

## **NANT CYLLA SCOUR PROTECTION –COST ESTIMATES (2023 V1.0)**

### **Summary (initial delivery estimate)**

#### **Preferred Option Cost Estimate - Strategy 1**

Preliminaries	£	81,522
Section 1: Energy dissipation baffles	£	73,081
Section 2: Energy dissipation rock weir	£	162,597
Section 3: Channel widening, regrade eastern bank, renew existing scour protection, rock meanders and green engineering	£	861,067
Contractor's fees	£	294,567
Pre-construction activities:	£	270,283
Risk Allowances:	£	1,150,457
<b>Total Estimated Works Costs</b>	<b>£</b>	<b>2,893,574</b>

#### **Preferred Option Cost Estimate - Strategy 2**

Preliminaries	£	81,522
Section 1: Energy dissipation baffles	£	73,081
Section 2: Energy dissipation rock weir	£	162,597
Section 3: Renewal of existing scour protection east and west bank	£	381,250
Contractor's fees:	£	174,612
Pre-construction activities:	£	210,306
Risk Allowances:	£	715,023
<b>Total Estimated Works Costs</b>	<b>£</b>	<b>1,798,391</b>

## Scheme: Preferred Option Cost Estimate - Strategy 1

Main Works Elements		
<b>Preliminaries</b>		
0.10	General site clearance and vegetation removal to facilitate site access.	£3,300
0.20	Provision of 2 No. permanent access tracks/ points to watercourse to facilitate longer term operation and maintenance.	£26,396
0.30	Provision and fixing of temporary access gates - hire and installation for duration of works and removal on completion	£2,200
0.40	Provision of temporary fencing - hire and installation for duration of works and removal on completion	£2,250
0.50	Establish and remove site offices	£1,403
0.60	Hire, service and operate site offices	£4,500
0.70	Dewatering	£41,474
<b>Section 1: Energy dissipation baffles</b>		
1.10	Coring/ dowelling in channel bed and bank to facilitate installation of concrete baffles.	£16,500
1.20	Cast in baffles into base of channel	£33,118
1.30	Cast in baffles into walls of channel	£23,463
<b>Section 2: Energy dissipation rock weir</b>		
2.10	Excavation for foundations (Maximum depth 0.5 - 1m) - incl removal off site	£18,809
2.20	Provision of concrete: Grade C30/20 mm aggregate to BS EN 197	£18,222
2.30	Concrete ancillaries: formwork fair finish (plane vertical exceeding 1.22m width)	£28,028
2.40	Placing of concrete: mass concrete blinding (thickness not exceeding 150mm)	£662
2.50	Placing of concrete: RC ground slab (thickness 150 - 300mm)	£1,983
2.60	Placing of concrete: RC wall (thickness 150 - 300mm)	£3,074
2.70	Reinforcement: bent and cut to length (nominal bar size 16mm). Plain round steel bars to BS 4449.	£80,365
2.80	Rock armour provision	£10,863
2.90	Placing of concrete: mass concrete (for rock embedment)	£592
<b>Section 3: Channel widening, regrade eastern bank, renew existing scour protection, rock meanders and green engineering</b>		
3.10	Vegetation clearance (east bank)	£822
3.20	Tree removal (east bank)	£6,593
3.30	Stump removal (east bank)	£10,623
3.40	Excavation of material (east bank)	£17,996
3.50	Disposal of material (east bank)	£555,984
3.60	Removal and dispose of existing erosion protection measures (concrete)	£61,695
3.70	Removal and disposal of existing erosion protection material (gabions)	£58,870

**Scheme: Preferred Option Cost Estimate - Strategy 1**

3.80	Provision of concrete: Grade C30/20 mm aggregate to BS EN 197, for gabion foundations (west bank)		£27,332
3.90	Placing of mass concrete blinding (thickness not exceeding 150mm) for gabion foundations (west bank)		£662
3.10	Placing of gabion concrete foundations (west bank)		£7,222
3.11	Reinforcement		£8,250
3.12	Provision and installation of new erosion protection / gabions (west bank)		£28,781
3.13	Geotextiles		£10,384
3.14	Coir matting		£5,500
3.15	Rock mattresses to replicate natural channel features		£31,653
3.16	Topsoiling (reuse of existing)		£3,697
3.17	Planting and re-landscaping / trees		£14,905
3.18	Landscaping - grass seeding (10 - 45 degrees to horizontal)		£10,098
<b>Main Works Elements:</b>			<b>£1,178,267</b>
<b>Contractor's fees</b>			
	Contractors profit & overheads	20%	£235,653.34
	Contractors personnel - Contracts Manager, Site Agent	5%	£58,913.34
<b>Sub-total Works Costs:</b>			<b>£1,472,833</b>
<b>Pre-construction activities:</b>			
	Feasibility study, hydraulic modelling & assessment		£50,000
	Topographic / channel survey		£8,000
	Ecology surveys		£10,000
	GI		£15,000
	Structural inspections		£10,000
	Consents (assumes planning not required)		£10,000
	Legal fees relating to land access and acquisition (purchase / compensation excl)		£20,000
	Design incl surveys all associated fees (liaise, manage) & site supervision	10%	£147,283
<b>Sub-total Works Costs including Design and Supervision (excluding Risk Allowances):</b>			<b>£1,743,117</b>
<b>Risk Allowances:</b>			
	Optimism Bias (based on the supplementary Green Book Guidance)	66%	£1,150,457
<b>Total Estimated Works Costs (including Risk Allowances):</b>			<b>£2,893,574</b>

## Scheme: Preferred Option Cost Estimate - Strategy 2

Main Works Elements		
<b>Preliminaries</b>		
0.10	General site clearance and vegetation removal to facilitate site access.	£3,300
0.20	Provision of 2 No. permanent access tracks/ points to watercourse to facilitate longer term operation and maintenance.	£26,396
0.30	Provision and fixing of temporary access gates - hire and installation for duration of works and removal on completion	£2,200
0.40	Provision of temporary fencing - hire and installation for duration of works and removal on completion	£2,250
0.50	Establish and remove site offices	£1,403
0.60	Hire, service and operate site offices	£4,500
0.70	Dewatering	£41,474
<b>Section 1: Energy dissipation baffles</b>		
1.10	Coring/ dowelling in channel bed and bank to facilitate installation of concrete baffles.	£16,500
1.20	Cast in baffles into base of channel	£33,118
1.30	Cast in baffles into walls of channel	£23,463
<b>Section 2: Energy dissipation rock weir</b>		
2.10	Excavation for foundations (Maximum depth 0.5 - 1m) - incl removal off site	£18,809
2.20	Provision of concrete: Grade C30/20 mm aggregate to BS EN 197	£18,222
2.30	Concrete ancillaries: formwork fair finish (plane vertical exceeding 1.22m width)	£28,028
2.40	Placing of concrete: mass concrete blinding (thickness not exceeding 150mm)	£662
2.50	Placing of concrete: RC ground slab (thickness 150 - 300mm)	£1,983
2.60	Placing of concrete: RC wall (thickness 150 - 300mm)	£3,074
2.70	Reinforcement: bent and cut to length (nominal bar size 16mm). Plain round steel bars to BS 4449.	£80,365
2.80	Rock armour provision	£10,863
2.90	Placing of concrete: mass concrete (for rock embedment)	£592
<b>Section 3: Renewal of existing scour protection east and west bank</b>		
4.10	Removal and dispose of existing erosion protection measures (concrete)	£123,390
4.20	Removal and disposal of existing erosion protection material (gabions)	£117,741
4.30	Provision of concrete: Grade C30/20 mm aggregate to BS EN 197, for gabion foundations (east and west bank)	£54,665
4.40	Placing of mass concrete blinding (thickness not exceeding 150mm) for gabion foundations (east and west bank)	£1,261

**Scheme: Preferred Option Cost Estimate - Strategy 2**

4.50	Placing of gabion concrete foundations (east and west bank)		£15,887
4.60	Reinforcement		£16,500
4.70	New erosion protection / gabions (east and west bank)		£51,806
<b>Main Works Elements:</b>			<b>£698,450</b>
<b>Contractor's fees:</b>			
	Contractor's profit and overheads	20%	£139,689.93
	Contractors personnel - Contracts Manager, Site Agent	5%	£34,922.48
<b>Sub-total Works Costs:</b>			<b>£873,062</b>
<b>Pre-construction activities:</b>			
	Feasibility study, hydraulic modelling & assessment		£50,000
	Topographic / channel survey		£8,000
	Ecology surveys		£10,000
	GI		£15,000
	Structural inspections		£10,000
	Consents (assumes planning not required)		£10,000
	Legal fees relating to land access and acquisition (purchase / compensation excl)		£20,000
	Design incl surveys all associated fees (liaise, manage) & site supervision	10%	£87,306
<b>Sub-total Works Costs including Design and Supervision (excluding Risk Allowances):</b>			<b>£1,083,368</b>
<b>Risk Allowances:</b>			
	Optimism Bias (based on the supplementary Green Book Guidance)	66%	£715,023
<b>Total Estimated Works Costs (including Risk Allowances):</b>			<b>£1,798,391</b>

# Whole life cost estimate

## Strategy 1

Approximate 100 year design life; minor repairs approximately every 25 years.

	Low end WLC	Mid range WLC	High end WLC
<b>Initial cost</b>	<b>£2,893k (cash)</b> Prelims: £82k Section 1: £73k Section 2: £163k Section 3: £861k Contractor fees (25%): £295k Pre construction activities, design & supervision: £270k Risk allowance: £1,150k		
<b>Repair cost</b>	<b>£139k per repair (cash)</b> Prelims: £30k Section 1: £7.3k (10% of initial capital) Section 2: £16k (10% of initial capital) Section 3: £24k (10% of in-channel works only) Contractor fees (25%): £19k Pre construction activities, Design & supervision: £30k Risk allowance (10%): £13k <b>Repairs every 30 years.</b>	<b>£207k per repair (cash)</b> Prelims: £30k Section 1: £11k (15% of initial capital) Section 2: £24k (15% of initial capital) Section 3: £36k (15% of in-channel works only) Contractor fees (25%): £25k Pre construction activities, Design & supervision: £45k Risk allowance (20%): £34k <b>Repairs every 25 years.</b>	<b>£280k per repair (cash)</b> Prelims: £30k Section 1: £15k (20% of initial capital) Section 2: £33k (20% of initial capital) Section 3: £48k (20% of in-channel works only) Contractor fees (25%): £31k Pre construction activities, Design & supervision: £59k Risk allowance (30%): £65k <b>Repairs every 20 years. Repair undertaken at end of design life (99 years)</b>
<b>Total</b>	<b>Cash (excl inflation): £3,312k</b> <b>PV: £2,975k</b>	<b>Cash (excl inflation): £3,513k</b> <b>PV: £3,046k</b>	<b>Cash (excl inflation): £4,295k</b> <b>PV: £3,197k</b>

## Strategy 2

Approximate 50 year design life (section 3); moderate repairs approximately every 10 - 20 years.

	Low end WLC	Mid range WLC	High end WLC
<b>Initial cost</b>	<p><b>£1,798k (cash)</b>            Prelims: £82k            Section 1: £73k            Section 2: £163k            Section 3: £381k            Contractor fees (25%): £175k            Pre construction activities, design &amp; supervision: £210k            Risk allowance: £715k</p>		
<b>Repair cost</b>	<p><b>£139k per repair (cash)</b>            Prelims: £30k            Section 1: £7.3k (10% of initial capital)            Section 2: £16k (10% of initial capital)            Section 3: £76k (20% of initial capital)            Contractor fees (25%): £32k            Pre construction activities, Design &amp; supervision: £36k            Risk allowance (10%): £20k  <b>Repairs every 20 years.</b></p>	<p><b>£313k per repair (cash)</b>            Prelims: £30k            Section 1: £11k (15% of initial capital)            Section 2: £24k (15% of initial capital)            Section 3: £95k (25% of initial capital)            Contractor fees (25%): £40k            Pre construction activities, Design &amp; supervision: £60k            Risk allowance (20%): £52k  <b>Repairs every 15 years.</b></p>	<p><b>£415k per repair (cash)</b>            Prelims: £30k            Section 1: £15k (20% of initial capital)            Section 2: £33k (20% of initial capital)            Section 3: £114k (30% of in-channel works only)            Contractor fees (25%): £48k            Pre construction activities, Design &amp; supervision: £80k            Risk allowance (30%): £96k  <b>Repairs every 10 years. Repair undertaken at end of design life (99 years)</b></p>
<b>Section 3 renewal cost</b>	<p><b>£680k (cash)</b>            Prelims: £30k            Section 1: £7.3k (10% of initial capital)            Section 2: £16k (10% of initial capital)            Section 3: £381k (same as initial capital)            Contractor fees (25%): £109k            Pre construction activities, Design &amp; supervision: £74k            Risk allowance (10%): £62k  <b>Occurs at year 50. No renewal at year 99</b></p>	<p><b>£828k (cash)</b>            Prelims: £30k            Section 1: £11k (15% of initial capital)            Section 2: £24k (15% of initial capital)            Section 3: £381k (same as initial capital)            Contractor fees (25%): £112k            Pre construction activities, Design &amp; supervision: £132k            Risk allowance (20%): £138k  <b>Occurs at year 50. No renewal at year 99</b></p>	<p><b>£957k (cash)</b>            Prelims: £30k            Section 1: £15k (20% of initial capital)            Section 2: £33k (20% of initial capital)            Section 3: £381k (same as initial capital)            Contractor fees (25%): £115k            Pre construction activities, Design &amp; supervision: £163k            Risk allowance (30%): £221k  <b>Repairs every 10 years. Repair undertaken at end of design life (99 years)</b></p>
<b>Total</b>	<p><b>Cash (excl inflation): £3,351k</b>  <b>PV: £2,144k</b></p>	<p><b>Cash (excl inflation): £4,505k</b>  <b>PV: £2,430k</b></p>	<p><b>Cash (excl inflation): £6,491k</b>  <b>PV: £2,965k</b></p>

## **Risks & assumptions**

### **CONSTRUCTION RISKS (NOT EXCLUSIVE)**

Ground conditions - additional excavation required due to soft spots

Ground conditions - additional material to be disposed offsite

Access - additional over extra uplift to account for difficulties accessing works site

Adverse weather conditions

Environmental impacts and mitigation

Statutory undertakers - works required to facilitate works

Landownership - land access and purchase of land in private ownership

Safety considerations with respect to the proximity of the site to a school and also alongside private residences may need additional provision.

Additional manual handling, barrowing, smaller plant or temporary access equipment or structures may be required, beyond those accounted for here.

Additional temporary access track may be needed.

A weak channel base could reduce the volume of materials transported to site or require negotiation of access via private property.

Weak channel bed and walls could require additional strengthening works to support fixing of baffles. The structural requirements for attachment of baffles are likely to be higher for the walls than for the base. Failure to undertake adequate testing could result in wall collapse.

Additional costs may be incurred if ground investigation identifies unstable or inadequate strength ground for banks and foundations.

Excavations made need propping and the costs of this have not been included.

### **ASSUMPTIONS (NOT EXCLUSIVE)**

The same access used for works in 2018 will be available and agreement for landowner access can be negotiated feasibly.

The structures crossing the watercourse will be removed and access is possible along the length of the watercourse.

Access can be feasibly achieved throughout.

The same construction duration has been assumed for both strategies.

The concrete channel walls and base are tested and confirmed as structurally suitable for fixing baffles.

Baffle and rock armour will be unsuitable for manual handling.