Appendix 6.1 July 2008 Route Corridor Assessment

APPENDIX 6.1 – JULY 2008 ROUTE CORRIDOR ASSESSMENT

6.1 Introduction

The initial process of selecting feasible route corridor options is detailed in Chapter 5 (Volume 2A). This process culminated in the selection of the six feasible route corridors which were then subjected to detailed environmental analysis by the Project Team. Meanwhile these route corridor options were presented at Public Consultation No. 1. Figures 6.1 through 6.7 (Volume 2B) show the six corridors presented in July 2008 for public consultation and review, referred to as Route Corridors July 2008. The environmental analysis of the Route Corridors July 2008 is detailed in this Appendix. The Route Corridors July 2008 are also shown on Figures 11.1-11.22 (Landscape & Visual constraints) and Figures 14.1-14.22 (Ecology and Cultural Heritage constraints). These figures are presented in Appendix 6.2 (Volume 2C). The Route Corridors July 2008 were further refined following information received during the public consultation and from landowner meetings and following further analysis by the design team. The refined route corridors were then defined as Route Corridors August 2008. The analysis of these route corridors are detailed in Chapters 7-19 of Volume 2A.

6.2 Summary of Route Corridors

6.2.1 Red Route Corridor Option: July 2008

The Red Option commences at point A at the proposed North Ring Road interchange and proceeds along the existing N20 to point B. The Red option proceeds north to point F and crosses the River Blackwater to the west of Mallow. It continues north passing to the west of Buttevant, Charleville and Croom terminating at point N at Patrickswell.

6.2.2 Blue Route Corridor Option: July 2008

The Blue Option commences at point A and follows the Red option as far as point B. It then proceeds north-west to point D and crosses the River Blackwater to the west of Mallow. It continues northeast, passing west of Buttevant to point J and then follows the yellow option passing east of Charleville as far as point M. Passing west of Croom, the option then continues north to point N where it terminates at Patrickswell.

6.2.3 Purple Route Corridor Option: July 2008

The Purple Option commences at point A and follows the Blue option as far as point D. It then proceeds north to join the Red option at point F. The Purple option follows the Red option from point F as far as point M passing west of Buttevant, Charleville and Croom. It then proceeds north to point N where it terminates at Patrickswell.

6.2.4 Yellow Route Corridor Option: July 2008

The Yellow Option commences at point A and follows the Red option to point B. It then proceeds north to point G, crossing the River Blackwater to the east of Mallow. It continues north passing east of Buttevant, Charleville and west of Croom to point N where it terminates at Patrickswell.

6.2.5 Green Route Corridor Option: July 2008

The Green Option commences at point A and follows the Red option to point C. It then proceeds north to point G, crossing the River Blackwater to the east of Mallow. The Green option follows the yellow option passing east of Buttevant and Charleville and west of Croom before terminating at point N at Patrickswell.

6.2.6 Brown Route Corridor Option: July 2008

The Brown Option commences at point A and follows the Red option to point E. It then proceeds northeast to point G, crossing the River Blackwater to the east of Mallow. The Brown option follows the yellow option to point J passing east of Buttevant. The option then proceeds northwest to point K where it then follows the Red option passing west of Charleville and Croom and terminating at point N at Patrickswell.

6.3 Socio-Economic Assessment

6.3.1 Introduction

This section details the socio-economic assessment of the six Route Corridors July 2008. Each route corridor was assessed to determine which corridor would have the least impact on the socio-economic environment. The corridors were assessed in terms of journey characteristics, severance impacts, amenity impacts and economic impacts. Junction design, link roads, overpass/underpass locations, and potential road closures etc were not determined at this stage and, therefore, only a broad assessment could be made. A summary of the results of the assessment which determined preferences is outlined in Table 6.1 below.

6.3.2 Red Route Corridor Option – Socio-Economic Analysis

By following the line of the existing N20 as far Mourneabbey, the Red Route has the relative merit of avoiding the new severance and amenity issues that would potentially be associated with an entirely new route. There are a number of minor roads which currently have access to and across the existing N20 at the southern end of the study area, whereas future access to the proposed M20 for all route corridors would only be available via junctions. Access across the M20 for all route corridors could be provided via overpasses or underpasses. Any severance issues for minor roads would need to be considered.

For Mallow, one or more junctions could potentially be provided to the south and/or west of the town. The siting of junctions for Mallow will be important in determining how access north, south and west of Mallow is provided for and also in determining journey lengths to Cork from Mallow.

The Red Option presents some potential community severance issues for Firville and Scarteen north of the River Blackwater, as well as for communities on some minor roads to the north. There is potential for amenity impacts in relation to the Duhallow Hunt and point-to-point horse races, for example around Drommahane.

6.3.3 Blue Route Corridor Option – Socio-Economic Analysis

The Blue Option takes a more westerly course in comparison with the Red Option, but in doing so, provides the worst performance in terms of regional journey time. Connection to the Red alternative at Node H north of Buttevant would provide a more direct alternative for regional journeys, at least to a slight degree. Severance issues for minor roads would need to be considered.

The ultimate siting of a junction for Mallow will be important in determining how access to the town is provided for and in determining journey lengths to Cork from Mallow. The more likely location four kilometres west of Mallow would reduce the incentive to switch from the existing N20 for some journeys to Cork from parts of Mallow given that this road is already of good standard to the south.

6.3.4 Purple Route Corridor Option – Socio-Economic Analysis

There were no distinct journey time impacts for the specific part of the Purple Route. Again, the ultimate siting of a junction for Mallow will be important in determining how access is to be provided. As with the Blue alternative, the Purple Option appears to require a junction to the west, which, though closer to the town, would have implications for the eastern half of Mallow.

6.3.5 Yellow Route Corridor Option – Socio-Economic Analysis

The Yellow Option takes a north-easterly course north of Glencam. Severance issues for minor roads would need to be considered. In comparison with the previous alternatives, the option would appear to require a junction to the east of Mallow. This would benefit some businesses and residential estates in the east of the town, but to the disadvantage of businesses and people that could alternatively be served by a junction elsewhere. In addition, a junction to the east of Mallow would require improvements to existing urban roads and/or an advancing the planned link road north of the town (both factors are assumed in the assessment in Table 6.1 below).

Further north, the Yellow Option presents a potential negative amenity impact on the Ballyhoura Mountains and use of the Ballyhoura Way.

6.3.6 Green Route Corridor Option – Socio-Economic Analysis

Like the Red alternative, the Green Option presents potential benefits, but also other potentially negative considerations by staying on-line with the existing N20 as far as Mourneabbey. From this point, the route corridor takes a north-easterly direction with potential severance implications for the community of Clogheen and Ballynamona, while also presenting possible amenity impacts to the Avondhu Way below Knockaroura Hill (although partly shielded by conifer plantations) and passing close to Rahan National School. Junction options are possible to the south and east of Mallow.

6.3.7 Brown Route Corridor Option – Socio-Economic Analysis

This option is similar to the Green route south of New Twopothouse but is disadvantaged from the perspective of journey time due to the longer route taken around Mallow.

Table 6.1 Route Corridors July 2008 – Socio-Economic Preferences

Route	Preference
Red	Acceptable: Issues in relation to access to the new road south of Mourneabbey.
Blue	Acceptable: No implications for local journeys south of Mourneabbey, but distant from Mallow.
Purple	Least acceptable: Critically affected by lack of obvious access opportunities for Mallow.
Yellow	Preferred: Access to Mallow from the east. Some negative amenity impacts.
Green	Most preferred: Benefits from potential for access to Mallow from south or east of the town but with implications for local access south of Mourneabbey.
Brown	Acceptable: Potential for access south and east of Mallow, but at expense of journey time. No apparent benefits to northern branch from Node J without information on access to settlements.

6.4 Agronomy

6.4.1 Introduction

This section details the agronomy assessment of the six Route Corridors July 2008. The information sources used for the assessment as the same as those used for the Route Corridors August 2008 assessment and are detailed in Chapter 10 Agronomy of Volume 2A.

This section analyses and compares the Route corridors July 2008 under the following headings;

- Land take
- Impact on farm yards
- Impact on farm enterprise types
- Length on line

The lengths of corridors in Table 6.2 refer to the centreline of the corridor. The corridors with the lowest ranking score are more preferable from an agricultural point of view than corridors with high ranking scores. The ranking scores may not reflect that there are only small differences in measurements and should therefore be interpreted with caution. The highest ranking score may not always result in the least preferred corridor. In this assessment a high weighting is given to length on line and also the windshield assessment is taken into account.

Table 6.2 Comparison of Route Corridor Impacts - Agronomy

	Brown	Blue	Red	Yellow	Green	Purple
Estimated land take (100 meters wide) (i)	820	835	810	818	811	798
Estimated land take of Forestry / Scrub (ii)	40	52	45	60	52	48
Estimated net land take (100 meters wide) (i) – (ii)	780	783	765	758	759	750
Ranking of net estimated land take	*5*	*6*	*4*	*2*	*3*	*1*
No of farm yards within 50 m of center of corridor	6	8	5	7	6	4
No of farm yards within 100 m of center of corridor	39	32	37	32	32	36
Ranking of total number of farm yards within 100m	*6*	*1*	*5*	*1*	*1*	*4*
Length of corridor through District Electoral Divisions (DEDs) where the number of dairy farmers is above the county average (km) [1]	46.8	53.2	52.9	52.25	47.1	52.7
Length of corridor through DEDs where the area of tillage cropping is above the county average (km) [1]	17.5	18.4	17.9	22.3	17.9	18.7
Relative impact on higher sensitivity farms[2] (length - km)	26.4	30.8	30	29	28.6	30
Ranking of length through higher sensitivity farms	*1*	*6*	*4*	*3*	*2*	*4*
Relative impact on tillage farms (length - km)	3.9	2.7	3.9	3.8	2.9	3.8
Ranking of length through tillage farms	*1*	*6*	*1*	*3*	*5*	*3*
Estimated length on line (km)	21.7	14.2	21.7	15.5	21.4	14.2
Ranking of length of corridor which is on line	*1*	*5*	*1*	*4*	*3*	*5*
Total ranking (indicative)	**14**	**24**	**15**	**13**	**14**	**17**

Note1 The information data for DEDs is included in Table 10.1 for information purposes only and the ranking scores for this data is not included in the total.

Note2 While nearly all farms are sensitive to the impacts from new road construction some enterprises are more sensitive than others. The impact on dairy and equine farms from severance and land take is generally higher than the impact on beef and tillage enterprises. This is because on these farms livestock have to be moved on a daily basis and the financial output per hectare is generally higher. Therefore farms with dairy and equine enterprises have been categorized as higher sensitivity farms.

6.4.2 Discussion

Land take

The land take of a route within the corridor is estimated to be 100 meters wide on average along the length of the corridor. The blue corridor has the highest indicative land take and the purple corridor has the lowest.

Impact on farm yards

The brown corridor has the highest potential impact on farm yards within 100 meters (at each side of centerline) and the blue, yellow and green corridors have the lowest. The potential impact on farm yards within 50 meters of the centre line of the corridor represents the highest risk to farm yards. Within this category the impact from corridors is very similar. The blue corridor has the highest potential impact on farm yards within 50 meters of the centre line of the corridor and the purple corridor has the lowest.

Impact on sensitive farm enterprises

It is preferable for the proposed corridors to pass through tillage and beef farms rather than dairy and equine farms. The DED data regarding number of dairy farms indicates that the Red and Blue corridors should have the highest potential to impact dairy farms and the brown and yellow should have the lowest potential impact. The DED data indicates that yellow and purple and blue should have the highest potential to impact tillage farms (and therefore be preferred under this criteria) and the red, green and brown corridors should have the lowest potential to impact tillage farms (and therefore least preferred under this criteria). When the length of each corridor through high sensitivity and tillage farms is measured the following results are found;

- The blue corridor has the highest impact on high sensitivity farms.
- The brown corridor has the lowest impact on high sensitivity farms.
- The yellow, red, green and purple corridors have similar impacts on high sensitivity farms.
- Brown, red, yellow and purple travel through more tillage farms. Blue and green travel through less tillage farms.

Length online

If the proposed M20 is constructed on the imprint of or directly adjoining an existing railway line or road this will dramatically reduce the impact of land take, severance and disturbance. Where the proposed M20 is built directly on the imprint of an existing road an alternative road may have to be built adjoining the M20 requiring a similar amount of land take to a green field site. Even in this situation it is preferable to run on line because the severance and disturbance impacts will be lower compared to a green field site. Therefore this is an important criteria in this route selection assessment. Brown and red have the longest lengths on line followed by yellow and green. Blue and purple have the shortest lengths on line.

6.4.3 Conclusions

The ranking scores are indicative and should be interpreted with caution. It should be noted that some of the differences in the data in Table 6.2 are very small and this must be taken into account. The following are the conclusions of the assessment;

- The blue corridor has the highest impact ranking score and is the least preferred.
- The green corridor has the lowest impact ranking score and is the most preferred.
- The total ranking scores of the brown, red, yellow and purple corridors are similar. However because the ranking scores of the purple and yellow corridors are poor in the on line criteria these corridors are less preferable than the brown and red.

Table 6.3 Route Corridors July 2008 – Agronomy Preferences

Route	Preference
Red[1]	Preferred
Blue	Least Acceptable
Purple	Acceptable
Yellow	Preferred
Green	Most Preferred
Brown[1]	Preferred

Note [1] The red and brown corridors are given a similar preference to yellow because they have longer lengths on line

6.5 Landscape and Visual

6.5.1 Introduction

This section details the landscape and visual assessment of the six Route Corridors July 2008.

Landscape Constraints

Landscape constraints were identified where there may be a potential for a significant impact. The landscape constraints identified in the Constraints Report were further grouped into three broad categories which include;

- Historic Estates,
- Landscape Planning Constraints,
- Natural Features.

Not all landscape constraints are of equal sensitivity. Therefore, during the initial stages of this assessment, while assessing the Route Corridors July 2008, they were simply sub-divided into 'key' constraints and 'secondary' landscape constraints. 'Key' landscape constraints are of higher sensitivity.

Historic Estates are those gardens which are identified within the National Inventory of Architectural Heritage (NIAH). The original estate boundary has been used as the constraint outline, however many of these estates have been split up over time or are no longer physically evident on the ground. Those with an Index Rating of 2 or higher were identified as a key landscape constraint; those which are of 0-1 rating were identified as a secondary constraint.

Landscape Planning Constraints are those which have been identified in the Cork County Development Plan, 2003 (CCDP) or the Limerick County Development Plan 2005 (LCDP) and the equivalent draft documents. They include Scenic Landscapes, Scenic Routes, and Views and Prospects. These were all identified as key landscape constraints. Waymarked Paths are long distance walking routes these were also included in this category, however as a secondary constraint.

Natural Features are mainly comprised of mature vegetation, valley systems, wetland and rivers. These were predominantly assessed as secondary landscape constraints. However, there were a few occasions where the quality of the vegetation or amenity value of an area increased the sensitivity to a key landscape constraint.

There were also a few miscellaneous categories which include large distinct land uses such as Golf Courses and Quarries. These were identified as key landscape constraints.

Visual Constraints

Visual Constraints were picked up where there were two or more properties within the road corridor at any particular point. Generally this was areas where 'settlement' was identified in the constraints figures. This was to identify roughly where there is the potential for significant visual (and sometimes direct physical) impacts rather than exact locations and numbers of houses affected at that stage. There were instances where only one property would receive significant impacts, however these had not been picked up in the numbers included in the initial matrix tables. The visual constraints were all considered as the same sensitivity.

6.5.2 Methodology

The assessment of the Route Corridors July 2008 involved a quantitative assessment. The routes were split into shorter sections and were separated by 'nodes'. The numbers of constraints along the alternative route corridors were displayed in a matrix table, and compared to achieve an initial objective preference. Only the closest constraints within the route corridor (150m either side of the road) were taken into consideration, as these were most likely to be significant. Due to the nature of the landscape and visual assessment, a purely quantitative assessment can be misleading, therefore a level of qualitative assessment and professional judgment was introduced to reach the conclusions of the preferred route corridors. The Route Corridors July 2008 are also shown on Figures 11.1-11.22 (Landscape & Visual constraints). These figures are presented in Appendix 6.2 (Volume 2C).

6.5.3 Initial Assessment

Due to their large and wide ranging nature, the majority of the landscape and visual constraints extended over the entire 0-50m, 50-100m and 100-150m buffer zones on either side of the route corridor. These constraints were counted individually within each band. Therefore the number of total constraints in the initial matrix tables appears very high. Dividing the total number by 6 gives a better indication of the true number of constraints along any route. Refer to the following Tables 6.4 and 6.5. Refer to Figures 11.1-11.22 (Landscape & Visual constraints) which show the landscape and visual constraints with the Route Corridors July 2008.

For the purpose of this stage of the quantitative assessment, switching between the colored routes was not permitted for simplicity; however following discussions on emerging preferences, different 'switches' were introduced to allow more flexibility to form the basis of the Route Corridors August 2008. This explains some differences between the preferred results at each stage.

A route option preference, based on these numerical results and taking into consideration the generalised sensitivities of the constraints, has been identified in Table 6.5. Vertical alignment details were not available for the Route Corridors July 2008. More information was provided for the assessment of the subsequent 'August 2008 Route Corridor' version.

Table 6.4 Matrix - Route Corridors July 2008 - Landscape

	Routes											
Section	**Red**		**Blue**		**Purple**		**Yellow**		**Green**		**Brown**	
6	4	4	6	5	4	4	6	5	6	5	4	4
	4	4	6	5	4	4	6	5	6	5	4	4
	4	4	6	5	4	4	6	5	6	5	4	4
5	4	2	4	4	4	2	4	4	4	4	4	2
	4	1	4	4	4	1	4	4	4	4	4	1
	4	1	4	4	4	1	4	4	4	4	4	1
4	2	2	4	4	2	2	6	6	6	6	4	4
	2	2	4	3	2	2	6	6	6	6	4	4
	2	2	3	3	2	2	6	6	6	6	4	4
3	6	6	6	6	5	5	8	8	6	6	3	3
	7	6	6	6	6	5	8	8	7	6	3	3
	7	6	6	6	6	5	8	8	7	6	3	3
2	3	3	2	2	3	3	1	1	1	1	3	3
	3	3	2	2	3	3	1	1	1	1	3	3
	3	3	2	2	3	3	1	1	1	1	3	3
1	9	6	7	5	7	5	6	3	9	6	9	6
	9	6	7	5	7	5	6	3	9	6	9	6
	9	6	7	5	7	5	6	3	9	6	9	6
Sub-total	28	23	29	26	25	21	31	27	32	28	27	22
	29	22	29	25	26	20	31	27	33	28	27	21
	29	22	28	25	26	20	31	27	33	28	27	21
Total Figure	**153**		**162**		**138**		**174**		**182**		**145**	

Table 6.5 Matrix – Route Corridors July 2008 - Visual

	Routes											
Section	**Red**		**Blue**		**Purple**		**Yellow**		**Green**		**Brown**	
6	6	6	8	8	5	5	8	8	8	8	6	6
	6	6	8	8	5	5	8	8	8	8	6	6
	6	6	8	8	5	5	8	8	8	8	6	6
5	13	13	8	8	13	13	8	8	8	8	13	13
	13	13	8	8	13	13	8	8	8	8	13	13
	13	13	8	8	13	13	8	8	8	8	13	13
4	10	10	7	7	10	10	8	8	8	8	9	9
	10	10	7	7	10	10	8	8	8	8	9	9
	10	10	7	7	10	10	8	8	8	8	9	9
3	5	5	6	6	4	4	7	7	6	6	8	8
	5	5	6	6	4	4	7	7	6	6	8	8
	5	5	6	6	4	4	7	7	6	6	8	8
2	4	4	2	2	3	3	4	4	4	4	4	4
	4	4	2	2	3	3	4	4	4	4	4	4
	4	4	2	2	3	3	4	4	4	4	4	4
1	11	11	7	7	7	7	7	7	11	11	11	11
	11	11	7	7	7	7	7	7	11	11	11	11
	11	11	7	7	7	7	7	7	11	11	11	11
Sub-total	49	49	38	38	42	42	42	42	45	45	51	51
	49	49	38	38	42	42	42	42	45	45	51	51
	49	49	38	38	42	42	42	42	45	45	51	51
Total Figure	294		228		252		252		270		306	

From the matrix tables (6.4 and 6.5) the quantitative landscape results can be broken down qualitatively.

Landscape

- 1st choice Purple- 138 Constraints, 72 are key, 66 are secondary
- 2nd choice Blue Route- 162 Constraints, 76 are key, 86 are secondary
- 3rd choice Brown Route- 145 Constraints, 88 are key, 57 are secondary
- 4th choice Red Route -153 Constraints, 93 are key, 60 are secondary
- 5th choice Yellow Route- 164 Constraints, 92 are key, 72 are secondary
- 6th choice Green Route- 182 Constraints, 122 are key, 60 are secondary

Blue has been placed ahead of Red and Brown as the route passes through less key constraints.

Visual

- 1st choice Blue route- 228 Constraints
- 2nd choice Purple- 252 Constraints
- 3rd choice Yellow- 258 Constraints
- 4th choice Green- 270 Constraints
- 5th choice Red- 294 Constraints
- 6th choice Brown – 306 Constraints

6.5.4 Description of Route Corridors July 2008

General Description

The routes that were displayed at public consultation have been briefly described from south to north, with the main landscape and visual constraints highlighted.

The Red Route Corridor

The red route follows the existing N20 online route for much of the southern section, including Section 1 and half of section 2. The majority of the key constraints are situated close to the west of the proposed route including, some designated scenic landscape, Clogheenmilcon Sanctuary, amenity pathway, scenic route, mature vegetation and Historic Gardens. There will be potential significant visual impacts and loss of property as the route is widened through Rathduff. The route then passes through Burnfort Estate online. The estate has been compromised already by the N20 and only a small section remains to the west of the existing road.

The route then moves offline. It passes through the Avondhu Way waymarked route and some mature vegetation. It crosses over the existing N20 and railway which would require a significant bridging structure creating potential significant landscape and visual effects. The section west of Mallow cuts through many historic gardens, mature vegetation, a scenic route, the River Blackwater and then through steeply sloping complex topography. The visual impact would be significant for this section. The route passes by Bregoge Estate further to the north.

Passing to the west of Charleville, the route would pass through linear rows of housing along the local roads, creating a potential significant visual impact. It continues through an area with mature hedgerows which would create a landscape impact. This section of route will be very visible from the high land around Rockhill, which has views south to Charleville. Further north near Croom, the route will pass very tightly between Islandmore and The Rectory Estate. The Rectory is included as part of Islandmore in the constraints report as it does not appear individually in the NIAH Gardens list. The route passes through several other estates online where there is more room for expansion. The route then turns offline to move through houses at Liskilly where there is the potential for significant visual impacts before meeting with the N21 near Patrickswell.

The Blue Route Corridor

From Blarney, all routes are the same as the red route until point B. The blue route then turns to the west. It passes through some mature vegetation around the River Martin and then over the attractive Clyda River Valley, the Avondhu Way waymarked footpath and the Lyre River Valley. It passes through Danesfort estate, although this is currently agricultural. The route passes Mallow to the west through designated Scenic landscape, the former Sugar Factory, the Blackwater River and a Scenic Route. This would require a large bridging structure which would potentially create large visual impacts. The route rises steeply north of the Blackwater, passing through several large estates. The route then continues to the north of Buttevent and follows the yellow route until it reaches the N21 at Patrickswell.

The Purple Route Corridor

The purple route follows the blue route up to node D southwest of Mallow. It then turns northwards to meet with the red route at node F. During this section, it crosses over the Clyda Valley and Avondhu Way and through some mature vegetation and Estate landscape. Towards the north of the route, the route leaves the red route and passes through the northwestern corner of Attyflin estate to meet with the N21.

The Yellow Route Corridor

The yellow route follows the red route as far as node B. The route then branches northeast onto higher land, and in doing so avoids the settlement of Rathduff. This route would potentially require large areas of cutting which would create a visual impact. The route continues northwards to the east of Burnfoot and Mallow. It passes through the high ground at the edge of the Nagles Mountains, over the Avondhu Way and around the eastern edge of an area of designated Scenic landscape to the east of Mallow, and through a designated Scenic Route. The route crosses the Blackwater River close to several estate houses. It continues north through some small scale field patterns and hedgerows and crosses over the Awbeg River to the east of Buttevant. The route passes through Velvetstown estate online. The route passes around and over the edge of the Ballyhoura Mountain foothills and through the Ballyhoura Waymarked Way footpath and Castle Wrixton estate. The route follows the line of a dismantled railway for a section which would avoid cutting through field patterns and provide the potential for some screening. The route passes close to the east of Cooleen house and crosses the River Maigue on numerous occasions which would potentially require the need for visually prominent bridging structures. The route passes over the N20 and to the west of Croom passing close to residential properties along several local roads. The route joins the online route at Croom House estate then turns west again to pass close to more residential properties.

The Green Route Corridor

The Green route follows the red route to point C and then crosses to join the yellow route to the east of Mallow. It passes through a dip in an upland valley between Ballinvuskig and Knockaroura Hills. It will still require a large cutting, possibly creating a large visual impact along its length. To the east of Mallow, the green route passes through the Avondhu waymarked footpath, designated Scenic landscape and several estate landscapes. It crosses the River Blackwater and meets with the yellow route and follows the yellow route to the N21 at Patrickswell.

The Brown Route Corridor

The brown route follows the red route to node E where it turns northeast around the lower sections of the Nagle Mountains and close to the southeast of Mallow. It passes close to Mallow Golf Course, through the designated Scenic Landscape, close to several estate landscapes and other residential properties. It cuts through some mature vegetation and would also be highly visible from Mallow. The brown route then follows the yellow route to point J north of Buttevant where it crosses to meet with the red route. At point J the route stays on lower, flatter ground as it heads west away from the foothills of the Ballyhoura Mountains. It would however have to bridge over the railway the N20 and cross the Ballyhoura Way all of which would be visually prominent. The route then follows the red route west of Charleville and up to the N21 at Patrickswell.

6.5.5 Conclusion

When these routes are assessed quantitatively the blue and purple routes are 1st and 2nd choice in both the landscape and visual categories. Both of these route pass to the west of the study area in the more southerly sections and then the blue crosses to join the yellow in the eastern section of the study area in the more northerly areas while the purple route remains in the west.

However when broken down further, statistically, for landscape constraints the best route would be yellow in the southerly three sections (to the east of the study area) and then red in the northerly three sections (to the west), although this is not possible using the route selections that are available. This alternative route has however been carried forward as an option in the ‘Route Corridors August 2008’.

Regarding visual impacts, purple and blue would be the lowest number of constraints for the southerly sections (to the west of the study area) and blue in the northerly section. When this is looked at qualitatively however, the visual impacts would be significant particularly along the purple route (red in this section) due to the steeply undulating topography, high quality mature vegetation and amount of Historic demesnes that would be affected by a route that runs close to the west of Mallow.

The green route although highest in the overall number of landscape constraints gains these higher numbers statistically from the section of yellow route to the north and the online red route to the south. However, in the red route in Section 1, although many of the constraints are key, they are restricted to one side of the road and could be avoidable. The short section of green route which passes south of Mallow would be acceptable, although this is not reflected in the numbers.

Overall, all of the routes are fairly close in constraint numbers and there is not a clear preferable route overall. Every route will result in many significant effects although this is not unusual for a development of this nature and this size. The area has a lot of linear development and none of the routes will have no landscape or visual issues. The main pinch points of landscape and visual effect will occur around Mallow, on either side, around Croom, and at the junction with the N21. However, generally, the blue and green routes overall would be the most desirable.

Table 6.6 Route Corridors July 2008 – Landscape and Visual Preferences

Route	Preference
Red	Least Acceptable
Blue	Acceptable
Purple	Least Acceptable
Yellow	Least Acceptable
Green	Acceptable
Brown	Least Acceptable

6.6 Hydrology and Drainage

6.6.1 Introduction and Methodology

This section details the hydrology and drainage assessment of the six Route Corridors July 2008. The assessment was prepared using desk study based information. Aerial photography was used in addition to the Discovery series (1:50,000) mapping, feedback from consultees and findings from the windshield survey, which focused on the principal crossing points of the different routes considered.

The NRA Guidelines on Procedure for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (Draft, June 2008), has been followed with particular focus on Section 4 ‘Route Selection Study’.

Most of the potential environmental impacts related to the proposed motorway scheme would have the potential to occur close to crossings and these are associated with the potential to cause flooding and reduce water and biological quality. Consultation was carried out with the relevant bodies as detailed in the constraints report (Volume 1).

6.6.2 Scoring

The characteristics of the routes described above have been accumulated into three categories: Crossings, Water Quality, and Flooding. Each link of the route has been assigned weighted scores for each characteristic, based on the impacts of individual components of the route. The scores for the links have been accumulated into route scores for each individual characteristic.

Topic: Water Crossings						
Impact Level	Route Corridors					
	Red	Blue	Purple	Yellow	Green	Brown
Severe Negative	0	0	0	0	0	0
Major Negative	6	3	5	3	3	4
Moderate Negative	5	11	8	7	7	4
Minor Negative	32	31	33	38	34	33
Neutral	0	0	0	0	0	0
Minor Positive	0	0	0	0	0	0
Score	-117	-116	-123	-103	-99	-93
Order of Preference	5	4	6	3	2	1

Topic: Quality						
Impact Level	Route Corridors					
	Red	Blue	Purple	Yellow	Green	Brown
Severe Negative	0	0	0	0	0	0
Major Negative	10	7	10	9	7	8
Moderate Negative	2	7	1	7	6	2
Minor Negative	0	0	0	0	0	0
Neutral	0	0	0	0	0	0
Minor Positive	0	0	0	0	0	0
Score	-110	-105	-105	-125	-100	-90
Order of Preference	5	3	3	6	2	1

Topic: Flooding						
Impact Level	Route Corridors					
	Red	Blue	Purple	Yellow	Green	Brown
Severe Negative	1	0	1	0	0	0
Major Negative	1	3	1	2	2	3
Moderate Negative	1	2	1	2	2	2
Minor Negative	5	3	5	4	4	3
Neutral	2	0	1	0	1	2
Minor Positive	0	0	0	0	0	0
Score	-40	-43	-40	-34	-34	-43
Order of Preference	3	5	3	1	1	6

TOTAL						
Impact Level	Route Corridors					
	Red	Blue	Purple	Yellow	Green	Brown
Score	-267	-264	-268	-262	-233	-226
Order of Preference	5	4	6	3	2	1

Table 6.6 Route Corridors July 2008 – Hydrology Preferences

Route	Preference
Red	5 – Least Acceptable
Blue	4 - Acceptable
Purple	6 – Least Acceptable
Yellow	3 - Acceptable
Green	2 - Preferred
Brown	1 - Preferred

6.7 Geology and Hydrogeology

This section details the geology and hydrogeology assessment of the six Route Corridors July 2008.

6.7.1 Solid Geology

Table 6.7 describes the geological formations underlying each of the route corridors. The locations of areas of cut and fill along each route were analysed as part of the assessment. Cuts of 2m and greater were considered to have an impact. Similarly fill of 2m and greater was also considered an impact. The significance and impact were considered as follows;

- Cut or Fill 2-10m Low
- Cut or Fill 10-15m Medium
- Cut or Fill 15m < High

The duration of these impacts are considered to be permanent.

Table 6.7 Summary of Geological Formations in Study Area

Sector	Nodes	Colour Route Corridor Options	Geological Period	Bedrock Formations
1	A-B	All Route Corridors	Carboniferous Devonian	Waulsortian Formation, Ringmoylan Formation, Cuskinny Member Gyleen Formation, Ballytrasna Formation, Gortanimill Formation
1,2,3	B-H	Blue Route Corridor Red Route Corridor	Devonian Carboniferous	Gortanimill Formation, Ballytrasna Formation, Gyleen Formation Lower Limestone Shale, Ballysteen Formation, Waulsortian Formation, Copstown Limestone Formation, Hazelwood Limestone Formation, Caherduggan Limestone Formation, Dinantian Limestone, Annabella Formation, Cloone Flagstone Formation, Namurian
1,2	B-D	Blue Route Corridor Purple Route Corridor	Devonian	Gortanimill Formation, Ballytrasna Formation
1,2	B-C	Red Route Corridor Green Route Corridor Brown Route Corridor	Devonian	Gortanimill Formation, Ballytrasna Formation
1,2	C-G	Green Route Corridor	Devonian	Ballytrasna Formation

Sector	Nodes	Colour Route Corridor Options	Geological Period	Bedrock Formations
1,2,3	B-G	Yellow Route Corridor	Devonian Carboniferous	Gortanimill Formation, Ballystrasna Formation, Gyleen Formation Lower Limestone Shale Waulsortian Formation, Caherduggan Formation, Hazelwood Formation,
2,3	D-F	Purple Route Corridor	Devonian	Ballystrasna Formation
2	C-E	Red Route Corridor Brown Route	Devonian	Ballystrasna Formation
3	E-F	Red Route Corridor	Devonian	Ballystrasna Formation, Gyleen Formation
3,4	F-H	Red Route Corridor Purple Route Corridor	Devonian Carboniferous	Gyleen Formation Lower Limestone Shale, Ballysteen Formation, Waulsortian Formation, Copstown Limestone, Formation, Namurian, Annabella Formation, Cloone Flagstone Formation, Caherduggan Limestone, Hazelwood Limestone Formation, Formation,
3	E-G	Brown Route Corridor	Devonian	Ballystrasna Formation, Gyleen Formation
3,4	G-J	Yellow Route Corridor Green Route Corridor Brown Route Corridor	Devonian Carboniferous	Ballystrasna Formation, Gyleen Formation, Old Red Sandstone Annabella Formation, Waulsortian Formation, Copstown Formation, Caherduggan Formation, Hazelwood Formation, Ballysteen Formation, Ballymartin Formation, Lower Limestone Shale, Kiltorcan Formation
4	H-J	Blue Route Corridor	Devonian Carboniferous	Kiltorcan Formation Waulsortian Formation, Copstown Formation, Caherduggan Formation, Hazelwood Formation, Ballysteen Formation, Ballymartin Formation, Lower Limestone Shale,
4-5	H-K	Red Route Corridor Purple Route Corridor	Carboniferous	Waulsortian Formation, Copstown Formation, Caherduggan Fmt, Liscarrol Formation, Hazelwood Formation, Ballysteen Formation, Ballymartin Formation, Lower Limestone Shale, Clare Shale Formation
4-5	J-K	Brown Route Corridor	Devonian Carboniferous	Kiltorcan Formation Waulsortian Formation, Copstown Formation, Liscarrol Formation, Hazelwood Formation, Ballysteen Formation, Ballymartin Formation, Lower Limestone Shale, Clare Shale Formation
5 - 6	K-M	Red Route Corridor Brown Route Corridor Purple Route Corridor	Carboniferous Devonian	Clare Shale Formation, Visean Limestone Fmt, Waulsortion Fmt, Ballysteen Fmt, Lower Limestone Shale, Old Red Sandstone
4-5-6	J-M	Yellow Route Corridor Green Route Corridor Blue Route Corridor	Devonian Carboniferous	Old Red Sandstone, Kiltorcan Formation, Poulgrania Formation Waulsortian Formation, Copstown Formation, Hazelwood Formation, Ballysteen Formation, Ballymartin Formation, Lower Limestone Shale, Clare Shale Formation, Visean Lst,
6	M-N	Purple Route Corridor	Carboniferous	Visean Limestone, Waulsortian Lst
6	M-N	Red Route Corridor	Carboniferous	Visean Limestone, Waulsortian Lst
6	M-N	Yellow Route Corridor	Carboniferous	Visean Limestone, Waulsortian Lst

6.7.2 Superficial and Agricultural Deposits

Information on the subsoil/quaternary geology of the Study Area has been obtained from Teagasc and the Geological Survey of Ireland (GSI). Information on the soils encountered in the Study Area is presented in Table 6.8.

Table 6.8: Summary of Agricultural and Superficial Deposits in Study Area

Sector	Nodes	Colour Route Options	Principal Agricultural Soils from South to North	Superficial Deposits from South to North (linear meters beneath the route corridor)
1	A-B	All Routes	AminDW - Deep well drained mineral derived from mainly acidic parent materials AminSW - Shallow well drained mineral derived from mainly acidic parent materials AlluvMIN - Mineral Alluvium	Alluvium Fen Peat (700m) Sandstone Till Made ground Rock Close to surface
1,2,3	B-H	Blue Route Red Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AminSW - Shallow well drained mineral derived from mainly acidic parent materials AlluvMIN - Mineral Alluvium AminPDPT – Poorly drained mineral soils with peaty topsoil derived from mainly acidic parent materials AminPD – Deeply poorly drained mineral derived from mainly acidic parent materials MADE - made ground	Sandstone Till Alluvium Blanket Peat (250m) Shales and Sandstone Till Made Ground Rock Close to surface
1,2	B-D	Blue Route Purple Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AminSW - Shallow well drained mineral derived from mainly acidic parent materials AlluvMIN - Mineral Alluvium	Sandstone Till Alluvium Rock Close to surface
1,2	B-C	Red Route Green Route Brown Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AminSW - Shallow well drained mineral derived from mainly acidic	Sandstone Till Alluvium Rock Close to surface
1,2	C-G	Green Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AminSW - Shallow well drained mineral derived from mainly acidic parent materials AminPDPT – Poorly drained mineral soils with peaty topsoil derived from mainly acidic parent materials	Sandstone Till Rock Close to surface
1,2,3	B-G	Yellow Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AminSW - Shallow well drained mineral derived from mainly acidic parent materials	Sandstone Till Alluvium Rock Close to surface
2,3	D-F	Purple Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AminSW - Shallow well drained mineral derived from mainly acidic parent materials	
2	C-E	Red Route Brown Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials	
3	E-F	Red Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AminSW - Shallow well drained mineral derived from mainly acidic parent materials	
3,4	F-H	Red Route Purple Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AminSW - Shallow well drained mineral derived from mainly acidic parent materials AlluvMIN - Mineral Alluvium AminPDPT – Poorly drained mineral soils with peaty topsoil derived from mainly acidic parent materials AminPD – Deeply poorly drained mineral derived from mainly acidic parent materials	Sandstone Till Alluvium Shales and Sandstone Till Made Ground Rock Close to surface
3	E-G	Brown Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials	Sandstone Till
3,4	G-J	Yellow Route	AminDW - Deep well drained mineral	Sandstone Till

Sector	Nodes	Colour Route Options	Principal Agricultural Soils from South to North	Superficial Deposits from South to North (linear meters beneath the route corridor)
		Green Route Brown Route	derived from mainly acidic parent materials AlluvMIN - Mineral Alluvium AminPD – Deeply poorly drained mineral derived from mainly acidic parent materials	Alluvium Shales and Sandstone Till Namurian till Devonian Till Rock Close to surface Alluvium
4	H-J	Blue Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AlluvMIN - Mineral Alluvium AminPD – Deeply poorly drained mineral derived from mainly acidic parent materials	Namurian till Devonian Till Rock Close to surface Alluvium
4-5	H-K	Red Route Purple Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AlluvMIN - Mineral Alluvium AminPD – Deeply poorly drained mineral derived from mainly acidic parent materials Lac – Lacustrine Deposits	Namurian Till Rock Close to Surface Alluvium Lacustrine Deposits
4-5	J-K	Brown Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AlluvMIN - Mineral Alluvium AminPD – Deeply poorly drained mineral derived from mainly acidic parent materials Lac – Lacustrine Deposits BminSW – Shallow well drained – Derived from mainly basic parent material	Alluvium Devonian Till Rock close to surface Gravel Namurian Till
5 - 6	K-M	Red Route Brown Route Purple Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AminPD – Deeply poorly drained mineral derived from mainly acidic parent materials AlluvMIN - Mineral Alluvium BminSW – Shallow well drained – Derived from mainly basic parent material BminDW – Shallow well drained – Derived from mainly basic parent material BminPD –Poorly Drained – Derived mainly from basic parent materials	Namurian Till Devonian Till Limestone Till Gravel Alluvium Rock near the surface
4-5-6	J-M	Yellow Route Green Route Blue Route	AminDW - Deep well drained mineral derived from mainly acidic parent materials AlluvMIN - Mineral Alluvium AminPD – Deeply poorly drained mineral derived from mainly acidic parent materials Lac – Lacustrine Deposits BminSW – Shallow well drained – Derived from mainly basic parent material BminDW – Shallow well drained – Derived from mainly basic parent material BminPD – Deep Poorly Drained – Derived mainly from basic parent material	Alluvium Devonian Till Gravel Namurian Till Limestone Till Lacustrine Deposits Rock near the surface Gravel Made ground
6	M-N	Purple Route	AlluvMIN - Mineral Alluvium BminSW – Shallow well drained – Derived from mainly basic parent material BminDW – Shallow well drained – Derived from mainly basic parent material BminPD –Poorly Drained – Derived mainly from basic parent materials	Alluvium Limestone Till Cut Peat Rock Near Surface Made ground
6	M-N	Red Route	BminSW – Shallow well drained – Derived from mainly basic parent material BminDW – Shallow well drained – Derived from mainly basic parent material Cut – Cutaway Peat BminPD –Poorly Drained – Derived mainly from basic parent materials AlluvMIN - Mineral Alluvium	Alluvium Limestone Till Cut Peat Rock Near Surface Made ground
6	M-N	Yellow Route	BminSW – Shallow well drained – Derived	Alluvium

Sector	Nodes	Colour Route Options	Principal Agricultural Soils from South to North	Superficial Deposits from South to North (linear meters beneath the route corridor)
			from mainly basic parent material BminDW – Shallow well drained – Derived from mainly basic parent material Cut – Cutaway Peat BminPD –Poorly Drained – Derived mainly from basic parent materials AlluvMIN - Mineral Alluvium	Limestone Till Cut Peat Rock Near Surface

6.7.3 Karst Solution Features

Karst is the name given to a landscape characterised by remarkable surface and underground forms, created as a result of the action of the water on the permeable limestone. Surface and underground features occur where fissures and fractures have been widened by dissolution to allow the passage of groundwater. As groundwater flows through the rock it dissolves it to form caves and caverns of varying sizes that are referred to as 'solution features'.

As discussed in Volume 1A Constraints Report, significant parts of the study area underlain by clean limestone where karstification has occurred. The formations most commonly associated with karst features are the Waulsortian, Hazelwood and Caherduggan formations which are shown on the geology map of the study area. A range of solution features were found within the study area. These are: caves, enclosed depressions, springs, tepid springs, swallow holes and natural ponds.

The solution features that are along the route have been obtained from the following sources:

- Geological Survey of Ireland Karst Database;
- 6" Historical Geological Survey of Ireland Maps;
- Public Consultations

In the study area indications of the presence of karst limestone are concentrated in Sector 3. Table 6.9 and Figures 13.36-13.42 (Volume 2B) detail the type and location of these features. Given the frequent occurrence of karst features mapped in the study area, particularly in Sector 3, all limestone formations along the route will be investigated for karst behaviour during the detailed site investigation. Where karst features were encountered close to a proposed route the impact assessment was based on both geological and hydrogeological considerations. The nature of the karst feature and the potential impact a road development may have on the geomorphology (e.g. caves) or hydrology (e.g. spring) was considered on an individual basis by the hydrogeologist and a suitable impact assigned. The potential impacts were considered to have a permanent duration.

Table 6.9 Summary of Karst Solution Features

Sector	Nodes	Colour Route Corridor Options	Potential karst bedrock beneath the route corridor	Karst Solution Features
1	A-B	All Route Corridors		None Recorded
1,2,3	B-H	Blue Route Corridor Red Route Corridor	Waulsortian Lst Caherduggan Lst Formation Hazelwood Formation Copstown Lst Formation	3-K-01(Swallow Hole)
1,2	B-D	Blue Route Corridor Purple Route Corridor		None Recorded
1,2	B-C	Red Route Corridor Green Route Corridor Brown Route Corridor		None Recorded
1,2	C-G	Green Route Corridor		None Recorded
1,2,3	B-G	Yellow Route Corridor		None Recorded
2,3	D-F	Purple Route Corridor		None Recorded
2	C-E	Red Route Corridor Brown Route Corridor		None Recorded
3	E-F	Red Route Corridor		None Recorded
3,4	F-H	Red Route Corridor Purple Route Corridor	Waulsortian Lst Caherduggan Lst Formation Hazelwood Formation Copstown Lst Formation	None Recorded
3	E-G	Brown Route Corridor		None Recorded
3,4	G-J	Yellow Route Corridor Green Route Corridor Brown Route Corridor	Waulsortian Lst Caherduggan Lst Formation Hazelwood Formation Copstone Limestone Formation	3-K-08 Natural Ponds
4	H-J	Blue Route Corridor		None Recorded
4-5	H-K	Red Route Corridor Purple Route Corridor		None Recorded
4-5	J-K	Brown Route Corridor		None Recorded
5 - 6	K-M	Red Route Corridor Brown Route Corridor Purple Route Corridor	Waulsortian Lst	None Recorded
4-5-6	J-M	Yellow Route Corridor Green Route Corridor Blue Route Corridor		None Recorded
6	M-N	Purple Route Corridor		Non Recorded
6	M-N	Red Route Corridor		None Recorded
6	M-N	Yellow Route Corridor	Waulsortian Lst	None Recorded

6.7.4 Economic Geology

The impact assessment of economic geological sites was carried out on an individual basis. Table 6.10 outlines all the economic geology sites within 100m of the route corridors. The potential impact was assessed based on the proximity of the site and the importance of the development.

Table 6.10 Summary of Economic Geology Features

Sector	Nodes	Colour Route Corridor Options	Economic Geology occurring in Bedrock Geology Type	Quarries within route corridor	IPPC Licensed Facilities	Waste Facilities	Geological Features
1	A-B	All Route corridors		None Recorded	None Recorded	1-LL-01	None Recorded
1,2,3	B-H	Blue Route Corridor Red Route Corridor	Hazelwood Formation Copstown Limestone Formation	3-Q-19 3-Q-20	None Recorded	None Recorded	2-GF-01
1,2	B-D	Blue Route Corridor Purple Route Corridor		None Recorded	None Recorded	None Recorded	2-GF-01
1,2	B-C	Red Route Corridor Green Route Corridor Brown Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
1,2	C-G	Green Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
1,2,3	B-G	Yellow Route Corridor	Gortanimill Formation, Ballystrasna Formation, Waulsortian Formation, Hazelwood Formation,	1 Active Quarry 3-Q-16 2 Disused Quarries 3-Q-15, 3-Q-14	None Recorded	3-LL-04 3-LL-05	3-GF-01
2,3	D-F	Purple Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded

Sector	Nodes	Colour Route Corridor Options	Economic Geology occurring in Bedrock Geology Type	Quarries within route corridor	IPPC Licensed Facilities	Waste Facilities	Geological Features
2	C-E	Red Route Corridor Brown Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
3	E-F	Red Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
3,4	F-H	Red Route Corridor Purple Route Corridor	Copstown Limestone Formation	None Recorded	None Recorded	None Recorded	None Recorded
3	E-G	Brown Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
3,4	G-J	Yellow Route Corridor Green Route Corridor Brown Route Corridor		None Recorded	None Recorded	4-LL-01	None Recorded
4	H-J	Blue Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
4-5	H-K	Red Route Corridor Purple Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
4-5	J-K	Brown Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
5 - 6	K-M	Red Route Corridor Brown Route Corridor Purple Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
4-5-6	J-M	Yellow Route Corridor Green Route Corridor Blue Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
6	M-N	Purple Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
6	M-N	Red Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded
6	M-N	Yellow Route Corridor		None Recorded	None Recorded	None Recorded	None Recorded

6.7.5 Geological Heritage

The Geological Heritage site identified during the Constraints Study, 3-GH-01, is located in Sector 3. This is a Cotterite deposit. In the initial route options, Route Corridors July 2008, section B-G of the yellow route ran through this area of geological heritage.

6.7.6 Aquifer Type and Classification

Table 6.11 Summary of Aquifer Classification

Sector	Nodes	Colour Route Options	Aquifer Type
1	A-B	All Route Corridors	Ll
1,2,3	B-H	Blue Route Corridor Red Route Corridor	Rkd, Ll, Pl
1,2	B-D	Blue Route Corridor Purple Route Corridor	Ll
1,2	B-C	Red Route Corridor Green Route Corridor Brown Route Corridor	Ll
1,2	C-G	Green Route Corridor	Ll
1,2,3	B-G	Yellow Route Corridor	Ll
2,3	D-F	Purple Route Corridor	Ll
2	C-E	Red Route Corridor Brown Route Corridor	Ll
3	E-F	Red Route Corridor	Ll
3,4	F-H	Red Route Corridor Purple Route Corridor	Ll, Rkd, Pl
3	E-G	Brown Route Corridor	Ll
3,4	G-J	Yellow Route Corridor Green Route Corridor Brown Route Corridor	Rkd, Ll, Pl
4	H-J	Blue Route Corridor	Pl, Rkd, Ll, Pu, Rf
4-5	H-K	Red Route Corridor Purple Route Corridor	Pl, Rkd, Ll, Pu
4-5	J-K	Brown Route Corridor	Rf, Rkd, Pu, Ll,
5 - 6	K-M	Red Route Corridor Brown Route Corridor Purple Route Corridor	Pu, Ll, Rkd, Rf
4-5-6	J-M	Yellow Route Corridor Green Route Corridor Blue Route Corridor	Rf, Rkd, Pu, Ll, Pl
6	M-N	Purple Route Corridor	Rkd, Ll
6	M-N	Red Route Corridor	Rkd, Ll
6	M-N	Yellow Route Corridor	Rkd, Ll

6.7.7 Vulnerability

Table 6.12 Summary of Vulnerability Areas

Sector	Nodes	Colour Route Corridor Options	Groundwater vulnerability
1	A-B	All Route Corridors	Extreme, Extreme Rock Near Surface, High
1,2,3	B-H	Blue Route Corridor Red Route Corridor	Extreme, Extreme Rock Near Surface, High, High-Low
1,2	B-D	Blue Route Corridor Purple Route Corridor	Extreme, Extreme Rock Near Surface, High, High-Low
1,2	B-C	Red Route Corridor Green Route Corridor Brown Route Corridor	Extreme, Extreme Rock Near Surface, High, High-Low
1,2	C-G	Green Route Corridor	Extreme Rock near surface, Extreme, High to Low
1,2,3	B-G	Yellow Route Corridor	Extreme, Extreme Rock Near Surface, High, High-Low
2,3	D-F	Purple Route Corridor	Extreme Rock near surface, Extreme, High to Low
2	C-E	Red Route Corridor Brown Route Corridor	Extreme Rock near surface, Extreme, High to Low
3	E-F	Red Route Corridor	Extreme Rock near surface, Extreme, High to Low
3,4	F-H	Red Route Corridor Purple Route Corridor	Extreme Rock near surface, Extreme, High to Low

Sector	Nodes	Colour Route Corridor Options	Groundwater vulnerability
3	E-G	Brown Route Corridor	Extreme Rock near surface, Extreme, High to Low
3,4	G-J	Yellow Route Corridor Green Route Corridor Brown Route Corridor	Extreme, Extreme Rock Near Surface, High, High-Low
4	H-J	Blue Route Corridor	Extreme Rock near surface, Extreme, High to Low
4-5	H-K	Red Route Corridor Purple Route Corridor	Extreme Rock near surface, Extreme, High to Low
4-5	J-K	Brown Route Corridor	Extreme Rock near surface, Extreme, High to Low
5 - 6	K-M	Red Route Corridor Brown Route Corridor Purple Route Corridor	Extreme Rock near surface, Extreme, High to Low
4-5-6	J-M	Yellow Route Corridor Green Route Corridor Blue Route Corridor	Extreme Rock near surface, Extreme, High to Low
6	M-N	Purple Route Corridor	Extreme Rock near surface, Extreme, High to Low
6	M-N	Red Route Corridor	Extreme Rock near surface, Extreme, High to Low
6	M-N	Yellow Route Corridor	Extreme Rock near surface, Extreme, High to Low

6.7.8 Ecology

Table 6.13 Summary of Groundwater Dependant Ecosystems

Sector	Nodes	Colour Route Corridor Options	Groundwater dependent ecological feature
1	A-B	All Route Corridors	Blarney Bog
1,2,3	B-H	Blue Route Corridor Red Route Corridor	River Blackwater cSAC
1,2	B-D	Blue Route Corridor Purple Route Corridor	None Present
1,2	B-C	Red Route Corridor Green Route Corridor Brown Route Corridor	None Present
1,2	C-G	Green Route Corridor	River Blackwater cSAC
1,2,3	B-G	Yellow Route Corridor	None Present
2,3	D-F	Purple Route Corridor	River Blackwater cSAC
2	C-E	Red Route Corridor Brown Route Corridor	River Blackwater cSAC
3	E-F	Red Route Corridor	River Blackwater sSAC
3,4	F-H	Red Route Corridor Purple Route Corridor	River Blackwater cSAC
3	E-G	Brown Route Corridor	None Present
3,4	G-J	Yellow Route Corridor Green Route Corridor Brown Route Corridor	River Blackwater cSAC Eagle Lough SAC
4	H-J	Blue Route Corridor	River Blackwater SAC
4-5	H-K	Red Route Corridor Purple Route Corridor	River Blackwater SAC
4-5	J-K	Brown Route Corridor	River Blackwater SAC
5 - 6	K-M	Red Route Corridor Brown Route Corridor Purple Route Corridor	None Present
4-5-6	J-M	Yellow Route Corridor Green Route Corridor Blue Route Corridor	None Present
6	M-N	Purple Route Corridor	None Present
6	M-N	Red Route Corridor	None Present
6	M-N	Yellow Route Corridor	None Present

6.7.9 Groundwater Resources

Table 6.14 Summary of Groundwater Resources

Sector	Nodes	Colour Route Corridor Options	Groundwater resources
1	A-B	All Route Corridors	1-S-01, 1-S-02, 1-S-03 1-LS-01
1,2,3	B-H	Blue Route Corridor Red Route Corridor	1-S-04, 1-S-05, 1-S-06, 2-S-08, 2-S-04, 2-S-07, 3-S-11 1-LS-02, 1-LS-03, 1-LS-04, 1-LS-06, 3-LS-08
1,2	B-D	Blue Route Corridor Purple Route Corridor	1-S-04, 1-S-05, 1-S-06, 2-S-08 1-LS-02, 1-LS-03, 1-LS-4, 1-LS-06
1,2	B-C	Red Route Corridor Green Route Corridor Brown Route Corridor	2-S-03 1-LS-05
1,2	C-G	Green Route Corridor	3-S-06, 3-S-20, 3-S-07, 3-S-24, 2-S-23
1,2,3	B-G	Yellow Route Corridor	1-S-09, 2-S-03, 2-S-06, 3-S-06 2-LS-03, 2-LS-04, 2-LS-05, 2-LS-06, 2-LS-07, 2-LS-09, 3-LS-05, 3-LS-06
2,3	D-F	Purple Route Corridor	2-S-04
2	C-E	Red Route Corridor Brown Route Corridor	2-S-05, 3-S-16
3	E-F	Red Route Corridor	None Present
3,4	F-H	Red Route Corridor Purple Route Corridor	3-S-03, 3-S-02, 3-S-12, 3-S-17, 3-S-18, 3-S-19
3	E-G	Brown Route Corridor	2-S-16, 3-S-04, 3-S-24, 3-S-05, 3-S-05, 3-S-23
3,4	G-J	Yellow Route Corridor Green Route Corridor Brown Route Corridor	3-S-24, 3-S-23, 3-S-20, 3-S-08, 3-S-07, 3-S-21, 3-S-09, 3-S-22, 3-S-14, 3-S-13, 4-S-02
4	H-J	Blue Route Corridor	None Recorded
4-5	H-K	Red Route Corridor Purple Route Corridor	None Recorded
4-5	J-K	Brown Route Corridor	None Recorded
5 - 6	K-M	Red Route Corridor Brown Route Corridor Purple Route Corridor	Banogue PWS (6-S-01) Croom PWS (6-S-04) Rockhill GWS (5-S-01)
4-5-6	J-M	Yellow Route Corridor Green Route Corridor Blue Route Corridor	Croom PWS - 6-S-04
6	M-N	Purple Route Corridor	Patrickswell GWS (6-S-07) Chaerass GWS (6-S-06)
6	M-N	Red Route Corridor	Patrickswell GWS (6-S-07) Chaerass GWS (6-S-06)
6	M-N	Yellow Route Corridor	Patrickswell GWS (6-S-07) Caherass GWS (6-S-06)

6.7.10 Conclusions

The overall preferences are presented in Table 6.15 below. Based on this table, the following conclusions can be drawn:

- The most preferred routes based on soils, geology and hydrogeological constraints are the red and blue routes.
- The purple and green routes are all preferred routes
- The yellow are considered acceptable routes.
- Least acceptable route is the brown route option.

Table 6.15 Route Corridors July 2008 – Geology and Hydrogeology Preferences

Route	Lows	Med	High	Score	Preference
Red	82.08	8.31	9.25	126.45	1 - Most Preferred
Blue	88.92	11.19	5.35	127.35	2 - Most Preferred
Purple	88.58	10.43	9.07	136.65	3 - Preferred
Yellow	100.66	11.89	6.75	144.69	5 - Acceptable
Green	99.92	11.99	5.61	140.73	4 - Preferred
Brown	98.2	12	9.81	151.63	6 - Least Acceptable

6.8 Ecology

6.8.1 Introduction

This section details the ecology assessment of the six Route Corridors July 2008. The impact of these route corridors on ecological sites and designated areas were assessed in accordance with the NRA guidelines as described in Chapter 14 Volume 2A. Refer to Figures 14.1- 14.22 which shows the ecology constraints with the July 2008 Route Corridors. Note the overall preferences differ between Route Corridors July 2008 and Route Corridors August 2008. Detailed route design and additional constraints were not available for Route Corridors July 2008 hence mitigation measures etc could not be considered.

Table 6.16 shows the number of ecological sites of each category within the six route corridors and Table 6.17 shows the impacts of each of these corridors on ecological sites and designated areas within the study area. Table 6.18 gives the order of preference based on the number and significance of impacts on ecological sites and designated areas.

6.8.2 Analysis

Table 6.16 The number of ecological sites (including impacted designated areas) intersected by each route corridor

Site Rating	Red Route	Blue Route	Purple Route	Yellow Route	Green Route	Brown Route
A	6	3	5	3	4	6
B	2	2	2	2	2	2
C	8	7	9	9	9	7
D	3	0	3	0	1	2
E	0	0	0	1	0	0
Total	19	12	19	15	16	17

Table 6.17 Summary of the potential impacts on ecological sites (including impacted designated areas)

Impact Level	Red Route	Blue Route	Purple Route	Yellow Route	Green Route	Brown Route
Severe negative	1	1	1	1	1	1
Major negative	12	6	9	8	8	11
Moderate negative	4	5	5	5	6	4
Minor negative	2	0	4	1	1	1
Not significant	0	0	0	0	0	0
Total no. of sites impacted	19	12	19	15	16	17

Table 6.18 Route Corridors July 2008 – Ecology Preferences

Route	Preference
Red	Least Acceptable
Blue	Most Preferred
Purple	Least Acceptable
Yellow	Preferred
Green	Acceptable
Brown	Acceptable

6.9 Archaeology and Cultural Heritage

6.9.1 Introduction

This section details the archaeological and cultural heritage assessment of the six Route Corridors July 2008. Each of the six route corridor options (Red, Blue, Purple, Yellow, Green and Brown) was assessed to determine which corridor would have the least impact on the receiving archaeological and cultural heritage environment. At this stage of the assessment route alignments were not available, therefore, all known and recorded archaeological sites (RMP sites) within each route corridor (300m in diameter) were identified. It is acknowledged that all RMP sites are afforded the same protection under National Monuments legislation. For the purpose of assessing the various route corridor options, however, all RMP sites within the route corridors were assessed and graded into those which were considered Key Constraints (KC). In addition, Key Constraints were further graded, where necessary, and were listed as '*Very Sensitive KC*'.

Refer to Figures 14.1- 14.22 which shows the archaeological and cultural heritage constraints with the July 2008 Route Corridors.

6.9.2 Analysis

Two National Monuments subject to Preservation Orders were found to lie adjacent to, and just within, three of the six route corridors as follows;

CSS Number	Site Type	Townland	Route Options	Section
1309	Castle - Motte	Ballynoe	Green, Blue, Yellow	5
1482	Ringfort	Croom	Green, Blue, Yellow	6

The findings of the assessment for each of the six route options is summarised in tabular form below.

Table 6.19 Red Route Corridor

Section Number	Total Number of constraints	Key Constraints (KC)	Very Sensitive KC
Section 1	6	2	1
Section 2	7	6	1
Section 3	7	4	2
Section 4	13	13	3
Section 5	11	11	0
Section 6	21	16	1
Total	65	52	8

Table 6.20 Blue Route Corridor

Section Number	Total Number of constraints	Key Constraints (KC)	Very Sensitive KC
Section 1	8	4	1
Section 2	4	4	0
Section 3	6	6	1
Section 4	16	12	3
Section 5	9	9	2
Section 6	28	20	2
Total	71	55	9

Table 6.21 Purple Route Corridor

Section Number	Total Number of constraints	Key Constraints (KC)	Very Sensitive KC
Section 1	8	4	1
Section 2	2	2	0
Section 3	3	3	2
Section 4	14	14	3
Section 5	12	12	0
Section 6	32	21	3
Total	71	56	9

Table 6.21 Yellow Route Corridor

Section Number	Total Number of constraints	Key Constraints (KC)	Very Sensitive KC
Section 1	8	4	1
Section 2	5	2	0
Section 3	7	5	3
Section 4	13	9	2
Section 5	9	9	2
Section 6	28	20	3
Total	70	49	11

Table 6.22 Green Route Corridor

Section Number	Total Number of constraints	Key Constraints (KC)	Very Sensitive KC
Section 1	6	2	1
Section 2	5	4	1
Section 3	5	2	1
Section 4	13	9	2
Section 5	9	9	2
Section 6	28	20	3
Total	66	46	10

Table 6.23 Brown Route Corridor

Section Number	Total Number of constraints	Key Constraints (KC)	Very Sensitive KC
Section 1	6	2	1
Section 2	7	6	1
Section 3	6	3	0
Section 4	12	11	4
Section 5	12	12	0
Section 6	21	16	1
Total	64	50	7

6.9.3 Discussion

Statistically, (counting the total number of constraints), the Brown Route was the most preferred with the least number of recorded archaeological sites (64) within the route corridor. A close second was the Red Route with 65 constraints. Statistically the Blue and Purple Routes were the least preferred with the most number of recorded archaeological sites (71).

An assessment of the route corridors was then made taking into account the number of RMP sites considered to be Key Constraints (i.e. ringforts, enclosures, ring barrows etc.) and Very Sensitive Key Constraints (i.e. National monuments subject to a P.O., churches, graveyards, castles, holy wells in active use). Following this assessment, the Green route emerged as the preferred route with the least number of Key Constraints overall (46)

The Purple Route was considered the least preferred route with the highest number of Key Constraints overall (56).

Table 6.24 Summary of Impacted Key and Very Sensitive Key Constraints

Route Option	Key Constraints (KC)	Very Sensitive KC
Green	46	10
Yellow	49	11
Brown	50	7
Red	52	8
Blue	55	9
Purple	56	0

Table 6.25 Route Corridors July 2008 –Archaeology and Cultural Heritage

Route	Preference
Red	Acceptable
Blue	Least Preferred
Purple	Least Preferred
Yellow	Preferred
Green	Most Preferred
Brown	Acceptable

6.9.4 Summation

Each route corridor option was found to impact on the archaeological heritage to some degree. There was very little difference between each route corridor reflecting the scale and number of recorded archaeological sites within the Constraint Study Area (1750).

6.10 Architectural Heritage

6.10.1 Introduction

This section details the architectural heritage assessment of the six Route Corridors July 2008.

The Route Corridors July 2008 were assessed by quantitative means only as no road alignment was available at the time of assessment. A feature or site of architectural heritage merit was considered to be potentially directly impacted upon when it was physically located in whole or in part within the 300-metre route corridor. Where the structure (or part thereof) within the route corridor was a formal or informal demesne, the associated house was included in the calculations as a potential indirect impact even when it was located outside the route corridor. This precaution was taken in order to protect designed landscape elements such as vistas. It should be noted that in addition to designed landscape elements the term 'demesne' in the context of this report encompasses auxiliary structures such as gate lodges, outbuildings, courtyards, follies and boundary walls.

6.10.2 Analysis

The six Route Corridors July 2008 impact upon a total of 112 structures or features of architectural heritage merit as listed in Table 1.1 in Appendix 16.1 (*Refer to Appendix 16.1*). No National Monuments, National Monuments in Ownership or Guardianship, sites on the Register of Historic Monuments, sites subject to Preservation Orders and Temporary Preservation Orders, or Architectural Conservation Areas are affected by any of the route options.

Of the 112 structures impacted by one or more of Route Corridors July 2008, 12 are on the Record of Monuments and Places (RMP) and 13 on the Record of Protected Structures (RPS), as identified in Table 1.1 in Appendix 16.1. Ninety-two sites are unregistered. For a summary of the statutory protection of architectural heritage in Ireland, please refer to Sections 10.2.3-10.2.11 of the Constraints Report.

Of the 112 structures impacted by one or more of the Route Corridors July 2008, 56 are considered to be Key Constraints, as identified in Table 1.1 in Appendix 16.1. For methods applied to identifying Key Constraints, please refer to Sections 10.3.1 and 10.7 of the Constraints Report.

Of the 112 impacted structures of architectural heritage merit, 52 are perceived to be of regional and 54 or local importance, as identified in Table 1.1 in Appendix 16.1. The importance of six structures remains to be confirmed. No structures of international or national significance are impacted upon by the Route Corridors July 2008 options. For methods applied to the assessment of perceived importance, please refer to Section 10.3.4-10.3.5 of the Constraints Report.

6.10.3 Red Route

A total of 63 potential impacts were identified on the Red Route as listed in Table 2.1 in Appendix 16.2. Table 16.3 is a summary of the potential impacts of the Red Route.

Table 6.26 Summary of Potential Impacts of the Route Corridors July 2008 Red Route

Potential Impacts	International significance	National significance	Regional significance	Local significance	Undetermined	Total potential impacts	Of which are Key Constraints
Direct	0	0	16	24	1	41	17
Indirect	0	0	12	10	0	22	12
Total sites	**0**	**0**	**28**	**34**	**1**	**63**	**29**

6.10.4 Blue Route

A total of 51 potential impacts were identified on the Blue Route as listed in Table 2.2 in Appendix 16.2.Table 16.4 is a summary of the potential impacts of the Blue Route.

Table 6.27 Summary of Potential Impacts of the Route Corridors July 2008 Blue Route

Potential Impacts	International significance	National significance	Regional significance	Local significance	Undetermined	Total potential impacts	Of which are Key Constraints
Direct	0	0	16	20	0	36	16
Indirect	0	0	11	3	1	15	12
Total sites	**0**	**0**	**27**	**23**	**1**	**51**	**28**

6.10.5 Yellow Route

A total of 43 potential impacts were identified on the Yellow Route as listed in Table 2.3 in Appendix 16.2.Table 16.5 is a summary of the potential impacts of the Yellow Route.

Table 6.28 Summary of Potential Impacts of the Route Corridors July 2008 Yellow Route

Potential Impacts	International significance	National significance	Regional significance	Local significance	Undetermined	Total potential impacts	Of which are Key Constraints
Direct	0	0	13	18	0	31	12
Indirect	0	0	9	2	1	12	10
Total sites	**0**	**0**	**22**	**20**	**1**	**43**	**22**

6.10.6 Purple Route

A total of 58 potential impacts were identified on the Purple Route as listed in Table 2.4 in Appendix 16.2. Table 16.6 is a summary of the potential impacts of the Purple Route.

Table 6.29 Summary of Potential Impacts of the Route Corridors July 2008 Purple Route

Potential Impacts	International significance	National significance	Regional significance	Local significance	Undetermined	Total potential impacts	Of which are Key Constraints
Direct	0	0	16	21	1	38	17
Indirect	0	0	14	6	0	20	14
Total sites	**0**	**0**	**30**	**27**	**1**	**58**	**31**

6.10.7 Green Route

A total of 44 potential impacts were identified on the Green Route as listed in Table 2.5 in Appendix 16.2. Table 16.7 is a summary of the potential impacts of the Green Route.

Table 6.30 Summary of Potential Impacts of the Route Corridors July 2008 Green Route

Potential Impacts	International significance	National significance	Regional significance	Local significance	Undetermined	Total potential impacts	Of which are Key Constraints
Direct	0	0	11	21	0	32	11
Indirect	0	0	8	4	0	12	8
Total sites	**0**	**0**	**19**	**25**	**0**	**44**	**19**

6.10.8 Brown Route

A total of 54 potential impacts were identified on the Brown Route as listed in Table 2.6 in Appendix 16.2. Table 16.8 is a summary of the potential impacts of the Brown Route.

Table 6.31 Summary of Potential Impacts of the Route Corridors July 2008 Brown Route

Potential Impacts	International significance	National significance	Regional significance	Local significance	Undetermined	Total potential impacts	Of which are Key Constraints
Direct	0	0	13	23	1	37	13
Indirect	0	0	10	6	1	17	11
Total sites	**0**	**0**	**23**	**29**	**2**	**54**	**24**

6.10.9 Preference Order for Route Corridors July 2008

The route corridors were appraised by considering in each case the total number of overall direct impacts, direct impacts on higher significance sites, and direct impacts on Key Constraints. Table 16.9 is a summary of this appraisal.

Table 6.32 Appraisal of Route Corridor Impacts

Route	Total Direct impacts	Ranking	Total Direct Impacts on Higher significance sites*	Ranking	Direct Impacts on Key Constraints	Ranking	Overall ranking order
Red	41	6th	16 (39.0%)	3rd	17 (42.5%)	4th	4th
Blue	36	3rd	16 (44.4%)	6th	16 (44.5%)	5th	5th
Yellow	31	1st	13 (41.9%)	4th	12 (38.7%)	Close 3rd	3rd
Purple	38	5th	16 (42.1%)	5th	17 (44.7%)	Close 6th	6th

Green	32	Close 2nd	11 (34.4%)	1st	11 (34.4%)	1st	1st
Brown	37	Close 4th	13 (35.1%)	Close 2nd	13 (35.1%)	2nd	2nd

'Higher significant sites' can be deemed as those of International, National and Regional Importance, collectively.

6.10.10 Preference Order Results

In the route corridor appraisal, the Green Route emerged as the most preferred option with the second lowest number of total direct impacts and the lowest number of impacts on both higher significance sites and Key Constraints. The Yellow Route had the lowest number of direct impacts but proportionately a much greater occurrence of impacts on higher significance sites than the Green Route. Conversely, the Brown Route had the third highest number of total impacts but the second lowest number of impacts on higher significance sites and Key Constraints. Both were considered preferred options.

The Red Route had the highest occurrence of direct impacts but ranked in the middle of the scale in terms of impacts on higher significance sites and Key Constraints. Conversely, the Blue Route had the third lowest number of direct impacts but ranked high in the other two categories. The Red and Blue routes were both ranked acceptable. The Purple Route ranked high on all three categories of impacts and was considered the least acceptable of the six corridors. Overall, in terms of architectural heritage easterly routes were considered preferable to westerly ones. Table 16.10 is a summary of the order of preference of the six route corridors.

Table 6.33 Route Corridors July 2008 –Architectural Heritage

Route	Preference
Red	Acceptable
Blue	Acceptable
Purple	Least Acceptable
Yellow	Preferred
Green	Most Preferred
Brown	Preferred

6.10.11 M20/N21 Free Flow Junction

In addition to the six route corridors, an assessment was made of a constraints area for the M20/ N21 Free Flow Junction under development between Adare and Patrickswell. A total of 16 potential constraints were identified within this area as listed in Table 16.11 below. A qualitative evaluation of constraints was not carried out as no route alignment was available at the time of the assessment. This Study Area was not included in the preference order appraisal of the Route Corridors July 2008.

Table 6.34 Potential Constraints Identified within the M20/ N21 Free Flow Junction Area

CSS No.	Site Type	Site Name	Townland	Statutory Protection	Key Constraint (Y/N)	Perceived Architectural Importance
CSS1773	Railway	Dismantled Railway	Commons Etc.	None	No	Local
CSS2421	Informal Demesne	Fort Union	Rineroe	None	No	Local
CSS2436	Vernacular House	Rose Cottage	Rineroe	None	No	Local
CSS2438	Vernacular House	Monearla Cottage	Monearla	None	No	Local
CSS2450	Country House	Yewfort	Killeen	None	No	Local
CSS2451	Informal Demesne	Yewfort	Killeen	None	No	Local
CSS2464	Demesne	Ballycarrane House	Ballycarrane	None	No	Local
CSS2469	Country House	Attyflin House	Killonanan	RPS	Yes	Regional
CSS2471	Demesne	Attyflin House	Killonanan	None	Yes	Regional
CSS2482	Demesne	Richmond Villa	Richmondvilla	None	No	Local
CSS2496	Railway Station	Patrickswell Train Station	Killonahan	None	No	Local
CSS2513	Country House	Fort Etna	Killonahan	RPS	Yes	Regional
CSS2517	Demesne	Fort Etna	Killonahan	None	Yes	Regional
CSS2539	Demesne	Greenmount	Greenmount	None	Yes	Regional
CSS2576	Informal Demesne	Rose Cottage	Rineroe	None	No	Local
CSS2577	Demesne	Monearla Cottage	Monearla	None	No	Local

Of the 112 structures the Route Corridors July 2008 impacted upon, 90 (or 80%) fell into this category of constraints. The number of potential direct impacts varied from 31 (Yellow Corridor) to 41 (Red Corridor) and the overall potential impacts ranged from to 43 (Yellow Corridor) to 63 (Red Corridor).

6.11 Air Quality

6.11.1 Introduction

This section details the air quality assessment of the six Route Corridors July 2008. The route options displayed for public consultation in July 2008 are assessed qualitatively in Table 6.35. The red route is identified as the least preferred option owing to its proximity to the River Blackwater/River Clyda candidate Special Area of Conservation (cSAC) at Mallow and large housing developments at Croom. The purple route joins the red route at Point F (refer to Figure 6.2) and is therefore also deemed to be the least preferred option. There are no major constraints associated with any of the other options from an air quality perspective.

Table 6.35 Route Corridors July 2008 – Air Quality

Route	Preference
Red	Least Preferred
Blue	Most Preferred
Purple	Least Preferred
Yellow	Most Preferred
Green	Most Preferred
Brown	Most Preferred

6.12 Noise and Vibration

6.12.1 Introduction

This section details the noise and vibration assessment of the six Route Corridors July 2008. The July 2008 Route Corridors have not been assessed in order of preference for noise because further information relevant to the NRA Noise Route Selection Procedures such as band count numbers which allow for Potential Impact Rating assessment was not provided at that stage.

Following the consultation period and further environmental studies, the July 2008 route corridors were modified and these became the August 2008 route corridors.

The preliminary preferred route selection of the July 2008 route corridor options was based on an assessment of the likely noise impact without the provision of band count numbers or traffic flows for each option. Therefore, it was not possible to give a specific preference at this stage prior to discussing the August 2008 route corridor options. However, in terms of reducing the relative noise impact of the proposed route options on noise sensitive receptors, it was recommended to remain online, where possible. Such a preferred route option alignment is likely to have a higher number of receptor locations in close proximity but it is likely to result in a lower perceived noise impact on the surrounding noise sensitive receptors, as these receptors will be exposed to a background noise level already dominated by traffic volumes on the existing N20.