

Sustainability

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The Brundtland Report. World Commission on Environment and Development, Our Common Future: Oxford University Press 1987.

Outline.

- 1.1. In 1990 permission was granted for the erection of 511 multi storey holiday homes on Crinnis and Shorthorn beaches, Carlyon Bay, St Austell. The permission also included a vertical sea wall with rock armour laid on a geotextile fabric.
- 1.2. The material make up of the beaches is in fact china clay waste locally called 'stent'. The beach was created by the fluvial deposition of this waste material through an adit and is therefore a man-made beach. Its characteristics and behaviour is possibly unique and cannot simply be regarded as 'sand'. It has only been in existence for some 150 years.
- 1.3. The 1990 permission was renewed in 1996. An application was made in 2001 to renew the consent but discontinued when a certificate of lawful commencement was issued by Restormel Borough Council on 13 December 2001 confirming that the developer had commenced just prior to the expiry of the five year period, which had been a condition.
- 1.4. It is worthy of note here that the commencement of development was merely a few wooden pegs in the ground and some white lines, none of which can be identified today. Whilst this might have been sufficient in law to claim a commencement of works, since that time no further construction of any kind of the 1990 scheme has taken place. Some twenty years have elapsed since that proposed development received planning permission.
- 1.5. A planning application in 2002 for an alternative development of similar holiday home scale also proposed an extension of the retail and leisure facilities and included a hotel. There was overwhelming opposition to this application, including the then-named Cornwall County Council, and the application was withdrawn.
- 1.6. In 2004 the developer, then named The Ampersand group Ltd., constructed, without planning permission, a sea wall built out into the tidal zone. After considerable pressure was placed upon the Local Planning Authority (LPA) by objectors, the developer was forced to make a further application in January 2005

for a revision of the design and location of the sea wall, not as designed for the 1990 consent. This new application included a placement of beach replenishment and recharge as part of the flood protection.

- 1.7. This new application for the sea wall was intrinsic to the abandoned 2002 scheme (above).
- 1.8. It should be noted that by this time, the developer's experts, H.R. Wallingford, had already advised the site owner that the 1990 sea wall design was "*dangerous to life and property.*"
- 1.9. This application was called in for a decision by the Secretary of State by a Direction made under section 77 of the Town and Country Planning Act 1990, on 12 January 2006.
- 1.10. Following a lengthy Public Inquiry the application for the revised sea wall was rejected by the Secretary of State, on the basis that "*the proposal conflicts with the relevant development plan policies.*"
- 1.11. The developer has now submitted a completely new planning application for redesigned sea defences and outline planning for the development behind those sea defences.

Documented History for Sea Defences for the Development Site.

1987

- 2.1. In 1987 Hydraulics Research, Wallingford, produced a report No. EX128, following a small scale study of Carlyon Bay. This study was carried out at the request of Coode Blizard and Partners acting for Cornish Leisure World. At the time it was proposed that the two beaches were to be developed as a holiday complex and HR were asked to assess the likely flood risk of this area.
- 2.2. It's worth pointing out that this study pre-dates the approval of the extant permission.
- 2.3. The report covered Development of Carlyon Bay, (i.e. the history of the beaches formation and make up), Assessment of Flood Risk, Maintenance of Stream Outlet and Conclusions.
- 2.4. In the Paragraph 2 "Development of Carlyon Bay" it is observed that both beaches (Crinnis and Shorthorn) had "*reached their maximum extent by c 1933,*

with the high water line extending well beyond the headland which once separated Crinnis and Shorthorn."

The report continues:

"By 1969 the high water line had become slightly realigned, resulting in some further build-up on Crinnis and some recession on Shorthorn. The net result appears to be a small reduction in the overall area of the two beaches. Further surveys are clearly needed to confirm whether this trend will continue. However on the basis of existing information it would appear that with the influx of china clay waste being greatly reduced the future trend will be one of erosion."

(This observation of erosion was echoed in their subsequent report dated 1990.)

- 2.5. In paragraph 3.3 of the 1987 report, the issue of wave run-up, that is to say the vertical height to which waves reach above still water level, which had been raised by South West Water was considered. Within that discussion is a point I consider worth noting:

"Firstly, provided the ability of the beach to respond to wave and tidal conditions is not impaired (eg by building a wall or developing too close to its crest), then only a small percentage of waves will overtop its crest. This is because the beach profile will adjust to the forces acting upon it, material will be moved upwards to form a berm at about the vertical run-up limit. This explains the general ground level in Crinnis Bay and along the beach crest elsewhere.

- 2.6. *Any water that does overtop will soon drain back into the beach material, again provided that development is set back a reasonable distance behind the beach crest."*

At 3.4 "Discussion of results it was noted:

"Since Crinnis and the western two-thirds of Shorthorn beach have ground levels generally in excess of 5m ODN they are very unlikely to become flooded, even in the rare event of a 250 year still water level plus 2m wave height run up. However, the situation in the eastern most third of Shorthorn Beach is far less satisfactory."

- 2.7. The report shows that some areas of ground levels at the eastern end of Shorthorn are about 2.5m ODN.
- 2.8. Some suggestions to overcome this flooding risk were *"to infill the area behind the beach to the general level of about 5m ODN."* Or *"...the low lying areas at the east end of Shorthorn beach could be prevented from flooding by a low sea wall."*

- 2.9. It appears from the report, that the idea of a permanent sea wall structure that has subsequently been proposed was never considered. Although in the conclusions they do give one caveat:

"Given that the high water line has receded 30 metres between 1933 and 1969 at the eastern end of Shorthorn Beach then clearly a buffer zone is required between the seaward limits of the development and the beach face. With the information presently available only a very crude estimate of the width of the buffer zone can be made. We would recommend that until more beach monitoring has been carried out then any plans for constructing dwelling units within 50 metres of the present mean high water mark should be deferred."

1990

- 2.10. In September 1990 Hydraulics Research produced a second report, this time for Jubb and Partners, Consulting Engineers. This report concerned a desk study to determine whether the construction of a promenade wall in Carlyon bay would have any effect on beach stability, and whether there was any likelihood of erosion at its toe.

- 2.11. In that report's second section "Historical Background" it re-iterated the observation made in the 1987 report that:

"...on the basis of existing information it would appear that with the influx of china clay waste being reduced, the future trend will be one of erosion."

- 2.12. The 1990 report again revisits "Assessment of Wave and tidal Conditions". From which it looks at "Beach Profile Response".

- 2.13. The observation in that section is that the natural beach berm elevations vary from 6.1m OD to 6.9m OD. It continues with the claim that during conditions with a 1 year return period and a 10 year return period the wave run up elevation is short of the natural berm crest. However, during the 100 year event the run up elevation is between 5.5m OD and 7m OD depending on choice of wave/tidal combinations examined.

"The fact that the natural beach berm elevation lies within this range indicates that the beach has been subjected to, and the crest formed by extreme wave/tidal conditions. It is likely that such conditions did, in fact, occur during the

winter of 1990, when there were high surge levels plus prolonged periods of storm activity over much of the south west coasts of the United Kingdom."

- 2.14. The report continues, with regard to the promenade wall:

"If one examines the positions of the promenade wall at section 5250,5385 and 5490 it can be seen that it is generally situated about 10m seawards of the natural beach crest. This berm effectively represents the maximum run up limit since the beach was fully formed ie from c 1933 onwards. If the events which formed this berm occur after the promenade wall is constructed then beach drawdown or scour will occur in front of it."

- 2.15. Further observations are made with regard to "littoral drift" and the effects on the rotation of beach contours noting that:

"...the amount of recession at Shorthorn Beach during south-easterlies may be 30m or more. During south-westerlies we would expect a similar amount of recession to take place at Crinnis Beach. Any such movements will put the promenade wall at risk and there is in our opinion a need to maintain a healthy beach profile at all points along the frontage and a need to prevent the profile receding landwards during storms."

The report concludes:

- 2.16. *"From our calculations it is clear that the proposed promenade wall, which is seaward of the existing beach crest, will interfere with beach profile formation, if only occasionally. It is recommended that the wall should either be moved back at least 10m or the beach built out seawards by a similar amount, by the addition of new material."*

- 2.17. It continues that if these solutions were not seen to be feasible then scour protection measures would be needed but best examined by means of a physical model. It confirms the unusual nature of the beach material such that *"numerical methods cannot be relied upon to assess accurately the amount of scour that is likely to take place."*

- 2.18. The report recommends further survey work and analysis of china clay waste be carried out.

2002 - 2006

2.19. We now know that following that initial work the beaches were sold to Ampersand and subsequently acquired by CEG. Far from following the advice contained in the earlier reports the developer submitted plans for a revised sea wall which not only involved a beach nourishment programme but pushed the wall further seawards. This revised sea wall became the subject of the Public Inquiry in 2006. It was revealed at that public inquiry of the existence of a further report by Wallingfords, produced in 2002, which described the extant sea wall as dangerous to life and property. Knowledge of this report was denied by Mr Andrew Woods, the Investment Director of CEG. It was at this time that Mr Woods was heavily involved in the promotion and application of the revised sea wall so it does seem surprising that he was ignorant of that earlier report.

2.20. Prior to the Public Inquiry the Environment Agency (EA) submitted their Rule 6 statement in which they made reference to alternative approaches that might provide more sustainable options for development at Carlyon Bay. Following the pre-inquiry meeting of the 13 July 2006, the Planning Inspector directed the EA to present an indication as to how the alternative approaches would manifest themselves. This 'Statement of Alternative Approach for the Environment agency' was subsequently provided. (GOSW ref: 8045/126, Restormel Borough Council ref: 05/00028)

It is to that document I now address my comments.

2.21. At 2.1 the report refers to a 2002 study of the coastal defences by Wallingford. The conclusion stated from that document was that it would be preferable for economic, environmental, amenity and engineering reasons to protect the development against flooding by a combination of a sea wall fronted by a wide sandy beach. This is consistent with Wallingfords earlier observations.

2.22. The EA's position in relation to this start point was:

"Rather than import materials to establish a suitably wide beach in front of the sea wall, the alternative approaches look to set back any sea wall or other defence system behind the existing beach. However, in drawing up these options it is necessary to consider what should be taken as the line of the existing beach head." (2.2)

2.23. The EA put forward the line as being that on *"which vegetation had been able to firmly establish itself."* (2.3) and used as its guide the 'Carlyon Bay Sea Defence EIA Ecological technical report' dated 11 October 2004 by Baker Shepherd

Gillespie, submitted by Ampersand. The EA included an aerial plan to illustrate the positions of the vegetation line and considered a 20m beach width and closest building line. The plan below is scanned from their document for illustrative purposes.



- 2.24. The key with the plan indicates that the thick red line is the 'Approximate Natural Vegetation Line', the thin red line is the '20m beach width from vegetation line' and the black line is the 'Approximate closest building line (14m set back)'.
- 2.25. The report then continues with proposing three alternative approaches to the development of the site. I would recommend full attention to the entire report but sufficient for my point to be made I will précis the three alternatives.
- 2.26. In the first, identified as 'Option A' the EA proposed that the sea wall and rock armour be set back behind the natural vegetation line. The built frontage anticipated, to be set back approximately 14m behind the sea wall. (3.6)
- 2.27. However, they considered that there would be insufficient beach width to properly protect Shorthorn Beach. Their conclusion was:

"Therefore, in order to avoid the importation and management of sand in this area or the construction of alternative sea defences structures this option effectively restricts development to Crinnis Beach alone." (3.8)

However, the report points out:

2.28. *"Whilst this approach might be considered more sustainable, in that it removes the need to import sand to establish a beach in front of the defence, an application for such a development would nonetheless be contrary to current planning policies. Notably, Planning Policy Guidance Note (PPG) 20 policies for risks states that new development should not generally be permitted in areas which would involve expensive engineering works; and the risk based approach of PPG 25 directs that undeveloped or sparsely developed areas are generally not suitable for residential, commercial and industrial development."* (3.9)

2.29. 'Option B' proposed using the existing beach profile again but replacing expensive hard engineering with a buffer strip and small scale return wall. (3.11)

2.30. They noted that there would be a disadvantage to the developer:

"Given the layout of the site it is reasonable to assume that the provision of this additional dissipative strip would have significant implications on the scale of the development that could be constructed behind this defence arrangement. Development on Shorthorn Beach would not be viable for this option." (3.14)

2.31. The report further points out that even this option would conflict with PPG 25. (3.15)

2.32. 'Option C' proposed to utilise the natural beach as the primary defence and as the sole defence for the site as a whole. Whilst there would be a continued flood risk in the 1 in 200 year storm conditions and any built development would need to incorporate flood resistant and flood resilient construction methods there would be some development that would not conflict with planning policy. (3.17, 3.18, 3.19, 3.20)

2.33. The suitable uses that the EA offered as conforming to the guidance in the Consultation Planning Policy Statement 25 and Flood Risk included, *"outdoor sports and recreational facilities, public and tourist amenity uses, and possibly buildings used for shops, cafes etc."*

And in their words:

- 2.34. *"This form of development is therefore largely comparable to the previous uses of the site that included a pool, cafe, arcade, public amenity hall, public entertainment suites and a beach car park."* (3.21)
- 2.35. A stance to which CarlyonBayWatch have continuously given their support.

The Developer's View of the EA Options.

- 2.1. Andrew Woods, Investment Director of CEG, gave his company's view of the EA proposals in his Proof of Evidence submitted to the Public Inquiry.
- 2.2. He acknowledges that *"Each option identified by the EA would require a new planning application."* (10.4)
- 2.3. He dismisses all three options on the grounds that they would *"rule out any form of residential development which, in this unique location would clearly offer the highest return on investment."* (10.6)
- 2.4. The significance of procuring a return on investment is spelt out in no uncertain terms within the proof.
- 2.5. *"It (low key residential development) also fails to recognise the stark commercial realisation that even if what has been proposed by the EA were viable (which it is not), it would not deliver anything like the return on our investment which will be achieved by building out the holiday resort development with either the extant or the proposed sea defences."* (10.8)

And:

"In short, none of the EA proposals are remotely financially viable;.." (10.10)

And:

"Faced with an option of either proceeding with the current development or pursuing the EA's suggested alternative sports and recreational development, the Group would have no hesitation in proceeding with the extant scheme, which as

can be seen from the appraisal at sections 8, delivers an acceptable financial return on our investment.” (10.11)

- 2.6. The point that Mr Woods appears to have missed is that the EA were not invited to propose alternative schemes that sought to maximise CEG’s profits. Their approach was, and for a Government organisation, properly to propose alternative schemes from the point of view of safety, sustainability and compliance with Planning Policy Guidelines. In this they did so in a clear and coherent fashion.

The Current Proposal 2011

- 3.1. It is now four years since that Public Inquiry. However, the developer has now submitted a whole new planning proposal. It is interesting to note here that at no time since 2006 has the developer commenced any building work commensurate with the extant permission. In direct contradiction of their stated position at the Public Inquiry, they have completely abandoned any pretence of seeking to build out any part of that extant permission.
- 3.2. Given their robust criticism of the EA’s approach to a set back option of the sea defences on Crinnis it is startling to see that in the minutes of the Liaison Meeting of June 2010 under 4.0 Design Update it states that: *“No beach recharge. The sea wall would move back 27 metres from the front face of the sea wall proposed and rejected at the planning inquiry.”*
- 3.3. This rearward movement is described in the Appendix D1 Flood Risk Assessment:
- “3.3 Sea defences*
- 3.3.1 Crinnis*
- The sea defences for Crinnis comprise a concrete recurve seawall, with a promenade incorporating secondary and tertiary defences. The seawall is similar in concept to the design proposed in 2004, however the position of the defence line is significantly further landward than the seaward points of the previous design, eliminating the need for beach recharge which was a key component of the 2004 design. The sea defences for Crinnis are shown in drawings DKR4334/D111 included in Appendix B.1.”*
- 3.4. One might surmise that this withdrawal was in response to the EA’s observations. However, if one re-examines the document, within the planning submission,

labelled 1782_pl_100_existing site plan, ORMS Detailed Drawings, one can see annotated 'Mean High Water Survey 2003' and 'Mean High Water Survey 2006'. The 2006 MHW is substantially landward of the 2003 MHW point.

- 3.5. For further confirmation of the landward movement of the MHW I draw your attention to copies of correspondence between Mr Roy Bennett and the MCEU with regard to the FEPA licence issued for the placement of the rock armour, temporarily below mean high water springs (MHWS). In that correspondence Mr Bennett points out that although the FEPA licence was issued on the basis that the rock armour would be placed below MHWS but subsequently moved above it, the action of placing the steel shuttering and the rock armour had so scoured sand from the beach frontage that the rock armour was now indeed within the MHWS. This was agreed by the MCEU in a letter dated 18th January 2009 in which Mr Ricky Evans, Consent Manager (West Coast) wrote:

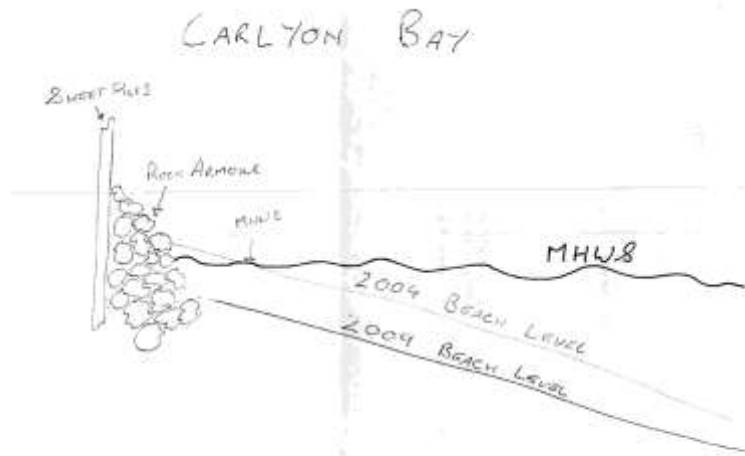
"Subsequent to receiving your letters of 28 July and 6 November, I arranged for an officer to revisit the site in question. Following the additional site visit I can now confirm that

The rock armour was placed and repositioned above MHWS, in accordance with all conditions of the above FEPA licence.

The current state of the rock armour suggests erosion; sand movement and possible storm action have exposed or moved the rock armour.

The licence holder has carried out no other additional work.

The sequence of events suggest it is most likely that between 2004 when the licence was issued and present time, coastal processes have migrated the line of MHWS and thus the area previously considered landward of the MHWS mark is now well within the inter-tidal area. A simple diagram, which I also enclose, may assist to illustrate this."



- 3.6. In 2011 Mrs Gloria Price exchanged e-mails with Ms Katie Hill at the Marine Management Organisation (MMO) concerning amongst other things the placement of the rock armour and steel sheeting by the developer. It was confirmed by Ms Hill that a FEPA licence was issued by the Marine and Fisheries Agency (now the MMO) for the works at Carlyon Bay. This included the temporary deposit of the rock armour below MHWS. Subsequently inspections found that the rock armour was placed and repositioned above MHWS in accordance with the licence.

However, Ms Hill confirms:

- 3.7. *"The current state of the rock armour suggests that erosion and coastal processes have exposed the rock and the profile of the coastline has changed. This means some of the works may lie below MHWS."*
- 3.8. This was further confirmed in a document prepared by Davis Langdon, on behalf of The Ampersand Group Ltd, relating to the Public Inquiry into the revised sea wall. The Document was entitled 'Response to the Formal Objection by CarlyonBayWatch Limited to Planning Application 05/00028' dated February 2005. At 3.2.7: *'The beach is presently responding to the highly reflective temporary sheet pile structure. As this is placed along the line of the proposed sea wall, but without the beach recharge in place it is not surprising that there are changes to the beach.'*
- 3.9. The developer's advisers pointed out that the steel shuttering has had a negative effect on the beach.

- 3.10. To put it bluntly the beach is already being lost. Moving the sea wall backwards may not be in response to better protection but in response to the loss of beach in front of it and in anticipation of further losses over the lifetime of the project.

Predicting the Future.

- 4.1. The Flood Risk Assessment (FRA) contains details of extensive testing both in computer models and water tanks. The conclusions by H R Wallingford are that the proposed design and placement of the sea defences will meet the requirements of their client. However, the conclusions are reliant on one very important assumption.

- 4.2. FRA Non Technical Summary, Introduction:

"There are a number of precautionary criteria embedded in the sea defences we have designed for Carlyon Bay. For example PPS25 states that this degree of protection should be afforded for 100 years having allowed for climate change which in this instance equates to a 1 metre rise in the sea level."

- 4.3. Page 33 FRA:

"It should be noted that these observations on hazard are based on conditions at the end of the design life, including water levels 1m higher than present day levels."

- 4.4. Page 61 FRA:

"The maximum predicted sea level for the 200 year return period is 4.84m ODN, which includes an allowance for sea level rise in accordance with Planning Policy Statement 25 'Development and Flood Risk', over the next 100 years with climate change."

- 4.5. The importance of the predicted position of the mean high water mark was highlighted in the Draft Shoreline Management Plan, when commenting upon the proposed development of Crinnis Beach:

'Temporary defence (steel piles and rock armour) of the development site has been constructed along some 600m of Crinnis Beach. A suitable position for any permanent defensive line (which would need to be established to protect any development) would be critical to the long term overall sustainability of the

foreshore. Ensuring that any structures are set far enough back from the predicted mean high water position in 2015 would be critical.'

- 4.6. With respect to PPS 25 to predict a MHW position for 2015 will be no mean feat.
- 4.7. I draw attention to the document 'Global sea level linked to global temperature' by Martin Vermeer and Stefan Rahmstorf, dated October 26 2009, contained in the appendix.
- This document is of a technical nature, which I confess not to be sufficiently literate to understand. However, the tenor of their argument can be summarised by the following quotes:
- In their opening paragraph:
- 'Sea-level rise is among the potentially most serious impacts of climate change. But sea-level changes cannot yet be predicted with confidence using models based on physical processes, because the dynamics of ice sheets and glaciers and to a lesser extent that of oceanic heat uptake is not sufficiently understood.'*
- 4.8. They continue in that paragraph:
- 'The last Intergovernmental Panel on Climate Change (IPCC) assessment report did not include rapid ice flow changes in its projected sea-level ranges, arguing that they could not yet be modelled, and consequently did not present an upper limit of the expected rise.'*
- 4.9. Following the author's numerical modelling, their final paragraph 'Discussion: Implications for the Future' is best read in its entirety but I quote:
- 'If our method presents a reasonable approximation.....sea level will rise approximately three times as much by 2100 as the projections (excluding rapid ice flow dynamics) of the IPCC AR4 have suggested.'*
- 4.10. However, they also acknowledge: *'Uncertainties remain...'*
- 4.11. The only certainty amongst the International community is that sea levels will rise and as such will have an impact on coastal regions. To predict the degree of sea level rise over the next 100 years does not appear to be any kind of exact science.

- 4.12. Stephen Rahmstorf published an updated document on-line on 6 April 2010 entitled "A New View on Sea Level Rise." Subtitled "Has the IPCC underestimated the risk of sea level rise?" The last paragraph makes for uneasy reading:

"At the end of the last ice age, the Earth warmed by 4-7 °C globally and lost almost two thirds of its land ice in the process. That raised sea level by 120 metres, at rates often exceeding a metre per century. It seems that nothing in the present ice-sheet configuration would rule out similar rates in future. How much of the remaining 65 metres worth of land ice will humans melt if we warm the planet by a further several degrees?"

- 4.13. Most recently, The Joseph Rowntree Foundation produced a report, dated March 2011, entitled, 'Impacts of climate change on disadvantaged UK coastal communities'. In that report it states:

"Climate change impacts on the coast

Climate change and rising sea levels are likely to have a severe impact on the UK coast by 2080. The total rise in sea levels off the UK coast may exceed one metre and could potentially reach two metres. The frequency of intense storm events is expected to increase and, along with the rise in sea level, to lead to more coastal flooding."

- 4.14. Every considered aspect of this development site which follows through from its initial idea in 1989 to date has been continuously scaled upwards in its predictions for protection. Attempting to predict the future, when its determination hinges on approval for the proposed development, is in my submission, simply playing with dice.

- 4.15. A demonstration of our inability to predict future climatic events occurred much closer to home.

- 4.16. On the 17th November 2010 heavy rain caused widespread flooding to parts of St Austell, Lostwithiel and St Blazey.

- 4.17. The Environment Secretary, Ms Spelman, commenting on the flooding said:
"In the afternoon of that event, there was only a 20% risk of severe flooding. By 2230 it had increased to an 80% risk – when most people were in bed asleep."

- 4.18. This statement by Ms Spelman confirms that we cannot safely predict the weather and its extremes over a timescale of just a few hours, never mind 100 years.
- 4.19. To re-iterate, H R Wallingfords FRA uses as its baseline, a predicted 1 Metre sea level rise over the next 100 years. It is upon this assumption that the safety of the whole of the residential development rests.

The Governments View.

- 5.1. I refer to the document entitled: Flood and Coastal Defence Appraisal Guidance FCDPAG3 Economic Appraisal, Supplementary Note to Operating Authorities – Climate Change Impacts, October 2006.
- 5.2. This supplementary note comments upon the impacts of flooding and coastal erosion and the challenges and risks these impacts have for Defra and operating authorities (i.e. Environment Agency, Local Authorities and Internal Drainage Boards).
- 5.3. The note provided interim policy guidance prior to the wider ranging review in MSfW and supported the publication of Planning Policy Statement 25 (PPS25) 'Development and Flood Risk'.
- 5.4. Accepting that policies have since been updated the document is still worthy of note in many of its observations.
- 5.5. The document recognised that there was *'a need to consider longer term timescales, together with the inevitable longer term effects of climate change.'* (2.1)
- 5.6. If one looks at table 1: 'Regional net sea level rise allowances' and table 2: 'Indicative Sensitivity Ranges' it is worthy of note that all the figures shown are positive, i.e. they all show an increasing risk over time. However, the veracity of those figures is qualified in Annex A of that document.
- 5.7. At (ii) *'Net sea level rise allowances are sensitive to assumptions about thermal expansion of the oceans, melt from land glaciers and ice caps, melt from*

Antarctica and Greenland, climate model sensitivity, greenhouse gas emissions, and vertical adjustments of the land.'

5.8. And at (v) *'Recent model evidence suggests estimated contributions from Antarctica and Greenland ice melt to sea level rise will need to be revised upwards by as much as 5mm/yr.'*

5.9. I would also draw attention to the list of examples on page 6 of the document, particularly at 5: 'Coastal- Hard Choices Approach; Application of Sea Level Rise Allowances':

"When sea level rise allowances were applied to the coastal defence improvement proposals at town B, the scheme was found to be not viable despite large numbers of property being at risk. The future damages avoided by the proposals were outweighed by the improvement costs, even with the sea level rise factored in. Over the long term, upgrading the frontage would not be sustainable. Therefore the decision was taken to: 1) bear the increasing risk and accept the lower standard of protection afforded by the existing defence; 2) progress with modest and justifiable short term investment to sustain the existing defence over the remaining 40 year residual life; 3) focus efforts to realise more sustainable frontage management through land use change and eventual retreat beyond year 40"

5.10. This example deals with the ongoing defences of an existing development. It highlights the hard choices having to be made and draws the conclusion that continued protection is not sustainable.

5.11. This is nothing new. The problems with sea walls were documented in a book: *Beaches and Coasts*, Cuchlaine A. M. King. M.A., PhD. Pub 1959 reprinted 1966 – Edward Arnold (Publishers) Ltd.

"A concrete wall is a very inflexible structure which will return all the water thrown on it by the swash, the backwash will be powerful because none can be lost by percolation. This seaward movement which will be strengthened during periods of strong onshore winds, will help to remove the beach immediately in front of the wall. No reserves of sand are available to help cushion and stabilize the upper beach. The reduction in height of the beach in front of the wall, will allow deeper water to penetrate closer inshore, and in this way, the energy of the

waves becomes concentrated over a shorter distance, and their destructive effect is intensified."

Sustainability of the Beach Profile.

- 5.1. The importance of a sustained beach width in front of the sea wall has been highlighted. A wide beach performs a dissipative role in reducing wave energy before any contact is made with an inflexible structure. The previously rejected revised sea wall had as part of its defence a beach charge and nourishment programme. The proposed sea wall, avoiding the necessity of a beach charge, has retreated some 27m from the line of that revised sea wall. This, we are advised, will provide the necessary beach width.
- 5.2. H R Wallingford is so confident in their predictions they state:

"4.8 Residual risks

4.8.1 Beach and defence monitoring

4.8.2 Monitoring and maintenance of the beach is not required to achieve the required standard of flood protection at the site as the defences have been designed to accommodate the range of expected beach variations, including the effects of climate change."

Although they immediately follow this with:

"Though not required to maintain the standard of flood defence, given the value of the beach and defences to the development, regular monitoring of the beach and condition inspection of the defences is recommended."

- 5.3. However, the long term approach to the whole site over its lifetime is that of a 'precautionary approach'.

- 5.4. Confirmed in answer to CarlyonBayWatch question in response to the EIA Scoping Opinion:

"The Developer should consider and put forward the different effects of treating the site by way of a 'Managed Adaptive' approach and by way of a 'Precautionary' approach (as indicated in 'Flood and Coastal Defence Appraisal Guidance, PCDPAG3 Economic Appraisal, Supplementary Note to Operating Authorities – Climate Change Impacts October 2006, issued by DEFRA)"

- 5.5. The response given in Chapter B 'Scope and Methodology':

"See Chapter D – A precautionary approach has been adopted – the design has developed including full allowance for climate change over the design life."

- 5.6. A 'precautionary approach' is given as:

"For some circumstances, future adaptation may be technically infeasible or too complex to administer over the long term of up to 100 years. These circumstances may occur where multiple interventions are not possible to manage the changes in risk. Therefore, a precautionary approach, perhaps with one-off intervention, may be the only feasible option, such as in the design capacity of a major culvert or in the span of a road bridge across a flood plain."

- 5.7. Thus, the sea wall and defences will be built on the premise that predictions of sea level rise, coastal erosion, climate change and construction methodology will meet the requirements of the next 100 years.

- 5.8. One might simply put it: 'In God's hands we place our trust'.

- 5.9. The overriding point with regard to the proposed beach development at Carlyon Bay is that at present there is nothing to protect. The proposal is to create a problem, with built in 'hard choices' for the future where one does not exist. With all of the current knowledge available to us with regard to coastal defences and

the evidence available with regard to the lack of sustainability for those defences it seems to be a folly to approve a large residential development on the sea shore at sea level, backed by a sheer cliff. The only argument in support of this being that it can simply be protected by a sea wall and sand dune without further intervention for the next 100 years.

Conclusions.

- 8.1. A sea wall is by name and definition a structure which will be in contact with the sea. Its placement and its contact with the sea are not seen as a peripheral issue but as a major component part of its purpose and design.
- 8.2. Historically sea walls require ongoing maintenance to continue to provide levels of protection for the structures placed behind them.
- 8.3. Climate change is internationally recognised and its impact on rising sea levels is also agreed.
- 8.4. There is a wide difference of opinion as to how data is being gathered/analysed in order to safely predict how much sea levels will rise over the next 100 years.
- 8.5. The problems of placing of hard engineering to protect against sea level rise and storm conditions are well documented. The principle disadvantage is the scouring effect of wave energy and subsequent risk to structures.
- 8.6. Maintaining sea defences is costly and no longer considered necessarily to be a sustainable option.
- 8.7. The revised sea wall previously submitted by the developer relied upon an initial beach charge of 184,000 cubic metres of waste material to build up a beach profile to defend the structures behind it. This proposal required ongoing re-nourishment of approximately 17,000 cubic metres annually.
- 8.8. It was a fundamental requirement of protecting the proposed development that beach material would have to be continuously present in front of the concrete sea wall.
- 8.9. The sea wall now being proposed in 2011, simply avoids the initial sand charge.
- 8.10. There is no provision for maintaining the sand loss which will take place.

- 8.11. The unauthorised sea wall, placed by the developer has altered the profile of the beach to such an extent that the steel shuttering and rock armour is now within mean high water springs.
- 8.12. There are no guarantees that simply moving the sea wall further back will not simply accelerate the decline of the beach.
- 8.13. The Environment Agency did not support the proposition of any development on Shorthorn Beach.
- 8.14. The Environment Agency also observed that their alternative proposals would conflict with current planning policies.
- 8.15. National Policy on Coastal Development is well documented.
- 8.16. Following a lengthy Public Inquiry the application for the revised sea wall (as above) was rejected by the Secretary of State, on the basis that "*the proposal conflicts with the relevant development plan policies.*"
- 8.17. The Secretary of State also concluded that the application proposals are "*generally unsustainable and conflict with the principles of PPS1*".
- 8.18. It is simply not sensible to argue that solely on the basis of computer modelling, 3d physical models and a reliance on a fixed measurement of sea level rise that the new proposal will be any more sustainable than the last.
- 8.19. This site is simply not suitable for the scale of development that was approved in 1990.