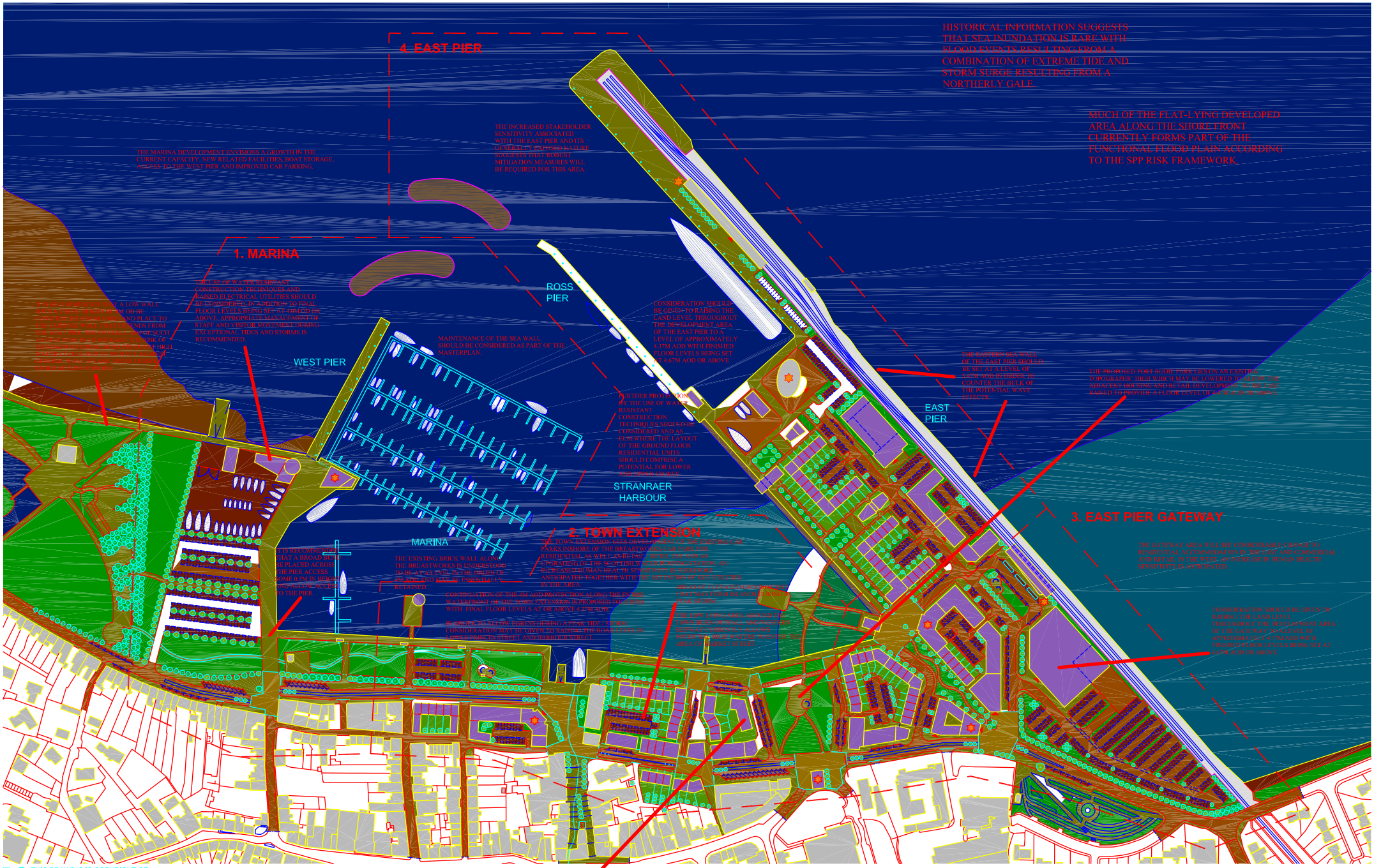
FIGURES & DRAWINGS

Project: STRANRAER WATERFRONT	Drawing Title: SITE LOCATION			
	Figure No.: FIGURE 1			
Client: DUMFRIES AND GALLOWAY COUNCIL	Project No.: 1168–200			
Date: 22/09/10	Grid Ref: NX 060 612	Drawn: JMc	Checked: WH	Approved: WH
Scale(s): NTS				

Terrenus CDH

TERRENUS CDH LTD
1 Orbital Court, Peel Park,
East Kilbride, G74 5PH
Tel: - 01355 279 000 : Fax:- 01355 263 629



REVISIONS

BEING A KEY UTILITY, THE FINISHED FLOOR LEVEL OF THE SCOTTISH WATER PUMPING STATION SHOULD BE PLACED AT A HEIGHT OF 4.67M AOD OR ABOVE. OTHER FLOOD RESILIENCE MEASURES MAY ALSO BE CONSIDERED APPROPRIATE FOR THIS UTILITY.

STRANRAER WATERFRONT MASTERPLAN

PROPOSED MASTERPLAN

1:2750 @ A3 01.07.09

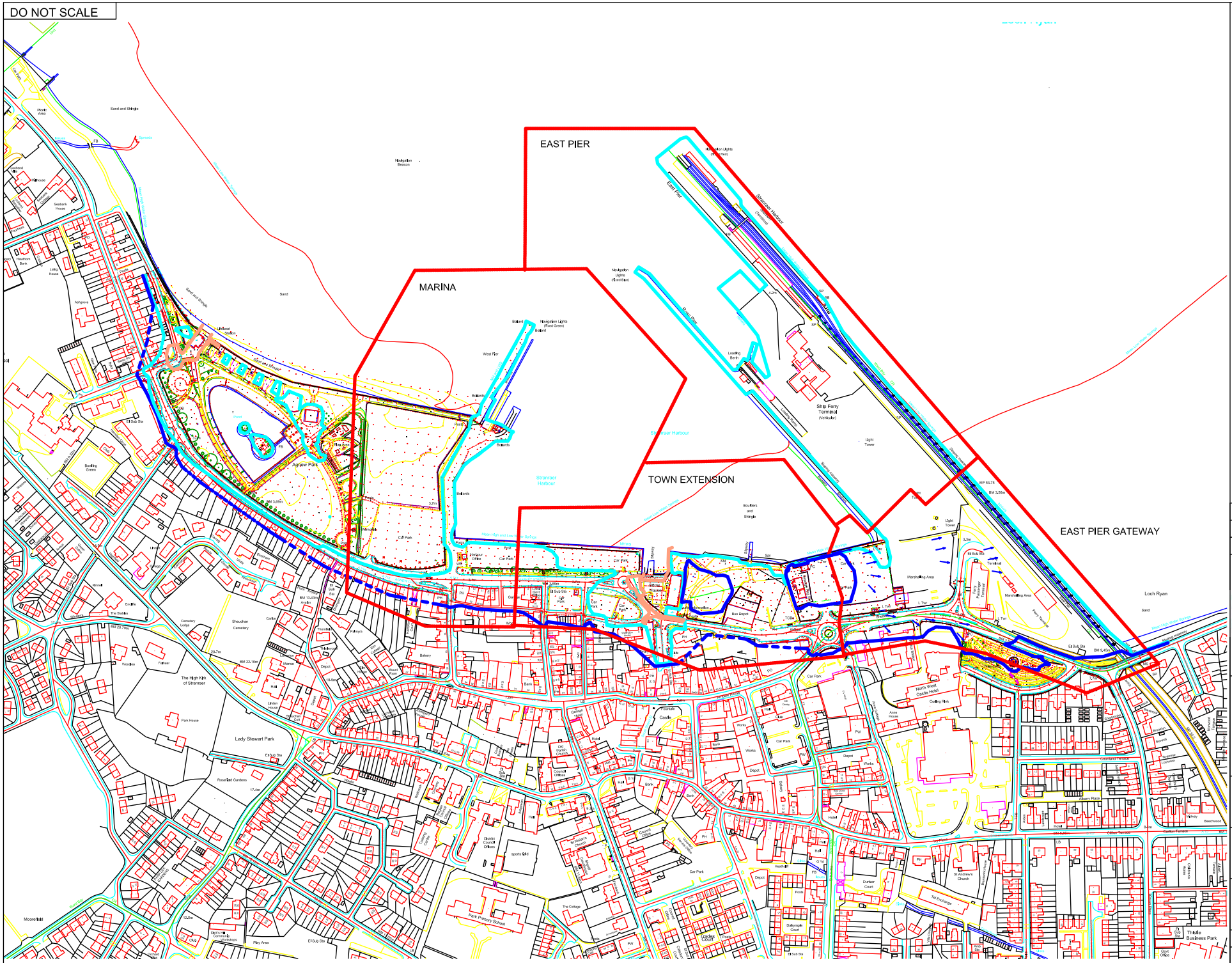
0807/D-200 REV A

SMITH | SCOTT | MULLAN | ASSOCIATES

T 0131 555 1414
F 0131 555 1448
E mail@smith-scott-mullan.co.uk

378 LEITH WALK
EDINBURGH
EH7 4PF

DO NOT SCALE



LEGEND

: 2.99m WATER LEVEL

: 3.40m WATER LEVEL

: 4.00m WATER LEVEL

: BOUNDARY OF EACH AREA

Rev	Description	By	App	Date

Terrenus CDH

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Client
DUMFRIES AND GALLOWAY COUNCIL

Project
STRANRAER WATERFRONT

Drawing Title
FLOOD RISK ASSESMENT - PEAK WATER LEVELS

Drawn	Checked	Approved
JMc	WH	WH

Date 22/09/10

Scale NTS

1168-200-001

ORIGINAL A3

DO NOT SCALE

TEXT FOR EDITING

LEGEND

: 3.40m WATER LEVEL

Rev	Description	By	App	Date

Terrenus CDH

TERRENUS CDH LTD
1 Orbital Court, Peel Park,
East Kilbride, G74 5PH
Tel:- 01355 279 000 : Fax:- 01355 263 629

Client
DUMFRIES AND GALLOWAY COUNCIL

Project
STRANRAER WATERFRONT

Drawing Title
INUNDATION WITH WATER LEVEL AT 3.4M AOD

Drawn	Checked	Approved
JMc	WH	WH

Date 22/09/10

Scale NTS

1168-200-002

ORIGINAL A3

DO NOT SCALE

LEGEND

: 2.99m WATER LEVEL

: 3.40m WATER LEVEL

: 4.00m WATER LEVEL

: BOUNDARY OF EACH AREA

Rev	Description	By	App	Date

Terrenus CDH

TERRENUS CDH LTD
1 Orbital Court, Peel Park,
East Kilbride, G74 5PH
Tel:- 01355 279 000 : Fax:- 01355 263 629

Client
DUMFRIES AND GALLOWAY COUNCIL

Project
STRANRAER WATERFRONT

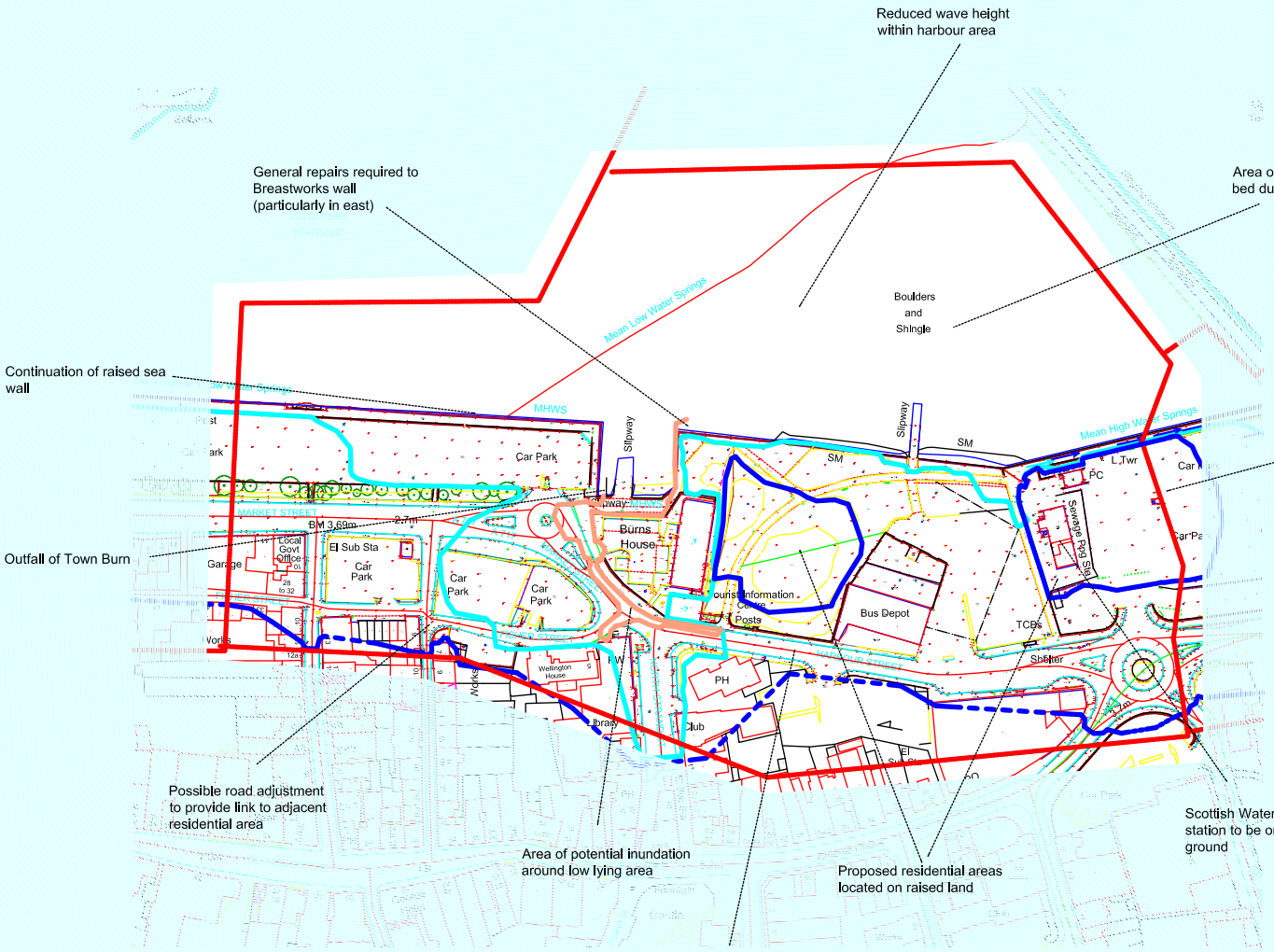
Drawing Title
MARINA

Drawn	JMc	Checked	WH	Approved	WH
Date	22/09/10				
Scale	NTS				

1168-200-003

ORIGINAL A3

DO NOT SCALE



LEGEND

: 2.99m WATER LEVEL

: 3.40m WATER LEVEL

: 4.00m WATER LEVEL

: BOUNDARY OF EACH AREA

Rev	Description	By	App	Date

Terrenus CDH

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Tel:- 01355 279 000 : Fax:- 01355 263 629

Client: DUMFRIES AND GALLOWAY COUNCIL

Project: STRANRAER WATERFRONT

Drawing Title: TOWN EXTENSION

Drawn	Checked	Approved
JMc	WH	WH

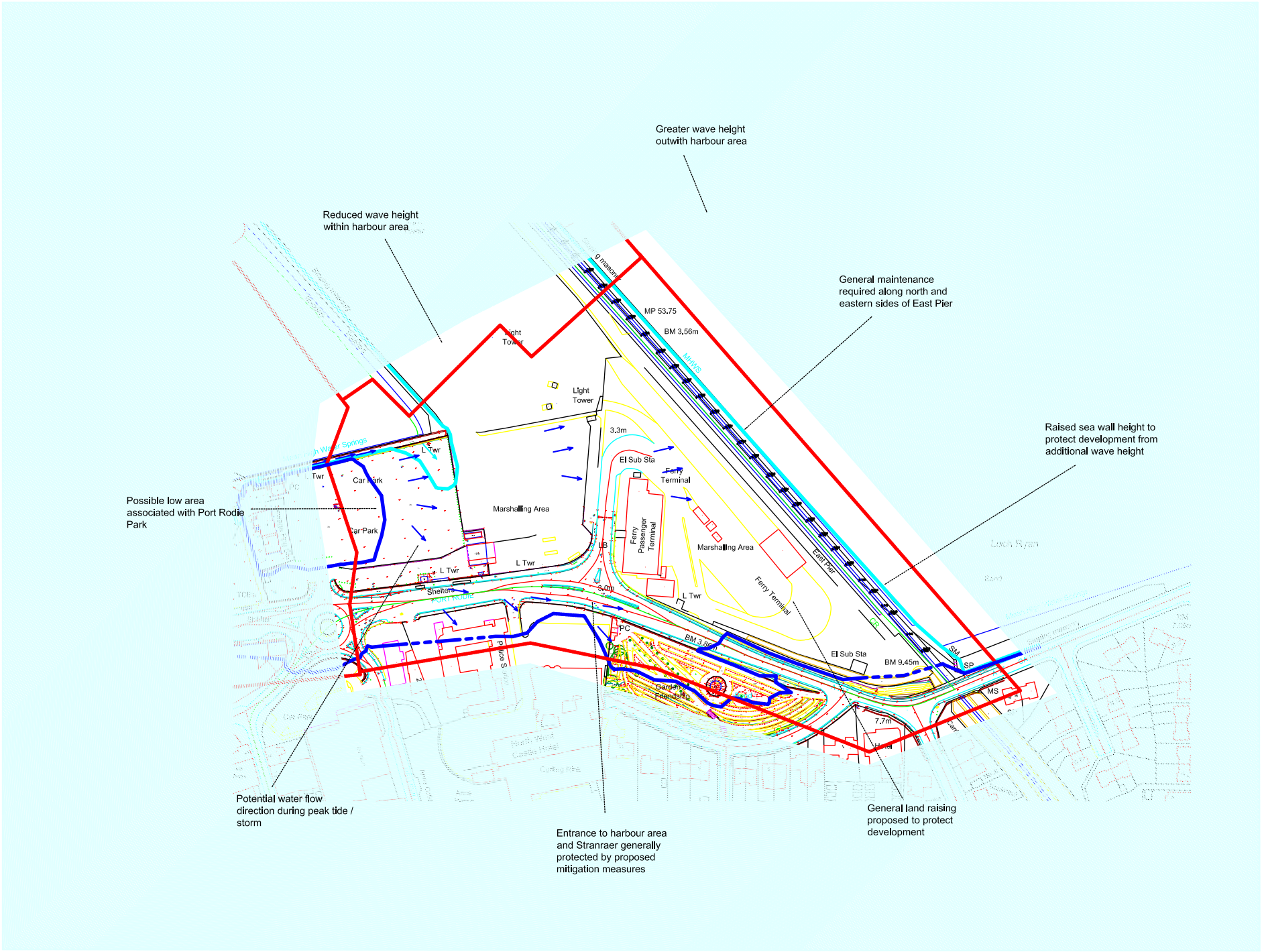
Date: 22/09/10

Scale: NTS

1168-200-004

ORIGINAL A3

DO NOT SCALE



LEGEND

: 2.99m WATER LEVEL

: 3.40m WATER LEVEL

: 4.00m WATER LEVEL

: BOUNDARY OF EACH AREA

Rev	Description	By	App	Date

Terrenus CDH

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East Kilbride, G74 5PH
Tel:- 01355 279 000 : Fax:- 01355 263 629

Client: DUMFRIES AND GALLOWAY COUNCIL

Project: STRANRAER WATERFRONT

Drawing Title: EAST PIER GATEWAY

Drawn	Checked	Approved
JMc	WH	WH

Date: 22/09/10

Scale: NTS

1168-200-005

ORIGINAL A3

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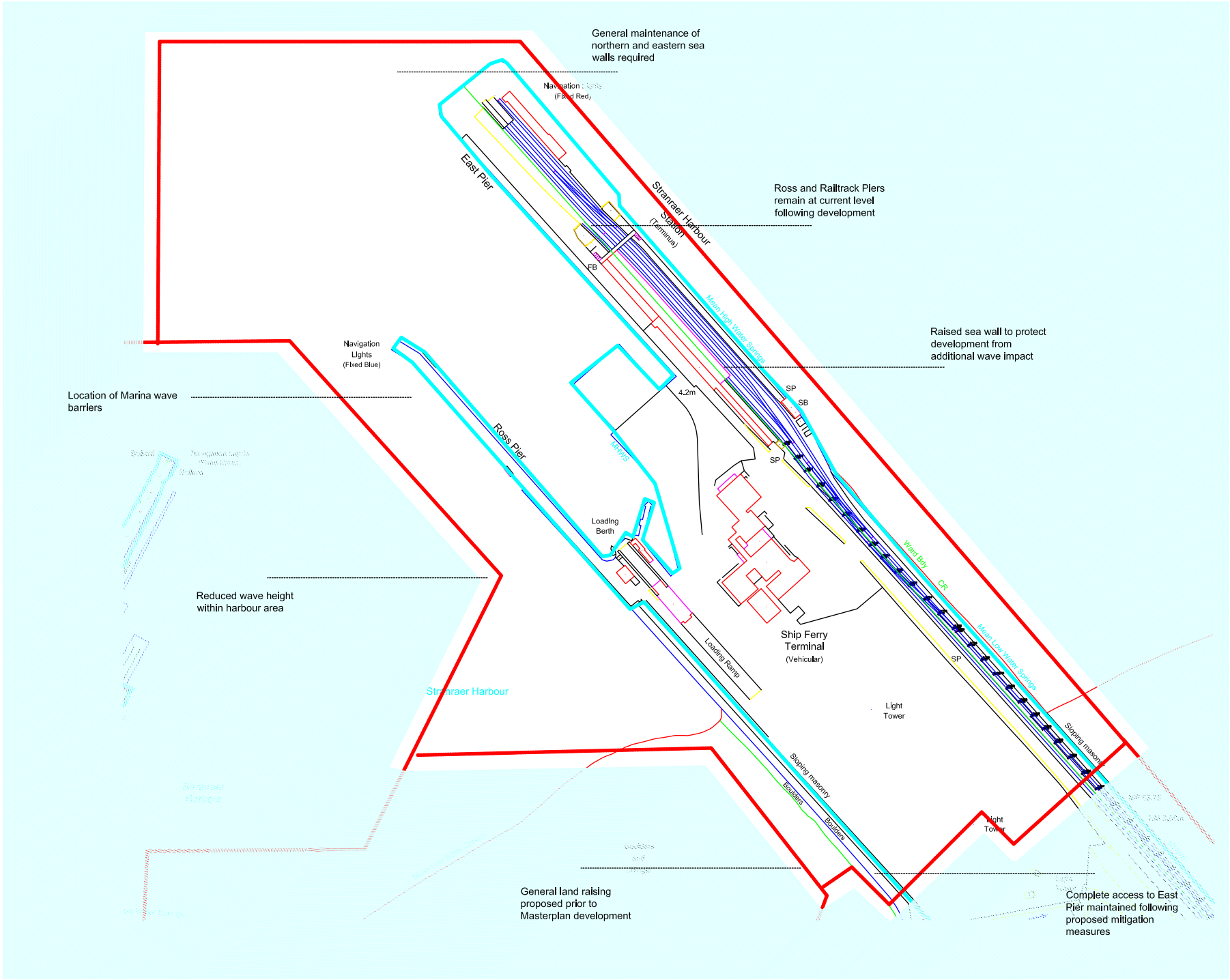

LEGEND

: 2.99m WATER LEVEL

: 3.40m WATER LEVEL

: 4.00m WATER LEVEL

: BOUNDARY OF EACH AREA

Rev	Description	By	App	Date

Terrenus CDH

TERRENUS CDH LTD
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Client
DUMFRIES AND GALLOWAY COUNCIL

Project
STRANRAER WATERFRONT

Drawing Title
EAST PIER

Drawn	JMc	Checked	WH	Approved	WH
Date	22/09/10				
Scale	NTS				

1168-200-006

ORIGINAL A3

PHOTOGRAPHS

PHOTOGRAPHIC PLATES - GENERAL

Plate 1: Panorama of Stranraer Harbour from Castle of St John.

Plate 2: Panorama of Stranraer from Ross Pier.

PHOTOGRAPHIC PLATES – MARINA

Plate 3: Panorama of Foreland Place with Agnew Park on left.

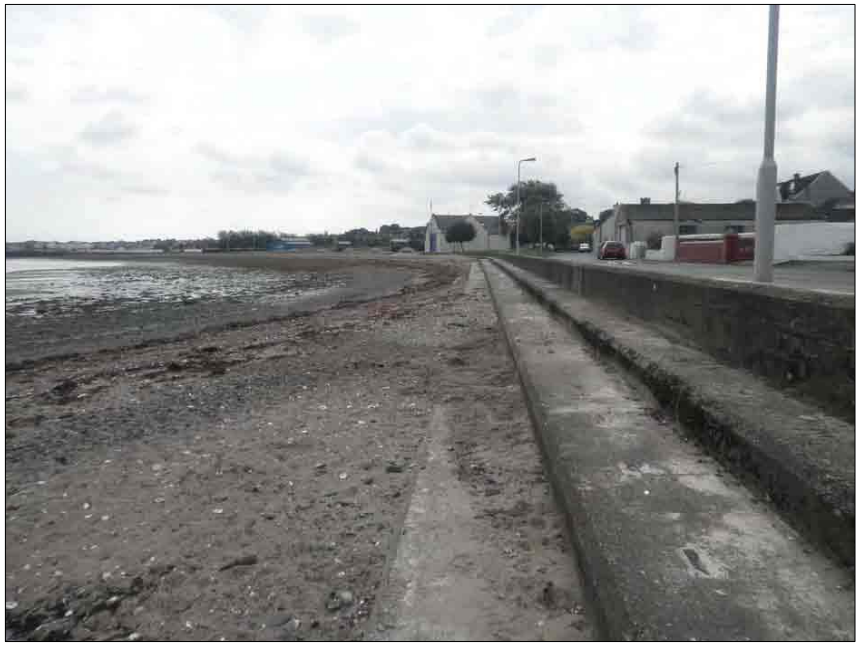

Plate 4: Detail of shore adjacent to Foreland Place.

Plate 5: Looking towards Marina with Agnew Park on right.

PHOTOGRAPHIC PLATES – MARINA

Plate 6: Looking west towards un-used ground and Agnew Park beyond.

Plate 7: Condition of breakwater near Agnew Park.

Plate 8: Marina with West Pier on left.

PHOTOGRAPHIC PLATES – MARINA

Plate 9: West side of West Pier showing breakwater construction.

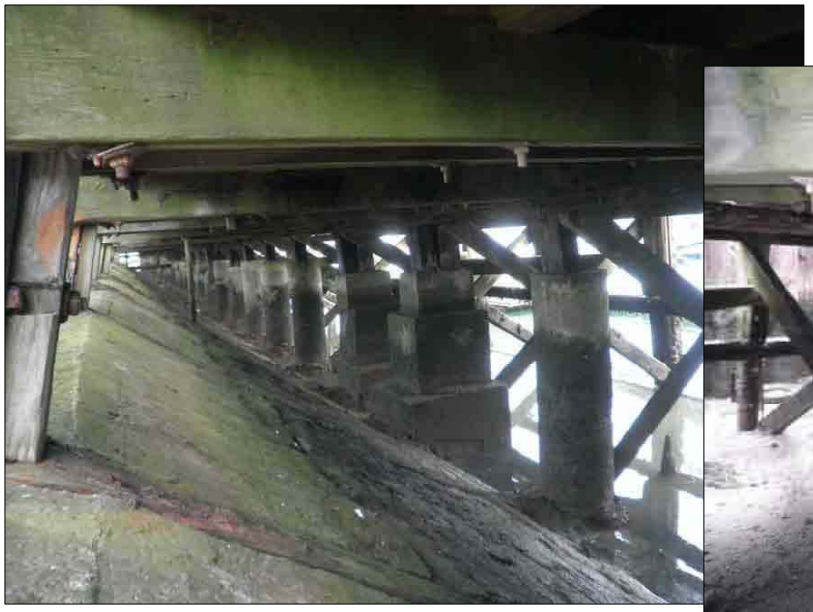

Plate 10: Under detail of West Pier showing breakwater construction.

Plate 11: Underside of West Pier.

Plate 12: Deterioration of West Pier breakwater.

PHOTOGRAPHIC PLATES – MARINA

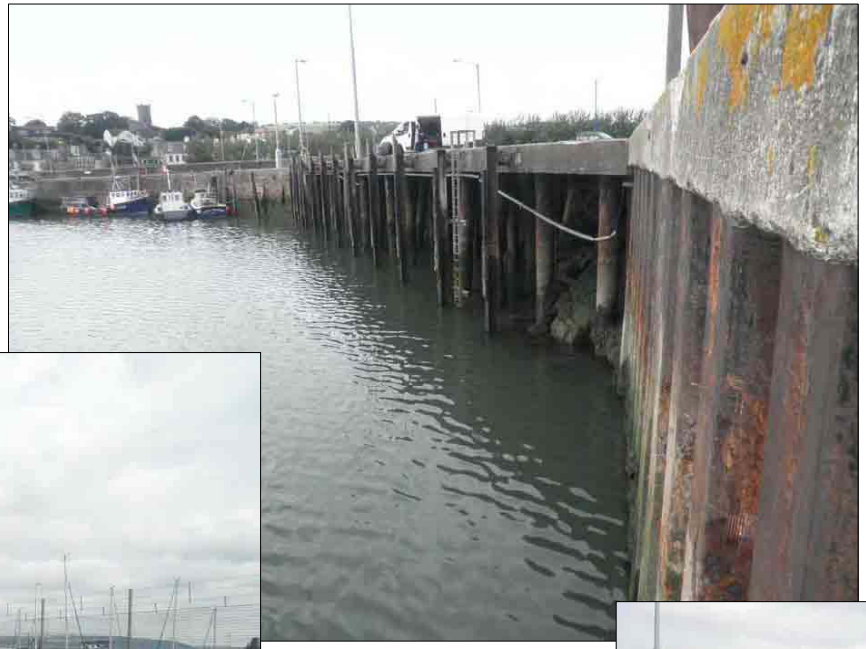

Plate 14: West Pier.

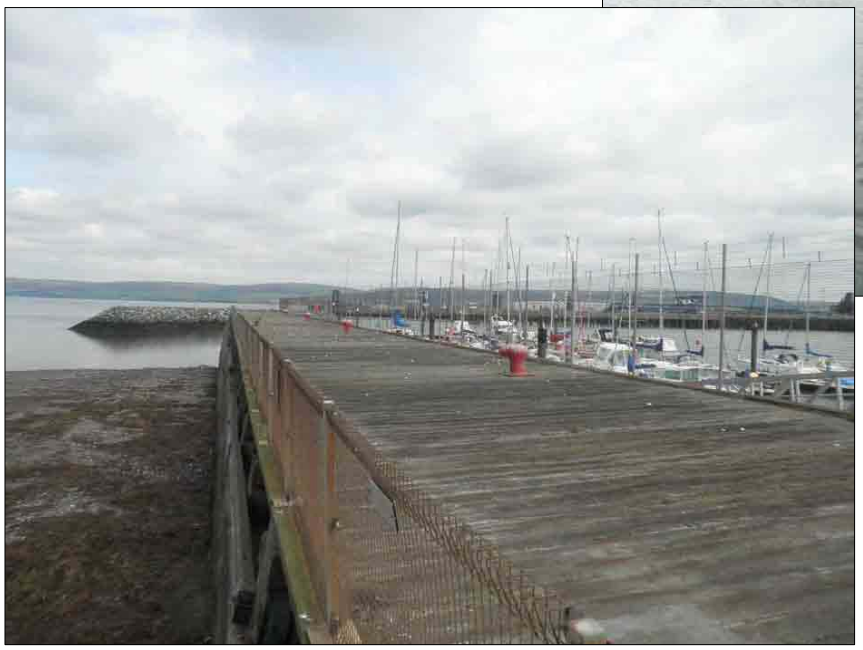

Plate 13: View of West Pier with new breakwater beyond.

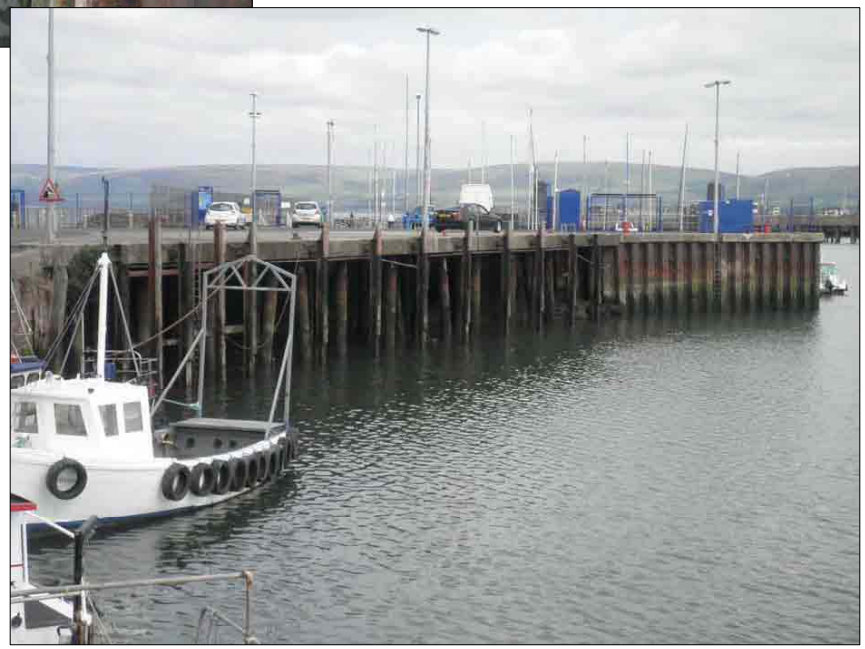

Plate 15: Eastern side of West Pier.

PHOTOGRAPHIC PLATES – MARINA

Plate 16: Inner Marina area from West Pier.

Plate 17: Marina area from Breastworks Car park.

PHOTOGRAPHIC PLATES – TOWN EXTENSION

Plate 18: Town Extension Breastworks looking east.

Plate 19: Detail of Breastworks.

Plate 20: Town Burn outfall and old slipway. Note Stena Offices on left.

PHOTOGRAPHIC PLATES – TOWN EXTENSION

Plate 21: Town Burn outfall.

Plate 22: Breastworks wall near Stena Offices.

Plate 23: Detail of Breastworks wall deterioration.

PHOTOGRAPHIC PLATES – TOWN EXTENSION

Plate 23: View towards South East Corner of Town Extension area.

Plate 25: Scottish Water Pumping Station, note raised car park beyond.

Plate 24: Western part of Town Extension.

PHOTOGRAPHIC PLATES – EAST PIER

Plate 25: Western part of East Pier showing revetments.

Plate 26: View to the South from Ross Pier.

PHOTOGRAPHIC PLATES – EAST PIER

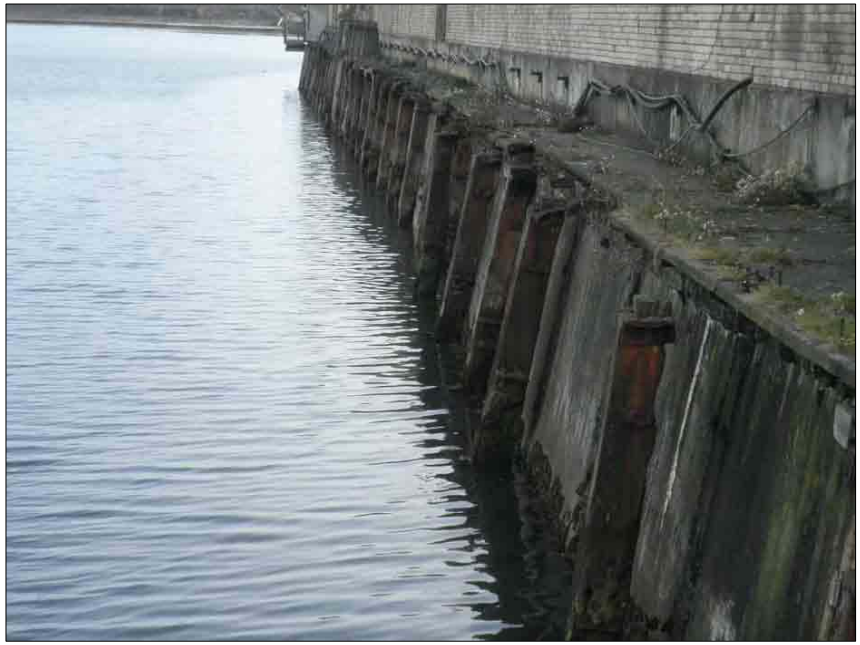

Plate 27: East side of East Pier.

PHOTOGRAPHIC PLATES – EAST PIER GATEWAY

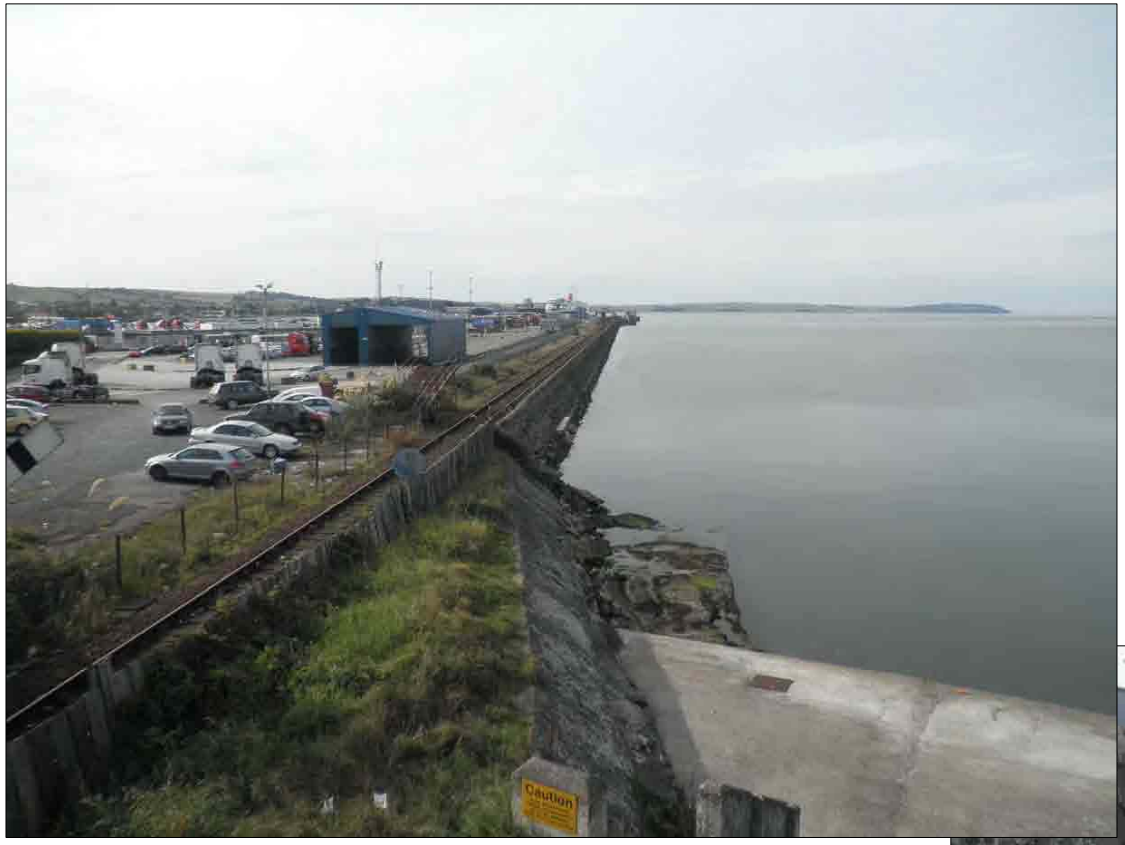

Plate 28: East Pier Gateway from Railway Bridge.

Plate 29: Looking East from Railway Bridge.

Plate 30: East side of East Pier Gateway.

PHOTOGRAPHIC PLATES – EAST PIER GATEWAY

Plate 32: Condition of East Pier Gateway.

Plate 31: Looking west towards East Pier Gateway.

Plate 34: East side of East Pier Gateway at Railway Bridge.

Plate 33: Embankment Detail immediately to east of Railway Bridge.

TABLES

Table 1 - Calculated Sea Level For Stranraer

NODE		72	SITE	73		
Distance		3674		3722	m	Figure 8.10 - 8.17 (page 142-149) Table 4.1 (page 57)
Year level Calculated For		2060				
Distance Ratio		0.9		0.1		Ratio of distance from each node (self calculation)
1 year level		1.91		2.41	m	Table 8.4 (page 138)
100 year return level adjustment	10 year return period	0.34		0.45		Table 8.1 to 8.3 (page 133-135)
	25 year return period	0.48		0.64		
	50 year return period	0.57		0.75		
	100 year return period	0.71		0.94		
	250 year return period	0.85		1.13		
	500 year return period	0.94		1.24		
	1000 year return period	1.05		1.39		
	10000 year return period	1.43		1.89		
Additive trend adjustment		-0.29		-0.33	mm/yr	Table 8.7 (page 153)
		-0.0203		-0.0231	m	
ODN adjustment		0.21		0.21		Table 8.6 (page152)
Sea Level at each node	10 year return period	2.23		2.84		
	25 year return period	2.37		3.03		
	50 year return period	2.46		3.14		
	100 year return period	2.60		3.33		
	250 year return period	2.74		3.52		
	500 year return period	2.83		3.63		
	1000 year return period	2.94		3.78		
	10000 year return period	3.32		4.28		
Sea Level at site	10 year return period		2.29			
	25 year return period		2.44			
	50 year return period		2.53			
	100 year return period		2.67			
	250 year return period		2.82			
	500 year return period		2.91			
	1000 year return period		3.02			
	10000 year return period		3.42			

		72	SITE	73	
Sea Level adjusted to ODN	10 year return period	2.44	2.50	3.05	mOD
	25 year return period	2.58	2.65	3.24	
	50 year return period	2.67	2.74	3.35	
	100 year return period	2.81	2.88	3.54	
	200* year return period	2.90	2.98	3.66	
	250 year return period	2.95	3.03	3.73	
	500 year return period	3.04	3.12	3.84	
	1000 year return period	3.15	3.23	3.99	
	10000 year return period	3.53	3.63	4.49	

		72	SITE	73	
Sea Levels with worst case 170mm Climate Change for 2050	10 year return period	2.61	2.67	3.22	mOD
	25 year return period	2.75	2.82	3.41	
	50 year return period	2.84	2.91	3.52	
	100 year return period	2.98	3.05	3.71	
	200* year return period	3.07	3.15	3.83	
	250 year return period	3.12	3.20	3.90	
	500 year return period	3.21	3.29	4.01	
	1000 year return period	3.32	3.40	4.16	
	10000 year return period	3.70	3.80	4.66	

Data from Estimates of Extreme Sea Conditions, Spatial Analysis for the UK Coast - The Proudman Oceanographic Laboratory (Section 8.5)

* Calculated from 100 and 250 yr return period

Table 2
Adjusted Peak Water Levels for Stranraer

		72	SITE	73
Sea Level adjusted to ODN	10 year return period	2.69	2.75	3.30
	25 year return period	2.83	2.90	3.49
	50 year return period	2.92	2.99	3.60
	100 year return period	3.06	3.13	3.79
	200* year return period	3.15	3.23	3.91
	250 year return period	3.20	3.28	3.98
	500 year return period	3.29	3.37	4.09
	1000 year return period	3.40	3.48	4.24
	10000 year return period	3.78	3.88	4.74

		72	SITE	73
Sea Levels with worst case 170mm Climate Change for 2050	10 year return period	2.86	2.92	3.47
	25 year return period	3.00	3.07	3.66
	50 year return period	3.09	3.16	3.77
	100 year return period	3.23	3.30	3.96
	200* year return period	3.32	3.40	4.08
	250 year return period	3.37	3.45	4.15
	500 year return period	3.46	3.54	4.26
	1000 year return period	3.57	3.65	4.41
	10000 year return period	3.95	4.05	4.91

* Calculated from 100 and 250 yr return period

Table 3
Adopted Sea Levels for Stranraer

	25 yr return period	50 yr return period	100 yr return period	200 yr return period
HAT Levels	2.90	2.99	3.13	3.23
Potential Sea Rise due to Climate Change	3.07	3.16	3.30	3.40
Additional Adopted Surge	4.04	4.13	4.27	4.37
Adopted Design Maximum	**4.04**	**4.13**	**4.27**	**4.37**
Adopted Wave Height around Stranraer	4.34	4.43	4.57	4.67
Adopted Maximum in Harbour	4.34	4.43	4.57	4.67
Adopted Maximum outwith Harbour	5.14	5.23	5.37	5.47

* all levels to Ordnance Datum (mOD)
** HAT - Highest Astranomical Tide

	Metres		
Potential Peak Surge	0.97	to	1.6
Locally Generated Peak Wave in Southern Loch Ryan (330deg N) under 100 year return period	1.1		
Most Severe Swell near Harbour Entrance (300deg N) under 100 year return period	0.3		

Table 5 - SC060064 Methodology - Annual Exceedance Probibility Peak Sea Level with Uncertainty

STEP	1	2	3	4		5									
(using P11 Design Sea Levels)	Is study area outwith estury areas?	Adopted Chainage point	1 in 200 Yr Exceedance Probibility Peak Sea Level (m OD)	Allowance for Uncertainty (m)	Peak Sea level with Uncertainty (mOD)	Base Astranomical Tide									**Application of Potential Climate Change (PCC)**
	Yes	1522	Id 0	Id 0		Using 2011 Admiralty Tide Tables Vol 1									
			CHAINAGE 1678	CHAINAGE 1678		Nearest to Site and Standard Port		ATT Number	MHWS add to SP (m)	MHWS (m CD)	HAT (m CD)	Base Tide Curve Level (using midpoint level) (m CD)	Similar Peak level from ATT for Standard Port (m CD)	Date & Time	Tide Curve Dates	
			T1 2.55	T1 0.1												(m)
			T2 2.65	T2 0.1		Greenock	appropriate	404		3.4	3.9					
			T5 2.78	T5 0.1		Stranraer	Standard	414a		3.2	3.7	3.5	3.5	20/01/2011 11:58	18 Jan to 22 Jan	0.17
			T10 2.88	T10 0.1												
			T20 2.98	T20 0.1												
			T25 3.01	T25 0.1		**Stranraer**	**Conversion to OD from CD**			**-1.4**						
			T50 3.11	T50 0.1												
			T75 3.15	T75 0.1												
			T100 3.2	T100 0.2												
			T150 3.26	T150 0.2												
			T200 3.3	T200 0.2	**3.50**										**Predicted peak sea level including surge & PCC factors (mOD):**	**3.67**
			T250 3.33	T250 0.2												
			T300 3.36	T300 0.2												
			T500 3.43	T500 0.2												
			T1000 3.54	T1000 0.3												
			T10000 3.92	T10000 0.3												
			ISLAND MAIN BASE_YEAR 2008													