

Project Summary Sheet

Client/Authority North Yorkshire County Council	Prepared (date)	31/05/2012
Project name Sandsend Road Coast Protection Scheme PAR	Printed	31/05/2012
Project reference 9W5572/Z3 Q4 2011	Prepared by	Emma Hick
Base date for estimates (year 0)	Checked by	
Scaling factor (e.g. £m, £k, £)	Checked date	
Year	£ (used for all costs, losses and benefits)	
Discount Rate	0	30 75
Optimism bias adjustment factor	3.5%	3.00% 2.50%
Costs and benefits of options	45%	

Option number Option name AEP or SoP (where relevant)	Costs and benefits £					
	Option 1 Do-nothing	Option 2 Do Minimum	Option 3 Option 1B	Option 4 Option 1C	Option 5 Option 3B	Option 6 Option 3C

COSTS:						
PV capital costs	0	0	9,855,619	8,140,723	15,984,489	14,269,593
PV operation and maintenance costs	0	1,501,338	335,255	362,544	423,239	450,528
PV other	0	45,592	45,592	45,592	78,941	78,941
Optimism bias adjustment	0	696,118	4,606,410	3,846,987	7,419,001	6,659,578
PV negative costs (e.g. sales)	0	0	0	0	0	0
PV contributions						
Total PV Costs £ excluding contributions	0	2,243,048	14,842,875	12,395,846	23,905,669	21,458,639
Total PV Costs £ taking contributions into account	0	2,243,048	14,842,875	12,395,846	23,905,669	21,458,639

BENEFITS:						
PV monetised flood damages	0	0	0	0	0	0
PV monetised flood damages avoided		0	0	0	0	0
PV monetised erosion damages	85,108,373	84,923,184	298,140	298,140	298,140	298,140
PV monetised erosion damages avoided (protected)		185,189	84,810,233	84,810,233	84,810,233	84,810,233
Total monetised PV damages £	85,108,373	84,923,184	298,140	298,140	298,140	298,140
Total monetised PV benefits £		185,189	84,810,233	84,810,233	84,810,233	84,810,233
PV damages (from scoring and weighting)						
PV damages avoided/benefits (from scoring and weighting)						
PV benefits from ecosystem services						
Total PV damages £	85,108,373	84,923,184	298,140	298,140	298,140	298,140
Total PV benefits £		185,189	84,810,233	84,810,233	84,810,233	84,810,233

DECISION-MAKING CRITERIA:

excluding contributions						
<i>Based on total PV benefits (includes benefits from scoring and weighting and ecosystem services)</i>						
Net Present Value NPV		-2,057,859	69,967,358	72,414,387	60,904,564	63,351,593
Average benefit/cost ratio BCR		0.1	5.7	6.8	3.5	4.0
Incremental benefit/cost ratio IBCR			6.7	8.3	3.9	4.4

Highest bcr						
IBCR>1 IBCR>1 IBCR>1 IBCR>1						
<i>Based on monetised PV benefits (excludes benefits from scoring and weighting and ecosystem services)</i>						
Net Present Value NPV		-2,057,859	69,967,358	72,414,387	60,904,564	63,351,593
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including contributions						
<i>Taking account of contributions (includes benefits from scoring and weighting and ecosystem services)</i>						
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Incremental benefit/cost ratio IBCR			6.7	8.3	3.9	4.4

Best practicable environmental option (WFD)

Brief description of options:	
Option 1	Do-nothing
Option 2	Do Minimum
Option 3	Option 1B
Option 4	Option 1C
Option 5	Option 3B
Option 6	Option 3C

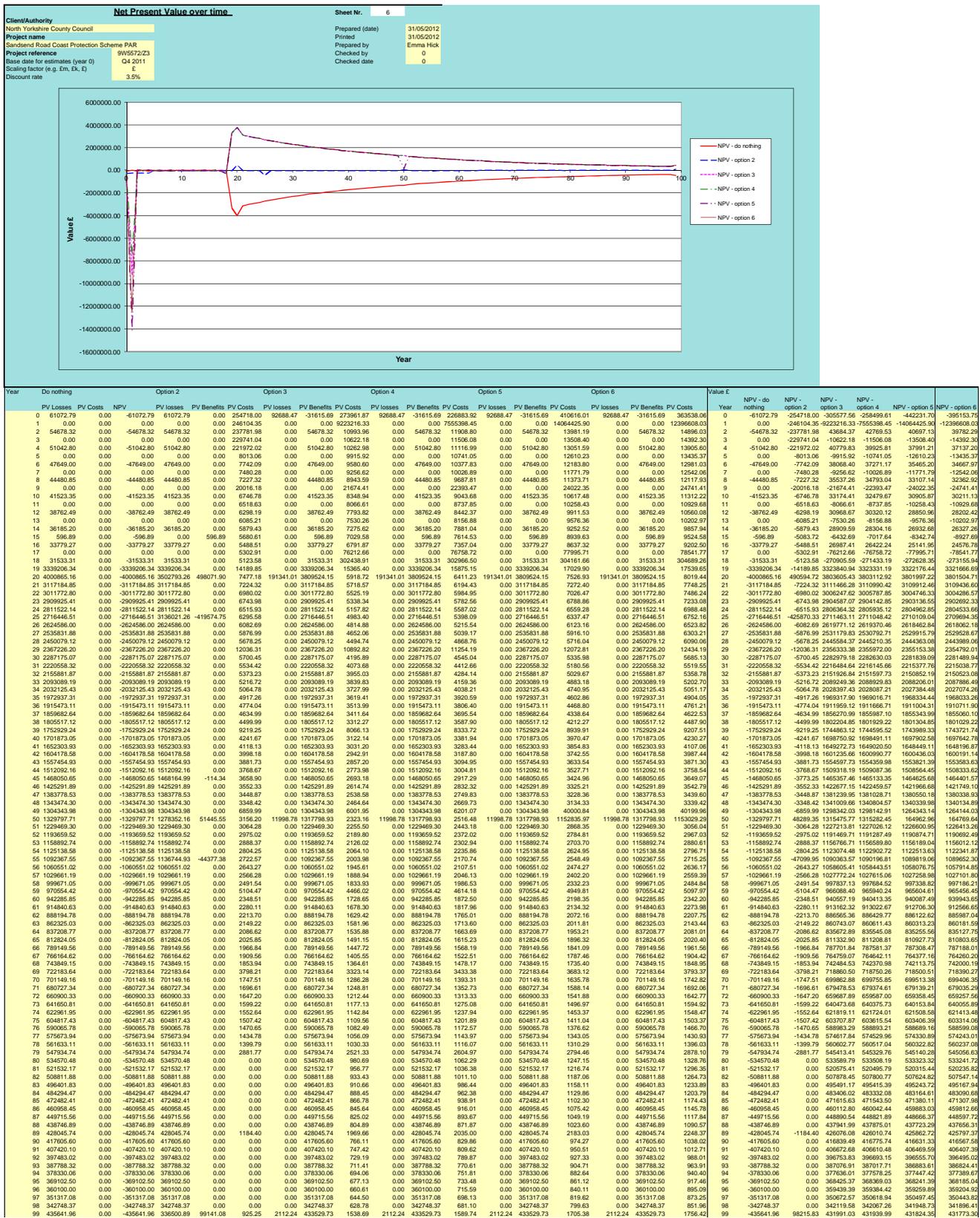
Comments and assumptions:

Erosion Loss Calculation Sheet with delay options						Sheet Nr. 1				
Client/Authority North Yorkshire County Council										
Project name Sandsend Road Coast Protection Scheme PAR		Option: Option 2		Delay (yrs) 5	Prepared (date) 31/05/2012					
Project reference 9W5572/Z3		Option 3		100	Printed 31/05/2012					
Base date for estimates (year 0) Q4 2011		Option 4		100	Prepared by Emma Hick					
Scaling factor (e.g. £m, £k, £) £		Option 5		100	Checked by 0					
Discount rate 3.5%		Option 6		100	Checked date 0					
Ref	Asset Description	Risk free market value £	Year when the asset is expected to be lost	Prob of loss in year	Expected value of asset losses £					
					Do-nothing	Do Minimum	Option 1B	Option 1C	Option 3B	Option 3C
0	Sandhills	275802.00	99	1	14,366.10	-	-	-	-	-
1	Fairfields	173585.00	99	1	9,041.78	-	-	-	-	-
2	Cliff View	173585.00	99	1	9,041.78	-	-	-	-	-
3	Haywood	148196.00	99	1	7,719.30	-	-	-	-	-
4	Norwood	18506.00	99	1	963.95	-	-	-	-	-
5	Ridgewood	148196.00	99	1	7,719.30	-	-	-	-	-
6	Woodlea	148196.00	99	1	7,719.30	-	-	-	-	-
7	Sea View	27500.00	99	1	1,432.43	-	-	-	-	-
8	Ness View	173585.00	99	1	9,041.78	-	-	-	-	-
9	1 Railway Cottages	173585.00	99	1	9,041.78	-	-	-	-	-
10	2 Railway Cottages	173585.00	99	1	9,041.78	-	-	-	-	-
11	The Surgery	74000.00	50	1	14,597.44	12,591.88	-	-	-	-
12	The Surgery - car park	7200.00	99	1	375.04	-	-	-	-	-
13	The Surgery	35714.00	99	1	1,860.29	-	-	-	-	-
14	The Surgery - Doctor	34831.00	99	1	1,814.29	-	-	-	-	-
15	The Surgery - Flat	141192.00	99	1	7,354.48	-	-	-	-	-
16										
17	Historic Assets - MU4CD	500.00	15	1	298.45	114.34	-	-	-	-
18	Historic Assets - MU5	500.00	15	1	298.45	251.28	-	-	-	-
19	Historic Assets - MU6	2000.00	0	1	2,000.00	2,000.00	-	-	-	-
20	Historic Assets - MU7A	500.00	0	1	500.00	500.00	500.00	500.00	500.00	500.00
21										
22	Services - MU4CD - 20yr	82916.65	20	1	41,671.08	35,085.93	-	-	-	-
23	Services - MU4CD - 50yr	117334.88	50	1	23,145.80	19,965.77	-	-	-	-
24	Services - MU4CD - 100yr	50062.88	99	1	2,607.70	-	-	-	-	-
25	Services - MU5 - 20yr	908641.27	20	1	456,652.10	384,488.82	-	-	-	-
26	Services - MU5 - 50yr	69462.25	50	1	13,702.31	11,819.73	-	-	-	-
27	Services - MU6 - 20yr	168962.22	20	1	84,914.65	84,914.65	-	-	-	-
28	Services - MU7A - 20yr	380728.20	20	1	191,341.01	191,341.01	191,341.01	191,341.01	191,341.01	191,341.01
29	Services - MU7A - 50yr	60826.40	50	1	11,998.78	11,998.78	11,998.78	11,998.78	11,998.78	11,998.78
30	Services - MU7A - 100yr	40550.93	99	1	2,112.24	2,112.24	2,112.24	2,112.24	2,112.24	2,112.24
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
Totals		3810243.67			942373.37	757184.42	205952.02	205952.02	205952.02	205952.02
Notes Make one entry in the description column for each property (or group of properties) as this determines subsequent calculation MV = risk free market value at base date for estimate - must be entered on each line when probability distribution is used Equivalent annual value = MV x discount rate (assumes infinite life) Year is year in which there is the probability of loss shown, years must be entered consecutively for each property or group If no distribution is used enter year of expected year of loss and enter 1.0 in probability column Columns G to K show expected values of asset losses with each option, assuming extensions of life entered above The loss is calculated using the formula $PV \text{ loss} = MV * \text{Prob of loss} * (1 - (1 - 1/((1+r)^{\text{Year of loss}}))) = MV * \text{Prob of loss} / ((1+r)^{\text{Year of loss}})$ Additional properties can be entered by inserting lines above line 62 and copying all formulae, including hidden calculation in column C										

Damage Cost Calculation Sheet - Do Nothing (Linear)										Sheet Nr.	2									
Client/Authority											North Yorkshire County Council									
Project name											Sandsend Road Coast Protection Scheme PAR									
Project reference											9W5572/Z3									
Base date for estimates (year 0)											Q4 2011									
Scaling factor (e.g. £m, £k, £)											£									
Initial discount rate											3.5%	3.0%	2.5%	Prepared (date)	31/05/2012					
Year											<	10	30	>	PV breach/failure	£	Printed	31/05/2012		
Breach pb											0	1.000	1.000	1.000	99	Ave Annual Damage (overtopping)	£	0.00 /yr	Prepared by	Emma Hick
PV Total Damage											£	100,731,189	(calculated below)	Checked date	0					
Year	Discount factor	Prob of a breach/failure	Prob that breach/failure occurs in year	Prob that breach/failure has not occurred	PV damage due to: breach or failure	over-topping	Road Clearance	Other damages Traffic Disruption	Damages 3	PV total damage										
0	1.000	0.100	0.100	0.900	0.00	0.00	58572.78735			58572.79										
1	0.966	0.190	0.171	0.729	0.00	0.00				0.00										
2	0.934	0.280	0.204	0.525	0.00	0.00	54678.32374			54678.32										
3	0.902	0.370	0.194	0.331	0.00	0.00				0.00										
4	0.871	0.460	0.152	0.179	0.00	0.00	51042.80029			51042.80										
5	0.842	0.550	0.098	0.080	0.00	0.00				0.00										
6	0.814	0.640	0.051	0.029	0.00	0.00	47649.00025			47649.00										
7	0.786	0.730	0.021	0.008	0.00	0.00				0.00										
8	0.759	0.820	0.006	0.001	0.00	0.00	44480.85159			44480.85										
9	0.734	0.910	0.001	0.000	0.00	0.00				0.00										
10	0.709	1.000	0.000	0.000	0.00	0.00	41523.35092			41523.35										
11	0.685	1.000	0.000	0.000	0.00	0.00				0.00										
12	0.662	1.000	0.000	0.000	0.00	0.00	38762.4924			38762.49										
13	0.639	1.000	0.000	0.000	0.00	0.00				0.00										
14	0.618	1.000	0.000	0.000	0.00	0.00	36185.20143			36185.20										
15	0.597	1.000	0.000	0.000	0.00	0.00				0.00										
16	0.577	1.000	0.000	0.000	0.00	0.00	33779.27273			33779.27										
17	0.557	1.000	0.000	0.000	0.00	0.00				0.00										
18	0.538	1.000	0.000	0.000	0.00	0.00	31533.31255			31533.31										
19	0.520	1.000	0.000	0.000	0.00	0.00		3339206.34		3339206.34										
20	0.503	1.000	0.000	0.000	0.00	0.00		3226286.32		3226286.32										
21	0.486	1.000	0.000	0.000	0.00	0.00		3117184.85		3117184.85										
22	0.469	1.000	0.000	0.000	0.00	0.00		3011772.8		3011772.80										
23	0.453	1.000	0.000	0.000	0.00	0.00		2909925.41		2909925.41										
24	0.438	1.000	0.000	0.000	0.00	0.00		2811522.14		2811522.14										
25	0.423	1.000	0.000	0.000	0.00	0.00		2716446.51		2716446.51										
26	0.409	1.000	0.000	0.000	0.00	0.00		2624586		2624586.00										
27	0.395	1.000	0.000	0.000	0.00	0.00		2535831.88		2535831.88										
28	0.382	1.000	0.000	0.000	0.00	0.00		2450079.12		2450079.12										
29	0.369	1.000	0.000	0.000	0.00	0.00		2367226.20		2367226.20										
30	0.356	1.000	0.000	0.000	0.00	0.00		2287175.07		2287175.07										
31	0.346	1.000	0.000	0.000	0.00	0.00		2220558.32		2220558.32										
32	0.336	1.000	0.000	0.000	0.00	0.00		2155881.87		2155881.87										
33	0.326	1.000	0.000	0.000	0.00	0.00		2093089.19		2093089.19										
34	0.317	1.000	0.000	0.000	0.00	0.00		2032125.43		2032125.43										
35	0.307	1.000	0.000	0.000	0.00	0.00		1972937.31		1972937.31										
36	0.298	1.000	0.000	0.000	0.00	0.00		1915473.11		1915473.11										
37	0.290	1.000	0.000	0.000	0.00	0.00		1859682.64		1859682.64										
38	0.281	1.000	0.000	0.000	0.00	0.00		1805517.12		1805517.12										
39	0.273	1.000	0.000	0.000	0.00	0.00		1752929.24		1752929.24										
40	0.265	1.000	0.000	0.000	0.00	0.00		1701873.05		1701873.05										
41	0.257	1.000	0.000	0.000	0.00	0.00		1652303.93		1652303.93										
42	0.250	1.000	0.000	0.000	0.00	0.00		1604178.58		1604178.58										
43	0.243	1.000	0.000	0.000	0.00	0.00		1557454.93		1557454.93										
44	0.236	1.000	0.000	0.000	0.00	0.00		1512092.16		1512092.16										
45	0.229	1.000	0.000	0.000	0.00	0.00		1468050.65		1468050.65										
46	0.222	1.000	0.000	0.000	0.00	0.00		1425291.89		1425291.89										
47	0.216	1.000	0.000	0.000	0.00	0.00		1383778.53		1383778.53										
48	0.209	1.000	0.000	0.000	0.00	0.00		1343474.30		1343474.30										
49	0.203	1.000	0.000	0.000	0.00	0.00		1304343.98		1304343.98										
50	0.197	1.000	0.000	0.000	0.00	0.00		1266353.38		1266353.38										
51	0.192	1.000	0.000	0.000	0.00	0.00		1229469.30		1229469.30										
52	0.186	1.000	0.000	0.000	0.00	0.00		1193659.52		1193659.52										
53	0.181	1.000	0.000	0.000	0.00	0.00		1158892.74		1158892.74										
54	0.175	1.000	0.000	0.000	0.00	0.00		1125138.58		1125138.58										
55	0.170	1.000	0.000	0.000	0.00	0.00		1092367.55		1092367.55										
56	0.165	1.000	0.000	0.000	0.00	0.00		1060551.02		1060551.02										
57	0.160	1.000	0.000	0.000	0.00	0.00		1029661.19		1029661.19										
58	0.156	1.000	0.000	0.000	0.00	0.00		999671.054		999671.05										
59	0.151	1.000	0.000	0.000	0.00	0.00		970554.421		970554.42										
60	0.147	1.000	0.000	0.000	0.00	0.00		942285.846		942285.85										
61	0.143	1.000	0.000	0.000	0.00	0.00		914840.627		914840.63										
62	0.138	1.000	0.000	0.000	0.00	0.00		888194.784		888194.78										
63	0.134	1.000	0.000	0.000	0.00	0.00		862325.033		862325.03										
64	0.130	1.000	0.000	0.000	0.00	0.00		837208.769		837208.77										
65	0.127	1.000	0.000	0.000	0.00	0.00		812824.048		812824.05										
66	0.123	1.000	0.000	0.000	0.00	0.00		789149.561		789149.56										
67	0.119	1.000	0.000	0.000	0.00	0.00		766164.623		766164.62										
68	0.116	1.000	0.000	0.000	0.00	0.00		743849.148		743849.15										
69	0.112	1.000	0.000	0.000	0.00	0.00		722183.639		722183.64										
70	0.109	1.000	0.000	0.000	0.00	0.00		701149.164		701149.16										
71	0.106	1.000	0.000	0.000	0.00	0.00		680727.344		680727.34										
72	0.103	1.000	0.000	0.000	0.00	0.00		660900.334		660900.33										
73	0.100	1.000	0.000	0.000	0.00	0.00		641650.809		641650.81										
74	0.097	1.000	0.000	0.000	0.00	0.00		622961.951		622961.95										
75	0.094	1.000	0.000	0.000	0.00	0.00		604817.428		604817.43										
76	0.092	1.000	0.000	0.000	0.00	0.00		590065.783		590065.78										
77	0.090	1.000	0.000	0.000	0.00	0.00		575673.935		575673.94										
78	0.087	1.000	0.000	0.000	0.00	0.00		561633.107		561633.11										
79	0.085	1.000	0.000	0.000	0.00	0.00		547934.739		547934.74										
80	0.083	1.000	0.000	0.000	0.00	0.00		534570.477		534570.48										
81	0.081	1.000	0.000	0.000	0.00	0.00		521532.173		521532.17										
82	0.079	1.000	0.000	0.000	0.00	0.00		508811.876		508811.88										
83	0.077	1.000	0.000	0.000	0.00	0.00		496401.83		496401.83										
84	0.075	1.000	0.000	0.000	0.00	0.00		484294.468		484294.47										
85	0.074	1.000	0.000	0.000	0.00	0.00		472482.408		472482.41										
86	0.072	1.000	0.000	0.000	0.00	0.00		460958.447		460958.45										
87	0.070	1.000	0.000	0.000	0.00	0.00		449715.558		449715.56										
88	0.068	1.000	0.000	0.000	0.00	0.00		438746.886		438746.89										
89	0.067	1.000	0.000	0.000	0.00	0.00		428045.742		428045.74										
90	0.065	1.000	0.000	0.000	0.00	0.00		417605.602		417605.60										
91	0.063	1.000	0.000	0.000	0.00	0.00		407420.1		407420.10										
92	0.062	1.000	0.000	0.000	0.00	0.00		397483.024		397483.02										
93	0.060	1.000	0.000	0.000	0.00	0.00		387788.316		387788.32										
94	0.059	1.000	0.000	0.000	0.00	0.00		378330.065		378330.06										
95	0.057	1.000	0.000	0.000	0.00	0.00		369102.502		369102.50										
96	0.056	1.000	0.000	0.000	0.00	0.00														

Damage Cost Calculation Sheet - Do Something (Linear)										Sheet Nr.	3							
Client/Authority											North Yorkshire County Council							
Project name											Option:							
Sandsend Road Coast Protection Scheme PAR											Do Minimum							
Project reference											9W5572/Z3							
Base date for estimates (year 0)											Q4 2011							
Scaling factor (e.g. Em, Ek, £)											£							
Initial discount rate											3.5%		3.0%		2.5%			
Year											<		0		>		99	
Breach pb											0.100		0.100		0.200		0.500	
PV Total Damage											£		100,731,189		(calculated below)			
Prepared (date)											31/05/2012							
Printed											31/05/2012							
Prepared by											Emma Hick							
Checked by											0							
Checked date											0							
PV breach/failure											£							
Ave Annual Damage (overtopping)											£		/yr					
PV Total Damage											£		100,731,189					
Year	Discount	Prob of a breach or failure	Prob that breach/failure: occurs in year	Prob that breach/failure: has not occurred	PV damage due to: breach or failure	PV damage due to: overtopping	Road Clearance	Other damages Traffic Disruption	Damages 3	PV total damage								
0	1.000	0.100	0.100	0.900	0.00	0.00	58572.78735			58572.79								
1	0.966	0.102	0.102	0.898	0.00	0.00				0.00								
2	0.934	0.104	0.104	0.896	0.00	0.00	54678.32374			54678.32								
3	0.902	0.106	0.106	0.894	0.00	0.00				0.00								
4	0.871	0.108	0.108	0.892	0.00	0.00	51042.80029			51042.80								
5	0.842	0.110	0.110	0.890	0.00	0.00				0.00								
6	0.814	0.112	0.112	0.888	0.00	0.00	47649.00025			47649.00								
7	0.786	0.114	0.114	0.886	0.00	0.00				0.00								
8	0.759	0.116	0.116	0.884	0.00	0.00	44480.85159			44480.85								
9	0.734	0.118	0.118	0.882	0.00	0.00				0.00								
10	0.709	0.120	0.120	0.880	0.00	0.00	41523.35092			41523.35								
11	0.685	0.122	0.122	0.878	0.00	0.00				0.00								
12	0.662	0.124	0.124	0.876	0.00	0.00	38762.4924			38762.49								
13	0.639	0.127	0.127	0.873	0.00	0.00				0.00								
14	0.618	0.129	0.129	0.871	0.00	0.00	36185.20143			36185.20								
15	0.597	0.131	0.131	0.869	0.00	0.00				0.00								
16	0.577	0.133	0.133	0.867	0.00	0.00	33779.27273			33779.27								
17	0.557	0.135	0.135	0.865	0.00	0.00				0.00								
18	0.538	0.137	0.137	0.863	0.00	0.00	31533.31255			31533.31								
19	0.520	0.139	0.139	0.861	0.00	0.00		3339206.34		3339206.34								
20	0.503	0.141	0.141	0.859	0.00	0.00		3226286.32		3226286.32								
21	0.486	0.143	0.143	0.857	0.00	0.00		3117184.85		3117184.85								
22	0.469	0.145	0.145	0.855	0.00	0.00		3011772.8		3011772.8								
23	0.453	0.147	0.147	0.853	0.00	0.00		2909925.41		2909925.41								
24	0.438	0.149	0.149	0.851	0.00	0.00		2811522.14		2811522.14								
25	0.423	0.151	0.151	0.849	0.00	0.00		2716446.51		2716446.51								
26	0.409	0.153	0.153	0.847	0.00	0.00		2624586.00		2624586.00								
27	0.395	0.155	0.155	0.845	0.00	0.00		2535831.88		2535831.88								
28	0.382	0.157	0.157	0.843	0.00	0.00		2450079.12		2450079.12								
29	0.369	0.159	0.159	0.841	0.00	0.00		2367226.2		2367226.2								
30	0.356	0.161	0.161	0.839	0.00	0.00		2287175.07		2287175.07								
31	0.346	0.163	0.163	0.837	0.00	0.00		2220558.32		2220558.32								
32	0.336	0.165	0.165	0.835	0.00	0.00		2155881.87		2155881.87								
33	0.326	0.167	0.167	0.833	0.00	0.00		2093089.19		2093089.19								
34	0.317	0.169	0.169	0.831	0.00	0.00		2032125.43		2032125.43								
35	0.307	0.171	0.171	0.829	0.00	0.00		1972937.31		1972937.31								
36	0.298	0.173	0.173	0.827	0.00	0.00		1915473.11		1915473.11								
37	0.290	0.176	0.176	0.824	0.00	0.00		1859682.64		1859682.64								
38	0.281	0.178	0.178	0.822	0.00	0.00		1805517.12		1805517.12								
39	0.273	0.180	0.180	0.820	0.00	0.00		1752929.24		1752929.24								
40	0.265	0.182	0.182	0.818	0.00	0.00		1701873.05		1701873.05								
41	0.257	0.184	0.184	0.816	0.00	0.00		1652303.93		1652303.93								
42	0.250	0.186	0.186	0.814	0.00	0.00		1604178.58		1604178.58								
43	0.243	0.188	0.188	0.812	0.00	0.00		1557454.93		1557454.93								
44	0.236	0.190	0.190	0.810	0.00	0.00		1512092.16		1512092.16								
45	0.229	0.192	0.192	0.808	0.00	0.00		1468050.65		1468050.65								
46	0.222	0.194	0.194	0.806	0.00	0.00		1425291.89		1425291.89								
47	0.216	0.196	0.196	0.804	0.00	0.00		1383778.53		1383778.53								
48	0.209	0.198	0.198	0.802	0.00	0.00		1343474.3		1343474.3								
49	0.203	0.200	0.200	0.800	0.00	0.00		1304343.98		1304343.98								
50	0.197	0.206	0.206	0.794	0.00	0.00		1266353.38		1266353.38								
51	0.192	0.212	0.212	0.788	0.00	0.00		1229469.3		1229469.3								
52	0.186	0.218	0.218	0.782	0.00	0.00		1193659.52		1193659.52								
53	0.181	0.224	0.224	0.776	0.00	0.00		1158892.74		1158892.74								
54	0.175	0.230	0.230	0.770	0.00	0.00		1125138.58		1125138.58								
55	0.170	0.236	0.236	0.764	0.00	0.00		1092367.55		1092367.55								
56	0.165	0.242	0.242	0.758	0.00	0.00		1060551.02		1060551.02								
57	0.160	0.248	0.248	0.752	0.00	0.00		1029661.19		1029661.19								
58	0.156	0.254	0.254	0.746	0.00	0.00		999671.054		999671.05								
59	0.151	0.260	0.260	0.740	0.00	0.00		970554.421		970554.42								
60	0.147	0.266	0.266	0.734	0.00	0.00		942285.846		942285.85								
61	0.143	0.272	0.272	0.728	0.00	0.00		914840.627		914840.63								
62	0.138	0.278	0.278	0.722	0.00	0.00		888194.784		888194.78								
63	0.134	0.284	0.284	0.716	0.00	0.00		862325.033		862325.03								
64	0.130	0.290	0.290	0.710	0.00	0.00		837208.769		837208.77								
65	0.127	0.296	0.296	0.704	0.00	0.00		812824.048		812824.05								
66	0.123	0.302	0.302	0.698	0.00	0.00		789149.561		789149.56								
67	0.119	0.308	0.308	0.692	0.00	0.00		766164.623		766164.62								
68	0.116	0.314	0.314	0.686	0.00	0.00		743849.148		743849.15								
69	0.112	0.320	0.320	0.680	0.00	0.00		722183.639		722183.64								
70	0.109	0.326	0.326	0.674	0.00	0.00		701149.164		701149.16								
71	0.106	0.332	0.332	0.668	0.00	0.00		680727.344		680727.34								
72	0.103	0.338	0.338	0.662	0.00	0.00		660900.334		660900.33								
73	0.100	0.344	0.344	0.656	0.00	0.00		641650.809		641650.81								
74	0.097	0.350	0.350	0.650	0.00	0.00		622961.951		622961.95								
75	0.094	0.356	0.356	0.644	0.00	0.00		604817.428		604817.43								
76	0.092	0.362	0.362	0.638	0.00	0.00		590065.783		590065.78								
77	0.090	0.368	0.368	0.632	0.00	0.00		575673.935		575673.94								
78	0.087	0.374	0.374	0.626	0.00	0.00		561633.107		561633.11								
79	0.085	0.380	0.380	0.620	0.00	0.00		547934.739		547934.74								
80	0.083	0.386	0.386	0.614	0.00	0.00		534570.477		534570.48								
81	0.081	0.392	0.392	0.608	0.00	0.00		521532.173		521532.17								
82	0.079	0.398	0.398	0.602	0.00	0.00		508811.876		508811.88								
83	0.077	0.404	0.404	0.596	0.00	0.00		496401.83		496401.83								
84	0.075	0.410	0.410	0.590	0.00	0.00		484294.468		484294.47								
85	0.074	0.416	0.416	0.584	0.00	0.00		472482.408		472482.41								
86	0.072	0.422	0.422	0.578	0.00	0.00		460958.447		460958.45								
87	0.070	0.428	0.428	0.572	0.00	0.00		449715.558		449715.56								
88	0.068	0.434	0.434	0.566	0.00	0.00		438746.886		438746.89								
89	0.067	0.440	0.440	0.560	0.00	0.00		428045.742		428045.74								
90	0.065	0.446	0.446	0.554	0.00	0.00		417605.602		417605.60								
91	0.063	0.452	0.452	0.548	0.00	0.00		407420.1		407420.1								
92	0.062	0.458	0.458	0.542	0.00	0.00		397483.024		397483.02								
93	0.060	0.464	0.464	0.536	0.00	0.00		387788.316		387788.32								
94	0.059	0.470	0.470	0.530	0.00	0.00		378330.065		378330.06								
95	0.057	0.476	0.476	0.5														

Damage Cost Calculation Sheet - Do Something (Linear)										Sheet Nr.	4		
Client/Authority											North Yorkshire County Council		
Project name											Sandsend Road Coast Protection Scheme PAR		
Project reference											9W5572/Z3		
Base date for estimates (year 0)											Q4 2011		
Scaling factor (e.g. Em, Ek, E)											£		
Initial discount rate											3.5%	3.0%	2.5%
Prepared (date)											31/05/2012		
Printed											31/05/2012		
Prepared by											Emma Hick		
Checked by											0		
Checked date											0		
PV breach/failure											£		
Ave Annual Damage (overtopping)											£		
PV Total Damage											£ 92,188 (calculated below)		
Year	Discount	Prob of a breach or failure	Prob that breach/failure: occurs in year	has not occurred	PV damage due to: breach or failure	over-topping	Road Clearance	Other damages Traffic Disruption	Damages 3	PV total damage			
0	1.000	0.100	0.100	0.900	0.00	0.00	92188.474			92188.47			
1	0.966	0.100	0.100	0.900	0.00	0.00				0.00			
2	0.934	0.100	0.100	0.900	0.00	0.00				0.00			
3	0.902	0.100	0.100	0.900	0.00	0.00				0.00			
4	0.871	0.100	0.100	0.900	0.00	0.00				0.00			
5	0.842	0.100	0.100	0.900	0.00	0.00				0.00			
6	0.814	0.100	0.100	0.900	0.00	0.00				0.00			
7	0.786	0.100	0.100	0.900	0.00	0.00				0.00			
8	0.759	0.100	0.100	0.900	0.00	0.00				0.00			
9	0.734	0.100	0.100	0.900	0.00	0.00				0.00			
10	0.709	0.100	0.100	0.900	0.00	0.00				0.00			
11	0.685	0.100	0.100	0.900	0.00	0.00				0.00			
12	0.662	0.100	0.100	0.900	0.00	0.00				0.00			
13	0.639	0.100	0.100	0.900	0.00	0.00				0.00			
14	0.618	0.100	0.100	0.900	0.00	0.00				0.00			
15	0.597	0.100	0.100	0.900	0.00	0.00				0.00			
16	0.577	0.100	0.100	0.900	0.00	0.00				0.00			
17	0.557	0.100	0.100	0.900	0.00	0.00				0.00			
18	0.538	0.100	0.100	0.900	0.00	0.00				0.00			
19	0.520	0.100	0.100	0.900	0.00	0.00				0.00			
20	0.503	0.100	0.100	0.900	0.00	0.00				0.00			
21	0.486	0.100	0.100	0.900	0.00	0.00				0.00			
22	0.469	0.100	0.100	0.900	0.00	0.00				0.00			
23	0.453	0.100	0.100	0.900	0.00	0.00				0.00			
24	0.438	0.100	0.100	0.900	0.00	0.00				0.00			
25	0.423	0.100	0.100	0.900	0.00	0.00				0.00			
26	0.409	0.100	0.100	0.900	0.00	0.00				0.00			
27	0.395	0.100	0.100	0.900	0.00	0.00				0.00			
28	0.382	0.100	0.100	0.900	0.00	0.00				0.00			
29	0.369	0.100	0.100	0.900	0.00	0.00				0.00			
30	0.356	0.100	0.100	0.900	0.00	0.00				0.00			
31	0.346	0.100	0.100	0.900	0.00	0.00				0.00			
32	0.336	0.100	0.100	0.900	0.00	0.00				0.00			
33	0.326	0.100	0.100	0.900	0.00	0.00				0.00			
34	0.317	0.100	0.100	0.900	0.00	0.00				0.00			
35	0.307	0.100	0.100	0.900	0.00	0.00				0.00			
36	0.298	0.100	0.100	0.900	0.00	0.00				0.00			
37	0.290	0.100	0.100	0.900	0.00	0.00				0.00			
38	0.281	0.100	0.100	0.900	0.00	0.00				0.00			
39	0.273	0.100	0.100	0.900	0.00	0.00				0.00			
40	0.265	0.100	0.100	0.900	0.00	0.00				0.00			
41	0.257	0.100	0.100	0.900	0.00	0.00				0.00			
42	0.250	0.100	0.100	0.900	0.00	0.00				0.00			
43	0.243	0.100	0.100	0.900	0.00	0.00				0.00			
44	0.236	0.100	0.100	0.900	0.00	0.00				0.00			
45	0.229	0.100	0.100	0.900	0.00	0.00				0.00			
46	0.222	0.100	0.100	0.900	0.00	0.00				0.00			
47	0.216	0.100	0.100	0.900	0.00	0.00				0.00			
48	0.209	0.100	0.100	0.900	0.00	0.00				0.00			
49	0.203	0.100	0.100	0.900	0.00	0.00				0.00			
50	0.197	0.100	0.100	0.900	0.00	0.00				0.00			
51	0.192	0.100	0.100	0.900	0.00	0.00				0.00			
52	0.186	0.100	0.100	0.900	0.00	0.00				0.00			
53	0.181	0.100	0.100	0.900	0.00	0.00				0.00			
54	0.175	0.100	0.100	0.900	0.00	0.00				0.00			
55	0.170	0.100	0.100	0.900	0.00	0.00				0.00			
56	0.165	0.100	0.100	0.900	0.00	0.00				0.00			
57	0.160	0.100	0.100	0.900	0.00	0.00				0.00			
58	0.156	0.100	0.100	0.900	0.00	0.00				0.00			
59	0.151	0.100	0.100	0.900	0.00	0.00				0.00			
60	0.147	0.100	0.100	0.900	0.00	0.00				0.00			
61	0.143	0.100	0.100	0.900	0.00	0.00				0.00			
62	0.138	0.100	0.100	0.900	0.00	0.00				0.00			
63	0.134	0.100	0.100	0.900	0.00	0.00				0.00			
64	0.130	0.100	0.100	0.900	0.00	0.00				0.00			
65	0.127	0.100	0.100	0.900	0.00	0.00				0.00			
66	0.123	0.100	0.100	0.900	0.00	0.00				0.00			
67	0.119	0.100	0.100	0.900	0.00	0.00				0.00			
68	0.116	0.100	0.100	0.900	0.00	0.00				0.00			
69	0.112	0.100	0.100	0.900	0.00	0.00				0.00			
70	0.109	0.100	0.100	0.900	0.00	0.00				0.00			
71	0.106	0.100	0.100	0.900	0.00	0.00				0.00			
72	0.103	0.100	0.100	0.900	0.00	0.00				0.00			
73	0.100	0.100	0.100	0.900	0.00	0.00				0.00			
74	0.097	0.100	0.100	0.900	0.00	0.00				0.00			
75	0.094	0.100	0.100	0.900	0.00	0.00				0.00			
76	0.092	0.100	0.100	0.900	0.00	0.00				0.00			
77	0.090	0.100	0.100	0.900	0.00	0.00				0.00			
78	0.087	0.100	0.100	0.900	0.00	0.00				0.00			
79	0.085	0.100	0.100	0.900	0.00	0.00				0.00			
80	0.083	0.100	0.100	0.900	0.00	0.00				0.00			
81	0.081	0.100	0.100	0.900	0.00	0.00				0.00			
82	0.079	0.100	0.100	0.900	0.00	0.00				0.00			
83	0.077	0.100	0.100	0.900	0.00	0.00				0.00			
84	0.075	0.100	0.100	0.900	0.00	0.00				0.00			
85	0.074	0.100	0.100	0.900	0.00	0.00				0.00			
86	0.072	0.100	0.100	0.900	0.00	0.00				0.00			
87	0.070	0.100	0.100	0.900	0.00	0.00				0.00			
88	0.068	0.100	0.100	0.900	0.00	0.00				0.00			
89	0.067	0.100	0.100	0.900	0.00	0.00				0.00			
90	0.065	0.100	0.100	0.900	0.00	0.00				0.00			
91	0.063	0.100	0.100	0.900	0.00	0.00				0.00			
92	0.062	0.100	0.100	0.900	0.00	0.00				0.00			
93	0.060	0.100	0.100	0.900	0.00	0.00				0.00			
94	0.059	0.100	0.100	0.900	0.00	0.00				0.00			
95	0.057	0.100	0.100	0.900	0.00	0.00				0.00			
96	0.056	0.100	0.100	0.900	0.00	0.00				0.00			
97	0.055	0.100	0.100	0.900	0.00	0.00				0.00			
98	0.053	0.100	0.100	0.900	0.00	0.00				0.00			
99	0.052	0.100	0.100	0.900	0.00	0.00				0.00			
Total					0.00	0.00				92188.47			



Year	Do nothing	Option 2	Option 3	Option 4	Option 5	Option 6	Value	NPV - do nothing	NPV - option 2	NPV - option 3	NPV - option 4	NPV - option 5	NPV - option 6
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	-41072.79	0.00	-31615.69	273961.87	92688.47	-31615.69	273961.87	92688.47	0.00	0.00	0.00	0.00
2	0.00	-82145.58	0.00	-63231.38	547923.74	185376.94	-63231.38	547923.74	185376.94	0.00	0.00	0.00	0.00
3	0.00	-123218.37	0.00	-94846.87	821785.61	278065.41	-94846.87	821785.61	278065.41	0.00	0.00	0.00	0.00
4	0.00	-164291.16	0.00	-126462.36	1105647.48	370154.91	-126462.36	1105647.48	370154.91	0.00	0.00	0.00	0.00
5	0.00	-205363.95	0.00	-158037.85	1384539.35	471244.41	-158037.85	1384539.35	471244.41	0.00	0.00	0.00	0.00
6	0.00	-246436.74	0.00	-189613.34	1663431.22	572333.91	-189613.34	1663431.22	572333.91	0.00	0.00	0.00	0.00
7	0.00	-287509.53	0.00	-221188.84	1942323.09	673423.41	-221188.84	1942323.09	673423.41	0.00	0.00	0.00	0.00
8	0.00	-328582.32	0.00	-252764.33	2221214.96	774512.91	-252764.33	2221214.96	774512.91	0.00	0.00	0.00	0.00
9	0.00	-369655.11	0.00	-284339.83	2500106.83	875602.41	-284339.83	2500106.83	875602.41	0.00	0.00	0.00	0.00
10	0.00	-410727.90	0.00	-315915.32	2779000.00	976691.91	-315915.32	2779000.00	976691.91	0.00	0.00	0.00	0.00
11	0.00	-451800.69	0.00	-347490.81	3057893.17	1077781.41	-347490.81	3057893.17	1077781.41	0.00	0.00	0.00	0.00
12	0.00	-492873.48	0.00	-379066.30	3336786.34	1178970.91	-379066.30	3336786.34	1178970.91	0.00	0.00	0.00	0.00
13	0.00	-533946.27	0.00	-410641.79	3615679.51	1280160.41	-410641.79	3615679.51	1280160.41	0.00	0.00	0.00	0.00
14	0.00	-575019.06	0.00	-442217.28	3894572.68	1381350.91	-442217.28	3894572.68	1381350.91	0.00	0.00	0.00	0.00
15	0.00	-616091.85	0.00	-473792.77	4173465.85	1482540.41	-473792.77	4173465.85	1482540.41	0.00	0.00	0.00	0.00
16	0.00	-657164.64	0.00	-505368.26	4452358.02	1583730.91	-505368.26	4452358.02	1583730.91	0.00	0.00	0.00	0.00
17	0.00	-698237.43	0.00	-536943.75	4731251.19	1684920.41	-536943.75	4731251.19	1684920.41	0.00	0.00	0.00	0.00
18	0.00	-739310.22	0.00	-568519.24	5010144.36	1786110.91	-568519.24	5010144.36	1786110.91	0.00	0.00	0.00	0.00
19	0.00	-780383.01	0.00	-600094.73	5289037.53	1887300.41	-600094.73	5289037.53	1887300.41	0.00	0.00	0.00	0.00
20	0.00	-821455.80	0.00	-631670.22	5567930.70	1988490.91	-631670.22	5567930.70	1988490.91	0.00	0.00	0.00	0.00
21	0.00	-862528.59	0.00	-663245.71	5846823.87	2089680.41	-663245.71	5846823.87	2089680.41	0.00	0.00	0.00	0.00
22	0.00	-903601.38	0.00	-694821.20	6125717.04	2190870.91	-694821.20	6125717.04	2190870.91	0.00	0.00	0.00	0.00
23	0.00	-944674.17	0.00	-726396.69	6404610.21	2292060.41	-726396.69	6404610.21	2292060.41	0.00	0.00	0.00	0.00
24	0.00	-985746.96	0.00	-757972.18	6683503.38	2393250.91	-757972.18	6683503.38	2393250.91	0.00	0.00	0.00	0.00
25	0.00	-1026419.75	0.00	-789547.67	6962396.55	2494440.41	-789547.67	6962396.55	2494440.41	0.00	0.00	0.00	0.00
26	0.00	-1067092.54	0.00	-821123.16	7241289.72	2595630.91	-821123.16	7241289.72	2595630.91	0.00	0.00	0.00	0.00
27	0.00	-1107765.33	0.00	-852698.65	7520182.89	2696820.41	-852698.65	7520182.89	2696820.41	0.00	0.00	0.00	0.00
28	0.00	-1148438.12	0.00	-884274.14	7799076.06	2798010.91	-884274.14	7799076.06	2798010.91	0.00	0.00	0.00	0.00
29	0.00	-1189110.91	0.00	-915849.63	8077969.23	2899200.41	-915849.63	8077969.23	2899200.41	0.00	0.00	0.00	0.00
30	0.00	-1229783.70	0.00	-947425.12	8356862.40	2999990.91	-947425.12	8356862.40	2999990.91	0.00	0.00	0.00	0.00
31	0.00	-1270456.49	0.00	-979000.61	8635755.57	3100180.41	-979000.61	8635755.57	3100180.41	0.00	0.00	0.00	0.00
32	0.00	-1311129.28	0.00	-1010576.10	8914648.74	3200370.91	-1010576.10	8914648.74	3200370.91	0.00	0.00	0.00	0.00
33	0.00	-1351802.07	0.00	-1042151.59	9193541.91	3300560.41	-1042151.59	9193541.91	3300560.41	0.00	0.00	0.00	0.00
34	0.00	-1392474.86	0.00	-1073727.08	9472435.08	3400750.91	-1073727.08	9472435.08	3400750.91	0.00	0.00	0.00	0.00
35	0.00	-1433147.65	0.00	-1105302.57	9751328.25	3500940.41	-1105302.57	9751328.25	3500940.41	0.00	0.00	0.00	0.00
36	0.00	-1473820.44	0.00	-1136878.06	10030221.42	3601130.91	-1136878.06	10030221.42	3601130.91	0.00	0.00	0.00	0.00
37	0.00	-1514493.23	0.00	-1168453.55	10309114.59	3701320.41	-1168453.55	10309114.59	3701320.41	0.00	0.00	0.00	0.00
38	0.00	-1555166.02	0.00	-1200029.04	10588007.76	3801510.91	-1200029.04	10588007.76	3801510.91	0.00	0.00	0.00	0.00
39	0.00	-1595838.81	0.00	-1231604.53	10866900.93	3901700.41	-1231604.53	10866900.93	3901700.41	0.00	0.00	0.00	0.00
40	0.00	-1636511.60	0.00	-1263180.02	11145794.10	4001890.91	-1263180.02	11145794.10	4001890.91	0.00	0.00	0.00	0.00
41	0.00	-1677184.39	0.00	-1294755.51	11424687.27	4102080.41	-1294755.51	11424687.27	4102080.41	0.00	0.00	0.00	0.00
42	0.00	-1717857.18	0.00	-1326331.00	11703580.44	4202270.91	-1326331.00	11703580.44	4202270.91	0.00	0.00	0.00	0.00
43	0.00	-1758530.00	0.00	-1357906.49	11982473.61	4302460.41	-1357906.49	11982473.61	4302460.41	0.00	0.00	0.00	0.00
44	0.00	-1799202.79	0.00	-1389481.98	12261366.78	4402650.91	-1389481.98	12261366.78	4402650.91	0.00	0.00	0.00	0.00
45	0.00	-1839875.58	0.00	-1421057.47	12540259.95	4502840.41	-1421057.47	12540259.95	4502840.41	0.00	0.00	0.00	0.00
46	0.00	-1880548.37	0.00	-1452632.96	12819153.12	4603030.91	-1452632.96	12819153.12	4603030.91	0.00	0.00	0.00	0.00
47	0.00	-1921221.16	0.00	-1484208.45	13098046.29	4703220.41	-1484208.45	13098046.29	4703220.41	0.00	0.00	0.00	0.00
48	0.00	-1961893.95	0.00	-1515783.94	13376939.46	4803410.91	-1515783.94	13376939.46	4803410.91	0.00	0.00	0.00	0.00
49	0.00	-2002566.74	0.00	-1547359.43	13655832.63	4903600.41	-1547359.43	13655832.63	4903600.41	0.00	0.00	0.00	0.00
50	0.00	-2043239.53	0.00	-1578934.92	13934725.80	5003790.91	-1578934.92	13934725.80	5003790.91	0.00	0.00	0.00	0.00
51	0.00	-2083912.32	0.00	-1610510.41	14213618.97	5103980.41	-1610510.41	14213618.97	5103980.41	0.00	0.00	0.00	0.00
52	0.00	-2124585.11	0.00	-1642085.90	14492512.14	5204170.91	-1642085.90	14492512.14	5204170.91	0.00	0.00	0.00	0.00
53	0.00	-2165257.90	0.00	-1673661.39	14771405.31	5304360.41	-1673661.39	14771405.31	5304360.41	0.00	0.00	0.00	0.00
54	0.00	-2205930.69	0.00	-1705236.88	15050298.48	5404550.91	-1705236.88	15050298.48	5404550.91	0.00	0.00	0.00	0.00
55	0.00	-2246603.48	0.00	-1736812.37	15329191.65	5504740.41	-1736812.37	15329191.65	5504740.41	0.00	0.00	0.00	0.00
56	0.00	-2287276.27	0.00	-1768387.86	15608084.82	5604930.91	-1768387.86	15608084.82	5604930.91	0.00	0.00	0.00	0.00
57	0.00	-2327949.06	0.00	-1800000.00	15886977.99	5705120.41	-1800000.00	15886977.99	5705120.41	0.00	0.00	0.00	0.00
58	0.00	-2368621.85	0.00	-1831612.14	16165871.16	5805310.91	-1831612.14	16165871.16	5805310.91	0.00	0.00	0.00	0.00
59	0.00	-2409294.64	0.00	-1863224.28	16444764.33	5905500.41	-1863224.28	16444764.33	5905500.41	0.00	0.00	0.00	0.00
60	0.00	-2449967.43	0.00	-1894836.42	16723657.50	6005690.91	-1894836.42	16723657.50	6005690.91	0.00	0.00	0.00	0.00
61	0.00	-2490640.22	0.00	-1926448.56	17002550.67	6105880.41	-1926448.56	17002550.67	6105880.41	0.00	0.00	0.00	0.00
62	0.00	-2531313.01	0.00	-1958060.70	17281443.84	6206070.91	-1958060.70	17281443.84	6206070.91	0.00	0.00	0.00	0.00
63	0.00	-2571985.80	0.00	-1989672.84	17560337.01	6306260.41	-1989672.84	17560337.01					