

**Appendix G
TAG Worksheets 3.3.5
Greenhouse Gases**

APPRAISAL- Greenhouse Gases

Proposal Name: M1 Junction 19 Improvement

Current Year of Appraisal: 2007

Proposal Opening year: 2014

Project (Road/Rail or Road and Rail): Road

Overall Assessment Score:

Net Present Value of Carbon Emissions of Proposal (£):

-14,335,392

(60 Year Period)

*positive value reflects a net benefit (i.e. carbon emissions reduction)

Quantitative Assessment:

Change in Carbon Emissions over 60 year appraisal period (tonnes):

321,070

(between 'with scheme' and 'without scheme' scenarios)

Change in Carbon Emissions in Opening year (tonnes):

8,080

(between 'with scheme' and 'without scheme' scenarios)

Qualitative Comments:

There will be an increase in carbon emissions over time, with or without the proposals, due to increased traffic. The increase would be slightly greater with the improvement in place, but not significant (+0.7%) compared to the the total carbon emissions over 60 years.

Sensitivity Analysis:

Description:

Upper Estimate Net Present Value of Carbon Emissions of Proposal (£):

-17,202,470

Lower Estimate Net Present Value of Carbon Emissions of Proposal (£):

-12,901,853

Data Sources:

Data provided by Jacobs - November 2009 - Based on yearly results from TUBA between 2014 and 2073

Tonnes of carbon emitted:

Road:

	Tonnes of carbon emitted in 'without scheme' scenario	Tonnes of carbon emitted in 'with scheme' scenario
Year		
2014	663142	671222
2015	672578	680479
2016	681107	688819
2017	689471	696998
2018	697674	705019
2019	705723	712889
2020	713620	720610
2021	727004	733906
2022	735669	742322
2023	744314	750718
2024	752939	759095
2025	761544	767453
2026	770410	776077
2027	779260	784686
2028	788093	793278
2029	796910	801854
2030	796193	801133
2031	795938	800875
2032	795683	800618
2033	795428	800361
2034	795174	800104
2035	794920	799848
2036	794666	799591
2037	794412	799335
2038	794159	799080
2039	793906	798824
2040	793653	798569
2041	793400	798314
2042	793148	798059
2043	792895	797804
2044	792643	797550
2045	792391	797295
2046	792140	797041
2047	791888	796788
2048	791637	796534
2049	791386	796281
2050	791136	796028
2051	790885	795775
2052	790635	795522
2053	790385	795270
2054	790135	795018
2055	789886	794766
2056	789636	794514
2057	789387	794263
2058	789138	794011
2059	788890	793760
2060	788641	793510
2061	788393	793259
2062	788145	793009
2063	787897	792759
2064	787650	792509
2065	787402	792259
2066	787155	792009
2067	786909	791760
2068	786662	791511
2069	786415	791262
2070	786169	791014
2071	785923	790766
2072	785677	790518
2073	785432	790270

Rail:

	Tonnes of carbon emitted in 'without scheme' scenario	Tonnes of carbon emitted in 'with scheme' scenario
Year		
2014	0	0
2015	0	0
2016	0	0
2017	0	0
2018	0	0
2019	0	0
2020	0	0
2021	0	0
2022	0	0
2023	0	0
2024	0	0
2025	0	0
2026	0	0
2027	0	0
2028	0	0
2029	0	0
2030	0	0
2031	0	0
2032	0	0
2033	0	0
2034	0	0
2035	0	0
2036	0	0
2037	0	0
2038	0	0
2039	0	0
2040	0	0
2041	0	0
2042	0	0
2043	0	0
2044	0	0
2045	0	0
2046	0	0
2047	0	0
2048	0	0
2049	0	0
2050	0	0
2051	0	0
2052	0	0
2053	0	0
2054	0	0
2055	0	0
2056	0	0
2057	0	0
2058	0	0
2059	0	0
2060	0	0
2061	0	0
2062	0	0
2063	0	0
2064	0	0
2065	0	0
2066	0	0
2067	0	0
2068	0	0
2069	0	0
2070	0	0
2071	0	0
2072	0	0
2073	0	0

Monetary calculation of total change resulting from scheme:

Change in tonnes of carbon emitted	Shadow Price of carbon per tonne	Shadow Price of carbon for year change	NPV
8080	93.68	756958.58	-500942.54
7901	95.56	754993.11	-482745.73
7712	97.47	751671.56	-464369.00
7527	99.42	748312.82	-446660.90
7345	101.41	744823.28	-429543.99
7166	103.43	741205.13	-413002.30
6990	105.50	737460.83	-397020.25
6902	107.61	742740.17	-386340.52
6653	109.76	730263.60	-367005.57
6404	111.96	716990.87	-348149.90
6156	114.20	703009.32	-329817.27
5909	116.48	688298.20	-311995.68
5667	118.81	673311.49	-294881.57
5426	121.19	657571.19	-278249.27
5185	123.61	640931.95	-262037.12
4944	126.08	623364.11	-246236.45
4940	128.61	635316.96	-242471.48
4937	131.18	647629.76	-238812.28
4935	133.80	660314.76	-235255.89
4933	136.48	673248.09	-231752.43
4930	139.21	686295.43	-228254.80
4928	141.99	699737.36	-224855.50
4925	144.83	713297.61	-221461.82
4923	147.73	727268.10	-218163.60
4921	150.68	741512.10	-215957.74
4918	153.70	755881.25	-213730.69
4916	156.77	770685.33	-211569.56
4914	159.91	785779.23	-209430.25
4911	163.10	801005.50	-207270.33
4909	166.37	816692.87	-205174.40
4907	169.69	832687.34	-203099.64
4904	173.09	848821.83	-201004.83
4901	176.55	865268.62	-198931.56
4900	180.08	882393.91	-196959.99
4897	183.68	899490.74	-194928.34
4895	187.36	917105.84	-192956.99
4892	191.10	934874.65	-190966.51
4890	194.92	953182.30	-189035.16
4887	198.82	971649.47	-187085.02
4885	202.80	990676.86	-185192.84
4883	206.86	1010076.69	-183319.76
4880	210.99	1029645.24	-181428.42
4878	215.21	1049807.72	-179593.35
4876	219.52	1070364.84	-177776.81
4873	223.91	1091100.42	-175942.50
4870	228.39	1112237.27	-174127.06
4869	232.95	1134249.06	-172401.09
4866	237.61	1156221.21	-170622.10
4864	242.36	1178860.90	-168896.13
4862	247.21	1201943.70	-167187.59
4859	252.16	1225226.10	-165462.25
4857	257.20	1249216.23	-163788.38
4854	262.34	1273413.52	-162098.02
4851	267.59	1298079.02	-160425.04
4849	272.94	1323494.72	-158802.01
4847	278.40	1349407.81	-157195.38
4845	283.97	1375828.03	-155604.98
4843	289.65	1402765.30	-154030.64
4841	295.44	1430229.72	-152472.21
4838	301.35	1457930.26	-150898.33

Net Present Value of Carbon Emissions of Proposal: - 14,335,391.77