BEACON FEN
ENERGY PARK

Calculation Sheet

CLIENT:	PROJECT: Beacon Fen Energy Park	JOB NO.: ST19595	CALC. REF. NO.:	
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Calculation: Required Attenuation - Construction Phase (Submitted Work Plan)

Causeway 'Flow' Attenuation Volume Estimate

Rainfall Methodology	FSR ⌄
Rainfall Events	Singular ⌄
FSR Region	England & Wales ⌄
M5-60 (mm)	20.000
Ratio-R	0.400
Summer CV	☑ 0.750
Winter CV	☑ 0.840

Calculations assume no infiltration as a 'worst case' scenario

Discharge rates based on 1.44 l/s/ha QBAR rate

Work No. 4A

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	0.690
Peak Discharge (l/s)	0.990
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	0.00000
Required Storage (m³)	Calc
from	428
to	486

Average: 457m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	0.690
Peak Discharge (l/s)	0.990
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	0.00000
Required Storage (m³)	Calc
from	589
to	647

Average: 618m3

Work No. 5A, 5B, 5C

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	2.940
Peak Discharge (l/s)	4.230
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	1821
to	2069

Average: 1,945m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	2.940
Peak Discharge (l/s)	4.230
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	2508
to	2758

Average: 2,633m3

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Calculation: Required Attenuation - Construction Phase (Submitted Work Plan)

Causeway 'Flow' Attenuation Volume Estimate

Work No. 5D

Rainfall Methodology	FSR
Rainfall Events	Singular
FSR Region	England & Wales
M5-60 (mm)	20.000
Ratio-R	0.400
Summer CV	✔ 0.750
Winter CV	✔ 0.840

Calculations assume no infiltration as a 'worst case' scenario

Discharge rates based on 1.44 l/s/ha QBAR rate

Work No. 5D

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	1.670
Peak Discharge (l/s)	2.400
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	1035
to	1175

Average: 1,105m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	1.670
Peak Discharge (l/s)	2.400
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	1425
to	1567

Average: 1,316m3

Existing Substation

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	7.430
Peak Discharge (l/s)	10.700
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	0.00000
Required Storage (m³)	Calc
from	4601
to	5229

Average: 4,915m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	7.430
Peak Discharge (l/s)	10.700
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	0.00000
Required Storage (m³)	Calc
from	6336
to	6971

Average: 6,654m3

Calculation Sheet

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Calculation: Required Attenuation - Construction Phase (Change Request)

Causeway 'Flow' Attenuation Volume Estimate

Work No. 5D

Rainfall Methodology	FSR
Rainfall Events	Singular
FSR Region	England & Wales
M5-60 (mm)	20.000
Ratio-R	0.400
Summer CV ☑	0.750
Winter CV ☑	0.840

Calculations assume no infiltration as a 'worst case' scenario

Discharge rates based on 1.44 l/s/ha QBAR rate

Work No. 4A, 5A, 5B and 5C

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	5.410
Peak Discharge (l/s)	7.790
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	3350
to	3808

Average: 3,579m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	45
Impermeable Area (ha)	5.410
Peak Discharge (l/s)	7.790
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	4802
to	5264

Average: 5,033m3

Work No. 5D

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	2.160
Peak Discharge (l/s)	3.110
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	1338
to	1520

Average: 1,429m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	2.160
Peak Discharge (l/s)	3.110
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	1842
to	2027

Average: 1,935m3

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Calculation: Required Attenuation - Construction Phase				

Causeway 'Flow' Attenuation Volume Estimate

Rainfall Methodology	FSR
Rainfall Events	Singular
FSR Region	England & Wales
M5-60 (mm)	20.000
Ratio-R	0.400
Summer CV ☑	0.750
Winter CV ☑	0.840

Calculations assume no infiltration as a 'worst case' scenario

Discharge rates based on 1.44 l/s/ha QBAR rate

Existing Substation

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	7.140
Peak Discharge (l/s)	10.280
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	4422
to	5025

Average: 4,724m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	7.140
Peak Discharge (l/s)	10.280
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	6089
to	6699

Average: 6,394m3

Calculation Sheet

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Calculation: Required Attenuation - Operational Phase (Submitted Work Plan)

Causeway 'Flow' Attenuation Volume Estimate

Rainfall Methodology	FSR
Rainfall Events	Singular
FSR Region	England & Wales
M5-60 (mm)	20.000
Ratio-R	0.400
Summer CV	✓ 0.750
Winter CV	✓ 0.840

Calculations assume no infiltration as a 'worst case' scenario

Discharge rates based on 1.44 l/s/ha QBAR rate

Area 4A is revegetated during operational phase

Work No. 5A, 5B and 5C

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	2.200
Peak Discharge (l/s)	3.170
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	1362
to	1548

Average: 1,455m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	2.200
Peak Discharge (l/s)	3.170
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	1876
to	2064

Average: 1,970m3

Work No. 5D - existing access road

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	0.480
Peak Discharge (l/s)	0.690
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	297
to	338

Average:318m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	0.480
Peak Discharge (l/s)	0.690
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	409
to	450

Average: 430m3

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Calculation: Required Attenuation - Operational Phase (Submitted Work Plan)

Causeway 'Flow' Attenuation Volume Estimate

Rainfall Methodology	FSR ⌄
Rainfall Events	Singular ⌄
FSR Region	England & Wales ⌄
M5-60 (mm)	20.000
Ratio-R	0.400
Summer CV	☑ 0.750
Winter CV	☑ 0.840

Calculations assume no infiltration as a 'worst case' scenario

Discharge rates based on 1.44 l/s/ha QBAR rate

Area 4A is revegetated during operational phase

Existing Substation

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	7.430
Peak Discharge (l/s)	10.700
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	0.00000
Required Storage (m³)	Calc
from	4601
to	5229

Average: 4,915m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	7.430
Peak Discharge (l/s)	10.700
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	0.00000
Required Storage (m³)	Calc
from	6336
to	6971

Average: 6,654m3

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Calculation: Required Attenuation - Operational Phase (Change Request)

Causeway 'Flow' Attenuation Volume Estimate

Rainfall Methodology	FSR ⌄
Rainfall Events	Singular ⌄
FSR Region	England & Wales ⌄
M5-60 (mm)	20.000
Ratio-R	0.400
Summer CV	✔ 0.750
Winter CV	✔ 0.840

Calculations assume no infiltration as a 'worst case' scenario

Discharge rates based on 1.44 l/s/ha QBAR rate

*(all surfacing removed within 4A area to south east of substation)

Work No. 5A, 5B and parital 5C*

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	2.200
Peak Discharge (l/s)	3.170
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	1362
to	1548

Average: 1,455m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	2.200
Peak Discharge (l/s)	3.170
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	1876
to	2064

Average: 1,970m3

Work No. 5D (existing aggregate compound and access road retained - other areas revegetated)

Storage Estimate

Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	0.770
Peak Discharge (l/s)	1.110
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	477
to	542

Average: 510m3

Storage Estimate

Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	0.770
Peak Discharge (l/s)	1.110
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	657
to	722

Average: 690m3

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Causeway 'Flow' Attenuation Volume Estimate

Rainfall Methodology	FSR ⌄
Rainfall Events	Singular ⌄
FSR Region	England & Wales ⌄
M5-60 (mm)	20.000
Ratio-R	0.400
Summer CV	✓ 0.750
Winter CV	✓ 0.840

Calculations assume no infiltration as a 'worst case' scenario
Discharge rates based on 1.44 l/s/ha QBAR rate

Substation

Storage Estimate	
Return Period (years)	30
Climate Change (%)	35
Impermeable Area (ha)	7.140
Peak Discharge (l/s)	10.280
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	4422
to	5025

Average: 4,723m3

Storage Estimate	
Return Period (years)	100
Climate Change (%)	40
Impermeable Area (ha)	7.140
Peak Discharge (l/s)	10.280
Infiltration Coefficient (m/hr) (leave blank if no infiltration)	
Required Storage (m³)	Calc
from	6089
to	6699

Average: 6,394m3