Appendices

Appendix 1.1

Phase 2: Stage 1 – Preliminary Option Assessment Matrices

Environmental Criteria	Preliminary Assessment of Option : *Purple - Route A* - 11.5km		Score
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	Route traverses' site where planning permission for dwelling was recently granted, and a site which is the subject of a current planning application for a dwelling. The proposed route is within 100m of 8 no. dwellings.	The proposed route is located outside the area designated to be kept free from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. There are 2 no. significant constraints to the development of this route having regard to current and permitted planning applications. Firstly, the route appears to dissect a landholding where planning permission was granted for a dwelling under application register reference 18689. In addition, a new planning application (Register reference 2010) has been lodged with Kilkenny County Council, seeking permission for a dwelling house. The location of this permitted and proposed dwellings along the subject route is likely to have significant implications in terms of objections to the development in the planning process, if this route is progressed past this preliminary assessment stage. It is further noted that the proposed route comes within 100m of 8 no. existing dwellings, and on this basis, is likely to have significant implications in terms of objections to the development in the planning process, if this route is progressed past this preliminary assessment stage on the grounds of noise impact, air quality, and construction impacts etc. This is one of just 3 of the proposed routes that does not traverse a Special Area of Conservation or a proposed Natural Heritage Area. Having regard to the presence of a permitted dwellings, and a valid planning application seeking permission for a new dwelling along the proposed route, this route is considered to be moderately negative.	2
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts the following; • 1 County Environmentally Sensitive Area (ESA) • 3 High Local ESA • 2 Low Local ESA • 3 Watercourses	This route is considered one of the longer options and is approximately 1.5 to 2km west of the original alignment. The route skims the edge of the River Barrow And River Nore Special Area of Conservation (SAC) in a number of places as it passes to the north, with no direct impact to Special Protection Areas (SPAs), Natural Heritage Areas (NHAs) or Proposed Natural Heritage Areas (pNHAs) predicted. This route negatively impacts the northern half of ESA-1 (Ballybraghy); a site of county importance. Includes area of WN6 wet woodland. Significant impacts to 3 sites of high local importance (i.e. ESA-4, 5 & 19). Areas of WN6 recorded within all 3. Significant impacts to 1 site of low local importance (i.e. ESA-6); moderate impact to edge of one further site (ESA-14). The route traverses 3 crossings from Barrow to Nore and 0 at Suir.	3
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 3 un-named watercourses and 2 river catchments.	Route crosses two river catchments i.e. the Suir and Nore. The route crosses three un-named streams (within the Nore catchment) which eventually flow to the River Barrow. The River Barrow is part of the River Barrow and River Nore Special Area of Conservation (SAC). A small localised point within the study area has been identified to be at potential risk of flooding located at Slieverue, to the south west of the Luffany roundabout.	5
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	6 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 2 Regionally Important; • 5 Locally Important; • 1 Poor. Approximately 56% (6.6km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 2 isolated pockets of alluvium are intersected by the route in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, mudstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 0.8km north of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	3
Air Quality (existing air quality environment and number of sensitive receptors).	There are no sensitive receptors within 50m of route.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. As no receptors are impacted by this route option it is considered positive in terms of air quality.	7
Climate	N/A	Longer routes such as the purple route will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options.	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) score = 94 58 properties are within 300m of the new roads. None of these properties are within 50m and 8 properties are within 100m.	Expected noise climate to be quiet in the rural area and the introduction of a 100km/h road would significantly change the noise environment. However, due to the low PIR readings, the noise mitigation at the 8 properties within 100m distance may be possible and would make it a marginally more preferable route to the dark blue dashed (PR3) and orange dashed route (PR6), which have a marginally higher PIR in the 0-100m bands.	3

Environmental Criteria	**Preliminary Assessment of Option :** *Purple - Route A* - 11.5km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Route travels in close proximity to the lower slopes and wooded vegetation of the system of narrow stream valleys north and west of Glenmore (travels too close to this intimate valley system especially at Mullennahone). Significant adverse effects on valley system. Immediately east of Ardbeg this route travels close to a prominent ridge of high ground at Ballinclare. From south of Ardbeg towards Nicholastown the route travels across the steep side slopes of a locally prominent ridge of higher ground. The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Significant adverse effects on side slopes of ridge of high ground from Ardbeg to Nicholstown. Alignment of large section of route is very straight (approximately 5km), this would be at odds with the predominately curved pattern of the landscape and existing routes.	1
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	Route crosses 3 high voltage overhead powerlines at the southern end of the scheme.	Route crosses a number of secondary and minor roads. This route does not cross the existing N25. No active quarries or pits have been identified in proximity to the study area. Potential impacts to other existing utilies such as telecom, broadband etc and there will be a requirement for new services along the scheme and connections to existing.	4
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 24.99 ha, impact on approximately 54 holdings and 9 dairy farms.	Good quality agricultural land, majority of the route impacting on grassland, and some tillage to the northern end of the route. Small area of forestry. The route is offline and will result in severance to land holdings.	1
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Purple Route could directly impact the designed landscape associated with Frazers Hall demesne. The route also crosses 18 townland boundaries which may be of archaeological significance. This route has a potential impact on the setting of 4 cultural heritage sites.	The Purple Option, runs to the west of the existing N25 and is the third longest of the options under consideration. The route runs north of a former castle site (SMR KK041-017001-), crosses over a local access road between two monuments in Haggard classified as a ringfort 110m to the east and a mound 460m to the west (SMR KK040-022--& KK040-034--). From Haggard through Ballinlammy the route travels south bypassing ringforts at Ardbeg (SMR KK040-033---) and Grogan (SMR KK043-005-) and within 100m west of the zone of notification for a well preserved rath at Nicholastown (SMR KK043-039----). The route arcs south east through sloping ground past a local road at Treanaree and 40m west of the bank of an unrecorded enclosure. Through Treanaree the route impacts on the north east corner of what was Frazer's Hall demesne.	4
Human Health	Property counts within 300m of the Route include: Residential: 45 Commerical (Residential): 1 Commerical: 2 Agriculture: 5 Agriculture (Residential): 7 Private Storage: 0 Unknown: 3 Total: 63	Route avoids the main centres of population.	3

Environmental Criteria	**Preliminary Assessment of Option :** *Grey - Route B* **-** 10.4km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	Route traverses' site where planning permission for dwelling was recently granted, and a site which is the subject of a current planning application for a dwelling. The route dissects an existing dwelling and the access to an existing farm holding. There are 7 no. dwellings within 100 metres of the subject route. The proposed route traverses the River Barrow and River Nore Special Area of Conservation (SAC).	The proposed route is located outside the area designated to be kept free from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. In terms of impacts on human beings, it is noted that the proposed route dissects an existing dwelling at the junction of L3406-15 and L3406-28, as well as dissecting an access to a farm holding on the L7466-40. There are 2 no. significant constraints to the development of this route having regard to current and permitted planning applications. Firstly, the route appears to dissect a landholding where planning permission was granted for a dwelling under application register reference 18689. In addition, a new planning application (Register reference 2010) has been lodged with Kilkenny County Council, seeking permission for a dwelling house. The location of these permitted and proposed dwellings along the subject route is likely to have significant implications in terms of objections to the development in the planning process, if this route is progressed past this preliminary assessment stage. There are 7 no. dwellings located within c. 0m - 100m of the proposed route. In addition, the site traverses the River Barrow and River Nore Special Area of Conservation. Having regard to the presence of existing dwellings, as well as a permitted dwelling and proposed dwelling along the subject route, as well as the dissection of an access to a farm, and the fact that this route traverses the SAC, this route is considered to be major or highly negative.	1
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Route runs close to 1 potential Natural Heritage Areas Negatively impacts the following; • 1 County Environmentally Sensitive Area (ESA) • 1 Low Local ESA • 1 Watercourse	This route is considered one of the longer options and is approximately 0.5 to 1.5km west of the original alignment. The route crosses the Special Area of Conservation (SAC) near Glenmore, with no direct impact to Special Protection Areas (SPAs) predicted. No impact to Natural Heritage Areas (NHAs) or Proposed Natural Heritage Areas (pNHAs) predicted. The route runs close to Lough Cullin & associated watercourses - possible minor indirect impact. Negatively impacts northern half of ESA-1 (Ballybraghy); a site of county importance. Includes area of WN6 wet woodland. Significant impacts to 1 site of low local importance (i.e. ESA-18) The route traverses 1 crossing from Barrow to Nore and 0 at Suir.	4
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 1 un-named watercourse and 2 river catchments.	Route crosses two river catchments i.e. the Suir and Nore, and one un-named stream (within the Nore catchment) which eventually flows to the River Barrow. The River Barrow is part of the River Barrow and River Nore Special Area of Conservation (SAC). No areas of flooding noted in close proximity to option.	6
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	5 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 3 Regionally Important; • 3 Locally Important; • 1 Poor. Approximately 80% (8.2km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 2 isolated pockets of alluvium are intersected by the route in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, mudstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.3km north of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	2
Air Quality (existing air quality environment and number of sensitive receptors).	1 residential property within 50m of route.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptor impacted will likely experience an increase in pollutant concentrations as a result of the proposed route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) score = 142 90 properties (excluding agriculture) are within 300m of the new roads (grey). One of these properties is within 50m and 6 properties are within 50-100m.	Follows similar lines to blue route (D) until Robinstown, then is at a reasonable distance to properties at Ballinclare before it then follows similar route to turquoise route (P), heading further west through rural areas. Further distance to properties than the turquoise route (P) from Atateenmore to Luffany west. Expected noise climate in some sections to be a rural environment and introduction of a busy 100km/h road to be large disruption to the smaller number of houses in the area. Preferable over turquoise route (P) due to the lower number of properties affected. Possible mitigation where required for new alignment passing to rear of properties currently influenced by the existing route at Glenmore. Favourable topography from Atateenmore to Luffany west which is not evident for turquoise route (P).	3

Environmental Criteria	**Preliminary Assessment of Option :** *Grey - Route B* **-** 10.4km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Route will cross and affect some woodland in narrow stream valley at Glenmore. Travels in the valley immediately adjacent to the north west of Glenmore village. Likely to have significant adverse visual effects on receptors (people) at Glenmore village. Will adversely affect the setting of Glenmore village. Route crosses through a primary ridgeline (Kilkenny Landscape Character Assessment) at Ballinclare then across side slopes of this ridge towards Nicholstown. Significant adverse effects on this ridgeline. From south of Ardbeg towards Nicholastown the route travels across the steep side slopes of a locally prominent ridge of higher ground. The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Significant adverse effects on side slopes of ridge of high ground from Ardbeg to Nicholstown. South of Nicholastown the route will travel on lower lands, however it travels close to an existing local road and adjacent dwellings, which may lead to some adverse visual effects on local dwellings.	1
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	Route crosses 3 high voltage overhead powerlines and at grade junction on the Waterford Bypass it impacts an additional high voltage overhead cable.	Route crosses a number of secondary and minor roads but does not cross the existing N25. No active quarries or pits have been identified in proximity to the study area. Potential impacts to other existing utilies such as telecom, broadband etc and there will be a requirement for new services along the scheme and connections to existing.	4
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 23ha, impact on approximately 53 holdings, 9 dairy farms, and one equine holding.	Good quality agricultural land, some medium quality land at the southern end of the route. A majority of the route impacting on grassland, and some tillage. The route is offline and will result in severance to land holdings.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Grey Route could directly impact a mill race at Robinstown. The route also crosses 11 townland boundaries which may be of archaeological significance. This route has a potential significant impact on the setting of 1 cultural heritage site.	This route is the fourth longest of the options under consideration. It passes Glenmore, the site of five NIAH listed structures. The route passes to the south of a ringfort and an enclosure at Mullennahone (SMR's KK041-018----& K041-019---) and just east of the zones of notification for a fulacht fia and a rath in Robinstown (SMR's KK041-052-& KK041-020----). Continuing to the east of a ringfort at Ballynaraha (SMR KK041-022----) the route passes a hilltop at Ballinclare into Grogan townland the site of a well preserved rath (SMR KK043-005). It avoids by 55m the Zone of Notification for a Rath in Nicholastown (SMR KK043-010-). The Grey route connects with the N25 west of the former site of three standing stones known locally as 'The Three Friars' (SMR KK043-060--). These standing stones were excavated and re-located in 2003 to facilitate the construction of the N25 Waterford Bypass.	4
Human Health	Property counts within 300m of the Route include: Residential: 64 Commerical (Residential): 3 Commerical: 7 Agriculture: 7 Agriculture (Residential): 13 Private Storage: 0 Unknown: 3 Total: 97	Route avoids the main centres of population.	3

Environmental Criteria	**Preliminary Assessment of Option :** *Blue - Route D* - 10.1km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	Within 100 metres of 20 residential properties. The route traverses the RIver Barrow and River Nore Special Area of Conservation (SAC).	The proposed route is largely located within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. The proposed route is located within 100 metres of 20 residential properties, on this basis, objections are likely on the grounds of noise impact, air quality, and construction impacts etc. In addition, the site traverses the River Barrow and River Nore SAC. The County Development Plan seeks their protection under Object 8B and 8C of the Plan.	6
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts the following; • 1 County Environmentally Sensitive Area (ESA) • 5 High Local ESA • 2 Low Local ESA • 1 Watercourse	This route is considered one of the longer options and is approximately 0.5km west of the original alignment. The route crosses the Special Area of Conservation (SAC) near Glenmore with no direct impact to Special Protection Areas (SPAs), Natural Herital Areas (NHAs) or Potential Natural Heritage Areas (pNHAs) predicted. Negatively impacts northern half of ESA-1 (Ballybraghy); a site of county importance. Includes area of WN6 wet woodland. Significant impacts to 2 sites of high local importance (i.e. ESA-11 & 19). Areas of WN6 recorded within both. Significant impacts to ESA-10 and ESA-14; minor impacts to ESA-9 and negligible impacts to ESA-12. The route traverses 1 crossing from Barrow to Nore and 0 at Suir.	4
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 1 un-named watercourse and 2 river catchments.	The route crosses two river catchments i.e. the Suir and Nore, and crosses one un-named stream (within the Nore catchment) which eventually flows to the River Barrow. The River Barrow is part of the River Barrow and River Nore Special Area of Conservation (SAC). A small localised point within the study area has been identified to be at potential risk of flooding located at Slieverue, to the south west of the Luffany roundabout.	5
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	6 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 1 Regionally Important; • 3 Locally Important; • 1 Poor. Approximately 82% (8.3km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 3 isolated pockets of alluvium are intersected by the route. 1 in the central region and 2 in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.3km north of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	2
Air Quality (existing air quality environment and number of sensitive receptors).	6 sensitive receptors within 50m of route.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptors impacted will likely experience an increase in pollutant concentrations as a result of the proposed route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options.	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) score = 203 116 properties (excluding agriculture) are within 300m of the new roads (blue). 6 of these properties are within 50m and 14 properties are within 50-100m.	Follows similar alignment to grey route (B) route until Robinstown when it moves closer to dark blue (G) and cyan dashed (PR2) routes until Ballinclare i.e. it passes to the rear of the existing routes. Potential for mitigation to rear of properties along existing route. Passes closer to properties at Atateenmore than purple route (A) with a higher PIR. Marginally higher PIR than brown route (F). Moves closer to a large number of properties from Atateenmore to Luffany. Possibility of favourable topography for mitigation however it would be extended over a long section of the route as properties are not in clusters.	2
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	The route will cross and affect some woodland in narrow stream valley at Glenmore. Travels in the valley immediately adjacent to the north west of Glenmore village. Likely to have significant adverse visual effects on receptors (people) at Glenmore village. Will adversely affect the setting of Glenmore village. Travels close to and parallel to existing N25 up to Davidstown, which limits the effects of the route on surrounding wider landscape. However, at Davidstown the route climbs and cuts through a principal ridgeline towards Treanaree (Kilkenny Landscape Character Assessment). Significant adverse effects on this ridgeline.	1

Environmental Criteria	**Preliminary Assessment of Option :** *Blue - Route D* - 10.1km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	Route crosses 3 high voltage overhead powerlines.	The route crosses a number of secondary and minor roads. This route does not cross the existing N25. No active quarries or pits have been identified in proximity to the study area. Potential impacts to local telecom, water and possibly broadband utilities. There will be a requirement to provide services along the proposed route with connections to the existing networks.	4
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 22 ha, impact on approximately 38 holdings 6 dairy farms, in close proximity to 1 farmyard.	Good quality agricultural land. A majority of the route impacting on grassland, some tillage, and some forestry in the southern end of the route. The route is offline and will result in severance to land holdings.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Blue Route could directly impact 4 known archaeological, architectural, or cultural heritage sites or features. The route also crosses 14 townland boundaries which may be of archaeological significance.	This option is the fifth longest of the options under consideration. At Robinstown it avoids both a levelled fulacht fia and a rath (SMR's KK041-052-& KK041-020----) by circa 50m, but directly impacts on the site of a mill race. Veering south east the route passes by a wide margin a rath (SMR KK041-022). The route traverses sloping ground past another fulacht fia at Ballinclare (SMR KK041-025). Near the townland boundary of Grogan and Davidstown, on a high ground, the alignment passes 60m to the west of a farm complex, the former location of a Church (SMR KK043-041-). The route passes to the west of an overgrown rath (SMR KK043-039) in Nicholastown. In Treanaree the Route passes directly over an unrecorded enclosure at (ITM 663128/616966). From this point the route sweeps in a long bend through Kilmurry impacting on the demesne lands of Frazer's Hall and a pillar within the grounds..	2
Human Health	Property counts within 300m of the Route include: Residential: 79 Commerical (Residential): 6 Commerical: 12 Agriculture: 4 Agriculture (Residential): 16 Private Storage: 0 Unknown: 3 Total: 120	Route avoids the main centres of population.	2

Environmental Criteria	**Preliminary Assessment of Option :** *Brown - Route F* - 10.0km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	Within 100 metres of 17 no. existing dwellings. The route traverses the River Barrow and River Nore Special Area of Conservation (SAC). Route appears to traverse a GAA club.	The proposed route is largely within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. In terms of impact on human beings, the proposed route appears to traverse the grounds of Glenmore GAA club. Objective 7a of the Plan seeks the preservation and improvement of such facilities and therefore it is unlikely to be supported from a planning perspective. Furthermore, the proposed route comes within 100 metres of 17 no. dwellings along the route and on this basis, objections are on the grounds of noise impact, air quality, and construction impacts etc. The location of these existing dwellings along the subject route is likely to have significant implications in terms of objections to the development in the planning process, if this route is progressed past this preliminary assessment stage. In addition, the site traverses the River Barrow and River Nore Special Area of Conservation. The County Development Plan seeks their protection under Object 8B and 8C of the Plan. Having regard to the route which passes through the Glenmore GAA club grounds, this route could significantly impact on a key recreational facility within the community. In addition, having regard to the potential adverse impact of the route on the SAC which cannot be ruled out at this stage, as well as the loss of sports grounds this route is considered to be majorly negative.	1
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts the following; • 2 High Local Environmentally Sensitive Area (ESA) • 1 Watercourse	This route is considered one of the longer options and is approximately 0.5km and 1km west of the original alignment. The route crosses the Special Area of Conservation (SAC) near Glenmore with no direct impact to Special Protected Areas (SPAs), Natural Heritage Areas (NHAs) or Proposed Natural Heritage Areas (pNHAs) predicted. Entirety of ESA-1 (Ballybraghy) is located within the study corridor for the route; a site of county importance which includes the area of WN6 wet woodland. Significant impacts to 2 sites of high local importance (i.e. ESA-11 & 19). Areas of WN6 recorded within both. Significant impacts to ESA-10. Likley that neglible impacts to ESA-12 and ESA-15 can be avoided at detailed design stage. The route traverses 1 crossing from Barrow to Nore and 0 at Suir.	4
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 1 un-named watercourse and 2 river catchments.	The route crosses two river catchments i.e. the Suir and Nore, and crosses one un-named stream (within the Nore catchment) which eventually flows to the River Barrow. The River Barrow is part of the River Barrow and River Nore Special Area of Conservation (SAC). A small localised point within the study area has been identified to be at potential risk of flooding located at Slieverue, to the south west of the Luffany roundabout.	5
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	3 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 0 Regionally Important; • 3 Locally Important; • 1 Poor. Approximately 92% (9.2km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 2 isolated pockets of alluvium are intersected by the route in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.4km north of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	2
Air Quality (existing air quality environment and number of sensitive receptors).	4 sensitive receptors within 50m of route.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptors impacted will likely experience an increase in pollutant concentrations as a result of the proposed route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options	3

Environmental Criteria	**Preliminary Assessment of Option :** *Brown - Route F* - 10.0km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) score = 189 112 properties, excluding agriculture, are within 300m of the new roads (brown). 4 of these properties are within 50m and 13 properties are within 50-100m.	Closer to properties at Carpagh than grey (B) and blue (D) routes. Passes in closer proximity to a cluster of properties at Ballynaraha (~13) than grey route (B), dark blue (G) and cyan dashed route (PR2) routes. Passes closer to properties at Davidstown than cyan dashed and pink dashed routes. Rural noise climate with potentially unsuitable topography between Grogan and Treanaree, making mitigation a challenge.	2
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Route will cross and affect some woodland in narrow stream valley at Glenmore. Travels in the valley immediately adjacent to the north west of Glenmore village. Likely to have significant adverse visual effects on receptors (people) at Glenmore village. Will adversely affect the setting of Glenmore village. Route will have significant adverse effects on a local hill at Robinstown which is visually prominent in the local landscape. The route almost travels through the summit. There would be significant adverse effects as the route crosses through a principal ridgeline (Kilkenny Landscape Character Assessment) at Davidstown towards Treanaree.	1
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	Route crosses 3 high voltage overhead powerlines.	The route crosses a number of secondary and minor roads but does not cross the existing N25. No active quarries or pits have been identified in proximity to the study area. Potential impacts to other existing utilies such as telecom, broadband etc and there will be a requirement for new services along the scheme and connections to existing.	4
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 22 ha, impact on approximately 39 holdings 6 dairy farms, 1 equine holding and in close proximity to 3 farmyards.	Good quality agricultural land, majority of the route impacting on grassland, some tillage, and some forestry . The route is offline and will result in severance to land holdings.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Brown Route could directly impact the mill race at Robinstown and the designed landscape at Frazer's Hall demesne. The route also crosses 12 townland boundaries which may be of archaeological significance. This route has a potentially moderate impact on the setting of 3 cultural heritage sites.	This option is the sixth longest of the options under consideration. The route passes to the north of a rath and enclosure at Mullennahone (SMR's KK041-018--& KK041-019--) before diverting south between two raths in Ballynaraha (SMR's KK040-023--& KK040-022--). Near the townland boundary of Grogan and Davidstown the alignment passes 50m east of the zone of notification of the former site of a Church (SMR KK043-041-). Continuing over the summit of a ridge past Cloonpatrick bullaun stone (SMR KK043-011004) the route passes north of a series of three ringforts (SMR's KK043-012-, KK043-013- & KK043-014-) into Carriganura townland where it sweeps in a wide arc past the rath (SMR KK043-014-).	3
Human Health	Property counts within 300m of the Route include: • Residential: 81 • Commerical (Residential): 5 • Commerical: 7 • Agriculture: 8 • Agriculture (Residential): 15 • Private Storage: 1 • Unknown: 3 Total: 120	Route avoids the main centres of population.	2

Environmental Criteria	**Preliminary Assessment of Option :** *Dark Blue - Route G* - 9.7km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	Within 100m of 22 no. existing dwellings. The route traverses the River Barrow and River Nore Special Area of Conservation (SAC).	The proposed route is largely within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. Furthermore, the proposed route comes within Within 100 metres of 22 no. dwellings along the route and on this basis, objections are likely on the grounds of noise impact, air quality, and construction impacts etc. The location of these existing dwellings along the subject route is likely to have significant implications in terms of objections to the development in the planning process, if this route is progressed past this preliminary assessment stage. In addition, the site traverses the River Barrow and River Nore SAC. The County Development Plan seeks their protection under Object 8B and 8C of the Plan.	6
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts the following; • 4 High Local Environmentally Sensitive Area (ESA) • 3 Low Local ESA • 1 Watercourse	This route is similar in nature and length to the existing N25 and approximately 0.5km to 1km west of the existing alignment. The route runs through and along a section of Special Area of Conservation (SAC) near Glenmore with no direct impact to Special Protection Areas (SPAs), Natural Heritage Areas (NHAs) or Proposed Natural Heritage Areas (pNHAs) predicted. No direct impact on ESA County level. Significant impacts to 3 sites of high local importance (i.e. ESA-8, 17 & 19). Very minor impacts to 1 further sites of high local importance (i.e. ESA-11). Significant impacts predicted to 2 sites of low local value; to ESA-10 & 12. While very minor impacts to ESA-15 are possible, it is likely that these can be avoided. The route traverses 1 crossing from Barrow to Nore and 0 crossing at Suir.	4
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 1 un-named watercourse and 2 river catchments.	The route crosses two river catchments i.e. the Suir and Nore, and crosses one un-named stream (within the Nore catchment) which eventually flows to the River Barrow. The River Barrow is part of the River Barrow and River Nore Special Area of Conservation (SAC). A small localised point within the study area has been identified to be at potential risk of flooding located at Slieverue, to the south west of the Luffany roundabout.	5
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	4 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 0 Regionally Important; • 2 Locally Important; • 1 Poor. Approximately 97% (9.4km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 1 isolated pocket of alluvium is intersected by the route in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.8km north west of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	2
Air Quality (existing air quality environment and number of sensitive receptors).	3 sensitive receptors within 50m of route.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptors impacted will likely experience an increase in pollutant concentrations as a result of the proposed route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options	3

Environmental Criteria	**Preliminary Assessment of Option :** *Dark Blue - Route G* - 9.7km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) score = 272 139 properties (excluding agriculture) are within 300m of the new roads (dark blue). 3 of these properties are within 50m and 19 properties are within 50-100m.	Route diverts west at a similar distance to the existing route, passing by rear facades of properties to a rural noise environment. Mitigation option to the rear of the facades along the existing alignment with noise reduction at front of facades but higher PIR than cyan dashed route (PR2) at Ballinclare. Mitigation potential due to topography at rear of facades between Davidstown and Cariganurra.	3
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Follows the existing N25 alignment to south of Glenmore thus, avoiding effects on Glenmore and narrow stream valleys. From Ballinclare to south of Davidstown the route continues parallel to the existing N25 corridor and travels along the lower side slopes of a ridge of high ground, avoiding the higher contours. At Carriganurra the route crosses through this ridge of high ground and to the west of a local rock outcrop (with cross on top) which is a prominent local landmark.	3
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	Route crosses 3 high voltage overhead powerlines.	The route crosses a number of secondary and minor roads including the existing N25. The N25 is recorded as the only public transport route through the study area, serviced by the Bus Eireann Route 370. No active quarries or pits have been identified in proximity to the study area. Potential impacts to local telecom, water and possibly broadband utilities. There will be a requirement to provide services along the proposed route with relatively short connections to the existing networks given the location of the proposed corridor.	3
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 21ha, impact on approximately 31 holdings, 5 dairy farms, and in close proximity to 1 farmyard.	Good quality agricultural land, majority of the route impacting on grassland, some tillage and some forestry in the southern end of the route. The route is offline and will result in severance to land holdings. However, the route is online in the Northern section and the online section will not cause severance to land holdings.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Dark Blue Route G could directly impact 2 cultural heritage sites or features (a quay at Jamestown and a mill race at Graiguenakill). The route also crosses 13 townland boundaries which may be of archaeological significance.	This route option is the seventh longest of the options under consideration. The route passes 20m to the south of a fulacht fia (SMR KK041-021-) and 60m from an extant standing stone at Robinstown (SMR KK041-055-). It passes 100m west of the zone of notification for the fulacht fia (SMR KK041-025--). From this point the route runs parallel to and west of the existing road running to the rear of several roadside properties. In Davidstown the route bends to the east around a series of three raths (SMR's KK043-012--, KK043-013-- & KK043-014). Further south in Carriganurra the route runs to the west of a landmark rock outcrop with a cross on its summit.	3
Human Health	Property counts within 300m of the Route include: Residential: 96 Commerical (Residential): 9 Commerical: 13 Agriculture: 7 Agriculture (Residential): 13 Private Storage: 3 Unknown: 5 Total: 146	Route avoids the main centres of population.	2

Environmental Criteria	Preliminary Assessment of Option : *Magenta - Route H - 9.4km*		Score
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	Within 100m of 52 no. existing dwellings. The route traverses the Rver Barrow and River Nore Special Area fo Conservation (SAC).Traverses 3 no. monuments included on the Record of Monuments and Places (RMP).	The proposed route is located within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. In addition, the proposed route is located within 100 metres of 52 no. dwellings . Notwithstanding this, a significant portion of these dwellings are located along the existing route of the N25. On this basis, it is expected that any impacts will be limited to the construction stage of development, from a planning perspective. In addition, the site traverses the River Barrow and River Nore SAC. The County Development Plan seeks their protection under Object 8B and 8C of the Plan. The subject route is located within 100m of 3 no. monuments included within the Record of Monumnets and Places (RMP) (Ref: KK041-025, KK041-021 and KK041-023). The Planning Authority have strong policies in place to protect such sites as outlined in Objective 8I of the Plan. Please refer to heritage section for further details. Overall it is considered that this route, which generally follows the existing route of the N25, will not have significant impacts. Notwithstanding this, it is noted that the proposed route traverses within 100m of 3 no. monuments listed in the Record of Monuments and Places. However, the zones of notification of these monuments are already traversed by the N25 and on this basis, the proposed route is considered to be neutral.	4
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts the following; • 6 High Local Environmentally Sensitive Area (ESA) • 2 Low Local ESA • 3 Watercourses	This route is predominantly on-line with short lengths off-line to improve the existing alignment. The route runs through & along a section of SAC near Glenmore with no direct impact to Special Protection Areas (SPAs), Natural Heritage Areas (NHAs) or Propoesd Natural Heritage Areas pNHAs predicted. No direct impact on ESA's County level. Significant impacts to 3 sites of high local importance (i.e. ESA-8, 11 & 13). Minor impacts to 3 further sites of high local importance (i.e. ESA-16, 17 & 19). Significant impacts predicted to 2 sites of low local value; to ESA-9 & 10. The route traverses 1 crossing from Barrow to Nore and 1 at Suir.	4
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 1 un-named watercourse, 1 named (Luffany) and 2 catchments. 5 Wells identified within 300m of Route option.	The route crosses two river catchments i.e. the Suir and Nore, and crosses one un-named stream (within the Nore catchment) which eventually flows to the River Barrow and one named stream, Luffany (within the Suir catchment) which eventually flows to the River Suir. The River Barrow is part of the River Barrow and River Nore Special Area of Conservation (SAC) and the River Suir is part of the Lower River Suir SAC. A small localised point within the study area has been identified to be at potential risk of flooding located at Slieverue, to the south west of the Luffany roundabout.	4
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	5 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 0 regionally important; • 2 Locally Important; and • 1 poor. Approximately 96% (9.0km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. A long Alluvium vein is intersected by the route in the Glenmore region along with 1no. pocket in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.8km north west of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	2

Environmental Criteria	Preliminary Assessment of Option : *Magenta - Route H - 9.4km*		Score
	Quantitative Assessment	**Qualitative Assessment**	
Air Quality (existing air quality environment and number of sensitive receptors).	22 sensitive receptors within 50m of route.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. This is the most online route option and the properties impacted would likely already experience elevated levels of air pollutants as a result fo traffic on the existing N25 and therefore would have a higher tolerance to pollutants. Some properties will experience an increase in pollutant concentrations as a result of the route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options.	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) = 401 176 properties, excluding agriculture, are within 300m of the new roads (magenta). 22 of these properties are within 50m and 34 properties are within 50-100m.	Closest alignment to the existing route. While the PIR is high with a number of properties affected, the existing noise environment will be improved due to realignment of the existing route i.e. magenta route (H) at a greater distance to properties along existing route from Ballynamona and Gaulstown. Towards southern end of the route (Curraghmore and Luffany) magenta route (H) moves to rear of NSLs affected by existing route (comparable distance). Change from current noise environment will likely be reduced at a selection of properties due to opportunities for mitigation to rear of properties (Luffany).	3
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Generally, follows existing N25 alignment towards Ballyrownagh. Thus, avoiding effects on Glenmore and narrow stream valleys and ridges of surrounding higher ground either side of the existing N25 Road. Diverts west from existing N25 towards Carriganurra. At Carriganurra the route travels close to a local rock outcrop (with cross on top) which is a prominent local landmark. With mitigation this landmark may be successfully integrated.	3
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	Route crosses 3 high voltage overhead powerlines.	The route crosses a number of secondary and minor roads. This route crosses the existing N25. The N25 is recorded as the only public transport route through the study area, serviced by the Bus Eireann Route 370. No active quarries or pits have been identified in proximity to the study area. This corridor impacts linear high voltage power lines and local telecom lines and possibly impacts existing water and possibly broadband utilities. There will be a requirement to provide additional services along the proposed route with short connects to the existing networks given the location of the proposed corridor.	3
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 20 ha, impact on approximately 24 holdings, 4 dairy farms and in close proximity to 1 farmyard.	Good quality agricultural land, majority of the route impacting on grassland, and some tillage. The majority of the route is online and will not result in severance to land holdings where the route is online.	3
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Magenta Route H could directly impact 3 known or potential archaeological, architectural, or cultural heritage sites or features (2 fulachtaí fia at Ballynaraha and Ballinclare, respectively and the corn mill at Graiguenakill). The route also crosses 16 townland boundaries which may be of archaeological significance.	The Magenta option (Route H) is the route that most mirrors the existing line of the N25. The only substantive deviations are to the south, at Carriganurra. The route impacts the Zone of Notification surrounding three archaeological monuments, fulachtaí fia at Ballynaraha (KK041-023) and Ballinclare (KK041-025) and a fulacht fia (KK041-21-) at Kilmakevoge. To the south, it extends close to a kiln site (KK043-021-) and an excavated fulacht fia (KK044-023--) 120m west and 90m east of the route respectively, while to the north, 78m from an extant standing stone at Robinstown (KK041-055-).	3

Environmental Criteria	**Preliminary Assessment of Option :** *Magenta - Route H* - 9.4km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Human Health	Property counts within 300m of the Route include: Residential: 134 Commerical (residential): 8 Commerical: 14 Agriculture: 6 Agriculture (Residential): 12 Private Storage: 3 Unknown: 5 Total: 182.	Route avoids the main centres of population.	3

Environmental Criteria	Preliminary Assessment of Option : *Red - Route I* - 8.9km		Score
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	Within 100m of 22 dwellings. The route traverses both a Speacial Area of Conservation (SAC) and proposed Natural Heritage Area (pNHA). The route crosses the disused rail line (south-east Greenway) twice. Route traverses access road to equine centre. Route traverses monument included in the Record of Monuments and Places.	The proposed route is not located within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. The proposed route appears to traverse a monument included in the Record of Monuments and Places (ref: KK044-023). The Planning Authority have strong policies in place to protect such sites as outlined in Objective 8I of the Plan. Please refer to Heritage Section for specific information regarding heritage. Of significance is that the proposed route appears to traverse the grounds of Beacon Hill Equine Centre. This is likely to be a critical issue due to economic impact in terms of operating the stables, as well as likely impact on the horses at the centre. The proposed route is located within 100 metres of 22 dwellings and on this basis, objections are likely on the grounds of noise impact, air quality, and construction impacts etc. The location of these existing dwellings along the subject route is likely to have significant implications in terms of objections to the development in the planning process, if this route is progressed past this preliminary assessment stage Furthermore, the route also traverses both the Barrow River Estuary pNHA and the River Barrow and River Nore SAC. The County Development Plan seeks their protection under Object 8B and 8C of the Plan. In addition, it is noted that this route traverses the disued rail line (south-east Greenway) at 2 no. locations and therefore consultation with impacted councils is likely to be required.	1
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	• 1 pHNA Negatively impacts the following; • 2 High Local Environmentally Sensitive Area (ESA) • 2 Low Local ESA • 3 Watercourses	This route is considered one of the shorter options and is approximately 0.5 and 2.5km east of the original alignment. The route crosses the River Barrow And River Nore Special Area of Conservation (SAC) where it rejoins the existing alignment of the N25. Impact dependant on nature and scale of works. No direct impact to SPAs, NHAs or pNHAs predicted. Northern terminus of the route approaches close to the River Barrow Estuary pNHA at the N25 tie-in; indirect impact possible, but likely to be minor. No direct impact on ESA County level. Significant impacts to 1 site of high local importance (i.e. ESA-3). While minor impacts could occur at ESA-16, it is likley that these can be avoided at detailed design. Significant impacts predicted to 2 sites of low local value; to ESA-20 & ESA-21. Barrow - Nore: 1 crossings; Suir: 2 crossings.	2
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 2 un-named watercourses, 1 named (Luffany) and 2 catchments. 3 Wells identified within 300m of Route option.	The route crosses two river catchments i.e. the Suir and Nore, and crosses two un-named stream (within the Nore catchment) which eventually flows to the River Barrow and one named stream, Luffany (within the Suir catchment) which eventually flows to the River Suir. The River Barrow is part of the River Barrow and River Nore Special Area of Conservation (SAC) and the River Suir is part of the Lower River Suir SAC. A small localised point within the study area has been identified to be at potential risk of flooding located at Slieverue, to the south west of the Luffany roundabout.	4
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	3 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 0 regionally important; • 3 Locally Important; and • 1 poor. Approximately 74% (6.6km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 3 isolated pockets of Alluvium are intersected by the route. 2no in the central region and 1no. in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.8km north west of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations	3
Air Quality (existing air quality environment and number of sensitive receptors).	3 sensitive receptors within 50m of route.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptors impacted will likely experience an increase in pollutant concentrations as a result of the proposed route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high (Greenhouse Gas) GHG emissions. Longer journies will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) = 158 78 properties, excluding agriculture, are within 300m of the new roads (red). Three of these properties are within 50m and 20 properties are within 50-100m.	Similar to orange route (K) as it starts along the existing route from New Ross bypass to Graiguenakill then diverts furthest east through clusters of properties between Carrickcloney and Redgap. Follows dark blue dashed route (PR3) closely from Curraghmore to Luffany. Rural noise environment with route passing close to many small clusters of properties in the 0-100m bands (24no.) in comparison to grey route (B) route (7no.).	2

Environmental Criteria	Preliminary Assessment of Option : *Red - Route I* - 8.9km		Score
	Quantitative Assessment	**Qualitative Assessment**	
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Travels up steep hillside and over stream valley from Craiguenakil to Carrickcloney. Significant adverse effects on landscape character of this sloping land which connects with the River Barrow valley. Potential adverse visual effects from dwellings at Carrickcloney. Will travel along River Barrow valley side of a ridge of high ground at Aylwardstown and south to Rathinure. Significant adverse effects on this ridge of high ground and to wider River Barrow valley landscape. Travels through local valley between Rathinure and Redgap and sidelong of a hill at Redgap, which are visually connected with the River Barrow valley corridor and views from along this corridor. Thus, potential significant adverse effects on hill at Redgap and on views through this valley and on landscape character of the wider river Barrow valley.	1
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	The route crosses 2 High Voltage overhead powerlines.	The route crosses a number of secondary and minor roads. This route crosses the existing N25. The N25 is recorded as the only public transport route through the study area, serviced by the Bus Eireann Route 370. No active quarries or pits have been identified in proximity to the study area. This corridor impacts two high voltage power lines and potentially impacts local telecom, transmission gas main, water and possibly broadband utilities. There will be a requirement to provide services along the proposed route with connections to the existing networks which could extend a distance given the location of the proposed corridor.	3
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 19ha, impact on approximately 30 holdings 7 dairy farms, 1 equine holding " Beacon Hill" and in close proximity to 2 farmyards.	Good quality agricultural land, majority of the route impacting on grassland, tillage land to the northern end of the route. The majority of the route is offline and will result in severance to land holdings.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Red Route could directly impact 3 known or potential archaeological, architectural, or cultural heritage sites or features (a fulacht fia at Luffany, a corn mill at Graiguenakill and the designed landscape associated with Aylwardstown House demesne). The route also crosses 13 townland boundaries which may be of archaeological significance.	This option is the second shortest of the routes submitted for consideration. It passes 330m west of Carrickcloney Castle (SMR KK041-032-). Veering to the south west the route traverses the eastern edge of Aylwardstown House demesne. Continuing south the route crosses the embanked Waterford - New Ross railway line in Rathinure to the east of a skew-arch bridge (RPS D126). Proceeding through Rochestown the alignment bypasses two monuments SMR's KK044-010001 and KK044-010002—classified as a church and standing stone. Winding though farmland in Ballyvarring, Ballyrowragh and Ballinlaw the route passes a local road and crosses pastureland in Curraghmore and into Luffany. From here it crosses the N25 near a fulacht fia (SMR KK044-023) before terminating at the roundabout at Rathpatrick.	3
Human Health	Property counts within 300m of the Route include: Residential: 57 Commerical (residential): 1 Commerical: 2 Agriculture: 6 Agriculture (Residential): 12 Private Storage: 0 Unknown: 6 Total: 84	Route avoids the main centres of population. As with the orange (K), cyan (J) and Previous Route 3, this route intersects the proposed Kilkenny Greenway at two locations.	2

Environmental Criteria	Preliminary Assessment of Option : *Cyan - Route J* - 9.6km		Score
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	Within 100 metres of 25 dwellings. There is 1 no. permitted dwelling located along route with live planning permission in place. Traverses 1 no. monument included in the Record of Monuments and Places. as well as the disused rail line (south-east Greenway). The route traverses the River Barrow and River Nore Special Area of Conservation (SAC). Route traverses' access to existing dwelling and to an Equine centre	The proposed route is located outside the area designated to be kept free from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. In terms of impact on human beings, it is noted that the proposed route dissects access to an existing dwelling on the L7470-24, as well as the access to an Equine Training Centre. This could potentially have significant economic impacts and is likely to be highly contested on the grounds of impacts to the equine centre. Dissecting this access should be avoided if possible. Furthermore, the proposed route comes within 100 metres of 25 dwellings along the route and on this basis, objections are on the grounds of noise impact, air quality, and construction impacts etc. Critically, the route appears to traverse a site which was recently granted planning permission under application register reference (18/525) and this would provide an opportunity for a strong objection by the landowner in terms of economic and social impacts. It is further noted that this route traverses the disused rail line (south-east Greenway) and on this basis consultation with impacted councils will be required. The location of this permitted and existing dwellings along the subject route is likely to have significant implications in terms of objections to the development in the planning process, if this route is progressed past this preliminary assessment stage. In terms of planning designations, it is noted that this route appears to traverse a monument included on the Record of Monuments and Places (Reference KK-044-023). The Planning Authority have strong policies in place to protect such sites as outlined in Objective 8I of the Plan. Please revert to Heritage section for specific information regarding monuments.In addition, the site traverses the River Barrow and River Nore SAC. The County Development Plan seeks their protection under Object 8B and 8C of the Plan.	2
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts the following; • 1 High Local Environmentally Sensitive Area (ESA) • 2 Low Local ESA's • 2 Watercourses	This route is considered one of the shorter options and is approximately 0.5 and 2.5km east of the original alignment. The route runs through & along a section of River Barrow and River Nore SAC near Glenmore with no direct impact to Special Protection Area (SPAs), Natural Heritage Areas (NHAs) or Proposed Natural Heritage Areas (pNHAs) predicted. No direct impact on ESA's County level. Significant mpacts to 1 site of high local importance (i.e. ESA-8). Significant impacts predicted to 1 site of low local value; to ESA-21. While minor impacts could occur at ESA-20, it is likley that these can be avoided at detailed design. Barrow - Nore: 1 crossings; Suir: 1 crossings.	4
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 1 un-named watercourses, 1 named (Luffany) and 2 catchments. 2 Wells identified within 300m of Route option.	The route crosses two river catchments i.e. the Suir and Nore, and crosses one un-named stream (within the Nore catchment) which eventually flows to the River Barrow and one named stream, Luffany (within the Suir catchment) which eventually flows to the River Suir. The River Barrow is part of the River Barrow and River Nore SAC and the River Suir is part of the Lower River Suir SAC. A small localised point within the study area has been identified to be at potential risk of flooding located at Slieverue, to the south west of the Luffany roundabout.	4
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	2 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 0 regionally important; • 3 Locally Important; and • 1 poor. Approximately 91% (8.7km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 3 isolated pockets of Alluvium are intersected by the route. 1no. in the southern region, 1no. in the central region and 1no. in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.7km north west of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	2
Air Quality (existing air quality environment and number of sensitive receptors).	5 sensitive receptors within 50m of route.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptors impacted will likely experience an increase in pollutant concentrations as a result of the proposed route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options.	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) = 292 145 properties, excluding agriculture, are within 300m of the new roads (cyan). Five of these properties are within 50m and 21 properties are within 50-100m.	Along existing route from New Ross bypass to north of Kilmakevoge then diverts east through rural area in close proximity to a small cluster of houses at Ballyhobuck (~3), Ballyrowragh and Curraghamore (~6), Ballinlaw (~16) and Luffany (~3). Expected noise climate to be a quiet in the rural area and the introduction of a 100km/h road would significantly change the noise environment. Higher PIR than Red (I) and Orange (K) routes but fewer property clusters to introduce noise mitigation measures. Topography may not be favourable for noise mitigation e.g. at Ballyhobuck.	2
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Follows existing N25 alignment to south of Glenmore. Thus, avoiding effects on Glenmore and narrow stream valleys. From south of Glenmore, will cut though some of the highest contours of a ridge of high ground between Ballynamona and Aylwardstown and south to Rathinure. Significant adverse effects on this ridge of high ground. Travels through local valley between Rathinure and Redgap and a hill at Redgap, which are visually connected with the River Barrow valley corridor and views from along this corridor. Thus, potential significant adverse visual effects on views through this valley and on landscape character of the river Barrow valley.	1

Environmental Criteria	Preliminary Assessment of Option : *Cyan - Route J* - 9.6km		Score
	Quantitative Assessment	**Qualitative Assessment**	
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	The route crosses 2 hig voltage overhead powerlines.	The route crosses a number of secondary and minor roads. This route crosses the existing N25. The N25 is recorded as the only public transport route through the study area, serviced by the Bus Eireann Route 370. No active quarries or pits have been identified in proximity to the study area. This corridor impacts two high voltage power lines and potentially impacts local telecom, transmission gas main, water and possibly broadband utilities. There will be a requirement to provide services along the proposed route with connections to the existing networks which could extend a distance given the location of the proposed corridor.	3
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 21ha, Impact on approximately 37 holdings impact on 1 dairy farm, 1 equine holding " Beacon Hill" and in close proximity to 2 farmyards.	Good quality agricultural land, majority of the route impacting on grassland, small amount of tillage land dispersed through the route. The majority of the route is offline and will result in severance to land holdings, small online section at northern end there will not be any severance to land holdings along the online section.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Cyan Route J could directly impact 2 known heritage sites (a fulacht fia at Luffany and a corn mill at Graiguenakill). The route also crosses 14 townland boundaries which may be of archaeological significance. This route has a potential significant impact on the setting of 1 cultural heritage site, namely, a ringfort at Rathinure (KK044-009----).	This option passes west of an earthwork in Aylwardstown (SMR KK041-027) and then east of a complex of monuments associated with Kilcolumb Church and Graveyard (SMR's KK044-007001& KK044-007002-) including a bullaun stone (SMR KK044-007003), Holy well (SMR KK044-008-) and nearby ringfort (SMR KK044-009). The route passes over the embanked former Waterford - New Ross railway line. The route may have a direct impact on the site of an excavated fulacht fia in Luffany (KK044-023).	3
Human Health	Property counts within 300m of the Route include: Residential: 116 Commerical (residential): 5 Commerical: 8 Agriculture: 7 Agriculture (Residential): 7 Private Storage: 3 Unknown: 6 Total: 152	Route avoids the main centres of population. As with the orange (K), red (I) and Previous Route 3, this route intersects the proposed Kilkenny Greenway at two locations.	2

Environmental Criteria	Preliminary Assessment of Option : *Orange - Route K* - 9.3km		Score
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	The route traverses both a Special Area of Conservation (SAC) and propoesed Natural Heritage Area (pNHA). The route crosses the disused rail line (south-east Greenway) twice. Within 100metres of 17 dwellings. The route traverses a rail line. The route dissects the Beacon Hill Equine Centre. The route traverses a monument included in the Record of Monuments and Places.	The proposed route is not located within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. The proposed route appears to traverse a monument included in the Record of Monuments and Places (ref: KK044-023). The Planning Authority have strong policies in place to protect such sites as outlined in Objective 8I of the Plan. Please revert to Heritage Section for specific details on impact on monuments. There are 17 dwellings within 100 metres of the proposed route, and on this basis, objections are likely on the grounds of noise impact, air quality, and construction impacts etc Of significance is that the proposed route appears to traverse the grounds of Beacon Hill Equine Centre. This is likely to be a critical issue due to economic impact in terms of operating the stables, as well as likely impact on the horses at the centre. Furthermore, the route also traverses both the Barrow River Estuary proposed Natural Heritage Area and the River Barrow and River Nore SAC. The County Development Plan seeks their protection under Object 8B and 8C of the Plan. In addition, it is noted that this route traverses the disused rail line (south-east Greenway) and therefore consultation with impacted councils is likely to be required.	2
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts the following; • 1 High Local Environmentally Sensitive Area (ESA) • 3 Low Local ESA • 3 Watercourses	This route is considered one of the shorter options and is approximately 0.5km and 2.5km east of the original alignment. The route crosses the SAC where it rejoins the existing alignment of the N25. Impact dependant on nature and scale of works. No direct impact to Special Protection Area (SPAs), Natural Heritage Area (NHAs) or pNHAs predicted. Northern terminus of the route approaches close to the River Barrow Estuary pNHA at the N25 tie-in; indirect impact possible, but likely to be minor. No direct impact on ESA's County level. Significant impacts to 1 site of high local importance (i.e. ESA-3). Significant impacts predicted to 1 site of low local value; to ESA-21. While minor impacts could occur at ESA-16 & ESA-20, it is likley that these can be avoided at detailed design. Barrow - Nore: 2 crossings; Suir: 1 crossings.	2
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 2 un-named watercourses, 1 named (Luffany) and 2 catchments. 5 Wells identified within 300m of Route option.	The route crosses two river catchments i.e. the Suir and Nore, and crosses two un-named stream (within the Nore catchment) which eventually flows to the River Barrow and one named stream, Luffany (within the Suir catchment) which eventually flows to the River Suir. The River Barrow is part of the River Barrow and River Nore SAC and the River Suir is part of the Lower River Suir SAC. An area noted to the north east of the study area is considered 'liable to flood'. The route is located approximately 120m west of this potential flood area at its closest point. In addition, a small localised point within the study area has been identified to be at potential risk of flooding located at Slieverue, to the south west of the Luffany roundabout.	3
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	5 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 0 regionally important; • 4 Locally Important; and • 1 poor. Approximately 86% (8.0km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 3 isolated pockets of Alluvium are intersected by the route. 1no. in the southern region, 1no. in the central region and 1no. in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.7km north west of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	2
Air Quality (existing air quality environment and number of sensitive receptors).	4 sensitive receptors within 50m of route.	A review of Environmenal Proetection Area (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptors impacted will likely experience an increase in pollutant concentrations as a result of the proposed route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options	3

Environmental Criteria	**Preliminary Assessment of Option :** *Orange - Route K* - 9.3km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) = 149 76 properties, excluding agriculture, are within 300m of the new roads (orange). Four of these properties are within 50m and 13 properties are within 50-100m.	Similar to the red route along existing route from New Ross bypass to Graiguenakill then diverts east through clusters of properties between Carrickcloney (~5) and Redgap. Follows cyan route (J) from Redgap to Luffany. Rural noise environment with route passing close to many small clusters of properties in the 0-100m bands (20no.) in comparison to grey route (B) route (7no.). Marginally higher number of properties in the 0-50m band than the red route.	2
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Travels up steep hillside and over stream valley from Graiguenakill to Carrickcloney. Significant adverse effects on landscape character of this sloping land which connects with the River Barrow valley. Potential adverse visual effects from dwellings at Carrickcloney. Will cut though some the highest contours of a ridge of high ground at Aylwardstown and south to Rathinure. Significant adverse effects on this ridge of high ground. Will travel through a historic railway bridge south of Rathinure. Significant adverse effect on this element. Travels through local valley between Rathinure and Redgap and sidelong on a hill at Redgap, which are visually connected with the River Barrow valley corridor and views from along this corridor. Thus, potential significant adverse visual effects on the hill at Redgap and on views through this valley and on landscape character of the river Barrow valley.	1
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	The route crosses 2 high voltage overhead powerlines.	The route crosses a number of secondary and minor roads. This route crosses the existing N25. The N25 is recorded as the only public transport route through the study area, serviced by the Bus Eireann Route 370. No active quarries or pits have been identified in proximity to the study area. This corridor impacts two high voltage power lines and potentially impacts local telecom, transmission gas main, water and possibly broadband utilities. There will be a requirement to provide services along the proposed route with connections to the existing networks which could extend a distance given the location of the proposed corridor.	3
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 20ha, impact on approximately 35 holdings 6 dairy farms, 1 equine holding "Beacon Hill" and in close proximity to 2 farmyards.	Good quality agricultural land, majority of the route impacting on grassland, tillage land dispersed through the route mid section northwards. The majority of the route is offline and will result in severance to land holdings.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Orange Route K could directly impact 4 known or potential archaeological, architectural, or cultural heritage sites or features. The route also crosses 12 townland boundaries which may be of archaeological significance.	This route is the second shortest of the options under consideration. It passes 250m east of the zone of notification for a rath (SMR KK040-030). This rath is located near Graiguenakill Church and graveyard (SMR's KK041-028001-& KK041-028002-). Veering south south east the alignment cuts through Aylwardstown House demesne and an area of archaeological potential, highlighted in the course of geophysical survey of lands within the demesne, identified locally as 'Cromwell's Field'. The largely 19th century house (SMR KK041-031001-, NIAH 12404107) with some 17th century fabric lies 220m to the east. The route passes within 33 m of the site of an excavated fulacht fia in Luffany (KK044-023) and directly impacts on the site of a corn mill at Graiguenakill.	2
Human Health	Property counts within 300m of the Route include: Residential:53 Commerical (residential): 2 Commerical: 3 Agriculture: 5 Agriculture (Residential):12 Private Storage: 0 Unknown: 6 Total: 81	Route avoids the main centres of population. As with the cyan (J), red (I) and Previous Route 3, this route intersects the proposed Kilkenny Greenway at two locations.	2

Environmental Criteria	**Preliminary Assessment of Option :** *Turquoise - Route P* - 12.7km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	The route crosses the disused rail line (south-east Greenway) twice. Within 100 metres of 12 Dwellings.	The proposed route is not located within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. There are 12 dwellingswithin 100 metres of the proposed route, and on this basis, objections are likely on the grounds of noise impact, air quality, and construction impacts etc. There are 2 no. significant constraints to the development of this route having regard to current and permitted planning applications. Firstly, the route appears to dissect a landholding where planning permission was granted for a dwelling under application register reference 19147. In addition, a new planning application (Register reference 2010) has been lodged with Kilkenny County Council, seeking permission for a dwelling house. This application is currently at pre-validation stage with the Council. The location of this permitted and proposed dwellings along the subject route is likely to have significant implications in terms of objections to the development in the planning process, if this route is progressed past this preliminary assessment stage. In addition, a section of the route appears to traverse the access to an existing farm holding. On this basis, it is likely that there will additional objections to this route by the landowner in terms of negative economic impact both during construction, and when the proposed road opens. Overall, and considering the constraint presented as a result of the permitted dwelling and a planning application seeking permission for a dwelling along the route, this option is considered to be moderately negative.	2
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts the following; • Minor overlap of County (Ballybraghy) Environmentally Sensitive Area (ESA) • 1 High Local ESA • 1 Low Local ESA • 2 Watercourses	This route is considered one of the longer options and is approximately 1.5km to 2.5km west of the original alignment. No direct impact to SACs, Special Protection Areas (SPAs), Natural Heritage Area (NHAs) or pNHAs predicted. Runs close to Lough Cullin & associated watercourses - indirect impact possible, but likely to be minor. Minor overlap of the northern end of ESA-1 (Ballybraghy) with the study corridor; however, it is likley that this can be avoided at detailed design. Significant impacts to 1 site of high local importance (i.e. ESA-4); the site would be impacted across 3 no. valleys. While minor impacts could occur at ESA-18, it is likley that these can be avoided at detailed design. Barrow - Nore: 1 crossings; Suir: 1 crossings.	1
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 1 un-named watercourse, 1 named (Nicholastown 16) and 2 catchments. 2 Wells identified within 300m of Route option.	The route crosses two river catchments i.e. the Suir and Nore, and crosses one un-named stream (within the Nore catchment) which eventually flows to the River Barrow and one named stream, Nicholastown 16 (within the Suir catchment) which flows in a northernly direction and drains to Lough Cullin, before ultimately discharging into the River Suir. The River Barrow is part of the River Barrow and River Nore SAC and the River Suir is part of the Lower River Suir SAC. A small area located to the north west of the study area is considered as 'liable to flood'. The route is the closest route option to this area, located approximately 170m west of flood risk area.	3
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	2 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 4 regionally important; • 5 Locally Important; and • 1 poor. Approximately 56% (7.1km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 1no. isolated pockets of Alluvium is intersected by the route in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, Mudstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 0.45km north of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	3
Air Quality (existing air quality environment and number of sensitive receptors).	2 sensitive receptors within 50m of route.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptors impacted will likely experience an increase in pollutant concentrations as a result of the proposed route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options.	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) = 134 77 properties, excluding agriculture, are within 300m of the new roads (turquoise). Two of these properties are within 50m and 11 properties are within 50-100m.	Diverts west at New Ross bypass through rural areas with no alignment along the existing route. Expected noise climate to be quiet rural and introduction of a busy 100km/h road would significantly change the noise environment. More properties to be mitigated compared to purple route (A) with potentially unfavourable topography at property clusters.	2

Environmental Criteria	**Preliminary Assessment of Option :** *Turquoise - Route P* - 12.7km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Mostly avoids lower slopes and wooded vegetation of narrow stream valleys north and west of Glenmore (travels close to the edge of this intimate valley system). However, will affect some woodland near Mullennahone. Will lead to significant adverse effects on hill at Ardbeg, cutting close to the hills summit, which forms a prominent backdrop in views especially from land to the south of Ardbeg. Immediately east of Ardbeg this route travels close to a prominent ridge of high ground at Ballinclare. From south of Ardbeg towards Nicholastown the route travels across the steep side slopes of a locally prominent ridge of higher ground. The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Significant adverse effects on side slopes of ridge of high ground from Ardbeg to Nicholstown. South of Nicholastown the route will travel on lower lands including much vegetation so would be less visible.	2
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	The route crosses 4 high voltage overhead powerlines.	The route crosses a number of secondary and minor roads. This route does not cross the existing N25. No active quarries or pits have been identified in proximity to the study area. This corridor impacts four high voltage power lines and potentially impacts local telecom, water and possibly broadband utilities. There will be a requirement to provide services along the proposed route with connections to the existing networks which could extend a distance given the location of the proposed corridor.	4
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 27 ha, impact on approximately 45 holdings 8 dairy farms, and in close proximity to 2 farmyards.	Good quality agricultural land, majority of the route impacting on grassland, and some tillage to the northern end of the route. The route is offline and will result in severance to land holdings.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Turquoise Route P crosses 18 townland boundaries which may be of archaeological significance. This route has a potential impact on the setting of 2 cultural heritage sites, ringforts KK040-014---- and KK040-033---- at Haggard and Ardbeg respectively.	This option is the furthest west and the longest route under consideration. In Haggard townland the route passes between a ringfort (SMR KK040-014-) 50m to the east and the former site of a castle (SMR KK040-056) 110m to the west. Passing over two local access roads the Turquoise option continues arcing through farmland in Ballinlammy, Ardbeg and Grogan avoiding a settlement cluster. Through this section the only monument is a rath in Ardbeg (SMR KK040-033-) 85m to east of the route. From Grogan the route passes through Ballincrea and Nicholastown bypassing the rath (SMR KK043-010--) 60m to the east. From this point Route P continues south though Nicholastown, Tinvaucoosh before meeting the N25 at Ballynamona.	5
Human Health	Property counts within 300m of the Route include: Residential: 57 Commerical (residential): 3 Commerical: 1 Agriculture: 8 Agriculture (Residential): 13 Private Storage: 0 Unknown: 3 Total: 85	Route avoids the main centres of population.	2

Environmental Criteria	**Preliminary Assessment of Option :** *Lime Green - Route Q* - 8.9km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	There are 26 dwellings within 100 metres of the proposed route.	The proposed route is partially located within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. There are 26 dwellings within 100 m of the proposed route, and on this basis, objections are likely on the grounds of noise impact, air quality, and construction impacts etc. In comparison to the alternative options put forward at this stage, this proposed route is considered to be slightly positive from a planning perspective.	5
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts on the following; • 5 High Local Environmentally Sensitive Areas (ESA) • 2 Watercourses	This route is considered one of the shorter options and is approximately 0 - 0.5km east of the original alignment. No direct impact to SACs, Special Protection Areas (SPAs), Natural Heritage Areas (NHAs) or Proposed Natural Heritage Areas (pNHAs) predicted. No direct impact on ESA County level. Significant impacts to 4 sites of high local importance (i.e. ESA-8, 13, 17 & 19); with minor impacts predicted at a fifth site, ESA-16. Barrow - Nore: 1 crossings; Suir: 1 crossings.	4
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 1 un-named watercourse, 1 named (Luffany) and 2 catchments. 2 Wells identified within 300m of Route option.	The Route crosses two river catchments i.e. the Suir and Nore, and crosses one un-named stream (within the Nore catchment) which eventually flows to the River Barrow and one named stream, Luffany (within the Suir catchment) which eventually flows to the River Suir. The River Barrow is part of the River Barrow and River Nore SAC and the River Suir is part of the Lower River Suir SAC. A small localised point within the study area has been identified to be at potential risk of flooding. The flood risk is identified at Slieverue, near Rathpatrick, to the south west of the Luffany roundabout.	4
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	2 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 0 regionally important; • 3 Locally Important; and • 1 poor. Approximately 93% (8.3km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 2no. isolated pockets of Alluvium are intersected by the route. 1no. in the central region and 1no. in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.8km north west of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	2
Air Quality (existing air quality environment and number of sensitive receptors).	3 sensitive receptors within 50m of route.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptors impacted will likely experience an increase in pollutant concentrations as a result of the proposed route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) = 316 161 properties, excluding agriculture, are within 300m of the new roads (lime green). Three of these properties are within 50m and 25 properties are within 50-100m.	Along existing route from New Ross bypass to Kilmakevoge, then diverts east. Close to a cluster of properties at Kilmakevoge and along existing route from New Ross bypass to Kilmakevoge, then diverts east. Close to a cluster of properties at Kilmakevoge and Ballyrahan (side facades), Scartnamo (rear facades). Intersects existing route at Ballyrowragh and heads west close to rear of properties along existing route at Curraghmore but further distance to pink/orange/cyan dashed routes. Rural noise environment with a higher PIR than dark blue dashed route (PR3). Mitigation near existing route at intersection and Curraghmore would be more beneficial to the current noise environment than the red and orange (K) routes in their rural local environments.	3

Environmental Criteria	Preliminary Assessment of Option : *Lime Green - Route Q - 8.9km*		Score
	Quantitative Assessment	**Qualitative Assessment**	
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Follows existing N25 alignment to south of Glenmore. Thus, avoiding effects on Glenmore and narrow stream valleys. From south of Glenmore, will cut though some of the highest contours of a ridge of high ground between Ballynamona and Aylwardstown and south to Gaulstown. Significant adverse effects on this ridge of high ground. Descends into local stream valley at Ballyrahan including an ecological sensitive area of land cover. Significant adverse effects on local stream valley at Ballyrahan. Crosses over existing N25 towards Carriganurra. At Carriganurra the route goes through a local rock outcrop (with cross on top) which is a prominent local landmark. Significant adverse effects on this feature.	1
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	The Route crosses 2 high voltage overhead powerlines.	The route crosses a number of secondary and minor roads. This route crosses the existing N25. The N25 is recorded as the only public transport route through the study area, serviced by the Bus Eireann Route 370. No active quarries or pits have been identified in proximity to the study area. This corridor impacts two high voltage power lines and potentially impacts local telecom, water and possibly broadband utilities. There will be a requirement to provide services along the proposed route with connections to the existing networks which could extend a distance given the location of the proposed corridor.	3
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 19ha, impact on approximately 20 holdings 4 dairy farms, no equine.	Good quality agricultural land, majority of the route impacting on grassland, some tillage and some forestry in the southern end of the route. The majority of the route is offline and will result in severance to land holdings. However the Route is online in the Northern section and the online section will not cause severance to land holdings.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Lime Green Route Q could directly impact 1 cultural heritage site (the corn mill at Graiguenakill). The route also crosses 10 townland boundaries which may be of archaeological significance. This route has a potential moderate to significant impact on the setting of 2 cultural heritage sites, namely the Holy Year cross mounted on the rock outcrop at Carriganurra, and a ringfort KK044-003 at Ballyrahan.	This option is one of the shortest of the routes for consideration. The route follows the existing road to a point south west of Glenmore where it diverts into farmland south of a fulacht fia (SMR KK041-021--) in Kilmakevoge. Sweeping in a long bend the route travels south through Aylwardstown and Ballyhoebuck bypassing two raths (SMR 044-01) 335m to the west and (SMR KK044-002) 53m to the east. Continuing south this option avoids a rath (SMR KK044-003) 130m to the west and a complex of three monuments in Ballyrahan including an earthwork and two fulachtaí fia (SMR's KK044-004-, KK044-005001-& KK044-005002). It then crosses the existing N25 150m east of O'Donovan's Mill (RPS 0845) and runs to the rear of Carriganurra rock outcrop. From here the route passes through Luffany traversing fields edged with tree lines 60m to the west of a Kiln (SMR KK043-021).	4
Human Health	Property counts within 300m of the Route include: Residential: 126 Commerical (residential): 5 Commerical: 9 Agriculture: 6 Agriculture (Residential): 14 Private Storage: 3 Unknown: 4 Total: 167	Route avoids the main centres of population.	3

Environmental Criteria	**Preliminary Assessment of Option :** *Cyan Dashed (Navy Stage 2)* - 9.4km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	The route is within 100m of 5 no. monuments included in the RMP. Within 100m of 13 dwellings.	The proposed route is partially located within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. The proposed route is within 100m of 5 no. monuments included in the Record of Monuments and Places(ref: KK041-021, KK041-025, KK041-055, KK043-013 and KK043-021). The Planning Authority have strong policies in place to protect such sites as outlined in Objective 8I of the Plan, however, please refer to Heritage Section for specific information regarding monuments. There are 13 dwellings within 100 metres of the subject site, and on this basis, objections are likely on the grounds of noise impact, air quality, and construction impacts etc. In comparison to the alternative options put forward at this stage, this proposed route is considered to be neutral.	4
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts the following; • 4 High Local Environmentally Sensitive Areas (ESA) • 3 Low Local ESA • 1 Watercourse	This route is considered one of the shorter options and is approximately 0 - 1.0km west of the original alignment. No direct impact to Special Protection Areas (SPAs), Natural Heritage Areas (NHAs) or Proposed Natural Heritage Areas (pNHAs) predicted. Significant Impacts to 3 sites of high local importance (i.e. ESA-8, 11, & 17); with minor impacts predicted at a fourth site, ESA-19. Significant impacts predicted to 4 sites of low local value; to ESA-10, 12 & 15. Barrow - Nore: 1 crossings; Suir: 0 crossings.	4
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 1 un-named watercourse and 2 catchments. 3 Wells identified within 300m of Route option.	The route crosses two river catchments i.e. the Suir and Nore, and crosses one un-named stream (within the Nore catchment) which eventually flows to the River Barrow. The River Barrow is part of the River Barrow and River Nore SAC. A small localised point within the study area has been identified to be at potential risk of flooding. The flood risk is identified at Slieverue, near Rathpatrick, to the south west of the Luffany roundabout.	5
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	3 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 0 regionally important; • 3 Locally Important; and • 1 poor. Approximately 95% (9.0km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. A long Alluvium vein is intersected by the route in the Glenmore region along with 1no. pocket in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.8km north west of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	2
Air Quality (existing air quality environment and number of sensitive receptors).	4 sensitive receptors within 50m of route.	A review of Environmental Protection Areas (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptors impacted will likely experience an increase in pollutant concentrations as a result of the proposed route 2 (previous).	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) = 277 149 properties, excluding agriculture, are within 300m of the new roads (cyan dashed). Four of these properties are within 50m and 13 properties are within 50-100m.	Along existing route from New Ross bypass to Kilmakevoge then diverts west, following a similar line to the dark blue route (G). Passes further away from properties than the blue (D) and brown (F) routes between Ballinclare and Davidstown. Between Davidstown and Carrianurra cyan dashed route (PR2) route moves further from properties than the dark blue route (G). Rural noise climate expected with potential influence from the existing road in northern sections. Opportunity to mitigate at rear of properties at Ballynaraha, which will benefit from a noise reduction at the front facades from expected reduced traffic from the existing road. Mitigation also possible at Grogan and at similar areas to pink dashed route (PR4) and orange dashed route (PR6) routes between Davidstown and Luffany.	3
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Follows the existing N25 alignment to south of Glenmore. Thus, avoiding effects on Glenmore and narrow stream valleys. From Ballinclare to south of Davidstown the route continues generally parallel to the existing N25 corridor and travels along the lower side slopes of a ridge of high ground, avoiding the higher contours. Travels on higher contours of the ridge of higher ground from Davidstown to Carriganurra. Significant impacts on this ridge of high ground and area of sensitive vegetation and potential adverse effects on setting of local monuments.	2

Environmental Criteria	**Preliminary Assessment of Option :** *Cyan Dashed (Navy Stage 2) -* 9.4km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	The route crosses 2 high voltage powerlines.	The route crosses a number of secondary and minor roads. This route crosses the existing N25. The N25 is recorded as the only public transport route through the study area, serviced by the Bus Eireann Route 370. No active quarries or pits have been identified in proximity to the study area. This corridor impacts two high voltage power lines and potentially impacts local telecom, water and possibly broadband utilities. There will be a requirement to provide services along the proposed route with connections to the existing networks given the location of the proposed corridor.	3
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 20 ha, impact on approximately 31 holdings 4 dairy farms.	Good quality agricultural land, majority of the route impacting on grassland, small amount of tillage land dispersed through the route. The majority of the route is offline and will result in severance to land holdings, small online section at northern end, there will not be any severance to land holdings along the online section.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Cyan Dashed Route 2 could directly impact 4 known or potential archaeological, architectural, or cultural heritage sites or features. The route also crosses 12 townland boundaries which may be of archaeological significance. The route will have a moderate impact on the setting of a series of ringforts in Davidstown/Carriganurra (KK043-013 and KK043-014).	This option measures 9.4km. The route follows the existing road to a point south west of Glenmore where it diverts into farmland bypassing the zone of notification for a fulacht fia in Kilmakevoge (KK041-021), a standing stone in Robinstown KK041-055 and a further fulacht fia (SMRKK041-025) in Ballinclare. Continuing southwards into Grogan and Davidstown the route runs between the last two raths in a group of three (SMR's KK043-012--, KK043-013-- & KK043-014). From this point the route continues through Treanaree and Luffany 45m from a kiln site (SMR KK043-021) and terminating at the existing N25 junction at Rathpatrick.Culural heritage sites that may be directly impacted by this route include a corn mill at Graiguenakill, and curvilinear boundaries and an area of high archaeological potential associated with the series of raths/ringforts at Davidstown/Carriganurra.	2
Human Health	Property counts within 300m of the Route include: Residential: 98 Commerical (residential): 10 Commerical: 14 Agriculture: 5 Agriculture (Residential): 18 Private Storage: 3 Unknown: 6 Total: 154	Route avoids the main centres of population.	3

Environmental Criteria	Preliminary Assessment of Option : *Dark Blue Dashed (Teal Stage 2)* - 8.7km		Score
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	The route traverses a monument included on the Record of Monuments and Places. There are 9 dwellings within 100 metres of the proposed route. The route traverses both a Special Area of Conservation (SAC) and proposed Natural Heritage Area (pNHA). The route crosses the disused rail line (south-east Greenway).	The proposed route is not located within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. The proposed route appears to traverse a monument included on the Record of Monuments and Places (ref: KK044-023). The Planning Authority have strong policies in place to protect such sites as outlined in Objective 8I of the Plan, however please refer to Heritage Section for specific details relating to heritage impacts. There are 9 dwellings located within 100 metres of the proposed route, and on this basis, objections are likely on the grounds of noise impact, air quality, and construction impacts etc. It is noted that this route traverses the disused rail line (south-east Greenway) and therefore consultation with impacted councils is likely to be required. Furthermore, the route also traverses both the Barrow River Estuary proposed Natural Heritage Area and the River Barrow and River Nore SAC. The County Development Plan seeks their protection under Objective 8B and 8C of the Plan.	3
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	• 1 pNHA Negatively impacts on the following; • 2 High Local Environmentally Sensitive Areas (ESA) • 2 Low Local ESA • 3 Watercourses	This route is considered one of the shorter options and is approximately 0.5 - 2.0km east of the original alignment. Crosses the SAC where it rejoins the existing alignment of the N25. No direct impacts to Special Protection Areas (SPAs), Natual Heritage Area (NHA) predicted. No direct impact to pNHAs predicted. Northern terminus of the route approaches close to the River Barrow Estuary pNHA at the N25 tie-in; indirect impact possible, but likely to be minor. Significant impacts to 2 sites of high local importance (i.e. ESA-3, & 16). Significant impacts predicted to 3 sites of low local value; to ESA-20 & 21. Barrow - Nore: 2 cossings; Suir: 1 crossing.	2
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 2 un-named watercourses, 1 named (Luffany) and 2 catchments. 5 Wells identified within 300m of Route option.	The route crosses two river catchments i.e. the Suir and Nore, and crosses two un-named stream (within the Nore catchment) which eventually flows to the River Barrow and one named stream, Luffany (within the Suir catchment) which eventually flows to the River Suir. The River Barrow is part of the River Barrow and River Nore SAC and the River Suir is part of the Lower River Suir SAC. A small localised point within the study area has been identified to be at potential risk of flooding. The flood risk is identified at Slieverue, near Rathpatrick, to the south west of the Luffany roundabout.	4
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	5 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 0 regionally important; • 3 Locally Important; and • 1 poor. Approximately 71% (6.7km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 4no. isolated pockets of Alluvium are intersected by the route. 1no. in the southern region, 2no. in the central region and 1no. in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.8km north west of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	3
Air Quality (existing air quality environment and number of sensitive receptors).	No sensitive receptors within 50m of route.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. As no receptors are impacted by this route option it is considered positive in terms of air quality.	7
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Grrenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options.	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) = 103 63 properties, excluding agriculture, are within 300m of the new roads (dark blue dashed). None of these properties are within 50m and 9 properties are within 50-100m.	Along existing route from New Ross bypass to Graiguenakill then diverts east, closer to existing route than orange (K) and red (I) routes. Expected noise climate to be quiet rural area but route is a reasonable distance from many clusters of properties (second lowest PIR) until it follows similar line to red route (I) at Curraghmore to Luffany. Mitigation may be possible due to topography at the 10 properties within 100m.	3

Environmental Criteria	**Preliminary Assessment of Option :** *Dark Blue Dashed (Teal Stage 2)* - 8.7km		**Score**
	Quantitative Assessment	**Qualitative Assessment**	
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Travels up steep hillside and over stream valley from Craiguenakil to Carrickcloney. Significant adverse effects on landscape character of this sloping land which connects with the River Barrow valley. Potential adverse visual effects from dwellings at Carrickcloney. Will cut though some of the highest contours of a ridge of high ground at Aylwardstown and south to Rathinure: a principal ridgeline (Kilkenny Landscape Character Assessment). Significant adverse effects on this ridge of high ground. Travels through local valley between Rathinure and Redgap, which is visually connected with the River Barrow valley corridor and views from along this corridor. Thus, potential significant adverse visual effects on views through this valley and on landscape character of the wider river Barrow valley. Potential for adverse visual effects to dwellings at Rathinure. From Ballyrownagh to Slieveroe roundabout follows a local stream valley parallel to the existing N25. Following this lower ground will help reduce potential visual effects however it will affect the setting of this stream valley and associated wetland vegetation.	1
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	The route crosses 2 high voltage overhead powerlines.	The route crosses a number of secondary and minor roads. This route crosses the existing N25. The N25 is recorded as the only public transport route through the study area, serviced by the Bus Eireann Route 370. No active quarries or pits have been identified in proximity to the study area. This corridor impacts two high voltage power lines and potentially impacts local telecom, transmission gas main, water and possibly broadband utilities. There will be a requirement to provide services along the proposed route with connections to the existing networks which could extend a distance given the location of the proposed corridor.	3
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 19 ha, impact on approximately 25 holdings 3 dairy farms.	Good quality agricultural land, majority of the route impacting on grassland, small amount of tillage land dispersed through the route. The majority of the route is offline and will result in severance to land holdings, small online section at northern end, there will not be any severance to land holdings along the online section.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Dark Blue Dashed Route 3 could directly impact 5 known or potential archaeological, architectural, or cultural heritage sites or features. The route also crosses 9 townland boundaries which may be of archaeological significance.	This option is the shortest of the routes for consideration. It directly impacts on the site of a corn mill at Graiguenakill. It passes 200m east of a rath in Carrickcloney (SMR KK041-030--). Veering to the south west the route traverses the western part of Aylwardstown House demesne impacting on an area of archaeological potential, highlighted in the course of geophysical survey of lands within the demesne, identified locally as 'Cromwell's Field'. Proceeding from this point the route passes to the west of a settlement cluster in Rathinure and east of a complex of monuments associated with Kilcolumb Church and Graveyard (SMR's KK044-007001& KK044-007002-) including a bullaun stone (SMR KK044-007003), Holy well (SMR KK044-008-) and nearby ringfort (SMR KK044-009). The route passes over the embanked Waterford - New Ross railway line. At Luffany it crosses the N25, directly impacting on the site of a clachan and passing the excavated fulacht fia (SMR KK044-023----). It terminates at the existing N25 junction at Rathpatrick.	2
Human Health	Property counts within 300m of the Route include: Residential: 36 Commerical (residential): 1 Commerical: 1 Agriculture: 3 Agriculture (Residential): 21 Private Storage: 0 Unknown: 4 Total: 66	Route avoids the main centres of population. As with the orange (K), cyan (J) and red (I) routes, this route intersects the proposed Kilkenny Greenway at two locations.	3

Environmental Criteria	Preliminary Assessment of Option : *Pink Dashed* - 9.2km		Score
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	The route traverses the zone of notification for 1 no. Monument included in the Record of Monuments and Places. The route traverses the River Barrow and River Nore Special Area of Conservation (SAC). There are 13 dwellings within 100 metres of the proposed route.	The proposed route is largely located within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. The proposed route is located within 100m of 8 no. monuments included in the Record of Monuments and Places(ref: KK041-021, KK041-023,KK041-024, KK041-055, KK043-013, KK043-014, KK043-021, KK044-001). Please refer to Heritage section for specific information in relation to heritage impacts. Furthermore, the route also traverses the River Barrow and River Nore SAC. The County Development Plan seeks their protection under Objective 8B and 8C of the Plan. In addition, the subject route is within 100 metres of 13 dwellings, and on this basis, objections are likely on the grounds of noise impact, air quality, and construction impacts etc.	4
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts on the following; • 2 High Local Environmentally Sensitive Areas (ESA) • 2 Low Local ESA's • 3 Watercourses	This route is considered one of the shorter options and is approximately 0.5km east and west of the original alignment. Runs through & along a section of SAC near Glenmore but no direct impact to Special Protection Areas (SPAs), Natual Heritage Area (NHA) or Proposed Natual Heritage Area (pNHAs) are predicted. Significant Impacts to 2 sites of high local importance (i.e. ESA-8, & 17); while minor impacts could occur at ESA-19, it is likely that these can be avoided at detailed design. Significant impacts predicted to 4 sites of low local value; to ESA-9, 12 & 15. Barrow - Nore: 1 crossings; Suir: 1 crossings.	4
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 1 un-named watercourse, 1 named (Luffany) and 2 catchments. 4 Wells identified within 300m of Route option.	The route crosses two river catchments i.e. the Suir and Nore, and crosses one un-named stream (within the Nore catchment) which eventually flows to the River Barrow and one named stream, Luffany (within the Suir catchment) which eventually flows to the River Suir. The River Barrow is part of the River Barrow and River Nore SAC and the River Suir is part of the Lower River Suir SAC. A small localised point within the study area has been identified to be at potential risk of flooding. The flood risk is identified at Slieverue, near Rathpatrick, to the south west of the Luffany roundabout.	4
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	4 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 0 regionally important; • 3 Locally Important; and • 1 poor. Approximately 100% (9.2km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 3 isolated pockets of Alluvium are intersected by the route. 2no. in the central region and 1no. in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 1.8km north west of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	2
Air Quality (existing air quality environment and number of sensitive receptors).	4 sensitive receptors within 50m of route.	A review of EPA monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptors impacted will likely experience an increase in pollutant concentrations as a result of the proposed route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Grrenhouse Gas (GHG) emissions. Longer journies will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options.	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) = 266 139 properties, excluding agriculture, are within 300m of the new roads (pink dashed). Four of these properties are within 50m and 12 properties are within 50-100m.	Along existing route from New Ross bypass to Kilmakevoge then diverts east until Ballyrahan where it intersects existing route and moves west. Passes through rural noise climates but at a further distance to properties than lime green route (Q) route e.g. at Gaulstown. Existing noise environment rural in nature with opportunity to provide mitigation at rear of properties near Luffany, where the orange dashed route (PR6) route and cyan dashed route (PR2) route also merge.	3
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Follows the existing N25 alignment to south of Glenmore. Thus, avoiding effects on Glenmore and narrow stream valleys. From south of Glenmore, will cut towards the edge of a ridge of high ground between Ballynamona and Aylwardstown and south to Gaulstown. Avoids highest contours of this ridge. Significant adverse effects on this ridge of high ground. From Ballyrahan travels towards Davidstown. Travels on higher contours of ridge of higher ground from Davidstown to Carriganurra. Significant impacts on this ridge of high ground and area of sensitive vegetation and potential adverse effects on setting of local monuments.	2

Environmental Criteria	Preliminary Assessment of Option : *Pink Dashed* - 9.2km		Score
	Quantitative Assessment	**Qualitative Assessment**	
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	The route crosses 2 high voltage powerlines.	The route crosses a number of secondary and minor roads. This route crosses the existing N25. The N25 is recorded as the only public transport route through the study area, serviced by the Bus Eireann Route 370. No active quarries or pits have been identified in proximity to the study area. This corridor impacts two high voltage power lines and potentially impacts local telecom, water and possibly broadband utilities. There will be a requirement to provide services along the proposed route with connections to the existing networks given the location of the proposed corridor.	3
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 20 ha, impact on approximately 28 holdings 2 dairy farms.	Good quality agricultural land, majority of the route impacting on grassland, small amount of tillage land dispersed through the route. The majority of the route is offline and will result in severance to land holdings, small online section at northern end, there will not be any severance to land holdings along the online section.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Pink Dashed Route 4 could directly impact 6 known or potential archaeological, architectural, or cultural heritage sites or features. The route also crosses 13 townland boundaries which may be of archaeological significance. This route has a potential significant impact on the setting of 3 cultural heritage sites.	The route is relatively short measuring 9.2km. At its northern end it impacts on the site of a corn mill at Graiguenakill. From there it follows the N25 passing 68m to the south of a fulacht fia in Kilmakevoge (SMR KK041-021-) and 80m from an extant standing stone at Robinstown (SMR KK041-055-) until it diverts east of the N25 into Ballynaraha. Here it passes between two fulachtaí fia (SMR's KK041-023 & KK041-024-) impacting on the edge of the zone of the notification for the eastern site. The route bypasses the rath (SMR KK044-001---) in Gaulstown. The route runs between the two raths in Davidstown/Carriganurra - part of a group of three (SMR's KK043-012--, KK043-013-- & KK043-014). At this location the route will impact on a number of unrecorded curvilinear boundaries and an area of high archaeological potential (identified in an earlier assessment) associated with this series of raths/ringforts. From this point the route continues through Treanaree and Luffany 45m from the kiln site (SMR KK043-021). The setting of three ringforts/raths (KK043-013, KK043-014 and KK044-001) will be moderately impacted by this route.	1
Human Health	Property counts within 300m of the Route include: Residential: 101 Commerical (residential): 6 Commerical: 11 Agriculture: 4 Agriculture (Residential): 12 Private Storage: 3 Unknown: 6 Total: 143	Route avoids the main centres of population.	3

Environmental Criteria	Preliminary Assessment of Option : *Orange Dashed - 12.1km*		Score
	Quantitative Assessment	**Qualitative Assessment**	
Human Beings including compatibility with development policy	There are 5 dwellings within 100m of the route	The proposed route is not located within the area designated to be kept from development for the provision of the realigned N25 as per Figure 11.1 of the County Development Plan 2014-2020. However, there is not a specific policy/objective outlined in the County Development Plan which states that routes will need to be within this defined corridor. The proposed route is within 100m of 2 no. monuments included in the Record of Monuments and Places (ref. KK040-033, KK043-021). The Planning Authority have strong policies in place to protect such sites as outlined in Objective 8I of the Plan, however please refer to Heritage Section for specific details relating to heritage impacts. There are 5 existing dwellings a located within 100 metres of the proposed route. In comparison to the alternative options put forward at this stage, this proposed route is considered to be somewhat neutral from a planning perspective.	4
Flora & Fauna (comparative impact on designated sites/species and other areas of national, regional or local ecological value).	Negatively impacts on; • 4 High Local Environmentally Sensitive Areas (ESA) • 2 Low Local ESA • 3 Watercourses	This route is considered one of the longer options and is approximately 0.5km to 2km west of the original alignment. No direct impact to Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Natual Heritage Area (NHA) or Proposed Natual Heritage Area (pNHAs) predicted. Minor overlap of the northern end of ESA-1 (Ballybraghy) with the study corridor. Significant impacts to 2 sites of high local importance (i.e. ESA-4, & 17); while minor impacts could occur at ESA-19. While minor impacts may also occur at ESA-5, it is likely that these can be avoided at detailed design. Significant impacts predicted to 3 sites of low local value; to ESA-6 & 15. Barrow - Nore: 3 crossings; Suir: 0 crossings	1
Water Quality (comparative impact on watercourses, water supplies and aquatic ecology)	Traversal of 2 un-named watercourses and 2 catchments. 3 Wells identified within 300m of Route option.	The route crosses two river catchments i.e. the Suir and Nore, and crosses two un-named streams (within the Nore catchment) which eventually flows to the River Barrow. The River Barrow is part of the River Barrow and River Nore Special Area of Conservation (SAC). A small localised point within the study area has been identified to be at potential risk of flooding. The flood risk is identified at Slieverue, near Rathpatrick, to the south west of the Luffany roundabout.	5
Geology & Hydrogeology (comparative impact on vulnerable rocks and soils, aquifers and wells of national, regional or local importance.	3 Wells/boreholes identified within 300m of route. Route crosses the following aquifers: • 0 regionally important; • 5 Locally Important; and • 1 poor. Approximately 82% (9.9km) of the route crosses Extreme/High Groundwater Vulnerability.	A number of datasets have been examined and the following features have not been identified in proximity to the study area: geological heritage sites; waste facilities; active quarries or pits; mines; major areas of peat; or karst features. 2no. isolated pockets of Alluvium are intersected by the route. 1no. in the central region and 1no. in the north which could give rise to potential soft ground requiring excavation. The general bedrock geology of the area is a slate, sandstone, greywacke conglomerate. Glenmore Source Protection Zone is located approximately 0.5km north of route. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.	2
Air Quality (existing air quality environment and number of sensitive receptors).	No sensitive receptors within 50m of route. 7 sensitive receptors within 50-100m.	A review of Environmental Protection Agency (EPA) monitoring data for similar Zone D locations suggests that there is a good level of air quality in the study area. A conservative background concentration of 5 ug/m^3 for NO_2 has been estimated with a background of 10 ug/m^3 estimated for PM_{10}. The existing national routes are considered the primary sources of air pollution in the area. The sensitive receptors impacted will likely experience an increase in pollutant concentrations as a result of the proposed route.	3
Climate	N/A	Longer routes will require greater amounts of material for construction and will have high Greenhouse Gas (GHG) emissions. Longer journeys will also produce higher GHG emissions. All routes are ranked 3 in terms of climate as there is no significant difference between route options	3
Noise (identification of sensitive receptors, characteristics of the prevailing noise climate and opportunities for noise mitigation).	Potential Impact Rating (PIR) = 138 84 properties, excluding agriculture, are within 300m of the new roads (orange dashed). 7 receptors properties are within 50-100m.	Diverts west at New Ross bypass through rural areas with no alignment along the existing route. Similar to the purple route (A) it is expected that the noise climate will be a quiet rural area and the introduction of a busy 100km/h road would significantly change the noise environment. More properties to be mitigated compared to purple route (A) but the number of properties is comparable to dark blue dashed route (PR3).	3
Landscape & Visual (comparative impact on landscape character, topography, vegetation, natural features, views and obstructions)	N/A	Mostly avoids lower slopes and wooded vegetation of narrow stream valleys north and west of Glenmore (travels close to the edge of this intimate valley system). However, will affect some woodland near Mullennahone. Will lead to significant adverse effects on hill at Ardbeg, cutting close to the hills summit, which forms a prominent backdrop in views especially from land to the south of Ardbeg. From south of Ardbeg towards Carriganurra the route travels across the steep side slopes and higher contours of a locally prominent ridge of higher ground noted as a principal ridgeline (Kilkenny Landscape Character Assessment). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Significant adverse effects on side slopes and ridge of high ground from Ardbeg to Carriganurra.	1

Environmental Criteria	Preliminary Assessment of Option : *Orange Dashed - 12.1km*		Score
	Quantitative Assessment	**Qualitative Assessment**	
Material Assets (comparative impact on utilities, properties, quarries, transport and infrastructure, etc.).	The route crosses 2 high voltage powerlines.	The route crosses a number of secondary and minor roads. This route does not cross the existing N25. No active quarries or pits have been identified in proximity to the study area. This corridor impacts two high voltage power lines and potentially impacts local telecom, water and possibly broadband utilities. There will be a requirement to provide services along the proposed route with connections to the existing networks given the location of the proposed corridor.	4
Agriculture (comparative impact on farm operations, farm types, livestock and other agri-business).	Landtake of 26 ha, Impact on approximately 44 holdings 6 dairy farm and in close proximity to one farmyard.	Good quality agricultural land, majority of the route impacting on grassland, small amount of tillage land dispersed through the route. The majority of the route is offline and will result in severance to land holdings.	2
Archaeology & Cultural Heritage (comparative impact on Recorded Monuments and Places, areas of archaeological potential, Architectural Heritage, and any other areas of cultural significance as per TII Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes and TII Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes).	The Orange Dashed Route 6 could directly impact 2 cultural heritage sites or features (a ringfort – rath at Ardbeg and a cluster of buildings/possible settlement at Carriganurra). The route also crosses 18 townland boundaries which may be of archaeological significance. This route has a potentially significant impact on the setting of 5 cultural heritage sites.	This route is the second longest of the options under consideration. In Haggard townland the route passes between a mound 185m to the west (SMR KK040-034--) and a rath 390m to east (SMR KK040-022). From here it proceeds through Ballinlammy and impacts within the zone of notification for a rath in Ardbeg (SMR KK040-033--). Veering south east the route crosses a local access road into Grogan and runs 90m west of a rath (SMR KK043-005--). From Atateemore into Davidstown/Carriganurra the route bends to the south west bypassing a group of three raths (SMR's KK043-012--, KK043-013-- & KK043-014). It directly impacts on a cluster of buildings/a former settlement depicted on historic mapping in Carriganurra. From this point the route continues through Treanaree and Luffany, extending 45m east from the kiln site (SMR KK043-021) and terminates at the existing N25 junction at Rathpatrick. The setting of four ringforts (KK043-005, KK043-012, KK043-013, KK043-014) and a cairn (KK043-011001) will be moderately impacted by this route.	3
Human Health	Property counts within 300m of the Route include: Residential: 62 Commerical (residential): 5 Commerical: 2 Agriculture: 4 Agriculture (Residential): 9 Private Storage: 0 Unknown: 6 Total: 88	Route avoids the main centres of population.	3

	Purple - 11.5km	Grey - 10.4km	Blue - 10.1km	Brown - 10.0km	Dark Blue - 9.7km	Magenta - 9.4km	Red - 8.9km	Cyan - 9.6km	Orange - 9.3km	Turquoise - 12.7km	Lime Green - 8.9km	Cyan Dashed (Navy) - 9.4km	Dark Blue Dashed (Teal) - 8.7km	Pink Dashed - 9.2km	Orange Dashed - 12.1km
Human Beings including compatibility with development policy	2	1	6	1	6	4	1	2	2	2	5	4	3	4	4
Flora & Fauna	3	4	4	4	4	4	2	4	2	1	4	4	2	4	1
Water Quality	5	6	5	5	5	4	4	4	3	3	4	5	4	4	5
Geology & Hydrogeology	3	2	2	2	2	2	3	2	2	3	2	2	3	2	2
Air Quality	7	3	3	3	3	3	3	3	3	3	3	3	7	3	3
Climate	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Noise	3	3	2	2	3	3	2	2	2	2	3	3	3	3	3
Landscape & Visual	1	1	1	1	3	3	1	1	1	2	1	2	1	2	1
Material Assets	4	4	4	4	3	3	3	3	3	4	3	3	3	3	4
Agriculture	1	2	2	2	2	3	2	2	2	2	2	2	2	2	2
Archaeology & Cultural Heritage	4	4	2	3	3	3	3	3	2	5	4	2	2	1	3
Human Health	3	3	2	2	2	3	2	2	2	2	3	3	3	3	3
Total	**39**	**36**	**36**	**32**	**39**	**38**	**29**	**31**	**27**	**32**	**37**	**36**	**36**	**34**	**34**

Appendix 2.3

Noise

Appendix 2.3 Noise Methodology and Assessment

A.1. Potential Impact Rating Based on Property Counts

The following steps have been followed to assess the Potential Impact Rating (PIR) of each of the route corridors under consideration. Property counts have been conducted within four bands either side of the centreline of each route corridor, i.e. 0 to 50m, 50 to 100m, 100 to 200m and 200 to 300m. Using this information, the Potential Impact Ratings (PIR) for each of the six route corridor options has been established. This study includes all existing residential properties and other noise sensitive buildings adjacent to each route corridor excluding commercial properties. The number of properties in four bands either side of centreline of each of the route corridor have been counted. A weighting value for each distance band has been applied with a weighting factor of 4 for the closest distance band (0 to 50m) down to 1 for the furthest distance band (200 to 300m). The number of receptors in each band is multiplied by the appropriate rating factor and the total in each of the four band is summed to derive the PIR score for the route. The route option with the lowest PIR has the lowest nominal potential noise impact. This process is summarised in Table A.2.3.1. below.

Table A.2.3.1 Summary of the PIR Methodology

Distance Band	Number of Properties in Band (P)	PIR Weighting Factor (W)	Score (PxW)
0-50m	A	4	Ax4
50-100m	B	3	Bx3
100-200m	C	2	Cx2
200-300m	D	1	Dx1
		PIR Score	(Ax4)+(Bx3)+(Cx2)+(Dx1)

A.2. Likely Need for Noise Mitigation Measures

The operational noise footprint for a given route alignment is dependent on a range of factors including traffic volumes, traffic speed, road surface type and the vertical alignment, where available. For the Stage 2 assessment, traffic flows in Annual Average Daily Traffic (AADT) flows, percentage HGV's and horizontal and vertical alignments have been provided by the design team (Table A.2.3.2).

To analyse the potential noise impacts associated with the six route corridor options, the number of properties likely to require noise mitigation (i.e. the potential number of properties likely to be exposed to traffic noise levels at or above 60dB L_{den} along each route corridor) was determined using the following methodology:

- The potential traffic noise levels associated with each option has been established considering the vertical and horizontal alignments in addition to Annual Average Daily Traffic flows (AADT) and percentage HGV for the design year; and
- Each route corridor alignment (road centre lines and cut and fill lines) was overlaid into 3D a model of the existing topography;
- Traffic flows for each option were obtained from the AADT information provided by the traffic consultants for the year 2045 i.e. Design Year. These values are presented in Table A.2.3.2;

- A standard hot rolled asphalt road surface was used for all options;
- Using guidance from the TII 2014, noise levels at properties at least within 600m of the road alignment were established using predictive noise modelling; and
- Noise levels were calculated at the same assessment locations for the Do Minimum scenario for the year 2045. This was undertaken to calculate changes in traffic noise at properties along sections of on-line route corridors (i.e. along the existing N25), and to determine the requirement, if any, for noise mitigation based on the three conditions noted overleaf.

Table A.2.3.2 **Traffic Flow Data for Design Year**

Route	Route Options (Design Year 2045)				
	Map No.[Note 1]	AADT for Route Option	% HGV	Residual AADT on Existing N25	% HGV
Option A: Purple	1	n/a	n/a	8064	24.8%
	2	n/a	n/a	7918	25.0%
	3	n/a	n/a	7933	24.9%
	4	n/a	n/a	7836	25.2%
	5	n/a	n/a	8696	22.9%
	6	n/a	n/a	8754	22.7%
	7	n/a	n/a	8933	22.2%
	8	n/a	n/a	8915	22.2%
	9	n/a	n/a	9292	21.3%
	10	n/a	n/a	9448	20.9%
	11	7030	0.5%	n/a	n/a
Option B: Navy	1	15095	13.4%	n/a	n/a
	2	15095	13.4%	n/a	n/a
	3	15095	13.4%	n/a	n/a
	4	14575	13.6%	n/a	n/a
	5	n/a	n/a	538	6.2%
	6	n/a	n/a	543	6.2%
	7	n/a	n/a	722	3.4%
	8	n/a	n/a	698	3.5%
	9	n/a	n/a	1000	2.6%
	10	n/a	n/a	1156	1.7%
	11	15322	13.0%	n/a	n/a
Option C: Magenta [Note 2]	1	15130	13.4%	n/a	n/a
	2	15130	13.4%	n/a	n/a
	3	15130	13.4%	n/a	n/a

Route	Route Options (Design Year 2045)				
	Map No.[Note 1]	AADT for Route Option	% HGV	Residual AADT on Existing N25	% HGV
	4	14757	13.6%	n/a	n/a
	5	16020	12.6%	n/a	n/a
	6	16020	12.6%	n/a	n/a
	7	16020	12.6%	n/a	n/a
	8	16815	12.1%	n/a	n/a
	9	16196	12.4%	n/a	n/a
	10	16479	12.2%	n/a	n/a
Option D: Red	1	n/a	n/a	342	7.1%
	2	n/a	n/a	338	7.2%
	3	n/a	n/a	350	6.9%
	4	n/a	n/a	339	7.2%
	5	n/a	n/a	1155	3.0%
	6	n/a	n/a	1288	2.7%
	7	n/a	n/a	1467	1.8%
	8	n/a	n/a	1446	1.8%
	9	n/a	n/a	1748	1.5%
	10	n/a	n/a	1904	1.1%
	11	14575	13.6%	n/a	n/a
Option E: Teal	1	n/a	n/a	341	7.0%
	2	n/a	n/a	338	7.1%
	3	n/a	n/a	350	6.9%
	4	n/a	n/a	338	7.1%
	5	n/a	n/a	1155	3.0%
	6	n/a	n/a	1287	2.7%
	7	n/a	n/a	1466	1.7%
	8	n/a	n/a	1446	1.8%
	9	n/a	n/a	1747	1.5%
	10	n/a	n/a	1904	1.1%
	11	14575	13.6%	n/a	n/a
Option F: Lime Green	1	15063	13.4%	n/a	n/a
	2	15063	13.4%	n/a	n/a

Route	Route Options (Design Year 2045)				
	Map No.[Note 1]	AADT for Route Option	% HGV	Residual AADT on Existing N25	% HGV
	3	15063	13.4%	n/a	n/a
	4	n/a	n/a	1127	2.2%
	5	n/a	n/a	464	7.3%
	6	n/a	n/a	469	7.2%
	7	n/a	n/a	648	3.8%
	8	n/a	n/a	579	4.3%
	9	n/a	n/a	880	2.9%
	10	n/a	n/a	1036	1.9%
	11	14575	13.6%	n/a	n/a
	12	15442	12.9%	n/a	n/a

*Note 1: Numbers refer to nodes utilised in transport model for each route.

*Note 2: Closely aligned with existing route.

A.2.1. Noise Mitigation Conditions

The potential noise impact from each route corridor on its surrounding environment had been assessed in line with the methodology set out in Section A.2 to determine the number of properties for which noise mitigation is likely to be required through the assessment of noise footprints for each route corridor. The following three conditions must be satisfied under the TII guidelines in order for noise mitigation to be provided:

- The combined expected maximum traffic noise level, i.e. the relevant noise level, from the proposed road development together with other traffic in the vicinity is greater than the design goal of 60dB L_{den}
- The relevant noise level is at least 1dB more than the expected traffic noise level without the proposed road development in place; and
- The contribution to the increase in the relevant noise level from the proposed road development is at least 1dB.

A.2.2. Noise Modelling

Proprietary noise calculation software was used for to predict the noise levels, the selected software, Brüel & Kjær Type 7810 Predictor. This software calculates traffic noise levels in accordance with Calculation of Road Traffic Noise (CRTN) and TII guidance. The CRTN method of predicting noise from a road scheme consists of the following five elements:

- Divide the road scheme into segments so that the variation of noise within this segment is small;
- Calculate the basic noise level at a reference distance of 10 metres from the nearside carriageway edge for each segment;
- Assess for each segment the noise level at the reception point considering distance attenuation and screening of the source line;
- Correct the noise level at the reception point to take account of site layout features, and the size of source segment; and

- Combine the contributions from all segments to give the predicted noise level at the receiver location for the whole road scheme.

A.2.3. Impact Score

The comparative evaluation of options was assisted by scoring of impacts to sensitive receptors using the Stage 2 project appraisal matrix similar to that shown in the Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis (TII PAG). An assessment has been undertaken on each option to include both quantitative and qualitative assessment. Each impact is scored based on the seven-point scale as shown in Table A.2.3.3 and a number assigned according to the level of significance of the impacts.

Consideration has also been given to the likely change in traffic noise levels along the existing N25 to assess the overall positive and negative impacts associated with each route corridor based on changes in traffic flows along the existing N25 road due to diverted traffic etc.

Table A2. Impact Scoring Key

Score	Significance Level
7	Major or Highly Positive
6	Moderately Positive
5	Minor or Slightly Positive
4	Neutral
3	Minor or slightly negative
2	Moderately negative
1	Major or Highly negative

The scores for the noise assessment will be used to determine a preferred route corridor(s) with the lowest potential noise impacts being preferred.

A.2.4. Option Selection

A.2.4.1. Assessment of Potential Impacts

A.2.4.1.1 Potential Impact Rating Based on Property Counts

An assessment of the potential noise impact based on the number of noise sensitive receptors within specified distance bands from each of the route corridors under consideration as per the methodology in Section A.1 is set out below. NSLs may include residential units, schools, hospitals, nursing homes; although at this stage of the assessment no further distinction is made between these different types of properties. During the specific impact assessment for the emerging preferred route, any variation in NSL type will be identified and considered as appropriate. However, any variation in type of NSL would not be expected to materially affect the noise impact assessment. Table A.2.3.4 presents the potential impact rating for each of the six route corridors and the existing N25.

Table A.2.3.4 Summary of the PIR for Route Corridor Options

Option	PIR 0-50m Band	PIR 50-100m Band	PIR 100-200m Band	PIR 200-300m Band	PIR Score Note 1
Option A: Purple	0	24	46	28	98
Option B: Navy	16	39	150	42	247
Option C: Magenta	104	93	132	31	360
Option D: Red	12	60	60	23	155
Option E: Teal	0	36	44	27	107
Option F: Lime Green	16	75	174	34	299
Existing Route	132	84	144	24	384

Note 1: PIR scores presented in Table above have been calculated using all existing residential properties and other noise sensitive buildings adjacent to each route corridor excluding commercial properties, e.g. 8 NSLs within 50-100m of purple route therefore PIR = 8 x 3 = 24

With the exception of the existing route, Option C: Magenta has the highest PIR score however, it is noted that a high proportion of the properties along this route are along the existing N25 alignment. An online route corridor with a large section running online will typically result in the highest PIR value due to the high number of existing properties located in proximity to the road edge.

A.2.4.1.2 Likely Need for Noise Mitigation

This assessment has considered the traffic noise levels for the Do Minimum scenario for sections of proposed route corridors that are online i.e. when the noise level is also above 60dB L_{den} but is not predicted to increase by more than 1dB as stated in the methodology. All routes with the exception of Purple route satisfied the three requirements for noise mitigation as previously outlined in Section A2.1. All route designs included earthworks are part of the model predictions.

Appendix 2.4

Landscape and Visual

2.4.1. Introduction

The Landscape and Visual Assessment has been prepared by Eamonn Byrne Landscape Architects (EBLA). Landscape impact may be defined as changes in the physical landscape, which may give rise to changes in its character and how it is experienced. Visual impact comprises the change in the composition of available views from dwellings and public areas resulting from the proposals.

2.4.2. Method of Assessment

Transport Infrastructure Ireland (TII) are currently developing a set of guidelines with regard to landscape and visual impact assessment. In the absence of final published guidelines, landscape and visual impact assessments were carried out based on methods described in the following publications:

- Landscape Institute and Institute of Environmental Management and Assessment (2013). *Guidelines for Landscape and Visual Impact Assessment,* 3rd Edition, Oxon: Routledge;
- Department for Transport (UK). *TAG (Transport Analysis Guidance) Unit A3, Environmental Impact Appraisal*;
- Highways England (2020). *LA107 Landscape and Visual Effects (formerly DMRB Volume 11 Section 3 Part 5 Landscape Effects and IAN 135/10)*, Revision 2;
- Environmental Protection Agency (EPA) (2017). *Draft Guidelines on the information to be contained in Environmental Impact Assessment Report*; and
- Transport Infrastructure Ireland (2016). *Project Appraisal Guidelines for National Roads Unit 7.0- Multi Criteria Analysis*.

2.4.2.1. Landscape Character and Impact Assessment Method

The assessment of the impact on landscape considers the effect of the proposals on attributes of landscape character as defined in Transport Analysis Guidance UK (TAG) landscape appraisal work sheets. These attributes are defined as:

- **Pattern** - the expression of the relationship between topography and form, elevation and degree of enclosure and scale;
- **Tranquillity** - the remoteness and sense of isolation, or lack of it, within the landscape;
- **Cultural** - how landscape elements of an historic or traditional nature contribute to character; and
- **Landcover** - how the way in which the land is farmed or managed contributes to character.

Completed worksheets for this assessment are presented in Section 2.4.6. For each of the above attributes, the value is described in the table in terms of the scale at which it matters, its rarity, importance and substitutability. The impact on the attribute is then summarised and any recommendations for mitigation set out.

The landscape character assessment used as the baseline of this impact assessment is taken from;

- The Landscape Character Assessment, Kilkenny County Development Plan 2014-2020. This county level assessment is used as the baseline to describe the character of the general study area.

The assessment of landscape impact is based on the division of character areas derived from the county landscape character assessment. The impact is assessed in terms of the effect on landscape attributes, taking into consideration the capacity of the landscape to accommodate the type of change generated by the proposals. The TAG significance of effect criteria for landscape impact is set out in Section 2.4.7.

2.4.2.2. Landscape Sensitivity

The baseline description of landscape character in this report concludes with an assessment of existing landscape sensitivity with the criteria given in Table 7.1.1 TII Landscape and Visual Baseline Sensitivity Rating Criteria, Transport Infrastructure Ireland, Project Appraisal Guidelines for National Roads Unit 7.0-Multi Criteria Analysis. Sensitivity includes an assessment of the landscape receptors susceptibility to change and value.

Table 2.4-1 - Criteria for Assessing Landscape Sensitivity

Category	Typical Description
Very High	A landscape or townscape protected by an international or national designation (Special Area Amenity Order (SAAO), candidate Special Area of Conservation (cSAC), proposed Natural Heritage Area (pNHA), etc.). A landscape widely acknowledged for its distinctive features and the quality and value of its elements and edge condition. A landscape with distinctive character and low capacity to accommodate change. Absence of negative elements, e.g. traffic, noise, dereliction, unmanaged areas, etc. Landscape types to include but not limited to: • Historical townscapes and urban set pieces; and • Nationally important open spaces and parkland.
High	A landscape or townscape widely acknowledged as containing elements of national importance. National designation may apply. A landscape containing features of ecological, historical, socio cultural or national importance. A landscape acknowledged for its quality and value having few negative elements. A landscape having the capacity to accommodate change to a certain degree. Landscape types to include but not limited to: • Historical city centre; • Urban centre open spaces and plazas; • Significant urban specimen trees and tree groups including those with tree preservation orders; • District or regional parks and historic landscape or parkland; and • Greenbelt areas as defined in the Local Development Plan.
Medium	A landscape or townscape that exhibits positive characters is locally important and whose character, land use, pattern and scale would have the capacity to accommodate change. A landscape or townscape feature with significant merit or character that creates a sense of place – walls, structures, fountains, entrances, boundaries, sculptures and landmarks. Landscape types to include but not limited to: • Residential landscapes with established garden planting; • Roadside Open Spaces including semi-private residential spaces and local parks/sports grounds; • Road corridors with substantial street tree planting; • Intact urban townscapes and core urban villages; and • Agricultural lands.
Low	A landscape or townscape where the elements are not valued and is therefore not sensitive to change and where change is unlikely to be detrimental. • Landscape types to include but not limited to: • Industrial landscapes; • Infrastructural landscapes including major transport corridors; • Degraded urban townscapes/ streetscapes; and • Unmaintained wastelands.

2.4.2.3. Significance Criteria

The effect of the proposals on the individual character area is considered in the context of local landscape sensitivity to derive an overall impact score for the proposals in accordance with the Transport Analysis Guidance (TAG) criteria; these are set out in Section 2.4.7. The eight-point scale used to judge is Slight, Moderate or Large Beneficial or Adverse, Very Large Adverse plus Neutral as set out in TAG.

2.4.2.4. Visual Impact Assessment Method

By desk top study of ordnance survey plans, topography mapping and aerial photography the visual impact of the routes for the following receptors (located within 500m from the centreline of each route) was estimated:

- Dwellings and community buildings (the assessment of views from buildings includes the immediate curtilage and garden, the assessment is indicative only).

For each receptor identified, the overall significance of effects is established by combining the separate judgements about sensitivity and magnitude of effects.

Sensitivity includes an assessment of the visual receptors susceptibility to change and the value attached to views.

Magnitude includes an evaluation of the visual impact identified in terms of size or scale and geographical extent of the area influenced.

The criteria for assessing sensitivity of visual effects are shown at Table 2.4-2 below.

The criteria for assessing the magnitude of impact are shown at Table 2.4-3 below.

The separate assessments of sensitivity and magnitude are then combined to determine the significance of effect on each receptor. The results of sensitivity and magnitude are compared against the matrix at Table 2.4-4 which in combination with professional judgement guides the assessment of overall significance. These levels of significance can either be beneficial or adverse and are described in Table 2.4-5.

Table 2.4-2 - Criteria for assessing sensitivity of visual receptors

Sensitivity (susceptibility and value)	Visual
Very High	3. Static views from and of major tourist attractions; 4. Views from and of very important national/ international landscapes, cultural/ historical sites (e.g. National Parks, UNESCO World Heritage sites); and 5. Receptors engaged in specific activities for enjoyment of dark skies.
High	1. Views by users of nationally important PRoW / recreational trails (e.g. national trails, long distance footpaths); 2. Views by users of public open spaces for enjoyment of the countryside (e.g. country parks); 3. Static views from dense residential areas, longer transient views from designated public open space, recreational areas; and 4. Views from and of rare designated landscapes of national importance.
Medium	5. Static views from less populated residential areas, schools and other institutional buildings and their outdoor areas; 6. Views by outdoor workers; 7. Transient views from local/regional areas such as public open space, scenic roads, railways or waterways, users of local/ regional designated tourist routes of moderate importance; and 8. Views from and of landscapes of regional importance.
Low	9. Views by users of main roads or passengers in public transport on main arterial routes; 10. Views by indoor workers; 11. Views by users of recreational/formal sports facilities where the landscape is secondary to enjoyment of the sport; and 12. Views by users of local public open spaces of limited importance with limited variety or distinctiveness.
Negligible	13. Quick transient views such as from fast moving vehicles; 14. Views from industrial area, land awaiting re-development; and

15. Views from landscapes of no importance with no variety or distinctiveness.

Table 2.4-3 - Magnitude of Impact Criteria.

Magnitude (change) of effect	Visual
Major	The project, or a part of it, would become the dominant feature or focal point of the view.
Moderate	The project, or a part of it, would form a noticeable feature or element of the view which is readily apparent to the receptor.
Minor	The project, or a part of it, would be perceptible but not alter the overall balance of features and elements that comprise the existing view.
Negligible	Only a very small part of the project work or activity would be discernible or being at such a distance it would form a barely noticeable feature or element of the view.
No Change	No part of the project work or activity would be discernible.

Table 2.4-4 - Significance of effect categories.

Visual Sensitivity (susceptibility and value)	Magnitude of impact (degree of change)				
	No change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Table 2.4-5 - Significance categories and typical descriptions.

Category	Typical Description
Very Large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

2.4.3. Baseline Study-Landscape and Visual

2.4.3.1. Summary of Landscape Character

The study area is within the Landscape Character Assessment, Kilkenny County Development Plan 2014-2020. This county and local level character assessment provides detail on the type of landscape that occurs within the study area. The study area is within four Landscape Character Areas (LCA); Landscape Character Area C:

The South Western Uplands, Landscape Character Area E: The South Eastern Uplands, Landscape Character Area G: South Kilkenny Lowlands and Landscape Character Area C2: South Hills Transitional Area. Refer to Landscape Constraints drawing, Section 2.4.8 for location of character areas.

Landscape Character Area C: The South Western Uplands

The key characteristics described and apparent in the study area are as follows:

- The terrain dramatically rises, steeply sloping from the Kilkenny basin and the south Kilkenny lowlands. The area encompasses an undulating landscape of several hills, with primary and secondary ridgelines;
- Elevated Vistas: Long distance views of the River Suir and River Barrow valleys are available from the local roads of this upland character area. This area is no exception to the wealth of archaeological items that are evident throughout the county;
- Steep Slopes: Steeply sloping land provides the area with its character and a potentially increased elevation intensifying its visual prominence over greater distances. Slope also provides an increased opportunity for development to penetrate primary and secondary ridgelines when viewed from lower areas of the public realm such as the roads and population centres in this area. The steep slopes at the boundaries of this unit provide landscape character to it;
- Prominent Ridge Lines: These occur as either primary ridgelines (visible only against the sky from any prospect) or secondary ridgelines (visible at least from some prospects below a distant primary ridge line). Ridge lines perform the important roles of providing an area with its identity, acting as dominant landscape focal points, and defining the extent of visual catchments. Therefore, the main concern for the natural linear features formed by the ridgelines of the South Western Uplands is to avoid penetration by development that will interrupt and reduce the integrity of such elements;
- Shelter Vegetation: Shelter vegetation, generally represented at certain areas in this unit by coniferous plantations and some deciduous woodland on slopes and hilltops; and
- Low Vegetation: Low vegetation, represented in this unit by grassland and generally low hedgerows, fails to break up vistas, allowing long distance visibility, and therefore, providing an inability to absorb development.

From the field study it was noted that the area of The South Western Uplands within the study area is an attractive rural pastoral landscape with flat to undulating topography with variation in elevation. Views are often dramatic from open and elevated areas to distant uplands, lowlands the River Barrow valley. Attractive appearance and is tranquil in areas away from the existing N25 Road. Historic landscape with rich archaeological, architectural and cultural history. No detractors such as pylons.

Landscape Character Area E: The South Eastern Uplands

The key characteristics described and apparent in the study area are as follows:

- Low-lying upland area bordering the River Barrow Valley at the southeast of the County. The terrain rises from the Kilkenny basin to the north and the lowlands to the southeast, which gives rise to several small ridgelines at an elevation of approximately 250m above sea level;
- Local views include those of the River Barrow and into the neighbouring County of Wexford. Distant views include those of the South Leinster Way Mountains;
- The settlement pattern in this area is of a low density, with most residential development concentrated in local villages such as Glenmore;
- Elevated Vistas: Local roads cross the lower slopes of this upland area, from where extensive lowland vistas and afforested upland views are available. Long distance views of the valleys of the River Barrow can also be obtained from this upland character area;
- Slopes: Sloping land provides a potentially increased elevation intensifying visual prominence over greater distances. Slope also provides an increased opportunity for development to penetrate primary and secondary ridgelines when viewed from lower areas of the public realm such as the roads and population centres in this area. Slope often provides an area with its character, as in this case therefore renders this upland area sensitive to development that might impact on that character;
- Prominent Ridge Lines: These occur as either primary ridgelines (visible only against the sky from any prospect) or secondary ridgelines (visible at least from some prospects below a distant primary ridge line). Ridge lines perform the important roles of providing an area with its identity, acting as dominant landscape focal points, and defining the extent of visual catchments. Therefore, the main concern for

the natural linear features formed by the ridgelines of the South Eastern Uplands is to avoid penetration by development that will interrupt and reduce the integrity of such elements;

- Undulating topography: Gently undulating topography is presented within the upland area of this character unit. The dynamic and complex nature of undulating land encloses vistas and helps to provide a realistic scale and visual containment not available in open lands;
- Shelter Vegetation: Shelter vegetation, is represented in some areas of this unit by the presence of trees at certain sections of field hedgerows as well as by some large coniferous and deciduous tree plantations. In a similar manner to undulating topography, shelter vegetation has a shielding and absorbing quality in landscape terms. It can provide a natural visual barrier and adds to the complexity of a vista, breaking it up to provide scale and containment for built forms;
- Low Vegetation: Low vegetation, largely represented in this unit by grassland and generally low hedgerows is generally uniform in appearance. Consequently, it fails to break up vistas and allows long distance visibility, therefore providing an inability to absorb development. However, existing hedgerows partially screen lowest land parcels; and
- Localised River Views: Views of the river valleys (River Barrow) are available from the high points at some of the local roads. Visual intrusion, which will interrupt and reduce the integrity of the river valley should be avoided along this natural linear feature.

From the field study it was noted that the area of The South Eastern Uplands within the study area is an attractive rural pastoral and river landscape. Undulating topography with variation in elevation. Views often dramatic from open and elevated areas to distant uplands and lowlands and along the River Barrow Valley. Attractive appearance and is tranquil (outside of the N25 road corridor). Historic landscape with rich archaeological, architectural and cultural history. Landscape detractors include, the existing N25 road corridor, areas of ribbon development and electricity pylons in the south of the area.

Landscape Character Area G: South Kilkenny Lowlands

The key characteristics described and apparent in the study area are as follows:

- This area has open lands with regular (medium sized) field patterns. Medium sized hedgerows act as field boundaries where few trees can also be found;
- Smooth Terrain: The smooth terrain and the generally gentle topography of lowlands is characteristic of this landscape character unit, allowing vistas over long distances. As a result, development can have a disproportionate visual impact in areas, due to an inherent inability to be absorbed either visually or physically;
- Low Vegetation: The grassland, tillage and usually low hedgerows of this area provide similar characteristics to smooth terrain in landscape terms, and the two are often interrelated due to soil attributes. Grassland and tillage vegetation are uniform in appearance, failing to break up vistas, and allowing long distance visibility. Existing low hedgerows intertwined with some trees partially screen low-lying land parcels. Nevertheless, the generally low vegetation proves unable to absorb new development; and
- Shelter Vegetation: Shelter vegetation is represented at some stretches of this unit by the presence of coniferous and deciduous plantations. In a similar manner to undulating topography, shelter vegetation has a shielding and absorbing quality in landscape terms. It can provide a natural visual barrier and adds to the complexity of a vista, breaking it up to provide scale and containment for built forms.

Landscape Character Area C2: South Hills Transitional Area

The key characteristics described and apparent in the study area are as follows:

- Smooth Terrain: This unit is characterised by smooth, sloping terrain, which allows vistas over long distances. In such terrain, development can have a disproportionate visual impact, due to an inherent inability to be absorbed, physically or visually;
- Low Vegetation: Predominantly low vegetation, represented in this unit by grassland and moorland land cover, has similar characteristics to smooth terrain in landscape terms, and the two are often interrelated due to soil attributes. Grassland and moorland vegetation fail to break up vistas and allows long distance visibility;
- Shelter Vegetation: Shelter vegetation, represented in this unit by several forest areas, has a screening and absorbing quality in landscape terms. It provides a natural visual barrier and adds to the complexity of a vista, breaking it up to provide scale and containment for built forms.

From the field study it was noted that the area of The South Hills Transitional Area within the study area is a transition area between elevated areas to lowlands. Within the study area it includes a small area of pastureland which forms part of the western side slope to a ridge of high ground west of Davidstown.

2.4.3.2. Landscape Designations

There are no woods listed in the Woodland Survey of Kilkenny within the study area.

There are no trees from the tree register of Ireland within the study area.

The Kilkenny County Development Plan 2014-2020 identifies views to be preserved and protected. There are no protected views within the study area however there are some in close proximity. These include:

- V22- Views southwest over the River Suir at Grannagh Castle to the Comeraghs; and
- V9- View to the south east over the River Barrow Valley. South of the New Ross on the LS7512 between the junctions with road numbers LP3432 and the N25.

Due to the direction and distance from the proposed route corridors there is unlikely to be any significant adverse effects on these views.

Regarding Protected Structures, Architectural Conservation Areas (ACAs) and National Inventory of Architectural Heritage (NIAH) sites and National Monuments. Refer to Architectural and Archaeological and Cultural Heritage Options sections.

Regarding designated nature conservation and sites of ecological value refer to Flora and Fauna section.

2.4.3.3. Landscape Sensitivity

The Kilkenny Landscape Character Assessment identifies areas throughout the county that are highly sensitive to development and have a low capacity for change. These areas are identified on Figure 8.3. Kilkenny County Development Plan 2014-2020.

These areas take account of areas of higher altitude in the county and of land cover.

In general areas of elevated topography, with low growing or sparse vegetation and little existing development are landscapes of high sensitivity and have a low potential to absorb new development. These include areas of ground over 200m (none within the study area) and principal ridgelines. There are two sensitive ridgelines located within the study area (Refer to Landscape Constraints Drawing Section 2.4.8).

Sensitive land-use categories include areas which are open and exposed with sparse or low growing vegetation cover which is insufficient to provide screening. The exceptions to this are broadleaved, mixed forest, and transitional woodland and scrub areas which do support tall vegetation with potential to screen development. However, these areas are sensitive due their natural character.

From the field study it is judged that the study area contains predominately positive elements. Those elements contributing to character include the undulating topography, distant views from elevated areas, River Barrow Valley, wooded stream valleys (around Glenmore in particular), agricultural lands, intact field boundaries, hedgerows, trees, ringforts, and the perception of tranquillity.

Significant detractors from the quality of this landscape include the adverse impact of traffic noise on landscape tranquillity along the existing N25 Road corridor. Views to overhead electricity wires and pylons, in lands primarily south of the study area.

It is judged that the landscape elements and character within the study area would have medium to high sensitivity to the proposals. The most sensitive elements would include the undulating topography (including local hills and principal ridgelines at Aylwardstown and Davidstown), the River Barrow valley, Glenmore, stream valleys and areas of woodland. The undulating topography, existing mature trees and hedgerows which can foreshorten views within the study area gives the landscape within the study area capacity to absorb new road development subject to appropriate design. The least sensitive areas to the proposals would include the existing N25 road corridor.

2.4.3.4. Visual Receptors

The visual receptors identified includes people using; dwellings and community buildings and would have high and medium sensitivity, respectively.

Regarding the visual effects on Architectural Heritage, Archaeology and Cultural Heritage sites; refer to Architectural, Archaeological and Cultural Heritage sections.

2.4.4. Key Findings

2.4.4.1. Purple

Description

This route consists of circa. 11.6km of dual carriageway road through greenfield land.

Landscape Effects

This route lies within three landscape character areas; Landscape Character Area E: South Eastern Uplands, Landscape Character Area C: South Western Uplands and Landscape Character Area C2: South Hills Transition Area, South. The landscape effects of the route on the character areas is set out in Section 2.4.6 and summarised as follows.

Landscape Character Area E: South Eastern Uplands

The proposed route travels through greenfield land for circa. 7.1km through this character area.

Horizontal alignment of carriageways travels in close proximity to narrow stream valleys west of Glenmore. The straight alignment at odds with the pattern of these valleys. Some field pattern severance.

Vertical alignment cutting and embankment slopes would lead some disruption to existing landform.

The route travels in close proximity to the lower slopes and wooded vegetation of the system of narrow stream valleys north and west of Glenmore (travels close to this intimate valley system especially at Mullennahone). Significant adverse effects on landscape character of this valley system. From south of Ardbeg towards Grogan and Nicholastown the route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible.

Will lead to adverse effects on the tranquillity of land and wooded stream valleys currently located to the west of the existing N25 road and other lands located far to the west of the existing N25.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Landscape Impact Significance: **Large adverse (negative) effect**

Landscape Character Area C: South Western Uplands

The proposed route travels through greenfield land for circa. 4km through this character area.

Long straight sections of route alignment are at odds with the curved landscape pattern. Some field pattern severance. Vertical alignment cutting and embankment slopes would lead to some limited disruption to existing landform.

Immediately east of Ardbeg this route travels close to a prominent hill of high ground at Ballinclare. From south of Ardbeg towards Grogan and Nicholastown the route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Significant adverse effects on side slopes of ridge of high ground from Ardbeg to Grogan and Nicholstown.

Will lead to adverse effects on the tranquillity of land currently located to the west of the existing N25 road.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Landscape Impact Significance: **Large adverse (negative) effect**

Landscape Character Area C2: South Hills Transition Area, South

The proposed route travels through greenfield land for circa. 400m through this character area.

Route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible.

Loss of some areas of woodland, hedgerows and hedgerow trees.

Will lead to adverse effects on the tranquillity of land currently located to the west of the existing N25 road.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Landscape Impact Significance: **Moderate adverse (negative) effect**

Overall Landscape Impact Significance (all landscape character areas combined): Large adverse (negative) effect

Visual Effects

The table below summarises the visual effect of the proposals on dwellings and community buildings within 500m from the centreline of the proposed route. Refer also to Visual Impact Schedule and Visual Receptors Drawings, in Section 2.4.8 for receptor locations. The number of receptors judged to have significant adverseeffects (i.e. those categorised between the range of Moderate to Very Large) is 22.

Table 2.4-6 - Summary of Visual Effects, Purple Route.

Category	No. of receptors (residential dwellings and community buildings)
Very Large Adverse	0
Large Adverse	3
Moderate Adverse	19
Slight Adverse	48
Neutral	23

2.4.4.2. Navy

Description

This route consists of circa. 9.5km of dual carriageway road which circa. 6.8km of carriageway will cross through greenfield land.

Landscape Effects

This route lies within one landscape character area; Landscape Character Area E: South Eastern Uplands. The landscape effects of the route on the character area is set out in Section 2.4.6 and summarised below.

Landscape Character Area E: South Eastern Uplands

The proposed route travels for circa. 9.5km through this character area of which circa. 6.8km of carriagewaywill cross through greenfield land and circa. 2.6km online.

Vertical alignment cutting and embankment slopes would lead to no significant disruption to existing landform. No significant areas of cut and fill except for one area of large fill between chainage; 5800 and 6280 (Max depth fill 14m). In general, the route follows existing contours/ levels very well.

Follows the existing N25 road alignment south of Glenmore, thus avoiding effects on Glenmore and adjacent narrow stream valleys.

From Ballinclare to south of Davidstown the route continues generally parallel to the existing N25 road corridor and travels along the lower side slopes of a ridge of high ground, avoiding the higher contours.

Travels on higher contours of ridge of higher ground from Davidstown to Carriganurra, however vertical alignment follows existing contours well and cut and fill is generally not significant.

Limited effects to no change on tranquillity. The route travels through areas already on/ adjacent to the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Overall Landscape Impact Significance: **Slight adverse (negative) effect**

Visual Effects

The table below summarises the visual effect of the proposals on dwellings and community buildings within 500m from the centreline of the proposed route. Refer also to Visual Impact Schedule and Visual Receptors Drawings, in Section 2.4.8 for receptor locations. The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large) is 3.

Table 2.4-7 - Summary of Visual Effects, Navy Route.

Category	No. of receptors (residential dwellings and community buildings)
Very Large Adverse	0
Large Adverse	0
Moderate Adverse	3
Slight Adverse	53
Neutral	116

2.4.4.3. Magenta

Description

This route consists of circa. 9.3km of dual carriageway road of which circa. 4.1km of carriageway will cross through greenfield land.

Landscape Effects

This route lies within one landscape character area; Landscape Character Area E: South Eastern Uplands. The landscape effects of the route on the character area is set out in Section 2.4.6 and summarised below.

Landscape Character Area E: South Eastern Uplands

The proposed route travels for circa. 9.3km through this character area of which circa. 4.1km of carriageway will cross through greenfield land and circa. 5.2km online. Generally, the route follows the existing N25 alignment towards Ballyrownagh. Thus, avoiding effects on; Glenmore, narrow stream valleys and ridges of surrounding higher ground either side of the existing N25 Road.

The route diverts west from the existing N25 towards Carriganurra. At Carriganurra the route travels close to a local rock outcrop (with cross on top) which is a prominent local landmark. With mitigation this landmark may be successfully integrated.

Limited effects to no change on tranquillity. The route travels through areas already on/ adjacent to the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Overall Landscape Impact Significance: **Slight adverse (negative) effect**

Visual Effects

The table below summarises the visual effect of the proposals on dwellings and community buildings within 500m from the centreline of the proposed route. Refer also to Visual Impact Schedule and Visual Receptors Drawings, in Section 2.4.8 for receptor locations. The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large) is 27.

Table 2.4-8 - Summary of Visual Effects, Magenta Route.

Category	No. of receptors (residential dwellings and community buildings)
Very Large Adverse	0
Large Adverse	7
Moderate Adverse	20
Slight Adverse	43
Neutral	106
Slight Beneficial	2

2.4.4.4. Red

Description

This route consists of circa. 9.0km of dual carriageway road which circa. 8.65km of carriageway will cross through greenfield land.

Landscape Effects

This route lies within one landscape character area; Landscape Character Area E: South Eastern Uplands. The landscape effects of the route on the character area is set out in Section 2.4.6 and summarised below.

Landscape Character Area E: South Eastern Uplands

The proposed route travels for circa. 9.0km through this character area of which circa. 8.65km of carriageway will cross through greenfield land. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 2.8km distance to the east of the existing N25 Road in places). Horizontal alignment of carriageways would be in keeping with existing route patterns. However vertical alignment cutting, and embankment slopes would disrupt existing landform. In particular; where the route travels up a steep hillside and over a stream valley from Craiguenakil to Carrickcloney, there would be significant adverse effects on the landscape character from fill embankments within this sloping land which also connects visually with the River Barrow valley.

Where the route cuts through the side of a ridge of high ground at Aylwardstown and south to Rathinure, there would be significant adverse effects on this ridge of high ground and to the character of the wider River Barrow valley landscape.

Where the route travels through a local valley on embankments between Rathinure and Redgap and sidelong of a hill in a cutting at Redgap there is likely to be significant adverse effects on the hill at Redgap and also on views through this local valley and on landscape character of the wider river Barrow valley.

There would be adverse effects rural tranquillity as the route travels in existing tranquil land to the east of the existing N25 road and close to the River Barrow.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Overall Landscape Impact Significance: **Large adverse (negative) effect**

Visual Effects

The table below summarises the visual effect of the proposals on dwellings and community buildings within 500m from the centreline of the proposed route. Refer also to Visual Impact Schedule and Visual Receptors Drawings, in Section 2.4.8 for receptor locations. The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large) is 29.

Table 2.4-9 - Summary of Visual Effects, Red Route.

Category	No. of receptors (residential dwellings and community buildings)
Very Large Adverse	9
Large Adverse	0
Moderate Adverse	20
Slight Adverse	60
Neutral	26

2.4.4.5. Teal

Description

This route consists of circa. 8.7km of dual carriageway road of which circa. 8.3km of carriageway will cross through greenfield land.

Landscape Effects

This route lies within one landscape character area; Landscape Character Area E: South Eastern Uplands. The landscape effects of the route on the character area is set out in Section 2.4.6 and summarised below.

Landscape Character Area E: South Eastern Uplands

The proposed route travels for circa. 8.7km through this character area of which circa. 8.3km of carriageway will cross through greenfield land. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 1.8km distance to the east of the existing N25 Road in places). Horizontal alignment of carriageways would be in keeping with existing route patterns. However vertical alignment cutting, and embankment slopes would significantly disrupt existing landform. In particular; where the route travels up a steep hillside and over a stream valley from Craiguenakil to Carrickcloney (in a combination of fill embankments and cutting) there would significant adverse effects on landscape character of this sloping land which connects with the River Barrow valley.

The route forms a large cutting though some the highest contours of a ridge of high ground at Aylwardstown and south to Rathinure: A Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). There would be significant adverse effects on this ridge of high ground.

Travels through a local valley (mostly on fill embankments) between Rathinure and Redgap, which is visually connected with the River Barrow valley corridor and views from along this corridor. Thus, potential significant adverse effects on views through this valley and on the landscape character of the wider River Barrow valley.

From Ballyrownagh to Slieveroe roundabout the route (mostly on fill embankments) follows a local stream valley parallel to the existing N25. Following these areas of lower ground will help reduce potential wider visibility of this section of the route. However, it will affect the setting of this stream valley itself and associated wetland vegetation.

There would be adverse effects rural tranquillity as the route travels in existing tranquil land to the east of the existing N25 road.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Overall Landscape Impact Significance: **Large adverse (negative) effect**

Visual Effects

The table below summarises the visual effect of the proposals on dwellings and community buildings within 500m from the centreline of the proposed route. Refer also to Visual Impact Schedule and Visual Receptors Drawings, in Section 2.4.8 for receptor locations. The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large) is 10.

Table 2.4-10 - Summary of Visual Effects, Teal Route.

Category	No. of receptors (residential dwellings and community buildings)
Very Large Adverse	1
Large Adverse	1
Moderate Adverse	8
Slight Adverse	75
Neutral	28

2.4.4.6. Lime Green

Description

This route consists of circa. 8.9km of dual carriageway road of which circa. 8.3km of carriageway will cross through greenfield land.

Landscape Effects

This route lies within one landscape character area; Landscape Character Area E: South Eastern Uplands. The landscape effects of the route on the character area is set out in Section 2.4.6 and summarised below.

Landscape Character Area E: South Eastern Uplands

The proposed route travels for circa. 8.9km through this character area of which circa. 6.8km of carriageway will cross through greenfield land and circa. 2km online. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 0.7km distance to the east of the existing N25 Road in places). 2.3km of the route travels to the west of the existing N25.

Horizontal alignment of carriageways would be in keeping with existing route patterns. Some field pattern severance. Vertical alignment cutting and embankment slopes would disrupt existing landform. The route

follows the existing N25 alignment to south of Glenmore, thus, avoiding effects on Glenmore and adjacent narrow stream valleys.

From south of Glenmore, the route will cut though some of the highest contours of a ridge of high ground between Ballynamona and Aylwardstown and south to Gaulstown. Significant adverse effects on this ridge of high ground and the landscape character of this elevated area.

Descends into local stream valley at Ballyrahan including an ecological sensitive area of land cover. Significant adverse effects on local stream valley at Ballyrahan.

Crosses over the existing N25 towards Carriganurra. At Carriganurra the route goes through a local rock outcrop (with cross on top) which is a prominent local landmark. Significant adverse effects on this feature.

Limited effects on tranquillity. The route travels through areas on/ near the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity. The most adverse effects will be experienced in the elevated lands furthest to the east from the existing N25 road (including Aylwardstown and Ballyhobuck).

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Overall Landscape Impact Significance: **Moderate adverse (negative) effect**

Visual Effects

The table below summarises the visual effect of the proposals on dwellings and community buildings within 500m from the centreline of the proposed route. Refer also to Visual Impact Schedule and Visual Receptors Drawings, in Section 2.4.8 for receptor locations. The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large) is 32.

Table 2.4-11 - Summary of Visual Effects, Lime Green Route.

Category	No. of receptors (residential dwellings and community buildings)
Very Large Adverse	0
Large Adverse	4
Moderate Adverse	28
Slight Adverse	51
Neutral	91

2.4.5. Summary and Conclusions

This section summarises the effects of the proposed development on landscape and visual receptors, and the significance of the effects identified.

2.4.5.1. Comparison of Route Options

Landscape Effects

The assessment of landscape impact is based on the division of character areas derived from the county landscape character assessment. The effect of each route option on the individual landscape character area is considered in the context of local landscape sensitivity to derive an overall impact score for the proposals in accordance with the TAG criteria; these are set out in Section 2.4.7. The eight-point scale used to judge is Slight, Moderate or Large Beneficial or Adverse, Very Large Adverse plus Neutral as set out in TAG.

The overall impact score of the route options on landscape character areas within the study area are summarised here (Table 2.4-12).

Table 2.4-12 - Summary of Landscape Effect

Route Option	Summary
Purple	**Landscape Character Area E: South Eastern Uplands** The proposed route travels through greenfield land for circa. 7.1km through this character area.

Horizontal alignment of carriageways travels in close proximity to narrow stream valleys west of Glenmore. The straight alignment at odds with the pattern of these valleys. Some field pattern severance.

Vertical alignment cutting and embankment slopes would lead some disruption to existing landform.

The route travels in close proximity to the lower slopes and wooded vegetation of the system of narrow stream valleys north and west of Glenmore (travels close to this intimate valley system especially at Mullennahone). Significant adverse effects on landscape character of this valley system. From south of Ardbeg towards Grogan and Nicholastown the route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible.

Will lead to adverse effects on the tranquillity of land and wooded stream valleys currently located to the west of the existing N25 road and other lands located far to the west of the existing N25.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Landscape Impact Significance: Large adverse (negative) effect

Landscape Character Area C: South Western Uplands

The proposed route travels through greenfield land for circa. 4km through this character area.

Long straight sections of route alignment are at odds with the curved landscape pattern. Some field pattern severance. Vertical alignment cutting and embankment slopes would lead to some limited disruption to existing landform.

Immediately east of Ardbeg this route travels close to a prominent hill of high ground at Ballinclare. From south of Ardbeg towards Grogan and Nicholastown the route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Significant adverse effects on side slopes of ridge of high ground from Ardbeg to Grogan and Nicholstown.

Will lead to adverse effects on the tranquillity of land currently located to the west of the existing N25 road.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Landscape Impact Significance: Large adverse (negative) effect

Landscape Character Area C2: South Hills Transition Area, South

The proposed route travels through greenfield land for circa. 400m through this character area.

Route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible.

Loss of some areas of woodland, hedgerows and hedgerow trees.

Will lead to adverse effects on the tranquillity of land currently located to the west of the existing N25 road.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

	Landscape Impact Significance: Moderate adverse (negative) effect. Overall Landscape Impact Significance (all landscape character areas combined): Large adverse (negative) effect.
Navy	**Landscape Character Area E: South Eastern Uplands** The proposed route travels for circa. 9.5km through this character area of which circa. 6.8km of carriageway will cross through greenfield land and circa. 2.6km online. Vertical alignment cutting and embankment slopes would lead to no significant disruption to existing landform. No significant areas of cut and fill except for one area of large fill between chainage; 5800 and 6280 (Max depth fill 14m). In general, the route follows existing contours/ levels very well. Follows the existing N25 road alignment south of Glenmore, thus avoiding effects on Glenmore and adjacent narrow stream valleys. From Ballinclare to south of Davidstown the route continues generally parallel to the existing N25 road corridor and travels along the lower side slopes of a ridge of high ground, avoiding the higher contours. Travels on higher contours of ridge of higher ground from Davidstown to Carriganurra, however vertical alignment follows existing contours well and cut and fill is generally not significant. Limited effects to no change on tranquillity. The route travels through areas already on/ adjacent to the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity. Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land. Overall Landscape Impact Significance: Slight adverse (negative) effect
Magenta	**Landscape Character Area E: South Eastern Uplands** The proposed route travels for circa. 9.3km through this character area of which circa. 4.1km of carriageway will cross through greenfield land and circa. 5.2km online. Generally, the route follows the existing N25 alignment towards Ballyrownagh. Thus, avoiding effects on; Glenmore, narrow stream valleys and ridges of surrounding higher ground either side of the existing N25 Road. The route diverts west from the existing N25 towards Carriganurra. At Carriganurra the route travels close to a local rock outcrop (with cross on top) which is a prominent local landmark. With mitigation this landmark may be successfully integrated. Limited effects to no change on tranquillity. The route travels through areas already on/ adjacent to the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity. Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land. Overall Landscape Impact Significance: Slight adverse (negative) effect
Red	**Landscape Character Area E: South Eastern Uplands** The proposed route travels for circa. 9.0km through this character area of which circa. 8.65km of carriageway will cross through greenfield land. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 2.8km distance to the east of the existing N25 Road in places). Horizontal alignment of carriagewayswould be in keeping with existing route patterns. However vertical alignment cutting, and embankment slopes would disrupt existing landform. In particular; where the route travels up a steep hillside and over a stream valley from Craiguenakil to Carrickcloney, there would be significant adverse effects on the landscape character from fill embankments within this sloping land which also connects visually with the River Barrow valley. Where the route cuts through the side of a ridge of high ground at Aylwardstown and south to Rathinure, there would be significant adverse effects on this ridge of high ground and to the character of the wider River Barrow valley landscape. Where the route travels through a local valley on embankments between Rathinure and Redgap and sidelong of a hill in a cutting at Redgap there is likely to be significant adverse

	effects on the hill at Redgap and also on views through this local valley and on landscape character of the wider river Barrow valley. There would be adverse effects rural tranquillity as the route travels in existing tranquil land to the east of the existing N25 road and close to the River Barrow. Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land. Overall Landscape Impact Significance: Large adverse (negative) effect
Teal	**Landscape Character Area E: South Eastern Uplands** The proposed route travels for circa. 8.7km through this character area of which circa. 8.3km of carriageway will cross through greenfield land. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 1.8km distance to the east of the existing N25 Road in places). Horizontal alignment of carriageways would be in keeping with existing route patterns. However vertical alignment cutting, and embankment slopes would significantly disrupt existing landform. In particular; where the route travels up a steep hillside and over a stream valley from Craiguenakil to Carrickcloney (in a combination of fill embankments and cutting) there would significant adverse effects on landscape character of this sloping land which connects with the River Barrow valley. The route forms a large cutting though some the highest contours of a ridge of high ground at Aylwardstown and south to Rathinure: A Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). There would be significant adverse effects on this ridge of high ground. Travels through a local valley (mostly on fill embankments) between Rathinure and Redgap, which is visually connected with the River Barrow valley corridor and views from along this corridor. Thus, potential significant adverse effects on views through this valley and on the landscape character of the wider River Barrow valley. From Ballyrownagh to Slieveroe roundabout the route (mostly on fill embankments) follows a local stream valley parallel to the existing N25. Following these areas of lower ground will help reduce potential wider visibility of this section of the route. However, it will affect the setting of this stream valley itself and associated wetland vegetation. There would be adverse effects rural tranquillity as the route travels in existing tranquil land to the east of the existing N25 road. Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land. Overall Landscape Impact Significance: Large adverse (negative) effect
Lime Green	**Landscape Character Area E: South Eastern Uplands** The proposed route travels for circa. 8.9km through this character area of which circa. 6.8km of carriageway will cross through greenfield land and circa. 2km online. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 0.7km distance to the east of the existing N25 Road in places). 2.3km of the route travels to the west of the existing N25. Horizontal alignment of carriageways would be in keeping with existing route patterns. Some field pattern severance. Vertical alignment cutting and embankment slopes would disrupt existing landform. The route follows the existing N25 alignment to south of Glenmore, thus, avoiding effects on Glenmore and adjacent narrow stream valleys. From south of Glenmore, the route will cut though some of the highest contours of a ridge of high ground between Ballynamona and Aylwardstown and south to Gaulstown. Significant adverse effects on this ridge of high ground and the landscape character of this elevated area. Descends into local stream valley at Ballyrahan including an ecological sensitive area of land cover. Significant adverse effects on local stream valley at Ballyrahan. Crosses over the existing N25 towards Carriganurra. At Carriganurra the route goes through a local rock outcrop (with cross on top) which is a prominent local landmark. Significant adverse effects on this feature.

Limited effects on tranquillity. The route travels through areas on/ near the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity. The most adverse effects will be experienced in the elevated lands furthest to the east from the existing N25 road (including Aylwardstown and Ballyhobuck).

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Overall Landscape Impact Significance: Moderate adverse (negative) effect

Visual Effects

The number of receptors (dwellings and community buildings) judged to have significant adverse effects according to each route option is summarised below.

Table 2.4-13 – Summary of Visual Effects: Number of receptors experiencing significant visual effects.

Route Option	The number of receptors judged to have significant adverse effects (i.e. those categorised between the range of Moderate to Very Large)
Purple	22
Navy	3
Magenta	27
Red	29
Teal	10
Lime Green	32

2.4.5.2. Overall Landscape and visual ranking

Table 2.4-14 below summarises the overall landscape and visual ranking (and preference) for the various route options according to the seven-point scale. The overall scoring is based on combining the significance of effect scores for landscape (elements/ landscape character) and visual receptors (dwellings and community buildings) and professional judgment.

Table 2.4-14 - Landscape and Visual Scoring

Route Option	Score	Description
Purple	1	Major Negative
Navy	3	Minor or slightly negative
Magenta	3	Minor or slightly negative
Red	1	Major negative
Teal	1	Major negative
Lime Green	1	Major negative

2.4.5.3. Mitigation

Suggested mitigation measures for each route option are detailed in Section 2.4.6 and summarised below.

- Embankment and cutting slopes graded out;
- New planting to restore severed field pattern;
- Replanting of trees, hedgerows and woodland, including off-site planting;
- Ensure planting species are appropriate to surroundings; and
- Visual integration of noise barriers, signage and lighting into the landscape.

2.4.6. TAG Worksheets

TAG Worksheets

Table 2.4.15, TAG Worksheet: Landscape Character Area E: South Eastern Uplands Red Route Option Landscape Impact							
Features	**Description**	**Scale it matters**	**Rarity**	**Importance**	**Substitutability**	**Impact**	**Mitigation**
Pattern	Strongly undulating topography including a combination of hills and ridgelines with steep sides and in places dissected by stream valleys whose waters flow into the adjacent River Barrow. Stream valleys are often narrow and enclosed with steep sides in the environs of Glenmore in particular. Lands are more open and slope more broadly along the River Barrow valley. There is a rock outcrop and local landmark cross at Carriganurra. Topographic levels range from c.2m AOD near Bearstown Bridge, c.10m AOD at Glenmore Village, c.129m AOD at a hill west of Glenmore/ Robinstown, to c.146m AOD to a ridge at Aylwardstown, c.82m AOD at Rathinure, c.133m AOD to a hill at Redgap, and c.130m AOD to a ridge at Davidstown and c.68m AOD at Slieveroe roundabout. A Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan) is located at Aylwardstown and Davidstown. The existing N25 road, travels upon contours ranging from c.10m AOD west of Bearstown to c.44m AOD at Glenmore, to c.101m AOD east of Ballynaraha, then from here descending to c.78m AOD east of Carriganurra, and c.68m AOD at Slieveroe roundabout.	Local/ Regional	Locally Common	Medium	Field pattern may be reproduced. Undulating topography could be reproduced.	Circa. 250m online widening at north end of route. Circa. 8.65km of carriageway will cross through greenfield land within this character area. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 2.8km distance to the east of the existing N25 Road in places) Route will cross approximately 16 roads or farm tracks. Route will cross a disused railway line in 2 locations. Route will cross approximately 3 rivers/ streams. Horizontal alignment of carriageways would be in keeping with existing route patterns. Some field pattern severance. Vertical alignment cutting and embankment slopes would disrupt existing landform. Large cutting between chainage: 1160 and 1720 (Max depth cut 10.25m), 4940 and 6580 (Max depth cut 19m). Large fill between chainage; 300 and 1140 (Max depth fill 24m), 2380 and 2840 (Max depth fill 15m),	Embankment and cutting slopes graded out. Temporary CPO of additional land so as to grade out steep embankments and cuttings into surrounding landform and return them to agricultural use. New planting to restore severed field pattern.

	Small, medium to large rectangular and irregular shaped fields enclosed by hedgerows and tree lines. Some long-distance vistas along the River Barrow and to hills to the east including Slieve Coillte. Long distance views to lowland plains to the west, and the Waterford City suburbs to the south from ridge of high ground near Davidstown. Long distance panoramic 360-degree views from elevated/ open areas where hedgerows are low, otherwise an enclosed landscape at lower elevations between hills/ ridgelines, within stream valleys and where hedgerows are high or woodland occurs. Views from within this area towards various hills and ridgelines of high ground. Views along stream valleys and towards the River Barrow. Views within enclosed often wooded narrow stream valleys. Irregular grid of minor roads crosses the area. Existing N25 is in a sinuous alignment.					2900 and 3640 (Max depth fill 12.8m), 4100 and 4960 (Max depth fill 19.5m), 6620 and 7240 (Max depth fill 11m), Visibility of the route within the surrounding landscape is partially limited by intervening topography and vegetation or where the route is within cutting. However, sections of route especially where located on large fill embankments would be prominent in local views and lead to adverse effects on landscape character. In particular; where the route travels up a steep hillside and over a stream valley from Craiguenakil to Carrickcloney, there would be significant adverse effects on the landscape character of this sloping land which also connects visually with the River Barrow valley. Where the route travels through the side of a ridge of high ground at Aylwardstown and south to Rathinure, there would be significant adverse effects on this ridge of high ground and to the character of the wider River Barrow valley landscape. Where the route travels through a local valley between Rathinure and Redgap and sidelong of a hill at Redgap, there is likely to be significant adverse effects on the hill at Redgap and on views through this valley and on landscape character of the wider river Barrow valley.	
Tranquillity	Rural settlement and numerous isolated dwellings in combination with traffic on the N25 corridor reduces the tranquilly of this area. However, the	Local	Locally Common	High	Once lost is difficult to recover.	The route travels through an existing tranquil landscape located east (up to c.2.8km distance in parts) of the existing N25 Road. The introduction	None is possible without further disruption to pattern, landform and visual amenity.

	areas of land away (and visually disconnected) from the immediate N25 corridor, are often experienced as remote and tranquil.					of the route would lead to significant adverse effects on the tranquillity of this landscape.	
Cultural	Elements of historic character include the historic field pattern and boundaries including hedgerows/ hedge banks, country lanes and minor roads/ tracks. Archaeological heritage includes numerous ringforts, enclosures and fulacht fia. Church and graveyards and Bullaun stones. Architectural heritage includes various National Inventory of Architectural Heritage (NIAH) structures at Glenmore village. Record of Protected Structures (RPS) includes 2 railway bridges, Aylwardstown House, Ringvile House, O'Donovans Corn Mill and a Wayside cross. Remnants of demesne Landscape and Historic Gardens include Aylwardstown House, Rochestown House, Ringville House, Ballinlay Castle and Frazers Hall. Settlements: Village settlement at Glenmore. Settlement clusters at Ballybraghy, Ballynaraha, Curraghmore, Ballinlaw, Rochestown, Rathinure, Ballyhobuck, Aylwardstown, Kilmakevoge, Carrickcloney and Bearstown. Other settlement consists of numerous one-off housing and farm buildings dotted throughout area. Many examples of traditional farmhouses and farmyards. Rock outcrop and local landmark	Local/ Regional/ National	Locally Common	High	Cultural features may not be replaced.	Fields will be bisected. Route will cross over various minor roads/tracks and disused railway. Loss of farmsteads: None Loss of dwellings: None.	Embankment and cutting slopes graded out. New planting to restore severed field pattern.

	cross at Carriganurra.						
Landcover	Primarily pasture with some arable land with medium to large field sizes and predominantly hedgerow boundaries. Agricultural lands appear well maintained. Hedgerows including tree lines. Areas of deciduous, coniferous and mixed woodland. Areas of scrub. Long linear areas of riparian woodland associated with the narrow stream valleys near Glenmore in the north of the study area. Large blocks of woodland in southern half of the LCA in the study area. Clumps of trees associated with some farmsteads and settlement. Area includes land associated with the River Barrow and tributaries designated as Special Areas of Conservation/ proposed Natural Heritage areas. Area includes various Ecological Sensitive Area sites of local or county importance (Refer to Ecology chapter for details).	Local/ Regional/ National	Locally Common	High	Undeveloped agricultural land, wetland and woodland difficult to reproduce.	Loss of farmland, hedgerows and trees to carriageways, cutting and fill embankments. Minor loss of woodland/ scrub at ch.200—400 (within SAC). Loss of woodland/ scrub at ch.700--800. (Ecological sensitive area) Loss of woodland/ scrub at ch.4250--4450.	Replanting of trees and hedgerows and woodland. Including off-site planting.
Summary of character	Very attractive rural pastoral and river landscape. Undulating topography with variation in elevation. Views often dramatic from open and elevated areas to distant uplands and lowlands and along the River Barrow Valley. Attractive appearance and is tranquil (outside of the N25 road corridor). Historic landscape with rich archaeological, architectural and cultural history. Landscape detractors include, the	Regional/ National This area also includes and contributes to the landscape character of the River Barrow valley, which	Strongly undulating pasture farmland in combination with areas of woodland and river valley are locally common.	Medium	As a whole this character would be difficult to substitute.	Disruption to landform significant. Visibility of the route within the surrounding landscape is partially limited by intervening topography and vegetation or where the route is within cutting. However, sections of route especially where located on large fill embankments would be prominent in local views and lead to adverse effects on landscape character. In particular; where the route travels	Ensure planting species are appropriate to surroundings.

	existing N25 road corridor, areas of ribbon development and electricity pylons in the south of the area.	is judged to be of regional/ national importance				up a steep hillside and over a stream valley from Craiguenakil to Carrickcloney, there would be significant adverse effects on the landscape character of this sloping land which also connects visually with the River Barrow valley. Where the route travels through the side of a ridge of high ground at Aylwardstown and south to Rathinure, there would be significant adverse effects on this ridge of high ground and to the character of the wider River Barrow valley landscape. Where the route travels through a local valley between Rathinure and Redgap and sidelong of a hill at Redgap, there is likely to be significant adverse effects on the hill at Redgap and on views through this valley and on landscape character of the wider river Barrow valley. Significant adverse effects on tranquillity of landscape. Loss of some areas of woodland, hedgerows and hedgerow trees. Loss of agricultural land.	

Qualitative Comments:

The proposed route travels for circa. 9.0km through this character area of which circa. 8.65km of carriageway will cross through greenfield land. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 2.8km distance to the east of the existing N25 Road in places). Horizontal alignment of carriageways would be in keeping with existing route patterns. However vertical alignment cutting, and embankment slopes would disrupt existing landform. In particular; where the route travels up a steep hillside and over a stream valley from Craiguenakil to Carrickcloney, there would be significant adverse effects on the landscape character from fill embankments within this sloping land which also connects visually with the River Barrow valley.

Where the route cuts through the side of a ridge of high ground at Aylwardstown and south to Rathinure, there would be significant adverse effects on this ridge of high ground and to the character of the wider River Barrow valley landscape.

Where the route travels through a local valley on embankments between Rathinure and Redgap and sidelong of a hill in a cutting at Redgap there is likely to be significant adverse effects on the hill at Redgap and also on views through this local valley and on landscape character of the wider river Barrow valley.

There would be adverse effects rural tranquillity as the route travels in existing tranquil land to the east of the existing N25 road and close to the River Barrow.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Impact Significance: **Large Adverse (negative) effect.**

Table 2.4.16, TAG Worksheet: Landscape Character Area E: South Eastern Uplands Teal Route Option Landscape Impact							
Features	**Description**	**Scale it matters**	**Rarity**	**Importance**	**Substitutability**	**Impact**	**Mitigation**
Pattern	Strongly undulating topography including a combination of hills and ridgelines with steep sides and in places dissected by stream valleys whose waters flow into the adjacent River Barrow. Stream valleys are often narrow and enclosed with steep sides in the environs of Glenmore in particular. Lands are more open and slope more broadly along the River Barrow valley. There is a rock outcrop and local landmark cross at Carriganurra. Topographic levels range from c.2m AOD near Bearstown Bridge, c.10m AOD at Glenmore Village, c.129m AOD at a hill west of Glenmore/ Robinstown, to c.146m AOD to a ridge at Aylwardstown, c.82m AOD at Rathinure, c.133m AOD to a hill at Redgap, and c.130m AOD to a ridge at Davidstown and c.68m AOD at Slieveroe roundabout. A Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan) is located at Aylwardstown and Davidstown. The existing N25 road, travels upon contours ranging from c.10m AOD west of Bearstown to c.44m AOD at Glenmore, to c.101m AOD east of Ballynaraha, then from here descending to c.78m AOD east of Carriganurra, and c.68m AOD at Slieveroe roundabout. Small, medium to large rectangular	Local/ Regional	Locally Common	Medium	Field pattern may be reproduced. Undulating topography could be reproduced.	Circa. 300m online widening at north end of route. Circa. 8.3km of carriageway will cross through greenfield land within this character area. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 1.8km distance to the east of the existing N25 Road in places) Route will cross approximately 9 roads or farm tracks. Route will cross a disused railway line in 2 locations. Route will cross approximately 3 rivers/ streams. Horizontal alignment of carriageways would be in keeping with existing route patterns. Some field pattern severance. Vertical alignment cutting and embankment slopes would disrupt existing landform. Large cutting between chainage: 860 and 1420 (Max depth cut 10.00m), 1620 and 3180 (Max depth cut 27m), 5020 and 5720 (Max depth cut 13m). Large fill between chainage; 120 and 840 (Max depth fill 23.6m), 3200 and 5000 (Max depth fill 25m), 5960 and 8020 (Max depth fill 18m).	Embankment and cutting slopes graded out. Temporary CPO of additional land so as to grade out steep embankments and cuttings into surrounding landform and return them to agricultural use. New planting to restore severed field pattern.

	and irregular shaped fields enclosed by hedgerows and tree lines. Some long-distance vistas along the River Barrow and to hills to the east including Slieve Coillte. Long distance views to lowland plains to the west, and the Waterford City suburbs to the south from ridge of high ground near Davidstown. Long distance panoramic 360-degree views from elevated/ open areas where hedgerows are low, otherwise an enclosed landscape at lower elevations between hills/ ridgelines, within stream valleys and where hedgerows are high or woodland occurs. Views from within this area towards various hills and ridgelines of high ground. Views along stream valleys and towards the River Barrow. Views within enclosed often wooded narrow stream valleys. Irregular grid of minor roads crosses the area. Existing N25 is in a sinuous alignment.					Where the route travels up a steep hillside and over a stream valley from Craiguenakil to Carrickcloney (in a combination of fill embankments and cutting) there would significant adverse effects on landscape character of this sloping land which connects with the River Barrow valley. Large cutting though some the highest contours of a ridge of high ground at Aylwardstown and south to Rathinure: Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). Significant adverse effects on this ridge of high ground. Travels through a local valley (mostly on fill embankments) between Rathinure and Redgap, which is visually connected with the River Barrow valley corridor and views from along this corridor. Thus, potential significant adverse effects on views through this valley and on the landscape character of the wider River Barrow valley. From Ballyrownagh to Slieveroe roundabout (the route mostly on fill embankments) follows a local stream valley parallel to the existing N25. Following this lower ground will help reduce potential wider visibility of this section of the route. However, it will affect the setting of this stream valley itself and associated wetland vegetation.	
Tranquillity	Rural settlement and numerous isolated dwellings in combination with traffic on the N25 corridor reduces the tranquilly of this area. However, the areas of land away (and visually	Local	Locally Common	High	Once lost is difficult to recover.	The route travels through an existing tranquil landscape located east (up to c.1.8km distance in parts) of the existing N25 Road. The introduction of the route would lead to significant	None is possible without further disruption to pattern, landform and visual amenity.

	disconnected) from the immediate N25 corridor, are often experienced as remote and tranquil.					adverse effects on the tranquillity of this landscape.	
Cultural	Elements of historic character include the historic field pattern and boundaries including hedgerows/ hedge banks, country lanes and minor roads/ tracks. Archaeological heritage includes numerous ringforts, enclosures and fulacht fia. Church and graveyards and Bullaun stones. Architectural heritage includes various National Inventory of Architectural Heritage (NIAH) structures at Glenmore village. Record of Protected Structures (RPS) includes 2 railway bridges, Aylwardstown House, Ringvile House, O'Donovans Corn Mill and a Wayside cross. Remnants of demesne Landscape and Historic Gardens include Aylwardstown House, Rochestown House, Ringville House, Ballinlay Castle and Frazers Hall. Settlements: Village settlement at Glenmore. Settlement clusters at Ballybraghy, Ballynaraha, Curraghmore, Ballinlaw, Rochestown, Rathinure, Ballyhobuck, Aylwardstown, Kilmakevoge, Carrickcloney and Bearstown. Other settlement consists of numerous one-off housing and farm buildings dotted throughout area. Many examples of traditional farmhouses and farmyards. Rock outcrop and local landmark cross at Carriganurra.	Local/ Regional/ National	Locally Common	High	Cultural features may not be replaced.	Fields will be bisected. Route will cross over various minor roads/tracks and disused railway. Loss of farmsteads: None Loss of dwellings: None. Route will pass in close proximity to Kilcoumb Church and Tobernagolumb Holy Well.	Embankment and cutting slopes graded out. New planting to restore severed field pattern.

Landcover	Primarily pasture with some arable land with medium to large field sizes and predominantly hedgerow boundaries. Agricultural lands appear well maintained. Hedgerows including tree lines. Areas of deciduous, coniferous and mixed woodland. Areas of scrub. Long linear areas of riparian woodland associated with the narrow stream valleys near Glenmore in the north of the study area. Large blocks of woodland in southern half of the LCA in the study area. Clumps of trees associated with some farmsteads and settlement. Area includes land associated with the River Barrow and tributaries designated as Special Areas of Conservation/ proposed Natural Heritage areas. Area includes various Ecological Sensitive Area sites of local or county importance (Refer to Ecology chapter for details).	Local/ Regional/ National	Locally Common	High	Undeveloped agricultural land, wetland and woodland difficult to reproduce.	Loss of farmland, hedgerows and trees to carriageways, cutting and fill embankments. Minor loss of woodland/ scrub at ch.200—400 (within SAC). Loss of woodland/ scrub at ch.750—850 (Ecological sensitive area). Loss of woodland/ scrub at ch.5900—6300 (Ecological sensitive area). Loss of scrub/ grassland at ch.7500—8000 (Ecological sensitive area). From Ballyrownagh to Slieveroe roundabout (the route mostly on fill embankments) follows a local stream valley parallel to the existing N25. Following this lower ground will help reduce potential wider visibility of this section of the route. However, it will affect the setting of this stream valley itself and associated wetland vegetation.	Replanting of trees and hedgerows and woodland. Including off-site planting.
Summary of character	Very attractive rural pastoral and river landscape. Undulating topography with variation in elevation. Views often dramatic from open and elevated areas to distant uplands and lowlands and along the River Barrow Valley. Attractive appearance and is tranquil (outside of the N25 road corridor). Historic landscape with rich archaeological, architectural and cultural history. Landscape detractors include, the existing N25 road corridor, areas of	Regional/ National This area also includes and contributes to the landscape character of the River Barrow valley, which is judged to	Strongly undulating pasture farmland in combination with areas of woodland and river valley are locally common.	Medium	As a whole this character would be difficult to substitute.	Disruption to landform significant. Where the route travels up a steep hillside and over a stream valley from Craiguenakil to Carrickcloney (in a combination of fill embankments and cutting) there would significant adverse effects on landscape character of this sloping land which connects with the River Barrow valley. Large cutting though some the highest contours of a ridge of high	Ensure planting species are appropriate to surroundings.

	ribbon development and electricity pylons in the south of the area.	be of regional/ national importance				ground at Aylwardstown and south to Rathinure: Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). Significant adverse effects on this ridge of high ground. Travels through a local valley (mostly on fill embankments) between Rathinure and Redgap, which is visually connected with the River Barrow valley corridor and views from along this corridor. Thus, potential significant adverse effects on views through this valley and on landscape character of the wider river Barrow valley. From Ballyrownagh to Slieveroe roundabout (the route mostly on fill embankments) follows a local stream valley parallel to the existing N25. Following this lower ground will help reduce potential wider visibility of this section of the route. However, it will affect the setting of this stream valley itself and associated wetland vegetation. Significant adverse effects on tranquillity of landscape. Loss of some areas of woodland, hedgerows and hedgerow trees. Loss of agricultural land.	

Qualitative Comments:

The proposed route travels for circa. 8.7km through this character area of which circa. 8.3km of carriageway will cross through greenfield land. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 1.8km distance to the east of the existing N25 Road in places). Horizontal alignment of carriageways would be in keeping with existing route patterns. However vertical alignment cutting, and embankment slopes would significantly disrupt existing landform. In particular; where the route travels up a steep hillside and over a stream valley from Craiguenakil to Carrickcloney (in a combination of fill embankments and cutting) there would significant adverse effects on landscape character of this sloping land which connects with the River Barrow valley.

The route forms a large cutting though some the highest contours of a ridge of high ground at Aylwardstown and south to Rathinure: a Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). There would be significant adverse effects on this ridge of high ground.

Travels through a local valley (mostly on fill embankments) between Rathinure and Redgap, which is visually connected with the River Barrow valley corridor and views from along this corridor. Thus, potential significant adverse effects on views through this valley and on the landscape character of the wider River Barrow valley.

From Ballyrownagh to Slieveroe roundabout the route (mostly on fill embankments) follows a local stream valley parallel to the existing N25. Following these areas of lower ground will help reduce potential wider visibility of this section of the route. However, it will affect the setting of this stream valley itself and associated wetland vegetation.

There would be adverse effects rural tranquillity as the route travels in existing tranquil land to the east of the existing N25 road.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Impact Significance: **Large Adverse (negative) effect.**

Table 2.4.17, TAG Worksheet: Landscape Character Area E: South Eastern Uplands Lime Green Route Option Landscape Impact							
Features	**Description**	**Scale it matters**	**Rarity**	**Importance**	**Substitutability**	**Impact**	**Mitigation**
Pattern	Strongly undulating topography including a combination of hills and ridgelines with steep sides and in places dissected by stream valleys whose waters flow into the adjacent River Barrow. Stream valleys are often narrow and enclosed with steep sides in the environs of Glenmore in particular. Lands are more open and slope more broadly along the River Barrow valley. There is a rock outcrop and local landmark cross at Carriganurra. Topographic levels range from c.2m AOD near Bearstown Bridge, c.10m AOD at Glenmore Village, c.129m AOD at a hill west of Glenmore/ Robinstown, to c.146m AOD to a ridge at Aylwardstown, c.82m AOD at Rathinure, c.133m AOD to a hill at Redgap, and c.130m AOD to a ridge at Davidstown and c.68m AOD at Slieveroe roundabout. A Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan) is located at Aylwardstown and Davidstown. The existing N25 road, travels upon contours ranging from c.10m AOD west of Bearstown to c.44m AOD at Glenmore, to c.101m AOD east of Ballynaraha, then from here descending to c.78m AOD east of Carriganurra, and c.68m AOD at Slieveroe roundabout.	Local/ Regional	Locally Common	Medium	Field pattern may be reproduced. Undulating topography could be reproduced.	Circa. 2km online widening at north end of route. Circa. 6.8km of carriageway will cross through greenfield land within this character area. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 0.7km distance to the east of the existing N25 Road in places). 2.3km of the route travels to the west of the existing N25. Route will cross approximately 7 roads or farm tracks. Route will not cross a disused railway line. Route will cross approximately 2 rivers/ streams. Horizontal alignment of carriageways would be in keeping with existing route patterns. Some field pattern severance. Vertical alignment cutting and embankment slopes would disrupt existing landform. Large cutting between chainage: 2060 and 3580 (Max depth cut 16.00m), 6800 and 7340 (Max depth cut 26m), 7700 and 8140 (Max depth cut 8m).	Embankment and cutting slopes graded out. Temporary CPO of additional land so as to grade out steep embankments and cuttings into surrounding landform and return them to agricultural use. New planting to restore severed field pattern.

	Small, medium to large rectangular and irregular shaped fields enclosed by hedgerows and tree lines. Some long-distance vistas along the River Barrow and to hills to the east including Slieve Coillte. Long distance views to lowland plains to the west, and the Waterford City suburbs to the south from ridge of high ground near Davidstown. Long distance panoramic 360-degree views from elevated/ open areas where hedgerows are low, otherwise an enclosed landscape at lower elevations between hills/ ridgelines, within stream valleys and where hedgerows are high or woodland occurs. Views from within this area towards various hills and ridgelines of high ground. Views along stream valleys and towards the River Barrow. Views within enclosed often wooded narrow stream valleys. Irregular grid of minor roads crosses the area. Existing N25 is in a sinuous alignment.					Large fill between chainage; 6040 and 6600 (Max depth fill 18.5m). The route follows the existing N25 alignment to south of Glenmore. Thus, avoiding effects on Glenmore and narrow stream valleys. From south of Glenmore, the route will cut though some of the highest contours of a ridge of high ground between Ballynamona and Aylwardstown and south to Gaulstown. Significant adverse effects on this ridge of high ground. Descends into a local stream valley at Ballyrahan including an ecological sensitive area of land cover. Significant adverse effects on local stream valley at Ballyrahan. Crosses over existing N25 towards Carriganurra. At Carriganurra the route goes through a local rock outcrop (with cross on top) which is a prominent local landmark. Significant adverse effects on this feature.	
Tranquillity	Rural settlement and numerous isolated dwellings in combination with traffic on the N25 corridor reduces the tranquilly of this area. However, the areas of land away (and visually disconnected) from the immediate N25 corridor, are often experienced as remote and tranquil.	Local	Locally Common	High	Once lost is difficult to recover.	Limited effects on tranquillity. The route travels through areas on/ near the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity. The most adverse effects will be experienced in the elevated lands furthest to the east from the existing N25 road (including Aylwardstown and Ballyhobuck).	None is possible without further disruption to pattern, landform and visual amenity.
Cultural	Elements of historic character include the historic field pattern and boundaries including hedgerows/	Local/ Regional/ National	Locally Common	High	Cultural features may not be replaced.	Fields will be bisected. Route will cross over various minor	Embankment and cutting slopes graded out.

	hedge banks, country lanes and minor roads/ tracks. Archaeological heritage includes numerous ringforts, enclosures and fulacht fia. Church and graveyards and Bullaun stones. Architectural heritage includes various National Inventory of Architectural Heritage (NIAH) structures at Glenmore village. Record of Protected Structures (RPS) includes 2 railway bridges, Aylwardstown House, Ringvile House, O'Donovans Corn Mill and a Wayside cross. Remnants of demesne Landscape and Historic Gardens include Aylwardstown House, Rochestown House, Ringville House, Ballinlay Castle and Frazers Hall. Settlements: Village settlement at Glenmore. Settlement clusters at Ballybraghy, Ballynaraha, Curraghmore, Ballinlaw, Rochestown, Rathinure, Ballyhobuck, Aylwardstown, Kilmakevoge, Carrickcloney and Bearstown. Other settlement consists of numerous one-off housing and farm buildings dotted throughout area. Many examples of traditional farmhouses and farmyards. Rock outcrop and local landmark cross at Carriganurra.					roads/tracks and disused railway. Loss of farmsteads: None Loss of dwellings: None. At Carriganurra the route goes through a local rock outcrop (with cross on top) which is a prominent local landmark. Significant adverse effects on this feature	New planting to restore severed field pattern. Adjustment to alignment to avoid cross at Carriganurra.
Landcover	Primarily pasture with some arable land with medium to large field sizes and predominantly hedgerow boundaries. Agricultural lands appear well maintained.	Local/ Regional/ National	Locally Common	High	Undeveloped agricultural land, wetland and woodland difficult to reproduce.	Loss of farmland, hedgerows and trees to carriageways, cutting and fill embankments. Potential loss of some existing vegetation along the existing N25	Replanting of trees and hedgerows and woodland. Including off-site planting.

	Hedgerows including tree lines. Areas of deciduous, coniferous and mixed woodland. Areas of scrub. Long linear areas of riparian woodland associated with the narrow stream valleys near Glenmore in the north of the study area. Large blocks of woodland in southern half of the LCA in the study area. Clumps of trees associated with some farmsteads and settlement. Area includes land associated with the River Barrow and tributaries designated as Special Areas of Conservation/ proposed Natural Heritage areas. Area includes various Ecological Sensitive Area sites of local or county importance (Refer to Ecology chapter for details).					road. Descends into local stream valley at Ballyrahan including an ecological sensitive area of land cover. Minor loss of woodland/ scrub at ch.7550 (ecological sensitive area). Skirts ecological sensitive area of land cover at ch. 8500.	
Summary of character	Very attractive rural pastoral and river landscape. Undulating topography with variation in elevation. Views often dramatic from open and elevated areas to distant uplands and lowlands and along the River Barrow Valley. Attractive appearance and is tranquil (outside of the N25 road corridor). Historic landscape with rich archaeological, architectural and cultural history. Landscape detractors include, the existing N25 road corridor, areas of ribbon development and electricity pylons in the south of the area.	Regional/ National This area also includes and contributes to the landscape character of the River Barrow valley, which is judged to be of regional/ national importance	Strongly undulating pasture farmland in combination with areas of woodland and river valley are locally common.	Medium	As a whole this character would be difficult to substitute.	Follows the existing N25 alignment to south of Glenmore. Thus, avoiding effects on Glenmore and adjacent narrow stream valleys. From south of Glenmore, the route will cut though some of the highest contours of a ridge of high ground between Ballynamona and Aylwardstown and south to Gaulstown. Significant adverse effects on this ridge of high ground and the landscape character of this elevated area. Descends into a local stream valley at Ballyrahan including an ecological sensitive area of land cover. Significant adverse effects on local stream valley at Ballyrahan. Crosses over existing N25 towards Carriganurra. At Carriganurra the	Ensure planting species are appropriate to surroundings.

						route goes through a local rock outcrop (with cross on top) which is a prominent local landmark. Significant adverse effects on this feature. Limited effects on tranquillity. The route travels through areas on/ near the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity. The most adverse effects will be experienced in the elevated lands furthest to the east from the existing N25 road (including Aylwardstown and Ballyhobuck). Loss of some areas of woodland, hedgerows and hedgerow trees. Loss of agricultural land.	

Qualitative Comments:

The proposed route travels for circa. 8.9km through this character area of which circa. 6.8km of carriageway will cross through greenfield land and circa. 2km online. Most of the route within this character area travels in lands to the east of the existing N25 Road (up to 0.7km distance to the east of the existing N25 Road in places). 2.3km of the route travels to the west of the existing N25.

Horizontal alignment of carriageways would be in keeping with existing route patterns. Some field pattern severance. Vertical alignment cutting and embankment slopes would disrupt existing landform. The route follows the existing N25 alignment to south of Glenmore, thus, avoiding effects on Glenmore and adjacent narrow stream valleys.

From south of Glenmore, the route will cut though some of the highest contours of a ridge of high ground between Ballynamona and Aylwardstown and south to Gaulstown. Significant adverse effects on this ridge of high ground and the landscape character of this elevated area.

Descends into local stream valley at Ballyrahan including an ecological sensitive area of land cover. Significant adverse effects on local stream valley at Ballyrahan.

Crosses over the existing N25 towards Carriganurra. At Carriganurra the route goes through a local rock outcrop (with cross on top) which is a prominent local landmark. Significant adverse effects on this feature.

Limited effects on tranquillity. The route travels through areas on/ near the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity. The most adverse effects will be experienced in the elevated lands furthest to the east from the existing N25 road (including Aylwardstown and Ballyhobuck).

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Impact Significance: **Moderate Adverse (negative) effect**

Table 2.4.18, TAG Worksheet: Landscape Character Area E: South Eastern Uplands Magenta Route Option Landscape Impact							
Features	**Description**	**Scale it matters**	**Rarity**	**Importance**	**Substitutability**	**Impact**	**Mitigation**
Pattern	Strongly undulating topography including a combination of hills and ridgelines with steep sides and in places dissected by stream valleys whose waters flow into the adjacent River Barrow. Stream valleys are often narrow and enclosed with steep sides in the environs of Glenmore in particular. Lands are more open and slope more broadly along the River Barrow valley. There is a rock outcrop and local landmark cross at Carriganurra. Topographic levels range from c.2m AOD near Bearstown Bridge, c.10m AOD at Glenmore Village, c.129m AOD at a hill west of Glenmore/ Robinstown, to c.146m AOD to a ridge at Aylwardstown, c.82m AOD at Rathinure, c.133m AOD to a hill at Redgap, and c.130m AOD to a ridge at Davidstown and c.68m AOD at Slieveroe roundabout. A Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan) is located at Aylwardstown and Davidstown. The existing N25 road, travels upon contours ranging from c.10m AOD west of Bearstown to c.44m AOD at Glenmore, to c.101m AOD east of Ballynaraha, then from here descending to c.78m AOD east of Carriganurra, and c.68m AOD at Slieveroe roundabout. Small, medium to large rectangular	Local/ Regional	Locally Common	Medium	Field pattern may be reproduced. Undulating topography could be reproduced.	Circa. 5.2km online of existing N25 route. Circa. 4.1km of carriageway will cross through greenfield land within this character area. Most of the route within this character area travels in lands online with the existing N25 road or in areas immediately adjacent to the existing N25 road. Route will cross approximately 4 roads or farm tracks. Route will not cross a disused railway line. Route will cross approximately 2 rivers/ streams. Horizontal alignment of carriageways would be in keeping with existing route patterns. Some field pattern severance. Vertical alignment cutting and embankment slopes would lead to no significant disruption to existing landform. No significant areas of cut and fill, the route follows existing contours/ levels very well. Generally, the route follows the existing N25 alignment towards Ballyrownagh. Thus, avoiding effects on Glenmore, narrow stream valleys and ridges of surrounding higher ground either side of the existing N25 Road.	Embankment and cutting slopes graded out. Temporary CPO of additional land so as to grade out steep embankments and cuttings into surrounding landform and return them to agricultural use. New planting to restore severed field pattern.

	and irregular shaped fields enclosed by hedgerows and tree lines. Some long-distance vistas along the River Barrow and to hills to the east including Slieve Coillte. Long distance views to lowland plains to the west, and the Waterford City suburbs to the south from ridge of high ground near Davidstown. Long distance panoramic 360-degree views from elevated/ open areas where hedgerows are low, otherwise an enclosed landscape at lower elevations between hills/ ridgelines, within stream valleys and where hedgerows are high or woodland occurs. Views from within this area towards various hills and ridgelines of high ground. Views along stream valleys and towards the River Barrow. Views within enclosed often wooded narrow stream valleys. Irregular grid of minor roads crosses the area. Existing N25 is in a sinuous alignment.					The route diverts west from the existing N25 towards Carriganurra. At Carriganurra the route travels close to a local rock outcrop (with cross on top) which is a prominent local landmark. With mitigation this landmark may be successfully integrated.	
Tranquillity	Rural settlement and numerous isolated dwellings in combination with traffic on the N25 corridor reduces the tranquilly of this area. However, the areas of land away (and visually disconnected) from the immediate N25 corridor, are often experienced as remote and tranquil.	Local	Locally Common	High	Once lost is difficult to recover.	Limited effects to no change on tranquillity. The route travels through areas already on/ adjacent to the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity.	None is possible without further disruption to pattern, landform and visual amenity.
Cultural	Elements of historic character include the historic field pattern and boundaries including hedgerows/ hedge banks, country lanes and minor roads/ tracks.	Local/ Regional/ National	Locally Common	High	Cultural features may not be replaced.	Fields will be bisected. Route will cross over various minor roads/tracks and disused railway. Loss of farmsteads: None	Embankment and cutting slopes graded out. New planting to restore severed field pattern.

	Archaeological heritage includes numerous ringforts, enclosures and fulacht fia. Church and graveyards and Bullaun stones. Architectural heritage includes various National Inventory of Architectural Heritage (NIAH) structures at Glenmore village. Record of Protected Structures (RPS) includes 2 railway bridges, Aylwardstown House, Ringvile House, O'Donovans Corn Mill and a Wayside cross. Remnants of demesne Landscape and Historic Gardens include Aylwardstown House, Rochestown House, Ringville House, Ballinlay Castle and Frazers Hall. Settlements: Village settlement at Glenmore. Settlement clusters at Ballybraghy, Ballynaraha, Curraghmore, Ballinlaw, Rochestown, Rathinure, Ballyhobuck, Aylwardstown, Kilmakevoge, Carrickcloney and Bearstown. Other settlement consists of numerous one-off housing and farm buildings dotted throughout area. Many examples of traditional farmhouses and farmyards. Rock outcrop and local landmark cross at Carriganurra.					Loss of dwellings: None. At Carriganurra the route goes close to a local rock outcrop (with cross on top) which is a prominent local landmark. With mitigation this landmark may be successfully integrated.	.
Landcover	Primarily pasture with some arable land with medium to large field sizes and predominantly hedgerow boundaries. Agricultural lands appear well maintained. Hedgerows including tree lines. Areas of deciduous, coniferous and	Local/ Regional/ National	Locally Common	High	Undeveloped agricultural land, wetland and woodland difficult to reproduce.	Loss of farmland, hedgerows and trees to carriageways, cutting and fill embankments. Potential loss of some existing vegetation along the existing N25 road. Loss of vegetation at ch.4700-5400	Replanting of trees and hedgerows and woodland. Including off-site planting.

	mixed woodland. Areas of scrub. Long linear areas of riparian woodland associated with the narrow stream valleys near Glenmore in the north of the study area. Large blocks of woodland in southern half of the LCA in the study area. Clumps of trees associated with some farmsteads and settlement. Area includes land associated with the River Barrow and tributaries designated as Special Areas of Conservation/ proposed Natural Heritage areas. Area includes various Ecological Sensitive Area sites of local or county importance (Refer to Ecology chapter for details).					(ecological sensitive area).	
Summary of character	Very attractive rural pastoral and river landscape. Undulating topography with variation in elevation. Views often dramatic from open and elevated areas to distant uplands and lowlands and along the River Barrow Valley. Attractive appearance and is tranquil (outside of the N25 road corridor). Historic landscape with rich archaeological, architectural and cultural history. Landscape detractors include, the existing N25 road corridor, areas of ribbon development and electricity pylons in the south of the area.	Regional/ National This area also includes and contributes to the landscape character of the River Barrow valley, which is judged to be of regional/ national importance	Strongly undulating pasture farmland in combination with areas of woodland and river valley are locally common.	Medium	As a whole this character would be difficult to substitute.	No significant areas of cut and fill, the route follows existing contours/ levels very well. Generally, the route follows the existing N25 alignment towards Ballyrownagh. Thus, avoiding effects on Glenmore, narrow stream valleys and ridges of surrounding higher ground either side of the existing N25 Road. The route diverts west from the existing N25 towards Carriganurra. At Carriganurra the route travels close to a local rock outcrop (with cross on top) which is a prominent local landmark. With mitigation this landmark may be successfully integrated. Limited effects to no change on tranquillity. The route travels through areas already on/ adjacent to the existing N25 road corridor. The traffic	Ensure planting species are appropriate to surroundings.

						on the existing N25 road already affects tranquillity. Loss of some areas of woodland, hedgerows and hedgerow trees. Loss of agricultural land.	

Qualitative Comments:

The proposed route travels for circa. 9.3km through this character area of which circa. 4.1km of carriageway will cross through greenfield land and circa. 5.2km online. Generally, the route follows the existing N25 alignment towards Ballyrownagh. Thus, avoiding effects on; Glenmore, narrow stream valleys and ridges of surrounding higher ground either side of the existing N25 Road.

The route diverts west from the existing N25 towards Carriganurra. At Carriganurra the route travels close to a local rock outcrop (with cross on top) which is a prominent local landmark. With mitigation this landmark may be successfully integrated.

Limited effects to no change on tranquillity. The route travels through areas already on/ adjacent to the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Impact Significance: **Slight Adverse (negative) effect**

Table 2.4.19, TAG Worksheet: Landscape Character Area E: South Eastern Uplands Navy Route Option Landscape Impact							
Features	**Description**	**Scale it matters**	**Rarity**	**Importance**	**Substitutability**	**Impact**	**Mitigation**
Pattern	Strongly undulating topography including a combination of hills and ridgelines with steep sides and in places dissected by stream valleys whose waters flow into the adjacent River Barrow. Stream valleys are often narrow and enclosed with steep sides in the environs of Glenmore in particular. Lands are more open and slope more broadly along the River Barrow valley. There is a rock outcrop and local landmark cross at Carriganurra. Topographic levels range from c.2m AOD near Bearstown Bridge, c.10m AOD at Glenmore Village, c.129m AOD at a hill west of Glenmore/ Robinstown, to c.146m AOD to a ridge at Aylwardstown, c.82m AOD at Rathinure, c.133m AOD to a hill at Redgap, and c.130m AOD to a ridge at Davidstown and c.68m AOD at Slieveroe roundabout. A Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan) is located at Aylwardstown and Davidstown. The existing N25 road, travels upon contours ranging from c.10m AOD west of Bearstown to c.44m AOD at Glenmore, to c.101m AOD east of Ballynaraha, then from here descending to c.78m AOD east of Carriganurra, and c.68m AOD at Slieveroe roundabout.	Local/ Regional	Locally Common	Medium	Field pattern may be reproduced. Undulating topography could be reproduced.	Circa. 2.6km online of existing N25 route. Circa. 6.8km of carriageway will cross through greenfield land within this character area. Most of the route within this character area travels in lands online with the existing N25 road or in areas immediately adjacent to the existing N25 road. Route will cross approximately 3 roads or farm tracks. Route will not cross a disused railway line. Route will cross approximately 2 rivers/ streams. Horizontal alignment of carriageways would be in keeping with existing route patterns. Some field pattern severance. Vertical alignment cutting and embankment slopes would lead to no significant disruption to existing landform. No significant areas of cut and fill (except for one area of large fill between chainage; 5800 and 6280 (Max depth fill 14m).In genral the route follows existing contours/ levels very well. Follows the existing N25 road alignment south of Glenmore. Thus,	Embankment and cutting slopes graded out. Temporary CPO of additional land so as to grade out steep embankments and cuttings into surrounding landform and return them to agricultural use. New planting to restore severed field pattern.

	Small, medium to large rectangular and irregular shaped fields enclosed by hedgerows and tree lines. Some long-distance vistas along the River Barrow and to hills to the east including Slieve Coillte. Long distance views to lowland plains to the west, and the Waterford City suburbs to the south from ridge of high ground near Davidstown. Long distance panoramic 360-degree views from elevated/ open areas where hedgerows are low, otherwise an enclosed landscape at lower elevations between hills/ ridgelines, within stream valleys and where hedgerows are high or woodland occurs. Views from within this area towards various hills and ridgelines of high ground. Views along stream valleys and towards the River Barrow. Views within enclosed often wooded narrow stream valleys. Irregular grid of minor roads crosses the area. Existing N25 is in a sinuous alignment.					avoiding effects on Glenmore and adjacent narrow stream valleys. From Ballinclare to south of Davidstown the route continues generally parallel to the existing N25 road corridor and travels along the lower side slopes of a ridge of high ground, avoiding the higher contours. Travels on higher contours of a ridge of higher ground from Davidstown to Carriganurra, however vertical alignment follows existing contours well and cut and fill is generally not significant.	
Tranquillity	Rural settlement and numerous isolated dwellings in combination with traffic on the N25 corridor reduces the tranquilly of this area. However, the areas of land away (and visually disconnected) from the immediate N25 corridor, are often experienced as remote and tranquil.	Local	Locally Common	High	Once lost is difficult to recover.	Limited effects to no change on tranquillity. The route travels through areas already on/ adjacent to the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity.	None is possible without further disruption to pattern, landform and visual amenity.
Cultural	Elements of historic character include the historic field pattern and boundaries including hedgerows/ hedge banks, country lanes and minor	Local/ Regional/ National	Locally Common	High	Cultural features may not be replaced.	Fields will be bisected. Route will cross over various minor roads/tracks.	Embankment and cutting slopes graded out. New planting to restore

	roads/ tracks. Archaeological heritage includes numerous ringforts, enclosures and fulacht fia. Church and graveyards and Bullaun stones. Architectural heritage includes various National Inventory of Architectural Heritage (NIAH) structures at Glenmore village. Record of Protected Structures (RPS) includes 2 railway bridges, Aylwardstown House, Ringvile House, O'Donovans Corn Mill and a Wayside cross. Remnants of demesne Landscape and Historic Gardens include Aylwardstown House, Rochestown House, Ringville House, Ballinlay Castle and Frazers Hall. Settlements: Village settlement at Glenmore. Settlement clusters at Ballybraghy, Ballynaraha, Curraghmore, Ballinlaw, Rochestown, Rathinure, Ballyhobuck, Aylwardstown, Kilmakevoge, Carrickcloney and Bearstown. Other settlement consists of numerous one-off housing and farm buildings dotted throughout area. Many examples of traditional farmhouses and farmyards. Rock outcrop and local landmark cross at Carriganurra.					Loss of farmsteads: None Loss of dwellings: None. Potential adverse effects on setting of local monuments at Davidstown.	severed field pattern.
Landcover	Primarily pasture with some arable land with medium to large field sizes and predominantly hedgerow boundaries. Agricultural lands appear well maintained. Hedgerows including tree lines.	Local/ Regional/ National	Locally Common	High	Undeveloped agricultural land, wetland and woodland difficult to reproduce.	Loss of farmland, hedgerows and trees to carriageways, cutting and fill embankments. Potential loss of some existing vegetation along the existing N25 road.	Replanting of trees and hedgerows and woodland. Including off-site planting.

	Areas of deciduous, coniferous and mixed woodland. Areas of scrub. Long linear areas of riparian woodland associated with the narrow stream valleys near Glenmore in the north of the study area. Large blocks of woodland in southern half of the LCA in the study area. Clumps of trees associated with some farmsteads and settlement. Area includes land associated with the River Barrow and tributaries designated as Special Areas of Conservation/ proposed Natural Heritage areas. Area includes various Ecological Sensitive Area sites of local or county importance (Refer to Ecology chapter for details).					Loss of vegetation at ch.4200-4300 (ecological sensitive area). Loss of vegetation at ch.4800-5000 (ecological sensitive area). Loss of vegetation at ch.6100 (ecological sensitive area). Loss of vegetation at ch.7000-7600 (ecological sensitive area). Loss of vegetation at ch.7950 (ecological sensitive area).	
Summary of character	Very attractive rural pastoral and river landscape. Undulating topography with variation in elevation. Views often dramatic from open and elevated areas to distant uplands and lowlands and along the River Barrow Valley. Attractive appearance and is tranquil (outside of the N25 road corridor). Historic landscape with rich archaeological, architectural and cultural history. Landscape detractors include, the existing N25 road corridor, areas of ribbon development and electricity pylons in the south of the area.	Regional/ National This area also includes and contributes to the landscape character of the River Barrow valley, which is judged to be of regional/ national importance	Strongly undulating pasture farmland in combination with areas of woodland and river valley are locally common.	Medium	As a whole this character would be difficult to substitute.	Vertical alignment cutting and embankment slopes would lead to no significant disruption to existing landform. No significant areas of cut and fill (except for one area of large fill between chainage; 5800 and 6280 (Max depth fill 14m).In general the route follows existing contours/ levels very well. Follows the existing N25 road alignment south of Glenmore. Thus, avoiding effects on Glenmore and adjacent narrow stream valleys. From Ballinclare to south of Davidstown the route continues generally parallel to the existing N25 road corridor and travels along the lower side slopes of a ridge of high ground, avoiding the higher contours. Travels on higher contours of ridge of	Ensure planting species are appropriate to surroundings.

						higher ground from Davidstown to Carriganurra, however vertical alignment follows existing contours well and cut and fill is generally not significant. Loss of some areas of woodland, hedgerows and hedgerow trees. Loss of agricultural land. Effects numerous ecological sensitive areas.	

Qualitative Comments:

The proposed route travels for circa. 9.5km through this character area of which circa. 6.8km of carriageway will cross through greenfield land and circa. 2.6km online.

Vertical alignment cutting and embankment slopes would lead to no significant disruption to existing landform. No significant areas of cut and fill (except for one area of large fill between chainage; 5800 and 6280 (Max depth fill 14m). In general, the route follows existing contours/ levels very well.

Follows the existing N25 road alignment south of Glenmore, thus avoiding effects on Glenmore and adjacent narrow stream valleys.

From Ballinclare to south of Davidstown the route continues generally parallel to the existing N25 road corridor and travels along the lower side slopes of a ridge of high ground, avoiding the higher contours.

Travels on higher contours of ridge of higher ground from Davidstown to Carriganurra, however vertical alignment follows existing contours well and cut and fill is generally not significant.

Limited effects to no change on tranquillity. The route travels through areas already on/ adjacent to the existing N25 road corridor. The traffic on the existing N25 road already affects tranquillity.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Impact Significance: **Slight Adverse (negative) effect**

Table 2.4.20, TAG Worksheet: Landscape Character Area E: South Eastern Uplands Purple Route Option Landscape Impact							
Features	**Description**	**Scale it matters**	**Rarity**	**Importance**	**Substitutability**	**Impact**	**Mitigation**
Pattern	Strongly undulating topography including a combination of hills and ridgelines with steep sides and in places dissected by stream valleys whose waters flow into the adjacent River Barrow. Stream valleys are often narrow and enclosed with steep sides in the environs of Glenmore in particular. Lands are more open and slope more broadly along the River Barrow valley. There is a rock outcrop and local landmark cross at Carriganurra. Topographic levels range from c.2m AOD near Bearstown Bridge, c.10m AOD at Glenmore Village, c.129m AOD at a hill west of Glenmore/ Robinstown, to c.146m AOD to a ridge at Aylwardstown, c.82m AOD at Rathinure, c.133m AOD to a hill at Redgap, and c.130m AOD to a ridge at Davidstown and c.68m AOD at Slieveroe roundabout. A Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan) is located at Aylwardstown and Davidstown. The existing N25 road, travels upon contours ranging from c.10m AOD west of Bearstown to c.44m AOD at Glenmore, to c.101m AOD east of Ballynaraha, then from here descending to c.78m AOD east of Carriganurra, and c.68m AOD at Slieveroe roundabout. Small, medium to large rectangular	Local/ Regional	Locally Common	Medium	Field pattern may be reproduced. Undulating topography could be reproduced.	Circa. 7.1km of carriageway will cross through greenfield land within this character area. Most of the route within this character area travels in lands to the west of the existing N25 road (up to circa. 1.6km distance) Route will cross approximately 5 roads or farm tracks. Route will not cross a disused railway line. Route will cross approximately 3 rivers/ streams. Horizontal alignment of carriageways travels in close proximity to narrow stream valleys west of Glenmore. Straight alignment at odds with the pattern of these valleys. Some field pattern severance. Vertical alignment cutting and embankment slopes would lead some disruption to existing landform. Large cutting between chainage: 2340 and 2720 (Max depth cut 10.00m), 1060-11180 (Max depth cut 8m). Large fill between chainage: 420 and 820 (Max depth fill 13.00m), 1460 and 1600 (Max depth fill16.00m), 1920 and 2300 (Max depth fill 8.8m), 2760 and 3120 (Max depth fill 12m).	Embankment and cutting slopes graded out. Temporary CPO of additional land so as to grade out steep embankments and cuttings into surrounding landform and return them to agricultural use. New planting to restore severed field pattern.

	and irregular shaped fields enclosed by hedgerows and tree lines. Some long-distance vistas along the River Barrow and to hills to the east including Slieve Coillte. Long distance views to lowland plains to the west, and the Waterford City suburbs to the south from ridge of high ground near Davidstown. Long distance panoramic 360-degree views from elevated/ open areas where hedgerows are low, otherwise an enclosed landscape at lower elevations between hills/ ridgelines, within stream valleys and where hedgerows are high or woodland occurs. Views from within this area towards various hills and ridgelines of high ground. Views along stream valleys and towards the River Barrow. Views within enclosed often wooded narrow stream valleys. Irregular grid of minor roads crosses the area. Existing N25 is in a sinuous alignment.					Travels in close proximity to the lower slopes and wooded vegetation of the system of narrow stream valleys north and west of Glenmore (especially at Mullennahone). Significant adverse effects on landscape character of this valley system. From south of Ardbeg towards Grogan and Nicholastown the route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible.	
Tranquillity	Rural settlement and numerous isolated dwellings in combination with traffic on the N25 corridor reduces the tranquilly of this area. However, the areas of land away (and visually disconnected) from the immediate N25 corridor, are often experienced as remote and tranquil.	Local	Locally Common	High	Once lost is difficult to recover.	Will lead to adverse effects on the tranquillity of land and wooded stream valleys currently located to the west of the existing N25 road. Will lead to adverse effects on the tranquillity of other lands far to the west of the existing N25.	None is possible without further disruption to pattern, landform and visual amenity.
Cultural	Elements of historic character include the historic field pattern and boundaries including hedgerows/ hedge banks, country lanes and minor roads/ tracks.	Local/ Regional/ National	Locally Common	High	Cultural features may not be replaced.	Fields will be bisected. Route will cross over various minor roads/tracks. Loss of farmsteads: None	Embankment and cutting slopes graded out. New planting to restore severed field pattern.

	Archaeological heritage includes numerous ringforts, enclosures and fulacht fia. Church and graveyards and Bullaun stones. Architectural heritage includes various National Inventory of Architectural Heritage (NIAH) structures at Glenmore village. Record of Protected Structures (RPS) includes 2 railway bridges, Aylwardstown House, Ringvile House, O'Donovans Corn Mill and a Wayside cross. Remnants of demesne Landscape and Historic Gardens include Aylwardstown House, Rochestown House, Ringville House, Ballinlay Castle and Frazers Hall. Settlements: Village settlement at Glenmore. Settlement clusters at Ballybraghy, Ballynaraha, Curraghmore, Ballinlaw, Rochestown, Rathinure, Ballyhobuck, Aylwardstown, Kilmakevoge, Carrickcloney and Bearstown. Other settlement consists of numerous one-off housing and farm buildings dotted throughout area. Many examples of traditional farmhouses and farmyards. Rock outcrop and local landmark cross at Carriganurra.					Loss of dwellings: None.	
Landcover	Primarily pasture with some arable land with medium to large field sizes and predominantly hedgerow boundaries. Agricultural lands appear well maintained. Hedgerows including tree lines. Areas of deciduous, coniferous and	Local/ Regional/ National	Locally Common	High	Undeveloped agricultural land, wetland and woodland difficult to reproduce.	Loss of farmland, hedgerows and trees to carriageways, cutting and fill embankments. Loss of some woodland at ch. 500. Loss of vegetation at ch. 2850-2950 (ecological sensitive area).	Replanting of trees and hedgerows and woodland. Including off-site planting.

	mixed woodland. Areas of scrub. Long linear areas of riparian woodland associated with the narrow stream valleys near Glenmore in the north of the study area. Large blocks of woodland in southern half of the LCA in the study area. Clumps of trees associated with some farmsteads and settlement. Area includes land associated with the River Barrow and tributaries designated as Special Areas of Conservation/ proposed Natural Heritage areas. Area includes various Ecological Sensitive Area sites of local or county importance (Refer to Ecology chapter for details).					Loss of vegetation at ch. 10900 (ecological sensitive area).	
Summary of character	Very attractive rural pastoral and river landscape. Undulating topography with variation in elevation. Views often dramatic from open and elevated areas to distant uplands and lowlands and along the River Barrow Valley. Attractive appearance and is tranquil (outside of the N25 road corridor). Historic landscape with rich archaeological, architectural and cultural history. Landscape detractors include, the existing N25 road corridor, areas of ribbon development and electricity pylons in the south of the area.	Regional/ National This area also includes and contributes to the landscape character of the River Barrow valley, which is judged to be of regional/ national importance	Strongly undulating pasture farmland in combination with areas of woodland and river valley are locally common.	Medium	As a whole this character would be difficult to substitute.	Horizontal alignment of carriageways travels in close proximity to narrow stream valleys west of Glenmore. Straight alignment at odds with the pattern of these valleys. Some field pattern severance. Vertical alignment cutting and embankment slopes would lead some disruption to existing landform. The route travels in close proximity to the lower slopes and wooded vegetation of the system of narrow stream valleys north and west of Glenmore (travels close to this intimate valley system especially at Mullennahone). Significant adverse effects on landscape character of this valley system. From south of Ardbeg towards Grogan and Nicholastown the route travels across/ sidelong on the steep side slopes of a locally prominent	Ensure planting species are appropriate to surroundings.

						ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Loss of some areas of woodland, hedgerows and hedgerow trees. Loss of agricultural land.	

Qualitative Comments:

The proposed route travels through greenfield land for circa. 7.1km through this character area.

Horizontal alignment of carriageways travels in close proximity to narrow stream valleys west of Glenmore. Straight alignment at odds with the pattern of these valleys. Some field pattern severance.

Vertical alignment cutting and embankment slopes would lead some disruption to existing landform.

The route travels in close proximity to the lower slopes and wooded vegetation of the system of narrow stream valleys north and west of Glenmore (travels close to this intimate valley system especially at Mullennahone). Significant adverse effects on landscape character of this valley system. From south of Ardbeg towards Grogan and Nicholastown the route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible.

Will lead to adverse effects on the tranquillity of land and wooded stream valleys currently located to the west of the existing N25 road and other lands located far to the west of the existing N25.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Impact Significance: **Large Adverse (negative) effect**

Table 2.4.21, TAG Worksheet: Landscape Character Area C: South Western Uplands Purple Route Option Landscape Impact							
Features	**Description**	**Scale it matters**	**Rarity**	**Importance**	**Substitutability**	**Impact**	**Mitigation**
Pattern	Undulating topography including a combination of hills and ridgelines often with steep sides. Lands are flatter to the north of the character area at Haggard, and transition to a hill at Arbeg, and ridge at of high ground Ballinclare and Grogan A Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan) is located at Ballincalre to Grogan from where it continues to Davidstown (within the South Eastern Uplands Character Area). Irregular grid of minor roads, lanes and farm tracks crosses the area. Small, medium to large rectangular and irregular shaped fields enclosed by hedgerows and tree lines. Some long-distance panoramic vistas from elevated areas at Ardbeg, Ballinclare and Grogan. Long distance panoramic 360-degree views from elevated/ open areas where hedgerows are low, otherwise an enclosed landscape in flatter areas. Views from within this area towards various hills and ridgelines of high ground.	Local/ Regional	Locally Common	Medium	Field pattern may be reproduced. Undulating topography could be reproduced.	Circa. 4km of carriageway will cross through greenfield land within this character area. Most of the route within this character area travels in lands to the west of the existing N25 road (up to circa. 1.5km distance) Route will cross approximately 6 roads or farm tracks. Route will cross approximately 0 rivers/ streams. Long straight sections of alignment of route at odds with curved landscape pattern. Some field pattern severance. Vertical alignment cutting and embankment slopes would lead some limited disruption to existing landform. Large cutting between chainage: 6620 and 6940 (Max depth cut 7.5). Large fill between chainage: 6000 and 6600 (Max depth fill 10.50m). Immediately east of Ardbeg this route travels close to a prominent hill of high ground at Ballinclare. From south of Ardbeg towards Grogan and Nicholastown the route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny	Embankment and cutting slopes graded out. Temporary CPO of additional land so as to grade out steep embankments and cuttings into surrounding landform and return them to agricultural use. New planting to restore severed field pattern.

						County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Significant adverse effects on side slopes of ridge of high ground from Ardbeg to Grogan and Nicholstown.	
Tranquillity	The areas of land away (and visually disconnected) from the immediate N25 corridor, are often experienced as remote and tranquil.	Local	Locally Common	High	Once lost is difficult to recover.	Will lead to adverse effects on the tranquillity of land currently located to the west of the existing N25 road.	None is possible without further disruption to pattern, landform and visual amenity.
Cultural	Elements of historic character include the historic field pattern and boundaries including hedgerows/ hedge banks, country lanes and minor roads/ tracks. Archaeological heritage includes numerous ringforts, unclassified castle, ring barrow and fulacht fia. Settlements: Settlement cluster at Ardbeg. Other settlement consists of numerous one-off housing and farm buildings dotted throughout area. Examples of traditional farmhouses and farmyards.	Local/ Regional/ National	Locally Common	High	Cultural features may not be replaced.	Fields will be bisected. Route will cross over various minor roads/tracks. Loss of farmsteads: None Loss of dwellings: None.	Embankment and cutting slopes graded out. New planting to restore severed field pattern.
Landcover	Primarily pasture with medium to large field sizes and predominantly hedgerow boundaries. Agricultural lands appear well maintained.	Local/ Regional/ National	Locally Common	High	Undeveloped agricultural land, and woodland difficult to	Loss of farmland, hedgerows and trees to carriageways, cutting and fill embankments.	Replanting of trees and hedgerows and woodland. Including off-site planting.

	Hedgerows including tree lines. Areas of deciduous, coniferous and mixed woodland. Areas of scrub. Area includes various Ecological Sensitive Area sites of local or county importance (Refer to Ecology chapter for details).				reproduce.	Loss of some plantation woodland at ch. 5400-5600.	
Summary of character	Very attractive rural pastoral landscape. Flat to undulating topography with variation in elevation. Views often dramatic from open and elevated areas to distant uplands, lowlands the River Barrow valley. Attractive appearance and is tranquil. Historic landscape with rich archaeological, architectural and cultural history. No detractors such as pylons.	Regional	Undulating pasture farmland is locally common.	Medium	As a whole this character would be difficult to substitute.	Long straight sections of route alignment at odds with curved landscape pattern. Some field pattern severance. Vertical alignment cutting and embankment slopes would lead some limited disruption to existing landform. Immediately east of Ardbeg this route travels close to a prominent hill of high ground at Ballinclare. From south of Ardbeg towards Grogan and Nicholastown the route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Significant adverse effects on side slopes of ridge of high ground from Ardbeg to Grogan and Nicholstown Loss of some areas of woodland, hedgerows and hedgerow trees. Loss of agricultural land.	Ensure planting species are appropriate to surroundings.

Qualitative Comments:

The proposed route travels through greenfield land for circa. 4km through this character area.

Long straight sections of alignment of route at odds with curved landscape pattern. Some field pattern severance. Vertical alignment cutting and embankment slopes would lead some limited disruption to existing landform.

Immediately east of Ardbeg this route travels close to a prominent hill of high ground at Ballinclare. From south of Ardbeg towards Grogan and Nicholastown the route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Significant adverse effects on side slopes of ridge of high ground from Ardbeg to Grogan and Nicholstown.

Will lead to adverse effects on the tranquillity of land currently located to the west of the existing N25 road.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Impact Significance: **Large Adverse (negative) effect**

Table 2.4.22, TAG Worksheet: Landscape Character Area C2: South Hills Transition Area, South Purple Route Option Landscape Impact							
Features	**Description**	**Scale it matters**	**Rarity**	**Importance**	**Substitutability**	**Impact**	**Mitigation**
Pattern	Transition area between elevated areas to lowlands. Within the study area includes a small area of land which forms part of the western side slope to a ridge of high ground west of Davidstown. A Principal Ridgeline (Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). Small, medium to large rectangular and irregular shaped pasture fields enclosed by hedgerows and tree lines. Some long-distance vistas to lowlands to the west.	Local/ Regional	Locally Common	Medium	Field pattern may be reproduced. Undulating topography could be reproduced.	Circa. 400m of carriageway will cross through greenfield land within this character area. Most of the route within this character area travels in lands to the west of the existing N25 road (up to circa. 1.6km distance) Route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible.	Embankment and cutting slopes graded out. Temporary CPO of additional land so as to grade out steep embankments and cuttings into surrounding landform and return them to agricultural use. New planting to restore severed field pattern.
Tranquillity	This area of land is away (and visually disconnected) from the immediate N25 corridor and is remote and tranquil.	Local	Locally Common	High	Once lost is difficult to recover.	Will lead to adverse effects on the tranquillity of land currently located to the west of the existing N25 road.	None is possible without further disruption to pattern, landform and visual amenity.
Cultural	Elements of historic character include the historic field pattern and boundaries including hedgerows/ hedge banks, country lanes and minor roads/ tracks.	Local/ Regional	Locally Common	Medium	Cultural features may not be replaced.	Fields will be bisected. Route will cross over various minor roads/tracks. Loss of farmsteads: None Loss of dwellings: None.	Embankment and cutting slopes graded out. New planting to restore severed field pattern.
Landcover	Pasture with medium to large field sizes and predominantly hedgerow boundaries. Agricultural lands appear well maintained. Hedgerows including tree lines.	Local	Locally Common	Medium	Undeveloped agricultural land, and woodland difficult to reproduce.	Loss of farmland, hedgerows and trees to carriageways, cutting and fill embankments.	Replanting of trees and hedgerows and woodland. Including off-site planting.

Summary of character	Attractive rural sloping pastoral landscape.	Local	Sloping pasture farmland is locally common.	Medium	As a whole this character would be difficult to substitute.	Route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible. Loss of some areas of woodland, hedgerows and hedgerow trees. Loss of agricultural land.	Ensure planting species are appropriate to surroundings.

Qualitative Comments:

The proposed route travels through greenfield land for circa. 400m through this character area.

Route travels across/ sidelong on the steep side slopes of a locally prominent ridge of higher ground (a Principal Ridgeline, Refer to Figure 8.3 Landscape Sensitivities, Kilkenny County Development Plan). The side slopes are integral to the ridge and provide large scale views over the surrounding countryside. The side slopes of this ridge are visible from a wide surrounding area extending far to the west, and the route in this location may be widely visible.
Loss of some areas of woodland, hedgerows and hedgerow trees.

Will lead to adverse effects on the tranquillity of land currently located to the west of the existing N25 road.

Loss of some areas of woodland, hedgerows and hedgerow trees and loss of agricultural land.

Impact Significance: **Moderate Adverse (negative) effect**

2.4.7. TAG Significance Criteria

TAG Significance Criteria

Table 2.4.23: TAG Significance Criteria	
Score	**Comment**
Large beneficial (positive) effect	• The scheme provides an opportunity to greatly enhance the landscape because • It greatly enhances the character (including quality and value) of the landscape • It creates an iconic high-quality feature and/or series of elements • It enables a sense of place, scale and quality to be restored in an area formerly of high landscape quality • Note that very few, if any, schemes are likely to merit this score.
Moderate beneficial (positive) effect	• The scheme provides an opportunity to enhance the landscape because: • It fits very well with the scale, landform and pattern of the landscape • There is potential, through environmental design measures, to enable the restoration of characteristics, partially lost or diminished as the result of changes resulting from intensive farming or inappropriate development • It will enable a sense of place and scale to be restored through well-designed planting and environmental design measures, that is, characteristics are enhanced through the use of local materials and species used to fit the scheme into the landscape • It enables some sense of quality to be restored or enhanced through beneficial landscaping and sensitive design in a landscape which is not of any formally recognised quality • It furthers government objectives to regenerate degraded countryside
Slight beneficial (positive) effect	The scheme: • fits well with the scale, landform and pattern of the landscape • incorporates environmental design measures to ensure they will blend in well with surrounding landscape • will enable some sense of place and scale to be restored through well-designed planting and environmental design measures • maintains or enhances existing landscape character in an area which is not a designated landscape, nor vulnerable to change • avoids conflict with government policy towards protection of the countryside
Neutral effect	The scheme is well designed to: • complement the scale, landform and pattern of the landscape • incorporate environmental design measures to ensure that the scheme will blend in well with surrounding landscape characteristics and landscape elements • avoid being visually intrusive nor have an adverse effect on the current level of tranquillity of the landscape through which the scheme passes • maintain existing landscape character in an area which is not a designated landscape, that is, neither national or local high quality, nor is it vulnerable to change • avoid conflict with government policy towards protection of the countryside
Slight adverse (negative) effect	The scheme: • does not quite fit the landform and scale of the landscape • although not very visually intrusive, will impact on certain views into and across the area • cannot be completely integrated because of the nature of the scheme itself or the character of the landscape

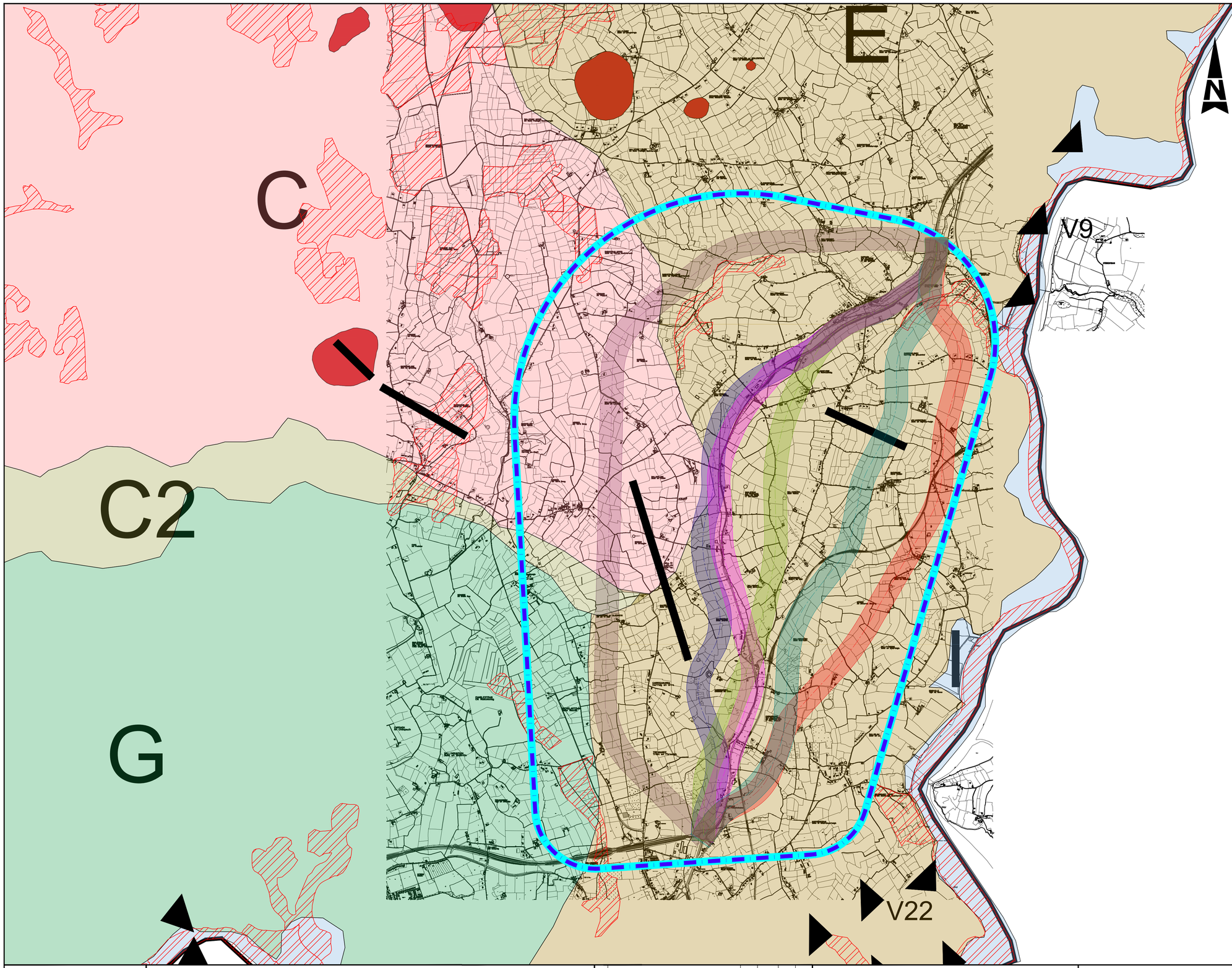
	through which it passes • affects an area of recognised landscape quality • conflicts with local authority policies for protecting the local character of the countryside
Moderate adverse (negative) effect	The scheme is: • out of scale with the landscape, or at odds with the local pattern and landform • visually intrusive and will adversely impact on the landscape • not possible to fully integrate, that is, environmental design measures will not prevent the scheme from scarring the landscape in the longer term as some features of interest will be partly destroyed or their setting reduced or removed • will have an adverse impact on a landscape of recognised quality or on vulnerable and important characteristics or elements • in conflict with local and national policies to protect open land and nationally recognised countryside
Large adverse (negative) effect	The scheme is very damaging to the landscape in that it: • is at considerable variance with the landform, scale and pattern of the landscape • is visually intrusive and would disrupt fine and valued views of the area • is likely to degrade, diminish or even destroy the integrity of a range of characteristics and elements and their setting • will be substantially damaging to a high quality or highly vulnerable landscape, causing it to change and be considerably diminished in quality • cannot be adequately integrated • is in serious conflict with government policy for the protection of nationally recognised countryside
Very large adverse (negative) effect	The scheme would result in exceptionally severe adverse impacts on the landscape because it: • is at complete variance with the landform, scale and pattern of the landscape • is highly visual and extremely intrusive, destroying fine and valued views both into and across the area • would irrevocably damage or degrade, badly diminish or even destroy the integrity of characteristics and elements and their setting • would cause a very high quality or highly vulnerable landscape to be irrevocably changed and its quality very considerably diminished • could not be integrated: there are no environmental design measures that would protect or replace the loss of a nationally important landscape • cannot be reconciled with government policy for the protection of nationally recognised countryside

2.4.8. Landscape Constraint Drawings

A1

0 10 100

DO NOT SCALE



GENERAL NOTES

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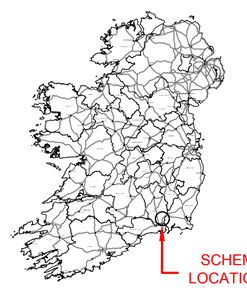
4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

KEY PLAN



LEGEND:

SYM.	DESCRIPTION
	COUNTY BOUNDARY
	STUDY AREA

LANDSCAPE CHARACTER

- LANDSCAPE CHARACTER AREA C- SOUTH WESTERN UPLANDS
- LANDSCAPE CHARACTER AREA E- SOUTH EASTERN UPLANDS
- LANDSCAPE CHARACTER AREA G- SOUTH KILKENNY LOWLANDS
- LANDSCAPE CHARACTER AREA C2- SOUTH HILLS TRANSITION AREA, SOUTH
- LANDSCAPE CHARACTER AREA I- BARROW VALLEY

PROTECTED VIEWS

- PROTECTED VIEWS KILKENNY COUNTY DEVELOPMENT PLAN 2014-2020

LANDSCAPE SENSITIVITIES

- ALTITUDE ABOVE 200 M
- PRINCIPAL RIDGELINE
- SENSITIVE LANDCOVER CORINE 2006

NOTES:

LANDSCAPE CHARACTER AREAS SHOWN HAVE BEEN TAKEN FROM THE KILKENNY COUNTY DEVELOPMENT PLAN 2014-2020, LANDSCAPE CHARACTER ASSESSMENT.

LANDSCAPE SENSITIVITIES, KILKENNY COUNTY DEVELOPMENT PLAN 2014-2020: SENSITIVE LANDCOVER, CORINE SURVEY 2006, PRINCIPAL RIDGELINES, LAND OVER 200M ALTITUDE. NOTE: LANDSCAPE SENSITIVITIES AND LANDSCAPE CHARACTER AREAS DO NOT DENOTE ANY LINE ON THE GROUND.

PROTECTED VIEWS, KILKENNY COUNTY DEVELOPMENT PLAN 2014-2020.
V22- VIEWS SOUTHWEST OVER THE RIVER SUIR AT GRANNAGH CASTLE TO THE COMERAGHS.
V9- VIEW TO THE SOUTH EAST OVER THE BARROW VALLEY, SOUTH OF NEW ROSS ON THE LS7512 BETWEEN THE JUNCTIONS WITH ROAD NUMBERS LP3432 AND THE N25.

THIS DRAWING HAS BEEN PRODUCED BY EAMONN BYRNE LANDSCAPE ARCHITECTS LTD IN RELATION TO THE N25 WATERFORD TO GLENMORE SCHEME. EAMONN BYRNE LANDSCAPE ARCHITECTS LTD ARE SUB-CONSULTANT TO ATKINS ON THE SCHEME.

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Transport Infrastructure Ireland

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PLEAN FORBARTHA NÁISIÚNTA

Rev	Description	By	Date	Chk'd	Auth

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Purpose: ISSUED FOR REVIEW

Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

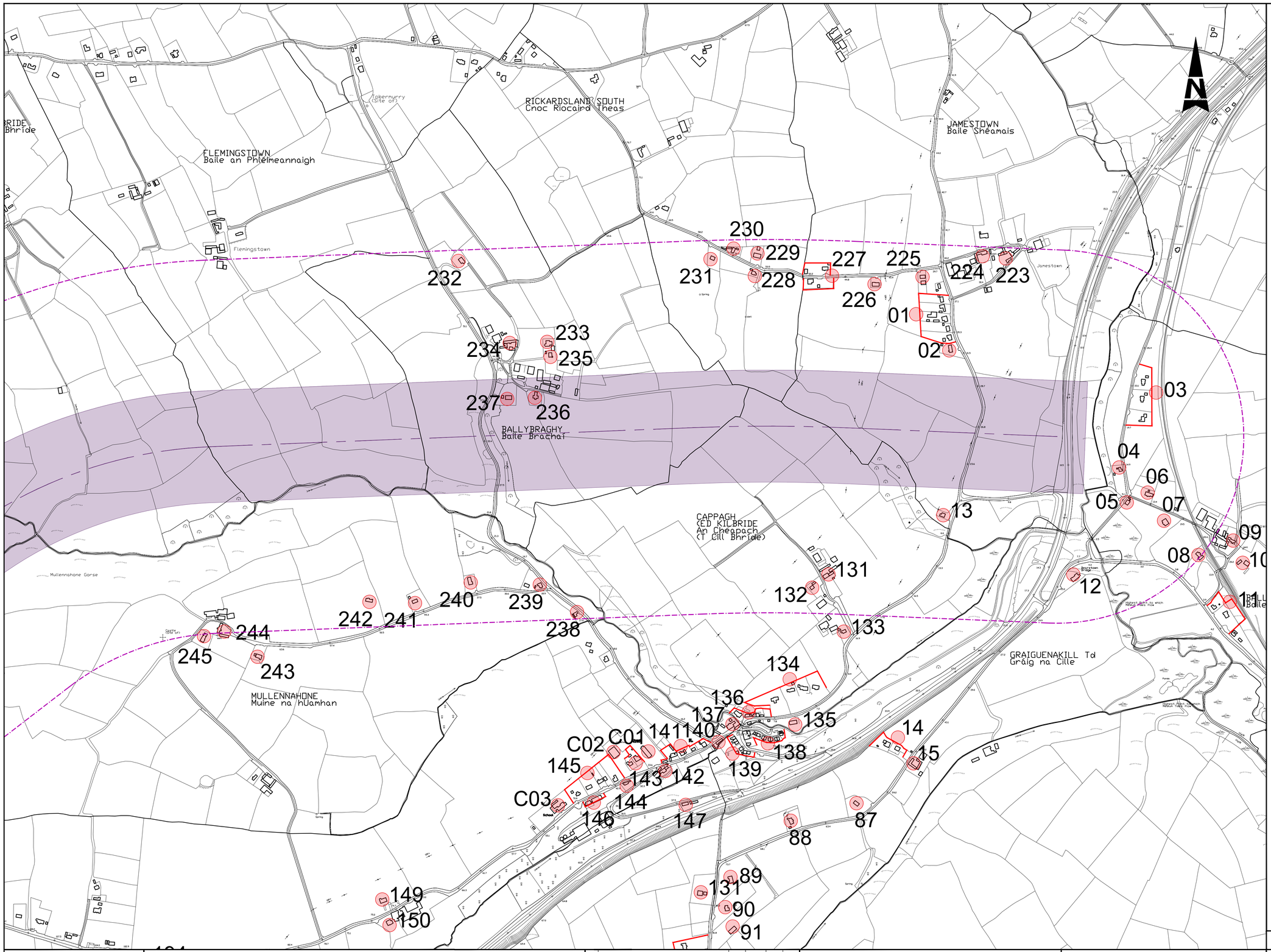
Title: LANDSCAPE CONSTRAINTS

Original Scale	Des/Drawn	Checked	Authorised
1:25000	JW	EB	EB
	Date 5/9/19	Date 05/09/19	Date 05/09/19

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0001	3

A1

DO NOT SCALE



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LEGEND:

SYM.	DESCRIPTION
	500M FROM CENTRELINE OF ROUTE
123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

Title: ROUTE OPTIONS/ VISUAL RECEPTORS PURPLE ROUTE

Original Scale	Des/Drawn	Checked	Authorised
1:5000	EK	EB	EB
	Date 15/6/2020	Date 15/6/2020	Date 15/6/2020

Status	Drawing Number	Rev
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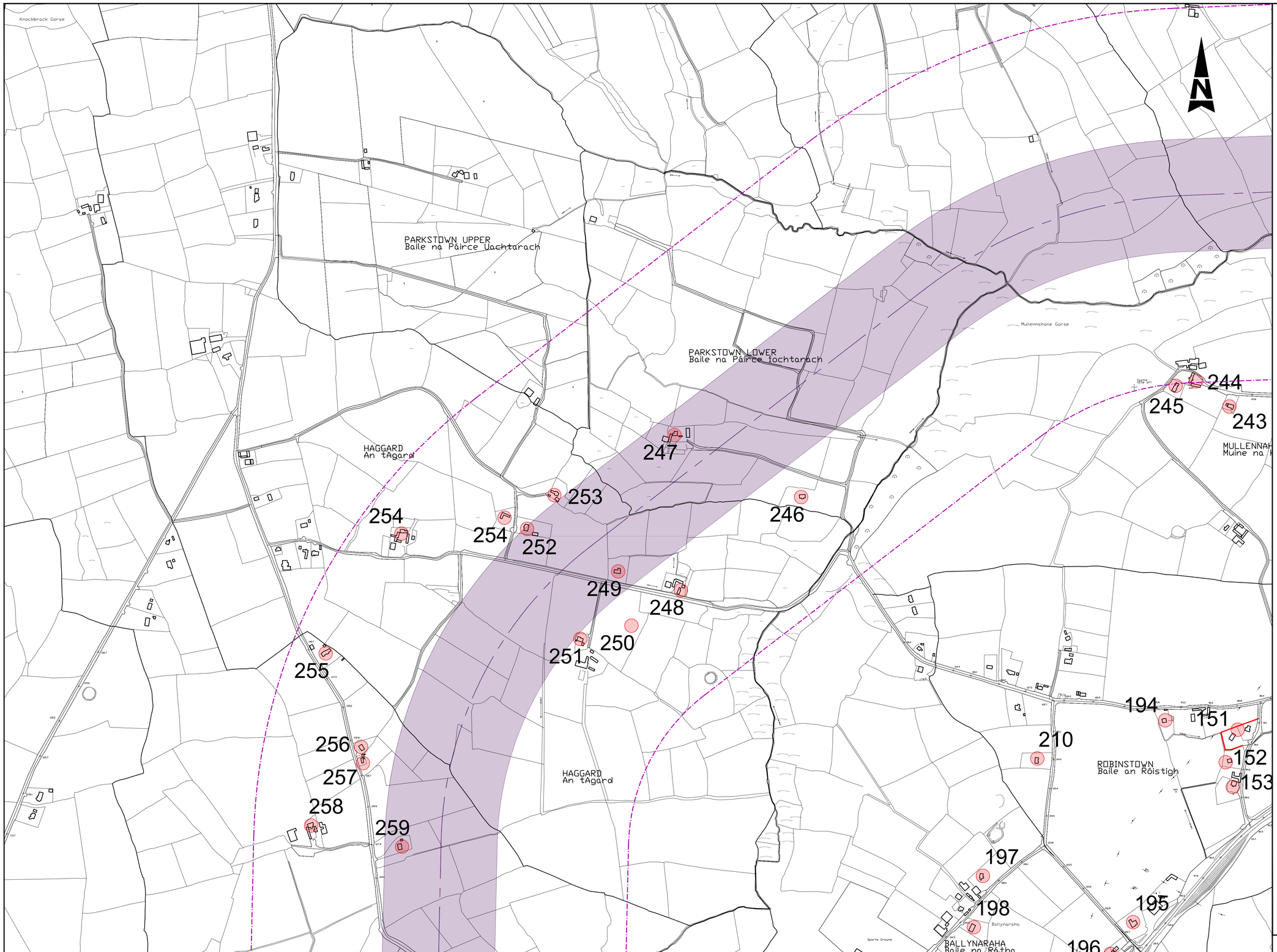

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C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

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1:5000	EK	EB	EB
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Status	Drawing Number	Rev
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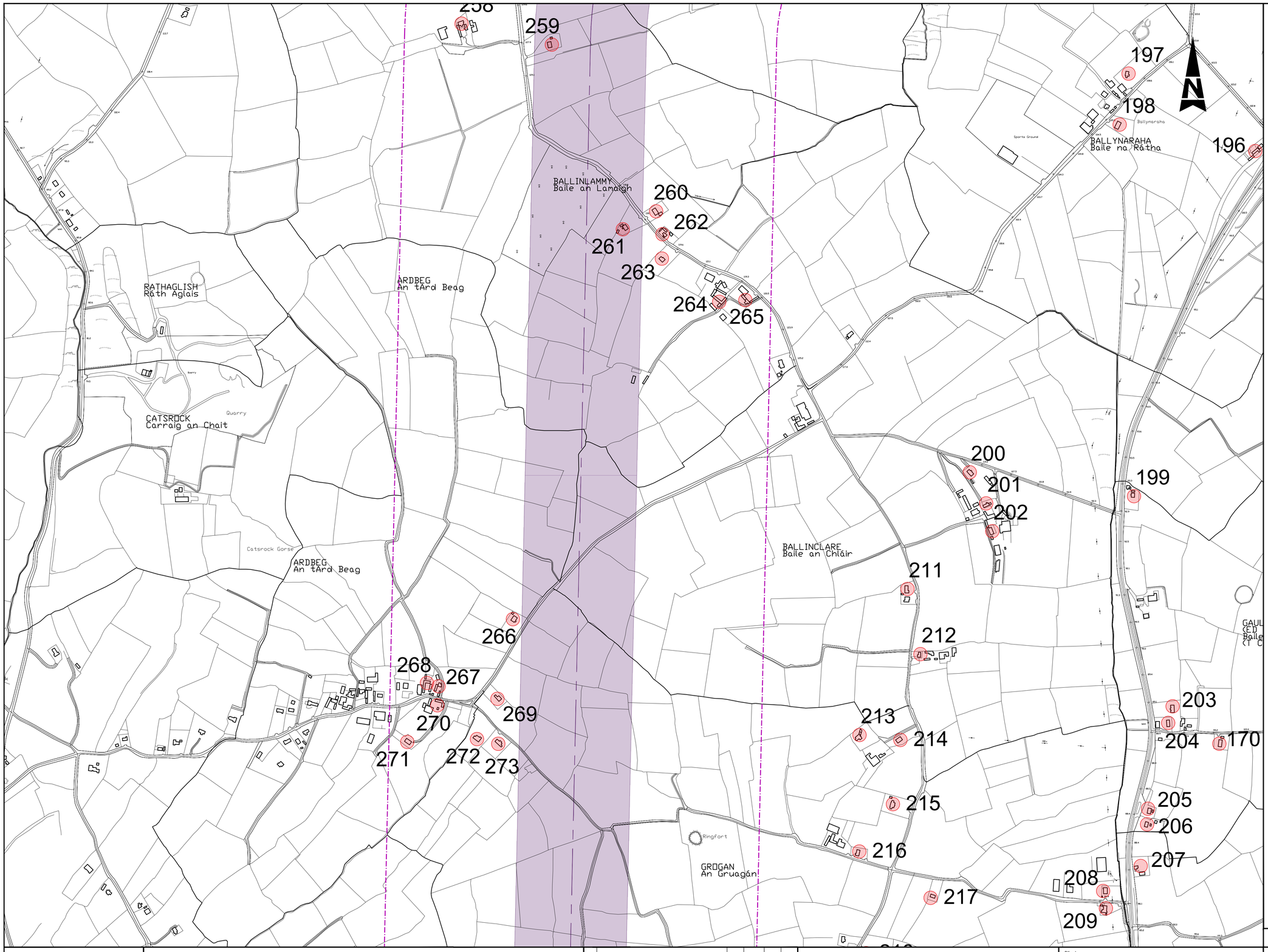

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C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

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Purpose: ISSUED FOR REVIEW

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1:5000	EK	EB	EB
	Date 15/6/2020	Date 15/6/2020	Date 15/6/2020

Status	Drawing Number	Rev
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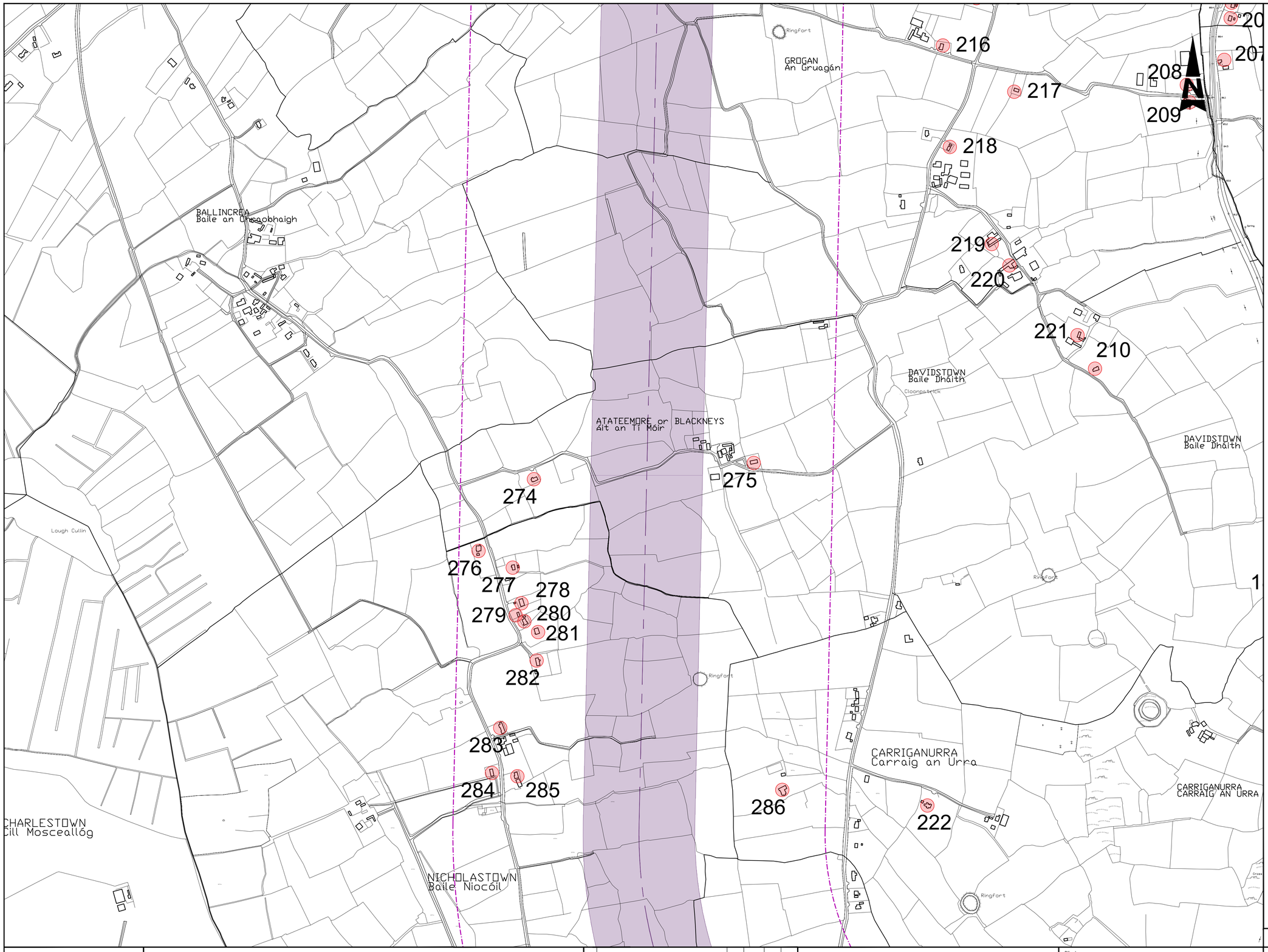

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C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

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1:5000	EK	EB	EB
	Date 15/6/2020	Date 15/6/2020	Date 15/6/2020

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0104	1

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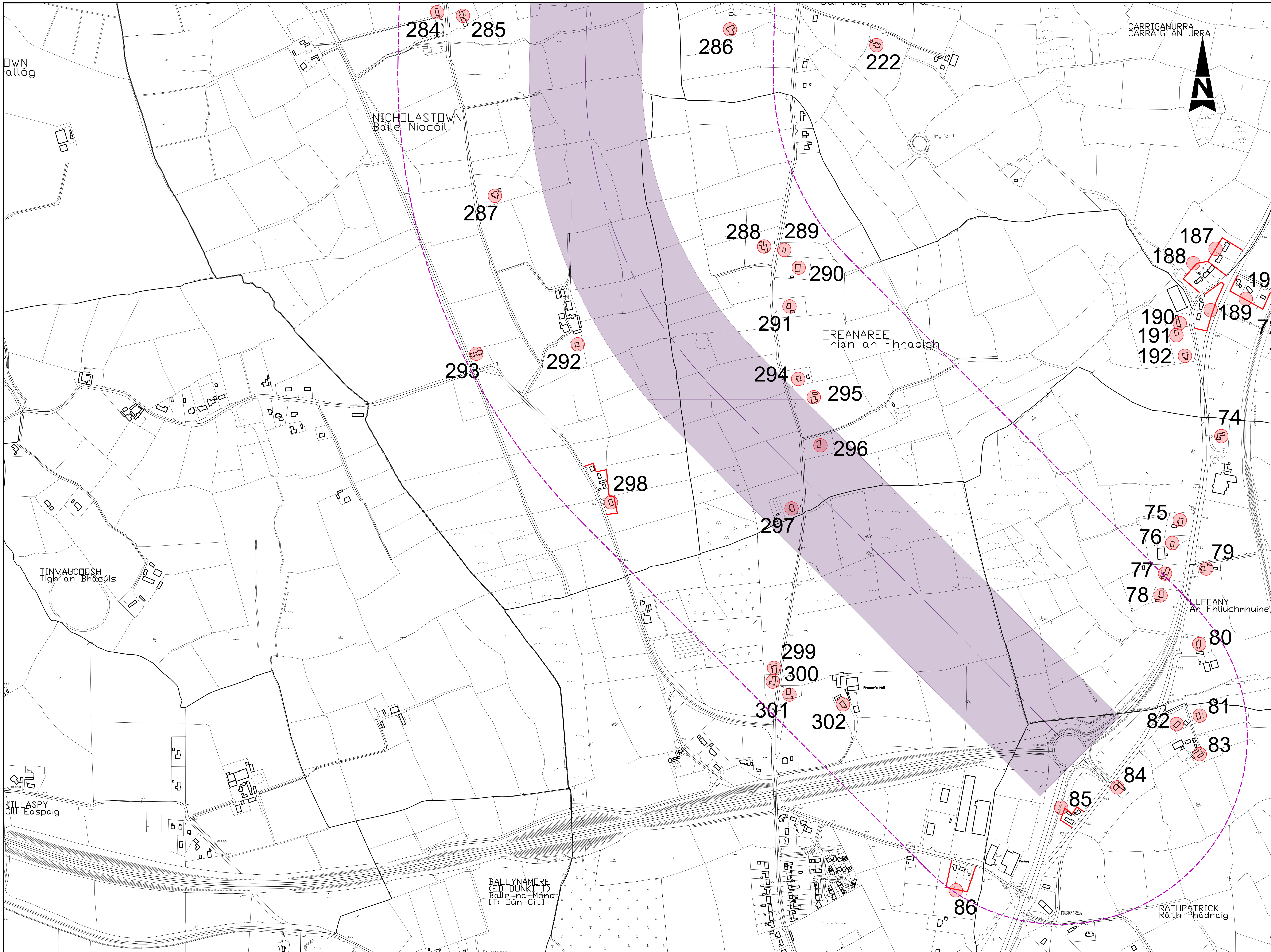

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Title: ROUTE OPTIONS/ VISUAL RECEPTORS PURPLE ROUTE

Project: N25 WATERFORD TO GLENMORE SCHEME

Original Scale	Des/Drawn	Checked	Authorised
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	Date 15/6/2020	Date 15/6/2020	Date 15/6/2020

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0105	1

A1

DO NOT SCALE

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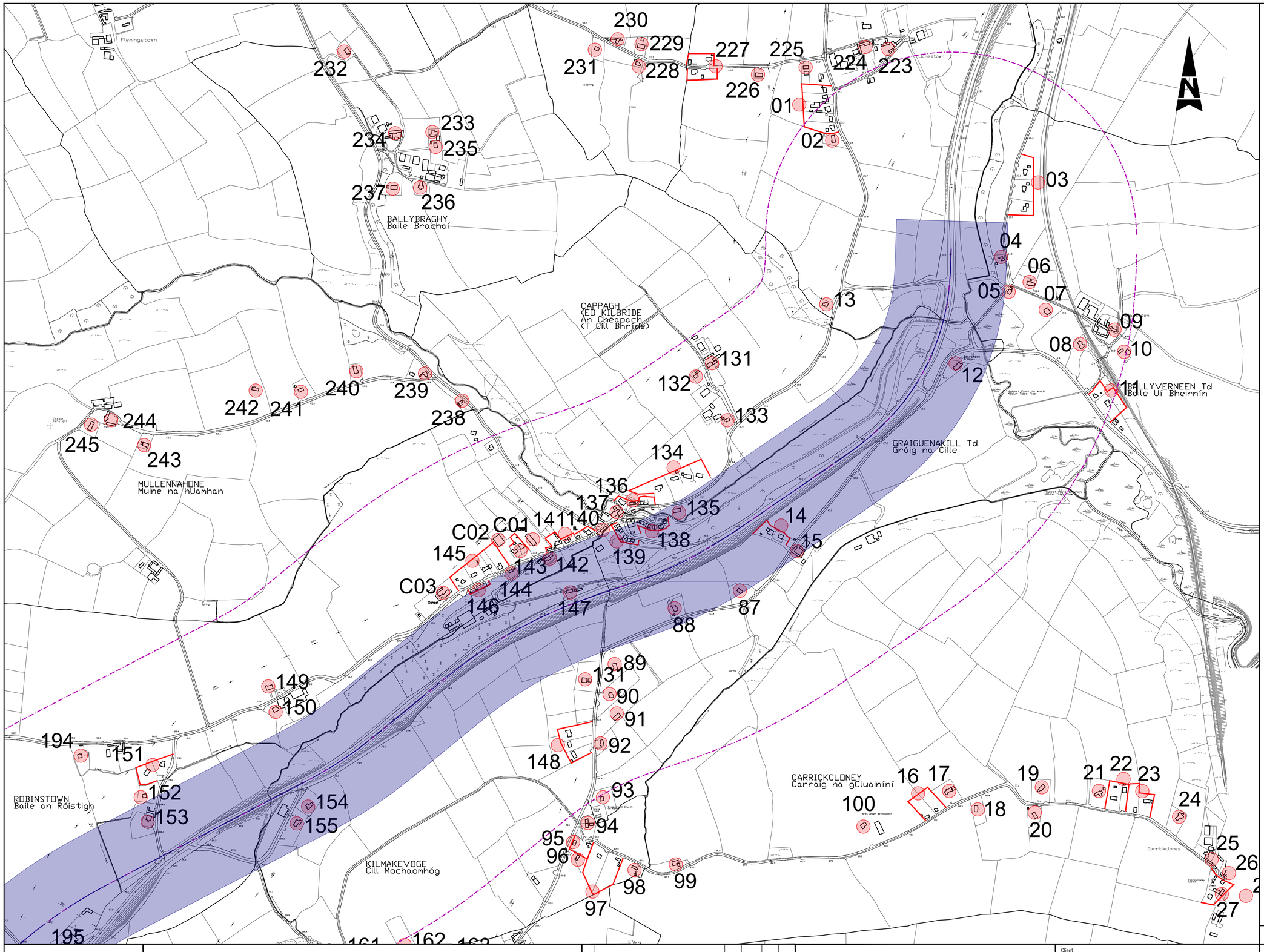

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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

Title: ROUTE OPTIONS/ VISUAL RECEPTORS NAVY ROUTE

Original Scale	Des/Drawn	Checked	Authorised
1:5000	EK	EB	EB
	Date 15/6/2020	Date 15/6/2020	Date 15/6/2020

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0106	1

A1

DO NOT SCALE

HAGGARD
An tAgard

ROBINSTOWN
Baile an Róistigh

BALLYNARAHA
Baile na Rátha

KILMAKEVOGE
Cill Mochaomhóg

BALLINCLARE
Baile an Chláir

GAULSTOWN
(E.D. Kilcolumb)
Baile an Ghaill
(T. Cill Cholm)

BALLYHOBUCK
Baile Hobac

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Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

Title: ROUTE OPTIONS/ VISUAL RECEPTORS NAVY ROUTE

Original Scale	Des/Drawn	Checked	Authorised
1:5000	EK Date 15/6/2020	EB Date 15/6/2020	EB Date 15/6/2020

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0107	1

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DO NOT SCALE

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Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0108	1

A1

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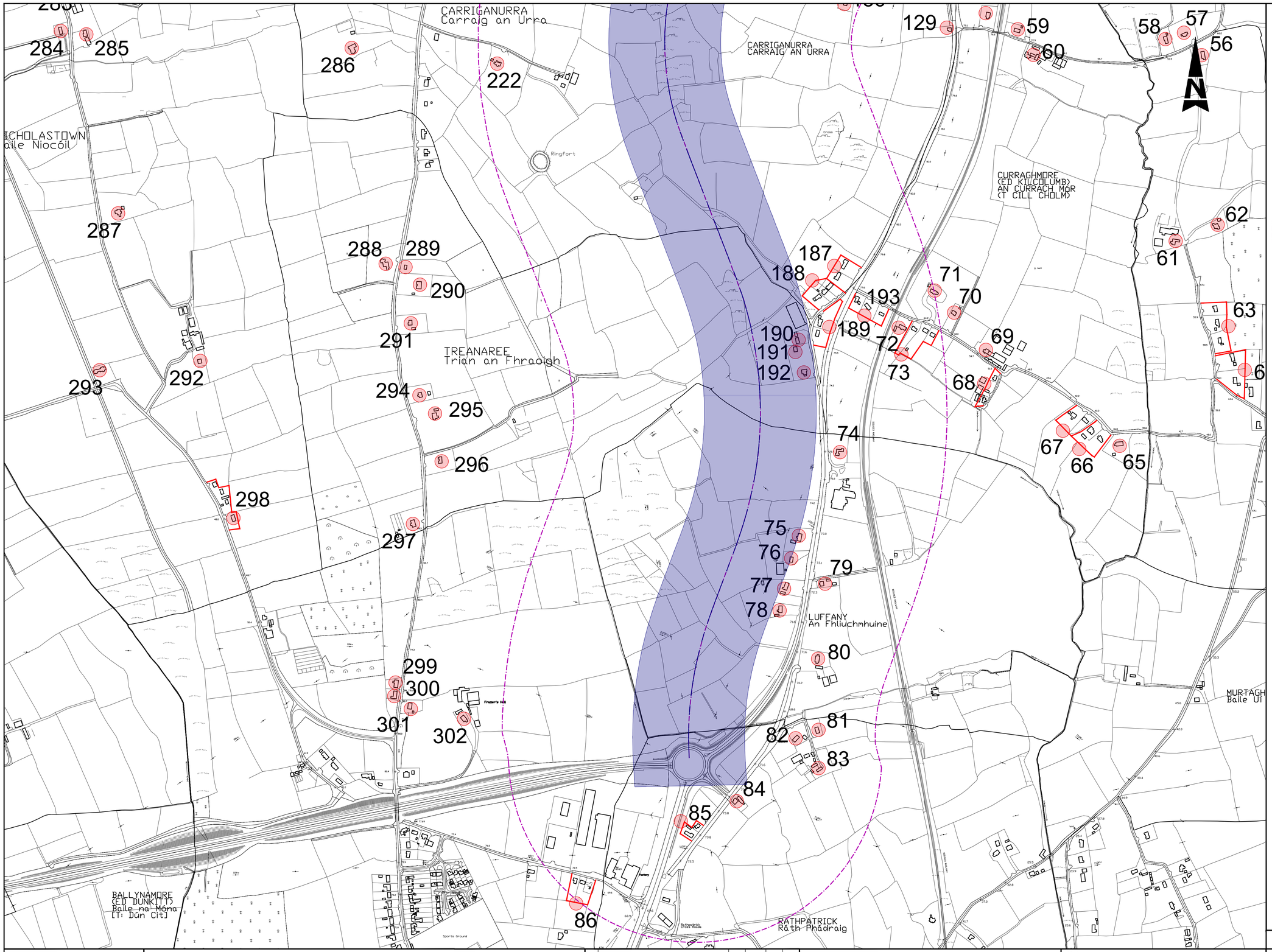

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3. ALL LEVELS ARE IN METRES AND ARE TO MALIN HEAD DATUM
4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

LEGEND:

SYM.	DESCRIPTION
	500M FROM CENTRELINE OF ROUTE
123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

NOTES:

THIS DRAWING HAS BEEN PRODUCED BY EAMONN BYRNE LANDSCAPE ARCHITECTS LTD IN RELATION TO THE N25 WATERFORD TO GLENMORE SCHEME. EAMONN BYRNE LANDSCAPE ARCHITECTS LTD ARE SUB-CONSULTANT TO ATKINS ON THE SCHEME.

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Transport Infrastructure Ireland

NDP
PLEAN FORBARTHA NÁISIÚNTA

Rev	Description	By	Date	Chk'd	Auth

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Tel (+353) 091 786 050

Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

Title: ROUTE OPTIONS/ VISUAL RECEPTORS NAVY ROUTE

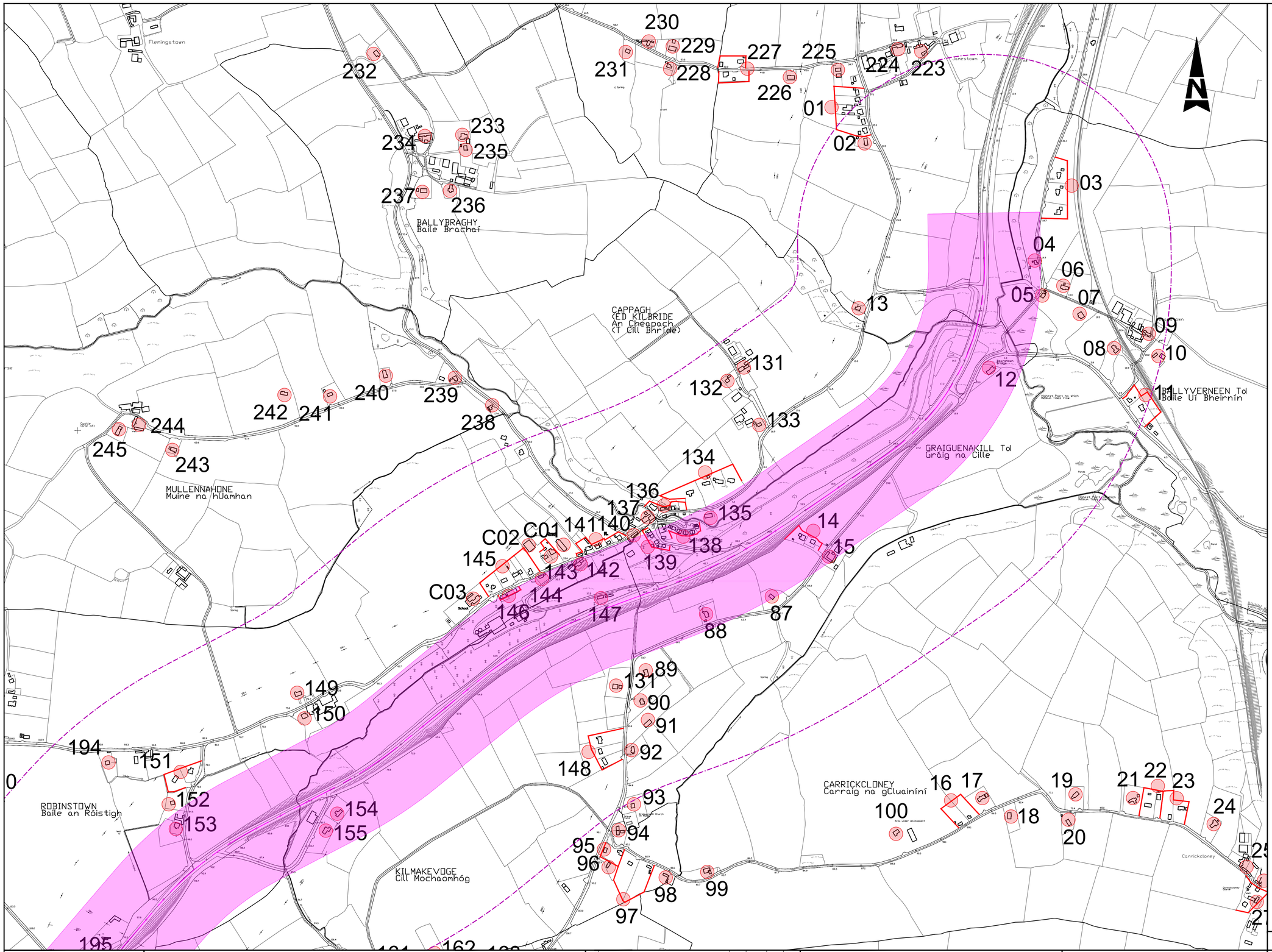
Original Scale	Des/Drawn	Checked	Authorised
1:5000	EK	EB	EB
	Date 15/6/2020	Date 15/6/2020	Date 15/6/2020

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0109	1

A1

DO NOT SCALE

0 10 100



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LEGEND:

SYM.	DESCRIPTION
	500M FROM CENTRELINE OF ROUTE
123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

NOTES:

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Client: KILKENNY COUNTY COUNCIL

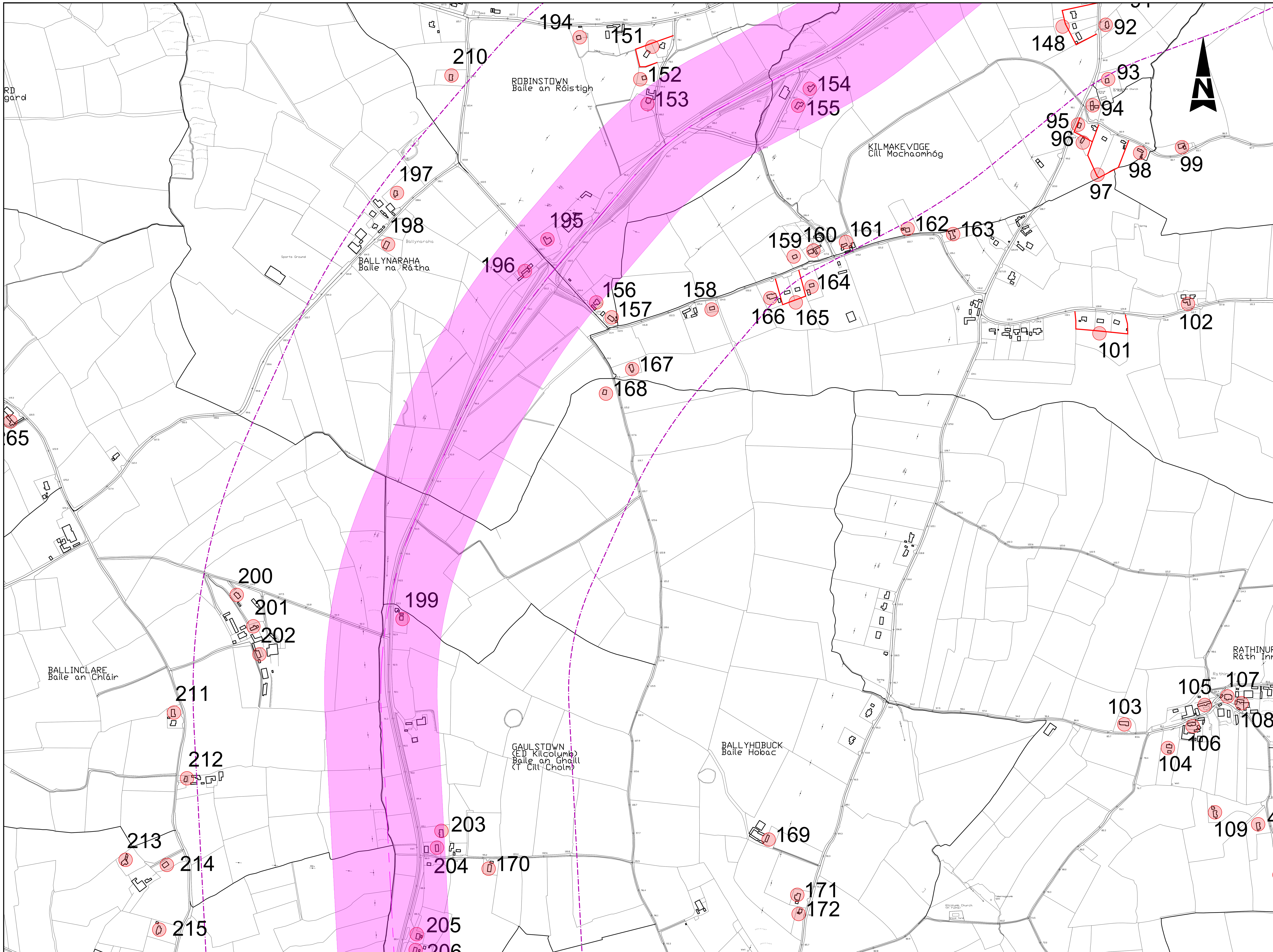
Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

Title: ROUTE OPTIONS/ VISUAL RECEPTORS MAGENTA ROUTE

Original Scale	Des/Drawn	Checked	Authorised
1:5000	EK	EB	EB
	Date 15/6/2020	Date 15/6/2020	Date 15/6/2020

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0110	1



DO NOT SCALE

A1

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LEGEND:

SYM.	DESCRIPTION
	500M FROM CENTRELINE OF ROUTE
123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

NOTES:

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Purpose: ISSUED FOR REVIEW

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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Title: ROUTE OPTIONS/ VISUAL RECEPTORS MAGENTA ROUTE

Original Scale	Des/Drawn	Checked	Authorised
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Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0111	1

A1

DO NOT SCALE

GROGAN
An Gruagán

DAVIDSTOWN
Baile Dháith

ATATEEMORE or BLACKNEYS
Áit an Tí Mór

CARRIGANURRA
Carraig an Urra

BALLYRAHAN
Baile Bhracham

CARTNAMOE
Scairt Na mBó

BALLYROWRAGH
Baile Ruarach

Ringfort

215 216 217 218 219 220 221 210 275 286 222 205 206 207 208 209 175 176 177 178 179 181 180 182 183 184 127 128 186 185 130 129 59 60 125 126 171 172 173 174 112 113 114 115 116 117 118 119 120 121 122 124 123 110 111 55 54 58 57 56

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LEGEND:

SYM.	DESCRIPTION
	500M FROM CENTRELINE OF ROUTE
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C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

NOTES:

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Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

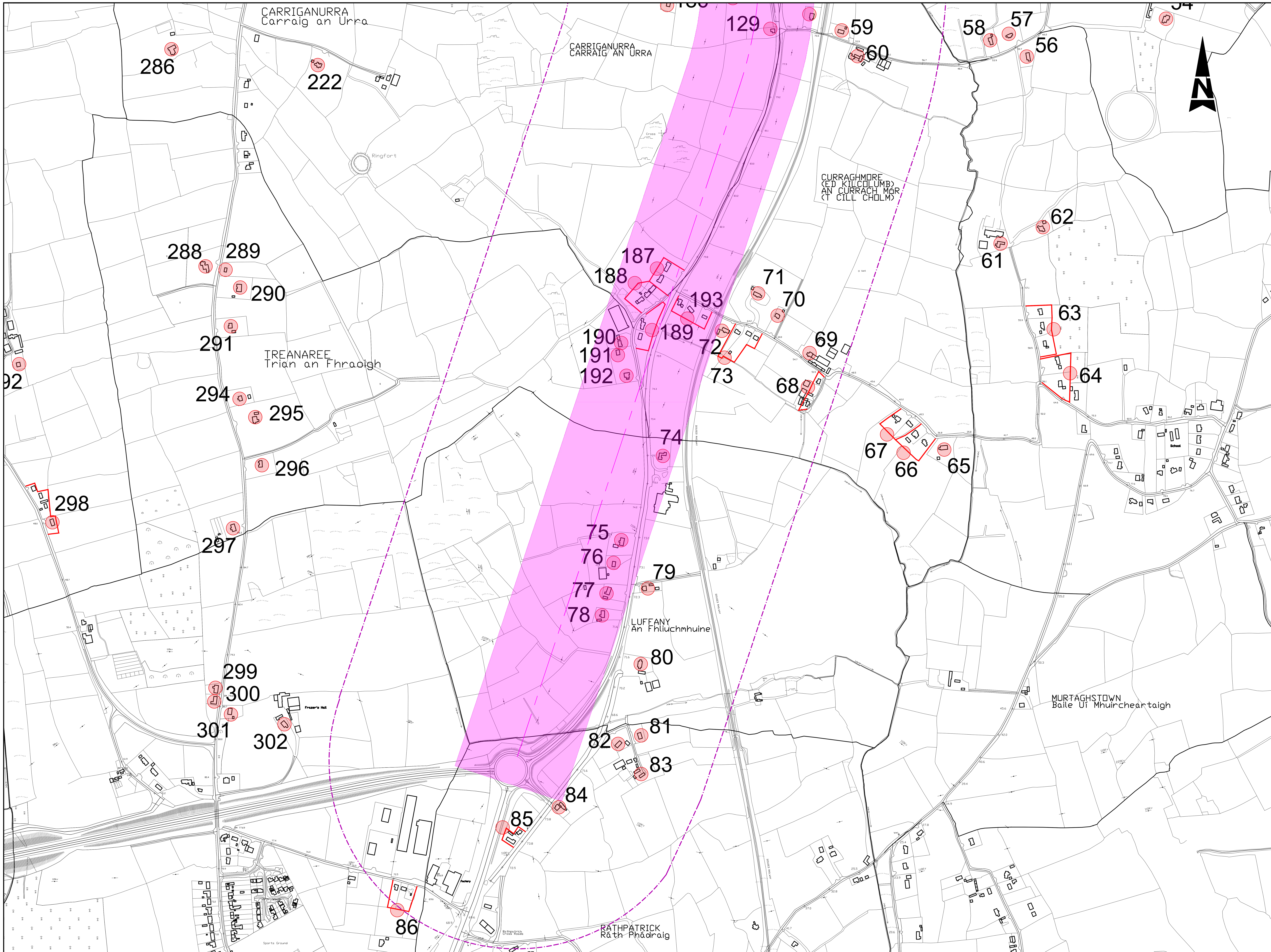
Title: ROUTE OPTIONS/ VISUAL RECEPTORS MAGENTA ROUTE

Original Scale	Des/Drawn	Checked	Authorised
1:5000	EK	EB	EB
	Date 15/6/2020	Date 15/6/2020	Date 15/6/2020

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0112	1

A1

DO NOT SCALE



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LEGEND:

SYM.	DESCRIPTION
	500M FROM CENTRELINE OF ROUTE
123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

NOTES:

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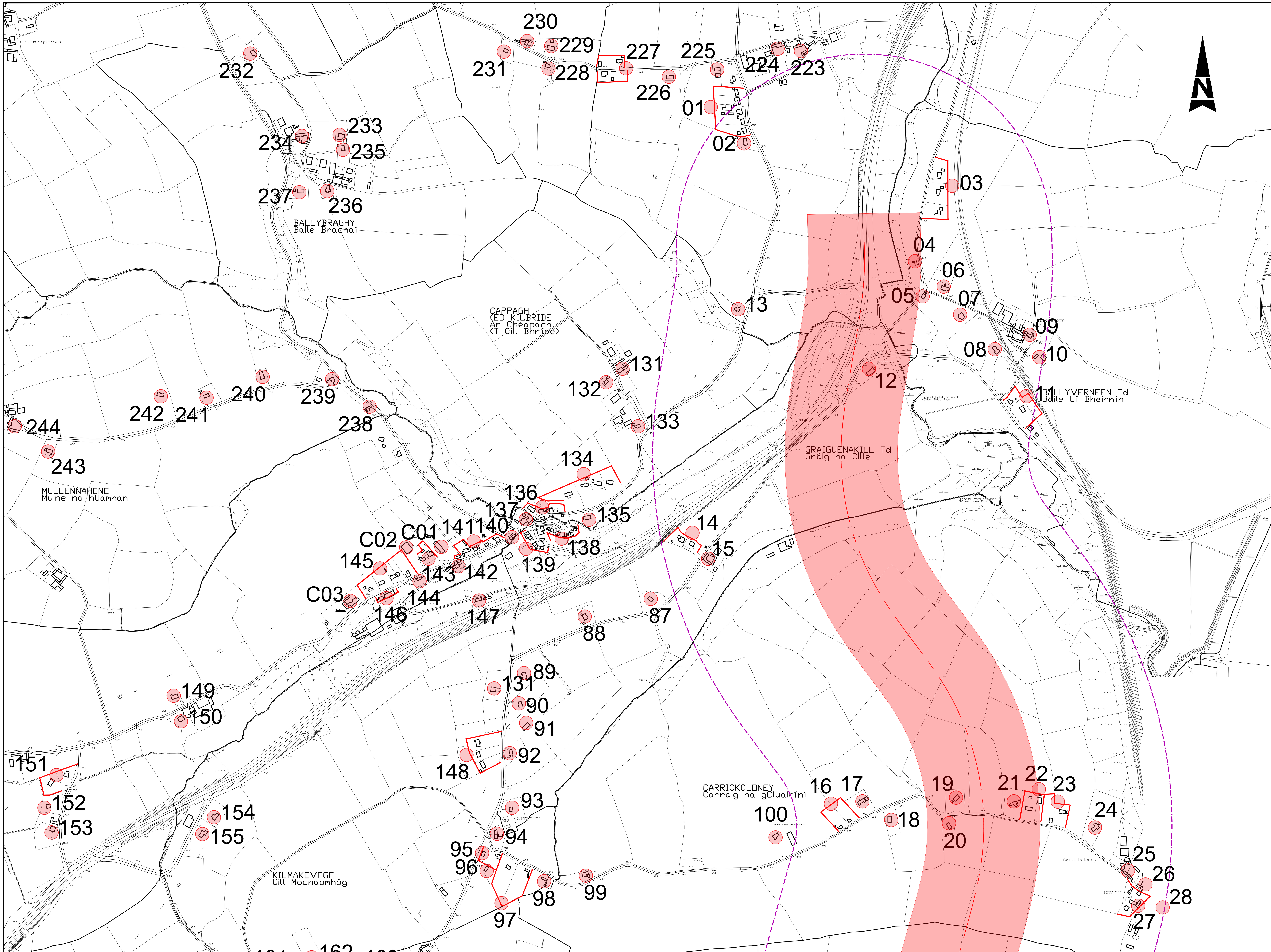
Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Title: ROUTE OPTIONS/ VISUAL RECEPTORS MAGENTA ROUTE

Original Scale	Des/Drawn	Checked	Authorised
1:5000	EK, Date 15/6/2020	EB, Date 15/6/2020	EB, Date 15/6/2020

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0113	1



A1

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LEGEND:

SYM.	DESCRIPTION
	500M FROM CENTRELINE OF ROUTE
123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

NOTES:

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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

Title: ROUTE OPTIONS/ VISUAL RECEPTORS RED ROUTE

Original Scale	Des/Drawn	Checked	Authorised
1:5000	EK Date 15/6/2020	EB Date 15/6/2020	EB Date 15/6/2020

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-01114	1

A1

DO NOT SCALE

KILMAKEVOGE
Cill Mochaomhóg

AYLWARDSTOWN
Baile an Aighleartaigh

RATHINURE
Ráth Innidir

BALLYHOBUCK
Baile Hobac

Carrickcloney

N

GENERAL NOTES

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LEGEND:

SYM.	DESCRIPTION
	500M FROM CENTRELINE OF ROUTE
123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

NOTES:

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Client: KILKENNY COUNTY COUNCIL

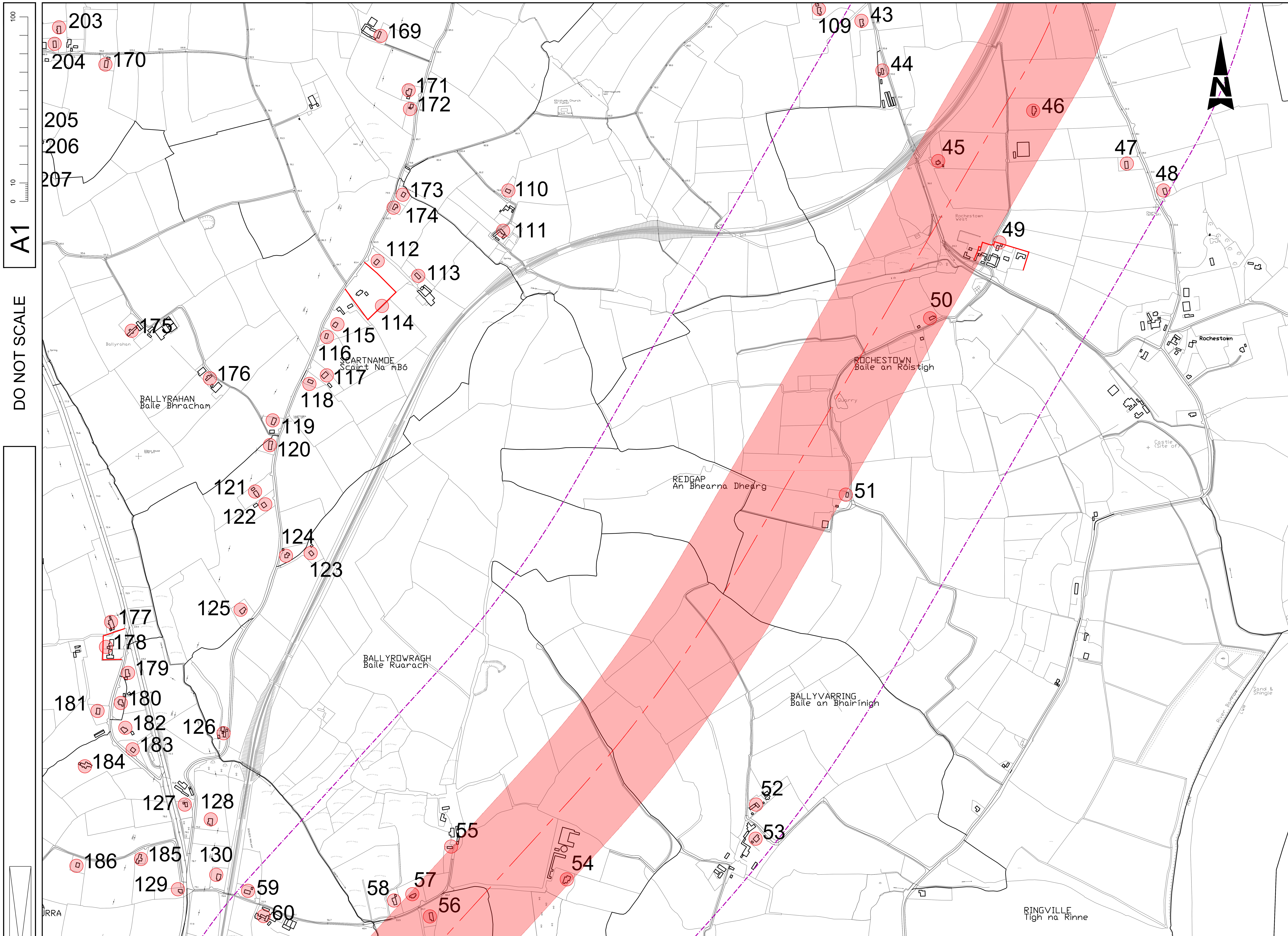
Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

Title: ROUTE OPTIONS/ VISUAL RECEPTORS RED ROUTE

Original Scale	Des/Drawn	Checked	Authorised
1:5000	EK	EB	EB
	Date 15/6/2020	Date 15/6/2020	Date 15/6/2020

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0115	1



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LEGEND:

SYM.	DESCRIPTION
(dashed box)	500M FROM CENTRELINE OF ROUTE
123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

NOTES:

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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

Title: ROUTE OPTIONS/ VISUAL RECEPTORS RED ROUTE

Original Scale	Des/Drawn	Checked	Authorised
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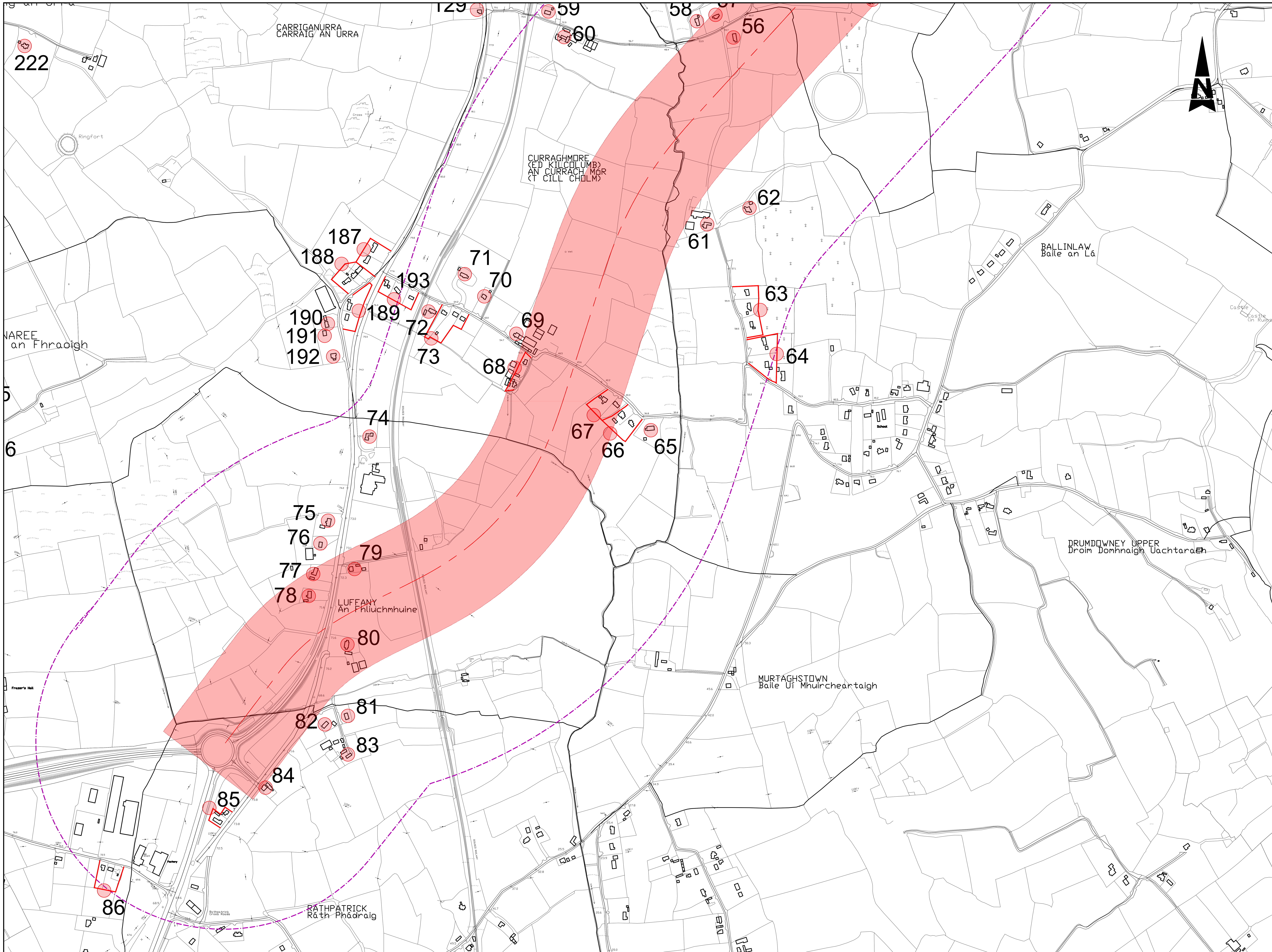
Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0116	1



A1

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N

LEGEND:

SYM.	DESCRIPTION
(dashed line)	500M FROM CENTRELINE OF ROUTE
123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

NOTES:

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Purpose: ISSUED FOR REVIEW

Client: KILKENNY COUNTY COUNCIL

Title: ROUTE OPTIONS/ VISUAL RECEPTORS RED ROUTE

Project: N25 WATERFORD TO GLENMORE SCHEME

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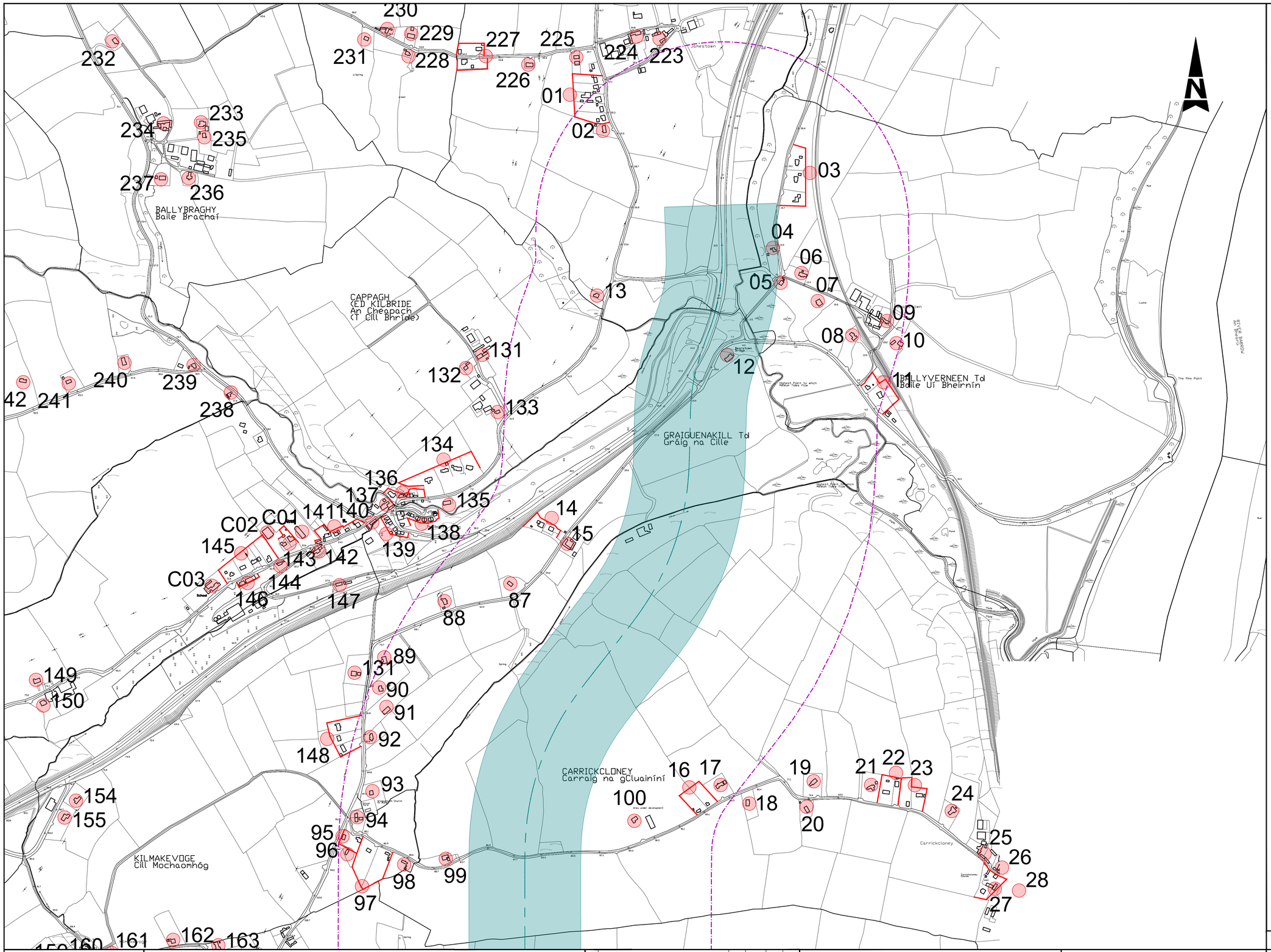
1:5000	EK, Date 15/6/2020	EB, Date 15/6/2020	EB, Date 15/6/2020

Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0117	1

A1

DO NOT SCALE

100 0 10



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LEGEND:

SYM.	DESCRIPTION
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123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

Title: ROUTE OPTIONS/ VISUAL RECEPTORS TEAL ROUTE

Original Scale	Des/Drawn	Checked	Authorised
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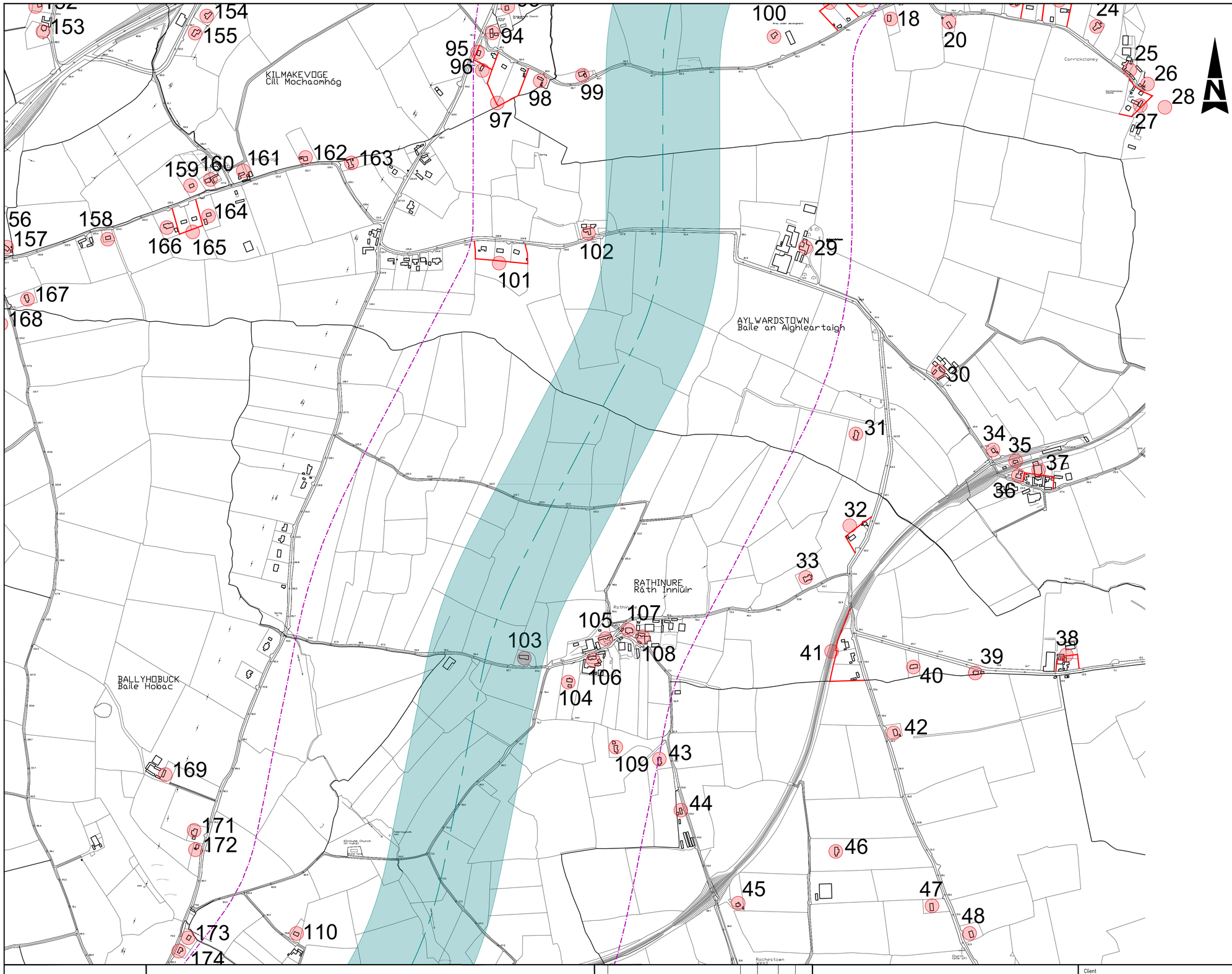
Status	Drawing Number	Rev
P	5190130-ATK-ZZ-ZZ-DR-LA-0118	1

A1

DO NOT SCALE



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LEGEND:

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C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

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P	5190130-ATK-ZZ-ZZ-DR-LA-0119	1

A1

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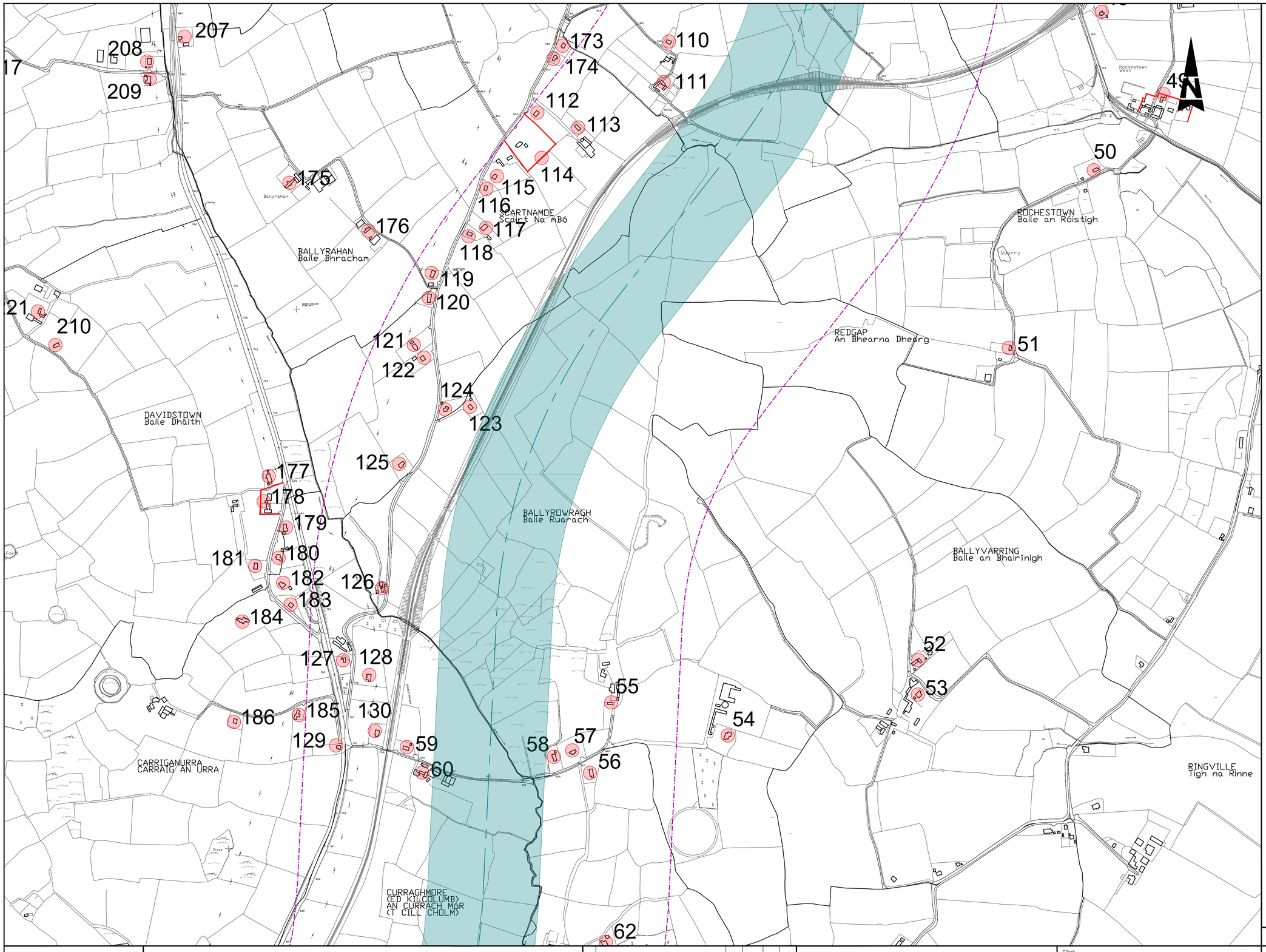

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5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

LEGEND:

SYM.	DESCRIPTION
	500M FROM CENTRELINE OF ROUTE
123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

NOTES:

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Bonneagar Iompair Éireann
Transport Infrastructure Ireland

NDP
PLEAN FORBARTHA NÁISIÚNTA

Rev	Description	By	Date	Chk'd	Auth

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Tel (+353) 091 786 050

Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

Title: ROUTE OPTIONS/ VISUAL RECEPTORS TEAL ROUTE

Original Scale	Des/Drawn	Checked	Authorised
1:5000	EK	EB	EB
	Date 15/6/2020	Date 15/6/2020	Date 15/6/2020

Status	Drawing Number	Rev
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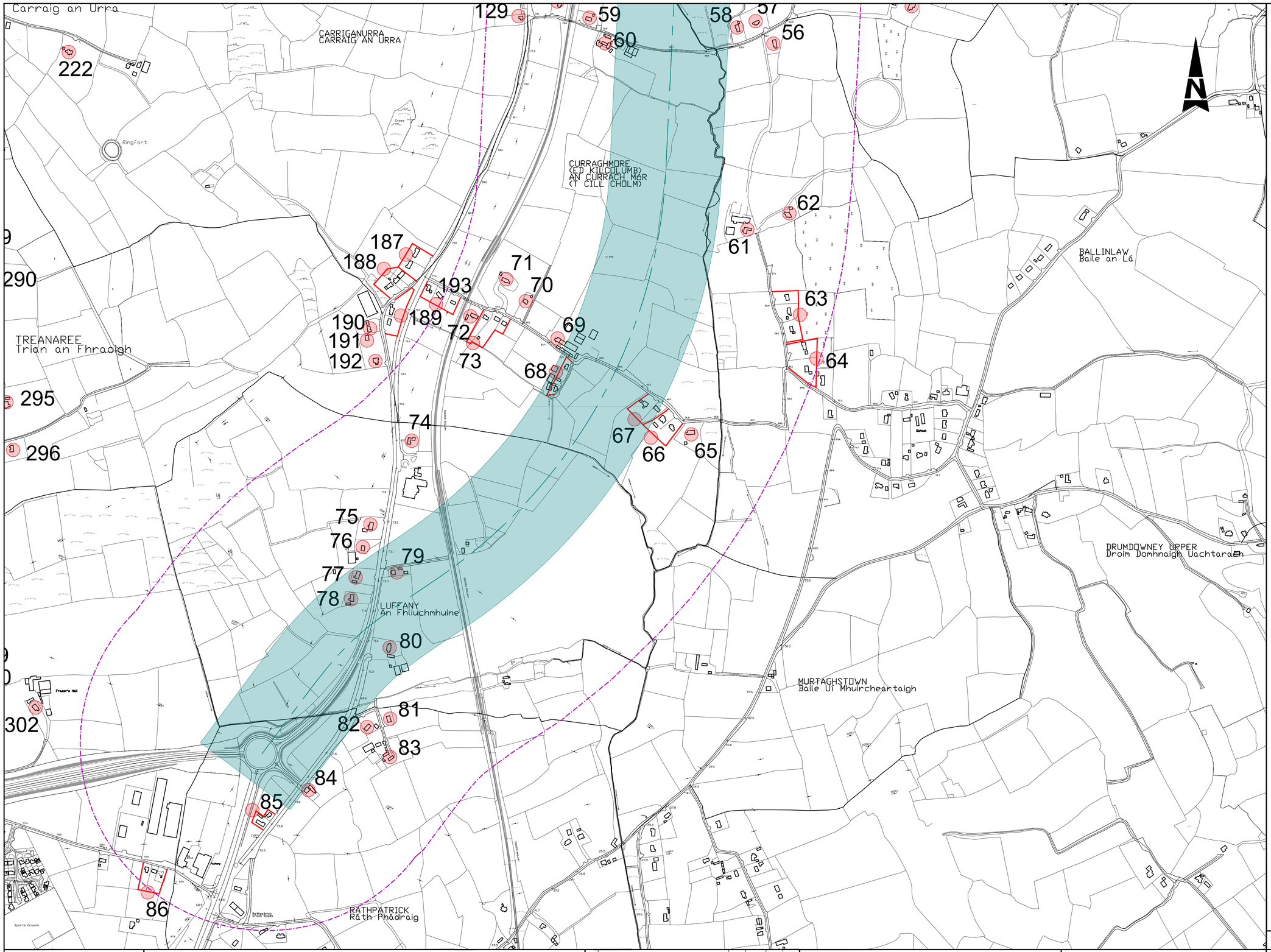

A1

DO NOT SCALE

GENERAL NOTES

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Status	Drawing Number	Rev
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A1

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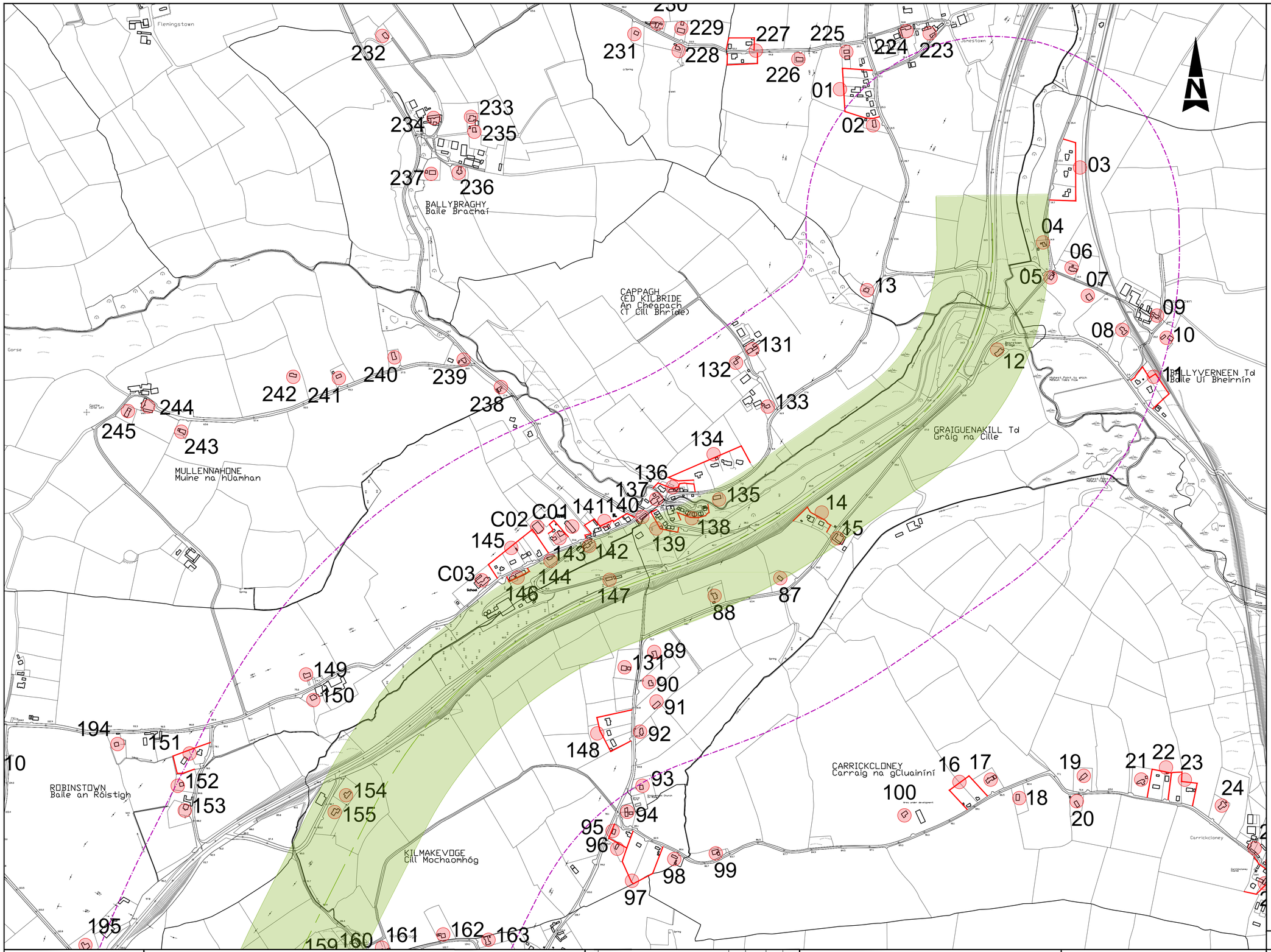

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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: ISSUED FOR REVIEW

Title: ROUTE OPTIONS/ VISUAL RECEPTORS LIME GREEN ROUTE

Original Scale	Des/Drawn	Checked	Authorised
1:5000	EK	EB	EB
	Date 15/6/2020	Date 15/6/2020	Date 15/6/2020

Status	Drawing Number	Rev
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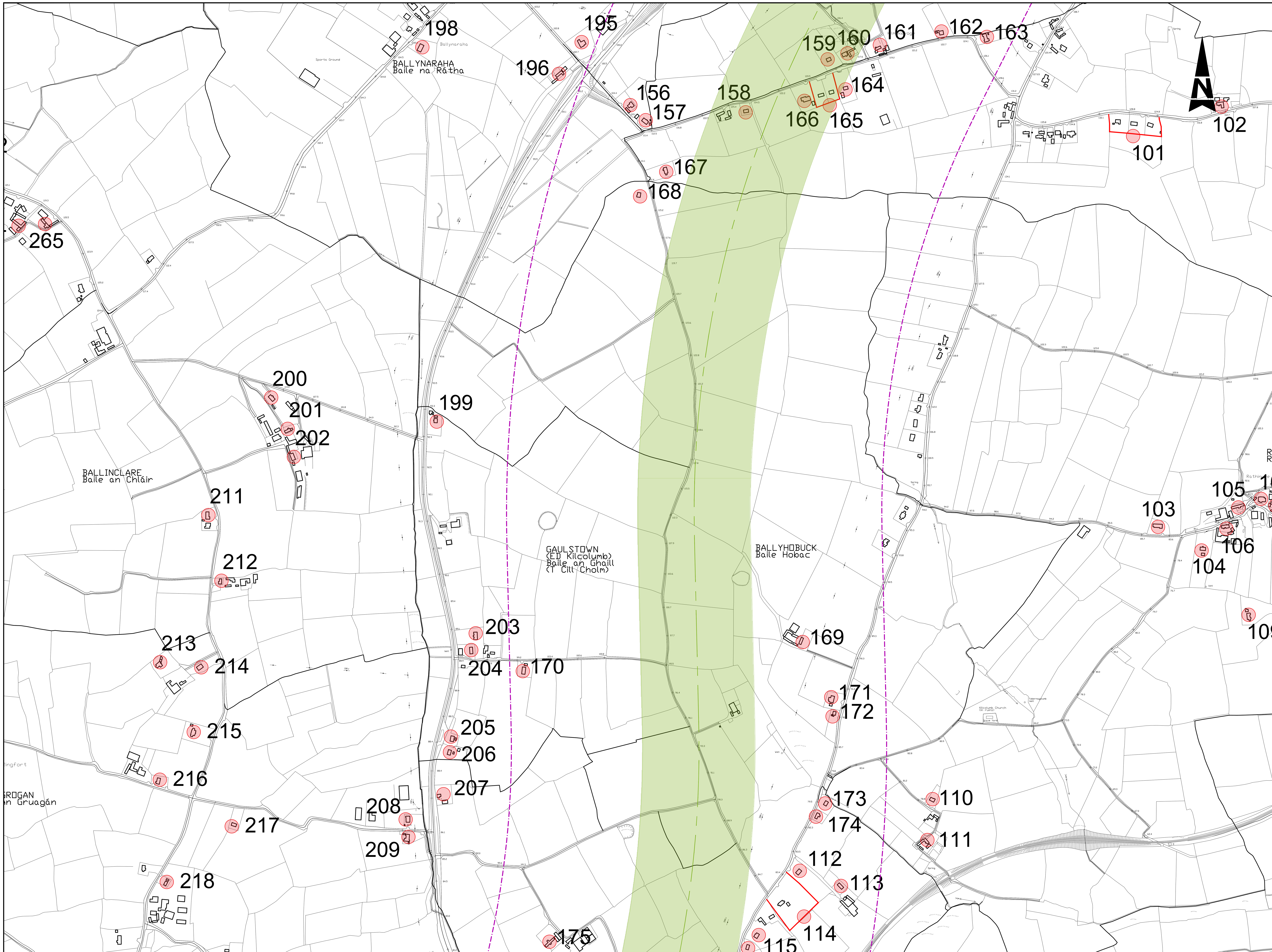

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LEGEND:

SYM.	DESCRIPTION
	500M FROM CENTRELINE OF ROUTE
123	VISUAL RECEPTOR (DWELLING)
C01	VISUAL RECEPTOR (COMMUNITY BUILDING)

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Status	Drawing Number	Rev
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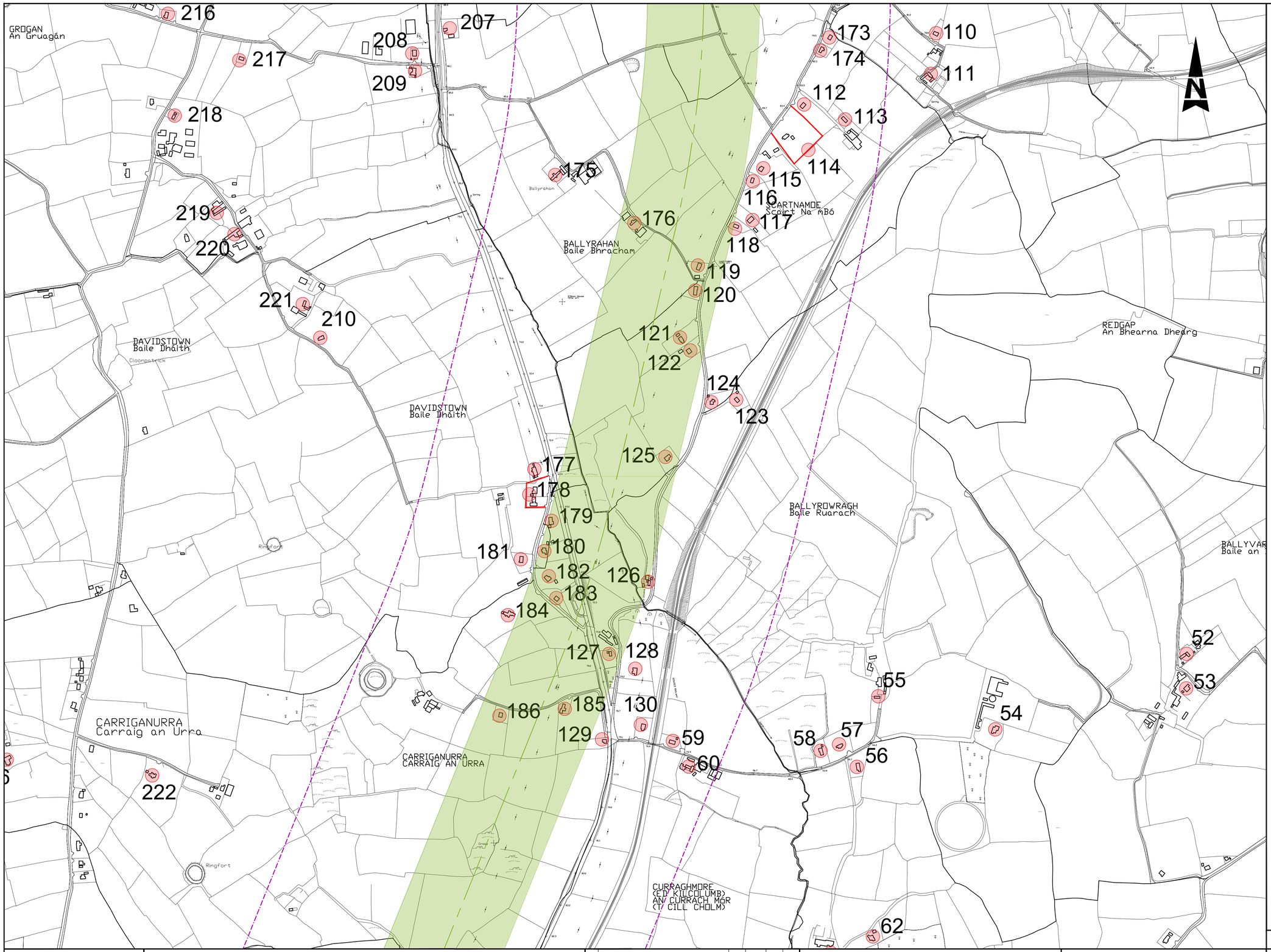
DO NOT SCALE



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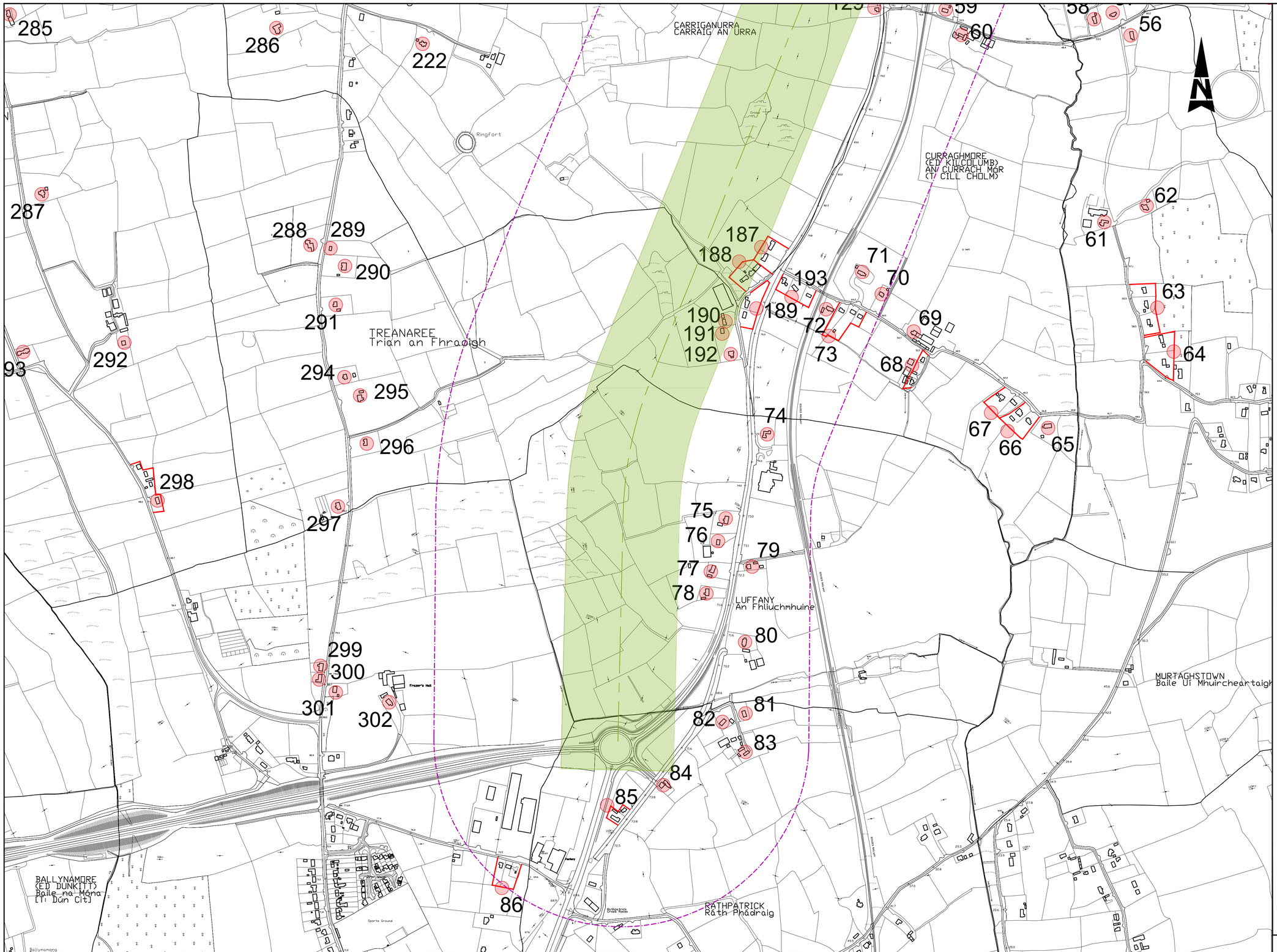

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P	5190130-ATK-ZZ-ZZ-DR-LA-0125	1

2.4.10. Visual Impact Schedule Worksheet

Visual Impact Schedule (N25)

Table 2.10.24: Visual Impact Schedule Worksheet- (Refer also to Visual Receptors Drawings, for visual receptor locations)

		Score												
Receptor			**Red Route Option**		**Teal Route Option**		**Lime Green Route Option**		**Magenta Route Option**		**Navy Route Option**		**Purple Route Option**	
Dwellings	**No.**	**Sensitivity**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**	**Magnitude**	**Significance**
01	5	High	Negligible	Slight Adverse	Negligible	Slight Adverse	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral
02	1	High	Negligible	Slight Adverse	Negligible	Slight Adverse	No change	Neutral	No change	Neutral	No change	Neutral	Minor	Slight Adverse
03	3	High	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse
04	1	High	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse
05	1	High	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral
06	1	High	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral
07	1	High	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral
08	1	High	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral
09	1	High	Negligible	Slight Adverse	Negligible	Slight Adverse	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
10	1	High	Negligible	Slight Adverse	Negligible	Slight Adverse	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
11	2	High	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
12	1	High	Major	Very Large Adverse	Major	Very Large Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral
13	1	High	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral
14	2	High	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
15	1	High	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
16	2	High	Negligible	Slight Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	1	High	Negligible	Slight Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18	1	High	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	1	High	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20	1	High	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
21	1	High	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	2	High	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
23	2	High	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24	1	High	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
25	1	High	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
26	1	High	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
27	1	High	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
28	1	High	No change	Neutral	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
29	1	High	Moderate	Moderate Adverse	No change	Neutral	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30	1	High	Major	Very Large Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
31	1	High	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
32	2	High	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
33	1	High	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
34	1	High	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35	1	High	No change	Neutral	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
36	1	High	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
37	3	High	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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39	1	High	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
40	1	High	Major	Very Large Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
41	3	High	Major	Very Large Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
42	1	High	Major	Very Large Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
43	1	High	No change	Neutral	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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45	1	High	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
46	1	High	Major	Very Large Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
47	1	High	Negligible	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
48	1	High	Negligible	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
49	4	High	Negligible	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
50	1	High	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
51	1	High	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
52	1	High	No change	Neutral	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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54	1	High	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
55	1	High	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
56	1	High	Major	Very Large Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
57	1	High	Moderate	Moderate Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
58	1	High	Minor	Slight Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
59	1	High	Minor	Slight Adverse	Moderate	Moderate Adverse	No change	Neutral	No change	Neutral	N/A	N/A	N/A	N/A
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63	3	High	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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66	2	High	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
67	2	High	Moderate	Moderate Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
68	3	High	Moderate	Moderate Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
69	1	High	No change	Neutral	No change	Neutral	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
70	1	High	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral	N/A	N/A	N/A	N/A
71	1	High	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral	N/A	N/A
72	1	High	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A

73	3	High	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
74	1	High	No change	Neutral	No change	Neutral	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
75	1	High	No change	Neutral	No change	Neutral	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
76	1	High	No change	Neutral	No change	Neutral	Minor	Slight Adverse	Moderate	Moderate Adverse	Minor	Slight Adverse	N/A	N/A
77	1	High	No change	Neutral	No change	Neutral	Minor	Slight Adverse	Moderate	Moderate Adverse	Minor	Slight Adverse	No change	Neutral
78	1	High	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Moderate	Moderate Adverse	Minor	Slight Adverse	No change	Neutral
79	1	High	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral	No change	Neutral	N/A	N/A
80	1	High	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral
81	1	High	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral
82	1	High	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral
83	1	High	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral
84	1	High	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral
85	1	High	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral
86	1	High	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral
87	1	High	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
88	1	High	N/A	N/A	No change	Neutral	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
89	1	High	N/A	N/A	No change	Neutral	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
90	1	High	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
91	1	High	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
92	1	High	N/A	N/A	Negligible	Slight Adverse	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
93	1	High	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral	No change	Neutral	N/A	N/A
94	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
95	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
96	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
97	2	High	N/A	N/A	No change	Neutral	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
98	1	High	N/A	N/A	No change	Neutral	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
99	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
100	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
101	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
102	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
103	1	High	N/A	N/A	Major	Large Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
104	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
105	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
106	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
107	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
108	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
109	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
110	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
111	1	High	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
112	1	High	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A
113	1	High	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A
114	1	High	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A
115	1	High	N/A	N/A	Minor	Slight Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A
116	1	High	N/A	N/A	Minor	Slight Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A
117	1	High	N/A	N/A	Minor	Slight Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A
118	1	High	N/A	N/A	Minor	Slight Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A
119	1	High	N/A	N/A	Minor	Slight Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A
120	1	High	N/A	N/A	Minor	Slight Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A
121	1	High	N/A	N/A	Minor	Slight Adverse	Moderate	Moderate Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A
122	1	High	N/A	N/A	Minor	Slight Adverse	Moderate	Moderate Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A
123	1	High	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A
124	1	High	N/A	N/A	Negligible	Slight Adverse	Negligible	Slight Adverse	No change	Neutral	N/A	N/A	N/A	N/A
125	1	High	N/A	N/A	Negligible	Slight Adverse	Moderate	Moderate Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A
126	1	High	N/A	N/A	No change	Neutral	Major	Large Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A
127	1	High	N/A	N/A	No change	Neutral	No change	Neutral	Minor	Slight Adverse	N/A	N/A	N/A	N/A
128	1	High	N/A	N/A	Minor	Slight Adverse	No change	Neutral	Minor	Slight Adverse	N/A	N/A	N/A	N/A
129	1	High	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A
130	1	High	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A
131	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral (131)	Minor	Slight Adverse
132	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	Minor	Slight Adverse
133	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
134	4	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
135	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
136	5	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
137	3	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
138	12	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
139	6	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
140	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
141	5	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
142	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
143	2	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
144	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
145	5	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
146	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
147	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
148	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
149	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
150	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	No change	Neutral	No change	Neutral	N/A	N/A
151	2	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
152	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	Minor	Slight Adverse	N/A	N/A
153	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	Minor	Slight Adverse	N/A	N/A

154	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
155	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
156	1	High	N/A	N/A	N/A	N/A	No change	Neutral	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
157	1	High	N/A	N/A	N/A	N/A	No change	Neutral	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
158	1	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	No change	Neutral	No change	Neutral	N/A	N/A
159	1	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	No change	Neutral	No change	Neutral	N/A	N/A
160	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
161	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	No change	Neutral	N/A	N/A
162	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A
163	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A
164	1	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A
165	2	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A
166	1	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	No change	Neutral	No change	Neutral	N/A	N/A
167	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	No change	Neutral	No change	Neutral	N/A	N/A
168	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	No change	Neutral	No change	Neutral	N/A	N/A
169	1	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A
170	1	High	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	Minor	Slight Adverse	N/A	N/A
171	1	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A
172	1	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A	N/A	N/A
173	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A
174	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A	N/A	N/A	N/A	N/A
175	1	High	N/A	N/A	N/A	N/A	No change	Neutral	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
176	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A	N/A	N/A
177	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Major	Large Adverse	No change	Neutral	N/A	N/A
178	2	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	Moderate	Moderate Adverse	No change	Neutral	N/A	N/A
179	1	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	Major	Large Adverse	No change	Neutral	N/A	N/A
180	1	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	Moderate	Moderate Adverse	No change	Neutral	N/A	N/A
181	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral	N/A	N/A
182	1	High	N/A	N/A	N/A	N/A	Major	Large Adverse	Major	Large Adverse	No change	Neutral	N/A	N/A
183	1	High	N/A	N/A	N/A	N/A	Major	Large Adverse	Moderate	Moderate Adverse	No change	Neutral	N/A	N/A
184	1	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
185	1	High	N/A	N/A	N/A	N/A	Major	Large Adverse	Moderate	Moderate Adverse	N/A	N/A	N/A	N/A
186	1	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	Minor	Slight Adverse	No change	Neutral	N/A	N/A
187	2	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	Major	Large Adverse	No change	Neutral	N/A	N/A
188	3	High	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	Moderate	Moderate Adverse	No change	Neutral	N/A	N/A
189	2	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Moderate	Moderate Adverse	Minor	Slight Adverse	N/A	N/A
190	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	Moderate	Moderate Adverse	N/A	N/A
191	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	Moderate	Moderate Adverse	N/A	N/A
192	1	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Moderate	Moderate Adverse	Moderate	Moderate Adverse	N/A	N/A
193	3	High	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	No change	Neutral	N/A	N/A
194	1	High	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral	No change	Neutral	N/A	N/A
195	1	High	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
196	1	High	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
197	1	High	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral	Minor	Slight Adverse	N/A	N/A
198	1	High	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral	Minor	Slight Adverse	N/A	N/A
199	1	High	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	No change	Neutral	N/A	N/A
200	1	High	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral	Minor	Slight Adverse	N/A	N/A
201	1	High	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral	Minor	Slight Adverse	N/A	N/A
202	1	High	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral	Minor	Slight Adverse	N/A	N/A
203	1	High	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Beneficial	No change	Neutral	N/A	N/A
204	1	High	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Beneficial	No change	Neutral	N/A	N/A
205	1	High	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	Minor	Slight Adverse	N/A	N/A
206	1	High	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	Minor	Slight Adverse	N/A	N/A
207	1	High	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	Minor	Slight Adverse	N/A	N/A
208	1	High	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse	Minor	Slight Adverse	N/A	N/A
209	1	High	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	Minor	Slight Adverse	N/A	N/A
210	1	High	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral	Minor	Slight Adverse	N/A	N/A
211	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A
212	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A
213	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A
214	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A
215	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A
216	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A
217	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A
218	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A
219	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral	N/A	N/A
220	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral	N/A	N/A
221	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse	N/A	N/A
222	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral	N/A	N/A
223	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
224	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
225	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
226	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
227	3	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
228	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
229	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
230	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
231	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
232	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
233	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
234	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral

235	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
236	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
237	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
238	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
239	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
240	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
241	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
242	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
243	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
244	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
245	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
246	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
247	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
248	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
249	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
250	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
251	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
252	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
253	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
254	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
255	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
256	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
257	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
258	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
259	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Major	Large Adverse
260	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
261	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
262	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
263	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
264	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
265	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
266	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
267	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
268	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
269	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
270	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
271	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
272	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
273	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
274	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
275	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
276	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
277	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
278	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
279	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
280	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
281	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
282	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
283	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
284	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
285	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
286	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
287	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
288	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
289	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
290	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
291	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
292	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
293	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
294	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
295	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Moderate	Moderate Adverse
296	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Major	Large Adverse
297	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Major	Large Adverse
298	3	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
299	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
300	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
301	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No change	Neutral
302	1	High	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Minor	Slight Adverse
Community Building	**No.**	**Sensitivity**	**Magnitude**	**Significance**										
C01	1	Medium	N/A	N/A	N/A	N/A	No change	Neutral	N/A	N/A	N/A	N/A	N/A	N/A
C02	1	Medium	N/A	N/A	N/A	N/A	No change	Neutral	N/A	N/A	N/A	N/A	N/A	N/A
C03	1	Medium	N/A	N/A	N/A	N/A	No change	Neutral	N/A	N/A	N/A	N/A	N/A	N/A

Appendix 2.5

Flora and Fauna

Appendix 2.5.1. Ecology Assessment Matrix

Purple Route		
Biodiversity Feature	**Quantitative**	**Qualitative Assessment**
International Importance		
SACs	1 SAC: River Barrow and River Nore SAC (002162). 2 SAC: Lower River Suir SAC (002137)	These SACs include all watercourses located within the Corridor. The Purple Route intersects the River Barrow and River Nore SAC perpendicularly north of Glenmore; crossing a small tributary of the Glenmore River, a first order stream (IE_SE_14O130860). The SAC is also within the route corridor at two further locations northwest and northeast of Glenmore (approximately 1.5km); however, it is possible that direct impacts to the SAC can be avoided at these latter two points during detailed design; it will also utilise structures already built as part of the New Ross Bypass.. No Article 17 habitats have been recorded (NPWS Conservation Objective documentation). Depending upon the final design drainage may go to the Nicholastown Stream, which via Lough Cullin, ultimately reaches the Lower River Suir SAC.
SPAs	None impacted	None impacted
National Importance		
NHAs	None impacted	None impacted
pNHAs	Barrow River Estuary pNHA	The Purple Route intersects the Nicholastown Stream (IE_SE_14O130860) stream 2.3km upstream of Lough Cullin pNHA. No existing road network at this point. At the northern end surface waters may discharge to the Barrow River Estuary pNHA (which overlaps with the SAC, as described above).
ESAs Importance		
County Importance	100% ESA1	100% of ESA1, a site of county importance, lies within the 600m wide Purple Route Corridor. Site includes WN6 woodland. The ESA is, however, located on eastern side of corridor – such that it may be possible to reduce impacts at detailed design stage.
Local (Higher) Importance	ca. 25% of ESA4; ca 90% of ESA5; 80% of ESA19 within 600m corridor	Includes the downstream extent of the ESA4 - no indirect impact on rest of ESA4. Sites include FW1, WN5, WN6/WS1, WN6, GS4, WS1, HD1 habitats. ESA 4 and ESA19 particularly difficult to avoid at detailed design as it would mean a minimum of 2 no. water crossings to avoid ESA4 and the ESA spans 525m width of corridor.
Local (Lower) Importance	100% of ESA6; 100% of ESA14 within 600m corridor	ESA6 includes PF2, GA1/GS4 habitats. ESA14 includes GS4. Direct impact to each site could be minimised at detailed design – as sufficient space is available within the 600m corridor.
Other Features		
Watercourses	1 waterbody: Glenmore River. Waterbody code: IE_SE_14O130860. Potential drainage to Nicholastown Stream	Water Framework Directive (WFD) status of Glenmore River unassigned. 3.6km of the Glenmore River is located within the Purple Route Corridor. 2.2km run perpendicular to route. 3 unavoidable water crossings. Hydrologically connected to River Barrow And River Nore SAC. The Nicholastown Stream is outside the corridor, but drainage to it is possible depending upon the final design.
Birds		Located closest to Lough Cullin which supports important roosting and feeding sites for birds.
Bats		Ranked worst option by bat specialist

Navy Route		
Biodiversity Feature	**Quantitative**	**Qualitative Assessment**
International Importance		
SACs	1 SAC: River Barrow and River Nore SAC (002162). 2 SAC: Lower River Suir SAC (002137).	The Navy Route intersects the River Barrow and River Nore SAC at the northern end of the scheme where the Navy Route overlaps with the Do Nothing/Existing Route and crosses the Glenmore River (IE_SE_14O130860 stream). The SAC runs perpendicular to the corridor at the north of the route - impact unavoidable when considering the full 600m width of the corridor. The SAC also occupies the western half of the corridor for 600m along the Do Nothing/Existing Route. No Article 17 habitats have been recorded (NPWS Conservation Objective documentation). Impact dependent on whether works will follow existing route and the extent to which works can be confined to within the existing route or on the side of the existing N25 away from the SAC; it will also utilise structures already built as part of the New Ross Bypass.. Depending upon the final design the scheme may drain to the Luffany Stream which in turn enters the Lower River Suir SAC, as well as to the River Barrow and River Nore via the Glenmore River.
SPAs	None impacted	None impacted
National Importance		
NHAs	None impacted	None impacted
pNHAs	1 pNHA: Barrow River Estuary pNHA	Located within the northern portion of the Study Area (SA) to the east of the existing road corridor – i.e. north of Glenmore and along the River Barrow (overlaps with the SAC). The pNHA is located within a small section in the north east of the Navy Route corridor. Direct impact unlikely. If current route chosen, it crosses the Glenmore River (IE_SE_14O130860) 140m upstream of the pNHA. Lough Cullin pNHA located to the west will not be impacted by the Magenta route option.
ESAs		
County Importance	None impacted	None impacted
Local (Higher) Importance	100% ESA 8, 100% ESA 11, 100% ESA 17, 50% ESA 19 within 600m corridor	ESA8 comprises a WD3/WD4 corridor between the river and existing N25 - significant impact likely if preliminary route chosen and upgrades to current extent required on the northern side of the road towards the river. ESA11 includes WS1/WD1, WN6, GA1, GS4 and spans 350m width along west of corridor - likely to be severely impacted based on preliminary route corridor. ESA17 includes FW1, WS1 and runs diagonally across centre of the route corridor - likely to be severely impacted regardless of finalised route. ESA19 includes WN6, GS4, WS1, HD1 and is located in the western half of the corridor - impact could be avoided at detailed design.
Local (Lower) Importance	60% ESA 2; 75% ESA 3; 50% ESA 9; 100% ESA 10; 100% ESA 12; 100% ESA 15	ESA2 comprises WN5, WD1, WD4, FW1 - already impacted by new roundabout built as part of the N25 New Ross Bypass scheme. Severe impact likely based on preliminary route. ESA3 includes WS1, FW1 and located along eastern margin of corridor - impact may be avoided at detailed design. ESA9 includes GS4, FW1, WS1; it is located within eastern 150m of the Navy corridor along the existing N25 - impact may be avoided at detailed design. ESA10 includes FS1, GS4, FW1 located in the centre of the route corridor - impact likely to be severe. ESA12 includes WS1, WD1 - impact likely to be severe. ESA15 includes GS4, FW4, WS1, ER1, WD4 - impact likely to be severe..
Other Features		

Watercourses	2 no watercourses: Glenmore River; Waterbody code: IE_SE_14O130860. Luffany Stream. Waterbody code: IE_SE_16L680750	WFD status of Glenmore River unassigned. Glenmore River: 3.6km within the Navy Route Corridor. 1km runs perpendicular to route. Hydrologically connected to River Barrow And River Nore SAC. Luffany Stream: 0.58km within Navy Route Corridor. Runs parallel to route within eastern 50m. Hydrologically connected to Lower River Suir SAC - unlikely to be impacted, but this will depend upon the detailed design.
Birds		Located furthest from bird sites.
Bats		Ranked joined 4th preference with Magenta by bat specialist

Magenta Route		
Biodiversity Feature	**Quantitative**	**Qualitative Assessment**
International Importance		
SACs	1 SAC: River Barrow and River Nore SAC (002162). 2 SAC: Lower River Suir SAC (002137)	The Magenta Route Corridor intersects the River Barrow and River Nore SAC at the northern end of the scheme where the Magenta Route overlaps with the Do Nothing/Existing Route and crosses the Glenmore River (IE_SE_14O130860). The SAC runs perpendicular to the corridor at the north of the route – as with the Navy Route, impacts are unavoidable when considering the 600m corridor. The SAC also occupies the western half of the corridor for 600m along the Do Nothing/Existing Route. No Article 17 habitats have been recorded (NPWS Conservation Objective documentation). The potential for negative impacts is dependent on whether works can be confined to within the existing route or on the side of the existing N25 away from the SAC; it will also utilise structures already built as part of the New Ross Bypass. Depending upon the final design the scheme may drain to the Luffany Stream which in turn enters the Lower River Suir SAC, as well as to the River Barrow and River Nore via the Glenmore River.
SPAs	None impacted	None impacted
National Importance		
NHAs	None impacted	None impacted
pNHAs	1 pNHA: Barrow River Estuary pNHA	The Barrow River Estuary pNHA is located within the northern portion of the Study Area (SA) to the east of the existing road corridor – i.e. north of Glenmore and along the River Barrow (overlaps with the SAC). The pNHA is located within a small section in the north east of the Magenta Route corridor. Direct impact unlikely. If existing route is chosen, it would cross the Glenmore River (IE_SE_14O130860) 140m upstream of the pNHA. Lough Cullin pNHA located to the west will not be impacted by the Magenta route option.
ESAs		
County Importance	None impacted	None impacted
Local (Higher) Importance	100% ESA 8, 100% ESA 11, 100% ESA13, 33% ESA16, 50% ESA 17, 33% ESA 19 within 600m corridor	ESA8 comprises a WD3/WD4 corridor between the river and existing route - significant impact likely if preliminary route chosen and upgrades to current extent required on the northern side of the road towards the river. ESA11 includes WS1/WD1, WN6, GA1, GS4 centrally located within corridor; as this site is 280m wide it is likely to be severely impacted. ESA13 includes FW1, GS4, WS1, WN6 and spans the eastern half of the route corridor (towards south) – again this could be severely impacted; though it may be possible to avoid at detailed design. ESA16 includes WS1, WD4, WS2, GS4, FW1, WN6, WL2, WN5 and spans the eastern half of corridor - again this could be severely impacted; though it may be possible to avoid at detailed design. ESA17 includes FW1, WS1 and runs diagonally within western half of the route corridor – as above it may be possible to avoid sever impacts associated with the corridor during detailed design.. ESA19 includes WN6, GS4, WS1, HD1 and is located in the western half of the corridor - as above it may be possible to avoid sever impacts associated with the corridor during detailed design.
Local (Lower) Importance	60% ESA 2; 75% ESA 3; 100% ESA 9; 100% ESA 10; 50% ESA 12; 33% ESA 20 within 600m corridor	ESA2 comprises WN5, WD1, WD4, FW1 - already impacted by new roundabout built as part of the N25 New Ross Bypass scheme. ESA3, which includes WS1 and FW1, is located along the eastern margin of the route corridor – a moderate impact likely based on the route corridor, though it may be possible to avoid this during detailed design. ESA9 includes GS4, FW1 and WS1 and is located within eastern half of corridor along existing route - likely severe impact. ESA10 includes FS1, GS4 and FW1 located in the centre of the corridor - impact likely to be severe. ESA12 includes WS1 and WD1 located along margin of corridor - impact likely to be moderate if any. ESA20 includes WD1 and GS4 along eastern margin - impact likely to be moderate if any.

Other Features		
Watercourses	2 no watercourses: Glenmore River; Waterbody code: IE_SE_14O130860. Luffany Stream. Waterbody code: IE_SE_16L680750	WFD status of Glenmore River is unassigned. Glenmore River: 3.6km within the Navy Route Corridor. 1km run perpendicular to route. Hydrologically connected to River Barrow And River Nore SAC. Luffany Stream: 1.6km within Magenta Route Corridor. Runs parallel to route within eastern 300m. Hydrologically connected to Lower River Suir SAC - unlikely to be impacted
Birds		Located furthest from bird sites.
Bats		Ranked joined 4th preference with Navy by bat specialist

Red Route		
Biodiversity Feature	**Quantitative**	**Qualitative Assessment**
International Importance		
SACs	1 SAC: River Barrow and River Nore SAC (002162). 2 SAC: Lower River Suir SAC (002137)	The River Barrow and River Nore SAC runs perpendicular to the corridor at the north of the route and crosses the Glenmore River (IE_SE_14O130860) - impact unavoidable when the 600m corridor is considered. The Red Route also crosses a further tributary of the Glenmore River ca. 270m (middle of corridor) upstream of SAC. While the Red route corridor approaches the route terminus from the south through Graiguenakill - potentially impacting the SAC and the Glenmore River; it may be possible at detailed design that the alignment / works can be located so as to avoid impacts to the SAC; it will also utilise structures already built as part of the New Ross Bypass. No Article 17 habitats have been recorded (NPWS Conservation Objective documentation); i.e. at the intersection or at confluence with connecting river. The corridor of the Red Route crosses the Luffany Stream which in turn enters the Lower River Suir SAC.
SPAs	None impacted	None impacted
National Importance		
NHAs	None impacted	None impacted
pNHAs	1 pNHA: Barrow River Estuary pNHA	The Barrow River Estuary pNHA is located within a small section in the north east of the Red Route corridor within eastern half of the route corridor. Any impact will be dependent upon the final design and the level of interaction with wetland habitats along the river at Graiguenakill following detailed design. The Red Route would cross the Glenmore River (IE_SE_14O130860) 270m upstream of the pNHA. Lough Cullin pNHA located to the west will not be impacted by the Magenta route option.
ESAs		
County Importance	None impacted	None impacted
Local (Higher) Importance	20% ESA16, 10% ESA 19 within 600m corridor	ESA16 includes WS1, WD4, WS2, GS4, FW1, WN6, WL2 andWN5; it is limited in extent to the western margin of corridor (towards the south) - likely to be severely impacted, but it may be possible to avoid during detailed design. ESA19 includes WN6, GS4, WS1 and HD1 and is located in the western margin of the route corridor -unlikely to be impacted due to need to realign with existing N25.
Local (Lower) Importance	100% ESA 2; 50% ESA 3; 80% ESA 20; 100% ESA21 within 600m corridor	ESA2 comprises WN5, WD1, WD4 and FW1 - already impacted by new roundabout built as part of the N25 New Ross Bypass scheme. ESA3 includes WS1 and FW1 and is located along eastern margin of corridor - severe impact likely. ESA20 includes WD1 and GS4 is located within western half of the corridor - . ESA21 includes WS1 and spans centre of corridor perpendicularly. Severe impact unavoidable.
Other Features		
Watercourses	2no watercourses: Glenmore River; Waterbody code: IE_SE_14O130860. Luffany Stream. Waterbody code: IE_SE_16L680750	WFD status of Glenmore River is unassigned. Glenmore River: 2km within the Red Route Corridor. 1.5km run perpendicular to route. Hydrologically connected to River Barrow And River Nore SAC (002162). Luffany Stream: 1.1km within Red Route Corridor. Runs perpendicular to route. Hydrologically connected to Lower River Suir SAC.
Birds		Located closest to Barrow Estuary which supports important roosting and feeding sites for birds.
Bats		Ranked 1st preference for bats by bat specialist

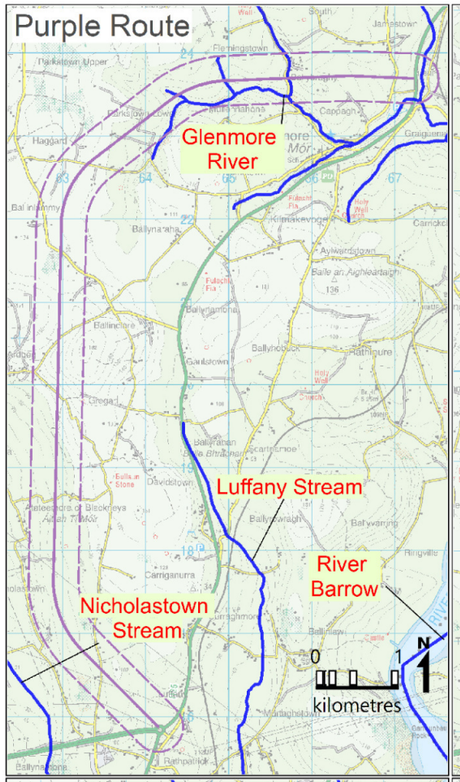
Teal Route		
Biodiversity Feature	**Quantitative**	**Qualitative Assessment**
International Importance		
SACs	1 SAC: River Barrow and River Nore SAC (002162). 2 SAC: Lower River Suir SAC (002137).	The River Barrow and River Nore SAC runs perpendicular to the corridor at the north of the route and crosses the Glenmore River (IE_SE_14O130860) - impact unavoidable when the 600m corridor is considered. The Teal Route also crosses a further tributary of the Glenmore River ca. 320m (middle of corridor) upstream of the SAC. However, while the proposed corridor suggests negative impacts to the River Barrow & River Nore SAC, it may be possible at detailed design that the alignment / works can be located so as to avoid impacts to the SAC; it will also utilise structures already built as part of the New Ross Bypass. No Article 17 habitats have been recorded (NPWS Conservation Objective documentation).. The corridor of the Red Route crosses the Luffany Stream which in turn enters the Lower River Suir SAC.
SPAs	None impacted	None impacted
National Importance		
NHAs	None impacted	None impacted
pNHAs	1 pNHA: Barrow River Estuary pNHA	A small section of the Barrow River Estuary pNHA is located within the north east of the Teal Route corridor (within the eastern half of the corridor). Any impact will be dependent upon the final design and the level of interaction with wetland habitats along the river at Graiguenakill following detailed design. The Teal route crosses the Glenmore River (IE_SE_14O130860) 140m upstream of the pNHA. Lough Cullin pNHA located to the west will not be impacted by the Magenta route option.
ESAs		
County Importance	None impacted	None impacted
Local (Higher) Importance	90% ESA16; 10% ESA19 within 600m corridor	ESA16 includes WS1, WD4, WS2, GS4, FW1, WN6, WL2, WN5 spans width of corridor - likely severe impact. ESA19 includes WN6, GS4, WS1, HD1 and is located in the western margin of the corridor -unlikely to be impacted.
Local (Lower) Importance	100% ESA2; 100% ESA3; 80% ESA20; 100% ESA21 within 600m corridor	ESA2 comprises WN5, WD1, WD4, FW1 - already impacted by new roundabout. Severe impact likely. ESA3 includes WS1, FW1 and spans majority of corridor width - severe impact likely. ESA20 includes WD1, GS4 within western half - impact likely to be moderate (some with prelims). ESA21 includes WS1 and spans centre of corridor perpendicularly. Severe impact likely.
Other Features		
Watercourses	2no watercourses: Glenmore River; Waterbody code: IE_SE_14O130860. Luffany Stream. Waterbody code: IE_SE_16L680750	WFD status of Glenmore River is unassigned. Glenmore River: 2.5km within the Teal Route Corridor. 2km run perpendicular to route. Hydrologically connected to River Barrow And River Nore SAC. Luffany Stream: 1.6km within Teal Route Corridor. Runs perpendicular to route. Hydrologically connected to Lower River Suir SAC.
Birds		Located close to Barrow Estuary which supports important roosting and feeding sites for birds.
Bats		Ranked 2nd preference by bat specialist

Lime Green Route		
Biodiversity Feature	**Quantitative Assessment**	**Qualitative Assessment**
International Importance		
SACs	1 SAC: River Barrow and River Nore SAC (002162). 2 SAC: Lower River Suir SAC (002137).	The Lime Green Route intersects the River Barrow and River Nore SAC at the northern end of the scheme where like the Navy Route it overlaps with the Do Nothing/Existing Route and crosses the Glenmore River (IE_SE_14O130860 stream). The SAC runs perpendicular to the corridor at the north of the route - impact unavoidable when considering the full 600m width of the corridor. The SAC also occupies the western half of the corridor for 600m along the Do Nothing/Existing Route. However, while the proposed corridor suggests negative impacts to the River Barrow & River Nore SAC, it may be possible at detailed design that the alignment / works can be located so as to avoid impacts to the SAC; it will also utilise structures already built as part of the New Ross Bypass. No Article 17 habitats have been recorded (NPWS Conservation Objective documentation). Impact dependent on whether works will follow existing route and the extent to which works can be confined to within the existing route or on the side of the existing N25 away from the SAC. Depending upon the final design the scheme may drain to the Luffany Stream which in turn enters the Lower River Suir SAC.
SPAs	None impacted	None impacted
National Importance		
NHAs	None impacted	None impacted
pNHAs	1 pNHA: Barrow River Estuary pNHA	A small section of the Barrow River Estuary pNHA is located within the north east of the Lime Green Route corridor (within the eastern half of the corridor). Any impact will be dependent upon the final design and the level of interaction with wetland habitats along the river at Graiguenakill following detailed design. The Lime Green route crosses the Glenmore River (IE_SE_14O130860) 140m upstream of the pNHA. Lough Cullin pNHA located to the west will not be impacted by the Magenta route option.
ESAs		
County Importance	None impacted	None impacted
Local (Higher) Importance	100% ESA 8; 100% ESA13; 33% ESA16; 90% ESA17; 50% ESA19 within 600m corridor	ESA8 comprises a WD3/WD4 corridor between river and existing N25 route -significant impact likely, depending upon whether works can occur within the existing route corridor or if works can extend to the southeast away from the ESA.ESA13 includes FW1, GS4, WS1 andWN6 and spans the western half of the route corridor - moderate impact likely. ESA16 includes WS1, WD4, WS2, GS4, FW1, WN6, WL2 and WN5 and spans eastern half of corridor towards south - likely moderate impact but possible that it can be avoided during detailed designed. ESA17 includes FW1 and WS1 and runs diagonally across centre of route corridor - likely to be severely impacted regardless of finalised route. ESA19 includes WN6, GS4, WS1 and HD1 and is located in the western half of the corridor - possible that it impacts can be avoided during detailed designed.
Local (Lower) Importance	60% ESA2; 75% ESA3 within 600m corridor	ESA2 comprises WN5, WD1, WD4 and FW1 - already impacted by new roundabout built as part of the N25 New Ross Bypass scheme. ESA3 includes WS1 and FW1 and located along eastern margin of the route corridor.
Other Features		

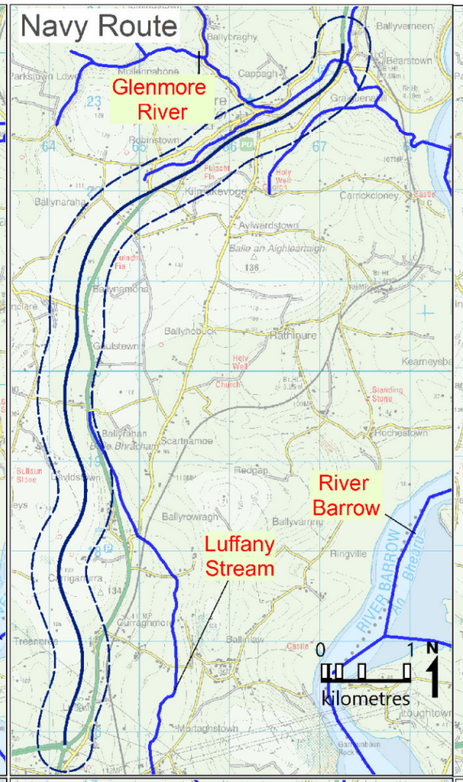
Watercourses	2no watercourses: Glenmore River; Waterbody code: IE_SE_14O130860. Luffany Stream. Waterbody code: IE_SE_16L680750	WFD status of Glenmore River is unassigned. Glenmore River: 4.4km within the Lime Green Route Corridor. 1.4km run perpendicular to route. Hydrologically connected to River Barrow And River Nore SAC. Luffany Stream: 0.9km within Lime Green Route Corridor. Runs perpendicular to route. Hydrologically connected to Lower River Suir SAC.
Birds		Located furthest from bird sites.
Bats		Ranked 3rd preference by bat specialist

2.5.2. Ecology Constraints Drawings

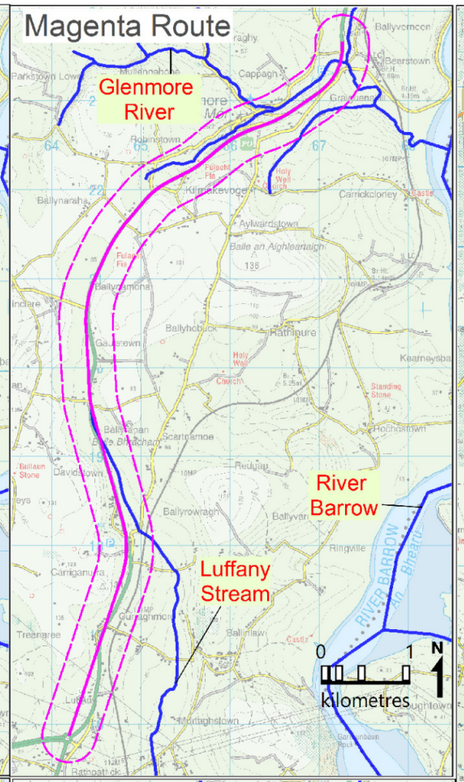
Purple Route



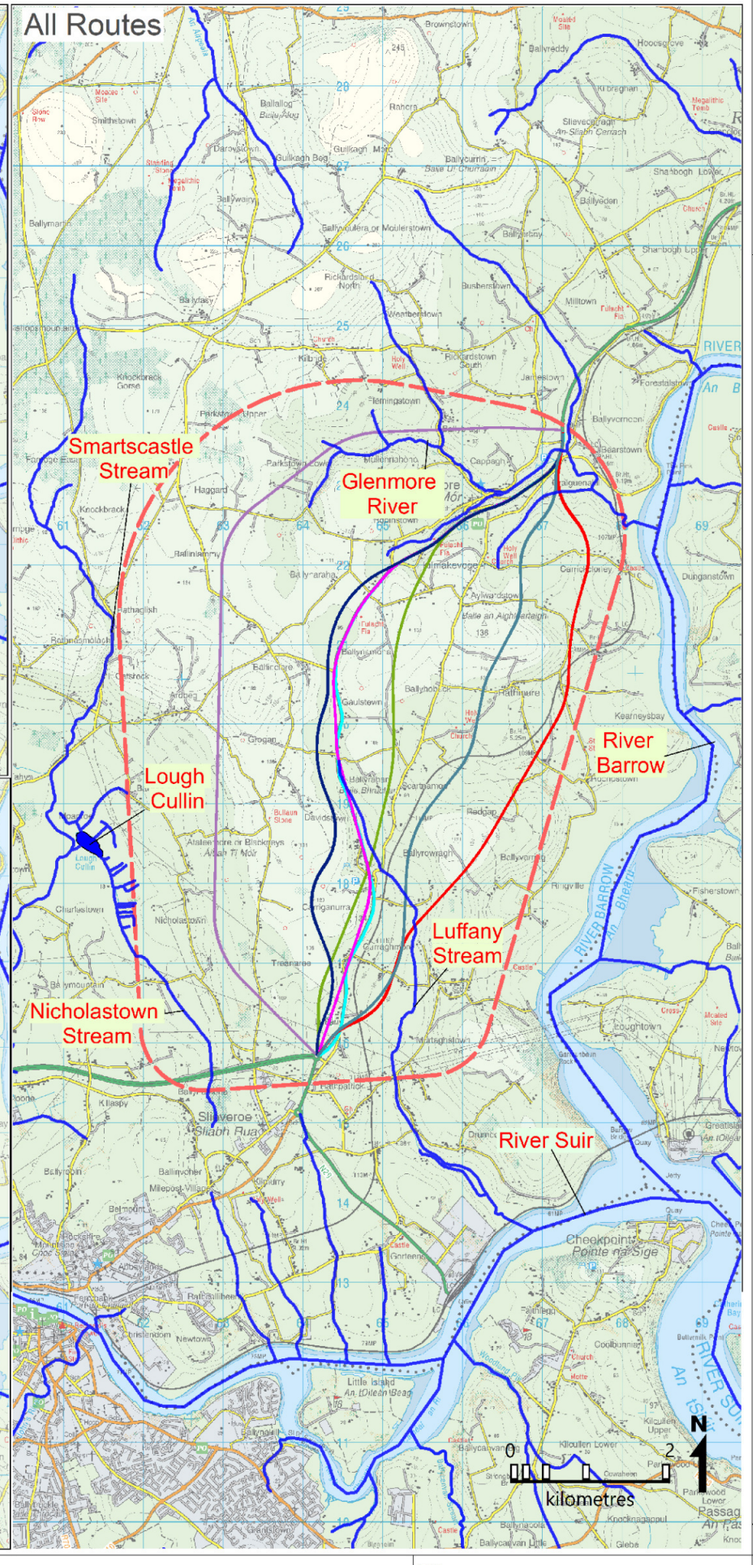
Navy Route



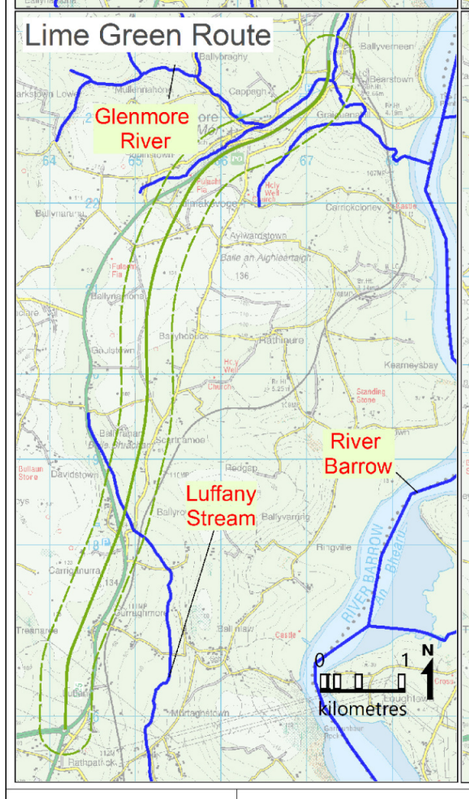
Magenta Route



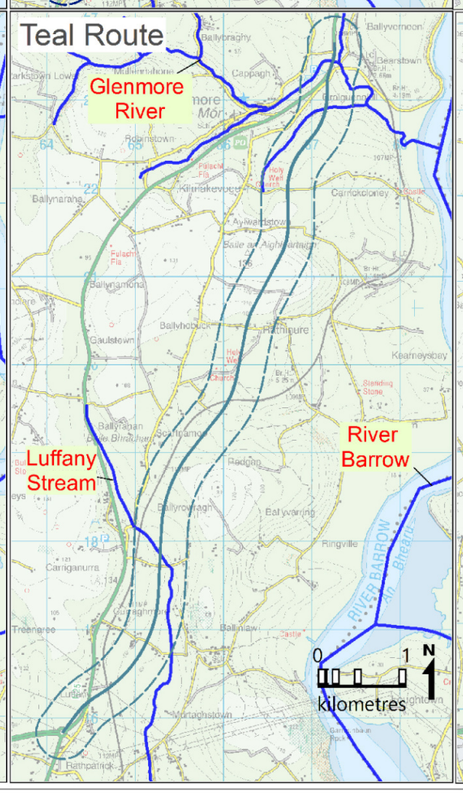
All Routes



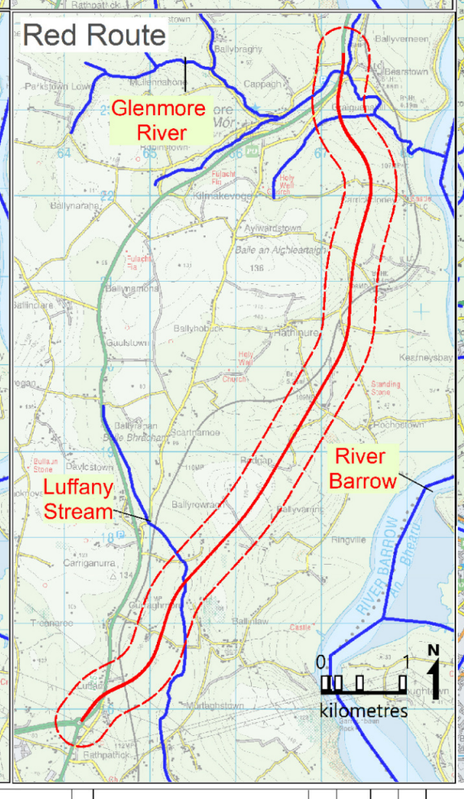
Lime Green Route



Teal Route



Red Route



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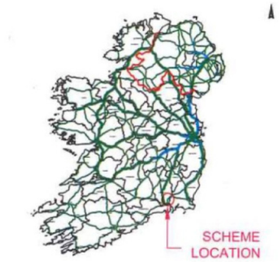
4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

KEY PLAN



Route Options

- Teal
- Red
- Purple
- Navy
- Magenta
- Lime Green
- Existing Route
- Study Area
- 300m Study Area*

*individual route maps only

- Watercourse
- Lake

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Transport Infrastructure Ireland

PLEAN FORBARTHA NÁISIÚNTA

Rev	Description	By	Date	Chk'd	Auth

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Tel(+353) 021 249 0300

1st Floor Technology House Parkmore Technology Park, Galway. H91 NXY4
Tel (+353) 091 766 050

Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Route Options Report

Title: Watercourses

Original Scale	Des/Drawn	Checked	Authorised
N/A	CA Date 08/07/2020	DMcL Date 08/07/2020	MMcL Date 08/07/2020

Status	Drawing Number	Rev
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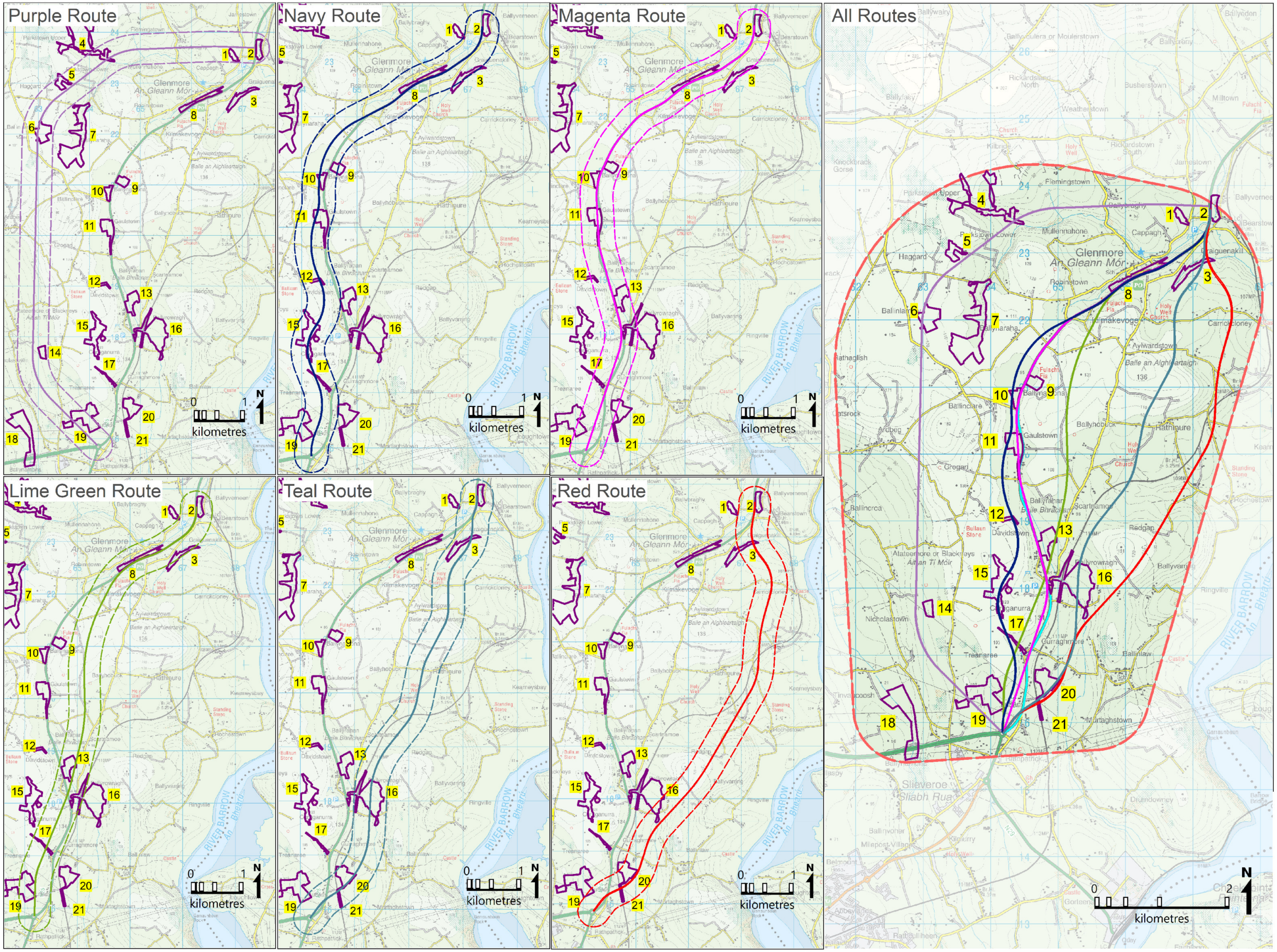

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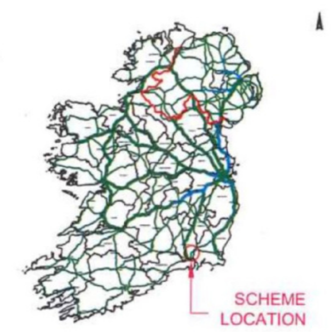
KEY PLAN



Route Options

- Teal
- Red
- Purple
- Navy
- Magenta
- Lime Green
- Existing Route
- Study Area
- 300m Study Area*

*individual route maps only

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Rev	Description	By	Date	Chk'd	Auth

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Tel (+353) 091 786 050

Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Route Options Report

Title: Environmentally Sensitive Areas

Original Scale	Des/Drawn	Checked	Authorised
N/A	CA Date 08/07/2020	DMcL Date 08/07/2020	MMcL Date 08/07/2020

Status	Drawing Number	Rev
F	5190130-ATK-XX-XX-DR-EC-0037	0

Purple Route

Navy Route

Magenta Route

All Routes

Lime Green Route

Teal Route

Red Route

0 1 kilometres N

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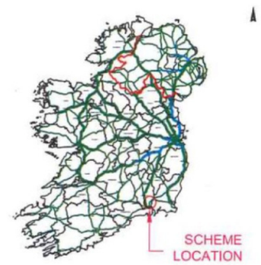

Route Options

- Teal
- Red
- Purple
- Navy
- Magenta
- Lime Green
- Existing Route
- Study Area
- 300m Study Area*

*individual route maps only

Special Conservation Areas

- Lower River Suir SAC
- River Barrow And River Nore SAC

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Tel (+353) 091 786 050

Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

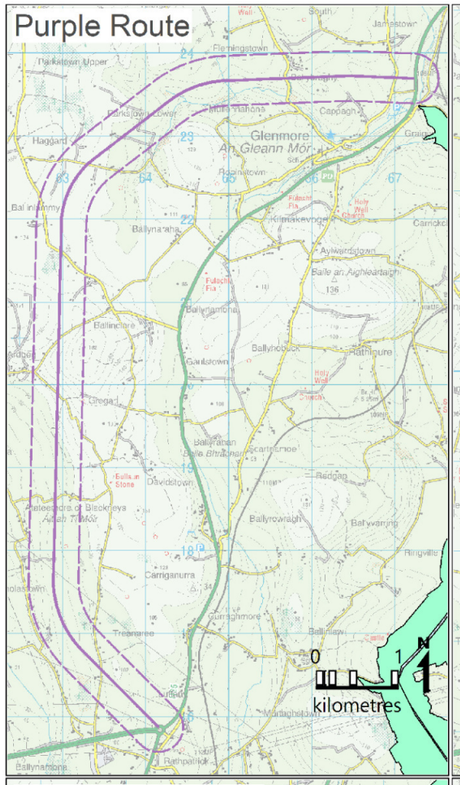
Purpose: Environmental Route Options Report

Title: Special Areas of Conservation

Original Scale	Des/Drawn	Checked	Authorised
N/A	CA Date 08/07/2020	DMcL Date 08/07/2020	MMcL Date 08/07/2020

Status	Drawing Number	Rev
F	5190130-ATK-XX-XX-DR-EC-0038	0

Purple Route



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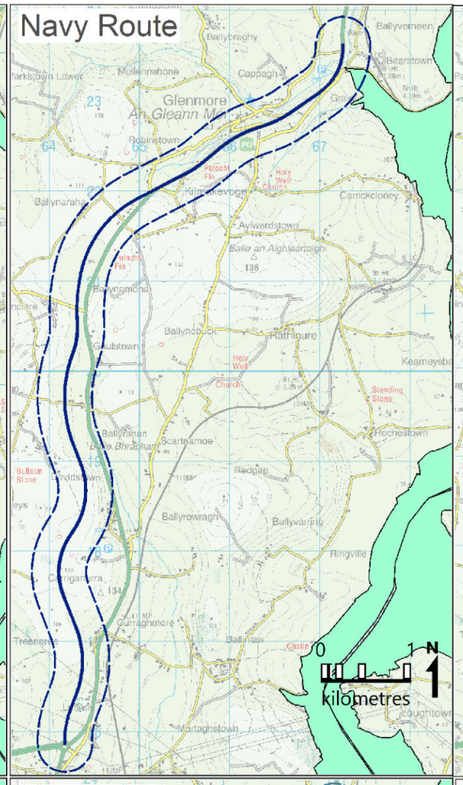
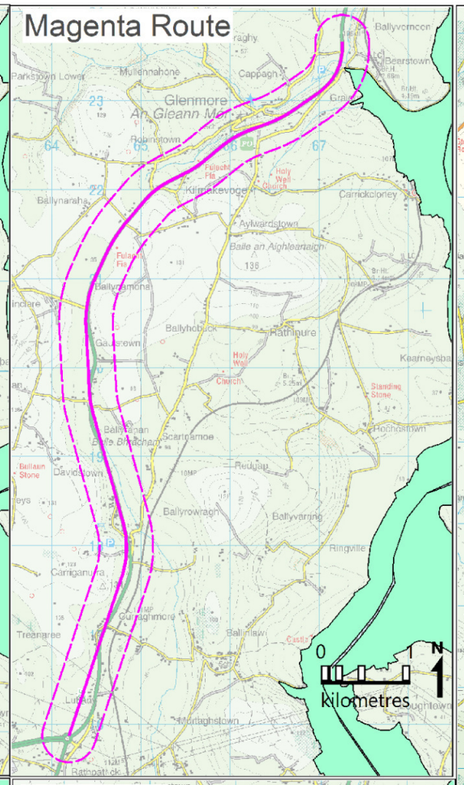
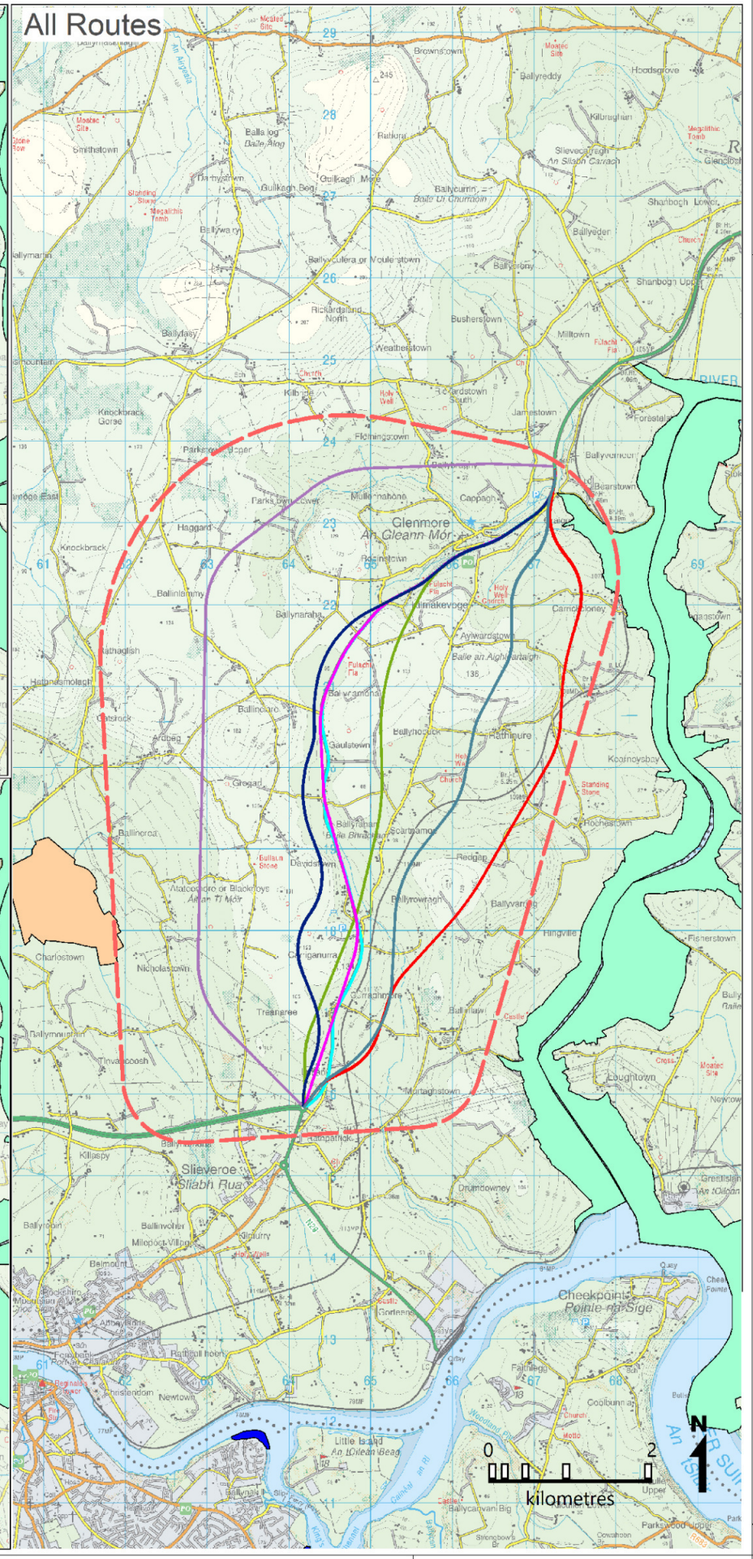


Magenta Route



All Routes



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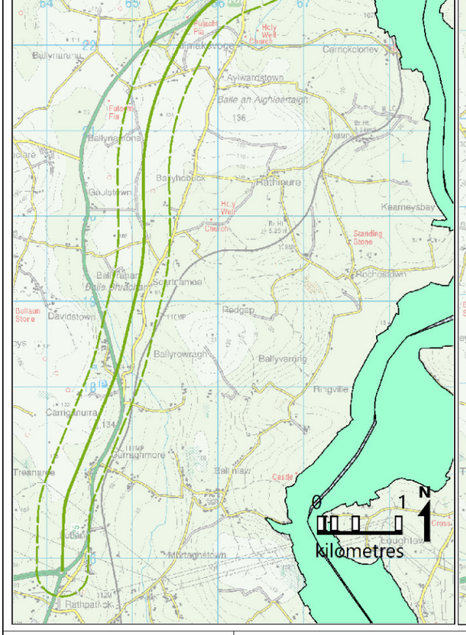

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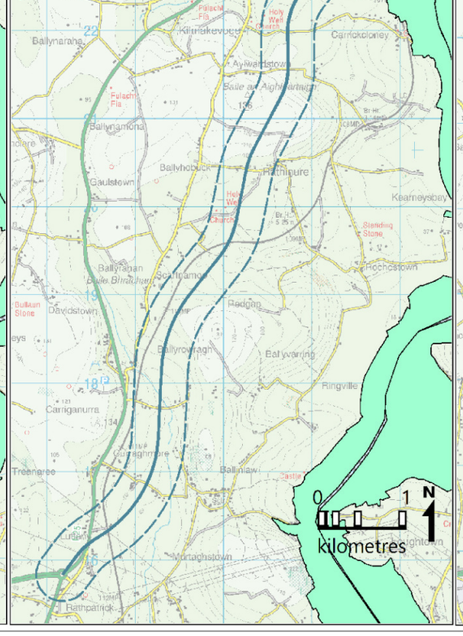
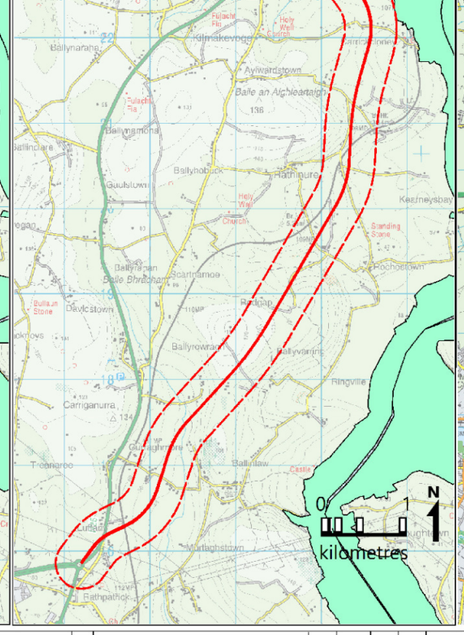


Red Route



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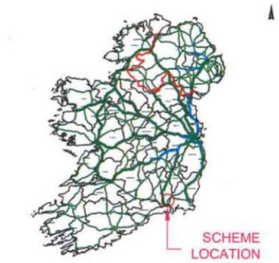

Route Options

- Teal
- Red
- Purple
- Navy
- Magenta
- Lime Green
- Existing Route
- Study Area
- 300m Study Area*

*individual route maps only

proposed National Heritage Area

- Barrow River Estuary
- King's Channel
- Lough Cullin

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Rev	Description	By	Date	Chk'd	Auth

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H91 NXY4
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Client: KILKENNY COUNTY COUNCIL

Project: N25 WATERFORD TO GLENMORE SCHEME

Purpose: Environmental Route Options Report

Title: proposed National Heritage Areas

Original Scale	Des/Drawn	Checked	Authorised
N/A	CA Date 09/07/2020	DMcL Date 08/07/2020	MMcL Date 08/07/2020

Status	Drawing Number	Rev
F	5190130-ATK-XX-XX-DR-EC-0039	0

Appendix 2.7

Soils and Geology

ATKINS

Member of the SNC-Lavalin Group

N25 Waterford to Glenmore

Stage 2 Phase 2: Soil and Geology Appraisal Report

Kilkenny County Council

June 2020

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This document and its contents have been prepared and are intended solely as information for Westmeath County Council and use in relation to N25 Waterford to Glenmore Scheme Route Selection Assessment.

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This document has 31 pages including the cover.

Document history

Revision	Purpose description	Origin-ated	Checked	Reviewed	Author-ised	Date
Rev 0	Issue to Client	RAS	CB	CB		June 2020
Rev 1	Issue to Client	RAS	CB	CB	EON	December 2020

Client signoff

Client	Kilkenny County Council
Project	N25 Waterford to Glenmore
Job number	5190130
Client signature / date	

Contents

Tables *(within text)*

Figures *(within text)*

1. Introduction

This Soils and Geology Assessment has been undertaken by Atkins, on behalf of Kilkenny County Council (KCC), as part of the overall Route Selection assessment process for the proposed N25 Waterford to Glenmore Scheme which will range between 8.7km and 11.5km in length. The location of site is shown in Figure 1-1.

The objective of this report is specifically to assess and evaluate the potential impacts of each route option on soil and geological aspects of the receiving environment, and to identify the preferred route in terms of these considerations, in accordance with relevant best practice guidance, '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'* (National Roads Authority (NRA), 2009). This report has also been prepared with due regard to the following relevant guidance (albeit, it is noted that this assessment does not constitute an environmental impact assessment report), '*Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'* (Institute of Geologists of Ireland (IGI) 2013).

Detailed descriptions of the N25 Waterford to Glenmore Scheme and each route option are provided in the Route Selection Report, prepared by Atkins (2020). Six route options have been brought forward for the Phase 2-Stage 2 Route Options assessment, namely the following;

- Navy Route Option;
- Teal Route Option;
- Purple Route Option;
- Magenta Route Option;
- Red Route Option; and,
- Lime-Green Route Option.

All 6no. route options are presented in Figure 1-1. Individual engineering drawings for each route option are presented in the main Route Selection Report (Atkins 2020).

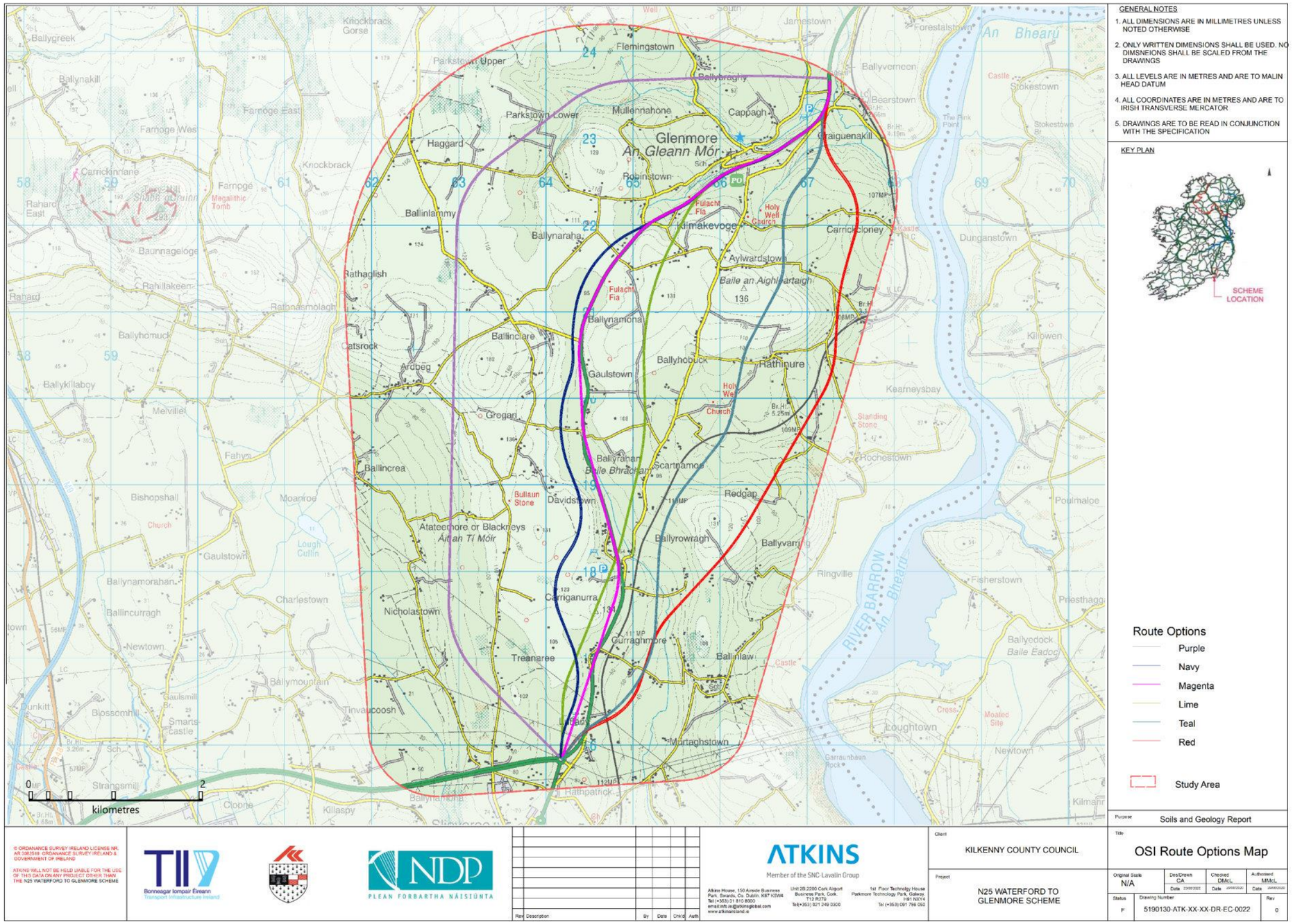


Figure 1-1 – General Site Location and Route Map

2. Methodology

This desk-based assessment has been prepared following a detailed review of all available data sources including;

- GSI Datasets Public Viewer and Groundwater web-mapping, 2020 (GSI, 2020);
- Environmental Protection Agency (EPA) Envision mapping, 2020 (EPA, 2020);
- Ordnance Survey Ireland (OSI) web-mapping 2020 (OSI, 2020);
- All available information for the site (including topographic surveys, and preliminary engineering information); and,

Consultation was undertaken with KCC with regards to groundwater supplies, active quarries, and any unauthorised / unregulated landfills within the general vicinity of the scheme. Throughout the Route Option Selection process, regular liaison and consultation was undertaken between the engineering design team and the geologist within the environmental team.

The findings of the initial desk-based review were further supplemented by additional information gathered as follows:

- A geological windscreen survey carried out by Atkins geologists on the 18/06/2020; and,

- A detailed non-intrusive examination of the geology, geomorphology and historical land use of each of the proposed routes, to identify any additional key geotechnical risks which could lead to delays or increase the risk/cost of any particular route option.

All of the available information was then evaluated to inform the findings of this appraisal report. The findings of the geological field survey are presented in Appendix B. This survey, which was carried out in accordance with relevant guidance (NRA, 2009), comprised a cursory inspection and field survey at key sites and features identified in the vicinity of each route corridor to verify (or 'ground truth') information compiled from the desk-based review. Relevant feedback obtained during the public consultation process has also been reviewed as part of this appraisal.

2.1. Assessment Criteria

Relevant assessment criteria for the rating of potential environmental impacts on the soils and geology environment are presented in Table 2.1 and Table 2.2, as per relevant NRA (2009) guidelines, which take account of the importance of the attributes, the significance, and the predicted scale and duration of any likely impacts. The evaluation for each of the geological attributes identified along each route option and the level of impact of the route option on each attribute has thus been determined.

For the purposes of this assessment each route option has generally been assessed using a buffer distance of 300m from the centre line of each route (i.e. overall width of 600m) (hereafter referred to as 'study area'). However professional judgement has also been applied to this assessment during the evaluation of potential risks posed to the receiving soils and geology environment. Accordingly, where relevant search criteria have been applied beyond the stated buffer distance.

Table 2.1: Criteria for Rating Site Attributes

Box 4.1: CRITERIA FOR RATING SITE ATTRIBUTES - Estimation of Importance of Soil and Geology Attributes		
Importance	Criteria	Typical Examples
Very High	Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale*	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit Proven economically extractable mineral resource.
High	Attribute has a high quality, significance or value on a local scale Degree or extent of soil contamination is significant on a local scale Volume of peat and/or soft organic soil underlying route is significant on a local scale*	Contaminated soil on site with previous heavy industrial usage Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site) Well drained and/or highly fertile soils Moderately sized existing quarry or pit Marginally economic extractable mineral resource
Medium	Attribute has a medium quality, significance or value on a local scale Degree or extent of soil contamination is moderate on a local scale Volume of peat and/or soft organic soil underlying route is moderate on a local scale*	Contaminated soil on site with previous light industrial usage Small recent landfill site for mixed wastes Moderately drained and/or moderate fertility soils Small existing quarry or pit Sub-economic extractable mineral resource
Low	Attribute has a low quality, significance or value on a local scale Degree or extent of soil contamination is minor on a local scale Volume of peat and/or soft organic soil underlying route is small on a local scale*	Large historical and/or recent site for construction and demolition wastes Small historical and/or recent landfill site for construction and demolition wastes Poorly drained and/or low fertility soils Uneconomically extractable mineral resource
	* Relative to the total volume inert soils disposed of and/or recovered.	
(Source: NRA Guidelines, 2009)		

Table 2.2: Criteria for Rating Impact Significance at Route Selection Stage

Box 4.4: CRITERIA FOR RATING IMPACT SIGNIFICANCE AT ROUTE SELECTION STAGE - Rating of Significant Environmental Impacts at Route Selection Stage					
Impact Level	**Attribute Importance**				
	Extremely High	**Very High**	**High**	**Medium**	**Low**
Profound	Any permanent impact on attribute	Permanent impact on significant proportion of attribute			
Significant	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute		
Moderate	Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute	
Slight		Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute
Imperceptible			Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute

(Source: NRA Guidelines, 2009)

In describing the significance of potential impacts, the following terminology has been used, in accordance with TII Publication *'PE-PAG-02031 Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis'* (TII, 2016), and relevant NRA (2009) guidelines:

- Major or highly positive;
- Moderately positive;
- Minor or slightly positive;
- Not significant or neutral;
- Minor or slightly negative;
- Moderately negative;
- Major or highly negative; and,
- Severe negative.

3. Geology

3.1. Geology Overview

3.1.1. General Overview of Solid Geology, Subsoils and Soils

Ground conditions beneath each of the six route options are considered to be generally comparable. The majority of each route is underlain by tills derived from shales with a pocket of tills derived from sandstone in the south western portion beneath Purple Route Option. Alluvium occurs along stream valleys at localised areas in the general vicinity of the N25 scheme with moderate coverage in the north eastern section along the River Barrow and its associated tributaries. Very minor portions of lacustrine deposits and chert also occur beneath the general vicinity of the N25 scheme. Scattered rock outcrops/subcrops are located along each route option. Refer to Figures 3-1 and 3-2 (GSI, 2020). All relevant desk-based figures (Figure 3-1 to Figure 3-5) are presented at the end of this section of the report.

Bedrock underlying all route option comprises green, red-purple, buff slate, siltstone of the Oaklands Formation, green and grey slate with thin siltstone from the Ballylane Formation, red, brown conglomerate & sandstone of Carrigmaclea Formation and Dolerite and Rhyolitic volcanics, grey & brown slates of Campile formation. Purple route option is also underlain by yellow and red sandstone, and green mudstone of Kiltorcan Formation as shown in Figure 3-3.

3.1.2. Previous Ground Investigation

A geotechnical ground investigation was carried out by Glover Site Investigations along the preferred emerging route identified as Route 2 (Navy) in 2012. The findings of this ground investigation are discussed within Section 3.1.4.

3.1.3. Geological Field Survey

A windscreen survey was carried out on 18th June 2020 to further assess ground conditions at specific locations within the vicinity of each route option.

It should be noted that permission was not granted to enter access any areas of private land. Any observations were made using public roads. Due to the restricted nature of the survey some areas of the route were not accessible or visible.

A summary of the findings of the windscreen survey are summarised in Table 3.1.

Table 3.1: Windscreen Survey Findings

	Purple	Navy	Magenta	Red	Teal	Lime Green
Current Site Use	Mainly agricultural use	Mainly agricultural use. Intersects with a section of the existing N25 in the north.	Follows the existing alignment of N25, including, a number of residential properties and businesses located along the N25	Mainly agricultural use.	Mainly agricultural use.	Mainly agricultural use. Intersects with a section of the existing N25 in the north.
Description of existing surface condition and ground condition	Grassy fields occasionally containing crops or livestock. There several areas along the route or adjacent to the route that contain soft ground. Access was not possible to inspect these areas however they are assumed to be unfavourable.	Grassy fields occasionally containing crops or livestock in the south and centre of the route. The route follows the N25 alignment in the north, which has a tarmac surface. The surface of the cuttings on the N25 are generally in rock, however vegetation prevents surveying.	This route predominantly follows the route of the existing N25 surface generally consists of tarmac. The N25 is generally bound by a grass verge and some vegetation.	Grassy fields, with some fields occasionally containing crops or livestock. Several areas along or adjacent to the route contain potential soft ground. No access permitted. The route follows a section of the existing N25 with surface generally consisting of tarmac.	Grassy fields, occasionally containing crops or livestock. Several areas along or adjacent to the route contain potential soft ground. No access permitted. The route follows a short section of the existing N25 in the north and south with surface generally consisting of tarmac.	Grassy fields occasionally containing crops or livestock. Several areas along or adjacent to the route contain potential soft ground. No access permitted. The route follows a section of the existing N25 with surface generally consisting of tarmac.
Existing topography (visible during windscreen survey)	Undulating topography in the north, with gently rolling fields intersected by small valleys and rivers. South of the ridgeline the route becomes less undulating and transitions to a low-lying topography containing soft ground.	Relatively flat in the north as the route follows the existing N25. The N25 is bound by a cutting to the south and a steep slope to the north. Rocky outcrops were visible along the sections of the slope and cutting in this area. As the route continues south it travels through gently rolling fields parallel to the existing N25. These fields generally slope east towards the N25 and away from the ridgeline to the west.	Level following the N25 through areas with gently rolling fields. Along the northern areas, the N25 is located between a cutting, predominantly in rock, with a significant slope dropping off to the north. As the route travels south, the land is generally sloping from a ridgeline in the west	Undulating with hilly agricultural land in the north. Generally, the route crosses gently rolling fields, however areas of slightly steeper terrain are encountered near some the small rivers that intersect the route. As the route travels south, it becomes slightly less undulating before terminating in an area of flat soft ground.	Undulating with some significant slopes in the north. Steep sloping fields are typically in small river valleys that intersect the route. From the centre of the route, the topography comprises of gently undulating fields until terminating in the flat soft ground north of Luffany Roundabout.	Route follows the level alignment of the N25 in the north before travelling south through undulating and gently rolling agricultural land. The N25 is located between a cutting, predominantly in rock, with a significant slope dropping off to the north.

		Areas can become undulating around the centre of the route. The route terminates in the flat and soft ground north of the Luffany Roundabout.	towards the River Barrow in the east. The undulating topography gives way to a flat area made up of soft ground north of the Luffany Roundabout.			As the route travels south, it crosses a local high point in the form of a rock outcrop before continuing to an area of low-lying land containing soft ground.
Surface slopes and steep faces present on site	Steep surface slopes were visible around Ch.1+550 where a small unnamed road and stream cuts through a small valley. Vegetation obscured the slopes restricting the view.	The route intersects part of the rock cuttings on the N25. A very steep rocky face was visible at the Glanbia site near Glenmore. This is north of the N25 at Ch.1+700. It is likely that a steep face is present along much of this section of the N25 however it is covered by vegetation.	The route intersects part of the rock cuttings on the N25. A very steep rocky face was visible at the Glanbia site near Glenmore. This is north of the N25 at Ch. 1+700. It is likely that a steep face is present along much of this section of the N25 however it is covered by vegetation.	Steep surface slopes assumed at Ch.0+750 where the route passes a watercourse. Steep surfaces were visible near areas adjacent to the route in small river valleys at Ch.4+250	The route intersects part of the rock cuttings on the N25.	The route intersects part of the rock cuttings on the N25. A very steep rocky face was visible at the Glanbia site near Glenmore. This is north of the N25 at Ch.1+700. It is likely that a steep face is present along much of this section of the N25 however it is covered by vegetation. There were steep slopes visible around the outcrop of bedrock at Ch.7+100 which are heavily vegetated and therefore difficult to determine the extent of the steep face.
Surface water	None observed / visible.	None observed / visible. Existing N25 crosses watercourse at Ch0+225.	None observed / visible. Existing N25 crosses watercourse at Ch0+225.	None observed / visible. Existing N25 crosses watercourse at Ch0+225. A small river which is intersected by the route	None observed / visible. Existing N25 crosses watercourse at Ch0+225.	None observed / visible.

			A small river which is intersected by the route was visible near Ch.5+650.	was visible near Ch.4+250.	A small watercourse which is intersected by the route was partially visible through the vegetation at Ch.6+250.	
Potential soft or marshy ground Due to limited access, potential wet ground indicators i.e. rushes were used to identify potential soft ground	Localised areas recorded at: Ch.1+500, 4+900, and 11+550	Localised areas recorded at: 2+450, 4+500,8+150 and 9+300.	Recorded at Ch.0+140, 2+550 3+600, 5+900, and 6+400, 8+450. Soft, marshy ground identified adjacent north of the Luffany Roundabout in the south.	Recorded at Ch. 0+140. Soft, marshy ground identified adjacent north of the Luffany Roundabout in the south.	Recorded at: Ch. 8+150, Soft, marshy ground identified adjacent north of the Luffany Roundabout in the south.	Recorded at: Ch. 0+140, 2+350, 7+025. Soft, marshy ground identified adjacent north of the Luffany Roundabout in the south.
Shallow Bedrock	No shallow bedrock observed	Bedrock was visible along several areas of cutting on the N25	Bedrock was visible along several areas of cutting on the N25	Bedrock was visible at several areas adjacent to route alignment at Ch.2+700, 2+950 and 3+150	No shallow bedrock observed	Bedrock was visible at several areas adjacent to route alignment e.g. Ch.7+100. This is a large outcrop on a hill overlooking the existing N25.
Disturbed ground	None observed	None observed	None observed	Area of disturbed ground recorded near the route at Ch.3+150. This area contained some waste material. Potentially an unrecorded historical quarry or pit.	An area of disturbed ground was recorded near the route at Ch.3+450. Appears to have been a storage area for material and was very overgrown in places.	None observed
Site Access	Typically, through field gates via narrow single-track roads.	Typically, through field gates via narrow single-track roads. Some areas in the south are accessed through field gates directly off the N25.	The route predominantly follows the existing N25 and therefore site access is generally through field gates off the N25	Typically, through field gates via narrow single-track roads.	Typically, through field gates via narrow single-track roads.	Typically, through field gates via narrow single-track roads. Some areas in the south are accessed

			or in areas adjacent to the N25.			through field gates directly off the N25.
Surface depressions and excavations	None observed during survey	None observed during survey	None observed during survey	None observed during survey	None observed during survey	None observed during survey
Vegetation and trees	Field boundaries are defined by hedgerows and occasional trees.	Field boundaries are defined by hedgerows and occasional trees.	Field boundaries are defined by hedgerows and occasional trees.	Field boundaries are defined by hedgerows and occasional trees.	Relatively dense trees and vegetation was visible from the road near Ch.4+250. Field boundaries are defined by hedgerows and occasional trees.	Field boundaries are defined by hedgerows and occasional trees.

From a geotechnical perspective, localised areas of poor ground are present beneath each of the route options and for the purposes of this assessment are broadly comparable. No landslide event is reported within the vicinity of the N25 scheme (GSI, 2020). The general risk of landslide is generally considered to be low, with areas of "Moderately High" and "High" along individual route options as presented in Figure 3-4.

The results from available regional geological mapping (GSI, 2020), supplemented by information gathered during the preliminary geotechnical ground investigation (Glover Site Investigation, 2012) have been used to determine the percentage of total estimated cut volumes for each route option which is likely to comprise soft or unsuitable material. Refer to Table 3-2.

Table 3.2: Cut volume and Percentage of Cut Soft Ground Along Individual Route Options

Route Name	Total Cut Volume (m3)	Cut Volume within Soft Ground (m3)	Cut Volume within Soft Ground (%)
Purple (A)	413,676	328,451	79
Magenta (H)	160,463	100,081	62
Red (I)	1,145,739	514,066	45
Lime Green (Q)	988,288	239,476	24
Navy (2)	279,981	148,004	53
Teal (3)	1,327,219	749,574	56

Note: *The above calculations are based on available regional soils mapping data (GSI, 2020) and supplemented where possible by site specific data (Glover Site Investigation, 2012). As such these calculations are approximate values only.*

All 6no. route options will involve excavation or cut into existing potential soft ground deposits, the lateral and vertical extent of which is not fully determined. The 2012 preliminary ground investigation targeted only 1no. route, the Navy route and did not fully investigate soft ground deposits.

No Geological Heritage Areas are identified within the study area of each of the route options (GSI, 2020). The closest Geological Heritage Site (Site Code: KK011, Site Name: Granny Quarry) comprises of exposed faces of limestone and shale with localised karst weathering features, and is located 5.6km, south-west of the N25 Scheme, well outside the study area of all 6no. route options (GSI, 2020).

A detailed review of historical land use along each route option is presented within the Cultural Heritage Assessment. Historical land-use beneath each of the six route options is primarily agricultural, with no historic mines identified within the vicinity of the N25 scheme.

Trade effluent discharge to receiving waters is licenced under Section 4 of the Local Government (Water Pollution) Act 1977, as amended in 1990. There is 1no. Section 4 discharge licences within the vicinity of the N25 scheme as presented in Figure 3.5 and summarised as follows;

- Kent Quarries Ltd (reference no. ENV/W/107), Coolnaleen.

However, this licenced discharge is unlikely to have an impact on soils and geology quality beneath any of the 6no. route options.

A detailed description of the receiving geology beneath each route option is presented below, including a review of pertinent considerations (specifically soil and bedrock types, economic geology, potential current / historic sources of contamination and any key findings from the preliminary ground investigation) or the geological field survey.

3.1.4. Navy Route Option

The navy route corridor is underlain by quaternary sediments, predominantly till derived from Lower Palaeozoic shales, with small sections of alluvium, lacustrine sediments and till derived from cherts.

Bedrock is mapped outcropping throughout the route corridor, particularly in the north and south. Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation

towards the north. It also intersects sections of green and grey slate with thin siltstone of Ballylane formation and red- brown conglomerate & sandstone of Carrigmaclea formation.

The route intersects a linear deposit of alluvium along the centre of the route along with 3no. localised deposits within the north and mid-section of the route which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments. (GSI, 2020).

A geotechnical ground investigation was carried out by Glover Site Investigations during 2012.

The findings of the ground investigation identified a general thickness of overburden across the site ranging from 0.1m bgl (BH121R) to 18.94m bgl in BH136R. A localised area of lacustrine deposits is within the southwest of the study area, which may be characterised by weak sediment with low permeability.

Table 3.3: Summary of Ground Conditions encountered during the Ground Investigation

Topsoil	Typical Thickness: 50-700mm thickness average 225mm.
Made Ground / Fill	Bound and unbound pavement construction layers and variable, predominantly coarse-grained soils. Encountered between 0.1m bgl and 1.5m bgl in BH199 at the north end of the route.
Peat and Soft Ground	Encountered in BH101 and TP102 in the low-lying area at the south end of the route. The soils include soft slightly sandy organic clay between 0.3m and 1.5m bgl, underlain to 5m bgl in BH101 by soft slightly sandy clay
Glacial Till	Predominantly fine-grained soils comprising clay, silty clay and silt of variable consistency, coarse-grained content and cobble and boulder contents. There are layers of coarse-grained soil of limited thickness and variable particle size distributions. Recorded between 0.2m bgl (BH103) and 18.9m bgl (BH136)
Bedrock	Rotary coring commencing at 0.1m bgl (BH121R) -11.5m bgl (BH165R), with rock types recorded as siltstone, sandstone, conglomerate, andesite, As evident from the measured rock strengths, RQD values and rock core photographs, the rock is of very variable quality.

Source: Glover Site Investigations, 2012

The following features have not been identified within or in close proximity to the 'Navy' route corridor:

- Geological Heritage Sites;
- Landfills;
- Extractive Industrial Site;
- Major Areas of Peat;
- Karst Features.
- Urban Waste Water Treatment Plants

An unnamed historic quarry was noted approximately 50m to the west of the navy route corridor and a historic pit (dated early to mid-20th century) is noted within this route corridor.

A mineral locality is noted approximately 50m west of the route corridor. The key mineral is slate, and the mineral location reference is 5,033.00 as presented in Figure 3.5.

The susceptibility to landslides for majority of the route option is classified as "Low" with a section of "Moderately High" located in between Ch.6+100 to Ch.6+350 and a section classified as "Moderately High" and "High" between Ch.0+400 and Ch.2+400.

Appropriate environmental management and checks, in addition to annual audits, should therefore be in place; accordingly, this site is unlikely to be a significant source of contamination.

3.1.5. Teal Route Option

The teal route corridor is predominately underlain by quaternary sediments, predominantly till derived from Lower Palaeozoic shales, with small sections of alluvium, lacustrine sediments and till derived from cherts. Bedrock is mapped outcropping throughout the route corridor.

Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation at 2no. locations in the north, and predominantly green and grey slate with thin siltstone of Ballylane formation along the north, centre and south of the route. The route locally intersects the red- brown conglomerate & sandstone of the Carrigmaclea formation in the south.

Four no. isolated pockets of alluvium are intersected by the route. 1no. in the southern region, 2no. in the central region and 1no. in the north which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments.

The following features have not been identified within or in close proximity to the 'Teal' route corridor:

- Geological Heritage Sites;
- Landfills;
- Backfilled Quarries;
- Extractive Industrial Site;
- Pits; Quarries or Mines;
- Mineral Localities;
- Major Areas of Peat;
- Urban Waste Water Treatment Plants
- Karst Features.

One potential historical backfilled quarry has been identified within 70m of the centreline of the alignment within the north as presented in Figure 3.5.

The susceptibility to landslides for majority of the route option is classified as "Low" with 3 sections of "Moderately High" located in between Ch.6+200 to Ch.6+350 and Ch.2+450 and Ch.2+550, and a section between Ch.0+700 and Ch.0+850. An isolated area of "Moderately Low" between Ch.4+150 and Ch.4+350.

Based on the results of a comprehensive suite of environmental soils analysis (Suite I) carried out on 5no. representative soil samples obtained during the preliminary geotechnical ground investigation, there is no evidence of significant soils contamination beneath the general vicinity of the proposed N25 scheme.

Appropriate environmental management and checks, in addition to annual audits, should therefore be in place; although this site is unlikely to be a significant source of contamination.

3.1.6. Purple Route Option

The purple route corridor is underlain by quaternary sediments, predominantly till derived from Lower Palaeozoic shales, with small sections of alluvium, lacustrine sediments and, locally within the south till derived from Devonian sandstones. Bedrock is mapped outcropping throughout the route corridor.

Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation in the north and travelling south it moves through sections of green and grey slate with thin siltstone of Ballylane formation, red- brown conglomerate and sandstone of Carrigmaclea formation and yellow and red sandstone and green mudstone of the Kiltorcan Formation.

Three isolated pockets of alluvium are intersected by the route in the north which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments. Additional potential soft ground areas have also been identified from a review of historical OS maps.

The following features have not been identified within or in close proximity to the 'Purple' route:

- Geological Heritage Sites;
- Landfills;
- Extractive Industrial Sites;
- Pits or Mines;
- Mineral Localities;
- Major Areas of Peat;
- Urban Waste Water Treatment Plants;
- Karst Features.

One potential historical backfilled quarry has been identified 37m approx.., from the centreline of the alignment along the north of the route as presented in Figure 3.5.

The susceptibility to landslides for majority of the route option is classified as “Low” with 3 sections of “Moderately High” and “Moderately Low” located in between chainage Ch.7+400 to Ch.7+700 and Ch.6+550 and Ch.6+950, and a section between Ch.3+400 and Ch.3+500. An isolated area of “Moderately Low” between Ch.1+450 and Ch.1+600.

Appropriate environmental management and checks, in addition to annual audits, should therefore be in place; although this site is unlikely to be a significant source of contamination.

3.1.7. Magenta Route Options

The magenta route corridor is predominantly underlain by quaternary sediments, predominantly till derived from Lower Palaeozoic shales, with small sections of alluvium, lacustrine sediments and till derived from cherts. Bedrock is mapped outcropping throughout the route corridor.

Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation within the north and mid-section of the route, and green and grey slate with thin siltstone of Ballylane formation along the centre and southern section. The route locally intersects the red- brown conglomerate & sandstone of the Carrigmaclea formation in the south.

The route intersects a linear deposit of alluvium in the central Glenmore region along with 3no. localised deposits in the north and south which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments. Additional potential soft ground areas have also been identified from a review of historical OS maps.

The following features have not been identified within or in close proximity to the ‘Magenta’ route corridor:

- Geological Heritage Sites;
- Landfills; Backfilled Quarries;
- Extractive Industrial Site;
- Quarries or Mines;
- Major Areas of Peat;
- Urban Waste Water Treatment Plants;
- Karst Features.

A historic pit (dated early to mid-20th century) is noted within this route corridor as presented in Figure 3.5.

A mineral locality is noted approximately 200m west of the route corridor. The key mineral is slate, and the mineral location reference is 5,033.00 as presented in Figure 3.5.

Three potential historical backfilled quarries have been identified within 65m of the centreline of the route along the north and mid-section of the route as presented in Figure 3.5.

Appropriate environmental management and checks, in addition to annual audits, should therefore be in place; although this site is unlikely to be a significant source of contamination.

The susceptibility to landslides for the majority of the route option is classified as “Low” with 4 sections of “Moderately High” and “Moderately Low” located in between chainage Ch.8+400 to Ch.8+550 and Ch.6+850 and Ch.7+350, and Ch.2+800 to Ch.3+150 and a section between Ch.0+400 and Ch.2+400.

3.1.8. Red Route Option

The red route corridor is predominately underlain by quaternary sediments, predominantly till derived from Lower Palaeozoic shales, with small sections of alluvium, and lacustrine sediments.

Bedrock is also mapped to be outcropping regularly throughout sections of route corridor. Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation within the north, and predominantly green and grey slate with thin siltstone of Ballylane formation along the north, centre and south of the route. The route locally intersects the red- brown conglomerate & sandstone of the Carrigmaclea formation in the south.

Four isolated pockets of alluvium are intersected by this route. 2no in the central region and 2no. in the north which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments. Additional potential soft ground areas have also been identified from a review of historical OS maps.

The following features have not been identified within or, in close proximity to the ‘Red’ route corridor:

- Geological Heritage Sites;
- Landfills;
- Backfilled Quarries;
- Mineral Localities;
- Extractive Industrial Site;
- Pits; Quarries or Mines;
- Major Areas of Peat;
- Urban Waste Water Treatment Plants;
- Karst Features.

Appropriate environmental management and checks, in addition to annual audits, should therefore be in place; although, this site is unlikely to be a significant source of contamination.

The susceptibility to landslides for majority of the route option is classified as “Low” with 3 sections of “Moderately High” and “Moderately Low” located in between chainage Ch.5+750 to Ch.6+150 and Ch.2+700 and Ch.2+900, and Ch.0+750 to Ch.1+000 and a section of between “Moderately Low” located in between chainage Ch.1+600 and Ch.1+700.

3.1.9. Lime-Green Route Option

The lime green route corridor is predominately underlain by quaternary sediments, predominantly till derived from Lower Palaeozoic shales, with small sections of alluvium and lacustrine sediments.

Bedrock is mapped outcropping regularly particularly in the north and south of the route corridor.

Bedrock below the route corridor consists of green and red-purple buff slate and siltstone of the Oaklands formation in the north, and predominantly green and grey slate with thin siltstone of Ballylane formation along the north, centre and south of the route. The route also intersects the red- brown conglomerate & sandstone of the Carrigmaclea formation at 2no. locations in the south.

Two isolated pockets of alluvium are intersected by the route in the north which could give rise to potential soft ground requiring excavation. The route terminates in the south within an area of Lacustrine sediments which may also contain soft, compressible sediments. Additional potential soft ground areas have also been identified from a review of historical OS maps.

Several datasets have been examined and the following features have not been identified within or in close proximity to the ‘Lime Green’ route corridor:

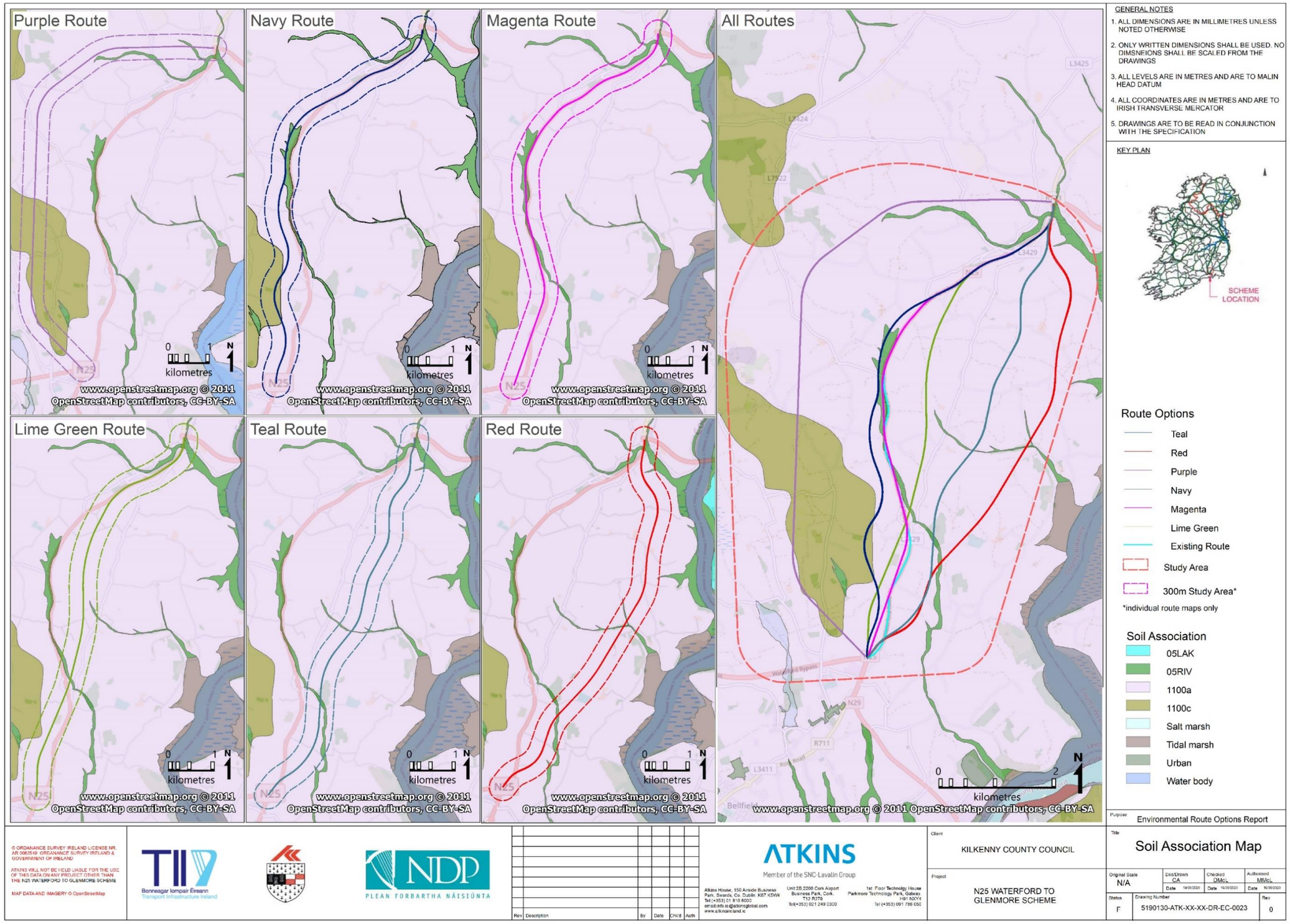
- Geological Heritage Sites;
- Landfills;
- Backfilled Quarries;
- Extractive Industrial Site;
- Quarries or Mines;
- Mineral Localities;
- Major Areas of Peat;
- Urban Waste Water Treatment Plants;
- Karst Features.

A historic pit (dated early to mid-20th century) is noted within this route corridor.

One potential historical backfilled pit has been identified within 20m of the centreline of the alignment within the north.

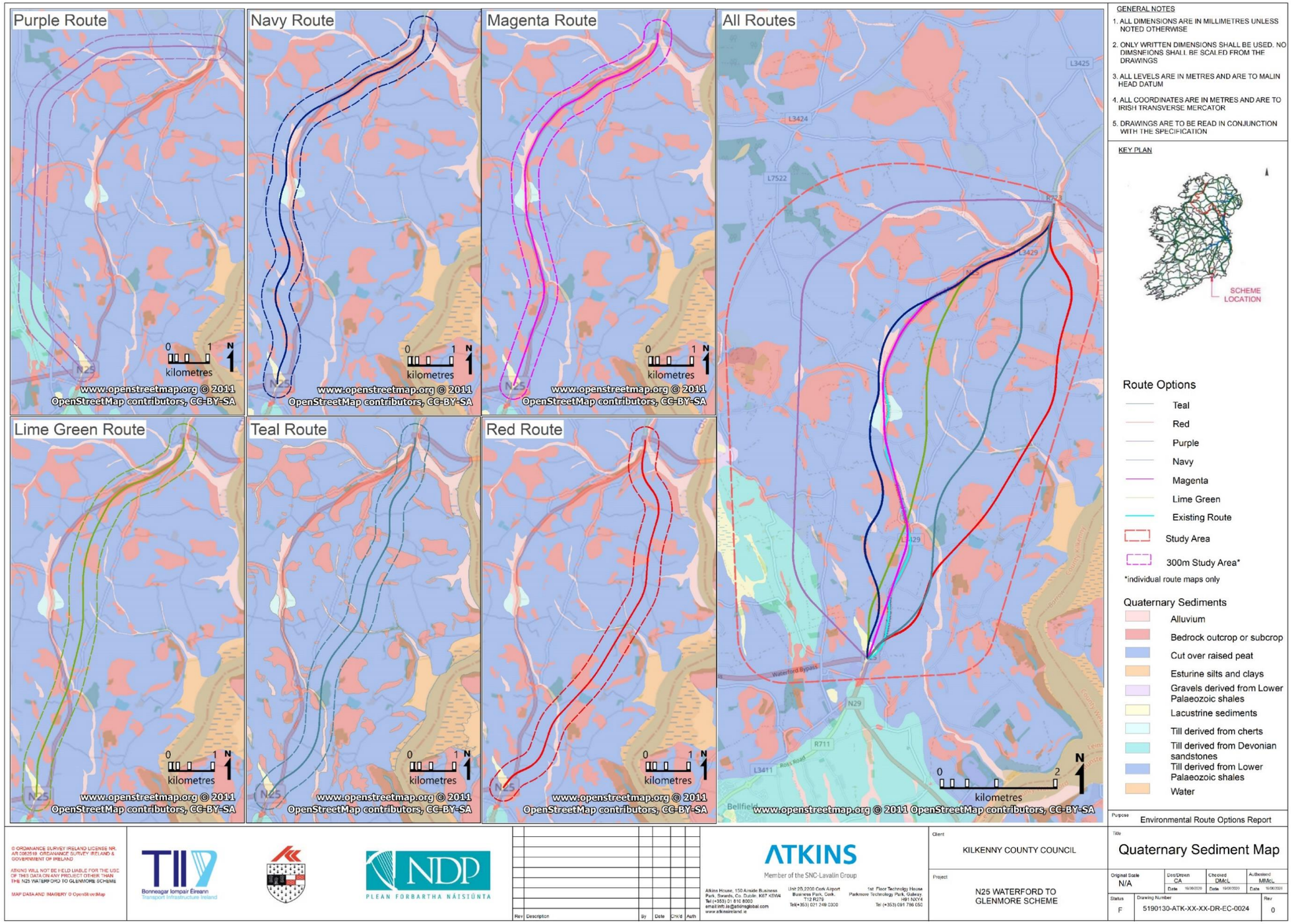
Appropriate environmental management and checks, in addition to annual audits, should therefore be in place; although, this site is unlikely to be a significant source of contamination.

The susceptibility to landslides for the majority of the route option is classified as “Low” with 3 sections of “Moderately High” and “Moderately Low” located in between Ch.6+400 to Ch.7+300, and Ch.0+400 to Ch.2+700 and 2 sections of “Moderately Low” located in between Ch.5+950 and Ch.6+200, and Ch.7+600 and Ch.7+800.



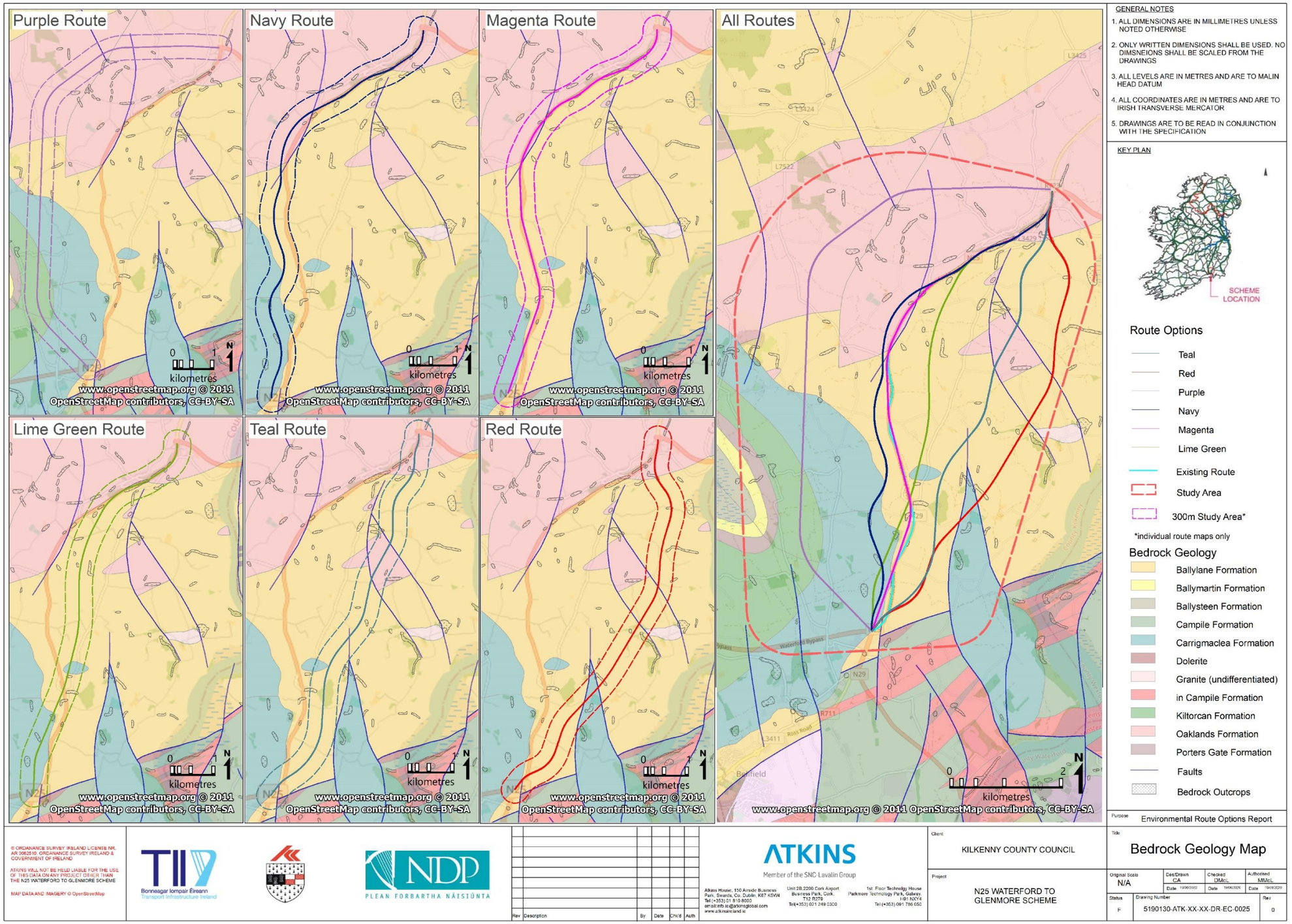
(Source: GSI, 2020)

Figure 3-1 - Soils Mapping beneath in the vicinity of each Route Option



(Source: GSI, 2020)

Figure 3-2 - Quaternary Geology Mapping in the vicinity of each Route Option

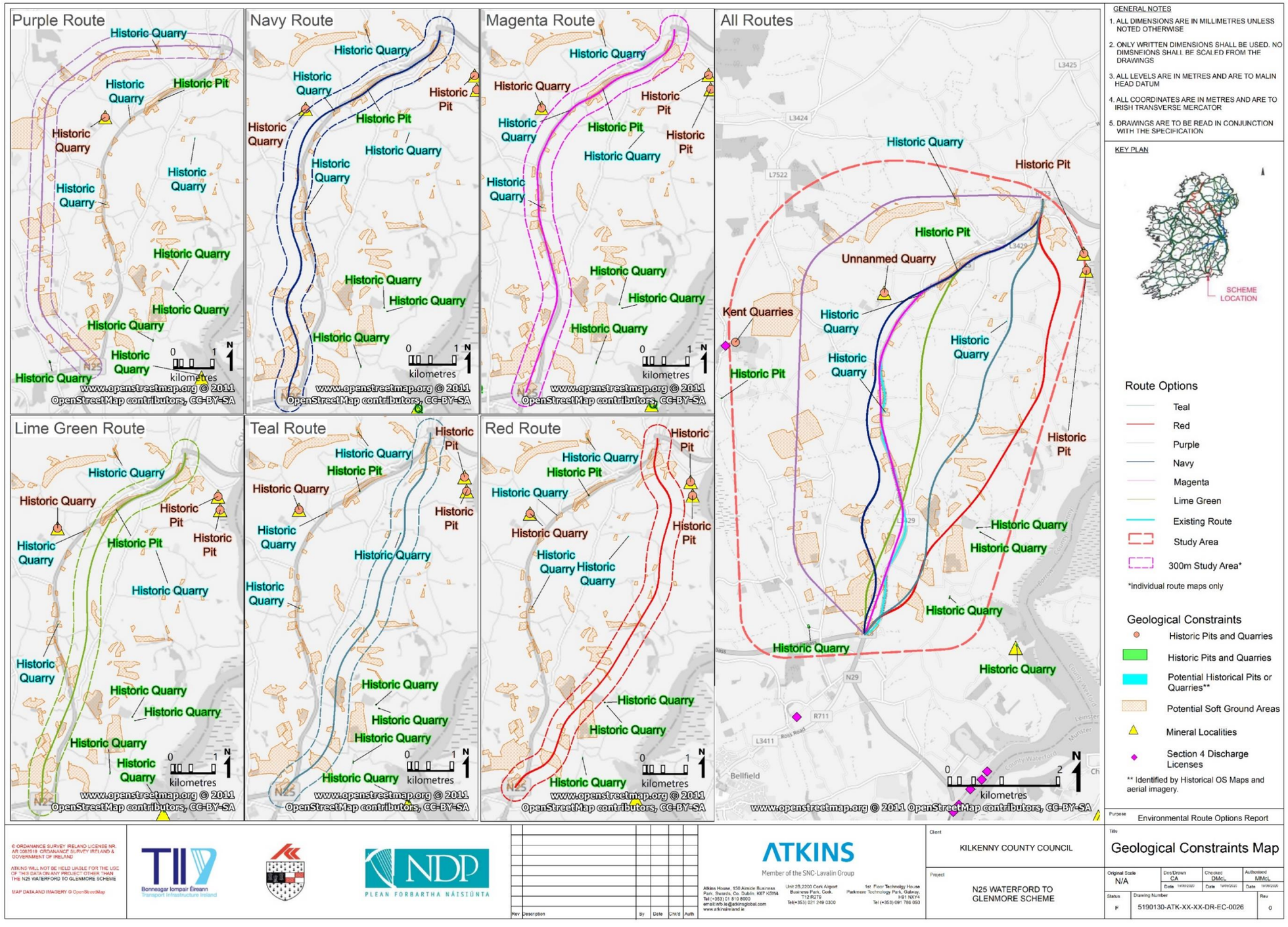


(Source: GSI, 2020)

Figure 3-3 - Bedrock Mapping in the vicinity of each Route Option

(Source: GSI, 2020)

Figure 3-4 - Landslide Susceptibility Mapping in the vicinity of each Route Option



(Source: GSI, OSI, EPA 2020)

Figure 3-5 - Potential Geological Constraints in the vicinity of each Route Option

3.2. Impact Assessment

Each route option has been assessed in terms of the potential impact to soils and geology, for key attributes. The results are summarised in Table 3-4 to Table 3-9.

Table 3.4: Soils & Geology Impact Assessment – Navy Route

Attribute	Attribute Importance	Impact	Level of Impact
Historic Quarry	Medium	Potential source of contamination	Moderate Negative
Moderately High Landslide Susceptibility (on a local scale)	Medium	Excavation collapse, structural instability and land subsidence **over a small proportion** of the route	Minor Negative
High Landslide Susceptibility (on a local scale)	High	Excavation collapse, structural instability and land subsidence over a medium proportion of the route	Major Negative
Well drained Soils	High	Loss of well drained and highly fertile soils over small proportion of the route	Moderate Negative
Soft / Compressible Soils	Medium	Alluvium intersecting medium proportion of the route which may require excavation.	Moderate Negative
	Medium	Lacustrine sediment intersecting minor proportion of the route which may require excavation.	Minor Negative
Potential Soft / Compressible Soils	Medium	A medium proportion of the route may contain soft compressible material which may require excavation and removal off site.	Moderate Negative

Table 3.5: Soils & Geology Impact Assessment – Teal Route

Attribute	Attribute Importance	Impact	Level of Impact
Potential Historic Quarry	Low	Potential source of contamination	Minor Negative
Moderately High Landslide Susceptibility (on a local scale)	Medium	Excavation collapse, structural instability and land subsidence over a small proportion of the route	Minor Negative
Well drained Soils	High	Loss of well drained and highly fertile soils over small proportion of the route	Moderate Negative
Soft / Compressible Soils	Low	Alluvium intersecting minor proportion of the route which may require excavation.	Minor Negative
	Medium	Lacustrine sediment intersecting minor proportion of the route which may require excavation.	Minor Negative

Potential Soft / Compressible Soils	Medium	A medium proportion of the route may contain soft compressible material which may require excavation and removal off site.	Moderate Negative

Table 3.6: Soils & Geology Impact Assessment – Purple Route

Attribute	Attribute Importance	Impact	Level of Impact
Potential Historic Quarry	Low	Potential source of contamination	Minor Negative
Moderately High Landslide Susceptibility (on a local scale)	Medium	Excavation collapse, structural instability and land subsidence over a medium proportion of the route	Moderate Negative
Well drained Soils	High	Loss of well drained and highly fertile soils over small proportion of the route	Moderate Negative
Soft / Compressible Soils	Low	Alluvium intersecting minor proportion of the route which may require excavation.	Minor Negative
	Low	Lacustrine sediment intersecting minor proportion of the route which may require excavation.	Neutral
Potential Soft / Compressible Soils	Medium	A medium proportion of the route may contain soft compressible material which may require excavation and removal off site.	Moderate Negative

Table 3.7: Soils & Geology Impact Assessment – Magenta Route

Attribute	Attribute Importance	Impact	Level of Impact
Historic Quarry	Medium	Potential source of contamination	Moderate Negative
Potential Historic Quarry	Low	2no. possible pits noted along the route which could be a potential source of contamination	Minor Negative
Moderately High Landslide Susceptibility (on a local scale)	Medium	Excavation collapse, structural instability and land subsidence over a medium proportion of the route	Moderate Negative
High Landslide Susceptibility (on a local scale)	High	Excavation collapse, structural instability and land subsidence over a medium proportion of the route	Major Negative
Well drained Soils	High	Loss of well drained and highly fertile soils over small proportion of the route	Moderate Negative
Soft / Compressible Soils	Medium	Alluvium intersecting medium proportion of the route which may require excavation.	Moderate Negative

	Medium	Lacustrine sediment intersecting minor proportion of the route which may require excavation.	Minor Negative
Potential Soft / Compressible Soils	Medium	A medium proportion of the route may contain soft compressible material which may require excavation and removal off site.	Moderate Negative

Table 3.8: Soils & Geology Impact Assessment – Red Route

Attribute	Attribute Importance	Impact	Level of Impact
Moderately High Landslide Susceptibility (on a local scale)	Medium	Excavation collapse, structural instability and land subsidence over a medium proportion of the route	Moderate Negative
Well drained Soils	High	Loss of well drained and highly fertile soils over small proportion of the route	Moderate Negative
Soft / Compressible Soils	Low	Alluvium intersecting minor proportion of the route which may require excavation.	Minor Negative
	Medium	Lacustrine sediment intersecting minor proportion of the route which may require excavation.	Minor Negative
Potential Soft / Compressible Soils	Medium	A small proportion of the route may contain soft compressible material which may require excavation and removal off site.	Minor Negative

Table 3.9: Soils & Geology Impact Assessment – Lime Green Route

Attribute	Attribute Importance	Impact	Level of Impact
Historic Quarry	Medium	Potential source of contamination	Moderate Negative
Moderately High Landslide Susceptibility (on a local scale)	Medium	Excavation collapse, structural instability and land subsidence over a medium proportion of the route	Moderate Negative
High Landslide Susceptibility (on a local scale)	High	Excavation collapse, structural instability and land subsidence over a medium proportion of the route	Major Negative
Well drained Soils	High	Loss of well drained and highly fertile soils over small proportion of the route	Moderate Negative
Soft / Compressible Soils	Low	Alluvium intersecting minor proportion of the route which may require excavation.	Minor Negative
	Medium	Lacustrine sediment intersecting minor proportion of the route which may require excavation.	Minor Negative

Potential Soft / Compressible Soils	Medium	A small proportion of the route may contain soft compressible material which may require excavation and removal off site.	Minor Negative

3.2.1. Comparison of Route Options

All 6no. route options have been reviewed as part of this appraisal, and the results are summarised in Table 3.10. Although the impact level for multiple routes are similar, the preference of individual routes is based on specific attributes of the receiving soils and geology environment which may affect or be affected by the route corridor.

Table 3.10: Summary of Soil and Geology Impacts for Route Corridor Options

	Topic: Soils & Geology					
Impact Level	**Navy Route**	**Teal Route**	**Purple Route**	**Magenta Route**	**Red Route**	**Lime Green Route**
Severe Negative	0	0	0	0	0	0
Major Negative	1	0	0	1	0	1
Moderate Negative	4	2	3	5	2	3
Minor Negative	2	4	2	2	3	3
Neutral	0	0	1	0	0	0
Minor Positive	0	0	0	0	0	0
Moderate Positive	0	0	0	0	0	0
Major Positive	0	0	0	0	0	0
Order of Preference	5th	2nd	3rd	6th	1st	4th
Ranking	Least Preferred	Intermediate	Intermediate	Least Preferred	Intermediate	Least Preferred

All six routes have been evaluated for the key soils/ geological attributes, specifically condition of existing soils and potential sources of contamination (all other parameters are broadly comparable). Based on this impact assessment the overall ranking or preference for each route has been determined, with respect to Soils and Geology.

A summary of the soils and geology appraisal for each route option is presented in Table 2-2.

The Red, Teal and Purple Routes have been identified as 'Intermediate' in preference, ranking 1st through to 3rd in order of preference, with respect to soils and geology.

The Red route has been identified as the **lowest impacting** route scoring:

- 2no. moderate negatives for Moderately High Landslide Susceptibility, and Well Drained Soils;
- 3no. minor negatives for Potential Soft / Compressible soils).

The Teal route is identified as the **2nd lowest impacting** route scoring:

- 2no. moderate negatives for: Well Drained soils, and for Potential Soft / Compressible soils identified from historical OS maps;
- 4no. minor negatives for proximity to a Potential Historic Quarry, Moderately High Landslide Susceptibility, and Soft / Compressible soils (published Quaternary mapping).

The Purple route is identified as the **3rd lowest impacting** route scoring:

- 3no. moderate negatives for: Moderately High Landslide Susceptibility; Well Drained soils; and Potential Soft / Compressible soils identified from historical OS maps;
- 2no. minor negatives for proximity to a Potential Historic Quarry; and Potential Soft / Compressible soils identified from published Quaternary mapping (alluvial deposits);
- 1no. neutral for Potential Soft / Compressible soils identified from published Quaternary mapping (lacustrine deposits).

The Lime Green route is identified as the **3rd highest impacting** route scoring:

- 1no. major negative for High Landslide Susceptibility;
- 3no. moderate negatives for: proximity to a Historic Quarry, Moderately High Landslide Susceptibility; Well Drained soils;
- 3no. minor negatives for Soft / Compressible soils identified from published Quaternary and historic OS maps.

The Navy route is identified as the **2nd highest impacting** route scoring:

- 1no. major negative for High Landslide Susceptibility;
- 4no. moderate negatives for: proximity to a Historic Quarry, Well Drained soils; and Soft / Compressible soils identified from published Quaternary mapping (alluvial deposits) and historic OS maps.
- 2no. minor negatives for Moderately High Landslide Susceptibility; Soft / Compressible soils identified from published Quaternary mapping (lacustrine deposits).

The Magenta route is identified as the **highest impacting** route scoring:

- 1no. major negative for High Landslide Susceptibility;
- 5no. moderate negatives for: proximity to a Historic Quarry, Moderately High Landslide Susceptibility; Well Drained soils; and Soft / Compressible soils identified from published Quaternary mapping (alluvial deposits) and historic OS maps.
- 2no. minor negatives for proximity to a Potential Historic Quarry, Soft / Compressible soils identified from published Quaternary mapping (lacustrine deposits).

Table 3-11 – Soils and Geology Scoring

Route Option	Score	Description
Purple	3	Minor or slightly negative
Navy	2	Moderately negative
Magenta	1	Major or highly negative
Red	3	Minor or slightly negative
Teal	3	Minor or slightly negative
Lime Green	2	Moderately negative

4. Conclusions and Recommendations

A Soil and Geology Appraisal of six route options has been undertaken by Atkins, as part of the overall Route Selection assessment process for the proposed N25 Glenmore to Waterford Scheme. The key findings of this assessment, which has been undertaken in accordance with relevant best practice guidance (NRA, 2009, IGI, 2013) are as follows;

- Ground conditions beneath each of the six route options are generally comparable. The majority of each route is underlain by glacial till, with localised occurrences of sands and gravels, alluvium, made ground and lacustrine deposits. Bedrock underlying all route option comprises green, red-purple, buff slate, siltstone of the Oaklands Formation, green and grey slate with thin siltstone from the Ballylane Formation, red, brown conglomerate & sandstone of Carrigmaclea Formation and Dolerite and Rhyolitic volcanics, grey & brown slates of Campile formation. The Purple route option is also underlain by yellow and red sandstone, and green mudstone of Kiltorcan Formation.
- During the 2012 ground investigation along the Navy route, bedrock was encountered at depths ranging from 0.1m bgl (BH121R) and 11.5m bgl (BH165R), with rock types recorded as siltstone, sandstone, conglomerate, andesite,
- No evidence of any karst features was identified during the desk-based review or preliminary ground investigation. No Geological Heritage Areas are identified within the study area of each of the route options.
- A windscreen survey was carried out on 18th June 2020 to further assess ground conditions at specific locations within the vicinity of each route option. It should be noted that permission was not granted to enter access any areas of private land. Any observations were made using public roads. Due to the restricted nature of the survey some areas of the route were not accessible or visible.
- From a geotechnical perspective, localised areas of poor ground are present beneath each of the route options and for the purposes of this assessment are broadly comparable. No landslide event is reported within the vicinity of the N25 scheme (GSI, 2020). All 6no. route options will involve excavation or cut into existing alluvium and lacustrine deposits, the lateral and extent of which has not been defined.
- The Red, Teal and Purple routes have been identified as 'Intermediate' in preference, ranking 1st through to 3rd in order of preference, with respect to soils and geology.
- The Magenta, Navy and Lime Green routes have been identified as the least preferable options with Magenta being the least preferable followed by Navy and then the Lime Green route

Once the emerging preferred route has been identified a detailed ground investigation will be required to accurately verify ground conditions beneath the emerging preferred route option. Additional environmental soils analysis should be undertaken as required.

This appraisal report has been prepared based on a desk-based review of all available information (including the results of the 2012 ground investigation), and windshield survey as per the relevant guidelines (NRA, 2009).

The findings of this report are based on general overview of potential risks and impacts with respect to soils and geology for each route option for the purposes of the route selection process. As such this report does not represent a detailed impact assessment of any one particular route.

5. References

Environmental Protection Agency (EPA), 2017. '*Guidelines on information to be contained in Environmental Impact Assessment Report*' EPA, Ireland.

Environmental Protection Agency (EPA). 2020. EPA Envision Mapping. [ONLINE] Available at: http://gis.epa.ie/Envision [Accessed 19 June 2020].

Geological Survey of Ireland (GSI). 2020. GSI Datasets Public Viewer and Groundwater Web-mapping. [ONLINE] Available at: http://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228 [Accessed 19 June 2020]

Institute of Geologists of Ireland (IGI), 2013. *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements*. IGI, Ireland.

National Parks and Wildlife Service (NPWS). 2020. NPWS Web Viewer. [ONLINE] Available at: http://webgis.npws.ie/npwsviewer/ [Accessed 19 June 2020].

National Roads Authority (NRA), 2009. *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.* NRA, Ireland

Glover Site Investigation (2012). Preliminary Ground Investigation *N25 Waterford Glenmore, Co. Kilkenny.*

Ordnance Survey of Ireland (OSI). 2020. OSI Geo-Hive Map Viewer. [ONLINE] Available at: http://map.geohive.ie/mapviewer.html [Accessed 19 June 2020].

Transport Infrastructure Ireland (TII), 2016. *PE-PAG-02031 Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis.* TII, Ireland

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Appendix 2.9

Hydrology and Hydrogeology

ATKINS

Member of the SNC-Lavalin Group

N25 Waterford to Glenmore Scheme

Stage 2 Phase 2: Hydrology and Hydrogeology Appraisal Report

Kilkenny County Council

July 2020

Notice

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This document has 58 pages including the cover.

Document history

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 0	Draft	RAS	KL	DL	MMc	17/07/20
Rev 1	Final	RAS	KL	DL	MMc	10/09/20

Client signoff

Client	Kilkenny County Council
Project	N25 Waterford to Glenmore
Job number	5190130
Client signature / date	

Contents

Tables (*within text*)

Figures (*within text)*

1. Introduction

This Hydrology and Hydrogeology Appraisal Report has been undertaken by Atkins Ireland Ltd. (Atkins), on behalf of Kilkenny County Council (KCC), as part of the overall Route Selection assessment process for the proposed N25 Waterford to Glenmore Scheme, which will range between 8.7km and 11.6km in length. The location of study area is shown in Figure 1-1.

The objective of this report is specifically to assess and evaluate the potential impacts of each route option on the hydrological and hydrogeological aspects of the receiving environment, and to identify the preferred route in terms of these considerations, in accordance with relevant best practice guidance, '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'* (National Roads Authority (NRA), 2008).

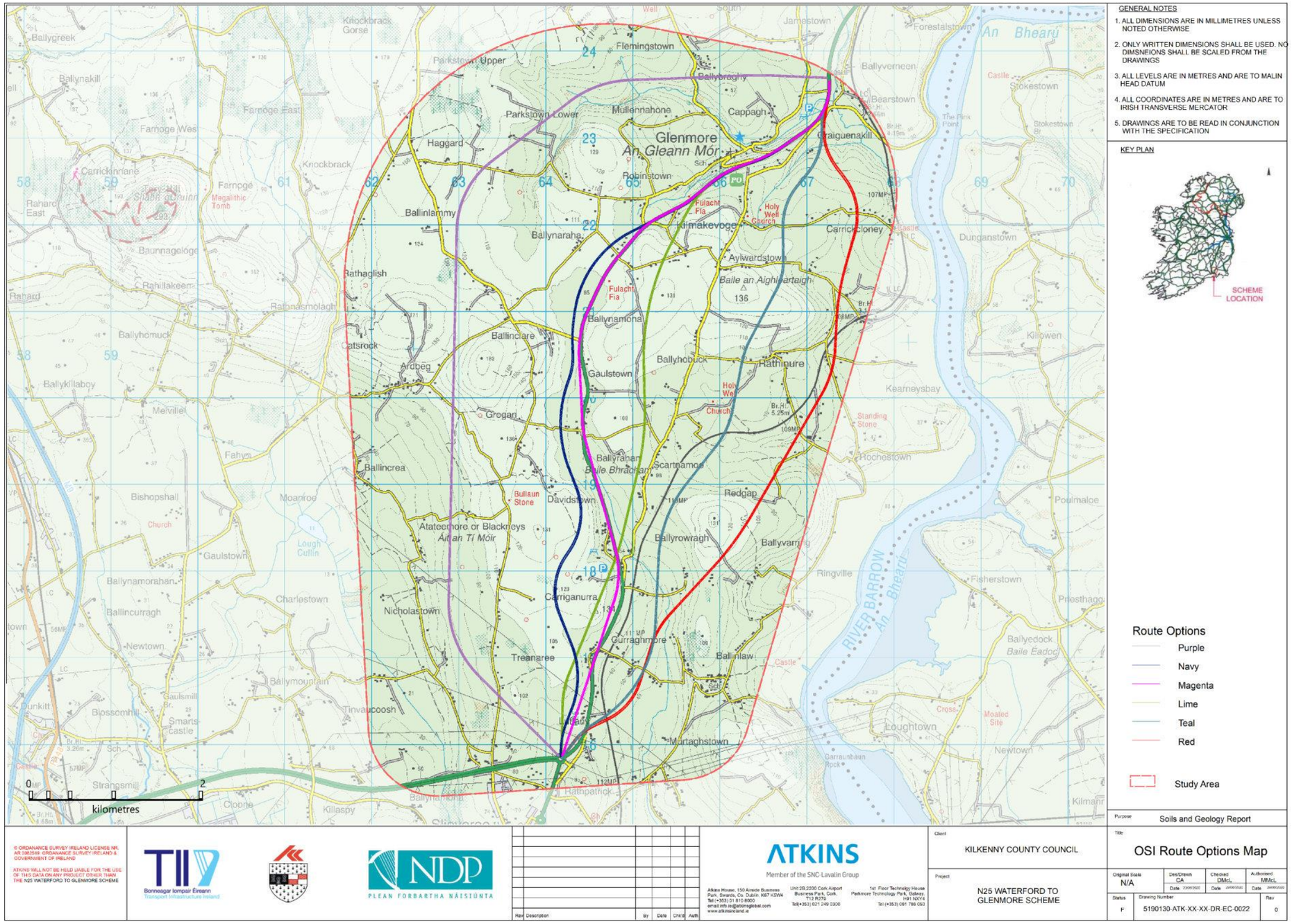
This report has also been prepared with due regard to the following relevant guidance (albeit, it should be noted that this assessment does not constitute an environmental impact assessment report), '*Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'* (Institute of Geologists of Ireland (IGI) 2013), and '*Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (Environmental Protection Agency (EPA) 2017).

Detailed descriptions of the N25 Waterford to Glenmore Scheme and each route option are provided in the Route Selection Report, prepared by Atkins (2020). Six route options have been brought forward for the Phase 2-Stage 2 Route Options assessment, namely the following;

- Navy Route Option;
- Teal Route Option;
- Purple Route Option;
- Magenta Route Option;
- Red Route Option; and,
- Lime Route Option.

All 6no. route options are presented in Figure 1-1. Individual engineering drawings for each route option are presented in the main Route Selection Report (Atkins 2020). For the purpose of this assessment, a study area (route buffer) of 300m (600m overall) was selected across all environmental disciplines.

Figure 1-1: General Study Area Location and Route Options Map



2. Methodology

This technical assessment has been carried out based on the following phased approach.

2.1. Desk Study

The purpose of the initial desk-based task was to characterise the current hydrological and hydrogeological setting of the scheme. Relevant background information was compiled, specifically from the following data sources;

- GSI Datasets Public Viewer and Groundwater web-mapping, 2020 (GSI, 2020);
- Environmental Protection Agency (EPA) Envision mapping, 2020 (EPA, 2020);
- Ordnance Survey Ireland (OSI) web-mapping 2020 (OSI, 2020);
- Water Framework Directive (WFD) Ireland web-mapping,(OPW, 2020);
- National Parks and Wildlife Service (NPWS) Map viewer 2020 (NPWS, 2020); and,
- All available information for the site (including topographic surveys, review of site-specific records (GSIL, 2012) and preliminary engineering information).

2.2. Review of Site-Specific Records

A geotechnical ground investigation was carried out by Glover Site Investigations Limited (GSIL) in 2012 in the vicinity of the study area. According to the findings of the ground investigation, the general thickness of overburden encountered in the study area ranges from 0.1m bgl (BH121R) located in the southern portion to 18.94m bgl (BH136R) located in the central portion of the study area. The ground investigation location map is presented in Figure 2-1. A localised area of lacustrine deposits was identified within the southwestern portion of the study area. Such deposits are typically associated with poor ground conditions and low permeability. The findings of the 2012 ground investigation are discussed further within Section 4.2 of this report.

2.3. Site Survey

The findings of the initial desk-based review were further supplemented by a 'windshield survey' carried out by an Atkins hydrogeologist on 18th June 2020. The survey was carried out in accordance with relevant guidance (NRA, 2008), and from the public road.

2.4. Assessment Criteria

All of the above information was then evaluated to inform the findings of this report. Assessment criteria for the rating of potential environmental impacts on the hydrological (i.e. surface water) and hydrogeological (i.e. groundwater) environment are presented in Table 2-1 to Table 2-3, as per the relevant NRA (2008) guidelines, which take account of the importance of attributes (Table 2-1 / Table 2-2), along with the significance, predicted scale and duration of any likely impacts (Table 2-3).

In describing the significance of potential impacts, guidance has been taken from the following two relevant sources;

- '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'* (NRA, 2008). Criteria for rating impact significance at this, the route selection stage, are summarised in Table 2-3.

- *'PE-PAG-02031 Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis'* (TII, 2016). Criteria for describing the significance of potential impacts are summarised as follows;

    - Major or highly positive;
    - Moderately positive;
    - Minor or slightly positive;
    - Not significant or neutral (i.e. imperceptible);
    - Minor or slightly negative (i.e. slight negative);
    - Moderately negative; and,
    - Major or highly negative (i.e. significant negative).

Both guidance documents are broadly consistent in the description of the significance of potential impacts; the only exception being the NRA (2008) guidelines also include an impact level of '*Profound'*. This impact level is described as either a permanent impact on an attribute with extremely high importance, or a permanent impact on a significant proportion of an attribute with very high importance.

Table 2-1: Criteria for Rating Site Attributes – Hydrology (Source: NRA Guidelines, 2008)

Box 4.1: CRITERIA FOR RATING SITE ATTRIBUTES - Estimation of Importance of Hydrology Attributes		
Importance	**Criteria**	**Typical Examples**
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale.	River, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Quality Class A (Biotic Index Q4, Q5) Flood plain protecting more than 50 residential or commercial properties from flooding Nationally important amenity site for wide range of leisure activities
High	Attribute has a high quality or value on a local scale	Salmon fishery Locally important potable water source supplying >1000 homes Quality Class B (Biotic Index Q3-4) Flood plain protecting between 5 and 50 residential or commercial properties from flooding Locally important amenity site for wide range of leisure activities
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2- 3) Flood plain protecting between 1 and 5 residential or commercial properties from flooding
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities Local potable water source supplying <50 homes Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding Amenity site used by small numbers of local people

Table 2-2: Criteria for Rating Site Attributes – Hydrogeology (Source: NRA Guidelines, 2008)

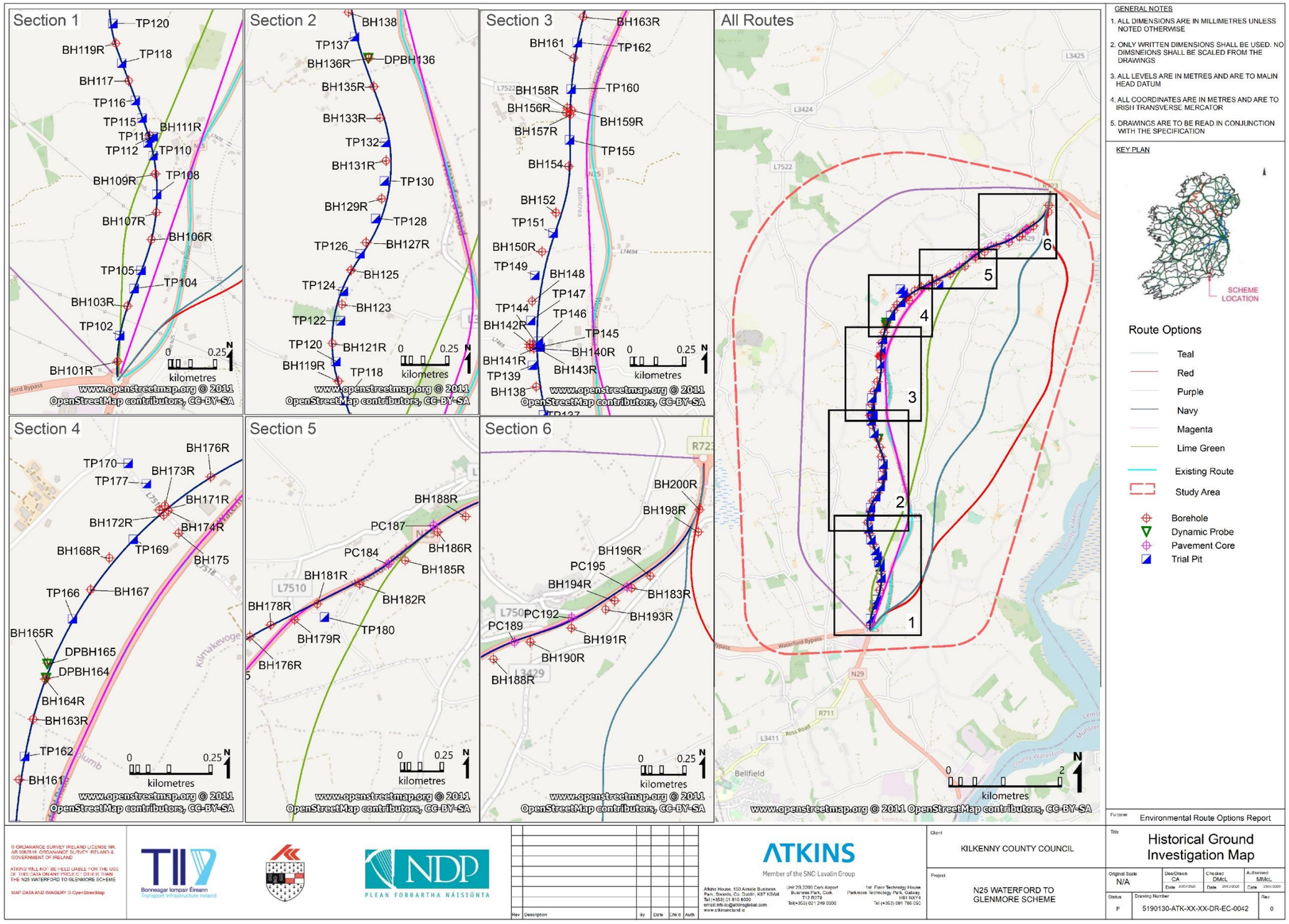
Box 4.1: CRITERIA FOR RATING SITE ATTRIBUTES - Estimation of Importance of Hydrogeology Attributes		
Importance	**Criteria**	**Typical Examples**
Extremely High	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
Very High	Attribute has a high quality or value on a regional or national scale.	Regionally Important Aquifer with multiple wellfields Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source
High	Attribute has a high quality or value on a local scale	Regionally Important Aquifer Groundwater provides large proportion of baseflow to local rivers Locally important potable water source supplying >1000 homes Outer source protection area for regionally important water source Inner source protection area for locally important water source
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer Potable water source supplying >50 homes Outer source protection area for locally important water source
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer Potable water source supplying <50 homes

Table 2-3: Typical Classification for Significance of Impacts (Source: NRA Guidelines, 2008)

Box 4.4: CRITERIA FOR RATING IMPACT SIGNIFICANCE AT ROUTE SELECTION STAGE - Rating of Significant Environmental Impacts at Route Selection Stage					
Impact Level	**Attribute Importance**				
	Extremely High	**Very High**	**High**	**Medium**	**Low**
Profound	Any permanent impact on attribute	Permanent impact on significant proportion of attribute			
Significant	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute		

Box 4.4: CRITERIA FOR RATING IMPACT SIGNIFICANCE AT ROUTE SELECTION STAGE - Rating of Significant Environmental Impacts at Route Selection Stage					
Impact Level	**Attribute Importance**				
	Extremely High	**Very High**	**High**	**Medium**	**Low**
Moderate	Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute	
Slight		Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute	Permanent impact on significant proportion of attribute
Imperceptible			Temporary impact on small proportion of attribute	Temporary impact on significant proportion of attribute	Permanent impact on small proportion of attribute

Figure 2-1 – Historical Ground Investigation (Source: Glover Site Investigations Limited , 2012)



3. Hydrology

3.1. Receiving Environment

3.1.1. Hydrological Features

All 6no. route options traverse two key river catchments; the Nore River Catchment (Water Framework Directive (WFD) EPA Code: 15), in the southern portion, and the Suir River Catchment (WFD EPA Code: 16), in the northern portion of the general scheme. Refer to Figure 3-1.

The River Nore Catchment 15 includes the area drained by the River Nore and all streams entering tidal water between its confluence with the River Barrow at Ringwood, and the Barrow railway bridge at Drumdowney, Co. Kilkenny, draining a total area of 2,595km². The Nore Rises on the north-eastern slopes of Borrisnoe Mountain, from where it runs northeast over an area underlain by a large gravel aquifer and past Borris-in-Ossory. The southern slopes of the Slieve Bloom Mountains are drained by the Tonet, Delour and Mountrath Rivers which join the Nore east and south of Mountrath (EPA 2018).

The River Suir Catchment 16 includes the area drained by the River Suir and all streams entering tidal water between Drumdowney and Cheekpoint, Co. Waterford, draining a total area of 3,542km². The headwaters of the Suir are located on the northern flanks of the Devil's Bit Mountain in Co. Tipperary. The river flows through a wide limestone plain, past Thurles, where the Suir is joined by the River Drish and the Tipperary Clodiagh. The Suir continues towards Cashel where it is joined by the Multeen River from the west and onwards to Cahir before which the Fidaghta, Ard and Aherlow Rivers flow into the Suir from the Golden Vale on the northern side of the Galtee Mountains (EPA, 2018).

There are two key rivers within the vicinity of the scheme with numerous tributaries as presented in Figure 3-1 (EPA, 2020);

- **Oakland River (IE_SE_14O130860),** which flows in a general easterly direction before discharging to the River Barrow;
- **Luffany River (IE_SE_16L680750)** which flows in a general southerly direction before discharging to the River Suir

Oakland River ultimately discharges to the River Barrow and River Nore SAC (Site Code: 002162) while Luffany River discharges to the Lower River Suir SAC (Site Code: 002137) (NPWS, 2020). Refer to Figure 3-2.

3.1.2. Surface Water Flows / Surface Water Levels

No surface water flow rates monitoring stations are available within the vicinity of the scheme.

3.1.3. Surface Water Quality

On a regional scale, The Oaklands River to the north of the scheme which is intersected by this route corridor and has a River Waterbody WFD status 2013 -2018, with no assigned status. The Oaklands is hydrologically connected to The River Barrow (east of the route corridor) which is noted as a Transitional Waterbody named New Ross Port and has been assigned 'Moderate' WFD status for the 2013- 2018 period. The Luffany River to the south of the scheme is crossed by this route corridor and has River Waterbody WFD status 2013 -2018, with no assigned status as presented in Figure 3-3 (WFD, 2020).

The Luffany River is hydrologically connected to The River Suir (to the south of the scheme) which also noted as a Transitional Waterbody named Lower Suir Estuary (Little Island Cheekpoint) which has been assigned 'Good' WFD status for the 2013- 2018 period as presented in Figure 3-3 (WFD, 2020).

There are no lakes within this route corridor (EPA, 2020).

3.1.4. Surface Water Abstraction

There are no significant reported abstractions from surface water along any of the route options (GSI, 2020).

3.1.5. Drainage & Flooding

Upon review of the OPW flood risk web mapping, no areas of flooding were identified along all 6no. route options. Although, sources of pluvial flooding are not addressed in the web mapping. The stream and rivers within the scheme are not assessed for flood risk in the web mapping. Based on preliminary desk study, windshield survey and topography of the site, it is considered that potential fluvial flooding associated with key river/ stream crossing points may occur. According to OSI, 2020, historic flood plain and lands liable to flooding are present in the vicinity of the scheme. The closest area is situated 1km north west of the Luffany roundabout and 300m from the closest point of the nearest route corridor as shown in Figure 3.4.

The windshield survey was undertaken by Atkins on the 18th June 2020. Apart from the Oakland River and its tributary in the north of the study area and the Luffany River emanating from the central section of the study area, no other areas of hydrological importance were identified in agricultural lands adjacent to the existing N25. However it should be noted that due to access limitations, the survey was carried out from roadside.

3.1.6. Ecological Setting

A detailed assessment of ecological issues along each route is outlined in the Ecological Appraisal prepared by Atkins (2020) which is presented in the Route Selection Report (Atkins, 2020).

All 6no. route options are hydrologically connected to River Barrow and River Nore Special Area of Conservation (SAC) (Site Code: 002162) and Barrow River Estuary proposed Natural Heritage Area (pNHA) (Site Code: 000698), and 5no. routes (Navy Route, Teal Route, Magenta Route, Red Route and Lime-Green Route) are hydrologically connected Lower River Suir Special Area of Conservation (SAC) (Site Code: 002137) via. Oakland River and Luffany River (Refer to Figure 3.2). These sites are of considerable conservation significance as outlined in detail within the Ecological Appraisal (Atkins, 2020).

As such these sites and the streams and rivers which connect all 6no. route options warrant due consideration in terms of potential impacts to surface water quality as part of this appraisal.

Specific details are presented for each route option further on within this hydrological appraisal.

3.1.7. Classification of the Scale and Importance of Watercourse Crossings along Each Route (Whether by Pipe, Culvert, Bridge or Tunnel)

A summary of the scale and importance of watercourse crossings is presented below in Table 3-1. At this preliminary juncture, and for the purposes of this assessment, it is considered that outfall locations and drainage requirements are comparable along each of the 6no. route options. It is also noted that attenuation areas for the emerging preferred route will be identified during the Phase 3 Design Stage. Therefore, any future Compulsory Purchase Order (CPO) should address this and ensure that sufficient space has been allowed for all drainage requirements including adequately sized attenuation areas. At this preliminary

juncture, given the scale of these watercourses it is considered likely that any crossing points over the rivers or tributaries named in Table 3-1 would be bridge/culvert structures.

Table 3-1: Classification of Scale and Importance of Watercourse Crossings

Route Option	No. of River /Tributary Crossings	Named Rivers / Streams Crossed
Navy Route	2	Oakland River (Barrow) Luffany River (Suir)
Teal Route	3	Oakland River & its Tributary x 2 (Barrow) Luffany River (Suir)
Purple Route	3	Oakland River Tributary x 3 (Barrow)
Magenta Route	3	Oakland River (Barrow) Luffany River x 2(Suir)
Red Route	3	Oakland River & its Tributary x 2 (Barrow) Luffany River (Suir)
Lime Green Route	2	Oakland River (Barrow) Luffany River (Suir)

3.2. Assessment of Hydrological Receptors – Navy Route

This route corridor intersects the Nore and Suir catchments and Nore_SC_140 and Blackwater_SC_010 sub catchments (EPA, 2020).

The navy route corridor is crossed by the Oakland River (IE_SE_14O130860) and its tributaries in the northern extent and the Luffany River (IE_SE_16L680750) to the southern extent of this route corridor therefore having the potential to impact water quality due to potential re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows in an easterly direction into the River Barrow and the Luffany River flows in a southerly direction into the River Suir (EPA, 2020).

The Oaklands River has a River Waterbody WFD status 2013 -2018, with no assigned status. The Oaklands River is hydrologically connected to The River Barrow (east of the route corridor), which is noted as a Transitional Waterbody (New Ross Port) and has been assigned 'Moderate' WFD status for the 2013- 2018 period.

The Luffany River a has River Waterbody WFD status 2013 -2018, with no assigned status. The Luffany River is hydrologically connected to the River Suir (to the south of the scheme) which also noted as a Transitional Waterbody (Lower Suir Estuary (Little Island Cheekpoint)) and has been assigned 'Good' WFD status for the 2013- 2018 period (WFD, 2020)

There are no identified lakes within this route corridor (EPA, 2020).

Therefore, this route has the potential to directly impact current surface water quality at the Oakland River and its tributaries and the Luffany River. It has the potential to directly impact the following internationally protected / ecologically sensitive sites (NPWS, 2020):

- River Barrow and River Nore SAC (intersected at the northern extent of this route corridor); and,
- Barrow River Estuary pNHA (intersected at the northern extent of this route).

This route also has the potential (via identified hydrological linkages) to indirectly impact the current surface water quality at the following internationally protected / ecologically sensitive sites (NPWS, 2020);

- Lower River Suir SAC which is hydrologically connected through the Oakland River, River Barrow, River Luffany and River Suir; and,
- Waterford Harbour Shellfish Area (Cheekpoint/Arthurstown/Creadan) which is hydrologically connected through the Oakland River, River Barrow, River Luffany and River Suir.

Although, no flood mapping is available for the study area, the potential risk of flooding along key rivers/streams cannot be eliminated, and should be assessed further as the scheme progresses. The potential for flooding associated with groundwater sources will depend on the final detailed design and has therefore not been considered at this preliminary juncture. Once the emerging preferred route has been identified, and as part of the scope of works to be carried out during Phase 3, a site-specific Flood Risk Assessment (FRA), and design of required flood mitigation measures will be required. This document should be prepared in accordance with '*The Planning System and Flood Risk Management Guidelines*' (DEHLG, 2009).

3.3. Assessment of Hydrological Receptors – Teal Route

This route corridor intersects the Nore and Suir catchments and Nore_SC_140 and Blackwater_SC_010 sub catchments (EPA, 2020).

The teal route corridor is crossed by the Oakland River (IE_SE_14O130860) and its tributaries in the northern extent and the Luffany River (IE_SE_16L680750) to the southern extent of this route corridor therefore having the potential to impact water quality due to re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows in an easterly direction into the River Barrow and the Luffany River flows in a southerly direction into the River Suir (EPA, 2020).

The Oaklands River has a River Waterbody WFD status 2013 -2018, with no assigned status. The Oaklands River is hydrologically connected to The River Barrow (east of the route corridor), which is noted as a Transitional Waterbody (New Ross Port) and has been assigned 'Moderate' WFD status for the 2013- 2018 period.

The Luffany River a has River Waterbody WFD status 2013 -2018, with no assigned status. The Luffany River is hydrologically connected to the River Suir (to the south of the scheme) which also noted as a Transitional Waterbody (Lower Suir Estuary (Little Island Cheekpoint)) and has been assigned 'Good' WFD status for the 2013- 2018 period (WFD, 2020)

There are no lakes within this route corridor (EPA, 2020).

Therefore, this route has the potential to directly impact current surface water quality at the Oakland River and its tributaries and Luffany River. It has the potential to directly impact the following internationally protected / ecologically sensitive sites (NPWS, 2020):

- River Barrow and River Nore SAC (intersected at the northern extent of this route corridor);
- Barrow River Estuary pNHA (intersected at the northern extent of this route); and
- Lower River Suir SAC.

This route also has the potential (via identified hydrological linkages) to indirectly impact the current surface water quality at the following ecologically sensitive site (NPWS, 2020);

- Waterford Harbour Shellfish Area (Cheekpoint/Arthurstown/Creadan) which is hydrologically connected through the Oakland River, River Barrow, River Luffany and River Suir.

Although, no flood mapping is available for the study area, the potential risk of flooding along key rivers/streams cannot be eliminated, and should be assessed further as the scheme progresses. The potential for flooding associated with groundwater sources will depend on the final detailed design and has therefore not been considered at this preliminary juncture. Once the emerging preferred route has been identified, and as part of the scope of works to be carried out during Phase 3, a site-specific Flood Risk Assessment (FRA), and design of required flood mitigation measures will be required. This document should be prepared in accordance with '*The Planning System and Flood Risk Management Guidelines*' (DEHLG, 2009).

3.4. Assessment of Hydrological Receptors – Purple Route

This route corridor intersects the Nore and Suir catchments and Nore_SC_140 and Blackwater_SC_010 sub catchments (EPA, 2020).

The purple route corridor is crossed by the Oakland River (IE_SE_14O130860) to the northern extent and therefore has the potential to impact water quality due to re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows into the River Barrow (EPA, 2020).

The Oaklands River has a River Waterbody WFD status 2013 -2018, with no assigned status. The Oaklands River is hydrologically connected to The River Barrow (east of the route corridor), which is noted as a Transitional Waterbody (New Ross Port) and has been assigned 'Moderate' WFD status for the 2013- 2018 period.

The Luffany River a has River Waterbody WFD status 2013 -2018, with no assigned status. The Luffany River is hydrologically connected to the River Suir (to the south of the scheme) which also noted as a Transitional Waterbody (Lower Suir Estuary (Little Island Cheekpoint)) and has been assigned 'Good' WFD status for the 2013- 2018 period (WFD, 2020)

There are no lakes within this route corridor (EPA, 2020).

Therefore, this route has the potential to directly impact current surface water quality at the Oakland River and its tributaries. It therefore has the potential to directly impact the following internationally protected / ecologically sensitive sites (NPWS, 2020):

- River Barrow and River Nore SAC (route corridor intersected at the northern extent); and
- Barrow River Estuary pNHA (intersected at the northern extent of this route);

This route also has the potential (via identified hydrological linkages) to indirectly impact the current surface water quality at the following ecologically sensitive sites (NPWS, 2020);

- Waterford Harbour Shellfish Area (Cheekpoint/Arthurstown/Creadan) which is hydrologically connected through the Oakland River and River Barrow; and
- Lower River Suir SAC.

Although, no flood mapping is available for the study area, the potential risk of flooding along key rivers/streams cannot be eliminated, and should be assessed further as the scheme progresses. The potential for flooding associated with groundwater sources will depend on the final detailed design and has therefore not been considered at this preliminary juncture. Once the emerging preferred route has been identified, and as part of the scope of works to be carried out during Phase 3, a site-specific Flood Risk Assessment (FRA), and design of required flood mitigation measures will be required. This document should be prepared in accordance with '*The Planning System and Flood Risk Management Guidelines*' (DEHLG, 2009).

3.5. Assessment of Hydrological Receptors – Magenta Route

This route corridor intersects the Nore and Suir catchments and Nore_SC_140 and Blackwater_SC_010 sub catchments (EPA, 2020).

The magenta route corridor is crossed by the Oakland River (IE_SE_14O130860) to its northern extent and the Luffany River (IE_SE_16L680750) at the mid-section of this proposed route corridor therefore having the potential to impact water quality due to re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows in an easterly direction into the River Barrow and the Luffany River flows in a southernly direction into the River Suir (EPA, 2020).

The Oaklands River has a River Waterbody WFD status 2013 -2018, with no assigned status. The Oaklands River is hydrologically connected to The River Barrow (east of the route corridor), which is noted as a Transitional Waterbody (New Ross Port) and has been assigned 'Moderate' WFD status for the 2013- 2018 period.

The Luffany River a has River Waterbody WFD status 2013 -2018, with no assigned status. The Luffany River is hydrologically connected to the River Suir (to the south of the scheme) which also noted as a Transitional Waterbody (Lower Suir Estuary (Little Island Cheekpoint)) and has been assigned 'Good' WFD status for the 2013- 2018 period (WFD, 2020)

There are no lakes within this route corridor (EPA, 2020).

Therefore, this route has the potential to directly impact current surface water quality at the Oakland River and its tributaries and Luffany River: It has the potential to directly impact the following internationally protected / ecologically sensitive sites (NPWS, 2020):

- River Barrow and River Nore SAC (intersected at the northern extent of this route corridor);
- Barrow River Estuary pNHA (intersected at the northern extent of this route); and
- Lower River Suir SAC which is hydrologically connected through the Oakland River, River Barrow, River Luffany and River Suir.

This route also has the potential (via identified hydrological linkages) to indirectly impact the current surface water quality at the following ecologically sensitive site (NPWS, 2020);

- Waterford Harbour Shellfish Area (Cheekpoint/Arthurstown/Creadan) which is hydrologically connected through the Oakland River, River Barrow, River Luffany and River Suir.

Although, no flood mapping is available for the study area, the potential risk of flooding along key rivers/streams cannot be eliminated, and should be assessed further as the scheme progresses. The potential for flooding associated with groundwater sources will depend on the final detailed design and has therefore not been considered at this preliminary juncture. Once the emerging preferred route has been identified, and as part of the scope of works to be carried out during Phase 3, a site-specific Flood Risk Assessment (FRA), and design of required flood mitigation measures will be required. This document should be prepared in accordance with '*The Planning System and Flood Risk Management Guidelines*' (DEHLG, 2009).

3.6. Assessment of Hydrological Receptors – Red Route

This route corridor intersects the Nore and Suir catchments and Nore_SC_140 and Blackwater_SC_010 sub catchments (EPA, 2020).

The red route corridor is crossed by the Oakland River (IE_SE_14O130860) to its northern extent and the Luffany River (IE_SE_16L680750) to the southern extent of this route corridor therefore having the potential to impact water quality due to re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows in an easterly direction into the River Barrow and the Luffany River flows in a southernly direction into the River Suir (EPA, 2020).

The Oaklands River has a River Waterbody WFD status 2013 -2018, with no assigned status. The Oaklands River is hydrologically connected to The River Barrow (east of the route corridor), which is noted as a Transitional Waterbody (New Ross Port) and has been assigned 'Moderate' WFD status for the 2013- 2018 period.

The Luffany River a has River Waterbody WFD status 2013 -2018, with no assigned status. The Luffany River is hydrologically connected to the River Suir (to the south of the scheme) which also noted as a Transitional Waterbody (Lower Suir Estuary (Little Island Cheekpoint)) and has been assigned 'Good' WFD status for the 2013- 2018 period (WFD, 2020).

There are no lakes within this route corridor (EPA, 2020).

Therefore, this route has the potential to directly impact current surface water quality at the Oakland River and its tributaries and Luffany River: It has the potential to directly impact the following internationally protected / ecologically sensitive sites (NPWS, 2020):

- River Barrow and River Nore SAC (intersected at the northern extent of this route corridor);
- Barrow River Estuary pNHA (intersected at the northern extent of this route); and,
- Lower River Suir SAC which is hydrologically connected through the Oakland River, River Barrow, River Luffany and River Suir.

This route also has the potential (via identified hydrological linkages) to indirectly impact the current surface water quality at the following ecologically sensitive site (NPWS, 2020);

- Waterford Harbour Shellfish Area (Cheekpoint/Arthurstown/Creadan) which is hydrologically connected through the Oakland River, River Barrow, River Luffany and River Suir.

Although, no flood mapping is available for the study area, the potential risk of flooding along key rivers/streams cannot be eliminated, and should be assessed further as the scheme progresses. The potential for flooding associated with groundwater sources will depend on the final detailed design and has therefore not been considered at this preliminary juncture. Once the emerging preferred route has been identified, and as part of the scope of works to be carried out during Phase 3, a site-specific Flood Risk Assessment (FRA), and design of required flood mitigation measures will be required. This document should be prepared in accordance with '*The Planning System and Flood Risk Management Guidelines*' (DEHLG, 2009).

3.7. Assessment of Hydrological Receptors – Lime-Green Route

This route corridor intersects the Nore and Suir catchments and Nore_SC_140 and Blackwater_SC_010 sub catchments (EPA, 2020).

The lime green route corridor is crossed by the Oakland River (IE_SE_14O130860) to its northern extent and the Luffany River (IE_SE_16L680750) to the southern extent of this route corridor therefore having the potential to impact water quality due to re-alignment works and the discharge of surface water run-off. It is important to note hydrological connections as the Oaklands River flows in an easterly direction into the River Barrow and the Luffany River flows in a southernly into the River Suir (EPA, 2020).

The Oaklands River has a River Waterbody WFD status 2013 -2018, with no assigned status. The Oaklands River is hydrologically connected to The River Barrow (east of the route corridor), which is noted as a Transitional Waterbody (New Ross Port) and has been assigned 'Moderate' WFD status for the 2013- 2018 period.

The Luffany River a has River Waterbody WFD status 2013 -2018, with no assigned status. The Luffany River is hydrologically connected to the River Suir (to the south of the scheme) which also noted as a Transitional Waterbody (Lower Suir Estuary (Little Island Cheekpoint)) and has been assigned 'Good' WFD status for the 2013- 2018 period (WFD, 2020).

There are no lakes within this route corridor (EPA, 2020).

Therefore, this route has the potential to directly impact current surface water quality at the Oakland River and its tributaries and Luffany River: It has the potential to directly impact the following internationally protected / ecologically sensitive sites (NPWS, 2020):

- River Barrow and River Nore SAC (intersected at the northern extent of this route corridor);
- Barrow River Estuary pNHA (intersected at the northern extent of this route); and,
- Lower River Suir SAC which is hydrologically connected through the Oakland River, River Barrow, River Luffany and River Suir.

This route also has the potential (via identified hydrological linkages) to indirectly impact the current surface water quality at the following ecologically sensitive site (NPWS, 2020);

- Waterford Harbour Shellfish Area (Cheekpoint/Arthurstown/Creadan) which is hydrologically connected through the Oakland River, River Barrow, River Luffany and River Suir.

Although, no flood mapping is available for the study area, the potential risk of flooding along key rivers/streams cannot be eliminated, and should be assessed further as the scheme progresses. The potential for flooding associated with groundwater sources will depend on the final detailed design and has therefore not been considered at this preliminary juncture. Once the emerging preferred route has been identified, and as part of the scope of works to be carried out during Phase 3, a site-specific Flood Risk Assessment (FRA), and design of required flood mitigation measures will be required. This document should be prepared in accordance with '*The Planning System and Flood Risk Management Guidelines*' (DEHLG, 2009).

Figure 3-1 – Water Framework Directive (WFD) River Catchments and River network (Source: EPA, 2020)

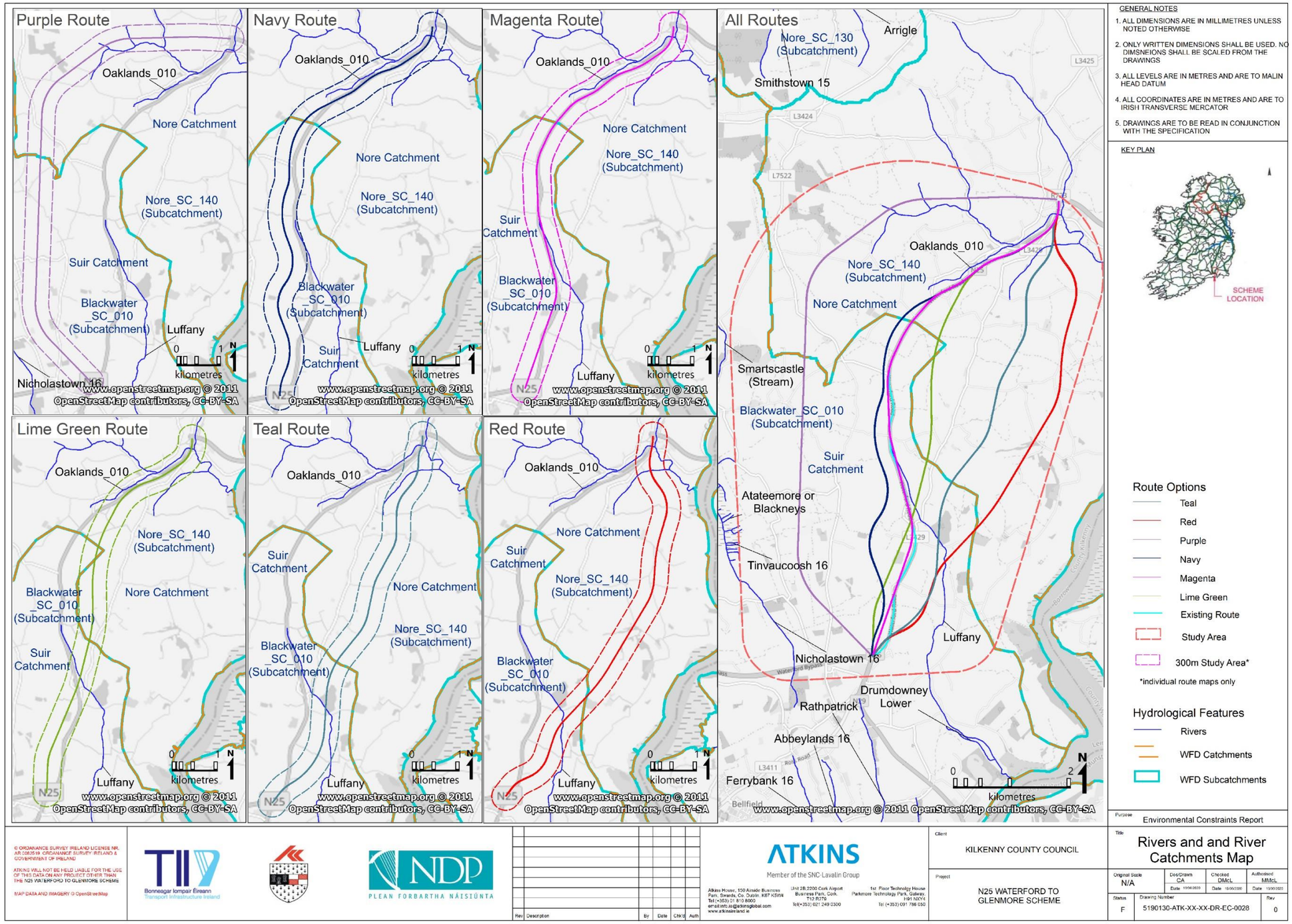


Figure 3-2: River Flow Direction and Natura Sites (Source: EPA & NPWS 2020)

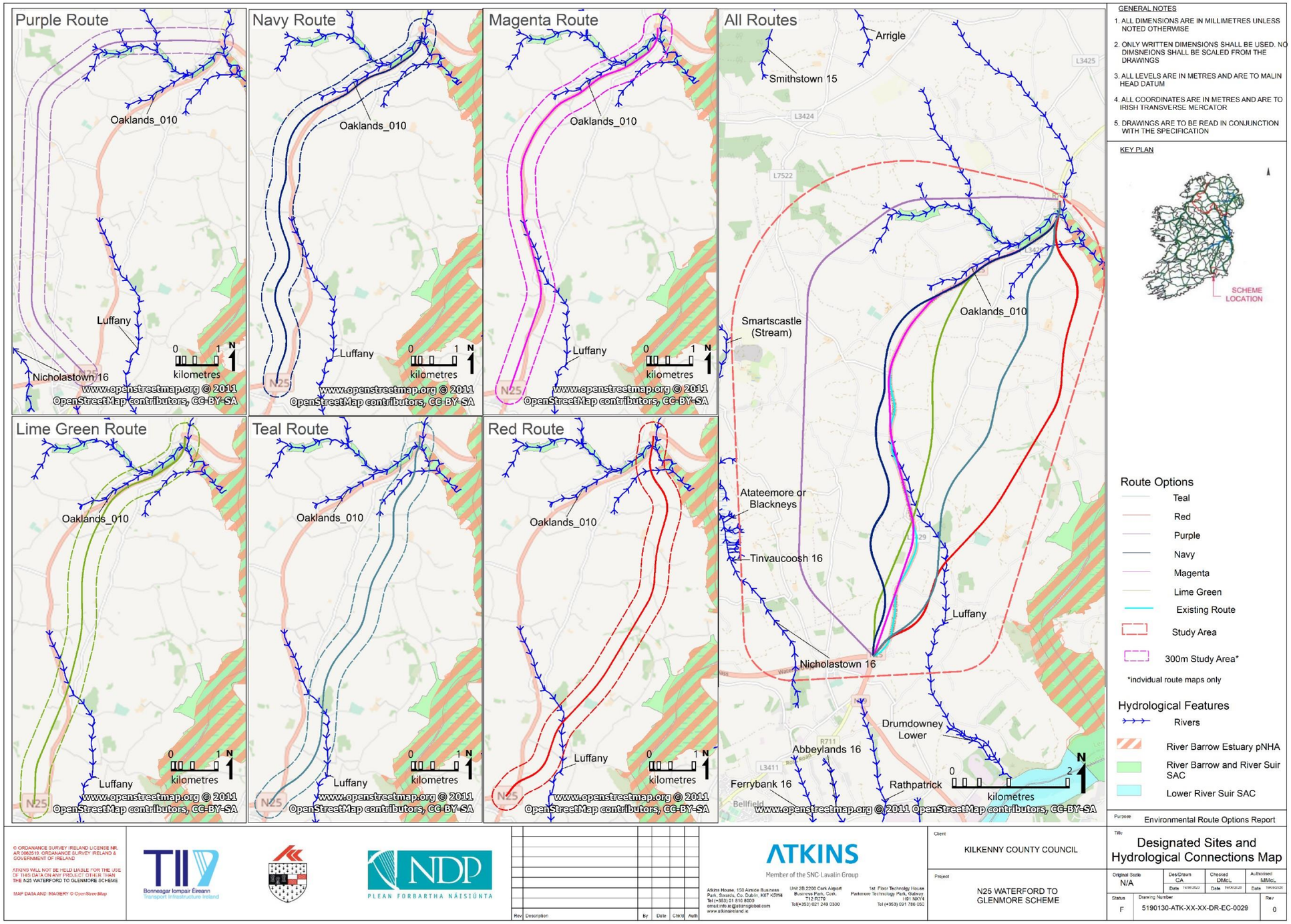


Figure 3-3: WFD Surface Water and Transitional Water Quality Status (Source: EPA, 2020)

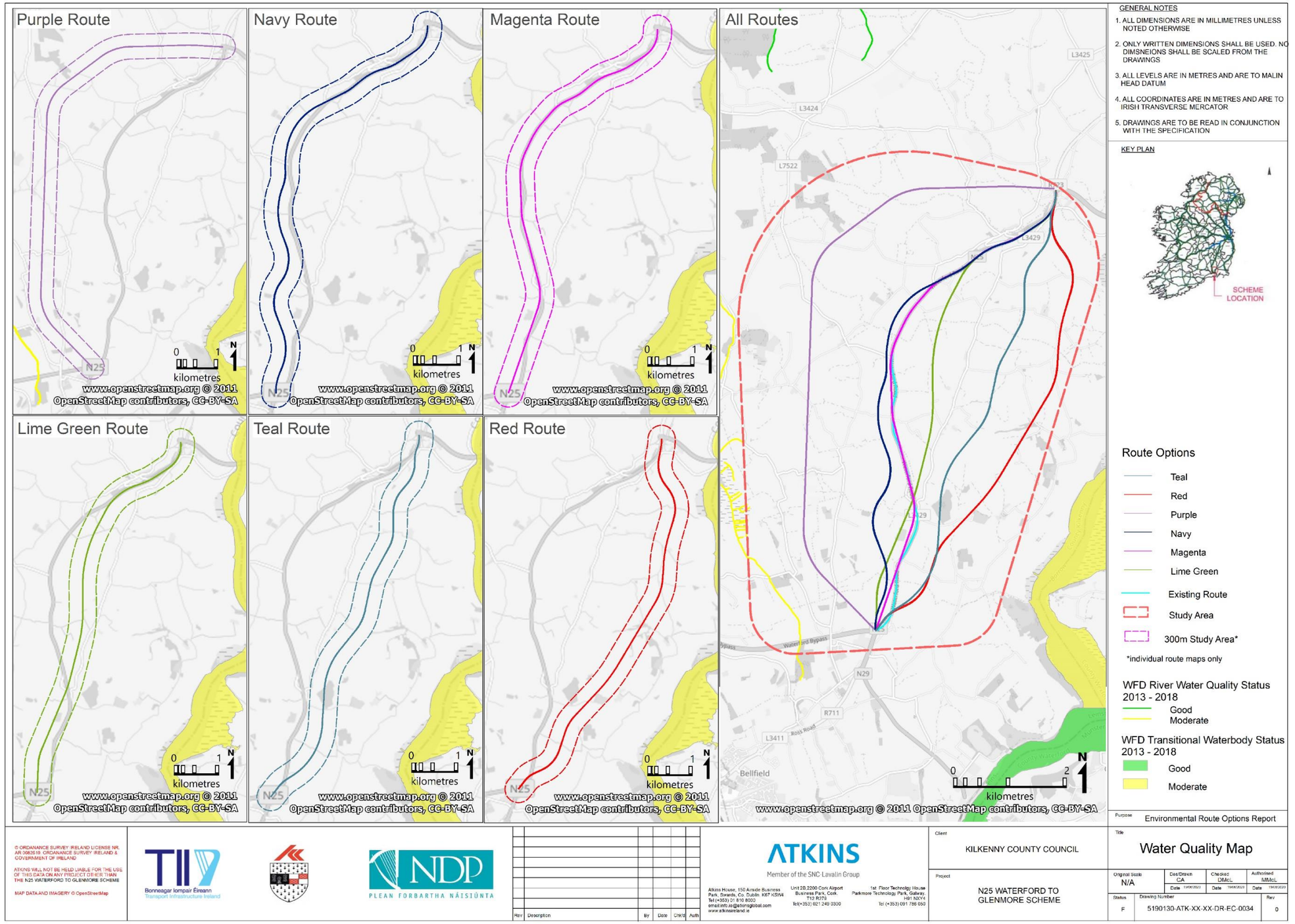
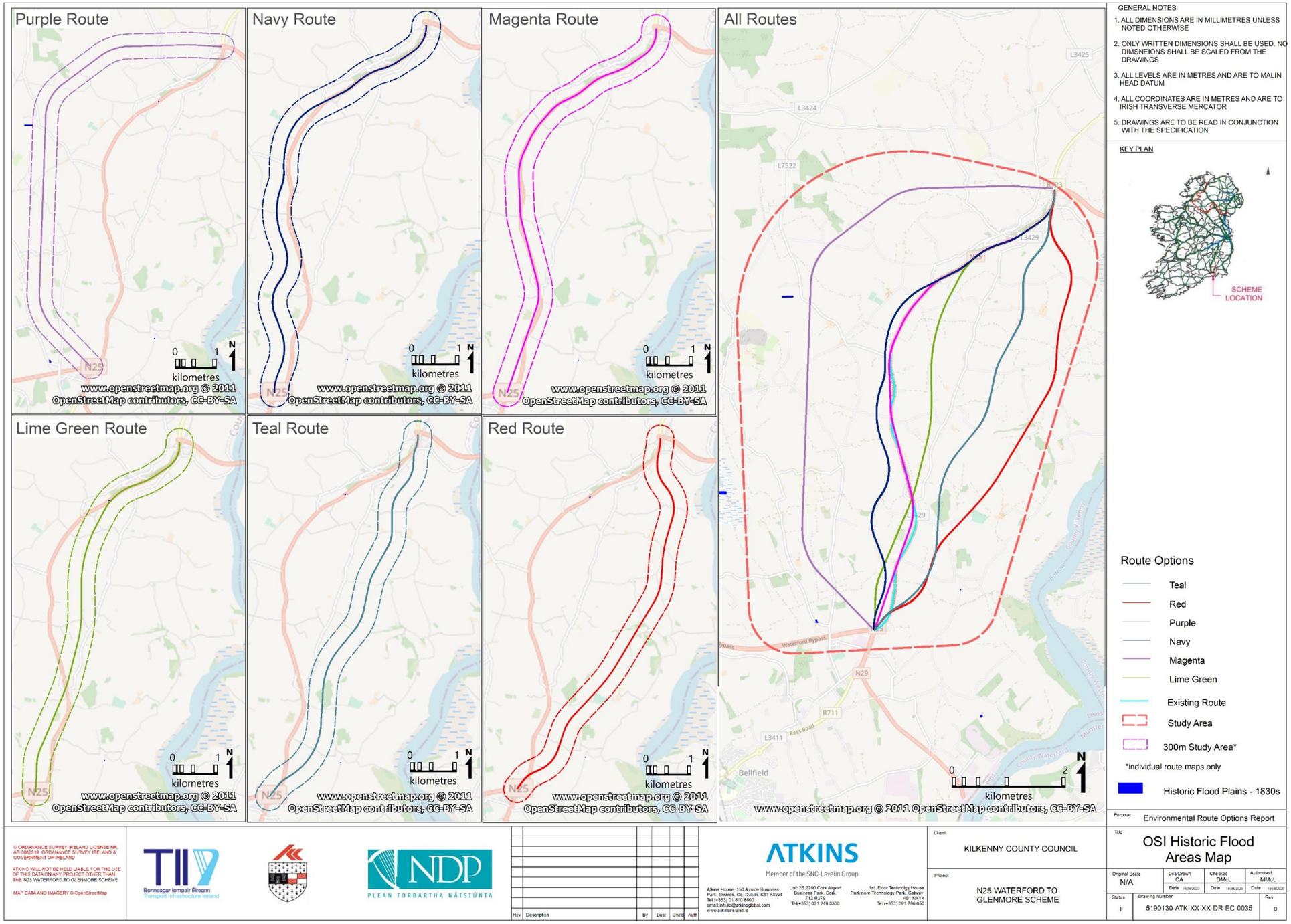


Figure 3-4: Historic Flood Maps (Source: OSI 2020)



3.8. Impact Assessment

Each route has been assessed in terms of the potential impact to hydrology, for key attributes or receptors, as detailed previously. The results are summarised in Table 3-2 to Table 3-7. Each impact has been rated taking account of the importance of the attribute or receptor, and the nature and duration of potential adverse / negative impacts.

Table 3-2: Hydrology Impact Assessment – Navy Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Moderate Negative
Lower River Suir SAC	Extremely High	Potential temporary indirect impact to surface water quality (small proportion of attribute).	Moderate Negative
Barrow River Estuary pNHA	Very High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Minor Negative
Waterford Harbour Shellfish Area	Very High	Potential temporary indirect impact to surface water quality (small proportion of attribute).	Minor Negative
Oakland River	High	Potential temporary direct impact to Oakland River (and tributaries) (small proportion of attribute).	Minor Negative
Luffany River	High	Potential temporary direct impact to Luffany River (small proportion of attribute).	Minor Negative

Table 3-3: Hydrology Impact Assessment – Teal Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Moderate Negative
Lower River Suir SAC	Extremely High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Moderate Negative
Barrow River Estuary pNHA	Very High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Minor Negative
Waterford Harbour Shellfish Area	Very High	Potential temporary indirect impact to surface water quality (small proportion of attribute).	Minor Negative
Oakland River	High	Potential temporary direct impact to Oakland River (and tributary) (small proportion of attribute).	Minor Negative
Luffany River	High	Potential temporary direct impact to Luffany River (small proportion of attribute).	Minor Negative

Table 3-4: Hydrology Impact Assessment – Purple Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Moderate Negative
Barrow River Estuary pNHA	Very High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Minor Negative
Waterford Harbour Shellfish Area	Very High	Potential temporary indirect impact to surface water quality (small proportion of attribute).	Minor Negative
Oakland River	High	Potential temporary direct impact to Oakland River (and tributaries) (small proportion of attribute).	Minor Negative
Lower River Suir SAC	Extremely High	Potential temporary indirect impact to surface water quality (small proportion of attribute).	Minor Negative

Table 3-5: Hydrology Impact Assessment – Magenta Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Moderate Negative
Lower River Suir SAC	Extremely High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Moderate Negative
Barrow River Estuary pNHA	Very High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Minor Negative
Waterford Harbour Shellfish Area	Very High	Potential temporary indirect impact to surface water quality (small proportion of attribute).	Minor Negative
Oakland River	High	Potential temporary direct impact to Oakland River (and tributary) (small proportion of attribute).	Minor Negative
Luffany River	High	Potential temporary direct impact to Luffany River (small proportion of attribute).	Minor Negative

Table 3-6: Hydrology Impact Assessment – Red Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Moderate Negative
Lower River Suir SAC	Extremely High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Moderate Negative
Barrow River Estuary pNHA	Very High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Minor Negative
Waterford Harbour Shellfish Area	Very High	Potential temporary indirect impact to surface water quality (small proportion of attribute).	Minor Negative
Oakland River	High	Potential temporary direct impact to Oakland River (and tributary) (small proportion of attribute).	Minor Negative
Luffany River	High	Potential temporary direct impact to Luffany River (small proportion of attribute).	Minor Negative

Table 3-7: Hydrology Impact Assessment – Lime-Green Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Moderate Negative
Lower River Suir SAC	Extremely High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Moderate Negative
Barrow River Estuary pNHA	Very High	Potential temporary direct impact to surface water quality (small proportion of attribute).	Minor Negative
Waterford Harbour Shellfish Area	Very High	Potential temporary indirect impact to surface water quality (small proportion of attribute).	Minor Negative
Oakland River	High	Potential temporary direct impact to Oakland River (and tributary) (small proportion of attribute).	Minor Negative
Luffany River	High	Potential temporary direct impact to Luffany River (small proportion of attribute).	Minor Negative

3.9. Comparative Evaluation

All six routes have been ranked in terms of preference based on the results of the hydrological impact assessment; namely the potential for surface water quality impacts to River Barrow and River Nore SAC, Lower River Suir SAC, Barrow River Estuary pNHA, Waterford Harbour Shellfish Area, and key rivers and streams. Potential flood risk associated with each route option has also been qualitatively considered as part of this appraisal. The results are presented in Table 3-8.

The Purple Route is identified as the '*preferred'* route. This route has been ranked 1st in order of preference. While all six routes are broadly comparable in terms of impact levels, the Purple Route has been identified as having less of a moderate negative impact than the other five route options (although it is noted that this route could potentially have a temporary direct impact to surface water quality in the River Barrow and River Nore SAC (albeit any impacts would likely be minor)).

The Navy Route, Lime-Green Route, Teal Route, Magenta Route and Red Route are identified as '*intermediate'* and ranked 2nd, 3rd, 4th, 5th, and 6th respectively primarily based on the fact that all 5no. routes could potentially impact surface water quality at River Barrow and River Nore SAC, Lower River Suir SAC, Barrow River Estuary pNHA, Waterford Harbour Shellfish Area.

No significant adverse (i.e. major negative), or profound adverse (i.e. severe negative) hydrological impacts have been identified associated with any of the 6no. routes assessed.

Table 3-8: Summary of Hydrology Impacts for Route Options

	Topic: Hydrology					
Impact Level	**Navy Route**	**Teal Route**	**Purple Route**	**Magenta Route**	**Red Route**	**Lime Green Route**
Severe Negative						
Major Negative						
Moderate Negative	2	2	1	2	2	2
Minor Negative	4	4	4	4	4	4
Neutral						
Minor Positive						
Moderate Positive						
Major Positive						
Order of Preference	2nd	4th	1st	5th	6th	3rd
Ranking	**Intermediate**	**Intermediate**	**Preferred**	**Intermediate**	**Intermediate**	**Intermediate**

4. Hydrogeology

4.1. Receiving Environment

4.1.1. Hydrogeological Characterisation

The GSI provides a methodology for aquifer classification based on resource value (regionally important, locally important and poor) and vulnerability (extreme, high, moderate or low). Resource value refers to the scale and production potential of the aquifer whilst vulnerability refers to the ease with which groundwater may be contaminated by human activities. Vulnerability classification is primarily based on the permeability and thickness of subsoils, as presented in Table 4-1.

Table 4-1: Vulnerability Mapping Guidelines (Source (DoELG, EPA, GSI, 1999)

Vulnerability rating	Hydrogeological conditions				
	Subsoil permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High Permeability (Sand/Gravel)	Moderate Permeability (e.g. Sandy subsoil)	Low Permeability (e.g. Clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30m radius)
Extreme (E)	0 - 3.0m	0 - 3.0m	0 - 3.0m	0 - 3.0m	-
High (H)	> 3.0m	3.0 - 10.0m	3.0 - 5.0m	> 3.0m	N/A
Moderate (M)	N/A	>10.0m	5.0 - 10.0m	N/A	N/A
Low (L)	N/A	N/A	>10.0m	N/A	N/A

Notes: (1) N/A= not applicable
(2) Precise permeability values cannot be given at present.
(3) Release point of contaminants is assumed to be 1-2 m below ground surface

Bedrock underlying all route option comprises green, red-purple, buff slate, siltstone of the Oaklands Formation, green and grey slate with thin siltstone from the Ballylane Formation, red, brown conglomerate & sandstone of Carrigmaclea Formation and Dolerite and Rhyolitic volcanics, grey & brown slates of Campile formation. The purple route option is also underlain by yellow and red sandstone, and green mudstone of Kiltorcan Formation, as discussed in detail in the Soils and Geology Appraisal prepared by Atkins (2020) as part of the Route Selection Report.

All 6no. route options are underlain by 2no. aquifer types classified as '*Pl'*, a Poor Aquifer which is Generally Unproductive except for local zones and '*Ll*', a Locally Important Aquifer which is Moderately Productive only in Local Zones (GSI, 2020). The bedrock aquifer beneath majority of 5no. route options namely (Navy, Teal, Magenta, Red and Lime Green) is classified as '*Pl'*, while the majority of the Purple route is classified as '*Ll*'. The south-western portion of the purple Route option is underlain by a Regionally Important Aquifer, classified as '*Rf*', a Regionally Important Aquifer with Fissured Bedrock (GSI, 2020) Refer to Figure 4-1.

Groundwater vulnerability rating beneath the general vicinity of the scheme, ranges from '*Low'* to '*Rock at or near Surface or Karst'.* The vulnerability rating beneath each route is presented in Figure 4-2. Any

areas identified as having a '*High', 'Extreme'* or *'Rock at or near Surface or Karst'* rating are likely to be underlain by shallow bedrock (within approximately 3m to 10m), and accordingly would be vulnerable to potential contamination.

Having reviewed the total length of each route which crosses lands with a groundwater vulnerability rating of *'High'/ 'Extreme'/'Rock at or near Surface or Karst'* (i.e. bedrock within approximately 3m of existing ground level), the total percentage of proposed cut within 3m of shallow bedrock along each route option is presented within individual assessments and presented in Table 4.2. The scheme has potential to impact groundwater quality and groundwater levels at these specific locations; the greater the percentage of cut in areas with an '*Extreme*' groundwater vulnerability rating, the greater the risk of potential impact to local groundwater quality and resources.

Table 4-2: Length & Percentage of Cut in Areas of High/Extreme Vulnerability

Route Name	Route Length (Km)	Proposed Cut in Areas of High/Extreme Vulnerability (Km)	Percentage of Cut in Relation to Total Length of Route (%)
Navy Route	9.500	4.490	48
Teal Route	8.700	3.470	40
Purple Route	11.600	4.250	37
Magenta Route	9.300	4.310	46
Red Route	9.000	3.170	36
Lime-Green Route	8.900	5.875	66

Groundwater beneath the general vicinity of the scheme forms part of the following WFD Groundwater bodies (GWB's); Mullinavat (IE_SE_G_155); Carrick-on-Suir (IE_SE_G_030); and Inistioge (IE_SE_G_076) (GSI, 2002) as shown in Figure 4.3.

Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high.

Within the Carrick-on-Suir GWB substantial artesian flows have been recorded in the aquifer due to the pressure of the water table in the elevated outcrop area. Evidence from drilling in the Kiltorcan Formation shows that the largest well yields are obtained at relatively low elevations, close to major structural features and where at least 40 m of the upper part of the Kiltorcan is penetrated.

Within the Inistioge body groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs and seeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater -surface water interactions occur. Groundwater baseflow to rivers and streams is likely to be relatively low.

Based on a review of available GSI (2020) and historic OSI (2020) mapping there are no springs or holy wells reported within the route corridor of any of the six route options.

Site specific groundwater level monitoring data is only available along the navy route option. Therefore, inferred regional groundwater flow is expected to follow topography in a general easterly direction towards River Barrow and River Nore SAC in the northern part of the scheme and in southerly direction towards Lower River Suir SAC in the southern part of the scheme. Shallow groundwater flow beneath

each route option will follow local topography, and will typically discharge to the closest downgradient stream, river or lake. Therefore, key groundwater discharge zones would include the following;

- Oakland River (and tributaries);
- Luffany River

4.1.2. Groundwater Use and Available Resource

A search of the GSI groundwater well database was conducted to identify registered wells within the scheme. There are 17no. registered wells within the study area (300m) of all 6no. routes (Figure 4-4, Table 4-3) and the following uses are reported;

- Agricultural & domestic use - 3no.; and,
- Unknown / other use – 14no.

Reported yields range from '*Poor*' to '*Good',* with a maximum daily yield of 109m^3 reported within the bedrock aquifer in Nicholastown. Several wells overlap with the alignment of various route options; however, it is noted that the accuracy of well locations (sourced via GSI records) ranges from 10m to 50m.

There are no reported Public Supply Source Protection Areas, Group Water Schemes or commercial / industrial groundwater abstractions within the study area of any of the six route options; the closest Public Supply Source Protection Area is Glenmore PWS which is approximately 500m north of the route corridor (GSI, 2020). Refer to Figure 4-4.

Table 4-3: Groundwater Wells within Study Area (Source: GSI, 2018)

GSI Reference	Depth (m)	Reported Use	Yield Class	Reported Yield (m3/day)
2611NWW061	19.5	Unknown	Moderate	65.5
2611NWW066	24.7	Unknown	Moderate	43.6
2611NWW069	19.5	Unknown	Moderate	58.9
2611NWW071	26.5	Unknown	Moderate	65.5
2611NWW082	26.5	Agri & domestic use	Unknown	Unknown
2611NWW083	20.7	Agri & domestic use	Unknown	Unknown
2611SWW115	Unknown	Unknown	Unknown	Unknown
2611SWW117	29.9	Unknown	Good	109
2611SWW120	Unknown	Unknown	Unknown	Unknown
2611SWW121	Unknown	Unknown	Unknown	Unknown
2611SWW122	21.3	Unknown	Poor	27.3
2611SWW123	Unknown	Unknown	Unknown	Unknown
2611SWW124	Unknown	Unknown	Unknown	Unknown
2611SWW125	27.4	Unknown	Unknown	Unknown
2611SWW126	18.3	Unknown	Unknown	Unknown
2611SWW128	22	Agri & domestic use	Unknown	Unknown
2611SWW130	13.4	Unknown	Poor	30.5

Source: (GSI, 2020)

A list of all properties located within the study area of each route are presented in Table 4-4. These are all assumed to be supplied privately by onsite domestic wells.

Table 4-4: Existing Properties within the Study Area of Each Route

Route Options	Property Count
Navy Route	149
Teal Route	63
Purple Route	52
Magenta Route	185
Red Route	83
Lime-Green Route	163

4.1.3. Groundwater Quality

The European Communities Environmental Objectives (Groundwater) Regulations, (S.I. 9 of 2010) came into effect on 27th January 2010. The aim of the Regulations is to achieve the environmental objectives established for groundwater by Article 4 (1) (b) of the Water Framework Directive (2000/60/EC). The 2010 Regulations set down groundwater quality standards for nitrate (50mg/L) and active substances in pesticides in Schedule 4 and also established threshold values for pollutants or indicators of pollutants in Schedule 5. Under these regulations the EPA shall also assign a status of '*Good'* or '*Poor'* to those bodies of groundwater where available data and knowledge allows.

Groundwater quality within the general vicinity of the scheme (Mullinavat (IE_SE_G_155); Carrick-on-Suir (IE_SE_G_030); and Inistioge (IE_SE_G_076) WFD groundwater bodies), was of '*Good Status'* for the 2013 to 2018 period. Refer to Figure 4-3. The overall objective of the Water Framework Directive for these groundwater bodies is to '*Protect'* the current good status (WFDI, 2018). A key component of the groundwater classification is the assessment of the impact of pollution on the groundwater body. The groundwater status classification process accounts for the ecological needs of the relevant rivers, lakes and terrestrial ecosystems that depend on contributions from groundwater.

4.1.4. Groundwater Dependent Terrestrial Eco-Systems (GWDTEs)

Groundwater-dependent terrestrial ecosystems (GWDTEs) are defined as habitats/species that are dependent on groundwater to maintain the environmental supporting conditions required to sustain that habitat and/or species (EPA, 2008). Groundwater may provide a direct input, such as in turloughs, fens and petrifying springs. Alternatively, the groundwater may have an indirect influence in maintaining high and stable water levels within the habitat, such as with raised bogs. Groundwater bodies are subject to a range of pressures which can result in significant damage to GWDTEs depending on the susceptibility of the pathway and the sensitivity of the receptor.

A detailed assessment of ecological issues, including potential impacts to ecologically sensitive areas along each route is outlined in the Ecological Appraisal prepared by Atkins (2020) and submitted as part of the Route Selection Report.

There are numerous ecologically sensitive areas within vicinity of the scheme; however, there are no identified GWDTEs within the study area of any route options.

The scheme has potential to directly impact water quality at River Barrow and River Nore SAC and Lower River Suir SAC particularly in the southern and northern portions of the scheme, via. groundwater pathways. Such impacts have been further evaluated as part of this appraisal.

4.2. Assessment of Hydrogeological Receptors – Navy Route

The navy route corridor is underlain predominately by a locally important bedrock aquifer with sections of poorly productive bedrock aquifer.

Groundwater vulnerability beneath the route corridor ranges from a classification of 'Moderate' to 'Rock at or near Surface or Karst'. Although, majority of the route corridor is underlain by 'High', 'Extreme' and 'Rock at or near Surface or Karst'. The area of groundwater vulnerability with 'Rock at or near Surface or Karst' is 22.9%. No karst features are noted within this route corridor. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.

A geotechnical investigation was carried out in 2012 for this route option. Shallow groundwater strikes within the overlying subsoil ranged from 1.5mbgl at BH161 to 5.9mbgl at BH101 as presented in Table 4-5. No groundwater strikes were encountered in the underlying bedrock along this route. Based on these levels groundwater within the overburden appears to be shallow, within several meters of the existing ground level.

Table 4-5: Groundwater Strikes During Ground Investigation

Exploratory Hole	Depth of Water Strike	Rise to (m)	Comments
BH101	5.5	5	Water Strike
BH154	3.4	2.9	Water Strike
	5.9	5.75	Water Strike
BH156	3	1.9	Water Strike
BH157	2.3	1.4	Water Strike
	5.9	4.4	Water Strike
BH158	2.5	2	Water Strike
BH159	2.3	2.3	Water Strike
BH161	1.5	1.4	Water Strike
BH163	3	3	Water Strike
BH164	2.5	2.5	Water Strike
BH167	2.3	2.25	Water Strike
BH178	2	2.05	Water Strike
TP102	1.7		Strong Inflow
TP126	3.2		Slight Seepage
TP145	1.7		Seepage
TP153	2.1		Seepage
TP160	2.2		Seepage
	2.7		Water Strike

Exploratory Hole	Depth of Water Strike	Rise to (m)	Comments
TP166	1.8		Seepage
	2.2		Inflow

Source: (Glover Site Investigations, 2012)

The ground investigation includes groundwater monitoring data that indicates groundwater levels ranging from 1.08mbgl to 12.23mbgl. A total of 4 out of the 15 boreholes that were monitored, were recorded as dry as presented in Table 4-6.

Table 4-6: Groundwater Monitoring Record

Exploratory Hole	Groundwater Monitoring (Depth of Water m)						
	30/09/11	12/10/11	13/10/11	14/10/11	15/10/11	17/10/11	18/10/11
BH101R						1.10	1.08
BH109R					Dry		Dry
BH111R				4.66		4.70	
BH119R		4.13			4.05		
BH121R							Dry
BH129R			Dry			Dry	
BH131R			7.71			7.60	
BH133R			5.49			5.46	
BH143R			12.23			12.17	
BH157R						1.56	1.33
BH168R				3.44		3.39	
BH173R	Dry						Dry
BH185R			6.96			6.89	
BH188R		5.32				5.37	
BH191R		4.93				5.01	

Source: (Glover Site Investigations, 2012)

There are a number of historic wells located within the study area and adjacent to a number of the routes which have not been monitored as part of this investigation.

Circa. 4.5km (48%) of the proposed route is in areas of cutting over areas of 'Extreme'/ 'High'/ 'Rock at or near Surface or Karst' groundwater vulnerability rating; excavations in such areas have potential to impact local groundwater quality and groundwater levels (and indirectly water quality / levels at any nearby surface water receptors). Regional baseline groundwater quality beneath the scheme was of 'Good' WFD status for the 2013 to 2018 period.

Groundwater beneath the route corridor is made up of both Mullinavat (IE_SE_G_155) and Inistioge (IE_SE_G_076) WFD Groundwater bodies.

Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow

circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high.

Within the Inistioge body groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs andseeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater -surface water interactions occur. Baseflow to rivers and streams is likely to be relatively low.

Shallow groundwater flow along this route will follow local topography and discharge along the following zones; Oakland River, Luffany River and associated river / stream catchments. Therefore, this route is likely connected to the above surface water receptors, via. groundwater pathways.

There are no Public Supply Source Protection Area, Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor.

A search of the GSI groundwater well database has identified 3no. registered wells within the route corridor (source use – unknown), refer to in Table 4-7. The number of properties located within the navy route corridor is 149 and it is assumed that all private dwellings have an onsite private potable well supply.

Table 4-7: Groundwater Wells within Study Area of Navy Route

GSI Reference	Depth (m)	Reported Use	Yield Class	Reported Yield (m3/day)
2611NWW066	24.7	Unknown	Moderate	43.6
2611SWW123	Unknown	Unknown	Unknown	Unknown
2611SWW124	Unknown	Unknown	Unknown	Unknown

Source: (GSI, 2020)

Based on a review of available GSI (2020) mapping no springs were identified within the route corridor but historic OSI (2020) mapping reported a spring within the route corridor, with another within 150m of the route corridor. Historic OSI (2020) mapping also identified ‘St James’s Holy Well’ approximately 230m south east of the route corridor.

4.3. Assessment of Hydrogeological Receptors – Teal Route

The purple route corridor is underlain by locally important bedrock aquifer with sections of poorly productive bedrock aquifer and regionally important bedrock aquifer.

Groundwater vulnerability beneath the route corridor ranges from a classification of ‘Moderate’ to ‘Rock at or near Surface or Karst’. Although, majority of the route corridor is underlain by ‘High’, ‘Extreme’ and ‘Rock at or near Surface or Karst’. The area of groundwater vulnerability with ‘Rock at or near Surface or Karst’ is 9.6%. No karst features are noted within this route corridor. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.

Circa 3.5Km (40%) of the proposed route is in areas of cutting over areas of ‘Extreme’/ ‘High’/ ‘Rock at or near Surface or Karst’ groundwater vulnerability rating; excavations in such areas have potential to impact local groundwater quality and groundwater levels (and indirectly water quality / levels at any

nearby surface water receptors). Regional baseline groundwater quality beneath the scheme was of 'Good' WFD status for the 2013 to 2018 period.

Groundwater beneath the route corridor is made up of the following WFD Groundwater bodies (GWB's); Mullinavat (IE_SE_G_155); Carrick-on-Suir (IE_SE_G_030); and Inistioge (IE_SE_G_076).

Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high.

Within the Inistioge body groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs and seeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater -surface water interactions occur. Groundwater baseflow to rivers and streams is likely to be relatively low.

Shallow groundwater flow along this route will follow local topography and discharge along the following zones; Oakland River, Luffany River and associated river / stream catchments. Therefore, this route is likely connected to the above surface water receptors, via. groundwater pathways.

There are no Public Supply Source Protection Area, Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor.

A search of the GSI groundwater well database has identified 5no. registered wells within the route corridor with the following uses; unknown us- 4no., and agricultural & domestic use – 1no., refer to in Table 4-8. The number of properties located within the teal route corridor is 63 and it is assumed that all private dwellings have an onsite private potable well supply.

Table 4-8: Groundwater Wells within Study Area of Teal Route

GSI Reference	Depth (m)	Reported Use	Yield Class	Reported Yield (m3/day)
2611NWW069	19.5	Unknown	Moderate	58.9
2611NWW071	26.5	Unknown	Moderate	65.5
2611NWW083	20.7	Agri & domestic use	Unknown	Unknown
2611SWW123	Unknown	Unknown	Unknown	Unknown
2611SWW130	13.4	Unknown	Poor	30.5

Source: (GSI, 2020)

Based on a review of available GSI (2020) mapping no springs were identified within the route corridor but historic OSI (2020) mapping reported two springs within the route corridor, with another within 100m of the route corridor. Historic OSI (2020) mapping also identified 'St James's Holy Well' approximately 120m west of the route corridor.

4.4. Assessment of Hydrogeological Receptors - Purple Route

The purple route corridor is underlain by a locally important bedrock aquifer with sections of poorly productive bedrock aquifer and regionally important bedrock aquifer.

Groundwater vulnerability beneath the route corridor ranges from a classification of 'Low' to 'Rock at or near Surface or Karst'. Although, Majority of the route corridor is underlain by 'High', 'Extreme' and 'Rock at or near Surface or Karst', the area of groundwater vulnerability with 'Rock at or near Surface or Karst' is 11.4%. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.

Circa. 4.3Km (37%) of the proposed route is in areas of cutting over areas of 'Extreme'/ 'High'/ 'Rock at or near Surface or Karst' groundwater vulnerability rating; excavations in such areas have potential to impact local groundwater quality and groundwater levels (and indirectly water quality / levels at any nearby surface water receptors). Regional baseline groundwater quality beneath the scheme was of 'Good' WFD status for the 2013 to 2018 period.

Groundwater beneath the route corridor is made up of the following WFD Groundwater bodies (GWB's); Mullinavat (IE_SE_G_155); Carrick-on-Suir (IE_SE_G_030); and Inistioge (IE_SE_G_076).

Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high.

Within the Carrick-on-Suir GWB substantial artesian flows have been recorded in the aquifer due to the pressure of the water table in the elevated outcrop area. Evidence from drilling in the Kiltorcan Formation shows that the largest well yields are obtained at relatively low elevations, close to major structural features and where at least 40 m of the upper part of the Kiltorcan is penetrated.

Within the Inistioge body groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs and seeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater -surface water interactions occur. Groundwater baseflow to rivers and streams is likely to be relatively low.

Shallow groundwater flow along this route will follow local topography and discharge along the following zones; Oakland River, Luffany River and associated river / stream catchments. Therefore, this route is likely connected to the above surface water receptors, via. groundwater pathways.

There are no Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor.

A search of the GSI groundwater well database has identified 6no. registered wells within the route corridor with the following uses; unknown us- 6no., refer to in Table 4-9. The number of properties located within the purple route corridor is 52 and it is assumed that all private dwellings have an onsite private potable well supply.

Table 4-9: Groundwater Wells within Study Area of Purple Route

GSI Reference	Depth (m)	Reported Use	Yield Class	Reported Yield (m3/day)
2611NWW061	19.5	Unknown	Moderate	65.5
2611SWW117	29.9	Unknown	Good	109
2611SWW120	Unknown	Unknown	Unknown	Unknown

2611SWW121	Unknown	Unknown	Unknown	Unknown
2611SWW122	21.3	Unknown	Poor	27.3
2611SWW123	Unknown	Unknown	Unknown	Unknown

Source: (GSI, 2020)

Based on a review of available GSI (2020) and historic OSI (2020) mapping there are no springs or holy wells reported within the route corridor.

4.5. Assessment of Hydrogeological Receptors - Magenta Route

The magenta route corridor is underlain by locally important bedrock aquifer with sections of poorly productive bedrock aquifer.

Groundwater vulnerability beneath the route corridor ranges from a classification of 'Moderate' to 'Rock at or near Surface or Karst'. Although, majority of the route corridor is underlain by 'High', 'Extreme' and 'Rock at or near Surface or Karst' The area of groundwater vulnerability with 'Rock at or near Surface or Karst' is 25.2%. It is important to note no karst features are noted within this route corridor. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.

Circa. 4.3Km (46%) of the proposed route is in areas of cutting over areas of 'Extreme'/ 'High'/ 'Rock at or near Surface or Karst' groundwater vulnerability rating; excavations in such areas have potential to impact local groundwater quality and groundwater levels (and indirectly water quality / levels at any nearby surface water receptors). Regional baseline groundwater quality beneath the scheme was of 'Good' WFD status for the 2013 to 2018 period.

Groundwater beneath the route corridor is made up of both Mullinavat (IE_SE_G_155) and Inistioge (IE_SE_G_076) WFD Groundwater bodies.

Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high.

Within the Inistioge body groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs andseeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater -surface water interactions occur. Groundwater baseflow to rivers and streams is likely to be relatively low.

Shallow groundwater flow along this route will follow local topography and discharge along the following zones; Oakland River, Luffany River and associated river / stream catchments. Therefore, this route is connected to the above surface water receptors, via. groundwater pathways.

There are no Public Supply Source Protection Area, Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor.

A search of the GSI groundwater well database has identified 6no. registered wells within the route corridor with the following uses; unknown us- 4no. and agricultural & domestic use -1no., refer to in Table 4-10. The number of properties located within the magenta route corridor is 185 and it is assumed that all private dwellings have an onsite private potable well supply.

Table 4-10: Groundwater Wells within Study Area of Magenta Route

GSI Reference	Depth (m)	Reported Use	Yield Class	Reported Yield (m3/day)
2611NWW066	24.7	Unknown	Moderate	43.6
2611NWW082	26.5	Agri & domestic use	Unknown	Unknown
2611SWW123	Unknown	Unknown	Unknown	Unknown
2611SWW125	27.4	Unknown	Unknown	Unknown
2611SWW130	13.4	Unknown	Poor	30.5

Source: (GSI, 2020)

Based on a review of available GSI (2020) mapping no springs were identified within the route corridor but historic OSI (2020) mapping reported a spring within the route corridor, with another within 140m of the route corridor. Historic OSI (2020) mapping also identified 'St James's Holy Well' approximately 230m south east of the route corridor

4.6. Assessment of Hydrogeological Receptors – Red Route

The red route corridor is underlain by a poorly productive bedrock aquifer with sections of locally important bedrock aquifer generally towards the north and south and a very small area of regionally important bedrock aquifer in the south.

Groundwater vulnerability beneath the route corridor ranges from a classification of 'Moderate' to 'Rock at or near Surface or Karst'. Although, majority of the route corridor is underlain by 'High', 'Extreme' and 'Rock at or near Surface or Karst'. The area of groundwater vulnerability with Rock at or near Surface or Karst is 15.4%. It is important to note no karst features are noted within this route corridor. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.

Circa. 3.2Km (36%) of the proposed route is in areas of cutting over areas of 'Extreme'/ 'High'/ 'Rock at or near Surface or Karst' groundwater vulnerability rating; excavations in such areas have potential to impact local groundwater quality and groundwater levels (and indirectly water quality / levels at any nearby surface water receptors). Regional baseline groundwater quality beneath the scheme was of 'Good' WFD status for the 2013 to 2018 period.

Groundwater beneath the route corridor is made up of both Mullinavat (IE_SE_G_155) and Inistioge (IE_SE_G_076) WFD Groundwater bodies.

Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high.

Within the Inistioge body groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs and seeps. Owing to the poor productivity of the aquifers in this body it is unlikely that any major groundwater -surface water interactions occur. Groundwater baseflow to rivers and streams is likely to be relatively low.

Shallow groundwater flow along this route will follow local topography and discharge along the following zones; Oakland River, Luffany River and associated river / stream catchments. Therefore, this route is connected to the above surface water receptors, via. groundwater pathways.

There are no Public Supply Source Protection Area, Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor.

A search of the GSI groundwater well database has identified 3no. registered wells within the route corridor with the following uses; unknown us- 2no. and agricultural & domestic use -1no., refer to in Table 4-11. The number of properties located within the red route corridor is 83 and it is assumed that all private dwellings have an onsite private potable well supply.

Table 4-11: Groundwater Wells within Study Area of Red Route Option

GSI Reference	Depth (m)	Reported Use	Yield Class	Reported Yield (m3/day)
2611SWW123	Unknown	Unknown	Unknown	Unknown
2611SWW128	22	Agri & domestic use	Unknown	Unknown
2611SWW130	13.4	Unknown	Poor	30.5

Source: (GSI, 2020)

Based on a review of available GSI (2020) mapping no springs were identified within the route corridor but historic OSI (2020) mapping reported a spring within the route corridor. Historic OSI (2020) mapping reported no holy wells within the route corridor.

4.7. Assessment of Hydrogeological Receptors – Lime-Green Route

The lime green route corridor is underlain by a poorly productive bedrock aquifer with sections of locally important bedrock aquifer located to the north central and south of the proposed route.

Groundwater vulnerability beneath the route corridor ranges from a classification of ‘Moderate’ to ‘Rock at or near Surface or Karst’. Although, majority of the route corridor is underlain by ‘High’, ‘Extreme’ and ‘Rock at or near Surface or Karst’. The area of groundwater vulnerability with ‘Rock at or near Surface or Karst’ is 24.9%. It is important to note no karst features are noted within this route corridor. Groundwater will be vulnerable to contamination and potential impact on groundwater flow can be expected in area of deep excavations.

Circa. 5.9Km (66%) of the proposed route is in areas of cutting over areas of ‘Extreme’/ ‘High’/ ‘Rock at or near Surface or Karst’ groundwater vulnerability rating; excavations in such areas have potential to impact local groundwater quality and groundwater levels (and indirectly water quality / levels at any nearby surface water receptors). Regional baseline groundwater quality beneath the scheme was of ‘Good’ WFD status for the 2013 to 2018 period.

Groundwater beneath the route corridor is made up of both Mullinavat (IE_SE_G_155) and Inistioge (IE_SE_G_076) WFD Groundwater bodies.

Groundwater flow paths in the area of the Mullinavat GWB are considered to be short because the bedrock is not considered to constitute a major aquifer. Therefore, it is likely that most groundwater flow circulates in the upper tens of meters, recharging and discharging in local zones. The groundwater flow in this area may be quite fast since the hydraulic gradient, a reflection of the mountainous topography, will be high.

Within the Inistioge body, groundwater will discharge locally to streams and rivers crossing the aquifer and also to small springs and seeps. Owing to the poor productivity of the aquifers in this body it is

unlikely that any major groundwater -surface water interactions occur. Groundwater baseflow to rivers and streams is likely to be relatively low.

Shallow groundwater flow along this route will follow local topography and discharge along the following zones; Oakland River, Luffany River and associated river / stream catchments. Therefore, this route is connected to the above surface water receptors, via. groundwater pathways.

There are no Public Supply Source Protection Area, Group Water Scheme Abstraction Points or Group Scheme Preliminary Source Protection Areas within the route corridor.

A search of the GSI groundwater well database has identified 6no. registered wells within the route corridor with the following uses; unknown us- 2no., refer to in Table 4-11. The number of properties located within the lime green route corridor is 163 and it is assumed that all private dwellings have an onsite private potable well supply.

Table 4-12: Groundwater Wells within Study Area of Lime Green Route Option

GSI Reference	Depth (m)	Reported Use	Yield Class	Reported Yield (m3/day)
2611SWW123	Unknown	Unknown	Unknown	Unknown
2611SWW126	18.3	Unknown	Unknown	Unknown

Source: (GSI, 2020)

Based on a review of available GSI (2020) mapping no springs were identified within the route corridor but historic OSI (2020) mapping reported one spring within the route corridor. Historic OSI (2020) mapping also identified ‘St James’s Holy Well’ approximately 250m south east of the route corridor.

Figure 4-1: Bedrock Aquifer Classification Regional Mapping (Source: GSI, 2020)

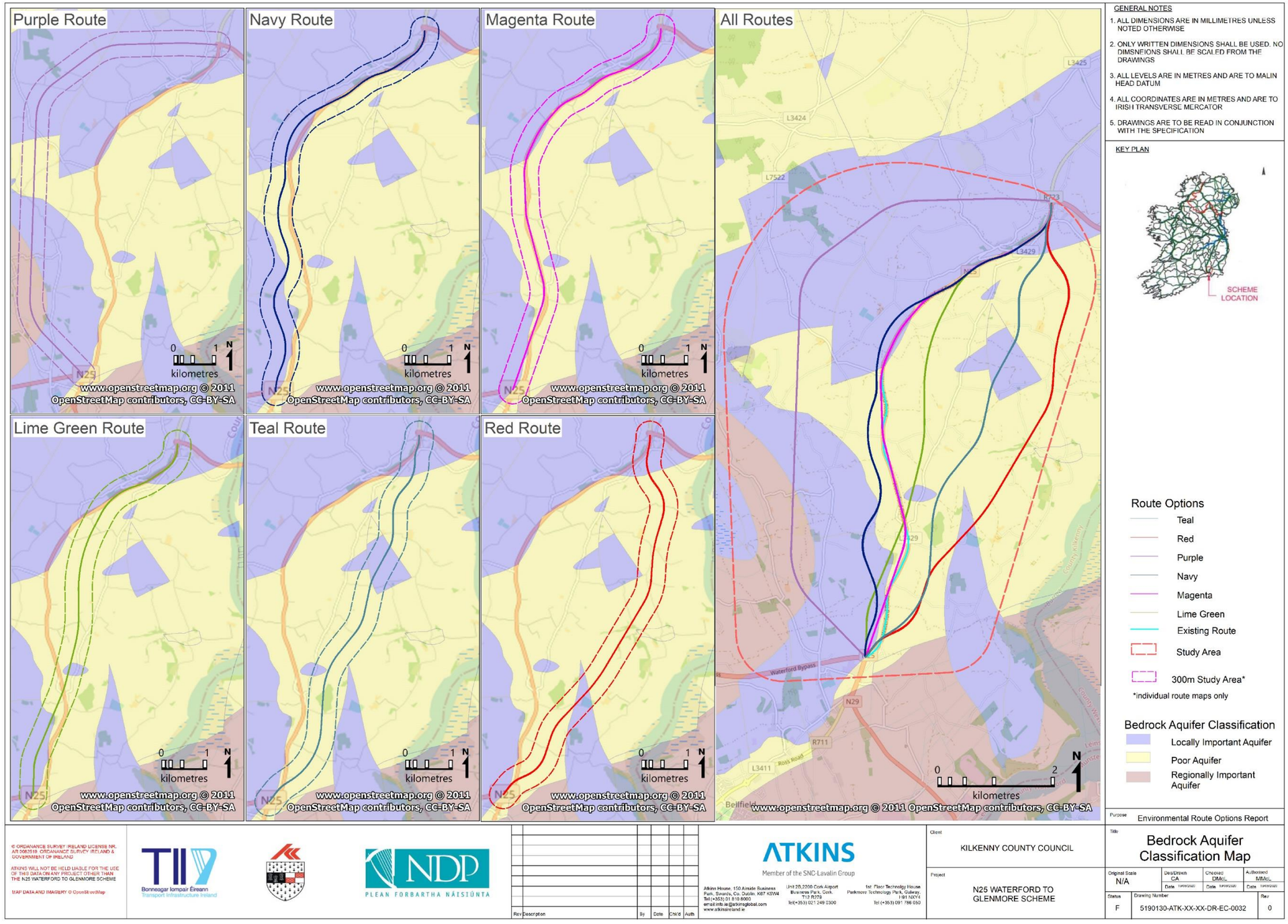


Figure 4-2: Groundwater Vulnerability Rating Regional Mapping (Source: GSI, 2020)

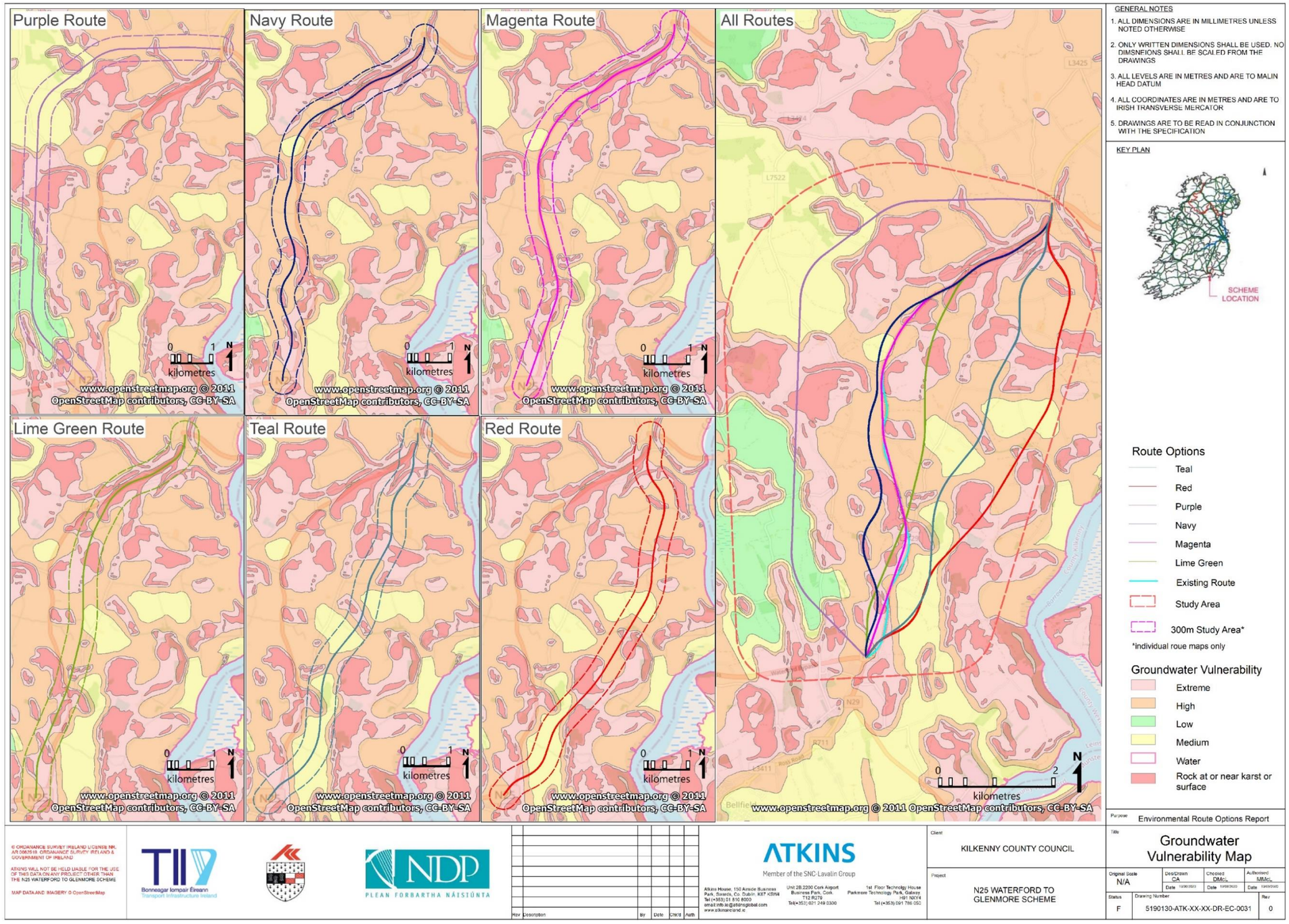


Figure 4-3: Water Framework Directive (WFD) Groundwater Bodies and Groundwater Quality Status Regional Mapping (Source: GSI & EPA 2020)

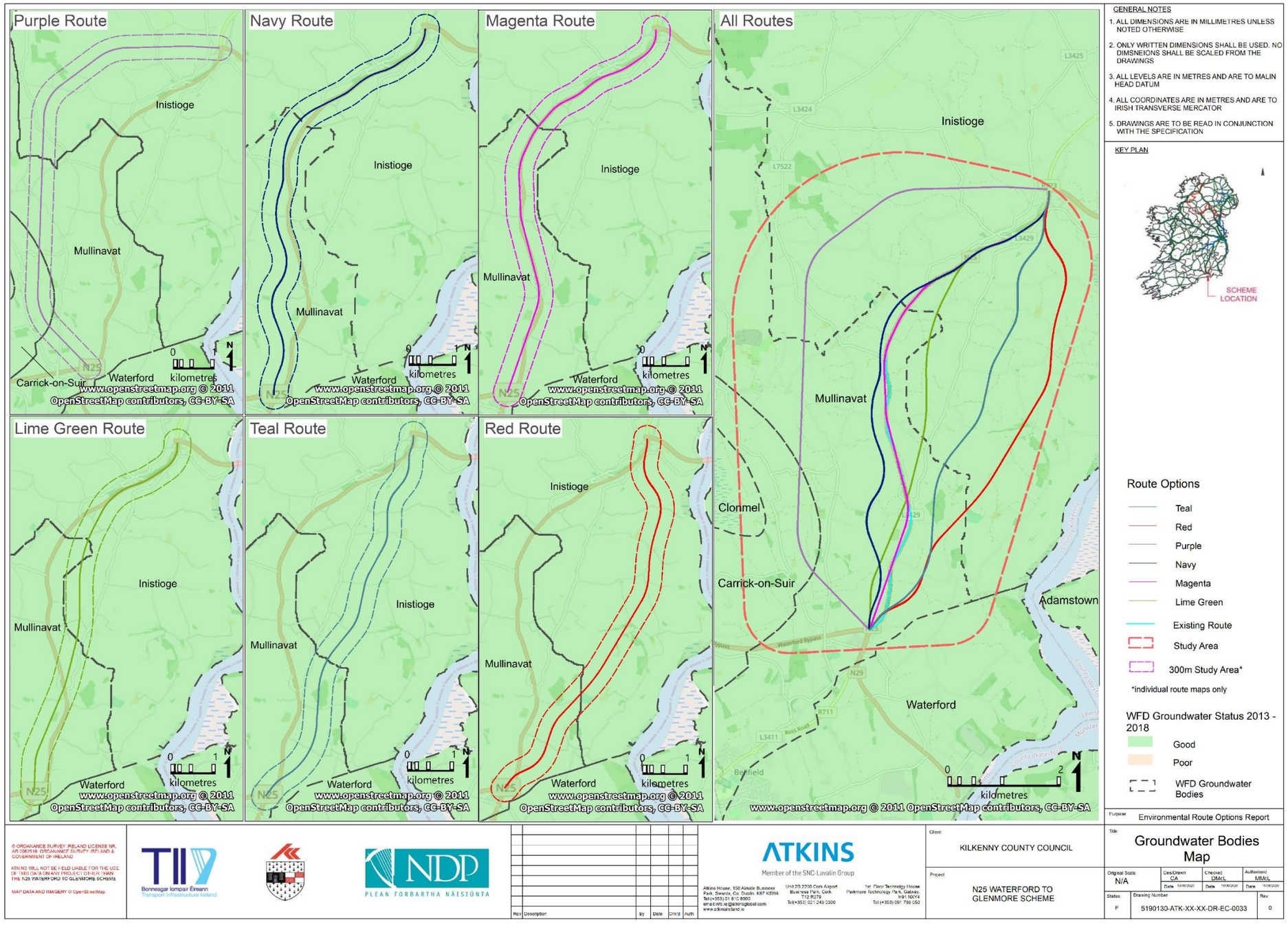
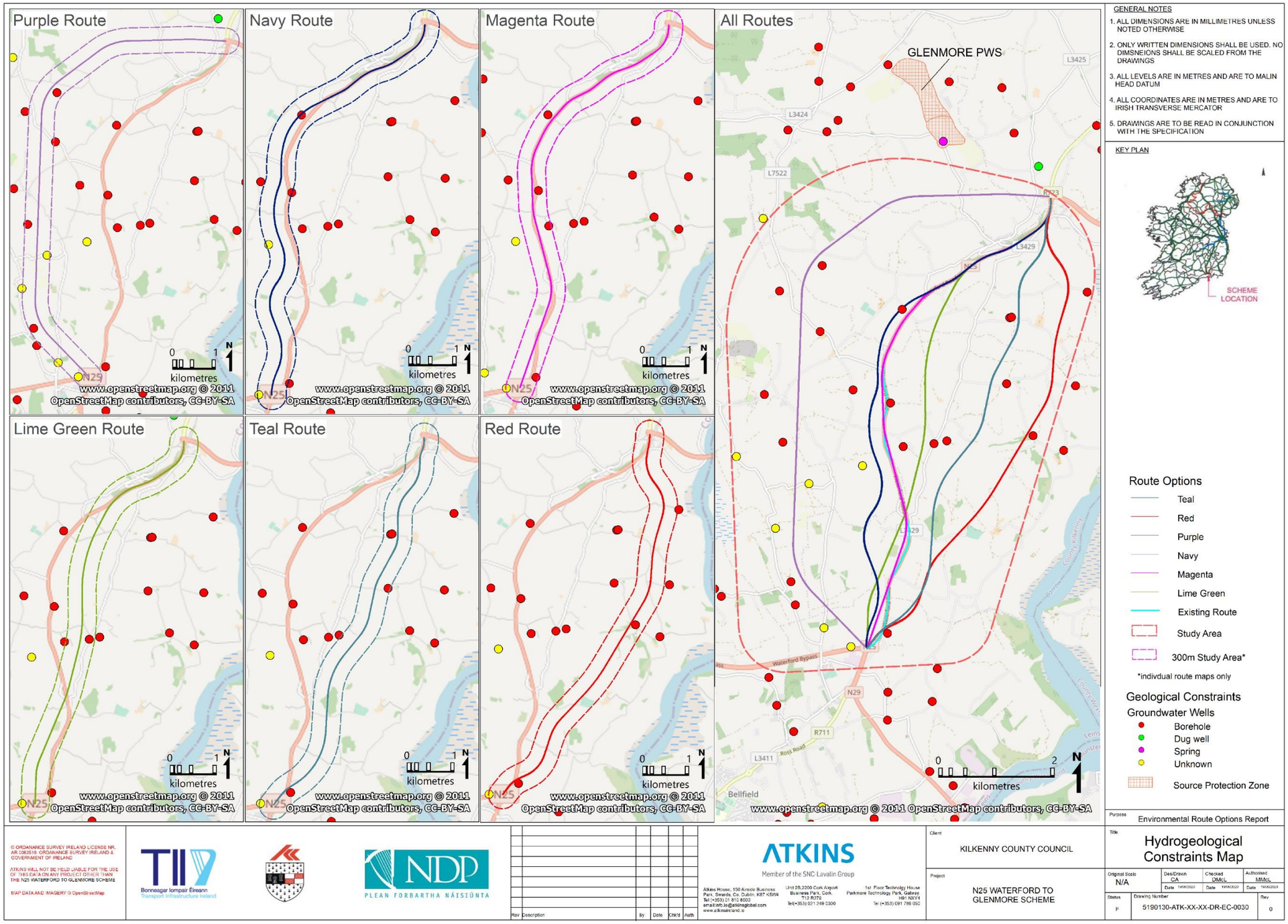


Figure 4-4: Geological Survey of Ireland (GSI) Well Search and Drinking Water Source Protection Areas Regional Mapping (Source: GSI, 2020)



4.8. Impact Assessment

Each route has been assessed in terms of the potential impacts to hydrogeology, for key attributes or receptors, as detailed previously. The results are summarised in Table 4-13 to Table 4-18. Each impact has been rated taking account of the importance of the attribute or receptor, and the nature and duration of potential adverse impacts.

Table 4-13: Hydrogeology Impact Assessment – Navy Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative
Lower River Suir SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative
Locally Important Bedrock Aquifer	Medium	Potential permanent impact to LI aquifer along c. 50% of route (small proportion of attribute).	Minor Negative
Bedrock Aquifer	Medium	c.4.5km (48%) of the total length of cut required along this route will occur in areas of '*Extreme'/'High'/ 'Rock at or near Surface or Karst'* groundwater vulnerability.	Minor Negative
Private Well Supplies (potable water source supplying <50 homes)	Low	Potential permanent impacts to 149no. private well supplies and 3no. GSI wells (unknown use) located along route corridor (to both to groundwater quality and quantity) (on significant proportion of attribute)	Minor Negative

Table 4-14: Hydrogeology Impact Assessment – Teal Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative
Lower River Suir SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative
Locally Important Bedrock Aquifer	Medium	Potential permanent impact to LI aquifer along c. 20% of route (small proportion of attribute).	Minor Negative

Attribute	Attribute Importance	Impact	Level of Impact
Bedrock Aquifer	Medium	c.3.5Km (40%) of the total length of cut required along this route will occur in areas of *Extreme'/'High'/ 'Rock at or near Surface or Karst'* groundwater vulnerability.	Minor Negative
Private Well Supplies (potable water source supplying <50 homes)	Low	Potential permanent impacts to 63no. private well supplies and 5no. GSI wells (unknown and agricultural & domestic use) located along route corridor (to both to groundwater quality and quantity) (on significant proportion of attribute)	Minor Negative

Table 4-15: Hydrogeology Impact Assessment – Purple Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative
Lower River Suir SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative
Locally Important Bedrock Aquifer	Medium	Potential permanent impact to LI aquifer along c. 60% of route (small proportion of attribute).	Minor Negative
Regionally Important Bedrock Aquifer	High	Potential permanent impact to Rf aquifer along c. 20% of route (small proportion of attribute).	Moderate Negative
Bedrock Aquifer	Medium	c.4.3Km (37%) of the total length of cut required along this route will occur in areas of *Extreme'/'High'/ 'Rock at or near Surface or Karst'* groundwater vulnerability.	Minor Negative
Private Well Supplies (potable water source supplying <50 homes)	Low	Potential permanent impacts to 52no. private well supplies and 6no. GSI wells (unknown use) located along route corridor (to both to groundwater quality and quantity) (on significant proportion of attribute)	Minor Negative

Table 4-16: Hydrogeology Impact Assessment – Magenta Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative

Attribute	Attribute Importance	Impact	Level of Impact
Lower River Suir SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative
Locally Important Bedrock Aquifer	Medium	Potential permanent impact to LI aquifer along c. 50% of route (small proportion of attribute).	Minor Negative
Bedrock Aquifer	Medium	c.4.3Km (46%) of the total length of cut required along this route will occur in areas of *Extreme'/'High'/ 'Rock at or near Surface or Karst'* groundwater vulnerability.	Minor Negative
Private Well Supplies (potable water source supplying <50 homes)	Low	Potential permanent impacts to 185no. private well supplies and 5no. GSI wells (unknown and agricultural & domestic use) located along route corridor (to both to groundwater quality and quantity) (on significant proportion of attribute)	Minor Negative

Table 4-17: Hydrogeology Impact Assessment – Red Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative
Lower River Suir SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative
Locally Important Bedrock Aquifer	Medium	Potential permanent impact to LI aquifer along c. 20% of route (small proportion of attribute).	Minor Negative
Bedrock Aquifer	Medium	c.3.2Km (36%) of the total length of cut required along this route will occur in areas of *Extreme'/'High'/ 'Rock at or near Surface or Karst'* groundwater vulnerability.	Minor Negative
Private Well Supplies (potable water source supplying <50 homes)	Low	Potential permanent impacts to 83no. private well supplies and 3no. GSI wells (unknown and agricultural & domestic use) located along route corridor (to both to groundwater quality and quantity) (on significant proportion of attribute)	Minor Negative

Table 4-18: Hydrogeology Impact Assessment – Lime-Green Route

Attribute	Attribute Importance	Impact	Level of Impact
River Barrow and River Nore SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative
Lower River Suir SAC	Extremely High	Potential temporary indirect impact to surface water quality (via groundwater pathways) (small proportion of attribute).	Moderate Negative
Locally Important Bedrock Aquifer	Medium	Potential permanent impact to LI aquifer along c. 30% of route (small proportion of attribute).	Minor Negative
Bedrock Aquifer	Medium	c.5.9 (66%) of the total length of cut required along this route will occur in areas of *Extreme'/'High'/ 'Rock at or near Surface or Karst'* groundwater vulnerability.	Minor Negative
Private Well Supplies (potable water source supplying <50 homes)	Low	Potential permanent impacts to 163no. private well supplies and 2no. GSI wells (unknown use) located along route corridor (to both to groundwater quality and quantity) (on significant proportion of attribute)	Minor Negative

4.10. Comparative Evaluation

All six routes have been ranked in terms of preference based on the results of the hydrogeological impact assessment; namely the potential for surface water quality impacts to the locally important bedrock, and all private well supplies within the study area of each route (for potable, domestic and agricultural use). The results are presented in Table 4-18.

Table 4-19: Summary of Hydrogeology Impacts for Route Options

	Topic: Hydrogeology					
Impact Level	**Navy Route**	**Teal Route**	**Purple Route**	**Magenta Route**	**Red Route**	**Lime-Green Route**
Severe Negative						
Major Negative						
Moderate Negative	2	2	3	2	2	2
Minor Negative	3	3	3	3	3	3
Neutral						
Minor Positive						
Moderate Positive						
Major Positive						
Ranking	2nd	1st	4th	2nd	1st	3rd
Preference Order	**Intermediate**	**Preferred**	**Least Preferred**	**Intermediate**	**Preferred**	**Intermediate**

The Red Route and The Teal Route are identified as '*preferred'* routes. These routes have been ranked 1st in order of preference. While both routes are broadly comparable in terms of impact levels, this ranking is primarily due to the estimated c.3.2km and 3.5km of the total length of cut required in areas of Extreme'/'High'/ 'Rock at or near Surface or Karst' groundwater vulnerability along these routes respectively (albeit any impacts would be on a local scale).

The Navy Route, The Magenta Route and The Lime-Green Route are all identified as '*intermediate'* while The Navy Route and The Magenta Route are ranked 2nd, and the Lime Green Route is ranked 3rd. All 3no. routes are broadly comparable in terms of impact levels, with potential impacts to River Barrow and River Nore SAC and Lower River Suir SAC arising from groundwater pathways. Therefore, this ranking is primarily due to the estimated c.4.3km, 4.5km and 5.9km of the total length of cut required in areas of Extreme'/'High'/ 'Rock at or near Surface or Karst' groundwater vulnerability along these routes respectively (albeit any impacts would be on a local scale).

The remaining route option (The Purple Route) is identified as the '*least preferred'* route with respect to hydrogeology. This has been ranked 4th, based on the fact that this could potentially impact the River Barrow and River Nore SAC and Lower River Suir SAC via groundwater pathways (albeit this is the

case for all route options) along with potential impact to the groundwater quality of Regionally Important Bedrock Aquifer. In addition, this poses a potential risk of localised impacts to existing groundwater quality within areas of Regionally Important Bedrock Aquifer along sections of cut. Groundwater would be shallow in these areas and therefore vulnerable to contamination.

No significant adverse (i.e. major negative), or profound adverse (i.e. severe negative) hydrogeological impacts have been identified associated with any of the 6no. routes assessed.

It is noted that all properties within the relevant study area of each route corridor (300m from the centre line of each route) (i.e. overall width of 600m) are assumed to be on private well supply. A door to door well survey will be required once the emerging preferred route has been identified.

5. Limitations in Methodology / Data Gaps

It should be noted that due to lack of access to privately owned lands, the site survey was limited to the public road network. A site-specific flood risk assessment will be required at Phase 4 (Statutory Processes), once the emerging preferred route has been identified.

For the purposes of this assessment it has been assumed that all private dwellings within the study area of each route option are on private potable supply. This would need to be verified through the completion of a door to door well survey (along with an inventory of septic tanks) once the emerging preferred route has been identified. In addition, a detailed hydrological and hydrogeological impact assessment may be required to further consider potential impacts to surface water and groundwater quality and resources, once the emerging preferred route has been identified. Potential impacts on identified key receptors (bedrock aquifer, gravel aquifer, any private/ agricultural / industrial / commercial wells in the vicinity, GWDTEs, rivers, streams, and lakes) may warrant further evaluation as part of any future assessment.

It should also be noted that this appraisal does not form part of an Environmental Impact Assessment Report (EIAR); a detailed impact assessment of each route option has not been undertaken at this preliminary juncture.

This appraisal has been prepared by an experienced hydrogeologist and has been carried out in accordance with, and to the required level of detail set out in, the relevant NRA (2008) guidelines. Cognisance, where relevant, has also been taken of the latest EPA (2017) Draft guidelines regarding environmental assessment, and IGI (2013) guidelines regarding soils, geological and hydrogeological assessment. This report is therefore suitably robust, and the above limitations do not in any way affect the findings or conclusions of this Stage 2 Phase 2 Hydrology and Hydrogeology Appraisal.

6. Conclusions

A Hydrology and Hydrogeology Appraisal of six route options has been undertaken by Atkins, as part of the overall Route Selection assessment process for the proposed N25 Waterford to Glenmore Scheme. The key findings of this assessment, which has been undertaken in accordance with relevant best practice guidance (NRA, 2009; IGI, 2013; EPA, 2017) are outlined below.

No significant adverse (i.e. major negative), or profound adverse (i.e. severe negative) hydrological or hydrogeological impacts have been identified associated with any of the 6no. routes assessed.

6.1. Hydrology Appraisal – Key Findings

- Each of the six-route options traverse two key river catchments the Nore River Catchment (Water Framework Directive ((WFD) EPA Code: 15)), in the northern portion, and the Suir River Catchment ((WFD EPA Code: 16)), in the southern portion of the general scheme. There are two key rivers within the vicinity of the scheme with few tributaries; Oakland River and Luffany River. Oakland rivers flow in a general easterly direction and ultimately discharge to River Barrow and Nore Special Area of Conservation (SAC) and River Barrow Estuary proposed Natural Heritage Area (pNHA). River flow rates are not available since no active monitoring stations are in the vicinity. There are no significant reported surface water abstractions along in the vicinity of the scheme (GSI, 2020). There is 1no. Section 4 discharge licence within the vicinity of the scheme; however, this is unlikely to have any impact on receiving surface water quality.

- Regional surface water quality of The Oaklands River to the north of the scheme which is intersected by all 6no. route corridor and has a River Waterbody WFD status 2013 -2018, with no assigned status. The Oaklands is hydrologically connected to The River Barrow (east of the route corridor) which is noted as a Transitional Waterbody named New Ross Port and has been assigned 'Moderate' WFD status for the 2013- 2018 period. The Luffany River to the south of the scheme is crossed by 5no. route corridor (Navy Route, Teal Route, Magenta Route, Red Route and Lime Green Route) and has no assigned WFD status as presented in Figure 3-3 (WFD, 2020). The Luffany River is hydrologically connected to The River Suir (to the south of the scheme) which is also noted to be a Transitional Waterbody named Lower Suir Estuary (Little Island Cheekpoint) and which has been assigned 'Good' WFD status for the 2013- 2018 period (WFD, 2020).

- All 6no. route options are hydrologically connected to River Barrow and River Nore Special Area of Conservation (SAC) (Site Code: 002162) and Barrow River Estuary proposed Natural Heritage Area (pNHA) (Site Code: 000698). 5no. routes corridor (Navy Route, Teal Route, Magenta Route, Red Route and Lime Green Route) are also directly hydrologically connected to the Lower River Suir Special Area of Conservation (SAC) (Site Code: 002137), with the) Purple Route indirectly connected. As such these sites and the streams and rivers which connect all 6no. route options have been considered as part of this appraisal in terms of potential surface water quality impacts.

- No significant adverse (i.e. major negative), or profound adverse (i.e. severe negative) hydrological impacts have been identified associated with any of the 6no. routes assessed.

- ***The Purple Route is identified as 'preferred' route*** *and has been ranked 1st in order of preference.* While all six routes are broadly comparable in terms of impact levels, the Purple Route does not directly impact the surface water quality of Lower River Suir SAC but could have an indirect impact. The Purple Route could potentially have a temporary direct impact to surface water quality at River Barrow and River Nore SAC (albeit any impacts would be minor).

- ***The Navy Route, Lime-Green Route, Teal Route, Magenta Route and Red Route are identified as 'intermediate'*** *and ranked 2nd, 3rd, 4th and 5th in order of preference*. This is primarily based on the fact that all 5no. routes could potentially impact surface water quality at River Barrow and River Nore SAC, Lower River Suir SAC, Barrow River Estuary pNHA, Waterford Harbour Shellfish Area.

- Once the emerging preferred route has been identified, a site-specific flood risk assessment will be required at Phase 4 (Statutory Processes), and additional baseline surface water monitoring (surface water quality and surface water level monitoring) should be undertaken as required.

6.2. Hydrogeology Appraisal – Key Findings

- All 6no. route options are underlain by 2no. aquifer types classified as 'Pl', a Poor Aquifer which is Generally Unproductive except for local zones and 'Ll', a Locally Important Aquifer which is Moderately Productive only in Local Zones (GSI, 2020). The bedrock aquifer beneath majority of 5no. route options namely (Navy, Teal, Magenta, Red and Lime Green) is classified as 'Pl', while the majority of the Purple route is classified as 'Ll'. The south-western portion of the purple Route option is underlain by a Regionally Important Aquifer, classified as 'Rf', a Regionally Important Aquifer with Fissured Bedrock (GSI, 2020). Refer to Figure 4-1. Groundwater vulnerability rating beneath the general vicinity of the scheme, ranges from 'Low' to 'Rock at or near Surface or Karst'. The vulnerability rating beneath each route is presented in Figure 4-2. Any areas identified as having a 'High', 'Extreme' or 'Rock at or near Surface or Karst' rating are likely to be underlain by shallow bedrock (within approximately 3m to 10m), and accordingly would be vulnerable to potential contamination. Therefore, inferred regional groundwater flow is expected to follow topography in a general easterly direction towards River Barrow and River Nore SAC in the northern part of the scheme and in southerly direction towards Lower River Suir SAC in the southern part of the scheme. Shallow groundwater flow beneath each route option will follow local topography, and will typically discharge to the closest downgradient stream, river or lake.

- Between 3.2km (Red Route) and 5.9km (Lime-Green Route) of proposed cut for the scheme will occur in areas with an *'High'/ Extreme'/ 'Rock at or near Surface or Karst'* groundwater vulnerability rating; excavations in such areas have potential to impact local groundwater quality and groundwater levels (and indirectly water quality / levels at any nearby surface water receptors). Regional baseline groundwater quality beneath the scheme was of 'Good' WFD status for the 2013 to 2018 period.

- There are no reported Public Supply Source Protection Areas, Group Water Schemes or commercial / industrial groundwater abstractions within the study area of any of the six route options. There are 17no. registered wells within the study area of all 6no. routes (used for domestic use / agricultural & domestic use, and unknown / other use). The number of properties located within the study area of all 6no. routes ranges from 52no. (Purple Route Option) to 185no. (Magenta Route Option, and it is assumed that all private dwellings have an onsite private potable well supply.

- There are numerous ecologically sensitive areas within vicinity of the scheme; however, there are no identified GWDTEs within the study area of any route options.

- No significant adverse (i.e. major negative), or profound adverse (i.e. severe negative) hydrogeological impacts have been identified associated with any of the 6no. routes assessed.

- **The Red Route and The Teal Route are identified as '*preferred*' routes with least potential impacts with respect to hydrogeology (i.e. groundwater).** These routes have been ranked 1st in order of preference. While both routes are broadly comparable in terms of impact levels, this ranking is primarily due to the estimated c.3.2km and 3.5km of the total length of cut required in areas of Extreme'/'High'/ 'Rock at or near Surface or Karst' groundwater vulnerability along these routes respectively (albeit any impacts would be on a local scale).

- **The Navy Route, The Magenta Route and The Lime-Green Route are all identified as 'intermediate' routes with respect to hydrogeology** while The Navy Route and The Magenta Route are ranked 2nd , The Lime green Route is ranked 3rd . All 3no. routes are broadly comparable in terms of impact levels, with potential impacts to River Barrow and River Nore SAC and Lower River Suir SAC arising from groundwater pathways. Therefore, this ranking is primarily due to the estimated c.4.3km, 4.5km and 5.9km of the total length of cut required in areas of Extreme'/'High'/ 'Rock at or near Surface or Karst' groundwater vulnerability along these routes respectively (albeit any impacts would be on a local scale).

- **The remaining route option (The Purple Route) is identified as 'least preferred' route with respect to hydrogeology**. This has been ranked 4th , based on the fact that this could potentially impact the River Barrow and River Nore SAC and Lower River Suir SAC via groundwater pathways (as with all route optios), along with potential impact to the groundwater quality of Regionally Important Bedrock Aquifer. In addition, this poses a potential risk of localised impacts to existing groundwater quality of Regionally Important Bedrock Aquifer along sections of cut. An estimated c.4.3km of the total length of cut required in areas of Extreme'/'High'/ 'Rock at or near Surface or Karst' groundwater vulnerability along this route.

- Once the emerging preferred route has been identified, a door to door well survey (along with an inventory of septic tanks) should be undertaken. Based on a review of measured surface water levels, groundwater strike levels, and regional and site specific geological records, surface water and groundwater regimes in the vicinity of the scheme are closely linked. Therefore, a detailed hydrological and hydrogeological impact assessment may be required to further consider potential impacts to surface water and groundwater quality and resources, once the emerging preferred route has been identified. Potential impacts on identified key receptors (bedrock aquifer, gravel aquifer, any private/ agricultural / industrial / commercial wells in the vicinity, GWDTEs, rivers, streams, and lakes) may warrant further evaluation as part of any future assessment.

This report has been prepared by an experienced hydrogeologist and has been carried out based on a desk-based review of currently available information (including the results of the preliminary ground investigation), and windshield survey, as per the relevant guidelines (NRA, 2009; IGI, 2013; EPA, 2017). The findings of this report are based on a general overview of potential risks and impacts with respect to hydrology and hydrogeology for each route option for the purposes of the route selection process. As such this report does not represent a detailed impact assessment of any one particular route. Notwithstanding these points, this report is suitably robust, and any limitations do not in any way affect the findings or conclusions of this Stage 2 Phase 2 Hydrology and Hydrogeology Appraisal.

7. References

Department of Environment and Local Government, Environmental Protection Agency, and Geological Survey of Ireland (DoELG, EPA, GSI) 1999. '*Groundwater Protection Schemes'*. GSI, Ireland.

Environmental Protection Agency (EPA), 2017. '*Guidelines on information to be contained in Environmental Impact Assessment Report*' EPA, Ireland.

Environmental Protection Agency (EPA), 2020. *EPA* HydroNet Data. Available at http://www.epa.ie/hydronet/#Flow [Accessed 23 June 2020].

Environmental Protection Agency (EPA). 2020. EPA Envision Mapping. [ONLINE] Available at: http://gis.epa.ie/Envision [Accessed 23 June 2020].

Environmental Protection Agency (EPA). 2018. '*Nore Catchment Assessment 2010 – 2015 – December 2018*' EPA, Ireland

Geological Survey of Ireland (GSI), 2002. *'Carrick-on-Suir GWB: Summary of Initial Characterisation – 2002'* GSI, Ireland.

Geological Survey of Ireland (GSI), 2002. *'Inistioge GWB: Summary of Initial Characterisation –2002'* GSI, Ireland.

Geological Survey of Ireland (GSI), 2002. *'Mullinavat GWB: Summary of Initial Characterisation –2002'* GSI, Ireland.

Geological Survey of Ireland (GSI). 2020. GSI Datasets Public Viewer and Groundwater Web-mapping. [ONLINE] Available at: http://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228 [Accessed 23 June 2020]

Glover Site Investigation Limited (2012). Preliminary Ground Investigation *N25 Waterford Glenmore, Co. Kilkenny.*

Institute of Geologists of Ireland (IGI), 2013. '*Guidelines for the Preparation of Soils, Geology and* Hydrogeology Chapters of Environmental Impact Statements' IGI, Ireland.

National Parks and Wildlife Service (NPWS). 2020. NPWS Web Viewer. [ONLINE] Available at: http://webgis.npws.ie/npwsviewer/ [Accessed 23 June 2020].

National Roads Authority (NRA), 2008. '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'* NRA, Ireland

Office of Public Works (OPW), 2020. 'Preliminary Flood Risk Assessment (PFRA) Maps. Available at http://www.floodinfo.ie [Accessed 24 June 2020].

Office of Public Works (OPW), 2020. Flood Hazard Mapping. Available at http://www.floodmaps.ie/View/Default.aspx [Accessed 23 June 2020].

Ordnance Survey of Ireland (OSI). 2020. OSI Geo-Hive Map Viewer. [ONLINE] Available at: http://map.geohive.ie/mapviewer.html [Accessed 24 June 2020].

Transport Infrastructure Ireland (TII), 2016. *'PE-PAG-02031 Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis' TII, Ireland.*

Water Framework Directive (WFD) Ireland, 2020. WFD Web-mapping, Available at; http://watermaps.wfdireland.ie/NsShare_Web/Viewer.aspx?Site=NsShare&ReloadKey=True [Accessed 25 June 2020].

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