NEWTOWNMOUNTKENNEDY TOWN CENTRE REFURBISHMENT PROJECT

FOR WICKLOW COUNTY COUNCIL

PART 8 REPORT

W335-OCSC-XX-XX-RP-C-0001

FEBRUARY 2022





Multidisciplinary Consulting Engineers

NEWTOWNMOUNTKENNEDY TOWN CENTRE REFURBISHMENT PROJECT

FOR WICKLOW COUNTY COUNCIL

PART 8 REPORT

W335-OCSC-XX-XX-RP-C-0001

FEBRUARY 2022





O'CONNOR | SUTTON | CRONIN

Multidisciplinary Consulting Engineers

Newtownmountkennedy Town Centre Refurbishment Project

Part 8 Report



NOTICE

This document has been produced by O'Connor Sutton Cronin & Associates for its client Wicklow County Council. It may not be used for any purpose other than that specified by any other person without the written permission of the authors.

OCSC Job No. W335	:	Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability	Code	Revision
		W335	OCSC	XX	XX	RP	С	0001	1	42	C01
Rev.	S	Status	Autho	rs	Che	cked	A	uthorised		ไรรเ	ue Date
C01		A2	N. McMen	amin	B. H	eron	В	. O'Rourke		04	/02/22
P01		S3	N. McMen	amin	B. H	eron	В	. O'Rourke		28	/01/22
Rev	Su (itability Code	Autho	or	Che	cker	A	uthorised		Issu	ue Date

DOCUMENT CONTROL & HISTORY

NEWTOWNMOUNTKENNEDY TOWN CENTRE REFURBISHMENT PROJECT PART 8 REPORT WICKLOW COUNTY COUNCIL O'CONNOR SUTTON CRONIN & ASSOCIATES MULTIDISCIPLINARY CONSULTING ENGINEERS PROJECT NO. W335

CONTENTS

1.	INTRODUCTION	. 1
2.	PROJECT DESCRIPTION	2
3.	BACKGROUND & PURPOSE	3
4.	NEED FOR THE SCHEME	10
5.	OBJECTIVES OF THE SCHEME	11
6.	COLLISION HISTORY	12
7.	CONSTRAINTS	14
8.	GEOMETRY & DESIGN STANDARDS	15
9.	PARKING PROVISION	24
10.	DRAINAGE	25
11.	PAVEMENT DESIGN	30
12.	SIGNAGE & DELINEATION	34
13.	PUBLIC LIGHTING	36
14.	STAGE 1/2 ROAD SAFETY AUDIT	37
15.	FLOOD RISK ASSESSMENT	38

1. INTRODUCTION

O'Connor Sutton Cronin Multidisciplinary Consulting Engineers (OCSC) was commissioned by Wicklow County Council to develop a design for the completion of the Newtownmountkennedy Town Centre Refurbishment Project. The Project comprises improvements to approximately 990m of the existing R772 (Dublin Road and Main Street) and approximately 170m of adjoining local roads at junctions with the R772, and the signalisation of two existing junctions: the R772 & Church Road junction and the R772 & Woodstock Road junction. Improvements comprise minor realignment, regularisation of carriageway width, wider footpaths, new carriageway surfaces, new footpath surfaces and pedestrian crossings. To accommodate these improvements, the number of car-parking spaces along Main Street will be reduced.

This Part 8 Report sets out the objectives, design, and characteristics of the proposed Project.





2. PROJECT DESCRIPTION

The refurbishment of the public realm in Newtownmountkennedy is one of the objectives of the Wicklow Draft County Development Plan 2021-2027. The Project area comprises the R772 regional road as it passes through Newtownmountkennedy, the approaches to urban area from the south and the north and junctions with adjoining roads.

The main objective of the Project is to provide a high-quality inner urban public realm where the balance of retail shopping and recreational amenity can be enjoyed in a safe and accessible way. The proposals provide highquality granite paving and kerbs and provides a clutter free streetscape to enhance the aesthetics of the area. The Project will deliver the following:

- The realignment and traffic calming of the R772 as it passes through Newtownmountkennedy;
- Singalisation of junctions with Church Road and with Woodstock Road, which will contribute to traffic calming and form 'bookmarks' to the main urban centre;
- The construction of wider pedestrian footpaths, including provision of footpath paving in a combination of different stone sizes, types, tone and texture. The realigned street shall provide for safer transport and pedestrian facilities;
- Provide an aesthetically appropriate scheme that is fitting within its environment and in accordance with Wicklow County Council's long-term vision for Newtownmountkennedy;
- The provision and installation of new traffic signals and associated works;
- Dealing with existing underground and overhead services including future proofing;
- The provision of high-quality street furniture which includes benches, railings, bollards, bins, bicycle shelters, bus shelters, banner poles, signs and decorative traffic signal poles;
- New landscaping and trees in limited areas; and
- Upgrading of the drainage network to provide sustainable drainage solutions.

Further details of the Project proposals are presented in the Part 8 Drawings.





3. BACKGROUND & PURPOSE

Background

The Draft Wicklow County Development Plan 2021-2027 (Draft CDP) Core Strategy (Chapter 3) identifies Newtownmountkennedy as one of five 'Self-

Sustaining Towns', which are described as towns that "*require* targeted 'catch up' investment to become more self-sustaining".



The Self-Sustaining Town Plans (Draft CDP Volume 2, Part 1) states that Self-Sustaining Towns "*require contained growth, focusing on driving investment in services, employment growth and infrastructure whilst balancing housing delivery*". The vision for Newtownmountkennedy described in the Draft CDP includes:

- "To ensure a high-quality living environment for existing and future residents;
- Sustain a revitalised town centre with commercial, residential and community developments being consolidated and promoted within this area;
- Create increased connectivity between a revitalised town core and the existing and proposed residential areas within the town;
- Develop the tourism potential of the area as a visitor / tourist destination in itself and in its role as a 'gateway' to surrounding attractions such as Wicklow Mountains, the Vartry Reservoir and Druids Glen Resort;
- Protect the built and natural heritage of the area;
- Facilitate a transition to a low carbon settlement."

The Self-Sustaining Town Plans (Draft CDP Volume 2, Part 1) states:

"Good quality public realm can provide the venue for multiple activities, including commercial, recreational, educational and of course, fun and enjoyment for residents and visitors alike.

"The road improvement schemes which were carried out previously regularised car parking along the main street and focused on the convenience of car users rather than visually improving the public realm or enhancing the safety or convenience of pedestrians and cyclists. As a result, the town centre is somewhat dominated by parked cars, available road space is not suitably shared between users (i.e.





the on street car parking spaces occupy space that could be alternatively used for cycle lanes and / or wider footpaths) and adequate visibility / sightlines are not available particularly at junctions.

"Further development of the public realm of Newtownmountkennedy would contribute to the quality of life of those living and visiting the town would include, the improved appearance of the streetscape, landmark buildings and appearance of principal junctions / gateways; building frontages, in particular materials, colours and shop fronts, the introduction of urban open space and parks, improved footpaths, lighting, seating and other street 'furniture'."

Objective NK8 of the Draft CDP aims to deliver:

- "the provision of mechanisms to slow traffic through this area [Main Street];
- alterations to the layout of the road carriageway and on-street car parking to allow for the provision of new or improved pedestrian and cycling facilities and additional pedestrian crossing points;
- the creation of new civic spaces at suitable locations and in particular at the existing plaza at the Parkview Hotel;
- *improved hard and soft landscaping and tree planting, lighting, seating and other street 'furniture';*
- the improvement of safety and appearance of key junctions, for example at the entrance to the car park at Dunnes Stores, the Roundwood Road junction at the Church leading up to the schools and the junction at the Woodstock Road;
- the provision of improved facilities for public transport providers and users, including improved access to bus stops (particularly crossing points for passengers), shelters, covered bicycle parking, information points with maps, routes, timetables, realtime information and designated taxi ranks at/near the bus stops on Main Street;
- The provision of bicycle parking and electric car charging points."

Objective NK9 of the Draft CDP aims to:

"avail of opportunities to remove public on-street car-parking on the Main Street, subject to due consideration of the commercial needs of Main Street, including loading parking".

The Self-Sustaining Town Plans (Draft CDP Volume 2, Part 1) states: "With respect to transportation and movement, one of the key issues arising in Newtownmountkennedy relates to the vehicular dominance





of the main street, and its alignment / design which allows for high speeds thereon, which is diminishing safety for pedestrians / cyclist and the overall experience and function of the town centre. In addition, on-street car-parking is available along the length of the main street which is attractive to users due to ease of access and abundance, but which clutters the town and makes it hard to merge from properties along the main street and in particular from the car park at Dunnes Stores. It also makes it very dangerous for pedestrians crossing the street as they are crossing behind parked cars making it harder for drivers to see them. Clearly, there is a need to review and possibly redesign the parking along the main street.

"It is key goal during the lifetime of this plan to see significant improvements in this area, to reduce car speeds, enhance pedestrian and cycling safety, eliminate on-street car-parking where necessary and overall to improve the public realm."

"Footpaths are provided within the settlement and they link the north of the town at Garden Village to the southern section of the town at Newcastle Hospital. The majority of the footpaths however tend to be narrow in nature and not suitable for those with limited mobility. In addition, there are limited cycling lanes in the town; it is objective of this plan to facilitate and support projects to improve pedestrian and cycling infrastructure and support a modal shift to these more sustainable active modes for local journeys and / or to connect with public transport options."

Objective NK15 of the Draft CDP aims to:

"improve existing or provide new footpaths and cycleways on existing public roads, as funding allows, and to facilitate the development of a cycling and walking amenity routes throughout the town in accordance with the NTA's "Permeability Best Practice Guide" and National Cycle Manual including foot and cycleways off road (e.g. through open spaces, along established rights-of-way etc), in order to achieve the most direct route to the principal destination (be that town centre, schools, community facilities or transport nodes), while ensuring that personal safety, particularly at night time, is of the utmost priority.

"In particular, to improve existing and provide new footpaths and cycleways (as funding allows) at the following locations and ensure developments along these routes are so designed as to provide for the delivery of required improvements:

- "Along the R772 from Garden Village to Newcastle Hospital
- "Along regional road R765 from St. Joseph's Church to the Moneycarrroll link road and local road L5048 in order to provide safe routes to existing primary schools..."





Objective NK16 of the Draft CDP aims to:

"maintain / upgrade and provide new regional and local routes as may be necessary, in accordance with the Principles of Road Development as set out in Section 5.8.3 of the NTA Transport Strategy with overall objective to: "

- "Enhance pedestrian and cycle safety through the provision of safer road junctions, improved pedestrian crossing facilities and the incorporation of appropriate cycle measures including signalised crossings where necessary;
- "Address localised traffic delay locations, in cases where the primary reason for intervention is to address safety or public transport issues at such locations;
- "Implement various junction improvements and local reconfigurations on the regional and local road network."

Objective NK18 of the Draft CDP aims to:

"improve the public realm of the town centre of Newtownmountkennedy in order to deliver a high level of priority and permeability for all modes of transport in order to create accessible, attractive, vibrant and safe places to work, live, shop and engage in all areas of community life."



Figure 1: Extract from Draft Wicklow County Development Plan 2021-2027, Newtownmountkennedy Town Plan, Map No.1 Land Use Zoning Objectives





Best Workplaces

Map No.2 of the Newtownmountkennedy Town Plan (Draft CDP Volume 2, Part 1) identifies a number of protected structures within the plan area, ten of which are adjacent to the proposed public realm improvements. The Map also identifies one View at the location of the proposed civic space – see *Figure 2*.



Figure 2: Extract from Draft Wicklow County Development Plan 2021-2027, Newtownmountkennedy Town Plan, Map No.2 Heritage Objectives

The Draft CDP Town & Village Centres Placemaking & Regeneration (Chapter 5) references the Framework for Town centre Renewal (Retail Consultation Forum), which recognises eleven key attributes for successful town centres. The Draft CDP identifies that:

"The two attributes which are of particular importance in terms of planning and the built environment are 'Place Making Strategy' and 'Visual Appearance Strategy'... The visual appearance of a town has an immediate impact on the perception of a town. Interventions in the public realm can have a transformative effect and act as a catalyst for regeneration and future improvements."



The Draft CDP Town & Village Centres Placemaking & Regeneration (Chapter 5) states:

"It is increasingly recognised that investing in quality public spaces and the public realm generates tangible benefits including stimulating economic growth. High quality public realm generates confidence and makes an area attractive to potential investors and visitors. Measures to improve the public realm include harmonising signage and reducing overall visual clutter by adopting a consistent approach in terms of street furniture, lighting, paving etc. Other measures include planting, landscaping, boundary treatments, painting buildings, clean and safe streets, undergrounding of wires and accessible footpaths."

The Draft CDP Town & Village Centres Placemaking & Regeneration (Chapter 5) identifies Town and Village Regeneration & Rejuvenation Priorities, which for Newtownmountkennedy comprises:

"Placemaking project for Newtownmountkennedy that will address the need to deliver catch-up facilities and regeneration of the town centre. The project includes provision of a new community centre and sports facilities, public realm improvements, and improvements in permeability. Extension of the existing riverine park into lands to the east of the main street, via a shared main street plaza, with green connections to other watercourses and recreational lands such as the Coillte forest to the north of the town."

Objective CPO5.7 of the Draft CDP aims to:

"identify and pursue transformational regeneration and renewal proposals and public realm initiatives that revitalise town and villages centres, encourage more people to live in town and village centres, facilitate and incentivise new economic activity and provide for enhanced recreational spaces."

Objective CPO5.16 of the Draft CDP aims to:

"actively pursue and implement environmental and public realm improvements and provision of amenities that create more attractive places and encourage healthier lifestyles for all ages and abilities."

Objective CPO5.19 of the Draft CDP aims to:

"implement environmental and public realm improvements in town and village centres to a high standard and finish."

Objective CPO5.23 of the Draft CDP aims to:

"require that new town centre development particularly public realm improvement works incorporates the principles of universal design to create an environment that is accessible, usable, convenient and a pleasure to use for all users."





Purpose

The overall purpose of the Project is to enhance the public realm, with amenities that are complimentary to the overall vision for Newtownmountkennedy town centre and enhance safe access to and from the town centre, through estate linkages and safe walk/cycle ways.

The Project will provide:

- improved and safer transport and pedestrian facilities for all users.
- a continuous aesthetic and design along Main Street that is in keeping with the character and history of the town.
- measures to reduce traffic speeds on the R772 (Main Street) through the town centre;
- alterations to the layout of the road carriageway and on-street car parking to allow for the provision of new or improved pedestrian and cycling facilities and additional pedestrian crossing points;
- the creation of new civic spaces at the existing plaza at the Parkview Hotel;
- improved hard and soft landscaping and tree planting, lighting, seating and other street 'furniture';
- the improvement of safety and appearance of key junctions;
- the provision of improved facilities for public transport providers and users, including improved access to bus stops (particularly crossing points for passengers), shelters, covered bicycle parking;
- The provision of bicycle parking and electric car charging points.





4. NEED FOR THE SCHEME

Identification of Need

As described in Section 3 earlier, the need for the Project has been identified in the Draft County Development Plan 2021-2027.

Existing Conditions

The existing R772 provides wide carriageway width (kerb to kerb width), which facilitates high speed traffic through the town centre. The Main Street is lined with on-street parallel parking bays on both sides, which detracts from the rich heritage in the existing urban environment and promotes the perception of a car-dominant space. The remaining space available for pedestrians is limited, with numerous pinch points in the footpath width restricting movement of mobility impaired people along the Main Street.

Apart from the signalised junction at Glenbrook Road, the R772 through the town provides priority for traffic, with limited opportunity for pedestrians to safely cross the road. This is particularly apparent at the junctions with Church Road and with Woodstock Road.

While the carriageway surface is generally uniform and in good condition, the footpaths along Main Street are composed variously of blocking paving, bituminous material or concrete, and is in poor condition in places. This contributes to an environment that can be difficult for use by visually impaired people and detracts from the potential for a compact retail and service town centre.





5. OBJECTIVES OF THE SCHEME

As described in Section 3 earlier, the Wicklow Draft County Development Plan 2021-2027 sets out a number of objectives, under different headings that allude to the need for and objectives of the Project.

The overall purpose of the Project is to enhance the public realm, with amenities that are complimentary to the overall vision for Newtownmountkennedy town centre and enhance safe access to and from the town centre, through estate linkages and safe walk/cycle ways.





6. COLLISION HISTORY

OCSC interrogated the Road Safety Authority (RSA) website https://www.rsa.ie/road-safety/statistics/collisions in order to ascertain the number, location, date, and severity of collisions recorded in the area in recent years. The site provides details of all accidents by year between 2005 and 2016 (latest available statistics). Collisions/accidents are categorised by severity i.e. fatal, serious, and minor. The statistics also identify what the collision type was i.e. vehicle only, pedestrian, cyclist/motorcyclist etc. In that regard the dataset provides a host of information that can be used to identify the requirements for, and potential benefits of, any road upgrade. Figure 3 shows an extract from the dataset for the Project environs.



Figure 3: Extract RSA Collision Data

OCSC collated the raw collision data into a table in order to assist in the assessment of same. This is shown in Table 1 over. The table summarises





only those recorded accidents which took place along the existing R772 within the environs of the Project.

RSA Collision History							
Year	Fatal	Serious	Minor	Total			
2005	0	0	2	2			
2006	0	0	0	0			
2007	0	0	1	1			
2008	0	0	1	1			
2009	0	0	0	0			
2010	0	0	2	2			
2011	0	0	1	1			
2012	0	0	0	0			
2013	0	0	0	0			
2014	0	0	0	0			
2015	0	0	0	0			
2016	0	0	0	0			
Total	0	0	7	7			

Table 1: RSA Collision Data Project Study Area

The dataset shows seven accidents, all classified as Minor, within the site extents of the Project. Two of the recorded accidents involved head-on collisions at the junction with Church Road. There is limited data available on two collisions that occurred at the junction with Glenbrook Road. Two accidents are recorded at the junction with the old R765 (at St. Joseph's Church); one of these involved a rear-end collision with two cars; the other involved a pedestrian and a goods vehicle. One recorded accident involved a head-on collision at the junction with Woodstock Road.

The Newtownmountkennedy Town Centre Refurbishment Project will reduce carriageway widths which will contribute to a low-speed environment. The Project will remove much of the parallel parking on Main Street, which will increase visibility between pedestrians and drivers. The Project will also increase footpath widths and improve pedestrian crossings. Significantly, the proposed Project includes the signalisation of the junctions with Church Road and with Woodstock Road. The proposed road alignments have been designed with horizontal and vertical geometry, sightlines and stopping sight distances in accordance with the Design Manual for Urban Roads and Streets (DMURS).



7. CONSTRAINTS

The following constraints were considered in the preliminary design process:

- Available Mapping & Photography;
- Extents of Study Area;
- Land Ownership;
- Granted & Pending Planning Permissions;
- Archaeology;
- Ecology;
- Topography;
- Soils & Geology;
- Site Investigation;
- Traffic;
- Flood risk management and drainage.

In addition to the above headline items, regard was had to the existing built environment along with various objectives of the Wicklow Draft County Development Plan 2021-2027.





8. GEOMETRY & DESIGN STANDARDS

Design Standards

The Project is located on approach to and within the town centre of Newtownmountkennedy. As a safety improvement, junction improvement and traffic management scheme within an urban area, the Project has been designed to urban standards in accordance with the *Design Manual for Urban Roads and Streets* (DMURS), published by the Department of Transport, Tourism and Sport and the Department of Environment, Community and Local Government in 2013. To manage the change in road environment on approach to the town centre, reference is made to Transport Infrastructure Ireland's *The Treatment of Transition Zones to Towns and Villages on National Roads* (DN-GEO-03084). The current speed limit along the R772 is 50 kph and the proposed speed limit along the Project is taken herein as being the same.

The design philosophy adopted for the Project applies a balanced and integrated approach to street design by applying, as far as possible, the four design principles of DMURS i.e. connected networks; multi-functional streets; pedestrian focus; and multidisciplinary approach. Where DMURS contains insufficient design guidance, alternative guidance documents are used, e.g. for drainage design, the Greater Dublin Strategic Drainage Strategy has been used as the standard.

Road Classification

The Project will be designed as an Arterial Street. The route will serve as a public transport route, cater for private vehicular traffic, and will include facilities for pedestrians throughout its length. The Project is therefore being classified in accordance with Table 3.1 of DMURS as an Arterial Street. Table 3.1 of DMURS is reproduced in Table 2 over.

Within the scope of Project, the R772 includes Rural Fringe, Transition and Urban sections, as described by Transport Infrastructure Ireland's *The Treatment of Transition Zones to Towns and Villages on National Roads* (DN-GEO-03084). This will inform the provision of a 'Gateway' at the



interface of Rural Fringe and Transition and also the selection of appropriate carriageway and footpath widths for Transition and Urban sections.

DMURS Description	Roads Act/TII DMRB	Traffic Management Guidelines	National Cycle Manual
Arterial	National	Primary Distributor Roads	Distributor
Link	Regional ¹	District Distributor Local Collector ^{1&2}	Local Collector
Local Local		Access	Access

Notes:

Note 1: Larger Regional/District Distributors may fall into the category of *Arterial* where they are the main links between major centres (i.e. towns) or have an orbital function.

Note 2: Local Distributors may fall into the category of *Local* street where they are relatively short in length and simply link a neighbourhood to the broader street network.

Road Design Speed

The roads within the Project extents will have a Speed Limit of 50 kph. Within the scope of Project, the R772 includes, Rural Fringe, Transition and Urban sections, in accordance with Transport Infrastructure Ireland's *The Treatment of Transition Zones to Towns and Villages on National Roads* (DN-GEO-03084). This Design Speed for the proposed works are derived from Table 4.1 of DMURS which is reproduced in *Table 3* below.

		P	edestrian Priority	Veh	icle Priority			
	Arterial	30-40 kph	40-50 kph	40-50 kph	50-60 kph	60-80 kph		
ion	Link	30 kph	30-50 kph	30-50 kph	50-60 kph	60-80 kph		
uncti	Local	10-30 kph	10-30 kph	10-30 kph	30-50 kph	60 kph		
FL		Centre	Neighbourhood	Suburban	Business/ Industrial	Rural		
	Context							

Table 3: DMURS Table 4.1, Design Speed





Table 2: DMURS Table 3.1, Terminology

Road Cross Section

The available width is constrained by existing property boundaries on both sides of the R772 and adjoining roads. The available width varies significantly along the corridor between approximately 8.5m to 18.7m. There are frequent abrupt changes in available width, where the available width may become wide for a short distance; as the road alignment conforms to DMURS recommendations, such changes offer little opportunity to change the alignment and provision for footpaths or parking on either side of the road.

With reference to DMURS Section 4.4.1, the carriageway lane widths were selected from Figure 4.55 of DMURS, which is reproduced in Figure 4 over, for standard carriageway widths for Arterial Streets. The proposed carriageway widths throughout the Project will be 6.0m, with the exception of the old R765 (at St. Joseph's Church), where the carriageway width will be the minimum 5.5m-wde, in order to maximise footpath width on the route to schools.

The width of the footpaths is determined by reference to DMURS Section 4.3.1 and Figure 4.55 which is reproduced in *Figure 5* over. Where the R772 forms Main Street in Newtownmountkennedy, which is the Urban section with reference to DN-GEO-03084, the preferred 3m-wide footpath is suitable in areas of moderate to high pedestrian activity and allows small groups to pass comfortably. North of the junction with Church Road and south of the junction with Woodstock Road, the R772 is in the Transition section with reference to DN-GEO-03084; here, the preferred 2.5m-wide footpath is suitable in areas of low to moderate pedestrian activity and is the desirable width for two people to pass comfortably. There are portions of the R772 and adjacent roads at junctions where spatial constraints limit the overall width; at these locations, a 1.8m-wide footpath, which is the minimum space for two people to pass comfortably, is generally provided.







Figure 4: DMURS Carriageway Widths







Figure 5: DMURS Footpath Widths





The National Cycle Manual section 1.7.4 Guidance Graph sets on the conditions under which the various forms of cycling infrastructure may be provided, depending on design speed and vehicular traffic volume – see *Figure 6*. The R772 Main Street in Newtownmountkennedy has a recorded Annual Average Daily Traffic (AADT) of 6465 and traffic calming proposed in the form of narrow carriageway and intermittent vertical deflections to control traffic speed within the range of 30-50kph (with a speed limit of 50kph). The proposed Shared Street facility for cycling is therefore appropriate and is suitable for the narrow width corridor available.



Figure 6: National Cycle Manual Guidance Graph



Figure 7: Example Cross Section for R772 Main Street





Horizontal and Vertical Geometry

The alignment has been designed so that the various geometric elements, including horizontal and vertical curvature, super elevation and sight distance will have at least the minimum values consistent with the design speed of the road. It is important that these geometric elements are not exceeded as this can lead to operating speeds greater than the intended design speed. This is as set out in Section 4.4.6 of DMURS. A standard carriageway cross fall of 2.5% will be adopted throughout with super elevation applied if necessary, noting that adverse camber is allowable under DMURS designs in accordance with Table 4.3. A cross fall of 2.5% will be used for footpaths and cycle facilities. Table 4.3 of DMURS is replicated as Table 4 hereunder.

Horizontal Curvature						
Design Speed (kph)	10	20	30	40	50	60
Minimum Radius with adverse camber of 2.5%	-	11	26	56	104	178
Minimum Radius with superelevation of 2.5%	-	-	-	46	82	136
Vertical Curvature						
Design Speed (kph)	10	20	30	40	50	60
Crest Curve K Value	N/A	N/A	N/A	2.6	4.7	8.2
Sag Curve K Value	N/A	N/A	2.3	4.1	6.4	9.2

Table 4: Proposed H & V Curvature

Junction Design

The R772 junctions with Church Road and with Woodstock Road will be designed as fully signalised junctions and will include controlled crossing facilities for pedestrians. In line with the design philosophy of DMURS, crossing facilities will be provided on all arms, kerb radii will be reduced thereby shortening crossing distances for cyclists and pedestrians and signal cycle times will minimise waiting times for pedestrians and cyclists.





The primary principle in the design of junctions along the route will be to provide junctions that are safe and consistent with existing layouts in order to present a uniformity of approach to drivers. The primary junction strategy objectives will be:

- To optimise road safety by ensuring adequate visibility and consistency;
- To function as traffic calming measures;
- To provide safe crossing facilities for pedestrians
- To provide safe crossing and turning facilities for cyclists;
- To provide an economic solution, so that the cost of implementing the design will be, to the maximum possible extent, offset by the economic benefits derived;
- To optimise road construction costs;
- To minimise environmental impacts, such as air pollution and engine noise, by minimising fuel consumption through reductions in the number of speed changes and the number of stop/starts required.

Visibility at signalised junctions, development of approach lanes and merging of lanes on exit arms are not specified in DMURS and as such the guidance outlined in UK DMRB TD50/04 as amended by TII DN-GE003044 will be adopted as best practice.





Principle Geometric Parameters

The principal geometrics for the proposed Project are set out below in Table 5.

Design Heading	Design Element	Requirement	Standards Ref.
Road	Road Type	Arterial Street	Table 3.1 DMURS/ NRA TD 9/07
туре	Design Standard	Urban	DMURS
Design	Mandatory Speed Limit	50 kph	Table 4.1 DMURS
Speed	Design Speed	50 kph	Table 4.1 DMURS
Sight	Stopping Sight Distance	45 m	Table 4.2 DMURS
Distance	Stopping Sight Distance on Bus Route	49 m	Table 4.2 DMURS
	Road Camber	2.5%	DMURS 4.4.6
	Superelevation	2.5%	DMURS 4.4.6
Horizontal	Min. R (no s/e)	104m	Table 4.3 DMURS
Alignment	Des. Min. R	82m	Table 4.3 DMURS
	1-step below Des. Min. R	56m	Table 4.3 DMURS
	Des. Min. K Crest	4.7	Table 4.3 DMURS
	Des. Min. K Sag	6.4	Table 4.3 DMURS
Vertical	1-step Below Des. Min. K	4.1	Table 4.3 DMURS
Alignment	Des. Max. Gradient	5%	DMURS 4.4.6
	Max. Gradient with Relaxation	8.3%	DMURS 4.4.6
	Min. Gradient	0.5%	DMURS 4.4.6
Cross-Section		3.00m traffic lane width	DMURS 4.4.1
& Headroom	Cross-Section	3.0m/2.5m footpath	DMURS 4.4.1
Junctions	Arterial Street	Signalised: Yes	DMURS 4.4.3

Table 5: Principle Geometric Parameters



9. PARKING PROVISION

The existing Main Street provides on-street parallel parking spaces on both sides of the street for much of its length. The carriageway (traffic lanes) is relatively wide in an urban context and contribute to high traffic speeds. The remaining space available for pedestrians is limited, with numerous pinch points in the footpath width restricting movement of mobility impaired people along the Main Street. The result is a car-dominated space that detracts from the rich heritage in the existing urban environment.

One of the aims of the Project is to deliver alterations to the layout of the road carriageway and on-street car parking to allow for the provision of new or improved pedestrian and cycling facilities and additional pedestrian crossing points. To deliver wider footpaths, it is proposed to rationalise the provision of parking spaces on Main Street.

Between St. Joseph's Church and Woodstock Road, the western side of Main Street accommodates on-street parallel parking and a relatively wide footpath area that is frequently used for unregulated car-parking. It is proposed to provide perpendicular parking spaces which will maximise the available ample available space at this location for on-street parking. This will alleviate the overall reduction in on-street parking provision in the town.

Currently, Main Street accommodates a total of 71nr car-parking spaces, of which 2nr are sub-standard 'blue card' spaces and 3nr are 'age-friendly' spaces. The proposals will reduce the total to 47nr car-parking spaces, of which 2nr are compliant 'blue card' spaces, 3nr are 'age-friendly' spaces, and 4nr are dedicated to electric vehicle charging. In addition, the proposals include bicycle stands at 5nr locations along Main Street that provide spaces for 50nr bicycles.

The reduction in car-parking spaces reflects the intended reallocation of public realm space from cars to pedestrians and cyclists and, together, with the increase in bicycle spaces, will encourage a modal shift from private cars to Active and Sustainable transport modes.





10. DRAINAGE

Design Guidelines Overview

The development is required to adhere to Local Authority requirements i.e. the Wicklow County Development Plan 2021-2027 and the Greater Dublin Strategic Drainage Study (GDSDS). As the Project comprises the refurbishment of an existing road corridor, there will be no change to the area of hardstanding drained and therefore no adverse impact on pluvial and fluvial flood risk. The Project area is currently served by a drainage system with multiple outfall locations. It is proposed to retain the existing drainage network.

Existing Site Drainage

The Newtownmountkennedy River flows generally from north to south in the vicinity of the Project area. At the northern end of the Project area, the R772 crosses over the Newtownmountkennedy River, while Main Street runs roughly parallel with the River. A second watercourse, known as the Glendarragh Stream flows generally from west to east and joins the Newtownmountkennedy River in the grounds of Valle Pacis. Main Street crosses over the Glendarragh Stream at the location of the proposed civic space. There are existing surface water drains discharging to the Newtownmountkennedy River at the northern and southern ends of the Project Area. Much of Main Street is currently drained by existing combined sewers, which drain to Irish Water's Newtown Pumping Station, from where it is pumped to Greystones Wastewater Treatment Plant.

Proposed Drainage Strategy

Where there is no extant surface water drains, it is proposed to provide a new surface water drainage network that will collect rainfall runoff from the Project area. The proposed surface water drains will run adjacent to the existing combined sewers serving the road and will discharge to the combined sewers as access to surface watercourses is constrained.





Kerb-Drainage

At locations where existing topographical features constrain the proposed road alignment and shallow longitudinal gradients are required, it is proposed to collect surface water runoff using proprietary kerb-drains with high conveyance capacity – see example shown in Figure 8.



Figure 8: Example kerb-drain unit for (image from Marshalls)

Trapped Road Gullies

Surface water runoff from the realigned sections of the R772 will be collected in road gullies. All road gullies will be trapped, with 150mm outlets, to help prevent sediment and gross pollutants from entering the surface water network, thus improving the water quality discharging from site. The grated covers are to have a minimum load classification of D400, for frequent vehicular traffic, and shall be lockable – see Figure 9.



Figure 9: Trapped Road Gully (Typical Detail)





Oil Separators

Oil separators are designed to separate gross amounts of oil and large (>250µm) suspended solids from the surface water, mainly through a sedimentation process. A Class 1 bypass fuel separator will be provided prior to surface water discharge to the receiving drainage system.



Figure 10: Typical Section Detail of Fuel Separator (CIRIA C753)

Design Software

The proposed surface water network will be designed in accordance with the requirements and guidelines outlined earlier, using MicroDrainage Network Design package, by Innovyze Inc., which simulates the performance of the integrated drainage network for varying rainfall return periods and storm durations. The MicroDrainage Network Design software applies the Flood Studies Report (FSR) methodology for analysis of rainfall profiles.

Climate Change

The proposed drainage system will be designed to allow for 20% increase in rainfall intensity to allow for Climate Change projections, in accordance with the requirements of the Draft CDP (Appendix 8 Strategic Flood Risk Assessment, Table 4-2).

Surface Water Piped Network Design

Piped components of the proposed drainage network will be designed in accordance with EN752, with minimum full-bore velocities of 1.0 m/s achieved throughout. All carrier pipes will be sized to ensure no surcharging





for rainfall events up to, and including, the 1 in 5-year Average Recurrence Interval (ARI) event (20% Annual Exceedance Probability (AEP)) and no flooding for rainfall events up to, and including, the 1 in 100-year ARI event (3.3% AEP).

Where gravity pipe and manhole network will be provided, manholes are to be provided for maintenance access at branched connections, changes in pipe size and gradient, and at intervals no greater than 90m distance.

Maintenance

The proposed surface water drainage network is to be carefully designed to minimise risk of blockage throughout the network, through provisions that limit and restrict the size of pollutants entering the network, such as bioretention areas and trapped road gullies.

Road gullies and flow control devices should be inspected regularly and maintained, as appropriate and in accordance with manufacturer's recommendations and guidelines. Items such as flow controls will be located so as to provide easy vehicular access for inspection and maintenance.





Parameter	Value
Annual Average Rainfall (AAR) Value	1045mm
Rainfall M5-60 Value	19.70mm
Rainfall M5-2D Value	73.5mm
Jenkinson's r	0.268
Impermeability Factor for paved areas	1.0
Time of Entry	4 minutes
Smallest pipe diameter to use for carriageway drainage	150mm
Roughness Coefficient	0.6
Minimum permissible velocity (self-cleansing velocity)	1.0 m/s
Maximum velocity	2.99 m/s
Minimum cover to pipes (unprotected)	1200mm
Pipe Levels	Soffit-to-Soffit
Return Period for no surcharge	5 years
Return Period for no flooding	100 years

Table 6: Summary of Drainage Design Parameters





11. PAVEMENT DESIGN

General

The pavement design will be prepared in accordance with TII/NRA Addendum to HD 24/06. This Addendum amends Standard HD24/06 – Pavement Design and Maintenance: Traffic Assessment of the DMRB. The preliminary design of capping layer, sub-base and pavement layers follow the requirements of TII/NRA HD 25-26/10 – Pavement and Foundation Design. The pavement materials to be used will further be in accordance the requirements of Series 700 to 1000 inclusive of the TII/NRA Specification for Road Works contained within Volume 1 of the Manual of Contract Documents for Road Works.

The design recommendations for the foundation layers of 'capping' and subbase are given in the design standard TII/NRA HD 25-26/10 and are based on the strength of the sub- grade, measured as its 'CBR' value. Capping is used to improve weak sub-grade material. Where deemed necessary and within the detailed design phase of the project, it may be proposed to use a capping layer using granular material conforming to Series 600 of the TII/NRA Specification for Road Works. The thickness of same will be as required by the above standard as appropriate to the CBR value of the subgrade and selected pavement type.

Pavement Typology

Given the relatively short length of carriageway involved, and that the noise characteristics of concrete pavements would be inappropriate in the surrounding environment, the use of a concrete pavement option for the Project is discounted.

Traffic Growth Rates & Expansion Factors

Traffic growth will be applied based on PAG Unit 5.3 – Travel Demand Projections (October 2021) guidelines which set out a standard approach to traffic growth rates as shown in Figure 11 over. The growth rates in Table 6.2 (Link-Based Growth Rates: County Annual Growth Rates) can be applied.

Great Place To	Best Workp	olaces [™]
Work	IRELAND	2020





Figure 11: Application of National Traffic Growth Forecasts

Based on the foregoing and allowing that the Project is located in Co. Wicklow, the following traffic national growth figures apply:

National Traffic Growth Forecasts: Annual Growth Factors [East]						
Dariad	Low G	Growth	Central Growth High Growth			Growth
Periou	LV	HV	LV	ΗV	LV	HV
2016 - 2030	1.0140	1.0361	1.0157	1.0377	1.0189	1.0412
2030 - 2040	1.0033	1.0153	1.0051	1.0173	1.0091	1.0211
2040 - 2050	1.0029	1.0185	1.0047	1.0204	1.0110	1.0305

Table 7: National Traffic Growth Factors for Co.Wicklow

AADT Expansion Factors can be calculated based on PAG Unit 16.1 - *Expansion Factors for Short Period Traffic Counts*.

Project Pavement Design

TII/NRA Addendum to HD 24/06 specifies a formula for calculating traffic loading which in turn is used to calculate the required design thickness of combined asphalt layers. This formula is as follows:

$$T_i = W \times P \times 10^{-6} \times 365 \times F_o \times Y \times G$$
 (msa)



The definitions for the above symbols and corresponding values used are as follows:

Symbol	Definition	Value
Ti	Pavement traffic loading for each individual class of vehicle over the design period (msa)	ТВС
W	Wear Factor for each traffic class	2.7
Р	Percentage of vehicles in the heaviest loaded lane	100%
Fo	Annual Average Daily Flow of traffic (AADF) for each traffic class in the year of opening	ТВС
Y	Design Period (Years)	20
G	Growth Factor	ТВС

Table 8: HD24/06 Symbols

The following notes are made with respect to the calculation in this instance:

- Design Traffic (T) typically equals the Σ T_i, where T_i is the traffic calculated for a specific class of vehicle. However, where insufficient data is available to make a separate calculation for every vehicle class, a combined approach may be adopted using a single calculation, so that T = T_i;
- TII/NRA Addendum to HD 24/06 specifies the Wm values in HD 24/06 Table 2.3 be used which does not allow a factor for combined vehicle type assessments. However, HD 24/06 was superseded by CD 224 in March 2020. This updated design document includes a wear factor for "all commercial vehicles" in Table 2.18, and this may be used for this calculation;
- The Project is proposed to have a single traffic lane in each direction meaning the value for P is taken as 100%;
- The Growth factor may be calculated based on PAG Unit 5.3 as outlined earlier. While the design period is noted as 20 years, the growth factor may make additional provision for time between year of assessment and year of opening.





This Design Traffic figure will be applied to Figure 4.2 of TII *Pavement & Foundation Design* DN-PAV-03021, to estimate the design thickness of combined asphalt layers for fully flexible design – reproduced in Figure 12.



Figure 12: Design Traffic Estimate to TII Design Thickness Chart

Summary Pavement Thickness Design

Based on the predicted traffic loading, the process described above will be used to determine the total pavement depth. Based on proposals for arterial routes elsewhere in the Wicklow County Council jurisdiction, a total pavement depth of 245mm is proposed for preliminary purposes. The recommended pavement thickness make-up is presented in Table 9.

Pavement Course	Clause	Mixture Designation/ Material	Thickness (mm)
Surface Course	5	PMSMA 10 surf PMB 65/105- 60 des	45
Binder Course	3	AC 20 dense bin 40/60 des	60
Base	3	AC 32 dense bas 40/60 des	140
Sub-base	808	Granular Material Type B	150
Total Pave	245		

Table 9: Preliminary Pavement Thickness





12. SIGNAGE & DELINEATION

Directional and Regulatory Signage for the Project will be provided in accordance with the Department of Transport, Tourism & Sport '*Traffic Signs Manual'* (TSM) August 2019. All Regulatory and Warning signage will be consistent with the design speed of the mainline and secondary roads.

Directional information signage will be consistent with the classification and design speed of the mainline and secondary roads. The route will most likely be designated either a Local or perhaps Regional Route on opening, so information that directional signage will comprise black lettering, symbols, and borders on a white background. Any Tourism signage



(e.g. to Glendalough) will comprise white lettering, symbols, and borders on a brown background. All Regulatory Signage will be provided in



accordance with Chapter 5 of the TSM with all Warning Signs provided in accordance with Chapter 6 of the TSM. All advance directional signs and directional signs will be designed using the 'AutoSign' traffic sign design software. It is not envisaged that any Variable Message Signing (VSM) will be required on the route.

Road markings, reflective markings and studs will be provided in accordance with Chapter 7 of the TSM and in accordance with the Specification for Road Works Series 1200 - Traffic Signs and Road Markings - CC-SPW-01200 (January 2019) as published by the TII.







Temporary traffic signs during construction will comply with the TSM and in accordance with Series 1200 of the 'Specification for Road Works' as published by the NRA.

Tactile paving with a blister surface is to be provided at all pedestrian crossings to provide information to vision impaired people. The tactile paving shall be provided in accordance with the guidance set out in the Guidance on the use of Tactile Paving Surfaces (2005) published by the UK Department of the Environment, Transport, and the Regions. "L" shaped tactile paving shall be laid across the full width of the drop kerb with the stem extending to the back of the footway.







13. PUBLIC LIGHTING

The design of public lighting for the Project will be in accordance with the requirements of BS 5489-1 (2020) Lighting of Roads and Public Amenity Areas – Code of Practice and I.S. EN13201-2 (2015) Road Lighting Part 2, Performance Requirements.

The height of lighting columns will be selected to accord with the scale of the built and planned environment. Consideration will be given to providing lower intensity pedestrian lanterns mounted on the same columns as the streetlights. In accordance with DMURS 4.2.5, only white light sources will be considered in the design of street lighting (metal halide, white SON, Cosmopolis and LED). The installation of the lighting network will comply with the requirements of Series 1300 and 1400 of the Specification for Road Works as published by TII and in accordance with the recommendations of BS5489 and BS5649.

Full cut-off lanterns will be utilised to minimise night-time visual intrusion if required by the Environmental Assessment.





14. STAGE 1/2 ROAD SAFETY AUDIT

The preliminary design of the Newtownmountkennedy Town Centre Refurbishment Project will be subjected to an independent Stage 1 Road Safety Audit. The Audit will be carried out in accordance with the requirements of TII, Publication Number GE-STY-01024, dated December 2017. The Road Safety Audit Team will comprise of one Team Leader and one Team member, each with certified appropriate training in Road Safety Auditing. The Road Safety Audit will comprise an examination of the OCSC drawings and a site visit by the Audit Team.

As with all Road Safety Audits, the audit report will follow the 'Problem'/'Observation' format. Problems are considered to require action by the Design Team that addresses the safety of the Project for road users. Observations are for information only. All problems identified can be addressed by the designers during the detailed design of the Project.





OPW Office a Poibli Office of Public Works

15. FLOOD RISK ASSESSMENT

The Office of Public Works (OPW) collates available reports on flooding from all sources (e.g. fluvial, pluvial, coastal, infrastructure) on a nationwide basis. The OPW's floodinfo.ie website was consulted to obtain reports of historical flooding within the vicinity of the subject site. The Summary Report present in Figure 13 lists reports of historical flooding within 2.5km of the subject site. There was no record available of flooding impacting the Project area.

Past Flood Event Local Area Summary Report

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

This report has been downloaded from www.floodinfo.ie (the "Website"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



Figure 13: OPW Past Flood Event Local Area Summary Report

There is no Catchment Flood Risk Assessment and Management (CFRAM) study available for the Project area.





The OPW's Draft National Preliminary Flood Risk Assessment (Draft PFRA) shows potential flooding on the Newtownmountkennedy River, including on the R772 where it crosses over the River. However, the Draft PFRA used approximations of topography and ignored the presence of structures such as the bridge and embankment that carries the R772 over the River.

OCSC inspected the Draft CDP Appendix 8 Strategic Flood Risk Assessment and Map No.2 Indicative Flood Zones of the Newtownmountkennedy Town Plan (Draft CDP Volume 2, Part 1) – see Figure 14. The Indicative Flood Zones on the Newtownmountkennedy River reproduce the approximate flood extents in the OPW's Draft PFRA. There are also Indicative Flood Zones shown for the Glendarragh Stream, which similar extend across the R772 Main Street.



Figure 14: Extract from Draft CDP Indicative Flood Zones map

The Project involves the refurbishment of existing public realm, following the corridor of the existing R772 which is currently in use. As such, the proposed works do not introduce additional receptors to the potential floodplain.





Multidisciplinary Consulting Engineers

> 9 Prussia Street Dublin 7 Ireland

T | +353 (0)1 8682000 F | +353 (0)1 8682100 W | www.ocsc.ie