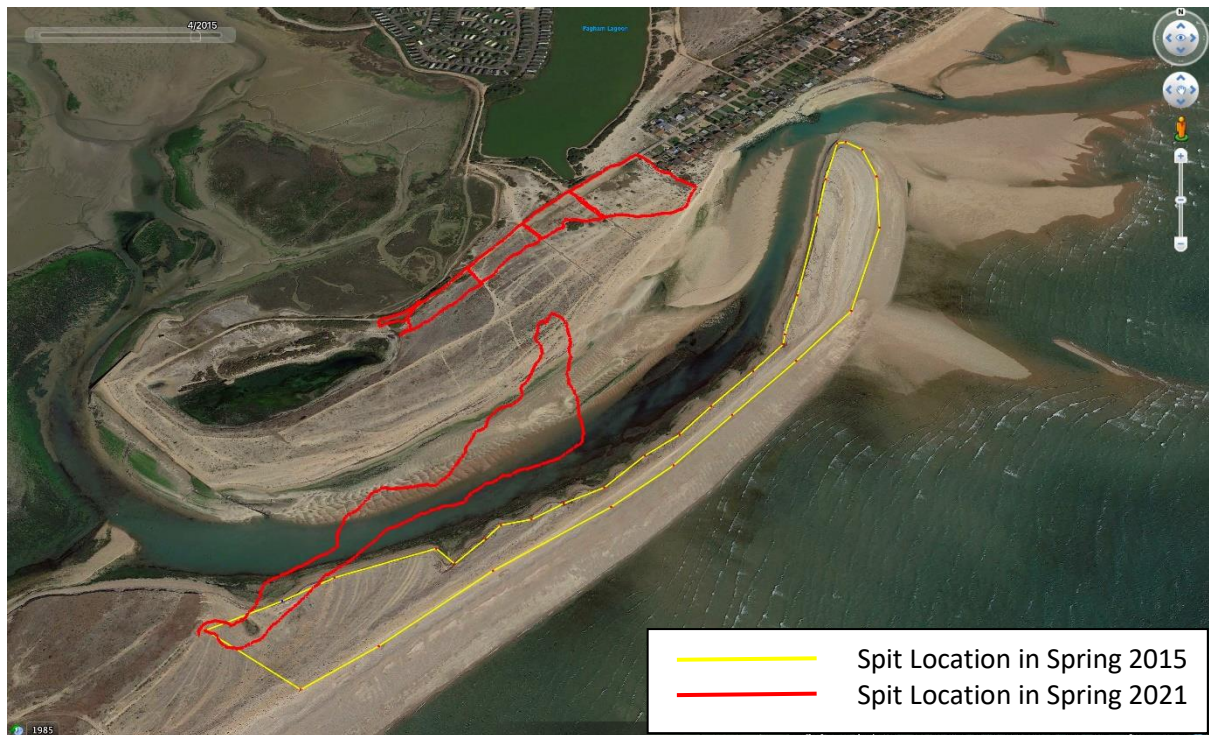


Pagham Adaptive Management Report No 1. – MAY 2021.



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Pagham Harbour and Church Norton Spit Adaptive Management Report No.1

1.0 Introduction -

This report is prepared to support the planning application to obtain consent to cut Church Norton (CN) Spit in Autumn 2021 to create a temporary alternative channel to reduce/avoid flood and erosion risk to properties and businesses at Pagham Beach and Haven Church Farm over the winter 2021/22. The report reviews the extensive submissions made for a previous consented application in 2015 and how these submissions remain relevant to the pending application in spring 2021.

2.0 Revised Goals -

- The original goals of the 2015 application to:
 - *Alleviate the pressure exerted by the harbour outlet channel along the shoreline*
 - *Allow a flux of shingle into Pagham beach shoreline to reverse beach erosion trends*

Have been refocussed to:

- Avoid/reduce the risk of a tidal breach into Pagham Lagoon with associated flood risk to properties on Pagham Beach and large parts of Haven Church Farm holiday park
- Avoid/reduce the risk of coastal erosion leading to property loss at the southern end of Pagham Beach

3.0 System Approach –

The area of interest to this planning application is notable for its coverage in whole or part by various boundaries – administrative in respect of Government and regulatory in respect of environmental designations. A useful familiarisation of the area is provided from the following link –

<https://abpmer.maps.arcgis.com/apps/Cascade/index.html?appid=09eeec4720514a249e503bf570059068>.

3.1 The system is not natural in its present day operation. It is a forced system as a consequence of human interventions (summarised on Table 'A') in the form of-

- Inside the harbour:
 - 3.1..1 Land reclamations inside and outside the harbour
 - 3.1..2 Building of embankments around the harbour
 - 3.1..3 Closing of Pagham Lagoon (9.0 ha) in the late 19th century
 - 3.1..4 Re-enforcing of the Pagham Lagoon bund
- On the open coast:
 - 3.1..1 Various steel sheet pile structures within and to landwards of the beach

- 3.1..2 Various timber groyne and seawall structures along the east side of Selsey Peninsula since at least the 1950s
- 3.1..3 Various timber groyne systems along Church Norton Spit build in the 1960 (presently largely buried)
- 3.1..4 The artificial shape and elevation of Church Norton Spit
- 3.1..5 Various timber groynes and concrete structures on Pagham Spit uncovered over the last year including the seaward end of the outfall from Pagham Lagoon
- 3.1..6 Groyne systems along Pagham Beach
- 3.1..7 WWII anti-invasion scaffolding fence on Pagham Spit
- 3.1..8 Beach management on Church Norton Spit from until 2004
- 3.1..9 Beach management on Pagham Beach
- 3.1..10 Emergency rock structures build in 2013-2015 at the southern end of Pagham Beach

The development of properties on Pagham Beach and the development of the holiday park. All these have and continue to impact the natural functioning of

the beach and harbour system preventing it from reaching its full natural potential. The present application recognises this situation and proposes an intervention that does not include any new structures but instead uses a beach management intervention that kick-starts the natural processes of channel switching that was seen to happen completely naturally in 2015/16.

4.0 Coastal Process Rationale-

This was set down in the ES and other reports submitted with the previous application in 2015 (see 5.3 below). Since 2015 there has been a breach of Church Norton Spit caused by natural processes. This succession of events confirms that natural processes of wave and tide action have the capability to establish a full breach of the spit at its naturally most vulnerable location. However, a natural breach relies on a sequence of events to progress from overwashing to tidal breach to channel switching as demonstrated overwashing events between 2011 and 2015 not progressing and instead sealing/healing through sediment accumulation inside the gap.

4.1 The principle features of the system are:

- The topographic features of:
 - the harbour
 - The outlet channel connecting the harbour and the sea
 - Church Norton Spit
 - Pagham Spit and Beach
- The coastal processes of:
 - The tidal prism pushing (2.8 million m³/ MHWST: 0.6 million m³/MHWNT of water into and out of the harbour at every tide
 - Longshore transport moving beach sediment from SW towards the NE

- Onshore transport of beach material at the Inner Owers and possibly near the mouth
- Onshore transport of sediment deposited in the nearshore by the outflow from the harbour

At the harbour mouth longshore transport of shingle and tidal water flow compete with longshore transport pushing the tidal flow eastwards while the tidal flow attempts to re-establish itself along the channel axis defined by the training arm. In the absence of the training arm the mouth may move northeastwards at the same speed as the spit (assumed to happen under a slow rate of spit growth) or the mouth may stay in position with the spit extending in front of Pagham Spit and beach ¹

4.2 The inflow and outflow of the tide to and from the harbour interacts with alongshore sediment movements to create a delta area of raised sea bed extending offshore of the beach. This raised delta area provides a platform on which the spit can develop in a north-easterly direction. Since the 2015 planning application, from the initial overwash in January 2016 it took natural processes more than 3 months to establish a full tidal connection between the sea and the harbour along this route. Reference to the photographs in the Appendix shows that-

- the breach formed at the weakest location within the length of the spit to the north-east of the harbour entrance. This location was where the internal face of the spit had been steepened, by the re-shaping referred to above and shown on figure 2. It was also where the old mature delta from the restricted channel movement between 1990 and 2004 had eroded. This movement left a lower sea bed with consequential increased water depths allowing larger waves to reach the spit during storms. This higher wave energy had also contributed to a narrowing of the spit from the seaward side at this location. However, the process of breach formation moved the spit shingle into the outlet channel, eventually providing a partial blockage of that channel. The channel geometry resulted in reductions to tidal exchanges with the harbour and, in response, the new channel broadened in a south-westerly direction and by February 2017 established a second channel at the approximate location of the proposed breach. A time series of satellite images with channel centrelines is provided as a layered digital file at the back of this report covering the period between 2015 and 2021 to show these changes. The shortest

¹ Orford, J.D., 2018. Natural England's advice request on behalf of Pagham Coastal Issues Advisory Group (PCIAG): Geomorphological advice in respect of Church Norton spit and Pagham beach changes, West Sussex. Natural England.

extent of Church Norton spit was in the summer of 2018 when it was also much narrower and about 75 m more landwards than the in the previous full extent.

- the shingle removed to form the breach was dispersed into the old channel and into banks within the new twin-channel formation within the spit. Some shingle was deposited in a new delta platform, but this platform was much smaller in extent and lower in elevation than the situation that existed in 2004.
- the growth since summer 2018 was closer to Pagham Spit forcing the outflow channel into a tighter bend pushed the channel towards Pagham Spit resulting in significant erosion of the shoreline (Pagham Spit) that led to the breach into the Little Lagoon in summer 2020 and the widespread exposure of the WWII anti-invasion scaffold structure that has recently become exposed along other frontages along the English south coast, though rarely in this still assembled state. With rates of erosion and channel migration towards the harbour, Lagoon and properties observed since 2020 it is very likely that properties will be at risk from flooding and/or erosion during next winter. This leaves Autumn 2021 as the only available window to carry out the planned intervention without impacting nesting or overwintering birds.
- The proposed cut of the spit opposite the training wall as shown on Drawing A, will have the least impact in terms of volume, is met by them lowest beach toe levels to allow for natural processes to create a deep tidal channel and allows for a straight channel that will contribute to the new channel becoming the dominant channel and thus reduce avoid further erosion into Pagham Spit with the associated flood and erosion risk to properties and businesses.

5.0 Reconciliation of Present Application with the Consent Obtained in 2016

- 5.1 The present application proposes a smaller intervention at the same general location to that proposed in the 2016 consent because the spit at this location is much narrower. This application does not include any establishment of temporary access to the spit with temporary steel sheet pile protection or the use of excavated shingle to block the existing outlet channel because there is not enough shingle to create a blockage and alternative low tide access for plant. It is expected, based on the experience in 2016, that the channel switch will happen naturally due to the more favourable conditions for a straight channel compared to the longer channel running along Pagham Spit. These exclusions from the present application mean that impacts from the proposed breach works are significantly reduced. The application does include the provision of

compensation, either in the form previously consented (with HE subsequent adjustments of no excavation of sea bed and provision of appropriate fencing in substitution) or an alternative location for the same compensation (shown on Drawing B).

- 5.2 The following reports presented with the consented application in 2016 (ref. P/97/15/PL) are re-submitted as relevant to the present application in that any changes between the two proposed breaches result in reduced effects and risks in 2021, compared to 2016. There are no new effects arising from the proposed breach in the present application. The following reports submitted as part of the previous planning application in 2015 appertain -
- 1) Environmental Statement – ABPmer report R2446, September 2015.
 - 2) Environmental Statement – Update to Appendix H – ABPmer report R2446, February 2017.
 - 3) Design Access statement and other planning documentation – ABPmer report R2529, November 2015.
 - 4) Further information for planning application and Marine Licence – ABPmer report R2614, May 2016.

The ADC validation list and Biodiversity Checklist in Appendix B of reference 3 above remain valid for this application. The other reports continue to apply in respect of their conclusions for the present proposed development, compared to the proposal presented under P/97/15/PL as a consequence of -

- The proposed breach location is in the same general location as shown on Drawing 'A' within the limits of deviation identified.
- The proposed size of breach is much reduced involving the removal of approximately 7500 cubic metres of shingle compared with 55,000 cubic metres in the previous application.
- The infill to the tidal channel of 48,000 cubic metres is omitted from this proposal.
- The more permanent causeway to be established during construction is to be omitted from this proposal along with the temporary steel sheet piling.
- The little tern island will be constructed as specified previously at either the previous location or an alternative location (area = 0.3ha) shown on Drawing 'B' – the alternative location does not require a temporary access and will utilise around 3000 cubic metres of the shingle to be excavated from the spit.
- Submitted red line area of breach surface to apply between the limits of deviation = 0.3 ha.

The previous Regulation 24 statement for P/97/15/PL applies to the present application except that in respect of regulation 24 (1) c) iii) –

- Construction phase to be 4 weeks (rather than 9 to 11 weeks).
- Impact durations to remain the same (short, medium and long-term).
- Shingle habitat impact reduced.
- Other protected habitat impacts removed.

- Birds –
- Temporary reduction in mudflat impact - removed.
- Construction programme impact – removed (provided consent forthcoming before September 2021).
- Compensation for little tern breeding impact – improved.
- Temporary saline lagoon impact – removed.
- Increased accessibility impact – removed.
- Mitigation measures – retained.
- Improved navigational access to harbour – retained.
- Risk of harbour closure – risk significantly reduced.

- Other protected species impacts – removed.
- Geomorphology impacts – retained.
- Marine recreation impacts – retained.

The summary of the regulation 24 statement continues to apply to the present proposal against the significant reduction in adverse effects of the proposed works as set out above.

- 5.4 the proposal retains the full compensation measures agreed previously. It is therefore assumed that the various stages required to allow consent to be granted can be expedited rapidly since the present proposal causes reduced environmental impact to the similar approved proposal in 2016 whilst retaining provision of the compensation measures agreed at that time.
- 5.5 Regarding the geomorphological SSSI interest the site was designated in 1986 and deemed to be in favourable condition in 2010, after the spit had started to grow again due to an increased amount of sediment arriving from updrift. The proposed cut will interrupt the natural evolution of the spit that might as well end in a natural breach in the future or the connection of the channel back into the harbour just east of the Little Lagoon. Nevertheless, given the natural development post the 2016 breach, the physical appearance and location of the cut is likely to be overprinted within a very short time.
- 5.6 It is expected that the consent conditions in 2016 will be reviewed against the information presented in this report and reduced proportionately. It is also clear that whilst the present proposal is self-standing there may be a requirement to

apply for further consents to manage the harbour outlet in the future, and in preparation for such eventualities, it is proposed to closely monitor the system behaviour before and after the breach construction as set out in Section 6 below.

6 Monitoring

Monitoring of the evolution of the site will continue through the Regional Coastal Monitoring programme, community smartphone surveys and satellite observations, and will be reviewed by the PCIAG

April 2021