Shoebury Common Alternative Proposal

Technical Review

September 2013

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Contents

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1 Introduction

1.1 Introduction

Black & Veatch Ltd (B&V) has been contracted by Southend-on-Sea Borough Council (SBC) to review and cost the alternative option for the Shoebury Common frontage as proposed by APS Design Associates Ltd. This report details the B&V finding and summarises the estimated costs of the proposals.

1.2 Alternative Proposal

In general the alternative proposal involves raising both the seawall and (in some sections) the promenade with an in-situ concrete gravity structure to a level of 5.8mAOD, with landscaping of imported fill behind.

The alternative proposal does vary along the length of the frontage and various sections through the proposed flood defence scheme are contained in Appendix A. A brief description of the proposed works in each of the 4 sections is provided below.

1.2.1 Section 2

Section 2 involves using in-situ concrete to raise the existing seawall and promenade behind to a new level of 5.80mAOD, and raising the ground level behind by landscaping the slope with new imported material with a grass seeded surface.

1.2.2 Section 3 & 4

Both Sections 3 and 4 involves using in-situ concrete to raise both the existing seawall and promenade to a new level of 5.80mAOD, and raising the ground level behind by landscaping the slope with new imported material with a grass seeded surface. This section also involves the raising of the existing beach huts that are currently situated on the existing promenade by approximately 1-2m.

1.2.3 Section 5

Section 5 is also the similar to Sections 3 and 4, but this section of the defence is in front of Uncle Tom's Cabin (cafe) and requires the landscaping to include a 1 in 4 (25%) slope to provide access to the promenade from the cafe.

1.2.4 Additional Comments

The proposals attempt to interpret and portray the Council's preferred option using pink hashing, however, it should be noted that this is an inaccurate representation of the Council's Option and should not be used by way of a comparison.

It should also be noted that the introduction of disproportionately large people (in some cases approximately 3m tall) to the drawings gives a misleading impression of the scale of the proposed works to the viewer.

2 Technical Review

2.1 Flood Risk

The 5.80mAOD seawall in the alternative proposal offers flood protection against a 1 in 200 year surge event (0.5% Annual Exceedance Probability (AEP)), which is in line with the preferred option outlined in the Shoebury Common Project Appraisal Report (B&V for SBC, 2013).

2.2 Technical Review

2.2.1 Levels

Following a comparison of the proposals against the 2011 topographic survey it is clear that the levels shown within the alternative proposal are only indicative and are not drawn to a to true scale.

It should also be noted that the beach levels shown on the proposals, which in some sections are shown to be approximately 4mAOD is fairly misleading as the topographic survey shows the crest of the beach to be as low as 2-3mAOD.

2.2.2 Access

Beach access
The proposals do not include any details of beach access from the new raised promenade. However, it will be necessary to raise or replace the existing access points in line with the latest 'Access for All' guidance, which will include introducing disabled/wheelchair access along the frontage. Therefore for costing purposes B&V have included for 6 no. new beach access steps and disabled/wheelchair ramps.

Access throughout construction
Both the promenade and large section of the Common will have to be closed throughout construction of the proposed defences. However, it may be possible to maintain some access to the beach throughout construction depending on the level of emergency access and egress that can be maintained.

2.2.3 Condition of Existing Wall

The 2010 condition survey undertaken by B&V for SBC has estimated that the residual life of the existing defences along the Shoebury Common frontage, the results of which are summarised in Table 1 below:

Table 1 – Summary of Shoebury Common Seawall Condition Survey

Frontage	Length	Condition Grade	Residual Life
East	~500m	Good to fair (Poor in places)	15-30 Years
West	~500m	Fair	15-30 Years

Reference – Condition Survey Report (B&V for SBC 2013)

It has been assumed for costing purposes that the front face of the existing seawall will have to be repaired to prolong its residual life to 50 years, in-line with the proposed works.

2.2.4 Drainage

The proposals do not include any details of drainage, and it is not clear from the sections how the drainage of pluvial runoff will be incorporated into the scheme. It is also evident that existing surface water drainage from both the road and adjacent land behind the existing defences will be affected by the proposed scheme.

For costing purposes engineering judgement has been used to estimate the cost of incorporating surface water drainage into the scheme.

2.2.5 Existing Structure / Stability

Further investigation into the existing frontage by SBC has uncovered some 'As-Built' drawings for the existing seawall (Appendix B). This has revealed that the existing Seawall does not have very substantial foundations, with only a limited amount of reinforcement in the face of the concrete (probably only designed to prevent surface cracking).

Consequently, it is estimated that in places (particularly in the east) the existing seawall will not be able to withstand the loading required to support either the raising of the seawall and promenade or the construction traffic required to undertake the works and would be expected to fail through sliding.

2.2.6 Beach Recharge

Structural failure of the seawall (as detailed in Section 2.2.5) could potentially be prevented if the beach is to be maintained at a high enough level to provide the seawall with the necessary lateral support. In order to achieve the levels required a programme of beach recharge and recycling will have to be implemented, as well the possible construction of additional beach control structures, such as groynes, to reduce the variation in levels that is currently experienced along the frontage.

However, the proposals do not provide any details on future beach management activities, therefore, for the costing purposes B&V have made a suitable allowance for beach recharge to achieve the required beach levels, although no assessment of future beach management activities has been undertaken.

It should also be noted that the actual beach levels are not as depicted in the proposal drawings and are subject to natural variations due to coastal processes and can therefore not be guaranteed to provide the required lateral support over time.

2.2.7 Raising of Beach Huts

The proposals involve the removal, temporary storage, and reinstatement of approximately 169 no. beach huts. However, an initial inspection of the beach huts has identified that they are of variable construction type, age, and condition. It is therefore considered quite likely that a significant proportion of them will be damaged beyond repair following their removal.

Where huts are damaged beyond repair, under existing Defra guidelines on public funding it is very unlikely that replacement beach huts will be provided entirely out of public money, and replacements are only likely to be possible with substantial contributions from the existing owners. As a consequence of both the disruption and potential costs to owners an agreement from all of the 169 no. affected beach hut owners would be required before any works could commence.

In addition, the raising of the beach huts by over a metre would result in an additional detrimental impact on the landscape and sea views from Shoebury Common Road, and both the properties of Lodwick and Letrim Avenue.

2.2.8 Services

The proposals do not include any details of local services that are known to run through the Common including gas, water and electricity.

Currently most of the 169 no. beach huts are connected to the low pressure gas main that runs through the Common, the proposal assumes that this connection can be disconnected whilst the works take place and reconnected at the new elevated position of the beach huts once the works are completed. However, following advice from National Grid works of this significance would have to be undertaken by them.

Therefore for costing purposes B&V have included for the diversion of the services where necessary and the disconnection and reconnection of a low pressure gas supply to 169 no. beach huts.

2.2.9 Existing Shelters

The proposal does not include any details of what is proposed for the 3 no. existing fixed shelters situated on the promenade along the frontage. But it is assumed that they will have to be removed, temporarily stored, and rebuilt upon the new raised promenade.

However, these structures are fairly old and of variable condition and are unlikely to survive the works undamaged. Therefore for costing purposes it has been assumed that these structures will have to be replaced.

2.2.10 Promenade Width

It appears from the proposals that following the completion of the works the promenade will be reduced in width by approximately 1-1.5m and an additional 0.5-0.75m will become grassed. It is believed that this may present a problem for both service and emergency vehicles that will require continued access along the promenade. In addition, this would limit the amount of amenity space available to each of the beach hut owners in front of their huts.

2.2.11 Settlement

The proposals require the quite significant loading of the existing promenade and seawall, at present it is unknown what the immediate sub-base material is made up of, but it is likely to be man-made granular fill over the formation clay. (Ground investigations in the adjacent common showed that the underlying strata be London clay at a depth of approximately 4-5m overlain by sandy gravels and topsoil.) Therefore by loading the existing promenade there is quite likely to be some settlement of the underlying material and sub-soils. At present the proposals do not demonstrate how this potential settlement will be accommodated.

2.2.12 Ness Road / Slipway

The proposals do not indicate how the defences will be tied into the existing (higher) defences fronting the coastguard station to the east or how Ness Road on the eastern boundary with vehicular access to the existing slipway will be incorporated into the defence.

It is assumed for costing purposes that if the proposed elevated promenade is continued to the eastern end of the frontage and tied into the neighbouring frontage and that both Ness Road and the slipway will also have to be significantly raised.

2.2.13 Uncle Tom's Cabin

The proposals currently show a grassed and graded (imported) material slope down from the elevated promenade providing access to Uncle Tom's cabin. However, closer inspections of the levels provided by a 2011 topographic survey indicate that this slope will be approximately a 25% gradient (1 in 4). A slope of this gradient is not in line with the latest

guidance for disabled/wheelchair access, which recommends a maximum gradient of 5% (1 in 20) with resting platforms every 10m. Therefore the proposal will in effect inhibit the use of this access point for the disabled and wheelchair users.

3 Construction

3.1.1 Construction Requirements

It has been assumed that the drawings provided are outline designs, with only indicative details of sizes, dimensions and materials.

In the absence of specific dimensions all quantities have been estimated and appropriate materials have been assumed for costing purposes.

3.1.2 Buildability

Using the information provided in the proposals an assessment has been made of the construction activities that would be required to implement the scheme, all of which are believed to be achievable, although some additional detail/investigation would be required to consider the following issues:

1. Loading of the existing structure by both construction plant/vehicles and the new structure.
2. Condition of the existing structure.
3. Future beach management.
4. Differential settlement of the new structure.
5. Beach and promenade access.
6. Removal, storage and reinstatement of beach huts.
7. How the proposed structure crosses Ness Road, the Slipway and adjoins the neighbouring frontage in the east.

4 Costing

4.1 Costings

B&V has undertaken a costing exercise of the proposed scheme using both the information that is provided in the drawings provided and their knowledge of the Shoebury Common frontage, the summary of which can be found listed below.

The rates and percentages applied are the same as those previously used for the project appraisal for the Council's proposals and funding application.

Due to the lack of detail within the proposals, B&V has had to make various assumptions regarding access, services, drainage and materials.

4.1.1 Cost Assumptions

1. The costs of temporary works and maintenance including the construction of temporary site access roads, temporary fencing and keeping the highway clean have all been included.
2. The price of flood gates has been provided by 'Defence Doors Ltd'.
3. Seawall repairs include the removal of all loose material and treating the front face with sprayed concrete.
4. It is assumed that the existing shelters are demolished and disposed of and replaced with new shelters of similar construction.
5. Although estimated, the cost of replacing the beach huts is not included in the overall capital cost of the scheme as it is unclear at this stage who would fund replacement huts.
6. Various services diversions, promenade lighting and gas connection to beach huts have all been estimated and allowed for.
7. Beach recharge activities have been estimated and priced as an alternative option.
8. Contractor on-costs have been included and cover the following items:
    - Supervision and Administration;
    - Accommodation and storage;
    - General items; and
    - Contractor risk.
9. An assumed Contractor fee (profit margin) of 6.5% of the construction costs has also been included.
10. Engineering cost and Site Supervision fees have been estimated and included at the same level as the Council's preferred scheme.
11. Compensation costs have also been included at 7.5% of the construction costs.
12. A project risk allowance has been included that has been calculated using a Monte Carlo analysis.

4.1.2 Summary of Costs

Table 2 below summarise the results of the costing exercise, however a further breakdown of cost information is contained in Appendix C.

Table 2 – Summary of Construction Price Information (Not including beach management activities)

Construction Activity	Price Estimate
Temporary works	£57,667
Raising seawall – Western end	£433,583
Repairs to existing seawall	£245,448
Raise seawall – Eastern end	£234,893
New beach access x 6	£180,000
Road ramp in Ness Road	£22,626
Earthworks	£533,122
Car park fencing	£13,875
New promenade	£341,115
Shelters x 3	£48,385
Raising existing beach huts x 169 (assuming no damage)	£199,641
Services to beach huts	£67,250
Promenade lighting (Eastern end)	£115,388
Improving car park	£38,462
Surface water drainage	£76,923
Net Construction Costs	**£2,608,467**

Additional Construction Costs

Contractor Preliminaries	£626,684
Contractor Fee (6.5%)	£210,285
Engineering & Site Supervision	£399,588
Compensation (7.5%)	£258,408
Project Risk Allowance (50%ile)	£1,315,560

Total Scheme Value (Without Beach Recharge)	**£5,418,991**

Beach Recharge

Mobilisation (assuming recharge takes place in conjunction with other frontages and the £1,014,000 cost is split accordingly)	£368,003
Beach Recharge	£1,376,099
Groyne Repair	£196,557
Net Construction Costs with Beach Recharge	**£4,549,127**

Additional Costs (Including Beach Recharge)

Contractor Preliminaries	£723,717
Contractor Fee (6.5%)	£342,735
Engineering & Site Supervision	£449,587
Compensation (7.5%)	£421,168
Project Risk Allowance (50%ile)	£2,079,518

Total Scheme Value (Including Beach Recharge)	**£8,565,852**

Potential additional cost of replacing the beach huts	£887,250

4.1.3 Cost comparison

By way of a comparison, the proposed scheme has been estimated to cost between £5.4m and £9.5m depending on whether beach recharge and/or replacement beach huts are included in the capital expenditure. Whereas the preferred option following the SBC's project appraisal report (PAR) (B&V for SBC, 2013) was estimated using similar assumptions to cost approximately £4.3m.

5 Conclusions

The proposal involves the raising of both the seawall and the promenade with an in-situ concrete gravity structure built to a level of 5.8mAOD with landscaping of imported material on its landward face, which also involves raising 169 beach huts.

In principle, based upon the information available the proposed scheme could work, in that it could successfully alleviate flood risk during a 1 in 200 year surge event (0.5% AEP). However, the proposals are only presented in outline design form and are consequently lacking in engineering detail. In fact, some of the indicative levels and scaling that have been used in the presentation of the scheme appear to be misleading.

Some of the key issues that have not been considered by these proposals, that could potentially prove to be show stoppers include:

- Both the condition and limited foundation size of the existing seawall, particularly at the eastern end, which is likely to be prohibitive to the stability of the new structure.
- The proposed new structure relies high beach levels in front of the existing seawall to provide the necessary lateral support. However, no details of any proposed beach management activities have been included within the proposal.
- Since the underlying geology of the existing promenade is likely to be a man-made granular fill over the formation clay, the expected loading of the proposed structure on the existing promenade is likely to cause settlement of the sub-base materials. This in turn is likely to result in uneven surfaces, cracking and, in time, failure of the new structure.
- The proposed scheme requires that each of the beach huts behind the existing promenade is raised to a new level, approximately 1-2m higher than the existing. This will involve the removal, temporary storage and reinstatement of all of the beach huts. However, it is believed that the nature of construction and current condition of many of the beach huts will prevent them from being double handled in this way without significant damage.
- The proposed access from the proposed level of the promenade to Uncle Tom's Cabin (Cafe) in Section 5 is shown as a gently sloping gradient. However, following a comparison between the existing ground levels and those proposed it is clear that the required slope will be steeper than that depicted in the Section and it will not conform with the latest guidance for disabled/wheelchair access.
- The proposal needs to address how access to the beach from the promenade will occur, as to date no access details have been provided.
- The proposal needs to address how the defence crosses both Ness Road and the slipway and adjoins with the neighbouring frontage to the east.

Using the information provided a cost estimate of the construction of the proposed scheme found that it could potentially cost more than double that of the SBC's preferred option in the recent PAR (B&V for SBC, 2013), if both beach recharge and replacement huts are included within the capital cost of the scheme, neither of which are required in SBC's preferred option.
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References

Black & Veatch Ltd for Southend-on-sea Borough Council. Southend-on-Sea Shoreline Strategy Plan, Defence Condition Assessment. 2013.

Black & Veatch Ltd for Southend-on-sea Borough Council. Southend-on-Sea Shoreline Strategy Plan, Coastal Processes Review. 2013.

Black & Veatch Ltd for Southend-on-sea Borough Council. Southend-on-Sea Shoreline Strategy Plan, Economic Appraisal Report. 2013.

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Environment Agency. Flood Risk Management Estimating Guide. January 2010.

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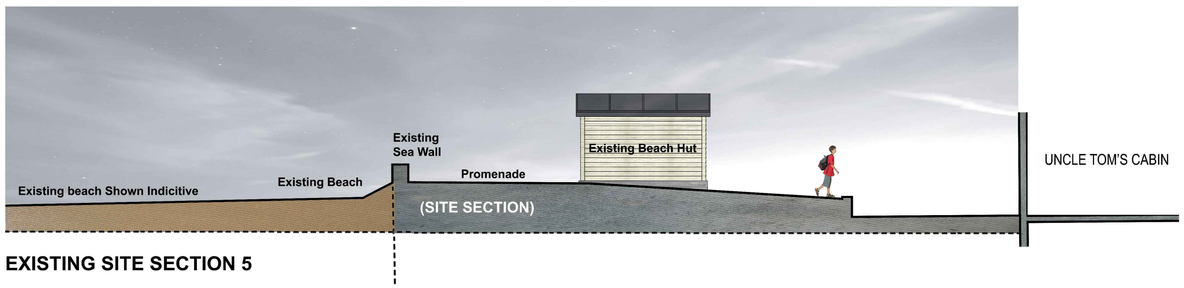
Appendix A – Alternative Proposal





APS DESIGN ASSOCIATES LTD
ARCHITECTURAL DESIGNERS AND PLANNING CONSULTANTS
TEL - 10702 469769

SHOEBURY SEA DEFENCE PROPOSAL



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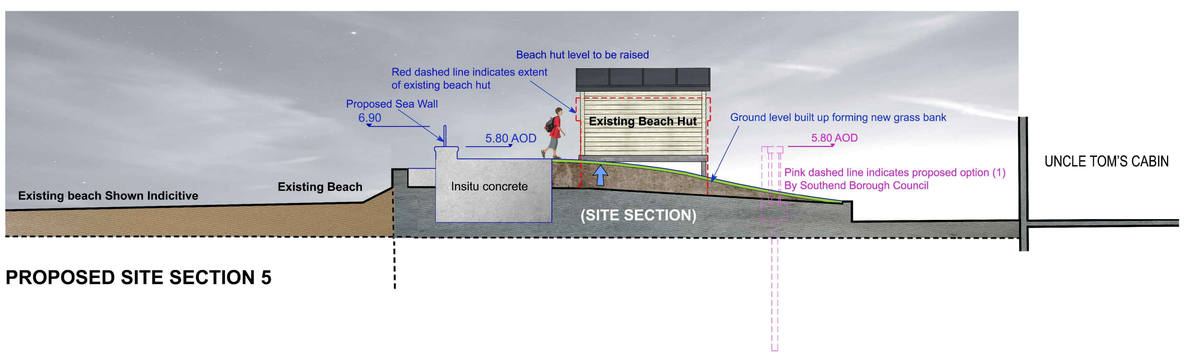

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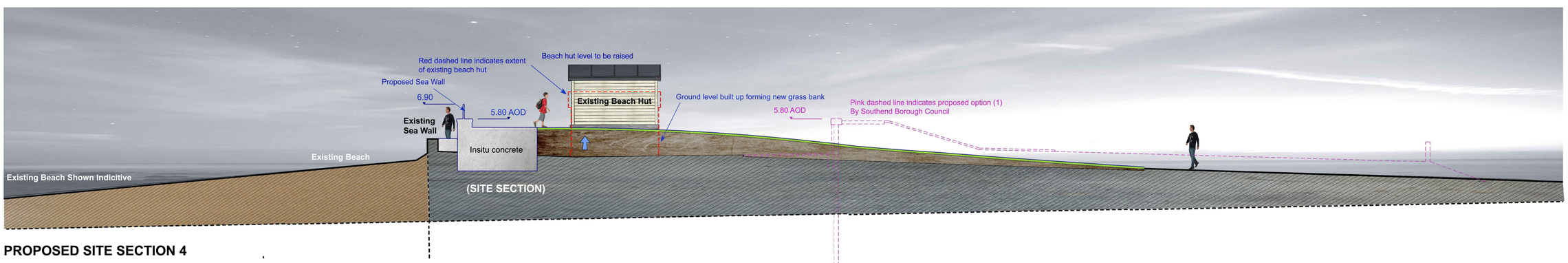

PROPOSED SITE SECTION 4

SITE LOCATION PLAN





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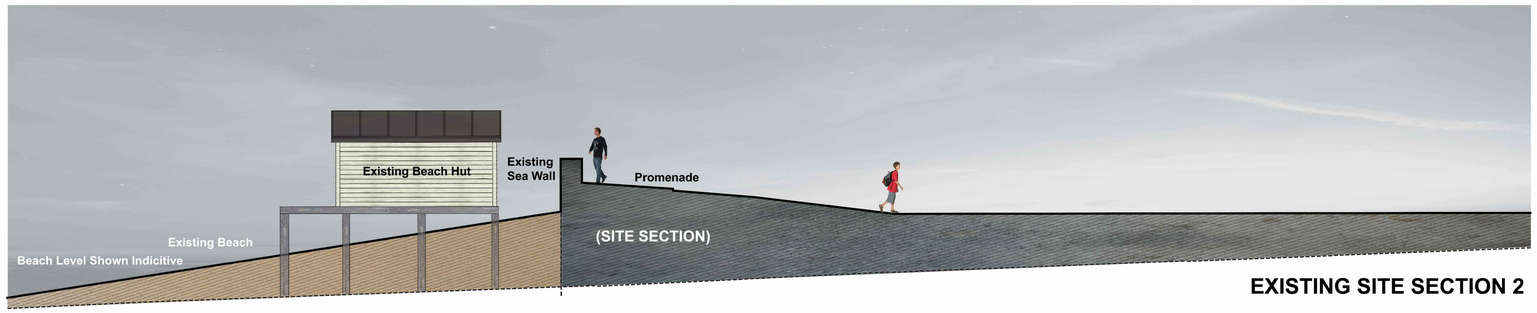
SHOEBURY SEA DEFENCE PROPOSAL



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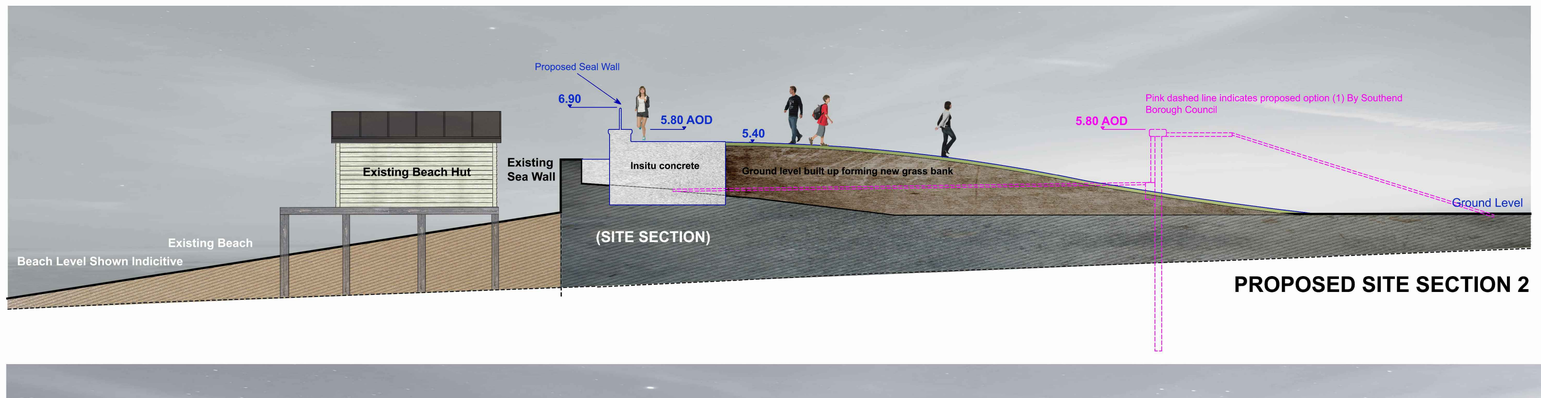

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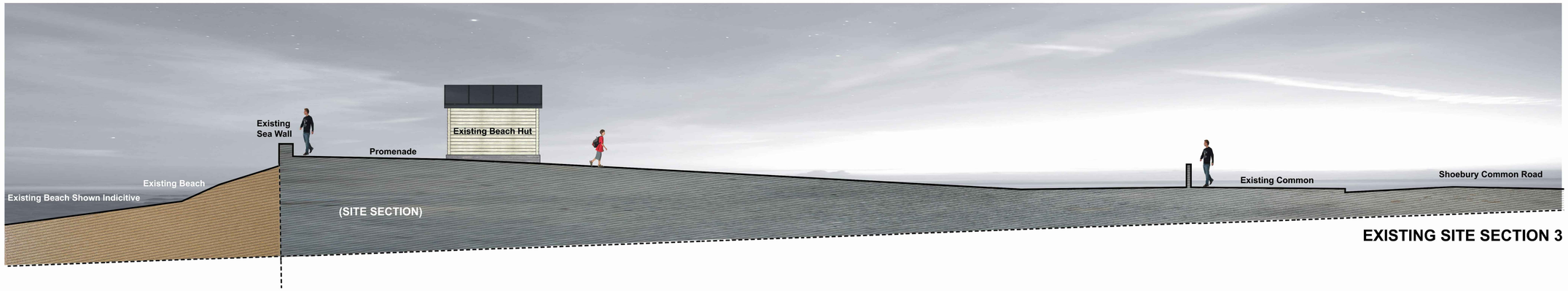

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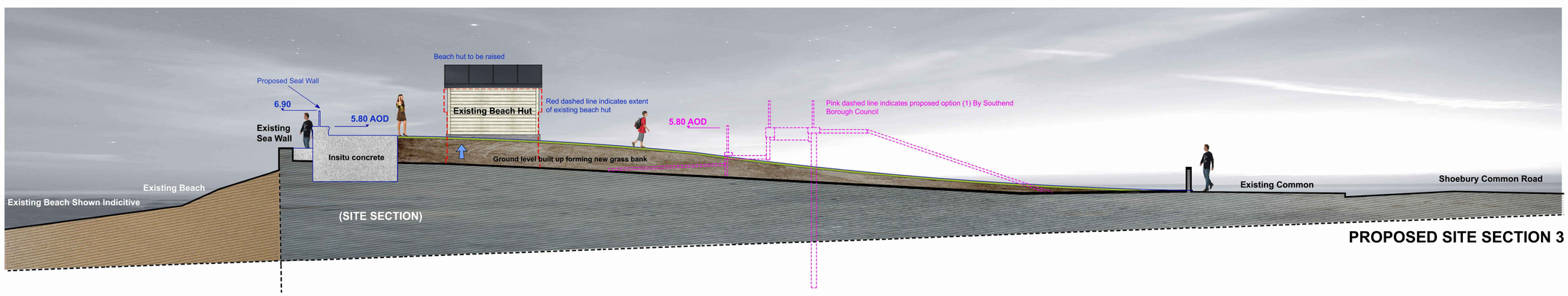

PROPOSED SITE SECTION 3

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Appendix B – As Built Drawings of Existing Seawall

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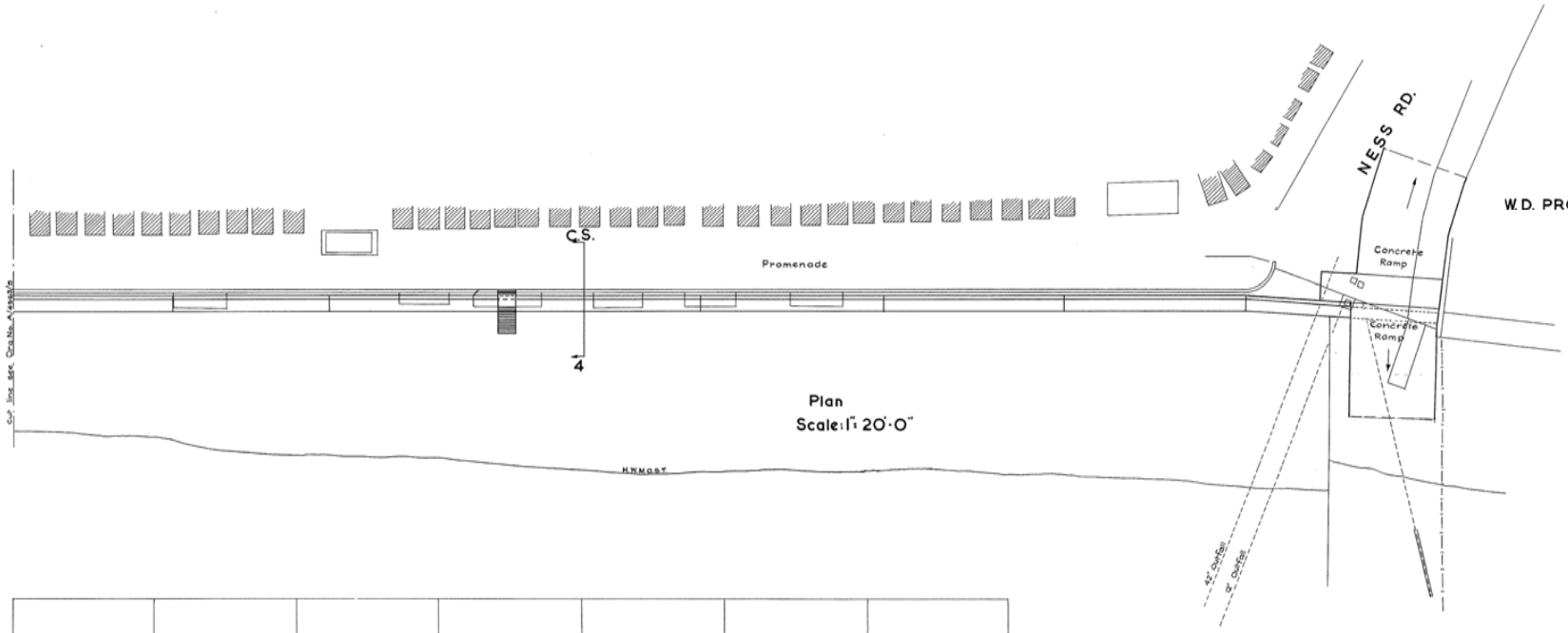

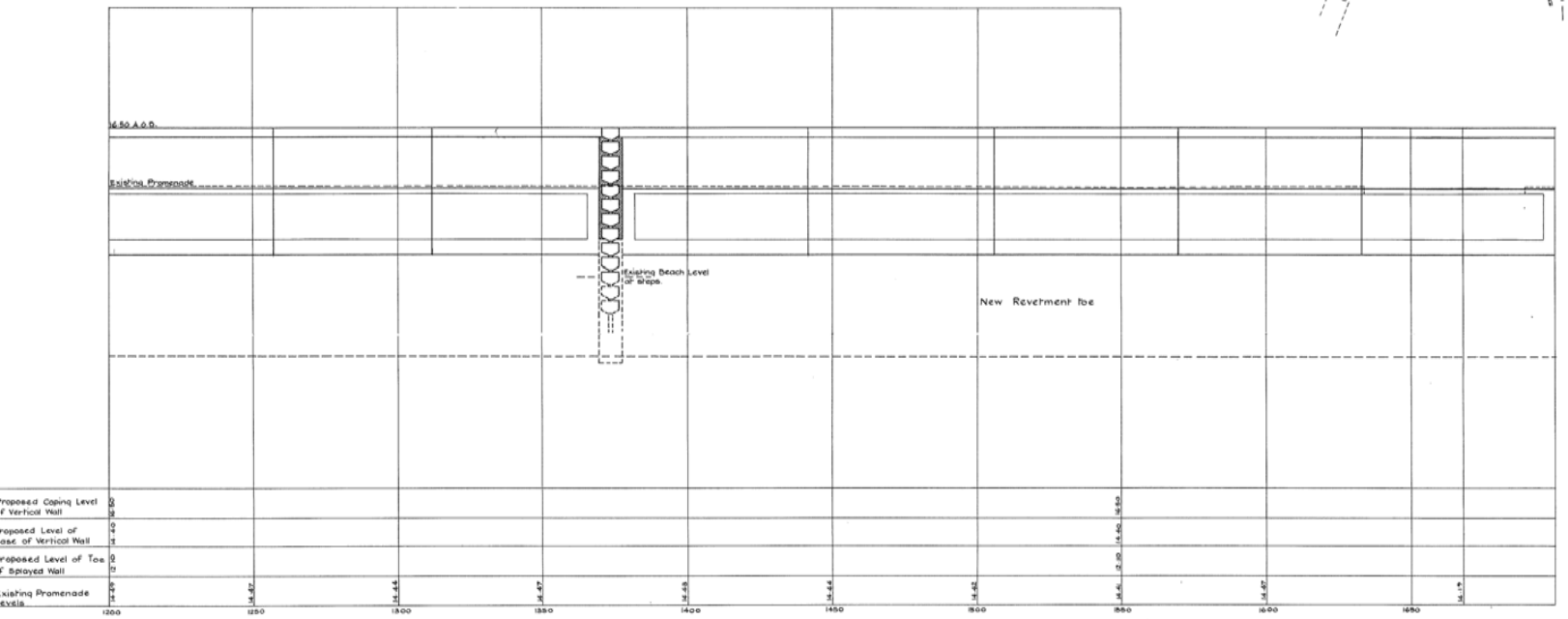

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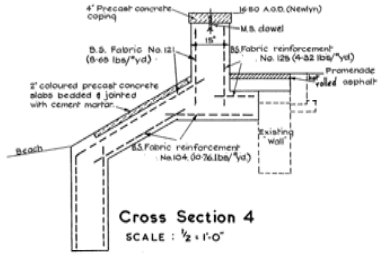

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COUNTY BOROUGH OF SOUTHEND-ON-SEA

SHOEBURY COMMON SEA WALL.

PROPOSED IMPROVEMENT - SHEET 3

SCALE:- AS ABOVE

DRAWN : : BY G.A.

TRACED 13 : 12 : 62 BY P.C.

T. B. HILL. M.I.C.E., M.I.Mun.E., A.M.I.V.
BOROUGH ENGINEER, SURVEYOR
& TOWN PLANNING OFFICER.

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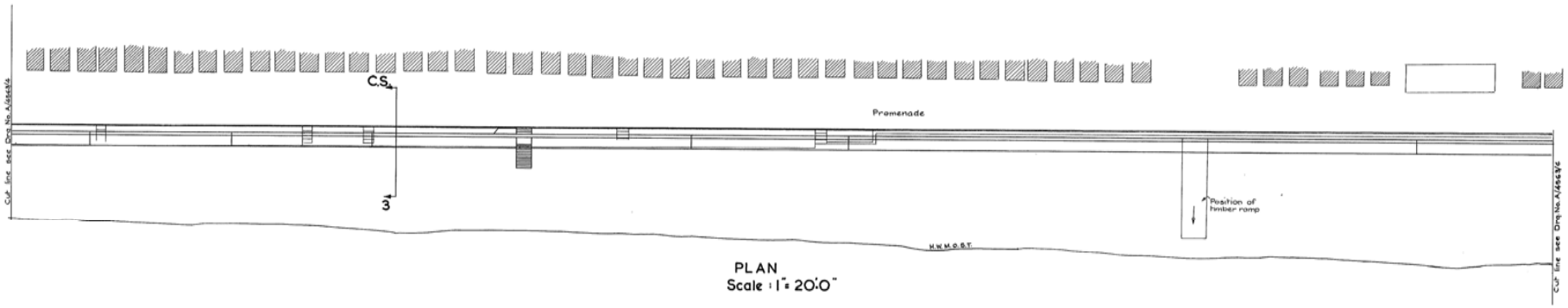

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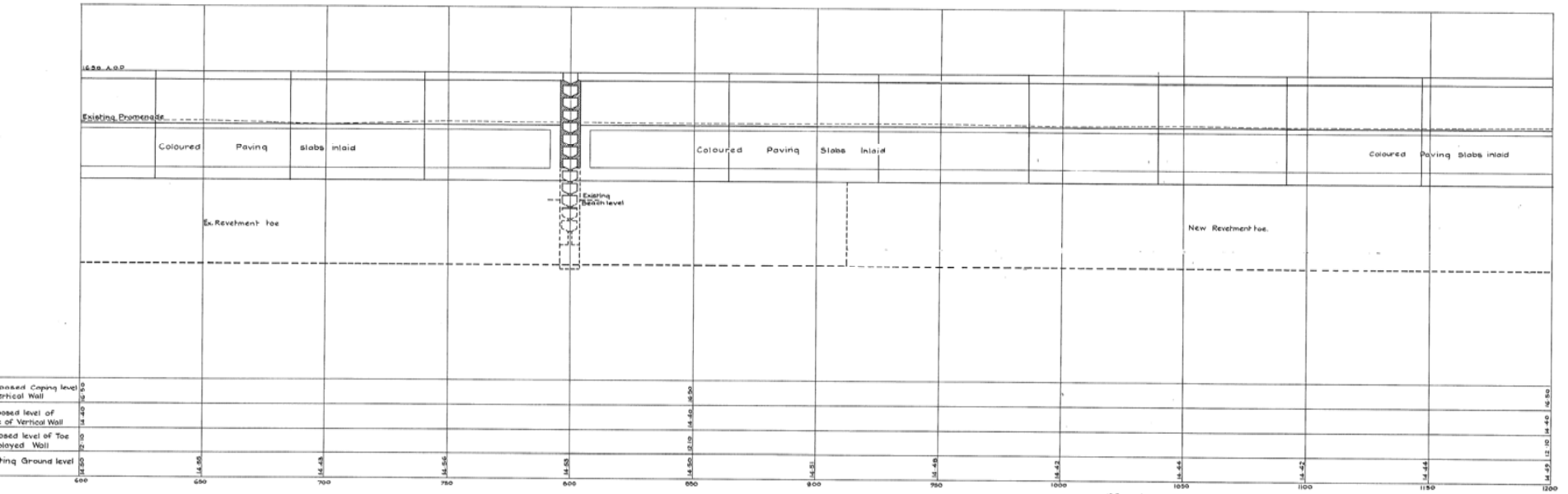

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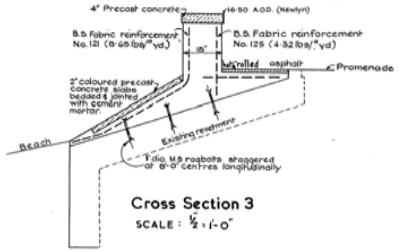

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COUNTY BOROUGH OF SOUTHEND-ON-SEA

SHOEBURY COMMON SEA WALL

PROPOSED IMPROVEMENTS SHEET 2

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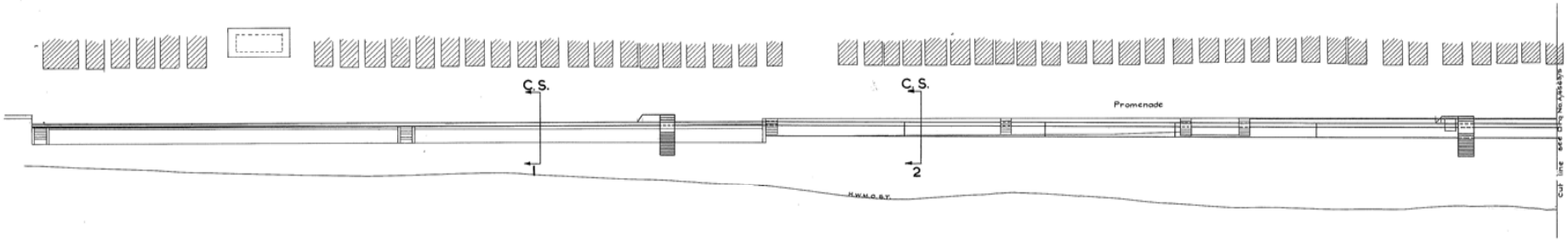

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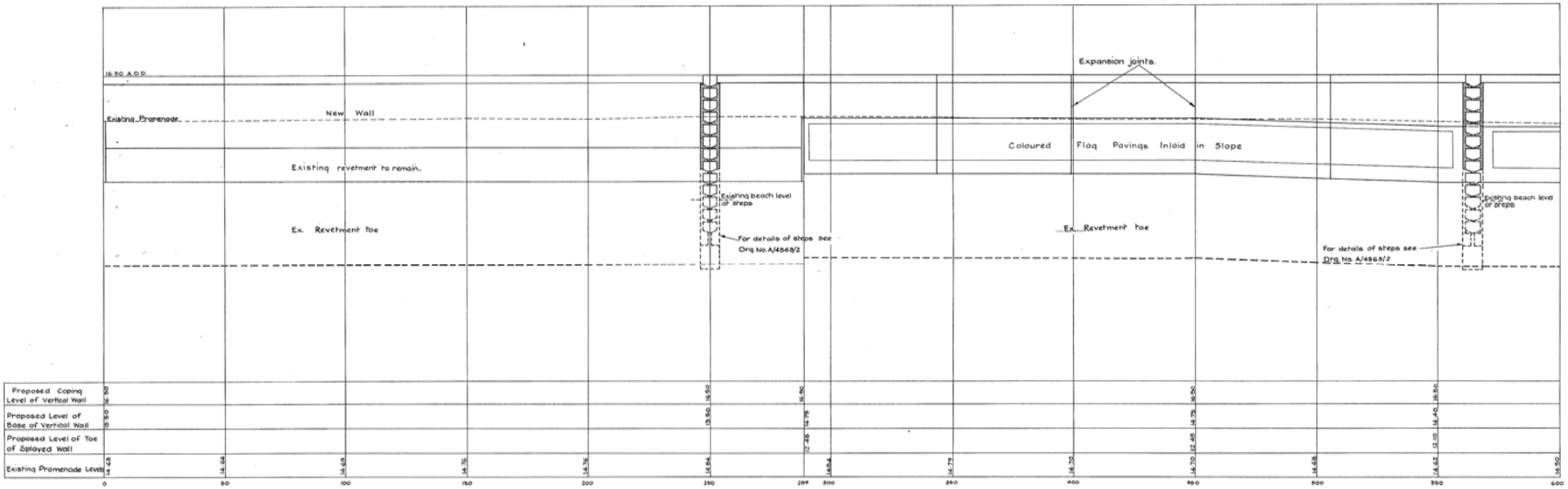

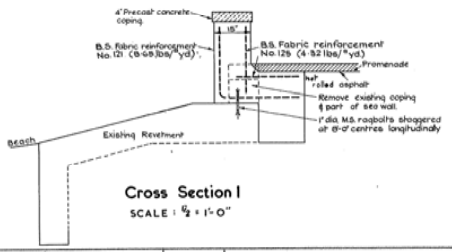

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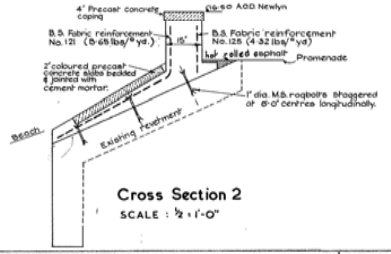

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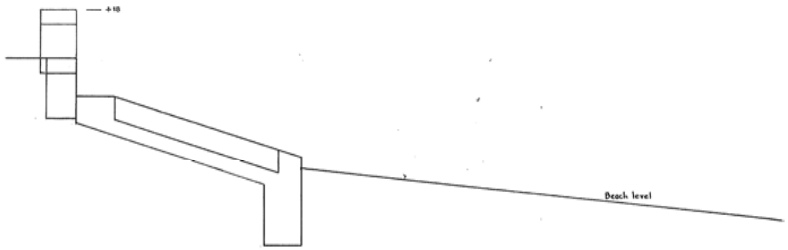
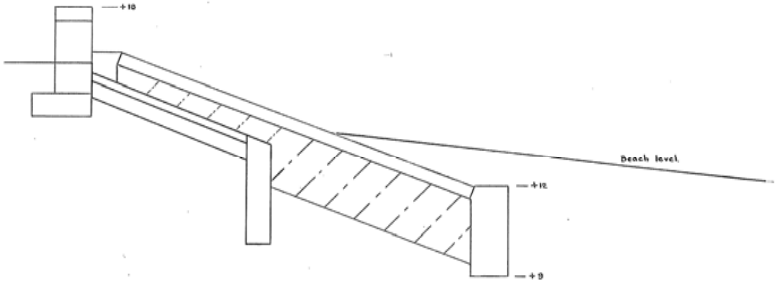
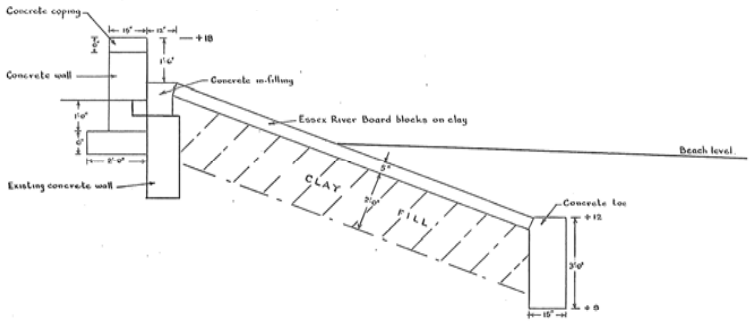
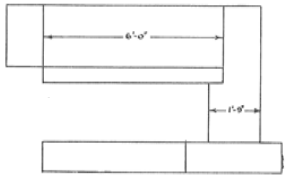






TYPICAL SECTIONS



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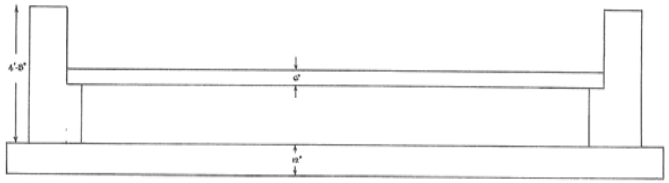

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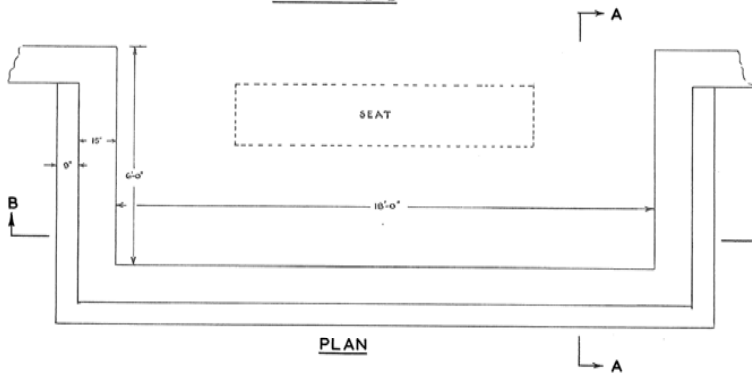

PLAN

TYPICAL SEAT EMBRASURE.

SENT TO				
E	DATE			
			REVISIONS	DATE

COUNTY BOROUGH OF SOUTHEND-ON-SEA

SEA WALL — SHOEBURY

SCALE:- 1/2 IN. TO 1 FT.

DRAWN : : BY

TRACED 11 : 4:57 BY G.W.

T.B.HILL, A.M.I.C.E., M.I.Mun.E., A.M.I.W.
BOROUGH ENGINEER & SURVEYO

DATE OF ISSUE

DRAWING NUMBER
A 4345/3/

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Appendix C – Costing

BLACK & VEATCH

Client	Southend on Sea Borough Council	Project Manager	D. Glasson
Scheme	Shoebury - Alternative Option	Estimator	C. Sheal
Project No.	122165	Date	August 2013

ESTIMATE SUMMARY - 2013

Civil's		
Labour Plant Materials Sub-Contractors Temporary Works	Bills 1-9 (See Attached Breakdown)	
TOTAL	**£2,608,467**	
Beach Recharge (Bill 10)		
Mobilisation (Assuming shared with other frontages) Groyne Repair Beach Recharge		
TOTAL		
NET CONSTRUCTION COSTS	**£2,608,467**	
CONTRACTORS SUPERVISION & ADMINISTRATION	**£365,185**	
CONTRACTORS ACCOMMODATION & STORAGE	**£104,339**	
CONTRACTORS GENERAL ITEMS (INCL SITE INVESTIGATIONS)	**£78,254**	
CONTRACTORS GENERIC RISK (2.5%)	**£78,906**	

MARGIN AS ON-COST

TOTAL CONSTRUCTION COST	**£3,235,152**	
FEE (6.5%)	**£210,285**	
CONSTRUCTION TOTAL	**£3,445,436**	
Engineering & Site Supervision		**£399,588**
Compensation (7.5%)		**£258,408**
Total Costs		**£4,103,432**
Optimism Bias (50%ile)	**£1,315,560**	
Total Contract Value	**£5,418,991**	
Potential Cost of Replacing Beach Huts (Non SBC)	**£887,250**	
Potential Project Value	**£6,306,241**	

NOTES:

Engineering and Site Supervision Costs (typically 12.5%) although have been capped at the same level as SBC's preferred scheme.
Optimism Bias covering project risks (calculated through Monte Carlo analysis) = 32.059984%
Costs do not include beach recharge

BLACK & VEATCH

Client	Southend on Sea Borough Council	Project Manager	D. Glasson
Scheme	Shoebury - Alternative Option with Recharge	Estimator	C. Sheal
Project No.	122165	Date	August2013

ESTIMATE SUMMARY - 2013

Civil's		
Labour Plant Materials Sub-Contractors Temporary Works	Bills 1-9 (See Attached Breakdown)	
TOTAL	£2,608,467	

Beach Recharge (Bill 10)		
Mobilisation (Assuming shared with other frontages)	£368,003	
Groyne Repair	£196,557	
Beach Recharge	£1,376,099	
TOTAL	£1,940,659	

NET CONSTRUCTION COSTS	£4,549,127	
CONTRACTORS SUPERVISION & ADMINISTRATION	£365,185	
CONTRACTORS ACCOMMODATION & STORAGE	£104,339	
CONTRACTORS GENERAL ITEMS (INCL SITE INVESTIGATIONS)	£78,254	
CONTRACTORS GENERIC RISK (2.5%)	£175,939	

MARGIN AS ON-COST

TOTAL CONSTRUCTION COST	£5,272,844	
FEE (6.5%)	£342,735	
CONSTRUCTION TOTAL	£5,615,579	
Engineering & Site Supervision		£449,587
Compensation (7.5%)		£421,168
Total Costs		£6,486,335
Optimism Bias (50%ile)	£2,079,518	
Total Contract Value	£8,565,852	
Potential Cost of Replacing Beach Huts (Non SBC)	£887,250	
Potential Project Value	£9,453,102	

NOTES:

Engineering and Site Supervision Costs (typically 12.5%) although have been capped at the same level as SBC's preferred scheme + £50k extra for recharge
Optimism Bias covering project risks (calculated through Monte Carlo analysis) = 32.059984%
Beach recharge assumes that the mobilisation costs are split with other frontages

	13010 Nett				
	Description	**Qty**	**Unit**	**Rate**	**£ p**
	Bill 1 General Items				
	CLASS A: GENERAL ITEMS				
	Method-related charges				
	Temporary Works				
A	Construct site access roads & hardstandings (assume these will be left in place and buried under the new raised ground)	1	sum	£5,166.75	£5,166.75
B	Remove site access roads & hardstandings	1	sum	£0.00	£0.00
C	Erect temporary fencing and remove upon completion of works	1140	m	£25.00	£28,500.00
D	Keeping roads clean during main construction operations	32	wk	£750.00	£24,000.00
	Page Total 1/1				**£57,666.75**

	Description	Qty	Unit	Rate	£ p
	Bill 2 Sea Wall (Western 500m)				
	CLASS X - MISCELLANEOUS ITEMS				
	Sea Wall				
A	Raise sea wall (western End) as per Option 1	500	m	£750.00	£375,000.00
B	Procure and Install Flood Gates	3	nr	£19,527.53	£58,582.59
	Page Total 2/1				**£433,582.59**

	Description	Qty	Unit	Rate	£ p
	Bill 3 Repairs to Sea Wall				
	CLASS X: MISCELLANEOUS WORK				
	Sprayed concrete				
A	Prepare area for spray concrete; remove loose material by scabbling and/or pressure jetting; approx. area 520m2	260	item	£9.03	£2,347.80
B	Sprayed concrete by specialist sub-contractor; assume 2m2 per metre of wall	260	m	£935.00	£243,100.00
	Page Total 3/1				**£245,447.80**

	Description	Qty	Unit	Rate	£ p
	Bill 4 Raise Existing Sea Wall				
	CLASS D: DEMOLITION AND SITE CLEARANCE				
	General clearance				
A	General clearance	1	item	£2,715.19	£2,715.19
	Other structures				
B	Remove existing cope and dispose off site	520	m	£7.28	£3,785.60
	CLASS F: IN SITU CONCRETE				
	Concrete				
C	Supply and place concrete in wall extension	250	m3	£198.26	£49,565.00
	CLASS G: CONCRETE ANCILLARIES				
	Formwork: fair finish				
D	Plane vertical width: 0.4 - 1.22 m	832	m2	£60.00	£49,920.00
	Reinforcement				
E	High yield steel bars to BS4449 or BS4461; assumed density 175kg/m3	43.75	t	£1,000.00	£43,750.00
	Joints				
F	Prepare existing surface joint with new wall by mechanically scabbling; width n.e. 0.5m	260	m2	£9.03	£2,347.80
G	Drill holes for 16mmdia dowels; supply and grout into existing wall concrete at 500mm c/c both faces	1000	nr	£21.95	£21,950.00
	CLASS H: PRECAST CONCRETE				
	Copings, sills and weir blocks				
H	Supply and place new precast concrete cope to new sea wall	520	m	£117.21	£60,949.20
	Page Total 4/1				**£234,982.79**

	Description	Qty	Unit	Rate	£ p
	Bill 5 Beach Accesses				
	CLASS X: MISCELLANEOUS WORK				
	In-situ concrete step and wheelchair accesses to beach				
A	Provisional Sum	6	nr	£30,000.00	£180,000.00
	In-situ concrete ramp from Ness Road to beach				
B	Build up existing ramp from Ness Road to top of raised wall and on to beach	1	nr	£22,626.00	£22,626.00
	Page Total 5/1				**£202,626.00**

	Description	Qty	Unit	Rate	£ p
	Bill 6 Re-profile Shoebury Common				
	CLASS D: DEMOLITION AND SITE CLEARANCE				
	General clearance				
A	General site clearance	1	item	£5,987.98	£5,987.98
	CLASS E: EARTHWORKS				
	General excavation				
B	Strip topsoil and deposit on site in temporary stockpiles; assumed depth 0.25 - 0.50m	4680	m3	£4.79	£22,417.20
	Fill				
C	Imported suitable fill spread and compacted to suit new ground profiles	18200	m3	£25.00	£455,000.00
D	Exxcavate topsoil from temporary site stockpiles and spread on site; assumed depth 0.25 - 0.50m	4680	m3	£4.79	£22,417.20
	Landscaping				
E	Grass seeding; allow for stone picking, fertiliser etc.	15600	m2	£1.75	£27,300.00
	CLASS X: MISCELLANEOUS WORK				
	Fences				
F	Provide timber post and wire fence height: 1 - 1.25m around new grassed area, , maintain and remove after germination of grass seed	1110	m	£12.50	£13,875.00
	Page Total 6/1				**£546,997.38**

	Description	Qty	Unit	Rate	£ p
	Bill 7 Promenade Road				
	CLASS R: ROADS AND PAVINGS				
	Sub-bases, flexible road bases and surfacing				
A	Granular material DTp Specified type 1 depth: 350mm	7800	m2	£14.59	£113,802.00
B	Flexible surfacing comprising 60mm thick base course & 40mm thick wearing course	7800	m2	£27.50	£214,500.00
	Kerbs, channels and edgings				
C	Precast concrete kerbs to BS 340 figures 1-3 straight or curved to radius exceeding 12m	520	m	£24.64	£12,812.80
	Page Total 7/1				**£341,114.80**

	Description	Qty	Unit	Rate	£ p
	Bill 8 Shelters				
	CLASS X: MISCELLANEOUS WORK				
	Shelters				
A	Demolish existing shelters and dispose of arisings off site	3	nr	£1,128.28	£3,384.84
	Construct new shelters				
B	PROVISIONAL SUM	3	nr	£15,000.00	£45,000.00
	Page Total 8/1				**£48,384.84**

	Description	Qty	Unit	Rate	£ p
	Bill 8 New Huts & Foundations				
	Beach huts				
A	Concrete slab foundation for beach hut. Slab size 5.0 x 3.0 x 0.2; 1nr. layer A393 mesh	169	nr	£601.31	£101,621.39
B	Remove, store and re-locate existing beach huts	169	nr	£580.00	£98,020.00
	Supply and erect new beach hut				
C	PROVISIONAL SUM **(Not Included)**	169	nr	£5,250.00	£887,250.00
	Page Total 8/1				**£199,641.39**

	Description	Qty	Unit	Rate	£ p
	Bill 8 Services to Beach Huts				
	Services to beach huts - Gas				
	Provision of new gas supply to rear of beach huts in Shoebury Common (approx. length 600m)				
A	PROVISIONAL SUM	1	item	£25,000.00	£25,000.00
	Connection of gas supply to meters within beach huts				
B	PROVISIONAL SUM	169	nr	£250.00	£42,250.00
	Page Total 8/1				**£67,250.00**

	Description	Qty	Unit	Rate	£ p
	Bill 9 Miscellaneous Items				
	Provision of Promenade Lighting				
A	PROVISIONAL SUM	520	m	£221.90	£115,388.00
	Formalising / Improving Car park				
B	PROVISIONAL SUM	1	item	£38,462.00	£38,462.00
	Surface Water Drainage Amendments/ Improvements				
C	PROVISIONAL SUM	1	item	£76,923.00	£76,923.00
	Page Total 9/1				**£230,773.00**

	Description	Qty	Unit	Rate	£ p
	Bill 10 Beach Recharge				
A	Mobilisation Cost (Assuming frontage recharged in conjuction with other frontages) PROVISIONAL SUM	1	item	£368,003.00	£368,003.00
B	Mobilisation Cost (Assuming frontage recharge completed independent of other frontages) PROVISIONAL SUM **(Not Included)**	1	item	£1,014,000.00	£1,014,000.00
C	Beach Recharge PROVISIONAL SUM	64545	m3	£21.32	£1,376,099.40
D	Groyne Repair (10 x 30m groynes) PROVISIONAL SUM	300	m	£655.19	£196,557.00
	Page Total 10/1				**£1,940,659.40**

Total (Without Beach Recharge)	£2,608,467.34
Total (With Beach Recharge)	£4,549,126.74