

Rubicon Project Consultancy Ltd

Flood Risk Assessment

Land adjacent to Crescent Cottages
(rear of Railway Terrace)

Seascale
CA20 1QB

April 2021



Seascale development plot © Zoom Earth

Version	Prepared by	Non-Technical Review by	Date
Draft	Rachel Gerrard	J. Tunnicliffe Wilson	25 March 2021
Final	Rachel Gerrard	J. Tunnicliffe Wilson	26 March 2021
Final4	Rachel Gerrard	J. Tunnicliffe Wilson	12 April 2021

Additional versions to provide further Sequential test information.

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The contents of this FRA follows the Site Specific Flood Risk Assessment checklist as specified in the Flood Risk and Coastal change guidance at:

<https://www.gov.uk/guidance/flood-risk-and-coastal-change#contents>

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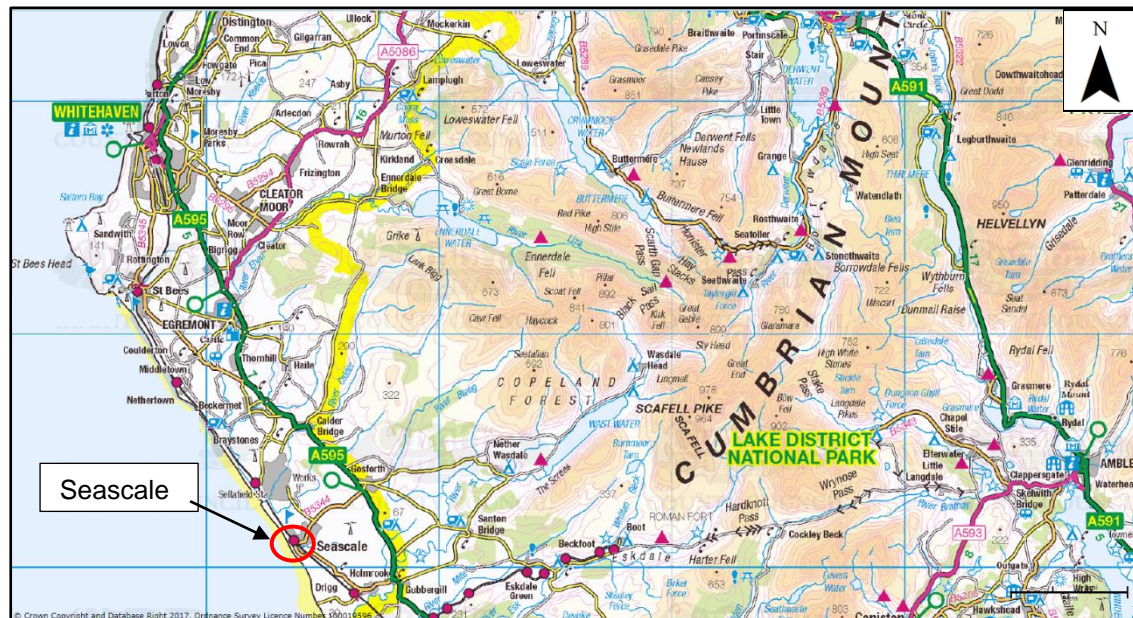
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1 - Development Site and Location

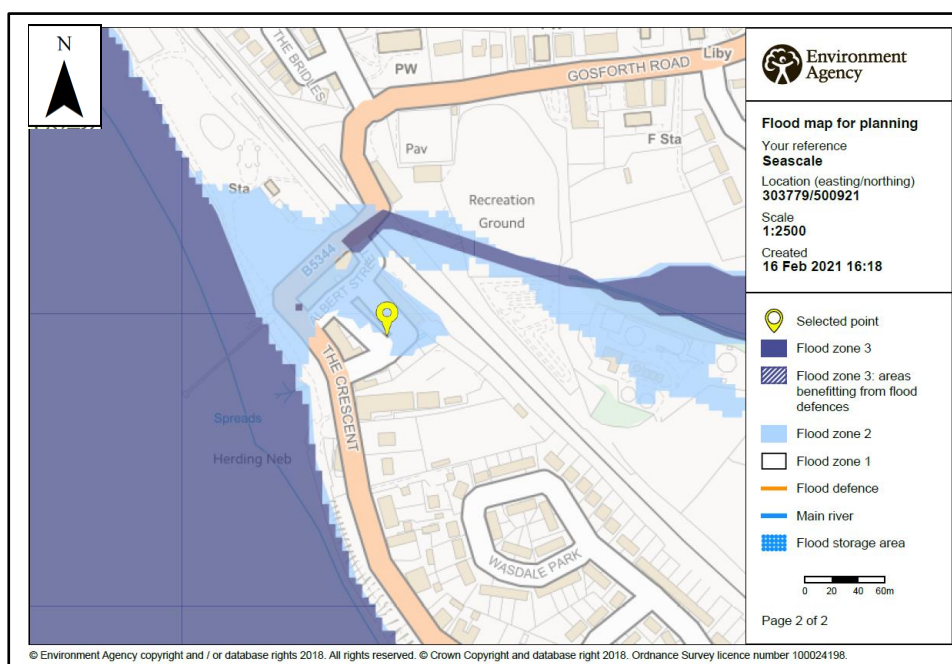
- a. The development plot next to Crescent Cottages is situated between the coast and the railway line in Seascale CA20 1QB approximately 19km to the south of Whitehaven on the West Coast of Cumbria. NGR NY03770093. See Figure 1 - Location Plan.

Figure 1 Location plan



- b. The site current land use is a storage shed.
- c. The site is shown in Flood Zone 2 on the flood risk maps. The Flood zones were taken from J-Flow data where the outline does not have the accuracy for site specific flood risk assessments so topographic survey should be used to determine an accurate level of flood risk. See Figure 2 below and Appendix C.

Figure 2 Seascale Flood Zones map



2 - Development Proposals

- a. The development proposal is to construct three terraced houses on the site. See Figure 3 below.

Figure 3 Site Plan

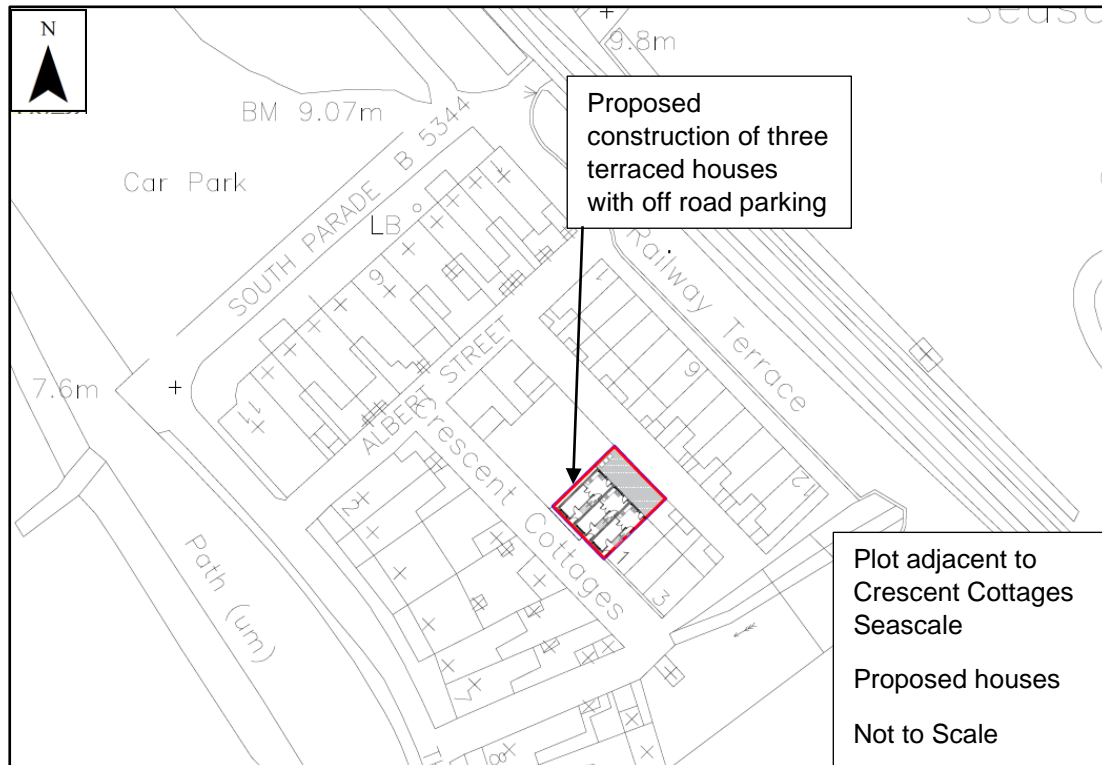
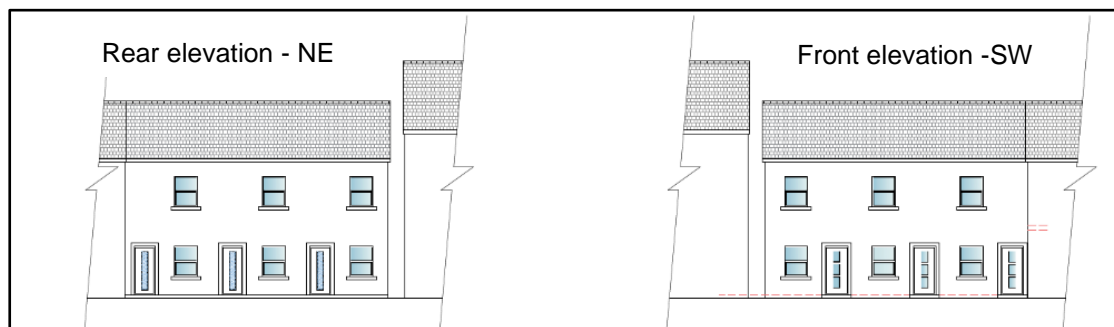


Figure 4 Elevations of proposed houses

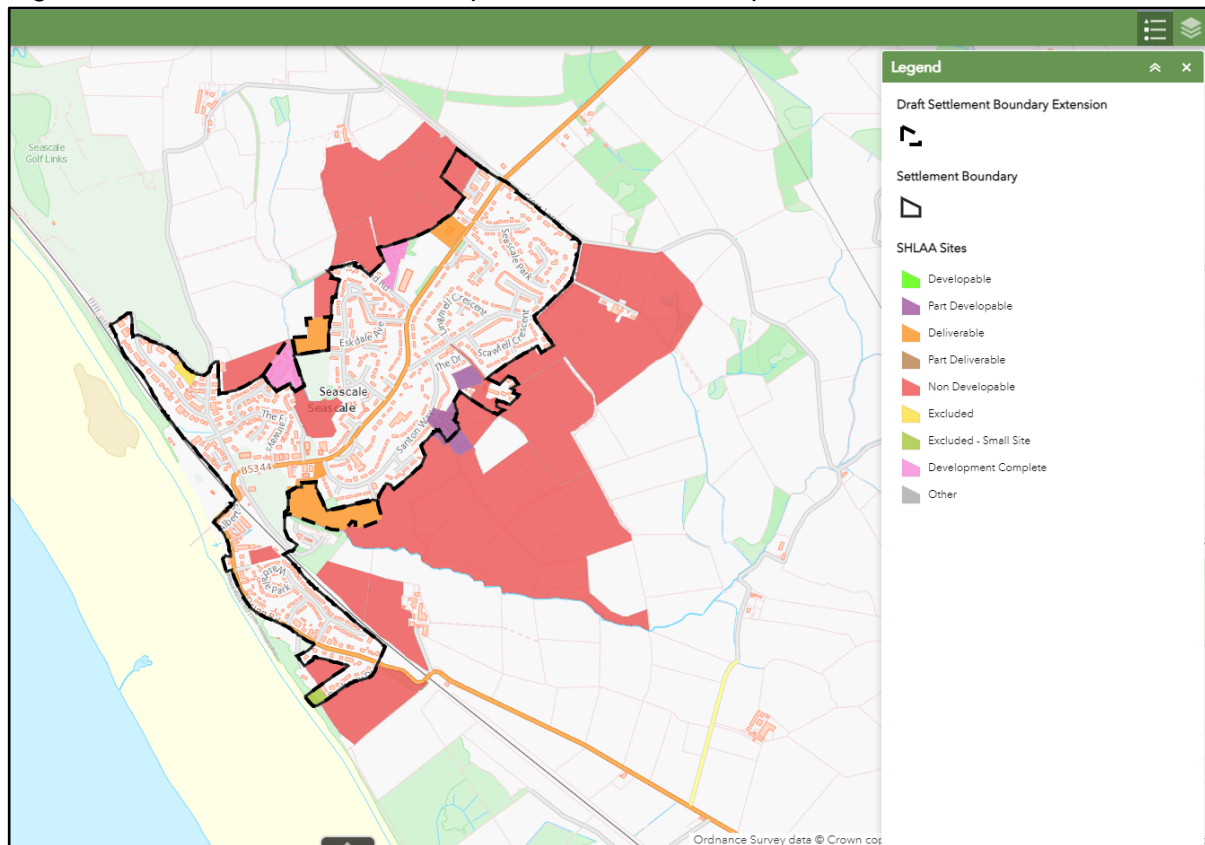


- b. The flood risk vulnerability classification of the proposed development is "More Vulnerable".
- c. For FRA purposes, the expected lifetime of the development is 100 years.

3 - Sequential Test

- a) The boundary given by Copeland Borough Council for the sequential test for this development is the settlement of Seascale which is a local service centre. See Figure 5 below. The Copeland draft local plan 2017-2035 and the Copeland BC Five Year Housing Land Supply Statement 2020/21 were both used to identify comparator sites capable of providing 3 residential affordable dwellings within Seascale.

Figure 5 Seascale - extract from Copeland BC draft local plan 2017-2035



There are 28 sites listed as submitted to be considered for development in the 2017-2035 Copeland Local Plan. Of the 28 sites 22 have been deemed non-developable, one excluded, two have development complete and three are deliverable. The three that are deliverable are: Se004 Swag Farm 0.56ha; Se024 Fairways Extension 1.85ha and Se030 Land West of Stanton Way 2.31ha. 22 houses are planned for Fairways and 45 houses planned for Land West of Stanton Way.

From the Five-Year Housing Land Supply Statement there are eleven sites identified in Seascale of which nine are currently under construction. The remaining two sites are Brookville and Silver Howe Farm each with a capacity for one property.

The development proposed is for 3 terraced two bed affordable houses on an existing brownfield site. This is a net increase of 3 residential dwellings. The plot of land is approximately 0.02 ha (170m²) and is located on the boundary of Flood Zones 2 to 1.

A suitable alternative site would need to meet the following two criteria: The site should be within the settlement of Seascale, and the site should need to have a similar size and yield.

Reviewing the sites provided in Copeland Borough Council's SHLAA document and 2017-2035 Draft local plan it was found that out of the three sites above identified as developable and deliverable Se004, Se024 and Se030, all were too large when compared with the proposed yield of 3 dwellings and therefore are not deemed suitable as an alternative site for the proposed development.

Reviewing the sites from the 5-year Housing and land supply statement two sites were identified at Brookville and Silver Howe Farm both with a capacity for a single property therefore not seemed suitable as an alternative site for the proposed development.

Overall, this assessment of the Copeland Borough Council's SHLAA and 5-Year Housing Land Supply Statement 2020/21 documents demonstrates that there are no available and suitable sites which could be used for the proposed development.

- b) Other locations with a lower risk of flooding have been considered but not found to be suitable for this development.
- c) The development is located on the boundary of flood zones 2 to 1 with new properties finished floor levels to be within flood zone 1.
- d) Other sources of flood risk have been considered for this development. There is low flood risk from surface water flooding to the road and no flood risk from reservoirs. See Appendix A.

4 - Climate change

The potential flood risk at the site will increase with climate change. For small rural catchments less than 5km² a peak rainfall intensity allowance is applied for climate change. Whitriggs Beck has a catchment of 4.6km² therefore the peak rainfall intensity allowance of 40% should be applied. The median annual maxima one day rainfall for the catchment is 36.1mm a 40% increase in this would be 50.5mm. For comparison, the flood event in August 2012 had a recorded rainfall of 37mm.

Although the site is shown not at tidal flood risk the effect of climate change on sea level rise still needs to be considered as it is a coastal site and Whitriggs Beck is in open channel at the end of the road before passing through a culvert onto the beach. The tidal 0.5% flood level is 6.06m AOD See Appendix D. In the North West River Basin District, the upper end tidal allowance for climate change is an increase of 1.41m giving a level of 7.47m AOD which is below the proposed finished floor level of 8.7m AOD.

5 - Site Specific Flood Risk

- a. The main potential source of flooding to the property is fluvial flooding from Whitriggs Beck See Figure 2 and Appendix C
- b. The probability of the site flooding from Environment Agency data is 0.1% or 1 in 1000 year with a flood level of 7.82mAOD. See Appendix C. The door threshold level of the existing property is 8.20m AOD and the proposed finished floor level is 8.70m AOD.
- c. Reservoir maps (see Appendix A) show that the area proposed for the extension site is not at risk of flooding from this source. Surface water flood maps show the access roads around the site have a low probability of flooding and depths would be below 300mm.
- d. There is no design (1%) flood flow for Whitriggs Beck but the site has been found by topographic survey to be above the 0.1% flood level of 7.82m AOD.
- e. The site is not expected to flood internally in the 1% design flood.

- f. Flows will increase with climate change, but the lie of the land seen on the topographic survey shows that although surface water flooding may collect in the area of Railway Terrace it would overflow to Albert Street and then into South Parade before reaching the proposed finished floor level of 8.7m AOD that would flood the new development internally. Checks have also been made for tidal climate change and a flood level of 7.47m AOD was calculated for the 0.5% flood.
- g. The proposed three new residential properties are replacing an existing building so there will be no additional floodwater displaced by the building.
- h. There are no opportunities offered by the development to reduce the causes of flooding but the impacts of flooding at this site will be reduced by raising the finished floor level to 8.7m AOD.

6 - Surface Water Management

- a. The existing surface water drainage system is to a surface water drain that outfalls into Whitriggs Beck.
- b. The existing rates and volumes of surface water runoff for the site are unknown.
- c. There is no plan to change the surface water disposal off site.
- d. The proposed development will not increase the impermeable area runoff from the site.
- e. The owner/occupier of the development will maintain the surface water drainage.

7 - Occupants and Users of the Development

- a. The number of users of the site will increase. Three 2 bed properties would expect an occupancy of 6 residents.
- b. The proposal will change the nature and times of use/occupation of the site as it will be occupied overnight.
- c. The flood risk to the roads around the property is low, of shallow depth. The flood risk is below the proposed finished floor level and due to the nature of the surface water flooding, flood durations will be short.

8 - Exception Test

- a. As this development is a 'more vulnerable' development in flood zone 2 an Exception test is not formally required but the development will bring wider sustainable benefits to the community by replacing a redundant brownfield workshop site within a housing area with affordable homes. Seascale is a local service centre and Copeland Borough Council's Housing Needs Study identifies that housing in the Whitehaven Rural sub-area, which contains Seascale, is the most expensive in the Borough and identifies this area as a priority for affordable housing development.
- b. The properties will remain safe over their lifetime and will not increase flood risk elsewhere.
- c. This development will not reduce flood risk overall.

9 - Residual Risk

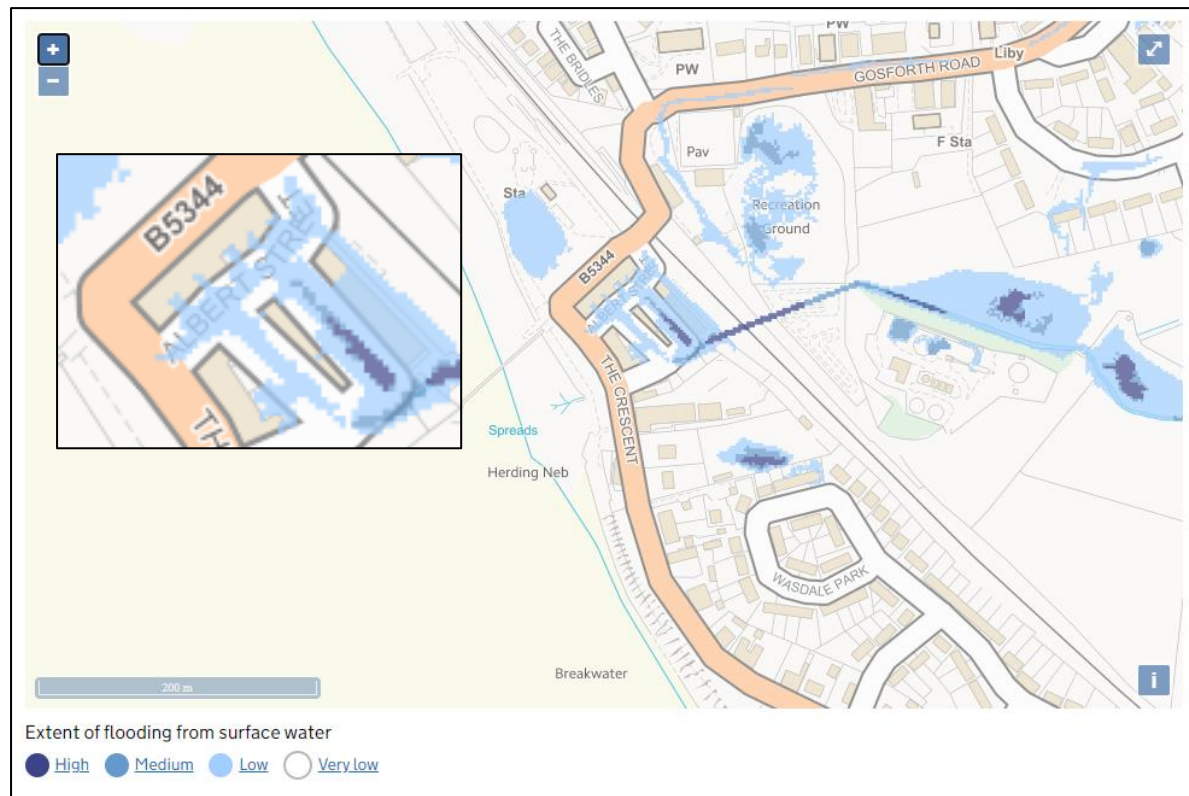
- a. Access and egress will still be subject to low flood risk to shallow depths for short durations from surface water flooding.
- b. Over the lifetime of the development any increase in flood risk will be managed by the property owners.

10 - Flood Risk Assessment credentials

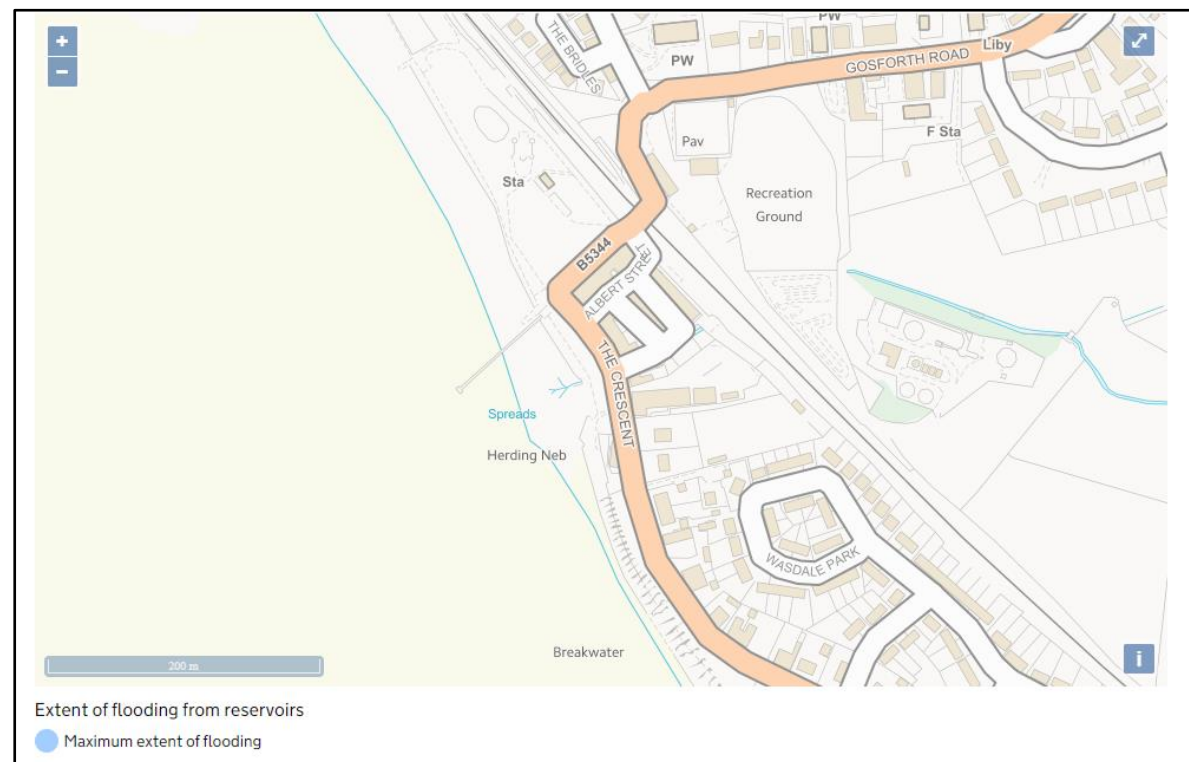
- a. This Flood Risk Assessment has been produced and written by:
Rachel Gerrard B.Eng C.Eng MICE
- b. The Flood Risk Assessment was completed April 2021.

APPENDIX A – Other sources of Flood Risk

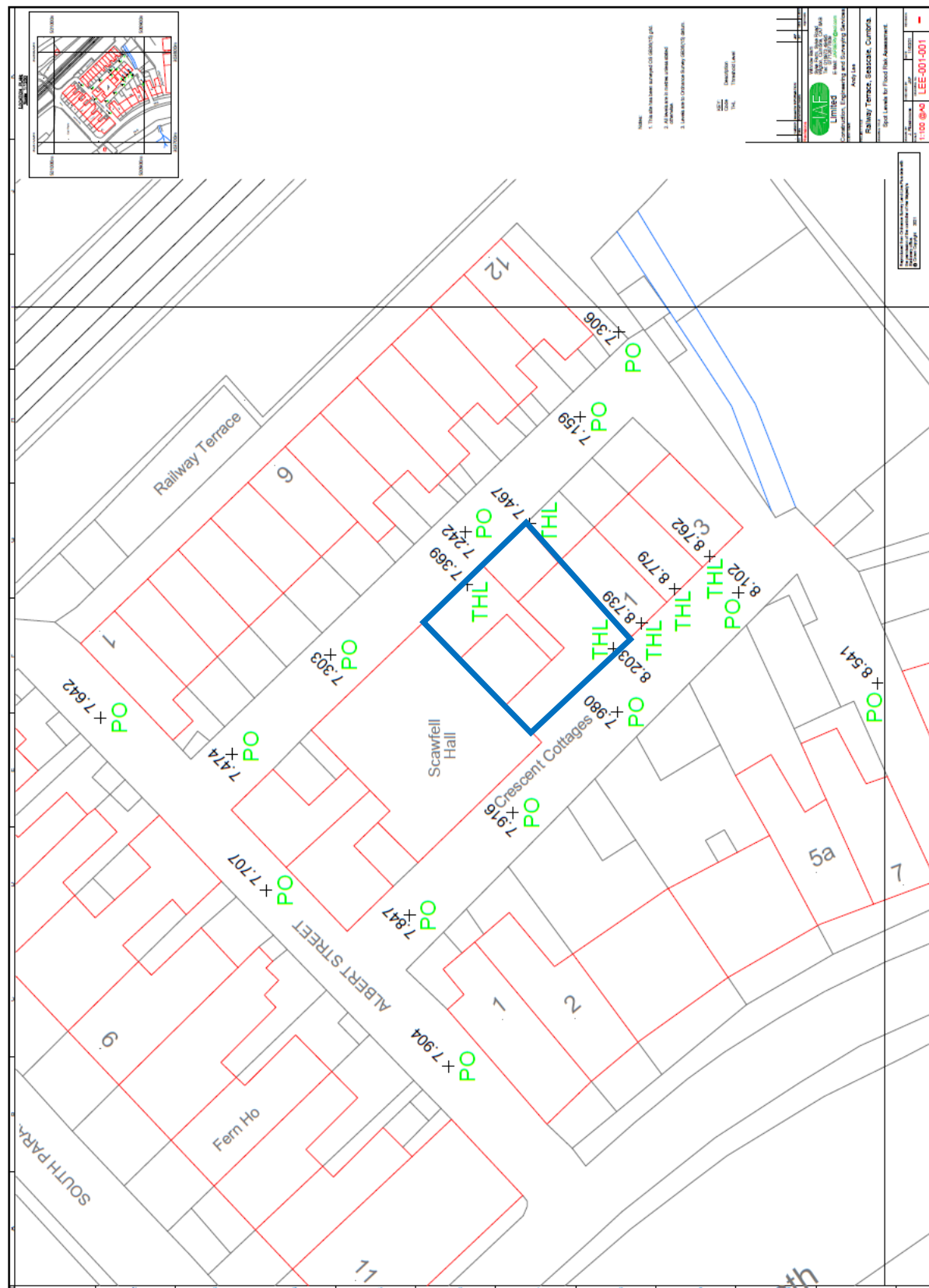
Surface Water Flood Risk



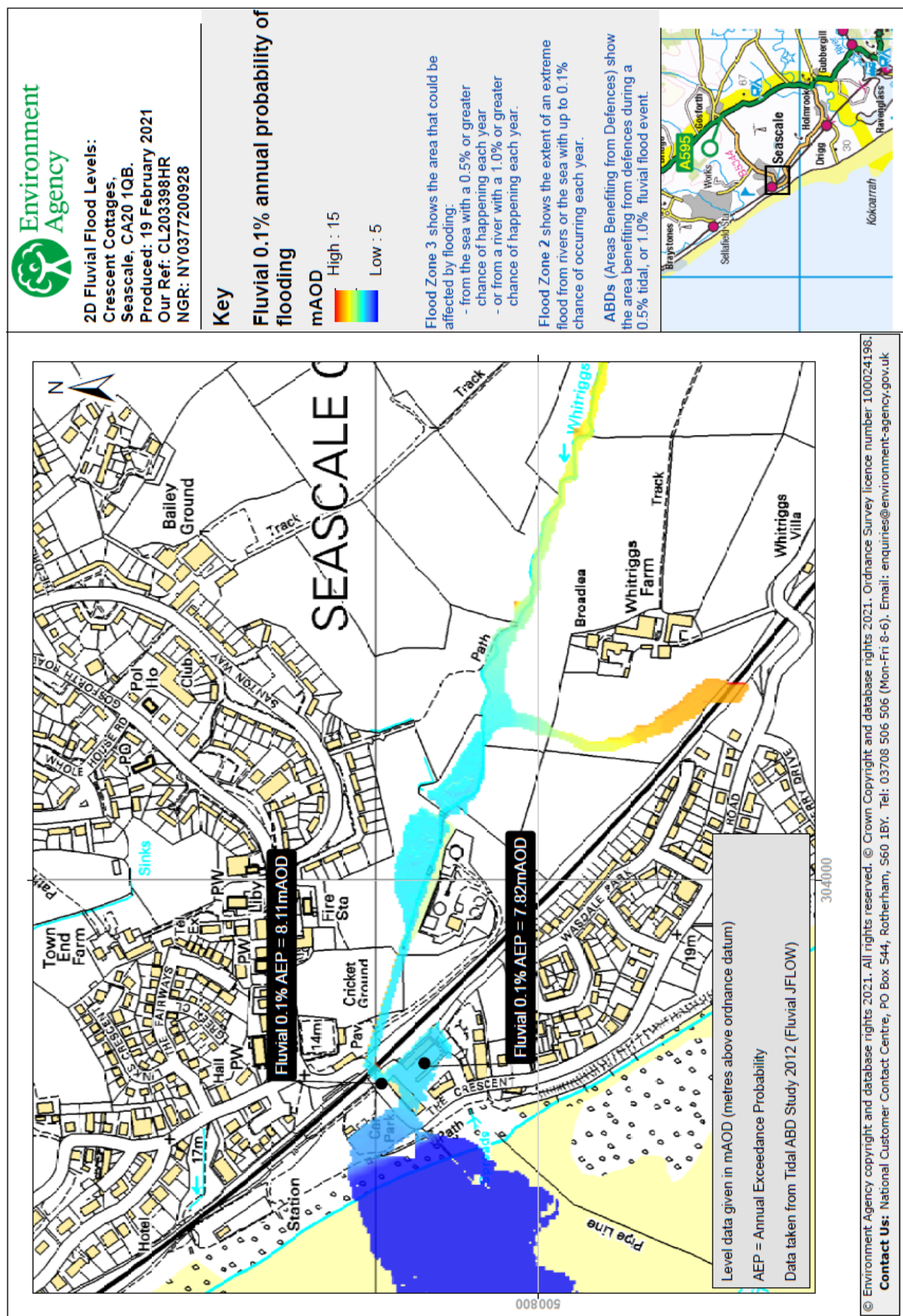
Reservoir Flood Risk



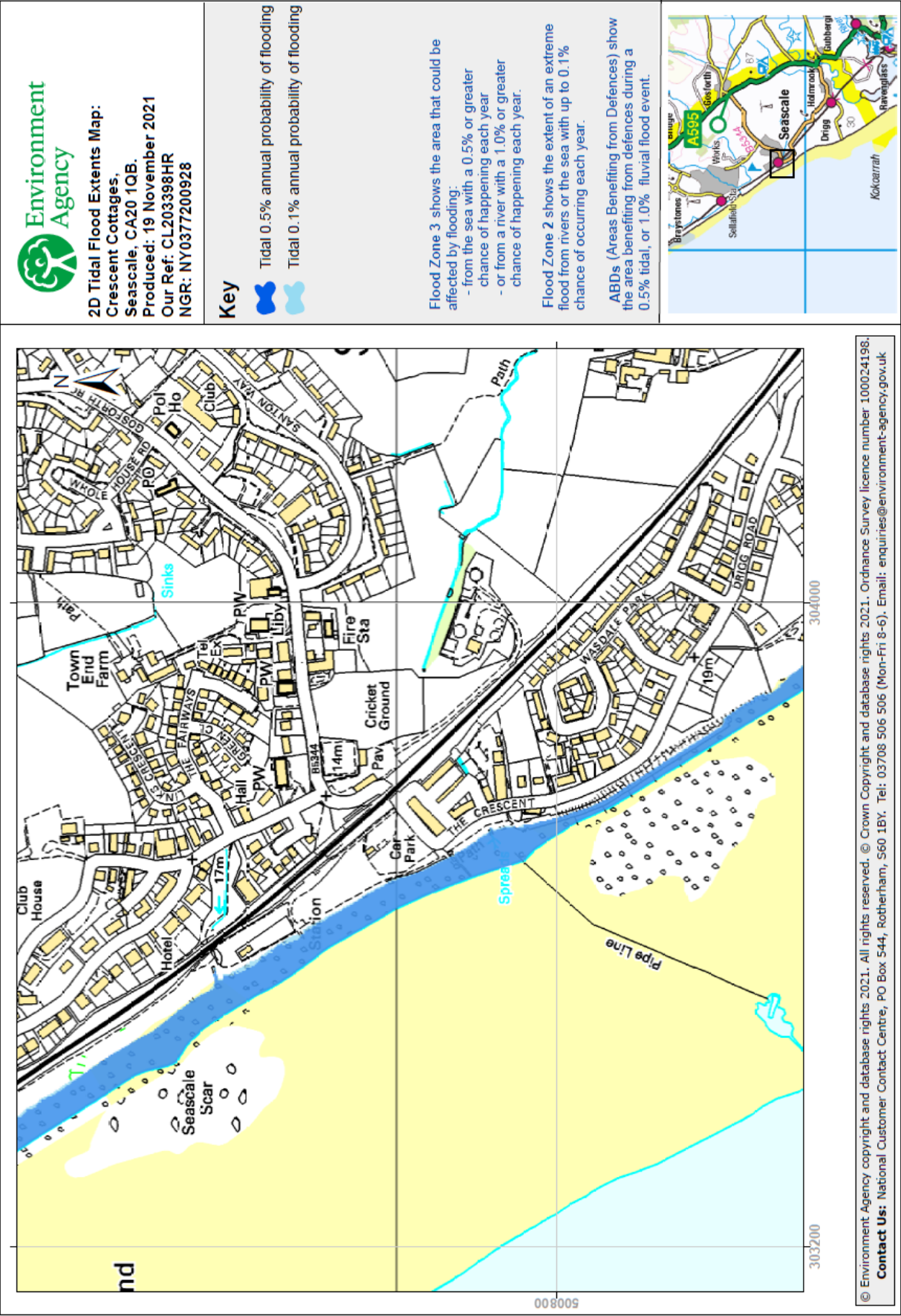
APPENDIX B – Topographic Survey



APPENDIX C –Fluvial Flood Levels from modelling data



Appendix D – Tidal flood map / Sea Levels

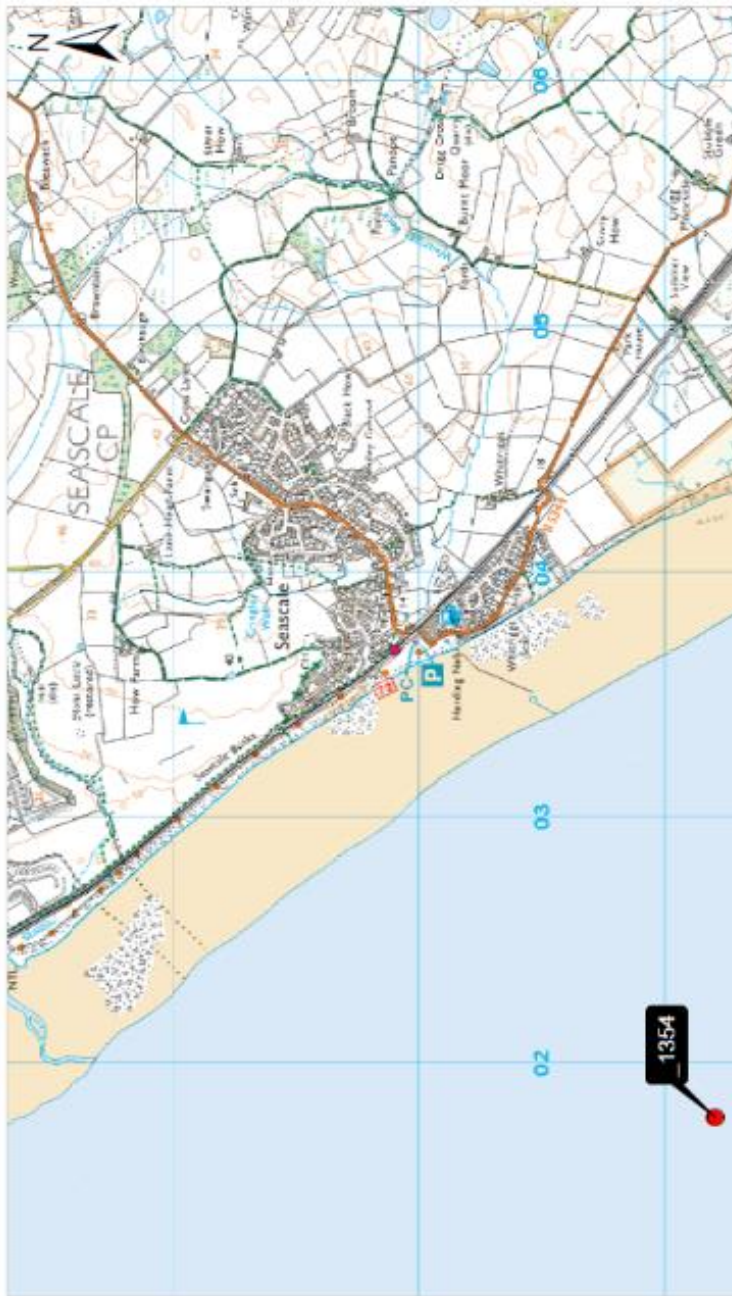
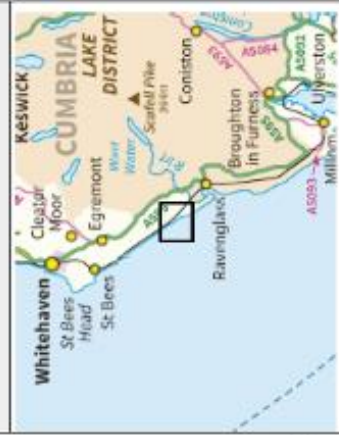




Coastal Flood Boundary Data:
Crescent Cottages,
Seascale, CA20 1QB
Produced: 18 March 2021
Our Ref: CL203398HR
NGR: NY0377200928

Key

- CFB Extreme Sea Levels



2018 Coastal Flood Boundary Data – Extreme Sea Levels

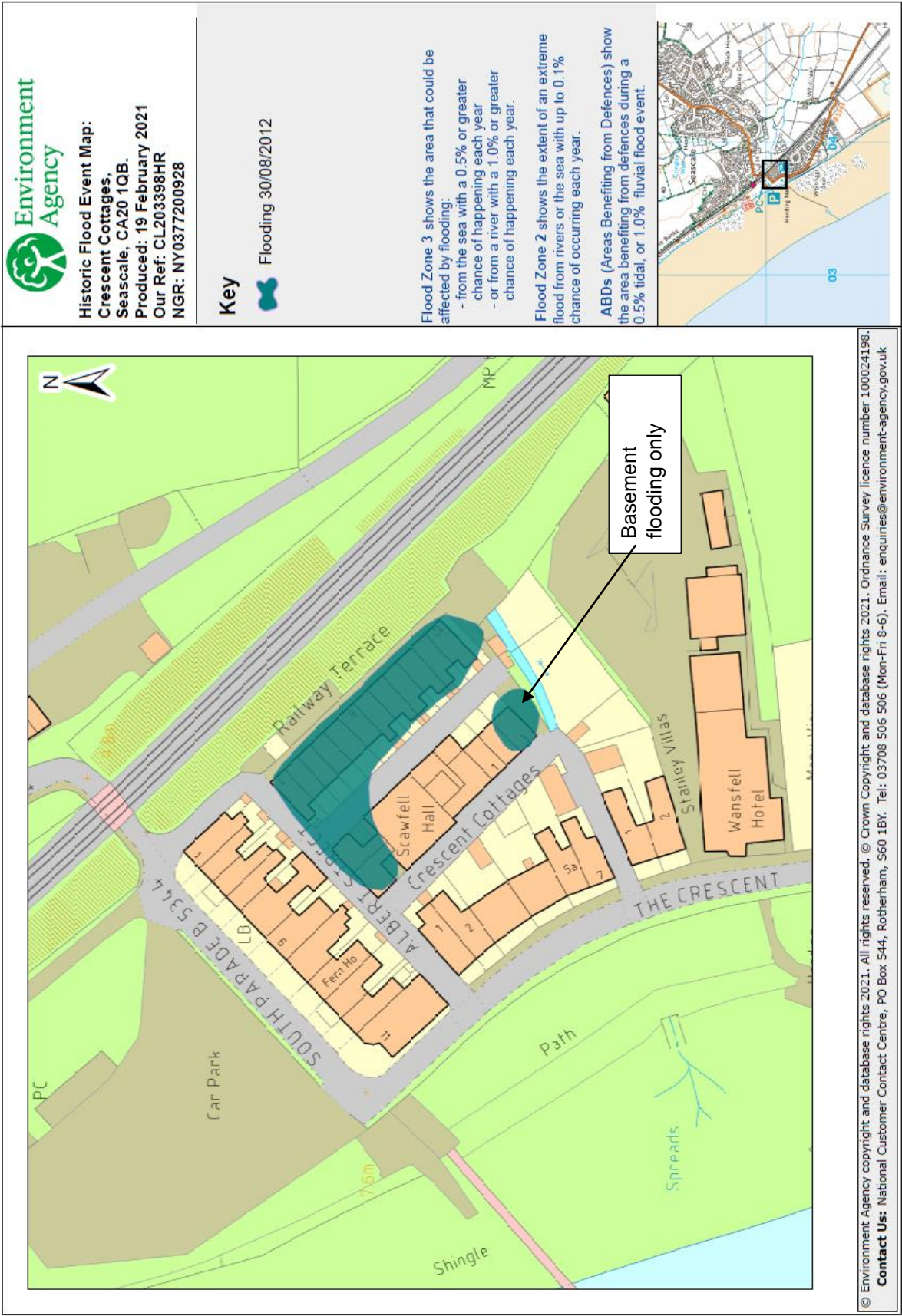
Chainage ID	Location	Easting	Northing	Base Year	Highest Astronomical Tide (mAOD)	Mean High Water Spring (mAOD)
_1354	UK MAINLAND	301780	499795	2017	4.86	3.91

Sea Level data showing still water design sea level estimates for a range of annual probability flood events around the coastline for the 2017 base year (mAOD)						
100%	50%	20%	10%	5%	2%	1%
5.18	5.30	5.45	5.57	5.68	5.83	5.94
					5.89	6.06
					6.33	

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Appendix E – Historic flood map August 2012



Appendix F – Extract from Seascale 2012 Flood Investigation

Cumbria County Council Flood Investigation Report 31 - Seascale Flood Event 30/08/2012

Cumbria County Council

Investigation

The ultimate cause of the flooding at all locations was the extreme and sustained heavy rainfall. The summer had been the wettest in England since records began and so surrounding fields were unable to absorb any new rainfall.

Rainfall Event

According to radar data taken from a weather records provider, peak rainfall was 29mm/hr and occurred at about 1:15am. The rain started at 9:00pm and finished at 3:30am with a total of 37mm in 6hrs 30mins.

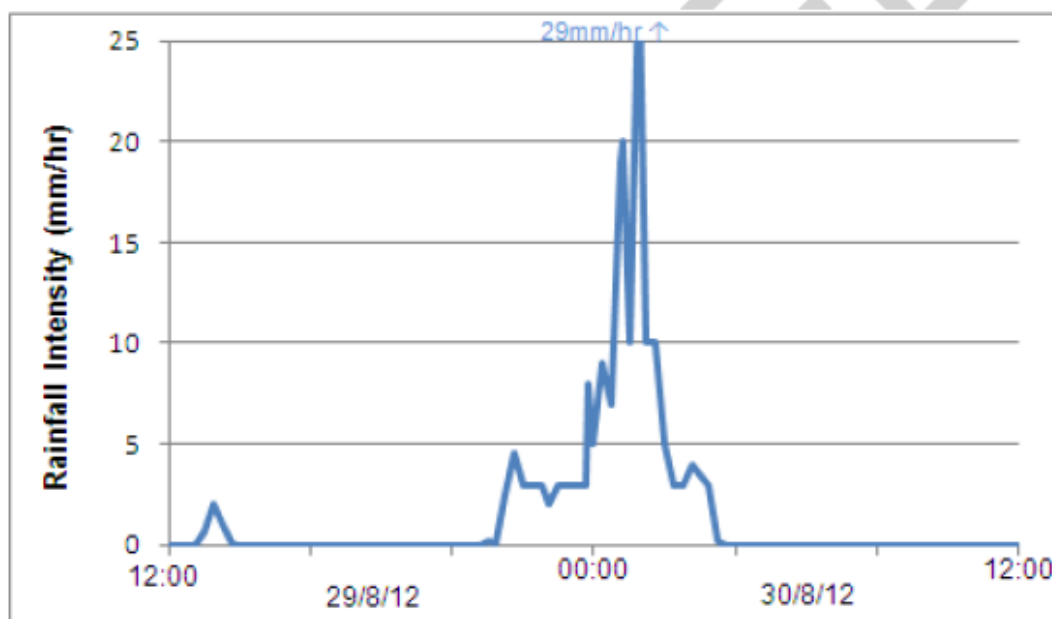


Figure 2. Radar rainfall data from 29-30 August 2012

The average total rainfall for the whole of August is 92mm (1981-2010) at St Bees Head which is the closest climate monitoring station.

Appendix G – Extract from Copeland Interim SHLAA Nov 2019

Seascale

