Newby Beck, Cost Benefit Assessment

	No		Unit cost	Ratio	frequency	£/event	Prob	£
Houses		6	20000	1	3	120,000	0.33	40,000
Road		1	3000	1	2	3,000	0.50	1,500
Average Annual Damage (AAD)								**41,500**
PV of benefits (100 yrs)		AAD x	26.88					**1,115,400**
Proposed Work			Length m	Unit £ min	Unit £ max	Total min	Total max	
All Options								
Open culvert	back gardens of Scalby Road and Newby Primary School		110	500	1500	55000	165000	
Option A	**Do Minimum**							
Detailed Design						20,000	30,000	
Min. flood storage	Public Open space to be allowed to flood					200,000	250,000	
Flood wall	Clay core and earth bund		200	250	500	50,000	100,000	
Culvert jetting	Cleaning culvert, manhole replacements, trash screens					15,000	20,000	
		Total				**285,000**	**400,000**	
Option B	**Replace Culvert**							
Detailed Design						20,000	30,000	
Replace culvert	Under Lawrence Close and Hackness Road		220	5,000	7,500	1,100,000	1,650,000	
		Total				**1,120,000**	**1,680,000**	
Option C	**Flood storage & protection walls**							
Detailed Design						20,000	30,000	
Clay/Concrete flood walls	Lawrence Close and Linden Road		220	500	1,000	110,000	220,000	
Replace opening				25,000	35,000	25,000	35,000	
		Total				**155,000**	**285,000**	
Option A	**Redirect Culvert**							
Detailed Design						20,000	30,000	
New Culvert	Under Lawrence Close and Hackness Road		600	5,000	7,500	3,000,000	4,500,000	
		Total				**3,020,000**	**4,530,000**	

		max	min
Benefit Cost Ratios	Option A	3.9	2.8
	Option B	1.0	0.7
	Option C	7.2	3.9
	Option D	0.4	0.2

Notes: £3,500 used is a 'Housing Equivalent' value which is utilised by the EA as representing the damage to a typical house in a small flood. Various factors are then applied for application to road and garden flooding etc.
£10,000 per house is assumed for damage costs based upon the latest data from Middlesex University
The value 15.76 is used to determine costs per year over 50 years assuming a discount rate of 6% (return of investment).

Option		Damage Prevented	Scheme Summary	Scheme Costs - £k		Benefit Cost Ratios	
				min	max	min	Max
A	Replace Culvert	6 homes every 3 years and Hackness road annually. AAD = £23.5k PV = £370k	Replace culvert under Lawrence Close and Hackness Road	£1,120k	£1,680k	0.2	0.3
B	Flood protection Wall		Build flood protection wall around properties at Lawrence grove and Hackness Road	£155k	£380k	1.0	2.4
C	New Culvert		Culvert along Linden and Hackness Road	£3,020k	£4,530K	0.1	0.1