



Enhancing Coastal Resilience: Beneficial Reuse of Dredged Material at Carnarvon

PIANC Conference | August 2024

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Background

Design

Results

Challenges

Acknowledgements

Background

- Carnarvon is located ~900km north of Perth
- Former southern arm of the Gascoyne river
- Fascine is crucial for tourism and the popular yacht club



Source : Shire of Carnarvon 2023

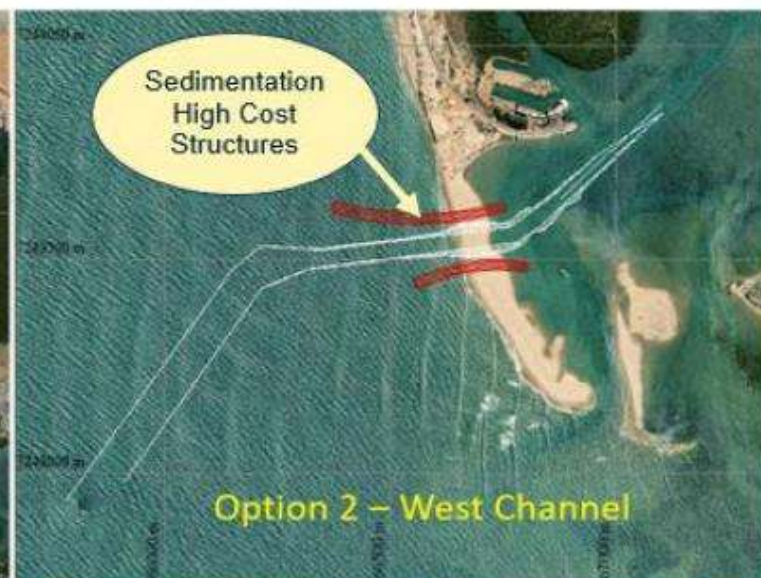
Background



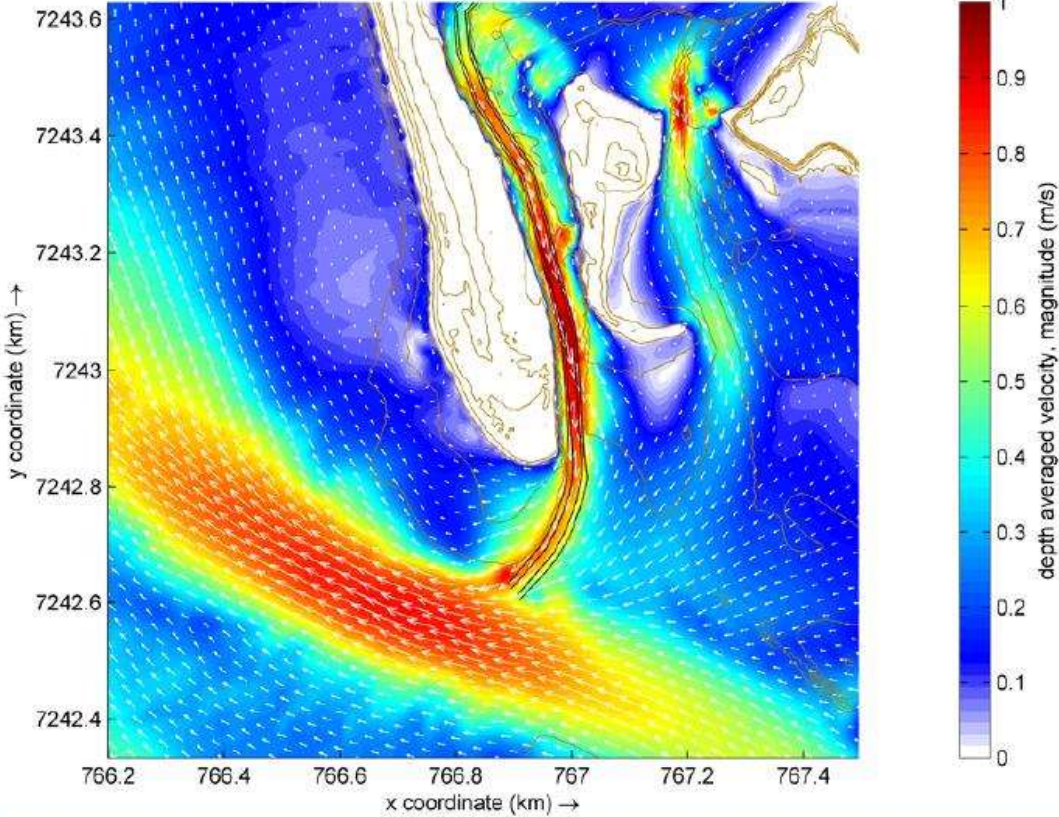
Source: Baird 2022

Background

- Technical workshop held in 2020, 4 options, looking at solving the option, cost, environmental impact etc
- Further site investigations in 2023 to inform the option selection. Where the east channel was proceeded further
- DoT endorsed completing this dredging with the routine maintenance of Teggs Channel



Concept Design – Dredge

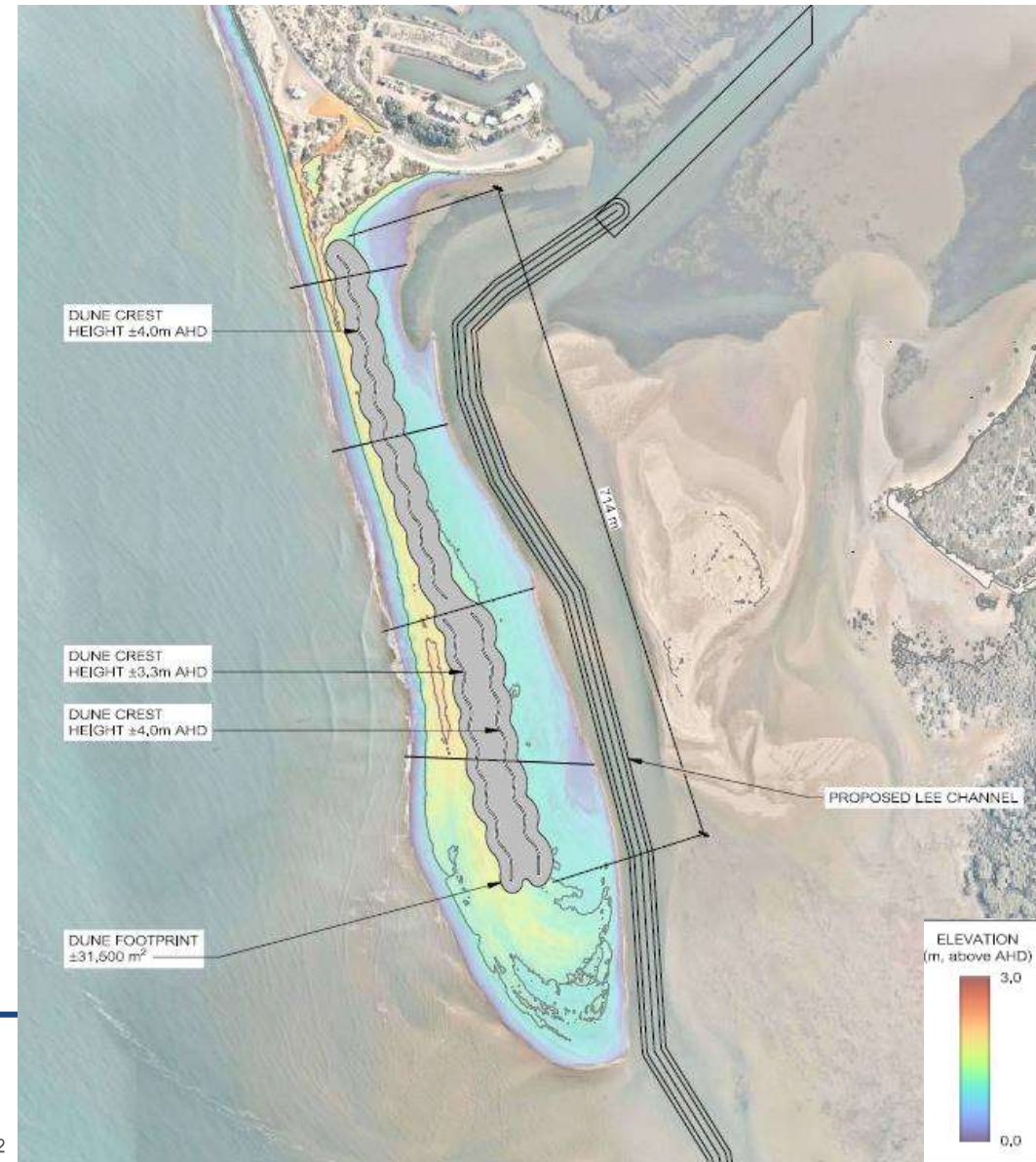


Source: Baird 2022



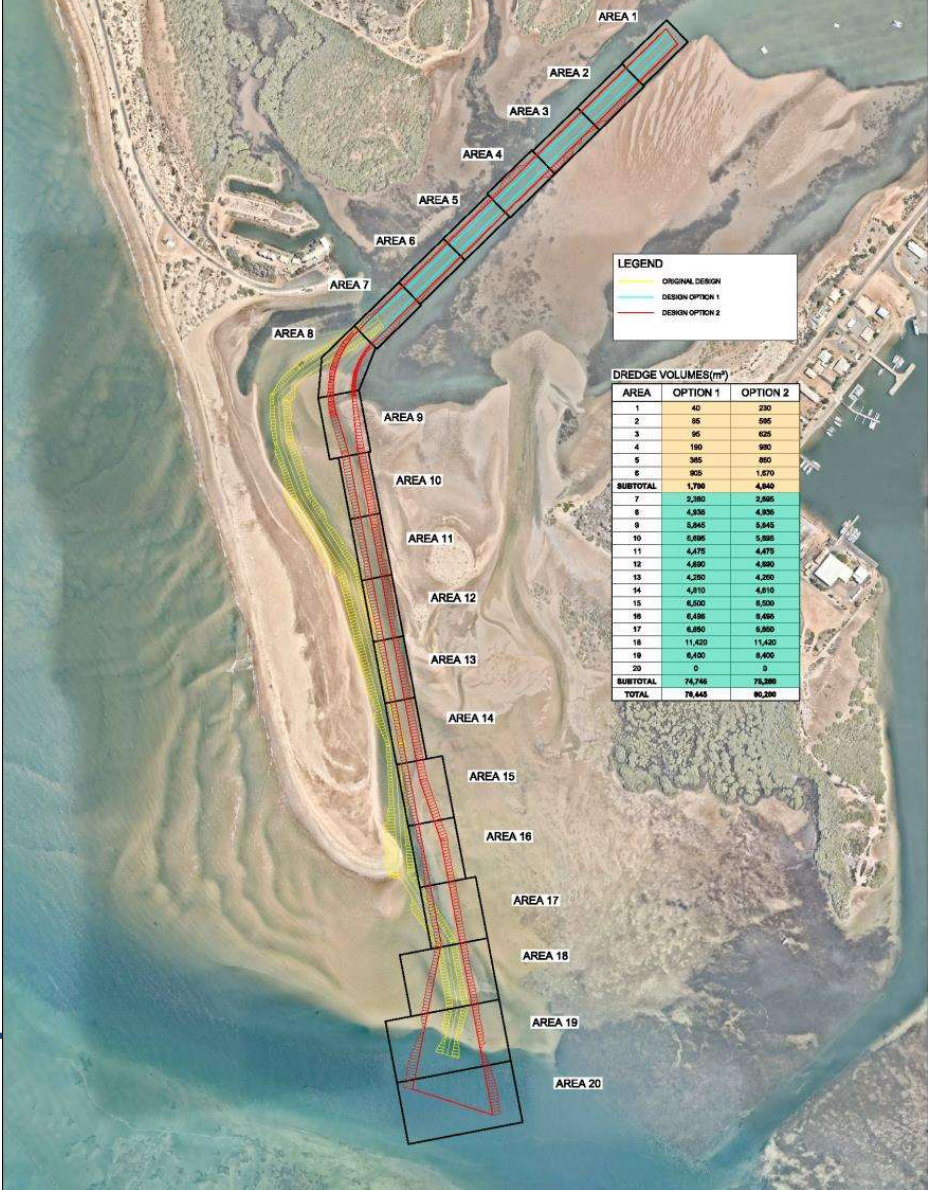
Concept Design – Material Placement

- 5m LAT
- 2 dunes in the southern section. Why?
- Slopes of 1:6 and 1:4 for each dune
- ~800m in length
- Dune footprint to allow sufficient amenity on the western side
- Revegetation to be included for extra protection



Preliminary Design - Dredge

- New alignment proposed to allow for spit movement
- 0m contour (sept 2022)
- Silt traps added
- Bell mouth
- Extended to match the existing channel



Source: BMT 2023

Preliminary Design – Material Placement

- Increased height
- Extended footprint
- Slopes of 1:3
- Increased length
- Small foredune



Source: BMT 2023

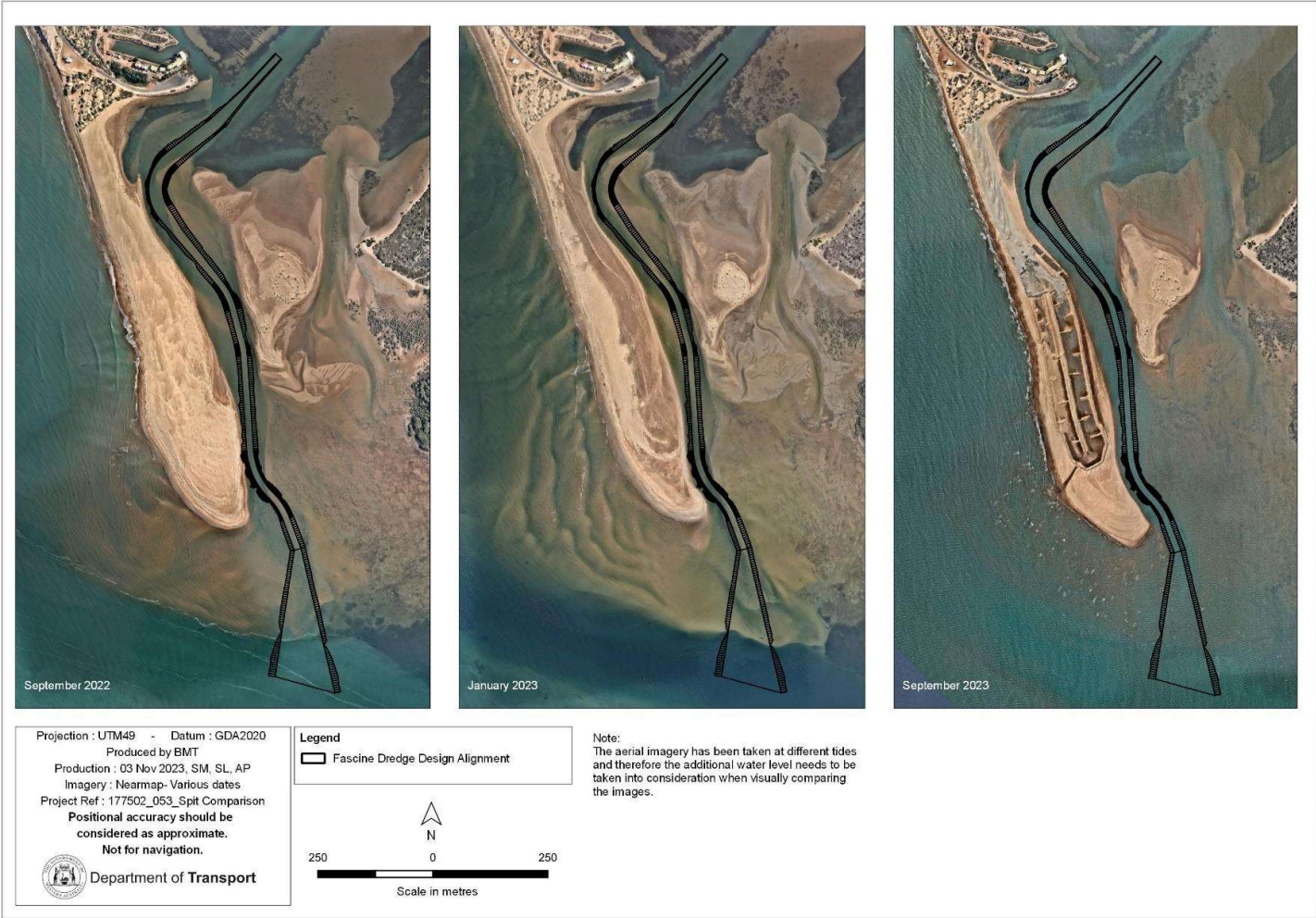
Constructability Workshop

- Held onsite with all key stakeholders
- Pivotal in highlighting challenges early on
- Potential issues:
 - Equipment
 - Type of Material
 - Stabilisation
 - Environmental
 - Dredged material placement management



Source: Maritime Constructions 2023

Detailed Dredging Design



Source: BMT 202

Detailed Design – Dredged Material Placement

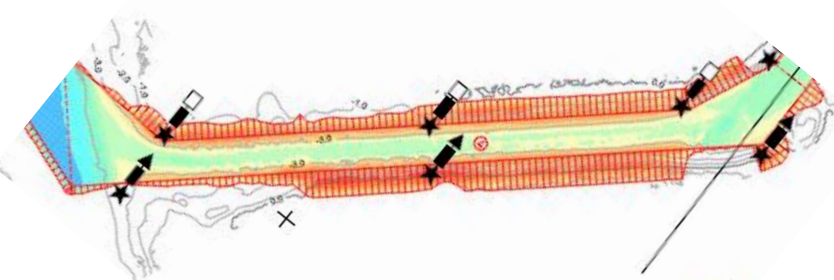
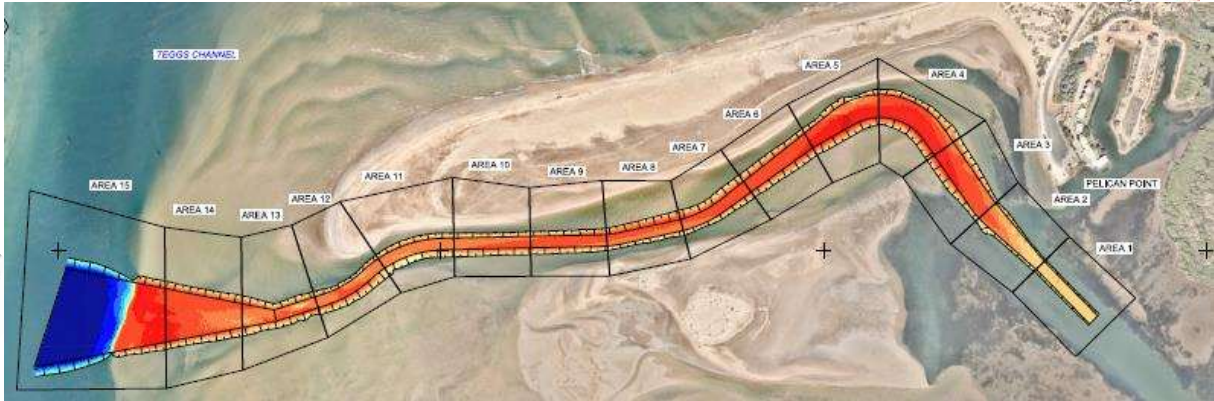
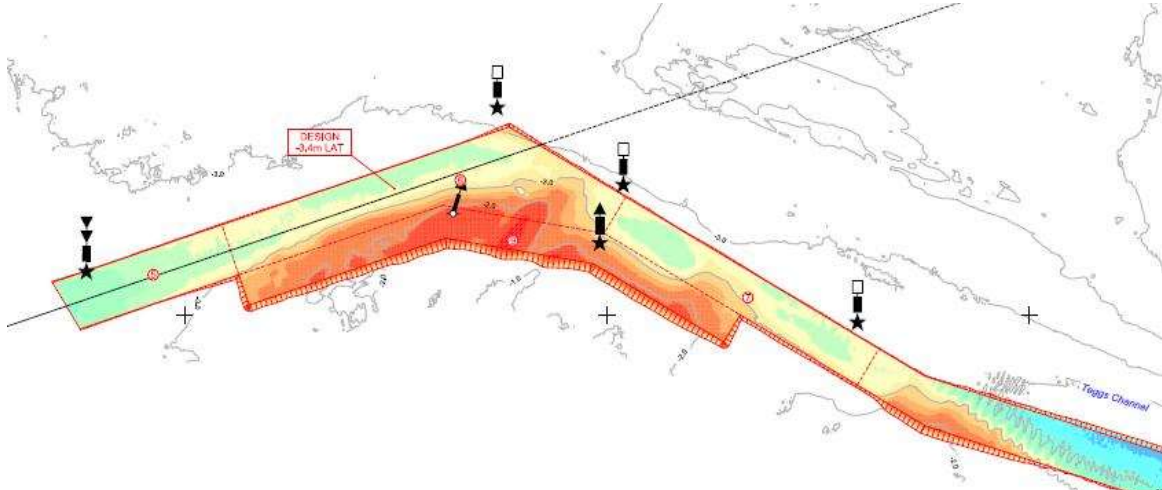
- Geotechnical sampling
- Commencement of construction
- Client feedback
- Revegetation consultant feedback



Source: Maritime Constructions 2023

Dredging Scope

Target Volume	To Design (m3)	To OD (incl of design) (m3)	OD amounts for reference (m3)
Entrance Access Channel	8,950	15,200	6,250
Teggs Channel	12,815	24,710	11,895
Sand Trap	9,040	12,825	3,785
Fascine	73,135	97,250	24,115
Totals	103,940	149,985	46,045



Source: BMT 2023



Disposal Scope

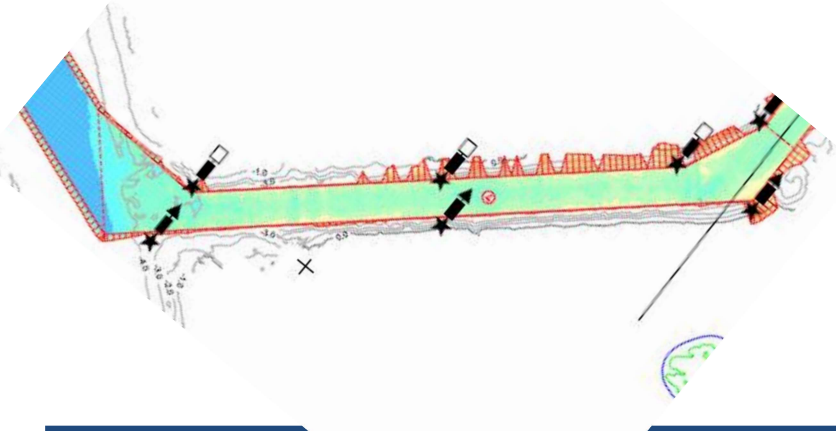
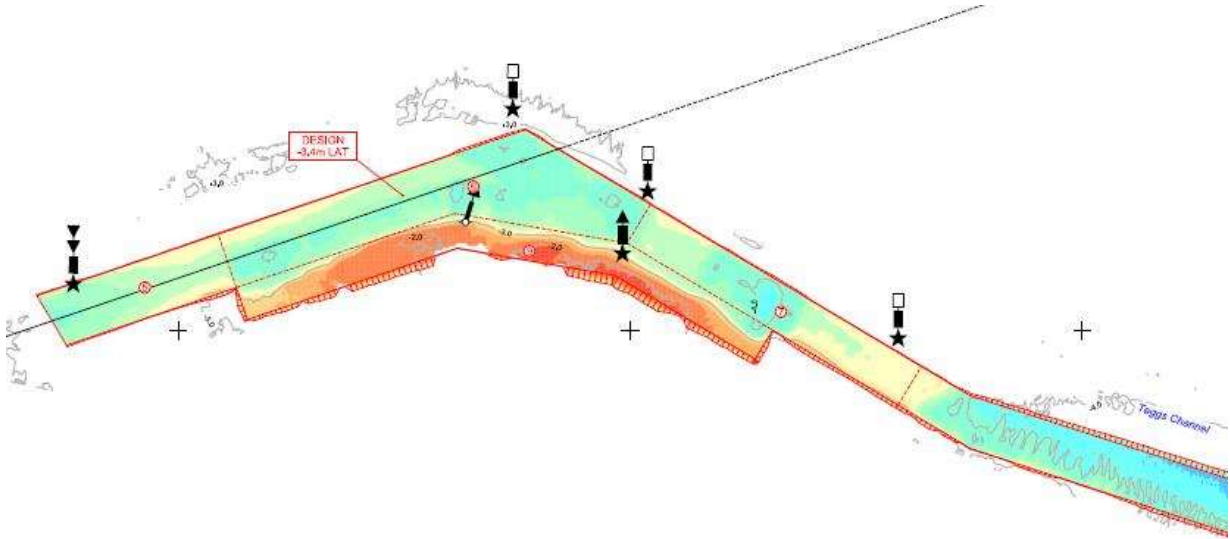
Target Volume	To Design (m3)
Northern	36,040
South-west	33,030
South east	49,970
Totals	119,040



Source: BMT 2023

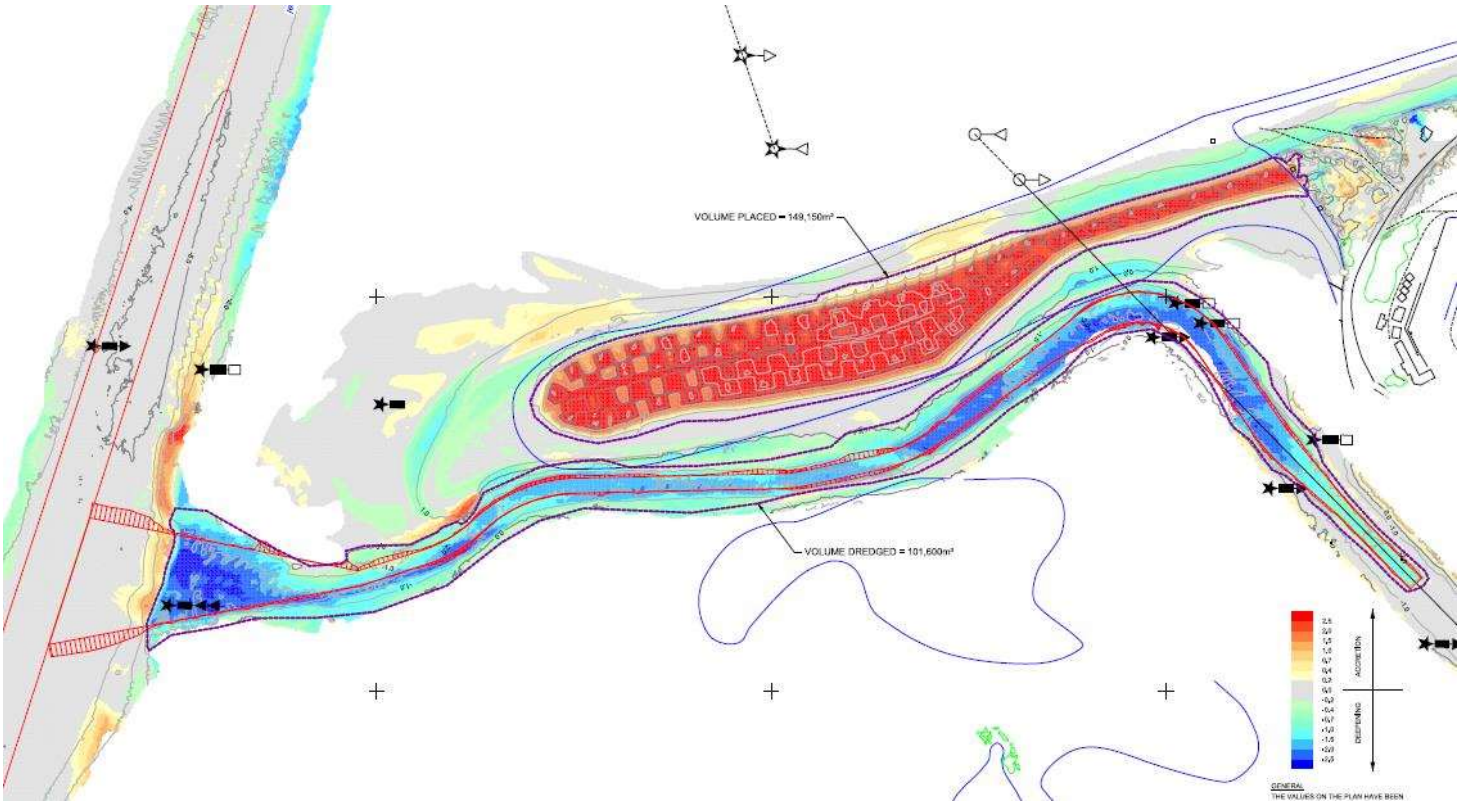
Dredging Results

Area	Actual Volume (m3)
Entrance Access Channel	14,300
Teggs Channel	36,250
Fascine	105,600
Totals	156,150



Disposal Results

Target Volume	To Design (m3)
Totals	149,150



Source: BMT 2024

Project Results



Source : Maritime Constructions 2024

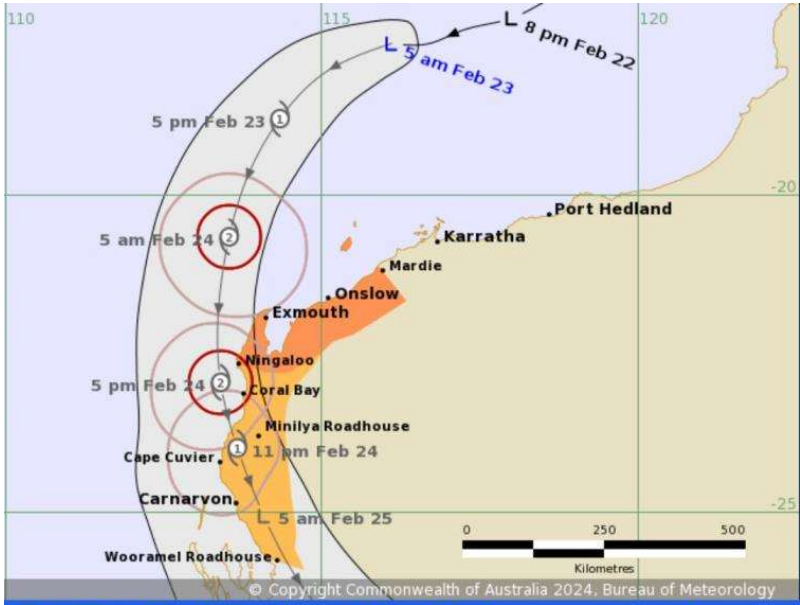
Challenges – Site Conditions

- Clay dredging and placement
- Removal of pylons from historical jetty



Source : Maritime Constructions 2023

Challenges – Metocean Conditions



Ex-Tropical Cyclone Lincoln forecast track map
Issued at 5:31 am AWST Friday 23 February 2024

Community Threat

Warning Zone	Watch Zone
Gales within 24 hours	Gales from 24-48 hours



Source: Maritime Constructions 2024

Challenges – Dune Construction

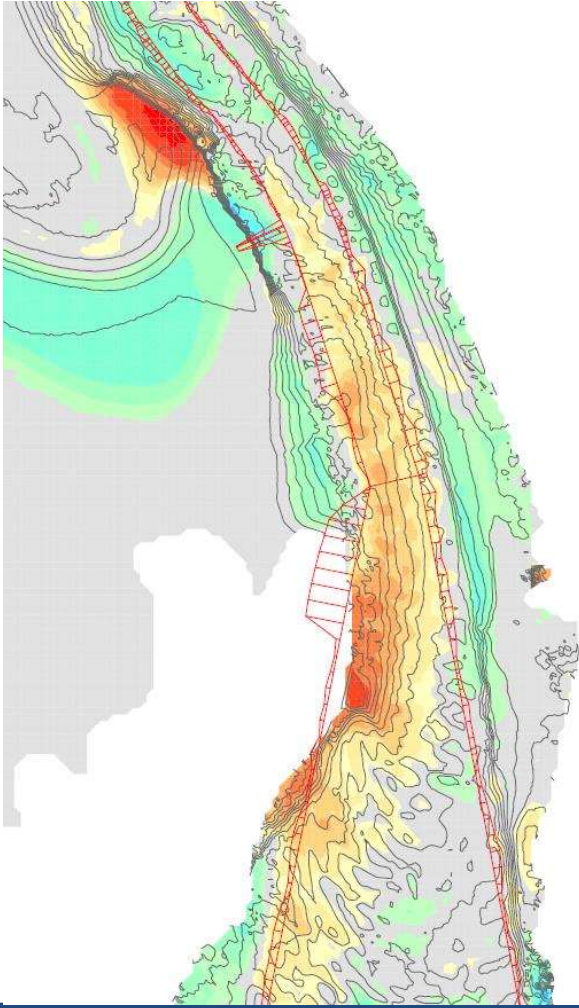


Source: Maritime Constructions 2024

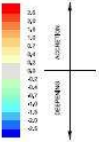
Challenges - Infilling



Source: Maritime Constructions 2024



CARNARVON - FASCINE
COLOUR CODED DIFFERENCES
NOVEMBER 2023 TO FEBRUARY 2024



GENERAL
THE VALUES ON THE PLANNING BEEN
CALCULATED USING DATA INTERPOLATED
FROM THE ORIGINAL SURVEYS
GRIDING PARAMETERS: 22m GRID

Source: BMT 2024



Future Projects

- Material management and placement strategy
- Flexible design integration
- Collaborative approach to stabilisation



Source: Bandy creek Maintenance Dredging and Castletown Beach Nourishment (DoT 2021)

Final Takeaways



Source: SDGS

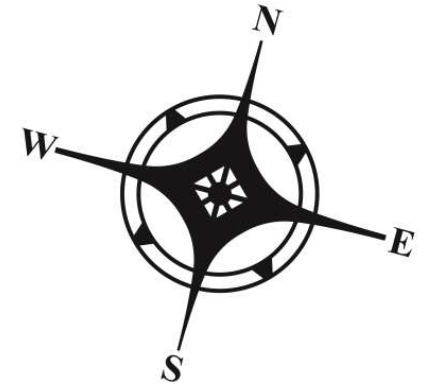
Source: Maritime Constructions 2024

Acknowledgements

- Department of Transport, WA
- Maritime Constructions
- Shire of Carnarvon



Department of
Transport



**MARITIME
CONSTRUCTIONS**

Questions





Thank you

