



Appendix A – Key Challenges

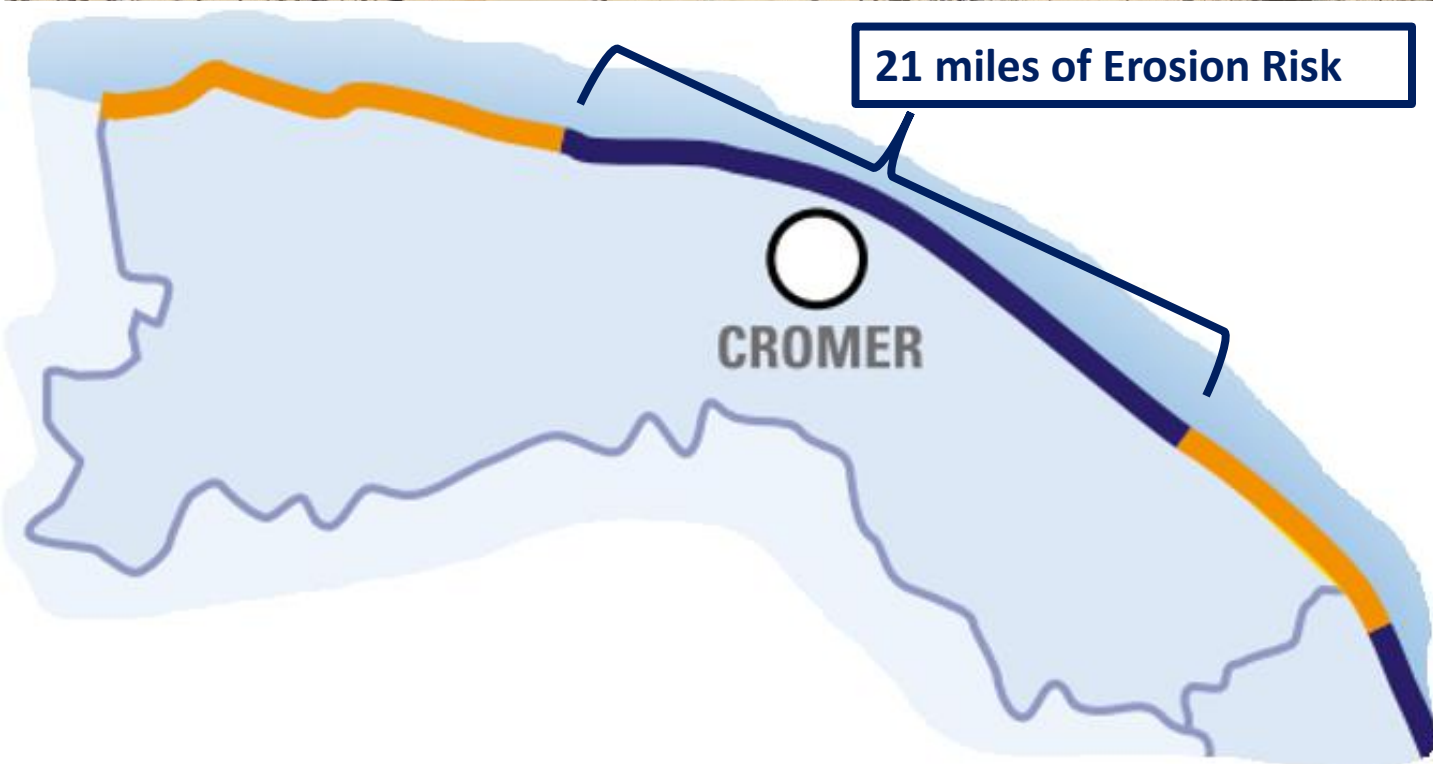
and Erosion Risk in North Norfolk



NORTH
NORFOLK
DISTRICT
COUNCIL

COASTWISE

The Challenge



The UK average temperature has
INCREASED
by **0.8 degrees**
since 1961–1990

By 2050 there could be
a **65%** chance of a summer
AS HOT
AS 2018

The UK has seen a **16 cm**
SEA LEVEL RISE since 1900

Summer temperatures
could be up to
7.4°C hotter
by 2050,
while winters could be up to
4.4°C hotter

By 2100 summer rainfall could
DECREASE
by up to **62%**

There could be up to **59% more**
PRECIPITATION
in winters by 2050

In 2020 there are **5.2 million**
homes and businesses at risk of
FLOODING

Up to 1.15m
SEA LEVEL RISE
by 2100

Climate challenges



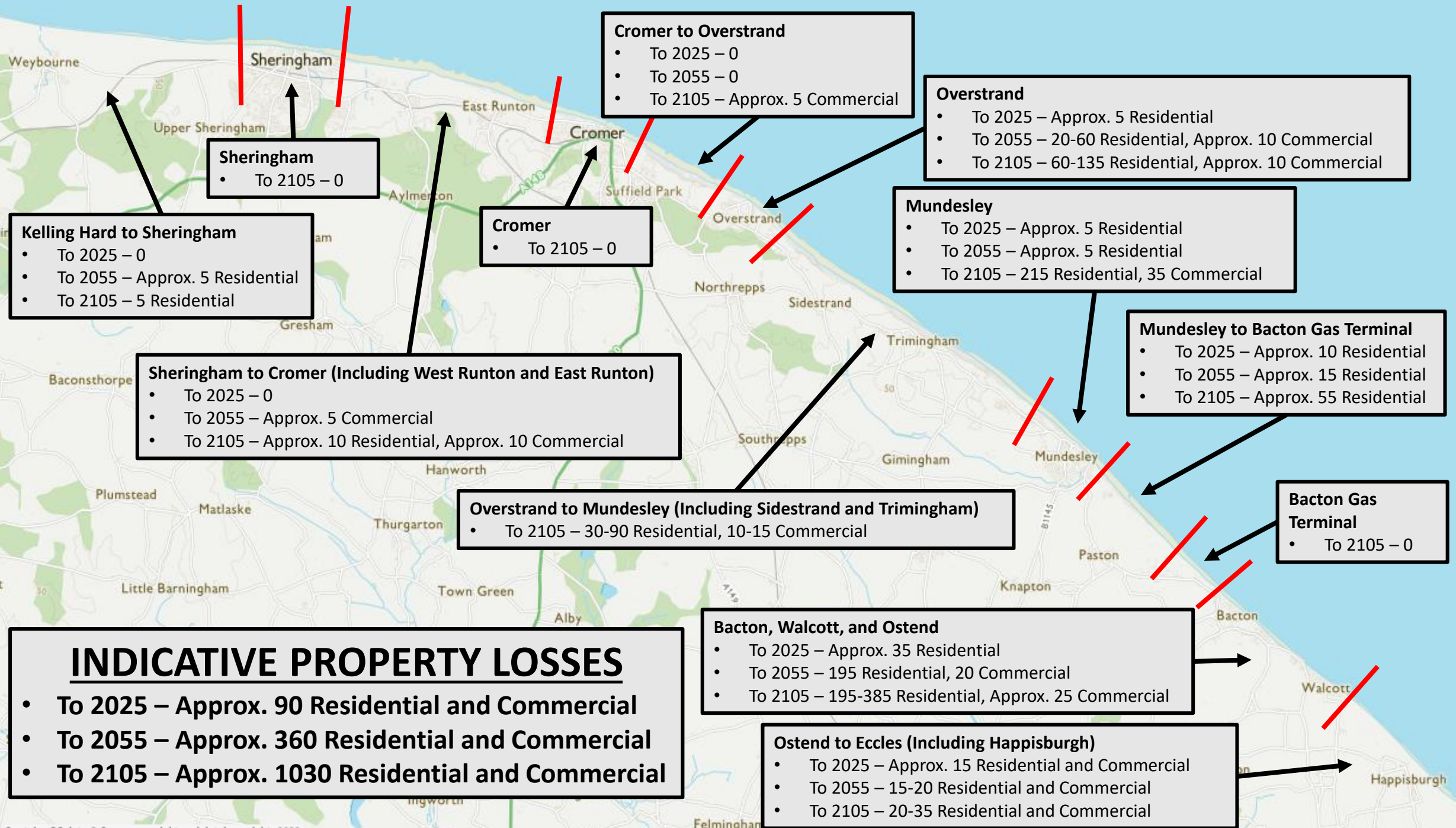
Deteriorating sea defences



Increasing coastal challenges



Reduction in beach volumes



Cromer to Overstrand

- To 2025 – 0
- To 2055 – 0
- To 2105 – Approx. 5 Commercial

Overstrand

- To 2025 – Approx. 5 Residential
- To 2055 – 20-60 Residential, Approx. 10 Commercial
- To 2105 – 60-135 Residential, Approx. 10 Commercial

Sheringham

- To 2105 – 0

Cromer

- To 2105 – 0

Mundesley

- To 2025 – Approx. 5 Residential
- To 2055 – Approx. 5 Residential
- To 2105 – 215 Residential, 35 Commercial

Kelling Hard to Sheringham

- To 2025 – 0
- To 2055 – Approx. 5 Residential
- To 2105 – 5 Residential

Mundesley to Bacton Gas Terminal

- To 2025 – Approx. 10 Residential
- To 2055 – Approx. 15 Residential
- To 2105 – Approx. 55 Residential

Sheringham to Cromer (Including West Runton and East Runton)

- To 2025 – 0
- To 2055 – Approx. 5 Commercial
- To 2105 – Approx. 10 Residential, Approx. 10 Commercial

Overstrand to Mundesley (Including Sidestrand and Trimmingham)

- To 2105 – 30-90 Residential, 10-15 Commercial

Bacton Gas Terminal

- To 2105 – 0

INDICATIVE PROPERTY LOSSES

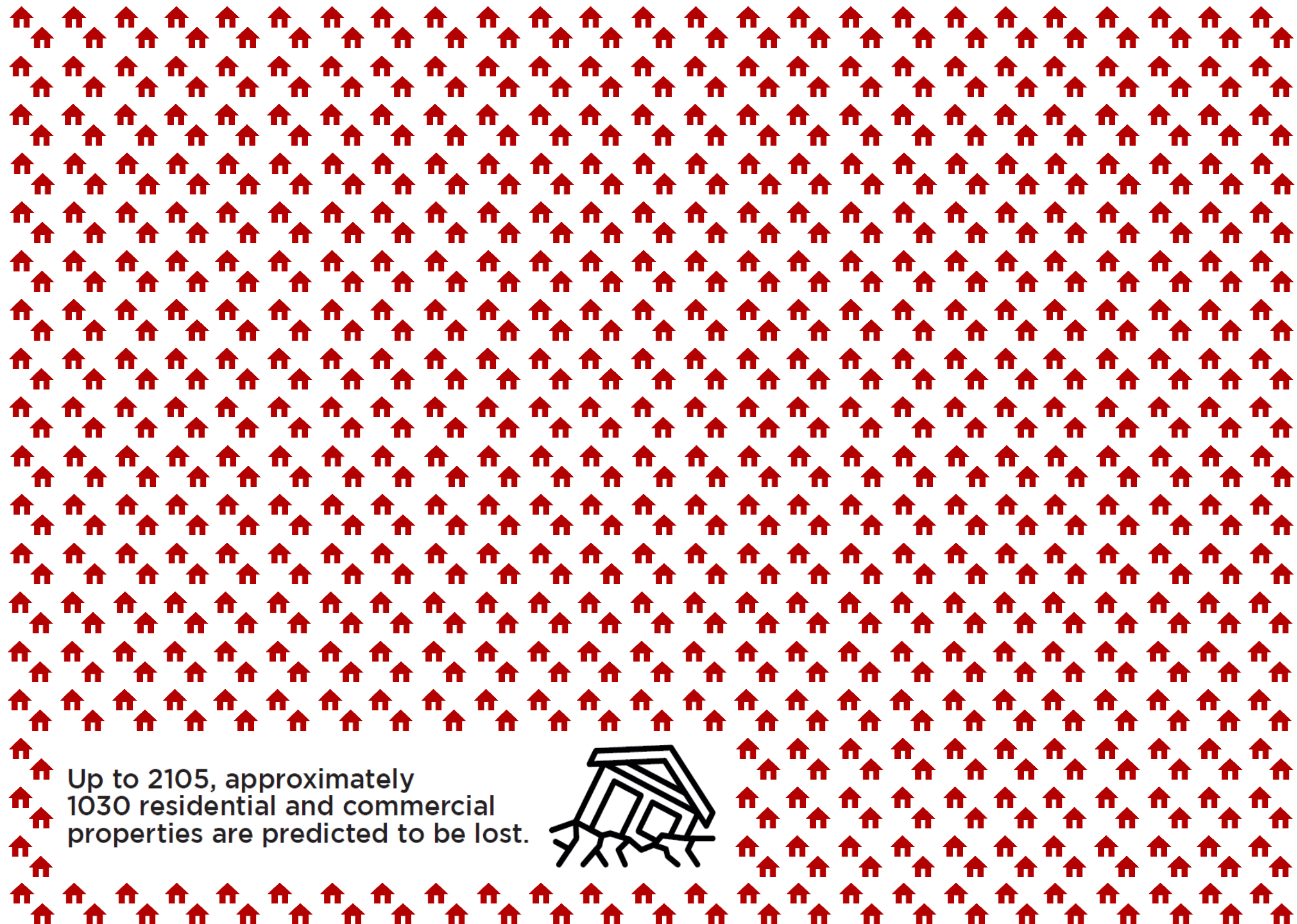
- To 2025 – Approx. 90 Residential and Commercial
- To 2055 – Approx. 360 Residential and Commercial
- To 2105 – Approx. 1030 Residential and Commercial

Bacton, Walcott, and Ostend

- To 2025 – Approx. 35 Residential
- To 2055 – 195 Residential, 20 Commercial
- To 2105 – 195-385 Residential, Approx. 25 Commercial

Ostend to Eccles (Including Happisburgh)

- To 2025 – Approx. 15 Residential and Commercial
- To 2055 – 15-20 Residential and Commercial
- To 2105 – 20-35 Residential and Commercial

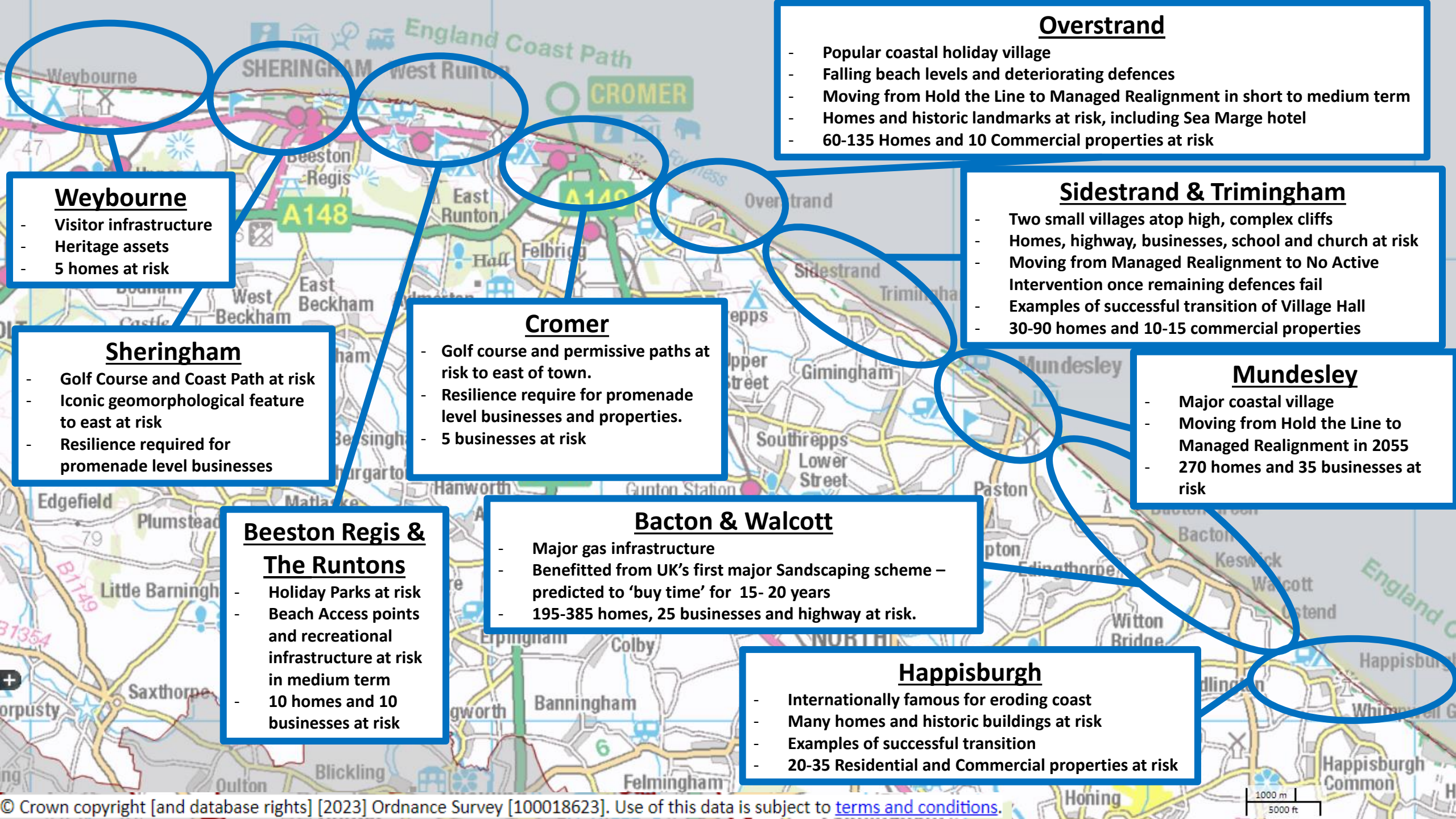


Up to 2105, approximately
1030 residential and commercial
properties are predicted to be lost.



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north-norfolk.gov.uk



Weybourne

- Visitor infrastructure
- Heritage assets
- 5 homes at risk

Sheringham

- Golf Course and Coast Path at risk
- Iconic geomorphological feature to east at risk
- Resilience required for promenade level businesses

Beeston Regis & The Runtons

- Holiday Parks at risk
- Beach Access points and recreational infrastructure at risk in medium term
- 10 homes and 10 businesses at risk

Cromer

- Golf course and permissive paths at risk to east of town.
- Resilience require for promenade level businesses and properties.
- 5 businesses at risk

Bacton & Walcott

- Major gas infrastructure
- Benefitted from UK's first major Sandscaping scheme – predicted to 'buy time' for 15- 20 years
- 195-385 homes, 25 businesses and highway at risk.

Overstrand

- Popular coastal holiday village
- Falling beach levels and deteriorating defences
- Moving from Hold the Line to Managed Realignment in short to medium term
- Homes and historic landmarks at risk, including Sea Marge hotel
- 60-135 Homes and 10 Commercial properties at risk

Sidestrand & Trimingham

- Two small villages atop high, complex cliffs
- Homes, highway, businesses, school and church at risk
- Moving from Managed Realignment to No Active Intervention once remaining defences fail
- Examples of successful transition of Village Hall
- 30-90 homes and 10-15 commercial properties

Mundesley

- Major coastal village
- Moving from Hold the Line to Managed Realignment in 2055
- 270 homes and 35 businesses at risk

Happisburgh

- Internationally famous for eroding coast
- Many homes and historic buildings at risk
- Examples of successful transition
- 20-35 Residential and Commercial properties at risk

Weybourne

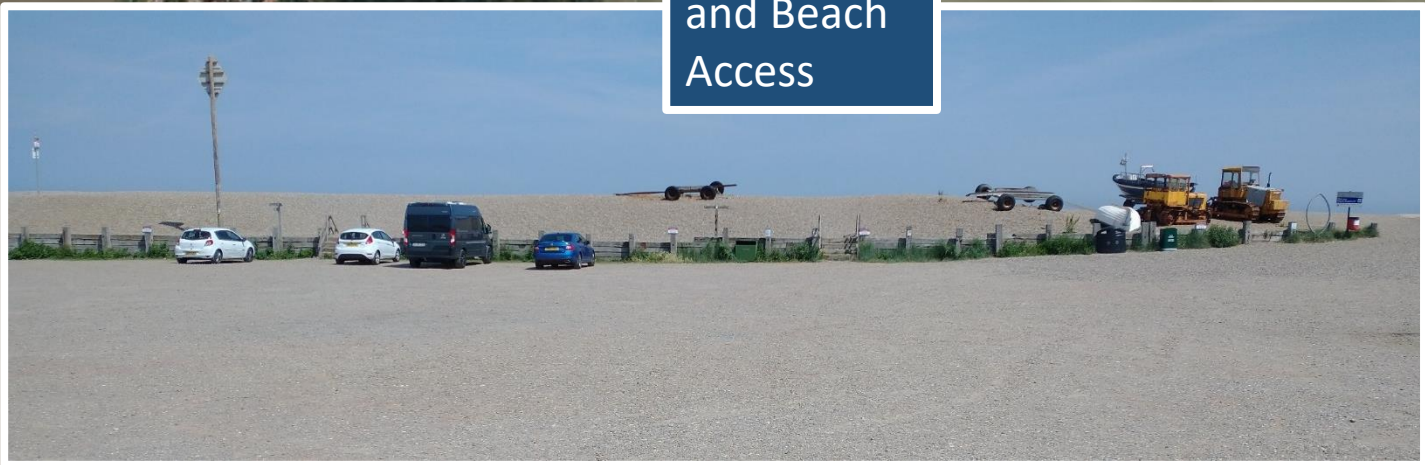
Approximate location of international telephone cable

England Coast Path

Homes

Car Park and Beach Access

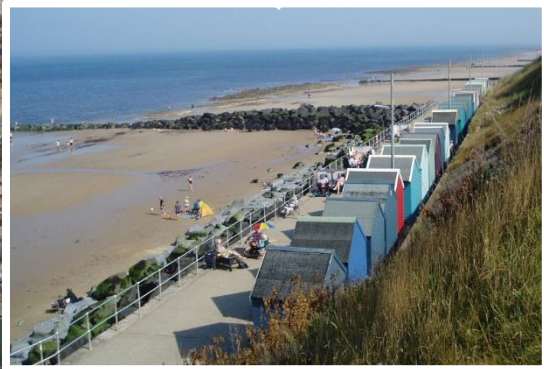
- Transition Needs:
- Beach Access needs to be maintained
 - Car park
 - 5 residential homes
 - Coast path realignment
 - Infrastructure maintenance



Sheringham

Golf Course

Lifeboat Station



Iconic landscape feature 'Beeston Bump'

England Coast Path

Transition Needs:
- Coast Path
- Golf course
- Prom level assets and businesses



Beeston and West Runton

Holiday
Parks

Car Park
and cafe

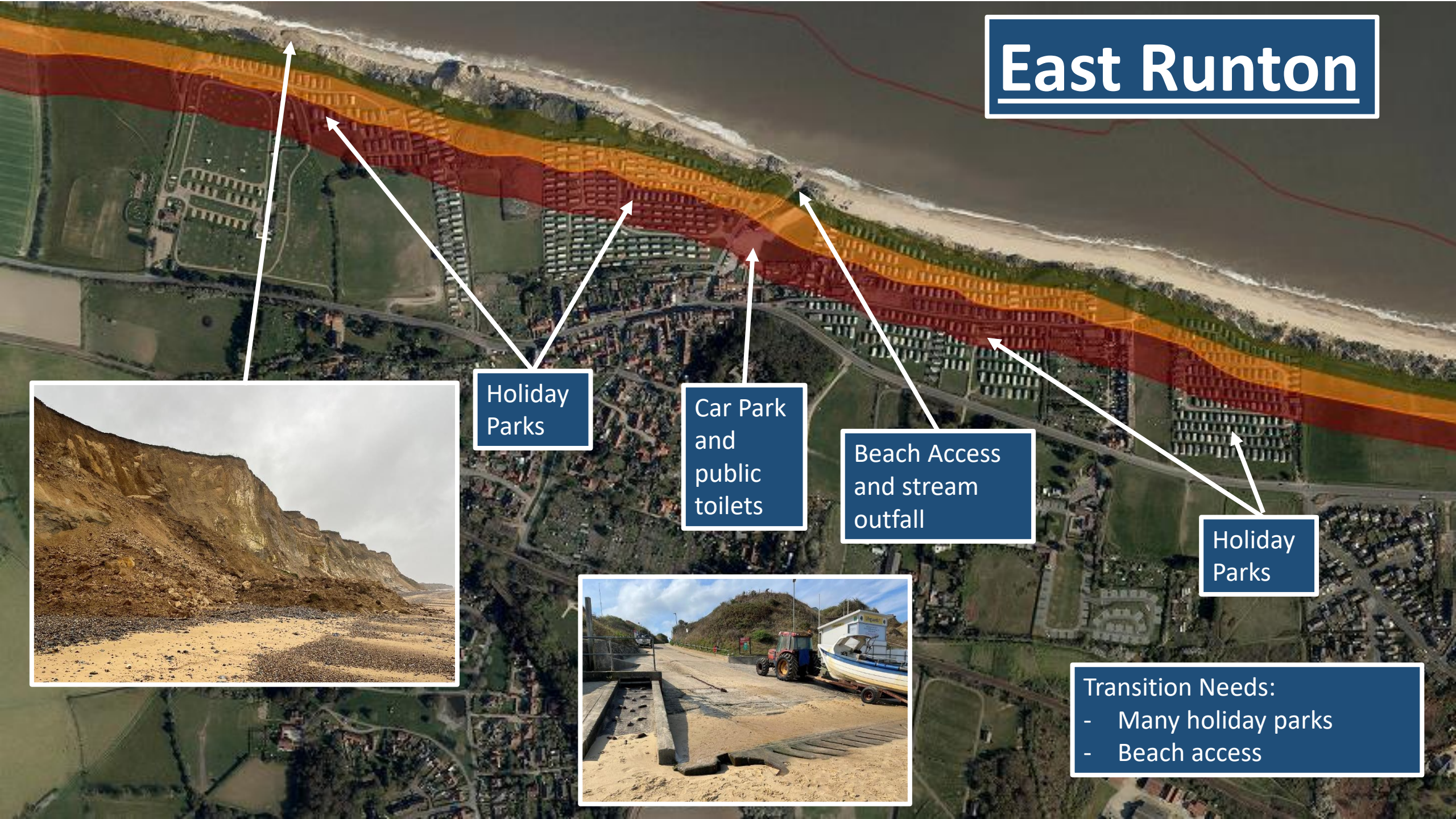
Beach
Access

England
Coast Path

Transition Needs:

- Holiday parks
- Community assets at risk – car park and beach access
- Cafe
- Coast Path

East Runton



Holiday Parks

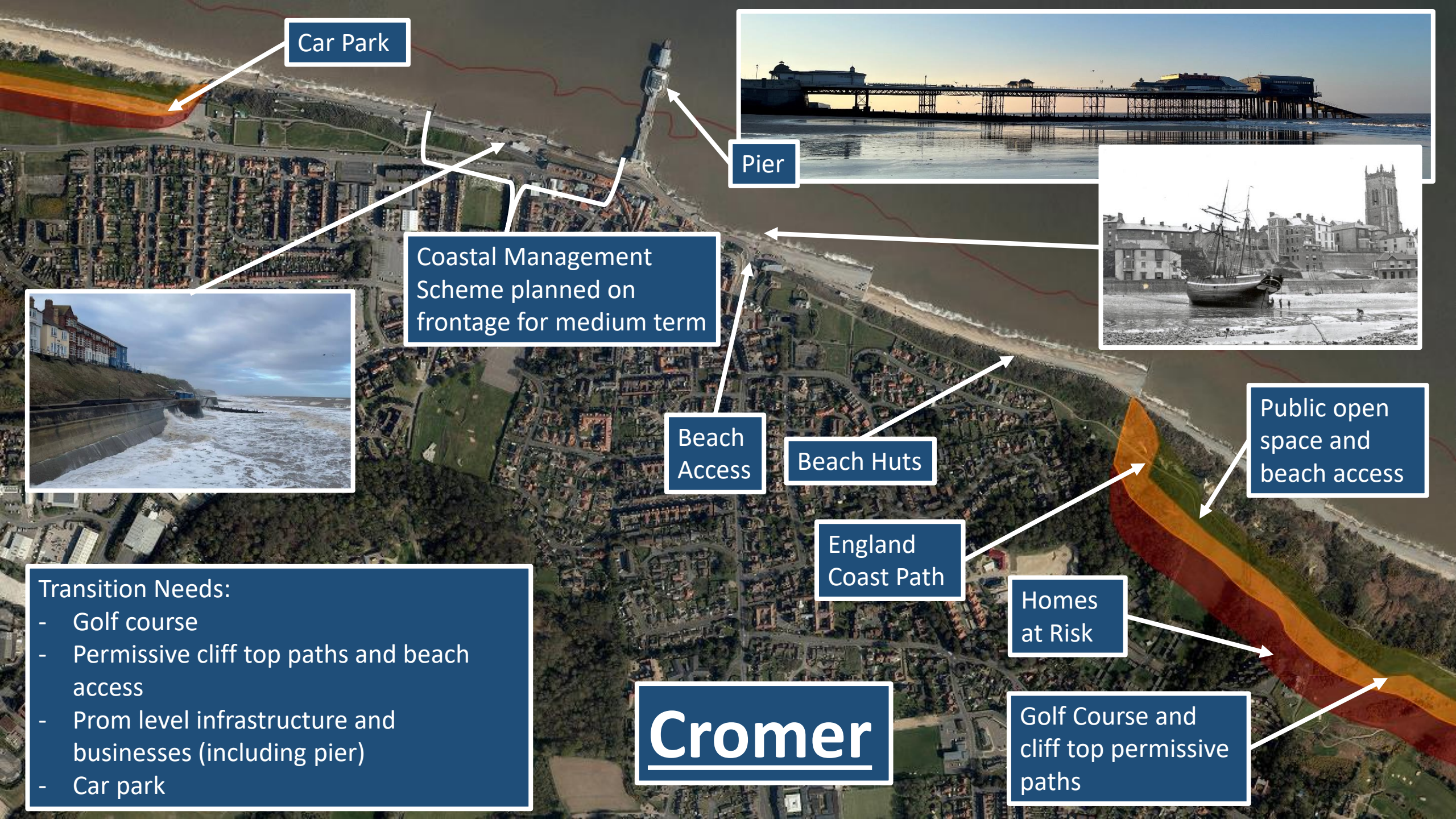
Car Park and public toilets

Beach Access and stream outfall

Holiday Parks



- Transition Needs:
- Many holiday parks
 - Beach access



Car Park

Pier

Coastal Management Scheme planned on frontage for medium term

Beach Access

Beach Huts

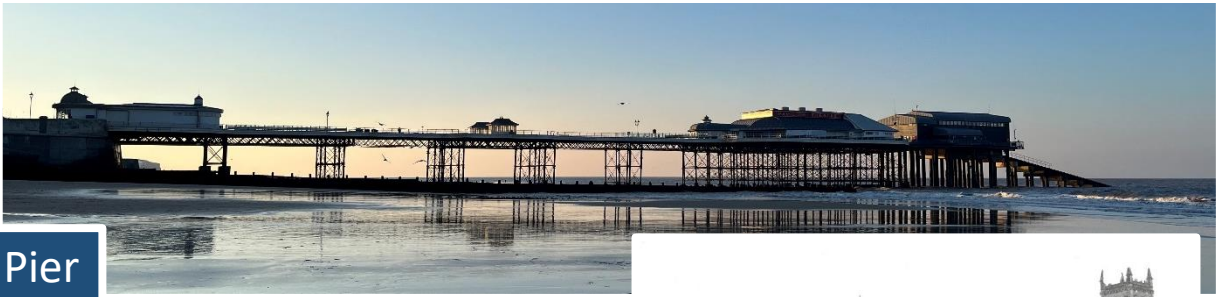
England Coast Path

Public open space and beach access

Homes at Risk

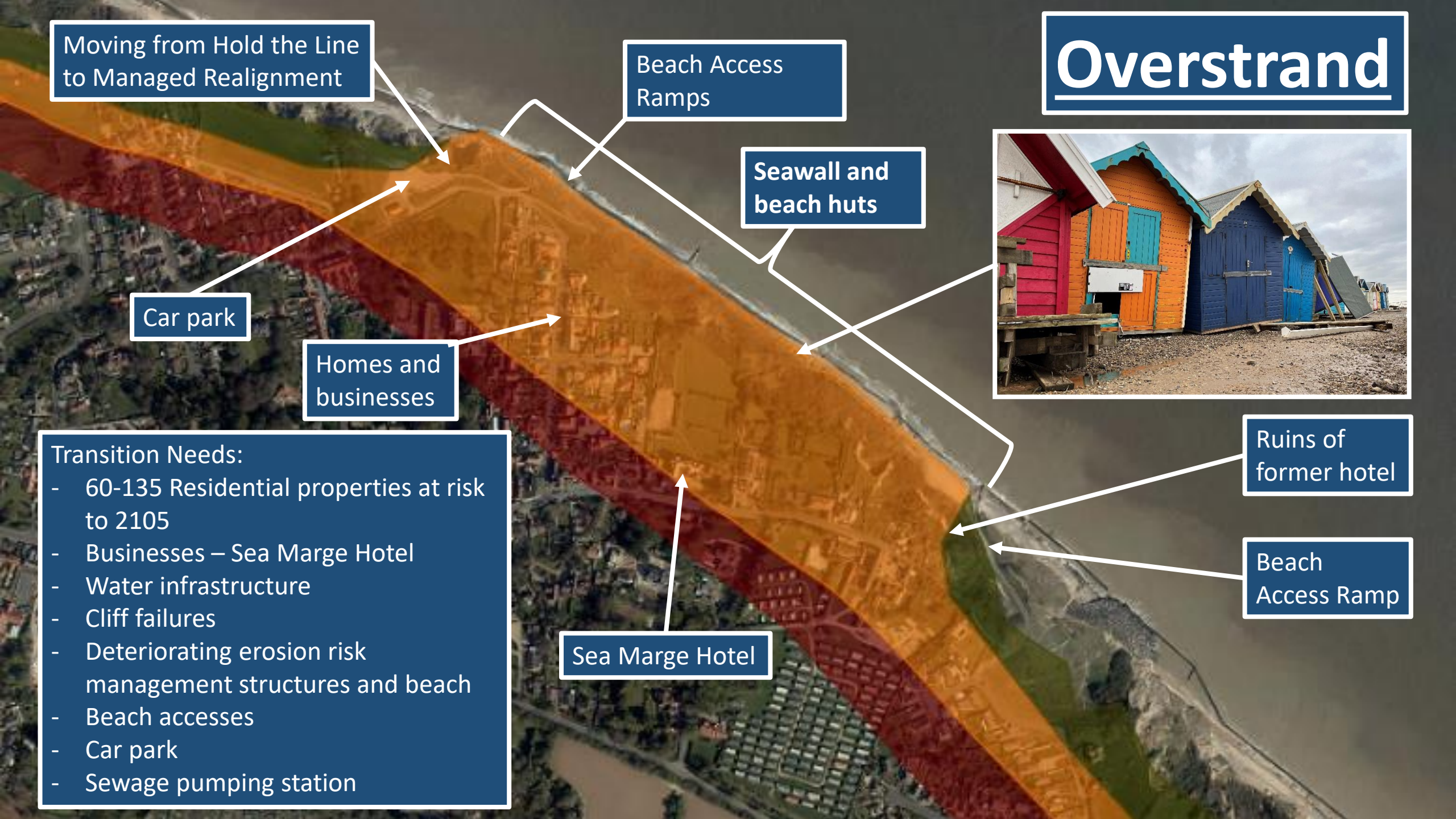
Golf Course and cliff top permissive paths

Cromer



Transition Needs:
- Golf course
- Permissive cliff top paths and beach access
- Prom level infrastructure and businesses (including pier)
- Car park

Overstrand



Moving from Hold the Line to Managed Realignment

Beach Access Ramps

Seawall and beach huts

Car park

Homes and businesses

- Transition Needs:
- 60-135 Residential properties at risk to 2105
 - Businesses – Sea Marge Hotel
 - Water infrastructure
 - Cliff failures
 - Deteriorating erosion risk management structures and beach
 - Beach accesses
 - Car park
 - Sewage pumping station

Sea Marge Hotel

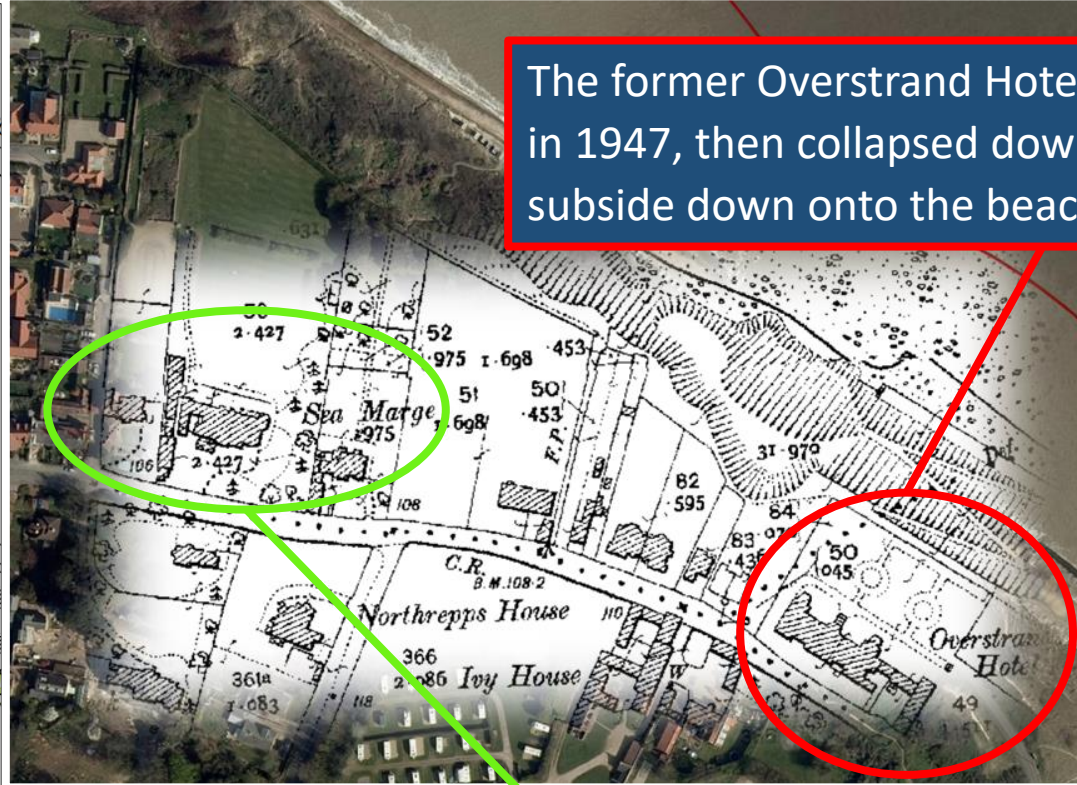
Ruins of former hotel

Beach Access Ramp





The former Overstrand Hotel, which first burnt down in 1947, then collapsed down the cliff, continues to subside down onto the beach access ramp



The Sea Marge Hotel – Transition Planning

- Historic permission for two storey bricks and mortar extension to rear of hotel
- Hotel is in Epoch 2 (indicative erosion up to 2055)
- Applied for permission to site seven movable lodges in grounds instead of extension.

This was seen as a pragmatic approach to the risk of coastal erosion and in line with an adaptation approach



Sidestrand



Homes

Agricultural Land at risk

School

Transition needs:

- School
- Agricultural land (opportunities?)
- Coast Path
- Residential Properties between Sidestrand and Trimmingham

Replacement Church - 1881

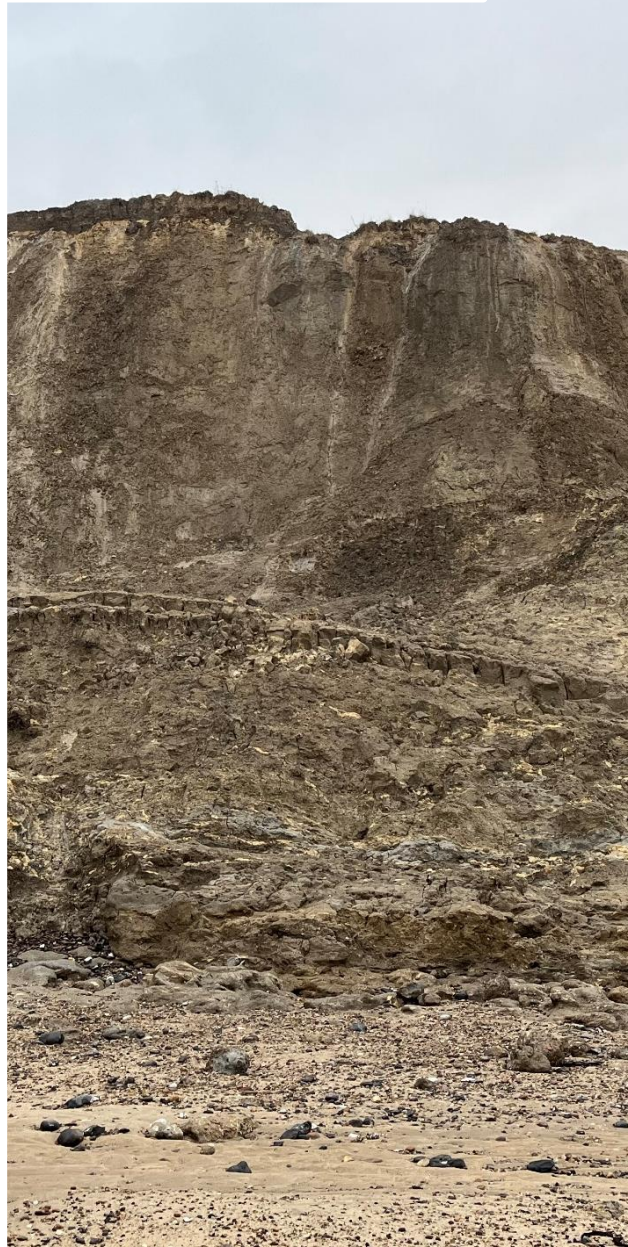


Previous Church

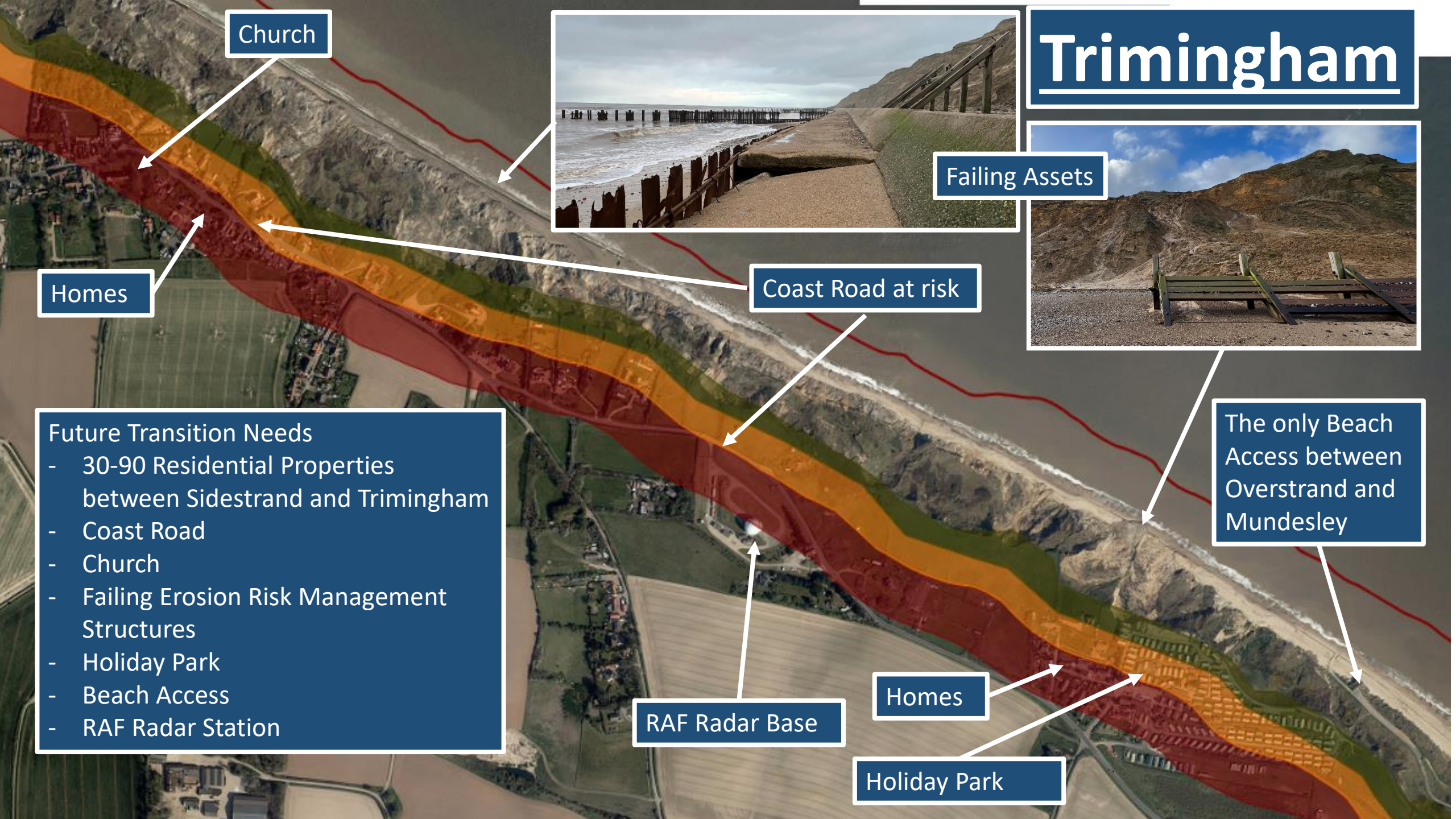
Complex cliffs along North Norfolk Coast



A school, farmland and coast path impacted by coastal erosion at Sidestrand



Trimingham



Church



Homes

Coast Road at risk

- Future Transition Needs
- 30-90 Residential Properties between Sidstrand and Trimingham
 - Coast Road
 - Church
 - Failing Erosion Risk Management Structures
 - Holiday Park
 - Beach Access
 - RAF Radar Station

RAF Radar Base

Homes

Holiday Park



Previous Transition measures:
- Village Hall relocated
- Properties privately rolled back



Mundesley

Holiday Park

Care home

Recent slip

Long-term moving from Hold the Line to Managed Realignment



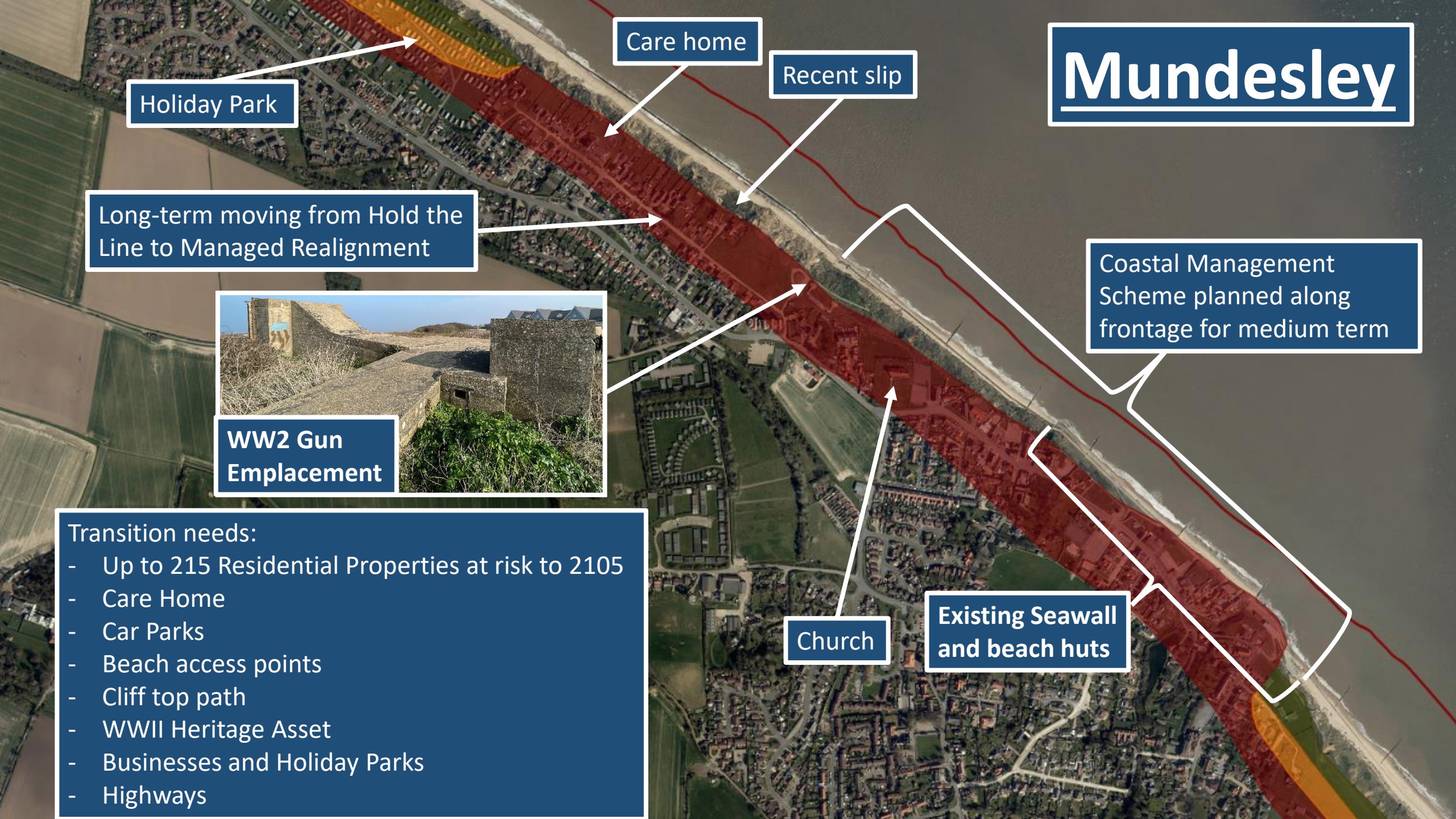
WW2 Gun Emplacement

Coastal Management Scheme planned along frontage for medium term

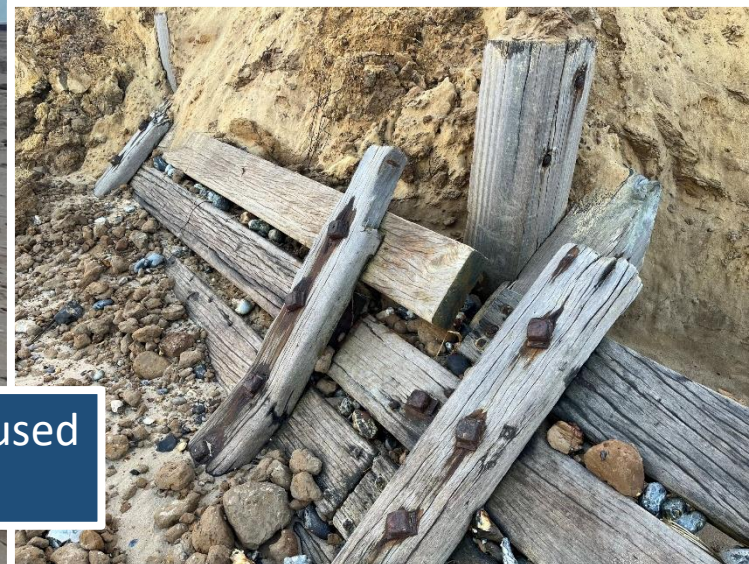
- Transition needs:
- Up to 215 Residential Properties at risk to 2105
 - Care Home
 - Car Parks
 - Beach access points
 - Cliff top path
 - WWII Heritage Asset
 - Businesses and Holiday Parks
 - Highways

Church

Existing Seawall and beach huts



Properties at risk at Mundesley following a cliff slip on Hold the Line policy frontage



Damage caused to defences

Bacton

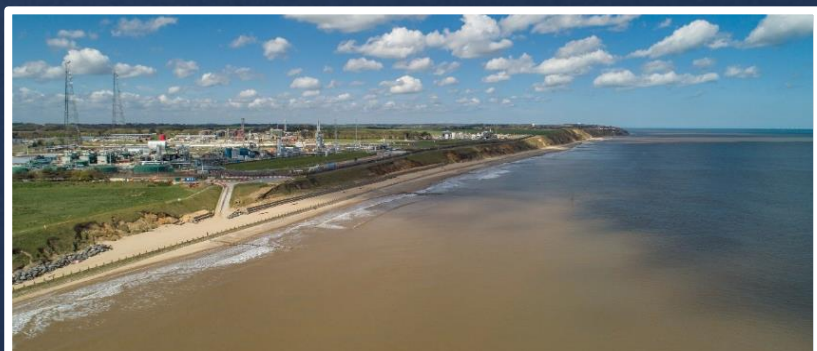
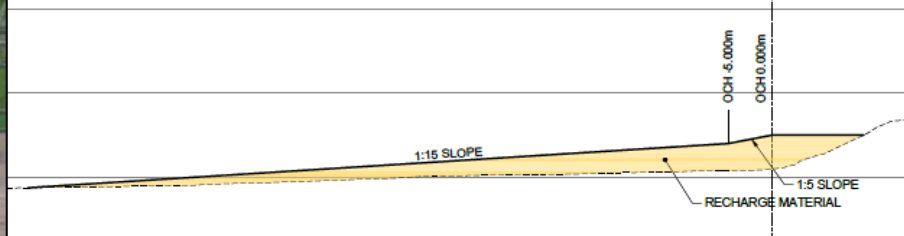
Bacton Gas Terminal

Holiday Parks

- Transition needs:
- Major infrastructure – 1/3 of UK's gas
 - 195-385 Residential properties in Bacton and Walcott
 - Coast Road
 - Businesses
 - Erosion risk management structures



Bacton to Walcott Sandscaping



1.8 million m³ of sediment

TERMINAL:

- Very high protection level
- Re-nourishment interval 15-20 years

VILLAGES:

- Higher beaches & slower erosion
- Time for adaptation/transition
- Beaches fed by terminal frontage over time



Walcott



Sea Wall

Businesses

Coast Road

Homes

- Transition needs:
- 195-385 Residential Properties in Bacton and Walcott
 - Coast Road
 - Businesses
 - Erosion Risk Management Structures



1960s

WALCOTT GAP

24371



Pre-Sandscaping



2015-2018

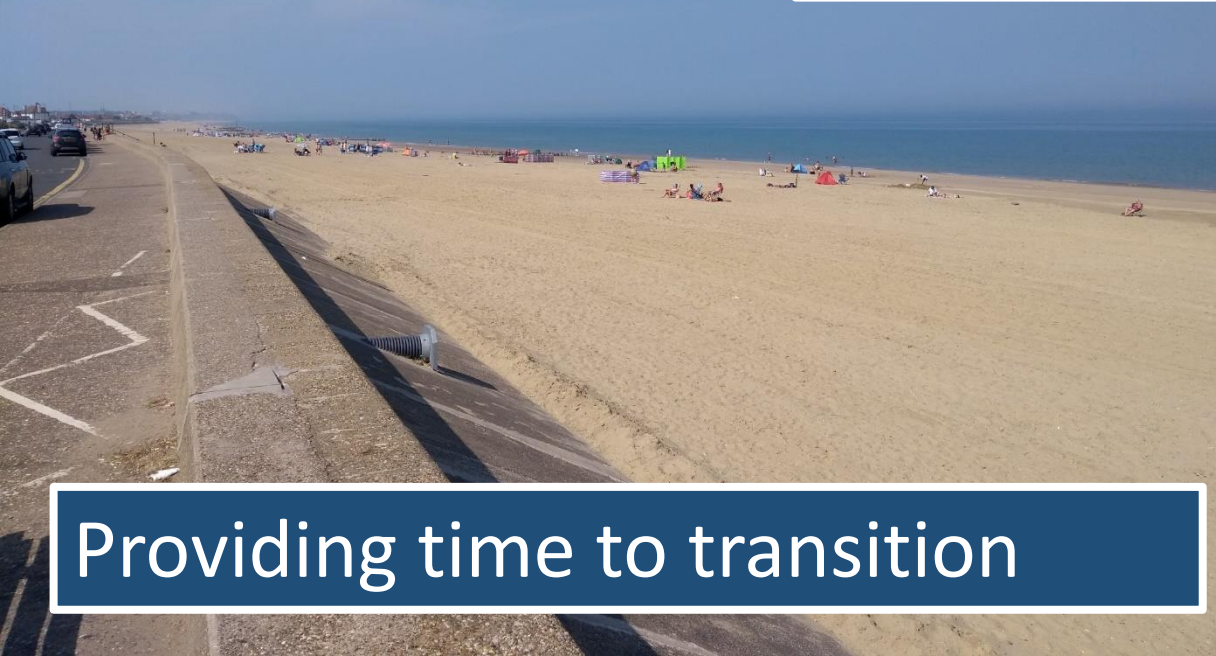


2019



2022

Post-Sandscaping

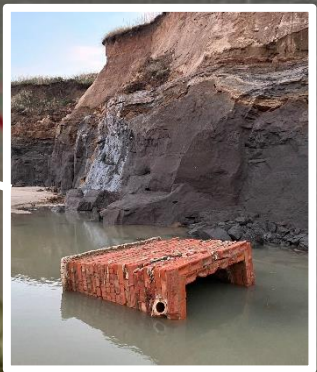


Providing time to transition



Happisburgh

- Previous Transition:
- 9 properties purchased, demolished and consent for relocation
 - Some failed erosion risk management structures removed
 - Beach debris removed
 - Holiday Park relocated
 - Car Park and public toilets re-provided



Old Holiday Park Site

Homes

Listed Buildings

Church

New Holiday Park Site

- Transition Needs:
- Residential properties at risk
 - Businesses including public house at risk
 - Listed buildings at risk
 - Grade 1 listed church
 - Beach access
 - Failing erosion risk management structures
 - Lighthouse?



Car Park

Beach Access



-Deteriorated risk management structures and beach debris removed over time.
-Rock berm to 'buy time'





1988



2007



2020

Coastal change at Happisburgh



The location of this holiday home is circled on the previous slide



Relocated holiday park – from a erosion risk zone to a new location





Homes at risk

1988



2007



2020



As part of a previous trial, these homes were purchased and a replacement site identified and secured



At risk homes replaced or 'rolled back'
with new housing away from the erosion
risk zone



Transition in Action – examples of successful adaptation



Relocation of holiday park – the coast is now open grassland



Relocation of a car park and public toilets



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Department
for Environment
Food & Rural Affairs



**Environment
Agency**

Coastal transition accelerator programme

Part of the £200m
Flood and coastal innovation programmes