Appendix A – Multi Criteria Analysis Tables

Table 1: SAS 1 Route Options Multi Criteria Analysis

MCA criteria	Assessment Sub-Criteria	N1 Option 1	N1 Option 2	N2 Option 1	N2 Option 2
Economy	1.a. Capital Cost	Capital Cost: €13.5M Length: 4.75km Cost/Km: 2.84M ***Indicative Scheme Infrastructure* Works Cost** - **€**12.5M ***Land Acquisition Cost*** - € 1M - 697 sq.m. of residential land	Capital Cost: €12.9M Length: 4.75km Cost/Km: 2.72M ***Indicative Scheme Infrastructure* Works Cost** - **€**12.1M ***Land Acquisition Cost*** - € 0.8M - 492 sq.m. of residential land	Capital Cost: €14.6M Length: 4.8km Cost/Km: 3.04M ***Indicative Scheme Infrastructure* Works Cost** - **€**11.9M ***Land Acquisition Cost*** - € 2.7M - 1,770 sq.m. of residential land	Capital Cost: €13.5M Length: 4.8km Cost/Km: 2.81M ***Indicative Scheme Infrastructure* Works Cost** - **€**11.4M ***Land Acquisition Cost*** - €2.1M - 1,441 sq.m. of residential land
	Rank				
	1.b. Transport Reliability and Quality (Journey Time)	Journey Time: 26 mins both directions Length: 4.4km No. of Junctions: 14 No. of pedestrian crossings: 3	Journey Time: 31 mins both directions Length: 4.4km No. of Junctions: 14 No. of pedestrian crossings: 3	Journey Time: 27 mins both directions Length: 4.5km No. of Junctions: 15 No. of pedestrian crossings: 4	Journey Time: 31mins inbound and 32mins outbound Length: 4.5km No. of Junctions: 15 No. of pedestrian crossings: 4
	Rank				
Integration	2.a. Land Use Integration	Integrates with existing / planned residential, educational, medical and leisure uses in this established area.	Integrates with existing / planned residential, educational, medical and leisure uses in this established area.	Integrates with existing / planned residential, educational, medical and leisure uses in this established area.	Integrates with existing / planned residential, educational, medical and leisure uses in this established area.
	Rank				
	2.b. Residential Population and Employment Catchments	***Residential Population Catchments*** - 5 minute walk catchment of approximately 8,300 - 10 minute walk catchment of approximately 20,300 - 15 minute walk catchment of approximately 43,300 ***Employment catchments*** 15 minute walk catchment of approximately 98,000 ***Education catchments*** 15 minute walk catchment of approximately 23,200	***Residential Population Catchments*** - 5 minute walk catchment of approximately 8,300 - 10 minute walk catchment of approximately 20,300 - 15 minute walk catchment of approximately 43,300 ***Employment catchments*** 15 minute walk catchment of approximately 98,000 ***Education catchments*** 15 minute walk catchment of approximately 23,200	***Residential Population Catchments*** - 5 minute walk catchment of approximately 10,200 - 10 minute walk catchment of approximately 24,900 - 15 minute walk catchment of approximately 46,100 ***Employment catchments*** 15 minute walk catchment of approximately 107,300 ***Education catchments*** 15 minute walk catchment of approximately 22,700	***Residential Population Catchments*** - 5 minute walk catchment of approximately 10,200 - 10 minute walk catchment of approximately 24,900 - 15 minute walk catchment of approximately 46,100 ***Employment catchments*** 15 minute walk catchment of approximately 107,300 ***Education catchments*** 15 minute walk catchment of approximately 22,700
	Rank				
	2.c. Transport Network Integration	Potential for interchange with the DART.	Potential for interchange with the DART.	Potential for interchange with the DART.	Potential for interchange with the DART.
	Rank				

	2.d. Cycle Network Integration	Both directions of the CBC align with primary route 13A and 13 as identified in the GDA Cycle Network Plan. See report Section 2 Figure 3. N1 and N2 are both primary cycle routes.	Both directions of the CBC align with primary route 13A and 13 as identified in the GDA Cycle Network Plan. See report Section 2 Figure 3. N1 and N2 are both primary cycle routes.	Both directions of the CBC align with primary route 13 as identified in the GDA Cycle Network Plan. See report Section 2 Figure 3. N1 and N2 are both primary cycle routes.	Both directions of the CBC align with primary route 13 as identified in the GDA Cycle Network Plan. See report Section 2 Figure 3. N1 and N2 are both primary cycle routes.
	Rank				
	2.e. Traffic Network Integration	Merrion Road - Provision of full bus and cycle facilities to consolidate existing cycle and bus lanes although this will require converting significant lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact Pembroke Road (from Ballsbridge Park to U.S Embassy) - Provision of full bus and cycle facilities to consolidate existing cycle and bus lanes although this will require converting significant lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact Pembroke Road (from U.S Embassy to Israeli Embassy) - Provision of additional cycle lanes and consolidation of existing bus lanes - minor positive impact Pembroke Road (from Israeli embassy to City Centre) - Provision of full bus and cycle facilities where none presently exist – Major positive impact Baggot Street - Provision of full bus and cycle facilities where none presently exist – Major positive impact	Merrion Road - Provision of full cycle facilities and bus lanes along the majority of the route to consolidate existing cycle and bus lanes although this will require converting lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact. Pembroke Road (from Ballsbridge Park to U.S Embassy) - Provision of full bus and cycle facilities to consolidate existing cycle and bus lanes although this will require converting significant lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact Pembroke Road (from U.S Embassy to Israeli Embassy) - Provision of additional cycle lanes and consolidation of existing bus lanes - minor positive impact Pembroke Road (from Israeli embassy to City Centre) - Provision of full bus and cycle facilities where none presently exist – Major positive impact Baggot Street - Provision of full bus and cycle facilities where none presently exist – Major positive impact	Merrion Road - Provision of full bus and cycle facilities to consolidate existing cycle and bus lanes (inbound and outbound) although this will require converting significant lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact Pembroke Road (from Ballsbridge Park to U.S Embassy) - Provision of full bus and cycle facilities to consolidate existing cycle and bus lanes although this will require converting significant lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact Northumberland Road - Provision of full bus and cycle facilities to consolidate existing cycle and bus lanes (inbound and outbound) although this will require converting significant lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact Mount Street Lower - Provision of full bus and cycle facilities to consolidate existing cycle and bus lanes (inbound and outbound) although this will require converting significant lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact	Merrion Road - Provision of full bus and cycle facilities to consolidate existing cycle and bus lanes (inbound and outbound) although this will require converting significant lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact Pembroke Road (from Ballsbridge Park to U.S Embassy) - Provision of full bus and cycle facilities to consolidate existing cycle and bus lanes although this will require converting significant lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact Northumberland Road - Provision of full bus and cycle facilities to consolidate existing cycle and bus lanes (inbound and outbound) although this will require converting significant lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact Mount Street Lower - Provision of full bus and cycle facilities to consolidate existing cycle and bus lanes (inbound and outbound) although this will require converting significant lengths of shared traffic lanes to segregated bus lanes – Moderate negative impact
	Rank				
Accessibility & Social Inclusion	3.a. Key Trip Attractors (Education/Health/Commercial/Employment)	- St Vincent's Hospital - RDS - Ballsbridge - Aviva stadium See Appendix B Figure 2.	- St Vincent's Hospital - RDS - Ballsbridge - Aviva stadium See Appendix B Figure 2.	- St Vincent's Hospital - RDS - Ballsbridge - Aviva stadium See Appendix B Figure 2.	- St Vincent's Hospital - RDS - Ballsbridge - Aviva stadium See Appendix B Figure 2.
	Rank				
	3.b. Deprived Geographic Areas	This option primarily serves areas considered a**ffluent** and **very affluent** in the Pobal Deprivation Index. It also serves a very small number of areas considered **marginally above** and **marginally below average.**	This option primarily serves areas considered a**ffluent** and **very affluent** in the Pobal Deprivation Index. It also serves a very small number of areas considered **marginally above** and **marginally below average.**	This option primarily serves areas considered a**ffluent** and **very affluent** in the Pobal Deprivation Index. It also serves a very small number of areas considered **marginally above** and **marginally below average.**	This option primarily serves areas considered a**ffluent** and **very affluent** in the Pobal Deprivation Index. It also serves a very small number of areas considered **marginally above** and **marginally below average.**
	Rank				

Safety	4.a. Road Safety	No. of Junctions: 15 1 turn movement required in each direction (1 right turns/ 1 Left turn in each direction)	No. of Junctions: 15 1 turn movement required in each direction (1 right turns/ 1 Left turn in each direction)	No. of Junctions: 16 0 turning movements required in each direction	No. of Junctions: 16 0 turning movements required in each direction
	Rank				
Physical Activity	5.a Physical Activity	This criterion relates to the health benefits derived from using different transport modes. The subject scheme options under consideration relate to the same mode of travel (bus). As such, this criterion will not produce any relative differences between the options. The physical benefits associated with the scheme will be quantified as part of a future Cost – Benefit Analysis.	This criterion relates to the health benefits derived from using different transport modes. The subject scheme options under consideration relate to the same mode of travel (bus). As such, this criterion will not produce any relative differences between the options. The physical benefits associated with the scheme will be quantified as part of a future Cost – Benefit Analysis.	This criterion relates to the health benefits derived from using different transport modes. The subject scheme options under consideration relate to the same mode of travel (bus). As such, this criterion will not produce any relative differences between the options. The physical benefits associated with the scheme will be quantified as part of a future Cost – Benefit Analysis.	This criterion relates to the health benefits derived from using different transport modes. The subject scheme options under consideration relate to the same mode of travel (bus). As such, this criterion will not produce any relative differences between the options. The physical benefits associated with the scheme will be quantified as part of a future Cost – Benefit Analysis.
	Rank				
Environment (refe	6.a. Archaeology and Cultural Heritage	Route is in immediate proximity to **two recorded monuments**	Route is in immediate proximity to **two recorded monuments**	Route is in immediate proximity to **two recorded monuments**	Route is in immediate proximity to **two recorded monuments**
	Rank				
	6.b. Architectural Heritage	**NIAH** survey yet to be completed for southern section of Dublin City Centre. Approx. **47 protected structures** front onto Baggots St Lower. Approx. **32 protected structures** front onto Baggots St Upper. Approx. **86 protected structures** front onto Pembroke Road. **10 protected structures** fronting onto Merrion Road. **1 protected structure** at junction of Rock Rd & Trimleston Avenue.	**NIAH** survey yet to be completed for southern section of Dublin City Centre. Approx. **47 protected structures** front onto Baggots St Lower. Approx. **32 protected structures** front onto Baggots St Upper. Approx. **86 protected structures** front onto Pembroke Road. **10 protected structures** fronting onto Merrion Road. **1 protected structure** at junction of Rock Rd & Trimleston Avenue.	**NIAH** survey yet to be completed for southern section of Dublin City Centre. Approx. **15 protected structures** front onto Mount St Lower. Approx. **72 protected structures** front onto Northumberland Road. Approx. **86 protected structures** front onto Pembroke Road. **10 protected structures** fronting onto Merrion Road. **1 protected structure** at junction of Rock Rd & Trimleston Avenue.	**NIAH** survey yet to be completed for southern section of Dublin City Centre. Approx. **15 protected structures** front onto Mount St Lower. Approx. **72 protected structures** front onto Northumberland Road. Approx. **86 protected structures** front onto Pembroke Road. **10 protected structures** fronting onto Merrion Road. **1 protected structure** at junction of Rock Rd & Trimleston Avenue.
	Rank				
	6.c. Flora & Fauna	The installation of bus lanes will require the removal of **232** existing trees including those along Merrion Rd, and Pembroke Road. It unlikely that these trees are of roosting importance for bats due to the urban environment however they may be used for foraging. This route comes in close proximity to the South Dublin Bay SAC/pNHA and South Dublin Bay and River Tolka Estuary SPA on Merrion Rd however no impacts are expected due to small scale of works.	The installation of bus lanes will require the removal of **232** existing trees including those along Merrion Rd, and Pembroke Road. It unlikely that these trees are of roosting importance for bats due to the urban environment however they may be used for foraging. This route comes in close proximity to the South Dublin Bay SAC/pNHA and South Dublin Bay and River Tolka Estuary SPA on Merrion Rd however no impacts are expected due to small scale of works.	The installation of bus lanes may require the removal of **227** existing trees including those on Merrion Rd, Pembroke Rd and Northumberland Ave. It unlikely that these trees are of roosting importance for bats due to the urban environment however they may be used for foraging. This route comes in close proximity to the South Dublin Bay SAC/pNHA and South Dublin Bay and River Tolka Estuary SPA on Merrion Rd however no impacts are expected due to small scale of works.	The installation of bus lanes may require the removal of **227** existing trees including those on Merrion Rd, Pembroke Rd and Northumberland Ave. It unlikely that these trees are of roosting importance for bats due to the urban environment however they may be used for foraging. This route comes in close proximity to the South Dublin Bay SAC/pNHA and South Dublin Bay and River Tolka Estuary SPA on Merrion Rd however no impacts are expected due to small scale of works.
	Rank				
	6.d. Soils and Geology	No appreciable impacts	No appreciable impacts	No appreciable impacts	No appreciable impacts
	Rank				

	6.e. Hydrology	Route crosses the Grand Canal and River Dodder. No appreciable impacts expected due to designs being within existing bridge width. Flood event at Merrion Gates in 1963 due to Nutley Elm Stream, and 2000 due to extreme weather events.	Route crosses the Grand Canal and River Dodder. No appreciable impacts expected due to designs being within existing bridge width. Flood event at Merrion Gates in 1963 due to Nutley Elm Stream, and 2000 due to extreme weather events.	Route crosses the Grand Canal and River Dodder. No appreciable impacts expected due to designs being within existing bridge width. Flood event at Merrion Gates in 1963 due to Nutley Elm Stream, and 2000 due to extreme weather events.	Route crosses the Grand Canal and River Dodder. No appreciable impacts expected due to designs being within existing bridge width. Flood event at Merrion Gates in 1963 due to Nutley Elm Stream, and 2000 due to extreme weather events.
	Rank				
	6.f. Landscape and Visual	Road widening will significantly impact on existing tree lines along Merrion Rd, and Pembroke Road. Bus route already exists on this route. Route runs through the centre of Merrion Square Key View as identified in the Dublin City Development Plan 2011-2017.	Road widening will significantly impact on existing tree lines along Merrion Rd, and Pembroke Road. Bus route already exists on this route. Route runs through the centre of Merrion Square Key View as identified in the Dublin City Development Plan 2011-2017.	Road widening will significantly impact on existing tree lines on Merrion Rd and through Ballsbridge. Existing route carries bus traffic already. Buses may be seen in distance of Merrion Square Key View as identified in the Dublin City Development Plan 2011-2017.	Road widening will significantly impact on existing tree lines on Merrion Rd and through Ballsbridge. Existing route carries bus traffic already. Buses may be seen in distance of Merrion Square Key View as identified in the Dublin City Development Plan 2011-2017.
	Rank				
	6.g. Air Quality	Existing route carries bus traffic already. Possible impacts due to increased trafficking of road networks and closer proximity to residential properties due to road widening.	Existing route carries bus traffic already. Possible impacts due to increased trafficking of road networks and closer proximity to residential properties due to road widening.	Existing route carries bus traffic already. Possible impacts due to increased trafficking of road networks and closer proximity to residential properties due to road widening.	Existing route carries bus traffic already. Possible impacts due to increased trafficking of road networks and closer proximity to residential properties due to road widening.
	Rank				
	6.h. Noise & Vibration	Possible impacts due to increased trafficking of road networks and increased proximity of vehicles to houses and gardens if bus lanes installed. Existing route carries bus traffic already.	Possible impacts due to increased trafficking of road networks and increased proximity of vehicles to houses and gardens if bus lanes installed. Existing route carries bus traffic already.	Possible impacts due to increased trafficking of road networks and increased proximity of vehicles to houses and gardens if bus lanes installed. Existing route carries bus traffic already.	Possible impacts due to increased trafficking of road networks and increased proximity of vehicles to houses and gardens if bus lanes installed. Existing route carries bus traffic already.
	Rank				
	6.i. Land Use Character	Large numbers of trees will be removed on Merrion Rd and Pembroke Rd. On-street parking will be affected on Pembroke Road and Baggot Street Lower.	Large numbers of trees will be removed on Merrion Rd and Pembroke Rd. On-street parking provisions will be affected on Pembroke Road and Baggot Street Lower, though not to the same extent as N1 Option 1.	Large numbers of trees will be removed on Merrion Rd and Northumberland Rd. On-street parking will be affected along Mount Street Lower.	Large numbers of trees will be removed on Merrion Rd and Northumberland Rd. On-street parking will be affected along Mount Street Lower.
	Rank				

Table 2: SAS 2 Route Options Multi Criteria Analysis

MCA criteria	Assessment Sub-Criteria	M1 Option 1	M1 Option 2
Economy	1.a. Capital Cost	Capital Cost: €4.65M Length: 2.57 km Cost/Km: 1.81M ***Indicative Scheme Infrastructure* Works Cost** - **€**12.5M ***Land Acquisition Cost*** - € 0.33M - 219sq.m. of residential land	Capital Cost: €3.83M Length: 2.75km Cost/Km: 1.49M ***Indicative Scheme Infrastructure* Works Cost** - **€**3.83M ***No Land Acquisition Cost***
	Rank		
	1.b. Transport Reliability and Quality (Journey Time)	Journey Time: 14 mins both directions Length: 2.57 km No. of Junctions: 9 No. of pedestrian crossings: 2	Journey Time: 14 mins both directions Length: 2.57km No. of Junctions: 9 No. of pedestrian crossings: 2
	Rank		
Integration	2.a. Land Use Integration	Integrates with existing / planned residential, educational, medical and leisure uses in this established area.	Integrates with existing / planned residential, educational, medical and leisure uses in this established area.
	Rank		
	2.b. Residential Population and Employment Catchments	***Residential Population Catchments*** - 5 minute walk catchment of approximately 2,731 - 10 minute walk catchment of approximately 6,748 - 15 minute walk catchment of approximately 16,381 ***Employment catchments*** 15 minute walk catchment of approximately 8,390 ***Education catchments*** 15 minute walk catchment of approximately 5,869	***Residential Population Catchments*** - 5 minute walk catchment of approximately 2,731 - 10 minute walk catchment of approximately 6,748 - 15 minute walk catchment of approximately 16,381 ***Employment catchments*** 15 minute walk catchment of approximately 8,390 ***Education catchments*** 15 minute walk catchment of approximately 5,869
	Rank		
	2.c. Transport Network Integration	Potential for interchange with the DART.	Potential for interchange with the DART.
	Rank		
	2.d. Cycle Network Integration	Both directions of the CBC align with primary route 13 as identified in the GDA Cycle Network Plan. See report Section 2 Figure 3.	Both directions of the CBC align with primary route 13 as identified in the GDA Cycle Network Plan. See report Section 2 Figure 3.
	Rank		

	2.e. Traffic Network Integration	Temple Road -Provision of full bus and cycle facilities to consolidate existing cycle lanes although this will require converting significant lengths of shared traffic lanes to segregated bus lanes –Moderate negative impact Frascati Road -Provision of full bus and cycle facilities to consolidate existing cycle lanes although this will require converting significant lengths of shared traffic lanes to segregated bus lanes –Moderate negative impact Rock Road-Provision of full bus and cycle facilities to consolidate existing bus and cycle lanes although this will require converting small lengths of shared traffic lanes to segregated bus lanes –Minor negative impact	Temple Road -Provision of full bus and cycle facilities to consolidate existing cycle lanes although this will require converting significant lengths of shared traffic lanes to segregated bus lanes –Moderate negative impact Frascati Road -Provision of full bus and cycle facilities to consolidate existing cycle lanes although this will require converting significant lengths of shared traffic lanes to segregated bus lanes –Moderate negative impact Rock Road-Provision of full bus and cycle facilities to consolidate existing bus and cycle lanes although this will require converting small lengths of shared traffic lanes to segregated bus lanes –Minor negative impact
	Rank		
Accessibility & Social Inclusion	3.a. Key Trip Attractors (Education/Health/Commercial/Employment)	- St Vincent's Hospital - Blackrock Village See Appendix B Figure 2.	- St Vincent's Hospital - Blackrock Village See Appendix B Figure 2.
	Rank		
	3.b. Deprived Geographic Areas	This option primarily serves areas considered a**ffluent** and **very affluent** in the Pobal Deprivation Index. It also serves a very small number of areas considered **marginally above** and **marginally below average.**	This option primarily serves areas considered a**ffluent** and **very affluent** in the Pobal Deprivation Index. It also serves a very small number of areas considered **marginally above** and **marginally below average.**
	Rank		
Safety	4.a. Road Safety	No. of Junctions:9 No turning movements and full bus lane segregation	No. of Junctions: 9 No turning movements though left turning traffic mix with buses at junction
	Rank		
Physical Activity	5.a Physical Activity	This criterion relates to the health benefits derived from using different transport modes. The subject scheme options under consideration relate to the same mode of travel (bus). As such, this criterion will not produce any relative differences between the options. The physical benefits associated with the scheme will be quantified as part of a future Cost – Benefit Analysis.	This criterion relates to the health benefits derived from using different transport modes. The subject scheme options under consideration relate to the same mode of travel (bus). As such, this criterion will not produce any relative differences between the options. The physical benefits associated with the scheme will be quantified as part of a future Cost – Benefit Analysis.
	Rank		
Environment	6.a. Archaeology and Cultural Heritage	The route borders the South Dublin Bay and River Tolka Estuary SPA and the South Dublin Bay SAC/pNHA at a distance of 200m for a duration of 2.2km however there are no predicted impacts	The route borders the South Dublin Bay and River Tolka Estuary SPA and the South Dublin Bay SAC/pNHA at a distance of 200m for a duration of 2.2km however there are no predicted impacts
	Rank		
	6.b. Architectural Heritage	No impact on protected structures	Negligible effects on existing flora and fauna
	Rank		
	6.c. Flora & Fauna	Negligible effects on existing flora and fauna	Negligible effects on existing flora and fauna
	Rank		

	6.d. Soils and Geology	No appreciable impacts	No appreciable impacts
	Rank		
	6.e. Hydrology	The Rock Rd has previously been flooded in 2002 and previous to this in 1963. A flood event was recorded on Temple Rd in 2011 also. The scheme is not expected to impact on hydrology.	The Rock Rd has previously been flooded in 2002 and previous to this in 1963. A flood event was recorded on Temple Rd in 2011 also. The scheme is not expected to impact on hydrology.
	Rank		
	6.f. Landscape and Visual	Minor impact on landscape and visual	Minor impact on landscape and visual
	Rank		
	6.g. Air Quality	Minor impact on air quality	Minor impact on air quality
	Rank		
	6.h. Noise & Vibration	Minor impact on noise and vibration	Minor impact on noise and vibration
	Rank		
	6.i. Land Use Character	Land use character will remain unchanged	Land use character will remain unchanged
	Rank		

Appendix B – Data Collection

1. Study area visit

Each of the route sections were visited / driven, photographed and audited to identify any constraints which may not have been evident from maps and drawings. The site visits enabled a comprehensive evaluation of the route options in terms of their capacity to accommodate of a core bus corridor.

2. Land Use

The land use assessment was carried out using GIS and examined private and public land along the different route options. This information was used for developing cost estimates for each of the route options, based on the area and nature (public or private) of the land acquisition required. The land use assessment results are presented in the MCA tables in Appendix A.

3. Existing Bus Lanes

A map indicating the existing bus lanes throughout the CBC study area was produced to highlight sections of the corridor already capable of accommodating segregated facilities. Blue routes indicate inbound bus lanes while red routes indicated outbound bus lanes.

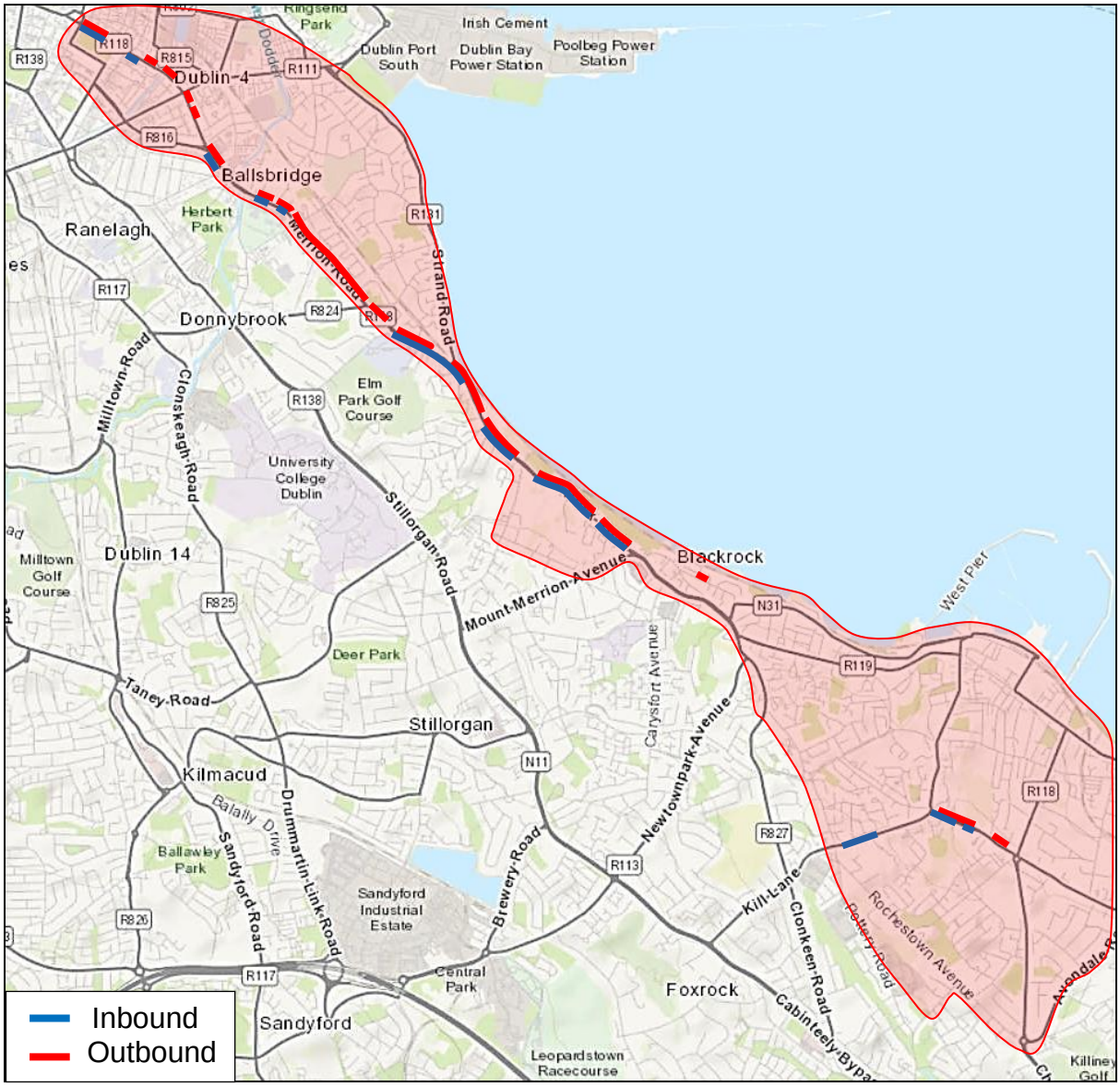


Figure 1: Existing bus lanes within the study area

4. Bus Journey Times

The bus travel times for each scheme option along the CBC were estimated based on a number of criteria, including;

- Length of segregated bus lane (suburban)
- Length of shared bus / traffic lane (urban / city centre)
- Number of signalised junctions with no turning lane and good priority
- Number of signalised junctions with no turning lane and poor priority
- Number of signalised junctions with right turning lane and good priority
- Number of signalised junctions with right turning lane and poor priority
- Number of signalised junctions with left turning lane and good priority
- Number of signalised junctions with left turning lane and poor priority
- Number of pedestrian crossings
- Number of busy bus stops
- Number of average use bus stops
- Number of lightly used bus stops

Due to the large number of route options and calculations, the results of the bus journey time estimates are presented in Appendix C.

5. Trip attractors

A map was produced to illustrate the location of the main trip destinations within the CBC study area, including IADT College, Dun Laoghaire, Blackrock Village, Blackrock Clinic, UCD, St. Vincent's Hospital, RTE, RDS, Ballsbridge, Sandymount Village and Aviva Stadium. Also identified were interchange points between different modes of public transport i.e. bus and rail routes. It is important that the CBC is designed to facilitate easy interchange for commuters between different transport systems along its route. This map was used to identify 'spider-web' routes sections for bus routes within the study area which could optimise connectivity between trip attractor destinations.

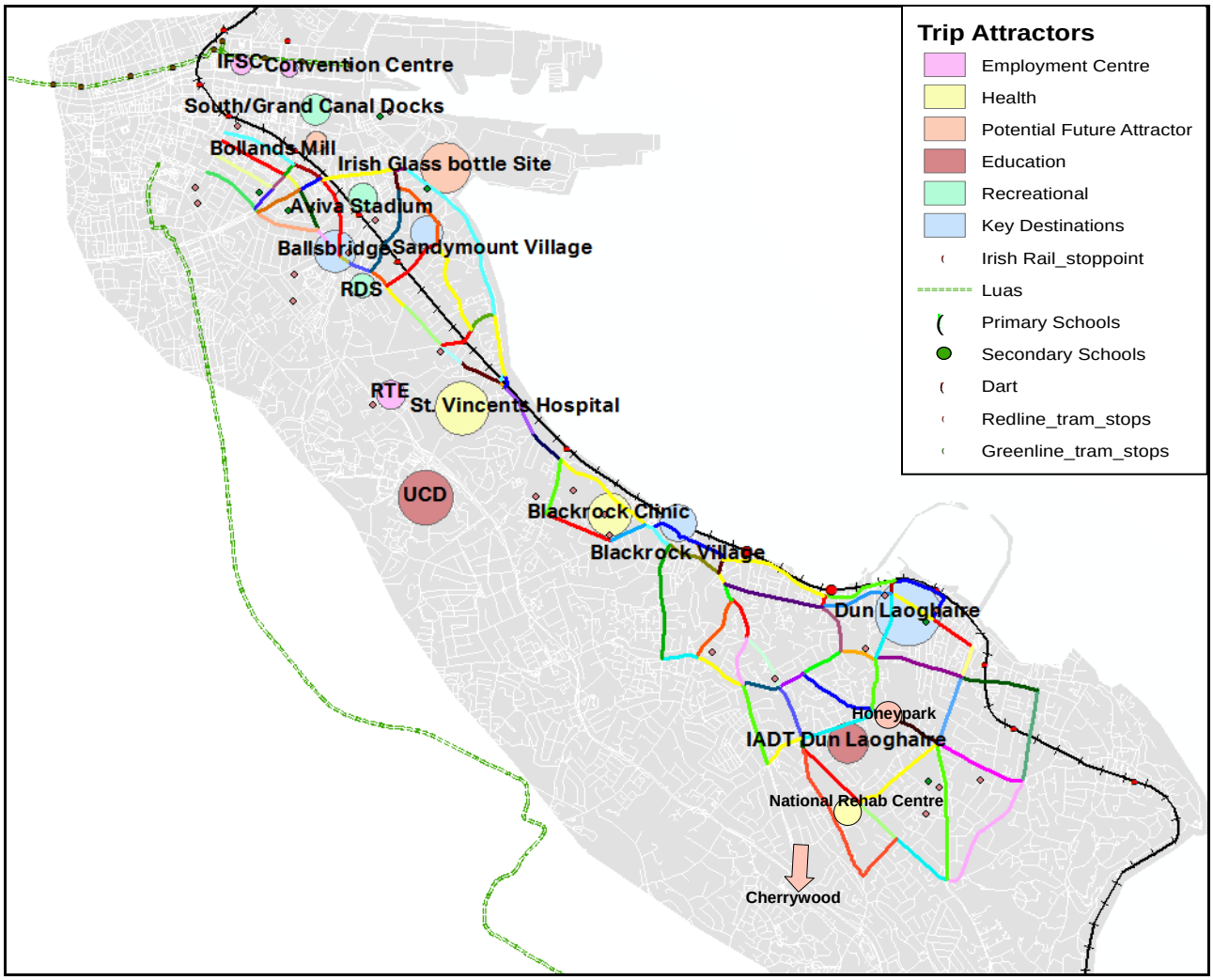


Figure 2: Trip attractors in the study area

6. Road collision history

The Road Safety Authority database of personal injury accidents was examined to establish if there are any existing safety issues in the study area that were not evident from the site visits. The database provides accident records for the period 2005 to 2013; in terms of location, year, road user type involved (pedestrian, car, cyclist, motorcyclist, bus etc.), circumstances and severity of collision (minor, serious or fatal). The following bus collision history maps indicate the location of incidents along the route options identified within each Study Area Section.

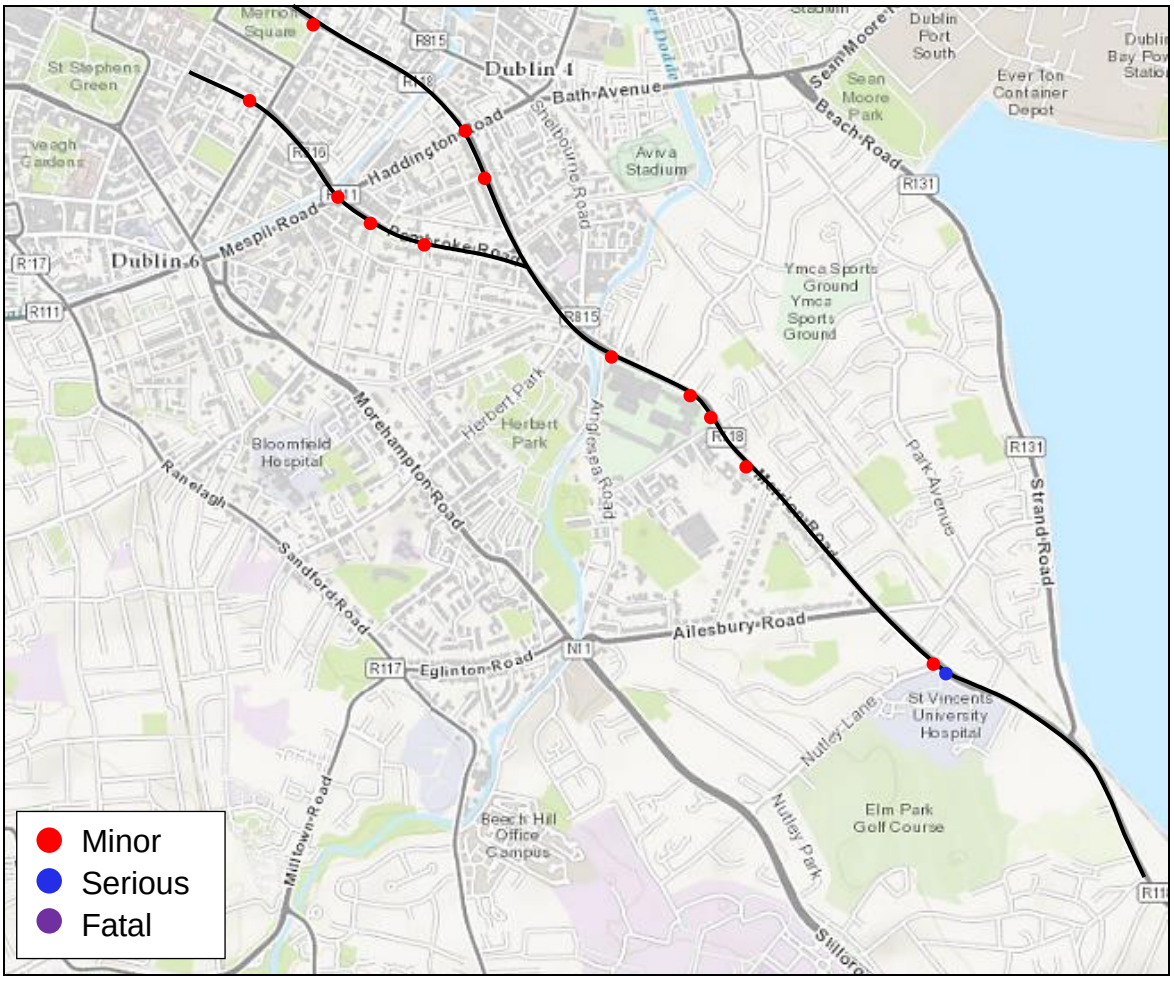


Figure 3: Bus collision history along SAS 1 route options

Figure 4: Bus collision history along SAS 2 route options

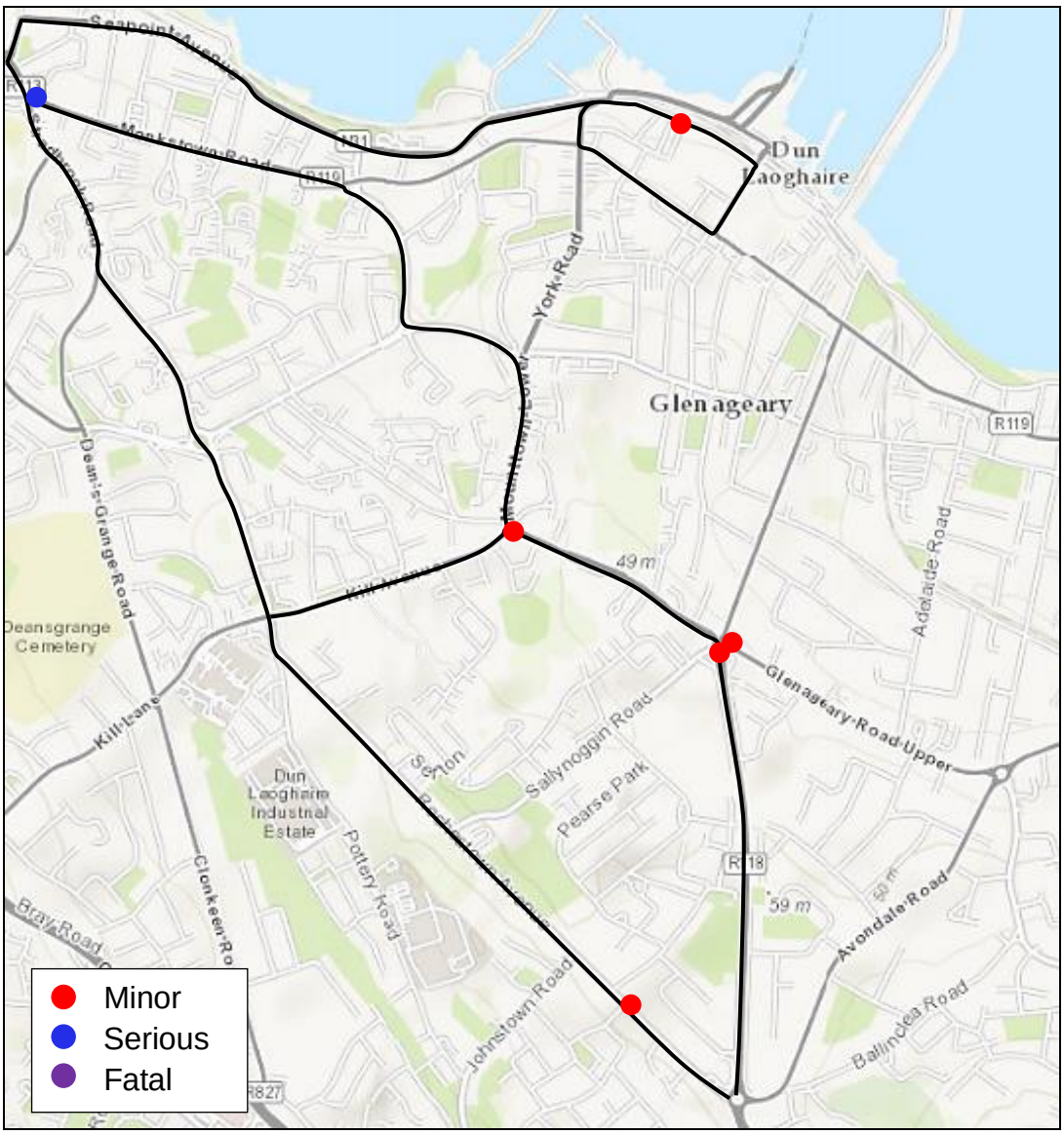


Figure 5: Bus collision history along SAS 3 route options

7. Tree surveys

Dr. Phillip Blackstock was commissioned to carry out a detailed and high-level tree survey along the route options. The tree survey assessment identified the number and approximate location of all roadside trees along the route options, as well as trees and hedges growing on adjoining grounds where their canopy extends over the carriageway. It also noted the location of those trees that have trunks or limbs close to and or within 5.1m above the carriageway. Due to the large number of drawings received, the results of the tree survey are contained in a separate document.

8. Permeability

An analysis for maximisation of accessibility through permeability opportunities in the Dun Laoghaire area has been completed and incorporated in the overall assessment. A number of permeability opportunities were identified along Rochestown Avenue which could significantly increase the number of people within a 5, 10 and 15 minute walking distance from the existing bus stops.

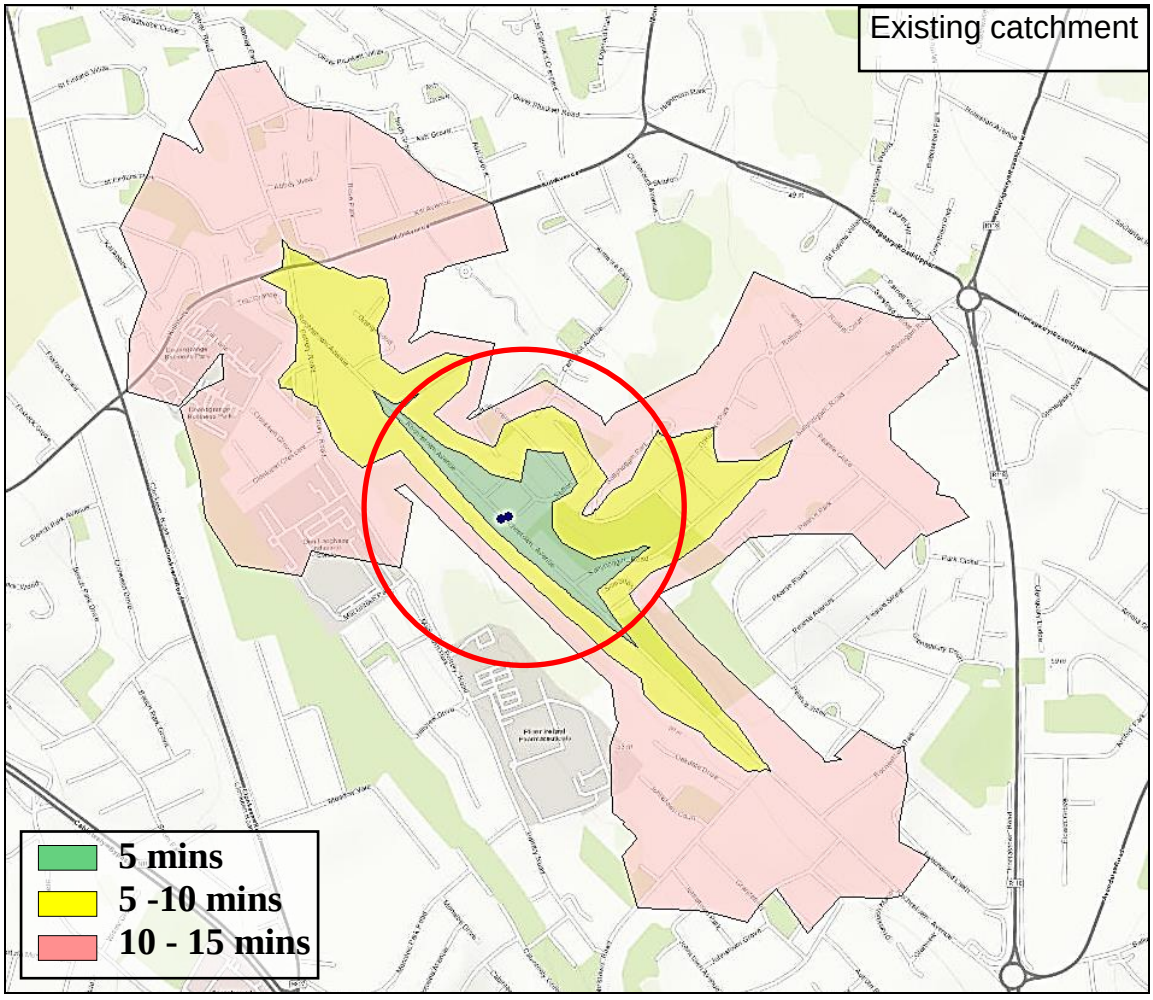


Figure 6: Existing catchment for bus stops on Rochestown Avenue

Figure above illustrates the existing catchment zones for the bus stops located midway along Rochestown Avenue. Figure below illustrates the proposed permeability routes (within the red circle in Figure above) which would greatly improve accessibility to the bus stops for a wider community.

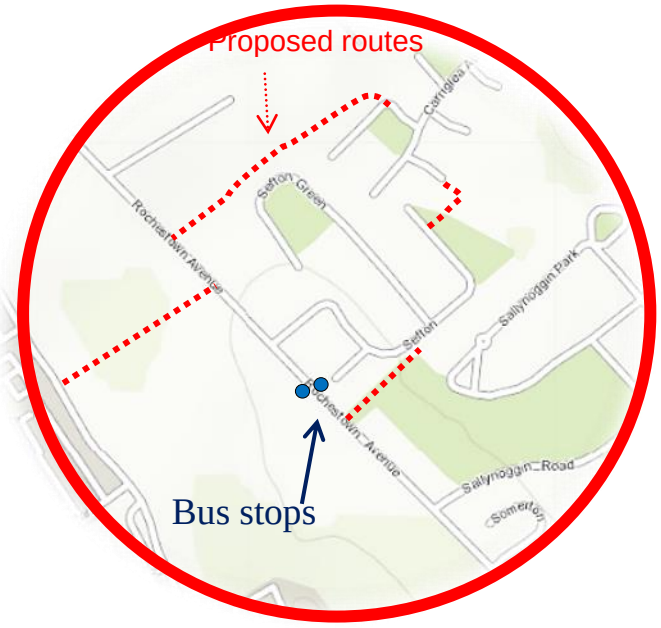


Figure 7: proposed permeability routes

Figure 8 below illustrates the new catchment zones for the Rochestown Avenue bus stops if the permeability routes were introduced for pedestrians.

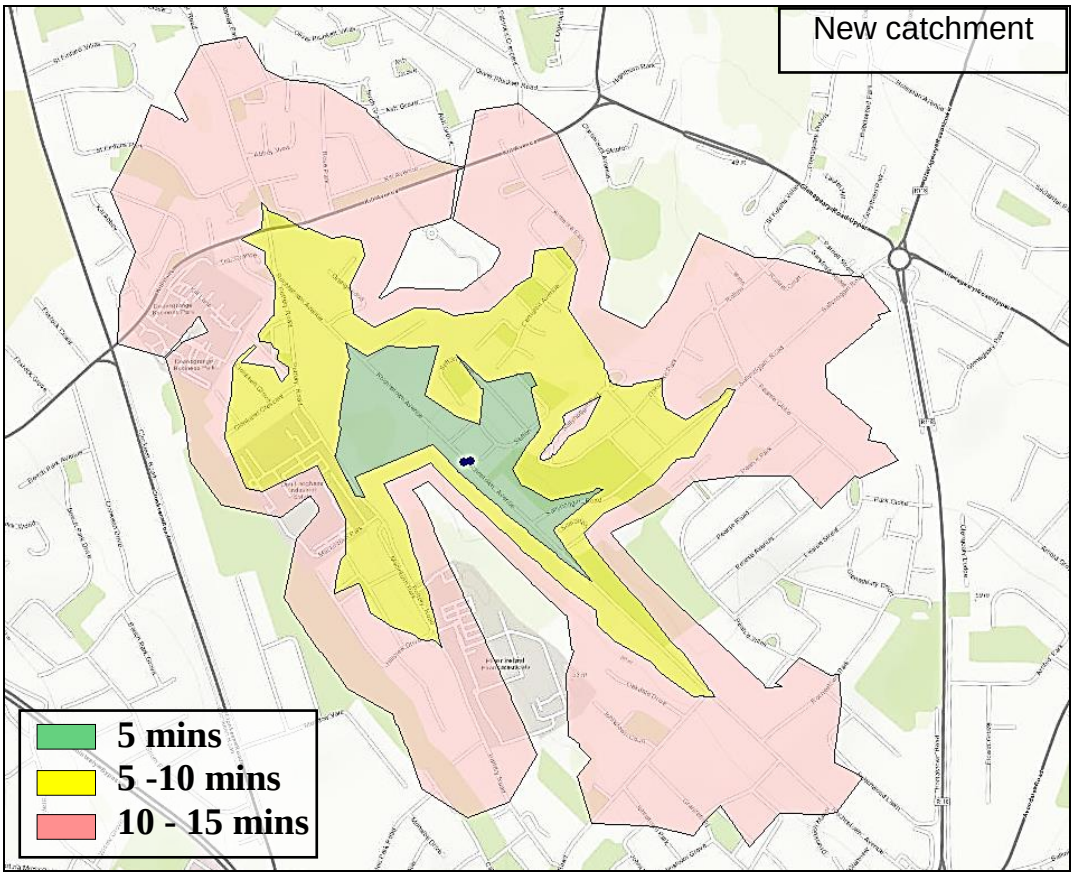


Figure 8: New (potential) catchment for bus stops on Rochestown Avenue

Table 1: Comparison of the new catchment against existing catchment

Walking time	Population
5 mins	79%
5 - 10 mins	53%
10 - 15 mins	16%
Within 15 mins	**24%**

Walking time	Destination Education
5 mins	100%
5 - 10 mins	244%
10 - 15 mins	32%
Within 15 mins	**67%**

Walking time	Destination Employment
5 mins	228%
5 - 10 mins	147%
10 - 15 mins	19%
Within 15 mins	**43%**

Table 1 shows that the number of people living within a 5 minute walking distance of the bus stops would increase by 79% if the permeability routes were introduced. Further, the percentage of people working or attending an educational institution within a 5 minute walk of the bus stops would increase by 228% and 100% respectively. This exemplifies the significant catchment area improvements which could be achieved by opening up several pedestrian routes along Rochestown Avenue to neighbouring housing estates.

9. Vertical alignments

Existing vertical alignments of all route options were examined as part of the scheme option designs development. The following images illustrate the road elevation along each of the routes.

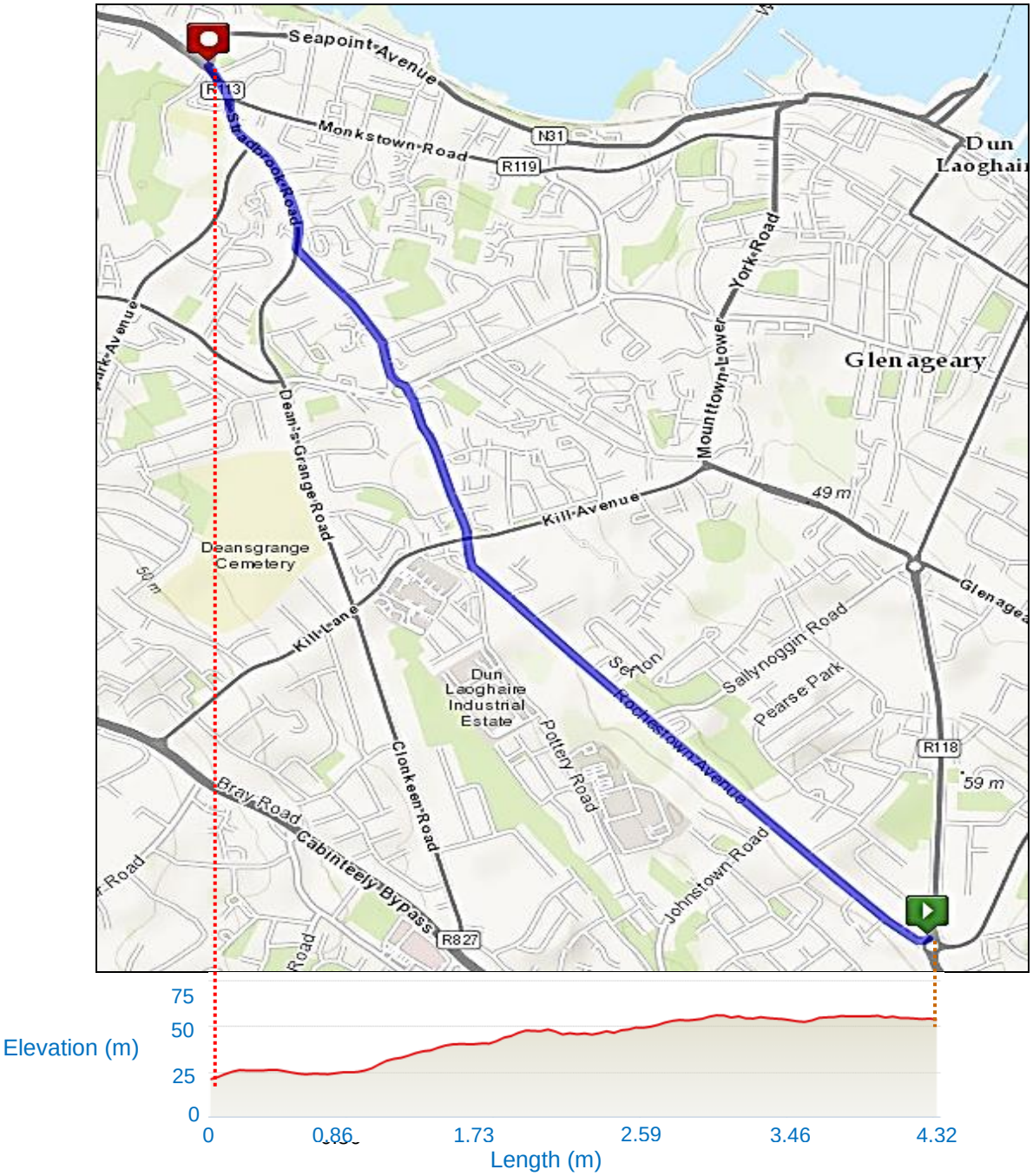


Figure 9: Vertical alignment of scheme option S1 in the inbound direction

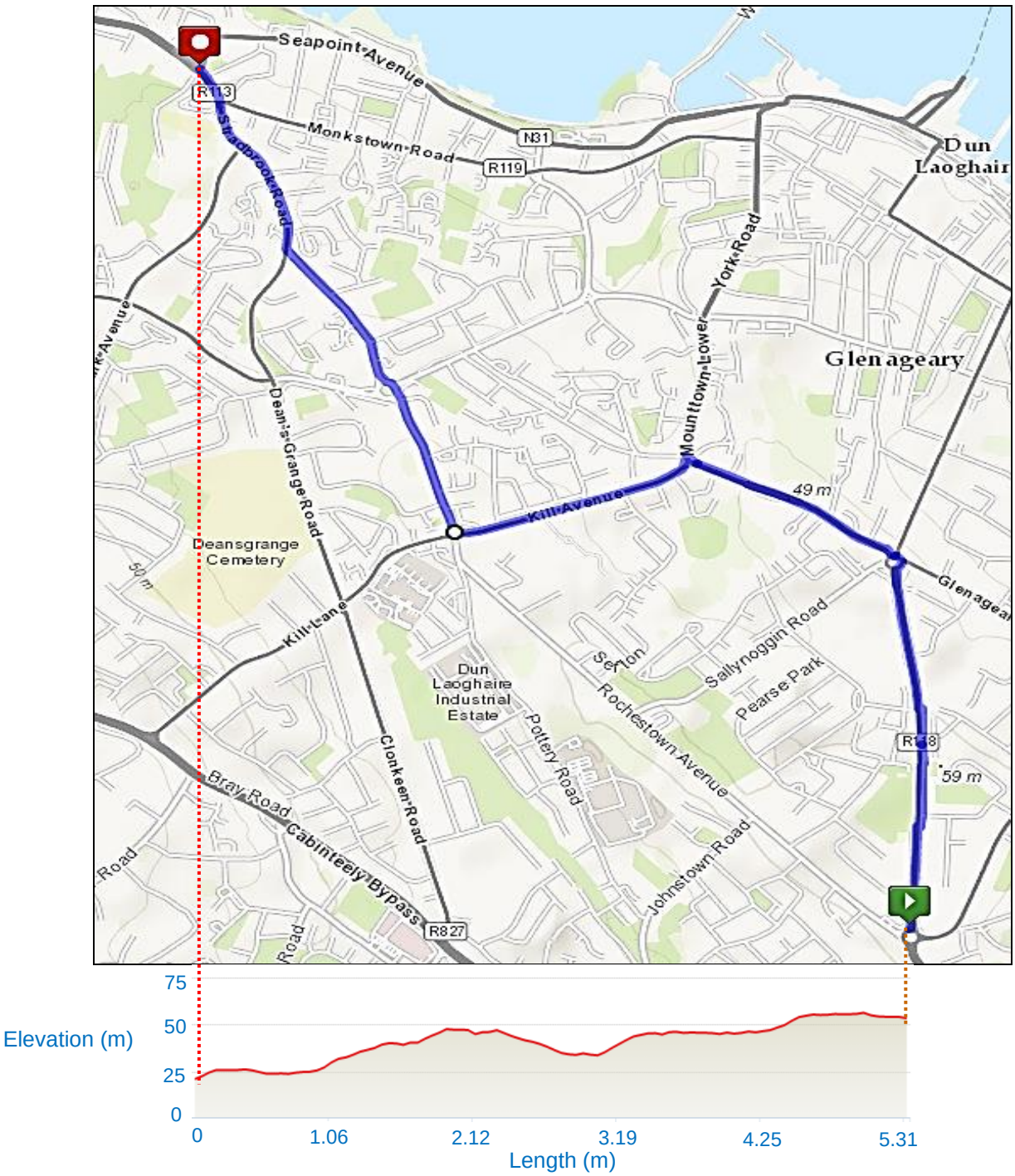


Figure 10: Vertical alignment of scheme option S2 in the inbound direction

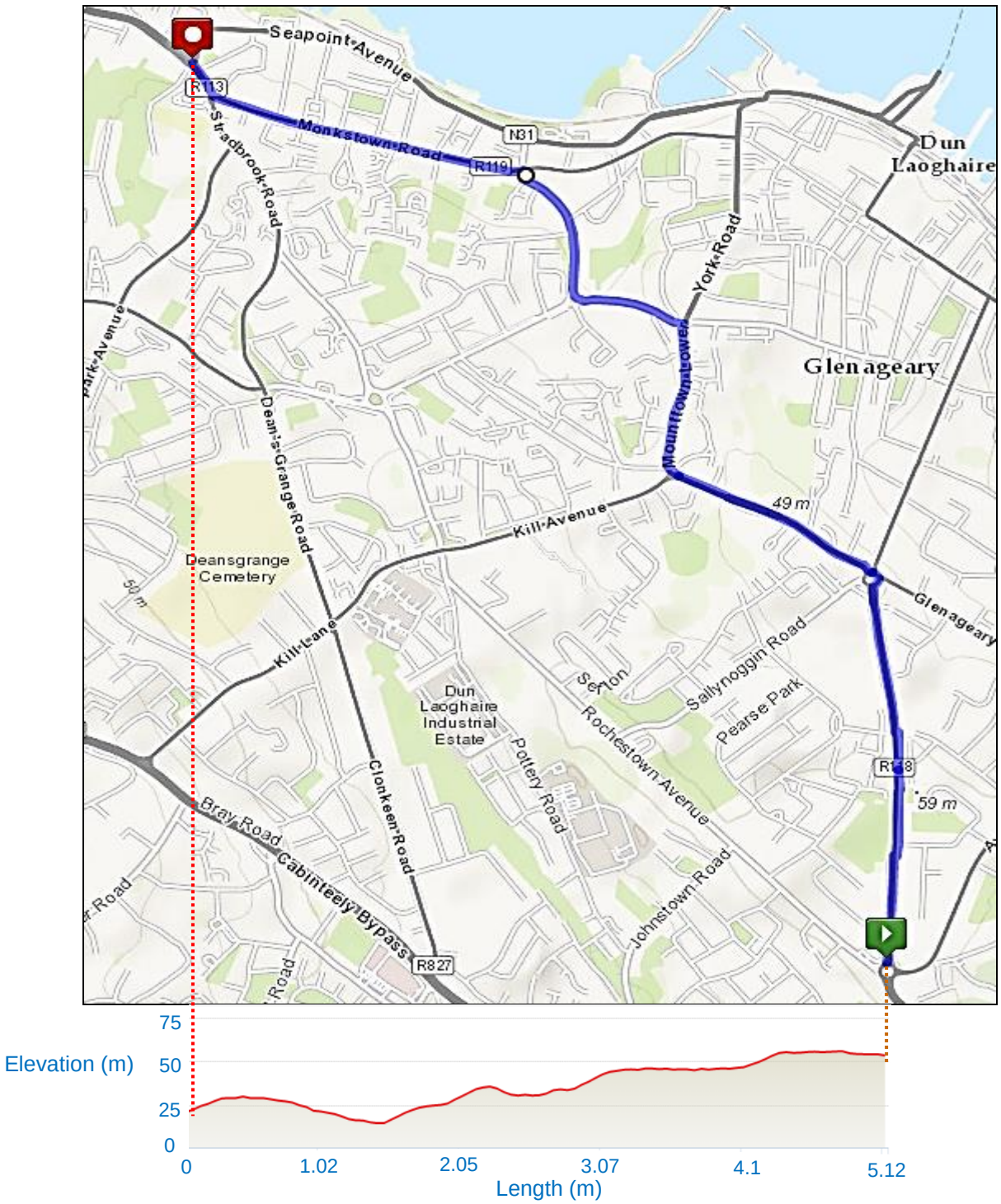


Figure 11: Vertical alignment of scheme option S3 in the inbound direction

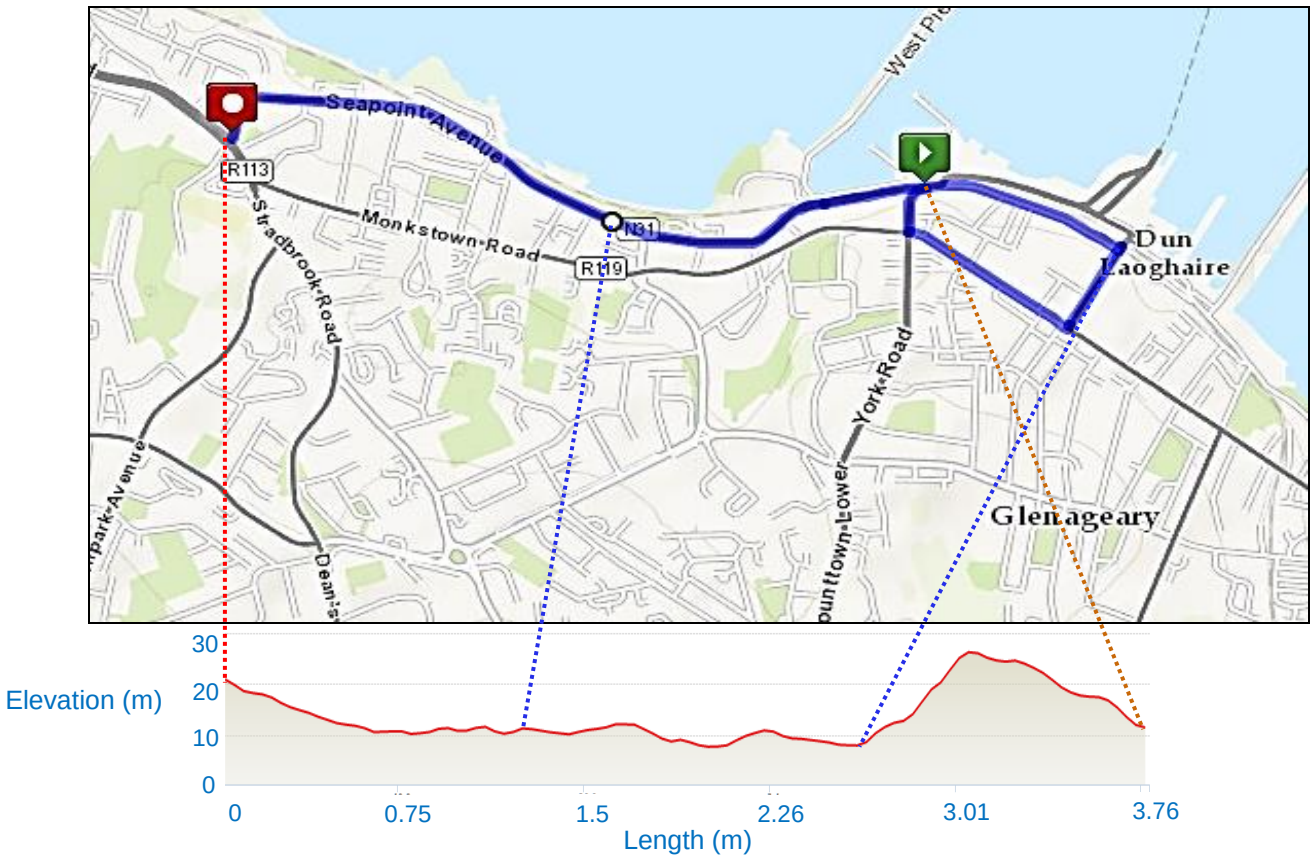


Figure 12: Vertical alignment of scheme option S4 in the inbound direction

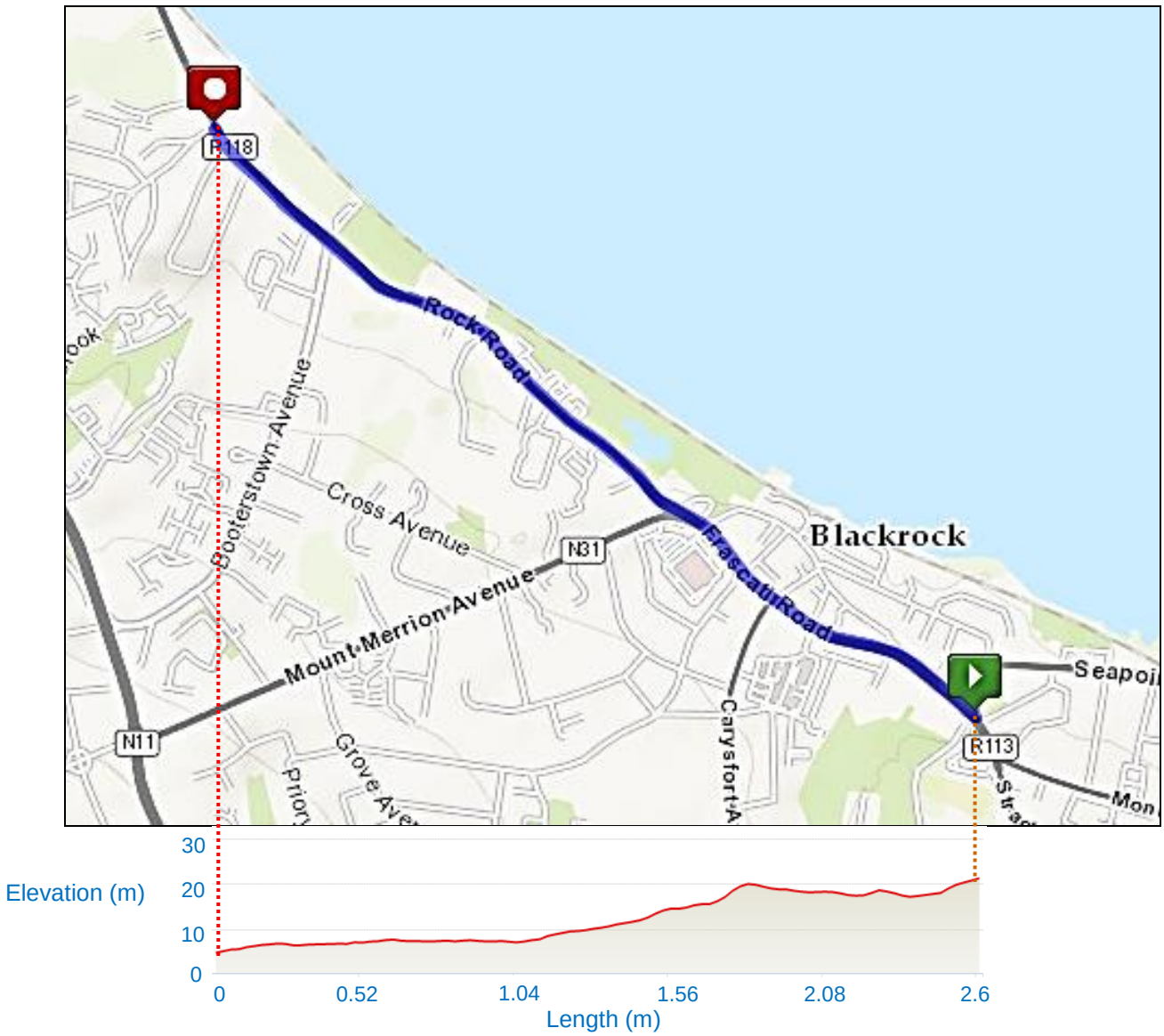


Figure 13: Vertical alignment of scheme option M1 in the inbound direction

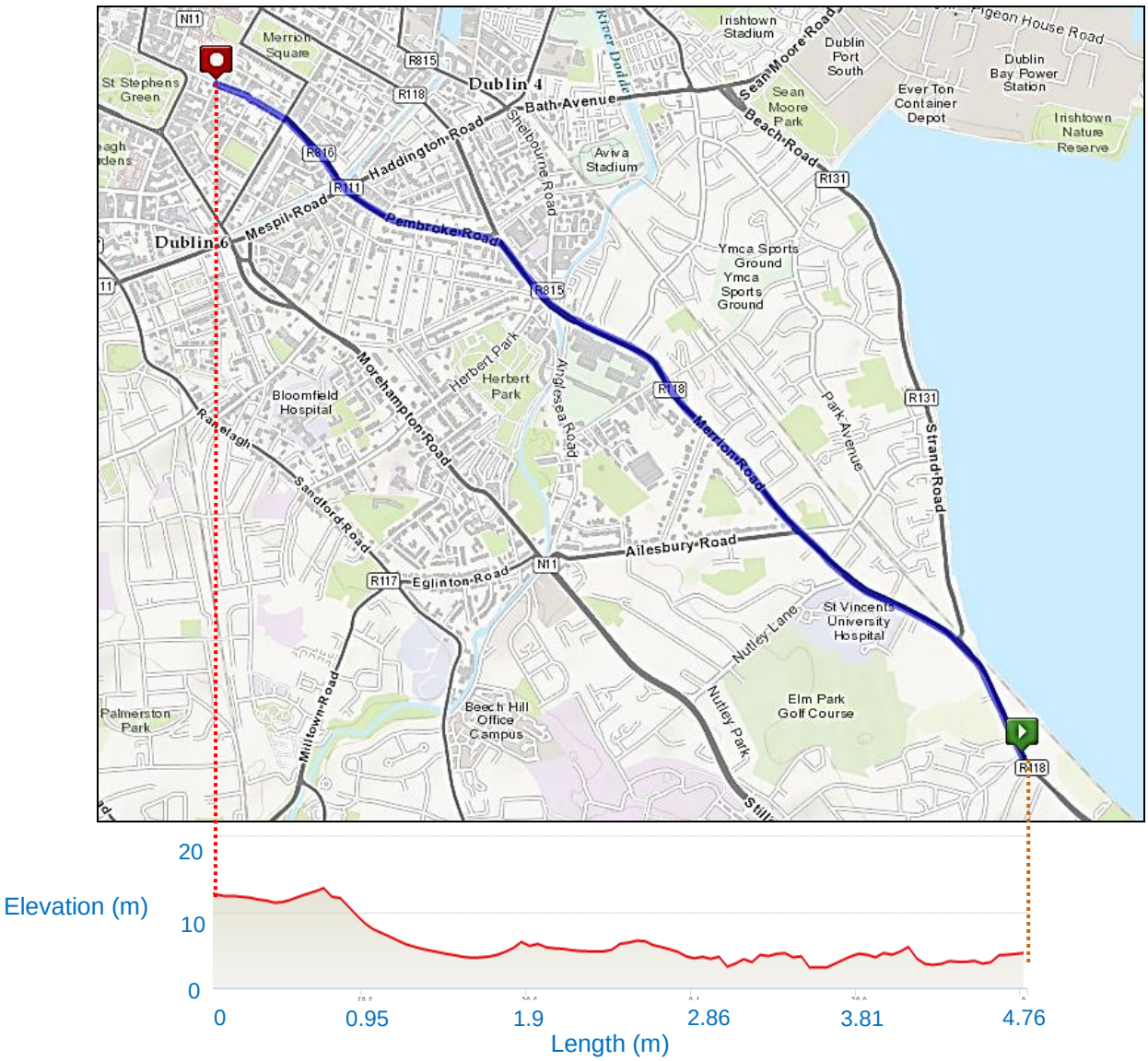


Figure 14: Vertical alignment of scheme option N1 in the inbound direction

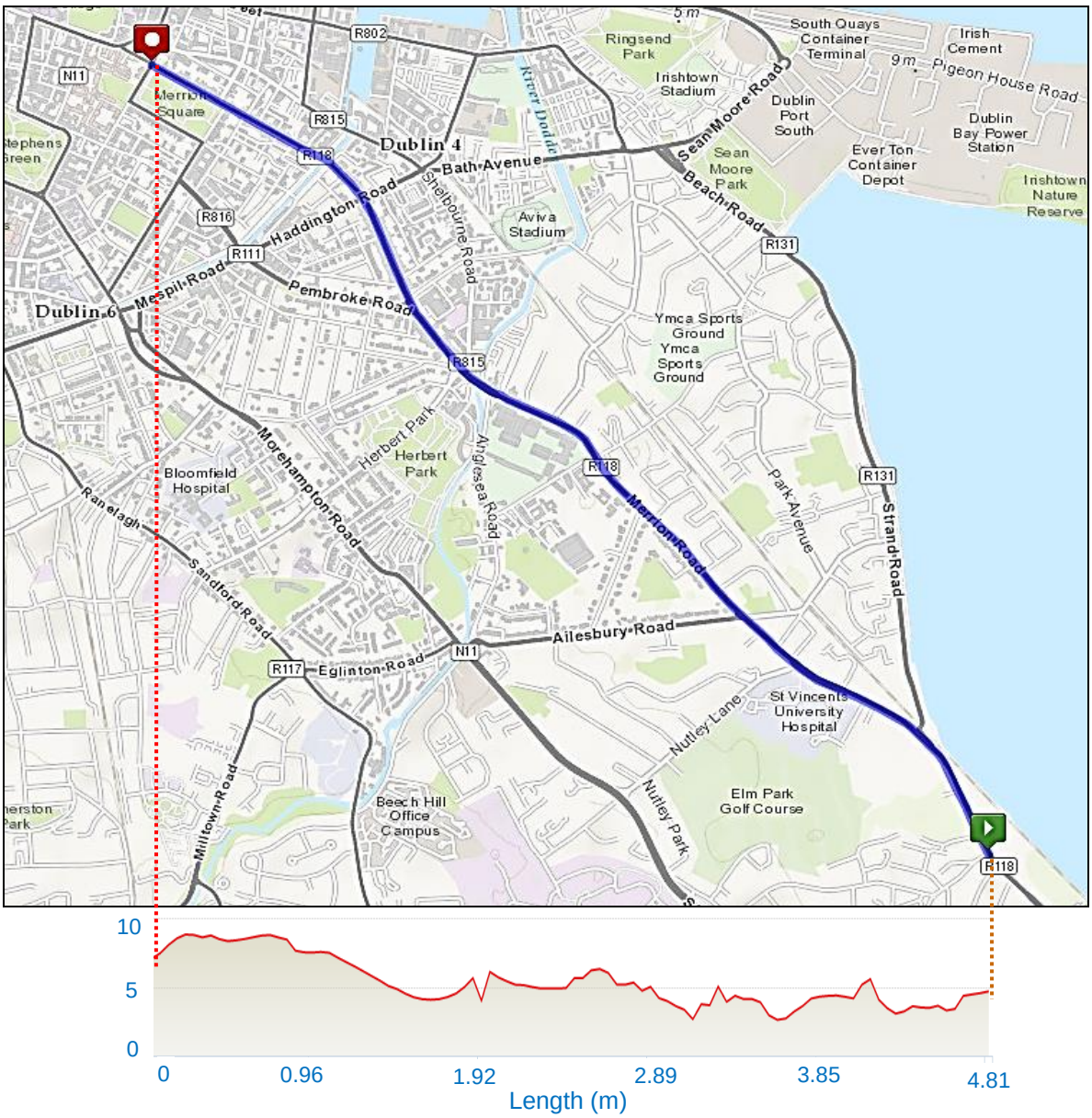


Figure 15: Vertical alignment of scheme option N2 in the inbound direction

10. Architectural and Archaeological information

Irish Archaeological Consultancy (IAC) and Roughan & O' Donovan (ROD) provided an environmental assessment of the different route options under the following criteria:

- Archaeology and Cultural Heritage
- Architectural Heritage
- Flora & Fauna
- Soils and Geology
- Hydrology
- Landscape and Visual
- Air Quality
- Noise & Vibration
- Land Use Character

The architectural and archaeological assessment results are presented in the MCA tables in Appendix A.

11. Problem identification

A detailed assessment of each route option was carried out to identify existing problems and constraints under the following criteria;

- Cycle Facilities
- Road Condition
- Pinch Points
- Footpath Condition
- Mobility Impaired and Disabled
- Dangerous Structures/Buildings
- Public Lighting
- Access Points
- Electricity Poles

The results of this assessment are contained in a report in Appendix D.

12. Parking survey

A parking survey study was carried out to identify the parking conditions in the existing road network. Each route was assessed under the following criteria:

- *Formal Parking:* On-street parking in which marked spaces has been provided. These are spaces in which the Local Authority charges an hourly rate to use.
- *Informal Parking:* On-street parking in which spaces may or may not be marked and in which the Local Authority does not charge for use.
- *Adjacent Parking:* Parking which is accessible to the general public and is located in close proximity to the street. These are spaces in which the Local Authority charges an hourly rate to use.

The results of the parking survey assessment are contained in a report in Appendix E.

13. Cost estimates

A breakdown of the cost estimation process is presented in Appendix F.

Appendix C – Bus Journey Times

1. SAS 1

1.1 N1 Scheme Options

Dun Laoghaire to City Centre Core Bus Corridor Scheme			**N1 Option 1**		**N1 Option 2**	
	km per Hour	*Average Delay (Minute)*	**Inbound**	**Outbound**	**Inbound**	**Outbound**
Length (km) of Fully Segregated Bus Lane	20		4.4	4.4	2.73	2.73
Length (km) of Shared Bus/Traffic Lane (suburban)	10				1.67	1.67
Length (km) of Shared Bus/Traffic Lane (urban/city centre)	8					
Number of Signalised Junctions with No turning and good Priority (15 Seconds)		0.25	14	14	14	14
Number of Signalised Junctions with No turning and poor Priority (60 Seconds)		1.00				
Number of Signalised Junction with Right turning Lane and Good Priority (45 seconds)		0.75				
Number of Signalised Junctions with Right turn and Poor Priority (2 minutes)		2.00				
Number of Signalised Junctions with Left turning Lane and Good Priority (30 seconds)		0.50				
Number of Signalised Junctions with Left turn and Poor Priority (2 minutes)		2.00				
Number of Pedestrian Crossings (15 second average)		0.25	3	3	3	3
Number of Busy Bus Stops; Dwell Time (60 seconds)		1.00				
Number of Average use Bus Stops; Dwell Time (30 Seconds)		0.50	17	17	17	17
Number of Lightly Used Bus Stops; Dwell Time (10 seconds)		0.17	3	3	3	3
Total Journey Time(Minutes)			26	26	31	31

1.2 N2 Scheme Options

Dun Laoghaire to City Centre Core Bus Corridor Scheme			**N2 Option 1**		**N2 Option 2**	
	km per Hour	*Average Delay (Minute)*	**Inbound**	**Outbound**	**Inbound**	**Outbound**
Length (km) of Fully Segregated Bus Lane	20		4.5	4.5	3.06	2.7
Length (km) of Shared Bus/Traffic Lane (suburban)	10				1.44	1.80
Length (km) of Shared Bus/Traffic Lane (urban/city centre)	8					
Number of Signalised Junctions with No turning and good Priority (15 Seconds)		0.25	15	15	15	15
Number of Signalised Junctions with No turning and poor Priority (60 Seconds)		1.00				
Number of Signalised Junction with Right turning Lane and Good Priority (45 seconds)		0.75				
Number of Signalised Junctions with Right turn and Poor Priority (2 minutes)		2.00				
Number of Signalised Junctions with Left turning Lane and Good Priority (30 seconds)		0.50				
Number of Signalised Junctions with Left turn and Poor Priority (2 minutes)		2.00				
Number of Pedestrian Crossings (15 second average)		0.25	4	4	4	4
Number of Busy Bus Stops; Dwell Time (60 seconds)		1.00				
Number of Average use Bus Stops; Dwell Time (30 Seconds)		0.50	16	16	16	16
Number of Lightly Used Bus Stops; Dwell Time (10 seconds)		0.17	3	3	3	3
Total Journey Time(Minutes)			27	27	31	32

2. SAS 2

2.1 M1 Scheme Options

Dun Laoghaire to City Centre Core Bus Corridor Scheme			**M1 Option 1**		**M1 Option 2**	
	km per Hour	*Average Delay (Minute)*	**Inbound**	**Outbound**	**Inbound**	**Outbound**
Length (km) of Fully Segregated Bus Lane	20		2.57	2.57	2.57	2.57
Length (km) of Shared Bus/Traffic Lane (suburban)	10					
Length (km) of Shared Bus/Traffic Lane (urban/city centre)	8					
Number of Signalised Junctions with No turning and good Priority (15 Seconds)		0.25	9	9	9	9
Number of Signalised Junctions with No turning and poor Priority (60 Seconds)		1.00				
Number of Signalised Junction with Right turning Lane and Good Priority (45 seconds)		0.75				
Number of Signalised Junctions with Right turn and Poor Priority (2 minutes)		2.00				
Number of Signalised Junctions with Left turning Lane and Good Priority (30 seconds)		0.50				
Number of Signalised Junctions with Left turn and Poor Priority (2 minutes)		2.00				
Number of Pedestrian Crossings (15 second average)		0.25	2	2	2	2
Number of Busy Bus Stops; Dwell Time (60 seconds)		1.00				
Number of Average use Bus Stops; Dwell Time (30 Seconds)		0.50	7	7	7	7
Number of Lightly Used Bus Stops; Dwell Time (10 seconds)		0.17	3	3	3	3
Total Journey Time(Minutes)			14	14	14	15

Appendix D – Problem Identification

1. Introduction

AECOM have been tasked by the National Transport Authority (NTA) to identify viable routes for a Core Bus Corridor which aims to provide ease of bus travel with the objective of improving journey times from South County Dublin into Dublin City Centre.

This report shall seek to identify problems with the existing conditions in the road network. Each route was assessed using the following criteria:

- *Cycle Facilities* – Each road along the possible route options were checked to see if cycle facilities such as cycle tracks have been provided and if so, the condition of the construction materials used.
- *Road Condition* - The roads along each route were assessed to determine the existing conditions of the road pavement, both the condition of the existing surface course and also the visibility of road markings, both in the carriageway and at existing bus stops.
- *Pinch Points* - Pinch points were assessed on whether each route could provide the minimum road standard width requirement to provide a two-way carriageway, a cycle track and a footpath. In areas that roads do not provide the minimum widths required these areas are identifiable as “pinch points”.
- *Footpath Condition* - The condition of the footpaths were also assessed along the possible route options to check for sections which have become dilapidated over time. The footpaths were also checked for uprights and traffic signs which may cause obstructions to pedestrians.
- *Mobility Impaired and Disabled* – Each road on the route options were assessed to determine if the correct facilities have been provided to ensure unrestricted movement, in the safest possible manner, for people with mobility impairments.
- *Dangerous Structures/Buildings* - Along each route, any buildings or structures which may potentially pose a health and safety risk to the general public and which may pose a hazard during any proposed construction works were recorded.
- *Public Lighting* – Public lighting columns along each route have been checked for damage. Any damage to the existing public lighting which may pose a hazard to the general public, and the location of same, was then duly recorded.
- *Access Points* – Each access point has been assessed to analyse the condition of pavements.
- *Electricity Poles* – Electricity Poles along each of the separate route options have been checked for damage. The location of the damaged poles have been recorded and also the damage that has occurred.
- Retaining Walls – Retaining walls locations have been identified along each of the separate routes.

2. SAS 3: Dun Laoghaire – Blackrock Route Options

2.1. Route Option S1: Rochestown Avenue/Abbey Road/Stradbrook Road

- Route Map Cycle Facilities

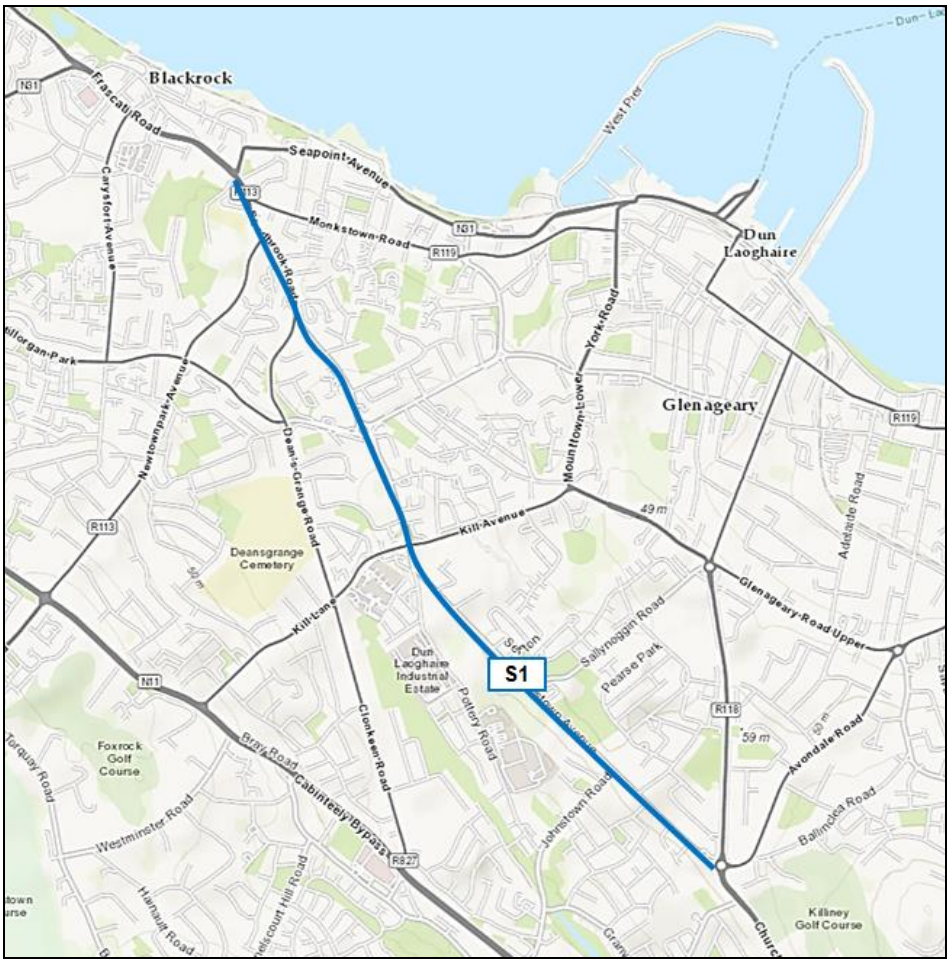


Figure 2.1: S1 Route Map

- Cycle Facilities

There are no cycle facilities along the full length of Rochestown Avenue from the Graduate Roundabout to the Rochestown/Pottery Lane junction, examples of which may be seen on Figure 2.2**Error! Reference source not found.** and Figure 2.3 below.

Figure 2.2: Example of lack of cycle facilities on Rochestown Avenue

Figure 2.3: Example of lack of cycle facilities on Rochestown Avenue

There are no cycle facilities along the length of Abbey Road until the approach to Abbey Road/Stradbrook Road/Monkstown Avenue roundabout, as shown in Figure 2.4 below.

Figure 2.4: Example of lack of cycle facilities on Abbey Road

There are no cycle facilities along Stradbrook Road from the Monkstown Avenue/ Abbey Road/Rockford roundabout to Stradbrook Lawn, examples of which are shown on Figure 2.5 **Error! Reference source not found.** and Figure 2.6 below.

Figure 2.5: Example of lack of cycle facilities on Stradbrook Road

Figure 2.6: Cycle facilities approaching Stradbrook Road/Rowan Park junction

Cycle lanes are provided (see Figure 2.7 below) including a shared surface segregated footpath (see Figure 2.8) along the route from the Stradbrook Road/Stradbrook Lawn junction to the Stradbrook Road/Monkstown Road junction.

Figure 2.7: Cycle facilities on approach to Stradbrook road/Newtownpark Avenue junction

Figure 2.8: Shared surface footpath Stradbrook Road

- Roads

Figure 2.9**Error! Reference source not found.** and Figure 2.10**Error! Reference source not found.** below show examples of the poor road conditions and markings as identified on Route Option S1.

Figure 2.9 Example of poor road condition along Rochestown Avenue

Figure 2.10: Dilapidated road condition at entrance to National rehab Centre

- Pinch Points

A pinch point was found at one location along this route namely a footpath with a width below the recommended standard width of 1.8m as shown in Figure 2.11 below.

Figure 2.11: Example of footpath with reduced width on Rochestown Avenue opposite Killiney Shopping Centre

- Footpaths

Travelling inbound towards the City Centre there are no footpath facilities from opposite the Somerton residential estate on Rochestown Avenue (see Figure 2.12) to Bakers Corner, examples of which can be seen on Figure 2.13 and Figure 2.14 below.

Figure 2.12: End of footpath opposite Somerton residential estate

Figure 2.13: Lack of footpath facilities on Rochestown Avenue

Figure 2.14: Lack of footpath facilities Rochestown Avenue

- Mobility Impaired and Disabled (MID)

There are several locations along the route at which tactile paving is not provided, an example of which can be seen on Figure 2.15**Error! Reference source not found.** below.

Figure 2.15: Lack of tactile paving at the crossing point at entrance to Kensington Manor

- Dangerous Structures/Buildings

One dilapidated wall was found on this route on Rochestown Avenue.

- Public Lighting

No problems were found with the existing street lighting.

- Access Points

One access point was found to be in a state of serious disrepair and this occurred at the entrance to the Abbey View residential estate, which is accessed from Abbey Road.

- Electricity Poles

One electricity pole was identified as being in need of repair and this was found on Rochestown Avenue in front of the Ulster Bank adjacent to Killiney Shopping Centre.

2.2. Route Option S2: Thomastown Road/Glenageary road/Kill Avenue/Abbey road/Stradbrook Road

- Route Map

Figure 2.16: Route Option S2 Location Map

- Cycle Facilities

Route S2 has adjacent segregated cycle facilities along Thomastown Road. Cycle lanes are also provided along Glenageary Road Upper as shown on Figure 2.17. The second half of this route follows the same route as Option S1 namely Abbey and Stradbrook roads, therefore encountering the same cycle facilities as detailed in Section S1 above.

Figure 2.17: Example of cycle facilities Glenageary Road Upper

- Roads

From the survey conducted the roads and markings along the first half of the route (along the Thomastown and Glengeary roads) are in good condition an example of which can be seen on **F**igure 2.18 below.

Figure 2.18: Example of road conditions on Thomastown Road

The second half of this route option follows the same route as Option S1 namely along the Abbey and Stradbrook roads therefore encountering the same road conditions as detailed in section S1 above.

- Pinch Points

No problems were found with pinch points along this route.

- Footpaths

Footpaths along the first half of the route are in good condition. The second half of this route option follows the same route as Option S1 namely Abbey and Stradbrook roads therefore encountering the same footpath conditions as detailed in section S1 above.

- Mobility Impaired Disabled (MID)

Mobility Impaired disabled facilities along the first half of the route are in good condition. The second half of this route option follows the same route as Option S1 namely Abbey and Stradbrook roads therefore encountering the same MID conditions as detailed in section S1 above

- Dangerous Structures/Buildings

No problems were found with the existing structures and buildings along this route.

- Public Lighting

No problems were found with the existing public lighting along this route.

- Access Points

Access points along the first half of the route are in good condition. The second half of this route option follows the same route as Option S1 namely Abbey and Stradbrook roads therefore encountering the same Access point conditions as detailed in section S1 above.

- Electricity Poles

No problems were found with the existing electricity poles along this route.

2.3. Route Option S3: Thomastown Road/Glenageary Road Upper/Mounttown/Carrickbrennan/Monkstown Road

- Route map

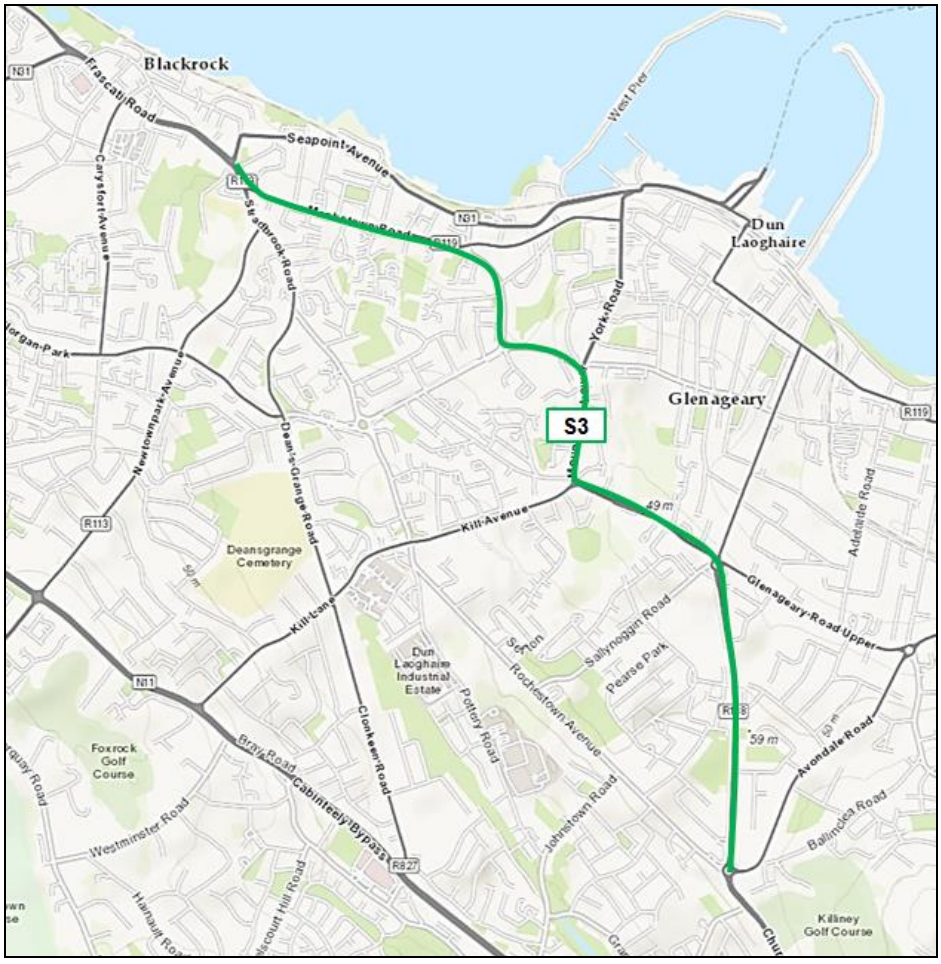


Figure 2.19: Route Option S3 Location Map

- Cycle Facilities

Route Option S3 follows the same route as Route Option S2 along Thomastown and Glenageary Roads which both have good cycle facilities. There is a lack of cycle facilities on the second half of the route along Mounttown, Carrickbrennan and Monkstown roads, examples of which can be seen in Figure 2.20 and Figure 2.21**Error! Reference source not found.** below.

Figure 2.20: Example of lack of cycle facilities on Carrickbrennan Road

Figure 2.21: Example of lack of cycle facilities on Monkstown road

- Roads

Route Option S3 follows the same route as Route Option as S2, i.e. along the Thomastown and Glenageary Roads along which the road pavement and markings are in good condition. Following an assessment of the second half of the route i.e. the Mounttown, Carrickbrennan and Monkstown roads, the roads were generally found to be in poor condition, examples of which can be seen on Figure 2.22**Error! Reference source not found.** – Figure 2.26**Error! Reference source not found.** below.

Figure 2.22: Example of poor road conditions at bus stop on Monkstown Road

Figure 2.23: Example of poor road conditions on Monkstown Road at entrance of Montpellier Manor

Figure 2.24: Road condition looking East-West on Monkstown road

Figure 2.25: Poor road condition Mounttown Road Upper

- Pinch Points

One pinch point was found along this route namely on Monkstown Road as shown on Figure 2.26 below.

Figure 2.26: Example of pinch point Monkstown Road

- Footpaths

The survey has identified locations along the route where footpaths are in poor condition, examples of which are shown on **Error! Reference source not found.** and **Error! Reference source not found.** below.

Figure 2.27: Section of dilapidated footpath Monkstown Road

Figure 2.28: Section of dilapidated footpath on Mounttown Road Lower

- Mobility Impaired Disabled (MID)

The survey has identified locations along the route were tactile paving is not provided, examples of which are shown on **Error! Reference source not found.** and **Error! Reference source not found.** below.

Figure 2.29: Entrance to Montpellier Manor illustrating lack of tactile paving

- Dangerous Structures/Buildings

No problems were found with the existing structures and buildings along this route.

- Public Lighting

No problems were found with the existing structures and buildings along this route.

- Access Points

The survey has identified locations along the route where access points are in poor condition. A full list of access points in poor condition and their locations is contained in Table 3.

- Electricity Poles

No problems were found with the existing electricity poles along this route.

- Retaining Walls

One retaining wall was found on this route at Montpellier parade which is shown on Figure 2.30 below. The wall retains earth with a height of approximately 1.5m. Several trees are planted in the retained earth.

Figure 2.30: Retaining Wall at Montpellier Parade

2.4. Route Option S4: Georges Street Upper/Marine Road/Crofton Road/Old DunLeary road/Seapoint Avenue/Newtown Avenue

- Route Map

Figure 2.31: Route Option S4 Location Map

- Cycle Facilities

The survey has identified a lack of cycle facilities on Newton Ave and Seapoint Avenue, Old DunLeary Road, Crofton Road, Marine Road, Georges Street Upper and Clarence Street examples of which can be seen in Figure 2.32**Error! Reference source not found.** - Figure 2.35 below.

Figure 2.32: Example of lack of cycle facilities on Crofton Road

Figure 2.33: Lack of Cycle Facilities on Old Dunleary Road

Figure 2.34: Lack of cycle facilities on Old Dunleary Road

Figure 2.35: Lack of cycle facilities on Seapoint Avenue

- Electricity Poles

No problems were found with the existing electricity poles along this route.

- Roads

One location was identified during this survey with poor road markings and is shown in Figure 2.36**Error! Reference source not found.** below.

Figure 2.36: Road in poor condition at the bus stop on Crofton Road

- Pinch Points

No problems were found with pinch points along this route.

- Footpaths

Two issues were identified on this route during the course of survey and these are shown on **Error! Reference source not found.** and Figure 2.38**Error! Reference source not found.** below.

Figure 2.37: Traffic sign upright causing obstruction in footpath Newtown Avenue

Figure 2.38: Footpath in poor condition Newtown Avenue

- Mobility Impaired Disabled (MID)

The survey has identified locations along the route where tactile paving is not provided, an example of which is shown on Figure 2.39 below.

Figure 2.39: Lack of tactile paving at Crofton Road/Stable Lane junction

- Dangerous Structures/Buildings

No problems were found with the existing structures and buildings along this route.

- Public Lighting

No problems were found with the existing structures and buildings along this route.

- Access Points

No problems were found with the existing access points along this route.

- Retaining Walls

One large retaining wall was found during the course of this survey located adjacent to the Marina House on the Old DunLeary road as shown on Figure 2.40 below.

Figure 2.40: Retaining Wall Old Dunleary Road

3. SAS 2: Blackrock – Booterstwon

3.1. Route Option M1: Temple Road/Frascati Road/Rock Road

- Route Map

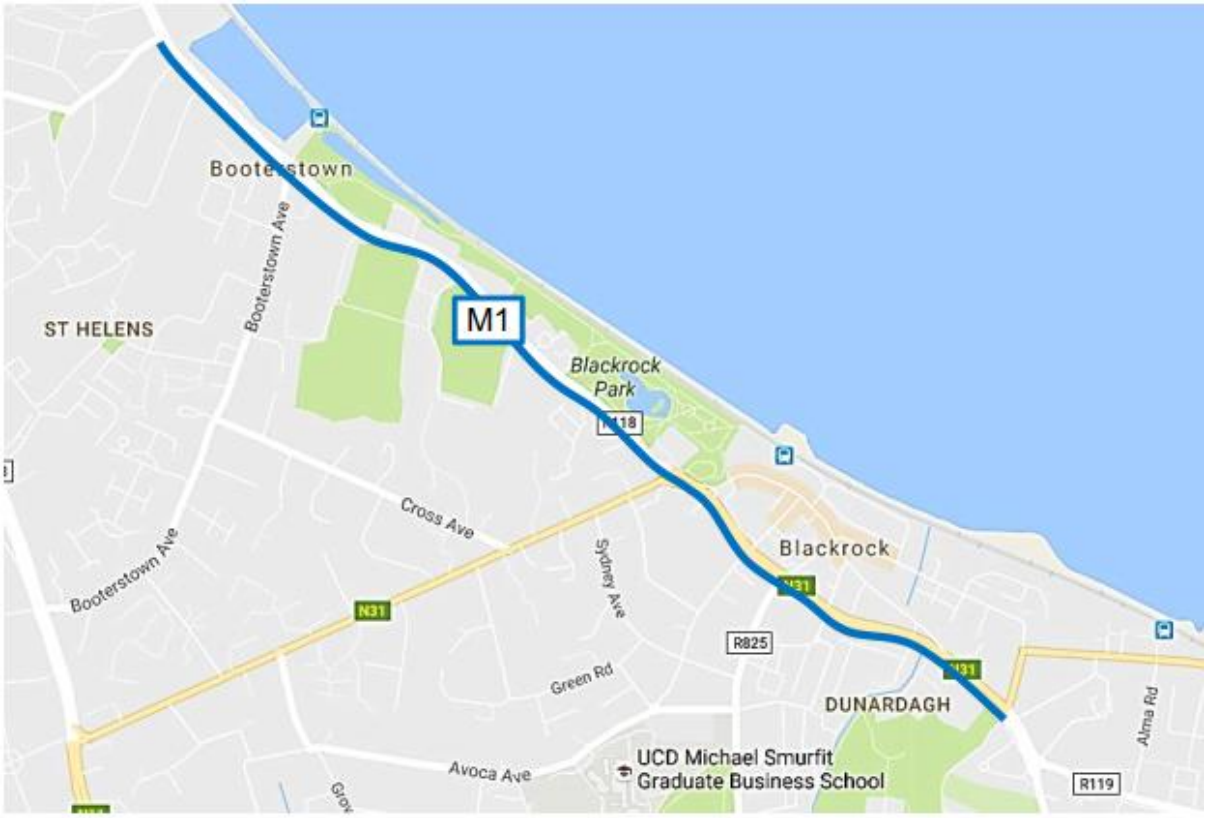


Figure 3.1: M1 Route Map

Route Option M1 is the middle section linking the Southern Route Options (e.g. Dun Laoghaire to Blackrock) to the Northern Route Options (e.g. Booterstown to the City Centre).

- Cycle facilities

Following the survey, good cycle facilities have been identified at the majority of locations along the route, examples of which can be seen in Figure 3.2**Error! Reference source not found.** below. The survey has also shown a number of issues at numerous locations such as dilapidated condition of cycle tracks and no thermoplastic material used in the surface course of the cycle tracks. Examples of these issues are shown on Figure 3.3**Error! Reference source not found.** below.

Figure 3.2: Example of good cycle facilities at Frascati Road/Barclay Court junction

Figure 3.3: Example of the lack of thermoplastic material in cycle track on Rock Road

- Roads

Following assessment of the route several locations were identified where the road pavement and markings were found to be in poor condition. A full list of the problems identified with the road pavement and markings along this route are contained within Table 4.

- Pinch points

No problems were found with pinch points along this route.

- Footpaths

The survey has identified two issues with the footpaths along the routes. A full list of the problems identified with the footpaths along this route is contained within Table 4.

- Mobility Impaired and Disabled (MID) facilities

The survey has identified numerous locations along the route where tactile paving is not provided. A full list of missing MID facilities and their locations is contained in Table 4.

- Dangerous structures/buildings

No problems were found with the existing structures and buildings along this route.

- Public Lighting

No problems were found with the existing public lighting along this route.

- Access points

One access point was identified during the survey as being in relatively poor condition.

- Electricity Pole

No problems were identified with the existing electricity poles along this route.

4. SAS 1: Booterstown – City Centre Route Options

4.1. Route Option N1: Merrion Road/Pembroke Road/Baggot Street

- Route Map

Figure 4.1: Map of Route Option N1

- Cycle facilities

Following the survey, a lack of cycle facilities has been identified at several locations along the route. The survey has also shown a number of issues at numerous locations such as the dilapidated condition of some cycle tracks and also a lack of thermoplastic material used in the surface course of the cycle tracks.

- Roads

Following assessment of the route several locations were identified where the roads were found to be in poor condition. A full list of the problems identified with the road pavement and markings along this route are contained within Table 5.

- Public Lighting

No problems were found with the existing public lighting along this route.

- Access points

No problems were found with existing access points along this route.

- Footpaths

The survey has identified several issues with the footpaths along the route.

- Mobility Impaired and Disabled (MID) Facilities

The survey has identified numerous locations along the route were tactile paving is not provided.

- Retaining Structures

No problems were found with existing retaining structures along this route.

- Dangerous structures/buildings

See Route Option N2 for problems identified.

- Electricity Pole

No problems were found with existing electricity poles along this route.

4.2. Route Option N2: Merrion Road/Pembroke Road/Northumberland Road/Mount Street Lower

- Route Map

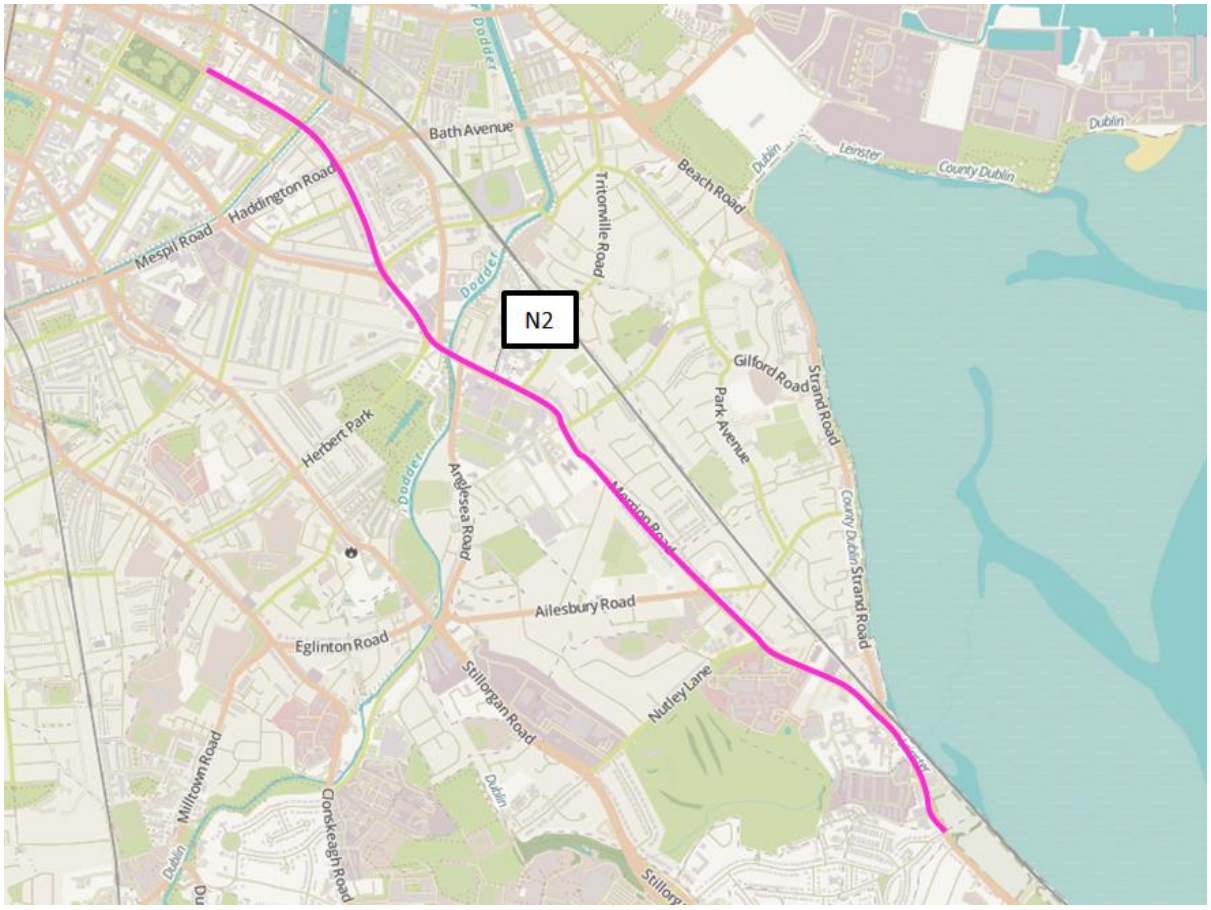


Figure 4.2: Map of Route Option N2

A large section of this route, namely along Merrion and Pembroke Road, have been documented in the Route Option N1 section above. The same issues identified in the N1 Route Option survey for Merrion Road/Pembroke Road, are also applicable to the N2 Route Option Survey for this section. The following section of the report shall concentrate on the problems identified on Northumberland Road and Mount Street Lower.

- Cycle facilities

The survey has identified the issue of a lack of thermoplastic material used in the surface course of the cycle tracks on Mount Street Lower.

- Roads

See Table 6 for problems identified.

- Pinch points

No problems were found with pinch points along this route.

- Footpaths

See Table 6 for problems identified.

- Retaining Structures

No existing retaining structures

- Dangerous structures/buildings

See Table 6 for problems identified.

- Electricity Pole

No problems were identified with the existing electricity poles along this route.

- Public Lighting

No problems were found with the existing structures and buildings along this route.

- Access Points

No problems were found with the existing access points along this route.

- Mobility Impaired and Disabled (MID) facilities

The survey has identified numerous locations along the route were tactile paving is not provided. A full list of missing MID facilities and their locations is contained in Table 6.

Table 1: Route S1 Problem Identification

Rochestown Avenue/Abbey Road/Stradbrook Existing Conditions		
Physical Items	**Condition**	**Location**
Cycle facilities	No cycle facilities	Along length of Rochestown Avenue until Pottery Road junction
	No cycle facilities	Along length of Abbey Road until approach to Abbey Road/Stradbrook/Monkstown Avenue roundabout
	No cycle facilities	Along full length of Stradbrook Road
Roads	Edge of Road in poor Condition	In front of bus stop,opposite entrance to Granitefield residential estate
	Edge of Road in poor Condition	At bus stop opposite Topaz, adjacent to entrance to Granitefield Mews
	Road Markings (Yellow junction box, Stop line) in poor condition	On approach to signalised pedestrian crossing at entrance to National Rehab Centre
	Road Pavement Cracking	On approach to entrance to National Rehab Centre
	Road pavement and markings in poor condition	On approach to Pottery road junction
	Road Markings in poor condition	At entrance and exit of Texaco garage, Abbey Road
	Bus Stop Road Markings in poor condition	At bus stop on approach to Texaco garage, adjacent to entrance to Rory O'Connor Park
Pinch points	Approx. 25m of footpath below minimum requirement of 1.8m width	Rochestown Avenue opposite Killiney Shopping Centre
	Approx. 30m of footpath below minimum requirement of 1.8m width	Between Newtown Park and St. Vincents
Lateral and Head Clearance		
Footpaths	Section of footpath in poor condition	Approaching Rory O'Connor Park from Texaco garage
MID facilities	Footpath ends, no tactile paving to indicate crossing point	Opposite Somerton residential estate
	No tactile paving	On footpath at entrance to National Rehab Centre
	No tactile paving at crossing point	Entrance to Sefton residential estate
	No tactile paving at crossing point	Entrance to Ruby Hall residential estate
	No tactile paving at crossing point	Entrance to Grangewood Residential estate
	No tactile paving at crossing point, unsuitable dishing.	Entrance to Abbey View Residential estate
	No tactile paving at crossing point	Entrance to Rory O'Connor Park
	No tactile paving at crossing point	Entrance to Brookland Wood Residential Estate
	No tactile paving at crossing point	Entrance to Stradbrook Park Residential Estate
	No tactile paving at crossing point	Entrance to Stradbrook Lawn Residential Estate
	No tactile paving at crossing point	At junction with Greenville Road (Across Entrance)
Retaining Structures		
Dangerous structures/buildings	Wall in delapidated condition, possibly due to proximity of trees	Opposite Texaco Garage on Rochestown Avenue
	Wall in delapidated condition, possible danger of collapse	Opposite Ruby Hall
Public Lighting	Pole lying off plumb, possible danger of collapse	On approach to Johnstown Road junction from Graduate roundabout
Boundary Treatments		
Access points	Road Pavement in poor condition	Access to Abbey view Residential Estate
Electricity Pole	Pole lying off plumb, possible danger of collapse	In front of Ulster Bank, adjacent to Killiney Shopping Centre

Table 2: Route S2 Problem Identification

Dun Laoghaire road/ Glengeary/Kill Avenue/Abbey road/Stradbrook Road Existing Conditions		
Physical Items	**Condition**	**Location**
Cycle facilities	No cycle facilities	Along length of Abbey Road until approach to Abbey Road/Stradbrook/Monkstown Avenue roundabout
	No cycle facilities	Along full length of Stradbrook Road
Roads	Road Markings in poor condition	At entrance and exit of Texaco garage, Abbey Road
	Bus Stop Road Markings in poor condition	At bus stop on approach to Texaco garage, adjacent to entrance to Rory O'Connor Park
Drainage	Road Gully blocked	Outside No.75 Kill Avenue
	Road Gully blocked	Kill Avenue-Opposite entrance/exit to Ardmore Park
Pinch points	Approx. 30m of footpath below minimum requirement of 1.8m width	Between Newtown Park Avenue and St. Vincents Park
Lateral and Head Clearance		
Footpaths	Section of footpath in poor condition	Approaching Rory O'Connor Park from Texaco garage
MID facilities	No tactile paving at crossing point, unsuitable dishing.	Entrance to Abbey View Residential estate
	No tactile paving at crossing point	Entrance to Rory O'Connor Park
	No tactile paving at crossing point	Entrance to Brookland Wood Residential Estate
	No tactile paving at crossing point	Entrance to Stradbrook Park Residential Estate
	No tactile paving at crossing point	Entrance to Stradbrook Lawn Residential Estate
	No tactile paving at crossing point	At junction with Greenville Road (Across Entrance)
Retaining Structures		
Dangerous structures/buildings		
Public Lighting		
Boundary Treatments		
Access points	Road Pavement in poor condition	Access to Abbey view Residential Estate
Electricity Pole		

Table 3: Route S3 Problem Identification

Dun Laoghaire road/Glengeary/Mounttown/Carrickbrennan/Monkstown Existing Conditions		
Physical Items	**Condition**	**Location**
Cycle facilities	No cycle facilities	Along Mounttown Road Lower
	Standard road gullies in cycle lane, thermoplastic material not used	On approach to Mounttown/Tivoli/York road junction
	No cycle facilities	Along Mounttown Road Upper from Mounttown/Tivoli/York road junction to St. John's Park
	Thermoplastic material not used	Along Mounttown Road Upper from St. John's Park to 11 Mountown Road Upper
	Thermoplastic material not used	Mounttown Road Upper from Monkstown Park School to St. John's Park
	Thermoplastic material not used	Mounttown Road Upper from Monkstown Park School to Mounttown/Carrickbrennan Roundabout
	No cycle facilities	Along Carrick brennan Road
Roads	Road Markings in poor condition	Mounttown Road Upper from Monkstown park school approaching Mounttown/Carrickbrennan Roundabout
	Double yellow line markings in poor condition	Approaching and departing Mounttown/Carrickbrennan Roundabout
	Road Pavement in delipadated condition	Along Carrickbrennan Road from Mounttown/Carrickbrennan Roundabout to Richmond Hill
	Road Marking in poor condition	Carrickbrennan road at junction with Richmond Hill
	Road Pavement in delipadated condition	Between Pakenham Road and Carrickbrennan/Monkstown Road junction
	Road Markings in poor condition	Between St. Patricks Church and Carrickbrennan/Monkstown Road junction
	Road Markings in poor condition	Approaching Carrickbrennan/Monkstown Road junction outside Monkstown Parish church
	Road Pavement in delipadated condition	Monkstown Road from Carrickbrennan junction to Knox Memorial hall
	Anti skid surface has been replaced with standard asphalt	Monkstown Road at entrance to Monkstown Valley
	Road Pavement in delipadated condition	Monkstown Road at junction with Belgrave Square
	Road Pavement and Markings in poor condition	Monkstown Road between Belgrave Square and Montpellier Manor
	Road Markings in need of improvement	Monkstown Road/Temple Road junction
Drainage		
Pinch points		
Lateral and Head Clearance		
Footpaths	Footpath in poor condition	Between Engleberg Court and St. John's Close
	Road signs restricting mobility access	Footpath on approach to Mounttown/Tivoli/York road junction
	Footpath in poor condition	Opposite St. John's Park
	Footpath in poor condition	Outside No. 65 Monkstown Road
MID facilities	No tactile paving at crossing point	Mounttown road Lower at Entrance to Mounttown Park
	No tactile paving at crossing point	Mounttown road Lower at Entrance to Engleberg court
	No tactile paving at crossing point	Mounttown road Lower at Entrance to Glandore Park
	No tactile paving at crossing point	Mounttown road upper at entrance to St.John's Park
	No tactile paving at crossing point	Monkstown Road at entrance to Drayton Close
Retaining Structures		
Dangerous structures/buildings		
Public Lighting		
Boundary Treatments		
Access points	Footpath in poor condition	Between access points to 51 and 53 Mounttown Lower
	Footpath in poor condition	Access to Mounttown Park
	Footpath in poor condition	Entrance/exit at Richmond Green
Electricity Pole		

Table 4: Route S4 Problem Identification

Georges Street/Marine Road/Crofton Road/Old DunLeary road/Seapoint Avenue/Newport Ave. Existing Conditions		
Physical Items	**Condition**	**Location**
Cycle facilities	No Cycle facilities	Newton Ave and Seapoint Ave.
	No Cycle facilities	Old Dunleary Road/Crofton Road
	No Cycle facilities	Marine Road/Georges Street/Clarence Street
Roads	Road Marking in poor condition	Junction of Seapoint Avenue and Brighton Avenue
Drainage		
Pinch points	Footpath below 1.8m recommended width	Approximately 75m along Newton Ave. travelling North from Temple road junction
Lateral and Head Clearance		
Footpaths	Traffic sign upright causing obstruction in footpath	Southern footpath on approach to Albany Avenue (Seapoint Avenue)
	Footpath in poor condition	Northern footpath at junction of Seapoint avenue and Clarence Street
MID facilities	No tactile paving at crossing point	At junction of Seapoint ave. and Tobernea Terrace
	No tactile paving at crossing point	At junction of Seapoint Ave. and Alma Road
	No tactile paving at crossing point	At junction of Seapoint Ave. and Belgrave Road
	No tactile paving at crossing point	At junction of Seapoint Ave. and Brighton Vale
	No tactile paving at crossing point	At junction of Seapoint Ave. and Seafield Avenue
	No tactile paving at crossing point	At junction of Seapoint Ave. and Albany avenue
	No tactile paving or dishing at crossing point	At junction of Seapoint Ave. and Brighton Avenue
	No tactile paving at crossing point	At junction of Seapoint Ave. and Longford Terrace
	No tactile paving or dishing at crossing point	At junction of Seapoint Ave. and Cumberland Street
	No tactile paving at crossing point	At junction of Crofton road and Kelly's Avenue
	No tactile paving at crossing point	At junction of Crofton road and Crofton Avenue
Retaining Structures		
Dangerous structures/buildings		
Public Lighting		
Boundary Treatments		
Access points		
Electricity Pole		

Table 5: Route N1 Problem Identification

Merrion Road/Pembroke Road/Baggot Street Existing Conditions		
Physical Items	**Condition**	**Location**
Cycle facilities	No Cycle Facilities	Travelling East-West along Merrion Road from Trimelston Road to Nutley Lane junction
	No Cycle Facilities	Travelling West-East along Merrion Road from Nutley Lane to Trimelston Road junction
	No Cycle Facilities	Travelling East-West along Merrion Road from Nutley Lane to Merrion View Avenue junction
	No thermoplastic material in Cycle Lane	Travelling East-West along Merrion Road from Sandymount Avenue junction to Aylesbury road junction
	No Cycle Facilities	Travelling East-West along Merrion Road from Aylesbury road to opposite Sydenham Road junction
	No Cycle Facilities	Travelling West-East along Merrion Road from Serpentine Avenue and Sandymount avenue junction
	No Cycle Facilities	Travelling East-West along Merrion Road for approx. 180m at front of RDS
	No Cycle Facilities	Travelling East-West along Merrion Road from Pembroke Road/Ballsbridge Terrace to Northumberland/Landsdowne junction
	No Cycle Facilities	Travelling East-West along Pembroke Road and Baggot Street
	No Cycle Markings in Cycle Lane	Travelling West-East along Baggot Street Upper for approx.80m
Roads	Road Pavement in poor condition	At junction of Merrion Road and Herbert Avenue
	Road Pavement in poor condition	Approaching Nutley Lane/Merrion Road junction
	Bus Stop Road Markings in poor condition	Merrion Road Bus Stop
	Bus Stop Road Markings in poor condition	Merrion Road Bus Stop (British Embassy)
	Bus Stop Road Markings in poor condition	Pembroke Road Bus Stop
	Bus Stop Road Markings in poor condition	Upper Baggot Street Bus Stop
	Road Pavement in poor condition	At junction of Baggot Street Lower and Herbert Street
	Road Pavement in poor condition	At junction of Baggot Street Lower and Pembroke Road
	Road Pavement in poor condition	In both lanes along Baggot Street Upper
	Central Median in poor condition	Central median Baggot Street approaching Fitzwilliam Street Upper Junction
	Road Pavement in poor condition	In both lanes along Baggot Street Lower
Drainage		
Pinch points		
Lateral and Head Clearance		
Footpaths	Footpath in dilapidated condition	Travelling West-East along Merrion Road opposite Merrion shopping centre
	Footpath in dilapidated condition	Travelling East-West along Merrion Road at gateway to St.Michaels College
	Footpath in dilapidated condition	Travelling West-East along Merrion Road from Sandymount Avenue to opposite the British Embassy
	Footpath in dilapidated condition	Travelling East-West along Merrion Road in front of Wanderers Rugby club
	Footpath in dilapidated condition	Surrounding trees at numerous locations along Merrion and Pembroke roads

MID facilities	No tactile paving at crossing point	At junction of Merrion Road and Bellevue Avenue
	No tactile paving at crossing point	At junction of Merrion Road and Merlyn Park
	No tactile paving at crossing point	At junction of Merrion Road and Merlyn Road
	No tactile paving at crossing point	At junction of Merrion Road and Shrewsbury Park
	No tactile paving at crossing point	At junction of Merrion Road and Shrewsbury Road
	No tactile paving at crossing point	At junction of Merrion Road and Sandymount Avenue
	No tactile paving at crossing point	At junction of Merrion Road and Sydenham Road
	No tactile paving at crossing point	At junction of Merrion Road and Ballsbridge Park
	No tactile paving at crossing point	At junction of Pembroke Road and Ballsbridge Terrace
	No tactile paving at crossing point	At junction of Pembroke Road and Beatty's Avenue
	No tactile paving at crossing point	At junction of Pembroke Road and Herbert Park
	No tactile paving at crossing point	At junction of Pembroke Road and Raglan Road
	No tactile paving at crossing point	At junction of Pembroke Road and Wellington Road
	No tactile paving at crossing point	At junction of Pembroke Road and Eastmoreland Place
	No tactile paving at crossing point	At junction of Baggot Street Lower and Herbert Street
	No tactile paving at crossing point	At junction of Baggot Street Lower and Pembroke Road
	No tactile paving at crossing point	At junction of Baggot Street Lower and James Street East
Retaining Structures		
Dangerous structures/buildings	Delapidated Wall	Just past Rock Road (Tara Towers Hotel) Bus Stop travelling South-North
Public Lighting		
Boundary Treatments		
Access points		
Electricity Pole		

Table 6: Route N2 Problem Identification

Merrion Road/Pembroke Road/Northumberland Road/Mount Street Lower Existing Conditions		
Physical Items	**Condition**	**Location**
Cycle facilities	No Cycle Facilities	Travelling East-West along Merrion Road from Trimelston Road to Nutley Lane junction
	No Cycle Facilities	Travelling West-East along Merrion Road from Nutley Lane to Trimelston Road junction
	No Cycle Facilities	Travelling East-West along Merrion Road from Nutley Lane to Merrion View Avenue junction
	No thermoplastic material in Cycle Lane	Travelling East-West along Merrion Road from Sandymount Avenue junction to Aylesbury road junction
	No Cycle Facilities	Travelling East-West along Merrion Road from Aylesbury road to opposite Sydenham Road junction
	No Cycle Facilities	Travelling West-East along Merrion Road from Serpentine Avenue and Sandymount avenue junction
	No Cycle Facilities	Travelling East-West along Merrion Road for approx. 180m at front of RDS
	No Cycle Facilities	Travelling East-West along Merrion Road from Pembroke Road/Ballsbridge Terrace to Northumberland/Landsdowne junction
	No thermoplastic material in Cycle Lane	Cycle lanes on both sides of Mount St Lower
Roads	Road Pavement in poor condition	At junction of Merrion Road and Herbert Avenue
	Road Pavement in poor condition	Approaching Nutley Lane/Merrion Road junction
	Bus Stop Road Markings in poor condition	Merrion Road Bus Stop
	Bus Stop Road Markings in poor condition	Merrion Road Bus Stop (British Embassy)
Drainage		
Pinch points		
Lateral and Head Clearance		
Footpaths	Footpath in dilapidated condition	Travelling West-East along Merrion Road opposite Merrion shopping centre
	Footpath in dilapidated condition	Travelling East-West along Merrion Road at gateway to St.Michaels College
	Footpath in dilapidated condition	Travelling West-East along Merrion Road from Sandymount Avenue to opposite the British Embassy
	Footpath in dilapidated condition	Travelling East-West along Merrion Road in front of Wanderers Rugby club
	Footpath in dilapidated condition	Surrounding trees at numerous locations along Merrion and Pembroke and Northumberland roads
MID facilities	No tactile paving at crossing point	At junction of Merrion Road and Bellevue Avenue
	No tactile paving at crossing point	At junction of Merrion Road and Merlyn Park
	No tactile paving at crossing point	At junction of Merrion Road and Merlyn Road
	No tactile paving at crossing point	At junction of Merrion Road and Shrewsbury Park
	No tactile paving at crossing point	At junction of Merrion Road and Shrewsbury Road
	No tactile paving at crossing point	At junction of Merrion Road and Sandymount Avenue
	No tactile paving at crossing point	At junction of Merrion Road and Sydenham Road
	No tactile paving at crossing point	At junction of Merrion Road and Ballsbridge Park
	No tactile paving at crossing point	At junction of Pembroke Road and Ballsbridge Terrace
	No tactile paving at crossing point	At junction of Pembroke Road and Beatty's Avenue
	No tactile paving at crossing point	At junction of Pembroke Road and Herbert Park
	No tactile paving at crossing point	At junction of Northumberland Road and Landsdowne Park
	No tactile paving at crossing point	At junction of Northumberland Road and St.Mary's Road

MID facilities	No tactile paving at crossing point	At junction of Northumberland Road and Estate Cottages
	No tactile paving at crossing point	At junction of Northumberland Road and Percy Place
	No tactile paving at crossing point	At junction of Mount Street Lower and Love Lane
	No tactile paving at crossing point	At junction of Mount Street Lower and Grattan Court
	No tactile paving at crossing point	At junction of Mount Street Lower and Grattan Street
	No tactile paving at crossing point	At junction of Mount Street Lower and Grants Row
	No tactile paving at crossing point	At junction of Mount Street Lower and Stephen's Place
Retaining Structures		
Dangerous structures/buildings	Delapidated Wall	Just past Rock Road (Tara Towers Hotel) Bus Stop travelling South-North
Public Lighting		
Boundary Treatments		
Access points		
Electricity Pole		

Table 7: Route M1 Problem Identification

Temple Road/Frascati Road/Rock Road Existing Conditions		
Physical Items	**Condition**	**Location**
Cycle facilities	No Cycle Facilities	Travelling in both directions Along Temple Road
	No Cycle Facilities	Travelling in both directions Along Frascati Road
	No thermoplastic material in Cycle Lane	Along Rock Road From Rock Road Bus Stop to Trimelston Avenue junction (With the exception of junctions)
	No thermoplastic material in Cycle Lane	Along Rock Road from Trimelston avenue junction to Mount Merrion Avenue junction
Roads	Road Markings in poor condition	Blackrock shopping centre crossing point
	Bus Stop Road Markings in poor condition	Rock Road Bus Stop
	Road Markings in poor condition	At junction of Rock Road and Blackrock Clinic
	Road Pavement in poor condition	At junction of Rock Road and Blackrock Clinic
	Bus Stop Road Markings in poor condition	Rock Road Booterstown Hall Bus Stop
Drainage		
Pinch points		
Lateral and Head Clearance		
Footpaths	Traffic sign causing obstruction in footpath	Travelling East-West along Temple Road
	Traffic sign causing obstruction in footpath	At entrance to Craigmore Gardens
	Footpath in dilapidated condition	At entrance to Alzheimer Society Day and Respite Care Centre Temple Road
MID facilities	No tactile paving at crossing point	Central Median Blackrock shopping centre crossing point
	No tactile paving at crossing point	At junction of Rock Road and Castledawson
	No tactile paving at crossing point	At junction of Rock Road and Blackrock Clinic
	No tactile paving at crossing point	At junction of Rock Road and Phoenix Terrace
	No tactile paving at crossing point	At junction of Rock Road and Emmet Square
	No tactile paving at crossing point	At junction of Rock Road and Seafort Parade Entrance 1 and 2
	No tactile paving at crossing point	At junction of Rock Road and Blackrock College
	No tactile paving at crossing point	At junction of Rock Road and Grotto Avenue
Retaining Structures		
Dangerous structures/buildings		
Public Lighting		
Boundary Treatments		
Access points	Entrance pavement in poor condition	Rear entrance to Blackrock College
Electricity Pole		

Appendix E – Parking Survey

1. Introduction

AECOM have been tasked by the National Transport Authority (NTA) to identify viable routes for a Core Bus Corridor which aims to provide ease of bus travel with the objective of improving journey times from South County Dublin into Dublin City Centre.

This report shall seek to identify the parking conditions in the existing road network. Each route was assessed using criteria specified by the NTA. The assessment criteria for the existing parking on the separate routes are listed as follows:

- *Formal Parking:* On-street parking in which marked spaces has been provided. These are spaces in which the Local Authority charges an hourly rate to use.
- *Informal Parking:* On-street parking in which spaces may or may not be marked and in which the Local Authority does not charge for use.
- *Adjacent Parking:* Parking which is accessible to the general public and is located in close proximity to the street. These are spaces in which the Local Authority charges an hourly rate to use.

Legend

- This colour represents sections along a route which has no parking facilities.
- This colour represents sections along a route which has formal parking facilities.
- This colour represents sections along a route which has informal parking facilities.
- This colour represents sections along a route which has adjacent parking facilities.
- This colour represents sections along a route which have taxi facilities.

2. SAS 1: Dun Laoghaire – Blackrock Route Options

2.1. Route Option S1: Rochestown Avenue/Abbey Road/Stradbrook Road

- Route Map

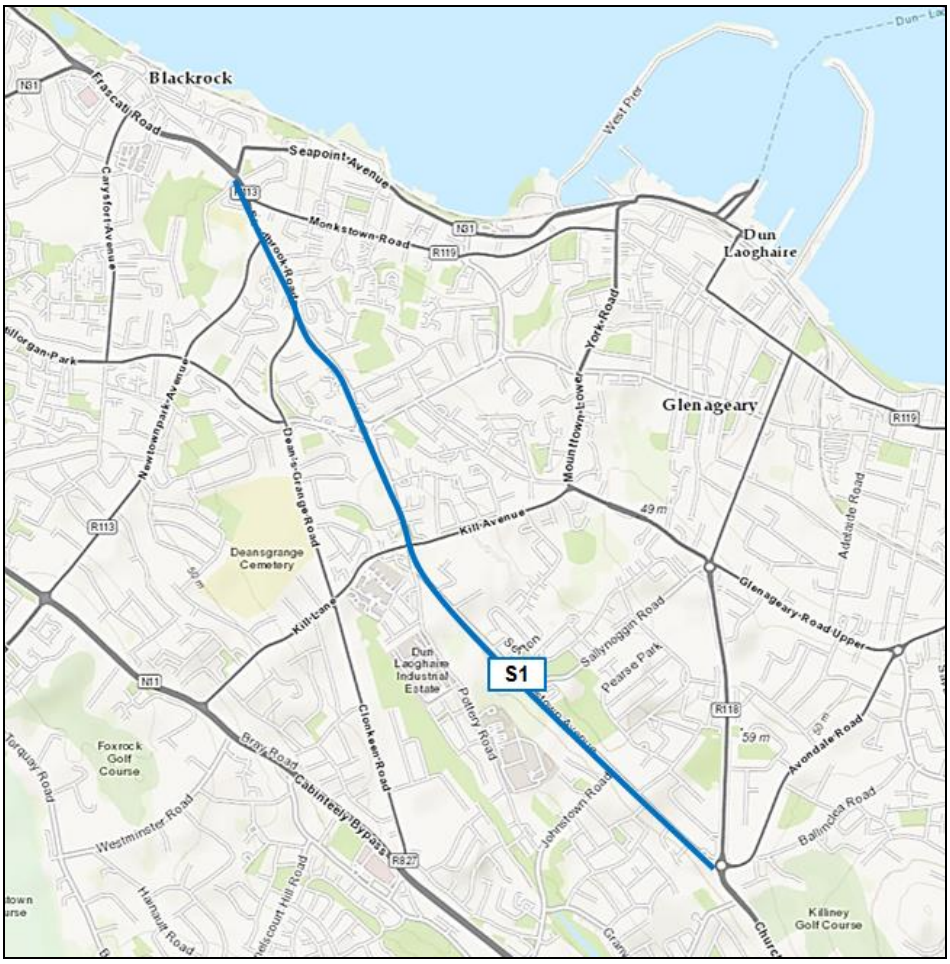


Figure 2.1. Map of Route Option S1

The survey has shown a lack of parking facilities along the majority of Rochestown Avenue. This lack of parking has resulted in illegal parking in a number of locations. There are approximately 10 informal parking spaces in the area adjacent to the Ulster Bank and the Dentist's practise. The parking breakdown on Rochestown Avenue is as follows:

- Formal Parking – 0 spaces.
- Informal Parking – 10 spaces.
- Adjacent parking – 0 spaces.

This breakdown has been graphically represented on **Error! Reference source not found.**2 below.

Figure 2.2. Rochestown Parking facilities

Each proposed scheme option requires full usage of the entire width of Rochestown Avenue and as such, all ten informal parking spaces outside the Ulster Bank and the Dentist's practise will be removed as part of the proposed works.

- Abbey Road

The survey has shown a lack of parking facilities along the entire length of Abbey Road, as shown on **Figure 2.3** below. This lack of parking has resulted in illegal parking in a number of locations.

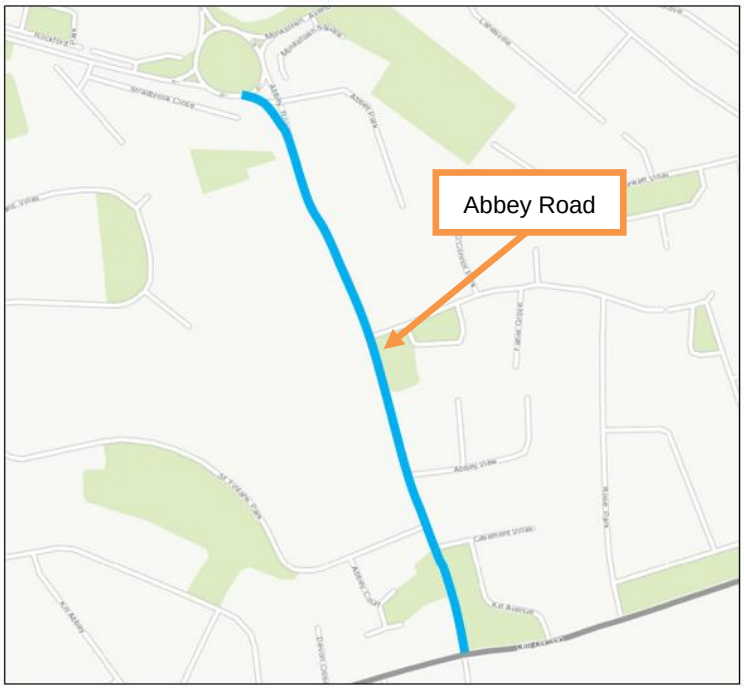


Figure 2.3: Abbey Road Parking Facilities

- Stradbrook Road

The survey has shown a lack of parking facilities along the entire length of Stradbrook Road, as shown on

Figure **2.4** below. This lack of parking has resulted in illegal parking in a number of locations.

Figure 2.4: Stradbrook Road Parking Facilities

As there are no parking facilities along the length of Abbey and Stradbrook Roads, no parking shall be affected by the proposed works.

2.2. Route Option S2: Dun Laoghaire Road/Glengeary road/Kill Avenue/Abbey road/Stradbrook Road

- Route Map

Figure 2.5: Map of Route Option S2

Route Option S2 begins at the Graduate Roundabout. The route follows Thomastown Road, Glenageary road and Kill Avenue before taking the same route as Route Option S1 i.e. along Abbey Road and Stradbrook Road. Therefore the same parking conditions identified in the S1 Route Option survey from the Rochestown Avenue/Kill Avenue/Stillorgan road junction, are also applicable to the S2 Route Option Survey.

- Thomastown Road

The survey has shown no parking facilities along the entire length of Thomastown Road, as shown on **Figure 2.6** below.

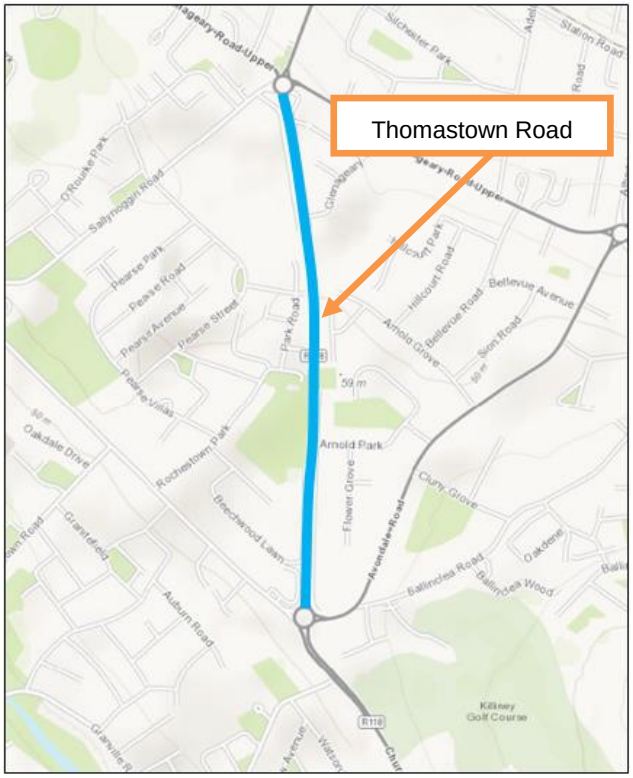


Figure 2.6: Thomastown Road Parking Facilities

- Glenageary Road

The survey has shown a lack of parking facilities along the entire length of Glengeary Road, an example of which is shown on **Figure 2.7** below.

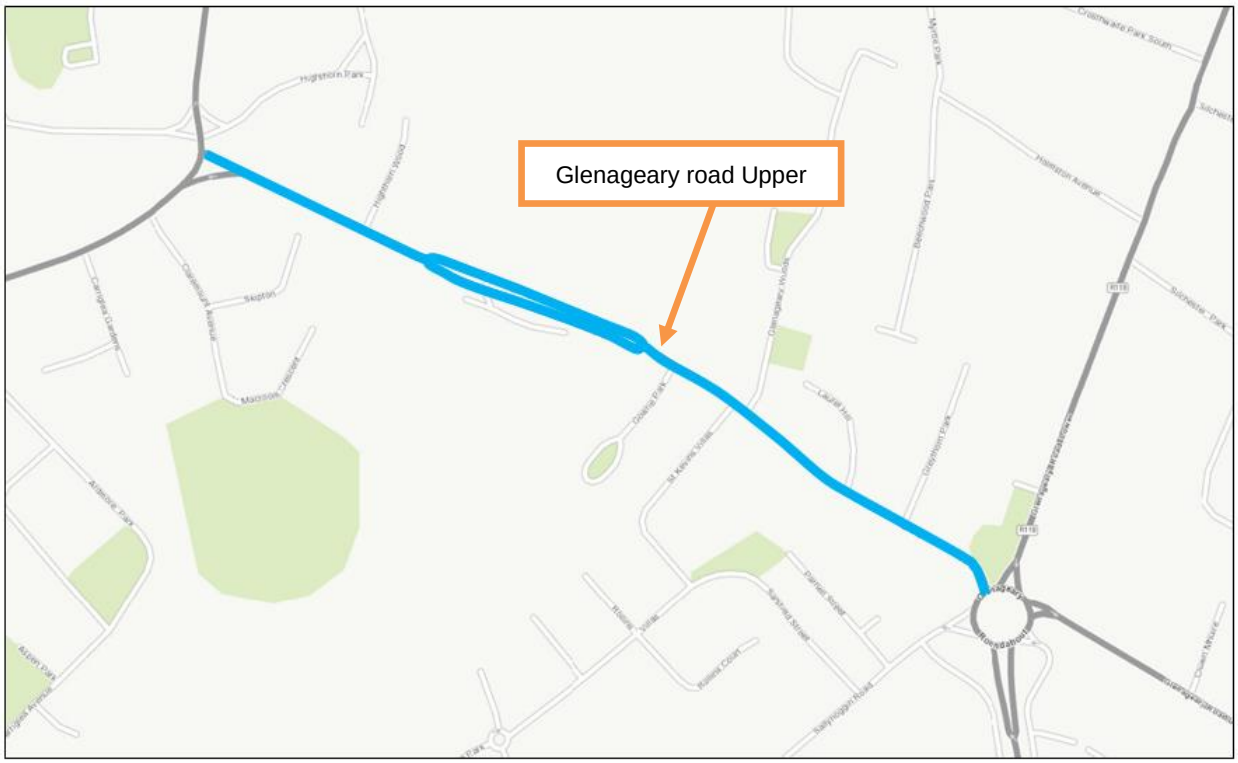


Figure 2.7: Glengeary Road Upper Parking Facilities

- Kill Avenue

The survey has shown a lack of parking facilities along the entire length of Kill Avenue, as shown on

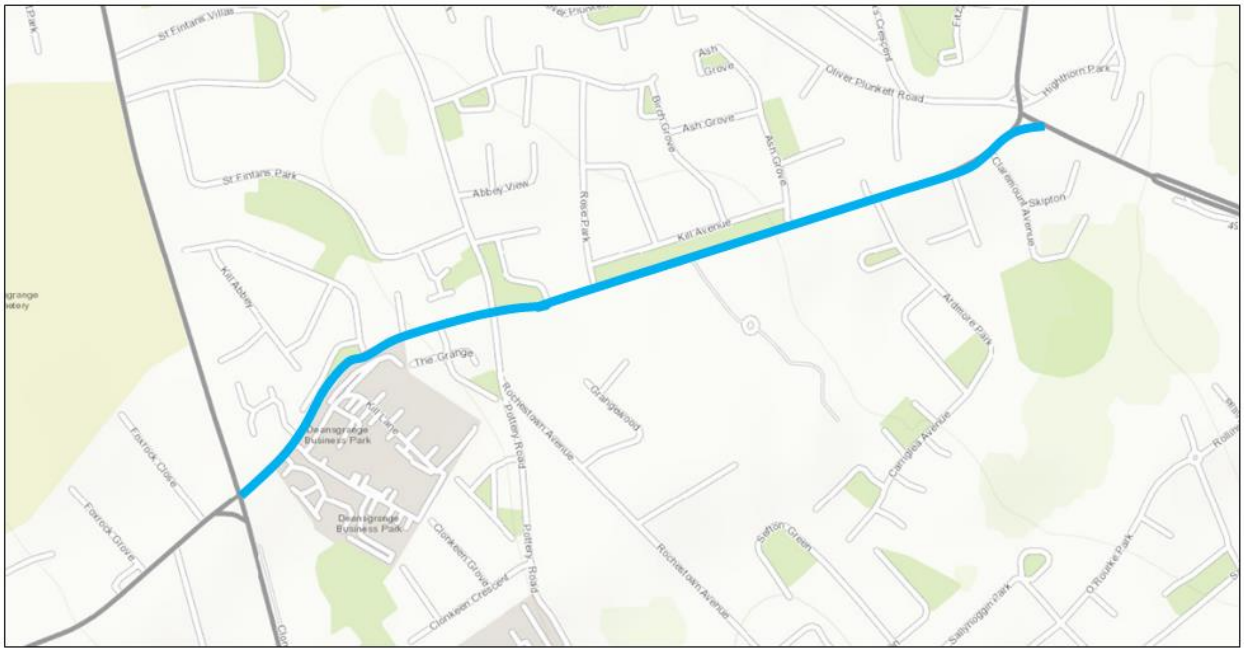


Figure 2.8 below.

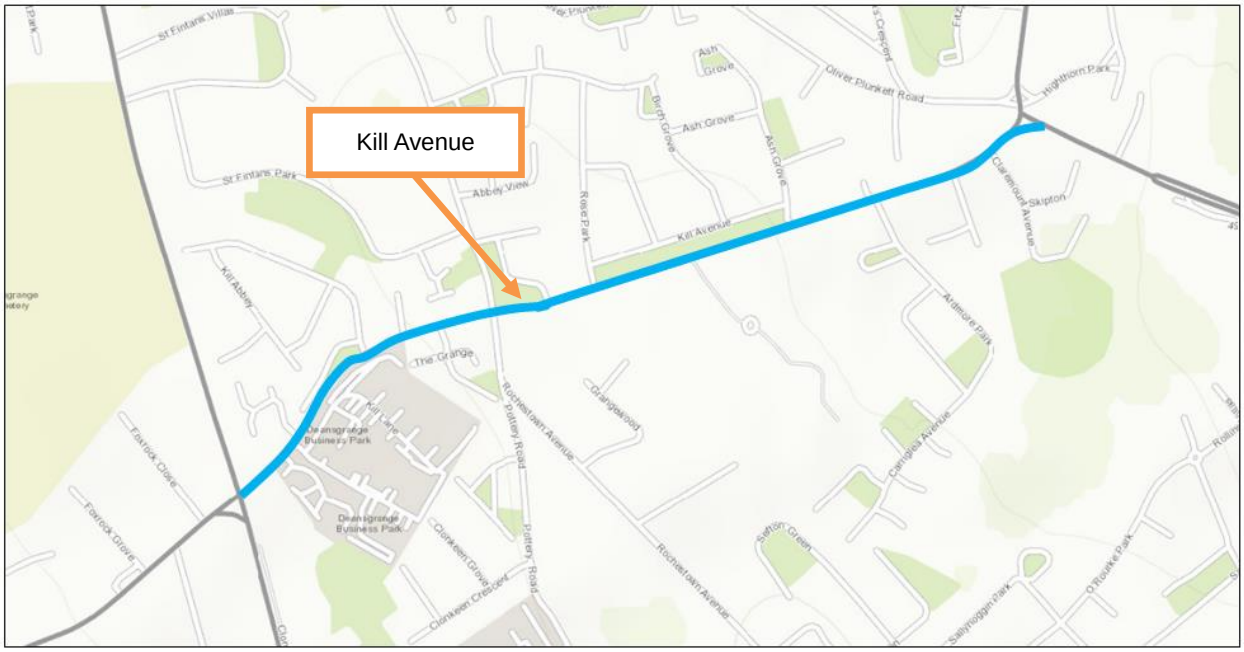


Figure 2.8: Kill Avenue Parking Facilities

As there are no parking facilities along Thomastown Road/Glengeary road/Kill Avenue/Abbey road/Stradbrook Road no parking shall be removed along these routes.

2.3. Route Option S3: Dun Laoghaire road/Glengeary Road Upper/Mounttown Road Lower/ Mounttown Road Upper/ Carrickbrennan/Monkstown Road

- Route map

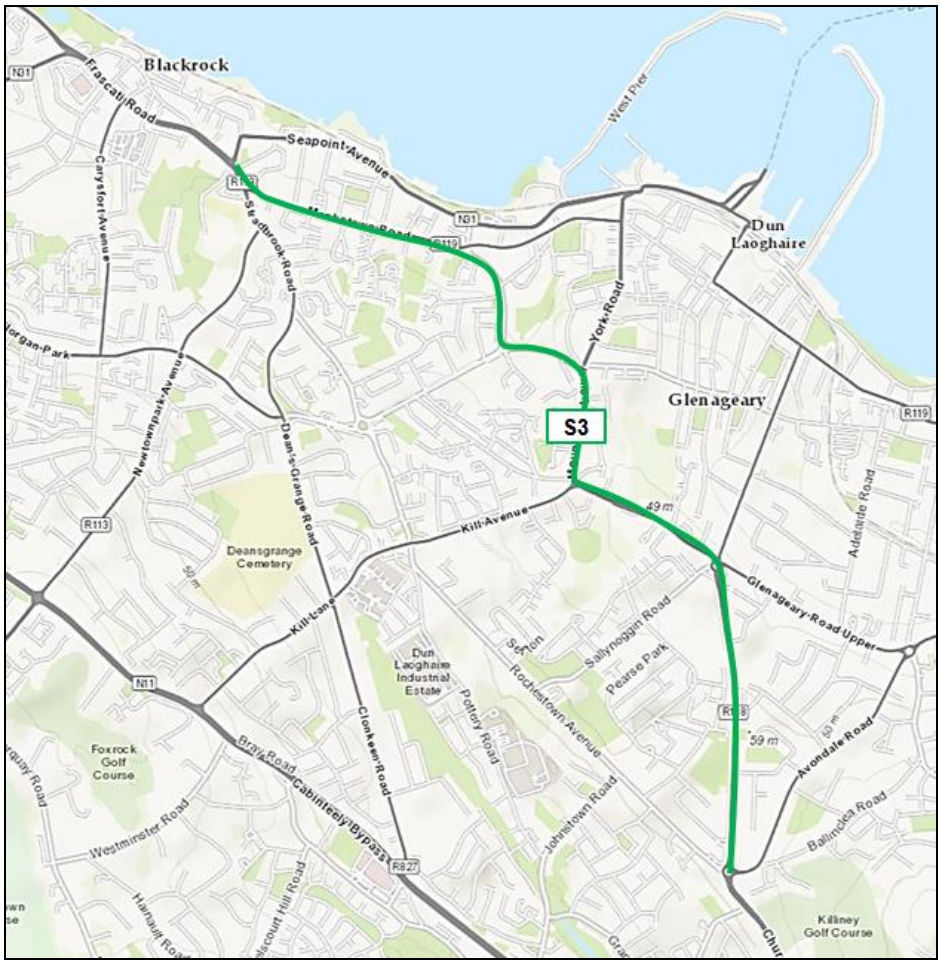


Figure 2.9: Map of Route Option S3

Route Option S3 begins at the Graduate Roundabout. The route follows the same route as Route Option S2 along the Thomastown and Glenageary Roads which have no parking facilities. As such, the same parking conditions identified in the S2 Route Option survey section from the Graduate roundabout to the Glengeary Road Upper/Mounttown/ Kill Avenue junction, are also applicable to the S3 Route Option Survey. This section shall concentrate on the second half of the route.

- Mounttown Road Lower

The survey has identified a lack of parking facilities for the approximately 280m from the Mounttown Road Lower/Glengeary Road/Kill Avenue junction travelling south-north. There is evidence of informal on-street parking and also some adjacent parking around Mounttown Business Park as shown on Figure 2.10. The parking breakdown on Mounttown Lower Avenue is as follows:

- Formal Parking – 0 spaces.
- Informal Parking – Approximately 18 spaces.
- Adjacent Parking – Approximately 5 spaces.

Figure 2.10: Parking Facilities Mounttown Road lower

All scheme options require full usage of the entire width of Mounttown Road Lower and as such, both the informal and adjacent spaces listed above will be removed as part of the proposed works.

- Mounttown Road Upper

The survey has identified both formal and informal on-street parking along Mounttown Road Upper as shown on **Figure 2.11**. The parking breakdown on Mounttown Road Upper is as follows:

- Formal Parking – 23 spaces.
- Informal Parking – Approximately 12 Spaces.
- Adjacent Parking – 0 Spaces.

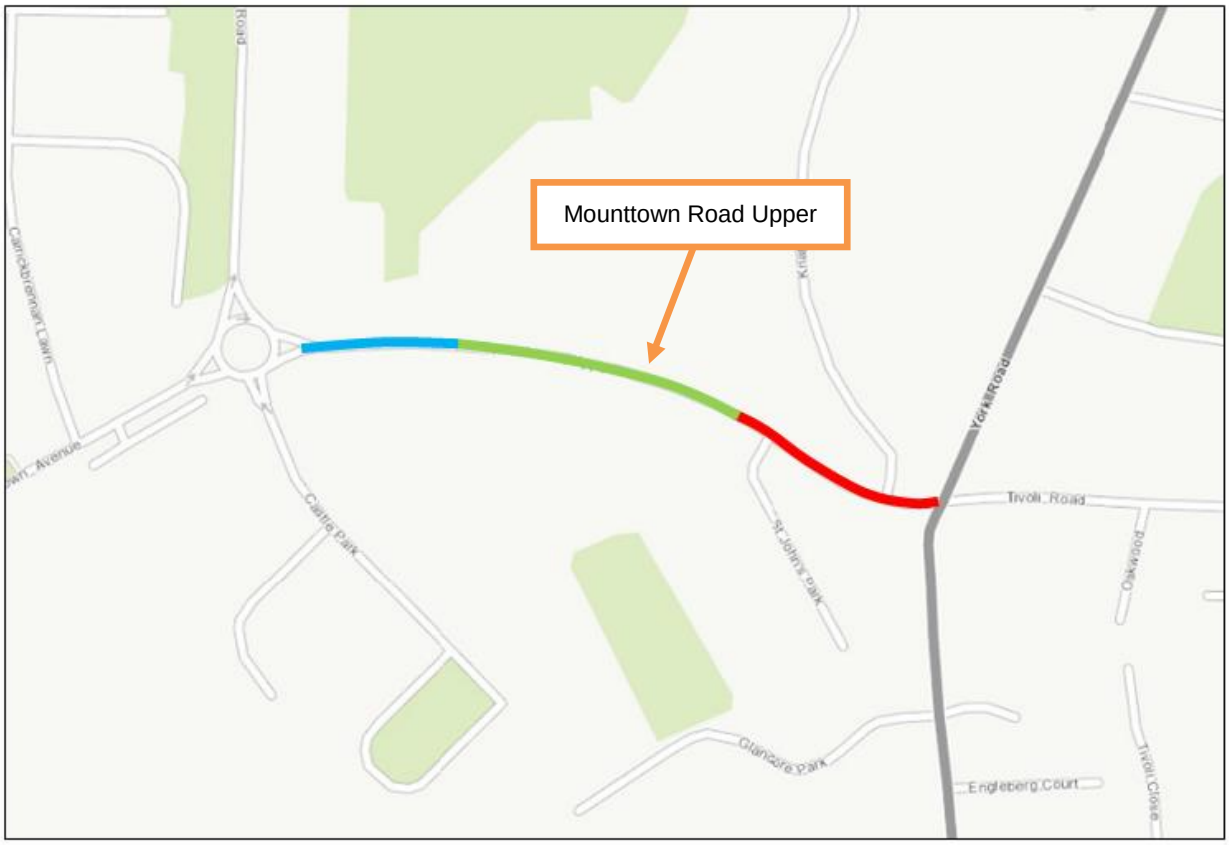


Figure 2.11: Mounttown Road Upper Parking Facilities

All scheme options require full usage of the entire width of Mounttown Road Lower and as such, both the formal (23 spaces) and informal (approximately 12) spaces listed above will be removed as part of the proposed works.

- Carrickbrennan road

The survey has shown that there is formal parking available at numerous locations along Carrickbrennan Road as shown on **Figure 2.12**. The parking breakdown on Carrickbrennan Road is as follows:

- Formal Parking – Approximately 92 spaces.
- Informal Parking –0 Spaces.
- Adjacent Parking – 0 Spaces.

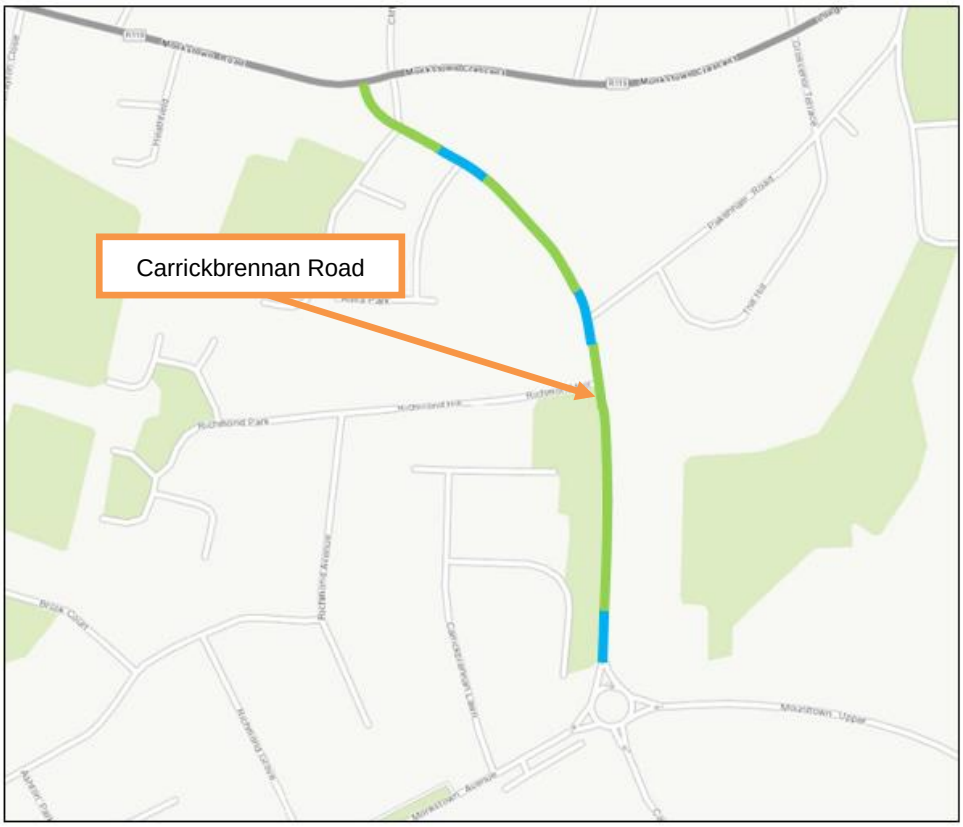


Figure 2.12: Carrickbrennan Road Parking Facilities

- Monkstown Road

Following the survey, no parking facilities were found on Monkstown Road, as shown on **Figure 2.13** below.

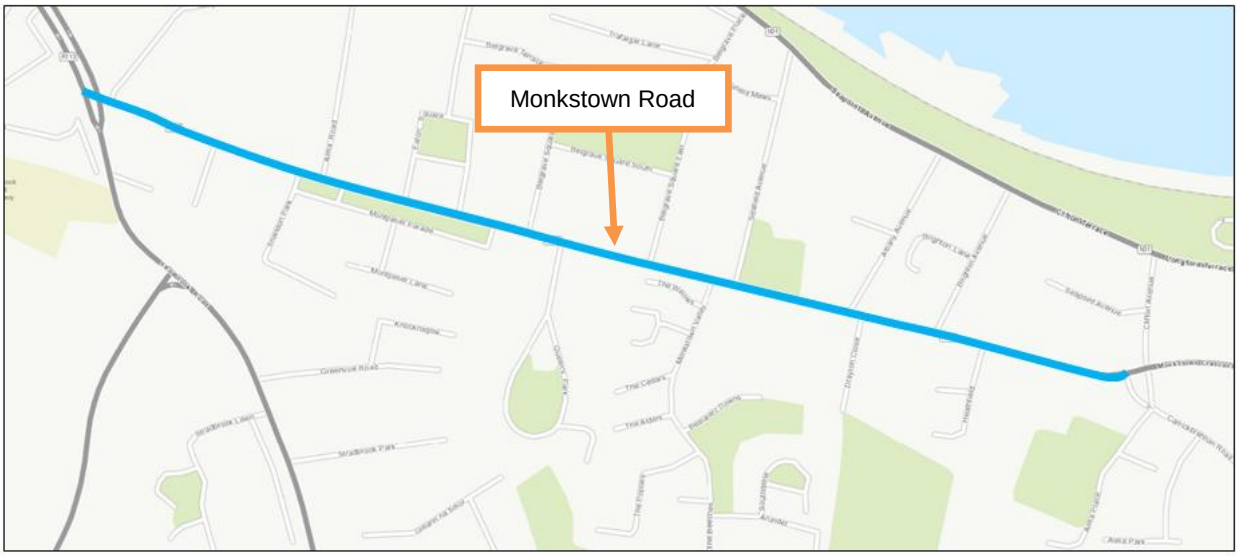


Figure 2.13: Monkstown Road Parking Facilities

2.4. Route Option S4: Georges Street Upper/Marine Road/Crofton Road/Old DunLeary road/Seapoint Avenue/Newtown Avenue/Georges Street Lower/Clarence Street

- Route Map

Figure 2.14: Map of Route Option S4

- Marine Road

The survey has shown that there is formal parking available at numerous locations along Marine Road as shown on **Figure 2.15** below. Of these formal spaces, 4 are shared as a loading bay between 7am and 7 pm Monday to Saturday. There is also a shared taxi rank and loading bay. The parking breakdown on Marine Road is as follows:

- Formal Parking – Approximately 20 spaces.
- Informal Parking – 0 Spaces.
- Adjacent Parking – 0 Spaces.
- Taxi Spaces/Loading Bay – 10 Spaces.

Figure 2.15: Marine Road Parking Facilities

All scheme options require full usage of the entire width of Marine Road and as such, both the formal parking spaces (approximately 20 No) and taxi rank spaces (approximately 10 No.) will be removed as part of the proposed works.

- Crofton Road

The survey has shown that there is formal parking available at the locations along Crofton Road as shown on **Figure 2.16** below. The breakdown of the car parking facilities along Crofton Road is as follows:

- Formal Parking – Approximately 35 spaces (1 Disabled).
- Informal Parking – 0 Spaces.
- Adjacent Parking – 0 Spaces.

Figure 2.16: Crofton Road Parking Facilities

All scheme options require full usage of the entire width of Crofton Road and as such, the formal parking spaces (approximately 36 No.) will be removed as part of the proposed works.

- Old Dun Laoghaire Road

Following the survey formal car parking has been found at a number of locations as shown on **Figure 2.17** below. There is also an adjacent car park servicing the Salthill and Monkstown Dart station. The breakdown of the car parking facilities along the Old Dun Laoghaire Road is as follows:

- Formal Parking – Approximately 11 spaces.
- Informal Parking – 0 Spaces.
- Adjacent Parking – Approximately 84 Spaces.

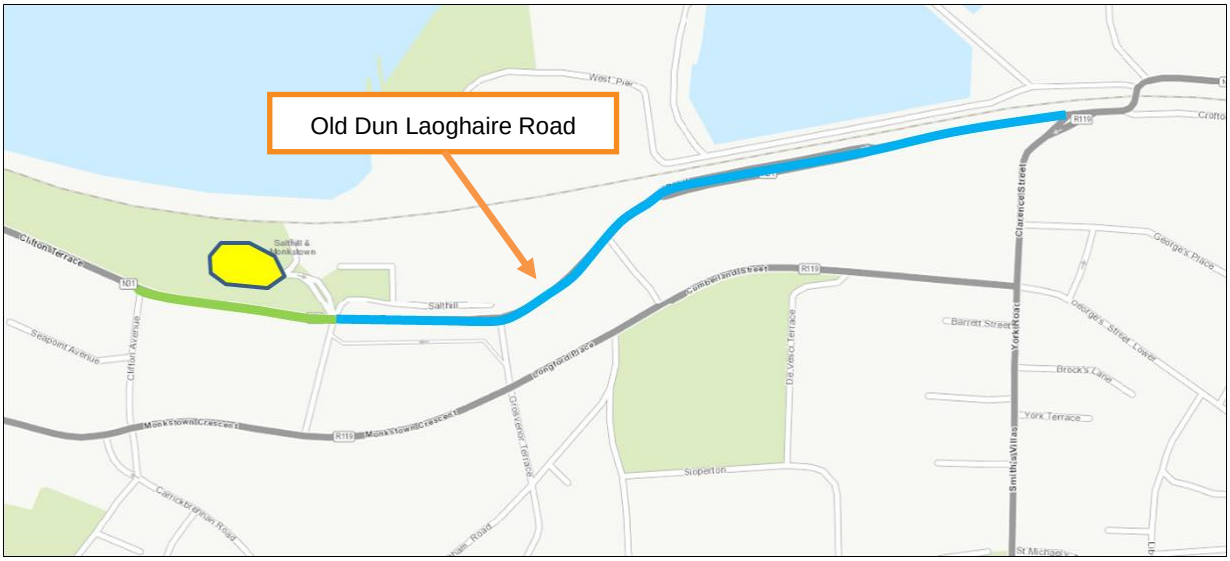


Figure 2.17: Old Dun Laoghaire Road Car Parking facilities

All scheme options require full usage of the entire width of the Old Dunleary Road and as such, the formal parking spaces (approximately 11 No.) will be removed as part of the proposed works. The proposed works for the scheme options will not affect the adjacent parking spaces at Salthill and Monkstown DART station.

- Seapoint Avenue

Following the survey formal car parking has been found at a number of locations as shown on **Figure 2.18** below. The breakdown of the car parking facilities along Seapoint Avenue is as follows:

- Formal Parking – Approximately 24 (Including 1 Disabled) spaces.
- Informal Parking – 0 Spaces.
- Adjacent Parking – 0 Spaces.

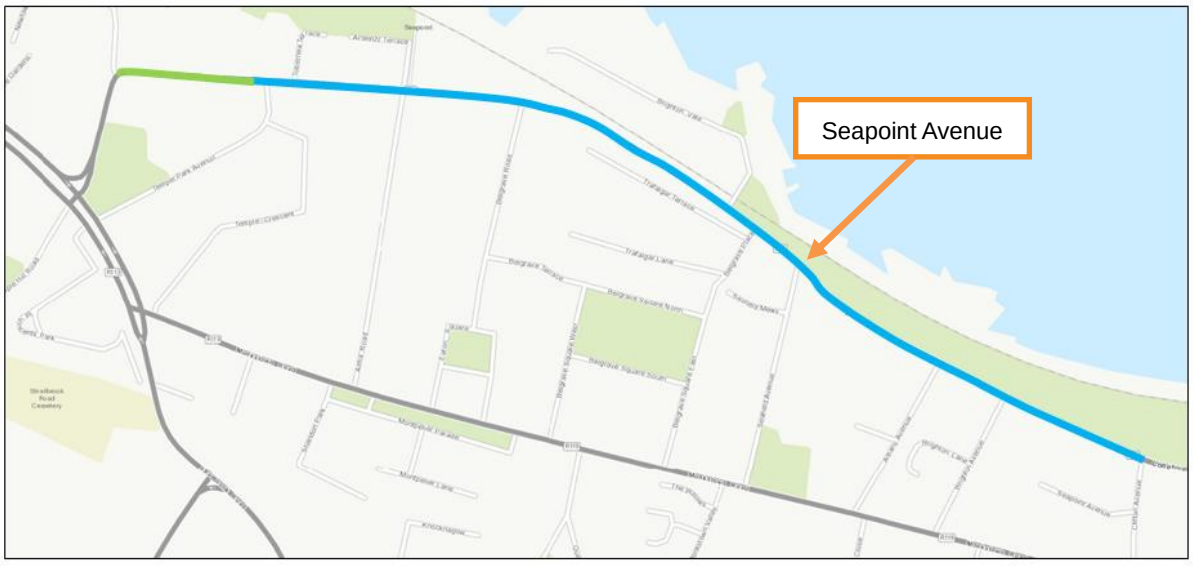


Figure 2.18: Seapoint Avenue Car Parking Facilities

All scheme options require full usage of the entire width of the Seapoint Avenue and as such, the formal parking spaces (approximately 25 No. including one disability) will be removed as part of the proposed works.

- Newtown Avenue

There are 3 formal car parking spaces located on Newtown Avenue, the location of which is as shown on **Figure 2.19** below.

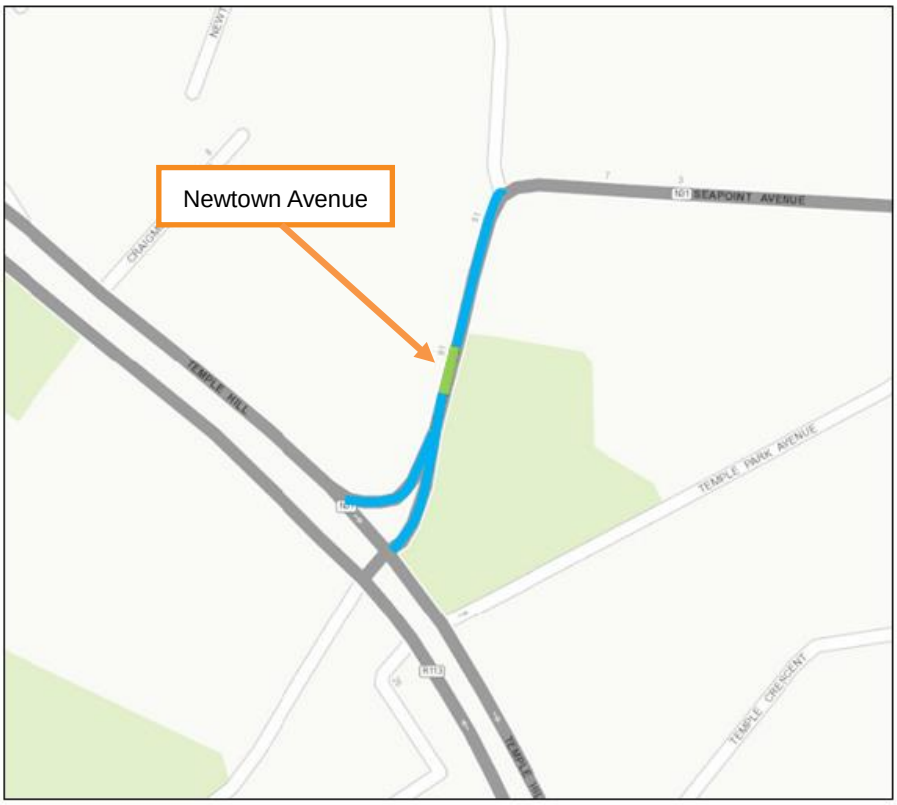


Figure 2.19: Newtown Avenue Car Parking Facilities

All scheme options require full usage of the entire width of the Seapoint Avenue and as such, the formal parking spaces (approximately 3 No.) will be removed as part of the proposed works.

- George's Street Lower

There are a number of formal parking spaces located at the western end of George's Street Lower as shown on **Figure 2.20** below. There is also a car park on Convent Lane adjacent to George's Street Lower. The breakdown of the car parking facilities along George's Street Lower is as follows:

- Formal Parking – Approximately 13 spaces.
- Informal Parking – 0 Spaces.
- Adjacent Parking – 8 (Including 1 Disabled) Spaces.
- Total Spaces – 4 spaces

Figure 2.20: George's Street Lower Car Parking Facilities

All scheme options require full usage of the entire width of Georges Street Lower and as such, the formal parking spaces (approximately 13 No.) will be removed as part of the proposed works. 4 No. of the adjacent spaces and 2 No. of the taxi rank spaces will also be removed as part of these works.

- Clarence Street

There is no car parking facilities on Clarence Street as shown on **Figure 2.21** below.

Figure 2.21: Clarence Street Car Parking Facilities

3. SAS 2: Booterstown – City Centre Route Options

3.1. Route Option N1: Merrion Road/Pembroke Road/Baggot Street

- Route Map

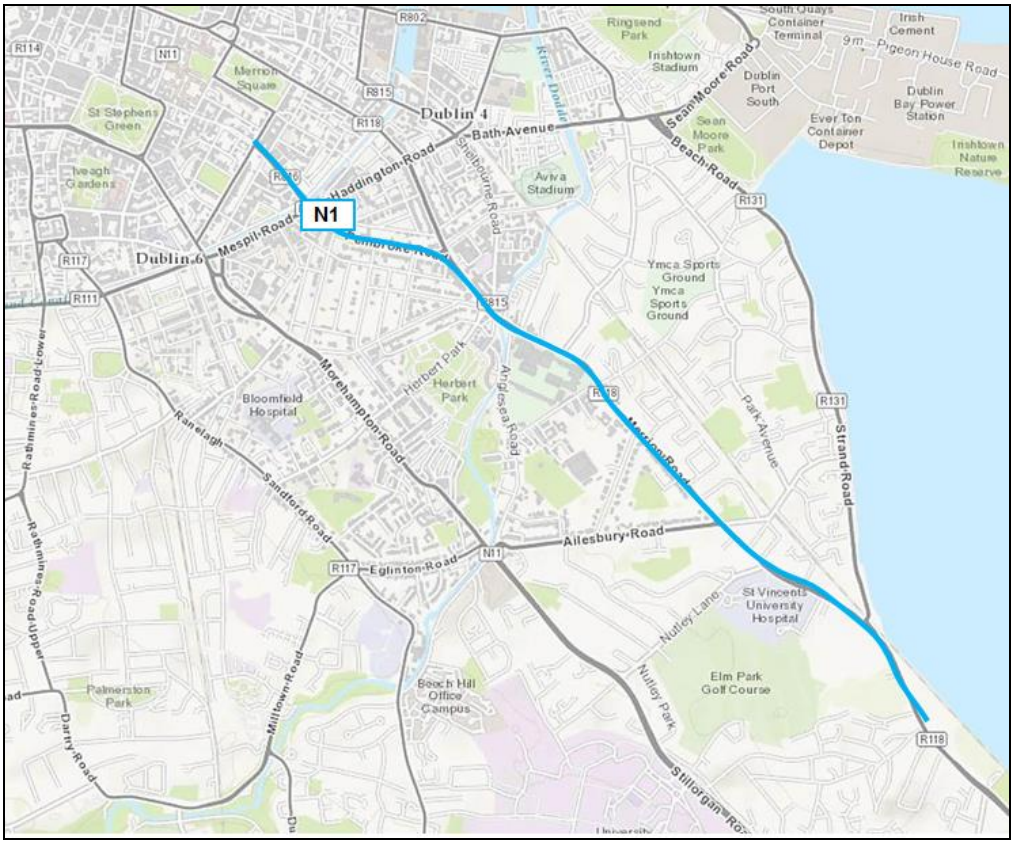


Figure 3.1: Map of Route Option N1

- Merrion Road

Following the survey formal, adjacent and informal car parking has been found on Merrion Road between Trimleston Avenue and Nutley Lane; the locations of which are as shown on Error! Reference source not found. below. The breakdown of the car parking facilities along this section of Merrion Road is as follows:

- Formal Parking – Approximately 12 Spaces.
- Informal Parking – Approximately 15 Spaces.
- Adjacent Parking – Approximately 206 (Of which 5 are Disabled Parking) Spaces.

Figure 3.2: Merrion Road Car Parking Facilities

All scheme options require full usage of the entire width of this section of Merrion road and as such, the formal parking spaces (approximately 12 No.) and informal parking spaces (approximately 15 No.) will be removed as part of the proposed works. The adjacent car parks will not be affected by any proposed works.

There are no parking facilities along the majority of the section of Merrion Road from the Nutley Lane junction to the Merrion Road/Beatty's Avenue junction aside from 9 formal parking spaces, the locations of which are shown on **Figure 3.3** below. The breakdown of the car parking facilities is as follows:

- Formal Parking – Approximately 9 Spaces.
- Informal Parking – 0 Spaces.
- Adjacent Parking – 0 Spaces.

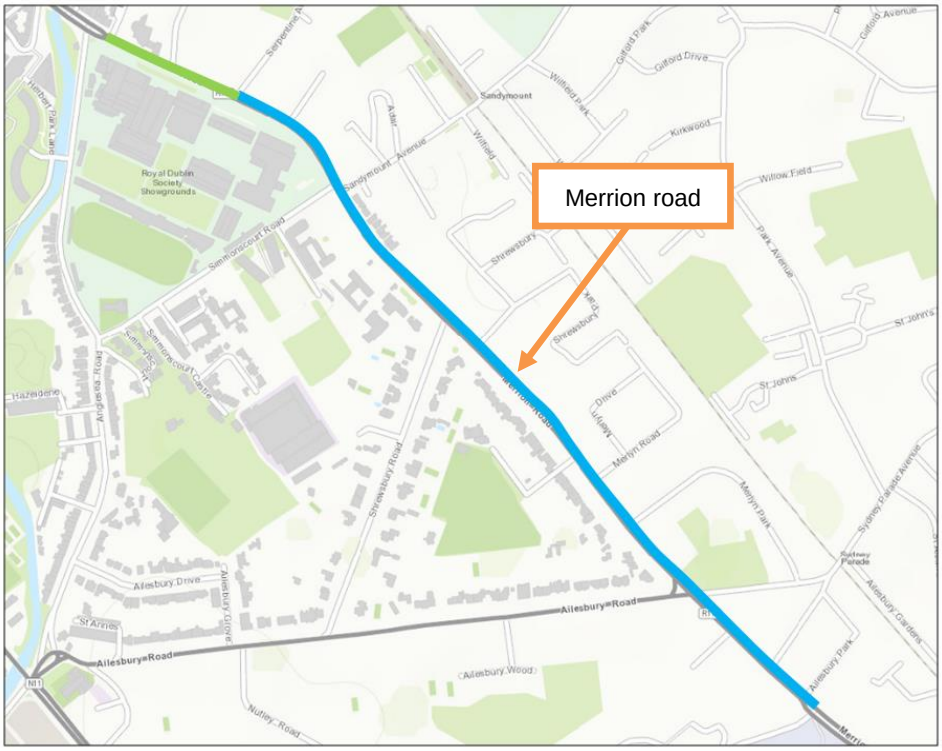


Figure 3.3: Merrion Road Car parking facilities

The proposed works in the scheme options do not affect the formal parking on Merrion Road listed above.

- Pembroke Road

The survey has shown formal car parking facilities along the majority of the length of Pembroke Road as shown on **Figure 3.4** below. There are no informal or adjacent parking spaces on Pembroke Road.

- Formal Parking – Approximately 110 Spaces.

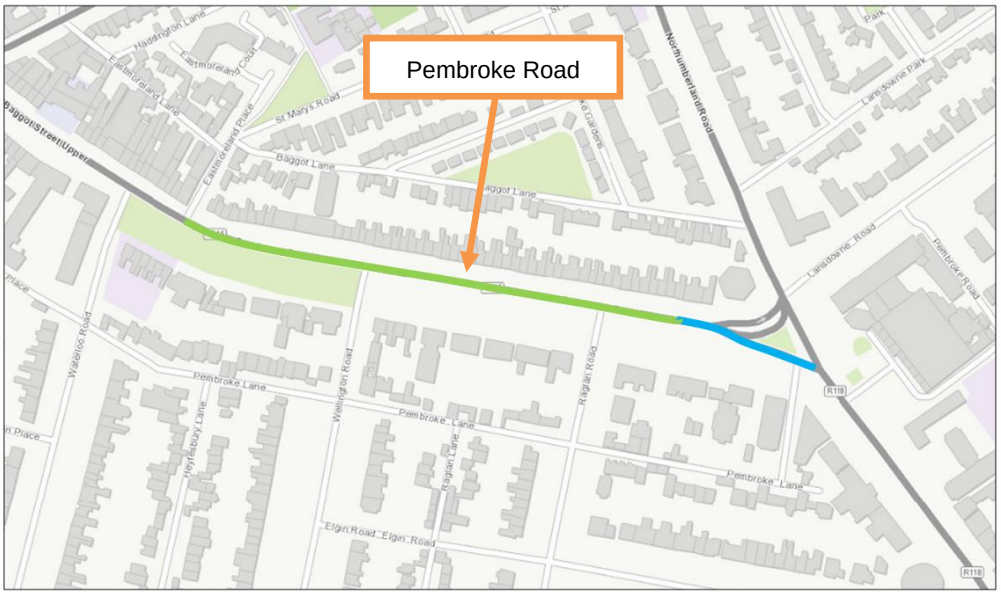


Figure 3.4: Pembroke Road Car Parking Facilities

All scheme options require full usage of the entire width of Pembroke Road and as such, the formal parking spaces (approximately 110 No.) will be removed as part of the proposed works.

- Baggot Street

The survey has shown formal car parking facilities at numerous locations along the length of Baggot Street as shown on **Figure 3.5** below. There are no informal or adjacent parking spaces on Baggot Street. A breakdown of the car parking facilities on Baggot Street is as follows:

- Formal Parking – 111 (Of which 1 Disabled Parking) Spaces.
- Taxi Rank 6 Spaces

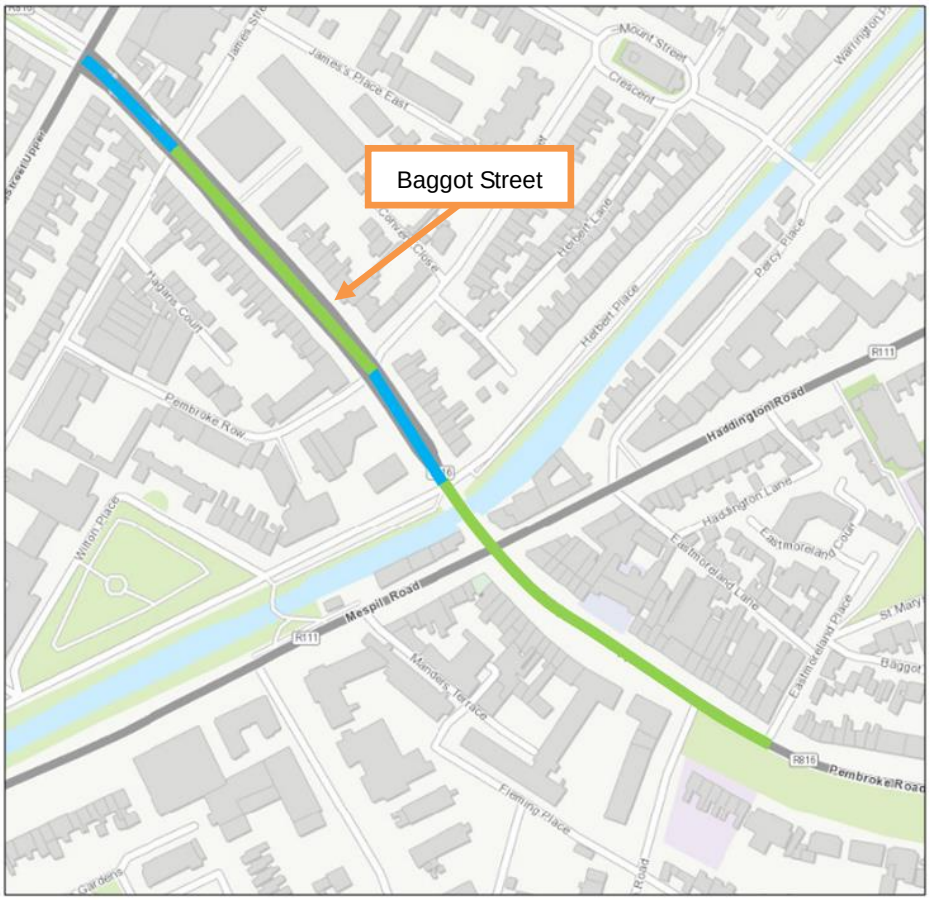


Figure 3.5: Baggot Street Car Parking Facilities

All scheme options require full usage of the entire width of Pembroke Road and as such, the formal parking (approximately 111 No.) and taxi rank spaces will be removed as part of the proposed works.

3.2. Route Option N2: Merrion Road/Northumberland Road/Mount Street Lower

- Route Map

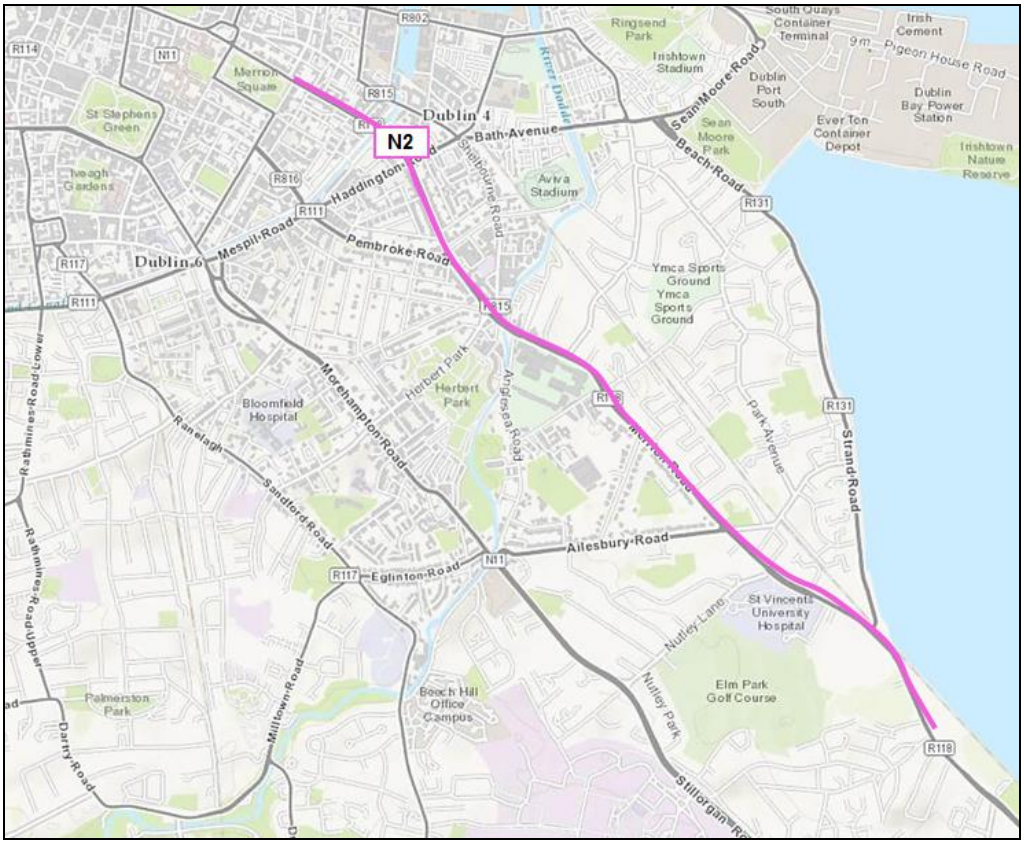


Figure 3.6: N2 Route Map

A large section of this route, namely along Merrion and Pembroke Road, have been documented in Route Option N1 above. The same car parking facilities identified in these sections for Merrion Road are also applicable to the N2 Parking Survey for this section. The following section of the report shall concentrate on the car parking facilities on Northumberland Road and Mount Street Lower.

- Northumberland Road

The survey has shown formal car parking facilities at certain locations along the length of Northumberland Road as shown on **Figure 3.7** below. There are no informal or adjacent parking spaces on Northumberland Road.

- Formal Parking – Approximately 21 Spaces.

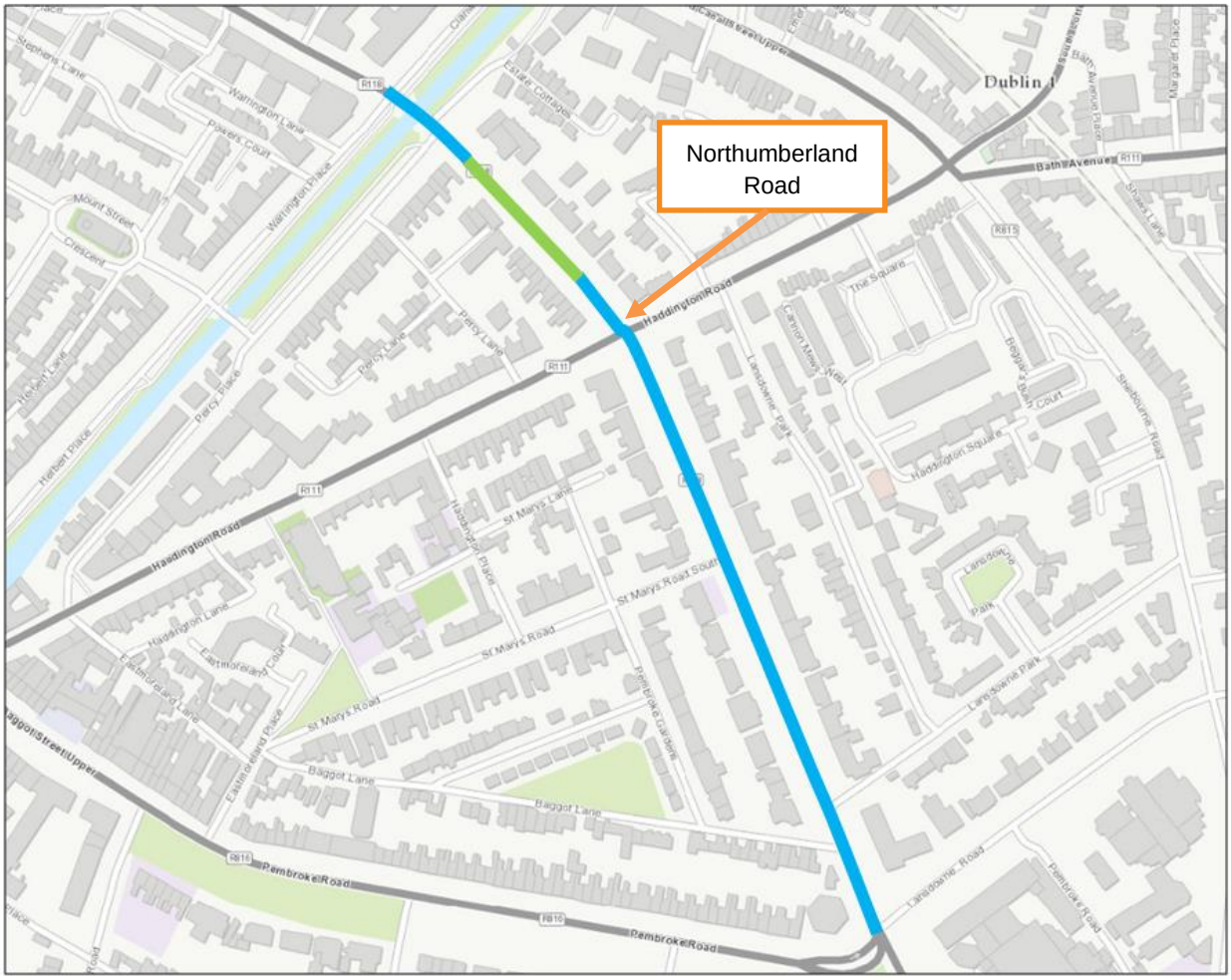


Figure 3.7: Northumberland Road Car Parking Facilities

All scheme options require full usage of the entire width of Pembroke Road and as such, the formal parking (approximately 21 No.) will be removed as part of the proposed works.

- Mount Street Lower

The survey has shown formal car parking facilities at certain locations along the length of Mount Street Lower as shown on **Figure 3.8** below. There are no informal or adjacent parking spaces on mount Street Lower.

- Formal Parking – Approximately 27 Spaces.

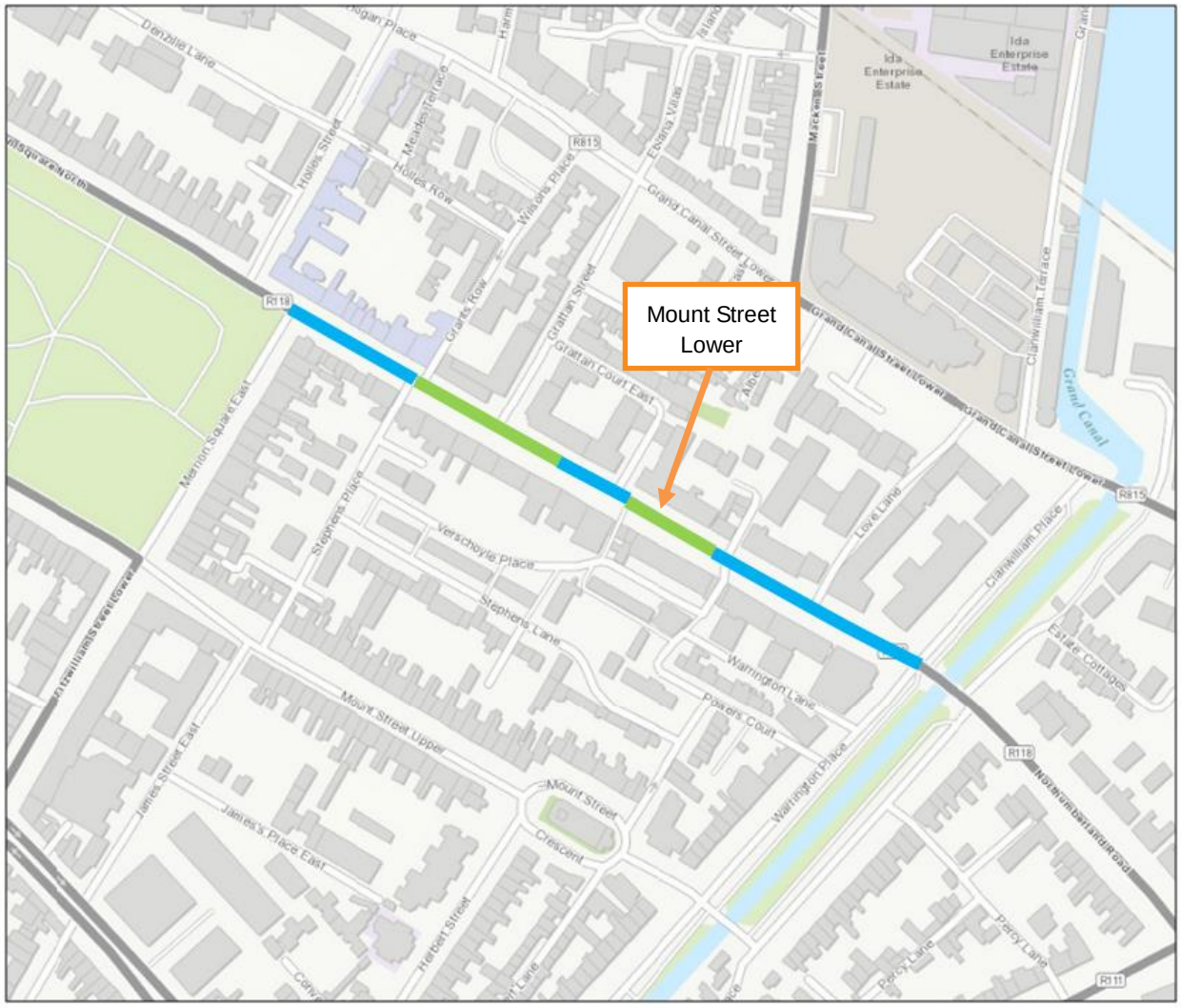


Figure 3.8: Mount Street Lower Car Parking Facilities

All scheme options require full usage of the entire width of Mount Street Lower and as such, the formal parking (approximately 27 No.) will be removed as part of the proposed works.

4. SAS 3: Blackrock- Booterstown Route Options

4.1. Route Option M1: Temple Road/Frascati Road/Rock Road

- Route Map

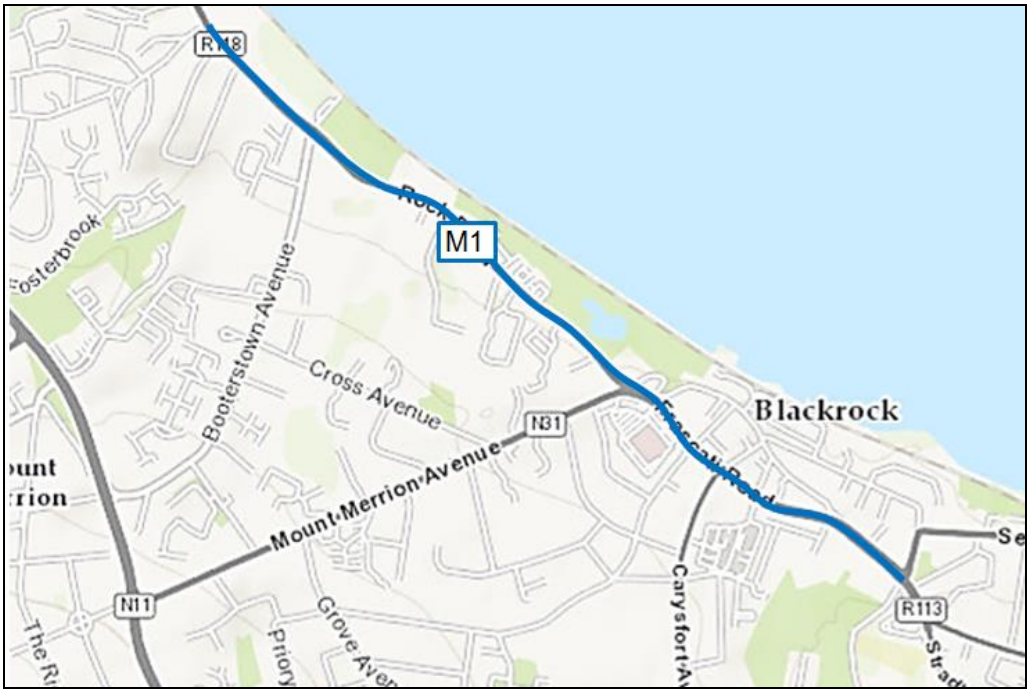


Figure 4.1: M1 Route Map

Route Option M1 is the middle section linking the Southern Route Options (e.g. Dun Laoghaire to Blackrock) to the Northern Route Options (e.g. Booterstown to the City Centre).

- Temple Road

The survey has shown no car parking facilities along the length of Temple Road as shown on **Figure 4.2** below.

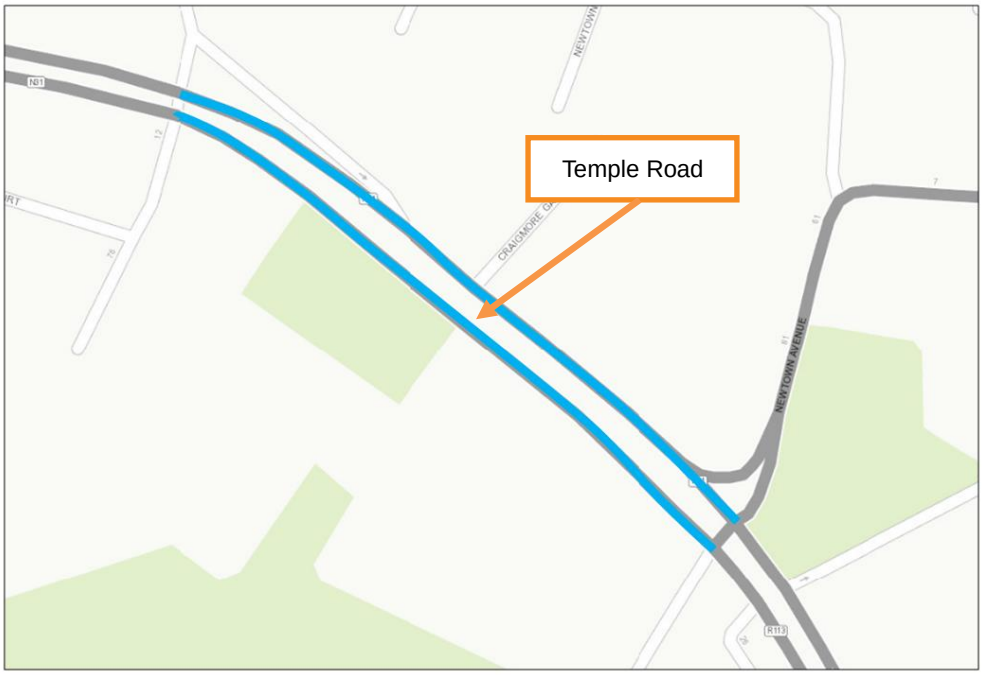


Figure 4.2: Temple Road Car Parking Facilities

- Frascati Road

The survey has shown no car parking facilities along the length of Temple Road as shown on **Figure 4.3** below.

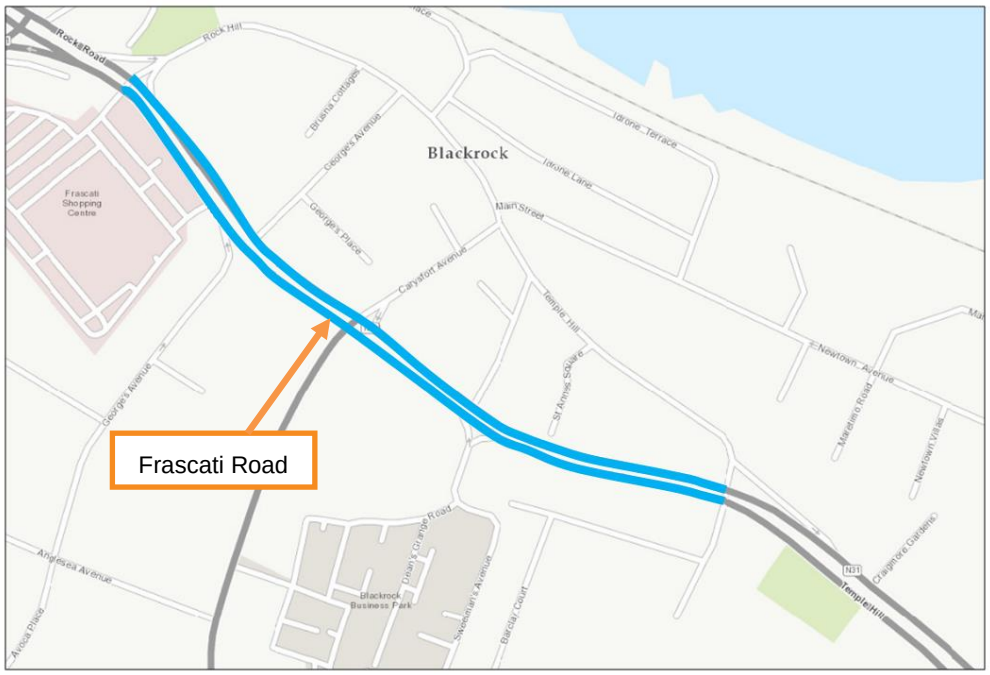


Figure 4.3: Frascati Road Car Parking Facilities

- Rock Road

The survey has shown that there is formal and adjacent parking available at the locations along Rock Road as shown on **Figure 4.4** below. The breakdown of the car parking facilities along Rock Road is as follows:

- Formal Parking – Approximately 40 spaces (1 Disabled).
- Informal Parking – 0 Spaces.
- Adjacent Parking – 112 Spaces.

Figure 4.4: Rock Road Car Parking Facilities

All scheme options require full usage of the entire width of the Rock road and as such, the formal parking spaces (approximately 40 No.) will be removed as part of the proposed works. The adjacent car parks will not be affected by any proposed works.

5. Summary of Figures

Summary of Figures								
Route Option	Formal Parking		Informal Parking		Adjacent Parking		Taxi Spaces	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
S1	0	0	10	0	0	0	0	0
S2	0	0	0	0	0	0	0	0
S3	115	0	30	0	5	0	0	0
S4	107	0	0	0	92	88	14	2
M1	40	0	0	0	112	112	0	0
N1	242	0	15	0	206	206	6	0
N2	69	0	15	0	206	206	0	0

Appendix F – Cost Estimate

Route: N1 Option 1					
Route Sections		Route Section Cost Rates (EUR / km)			Route Section Cost
		CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
		€ 650,000	€ 1,300,000	€ 2,500,000	
1	Section Length (km)		0.195		€ 253,500
2		0.015			€ 9,750
3			0.321		€ 417,300
4				0.106	€ 265,000
5			0.374		€ 486,200
6			0.091		€ 118,300
7				0.089	€ 222,500
8			0.032		€ 41,600
9				0.145	€ 362,500
10			0.114		€ 148,200
11				0.227	€ 567,500
12			0.308		€ 400,400
13			0.159		€ 206,700
14			0.154		€ 200,200
15			0.065		€ 84,500
16			0.211		€ 274,300
17			0.310		€ 403,000
18				0.105	€ 262,500
20					€ 0
21		0.079			€ 51,350
22			0.031		€ 40,300
23			0.399		€ 518,700
				Total of Route Sections Cost	**€ 5,334,300**

Junctions	Junction Cost Rates (EUR / junction)			Junctions Cost
	CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
	€ 70,000	€ 230,000	€ 1,000,000	
No of CL1	7			€ 490,000
No of CL2		6		€ 1,380,000
No of CL3			6	€ 6,000,000
			Total of Junctions Lower Costs	**€ 7,870,000**

Land Acquisition	Average Land Value (EUR / sq.m.)	Land Take Cost
	1,500 €	
Sum of Residential along Route (sq.m).	697	1,045,500 €
Sum of Commercial along Route (sq.m).		0 €
Sum of Agricultural along Route (sq.m).		0 €
Sum of Industrial along Route (sq.m).		0 €
	Total of Route Junctions Cost	**€ 1,045,500**

Route: N1 Option 1	**Total Cost =**	**€ 14,249,800**

Route: N1 Option 2					
Route Sections		Route Section Cost Rates (EUR / km)			Route Section Cost
		CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
		€ 650,000	€ 1,300,000	€ 2,500,000	
1	Section Length (km)		0.195		€ 253,500
2		0.015			€ 9,750
3			0.800		€ 1,040,000
4			0.207		€ 269,100
5				0.097	€ 242,500
6			0.165		€ 214,500
7				0.227	€ 567,500
8			0.308		€ 400,400
9			0.159		€ 206,700
10			0.154		€ 200,200
11			0.065		€ 84,500
12			0.192		€ 249,600
13			0.311		€ 404,300
14				0.109	€ 272,500
15		0.079			€ 51,350
16			0.032		€ 41,600
17			0.176		€ 228,800
18				0.111	€ 277,500
19					
20					
21					
22					
23					
				Total of Route Sections Cost	**€ 5,014,300**

Junctions	Junction Cost Rates (EUR / junction)			Junctions Cost
	CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
	€ 70,000	€ 230,000	€ 1,000,000	
No of CL1	7			€ 490,000
No of CL2		6		€ 1,380,000
No of CL3			6	€ 6,000,000
			Total of Junctions Lower Costs	**€ 7,870,000**

Land Acquisition	Average Land Value (EUR / sq.m.)	Land Take Cost
	1,500 €	
Sum of Residential along Route (sq.m).	492	738,000 €
Sum of Commercial along Route (sq.m).		0 €
Sum of Agricultural along Route (sq.m).		0 €
Sum of Industrial along Route (sq.m).		0 €
		Total of Route Junctions Cost	**€ 738,000**

Route: N1 Option 2	**Total Cost**	**€ 13,622,300**

Route: N2 Option 1					
Route Sections		Route Section Cost Rates (EUR / km)			Route Section Cost
		CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
		€ 650,000	€ 1,300,000	€ 2,500,000	
1	Section Length (km)		0.195		€ 253,500
2		0.015			€ 9,750
3			0.321		€ 417,300
4				0.106	€ 265,000
5			0.374		€ 486,200
6			0.091		€ 118,300
7				0.089	€ 222,500
8			0.032		€ 41,600
9				0.145	€ 362,500
10			0.114		€ 148,200
11				0.227	€ 567,500
12			0.308		€ 400,400
13			0.159		€ 206,700
14			0.154		€ 200,200
15			0.065		€ 84,500
16			0.211		€ 274,300
17			0.027		€ 35,100
18				0.345	€ 862,500
19				0.162	€ 405,000
20			0.168		€ 218,400
				0.008	€ 20,000
			0.143		€ 185,900
				0.041	€ 102,500
			0.235		€ 305,500
				Total of Route Sections Cost	**€ 6,193,350**

Junctions		Junction Cost Rates (EUR / junction)			Junctions Cost
		CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
		€ 70,000	€ 230,000	€ 1,000,000	
No of CL1		8			€ 560,000
No of CL2			4		€ 920,000
No of CL3				5	€ 5,000,000
				Total of Junctions Lower Costs	**€ 6,480,000**

Land Acquisition	Average Land Value (EUR / sq.m.)	Land Take Cost
	1,500 €	
Sum of Residential along Route (sq.m).	1770	2,655,000 €
Sum of Commercial along Route (sq.m).		0 €
Sum of Agricultural along Route (sq.m).		0 €
Sum of Industrial along Route (sq.m).		0 €
	Total of Route Junctions Cost	**€ 2,655,000**

Route: N2 Option 1	**Total Cost =**	**€ 15,328,350**

Route: N2 Option 2					
Route Sections		Route Section Cost Rates (EUR / km)			Route Section Cost
		CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
		€ 650,000	€ 1,300,000	€ 2,500,000	
1	Section Length (km)		0.195		€ 253,500
2		0.015			€ 9,750
3			0.800		€ 1,040,000
4			0.180		€ 234,000
5				0.097	€ 242,500
6			0.165		€ 214,500
7				0.227	€ 567,500
8			0.308		€ 400,400
9			0.159		€ 206,700
10			0.153		€ 198,900
11			0.065		€ 84,500
12			0.192		€ 249,600
13			0.037		€ 48,100
14				0.335	€ 837,500
15				0.110	€ 275,000
16			0.060		€ 78,000
17			0.360		€ 468,000
18			0.234		€ 304,200
19					
20					
				Total of Route Sections Cost	**€ 5,712,650**

Junctions	Junction Cost Rates (EUR / junction)			Junctions Cost
	CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
	€ 70,000	€ 230,000	€ 1,000,000	
No of CL1	8			€ 560,000
No of CL2		4		€ 920,000
No of CL3			5	€ 5,000,000
			Total of Junctions Lower Costs	**€ 6,480,000**

Land Acquisition	Average Land Value (EUR / sq.m.)	Land Take Cost
	1,500 €	
Sum of Residential along Route (sq.m).	1411	2,116,500 €
Sum of Commercial along Route (sq.m).		0 €
Sum of Agricultural along Route (sq.m).		0 €
Sum of Industrial along Route (sq.m).		0 €
	Total of Route Junctions Cost	**€ 2,116,500**

Route: N2 Option 2	**Total Cost =**	**€ 14,309,150**

Route: M1 Middle Section Option 1					
Route Sections		Route Section Cost Rates (EUR / km)			Route Section Cost
		CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
		€ 650,000	€ 1,300,000	€ 2,500,000	
1	Section Length (km)		0.129		€ 167,700
2			0.267		€ 347,100
3			0.191		€ 248,300
4			0.040		€ 52,000
5			0.105		€ 136,500
6				0.022	€ 55,000
7			0.330		€ 429,000
8				0.125	€ 312,500
9			0.015		€ 19,500
10				0.017	€ 42,500
11			0.013		€ 16,900
12				0.109	€ 272,500
13			0.331		€ 430,300
14			0.010		€ 13,000
15		0.081			€ 52,650
16			0.050		€ 65,000
17		0.025			€ 16,250
18			0.123		€ 159,900
19		0.017			€ 11,050
20			0.019		€ 24,700
21		0.039			€ 25,350
				Total of Route Sections Cost	**€ 2,897,700**

Junctions	Junction Cost Rates (EUR / junction)			Junctions Cost
	CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
	€ 70,000	€ 230,000	€ 1,000,000	
No of CL1	6			€ 420,000
No of CL2				€ 0
No of CL3			1	€ 1,000,000
			Total of Junctions Lower Costs	**€ 1,420,000**

Land Acquisition	Average Land Value (EUR / sq.m.)	Land Take Cost
	1,500 €	
Sum of Residential along Route (sq.m).	219	328,500 €
Sum of Commercial along Route (sq.m).		0 €
Sum of Agricultural along Route (sq.m).		0 €
Sum of Industrial along Route (sq.m).		0 €
	Total of Land Acquisition Cost	**€ 328,500**

Route: M1 Middle Section	**Cost**	**€ 4,646,200**

Route: M1 Middle Section Option 2					
Route Sections		Route Section Cost Rates (EUR / km)			Route Section Cost
		CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
		€ 650,000	€ 1,300,000	€ 2,500,000	
1	Section Length (km)		0.129		€ 167,700
2			0.270		€ 351,000
3			0.194		€ 252,200
4			1.010		€ 1,313,000
5		0.166			€ 107,900
6			0.116		€ 150,800
7		0.02			€ 15,600
8			0.019		€ 24,700
9		0.039			€ 25,350
				Total of Route Sections Cost	**€ 2,408,250**

Junctions	Junction Cost Rates (EUR / junction)			Junctions Cost
	CAL 1: Minor	CAL 2: Moderate	CAL 3: Major	
	€ 70,000	€ 230,000	€ 1,000,000	
No of CL1	6			€ 420,000
No of CL2				€ 0
No of CL3			1	€ 1,000,000
			Total of Junctions Lower Costs	**€ 1,420,000**

Land Acquisition	Average Land Value (EUR / sq.m.)	Land Take Cost
	1,500 €	
Sum of Residential along Route (sq.m).	0	0 €
Sum of Commercial along Route (sq.m).		0 €
Sum of Agricultural along Route (sq.m).		0 €
Sum of Industrial along Route (sq.m).		0 €
	Total of Land Acquisition Cost	**€ 0**
Route: M1 Middle Section	**Total Cost =**	**€ 3,828,250**

Appendix G – Infrastructural Cost Estimate

1. Route Option M1

1.1 Design option 1

1.1.1. Frascati Road

- **Minor modifications** are required at the Newtown Avenue/Frascati Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 130m approximately from the Newtown Avenue junction, the proposed works have been categorized as **moderate**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Existing road signage may need to be removed and relocated and/or replaced. No land take is required.

- **Minor modifications** are required at the Frascati Road/Temple Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road

markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 270m approximately, the proposed works have been categorized as **moderate**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs, central median and footways with a width greater than 500mm and the removal of and installation of new drainage systems. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Existing road signage to be removed and relocated and/or replaced. No land take is required.

- **Minor modifications** are required at the Frascati Road/Carysfort Avenue junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 190m approximately, the proposed works have been categorized as **moderate**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Existing road signage to be removed and relocated and/or replaced. To accommodate the 20m buffer some small trees and small plants need to removed/relocated and/or replaced at Permanent TSB therefore major landscaping works are also required along with full depth pavement reconstruction and associated road markings. No land take is required.

1.1.2 Rock Road

- **Minor modifications** are required at the Rock Hill/Rock Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 40m approximately, from the Rock Hill junction, the proposed works have been categorized as **moderate**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage

systems. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Safety barriers and guardrails must be replaced at the Rock Hill junction. Changes are required to the existing road geometry (i.e. removal of traffic islands, central median etc.) Existing road signage to be removed and relocated and/or replaced. No land take is required.

- **Minor modifications** are required at the Mount Merrion Avenue /Rock Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 105m approximately, from the Mount Merrion Avenue junction, the proposed works have been categorized as **moderate**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways (including central median) with a width greater than 500mm and the removal of and installation of new drainage systems. Existing services (power supply, communications, and water, gas) to be protected/relocated/diverted. Existing road signage to be removed and relocated and/or replaced. Existing road markings to be removed and replaced. No land take is required.

- For the next 22m, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Existing road signage may need to be removed and relocated and/or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed.

- For the next 330m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm. Some road signage and road furniture (bins and bollards) to be removed/ relocated or replaced. Existing services (power supply, communications, and water, gas) to be protected/relocated/diverted. Existing road markings to be removed and replaced. No land take is required along this section.

- For the next 125m approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm, the removal of and installation of new drainage systems. As this section of Marine Road is predominantly a commercial area, associated services (power supply, communications, water and gas) to be protected/relocated/diverted. Existing road signage to be removed and relocated and/or replaced. Existing road markings to be removed and replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed.

- For the next 15m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Some road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. Existing road markings to be removed and replaced. No land take is required along this section.

- For the next 17m, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Existing road signage to be removed and relocated and/or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed.

- For the next 13m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Some road signage and road furniture (bins and bollards) to be removed/ relocated or replaced. No land take is required along this section.

- For the next 109m, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Existing road signage may need to be removed and relocated and/or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed.

- For the next 331m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Some road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. Existing road markings to be removed and replaced. No land take is required along this section.

- **Minor modifications** are required at the Booterstown Avenue /Rock Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 10m approximately, works have been categorized as **moderate** due to the removal of the central median with a width greater than 500mm. Some road signage and road furniture (bins and bollards) to be removed/ relocated or replaced. No land take is required along this section.

- For the next 80m, the proposed works have been categorized as **minor**. I.e. the works to accommodate a 20m buffer include the removal and replacement of existing road markings and local road re-surfacing. Existing road signage to be removed and relocated and/or replaced.

- For 50m approximately, works have been categorized as **moderate** due to the removal of the central median with a width greater than 500mm and the removal/realignment of drainage systems and services. Some road signage to be removed/ relocated or replaced. No land take is required along this section.

- For the next 25m, the proposed works have been categorized as **minor**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways with a width less than 500mm and the removal of and installation of new drainage systems. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted.

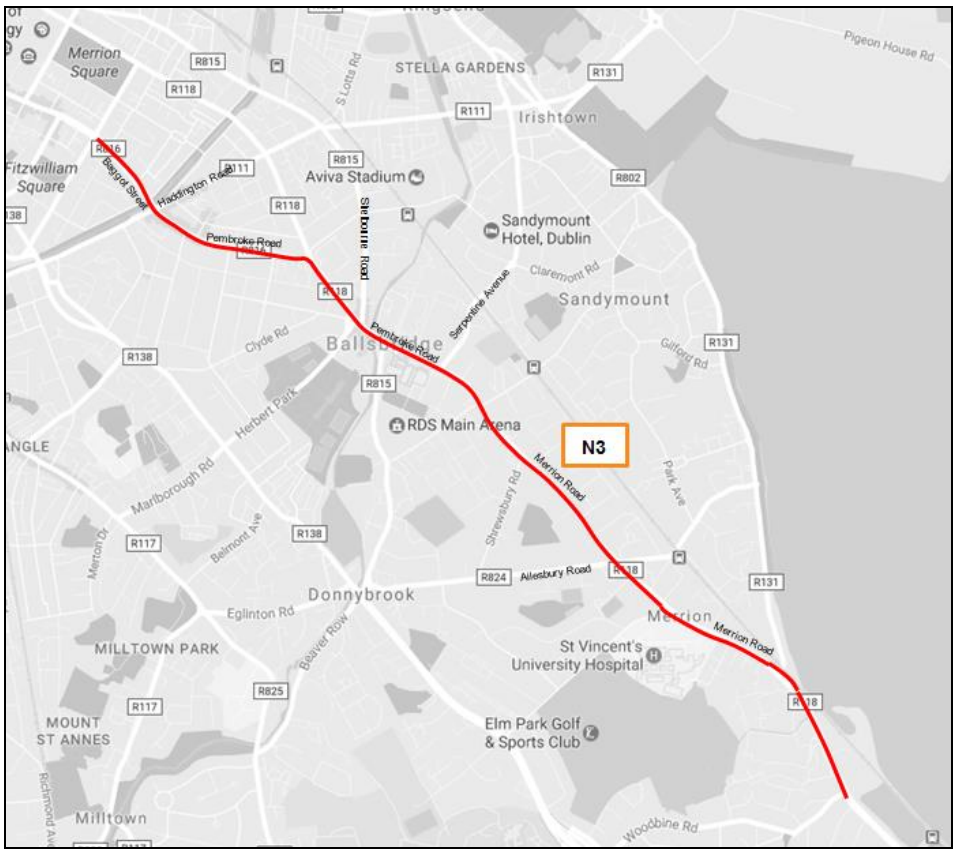
- For 125m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. No land take is required along this section.

- For the next 20m, the proposed works have been categorized as **minor**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways with a width less than 500mm. Existing road markings to be removed and replaced. No land take is required along this section.

- For 60m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways (including central median) with a width greater than 500mm and the removal/realignment of drainage systems and services. Some road signage to be removed/ relocated or replaced. Existing road markings to be removed and replaced. No land take is required along this section.

2. Route Option N1

2.1 Design Option 1



2.1.1 Merrion Road

- **Significant major modifications** are required at the Merrion Road/Trimleston Avenue junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 195m approximately from Trimleston Road travelling towards the city, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Road signage to be removed/ relocated or replaced. No land take is required along this section.

- For the next 15m, the proposed works have been categorized as **minor**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways with a width less than 500mm. Existing road markings to be removed and replaced. No land take is required along this section.

- **Minor modifications** are required at the Elmpark/Merrion Road junction. I.e. the works associated with this categorization include: removal and

replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 320m approximately, works have been categorized as **moderate** due to the removal of kerbs, central median and footways with a width greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. Safety barriers/guard rails to be removed/relocated/replaced at entrance to Elmpark Business Campus and along the central median to entrance to St. Mary's Nursing Home. No land take is required along this section.

- For 160m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a sizeable number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

- For the next 375m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Significant major modifications** are required at the Merrion Road/Nutley Lane junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal

poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 90m approximately from the Nutley lane junction travelling towards the city, works have been categorized as **moderate** due to the removal of kerbs and footways with a width greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Road signage to be removed/ relocated or replaced. No land take is required along this section.

- For the next 90m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- **Moderate upgrade modifications** are required at the Aylesbury road/Merrion Road junction i.e. the works to accommodate the buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 30m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- For the next 145m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to

accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (e.g. bollards at Merlyn Park junction) to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- For the next 115m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- For the next 225m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- For the next 310m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Sandymount Avenue/Simonscourt Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-

skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the 160m approximately, from Sandymount Avenue/Simonscourt Road works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Serpentine Avenue/Merrion Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the 155m approximately, from the Serpentine Avenue junction works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

2.1.2 Pembroke Road

- **Minor modifications** are required at the Anglesea Road/Merrion Road/Pembroke Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and

additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 65m approximately, from the Anglesea Road junction works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture such as bins, bollards and signal boxes, will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Herbert park/Shelbourne Road/Elgin Road/Pembroke Road junction. I.e. the works associated within this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 210m approximately, from the Herbert Park junction, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture such as bins, bollards and signal boxes, to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Lansdowne Road/Northumberland Road/Pembroke Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 310m approximately, from the Lansdowne Road junction, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Central median and traffic bollards also to be removed/relocated/replaced. Road lighting (and associated works i.e. cabling

and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture such as bins, bollards and signal boxes, to be removed/ relocated or replaced. No land take is required along this section.

- For the next 105m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- **Significant major modifications** are required at the Eastmoreland Place/Pembroke Road/Baggot Street Upper junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- **Moderate upgrade modifications** are required at the Waterloo Road/Baggot Street junction i.e. the works to accommodate the buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

2.1.3 Baggot Street

- For the next 80m, the proposed works have been categorized as **minor**. I.e. the works to accommodate a 20m buffer include the removal and replacement of existing road markings and local road re-surfacing. Existing road signage to be removed and relocated and/or replaced.

- **Significant major modifications** are required at the Herbert Place/Wilton Terrace/Mespil Road/Haddington Road/Baggot Street Upper junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 30m approximately, from the Herbert Place/Wilton Terrace/Mespil Road/Haddington Road junction, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Central median and traffic bollards also to be removed/relocated/replaced. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Local road resurfacing works to be conducted at several locations along this section. Road signage and road furniture such as bins, bollards and signal boxes, to be removed/ relocated or replaced. No land take is required along this section.

- **Moderate upgrade modifications** are required at the Herbert Street/Baggot Street junction i.e. the works to accommodate the buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

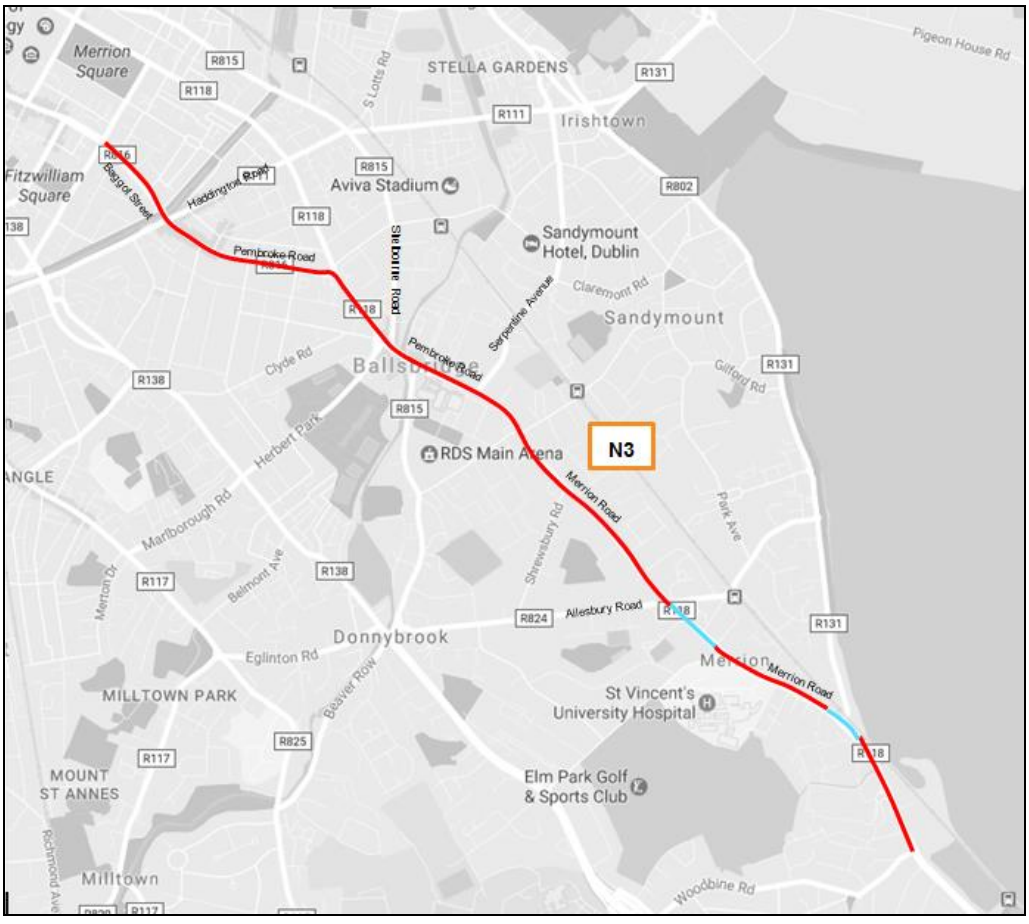
- For the next 410m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Significant major modifications** are required at the Fitzwilliam Street Lower/Baggot Street Lower junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs,

footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- **Significant major modifications** are required at the Pembroke Street Lower/Baggot Street Lower junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

2.2 Design Option 2



2.2.1 Merrion Road

- **Significant major modifications** are required at the Merrion Road/Trimleston Avenue junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 195m approximately from Trimleston Road travelling towards the city, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Road signage to be removed/ relocated or replaced. No land take is required along this section.

- For the next 15m, the proposed works have been categorized as **minor**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways with a width less than 500mm. Existing road markings to be removed and replaced. No land take is required along this section.

- **Minor modifications** are required at the Elmpark/Merrion Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 800m approximately, works have been categorized as **moderate** due to the removal of kerbs, central median and footways with a width greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. Safety barriers/guard rails to be removed/relocated/replaced at entrance to Elmpark Business Campus and along the central median to entrance to St. Mary's Nursing Home. No land take is required along this section.

- **Significant major modifications** are required at the Merrion Road/Nutley Lane junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas,

laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 205m approximately from the Nutley lane junction travelling towards the city, works have been categorized as **moderate** due to the removal of kerbs and footways with a width greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Road signage to be removed/ relocated or replaced. No land take is required along this section.

- **Moderate upgrade modifications** are required at the Aylesbury road/Merrion Road junction i.e. the works to accommodate the buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 95m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- For 160m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a sizeable number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road

signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

- For the next 225m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- For the next 310m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a sizeable number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Sandymount Avenue/Simonscourt Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the 160m approximately, from Sandymount Avenue/Simonscourt Road works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Serpentine Avenue/Merrion Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the 155m approximately, from Serpentine Avenue works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

2.2.2 Pembroke Road

- **Minor modifications** are required at the Anglesea Road/Merrion Road/Pembroke Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 65m approximately, from the Anglesea Road junction works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture such as bins, bollards and signal boxes, will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Herbert park/Shelbourne Road/Elgin Road/Pembroke Road junction. I.e. the works associated within this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all

crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 190m approximately, from the Herbert Park junction, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture such as bins, bollards and signal boxes, to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Lansdowne Road/Northumberland Road/Pembroke Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 310m approximately, from the Lansdowne Road junction, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Central median and traffic bollards also to be removed/relocated/replaced. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture such as bins, bollards and signal boxes, to be removed/ relocated or replaced. No land take is required along this section.

- For the next 110m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is

required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- **Significant major modifications** are required at the Eastmoreland Place/Pembroke Road/Baggot Street Upper junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- **Moderate upgrade modifications** are required at the Waterloo Road/Baggot Street junction i.e. the works to accommodate the buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

2.2.3 Baggot Street

- For the next 80m, the proposed works have been categorized as **minor**. I.e. the works to accommodate a 20m buffer include the removal and replacement of existing road markings and local road re-surfacing. Existing road signage to be removed and relocated and/or replaced.

- **Significant major modifications** are required at the Herbert Place/Wilton Terrace/Mespil Road/Haddington Road/Baggot Street Upper junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 30m approximately, from the Herbert Street junction, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Central median and traffic bollards also to be removed/relocated/replaced. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth

pavement reconstruction and associated road markings. Local road resurfacing works to be conducted at several locations along this section. Road signage and road furniture such as bins, bollards and signal boxes, to be removed/ relocated or replaced. No land take is required along this section.

- **Moderate upgrade modifications** are required at the Herbert Street/Baggot Street junction i.e. the works to accommodate the buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 175m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a sizeable number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

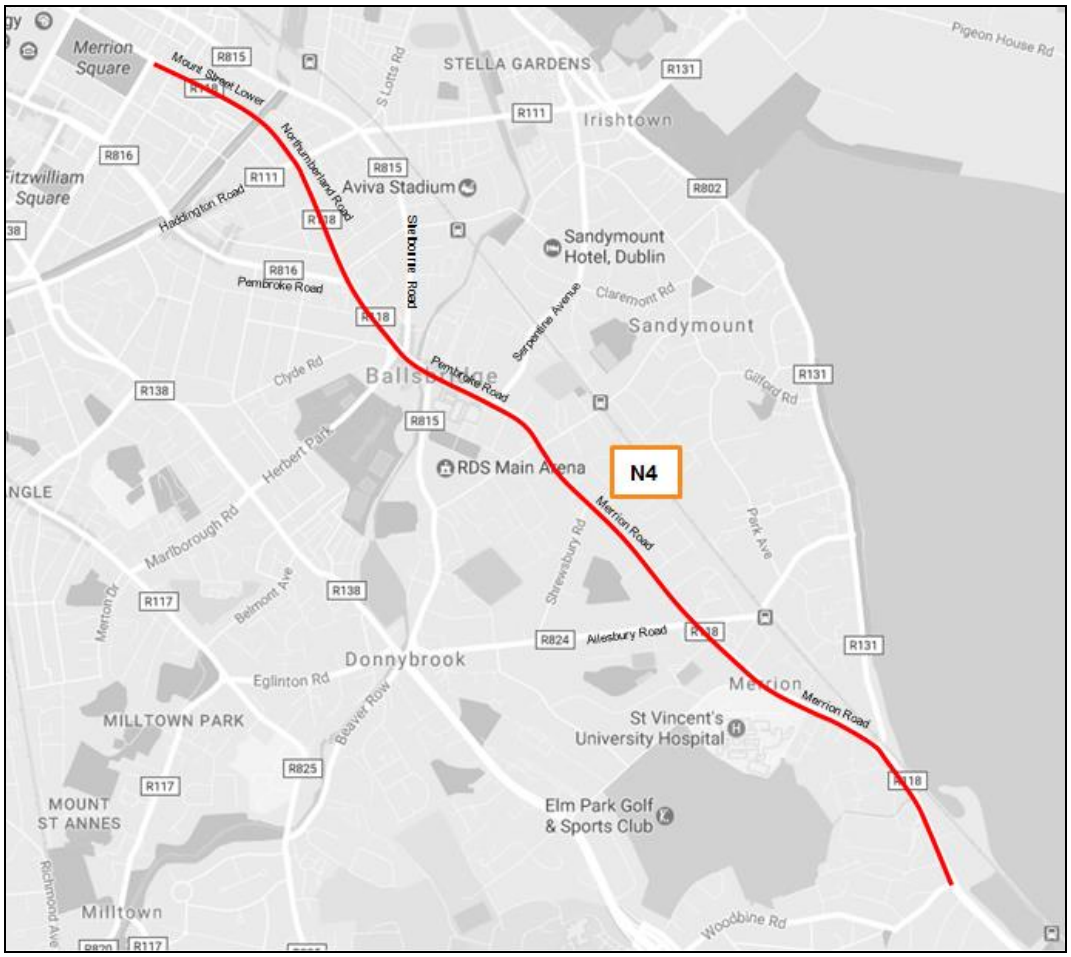
- For the next 110m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- **Significant major modifications** are required at the Fitzwilliam Street Lower/Baggot Street Lower junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- **Significant major modifications** are required at the Pembroke Street Lower/Baggot Street Lower junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

3. Route Option N2

3.1 Design Option 1



3.1.1 Merrion Road

- **Significant major modifications** are required at the Merrion Road/Trimleston Avenue junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and

additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 195m approximately from Trimleston Road travelling towards the city, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Road signage to be removed/ relocated or replaced. No land take is required along this section.

- For the next 15m, the proposed works have been categorized as **minor**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways with a width less than 500mm. Existing road markings to be removed and replaced. No land take is required along this section.

- **Minor modifications** are required at the Elmpark/Merrion Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 320m approximately, works have been categorized as **moderate** due to the removal of kerbs, central median and footways with a width greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. Safety barriers/guard rails to be removed/relocated/replaced at entrance to Elmpark Business Campus and along the central median to entrance to St. Mary's Nursing Home. No land take is required along this section.

- For 162m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a sizeable number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

- For the next 375m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the

removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Significant major modifications** are required at the Merrion Road/Nutley Lane junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 90m approximately from the Nutley lane junction travelling towards the city, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Road signage to be removed/ relocated or replaced. No land take is required along this section.

- For the next 90m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- **Moderate upgrade modifications** are required at the Aylesbury road/Merrion Road junction i.e. the works to accommodate the buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works,

additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 30m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- For the next 145m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (e.g. bollards at Merlyn Park junction) to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- For the next 115m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- For the next 225m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is

required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- For the next 310m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Sandymount Avenue/Simonscourt Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 160m approximately, from Sandymount Avenue/Simonscourt Road works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Serpentine Avenue/Merrion Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 155m approximately, from Serpentine Avenue works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route

to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

3.1.2 Pembroke Road

- **Minor modifications** are required at the Anglesea Road/Merrion Road/Pembroke Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 65m approximately, from the Anglesea Road junction works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture such as bins, bollards and signal boxes, will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Herbert park/Shelbourne Road/Elgin Road/Pembroke Road junction. I.e. the works associated within this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 210m approximately, from the Herbert Park junction, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and

road furniture such as bins, bollards and signal boxes, to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Lansdowne Road/Northumberland Road/Pembroke Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

3.1.3 Northumberland Road

- For 30m approximately, from the Lansdowne Road junction, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture such as bins, bollards and signal boxes, to be removed/ relocated or replaced. No land take is required along this section.

- For the next 345m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- **Significant major modifications** are required at the Haddington Road/Northumberland Road junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 160m approximately from the Haddington Road junction the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

3.1.4 Mount Street Lower

- **Significant major modifications** are required at the Northumberland Road/Clanwilliam Place/Mount Street Lower junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 170m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- For the next 8m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- For the next 145m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- For the next 40m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

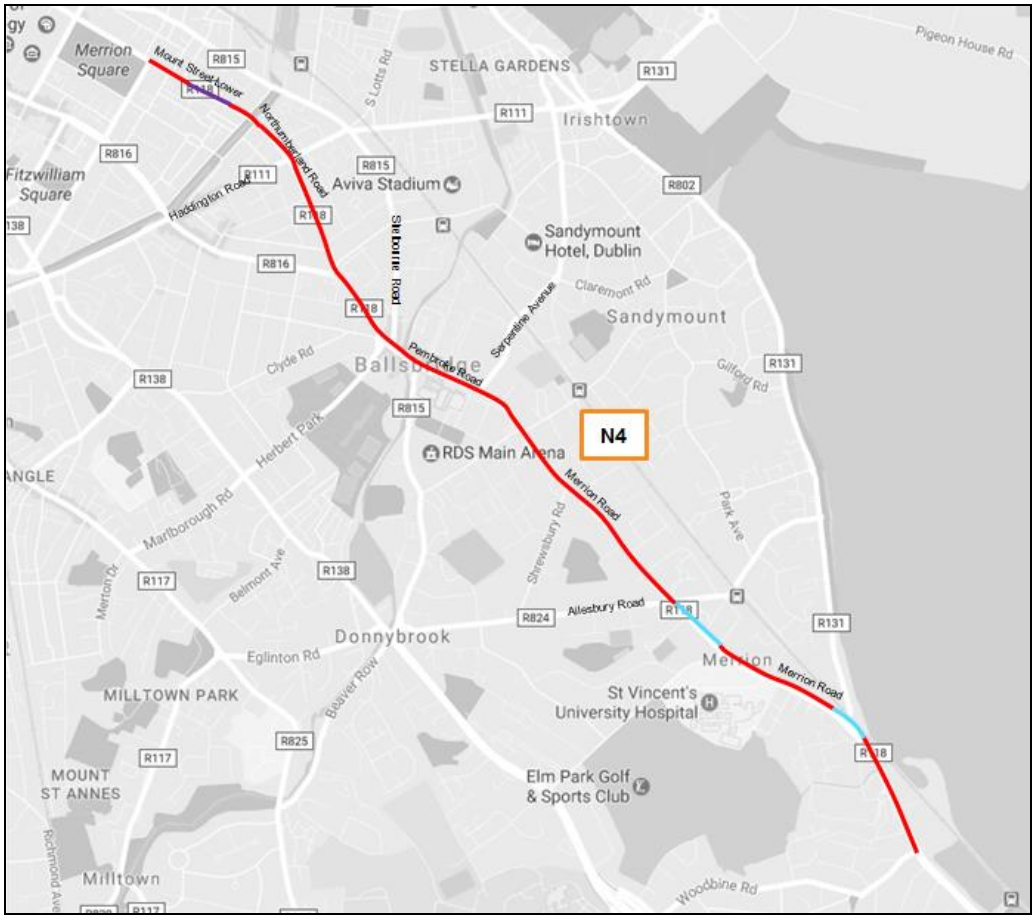
- **Significant major modifications** are required at the Holles Street**/**Merrion Square/Mount Street Lower junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 235m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Merrion Square North/Merrion Street Lower junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply,

communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

3.2 Design Option 2



3.2.1 Merrion Road

- **Significant major modifications** are required at the Merrion Road/Trimleston Avenue junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 195m approximately from Trimleston Road travelling towards the city, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and

ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Road signage to be removed/ relocated or replaced. No land take is required along this section.

- For the next 15m, the proposed works have been categorized as **minor**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways with a width less than 500mm. Existing road markings to be removed and replaced. No land take is required along this section.

- **Minor modifications** are required at the Elmpark/Merrion Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 800m approximately, works have been categorized as **moderate** due to the removal of kerbs, central median and footways with a width greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. Safety barriers/guard rails to be removed/relocated/replaced at entrance to Elmpark Business Campus and along the central median to entrance to St. Mary's Nursing Home. No land take is required along this section.

- **Significant major modifications** are required at the Merrion Road/Nutley Lane junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 205m approximately from the Nutley lane junction travelling towards the city, works have been categorized as **moderate** due to the removal of kerbs and footways with a width greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Existing services (power supply, communications, water, gas) will have to be

protected/relocated/diverted. Road signage to be removed/ relocated or replaced. No land take is required along this section.

- **Moderate upgrade modifications** are required at the Aylesbury road/Merrion Road junction i.e. the works to accommodate the buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the next 95m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- For 160m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a sizeable number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

- For the next 225m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- For the next 310m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a sizeable number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Sandymount Avenue/Simonscourt Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the 160m approximately, from Sandymount Avenue/Simonscourt Road works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Serpentine Avenue/Merrion Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For the 155m approximately, from Serpentine Avenue works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the

route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins, bollards, signal boxes, seating) will have to be removed/ relocated or replaced. No land take is required along this section.

3.2.2 Pembroke Road

- **Minor modifications** are required at the Anglesea Road/Merrion Road/Pembroke Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 65m approximately, from the Anglesea Road junction works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture such as bins, bollards and signal boxes, will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Herbert park/Shelbourne Road/Elgin Road/Pembroke Road junction. I.e. the works associated within this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

- For 190m approximately, from the Herbert Park junction, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture such as bins, bollards and signal boxes, to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Lansdowne Road/Northumberland Road/Pembroke Road junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

3.2.3 Northumberland Road

- For 30m approximately, from the Lansdowne Road junction, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture such as bins, bollards and signal boxes, to be removed/ relocated or replaced. No land take is required along this section.

- For the next 345m, approximately, the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- **Significant major modifications** are required at the Haddington Road/Northumberland Road junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 110m approximately from the Haddington Road junction the proposed works have been categorized as **major**. I.e. the works associated with widening of the road to accommodate a 20m buffer include the removal of

kerbs and footways greater than 500mm and the removal of and installation of new drainage systems. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water and gas) to be protected/relocated/diverted. To accommodate the 20m buffer a number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture to be removed/ relocated or replaced. Some land take is required and as such boundary re-instatement works (walls, gates, driveways, etc.) are needed. Existing road markings to be removed and replaced.

- For the next 60m approximately, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. To accommodate the 20m buffer a sizeable number of trees to be removed along the route and as such, limited earthworks works are also required along with full depth pavement reconstruction and associated road markings. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

3.2.4 Mount Street Lower

- **Significant major modifications** are required at the Northumberland Road/Clanwilliam Place/Mount Street Lower junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 360m approximately from Clanwilliam Place, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Significant major modifications** are required at the Holles Street**/**Merrion Square/Mount Street Lower junction i.e. the works to accommodate the 20m buffer include: General site clearance, removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and

bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. Some land take is required at this junction and as such property boundary re-instatement works are needed.

- For 235m approximately from The National Maternity Hospital, works have been categorized as **moderate** due to the removal of kerbs and footways greater than 500mm and the removal/realignment of drainage systems and services. Road lighting (and associated works i.e. cabling and ducting) along the route to be protected/relocated/diverted. Existing services (power supply, communications, water, gas) will have to be protected/relocated/diverted. Road signage and road furniture (bins and bollards) will have to be removed/ relocated or replaced. No land take is required along this section.

- **Minor modifications** are required at the Merrion Square North/Merrion Street Lower junction. I.e. the works associated with this categorization include: removal and replacement of kerbs, footways and paved areas, laying of Anti-skid surface, Protection/relocation/diversion of services (i.e. power supply, communications, water and gas), removal and replacement of existing road markings, dished kerbs and tactile paving at all crossing points, the provision of guardrails and bollards, landscaping works, additional traffic signals including ducting, cabling and chambers and additional signal poles/heads. No land take is required at this junction and as such property boundary re-instatement works are needed.

Appendix H – Environmental Impact Report

Dun Laoghaire to City Centre Core Bus Corridor Options Study – Feasibility and Options Assessment Report

Environmental Desktop Study Report

Draft - January 2017

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Dun Laoghaire to City Centre Core Bus Corridor Options Study – Feasibility and Options Assessment Report

Environmental Desktop Study Report

Document No:..... 16.175

Made:..... Gemma Rothwell

Checked:.....

Approved: .....

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0		GR			23/11/16
1		GR			24/01/2017

Dun Laoghaire to City Centre Core Bus Corridor Study

Environmental Desktop Study Report

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1.0 INTRODUCTION

1.1 Introduction (Objectives and Benefits)

Roughan & O'Donovan – AECOM Alliance Consulting Engineers has been commissioned by the National Transport Authority (NTA) to identify improvement proposals for the Dun Laoghaire to City Centre Core Bus Corridor Scheme (hereafter referred to as the "Scheme"). This report was compiled by Gemma Rothwell, an Environmental Scientist with Roughan & O'Donovan.

The main objectives of the Scheme are as follows:

- To deliver on-street infrastructure in order to provide continuous priority for bus movements along the Core Bus Corridor, facilitating a reliable and effective bus service;
- To provide on-street cycle facilities, particularly those required under the Greater Dublin Area Cycle Network Plan; and
- To optimise the movement of people and goods along the corridor, consistent with local constraints and place-making requirements.

1.2 Site Location

Although the exact route is not decided, there are four possible northern and southern routes with a connector route between the northern and southern sections. The northern routes propose to connect St Stephens Green, Baggot Street and Merrion Square to Booterstown while the southern routes connect Blackrock with Glenageary and Dun Laoghaire. The study area is shown in See Figure 1.1 and Appendix A. Each route has two scheme options, one being a 20m cross section area comprising a 2.0m footpath, a 2.0m cycle track, a 3.0m bus lane and a 3.0m traffic lane on both sides of the road. The other scheme options for the 9 routes are the 'B' options which comprise narrower sections of the route in areas where reducing the 20m buffer would prevent adverse impacts. These 'B' options can include the original 20m cross section, a 16.1m cross section including a 1.8m footpath, a 1.75m cycle track, a 3.0m traffic lane on both sides with a 3.0m bus lane on one side only, or a 13.1m cross section which comprise a 1.8m footpath, a 1.75m cycle track and a 3.0m traffic lane on both sides.

1.3 Purpose of the Environmental Desktop Study

This Environmental Desktop Study has been carried out with the objective of compiling as much information as possible relating to the natural environment in order to identify and assess all feasible potential scheme options for each proposed route. This data collection is focused on determining environmental constraints and designated sites which could affect the routing of the scheme.

As part of the Desktop Study, an assessment of two scheme options have been considered for each proposed route option of the Scheme. These have taken into account the environmental constraints of the study area. The chapters that follow examine these constraints in more detail.

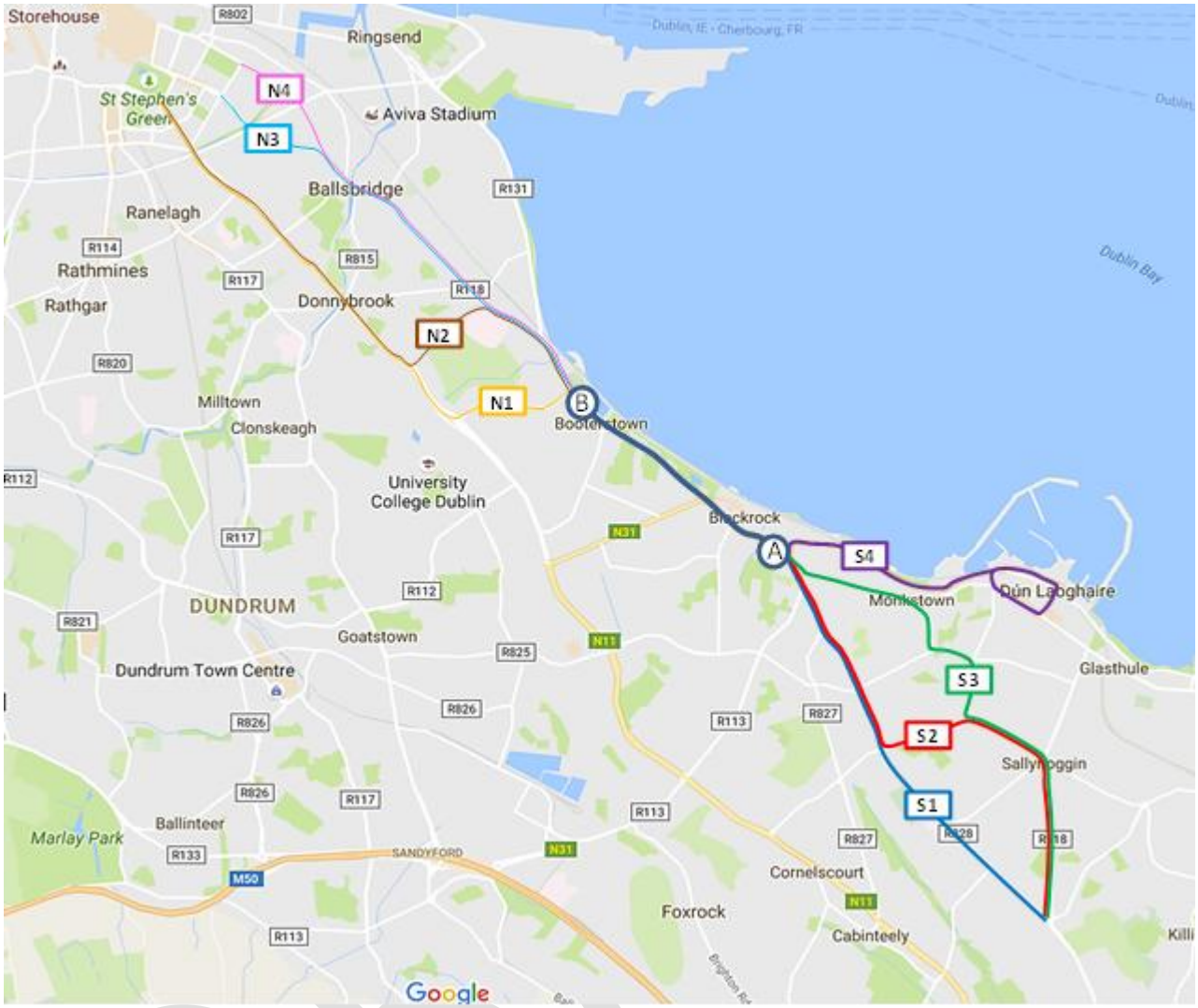


Figure 1.1 Proposed Route Options of the Scheme

2.0 METHODOLOGY

2.1 Desktop Study

A desktop study was initially undertaken to review potential environmental constraints within the study area. A review of the following available online data sources was carried out to screen the proposed project area for potential impacts:

- OSI mapping;
- Aerial photography;
- National Parks and Wildlife (NPWS); and
- National Biodiversity Data Centre Ireland (NBDC).

A review of the National Parks and Wildlife Service (NPWS) website database was undertaken to determine the boundaries of designated areas for conservation in the vicinity of the proposed project and to identify any known records of protected species within the area.

The National Biodiversity Data Centre Ireland (NBDC) database was reviewed to identify any known species records within 2km of the proposed scheme. The Draft Dublin City Biodiversity Action Plan 2015-2020 was also reviewed.

The desk study identified the potential for a range of flora and fauna to be present within the study area, of which protected species identified may be present or utilise the area. A review of the NPWS and the NBDC websites was undertaken to determine the boundaries of designated areas for conservation and to identify known records of the species listed for protection.

2.2 Reporting

The evaluation of the ecological environment and the criteria used to assess the significance of impacts are derived from the Guidelines for Assessment of Ecological Impacts on National Road Schemes (NRA, Rev. 2, 2009) and the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment (EcIA).

3.0 RECEIVING ENVIRONMENT

3.1 Introduction

This chapter of the Environmental Desktop Study Report considers the key constraints for the planning of the Scheme. It reviews the constraints and opportunities for the project in relation to ecology, landscape and flooding. The route of the proposed Scheme is shown in Figure 1.1 and Appendix A.

3.2 Designated Areas

3.2.1 Natura 2000 sites

Areas of international significance for nature conservation have been included in a European Union network of protected areas known as Natura 2000. These areas are:

- **Special Areas of Conservation (hereafter referred to as SACs)** are designated under the EU Habitats Directive (92/43/EEC) which are transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No 477 of 2011).
- **Special Protection Areas (SPAs)** are designated under the EU Birds Directive (79/409/EEC) which are transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No 477 of 2011).

A review of the National Parks and Wildlife Service database has identified the following designated sites as being within 10km of the site:

Table 3.1: Designated Sites within 10km

Name	Site code	Approximate Location
South Dublin Bay and River Tolka Estuary SPA	004024	200m north east
South Dublin Bay SAC/pNHA	000210	200m north east
Rockabill to Dalkey Island SAC	003000	3km east
Dalkey Islands SPA	004172	3km east
North Bull Island SPA	004006	5km east
North Dublin Bay SAC/pNHA	000206	5km north
Knocksink Wood SAC	000725	7km south
Ballyman Glen SAC	000713	8km south
Broadmeadow/Swords SPA	004025	8km north east
Bray Head SAC	000714	9km south east
Howth Head SAC/pNHA	000202	9km north east
Howth Head Coast SPA	004113	9 km north east
Wicklow Mountains SAC	002122	10km south west
Wicklow Mountains SPA	004040	10km south west
Liffey Valley pNHA	000128	5km west
Santry Demesne pNHA	000178	7km north
Dodder Valley pNHA	000991	9km south west
Dolphins, Dublin Docks pNHA	000201	5km east
Ballybetagh Bog pNHA	001202	8km south-west

Name	Site code	Approximate Location
Booterstown/Marsh pNHA	001205	10m east
Dalkey Coastal Zone and Killiney Hill pNHA	001206	500m east
Dingle Glen pNHA	001207	3km south west
Fitzsimon's Wood pNHA	001753	5km south west
Loughlinstown Woods pNHA	001211	2.5km south west
Royal Canal pNHA	002103	1km north east
Grand Canal pNHA	002104	0km

The study area does not cross any SACs or SPAs. The study area borders the South Dublin Bay and River Tolka Estuary SPA (Site Code 004024) and the South Dublin Bay SAC/pNHA (Site Code 000210). The route from A to B is located approx 200m from these Natura 2000 sites for a distance of 2.2km. Route S4 also runs adjacent to these Natura 2000 sites for a further 2.7km. Three of the northern routes (N2, N3 and N4) come within close proximity to these Natura 2000 sites on Merrion Road.

Depending on the location and the timing of the works, screening of effects on winter-breeding birds may be required.

The site synopses and full versions of the Conservation Objectives for the Natura 2000 sites can be found on the NPWS website at: http://www.npws.ie/protectedsites/.

3.3 Protected Species

Online sources of publicly available data provided by National Biodiversity Centre (NBDC) with regards to protected species recorded within 2km of the site informed the desk study and are presented in Appendix B.

There are many records of species protected under EU Directives recorded within 2km of the site. Due to the close proximity to designated areas, many of these species have habitats nearby, however the proposed site does not offer suitable habitats for these species.

3.4 Invasive Species

Publicly available data offered online by NBDC with regards to invasive species are presented in Table 2 of Appendix B. The presence of Japanese Knotweed (*Fallopia japonica*) was identified within 2km of the site for all northern routes as recently as 2014 and 2016. With regard to the southern routes, Japanese Knotweed was found within 2km of routes S3 and S4 in 2013. Japanese Knotweed, Giant Hogweed and Indian Balsam are species subject to restrictions (Third Schedule) under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011. **A complete invasive species survey will be required for the preferred route prior to the commencement of works.**

3.5 Bats

It is unlikely that bat roosts are present within the treelines along the route of the Scheme due to the urban, exposed and well lit nature of the study area. Records of bat species have been obtained from the NBDC along each of the proposed routes. Linear routes and overgrown vegetation may provide foraging and commuting areas for bats and the potential effects on bats from the removal of trees along the route will need to be assessed. Therefore, **a bat suitability assessment should be**

carried out by a bat specialist during the bat active survey season, between April to September, in advance of construction. The assessment should be carried out in accordance with Bat Conservation Trust guidance (Collins. J, 2016) and should determine baseline patterns of site use, identifying specific sections of the route that are important for bats. The NBDC online source of publicly available data determined that six species of bats have been recorded within 2km of the Site including Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Lesser Noctule (*Nyctalus leisleri*), Nathusius's Pipistrelle (*Pipistrellus nathusii*), Daubenton's Bat (*Myotis daubentonii*) and Brown Long-eared Bat (*Plecotus auritus*) (see Table 2). Routes S2 and M1 had the least records of bat species with only two species recorded along each. Regarding the northern routes, N3 and N4 had records of 4 species along each route while N1 and N2 had records of 5 species along each route.

3.6 Other Protected Mammals

NBDC data provided one Otter record within 2km of the Site boundary from 2015 for the southern routes S1-S4, see Table 1 in Appendix B. Similarly for the northern routes N1-N4 one otter record was recorded within 2km of the site in 2016. Due to the urban and exposed nature of the study area along with the lack of suitable habitat for the species, it is unlikely that the study area comprises Otter or Badger habitats. Therefore, no protected mammal survey is deemed necessary in relation to the proposed works.

3.7 Trees

A tree survey and report was undertaken by Dr Philip Blackstock in October 2016 along the majority of the proposed route options. After assessment of the results of this survey and the proposed designs, the potential effects of the proposed routes on treelines are described below.

Northern Routes

There are four routes outlined in the Northern Section of the proposed Scheme to link the City Centre to the Rock Rd in Booterstown. Route Options N1 & N2 both travel from Leeson St Lower to Stillorgan Rd, where Route Option N2 diverts along Nutley Lane and then joins Merrion Rd in the direction of the Rock Road. Route Option N1 remains on Stillorgan Rd and turns onto Woodbine Rd, joining Route N2 again after turning of Trimlestown Avenue onto the Rock Rd. Route Options N3 and N4 travel from Baggot Street Lower and Merrion Square North respectively to the Rock Rd in Booterstown. They merge on Pembroke Rd before travelling down Merrion Rd. Scheme Options N1-N4 aim to provide a 20m cross-section for the whole route while Scheme Options N1B – N4B include design changes along the route reducing the cross-section to a 16.1m Do Something buffer or a 13.1m Do Something buffer.

Scheme Option N1 Leeson Street Lower to Booterstown

Scheme Option N1 runs from Leeson Street Lower to the Rock Road in Booterstown. The proposed 'Do Max' design will in total remove 144 individual trees and one group of trees on Woodbine Rd. Scheme Option N1 also has the potential to affect a large green area including trees, surrounding the junction for Woodbine Rd on Stillorgan Rd. Some of those trees that will be affected by route option N1 are located on Sussex Rd and Leeson St Upper as shown in Plates 1 & 2.

Plate 1 Sussex Rd

Plate 2 Leeson St Upper

A large number of trees lining both sides of Morehampton Rd and Donnybrook Rd will also be affected as illustrated in Plates 3 & 4.

Plate 3 Morehampton Road

Plate 4 Donnybrook Road

The scheme option does not have such a severe impact on Stillorgan Rd as the route is well developed and already has bus lanes present therefore only a small number of trees in the centre of the road will be affected by the proposed Scheme. The green area at the Woodbine Junction on Stillorgan Rd as outlined in red in Plate 5 below is also within the 'Do Max' buffer. Therefore the scheme has the potential to affect this area.

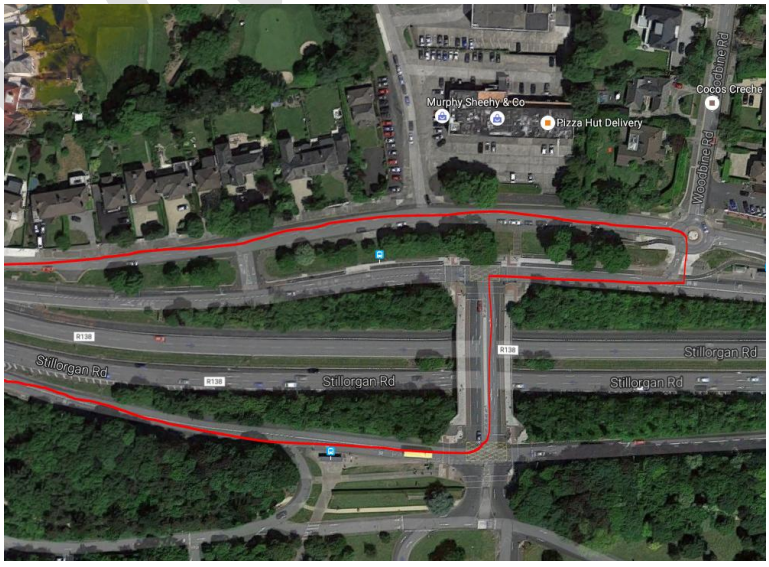


Plate 5 Woodbine Junction on the Stillorgan Rd

Scheme Option N1 also proposes to remove trees and a number of hedgerows along Woodbine Rd and Trimleston Ave.

Scheme Option N1B

The difference in Scheme Option N1B compared to N1 is small, as N1B still proposes to remove 144 trees. The 16.1m cross-section on Donnybrook Rd still affects the same amount of trees as the 20m 'Do Max' buffer for the same section. On Trimleston Park, the proposed 13.1m buffer does not reduce the individual tree count to be removed, however it does slightly reduce the landtake which includes residential gardens and an enclosed area of trees.

Scheme Option N2 Leeson Street Lower to Booterstown

Scheme Option N2 travels from Leeson Street Lower to the Rock Rd via Nutley Lane and has the potential to remove 189 trees as well as 5 groups of trees along Nutley Lane. Scheme Option N2 is similar to N1 as it travels from Leeson St Lower to Stillorgan Rd with the same designs and cross-section. Therefore the same number of trees on this section of the route will be affected as in Scheme Option N1, as illustrated in Plates 1-4 above.

Scheme Option N2 differs from N1 as it leaves Stillorgan Rd and travels along Nutley Lane. The 20m 'Do Max' buffer along the 800m stretch that is Nutley Lane proposes to remove 57 individual trees within the existing road boundaries as can be seen in Plate 6, while also affecting four areas of dense trees along the route and infringing on a 400m long strip of golf course and its barrier hedgerow as illustrated in Plate 7.

Plate 6 Nutley Lane

Plate 7 Hedgerow on Nutley Lane

The proposed Scheme then merges with Merrion Rd and has the potential to affect trees lining either side of the road as illustrated in Plate 11 below.

Scheme Option N2B

Scheme Option N2B differs from Option N2 along Donnybrook Rd as with N1 and N1B. Other than this the majority of the Scheme Option is subject to a 20m 'Do Max' buffer and therefore the potential effect on trees is as described under Scheme Option N2.

Scheme Option N3 Baggot Street to Booterstown

Scheme Option N3 runs from Baggot Street to the Rock Rd in Booterstown. The Scheme proposes to remove 232 trees in total. Included in this total are trees along

the centre of Baggot Street Lower as seen in Plate 8, trees on either side of Baggot Street Upper and 7 trees along Pembroke Rd as seen in Plate 9.

Plate 8 Baggot Street

Plate 9 Pembroke Road

Scheme N3 then merges with Scheme Option N4 on Pembroke Rd and has the potential to affect the trees that line both sides of Pembroke Road as shown in Plate 10 below. The trees that line Merrion Road as shown below are also within the 20 metre do max buffer and therefore will also be affected by the proposed Scheme.

Plate 10 Pembroke Road

Plate 11 Merrion Road

Scheme Option N3B

The effect of Scheme Options N3 and N3B are minimal. The only change in route N3B is the cross-section of the route goes from 20m to 16.1m for two short stretches on Merrion Rd, which would essentially prevent only two trees being removed.

Scheme Option N4 Merrion Square to Booterstown

Scheme Option N4 has the potential to remove 227 trees along its route from Merrion Square North and the Rock Rd. Scheme Option N4 travels along Northumberland Road, which has approx 40 large trees lining the avenue as pictured below. These trees are within the 20m do max buffer and therefore could potentially be affected.

Plate 12 Northumberland Rd

The route then merges with Scheme Option N3 and due to the same design scheme, has the potential to affect the same tree lines from Pembroke Rd and Merrion Rd as outlined under Scheme Option N3 above and as illustrated in Plates 10&11.

Scheme Option N4B

Scheme Option N4B is different from Scheme Option N4 as a short section on Mount Street Lower is changed from a 20m Do Max buffer to a 16.1m buffer. This means that one tree will not be affected by the N4B route. Similar to Scheme Option N3B, two further decreases in cross section on Merrion Road will only prevent 2 trees from being removed.

Scheme Option M1 - Booterstown to Blackrock

From Booterstown to Blackrock along the Rock Road, the number of trees that will potentially be affected is minimal. This is due to the 20 metre do max buffer being standard including bus lanes as can be seen below.

Plate 13 Rock Road

Plate 14 Rock Road

A tree survey concluded that 14 trees and three groups of 10 trees will potentially be affected.

Scheme Option M1B

Scheme Option M1B includes minor changes in design on the Rock Rd compared to route M1, however these do not affect the potential tree removal.

Southern Routes

The Southern section includes four routes connecting to route M1. Route Options S1-S3 run from Blackrock to Rochestown via Rochestown Ave, Monkstown and Sallynoggin while Route Option S4 travels from Blackrock to Dun Laoghaire. Southern Scheme Options S1-S4 include a 20m cross section for the duration of the route while Scheme Options S1B-S4B contain design changes such as periods of reduced cross-sectional area from a 20m Do Max buffer to a 16.1m or 13.1m Do Something buffer.

Scheme Option S1 Blackrock to Rochestown

Scheme Option S1 begins on Temple Hill in Booterstown and travels along Stradbrook Rd, Abbey Rd and Rochestown Avenue as far as Graduate Roundabout. Scheme Option S1 has the potential to remove 140 and effect 33 groups of trees on adjoining lands, of which three quarters are classed as moderate quality. These include trees on Abbey Road as seen in plates 15 & 16 and trees such as those shown in Plates 17 & 18 within the existing boundaries of Rochestown Avenue.

Plates 15 & 16 Trees on Abbey Road within the do max buffer

Plates 17 & 18 Trees on Rochestown Avenue

Scheme Option S1B

Scheme Option S1B includes sections along Stradbrook Rd and Abbey Rd being reduced from a 20m buffer to a 13.1m buffer. This scheme option reduces the impacts on treelines by preventing 14 trees from being removed and potentially preventing 5 groups of trees from being affected. Therefore Scheme option S1B has the potential to affect 127 trees and 27 groups of trees on adjoining lands.

Scheme Option S2 Booterstown to Rochestown

Scheme Option S2 travels from Booterstown to Rochestown via Abbey Rd, Kill Avenue and Glenageary Rd Upper and the R118 Regional Road. The route in total has the potential to remove 200 trees and affect up to 17 groups of trees on adjoining lands and an area of grasses/reeds on Kill Avenue. As Scheme Options S1 and S2 both travel Stradbrook Rd and Abbey Rd, trees to be removed by Scheme Option S2 will include those shown in Plates 15 & 16. Trees on Kill Avenue will also be affected such as those in Plates 19 & 20 below.

Plate 19 Kill Avenue

Plate 20 A group of trees on Kill Avenue

Scheme Option S2 will also affect an avenue of young trees lining Thomastown Road. These trees comprise four of the 17 groups of trees to be affected by this Scheme Option. They are classed as small/low quality Hornbeam trees and there are approx 140 trees within the four groups as classified during the tree survey. These treelines provide a positive visual and landscape aspect to the area however they are young and are of local importance only.

Plate 21 Thomastown Road

Scheme Option S2B

Scheme Option S2B includes sectional changes in cross sectional distance on Stradbrook Rd and Abbey Rd as in S1B. Other proposed changes include sections of reduced cross section on Kill Avenue and Glenageary Rd Upper. These scheme changes will prevent 16 trees and 5 groups of trees on adjoining lands from being affected by the route, bringing the total tree removal of the scheme option to 184 trees and 12 groups.

Scheme Option S3 – Blackrock to Rochestown via Monkstown

Scheme Option S3 commences on Monkstown Rd, follows on to Carrickbrennan Rd, Mounttown Rd Upper & Lower before joining Scheme Option S2 on Glenageary Rd as far as the Graduate Roundabout. The route has the potential to affect 104 trees along with 21 groups of trees, mostly on adjoining lands. These trees include trees such as those shown in Plate 22 below, on Monkstown Rd and Carrickbrennan Rd.

Plate 22 Monkstown Rd

Plate 23 Carrickbrennan Rd

Also included in the 21 groups are the 4 groups of young trees lining Thomastown Avenue which contain approx. 140 young trees as detailed above under Scheme Option S2.

Scheme Option S3B

Scheme Option S3b differs to S3 as sections along Monkstown Rd and Carrickbrennan Rd have been reduced to a cross-section area of 16.1m, while sections on Mount Town Rd Upper and Lower and Glenageary Rd Upper have been reduced to a cross-section of 13.1m. This would potentially prevent the scheme from affecting 10 individual trees and 4 groups of trees on adjoining lands bring the potential affect to 94 trees and 17 groups.

Scheme Option S4 – Blackrock to Dun Laoghaire

Scheme Option S4 begins on Newtown Avenue and runs as far as Dun Laoghaire via Seapoint Avenue. The route travels a loop around Dun Laoghaire Town, via Crofton Road, Marine Road, George's Street Lower and Clarence Street. The Scheme Option has the potential to remove 161 individual trees, with one group of trees on adjoining lands being affected. The individual trees include those in Plate 24, and the group of trees to be removed is shown in Plate 25 below.

Plate 24 Old Dunleary Road

Plate 25 Longford Terrace, Dun Laoghaire

Scheme Option S4B

Scheme Option S4B includes design changes to Scheme Option S4 in the form of a reduced cross section of 13.1m for the majority of the route with transitional periods of 16.1m cross section and stretches along Crofton Road and George's Street Lower with a 20m cross-section. These design changes have the potential to prevent 51 trees from being affected by the route, bringing the affect of Scheme Option S4B to 110 trees and one group of trees on adjoining lands as seen in Plate 25 above.

3.8 Breeding birds

Potential disturbance during construction may cause some temporary displacement of birds from treelines. The treelines on the route of the Scheme are likely to hold a community of breeding birds that would be dominated by small passerine species such as Blackbird, Robin, Chaffinch and Wren. The range of species present is likely to be low due to the urban nature of the study area, the high exposure of the trees to wind, the absence of ground cover and the lighting along the route. A breeding bird survey will not be required as a result of the proposed construction works.

However, any removal of trees required for the Works should be undertaken in a series of phases, thus avoiding simultaneous disturbance on the entire length of the project. Potential disturbance to breeding birds in the existing treelines should be avoided by confining the felling of trees and other site clearance to the period 1st September to 28th February. It is noted that the design of the proposed development is being developed so as to minimise the intrusiveness of the construction methodologies required.

3.9 Landscaping and Visual Impact

The most significant potential landscape and visual impact associated with the proposed development would arise in the case of the removal of tree lines. These tree lines provide a positive visual and landscape aspect to the area at present. The age of the trees to be felled will vary with each potential route and will therefore determine the magnitude of potential impact.

Additionally the view looking north up Fitzwilliam Place, from Leeson Street Lower is identified as a key view by the Dublin City Development Plan 2011-2017, as shown in Figure 4. This key view will be taken into consideration when developing the Scheme. Although the loss of trees along certain roads will have an adverse landscape and visual impact it is anticipated that with sensitive design there will not

be any significant adverse impacts, however a more detailed Landscape and Visual Impact Assessment will be required at planning stage.

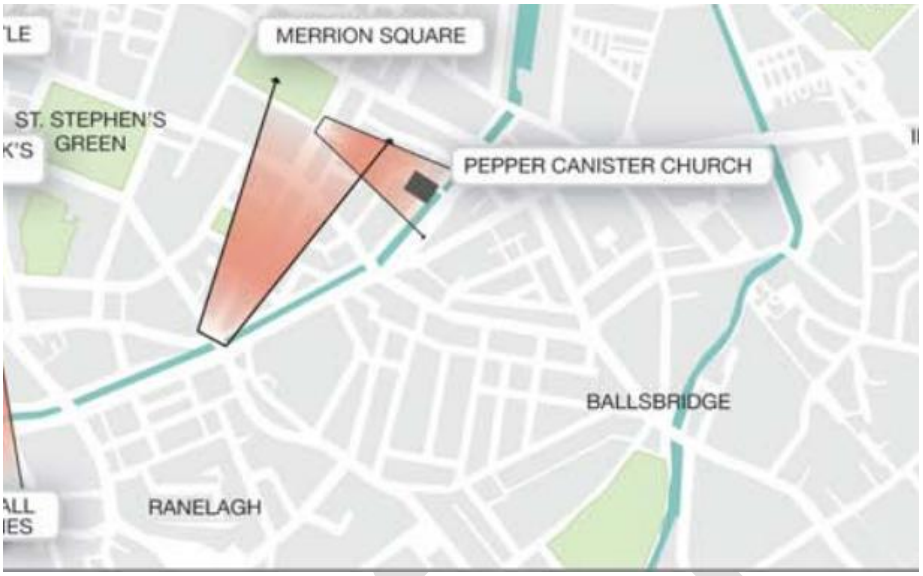


Figure 3.1 Key Views and Prospects from the Dublin City Development Plan 2011-2017

3.10 Flooding

A desktop study was carried out to investigate the flooding history of the site and the existing drainage regime within the study area.

The OPW floodmaps.ie website was consulted to determine the extent of flooding along the road network of the study area. Flood events within the area include flooding on Crofton Road in 2002 (see plate 3.2) which is located on Route S4, flooding on Carrickbrennan Road in 1993 and 2011 on route S3 and flooding at Stradbrook Gardens in 2011 which is located on the route of S1 and S2. A large stretch of route A-B at Nutley Elm was flooded in 1963 as shown in Plate 3.3, while a flooding event that occurred at the junction of Barclay Road and Temple Road in 2011 is also located on this route. The northern routes also have history of flooding events with flooding on the Rock Road in 2000 being located on route options N2, N3 and N4. Flooding was also recorded on Morehampton Rd in 1963 due to the Dodder, affecting route options N1 and N2, while flooding of Nutley Elm Park Stream affected Stillorgan Rd, Rock Rd and Merrion Gates in 1963, affecting all four route options.

These events will be taken into consideration when developing the Scheme, however, it is noted that flood improvement works have since been implemented in recent years and further schemes are planned.

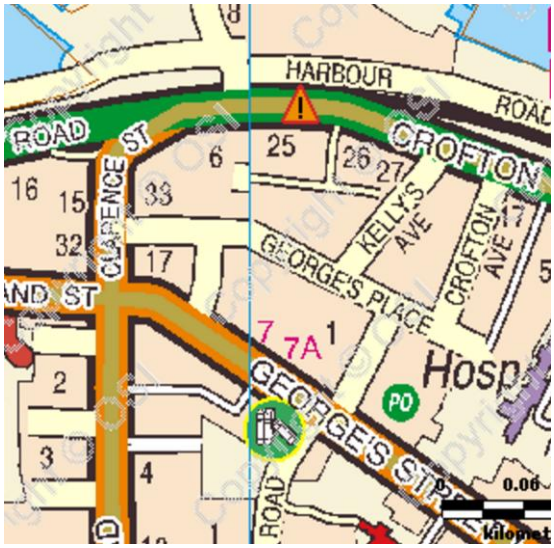


Plate 3.2 Location of flood on Crofton Road 2002 (OPW)

Plate 3.3 Flood event June 1963, Nutley Elm Park (OPW)

4.0 CONCLUSION

The proposed Scheme will be developed along an urban, well developed area of artificial landscaping, which has minimal biodiversity value at present. Although the site borders the South Dublin Bay and River Tolka Estuary SPA and the South Dublin Bay SAC/pNHA, with appropriate timing of the works it is not likely to impact on any designated sites due to the small scale works.

A bat suitability assessment should be carried out by a bat specialist prior to construction works. A protected mammal survey is not deemed necessary as no suitable habitat is likely to be found onsite. **Due to records of invasive species within the site, a complete invasive species survey will be required for the entire route prior to the commencement of works.**

Any felling of trees required for the works should be undertaken in a series of phases, thus avoiding simultaneous disturbance to breeding birds along the entire length of the project. The felling of trees should be confined to the period 1st September to 28th February and felled trees should be left in-situ for 24 hours prior to removal off site.

Provided that the presented avoidance measures are incorporated into the design of the development, the scheme is not expected to have any appreciable environmental impacts.

5.0 REFERENCES

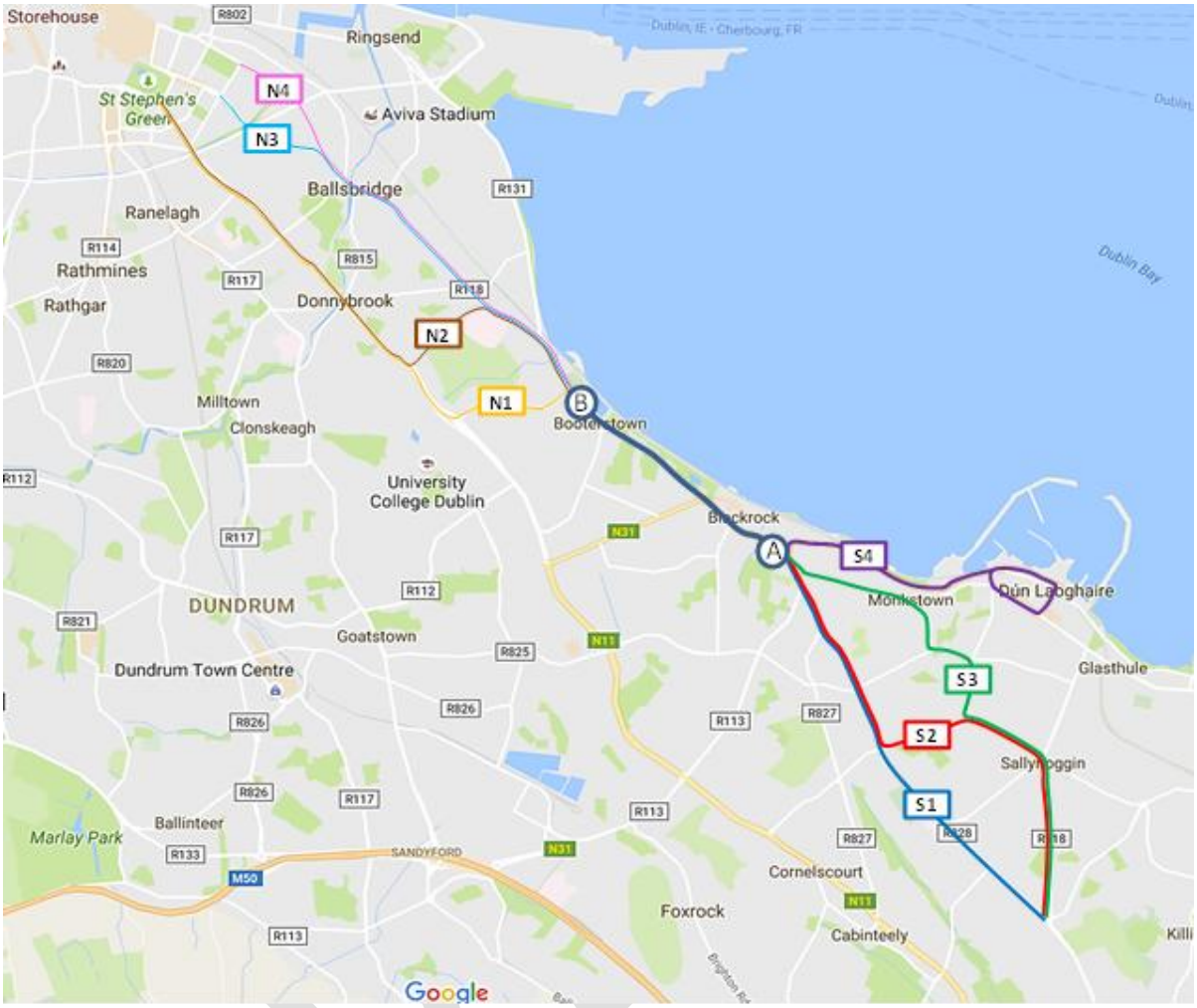
Chartered Institute of Ecology and Environmental Management (CIEEM), (2016), Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland

Collins, J (ed). (2016), Bat Surveys: Good Practice Guidelines, 3rd Edition, Bat Conservation Trust, London

Dublin City Development Plan, 2011-2017. Written Statement

NRA, (2009), Guidelines for Assessment of Ecological Impacts on National Road Schemes Rev. 2

Appendix A:
Outline of Proposed Core Bus Corridor Route


Storehouse
R802
Ringsend
St Stephen's Green
N4
N3
Aviva Stadium
Ballsbridge
R131
Ranelagh
R114
Rathmines
R815
R117
Rathgar
Donnybrook
R118
N2
R820
N1
B
Milltown
Clonskeagh
University College Dublin
R112
Blackrock
N31
A
S4
R117
DUNDRUM
R112
Monkstown
Dún Laoghaire
R821
Goatstown
N11
R825
Dundrum Town Centre
Glasthule
S3
R826
R826
R113
R827
S2
Sallynoggin
R826
R117
S1
Ballinteer
R113
Marlay Park
R827
R133
SANDYFORD
N31
R116
M50
Cornelscourt
N11
Foxrock
Cabinteely
R113
Google

Appendix B:
Protected and Invasive Species within 2km of the site

Table 1: Notable Protected Species Records within 2km of the Site

Species	Most Recent Date Recorded	Suitable Habitat Within the Site
EU Directive		
Route S1		
Common Frog (*Rana temporaria*)	2016	No
Dunlin (*Calidris alpine*)	2012	No
Rock Pigeon (*Columba palumbus*)	2011	Yes
Common Wood Pigeon (*Columba palumbus*)	2016	Yes
Great Northern Diver (*Gavia immer*)	2015	No
Red-throated Diver (*Gavia stellata*)	2016	No
Mediterranean Gull (*Larus melanocephalus*)	2016	No
Bar-tailed Godwit (*Limosa lapponica*)	2011	No
Red-breasted Merganser (*Mergus serrator*)	2016	No
Eurasian Curlew (*Numenius arquata*)	2012	No
Common Tern (*Sterna hirundo*)	2012	No
Common Dolphin (*Delphinus delphis*)	2009	No
European Otter (*Lutra lutra*)	2015	No
Grey Seal (*Halichoerus grypus*)	2016	No
Common Porpoise (*Phocoena phocoena*)	2016	No
Lesser Noctule (*Nyctalus leisleri*)	2012	Yes
Common Kingfisher (*Alcedo atthis*)	2010	No
Mallard (*Anas platyrhynchos*)	2011	No
Little Egret (*Egretta garzetta*)	2012	No
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	2004	Yes
Peregrine Falcon (*Falco peregrinus*)	2011	No
Wall (*Lasiommata megera*)	1982	Yes
Daubenton's Bat (*Myotis daubentonii*)	2004	Yes
Brown Long-eared Bat (*Plecotus auritus*)	2008	Yes
Route S2		
Common Frog (*Rana temporaria*)	2016	No
Dunlin (*Calidris alpine*)	2012	No
Rock Pigeon (*Columba palumbus*)	2011	Yes
Common Wood Pigeon (*Columba palumbus*)	2016	Yes
Great Northern Diver (*Gavia immer*)	2015	No
Red-throated Diver (*Gavia stellata*)	2016	No
Mediterranean Gull (*Larus melanocephalus*)	2016	No
Bar-tailed Godwit (*Limosa lapponica*)	2011	No
Red-breasted Merganser (*Mergus serrator*)	2016	No
Eurasian Curlew (*Numenius arquata*)	2012	No
Common Tern (*Sterna hirundo*)	2012	No
Common Dolphin (*Delphinus delphis*)	2009	No
European Otter (*Lutra lutra*)	2015	No
Grey Seal (*Halichoerus grypus*)	2016	No
Common Porpoise (*Phocoena phocoena*)	2016	No

Species	Most Recent Date Recorded	Suitable Habitat Within the Site
Lesser Noctule (*Nyctalus leisleri*)	2012	Yes
Common Kingfisher (*Alcedo atthis*)	2010	No
Mallard (*Anas platyrhynchos*)	2011	No
Little Egret (*Egretta garzetta*)	2012	No
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	2012	Yes
Peregrine Falcon (*Falco peregrines*)	2011	No
Northern Lapwing (*Vanellus vanellus*)	2011	No
Wall (*Lasiommata megera*)	1982	Yes
Daubenton's Bat (*Myotis daubentonii*)	2004	Yes
Brown Long-eared Bat (*Plecotus auritus*)	2008	Yes
Route S3 (Monkstown)		
Common Frog (*Rana temporaria*)	2016	No
Dunlin (*Calidris alpine*)	2012	No
Rock Pigeon (*Columba palumbus*)	2011	Yes
Common Wood Pigeon (*Columba palumbus*)	2016	Yes
Great Northern Diver (*Gavia immer*)	2015	No
Red-throated Diver (*Gavia stellata*)	2016	No
Mediterranean Gull (*Larus melanocephalus*)	2016	No
Bar-tailed Godwit (*Limosa lapponica*)	2011	No
Red-breasted Merganser (*Mergus serrator*)	2016	No
Eurasian Curlew (*Numenius arquata*)	2012	No
Common Tern (*Sterna hirundo)*	2012	No
Common Dolphin (*Delphinus delphis*)	2009	No
European Otter (*Lutra lutra*)	2015	No
Grey Seal (*Halichoerus grypus*)	2016	No
Common Porpoise (*Phocoena phocoena*)	2016	No
Lesser Noctule (*Nyctalus leisleri*)	2012	Yes
Common Kingfisher (*Alcedo atthis*)	2010	No
Mallard (*Anas platyrhynchos*)	2011	No
Little Egret (*Egretta garzetta*)	2012	No
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	2012	Yes
Peregrine Falcon (*Falco peregrines*)	2011	No
Northern Lapwing (*Vanellus vanellus*)	2011	No
Wall (*Lasiommata megera*)	1982	Yes
Daubenton's Bat (*Myotis daubentonii*)	2004	Yes
Brown Long-eared Bat (*Plecotus auritus*)	2008	Yes
Route S4 (Dun Laoghaire)		
Common Frog (*Rana temporaria*)	2003	No
Common Wood Pigeon (*Columba palumbus*)	2011	Yes
Whooper Swan (*Cygnus Cygnus*)	2011	No
Peregrine Falcon (*Falco peregrines*)	2011	No
Common Snipe (*Gallinago gallinago*)	2011	No

Species	Most Recent Date Recorded	Suitable Habitat Within the Site
Great Northern Diver (*Gavia immer*)	2015	No
Red-throated Diver (*Gavia stellata*)	2016	No
Mediterranean Gull (*Larus melanocephalus*)	2016	No
Little Gull (*Larus minutes*)	2011	No
Bar-tailed Godwit (*Limosa lapponica*)	2011	No
Red-breasted Merganser (*Mergus serrator*)	2016	No
Eurasian Curlew (*Numenius arquata*)	2012	No
Roseate Tern (*Aterna dougallii*)	2011	No
Common Tern (*Sterna hirundo*)	2012	No
Arctic Tern (*Aterna paradisaea*)	2001	No
Sandwich Tern (*Sterna sandvicensis*)	2016	No
Northern Lapwing (*Vanellus vanellus*)	2011	No
Grey Seal (*Halichoerus grypus*)	2016	No
Common Seal (*Phoca vitulina*)	2016	No
Common Porpoise (*Phocoena phocoena*)	2016	No
Bottle-nosed Dolphin (*Tursiops truncates*)	2012	No
Lesser Noctule (*Nyctalus leisleri*)	2012	Yes
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	2012	Yes
Dunlin (*Calidris alpine*)	2012	No
Rock Pigeon (*Columba palumbus*)	2011	Yes
Common Dolphin (*Delphinus delphis*)	2009	No
European Otter (*Lutra lutra*)	2015	No
Route A-B		
Common Frog (*Rana temporaria*)	2011	No
Common Kingfisher (*Alcedo atthis*)	2011	No
Mallard (*Anas platyrhynchos*)	2016	No
Dunlin (*Calidris alpine*)	2011	No
Rock Pigeon (*Columba palumbus*)	2011	Yes
Common Wood Pigeon (*Columba palumbus*)	2016	Yes
Little Egret (*Egretta garzetta*)	2016	No
Peregrine Falcon (*Falco peregrinus*)	2014	No
Mediterranean Gull (*Larus melanocephalus*)	2015	No
Bar-tailed Godwit (*Limosa lapponica*)	2011	No
Common Porpoise (*Phocoena phocoena*)	2004	No
Lesser Noctule (*Nyctalus leisleri*)	2004	Yes
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	2004	Yes
Red-breasted Merganser (*Mergus serrator*)	2011	No
Eurasian Curlew (*Numenius arquata*)	2012	No
Roseate Tern (*Sterna dougallii*)	2012	No
Common Tern (*Sterna hirundo*)	2012	No
Arctic Tern (*Sterna paradisaea*)	2012	No
Sandwich Tern (*Sterna sandvicensis*)	2012	No
Route (N1)		

Species	Most Recent Date Recorded	Suitable Habitat Within the Site
Common Frog (*Rana temporaria*)	2007	No
Mallard (*Anas platyrhynchos*)	2016	No
Dunlin (*Calidris alpine*)	2011	No
Rock Pigeon (*Columba palumbus*)	2016	Yes
Common Wood Pigeon (*Columba palumbus*)	2016	Yes
Little Egret (*Egretta garzetta*)	2016	No
Peregrine Falcon (*Falco peregrinus*)	2011	No
Bar-tailed Godwit (*Limosa lapponica*)	2011	No
Eurasian Curlew (*Numenius arquata*)	2016	No
Common Porpoise (*Phocoena phocoena*)	2013	No
Lesser Noctule (*Nyctalus leisleri*)	2016	Yes
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	2013	Yes
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	2013	Yes
Daubenton's Bat (*Myotis daubentonii*)	2014	Yes
Common Kingfisher (*Alcedo atthis*)	2016	No
European Otter (*Lutra lutra*)	2016	No
Nathusius's Pipistrelle (*Pipistrellus nathusii*)	2009	Yes
Route N2		
Common Frog (*Rana temporaria*)	2007	No
Mallard *(Anas platyrhynchos)*	2016	No
Dunlin *(Calidris alpine)*	2011	No
Rock Pigeon (*Columba palumbus*)	2016	Yes
Common Wood Pigeon (*Columba palumbus*)	2016	Yes
Little Egret (*Egretta garzetta*)	2016	No
Peregrine Falcon (*Falco peregrinus*)	2011	No
Bar-tailed Godwit (*Limosa lapponica*)	2011	No
Eurasian Curlew (*Numenius arquata*)	2016	No
Common Porpoise (*Phocoena phocoena*)	2013	No
Lesser Noctule (*Nyctalus leisleri*)	2016	Yes
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	2013	Yes
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	2013	Yes
Daubenton's Bat (*Myotis daubentonii*)	2014	Yes
Common Kingfisher (*Alcedo atthis*)	2016	No
European Otter (*Lutra lutra*)	2016	No
Nathusius's Pipistrelle (*Pipistrellus nathusii*)	2009	Yes
Route N3		
Common Frog (*Rana temporaria*)	2003	No
Mallard (*Anas platyrhynchos*)	2016	No
Dunlin (*Calidris alpine*)	2011	No
Rock Pigeon (*Columba palumbus*)	2012	Yes
Common Wood Pigeon (*Columba palumbus*)	2014	Yes
Little Egret (*Egretta garzetta*)	2012	No

Species	Most Recent Date Recorded	Suitable Habitat Within the Site
Peregrine Falcon (*Falco peregrinus*)	2011	No
Bar-tailed Godwit (*Limosa lapponica*)	2011	No
Eurasian Curlew (*Numenius arquata*)	2016	No
Common Porpoise (*Phocoena phocoena*)	2013	No
Lesser Noctule (*Nyctalus leisleri*)	2011	Yes
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	2011	Yes
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	2011	Yes
European Otter (*Lutra lutra*)	2016	No
Daubenton's Bat (*Myotis daubentonii*)	2011	Yes
Common Kingfisher (*Alcedo atthis*)	2011	No
Mediterranean Gull (*Larus melanocephalus*)	2011	No
Red-breasted Merganser (*Mergus serrator*)	2011	No
Common Tern (*Sterna hirundo)*	2011	No
Northern Lapwing (*Vanellus vanellus*)	2011	No
Grey Seal (*Halichoerus grypus*)	2013	No
Common Porpoise (*Phocoena phocoena*)	2012	No
Route N4		
Common Frog (*Rana temporaria*)	2003	No
Mallard (*Anas platyrhynchos*)	2016	No
Dunlin (*Calidris alpine*)	2011	No
Rock Pigeon (*Columba palumbus*)	2012	Yes
Common Wood Pigeon (*Columba palumbus*)	2014	Yes
Little Egret (*Egretta garzetta*)	2012	No
Peregrine Falcon (*Falco peregrinus*)	2011	No
Bar-tailed Godwit (*Limosa lapponica*)	2011	No
Eurasian Curlew (*Numenius arquata*)	2016	No
Common Porpoise (*Phocoena phocoena*)	2013	No
Lesser Noctule (*Nyctalus leisleri*)	2011	Yes
Pipistrelle (*Pipistrellus pipistrellus sensu lato*)	2011	Yes
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	2011	Yes
European Otter (*Lutra lutra*)	2016	No
Daubenton's Bat (*Myotis daubentonii*)	2011	Yes
Common Kingfisher (*Alcedo atthis)*	2011	No
Mediterranean Gull (*Larus melanocephalus*)	2011	No
Red-breasted Merganser (*Mergus serrator*)	2011	No
Common Tern (*Sterna hirundo*)	2011	No
Northern Lapwing (*Vanellus vanellus*)	2011	No
Grey Seal (*Halichoerus grypus*)	2013	No
Common Porpoise (*Phocoena phocoena*)	2012	No

Table 2: Invasive Species Records within 2km of the site

Species	Most Recent Date Recorded	Suitable Habitat Within the Site
Route S1		
Sycamore (*Acer pseudoplatanus*)	2014	
Butterfly-bush (*Buddleja davidii*)	2014	
European Rabbit (*Oryctolagus cuniculus*)	2015	
Cherry Laurel (*Prunus laurocerasus*)	2014	
Eastern Grey Squirrel (*Sciurus carolinensis)*	2015	
Nuttall's Waterweed (*Elodea nuttallii*)	2007	
Brown Rat (*Rattus norvegicus*)	2014	
New Zealand Flatworm (*Arthurdendyus triangulates*)	2012	
Sea-buckthorn (*Hippophae rhamnoides*)	1994	
House Mouse (*Mus musculus*)	2016	
Route S2		
Sycamore (*Acer pseudoplatanus*)	2015	
Butterfly-bush (*Buddleja davidii*)	2015	
European Rabbit (*Oryctolagus cuniculus*)	2015	
Cherry Laurel (*Prunus laurocerasus*)	2014	
Eastern Grey Squirrel (*Sciurus carolinensis)*	2015	
New Zealand Pigmyweed (*Crassula helmsii*)	2014	
Giant Hogweed (*Heracleum mantegazzianum*)	1929	
House Mouse (*Mus musculus*)	2016	
Raccoon (*Procyon lotor*)	2014	
New Zealand Flatworm (*Arthurdendyus triangulates*)	2012	
Nuttall's Waterweed (*Elodea nuttallii*)	1999	
Sea-buckthorn (*Hippophae rhamnoides*)	1994	
Brown Rat *(Rattus norvegicus)*	2014	
Route S3		
Butterfly-bush (*Buddleja davidii*)	2015	
Japanese Knotweed (*Fallopia japonica*)	2013	
House Mouse (Mus musculus)	*2015*	
Brown Rat *(Rattus norvegicus)*	2014	
Eastern Grey Squirrel (*Sciurus carolinensis)*	2015	
Sycamore (Acer pseudoplatanus)	2015	
European Rabbit (*Oryctolagus cuniculus*)	2015	
Cherry Laurel (*Prunus laurocerasus*)	2014	
Eastern Grey Squirrel (*Sciurus carolinensis)*	2015	
New Zealand Pigmyweed (*Crassula helmsii*)	2014	
Giant Hogweed (*Heracleum mantegazzianum*)	1929	

Species	Most Recent Date Recorded	Suitable Habitat Within the Site
Raccoon (*Procyon lotor*)	2014	
New Zealand Flatworm (*Arthurdendyus triangulates*)	2012	
Nuttall's Waterweed (*Elodea nuttallii*)	1999	
Sea-buckthorn (*Hippophae rhamnoides*)	1994	
Route S4 (Dun Laoghaire)		
Japanese Knotweed (*Fallopia japonica*)	2013	
Butterfly-bush (*Buddleja davidii*)	2015	
House Mouse (*Mus musculus)*	*2015*	
Brown Rat (Rattus norvegicus)	2014	
Eastern Grey Squirrel (*Sciurus carolinensis)*	2015	
Japanese Skeleton Shrimp (*Caprella mutica*)	2006	
Common Broomrape (*Orobanche minor*)	2010	
Common Garden Snail (*Cornu aspersum*)	2002	
Budapest Slug (*Tandonia budapestensis*)	2002	
Leathery Sea Squirt (*Styela clava*)	2004	
Route A-B		
Japanese Knotweed (*Fallopia japonica*)	2012	
Giant Hogweed (*Heracleum mantegazzianum*)	1987	
American Mink (*Mustela vison*)	1963	
Eastern Grey Squirrel (*Sciurus carolinensis*)	2012	
Brown Rat (*Rattus norvegicus*)	2013	
Route N1		
Sycamore (*Acer pseudoplatanus*)	2015	
Three-cornered Garlic (*Allium triquetrum*)	2016	
Butterfly-bush (*Buddleja davidii*)	2015	
Bohemian Knotweed (*Fallopia japonica x sachalinensis = F. x bohemica*)	2010	
Giant Hogweed (*Heracleum mantegazzianum*)	2012	
Parrot's-feather (*Myriophyllum aquaticum*)	2008	
Brown Rat (*Rattus norvegicus*)	2015	
Eastern Grey Squirrel (*Sciurus carolinensis*)	2016	
Japanese Knotweed (*Fallopia japonica*)	2016	
Indian Balsam (*Impatiens glandulifera*)	2013	
Nuttall's Waterweed (*Elodea nuttallii*)	2009	
House Mouse (*Mus musculus*)	2015	
American Mink (*Mustela vison*)	2016	
Water Fern (*Azolla filiculoides*)	1984	
Canadian Waterford (*Elodea Canadensis*)	2009	

Species	Most Recent Date Recorded	Suitable Habitat Within the Site
European Rabbit (*Oryctolagus cuniculus*)	2015	
Least Duckweed (*Lemna minuta*)	1993	
Route N2		
Sycamore (*Acer pseudoplatanus*)	2015	
Three-cornered Garlic (*Allium triquetrum*)	2016	
Butterfly-bush (*Buddleja davidii*)	2015	
Bohemian Knotweed (*Fallopia japonica x sachalinensis = F. x bohemica*)	1999	
Giant Hogweed (*Heracleum mantegazzianum*)	2014	
Parrot's-feather (*Myriophyllum aquaticum*)	2008	
Brown Rat (*Rattus norvegicus*)	2015	
Eastern Grey Squirrel (*Sciurus carolinensis*)	2016	
Indian Balsam (*Impatiens glandulifera*)	2013	
Japanese Knotweed (*Fallopia japonica*)	2016	
Nuttall's Waterweed (*Elodea nuttallii*)	2009	
House Mouse (*Mus musculus*)	2015	
American Mink (*Mustela vison*)	2016	
Water Fern (*Azolla filiculoides*)	1984	
Canadian Waterford (*Elodea Canadensis*)	2009	
European Rabbit (*Oryctolagus cuniculus*)	2015	
Least Duckweed (*Lemna minuta*)	1993	
Route N3		
Sycamore (*Acer pseudoplatanus*)	2015	
Three-cornered Garlic (*Allium triquetrum*)	2016	
Butterfly-bush (*Buddleja davidii*)	2015	
Bohemian Knotweed (*Fallopia japonica x sachalinensis = F. x bohemica*)	1999	
Giant Hogweed (*Heracleum mantegazzianum*)	2014	
Parrot's-feather (*Myriophyllum aquaticum*)	2008	
Brown Rat (*Rattus norvegicus*)	2015	
Eastern Grey Squirrel (*Sciurus carolinensis*)	2016	
Nuttall's Waterweed (*Elodea nuttallii*)	1991	
Indian Balsam (*Impatiens glandulifera*)	2013	
House Mouse (*Mus musculus*)	2015	
American Mink (*Mustela vison*)	2016	
Traveller's Joy (*Clematis vitalba*)	1999	
Canadian Fleabane (*Conyza canadensis*)	2012	
Japanese Knotweed (*Fallopia japonica*)	2014	
Sea-buckthorn (*Hippophae rhamnoide*)	2014	
Narrow-leaved Ragwort (*Senecio inaequidens*)	2014	

Species	Most Recent Date Recorded	Suitable Habitat Within the Site
Route N4		
Sycamore (*Acer pseudoplatanus*)	2015	
Three-cornered Garlic (*Allium triquetrum*)	2016	
Butterfly-bush (*Buddleja davidii*)	2015	
Bohemian Knotweed (*Fallopia japonica x sachalinensis = F. x bohemica*)	1999	
Giant Hogweed (*Heracleum mantegazzianum*)	2014	
Parrot's-feather (*Myriophyllum aquaticum*)	2008	
Brown Rat (*Rattus norvegicus*)	2015	
Eastern Grey Squirrel (*Sciurus carolinensis*)	2016	
Nuttall's Waterweed (*Elodea nuttallii*)	1991	
Indian Balsam (*Impatiens glandulifera*)	2013	
House Mouse (*Mus musculus*)	2015	
American Mink (*Mustela vison*)	2016	
Traveller's Joy (*Clematis vitalba*)	1999	
Canadian Fleabane (*Conyza canadensis*)	2012	
Japanese Knotweed (*Fallopia japonica*)	2014	
Sea-buckthorn (*Hippophae rhamnoide*)	2014	
Narrow-leaved Ragwort (*Senecio inaequidens*)	2014	