

Road Safety Remedial Measures Programme

Evaluation of Programme 9 to 11
Schemes Implemented between 2004 & 2006



Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

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Foreword

This report is the fifth in a series of periodic reviews on the NRA road safety programme, and it presents the results for the road safety remedial schemes that were completed between 2004 and 2006. Preliminary results for 2007 and 2008 are shown but sufficient time has not yet elapsed to fully evaluate these two years. The results have exceeded targets set for the rate of return for the schemes.

Executive Summary

The National Roads Authority (NRA) was formally established as an independent statutory body under the Roads Act, 1993 with effect from 1st of January, 1994. The Authority's primary function, under the Roads Act 1993, is 'to secure the provision of a safe and efficient network of national roads'. For this purpose, it has overall responsibility for planning and supervision of construction and maintenance works on these roads.

The NRA Road Safety Section is charged with a number of tasks under the last Government Road Safety Strategy. These tasks include having an annual programme of road safety remedial schemes on national roads and to carry out a periodic Before & After review of these road safety remedial schemes.

Since 1994 the Authority has operated a programme whereby, for limited financial outlay, deficiencies at high risk collision locations can be identified and remedied. The works concerned are intended to enhance the safety of the roads system through changes in road layout, junction control and improvements in signage and road markings. The results of Programme 1 to 8 are available on the NRA website. (RS456, RS465, RS473 & R474)

This report analyses the Before & After results for Programmes 9 to 11. It also lists the schemes undertaken in Programmes 12 and 13, but sufficient 'After' time has not yet elapsed to fully analyse these schemes.

This report outlines the road safety remedial schemes that have been undertaken in Ireland on National Roads between 2004 and 2008. It lists the schemes undertaken each year and summarises the performance of the road safety remedial schemes completed up to 2006. The report also provides an overview of the effectiveness of the different types of schemes up to 2006 with a view to ensuring future programmes deliver value for money. The collision data is not yet available for subsequent years. The report measures the effectiveness of the programmes based on collision data for a 5 year before period and a 3 to 5 year after period.

Road Safety Remedial Schemes:

The target of the road safety remedial programme was to reduce by 30 to 40% the number of collisions occurring at treated sites and to achieve a first year rate of return of 100%.

The first in the series, Programme 1- 1994/1995, had 128 road safety remedial schemes completed at a cost of £1.34 million. In the four and a half year after period there was a reduction of 25 Fatal and 41 Serious injury collisions relative to the before figures. This represented a saving of 6 fatal and 9 serious injury collisions per annum in the after period. This represents 18% fewer collisions. An annual average rate of return of 595% was achieved compared to the target of 100%.

Programme 2- 1996/1997 had 151 road safety remedial schemes completed at a cost of £1.83 million. In the 3 year after period there was a reduction of 18 Fatal and 43 Serious injury collisions relative to the expected numbers. In the three years following completion of the works, there were 108 fewer collisions at these sites than in the equivalent before period. This represents 31% fewer collisions. An annual average rate of return of 408% was achieved compared to the target of 100%.

Programme 3 to 6 –1998 to 2001 had 248 road safety remedial schemes completed at a cost of €8.1million. In the 3 to 5 year after period there was an overall reduction of 73 Fatal collisions, 40 Serious and 131 Minor injury collisions relative to the expected numbers, after controlling for national trends. For an outlay of just under

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€8.1 million there was an overall cost saving of €184 million for the period assessed. The target of a First Year Rate of Return of 100% was exceeded each year.

Programme 7 to 8 – 2002 to 2003 had 180 road safety remedial schemes completed at a cost of €4.9 million. In the 3 to 5 year after period there was an overall reduction of 35 Fatal Collisions, 38 Serious and 97 Minor injury collisions relative to the expected numbers, after controlling for national trends. For an outlay of just under €3.2million there was an overall cost saving of €94 million for the period assessed. The target of a First Year Rate of Return of 100% was exceeded each year.

The target of reducing collisions by between 30 to 40% was only achieved Programmes 4 and 7. The reasons for this are the subject of further review.

All of the above programmes have had a detailed analysis done on the implemented schemes and are available on the NRA website.

This current analysis is a review of programme 9 to 11 – 2004 to 2006 where 387 road safety remedial schemes were completed. The results of the 257 schemes that were assessed are shown below.

Table A – Assessment Results of Schemes in Programmes 9 - 11

Year of Treatment	Programme No	No. of Schemes Assessed	Cost (IM)	After Period (Yrs)	Collision Savings (- Reduction, +Increase)			Annual Average Rate of Return	% Fewer Collisions (- Reduction, +Increase)	Cost Saving in After Period (IM)
					Fatal	Serious	Minor			
2004	9	88	1.6	5	-19	-16	-58	626%	-29%	49
2005	10	77	1.5	4	-1	-14	-51	130%	-24%	8
2006	11	92	2.2	3	-7	-11	-27	294%	-21%	20
Total for Programmes 9 to 11			5.3		-26	-42	-136			77
2007	12	54	1.6	2	-1	-2	-9	*		
2008	13	43	1.2	1	0	-1	-6	*		

* The after period is considered too short for assessment

The above table shows that in the after period assessed for Programmes 9 to 11 there was an overall reduction of 26 Fatal collisions, 42 Serious and 136 Minor injury collisions. For an outlay of just under €5.3 million there was an overall cost saving of €77 million. The target of a First Year Rate of Return of 100% was exceeded each year. The target of reducing collisions by between 30 to 40% was not achieved for any of the 3 years.

The Authority will continue to research, recommend, and implement engineering road safety schemes with our counterparts in the local authorities around the country. These engineering solutions will assist in minimising risk factors across the national road network.

The delivery of the Major Inter-Urban road network – motorways from Dublin to the border, Galway, Limerick, Cork and Waterford – has helped to dramatically reduce the number of fatalities and injuries on national roads. However, in the light of the current slowdown in economic growth and anticipated budget cuts in the next few years, the road building programme of recent years is unlikely to be sustained and the need to leave those currently unimproved sections of road safe until they can be improved / bypassed will be a major challenge for the Road Safety Section.

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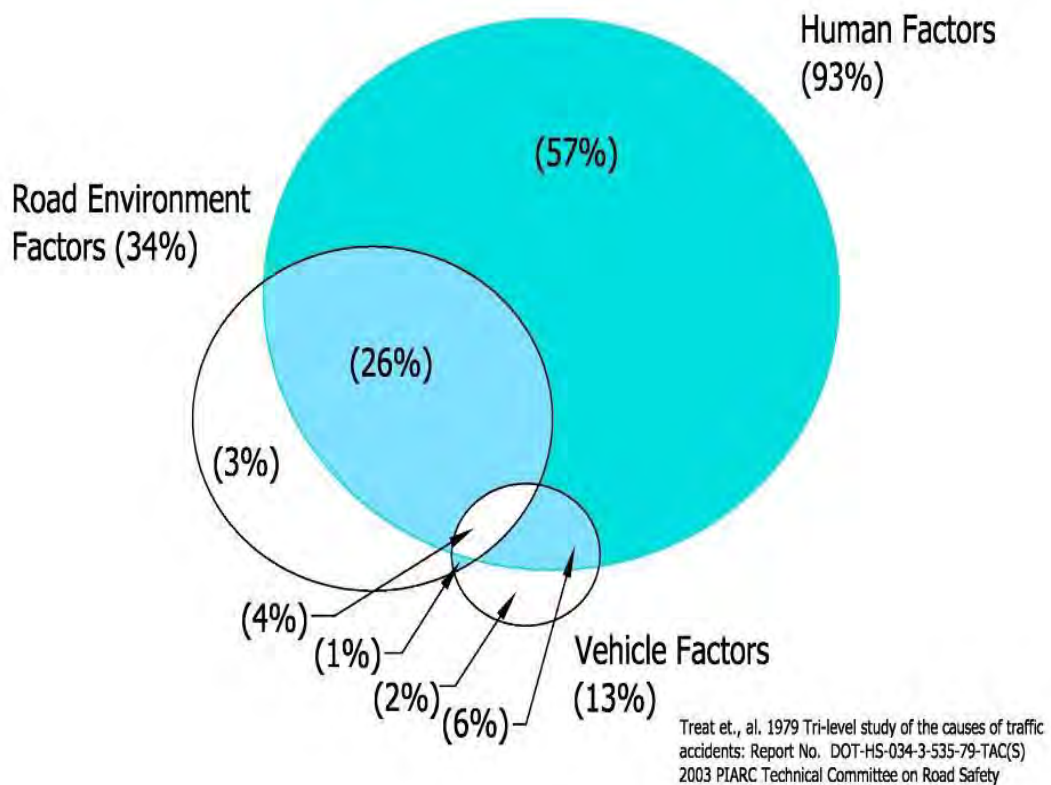
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1. Introduction

1.1. Background

Most road traffic collisions are caused by excessive speed and/or human error, although the road environment is also a contributory factor. See Figure 1 below.

Figure 1 - Tri-Level Study of the cause of Collisions.



Engineering works to reduce collisions on the existing network are implemented through the road safety remedial programmes and traffic calming programmes and are funded by the National Roads Authority.

The location of these collisions and the prioritising of these schemes is based on an analysis of the Garda collision database, which is received from the Road Safety Authority.

The National Roads Authority is committed to considering the potential for collision reduction in all aspects of its work. Within the road safety remedial programme we undertake work at individual sites and along routes to reduce collisions.

Under the terms of the Governments 'Road to Safety Strategy' 2007-2012 the Authority is required to undertake a number of specific tasks, including the implementation of an engineering countermeasures programme. Under this programme, the Authority has undertaken to complete an annual programme of road safety remedial schemes.

The assessment of Programmes 1 to 10, schemes completed between 1994 and 2005, can be found on the NRA web site.

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This report assesses the effectiveness of the road safety remedial programmes which have been completed since then.

A road safety remedial scheme is where an engineering solution is applied to a site with an identified road traffic collision problem. Table B summarises the total number of schemes that have been completed to date, and their cost.

Table B – Road Safety Remedial Costs from 1993 - 2009

Year	Programme No	No of Schemes Completed	Total Cost (€M) in Year of Construction	Average cost of a scheme (€)
1994/95	1	128	1.7	€13,281
1996/97	2	151	2.36	€15,629
1998	3	93	1.73	€18,602
1999	4	100	2.1	€21,000
2000	5	74	2.02	€27,297
2001	6	74	2.48	€33,514
2002	7	76	2.06	€27,105
2003	8	104	2.03	€19,519
2004	9	123	2.47	€20,081
2005	10	114	2.28	€20,000
2006	11	150	4.38	€29,200
2007	12	106	3.78	€35,660
2008	13	86	2.7	€31,395
2009	14	72	2.36	€32,778

1.2. Key Facts

Table C details the total number of collisions and the number of people killed and injured in these collisions on our roads in 2008.

Table C - 2009 Road Collision Facts

Persons Killed	238
Persons Injured	9742
Total Casualties	9980
Fatal Collisions	220
Injury Collisions	6365
Total Collisions	6585

(1)

1.3. Scope

The general guideline parameters for putting schemes into the programme were that each scheme should have an identifiable collision pattern, with at least one reported injury collision per year in the before period. The scheme should have the potential to reduce collisions by 30 to 40% and cost in the region of €1,000 to €50,000.

1.4. Target:

Proposed road safety remedial schemes are prioritised on a first year economic rate of return (FYERR) basis. This compares the expected value of the expected collision reduction with the estimated cost of the remedial works. For the period covered in this report the minimum FYERR level to attract funding was 100%.

1.5. Collision Reports

The Garda Collision report forms (CT68) are forwarded by An Gardaí to the Road Safety Authority (RSA), who then compile the annual Road Collision Facts document based on the forms. They also forward the raw CT68 data to the Authority. The Authority enter the data into a GIS environment and identify collision clusters in the data. These clusters are then analysed by the Road Safety Engineers and the resultant schemes form the core of work for the following year. The original of the collision report form is forwarded by the RSA on to the relevant Local Authority. The RSA database is also distributed to the relevant local authorities through the Local Government Computer Services Board.

This system facilitates the identification, and analysis, of collision clusters as well as providing a history of collision statistics.

1.6. Road Safety Remedial Schemes Assessment

Programme 1	1994/1995 has been assessed in detail in “Evaluation of Programme 1”, which was published in 2001.
Programme 2	1996/1997 has been assessed in detail and the report is available on the NRA web site.
Programmes 3 to 6.	1998 to 2001 are assessed in detail and the report is available on the NRA web site.
Programmes 7 to 8	2002 to 2003 are assessed in detail and the report is available on the NRA web site.
Programmes 9 to 13	2004 to 2008, Each year’s schemes are listed and their assessment summarised, where collision data available, in this report.

2. Evaluation

2.1. Road Safety Remedial Schemes 2004-2006 Programmes 9 to 11

Of the schemes completed under Programme 9 to 11 only a certain number of them have been assessed in this report. The reasons for the non assessment of some of the schemes is varied but in general includes the following:

- Schemes, such as improved pedestrian facilities, were granted funding even though there was no collision history associated with the scheme. This was done where it was felt that pedestrian safety would be improved by the implementation of such schemes.
- Some of the schemes listed in a particular year were a continuation on the previous years schemes where additional funding was required.
- Schemes did not indicate any collision history when the national database was checked. This can occur in the following instances:
 -
 - i) where the relevant local authority has looked at the collision database in detail and corrected the location of collisions which may have been mapped incorrectly on the national database.
 - ii) where the collisions that had occurred had not been reported to Gardai.
 - iii) where a scheme was granted funding in association with other improvement works being carried out at that location by the local authority.

Table D details the number of schemes that were assessed each year.

Table D – Total Costs of Assessed Schemes from 2004 to 2008

Year of Treatment	Programme No	No of Years used in Assessment		No of Schemes Assessed	Cost of Assessed Schemes (Yr 2002 costs -)	
		Before	After			
2004	9	5	5	88	€1,572,586	
2005	10	5	4	77	€1,465,035	
2006	11	5	3	92	€2,234,420	
2007	12	5	2	54	€1,589,900	*
2008	13	5	1	43	€1,168,794	*
* Enough after collision data is not yet available to fully assess Program 12 and 13						

Location maps and detailed information on the schemes assessed between 2004 and 2008 are given in Appendix 1& 2

2.2. Methodology of assessment

All costs were converted to year 2002 figures to enable comparison between the various years. Figures for this were taken from the Central Statistics Office (CSO).

Collision costs for 2002 are taken from the Goodbody Report, 2004. (2)

The assessment did not take into account collisions that occurred in the year of construction, as the exact date of completion of the scheme was unknown.

Results were controlled for collision trends on the Irish national road network. A Statistical test, "the k test", was done on the data. The "k test" is another way of showing the degree of changes that have occurred at a site and whether the change was an increase or decrease. If $k > 1$ there is an increase relative to controls. (3)

The controls used were the National Road network trends.

2.3. Controlling for Confounding Factors

Most studies that evaluate the effect of road safety remedial measures are observational the most common of which is the before-and -after study. These studies take a comparison of the before and after collision figures at the treated sites and make an assessment of the effectiveness of the measure. It is believed by some that simple before-and-after studies, which do not control for any confounding factors, should never be trusted as they can result in misleading figures.

For example, the general collision trend in a region may have increased or decreased which would have an effect on the after results at a treated site. A confounding factor is one that is not influenced by the road safety measure but has an effect on the collision rate at a site, and a resultant effect on the evaluation of the remedial measure.

This report takes account of the general collision trend on Ireland's national roads through out the before and after periods, and makes allowances for them in the assessment of the effectiveness of the road safety remedial schemes. In this case it is reasonable to assume that the comparison group (the relative increase/decrease in collision trends on Ireland's national roads over the same assessment period) captures the effects on collisions of traffic increases/decreases. (4)

2.4. Regression to mean

The random nature of road collisions tends to cause collision frequencies at specific locations to fluctuate. The selection of sites for treatment on the basis of their past collision record can introduce a source of potential bias in measuring the effectiveness of road safety remedial schemes. This arises as the selection process tends to introduce sites at the peak of their fluctuations in collision frequencies, and such sites may tend to experience reductions in collision frequency even if no treatment is applied.

This effect is commonly referred to as "regression to mean". An allowance for the effect of the regression to mean could be made by comparing the change in collision frequency at treated sites against a number of similar untreated control sites. This, however, would involve not treating sites with an identified collision history, which is felt would be unacceptable.

A study by Mountain et al (1998) suggested that up to half the observed reduction in collisions at treated sites could be due to the regression to mean effect. (5)

Another study by Rune Elvik (2002) calculated the effect of "regression-to mean" for a number of different types of road safety measures. Its effect was calculated as a reduction of 20-30% in three of the seven road safety measure types studied, but was negligible in the other four road safety measure types. (4)

This report does not take account of regression to mean but, as an exercise, Appendix 3 shows the effect on the overall results assuming a **worst-case scenario** of an effect of 30% for all scheme types. The findings still shows an overall positive result.

2.5. Economic Evaluation

The “willingness to pay method” is taken to be the most appropriate economic evaluation tool, since it takes account of the benefits arising from reductions in collision severity as well as reductions in frequency.

The effectiveness is analysed by comparing the changes in the before and after period and taking account of the national trends over the same periods of time where available. The overall results are detailed in the chart below.

Figure 2 – Effects on Collisions at Assessed Sites

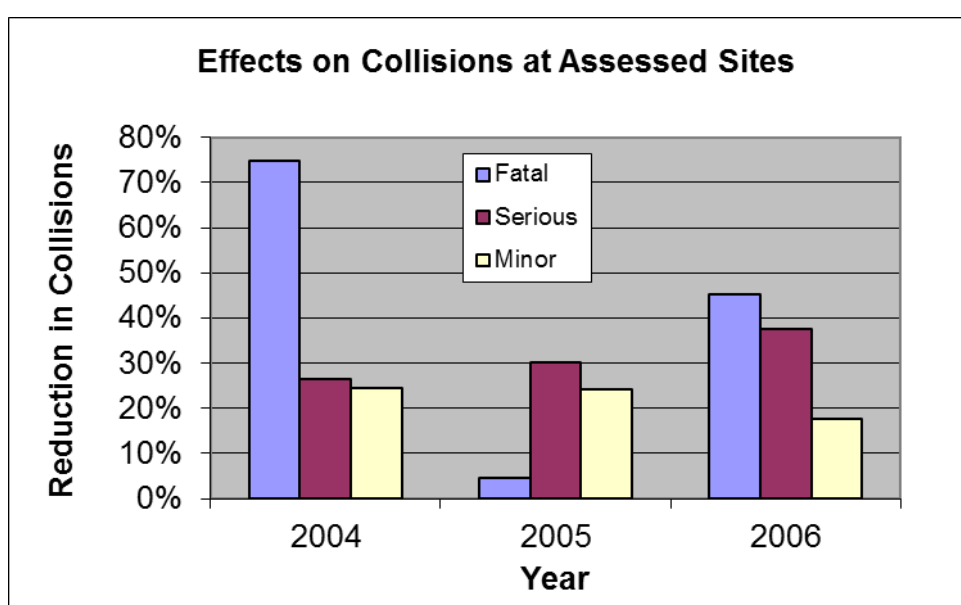


Table E indicates the cost saving, the rate of return and the reduction/increase in number of collisions at the sites for each of the programme years assessed.

Table E – Annual Reduction in Collisions

Year of Treatment	Programme No	% Reduction in Collisions (- Reduction, + Increase)			Total Cost Saving in Assessed Period	Annual Average Rate of Return	% Fewer Collisions (-Reductions, +Increase)
		F	S	M			
2004	9	-75%	-26%	-24%	€47,647,582	626%	-29%
2005	10	-5%	-30%	-24%	€6,133,104	130%	-24%
2006	11	-45%	-38%	-18%	€17,461,792	294%	-21%
2007	12	-19%	-25%	-21%	€987,216	*	*
2008	13	-13%	-14%	-35%	-€227,009	*	*
*The after period is considered too short for assessment					Average	350%	

Table F – Annual Reduction in Collisions

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Year of Treatment	Programme No	(Collision Saving / Year (-Reduction, +Increase))		
		F	S	M
2004	9	-3.7	-3.2	-11.5
2005	10	-0.2	-3.6	-12.9
2006	11	-2.3	-3.8	-9
Total		6	-11	-33

Table G – Annual Collision Cost Savings

Total Cost Savings in Collisions/Year	Number	Cost of Collision (€)	Total Cost (€)
F	6	2280000	14.1
S	11	304600	3.2
M	33	30000	1
Total			18.3

The combined effect of Programmes 9 to 11 at a total cost of €5.3M is an annual saving of €18.3M in collision costs, arising from an annual reduction in the after periods of approximately 6 fatal, 11 serious and 33 minor injury collisions.

2.6. Results by Solution Type

The solutions applied to individual schemes often involved two or more different measures. The most common combination was lining and signing. For the purpose of this assessment a primary solution was given to each scheme based on the information available for the schemes. This is called the Short Solution Description.

The assessment can be seen in Table H

Table H – Rate of Return by Solution Type

Urban/Rural Area	Short Solution Description	No. of Schemes	Total Cost	Avg Cost	% Overall Expenditure	Rate of return
Urban	Antiskid plus other	12	€376,885	€31,407.12	5%	-153%
Urban	Junction realignment	5	€108,339	€21,667.83	2%	493%
Urban	Pedestrian facilities	14	€481,979	€34,427.11	7%	125%
Urban	Signing & Lining	10	€166,180	€16,617.99	2%	432%
Rural	Antiskid plus other	9	€349,039	€38,782.11	5%	269%
Rural	Crash barrier plus other	8	€95,957	€11,994.64	1%	2016%
Rural	Junction Definition	8	€330,087	€41,260.83	5%	99%
Rural	Lighting plus other	4	€183,503	€45,875.71	3%	417%
Rural	Road widening/ narrowing plus other	12	€394,551	€32,879.22	6%	-274%
Rural	Right turn lane plus other	27	€963,009	€35,667	14%	549%
Rural	Sideroad adjustment	6	€110,471	€18,411.92	2%	-1130%
Rural	Sight Distance	28	€1,179,967	€42,141.67	17%	282%
Rural	Sign & Line	93	€1,800,521	€19,360.44	26%	245%
Rural	Surfacing & Sign & Line	12	€333,890	€27,824.19	5%	779%
Total			€6,874,378			

The above results show that some solution types have been much more effective in reducing collisions than others.

The best results in Urban Areas were for Junction Realignment, and Signing & Lining. In Rural Areas - they were Antiskid, Crash Barrier, Lighting, Right Turn Lane, Sight Distance, Signing & Lining schemes and Surfacing.

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Signing & Lining in Urban Areas, Rural Road Widening/Narrowing and Side Road Adjustment all show a negative Rate of Return.

Regarding the outcome of the results based on solution type it is clear that further detailed analysis will need to be done on the schemes that have produced a negative rate of return to investigate why the solution type was not effective and if the scheme type that was implemented needs to be revised.

In a further review the percentage reduction in collisions for the primary solutions types was assessed. The assessment covered the years 1998 to 2004 as the full 5 year before and after data was available.

The results are shown in Table I below.

Table I - Percentage Collision Reduction by Solution Type 1998-2004 with 5yr before and after data.

Urban/Rural Area	Short Solution Description	No. of Schemes	Total Cost (Yr 2002)	% Reduction on Collisions			
				All	Fatal	Serious	Minor
Urban	Antiskid plus other	15	€534,493	26%	100%	12%	26%
Urban	Pedestrian facilities	29	€594,090	-17%	44%	18%	-34%
Urban	RTL	12	€480,818	-16%	86%	74%	-84%
Urban	Signing & Lining	47	€905,067	11%	51%	24%	6%
Rural	Crash barrier plus other	11	€378,200	50%	69%	10%	61%
Rural	Lighting plus other	14	€688,841	67%	100%	69%	56%
Rural	Right turn lane plus other	57	€2,537,147	44%	37%	72%	32%
Rural	Sight Distance	30	€852,463	24%	63%	35%	13%
Rural	Sign & Line	182	€3,005,985	15%	48%	22%	6%
Rural	Surfacing & Sign & Line	24	€1,068,215	34%	39%	25%	36%
Total		421	€11,045,319	20%	52%	32%	10%

As noted in previous reports, the original target of reducing the number of collisions at treated sites by 30 to 40% was not always achieved. In addition treatment of urban sites with pedestrian facilities & right turn lanes increased the overall number of collisions. There was a reduction in Fatal & Serious injury collisions for these two solution types but an increase in Minor injury collisions.

2.7. Statistical Analysis:

A statistical analysis, the Chi Squared test, was carried out to investigate if the change in collisions observed was likely to be a result of real change or due to random fluctuations. This test was done on the data for the year 2004 where the full 5 year before and after data was available. The result indicated that the probability of the after collision numbers occurring due to random fluctuation was less than 0.1%, or there was a greater than 99.9% chance of a real reduction in risk between the before and after period. See Appendix 4

2.8. Examples of Road safety remedial schemes:

Kilnamona (N20), Programme 10, 2005.



Before road safety remedial measure implemented

Problem:

Collisions involving vehicles turning right out of junction being hit from right.

Collisions in the before period:

2 Serious & 2 Minor.



After road safety remedial measure implemented

Measure implemented:

Signing & Lining, High Friction Surfacing.

Collisions in the after period:

1 Minor

Newhill (N8), Programme 9, 2004.



Before road safety remedial measure implemented

Problem:

Collisions involved vehicles turning right into junction being hit by overtaking vehicles.

Collisions in the before period:

1 Fatal & 1 Minor



After road safety remedial measure implemented

Measure Implemented:

Right turn lane.

Collisions in the after period:

1 Minor

Shanbally (N7), Programme 9, 2004



Problem:

Collisions involved vehicles turning right out of junction being hit from right

Collisions in the before period:

2 Minor

Before road safety remedial measure implemented



Measure implemented:

Signing and Lining, High Friction Surfacing.

Collisions in the after period:

None

After road safety remedial measure implemented

Cork Road Kilbary Road, Waverford City (N25), Programme 11, 2006.



Problem:

Collisions involved vehicles turning and pedestrian type collisions

Collisions in the before period:

2 Minor.

Before road safety remedial measure implemented



Measure implemented:

Pedestrian refuge island
extend footpath, narrow
junction

Collisions in the after period:

1 Minor

After road safety remedial measure implemented

3. Conclusions

The combined effect of Programmes 9 to 11 at a total cost of €5.3 million is an annual saving of €18.3m in collision costs, arising from an annual reduction in the 'after' periods of approximately 6 fatal, 11 serious and 33 minor injury collisions.

The results show that some solution types have been much more effective in reducing collisions than others.

Three of the 14 listed solution types showed an overall negative result, they were Antiskid in urban areas, Road Widening/Narrowing in rural area and Side Road Adjustment in rural area. These schemes accounted for 13% of the schemes assessed. It is interesting to note that in previous assessments Road Widening/Narrowing and Side Road Adjustment in rural area consistently show negative results. These account for approximately 7% of treated schemes.

All the other treatment types showed a positive result of at least 100%, or well in excess of it. This accounted for 87% of the schemes treated.

From the results outlined in the evaluation it is clear that the road safety remedial schemes as a whole are economically justified, exceeding the target 100% rate of return.

The second target though, of reducing the overall number of collisions at the treated sites by 30 to 40%, was not achieved in any of the three years assessed. This shows that treatments are not as good as expected at reducing the overall level of collisions at the sites. This will need to be reviewed when setting future targets.

Regarding the outcome of the results based on solution type it is clear that further detailed analysis will need to be done on the schemes that have produced a negative rate of return to investigate why the solution type was not effective and if the scheme types that were implemented need to be revised.

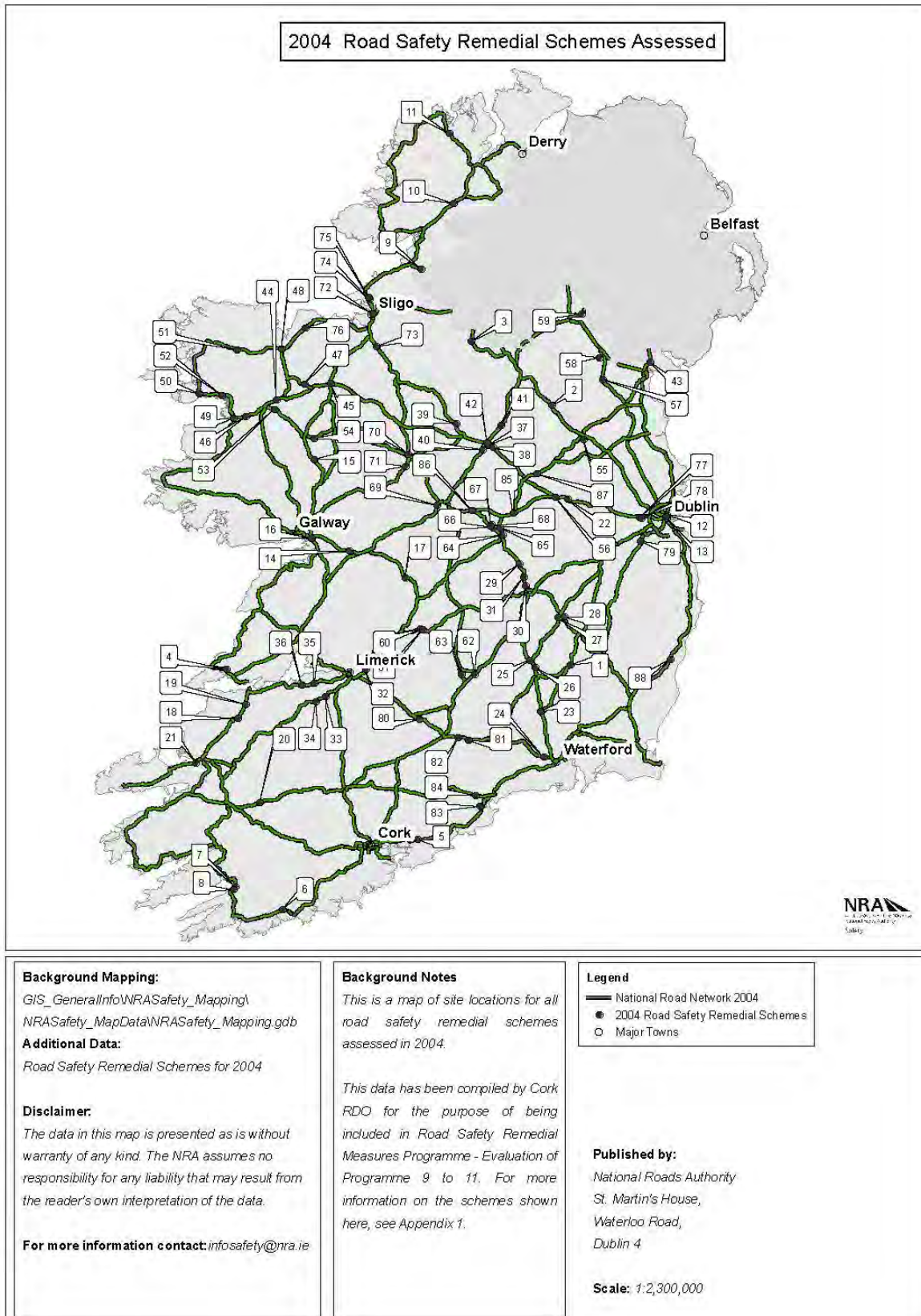
This report provides the basis for which road safety engineers can look back at solution types that have not performed well in order to assess if an alternative solution is required or whether engineering measures are not suitable to treat certain collision problems. It also helps in deciding on the best solution type for future schemes to ensure that future programmes deliver value for money.

In light of the current slowdown in economic growth and anticipated budget cuts in the next few years, the road building programme of recent years, which has delivered significant gains to road safety in Ireland, is unlikely to be sustained. The need to leave those currently unimproved sections of road safe until they can be improved / bypassed will be a major challenge for the Road Safety Section.

4. References

1. **Road Safety Authority.** *Road Collision Facts 2009, RS5.* December, 2010.
2. **Roads Service, Traffic Information & Control Centre.** *Road Safety Engineering Report.* 2003.
3. **Goodbody Economic Consultants.** *Cost Benefit Parameters and Application Rules for Transport Project Appraisal.* 2004.
4. **Department of the Environment.** *A Guide to Road Safety Engineering in Ireland.* 1996.
5. **National Roads Authority.** *Road Collision Facts 1993 to 2004.*
6. **Elvik, Rune.** *The importance of confounding in observational before-and-after studies of road safety measures.* 2002. *Accident Analysis and Prevention* 34 (631 - 635).

1. Appendix - Site location maps and scheme details with collision data



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88 Schemes Assessed, 2004			Total cost in year of construction	€1,722,768	Before (5 Yr data)			After (5 Yr data)		
			Number of Accidents per year		5	12	47	1	5	34
Sch No	LA	Rt	Scheme Description	Cost	F	S	M	F	S	M
1	Carlow	9	Wells Cross South of Royal Oak Junction	€8,553	0	0	2	0	0	0
2	Cavan	3	Lisgrey	€15,427	0	2	1	0	0	1
3	Cavan	87	Bawnmore to Derrynagrieve	€10,000	0	0	4	0	0	2
4	Clare	67	Moyasta	€7,008	0	1	4	0	1	2
5	Cork S	25	Churchtown	€5,298	0	0	3	0	1	1
6	Cork W	71	Connonagh signs & barrier	€8,799	0	3	1	0	0	0
7	Cork W	71	Donemark Bridge, Bantry.	€5,798	0	1	0	0	1	2
8	Cork W	71	Bantry Town	€27,460	0	0	2	0	2	3
9	Donegal	3	Beeleek Road	€1,429	2	0	0	0	0	1
10	Donegal	15	Meencarragh	€15,000	0	1	3	0	0	0
11	Donegal	56	Straggedy - Derriscligh	€10,021	2	0	0	0	0	1
12	Dublin	1	Drumcondra -Clonliffe Road North Junction	€1,389	0	1	10	0	0	7
13	Dublin	1	Dorset St Junction - Granby row - St. Marys Place North Junction	€9,996	0	0	12	0	1	11
14	Galway	6	Meadow court jcn additional (Capped)	€2,080	0	1	1	0	0	1
15	Galway	17	Cloonacross	€3,867	0	1	1	0	0	1
16	Galway	18	Rocklands Junction	€4,503	0	3	8	0	0	1
17	Galway	65	Portumna	€3,607	0	1	2	0	1	0
18	Kerry	69	Bolton's Cross	€1,000	0	1	0	1	0	1
19	Kerry	69	Leitrim	€7,519	0	0	4	0	0	0
20	Kerry	72	Gortnahaneboy (Shrone Cross)	€16,897	0	1	0	0	1	1
21	Kerry	86	Tonavane (Small scale)	€6,709	1	0	0	0	0	2
22	Kildare	4	Leinster Bridge to Blackwater Bridge Junction	€20,000	5	7	12	0	2	17
23	Kilkenny	10	Floodhall to Whitecastle	€35,619	0	2	4	1	1	7
24	Kilkenny	24	Ballygriffin to AGLISH	€38,147	1	0	4	0	0	1
25	Kilkenny	77	Georges Tree to Ardaloo	€65,450	2	2	4	0	0	2
26	Kilkenny	77	Baun to Dunmore	€2,584	0	0	1	1	0	2
27	Laois	78	Wandesford Bridge	€9,805	0	0	3	0	0	0
28	Laois	80	Coolanowle	€10,988	1	1	0	0	0	0
29	Laois	80	Nyra	€9,962	1	0	5	0	0	0
30	Laois	80	Clonreher	€4,187	0	1	1	0	1	0
31	Laois	80	Clonsoghey	€10,022	1	1	9	0	0	0
32	Limerick	7	Howley's Cross	€6,780	0	0	2	0	0	1

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

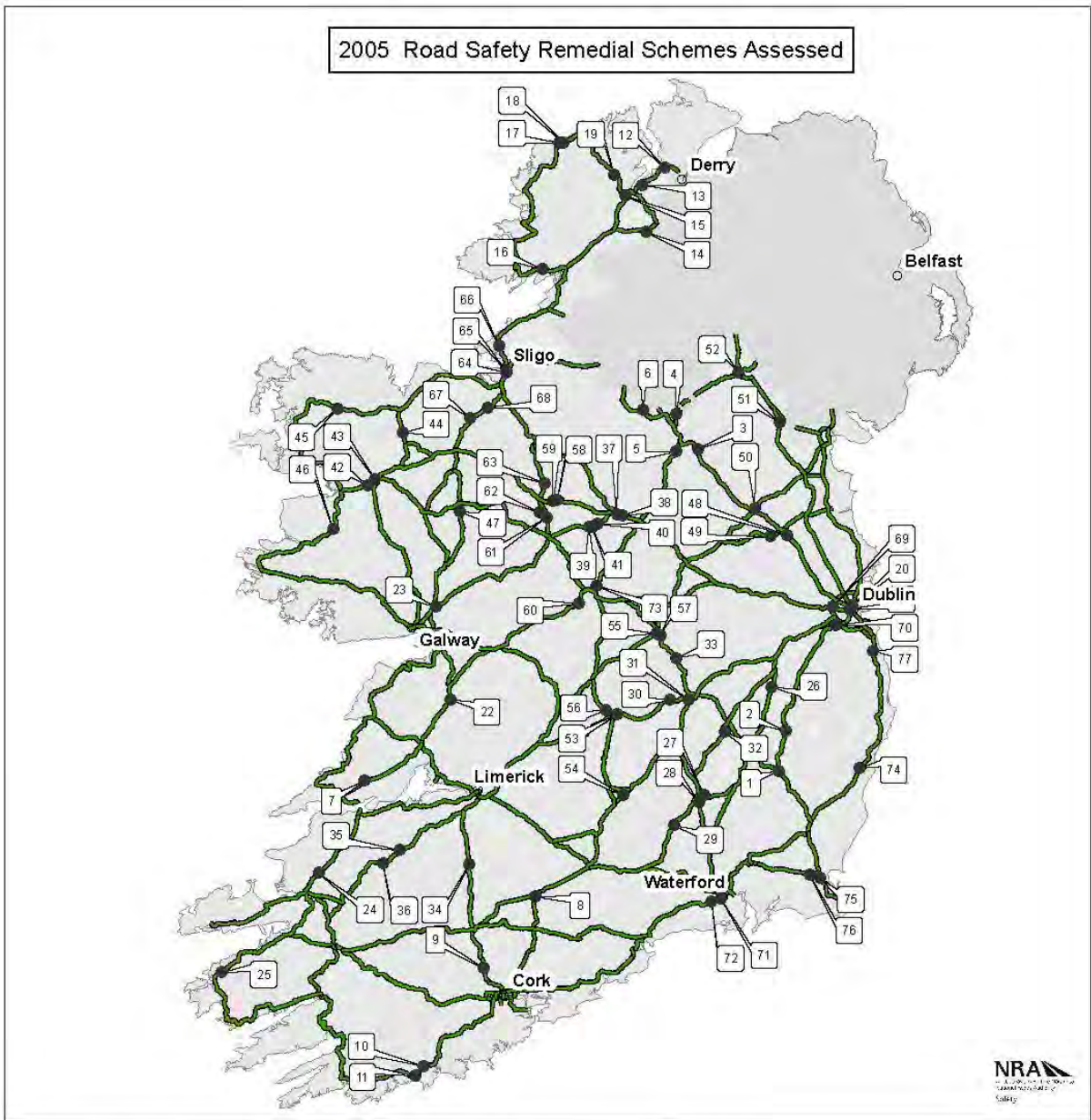
88 Schemes Assessed, 2004			Total cost in year of construction	€1,722,768	Before (5 Yr data)			After (5 Yr data)		
			Number of Accidents per year		5	12	47	1	5	34
Sch No	LA	Rt	Scheme Description	Cost	F	S	M	F	S	M
33	Limerick	21	Murphy's Cross, Adare	€30,000	1	0	3	0	0	4
34	Limerick	21	Croagh bypass	€40,843	1	1	9	0	0	5
35	Limerick	69	Cowpark	€4,001	0	0	1	1	0	0
36	Limerick	69	Wyeth Junction	€7,074	0	0	1	0	0	0
37	Longford	4	Garryandrew (1 material damage accident)	€17,801	1	0	3	0	1	2
38	Longford	4	Killsallagh	€25,574	0	1	5	0	1	2
39	Longford	4	Ballagh (5 material damage accidents reported)	€5,571	0	0	2	0	0	1
40	Longford	55	Crossea (2 material damage accidents reported)	€20,241	0	1	2	0	0	0
41	Longford	55	Granard / Lisryan junction	€14,353	0	1	0	0	1	0
42	Longford	55	Castlepollard junction	€10,947	0	0	3	0	0	0
43	Louth	1	Aghnaskeagh Jnt	€1,729	0	0	1	0	0	0
44	Mayo	5	Gortnafolla junction	€15,203	0	1	2	0	0	0
45	Mayo	5	junction at Charlestown	€5,250	0	0	1	0	1	3
46	Mayo	5	Kilbree	€5,986	0	1	4	0	1	4
47	Mayo	26	Cloongullaun Bridge	€17,809	0	1	0	0	0	1
48	Mayo	59	N59 Crossmolina Road Ballina at Carrs Corner	€10,262	0	0	2	0	0	0
49	Mayo	59	N59 Junction with R335 at Westport	€2,982	0	0	2	0	1	0
50	Mayo	59	Mulranny Village	€26,078	0	0	1	0	0	0
51	Mayo	59	Dooleeg	€12,530	0	1	3	0	0	0
52	Mayo	59	Knockbreagan, Newport to Mulranny Road	€4,317	0	1	1	0	0	1
53	Mayo	60	Kilknock	€16,100	1	0	2	0	0	0
54	Mayo	60	Cullmore junction	€38,000	0	0	0	0	0	1
55	Meath	3	Bloomsbury	€18,881	1	0	4	0	0	0
56	Meath	4	Edenderry Road (R 401) Junction, Kinnegad	€28,349	0	1	2	0	0	2
57	Monaghan	2	Carrickmacross Main Street	€11,096	0	2	2	0	0	3
58	Monaghan	2	LCRM Castleblayney Pedestrian Crossing	€45,112	1	0	3	0	0	5
59	Monaghan	12	Tamlat Jnt	€4,707	0	0	1	0	0	1
60	Nth Tipp	7	Lissanisky Cross	€18,129	0	0	1	0	0	1
61	Nth Tipp	7	Shanbally Cross	€27,484	0	0	2	0	0	0
62	Nth Tipperary	8	Newhill Junction	€47,566	1	0	1	0	0	1
63	Nth Tipperary	62	Turtulla Cross	€30,970	0	0	1	0	0	1

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

88 Schemes Assessed, 2004			Total cost in year of construction	€1,722,768	Before (5 Yr data)			After (5 Yr data)		
			Number of Accidents per year		5	12	47	1	5	34
Sch No	LA	Rt	Scheme Description	Cost	F	S	M	F	S	M
64	Offaly	52	Pedestrian crossing outside Tullamore Hospital	€22,901	0	1	1	0	1	1
65	Offaly	52	N52, Durrow Crossroads	€4,004	0	0	1	0	0	1
66	Offaly	80	N80, Coolnahely Junction	€3,399	0	1	0	0	0	0
67	Offaly	80	N80, Kildangan Junction	€2,589	0	0	3	0	0	0
68	Offaly	80	N80, Ashfield Junction and Bends	€2,681	0	1	0	0	0	1
69	Roscommon	6	Crannagh - Summerhill	€61,792	0	2	2	0	0	1
70	Roscommon	63	Ranelagh	€7,279	0	1	2	0	0	1
71	Roscommon	63	Ballgalda or Trust	€10,601	0	0	5	1	0	4
72	Sligo City	15	Duck Street Junction (N16)	€103,683	0	0	5	0	1	14
73	Sligo	4	Drumfin X Rds (L1401 and L5502)	€39,678	0	3	4	0	0	3
74	Sligo	15	Milltown X Rds (L3404)	€25,168	0	0	1	0	0	1
75	Sligo	15	Gortarowry X Rds (L7403 and L7308)	€40,825	1	1	2	0	0	2
76	Sligo	59	Culleens	€39,993	0	0	2	0	1	3
77	Sth Dublin	4	N4 at Kennelsfort Road Junction	€69,357	0	0	1	0	0	0
78	Sth Dublin	4	N4 at Newcastle / Adamstown	€80,257	0	0	10	0	2	11
79	Sth Dublin	81	N81 Embankment Road (Signing and Lining)	€48,758	0	3	12	0	3	11
80	Sth Tipperary	24	Kilshane	€45,602	0	0	1	0	1	2
81	Sth Tipperary	24	Condons Cross, Ballingarrane	€14,160	0	0	1	0	0	0
82	Sth Tipperary	24	Derrygrath (Part Funding)	€89,807	1	0	2	0	0	1
83	Waterford	25	The Sweep	€2,208	0	0	5	0	0	1
84	Waterford	72	Ballylemon	€4,298	0	0	3	0	0	3
85	Westmeath	6	Torque, west of Tyrrellspass	€11,652	0	1	1	0	0	0
86	Westmeath	6	Moate	€11,908	0	1	0	0	0	0
87	Westmeath	52	Kilynan	€9,610	0	0	1	0	0	1
88	Wexford	11	Tinnock N11	€19,709	0	1	0	0	0	1

*2 year after data only assessed as further scheme in 2007

Road Safety Remedial Measures Programme Evaluation of Programme 9 to 11



Background Mapping:
 GIS_GeneralInfo\NRASafety_Mapping\
 NRASafety_MapData\NRASafety_Mapping.gdb

Additional Data:
 Road Safety Remedial Schemes for 2005

Disclaimer:
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For more information contact: infosafety@nra.ie

Background Notes

This is a map of site locations for all road safety remedial schemes assessed in 2005.

This data has been compiled by Cork RDO for the purpose of being included in Road Safety Remedial Measures Programme - Evaluation of Programme 9 to 11. For more information on the schemes shown here, see Appendix 1.

Legend

- National Road Network 2005
- 2005 Road Safety Remedial Schemes
- Major Towns

Published by:
 National Roads Authority
 St. Martin's House,
 Waterloo Road,
 Dublin 4

Scale: 1:2,300,000

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

77 Schemes Assessed 2005			Total cost in year of construction	€1,598,283	Before Yr data) (5			After data) (4 Yr		
			Number of accidents per year		4	12	53	3	5	39
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
1	Carlow	81	Closh Cross Junction	€6,321		1	4	1	1	1
2	Carlow	81	Cuckoo Corner	€40,000	0	0	2	0	0	0
3	Cavan	3	Knockanoark	€20,000	0	4	2	0	2	0
4	Cavan	54	Gannon's "X" at Corrard	€15,000	0	0	2	0	0	2
5	Cavan	55	Clarebane Bridge	€2,000	0	0	2	0	0	0
6	Cavan	87	Jnt at Petrol Station at Ballyconnell Bridge	€15,000	0	0	1	0	0	1
7	Clare	68	Derycrossaun Cross Junction and Approach	€8,000	0	2	0	0	0	2
8	Cork N	8	Traffic Lights at Mitchelstown	€25,817	0	0	3	0	0	2
9	Cork S	20	Kilnamona N20, Junction to Grenagh	€19,413	0	2	2	0	0	1
10	Cork W	71	Curragh, East of Lissarda. Junction on bend.	€8,500	0	1	3	0	0	2
11	Cork W	71	Newmills E of Roscarbery. 1.2km series of bends.	€9,569	0	0	2	0	0	0

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

77 Schemes Assessed 2005			Total cost in year of construction	€1,598,283	Before (5 Yr data)			After (4 Yr data)		
77 Schemes Assessed 2005			Number of accidents per year		4	12	53	3	5	39
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
12	Donegal	13	Slab road junction Burt chapel	€8,000	0	0	2	0	1	0
13	Donegal	13	Newtown to Drumbarnet	€20,000	1	0	5	3	1	7
14	Donegal	15	Cloughfin/Clady junction	€25,000	1	0	0	0	1	3
15	Donegal	56	Lurgybrack School	€83,459	1	0	0	0	0	3
16	Donegal	56	Drumbeagh	€4,994	1	0	1	0	0	1
17	Donegal	56	Smullen's corner, Falcarragh	€3,000	0	2	1	0	0	2
18	Donegal	56	Ray, Ballyboe, Falcarragh	€12,000	0	0	2	0	1	0
19	Donegal	56	Mullaheep junction	€6,341	0	0	1	0	0	1
20	Dublin	1	Dorset Street - Circular Road North	€24,106	0	1	20	0	1	8
21	Dublin	4	Merchants quay - Ushers Quay - Bridge St Lower	€6,834	0	0	6	0	2	5
22	Galway	18	Tulla Road R462 Junction	€22,898	0	0	1	1	0	0
23	Galway	63	Roanmore Cross	€18,644	0	0	3	0	0	0
24	Kerry	69	Rea	€14,251	0	1	0	0	0	0

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

77 Schemes Assessed 2005			Total cost in year of construction	€1,598,283	Before (5 Yr data)			After (4 Yr data)		
			Number of accidents per year		4	12	53	3	5	39
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
25	Kerry	70	Knockaunrory junction, Cahersiveen	€220	0	1	0	1	0	0
26	Kildare	9	Ballymount Construction	€58,415	0	0	1	0	0	2
27	Kilkenny	10	Lyrath to Scart	€8,099	1	2	3	0	0	7
28	Kilkenny	10	Outrath	€10,000	0	0	2	0	0	3
29	Kilkenny	76	Kilbride to Ahanure	€18,000	0	1	3	0	1	0
30	Laois	7	Redcastle to Clonenagh	€40,000	1	1	2	0	0	0
31	Laois	8	Togher Roundabout	€20,000	0	1	2	0	0	2
32	Laois	78	The Rushes	€5,884	1	1	2	0	0	1
33	Laois	80	Laught Cross	€9,000	1	0	0	0	0	0
34	Limerick	20	Creggane	€10,000	0	0	2	0	1	0
35	Limerick	21	Garryduff Cross	€150,000	1	0	0	0	0	2
36	Limerick	21	Junction with R515	€7,500	0	0	1	0	0	2
37	Longford	4	East approach to Dublin roundabout	€69,004	0	0	2	0	0	1
38	Longford	4	Lissardowan	€14,000	0	0	1	0	0	1
39	Longford	63	Barnacor	€10,000	0	0	4	0	1	0
40	Longford	63	Kilashee West	€4,424	0	0	2	0	0	1
41	Longford	63	Rappareehill bends	€7,285	0	1	1	0	0	0
42	Mayo	5	Clonkeen	€6,000	0	0	2	0	0	0

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

77 Schemes Assessed 2005			Total cost in year of construction	€1,598,283	Before (5 Yr data)			After (4 Yr data)		
			Number of accidents per year		4	12	53	3	5	39
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
43	Mayo	5	Knockaphunta	€15,000	0	0	3	0	0	2
44	Mayo	26	Coolcronan	€15,000	0	0	1	0	0	0
45	Mayo	59	Bellacorick PS	€15,000	0	0	1	0	0	0
46	Mayo	59	Erriff Bridge	€5,000	1	0	0	0	0	0
47	Mayo	83	Corraun to Grallagh	€8,896	0	1	1	0	0	0
48	Meath	3	Kilcarn - Cannistown	€30,000	0	0	7	0	0	2
49	Meath	51	RS Halltown junction at post N51-0150	€12,852	1	0	2	0	0	1
50	Meath	52	Maudlin Bridge	€16,066	0	2	2	0	0	3
51	Monaghan	2	Broomfield Junction	€5,518	0	0	1	0	0	3
52	Monaghan	2	Coolshannagh, Monaghan Town	€19,745	0	0	2	0	0	0
53	Nth Tipperary	7	Roscrea Golf club Racht Hall	€29,992	0	1	2	1	1	0
54	Nth Tipperary	8	Lackins Cross Littleton Thurles	€40,000	0	0	1	0	0	0
55	Offaly	52	Charleville Gate	€6,000	0	0	1	0	0	1
56	Offaly	62	Drumakeenan School	€50,000	0	1	0	0	0	1
57	Offaly	80	Clonminch to Derrybeg	€8,000	0	2	1	0	0	7
58	Roscommon	5	Cloonfree east	€30,000	0	1	1	0	0	1

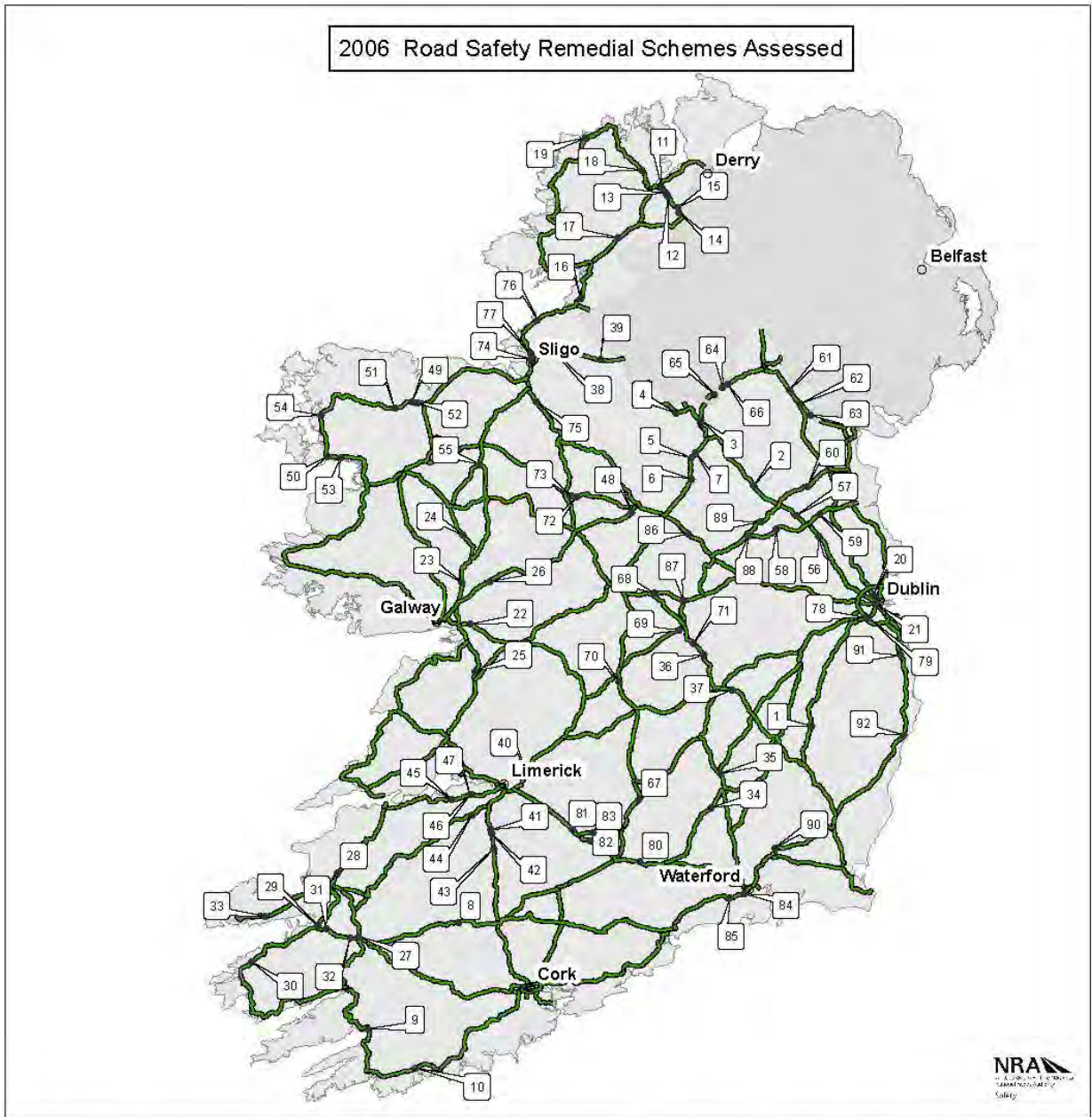
Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

77 Schemes Assessed 2005			Total cost in year of construction	€1,598,283	Before (5 Yr data)			After (4 Yr data)		
			Number of accidents per year		4	12	53	3	5	39
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
59	Roscommon	5	Cloonfree west	€25,333	0	0	1	0	1	0
60	Roscommon	6	Creggan	€40,000	0	0	1	1	0	0
61	Roscommon	61	Four mile house	€40,000	1	0	3	0	0	0
62	Roscommon	61	Grange	€21,306	0	0	1	0	0	0
63	Roscommon	61	Shankill	€17,391	0	0	2	0	0	1
64	Sligo City	4	Pearse Rd, Kierans Rd. Junction	€25,000	0	0	2	0	0	2
65	Sligo City	4	Pearse Rd, Mail Coach Rd, Junction	€20,000	0	0	2	0	0	1
66	Sligo	15	Cashelgarran	€25,000	1	0	1	0	0	2
67	Sligo	17	Muckelty, Tubbercurry	€10,000	0	0	1	0	0	2
68	Sligo	17	Ropified junction	€14,422	0	2	3	0	0	1
69	Sth Dublin	4	N4/M50 Roundabout	€20,000	1	1	21	0	1	12
70	Sth Dublin	81	Belgard Road Junction	€21,701	0	0	12	0	1	5
71	Waterford City	25	Cork Road, at Land Registry Waterford	€18,307	0	0	12	0	0	4
72	Waterford	25	Traffic Route Treatment	€38,000	7	23	70	3	3	35
73	Westmeath	55	Ballykeeran	€9,000	1	0	0	0	0	0
74	Wexford	11	Inch	€27,000	0	0	2	0	0	1
75	Wexford	25	Clonard	€6,000	0	0	2	0	0	0

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

77 Schemes Assessed 2005			Total cost in year of construction	€1,598,283	Before (5 Yr data)			After (4 Yr data)		
			Number of accidents per year		4	12	53	3	5	39
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
76	Wexford	25	Larkins Cross	€30,000	0	2	4	1	0	3
77	Wicklow	11	Kilarney Rd Western Roundabout, Anti Skid Surface	€15,776	0	0	2	0	0	4

Road Safety Remedial Measures Programme Evaluation of Programme 9 to 11



Background Mapping:

GIS_GeneralInfo\NRASafety_Mapping\
NRASafety_MapData\NRASafety_Mapping.gdb

Additional Data:

Road Safety Remedial Schemes for 2006

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Background Notes

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Legend

- National Road Network 2006
- 2006 Road Safety Remedial Schemes
- Major Towns

Published by:

National Roads Authority
St. Martin's House, Waterloo Road,
Dublin 4

Scale: 1:2,300,000

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

92 Schemes Assessed in 2006			Total cost in year of construction	€2,480,459	Before (5 Yr data)			After (3 Yr data)		
Number of accidents per year					5	10	51	2	4	42
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
1	Carlow	81	Rathvilly Bridge - Footpath	€4,528	0	0	1	0	0	0
2	Cavan	3	Virginia south to Magera	€90,000	1	1	10	1	1	1
3	Cavan	54	Kilnaglare	€16,288	0	1	3	0	0	0
4	Cavan	54	N87 / L-1054-0 at Ballyhugh	€18,504	0	0	2	0	0	0
5	Cavan	55	Lacken Cross	€30,000	0	1	2	0	0	0
6	Cavan	55	L2525 at Kilcogy	€1,029	0	0	1	0	0	0
7	Cavan	55	R154 Main Street	€32,841	0	1	0	0	0	0
8	Cork	72	Drumcummer, Millstreet.	€13,722	0	1	4	0	0	2
9	Cork	71	Dromkeal/Snave	€7,888	0	0	2	0	0	1
10	Cork	71	Myross Wood	€21,075	0	1	0	0	1	0
11	Donegal	14	Ballyboe X	€24,413	1	0	0	0	0	0
12	Donegal	14	Ballyholey Far	€17,405	3	0	4	0	0	4
13	Donegal	14	Doorable	€5,404	0	0	6	0	0	0
14	Donegal	14	Rossgier	€22,572	0	1	5	0	0	1
15	Donegal	14	X Roads, L-2414	€4,286	0	1	2	0	0	0
16	Donegal	15	Behy Hill, 4Km NE of Ballyshannon	€14,517	1	0	3	1	0	3
17	Donegal	15	Lough Mourne	€7,557	0	3	4	0	0	1
18	Donegal	56	Bluebanks	€16,532	0	1	2	0	0	0

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

92 Schemes Assessed in 2006			Total cost in year of construction	€2,480,459	Before (5 Yr data)			After (3 Yr data)		
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
19	Donegal	56	52/53, Falcarragh Town	€3,639	1	0	3	0	0	3
20	Dublin	2	Finglas Road - Ballyboggan Road Junction	€8,233	0	0	8	0	0	4
21	Dublin	4	Chruch Street Bridge (2 Junction)	€41,111	0	2	18	0	1	11
22	Galway	6	Derrydonnell Jcn	€10,738	1	0	4	0	0	3
23	Galway	17	Corofin	€28,898	0	0	3	0	0	0
24	Galway	17	Milltown Jcn	€5,501	0	0	1	0	0	0
25	Galway	18	Kiltartan	€2,078	0	1	4	0	2	0
26	Galway	63	Abbeyknockmoy	€16,190	0	0	1	0	0	0
27	Kerry	22	Coolgarriv junction	€110,399	0	2	2	0	0	0
28	Kerry	69	Leith East Cross	€15,541	0	0	1	0	0	2
29	Kerry	70	Bansha	€17,439	0	2	1	0	0	1
30	Kerry	70	Deelis Cahersiveen	€13,592	0	1	2	0	0	0
31	Kerry	72	Coolbane	€22,080	0	0	2	0	0	2
32	Kerry	72	Fossa, R563 junction	€33,641	0	0	1	0	0	0
33	Kerry	86	Aghnalack Bends	€22,456	0	0	1	0	0	0
34	Kilkenny	76	Ballymack	€25,000	0	1	4	0	0	1
35	Kilkenny	77	Junction with N78	€22,884	0	1	3	0	0	2
36	Laois	80	Clonaghadoo	€2,830	1	0	1	0	0	0
37	Laois	80	Park Grange	€8,663	1	1	2	0	0	0

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

92 Schemes Assessed in 2006			Total cost in year of construction	€2,480,459	Before (5 Yr data)			After (3 Yr data)		
			Number of accidents per year		5	10	51	2	4	42
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
38	Leitrim	16	Glencar-Waterfall jnt	€165,894	0	0	1	0	0	0
39	Leitrim	16	Sradrine, Lacoan and Sranagross	€51,347	1	1	1	0	0	0
40	Limerick	7	Junction with Bog Road north of Daly's Cross	€23,293	0	0	3	0	0	2
41	Limerick	20	Ballymacrory Cross	€7,329	0	0	1	0	0	1
42	Limerick	20	Banogue Village	€4,097	1	0	0	0	0	1
43	Limerick	20	Rockhill Cross	€9,305	0	0	1	0	0	3
44	Limerick	21	Coffey's Cross, Adare	€3,679	0	1	0	0	0	0
45	Limerick	69	Ballyengland Lower	€16,412	2	2	8	0	0	7
46	Limerick	69	Bolane	€8,842	0	0	1	0	0	3
47	Limerick	69	Hegarty's Cross	€63,550	1	1	1	0	0	1
48	Longford	63	Athlone Rd Junction	€18,051	0	0	2	0	0	2
49	Mayo	59	Ardagh	€17,790	0	0	2	0	0	0
50	Mayo	59	Corraun Junction	€15,350	0	1	0	0	0	1
51	Mayo	59	Freeheens junction	€1,889	0	0	1	0	0	0
52	Mayo	59	L5149 jct Ballina	€26,791	0	0	1	0	0	1
53	Mayo	59	Newfield	€15,043	0	0	2	0	0	0
54	Mayo	59	Shrahamonragh	€27,419	0	0	0	0	0	2
55	Mayo	83	Ballyhaunis/Charlestown Rd. junction	€24,377	0	1	0	0	0	1

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

92 Schemes Assessed in 2006			Total cost in year of construction	€2,480,459	Before (5 Yr data)			After (3 Yr data)		
Number of accidents per year					5	10	51	2	4	42
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
56	Meath	3	Dalغان Park Entrance	€96,033	0	1	1	0	0	2
57	Meath	3	Finnegans N3	€32,046	0	2	7	0	1	0
58	Meath	51	Ballyboy Junction with R164	€6,360	0	0	3	0	0	0
59	Meath	51	Wickers Cross	€32,762	0	0	1	0	0	1
60	Meath	52	Stokes Cross N52/L-1604	€16,496	0	0	2	0	0	0
61	Monaghan	2	Annyalla, minor road junction	€4,891	0	1	2	0	0	1
62	Monaghan	2	N53 Junction in Castleblaney	€46,181	0	0	2	0	0	1
63	Monaghan	53	Ballynacarry Bridge on County Boundary with Armagh	€17,537	0	0	1	0	0	0
64	Monaghan	54	Monaghan Road, Clones	€51,246	0	0	1	0	0	0
65	Monaghan	54	A3 Drumully to Clonoony SB	€39,336	0	0	1	0	0	1
66	Monaghan	54	Road Edges, Monaghan Road, Clones	€31,887	0	0	1	0	0	2

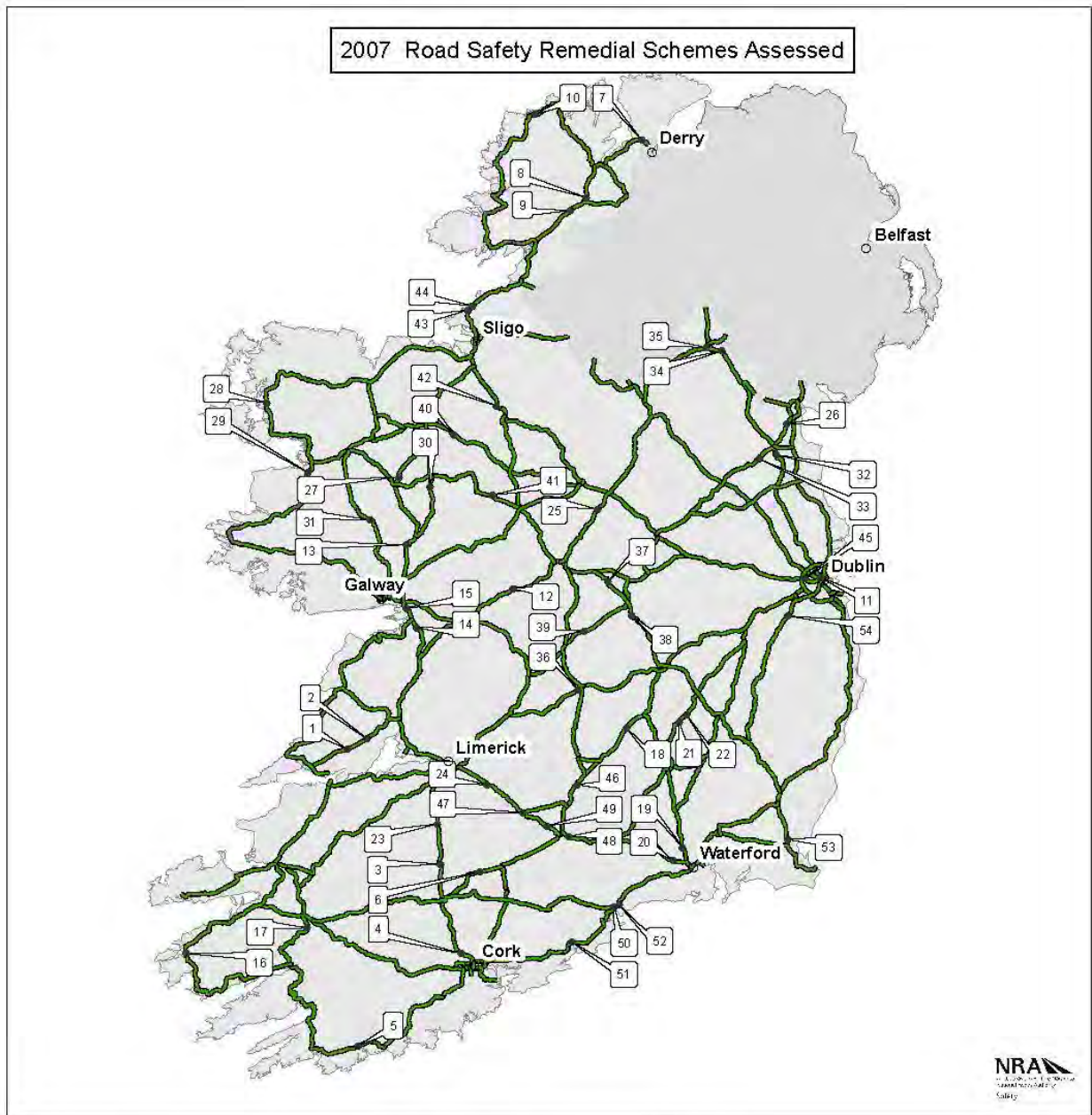
Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

92 Schemes Assessed in 2006			Total cost in year of construction	€2,480,459	Before (5 Yr data)			After (3 Yr data)		
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
67	Nth Tipperary	8	Maxwells Cross (near H&J)	€18,099	1	0	2	0	0	0
68	Offaly	6	The Well, Moate	€17,623	0	2	2	0	0	0
69	Offaly	52	Fingerboard Junction, (Part 2)	€6,635	0	0	1	0	0	1
70	Offaly	62	Ballyeighan	€5,488	0	0	1	0	0	1
71	Offaly	80	Pigeon House, Killeigh	€4,969	0	0	1	0	0	0
72	Roscommon	5	Ardakillin	€45,130	0	0	5	0	0	1
73	Roscommon	5	Cloonanart Beg	€89,532	0	0	1	0	0	0
74	Sligo City	15	Scotsman's Walk Jct.	€20,000	0	0	1	0	0	0
75	Sligo	4	Cloonlurg	€40,021	1	0	2	0	0	0
76	Sligo	15	Cross Roads at Creevykeel	€20,090	0	0	1	0	0	0
77	Sligo	17	Junction at Rahabaena	€24,704	0	0	2	0	0	0
78	Sth Dublin	81	N81/M50 Roundabout	€48,413	0	1	12	0	0	2
79	Sth Dublin	81	Spawell Roundabout	€57,204	0	0	4	0	0	6
80	Sth Tipperary	24	Barne Pub Junction	€83,217	0	0	1	0	1	0
81	Sth Tipperary	24	Barronstown Cross, Limerick Junction	€11,032	0	1	2	0	0	0

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

92 Schemes Assessed in 2006			Total cost in year of construction	€2,480,459	Before (5 Yr data)			After (3 Yr data)		
Number of accidents per year					5	10	51	2	4	42
Sch No	LA	Rt	Scheme Name	Cost	F	S	M	F	S	M
82	Sth Tipperary	24	Kavanagh's Cross , Cloonfinglas, Bansha	€98,530	0	1	0	0	0	0
83	Sth Tipperary	74	Kilfeakle	€6,619	0	1	0	0	0	0
84	Waterford City	25	Cork Rd Kilbarry Rd, Waterford City	€22,662	0	0	2	0	0	1
85	Waterford	25	East of Tramore cross rds	€29,461	1	3	8	0	0	4
86	Westmeath	4	Larc junction	€1,225	0	0	1	0	0	0
87	Westmeath	6	Kilbeggan	€77,521	0	0	1	0	0	0
88	Westmeath	51	Delvin Village	€43,277	0	0	1	1	0	7
89	Westmeath	52	North of Clonmellon	€9,918	1	0	2	0	0	1
90	Wexford	30	Ferrybridge	€46,949	0	1	4	1	0	3
91	Wicklow	11	Glenview South Bound Left-off	€5,724	0	0	1	0	0	0
92	Wicklow	11	Observation Platforms and Traffic Management	€11,709	6	5	37	3	6	24

Road Safety Remedial Measures Programme Evaluation of Programme 9 to 11



Background Mapping:

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NRASafety_MapData\NRASafety_Mapping.gdb

Additional Data:

Road Safety Remedial Schemes for 2007

Disclaimer:

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For more information contact: info.safety@nra.ie

Background Notes

This is a map of site locations for all road safety remedial schemes assessed in 2007.

This data has been compiled by Cork RDO for the purpose of being included in Road Safety Remedial Measures Programme - Evaluation of Programme 9 to 11. For more information on the schemes shown here, see Appendix 1.

Legend

- National Road Network 2007
- 2007 Road Safety Remedial Measures
- Major Towns

Published by:

National Roads Authority
St. Martin's House,
Waterloo Road,
Dublin 4

Scale: 1:2,300,000

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

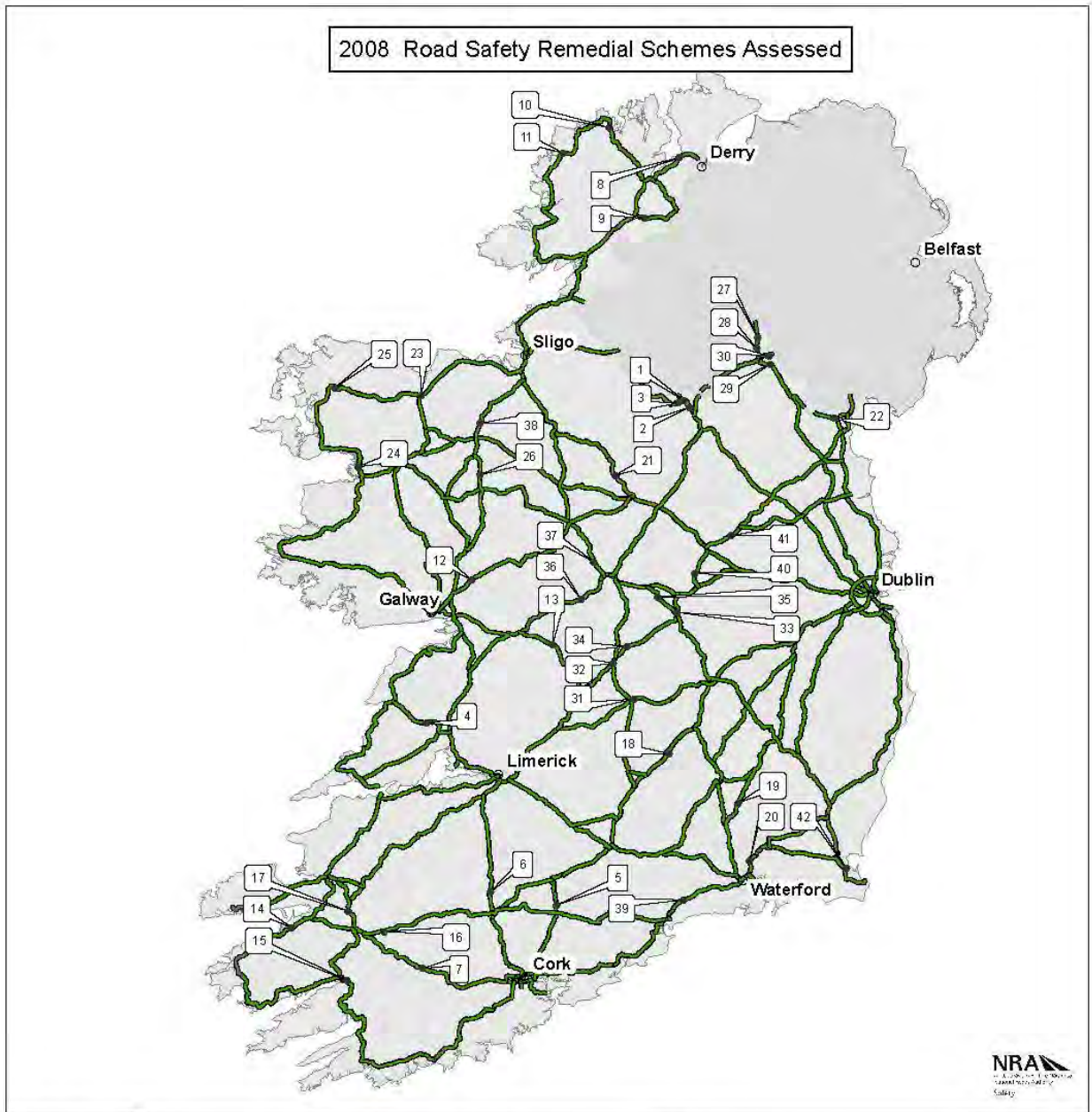
54 Schemes Assessed, 2007			Total cost in year of construction	€1,758,384	Before (5 Yr data)			After (2Yr data)		
			Number of collisions per year		2	3	20	1	2	18
Sch No	LA	Rt	Scheme Description	Cost	F	S	M	F	S	M
1	Clare	68	Sullivan's Cross	€76,190	0	0	3	0	1	1
2	Clare	68	Boree Log	€3,071	1	0	0	0	0	0
3	Cork	20	Lisballyhea	€5,647	0	0	1	0	0	0
4	Cork	20	Blarney Slip Road	€16,575	0	0	1	0	0	0
5	Cork	71	Kilfadeen Junction to Union Hall	€182,551	0	0	0	0	0	0
6	Cork	73	Kildorrery Ped Crossing	€33,726	0	0	1	0	0	0
7	Donegal	13	Bridgeend	€11,028	0	0	3	0	0	1
8	Donegal	13	Tircallen	€42,060	1	0	5	0	0	0
9	Donegal	15	Blackburn Bridge	€2,231	1	0	1	0	0	4
10	Donegal	56	Carrowcannon	€137,266	0	0	0	0	0	0
11	Dublin	1	LCRM Schemes National Roads	€8,772	0	0	10	0	1	2
12	Galway	6	Ballinasloe Ped Crossing	€157,808	0	1	0	0	0	2
13	Galway	17	Claretuam Junction	€41,567	0	1	3	0	0	1
14	Galway	18	Kiltiernan National School	€34,071	0	1	0	0	0	0
15	Galway	18	Creganna Junction	€11,450	0	0	1	0	1	0
16	Kerry	70	Creamery Cross	€21,217	0	0	1	0	0	1
17	Kerry	71	Muckcross-Torc Signs	€19,634	0	1	2	0	0	1
18	Kilkenny	8	Colnacrutta junction	€3,500	0	0	1	0	0	0
19	Kilkenny	9	Rossinan Railway Level Crossing	€10,463	0	0	3	0	0	1
20	Kilkenny	24	Rathkieran Junction	€11,743	1	0	0	0	0	0
21	Kilkenny	78	Coolbawn Junction	€2,646	0	0	1	0	0	0
22	Laois	78	Crettyard	€4,500	0	1	0	0	0	0
23	Limerick	20	O'Rourke's Cross	€89,360	0	0	2	1	0	1
24	Limerick	24	Dromkeen Bend	€1,673	1	0	2	0	0	0
25	Longford	55	Carrickboy	€20,000	0	1	1	0	0	0
26	Louth	52	Walterstown Cross	€9,392	1	1	0	0	0	2
27	Mayo	17	Barnacarroll	€19,036	0	0	3	0	0	1
28	Mayo	59	Lettera Junction	€5,000	0	0	1	0	0	0
29	Mayo	59	Knappagh	€5,000	0	1	0	0	0	1
30	Mayo	83	Levallyroe	€8,898	0	0	2	0	0	0
31	Mayo	84	Loughanboy	€15,090	1	0	0	0	0	0
32	Meath	52	N52/R165 Junction	€12,413	0	0	1	0	0	1
33	Meath	52	Woodtown	€15,994	0	1	1	0	0	2

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

54 Schemes Assessed, 2007			Total cost in year of construction	€1,758,384	Before (5 Yr data)			After (2Yr data)		
			Number of collisions per year		2	3	20	1	2	18
Sch No	LA	Rt	Scheme Description	Cost	F	S	M	F	S	M
34	Monaghan	2	R214 Junction, Green Mile	€40,700	0	0	2	0	0	0
35	Monaghan	54	St. Davnett's	€25,566	0	0	1	0	0	2
36	Nth Tipperary	7	Junction at Pintown, Roscrea	€20,266	0	0	1	1	0	0
37	Offaly	80	Curragh Road junction	€966	0	0	1	0	0	0
38	Offaly	80	Scrub Cross	€1,931	0	1	0	0	0	0
39	Offaly	52	Carraghmore	€4,858	0	0	2	0	0	1
40	Roscommon	5	Kilkeeran to Bohalas	€69,430	1	0	2	0	0	0
41	Roscommon	60	Killinraghty Big	€59,200	0	1	0	0	0	0
42	Sligo	4	Ballinafad	€13,925	0	0	1	0	0	0
43	Sligo	15	Grange ped crossing	€38,711	0	0	1	0	0	0
44	Sligo	15	Money Gold School	€6,048	1	0	2	0	0	0
45	Sth Dublin	81	N4 The Oval Junction	€44,170	1	0	8	0	0	3
46	Sth Tipperary	8	Ballytarsna Bends	€331	0	1	5	0	0	0
47	Sth Tipperary	24	Tipperary Town	€9,115	0	0	4	0	0	0
48	Sth Tipperary	24	Molls Cross	€54,000	0	1	4	0	0	0
49	Sth Tipperary	24	Tankerstown Cross	€374	0	0	1	0	1	2
50	Waterford	25	Tarrs Bridge N25/N72 Junction	€25,000	0	1	4	0	0	0
51	Waterford	25	Youghal Bridge	€7,000	0	0	1	0	0	0
52	Waterford	25	Kileen Deelish	€172,395	0	2	6	0	0	2
53	Wexford	11	Kitestown Cross Roads	€24,826	1	0	1	0	0	2
54	Wicklow	81	The Lamb Junction	€100,000	0	0	2	0	0	1

* Assess 3 yr before data only as 2004 scheme.

Road Safety Remedial Measures Programme Evaluation of Programme 9 to 11



Background Mapping:

GIS_GenerallInfo\NRASafety_Mapping\
NRASafety_MapData\NRASafety_Mapping.gdb

Additional Data:

Road Safety Remedial Schemes for 2008

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Background Notes

This is a map of site locations for all road safety remedial schemes assessed in 2008.

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Legend

- National Road Network 2008
- 2008 Road Safety Remedial Measures
- Major Towns

Published by:
National Roads Authority
St. Martin's House,
Waterloo Road,
Dublin 4

Scale: 1:2,300,000

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

43 Schemes Assessed, 2008			Total cost in year of construction	€1,276,868	Before (5 Yr data)			After (1Yr data)		
			Number of collisions per year		2	4	18	1	2	13
Sch No	LA	Rt	Scheme Description	Cost	F	S	M	F2	S3	M4
1	Cavan Co Co	3	Belturbet Main St Ped Xing	€50,036	0	1	2	0	0	0
2	Cavan Co Co	3	Drumalure, Dunne's Garage, L1510	€15,000	0	0	2	0	0	0
3	Cavan Co Co	3	Belturbet, R201 Junction	€10,000	0	0	1	0	0	0
4	Clare Co Co	84	Kilnamona	€26,941	0	1	1	0	0	1
5	Cork Co Co	8	Downeys Bridge	€21,160	0	0	1	0	0	0
6	Cork Co Co	20	Ballybeg	€23,315	0	1	3	1	0	0
7	Cork Co Co	22	Ballymakeera	€27,610	0	0	3	0	0	0
8	Donegal Co Co	13	Moneess, 4Km W of Bridgend	€13,985	1	2	4	0	0	0
9	Donegal Co Co	15	Carricknamanna, 5Km E of stranorlar	€24,922	0	1	5	0	0	0
10	Donegal Co Co	56	Cashelmore, 3Km N of Creeslough	€21,683	0	0	2	0	1	0
11	Donegal Co Co	56	Gweedore Station	€34,001	0	1	1	0	0	0
12	Galway Co Co	63	Annagh Cross	€37,534	0	0	3	0	0	0
13	Galway Co Co	65	Killimor School Pedestrian Crossing	€24,816	0	0	1	0	0	0
14	Kerry Co Co	70	Caragh Bridge	€33,604	0	0	2	0	0	0
15	Kerry Co Co	71	Bend near Gortnadullagh, Kenmare	€10,731	0	1	1	0	0	0
16	Kerry Co Co	72	Barraduff Bridge	€9,422	0	1	2	0	0	0
17	Kerry Co Co	72	Leamnaguilla RTL	€119,805	0	0	3	0	0	0
18	Kilkenny Co Co	8	Johnstown - main crossroads	€21,591	0	0	0	0	0	1
19	Kilkenny Co Co	9	Roadmarkings at Kilfane	€7,894	1	3	1	0	0	0
20	Kilkenny Co Co	25	Junction at Curraghmore	€20,300	1	0	0	0	0	0
21	Longford Co Co	4	Cloonart to Deerpark	€7,313	0	1	6	0	0	2
22	Louth Co Co	53	Cullaville	€49,622	1	1	2	0	0	2

Road Safety Remedial Measures Programme
Evaluation of Programme 9 to 11

43 Schemes Assessed, 2008			Total cost in year of construction	€1,276,868	Before (5 Yr data)			After (1Yr data)		
			Number of collisions per year		2	4	18	1	2	13
Sch No	LA	Rt	Scheme Description	Cost	F	S	M	F2	S3	M4
23	Mayo Co Co	59	Mini roundabouts in Ballina Town	€15,758	0	0	6	0	0	1
24	Mayo Co Co	59	Westport – Newport Rd at Buckfield Junction	€10,449	0	1	2	0	0	0
25	Mayo Co Co	59	Bangor – Bellacorick at Bellanumera	€15,000	0	0	2	0	0	0
26	Mayo Co Co	83	Ballyhaunis-Tooreen	€14,037	0	1	0	0	0	0
27	Monaghan Co Co	2	Emyvale Main Street	€27,367	0	0	3	0	1	0
28	Monaghan Co Co	2	Drumgeeny	€25,181	0	0	1	0	0	0
29	Monaghan Co Co	2	Castleshane Minor Road Junction	€24,980	1	0	0	0	0	0
30	Monaghan Co Co	12	Tullylish (Monaghan Mushrooms)	€17,973	0	0	2	0	0	1
31	Nth Tipperary Co Co	7	Roscrea Bypass Roundabout approaches	€40,703	0	0	5	0	0	2
32	Offaly Co Co	52	Wilmer Ped Crossing	€21,588	0	0	1	0	0	1
33	Offaly Co Co	52	Arden Rd Tullamore	€16,664	0	2	0	0	0	0
34	Offaly Co Co	52	Fivealley to Kilcormac Warning Signs	€4,441	1	0	4	0	0	0
35	Offaly Co Co	80	Moate Rd Clara	€11,308	0	0	1	0	0	1
36	Roscommon Co Co	6	Cloonulty - N6 / L7595 / L7616	€30,698	0	0	1	0	0	0
37	Roscommon Co Co	61	Moyvannan (Athlone)	€50,804	0	0	2	0	0	0
38	Sligo Co Co	17	Local road junction on a bend with the N17 at Drumbaun	€29,998	1	0	1	0	0	0
39	Waterford Co Co	25	Newtown Cross	€72,908	0	1	0	0	0	0
40	Westmeath Co Co	52	Mullingar Sth incl Dalystown	€178,991	3	2	8	0	0	1
41	Westmeath Co Co	52	Coole (Willamstown)	€41,734	0	0	1	0	0	0
42	Wexford Co Co	25	Rosslare Road Roundabout	€15,001	0	0	2	0	0	0

2. Appendix - Solution Type

In/Out BUA	Road Type	Local Authority	Rt	Scheme Description	Year 2002 costs	Sch No	F Colls before /year	S Colls before /year	M Colls before /year	F Colls after /year	S Colls after /year	M Colls after /year	F Colls after /year, adjusted	S Colls after /year, adjusted	M Colls after /year, adjusted	Short Solution Description	Year
O	Junction	Carlow	9	Wells Cross South of Royal Oak Junction	€9,370	1	0	0	0.4	0	0	0	0	0	0	Signing & Lining	2004
O	Junction	Cavan	3	Lisgrey	€16,900	2	0	0.4	0.2	0	0	0.25	0	0	0.26	RTL	2004
O	Length	Cavan	87	Bawnmore to Derrynagrieve	€10,955	3	0	0	0.8	0	0	0.25	0	0	0.26	Signing & Lining	2004
O	Length	Clare	67	Moyasta	€7,677	4	0	0.2	0.8	0	0.25	0.5	0	0.35	0.53	Signing & Lining	2004
O	Junction	Cork	25	Churchtown	€5,804	5	0	0	0.6	0	0.25	0.25	0	0.35	0.26	Signing & Lining	2004
O	Bend	Cork	71	Connonagh signs & barrier	€9,639	6	0	0.6	0.2	0	0	0	0	0	0	Crash barrier plus other such as Signing & Lining	2004
O	Bend	Cork	71	Donemark Bridge, Bantry.	€6,352	7	0	0.2	0	0	0.25	0.5	0	0.35	0.53	Signing & Lining	2004
I	Length	Cork	71	Bantry Town	€30,082	8	0	0	0.4	0	0.5	0.25	0	0.7	0.26	Pedestrian Facilities	2004
O	Length	Donegal	3	Beeleek Road	€1,565	9	0.4	0	0	0	0	0.25	0	0	0.26	Signing & Lining	2004
O	Bend	Donegal	15	Meencarragh	€16,433	10	0	0.2	0.6	0	0	0	0	0	0	Antiskid plus other such as Signing & Lining, ladder bar	2004

Road Safety Remedial Measures Programme Evaluation of Programme 9 to 11

In/Out BUA	Road Type	Local Authority	Rt	Scheme Description	Year 2002 costs	Sch No	F Colls before /year	S Colls before /year	M Colls before /year	F Colls after /year	S Colls after /year	M Colls after /year	F Colls after /year, adjusted	S Colls after /year, adjusted	M Colls after /year, adjusted	Short Solution Description	Year
O	B	Donegal	56	Straggedy - Derrisligh	€10,978	11	0.4	0	0	0	0	0.25	0	0	0.26	Signing & Lining	2004
I	Junction	Dublin	1	Drumcondra - Clonliffe Road North Junction	€1,522	12	0	0.2	2	0	0	1	0	0	1.05	Pedestrian Facilities	2004
I	Junction	Dublin	1	Dorset St Junction - Granby row - St. Marys Place North Junction	€10,951	13	0	0	2.4	0	0.25	2.25	0	0.35	2.36	Antiskid & other such as pedestrian barrier, traffic signal upgrade or signage	2004
O	Junction	Galway	6	Meadow court jcn additional (Capped)	€2,279	14	0	0.2	0.2	0	0	0.25	0	0	0.26	Sight Distance & Other	2004
O	Junction	Galway	17	Cloonacross	€4,236	15	0	0.2	0.2	0	0	0.25	0	0	0.26	Signing & Lining	2004
O	Junction	Galway	18	Rocklands Junction	€4,933	16	0	0.6	1.6	0	0	0.25	0	0	0.26	Road Widening/Narrowing including removal or introduction of deceleration or acceleration lanes, plus other such as Signing & Lining, pedestrian facilities	2004
I	Length	Galway	65	Portumna	€3,951	17	0	0.2	0.4	0	0.25	0	0	0.35	0	Pedestrian Facilities	2004
O	Junction	Kerry	69	Bolton's Cross	€1,096	18	0	0.2	0	0.25	0	0.25	0.29	0	0.26	Signing & Lining	2004
O	Junction	Kerry	69	Leitrim	€8,237	19	0	0	0.8	0	0	0	0	0	0	Signing & Lining	2004

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O	Junction	Kerry	72	Gortnahaneboy (Shrone Cross)	€18,511	20	0	0.2	0	0	0.25	0	0	0.35	0	Signing & Lining	2004
O	Junction	Kerry	86	Tonavane (Small scale)	€7,350	21	0.2	0	0	0	0	0.5	0	0	0.53	Signing & Lining	2004
O	Length	Kildare	4	Leinster Bridge to Blackwater Bridge Junction	€21,910	22	1	1.4	2.4	0	0.5	3.75	0	0.7	3.94	Speed Camera & Signing & Lining	2004
O	Length	Kilkenny	10	Floodhall to Whitecastle	€39,021	23	0	0.4	0.8	0.25	0.25	1.25	0.29	0.35	1.31	Signing & Lining	2004
O	Length	Kilkenny	24	Ballygriffin to Aglish	€41,790	24	0.2	0	0.8	0	0	0	0	0	0	Sight Distance & Other	2004
O	Length	Kilkenny	77	Georges Tree to Ardaloo	€71,700	25	0.4	0.4	0.8	0	0	0.5	0	0	0.53	Sight Distance & Other	2004
O	Length	Kilkenny	77	Baun to Dunmore	€2,831	26	0	0	0.2	0.25	0	0.25	0.29	0	0.26	Signing & Lining	2004
O	B	Laois	78	Wandesford Bridge	€10,741	27	0	0	0.6	0	0	0	0	0	0	Signing & Lining	2004
O	B	Laois	80	Coolanowle	€12,037	28	0.2	0.2	0	0	0	0	0	0	0	Signing & Lining	2004
O	Junction	Laois	80	Nyra	€10,913	29	0.2	0	1	0	0	0	0	0	0	Signing & Lining	2004
O	Junction	Laois	80	Clonreher	€4,587	30	0	0.2	0.2	0	0.25	0	0	0.35	0	Signing & Lining	2004
O	Length	Laois	80	Clonsoghey	€10,979	31	0.2	0.2	1.8	0	0	0	0	0	0	Signing & Lining	2004
O	Junction	Limerick	7	Howley's Cross	€7,427	32	0	0	0.4	0	0	0.25	0	0	0.26	Signing & Lining	2004

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O	Junction	Limerick	21	Murphy's Cross, Adare	€32,865	33	0.2	0	0.6	0	0	0.75	0	0	0.79	Surfacing & Signing & Lining	2004
O	Junction	Limerick	21	Croagh bypass	€44,744	34	0.2	0.2	1.8	0	0	1	0	0	1.05	Lighting plus other such as rumbles, sight distance, pedestrian facilities or sign & line	2004
O	Junction	Limerick	69	Cowpark	€4,383	35	0	0	0.2	0.25	0	0	0.29	0	0	Signing & Lining	2004
O	Junction	Limerick	69	Wyeth Junction	€7,750	36	0	0	0.2	0	0	0	0	0	0	Signing & Lining	2004
O	Junction	Longford	4	Garryandrew (1 material damage accident)	€19,501	37	0.2	0	0.6	0	0.25	0.5	0	0.35	0.53	Signing & Lining	2004
O	Length	Longford	4	Killsallagh	€28,016	38	0	0.2	1	0	0.25	0.25	0	0.35	0.26	Signing & Lining	2004
O	Junction	Longford	4	Ballagh (5 material damage accidents reported)	€6,103	39	0	0	0.4	0	0	0.25	0	0	0.26	Signing & Lining	2004
O	Junction	Longford	55	Crossea (2 material damage accidents reported)	€22,174	40	0	0.2	0.4	0	0	0	0	0	0	Signing & Lining	2004

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I	Junction	Longford	55	Granard / Lisryan junction	€15,724	41	0	0.2	0	0	0.25	0	0	0.35	0	Junction realignment	2004
I	Junction	Longford	55	Castlepollard junction	€11,992	42	0	0	0.6	0	0	0	0	0	0	Signing & Lining	2004
O	Junction	Louth	1	Aghnaskeagh Jnt	€1,894	43	0	0	0.2	0	0	0	0	0	0	Signing & Lining	2004
O	Junction	Mayo	5	Gortnafolla junction	€16,655	44	0	0.2	0.4	0	0	0	0	0	0	RTL	2004
I	Junction	Mayo	5	junction at Charlestown	€5,751	45	0	0	0.2	0	0.25	0.5	0	0.35	0.53	Signing & Lining	2004
O	Junction	Mayo	5	Kilbree	€6,558	46	0	0.2	0.8	0	0.25	0.5	0	0.35	0.53	Sight Distance & Other	2004
O	Length	Mayo	26	Cloongullaun Bridge	€19,510	47	0	0.2	0	0	0	0.25	0	0	0.26	Signing & Lining	2004
I	Junction	Mayo	59	N59 Crossmolina Road Ballina at Carrs Corner	€11,242	48	0	0	0.4	0	0	0	0	0	0	Signing & Lining	2004
I	Junction	Mayo	59	N59 Junction with R335 at Westport	€3,267	49	0	0	0.4	0	0.25	0	0	0.35	0	Signing & Lining	2004
O	Junction	Mayo	59	Mulranny Village	€28,568	50	0	0.2	0.2	0	0	0	0	0	0	Sight Distance	2004
O	Length	Mayo	59	Dooleeg	€13,727	51	0	0.2	0.6	0	0	0	0	0	0	Surfacing & Signing & Lining	2004
O	Length	Mayo	59	Knockbreagan, Newport to Mulranny Road	€4,729	52	0	0.2	0.2	0	0	0.25	0	0	0.26	Sight Distance & Other	2004
O	Length	Mayo	60	Kilknock	€17,638	53	0.2	0	0.4	0	0	0	0	0	0	Signing & Lining	2004

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O	Junction	Mayo	60	Cullmore junction	€41,629	54	0	0	0	0	0	0	0	0	0	RTL plus other such as Side Road Realignment or sight distance	2004
O	Junction	Meath	3	Bloomsbury	€20,684	55	0.2	0	0.8	0	0	0	0	0	0	RTL	2004
I	Junction	Meath	4	Edenderry Road (R 401) Junction, Kinnegad	€31,056	56	0	0.2	0.4	0	0	0.5	0	0	0.53	RTL	2004
I	Length	Monaghan	2	Carrickmacross Main Street	€12,156	57	0	0.4	0.4	0	0	0.75	0	0	0.79	Pedestrian Facilities	2004
I	Length	Monaghan	2	LCRM Castleblayney Pedestrian Crossing	€49,420	58	0.2	0	0.6	0	0	1	0	0	1.05	Pedestrian Facilities	2004
O	Junction	Monaghan	12	Tamlat Jnt	€5,157	59	0	0	0.2	0	0	0.25	0	0	0.26	Side road adjustment such as regrade, buildout or realign	2004
O	Junction	Nth Tipperary	7	Lissanisky Cross	€19,860	60	0	0	0.2	0	0	0.25	0	0	0.26	RTL	2004
O	Junction	Nth Tipperary	7	Shanbally Cross	€30,109	61	0	0	0.4	0	0	0	0	0	0	RTL	2004
O	Junction	Nth Tipperary	8	Newhill Junction	€52,109	62	0.2	0	0.2	0	0	0	0	0	0	RTL	2004
O	Junction	Nth Tipperary	62	Turtulla Cross	€33,928	63	0	0	0.2	0	0	0.25	0	0	0.26	Sight Distance & Other	2004

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I	Length	Offaly	52	Pedestrian crossing outside Tullamore Hospital	€25,088	64	0	0.2	0.2	0	0.25	0.25	0	0.35	0.26	Pedestrian Facilities	2004
O	Junction	Offaly	52	N52, Durrow Crossroads	€4,386	65	0	0	0.2	0	0	0.25	0	0	0.26	Signing & Lining	2004
O	Junction	Offaly	80	N80, Coolnahely Junction	€3,724	66	0	0.2	0	0	0	0	0	0	0	Signing & Lining	2004
O	Junction	Offaly	80	N80, Kildangan Junction	€2,836	67	0	0	0.6	0	0	0	0	0	0	Signing & Lining	2004
O	Junction	Offaly	80	N80, Ashfield Junction and Bends	€2,937	68	0	0.2	0	0	0	0.25	0	0	0.26	Signing & Lining	2004
O	Length	Roscommon	6	Crannagh - Summerhill	€67,693	69	0	0.4	0.4	0	0	0.25	0	0	0.26	Lighting plus other such as rumbles, sight distance, pedestrian facilities or sign & line	2004
O	Junction	Roscommon	63	Ranelagh	€7,974	70	0	0.2	0.4	0	0	0.25	0	0	0.26	Signing & Lining	2004
O	Length	Roscommon	63	Ballgalda or Trust	€11,613	71	0	0	1	0.25	0	0.5	0.29	0	0.53	Signing & Lining	2004

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O	Junction	Sligo City	15	Duck Street Junction (N16)	€113,585	72	0	0	1	0	0.25	1.5	0	0.35	1.58	Road Widening/Narrowing including removal or introduction of deceleration or acceleration lanes, plus other such as Signing & Lining, pedestrian facilities	2004
O	Junction	Sligo	4	Drumfin X Rds (L1401 and L5502)	€43,467	73	0	0.6	0.8	0	0	0.25	0	0	0.26	Sight Distance & Other	2004
O	Junction	Sligo	15	Milltown X Rds (L3404)	€27,572	74	0	0	0.2	0	0	0	0	0	0	RTL	2004
O	Junction	Sligo	15	Gortarowry X Rds (L7403 and L7308)	€44,724	75	0.2	0.2	0.4	0	0	0.5	0	0	0.53	RTL	2004
O	Length	Sligo	59	Culleens	€43,812	76	0	0	0.4	0	0.25	0.5	0	0.35	0.53	Sight Distance & Other	2004
I	Junction	Sth Dublin	4	N4 at Kennelsfort Road Junction	€75,981	77	0	0	0.2	0	0	0	0	0	0	Antiskid & other such as pedestrian barrier, traffic signal upgrade or signage	2004
I	Junction	Sth Dublin	4	N4 at Newcastle / Adamstown	€87,922	78	0	0	2	0	0.5	2.25	0	0.7	2.36	Antiskid & other such as pedestrian barrier, traffic signal upgrade or signage	2004

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O	Length	Sth Dublin	81	N81 Embankment Road (Signing and Lining)	€53,414	79	0	0.6	2.4	0	0.75	2.25	0	1.04	2.36	Surfacing & Signing & Lining	2004
O	Junction	Sth Tipperary	24	Kilshane	€49,957	80	0	0	0.2	0	0.25	0.5	0	0.35	0.53	Road Widening/Narrowing including removal or introduction of deceleration or acceleration lanes, plus other such as Signing & Lining, pedestrian facilities	2004
O	Junction	Sth Tipperary	24	Condons Cross, Ballingarrane	€15,512	81	0	0	0.2	0	0	0	0	0	0	RTL	2004
O	Junction	Sth Tipperary	24	Derrygrath (Part Funding)	€98,384	82	0.2	0	0.4	0	0	0.25	0	0	0.26	RTL	2004
O	Length	Waterford	25	The Sweep	€2,419	83	0	0	1	0	0	0.25	0	0	0.26	Signing & Lining	2004
O	Length	Waterford	72	Ballylemon	€4,708	84	0	0	0.6	0	0	0.5	0	0	0.53	Signing & Lining	2004
O	Junction	Westmeath	6	Torque, west of Tyrrellspass	€12,765	85	0	0.2	0.2	0	0	0	0	0	0	Signing & Lining	2004
I	Length	Westmeath	6	Moate	€13,045	86	0	0.2	0	0	0	0	0	0	0	Pedestrian Facilities	2004
O	Length	Westmeath	52	Kilynan	€10,528	87	0	0	0.2	0	0	0	0	0	0	Surfacing & Signing & Lining	2004

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O	Junction	Wexford	11	Tinnock N11	€21,591	88	0	0.2	0	0	0	0	0	0	0	Signing & Lining	2004
O	Junction	Carlow	81	RSRM Closh Cross Junction with the N80	€7,603	1	0	0.2	0.8	0	0.33	0.33	0	0.45	0.35	Side road adjustment such as regrade, buildout or realign	2005
O	Junction	Carlow	81	RSRM Cuckoo Corner	€48,111	2	0	0	0.4	0	0	0	0	0	0	Side road adjustment such as regrade, buildout or realign	2005
O	Junction	Cavan	3	RSRM N3 / R165-9/ R165-9 / L-3001. Knockanoark	€24,056	3	0	0.8	0.4	0	0.67	0	0	0.9	0	RTL	2005
O	Junction	Cavan	54	RSRM N54 / L-1502 / R197 Gannon's "X" at Corrarod	€18,042	4	0	0	0.4	0	0	0.67	0	0	0.7	Antiskid plus other such as Signing & Lining, ladder bar	2005
O	Narrow bridge	Cavan	55	RSRM N55 / L-65662 at Clarebane Bridge	€2,406	5	0	0	0.4	0	0	0	0	0	0	Signing & Lining	2005

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I	Garrage	Cavan	87	RSRM N87 / L-1043 Jnt at Petrol Station at Ballyconnell Bridge	€18,042	6	0	0	0.2	0	0	0.33	0	0	0.35	Junction realignment	2005
O	Junction	Clare	68	RSRM N68/R486 Derycrossaun Cross Junction and Approach	€9,622	7	0	0.4	0	0	0	0.67	0	0	0.7	Sight Distance & Other	2005
I	Junction	Cork	8	RSRM Traffic Lights at Mitchelstown	€31,052	8	0	0	0.6	0	0	0.67	0	0	0.7	Traffic Lights with pedestrian phase	2005
O	Junction	Cork	20	RSRM Kilnamona N20, Junction to Grenagh	€23,349	9	0	0.4	0.4	0	0	0.33	0	0	0.35	Antiskid plus other such as Signing & Lining, ladder bar	2005
O	Junction	Cork	71	RSRM Curragh, East of Lissarda. Junction on bend.	€10,224	10	0	0.2	0.6	0	0	0.67	0	0	0.7	Antiskid plus other such as Signing & Lining, ladder bar	2005
O	Length	Cork	71	RSRM Newmills E of Roscarbery. 1.2km series of bends.	€11,509	11	0	0	0.4	0	0	0	0	0	0	Signing & Lining	2005
O	Junction	Donegal	13	RSRM N-13-20, Slab road junction Burt chapel	€9,622	12	0	0	0.4	0	0.33	0	0	0.45	0	Sight distance	2005

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O	Length	Donegal	13	RSRM Newtown to Drumbarnet	€24,056	13	0.2	0	1	0.67	0.33	1.67	0.76	0.45	1.75	Signing & Lining	2005
O	Length	Donegal	15	RSRM N15-36 / 37, Cloughfin/Clady junction	€30,069	14	0.2	0	0	0	0.33	1	0	0.45	1.05	RTL or junction treatment along route	2005
O	Length	Donegal	56	RSRM Lurgybrack School	€100,382	15	0.2	0	0	0	0	1	0	0	1.05	Junction Definition including buildouts, kerbing, sign & Line	2005
O	Length	Donegal	56	RSRM N-56-5, Drumbeagh	€6,007	16	0.2	0	0.2	0	0	0.33	0	0	0.35	Road Widening/ Narrowing including removal or introduction of deceleration or acceleration lanes, plus other such as Signing & Lining, pedestrian facilities	2005
O	Length	Donegal	56	RSRM N-56-52, Smullen's corner, Falcarragh	€3,608	17	0	0.4	0.2	0	0	0.67	0	0	0.7	Crash barrier plus other such as Signing & Lining	2005

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O	Length	Donegal	56	RSRM N56-53/4 ray, Ballyboe, Falcarragh	€14,433	18	0	0	0.4	0	0.33	0	0	0.45	0	Side road adjustment such as regrade, buildout or realign	2005
O	Junction	Donegal	56	RSRM N-56-74 / L-5872-1 Mullaheep junction	€7,627	19	0	0	0.2	0	0	0.33	0	0	0.35	Side road adjustment such as regrade, buildout or realign	2005
I	Junction	Dublin	1	RSRM Dorset Street - Circular Road North	€28,994	20	0	0.2	4	0	0.33	1.33	0	0.45	1.4	Antiskid & other such as pedestrian barrier, traffic signal upgrade or signage	2005
I	Junction	Dublin	4	RSRM Merchants quay - Ushers Quay - Bridge St Lower	€8,220	21	0	0	1.2	0	0.67	1.67	0	0.9	1.75	Antiskid & other such as pedestrian barrier, traffic signal upgrade or signage	2005
O	Junction	Galway	18	RSRM Tulla Road R462 Junction	€27,541	22	0	0	0.2	0.33	0	0	0.38	0	0	Side road adjustment such as regrade, buildout or realign	2005
O	Junction	Galway	63	RSRM Roanmore Cross	€22,425	23	0	0	0.6	0	0	0	0	0	0	Signing & Lining	2005

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O	Junction	Kerry	69	RSRM Rea	€17,141	24	0	0.2	0	0	0	0	0	0	0	Signing & Lining	2005
O	Junction	Kerry	70	RSRM Knockaunrory junction, Cahersiveen	€265	25	0	0.2	0	0	0	0	0	0	0	Signing & Lining	2005
O	Junction	Kildare	9	RSRM Ballymount Construction	€70,260	26	0	0	0.2	0	0	0.33	0	0	0.35	RTL plus other such as Side Road Realignment or sight distance	2005
O	Length	Kilkenny	10	RSRM Lyrath to Scart	€9,741	27	0.2	0.4	0.6	0	0	2.33	0	0	2.45	Signing & Lining	2005
O	Length	Kilkenny	10	RSRM Outrath	€12,028	28	0	0	0.4	0	0	1	0	0	1.05	Signing & Lining	2005
O	Length	Kilkenny	76	RSRM Kilbride to Ahanure	€21,650	29	0	0.2	0.6	0	0	0	0	0	0	Signing & Lining	2005
O	Junction	Laois	7	RSRM Redcastle to Clonenagh	€48,111	30	0.2	0.2	0.4	0	0	0	0	0	0	Signing & Lining	2005
O	Junction	Laois	8	RSRM Togher Roundabout	€24,056	31	0	0.2	0.4	0	0	0.67	0	0	0.7	Junction Definition including buildouts & sign & Line	2005
O	Length	Laois	78	RSRM The Rushes	€7,077	32	0.2	0.2	0.4	0	0	0	0	0	0	Signing & Lining	2005

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In/Out BUA	Road Type	Local Authority	Rt	Scheme Description	Year 2002 costs	Sch No	F Colls before /year	S Colls before /year	M Colls before /year	F Colls after /year	S Colls after /year	M Colls after /year	F Colls after /year, adjusted	S Colls after /year, adjusted	M Colls after /year, adjusted	Short Solution Description	Year
O	Junction	Laois	80	RSRM Laught Cross	€10,825	33	0.2	0	0	0	0	0	0	0	0	Signing & Lining	2005
O	Junction	Limerick	20	RSRM Creggane	€12,028	34	0	0	0.4	0	0.33	0	0	0.45	0	Signing & Lining	2005
O	Junction	Limerick	21	RSRM Garryduff Cross	€180,416	35	0.2	0	0	0	0	0.33	0	0	0.35	Sight Distance & Other	2005
O	Junction	Limerick	21	RSRM Junction with R515	€9,021	36	0	0	0.2	0	0	0.33	0	0	0.35	Signing & Lining	2005
O	Junction	Longford	4	RSRM East approach to Dublin roundabout	€32,996	37	0	0	0.4	0	0	0	0	0	0	Antiskid plus other such as Signing & Lining, ladder bar	2005
O	Junction	Longford	4	RSRM Lissardowan	€16,839	38	0	0	0.2	0	0	0.33	0	0	0.35	RTL	2005
O	Length	Longford	63	RSRM Barnacor	€12,028	39	0	0	0.8	0	0.33	0	0	0.45	0	Signing & Lining	2005
O	Junction	Longford	63	RSRM Kilashee West	€5,321	40	0	0	0.4	0	0	0	0	0	0	Signing & Lining	2005
O	Length	Longford	63	RSRM Rappareehill bends	€8,762	41	0	0.2	0.2	0	0	0	0	0	0	Signing & Lining	2005
O	Length	Mayo	5	RSRM Clonkeen	€7,217	42	0	0	0.4	0	0	0	0	0	0	Signing & Lining	2005
I	Length	Mayo	5	RSRM Knockaphunta	€18,042	43	0	0	0.6	0	0	0.67	0	0	0.7	Signing & Lining	2005

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O	Bend	Mayo	26	RSRM Coolcronan	€18,042	44	0	0	0.2	0	0	0	0	0	0	Road Widening/ Narrowing including removal or introduction of deceleration or acceleration lanes, plus other such as Signing & Lining, pedestrian facilities	2005
O	Junction	Mayo	59	RSRM Bellacorick PS	€18,042	45	0	0	0.2	0	0	0	0	0	0	Crash barrier plus other such as Signing & Lining	2005
O	Narrow bridge	Mayo	59	RSRM Erriff Bridge	€6,014	46	0.2	0	0	0	0	0	0	0	0	Crash barrier plus other such as Signing & Lining	2005
O	Length	Mayo	83	RSRM Corraun to Grallagh	€10,700	47	0	0.2	0.2	0	0	0	0	0	0	Signing & Lining	2005
O	Junction	Meath	3	RSRM Kilcarn - Cannistown	€36,083	48	0	0	1.4	0	0	0.67	0	0	0.7	Signing & Lining	2005
O	Junction	Meath	51	RSRM Halltown junction at post N51-0150	€15,458	49	0.2	0	0.4	0	0	0	0	0	0	Sight Distance & Other	2005
O	Narrow bridge	Meath	52	RSRM Maudlin Bridge	€19,324	50	0	0.4	0.4	0	0	1	0	0	1.05	Traffic Lights on narrow bridge	2005
I	Junction	Monaghan	2	RSRM Broomfield Junction	€6,637	51	0	0	0.2	0	0	1	0	0	1.05	Signing & Lining	2005

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I	Length	Monaghan	2	RSRM Coolshannagh, Monaghan Town	€23,749	52	0	0	0.4	0	0	0	0	0	0	Pedestrian Facilities	2005
O	Junction	Nth Tipperary	7	RSRM Roscrea Golf club Racht Hall	€36,074	53	0	0.2	0.4	0.33	0	0	0.38	0	0	RTL	2005
O	Junction	Nth Tipperary	8	RSRM Lackins Cross Littleton Thurles	€48,111	54	0	0	0.2	0	0	0	0	0	0	RTL	2005
O	Junction	Offaly	52	RSRM Charleville Gate	€7,217	55	0	0	0.2	0	0	0.33	0	0	0.35	Signing & Lining	2005
O	Junction	Offaly	62	RSRM Drumakeenan School	€60,139	56	0	0.2	0	0	0	0.33	0	0	0.35	RTL	2005
O	Length	Offaly	80	RSRM Clonminch to Derrybeg	€9,622	57	0	0.4	0.2	0	0	0.67	0	0	0.7	Signing & Lining	2005
O	Junction	Roscommon	5	RSRM Cloonfree east	€36,083	58	0	0.2	0.2	0	0	0	0	0	0	Sight distance	2005
O	Junction	Roscommon	5	RSRM Cloonfree west	€30,470	59	0	0	0.2	0	0.33	0	0	0.45	0	Sight distance	2005
O	Junction	Roscommon	6	RSRM Creggan	€48,111	60	0	0	0.2	0.33	0	0	0.38	0	0	Junction Definition including buildouts & sign & Line	2005
O	Junction	Roscommon	61	RSRM Four mile house	€48,111	61	0.2	0	0.6	0	0	0	0	0	0	Junction Definition including buildouts & sign & Line	2005

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O	Junction	Roscommon	61	RSRM Grange	€25,626	62	0	0	0.2	0	0	0	0	0	0	Sight Distance	2005
O	Junction	Roscommon	61	RSRM Shankill	€20,917	63	0	0	0.4	0	0	0.33	0	0	0.35	Junction Definition including buildouts & sign & Line	2005
I	Junction	Sligo City	4	RSRM Pearse Rd, Kierans Rd. Junction	€30,069	64	0	0	0.4	0	0	0.67	0	0	0.7	Antiskid	2005
I	Junction	Sligo City	4	RSRM Pearse Rd, Mail Coach Rd, Junction	€24,056	65	0	0	0.4	0	0	0.33	0	0	0.35	Antiskid	2005
O	Length	Sligo	15	RSRM Cashelgarran	€30,069	66	0.2	0	0.2	0	0	0	0	0	0	Signing & Lining	2005
O	Length	Sligo	17	RSRM Muckelty, Tubbercurry	€12,028	67	0	0	0.2	0	0	0.33	0	0	0.35	Signing & Lining	2005
O	Junction	Sligo	17	RSRM Ropefied junction	€17,346	68	0	0.4	0.6	0	0	0.33	0	0	0.35	Sight Distance & Other	2005
I	Junction	Sth Dublin	4	RSRM N4/M50 Roundabout	€24,056	69	0.2	0.2	4.2	0	0.33	4	0	0.45	4.2	Junction realignment	2005
I	Junction	Sth Dublin	81	RSRM N81 Belgard Road Junction	€26,101	70	0	0	2.4	0	0.33	1.67	0	0.45	1.75	Antiskid & other such as pedestrian barrier, traffic signal upgrade or signage	2005

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I	Length	Waterford City	25	RSRM Cork Road, at Land Registry Waterford	€22,019	71	0	0	2.4	0	0	1.33	0	0	1.4	Pedestrian Facilities (central Islands)	2005
O	Length	Waterford	25	RSRM N25 Traffic Route Treatment	€45,705	72	1.4	4.6	14	1	1	10	1.14	1.35	10.5	RTL or junction treatment along route	2005
O	Length	Westmeath	55	RSRM Ballykeeran	€10,825	73	0.2	0	0	0	0	0	0	0	0	Crash barrier plus other such as Signing & Lining	2005
O	Junction	Wexford	11	RSRM Inch N11	€32,475	74	0	0	0.4	0	0	0.33	0	0	0.35	Signing & Lining	2005
O	Junction	Wexford	25	RSRM Clonard	€7,217	75	0	0	0.4	0	0	0	0	0	0	Signing & Lining	2005
O	Junction	Wexford	25	RSRM Larkins Cross	€36,083	76	0	0.4	0.8	0.33	0	1	0.38	0	1.05	Road Widening/Narrowi ng including removal or introduction of deceleration or acceleration lanes, plus other such as Signing & Lining, pedestrian facilities	2005
I	Junction	Wicklow	11	RSRM Kilarney Rd Western Roundabout, Anti Skid Surface	€18,975	77	0	0	0.4	0	0	0.67	0	0	0.7	Antiskid	2005

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I	Narrow bridge	Carlow	81	Rathvilly Bridge - Footpath	€6,110	1	0	0	0.2	0	0	0	0	0	0	Pedestrian Facilities	2006
O	Length	Cavan	3	Virginia south to Magera	€121,441	2	0.2	0.2	2	0.33	0.33	0.33	0.42	0.45	0.33	Pedestrian Facilities	2006
O	Bend	Cavan	54	Kilnaglare	€48,013	3	0	0.2	0.6	0	0	0	0	0	0	Signing & Lining	2006
O	Bend	Cavan	54	N87 / L-1054-0 at Ballyhugh	€21,978	4	0	0	0.4	0	0	0	0	0	0	Antiskid plus other	2006
O	Junction	Cavan	55	Lacken Cross	€24,968	5	0	0.2	0.4	0	0	0	0	0	0	RTL	2006
O	Junction	Cavan	55	L2525 at Kilcogy	€40,480	6	0	0	0.2	0	0	0	0	0	0	Antiskid plus other	2006
I	Length	Cavan	55	R154 Main Street	€40,490	7	0	0.2	0	0	0	0	0	0	0	Pedestrian Facilities	2006
O	Bend	Cork North	72	Drumcummer, Millstreet.	€44,314	8	0	0.2	0.8	0	0	0.67	0	0	0.67	Signing & Lining	2006
O	Bend	Cork West	71	Dromkeal/Snave	€18,875	9	0	0	0.4	0	0	0.33	0	0	0.33	Signing & Lining	2006
O	Bend	Cork West	71	Myross Wood	€10,644	10	0	0.2	0	0	0.33	0	0	0.45	0	Signing & Lining	2006
O	Junction	Donegal	14	Ballyboe X	€28,438	11	0.2	0	0	0	0	0	0	0	0	Surfacing & Signing & Lining	2006
O	Junction	Donegal	14	Ballyholey Far	€32,942	12	0.6	0	0.8	0	0	1.33	0	0	1.33	Surfacing & Signing & Lining	2006

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O	Bend	Donegal	14	Doorable	€23,485	13	0	0	1.2	0	0	0	0	0	0	Road Widening/ Narrowing	2006
O	Junction	Donegal	14	Rossgier	€7,292	14	0	0.2	1	0	0	0.33	0	0	0.33	Surfacing & Signing & Lining	2006
O	Junction	Donegal	14	X Roads, L-2414	€30,458	15	0	0.2	0.4	0	0	0	0	0	0	Surfacing & Signing & Lining	2006
O	Length	Donegal	15	Behy Hill, 4Km NE of Ballyshannon	€5,783	16	0.2	0	0.6	0.33	0	1	0.42	0	1	Signing & Lining	2006
O	Bend	Donegal	15	Lough Mourne	€19,589	17	0	0.6	0.8	0	0	0.33	0	0	0.33	Crash barrier plus other	2006
O	Bend	Donegal	56	Bluebanks	€10,197	18	0	0.2	0.4	0	0	0	0	0	0	Signing & Lining	2006
I	Length	Donegal	56	52/53, Falcarragh Town	€22,307	19	0.2	0	0.6	0	0	1	0	0	1	Signing & Lining	2006
I	Junction	Dublin City	2	Finglas Road - Ballyboggan Road Junction	€4,910	20	0	0	1.6	0	0	1.33	0	0	1.33	Antiskid plus other	2006
I	Junction	Dublin City	4	Chruch Street Bridge (2 Junction)	€11,057	21	0	0.4	3.6	0	0.33	3.67	0	0.45	3.67	Signing & Lining	2006
O	Junction	Galway	6	Derrydonnell Jcn	€11,109	22	0.2	0	0.8	0	0	1	0	0	1	Signing & Lining	2006
O	Junction	Galway	17	Corofin	€55,473	23	0	0	0.6	0	0	0	0	0	0	Sight Distance	2006
I	Junction	Galway	17	Milltown Jcn	€40,010	24	0	0	0.2	0	0	0	0	0	0	Sight Distance	2006

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O	Junction	Galway	18	Kiltartan	€14,489	25	0	0.2	0.8	0	0.67	0	0	0.91	0	RTL	2006
O	Junction	Galway	63	Abbeyknockmoy	€38,994	26	0	0	0.2	0	0	0	0	0	0	Signing & Lining	2006
O	Junction	Kerry	22	Coolgarriv junction	€7,423	27	0	0.4	0.4	0	0	0	0	0	0	Surfacing & Signing & Lining	2006
O	Junction	Kerry	69	Leith East Cross	€2,804	28	0	0	0.2	0	0	0.67	0	0	0.67	Signing & Lining	2006
I	Junction	Kerry	70	Bansha	€21,846	29	0	0.4	0.2	0	0	0.33	0	0	0.33	Sight Distance	2006
O	Junction	Kerry	70	Deelis Cahersiveen	€148,967	30	0	0.2	0.4	0	0	0	0	0	0	Signing & Lining	2006
O	Junction	Kerry	72	Coolbane	€20,970	31	0	0	0.4	0	0	0.67	0	0	0.67	Junction Defination	2006
I	Junction	Kerry	72	Fossa, R563 junction	€23,531	32	0	0	0.2	0	0	0	0	0	0	Junction Realignment	2006
O	Bend	Kerry	86	Aghnalack Bends	€18,340	33	0	0	0.2	0	0	0	0	0	0	Surfacing & Signing & Lining	2006
O	Junction	Kilkenny	76	Ballymack	€29,794	34	0	0.2	0.8	0	0	0.33	0	0	0.33	RTL	2006
O	Junction	Kilkenny	77	Junction with N78	€45,393	35	0	0.2	0.6	0	0	0.67	0	0	0.67	Junction Defination	2006
O	Junction	Laois	80	Clonaghadoo	€30,301	36	0.2	0	0.2	0	0	0	0	0	0	Signing & Lining	2006

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O	Junction	Laois	80	Park Grange	€33,734	37	0.2	0.2	0.4	0	0	0	0	0	0	Signing & Lining	2006
O	Junction	Leitrim	16	Glencar-Waterfall jnt	€30,879	38	0	0	0.2	0	0	0	0	0	0	RTL	2006
O	Length	Leitrim	16	Sradrine, Lagoon and Sranagross	€3,819	39	0.2	0.2	0.2	0	0	0	0	0	0	Crash barrier	2006
I	Junction	Limerick	7	Junction with Bog Road north of Daly's Cross	€11,689	40	0	0	0.6	0	0	0.67	0	0	0.67	Lighting	2006
O	Junction	Limerick	20	Ballymacrory Cross	€223,849	41	0	0	0.2	0	0	0.33	0	0	0.33	Signing & Lining	2006
I	Junction	Limerick	20	Banogue Village	€69,285	42	0.2	0	0	0	0	0.33	0	0	0.33	Signing & Lining	2006
O	Junction	Limerick	20	Rockhill Cross	€31,430	43	0	0	0.2	0	0	1	0	0	1	Signing & Lining	2006
O	Junction	Limerick	21	Coffey's Cross, Adare	€9,889	44	0	0.2	0	0	0	0	0	0	0	Signing & Lining	2006
O	Bend	Limerick	69	Ballyengland Lower	€5,528	45	0.4	0.4	1.6	0	0	2.33	0	0	2.33	Signing & Lining	2006
O	Bend	Limerick	69	Bolane	€12,556	46	0	0	0.2	0	0	1	0	0	1	Signing & Lining	2006
O	Junction	Limerick	69	Hegarty's Cross	€4,964	47	0.2	0.2	0.2	0	0	0.33	0	0	0.33	RTL	2006

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O	Junction	Longford	63	Athlone Rd Junction	€22,146	48	0	0	0.4	0	0	0.67	0	0	0.67	Junction Defination	2006
O	Junction	Mayo	59	Ardagh	€11,931	49	0	0	0.4	0	0	0	0	0	0	Sight distance	2006
O	Junction	Mayo	59	Corraun Junction	€85,751	50	0	0.2	0	0	0	0.33	0	0	0.33	Signing & Lining	2006
O	Junction	Mayo	59	Freeheens junction	€24,357	51	0	0	0.2	0	0	0	0	0	0	Signing & Lining	2006
O	Junction	Mayo	59	L5149 jct Ballina	€24,005	52	0	0	0.2	0	0	0.33	0	0	0.33	Sight Distance	2006
O	Length	Mayo	59	Newfield	€20,713	53	0	0	0.4	0	0	0	0	0	0	Signing & Lining	2006
O	Length	Mayo	59	Shrahamonragh	€2,549	54	0	0	0	0	0	0.67	0	0	0.67	Signing & Lining	2006
O	Junction	Mayo	83	Ballyhaunis/Charles town Rd. junction	€36,150	55	0	0.2	0	0	0	0.33	0	0	0.33	Surfacing	2006
O	Junction	Meath	3	Dalgan Park Entrance	€20,298	56	0	0.2	0.2	0	0	0.67	0	0	0.67	RTL	2006
O	Length	Meath	3	Finnegans N3	€36,998	57	0	0.4	1.4	0	0.33	0	0	0.45	0	Lighting	2006
O	Junction	Meath	51	Ballyboy Junction with R164	€32,893	58	0	0	0.6	0	0	0	0	0	0	Signing & Lining	2006
O	Junction	Meath	51	Wickers Cross	€129,582	59	0	0	0.2	0	0	0.33	0	0	0.33	Sight Distance	2006

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O	Junction	Meath	52	Stokes Cross N52/L-1604	€79,852	60	0	0	0.4	0	0	0	0	0	0	Sight Distance	2006
O	Junction	Monaghan	2	Annyalla, minor road junction	€8,582	61	0	0.2	0.4	0	0	0.33	0	0	0.33	Road Widening/ Narrowing	2006
I	Junction	Monaghan	2	N53 Junction in Castleblaney	€44,207	62	0	0	0.4	0	0	0.33	0	0	0.33	Pedestrian Facilities	2006
O	narrow bridge	Monaghan	53	Ballynacarry Bridge on County Boundary with Armagh	€22,259	63	0	0	0.2	0	0	0	0	0	0	Signing & Lining	2006
I	Length	Monaghan	54	Monaghan Road, Clones	€6,600	64	0	0	0.2	0	0	0	0	0	0	Signing & Lining	2006
O	Length	Monaghan	54	A3 Drumully to Clonoony SB	€62,314	65	0	0	0.2	0	0	0.33	0	0	0.33	Surfacing & Signing & Lining	2006
O	Length	Monaghan	54	Road Edges, Monaghan Road, Clones	€23,664	66	0	0	0.2	0	0	0.67	0	0	0.67	Road Widening/ Narrowing	2006
O	Junction	Nth Tipperary	8	Maxwells Cross (near H&J)	€69,149	67	0.2	0	0.4	0	0	0	0	0	0	RTL	2006
O	Junction	Offaly	6	The Well, Moate	€53,078	68	0	0.4	0.4	0	0	0	0	0	0	RTL	2006
O	Junction	Offaly	52	Fingerboard Junction, (Part 2)	€43,027	69	0	0	0.2	0	0	0.33	0	0	0.33	Road Widening/Narrowi ng	2006

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In/Out BUA	Road Type	Local Authority	Rt	Scheme Description	Year 2002 costs	Sch No	F Colls before /year	S Colls before /year	M Colls before /year	F Colls after /year	S Colls after /year	M Colls after /year	F Colls after /year, adjusted	S Colls after /year, adjusted	M Colls after /year, adjusted	Short Solution Description	Year
O	Bend	Offaly	62	Ballyeighan	€24,422	70	0	0	0.2	0	0	0.33	0	0	0.33	Crash barrier	2006
O	Bend	Offaly	80	Pigeon House, Killeigh	€23,780	71	0	0	0.2	0	0	0	0	0	0	Signing & Lining	2006
O	Junction	Roscommon	5	Ardakillin	€8,953	72	0	0	1	0	0	0.33	0	0	0.33	Sight Distance	2006
O	Junction	Roscommon	5	Cloonanart Beg	€7,405	73	0	0	0.2	0	0	0	0	0	0	Sight Distance	2006
I	Junction	Sligo City	15	Scotsman's Walk Jct.	€6,705	74	0	0	0.2	0	0	0	0	0	0	Antiskid	2006
O	Bend	Sligo	4	Cloonlurg	€60,896	75	0.2	0	0.4	0	0	0	0	0	0	Sight Distance	2006
O	Junction	Sligo	15	Cross Roads at Creevykeel	€46,249	76	0	0	0.2	0	0	0	0	0	0	Sight Distance	2006
O	Junction	Sligo	17	Junction at Rahabaena	€120,810	77	0	0	0.4	0	0	0	0	0	0	Sight Distance	2006
I	Junction	Sth Dublin	81	N81/M50 Roundabout	€26,987	78	0	0.2	2.4	0	0	0.67	0	0	0.67	Junction Realigning	2006
I	Junction	Sth Dublin	81	Spawell Roundabout	€54,002	79	0	0	0.8	0	0	2	0	0	2	Antiskid plus other	2006
O	Junction	Sth Tipperary	24	Barne Pub Junction	€27,434	80	0	0	0.2	0	0.33	0	0	0.45	0	Road Widening/Narrowing	2006
O	Junction	Sth Tipperary	24	Barronstown Cross, Limerick Junction	€34,068	81	0	0.2	0.4	0	0	0	0	0	0	Lighting	2006

Road Safety Remedial Measures Programme Evaluation of Programme 9 to 11

In/Out BUA	Road Type	Local Authority	Rt	Scheme Description	Year 2002 costs	Sch No	F Colls before /year	S Colls before /year	M Colls before /year	F Colls after /year	S Colls after /year	M Colls after /year	F Colls after /year, adjusted	S Colls after /year, adjusted	M Colls after /year, adjusted	Short Solution Description	Year
O	Junction	Sth Tipperary	24	Kavanagh's Cross , Cloonfinglas, Bansha	€33,334	82	0	0.2	0	0	0	0	0	0	0	Sight Distance	2006
	Bend	Sth Tipperary	74	Kilfeakle	€65,326	83	0	0.2	0	0	0	0	0	0	0	Signing & Lining	2006
I	Length	Waterford City	25	Cork Rd Kilbarry Rd, Waterford City	€77,188	84	0	0	0.4	0	0	0.33	0	0	0.33	Pedestrian Facilities	2006
O	Junction	Waterford	25	East of Tramore cross rds	€112,289	85	0.2	0.6	1.6	0	0	1.33	0	0	1.33	Antiskid plus other	2006
O	Junction	Westmeath	4	Larc junction	€14,886	86	0	0	0.2	0	0	0	0	0	0	Signing & Lining	2006
I	Length	Westmeath	6	Kilbeggan	€132,951	87	0	0	0.2	0	0	0	0	0	0	Pedestrian Facilities	2006
O	Length	Westmeath	51	Delvin Village	€10,833	88	0	0	0.2	0.33	0	2.33	0.42	0	2.33	Signing & Lining	2006
O	Length	Westmeath	52	North of Clonmellon	€30,579	89	0.2	0	0.4	0	0	0.33	0	0	0.33	Signing & Lining	2006
O	Bend	Wexford	30	Ferrybridge	€39,753	90	0	0.2	0.8	0.33	0	1	0.42	0	1	Road Widening/ Narrowing	2006
O	Junction	Wicklow	11	Glenview South Bound Left-off	€23,248	91	0	0	0.2	0	0	0	0	0	0	Antiskid	2006
O	Length	Wicklow	11	Observation Platforms and Traffic Management	€1,653	92	1.2	1	7.4	1	2	8	1.27	2.72	8	Observ platform	2006

3. Appendix - Assuming 'Regression to Mean' effect of 30%

Year of treatment	% Reduction in F Coll	% Reduction in S Coll	% Reduction in M Coll	Cost Saving per annum	Average Annual Rate of Return "Willingness to Pay" ("k-test" method, k>1 increase relative to controls)
2004	-64%	5%	8%	€5,433,805	446%
2005	36%	0%	6%	-€4,877,928	-233%
2006	-22%	-11%	18%	€297,872	113%
Overall				€853,749	109%

4. Appendix - The Chi Squared test for 2004 Schemes

	Site	Control	Totals
Before	320	9075	9395
After	200	8025	8225
Totals	520	17100	17620
			Chi Squared = 14.20

If Chi squared > 10.83 – Result is significant at 0.1%

Significance Levels		
Significance Level	Confidence Level	Subjective Level
1%	99%	Highly Acceptable