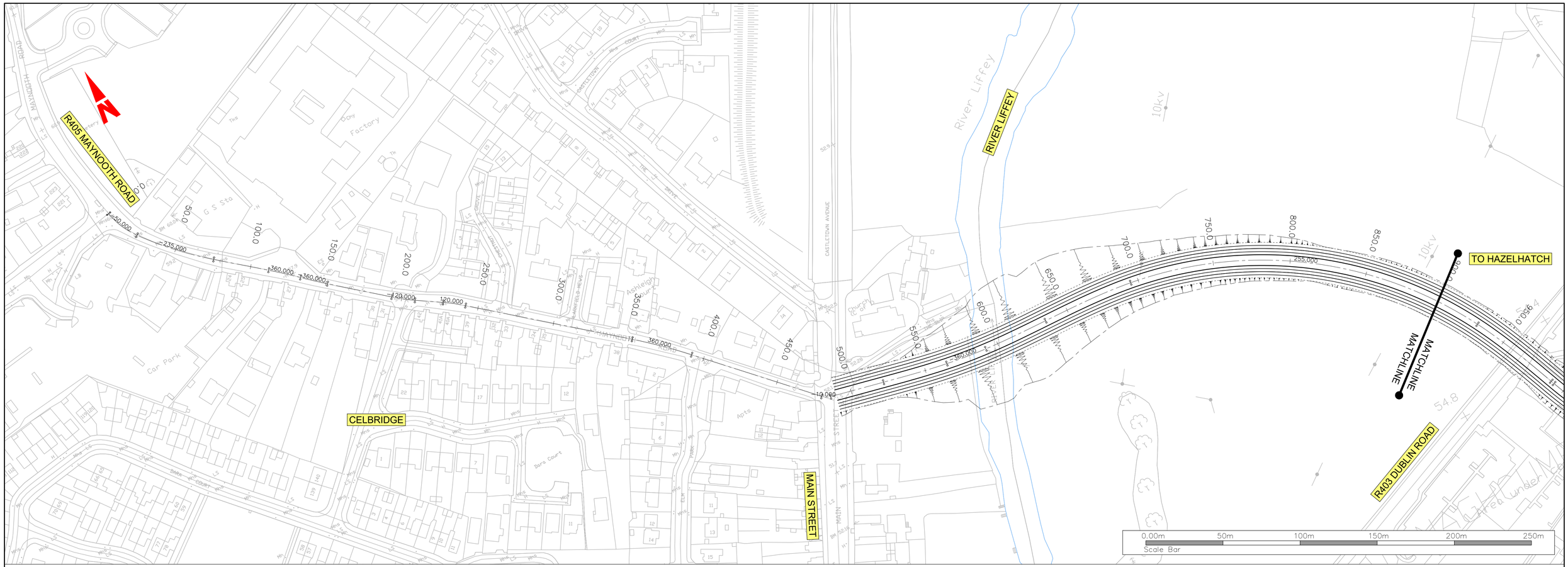
Project CELBRIDGE TO HAZELHATCH LINK ROAD

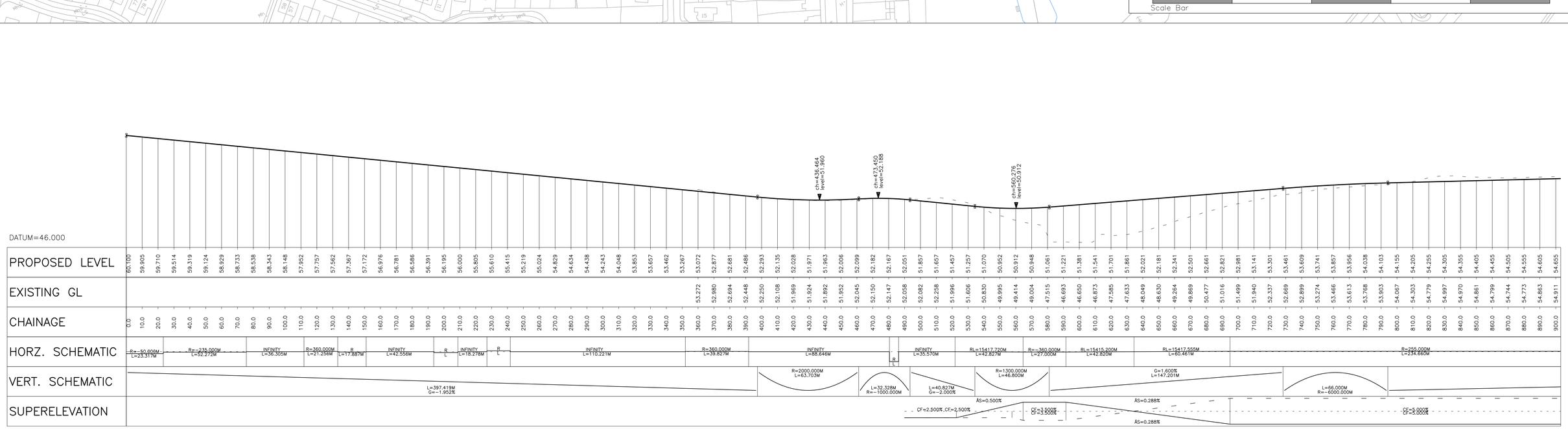
Title STAGE 1 OPTIONS
OPTION G

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0040

Status S0

Rev P01.01





OPTION H SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\6.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

General Notes

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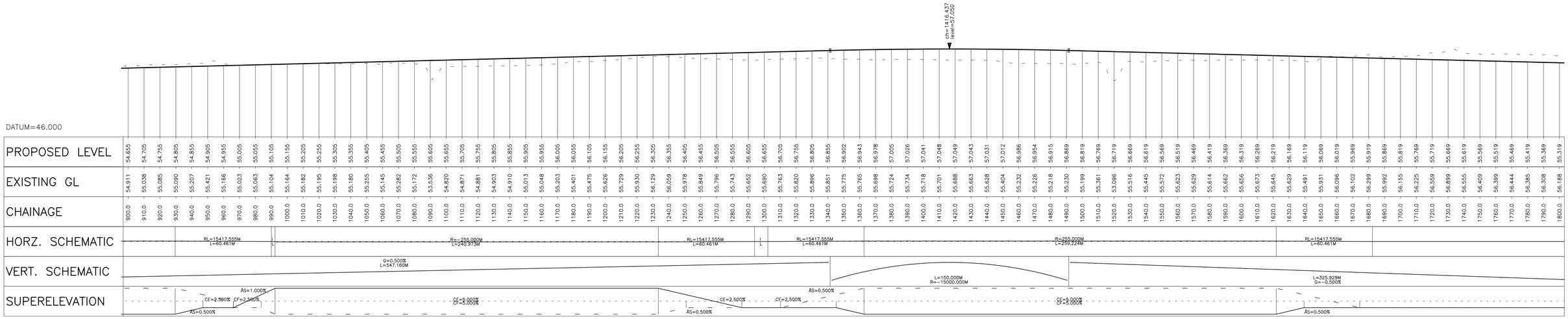
Model File Identifier

Scale	Project
1:1,250 @ A1 1:2,500 @ A3	CELBRIDGE TO HAZELHATCH LINK ROAD
Created on 04/12/2020	Title: STAGE 1 OPTIONS OPTION H
Sheets 01 of 04	

File Identifier	Status	Rev
MDT0902-RPS-00-XX-DR-Z- RN0041	S0	P01.01



OPTION H SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\6.0 Drawings\DGN\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

Client

Maithma agus Misneach

General Notes

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Model File Identifier

Scale 1:1,250 @ A1
1:2,500 @ A3

Created on 04/12/2020

Sheets 02 of 04

Project CELBRIDGE TO HAZELHATCH LINK ROAD

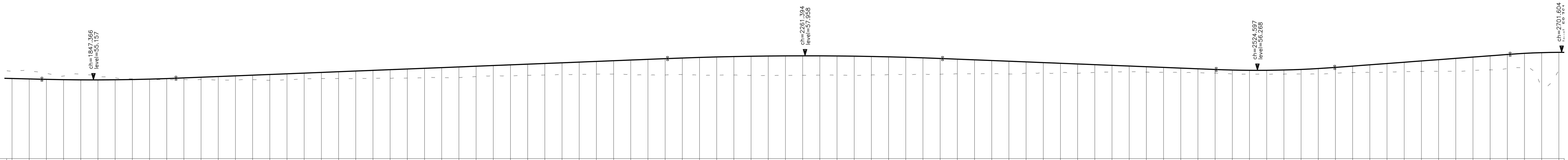
Title STAGE 1 OPTIONS
OPTION H

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0042

Status S0

Rev P01.01

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DG\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg



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PROPOSED LEVEL	55.319	55.269	55.220	55.183	55.162	55.158	55.171	55.200	55.246	55.309	55.386	55.466	55.546
EXISTING GL	56.188	56.197	55.917	55.606	55.829	55.596	55.410	55.279	55.229	55.189	55.208	55.188	55.118

CHAINAGE	1930.0	1940.0	1950.0	1960.0	1970.0	1980.0	1990.0	2000.0	2010.0	2020.0	2030.0	2040.0	2050.0
PROPOSED LEVEL	55.626	55.706	55.786	55.866	55.946	56.026	56.106	56.186	56.266	56.346	56.426	56.506	56.586
EXISTING GL	55.141	55.182	55.112	55.180	55.264	55.314	55.318	55.306	55.335	55.347	55.367	55.407	55.412

CHAINAGE	2060.0	2070.0	2080.0	2090.0	2100.0	2110.0	2120.0	2130.0	2140.0	2150.0	2160.0	2170.0	2180.0
PROPOSED LEVEL	56.666	56.746	56.826	56.906	56.986	57.066	57.146	57.226	57.306	57.386	57.466	57.546	57.626
EXISTING GL	55.433	55.544	55.605	55.631	55.691	55.724	55.768	55.793	55.832	55.837	55.762	55.727	55.734

CHAINAGE	2190.0	2200.0	2210.0	2220.0	2230.0	2240.0	2250.0	2260.0	2270.0	2280.0	2290.0	2300.0	2310.0
PROPOSED LEVEL	57.703	57.769	57.826	57.872	57.908	57.935	57.951	57.958	57.954	57.940	57.917	57.883	57.839
EXISTING GL	55.773	55.726	55.721	55.726	55.681	55.667	55.681	55.690	55.718	55.719	55.685	55.731	55.761

CHAINAGE	2320.0	2330.0	2340.0	2350.0	2360.0	2370.0	2380.0	2390.0	2400.0	2410.0	2420.0	2430.0	2440.0
PROPOSED LEVEL	57.786	57.722	57.649	57.569	57.489	57.409	57.329	57.249	57.169	57.089	57.009	56.929	56.849
EXISTING GL	55.790	55.801	55.814	55.869	55.860	55.883	55.842	55.940	55.999	56.002	55.923	56.025	56.073

CHAINAGE	2450.0	2460.0	2470.0	2480.0	2490.0	2500.0	2510.0	2520.0	2530.0	2540.0	2550.0	2560.0	2570.0
PROPOSED LEVEL	56.769	56.689	56.609	56.529	56.449	56.369	56.304	56.272	56.273	56.308	56.376	56.477	56.612
EXISTING GL	56.099	56.064	56.051	56.018	55.991	55.946	55.851	55.830	55.818	55.833	55.841	55.845	55.941

CHAINAGE	2580.0	2590.0	2600.0	2610.0	2620.0	2630.0	2640.0	2650.0	2660.0	2670.0	2680.0	2690.0	2700.0
PROPOSED LEVEL	56.762	56.912	57.062	57.212	57.362	57.512	57.662	57.812	57.962	58.112	58.244	58.327	58.360
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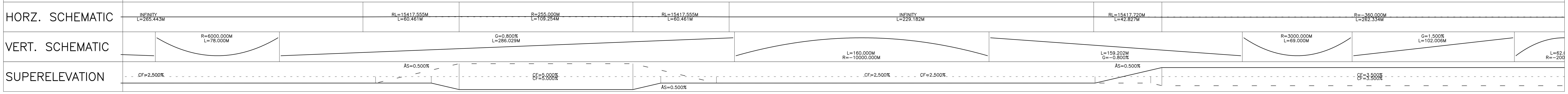

OPTION H SCALES:- HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

Meanma agus Misneach

General Notes

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Rev	Date	Drn Chk	Amendment / Issue	App
P01.01	12/01/21	JBR PW	WORK IN PROGRESS	MN

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Model File Identifier

Scale
1:1,250 @ A1
1:2,500 @ A3

Created on
04/12/2020

Sheets
03 of 04

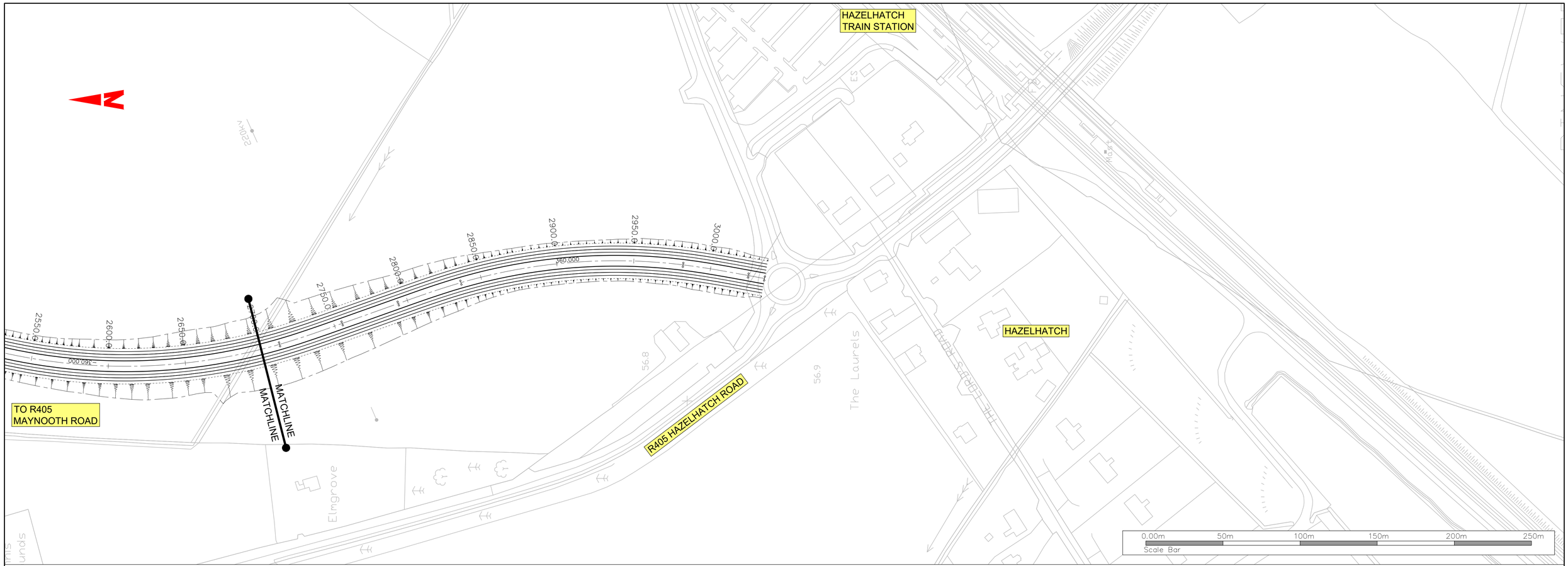
Project
CELBRIDGE TO HAZELHATCH LINK ROAD

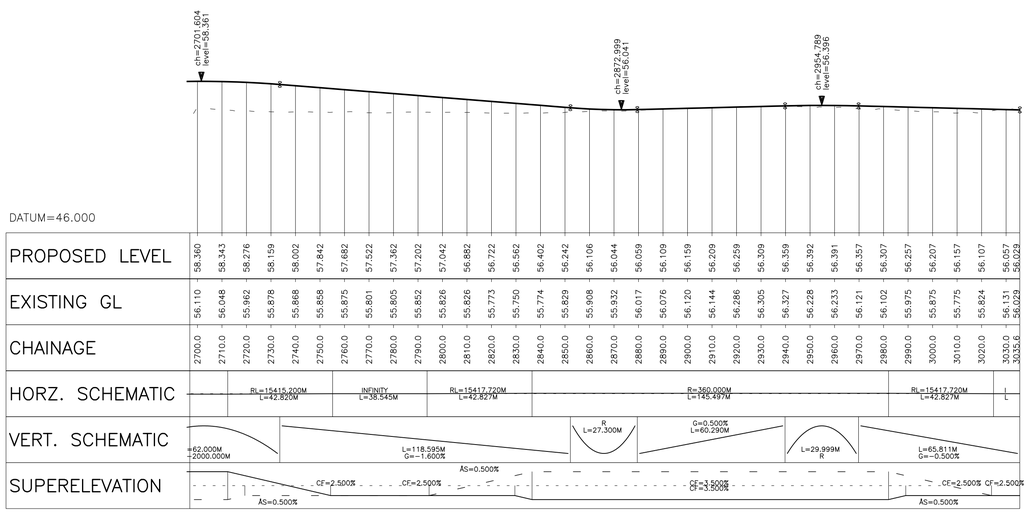
Title
STAGE 1 OPTIONS
OPTION H

File Identifier
MDT0902-RPS-00-XX-DR-Z- RN0043

Status
S0

Rev
P01.01





OPTION H SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

R:\MDT0902 - Celbridge to Hazelhatch Link Road\8.0 Drawings\DG\MDT0902-RPS-00-XX-DR-Z-RN0015-RN0048 - Plan and Profile of Routes.dwg

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File Identifier: MDT0902-RPS-00-XX-DR-Z- RN0044

Scale: 1:1,250 @ A1, 1:2,500 @ A3

Created on: 04/12/2020

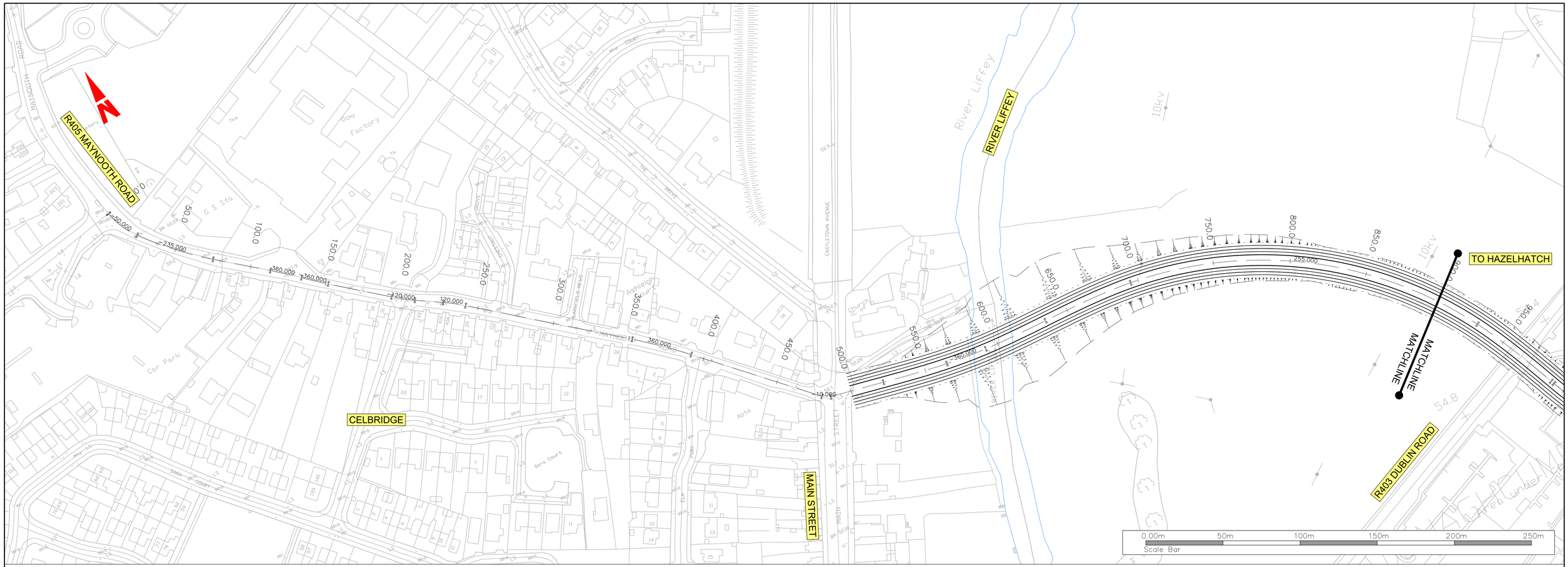
Sheets: 04 of 04

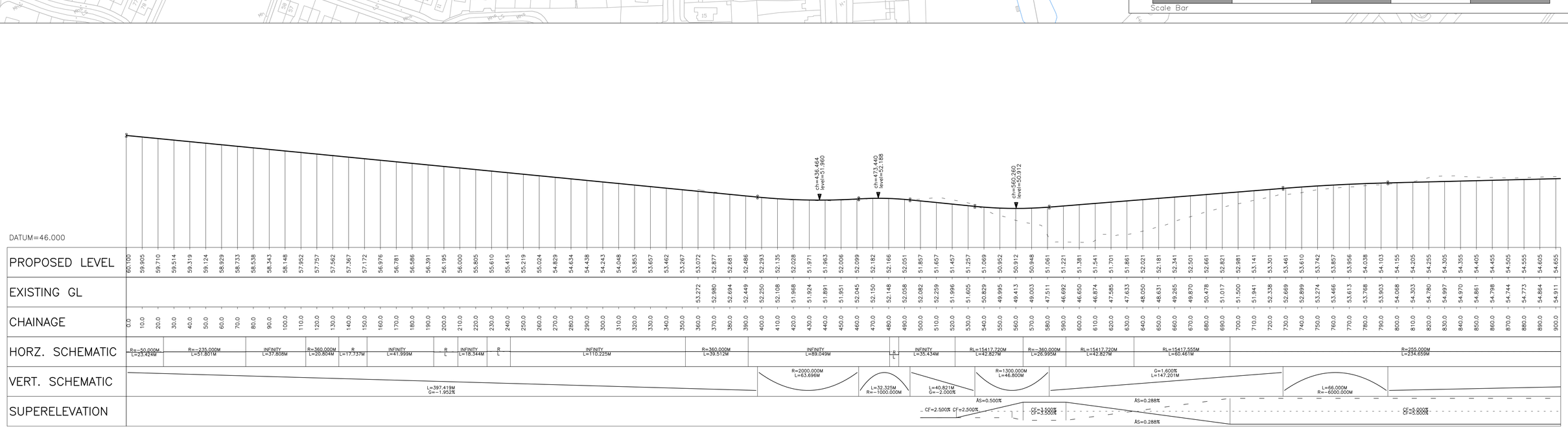
Project: CELBRIDGE TO HAZELHATCH LINK ROAD

Title: STAGE 1 OPTIONS
OPTION H

Status: S0

Rev: P01.01





OPTION H1 SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

Inchiama Sólas Mhaigheo

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Scale 1:1,250 @ A1 1:2,500 @ A3

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Project CELBRIDGE TO HAZELHATCH LINK ROAD

Title STAGE 1 OPTIONS OPTION H1

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0045

Status S0

Rev P01.01

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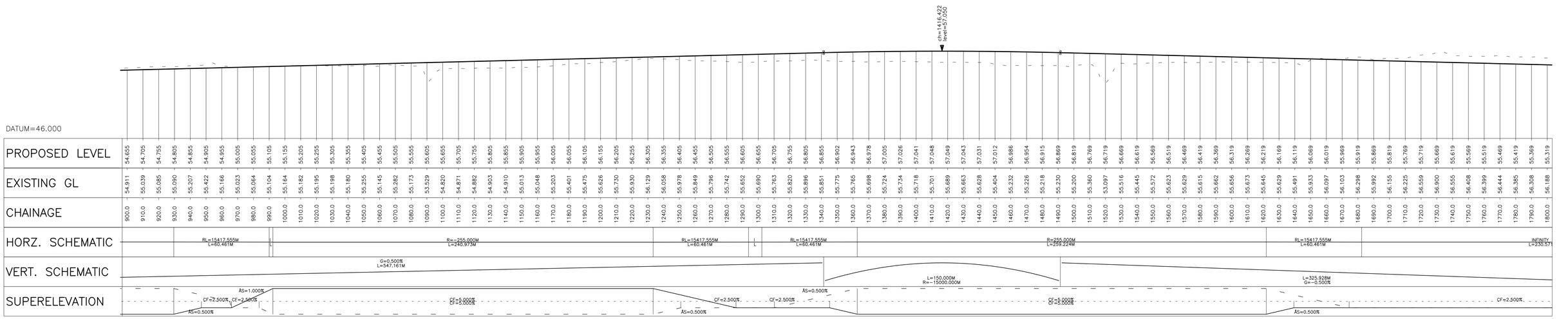

OPTION H1 SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

Client

Inchinna Aghas Mhaigneas

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Model File Identifier

Scale	1:1,250 @ A1 1:2,500 @ A3
Created on	04/12/2020
Sheets	02 of 04
Project	CELBRIDGE TO HAZELHATCH LINK ROAD
Title	STAGE 1 OPTIONS OPTION H1
File Identifier	MDT0902-RPS-00-XX-DR-Z- RN0046
Status	S0
Rev	P01.01

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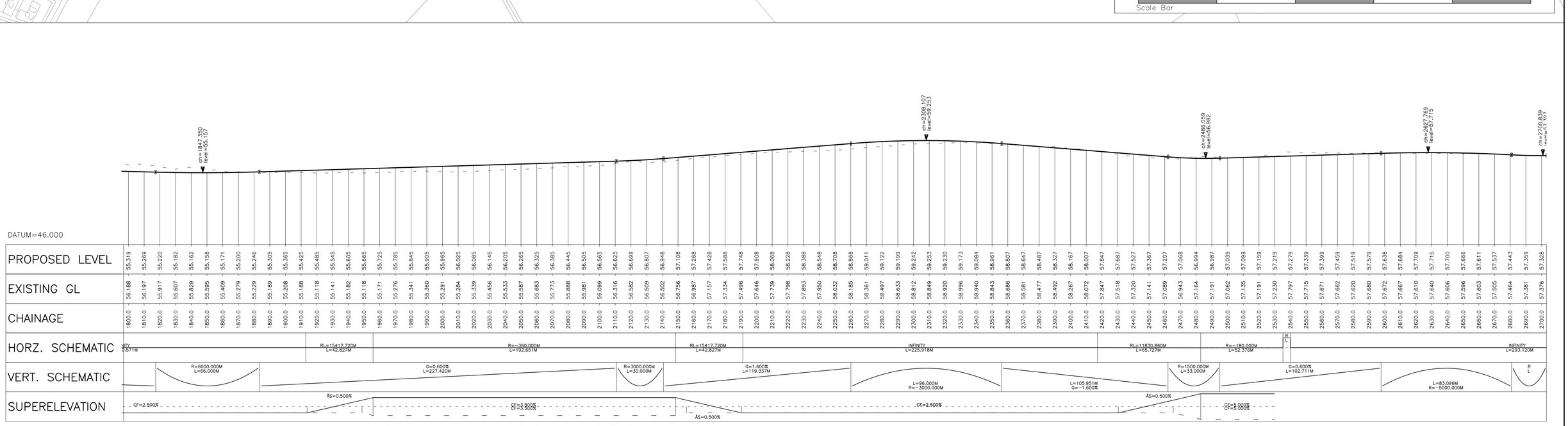

OPTION H1 SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

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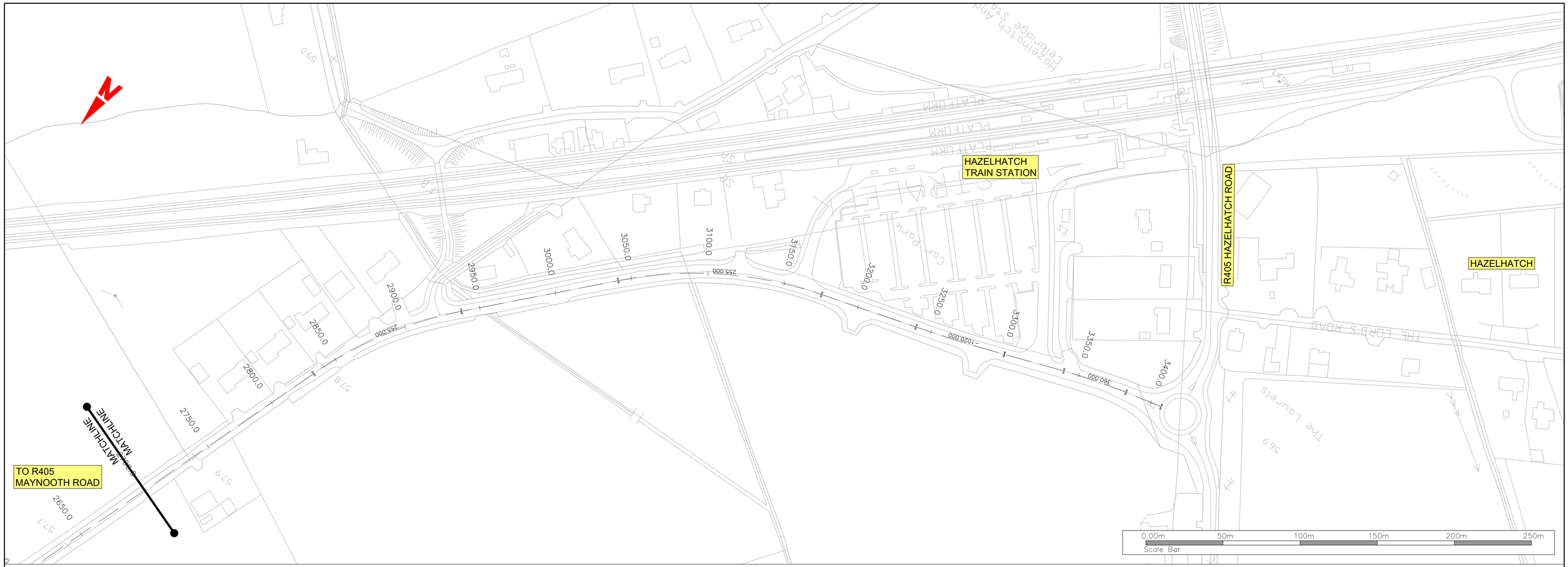
Project CELBRIDGE TO HAZELHATCH LINK ROAD

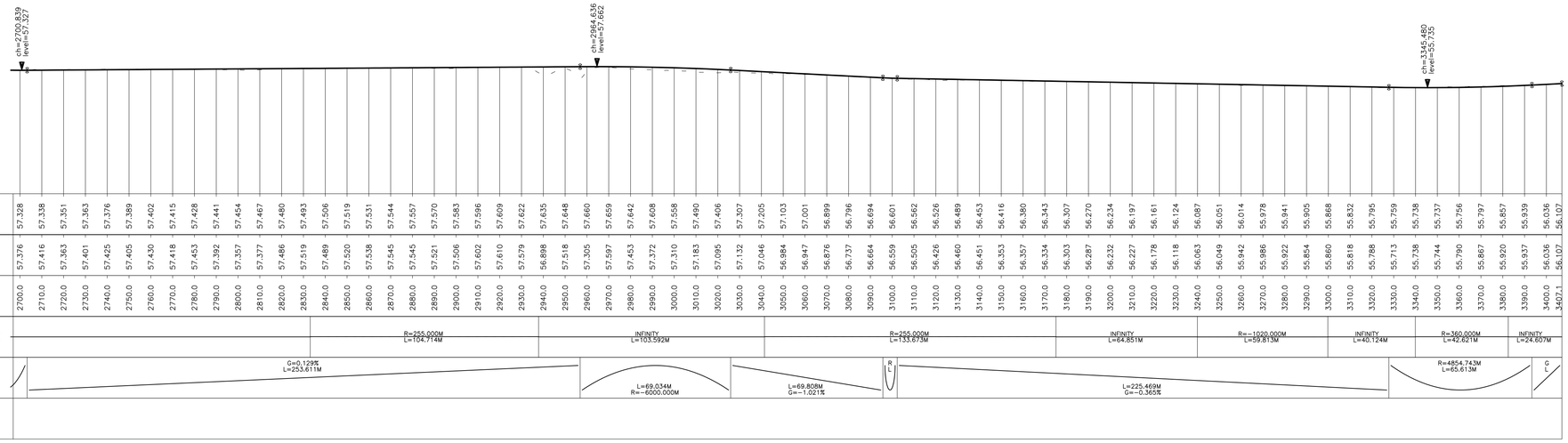
Title STAGE 1 OPTIONS
OPTION H1

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0047

Status S0

Rev P01.01





OPTION H1 SCALES:– HORIZ 1:1,250 VERT 1:250 @ A1
HORIZ 1:2,500 VERT 1:500 @ A3

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Sheets 04 of 04

Project CELBRIDGE TO HAZELHATCH LINK ROAD

Title STAGE 1 OPTIONS
OPTION H1

File Identifier MDT0902-RPS-00-XX-DR-Z- RN0048

Status S0

Rev P01.01

Appendix E
Cost Estimates

Cost Estimate - Option A

SCHEME TITLE	CHLR	**DATE OF ESTIMATE**	January 2021
CURRENT PHASE	Phase 2 Stage 1	**BASE DATE FOR RATES**	2020
NAME OF CONSULTANT	RPS	**NAME OF ESTIMATOR**	Alex Byrne

Mainline Section Type:	T2SC	Mainline Length:		2.635
Link Roads Section Type:		Link Road Length:		

		Quantity	Unit	Rate €	Total €
1	**Main Construction Contract**				
	a Offline Works - Type 2 Single Carriageway	2.635	km	1,860,000	4,901,100
	b Online Works - Type 2 Single Carriageway	0.000	km	1,395,000	0
	c Carriageway - Link Roads	0	km	0	0
	d Carriageway - Side Roads	0.7	km	1,400,000	980,000
	e Over/Underbridge	0	Nr.		0
	f River Crossings	1188	m²	3,500	4,158,000
	g Small river crossings - culverts (complete)	6	Nr.	250,000	1,500,000
	h Cut	5465	m^3	0.90	4,919
	i Fill	102270	m^3	1.50	153,405
	j Net balance	-96805	m^3		
	k Import (-ve)	96805	m^3	20	1,936,100
	l Disposal (+ve)	1639.5	m^3	7	11,477
	m Extra over for construction in soft ground	-	sum	15% of ewks costs	315,885
	n Utility Diversions	1	sum	710,000	710,000
	o Railway Crossings	0	Nr.		0
	p Grade Separated Junctions	0	Nr.		0
	q Freeflow Interchanges	0	Nr.		0
	r Signature Structures	0	Item		0
	s Specialist construction solutions, see notes	0	m^3		0
	Total Base Cost for Main Construction Contract (Ex VAT)				14,670,885
	VAT @ 13.5%				1,980,569
	Total MCC Base Cost (Incl VAT)				**16,651,454**
	Add Project Specific Risk Contingency		15%		2,497,718
	Main Construction Contract Cost (Incl VAT) & Contingency				**19,149,173**
2	**Land and Property - All-In Costs**	Quantity	Unit	Rate €	Total €
	a Mainline & Side Roads - land zoned residential	3.04	Ha.	1,853,000	5,629,414
	b Mainline & Side Roads - land zoned amenity	2.71	Ha.	247,000	669,988
	c Mainline & Side Roads - land zoned agriculture	5.10	Ha.	62,000	316,169
	d Properties	0	Item	0	0
	Total Base Cost for Land and Property (Incl VAT)				**6,615,571**
	Add Project Specific Risk Contingency		5%		330,779
	Total L&P Base Cost (Incl VAT) & Contingency				**6,946,349**
3	**Planning and Design (including GI and Surveys)**				
	Fixed Price (Ex VAT)				1,500,000
	VAT @ 23%				345,000
	Total P&D Base Cost (Incl VAT)				**1,845,000**
	Add Project Specific Risk Contingency		15%		276,750
	Planning & Design Cost (Incl. VAT) & Contingency				**2,121,750**
4	**Archaeology**				
	Provision based on €0.2m/km (Ex VAT)				527,000
	VAT @ 23%				121,210
	Total Archaeology Base Cost (Incl VAT)				**648,210**
	Add Project Specific Risk Contingency		10%		64,821
	Archaeology Cost (Incl. VAT) & Contingency				**713,031**
5	**Advance Works and Other Contracts**				
	Provision based on €72k/km (Ex VAT)				189,720
	VAT @ 23%				43,636
	Total Advance Works and Other Contracts Base Cost (Incl VAT)				**233,356**
	Add Project Specific Risk Contingency		10%		23,336
	Total Advance Works and Other Contracts Base Cost (Incl. VAT) & Contingency				**256,691**
6	**Main Contract Supervision (Employer's Costs)**				
	Provision 6% of construction cost (Ex VAT)				880,253
	VAT @ 23%				202,458
	Total MC Supervision (Employer's Costs) Base Cost (Incl VAT)				**1,082,711**
	Add Project Specific Risk Contingency		15%		162,407
	Main Contract Supervision (Employer's Costs) (Incl. VAT) & Contingency				**1,245,118**
7	**Walking, Cycling and Asset Renewal**				
	Provision 1% of construction cost (Incl VAT and contingency)				191,492
	Total Residual Network Base Cost (Incl VAT)				**191,492**

Base Cost Estimate (Incl. VAT) & Contingency - 2020 Base Year Excludes Programme Risk and Inflation					**30,623,604**
Mainline Length	**2.635**	km	**Rate per km**		**11,621,861**

Cost Estimate - Option A1

SCHEME TITLE	CHLR	**DATE OF ESTIMATE**	January 2021
CURRENT PHASE	Phase 2 Stage 1	**BASE DATE FOR RATES**	2020
NAME OF CONSULTANT	RPS	**NAME OF ESTIMATOR**	Alex Byrne

Mainline Section Type:	T2SC	Mainline Length:		2.975
Link Roads Section Type:		Link Road Length:		

	Main Construction Contract	Quantity	Unit	Rate €	Total €
1	a Offline Works - Type 2 Single Carriageway	2.975	km	1,860,000	5,533,500
	b Online Works - Type 2 Single Carriageway	0.000	km	1,395,000	0
	c Carriageway - Link Roads	0	km		0
	d Carriageway - Side Roads	0.7	km	1,400,000	980,000
	e Over/Underbridge	0	Nr.		0
	f River Crossings	1188	m²	3,500	4,158,000
	g Small river crossings - culverts (complete)	6	Nr.	250,000	1,500,000
	h Cut	6315	m^3	0.90	5,684
	i Fill	102915	m^3	1.50	154,373
	j Net balance	-96600	m^3		
	k Import (-ve)	96600	m^3	20	1,932,000
	l Disposal (+ve)	1894.5	m^3	7	13,262
	m Extra over for construction in soft ground	-	sum	15% of ewks costs	315,798
	n Utility Diversions	1	sum	910,000	910,000
	o Railway Crossings	0	Nr.		0
	p Grade Separated Junctions	0	Nr.		0
	q Freeflow Interchanges	0	Nr.		0
	r Signature Structures	0	Item		0
	s Specialist construction solutions, see notes	0	m^3		0
	Total Base Cost for Main Construction Contract (Ex VAT)				15,502,615
	VAT @ 13.5%				2,092,853
	Total MCC Base Cost (Incl VAT)				**17,595,468**
	Add Project Specific Risk Contingency		15%		2,639,320
	Main Construction Contract Cost (Incl VAT) & Contingency				**20,234,788**

	Land and Property - All-In Costs	Quantity	Unit	Rate €	Total €
2	a Mainline & Side Roads - land zoned residential	3.00	Ha.	1,853,000	5,549,735
	b Mainline & Side Roads - land zoned amenity	3.00	Ha.	247,000	739,765
	c Mainline & Side Roads - land zoned agriculture	5.99	Ha.	62,000	371,380
	d Properties	0	Item	0	0
	Total Base Cost for Land and Property (Incl VAT)				**6,660,880**
	Add Project Specific Risk Contingency		5%		333,044
	Total L&P Base Cost (Incl VAT) & Contingency				**6,993,924**

3	**Planning and Design (including GI and Surveys)**				
	Fixed Price (Ex VAT)				1,500,000
	VAT @ 23%				345,000
	Total P&D Base Cost (Incl VAT)				**1,845,000**
	Add Project Specific Risk Contingency		15%		276,750
	Planning & Design Cost (Incl. VAT) & Contingency				**2,121,750**
4	**Archaeology**				
	Provision based on €0.2m/km (Ex VAT)				595,000
	VAT @ 23%				136,850
	Total Archaeology Base Cost (Incl VAT)				**731,850**
	Add Project Specific Risk Contingency		10%		73,185
	Archaeology Cost (Incl. VAT) & Contingency				**805,035**
5	**Advance Works and Other Contracts**				
	Provision based on €72k/km (Ex VAT)				214,200
	VAT @ 23%				49,266
	Total Advance Works and Other Contracts Base Cost (Incl VAT)				263,466
	Add Project Specific Risk Contingency		10%		26,347
	Total Advance Works and Other Contracts Base Cost (Incl. VAT) & Contingency				**289,813**
6	**Main Contract Supervision (Employer's Costs)**				
	Provision 6% of construction cost (Ex VAT)				930,157
	VAT @ 23%				213,936
	Total MC Supervision (Employer's Costs) Base Cost (Incl VAT)				**1,144,093**
	Add Project Specific Risk Contingency		15%		171,614
	Main Contract Supervision (Employer's Costs) (Incl. VAT) & Contingency				**1,315,707**
7	**Walking, Cycling and Asset Renewal**				
	Provision 1% of construction cost (Incl VAT and contingency)				202,348
	Total Residual Network Base Cost (Incl VAT)				**202,348**

Base Cost Estimate (Incl. VAT) & Contingency - 2020 Base Year Excludes Programme Risk and Inflation					**31,963,365**
Mainline Length	**2.975**	km		**Rate per km**	**10,743,988**

Cost Estimate - Option B

SCHEME TITLE	CHLR	**DATE OF ESTIMATE**	January 2021
CURRENT PHASE	Phase 2 Stage 1	**BASE DATE FOR RATES**	2020
NAME OF CONSULTANT	RPS	**NAME OF ESTIMATOR**	Alex Byrne
Mainline Section Type:	T2SC	Mainline Length:	2.180
Link Roads Section Type:		Link Road Length:	

		Quantity	Unit	Rate €	Total €
1	**Main Construction Contract**				
	a Offline Works - Type 2 Single Carriageway	2.180	km	1,860,000	4,054,800
	b Online Works - Type 2 Single Carriageway	0.000	km	1,395,000	0
	c Carriageway - Link Roads	0	km		0
	d Carriageway - Side Roads	0.4	km	1,400,000	560,000
	e Over/Underbridge	0	Nr.		0
	f River Crossings	1080	m²	3,500	3,780,000
	g Small river crossings - culverts (complete)	4	Nr.	250,000	1,000,000
	h Cut	6540	m^3	0.90	5,886
	i Fill	72615	m^3	1.50	108,923
	j Net balance	-66075	m^3		
	k Import (-ve)	66075	m^3	20	1,321,500
	l Disposal (+ve)	1962	m^3	7	13,734
	m Extra over for construction in soft ground	-	sum	15% of ewks costs	217,506
	n Utility Diversions	1	sum	1,010,000	1,010,000
	o Railway Crossings	0	Nr.		0
	p Grade Separated Junctions	0	Nr.		0
	q Freeflow Interchanges	0	Nr.		0
	r Signature Structures	0	Item		0
	s Specialist construction solutions, see notes	0	m^3		0
	Total Base Cost for Main Construction Contract (Ex VAT)				12,072,349
	VAT @ 13.5%				1,629,767
	Total MCC Base Cost (Incl VAT)				**13,702,116**
	Add Project Specific Risk Contingency		15%		2,055,317
	Main Construction Contract Cost (Incl VAT) & Contingency				**15,757,433**
2	**Land and Property - All-In Costs**	Quantity	Unit	Rate €	Total €
	a Mainline & Side Roads - land zoned residential	2.10	Ha.	1,853,000	3,895,747
	b Mainline & Side Roads - land zoned amenity	1.58	Ha.	247,000	389,470
	c Mainline & Side Roads - land zoned agriculture	5.08	Ha.	62,000	315,010
	d Properties	0	Item	0	0
	Total Base Cost for Land and Property (Incl VAT)				**4,600,226**
	Add Project Specific Risk Contingency		5%		230,011
	Total L&P Base Cost (Incl VAT) & Contingency				**4,830,238**
3	**Planning and Design (including GI and Surveys)**				
	Fixed Price (Ex VAT)				1,500,000
	VAT @ 23%				345,000
	Total P&D Base Cost (Incl VAT)				**1,845,000**
	Add Project Specific Risk Contingency		15%		276,750
	Planning & Design Cost (Incl. VAT) & Contingency				**2,121,750**
4	**Archaeology**				
	Provision based on €0.2m/km (Ex VAT)				436,000
	VAT @ 23%				100,280
	Total Archaeology Base Cost (Incl VAT)				**536,280**
	Add Project Specific Risk Contingency		10%		53,628
	Archaeology Cost (Incl. VAT) & Contingency				**589,908**
5	**Advance Works and Other Contracts**				
	Provision based on €72k/km (Ex VAT)				156,960
	VAT @ 23%				36,101
	Total Advance Works and Other Contracts Base Cost (Incl VAT)				193,061
	Add Project Specific Risk Contingency		10%		19,306
	Total Advance Works and Other Contracts Base Cost (Incl. VAT) & Contingency				**212,367**
6	**Main Contract Supervision (Employer's Costs)**				
	Provision 6% of construction cost (Ex VAT)				724,341
	VAT @ 23%				166,598
	Total MC Supervision (Employer's Costs) Base Cost (Incl VAT)				**890,939**
	Add Project Specific Risk Contingency		15%		133,641
	Main Contract Supervision (Employer's Costs) (Incl. VAT) & Contingency				**1,024,580**
7	**Walking, Cycling and Asset Renewal**				
	Provision 1% of construction cost (Incl VAT and contingency)				157,574
	Total Residual Network Base Cost (Incl VAT)				**157,574**
	Base Cost Estimate (Incl. VAT) & Contingency - 2020 Base Year Excludes Programme Risk and Inflation				**24,693,851**
	Mainline Length	**2.180**	km	**Rate per km**	**11,327,454**

Cost Estimate - Option C

SCHEME TITLE	CHLR	**DATE OF ESTIMATE**	January 2021
CURRENT PHASE	Phase 2 Stage 1	**BASE DATE FOR RATES**	2020
NAME OF CONSULTANT	RPS	**NAME OF ESTIMATOR**	Alex Byrne

Mainline Section Type:	T2SC	Mainline Length:		2.105
Link Roads Section Type:		Link Road Length:		

		Quantity	Unit	Rate €	Total €
1	**Main Construction Contract**				
	a Offline Works - Type 2 Single Carriageway	1.830	km	1,860,000	3,403,800
	b Online Works - Type 2 Single Carriageway	0.275	km	1,395,000	383,625
	c Carriageway - Link Roads	0	km		0
	d Carriageway - Side Roads	0.5	km	1,400,000	700,000
	e Over/Underbridge	0	Nr.		0
	f River Crossings	1080	m²	3,500	3,780,000
	g Small river crossings - culverts (complete)	3	Nr.	250,000	750,000
	h Cut	7972.5	m^3	0.90	7,175
	i Fill	60485	m^3	1.50	90,728
	j Net balance	-52512.5	m^3		
	k Import (-ve)	52512.5	m^3	20	1,050,250
	l Disposal (+ve)	2391.75	m^3	7	16,742
	m Extra over for construction in soft ground	-	sum	15% of ewks costs	174,734
	n Utility Diversions	1	sum	1,010,000	1,010,000
	o Railway Crossings	0	Nr.		0
	p Grade Separated Junctions	0	Nr.		0
	q Freeflow Interchanges	0	Nr.		0
	r Signature Structures	0	Item		0
	s Specialist construction solutions, see notes	0	m^3		0
	Total Base Cost for Main Construction Contract (Ex VAT)				11,367,054
	VAT @ 13.5%				1,534,552
	Total MCC Base Cost (Incl VAT)				**12,901,607**
	Add Project Specific Risk Contingency		15%		1,935,241
	Main Construction Contract Cost (Incl VAT) & Contingency				**14,836,848**

		Quantity	Unit	Rate €	Total €
2	**Land and Property - All-In Costs**				
	a Mainline & Side Roads - land zoned residential	1.90	Ha.	1,853,000	3,521,812
	b Mainline & Side Roads - land zoned amenity	1.61	Ha.	247,000	397,225
	c Mainline & Side Roads - land zoned agriculture	3.80	Ha.	62,000	235,674
	d Properties	0	Item	0	0
	Total Base Cost for Land and Property (Incl VAT)				**4,154,712**
	Add Project Specific Risk Contingency		5%		207,736
	Total L&P Base Cost (Incl VAT) & Contingency				**4,362,447**
3	**Planning and Design (including GI and Surveys)**				
	Fixed Price (Ex VAT)				1,500,000
	VAT @ 23%				345,000
	Total P&D Base Cost (Incl VAT)				**1,845,000**
	Add Project Specific Risk Contingency		15%		276,750
	Planning & Design Cost (Incl. VAT) & Contingency				**2,121,750**
4	**Archaeology**				
	Provision based on €0.2m/km (Ex VAT)				421,000
	VAT @ 23%				96,830
	Total Archaeology Base Cost (Incl VAT)				**517,830**
	Add Project Specific Risk Contingency		10%		51,783
	Archaeology Cost (Incl. VAT) & Contingency				**569,613**
5	**Advance Works and Other Contracts**				
	Provision based on €72k/km (Ex VAT)				151,560
	VAT @ 23%				34,859
	Total Advance Works and Other Contracts Base Cost (Incl VAT)				186,419
	Add Project Specific Risk Contingency		10%		18,642
	Total Advance Works and Other Contracts Base Cost (Incl. VAT) & Contingency				**205,061**
6	**Main Contract Supervision (Employer's Costs)**				
	Provision 6% of construction cost (Ex VAT)				682,023
	VAT @ 23%				156,865
	Total MC Supervision (Employer's Costs) Base Cost (Incl VAT)				**838,889**
	Add Project Specific Risk Contingency		15%		125,833
	Main Contract Supervision (Employer's Costs) (Incl. VAT) & Contingency				**964,722**
7	**Walking, Cycling and Asset Renewal**				
	Provision 1% of construction cost (Incl VAT and contingency)				148,368
	Total Residual Network Base Cost (Incl VAT)				**148,368**

Base Cost Estimate (Incl. VAT) & Contingency - 2020 Base Year Excludes Programme Risk and Inflation					**23,208,809**
Mainline Length	**2.105**	km	**Rate per km**		**11,025,562**

Cost Estimate - Option D

SCHEME TITLE	CHLR	**DATE OF ESTIMATE**	January 2021
CURRENT PHASE	Phase 2 Stage 1	**BASE DATE FOR RATES**	2020
NAME OF CONSULTANT	RPS	**NAME OF ESTIMATOR**	Alex Byrne

Mainline Section Type:	T2SC	Mainline Length:		2.670
Link Roads Section Type:		Link Road Length:		

	Main Construction Contract	Quantity	Unit	Rate €	Total €
1	a Offline Works - Type 2 Single Carriageway	1.045	km	1,860,000	1,943,700
	b Online Works - Type 2 Single Carriageway	1.625	km	1,395,000	2,266,875
	c Carriageway - Link Roads	0	km		0
	d Carriageway - Side Roads	1.4	km	1,400,000	1,960,000
	e Over/Underbridge	0	Nr.		0
	f River Crossings	1080	m²	3,500	3,780,000
	g Small river crossings - culverts (complete)	1	Nr.	250,000	250,000
	h Cut	15977.5	m^3	0.90	14,380
	i Fill	24840	m^3	1.50	37,260
	j Net balance	-8862.5	m^3		
	k Import (-ve)	8862.5	m^3	20	177,250
	l Disposal (+ve)	4793.25	m^3	7	33,553
	m Extra over for construction in soft ground	-	sum	15% of ewks costs	39,366
	n Utility Diversions	1	sum	2,450,000	2,450,000
	o Railway Crossings	0	Nr.		0
	p Grade Separated Junctions	0	Nr.		0
	q Freeflow Interchanges	0	Nr.		0
	r Signature Structures	0	Item		0
	s Specialist construction solutions, see notes	0	m^3		0
	Total Base Cost for Main Construction Contract (Ex VAT)				12,952,384
	VAT @ 13.5%				1,748,572
	Total MCC Base Cost (Incl VAT)				**14,700,956**
	Add Project Specific Risk Contingency		15%		2,205,143
	Main Construction Contract Cost (Incl VAT) & Contingency				**16,906,099**

	Land and Property - All-In Costs	Quantity	Unit	Rate €	Total €
2	a Mainline & Side Roads - land zoned residential	2.36	Ha.	1,853,000	4,369,374
	b Mainline & Side Roads - land zoned amenity	1.57	Ha.	247,000	388,284
	c Mainline & Side Roads - land zoned agriculture	0.00	Ha.	62,000	0
	d Properties	0	Item	0	0
	Total Base Cost for Land and Property (Incl VAT)				**4,757,658**
	Add Project Specific Risk Contingency		5%		237,883
	Total L&P Base Cost (Incl VAT) & Contingency				**4,995,541**

3	**Planning and Design (including GI and Surveys)**				
	Fixed Price (Ex VAT)				1,500,000
	VAT @ 23%				345,000
	Total P&D Base Cost (Incl VAT)				**1,845,000**
	Add Project Specific Risk Contingency		15%		276,750
	Planning & Design Cost (Incl. VAT) & Contingency				**2,121,750**
4	**Archaeology**				
	Provision based on €0.2m/km (Ex VAT)				534,000
	VAT @ 23%				122,820
	Total Archaeology Base Cost (Incl VAT)				**656,820**
	Add Project Specific Risk Contingency		10%		65,682
	Archaeology Cost (Incl. VAT) & Contingency				**722,502**
5	**Advance Works and Other Contracts**				
	Provision based on €72k/km (Ex VAT)				192,240
	VAT @ 23%				44,215
	Total Advance Works and Other Contracts Base Cost (Incl VAT)				236,455
	Add Project Specific Risk Contingency		10%		23,646
	Total Advance Works and Other Contracts Base Cost (Incl. VAT) & Contingency				**260,101**
6	**Main Contract Supervision (Employer's Costs)**				
	Provision 6% of construction cost (Ex VAT)				777,143
	VAT @ 23%				178,743
	Total MC Supervision (Employer's Costs) Base Cost (Incl VAT)				**955,886**
	Add Project Specific Risk Contingency		15%		143,383
	Main Contract Supervision (Employer's Costs) (Incl. VAT) & Contingency				**1,099,269**
7	**Walking, Cycling and Asset Renewal**				
	Provision 1% of construction cost (Incl VAT and contingency)				169,061
	Total Residual Network Base Cost (Incl VAT)				**169,061**

Base Cost Estimate (Incl. VAT) & Contingency - 2020 Base Year Excludes Programme Risk and Inflation					**26,274,322**
Mainline Length	**2.670**	km		**Rate per km**	**9,840,570**

Cost Estimate - Option E

SCHEME TITLE	CHLR	**DATE OF ESTIMATE**	January 2021
CURRENT PHASE	Phase 2 Stage 1	**BASE DATE FOR RATES**	2020
NAME OF CONSULTANT	RPS	**NAME OF ESTIMATOR**	Alex Byrne

Mainline Section Type:	T2SC	Mainline Length:		2.040
Link Roads Section Type:		Link Road Length:		

	Main Construction Contract	Quantity	Unit	Rate €	Total €
1	a Offline Works - Type 2 Single Carriageway	1.250	km	1,860,000	2,325,000
	b Online Works - Type 2 Single Carriageway	0.790	km	1,395,000	1,102,050
	c Carriageway - Link Roads	0	km		0
	d Carriageway - Side Roads	0.6	km	1,400,000	840,000
	e Over/Underbridge	0	Nr.		0
	f River Crossings	1620	m²	3,500	5,670,000
	g Small river crossings - culverts (complete)	1	Nr.	250,000	250,000
	h Cut	8685	m^3	0.90	7,817
	i Fill	52640	m^3	1.50	78,960
	j Net balance	-43955	m^3		
	k Import (-ve)	43955	m^3	20	879,100
	l Disposal (+ve)	2605.5	m^3	7	18,239
	m Extra over for construction in soft ground	-	sum	15% of ewks costs	147,617
	n Utility Diversions	1	sum	910,000	910,000
	o Railway Crossings	0	Nr.		0
	p Grade Separated Junctions	0	Nr.		0
	q Freeflow Interchanges	0	Nr.		0
	r Signature Structures	0	Item		0
	s Specialist construction solutions, see notes	0	m^3		0
	Total Base Cost for Main Construction Contract (Ex VAT)				12,228,782
	VAT @ 13.5%				1,650,886
	Total MCC Base Cost (Incl VAT)				**13,879,668**
	Add Project Specific Risk Contingency		15%		2,081,950
	Main Construction Contract Cost (Incl VAT) & Contingency				**15,961,618**

	Land and Property - All-In Costs	Quantity	Unit	Rate €	Total €
2	a Mainline & Side Roads - land zoned residential	3.87	Ha.	1,853,000	7,169,257
	b Mainline & Side Roads - land zoned amenity	1.43	Ha.	247,000	353,457
	c Mainline & Side Roads - land zoned agriculture	0.00	Ha.	62,000	0
	d Properties	0	Item	0	0
	Total Base Cost for Land and Property (Incl VAT)				**7,522,714**
	Add Project Specific Risk Contingency		5%		376,136
	Total L&P Base Cost (Incl VAT) & Contingency				**7,898,850**

3	**Planning and Design (including GI and Surveys)**				
	Fixed Price (Ex VAT)				1,500,000
	VAT @ 23%				345,000
	Total P&D Base Cost (Incl VAT)				**1,845,000**
	Add Project Specific Risk Contingency		15%		276,750
	Planning & Design Cost (Incl. VAT) & Contingency				**2,121,750**
4	**Archaeology**				
	Provision based on €0.2m/km (Ex VAT)				408,000
	VAT @ 23%				93,840
	Total Archaeology Base Cost (Incl VAT)				**501,840**
	Add Project Specific Risk Contingency		10%		50,184
	Archaeology Cost (Incl. VAT) & Contingency				**552,024**
5	**Advance Works and Other Contracts**				
	Provision based on €72k/km (Ex VAT)				146,880
	VAT @ 23%				33,782
	Total Advance Works and Other Contracts Base Cost (Incl VAT)				180,662
	Add Project Specific Risk Contingency		10%		18,066
	Total Advance Works and Other Contracts Base Cost (Incl. VAT) & Contingency				**198,729**
6	**Main Contract Supervision (Employer's Costs)**				
	Provision 6% of construction cost (Ex VAT)				733,727
	VAT @ 23%				168,757
	Total MC Supervision (Employer's Costs) Base Cost (Incl VAT)				**902,484**
	Add Project Specific Risk Contingency		15%		135,373
	Main Contract Supervision (Employer's Costs) (Incl. VAT) & Contingency				**1,037,857**
7	**Walking, Cycling and Asset Renewal**				
	Provision 1% of construction cost (Incl VAT and contingency)				159,616
	Total Residual Network Base Cost (Incl VAT)				**159,616**

Base Cost Estimate (Incl. VAT) & Contingency - 2020 Base Year Excludes Programme Risk and Inflation					**27,930,443**
Mainline Length	**2.040**	km		**Rate per km**	**13,691,394**

Cost Estimate - Option F

SCHEME TITLE	CHLR	**DATE OF ESTIMATE**	January 2021
CURRENT PHASE	Phase 2 Stage 1	**BASE DATE FOR RATES**	2020
NAME OF CONSULTANT	RPS	**NAME OF ESTIMATOR**	Alex Byrne

Mainline Section Type:	T2SC	Mainline Length:		2.170
Link Roads Section Type:		Link Road Length:		

		Quantity	Unit	Rate €	Total €
1	**Main Construction Contract**				
	a Offline Works - Type 2 Single Carriageway	0.320	km	1,860,000	595,200
	b Online Works - Type 2 Single Carriageway	1.850	km	1,395,000	2,580,750
	c Carriageway - Link Roads	0	km		0
	d Carriageway - Side Roads	2	km	1,400,000	2,800,000
	e Over/Underbridge	0	Nr.		0
	f River Crossings	1728	m²	3,500	6,048,000
	g Small river crossings - culverts (complete)	1	Nr.	250,000	250,000
	h Cut	14380	m^3	0.90	12,942
	i Fill	17680	m^3	1.50	26,520
	j Net balance	-3300	m^3		
	k Import (-ve)	3300	m^3	20	66,000
	l Disposal (+ve)	4314	m^3	7	30,198
	m Extra over for construction in soft ground	-	sum	15% of ewks costs	20,349
	n Utility Diversions	1	sum	2,780,000	2,780,000
	o Railway Crossings	0	Nr.		0
	p Grade Separated Junctions	0	Nr.		0
	q Freeflow Interchanges	0	Nr.		0
	r Signature Structures	0	Item		0
	s Specialist construction solutions, see notes	0	m^3		0
	Total Base Cost for Main Construction Contract (Ex VAT)				15,209,959
	VAT @ 13.5%				2,053,344
	Total MCC Base Cost (Incl VAT)				**17,263,303**
	Add Project Specific Risk Contingency		15%		2,589,496
	Main Construction Contract Cost (Incl VAT) & Contingency				**19,852,799**
2	**Land and Property - All-In Costs**	Quantity	Unit	Rate €	Total €
	a Mainline & Side Roads - land zoned residential	0.00	Ha.	1,853,000	0
	b Mainline & Side Roads - land zoned amenity	1.48	Ha.	247,000	365,560
	c Mainline & Side Roads - land zoned agriculture	0.00	Ha.	62,000	0
	d Properties	0	Item	0	0
	Total Base Cost for Land and Property (Incl VAT)				**365,560**
	Add Project Specific Risk Contingency		5%		18,278
	Total L&P Base Cost (Incl VAT) & Contingency				**383,838**
3	**Planning and Design (including GI and Surveys)**				
	Fixed Price (Ex VAT)				1,500,000
	VAT @ 23%				345,000
	Total P&D Base Cost (Incl VAT)				**1,845,000**
	Add Project Specific Risk Contingency		15%		276,750
	Planning & Design Cost (Incl. VAT) & Contingency				**2,121,750**
4	**Archaeology**				
	Provision based on €0.2m/km (Ex VAT)				434,000
	VAT @ 23%				99,820
	Total Archaeology Base Cost (Incl VAT)				**533,820**
	Add Project Specific Risk Contingency		10%		53,382
	Archaeology Cost (Incl. VAT) & Contingency				**587,202**
5	**Advance Works and Other Contracts**				
	Provision based on €72k/km (Ex VAT)				156,240
	VAT @ 23%				35,935
	Total Advance Works and Other Contracts Base Cost (Incl VAT)				192,175
	Add Project Specific Risk Contingency		10%		19,218
	Total Advance Works and Other Contracts Base Cost (Incl. VAT) & Contingency				**211,393**
6	**Main Contract Supervision (Employer's Costs)**				
	Provision 6% of construction cost (Ex VAT)				912,598
	VAT @ 23%				209,897
	Total MC Supervision (Employer's Costs) Base Cost (Incl VAT)				**1,122,495**
	Add Project Specific Risk Contingency		15%		168,374
	Main Contract Supervision (Employer's Costs) (Incl. VAT) & Contingency				**1,290,869**
7	**Walking, Cycling and Asset Renewal**				
	Provision 1% of construction cost (Incl VAT and contingency)				198,528
	Total Residual Network Base Cost (Incl VAT)				**198,528**

Base Cost Estimate (Incl. VAT) & Contingency - 2020 Base Year Excludes Programme Risk and Inflation					**24,646,379**
Mainline Length	**2.170**	km	**Rate per km**		**11,357,778**

Cost Estimate - Option G

SCHEME TITLE	CHLR	**DATE OF ESTIMATE**	January 2021
CURRENT PHASE	Phase 2 Stage 1	**BASE DATE FOR RATES**	2020
NAME OF CONSULTANT	RPS	**NAME OF ESTIMATOR**	Alex Byrne

Mainline Section Type:	T2SC	Mainline Length:		2.830
Link Roads Section Type:		Link Road Length:		

	Main Construction Contract	Quantity	Unit	Rate €	Total €
1	a Offline Works - Type 2 Single Carriageway	0.470	km	1,860,000	874,200
	b Online Works - Type 2 Single Carriageway	2.360	km	1,395,000	3,292,200
	c Carriageway - Link Roads	0	km		0
	d Carriageway - Side Roads	2.6	km	1,400,000	3,640,000
	e Over/Underbridge	0	Nr.		0
	f River Crossings	1080	m²	3,500	3,780,000
	g Small river crossings - culverts (complete)	1	Nr.	250,000	250,000
	h Cut	18540	m^3	0.90	16,686
	i Fill	25380	m^3	1.50	38,070
	j Net balance	-6840	m^3		
	k Import (-ve)	6840	m^3	20	136,800
	l Disposal (+ve)	5562	m^3	7	38,934
	m Extra over for construction in soft ground	-	sum	15% of ewks costs	34,574
	n Utility Diversions	1	sum	3,770,000	3,770,000
	o Railway Crossings	0	Nr.		0
	p Grade Separated Junctions	0	Nr.		0
	q Freeflow Interchanges	0	Nr.		0
	r Signature Structures	0	Item		0
	s Specialist construction solutions, see notes	0	m^3		0
	Total Base Cost for Main Construction Contract (Ex VAT)				15,871,464
	VAT @ 13.5%				2,142,648
	Total MCC Base Cost (Incl VAT)				**18,014,111**
	Add Project Specific Risk Contingency		15%		2,702,117
	Main Construction Contract Cost (Incl VAT) & Contingency				**20,716,228**

	Land and Property - All-In Costs	Quantity	Unit	Rate €	Total €
2	a Mainline & Side Roads - land zoned residential	0.00	Ha.	1,853,000	0
	b Mainline & Side Roads - land zoned amenity	2.11	Ha.	247,000	521,170
	c Mainline & Side Roads - land zoned agriculture	0.00	Ha.	62,000	0
	d Properties	0	Item	0	0
	Total Base Cost for Land and Property (Incl VAT)				**521,170**
	Add Project Specific Risk Contingency		5%		26,059
	Total L&P Base Cost (Incl VAT) & Contingency				**547,229**

3	**Planning and Design (including GI and Surveys)**				
	Fixed Price (Ex VAT)				1,500,000
	VAT @ 23%				345,000
	Total P&D Base Cost (Incl VAT)				**1,845,000**
	Add Project Specific Risk Contingency		15%		276,750
	Planning & Design Cost (Incl. VAT) & Contingency				**2,121,750**
4	**Archaeology**				
	Provision based on €0.2m/km (Ex VAT)				566,000
	VAT @ 23%				130,180
	Total Archaeology Base Cost (Incl VAT)				**696,180**
	Add Project Specific Risk Contingency		10%		69,618
	Archaeology Cost (Incl. VAT) & Contingency				**765,798**
5	**Advance Works and Other Contracts**				
	Provision based on €72k/km (Ex VAT)				203,760
	VAT @ 23%				46,865
	Total Advance Works and Other Contracts Base Cost (Incl VAT)				250,625
	Add Project Specific Risk Contingency		10%		25,062
	Total Advance Works and Other Contracts Base Cost (Incl. VAT) & Contingency				**275,687**
6	**Main Contract Supervision (Employer's Costs)**				
	Provision 6% of construction cost (Ex VAT)				952,288
	VAT @ 23%				219,026
	Total MC Supervision (Employer's Costs) Base Cost (Incl VAT)				**1,171,314**
	Add Project Specific Risk Contingency		15%		175,697
	Main Contract Supervision (Employer's Costs) (Incl. VAT) & Contingency				**1,347,011**
7	**Walking, Cycling and Asset Renewal**				
	Provision 1% of construction cost (Incl VAT and contingency)				207,162
	Total Residual Network Base Cost (Incl VAT)				**207,162**

Base Cost Estimate (Incl. VAT) & Contingency - 2020 Base Year Excludes Programme Risk and Inflation					**25,980,865**
Mainline Length	**2.830**	km		**Rate per km**	**9,180,518**

Cost Estimate - Option H

SCHEME TITLE	CHLR	**DATE OF ESTIMATE**	January 2021
CURRENT PHASE	Phase 2 Stage 1	**BASE DATE FOR RATES**	2020
NAME OF CONSULTANT	RPS	**NAME OF ESTIMATOR**	Alex Byrne

Mainline Section Type:	T2SC	Mainline Length:		3.040
Link Roads Section Type:		Link Road Length:		

		Quantity	Unit	Rate €	Total €
1	**Main Construction Contract**				
	a Offline Works - Type 2 Single Carriageway	2.485	km	1,860,000	4,622,100
	b Online Works - Type 2 Single Carriageway	0.555	km	1,395,000	774,225
	c Carriageway - Link Roads	0	km		0
	d Carriageway - Side Roads	1.7	km	1,400,000	2,380,000
	e Over/Underbridge	0	Nr.		0
	f River Crossings	1080	m²	3,500	3,780,000
	g Small river crossings - culverts (complete)	4	Nr.	250,000	1,000,000
	h Cut	12052.5	m^3	0.90	10,847
	i Fill	96985	m^3	1.50	145,478
	j Net balance	-84932.5	m^3		
	k Import (-ve)	84932.5	m^3	20	1,698,650
	l Disposal (+ve)	3615.75	m^3	7	25,310
	m Extra over for construction in soft ground	-	sum	15% of ewks costs	282,043
	n Utility Diversions	1	sum	2,890,000	2,890,000
	o Railway Crossings	0	Nr.		0
	p Grade Separated Junctions	0	Nr.		0
	q Freeflow Interchanges	0	Nr.		0
	r Signature Structures	0	Item		0
	s Specialist construction solutions, see notes	0	m^3		0
	Total Base Cost for Main Construction Contract (Ex VAT)				17,608,653
	VAT @ 13.5%				2,377,168
	Total MCC Base Cost (Incl VAT)				**19,985,821**
	Add Project Specific Risk Contingency		15%		2,997,873
	Main Construction Contract Cost (Incl VAT) & Contingency				**22,983,694**
2	**Land and Property - All-In Costs**	Quantity	Unit	Rate €	Total €
	a Mainline & Side Roads - land zoned residential	3.00	Ha.	1,853,000	5,567,153
	b Mainline & Side Roads - land zoned amenity	2.58	Ha.	247,000	636,074
	c Mainline & Side Roads - land zoned agriculture	5.15	Ha.	62,000	319,325
	d Properties	0	Item	0	0
	Total Base Cost for Land and Property (Incl VAT)				**6,522,552**
	Add Project Specific Risk Contingency		5%		326,128
	Total L&P Base Cost (Incl VAT) & Contingency				**6,848,680**
3	**Planning and Design (including GI and Surveys)**				
	Fixed Price (Ex VAT)				1,500,000
	VAT @ 23%				345,000
	Total P&D Base Cost (Incl VAT)				**1,845,000**
	Add Project Specific Risk Contingency		15%		276,750
	Planning & Design Cost (Incl. VAT) & Contingency				**2,121,750**
4	**Archaeology**				
	Provision based on €0.2m/km (Ex VAT)				608,000
	VAT @ 23%				139,840
	Total Archaeology Base Cost (Incl VAT)				**747,840**
	Add Project Specific Risk Contingency		10%		74,784
	Archaeology Cost (Incl. VAT) & Contingency				**822,624**
5	**Advance Works and Other Contracts**				
	Provision based on €72k/km (Ex VAT)				218,880
	VAT @ 23%				50,342
	Total Advance Works and Other Contracts Base Cost (Incl VAT)				269,222
	Add Project Specific Risk Contingency		10%		26,922
	Total Advance Works and Other Contracts Base Cost (Incl. VAT) & Contingency				**296,145**
6	**Main Contract Supervision (Employer's Costs)**				
	Provision 6% of construction cost (Ex VAT)				1,056,519
	VAT @ 23%				242,999
	Total MC Supervision (Employer's Costs) Base Cost (Incl VAT)				**1,299,519**
	Add Project Specific Risk Contingency		15%		194,928
	Main Contract Supervision (Employer's Costs) (Incl. VAT) & Contingency				**1,494,446**
7	**Walking, Cycling and Asset Renewal**				
	Provision 1% of construction cost (Incl VAT and contingency)				229,837
	Total Residual Network Base Cost (Incl VAT)				**229,837**

Base Cost Estimate (Incl. VAT) & Contingency - 2020 Base Year Excludes Programme Risk and Inflation					**34,797,176**
Mainline Length	**3.040**	km	**Rate per km**		**11,446,439**

Cost Estimate - Option H1

SCHEME TITLE	CHLR	**DATE OF ESTIMATE**	January 2021
CURRENT PHASE	Phase 2 Stage 1	**BASE DATE FOR RATES**	2020
NAME OF CONSULTANT	RPS	**NAME OF ESTIMATOR**	Alex Byrne

Mainline Section Type:	T2SC	Mainline Length:		3.410
Link Roads Section Type:		Link Road Length:		

	Main Construction Contract	Quantity	Unit	Rate €	Total €
1	a Offline Works - Type 2 Single Carriageway	1.975	km	1,860,000	3,673,500
	b Online Works - Type 2 Single Carriageway	1.435	km	1,395,000	2,001,825
	c Carriageway - Link Roads	0	km		0
	d Carriageway - Side Roads	2.1	km	1,400,000	2,940,000
	e Over/Underbridge	0	Nr.		0
	f River Crossings	1080	m²	3,500	3,780,000
	g Small river crossings - culverts (complete)	5	Nr.	250,000	1,250,000
	h Cut	17367.5	m^3	0.90	15,631
	i Fill	56875	m^3	1.50	85,313
	j Net balance	-39507.5	m^3		
	k Import (-ve)	39507.5	m^3	20	790,150
	l Disposal (+ve)	5210.25	m^3	7	36,472
	m Extra over for construction in soft ground	-	sum	15% of ewks costs	139,135
	n Utility Diversions	1	sum	3,020,000	3,020,000
	o Railway Crossings	0	Nr.		0
	p Grade Separated Junctions	0	Nr.		0
	q Freeflow Interchanges	0	Nr.		0
	r Signature Structures	0	Item		0
	s Specialist construction solutions, see notes	0	m^3		0
	Total Base Cost for Main Construction Contract (Ex VAT)				17,732,025
	VAT @ 13.5%				2,393,823
	Total MCC Base Cost (Incl VAT)				**20,125,848**
	Add Project Specific Risk Contingency		15%		3,018,877
	Main Construction Contract Cost (Incl VAT) & Contingency				**23,144,725**

	Land and Property - All-In Costs	Quantity	Unit	Rate €	Total €
2	a Mainline & Side Roads - land zoned residential	3.02	Ha.	1,853,000	5,604,954
	b Mainline & Side Roads - land zoned amenity	2.55	Ha.	247,000	629,158
	c Mainline & Side Roads - land zoned agriculture	2.39	Ha.	62,000	148,056
	d Properties	0	Item	0	0
	Total Base Cost for Land and Property (Incl VAT)				**6,382,169**
	Add Project Specific Risk Contingency		5%		319,108
	Total L&P Base Cost (Incl VAT) & Contingency				**6,701,277**

3	**Planning and Design (including GI and Surveys)**				
	Fixed Price (Ex VAT)				1,500,000
	VAT @ 23%				345,000
	Total P&D Base Cost (Incl VAT)				**1,845,000**
	Add Project Specific Risk Contingency		15%		276,750
	Planning & Design Cost (Incl. VAT) & Contingency				**2,121,750**

4	**Archaeology**				
	Provision based on €0.2m/km (Ex VAT)				682,000
	VAT @ 23%				156,860
	Total Archaeology Base Cost (Incl VAT)				**838,860**
	Add Project Specific Risk Contingency		10%		83,886
	Archaeology Cost (Incl. VAT) & Contingency				**922,746**

5	**Advance Works and Other Contracts**				
	Provision based on €72k/km (Ex VAT)				245,520
	VAT @ 23%				56,470
	Total Advance Works and Other Contracts Base Cost (Incl VAT)				301,990
	Add Project Specific Risk Contingency		10%		30,199
	Total Advance Works and Other Contracts Base Cost (Incl. VAT) & Contingency				**332,189**

6	**Main Contract Supervision (Employer's Costs)**				
	Provision 6% of construction cost (Ex VAT)				1,063,921
	VAT @ 23%				244,702
	Total MC Supervision (Employer's Costs) Base Cost (Incl VAT)				**1,308,623**
	Add Project Specific Risk Contingency		15%		196,294
	Main Contract Supervision (Employer's Costs) (Incl. VAT) & Contingency				**1,504,917**

7	**Walking, Cycling and Asset Renewal**				
	Provision 1% of construction cost (Incl VAT and contingency)				231,447
	Total Residual Network Base Cost (Incl VAT)				**231,447**

Base Cost Estimate (Incl. VAT) & Contingency - 2020 Base Year Excludes Programme Risk and Inflation	**34,959,051**
Mainline Length 3.410 km **Rate per km**	**10,251,921**

Appendix F
Options Progressed to Stage 2 – Project Appraisal

LEGEND:

Existing Key Roads

ROUTE CORRIDOR OPTIONS SHORTLISTED TO PROCEED TO STAGE 2

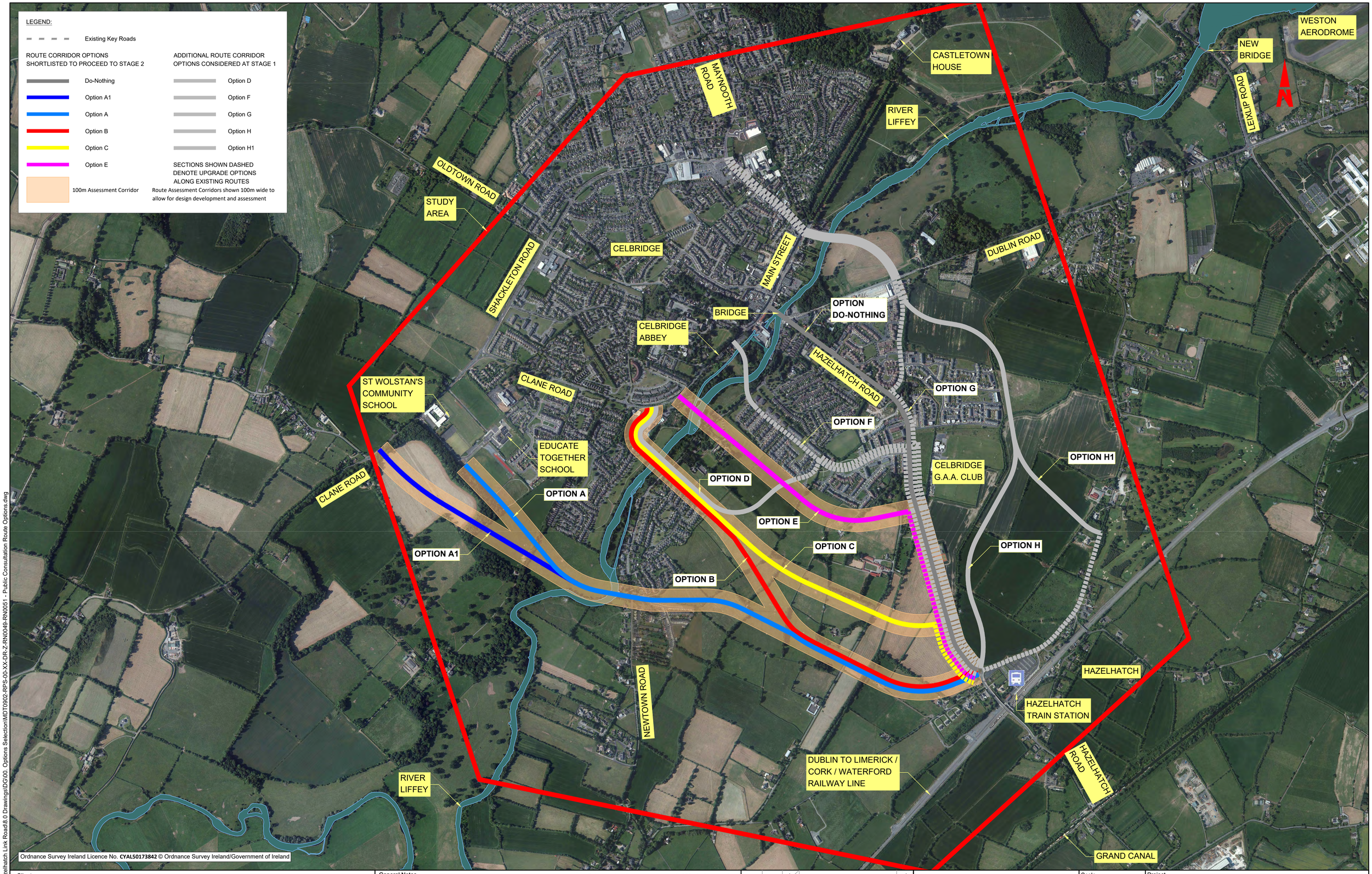
- Do-Nothing
- Option A1
- Option A
- Option B
- Option C
- Option E
- 100m Assessment Corridor

ADDITIONAL ROUTE CORRIDOR OPTIONS CONSIDERED AT STAGE 1

- Option D
- Option F
- Option G
- Option H
- Option H1

SECTIONS SHOWN DASHED DENOTE UPGRADE OPTIONS ALONG EXISTING ROUTES

Route Assessment Corridors shown 100m wide to allow for design development and assessment



R:\MDT0902 - Celbridge to Hazelhatch Link Road\6 0 Drawings\DG\00. Options Selection\MDT0902-RPS-00-XX-DR-Z-RN0049-RN0051 - Public Consultation Route Options.dwg

Client

Iníonna agus Mianaigh

General Notes

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(iv) Information including topographical survey, geotechnical investigation and utility detail used in the design have been provided by others.

(v) All Levels refer to Ordnance Survey Datum, Malin Head.

Rev	Date	Drn / Chk	Amendment / Issue	App
P04	21/12/21	AJ / SF	ISSUED FOR INFORMATION	MN
P03	15/02/21	JBR / PW	ISSUED FOR INFORMATION	MN
P02	04/02/21	JBR / PW	ISSUED FOR INFORMATION	MN
P01	01/02/21	JBR / PW	WORK IN PROGRESS	MN

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Sheets: 01 of 01

Project: CELBRIDGE TO HAZELHATCH LINK ROAD

Title: STAGE 1 OPTIONS SELECTION
PUBLIC CONSULTATION ROUTE OPTIONS

File Identifier: MDT0902-RPS-00-XX-DR-Z- RN0050

Status: S2

Rev: P04