



PIANC APAC 2024

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# Webb Dock East 4 & 5 Berth Capacity Expansion

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Jacobs (Melbourne)

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# Introduction



Goal 8: decent work and economic growth  
Goal 9: industry innovation and infrastructure  
Goal 11: sustainable cities and communities

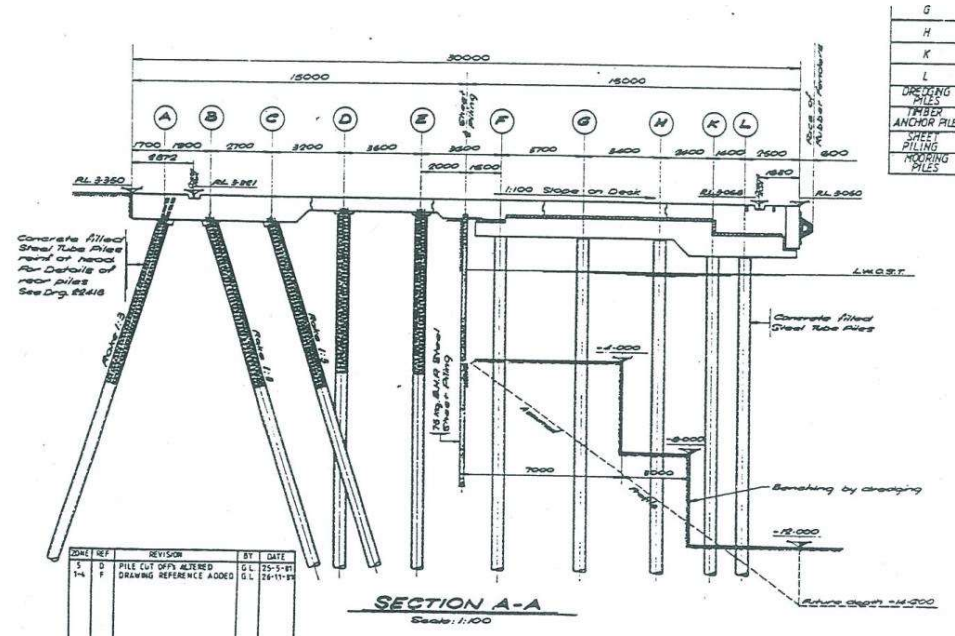


# Port of Melbourne



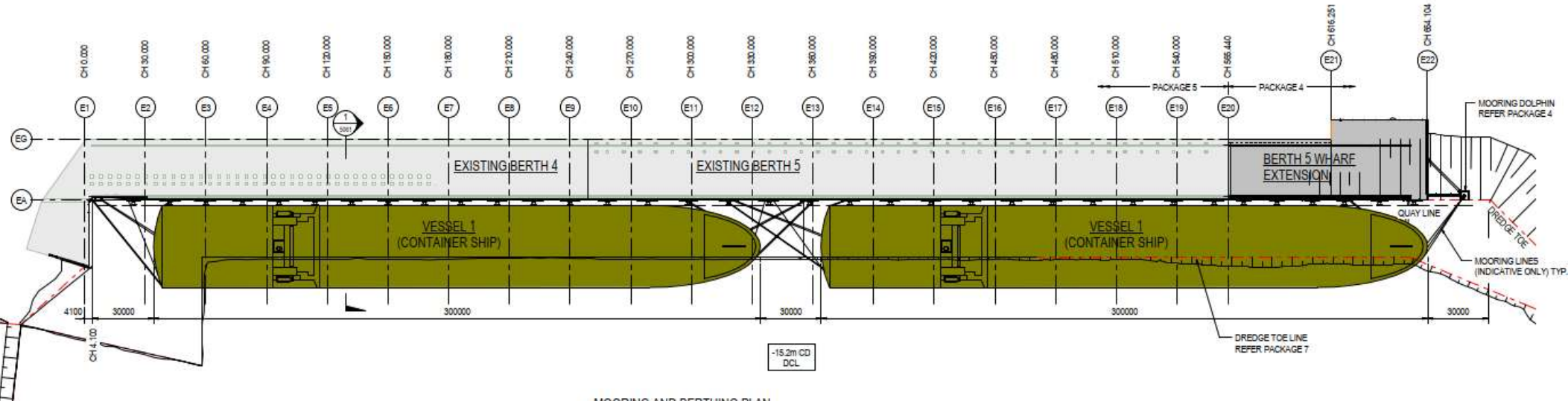


# History of Webb Dock East 4 & 5

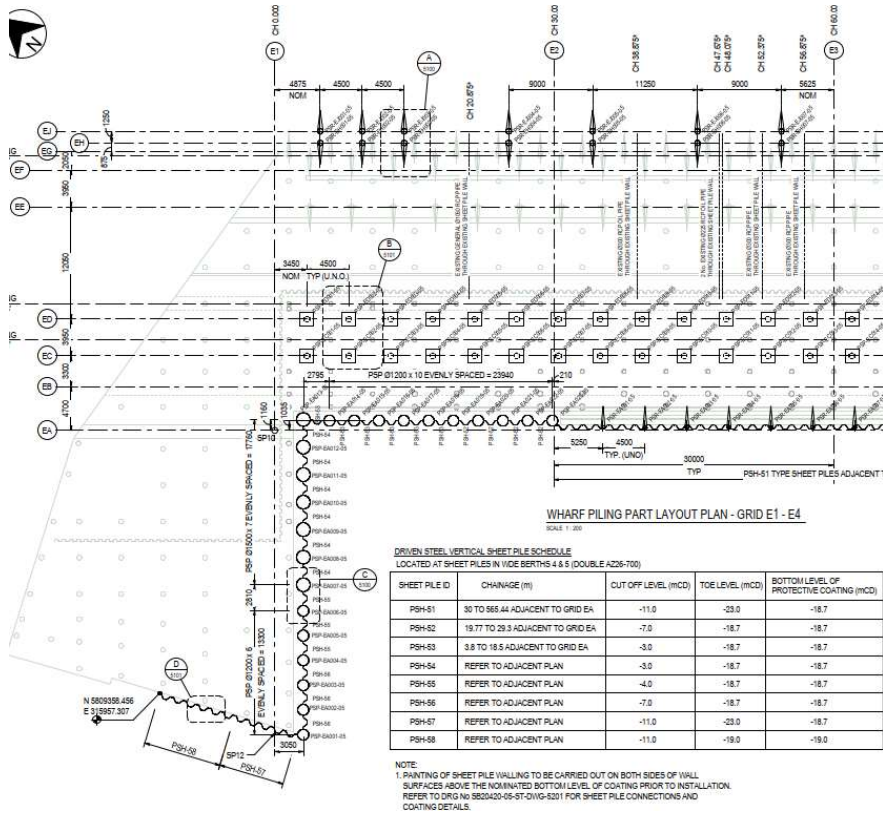




# Port Capacity Project



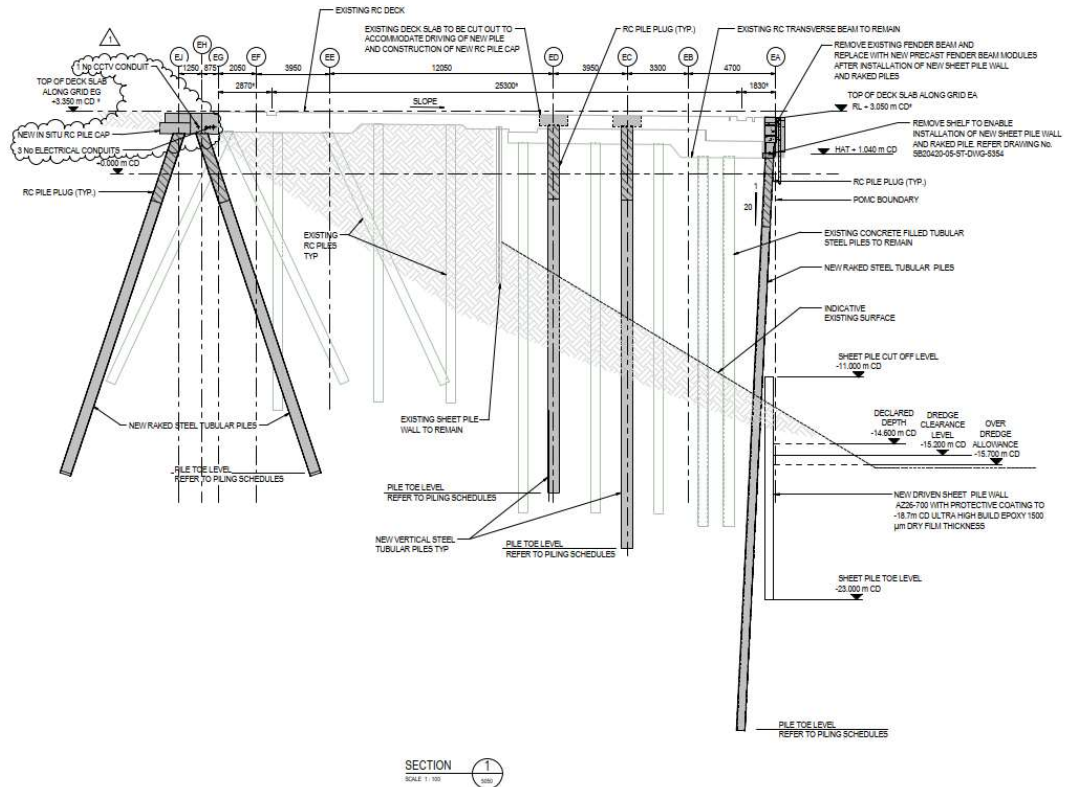
MOORING AND BERTHING PLAN  
SCALE 1:1000



**DRIVEN STEEL VERTICAL SHEET PILE SCHEDULE**  
LOCATED AT SHEET PILES IN VICE BERTHS 4 & 5 (DOUBLE A26-700)

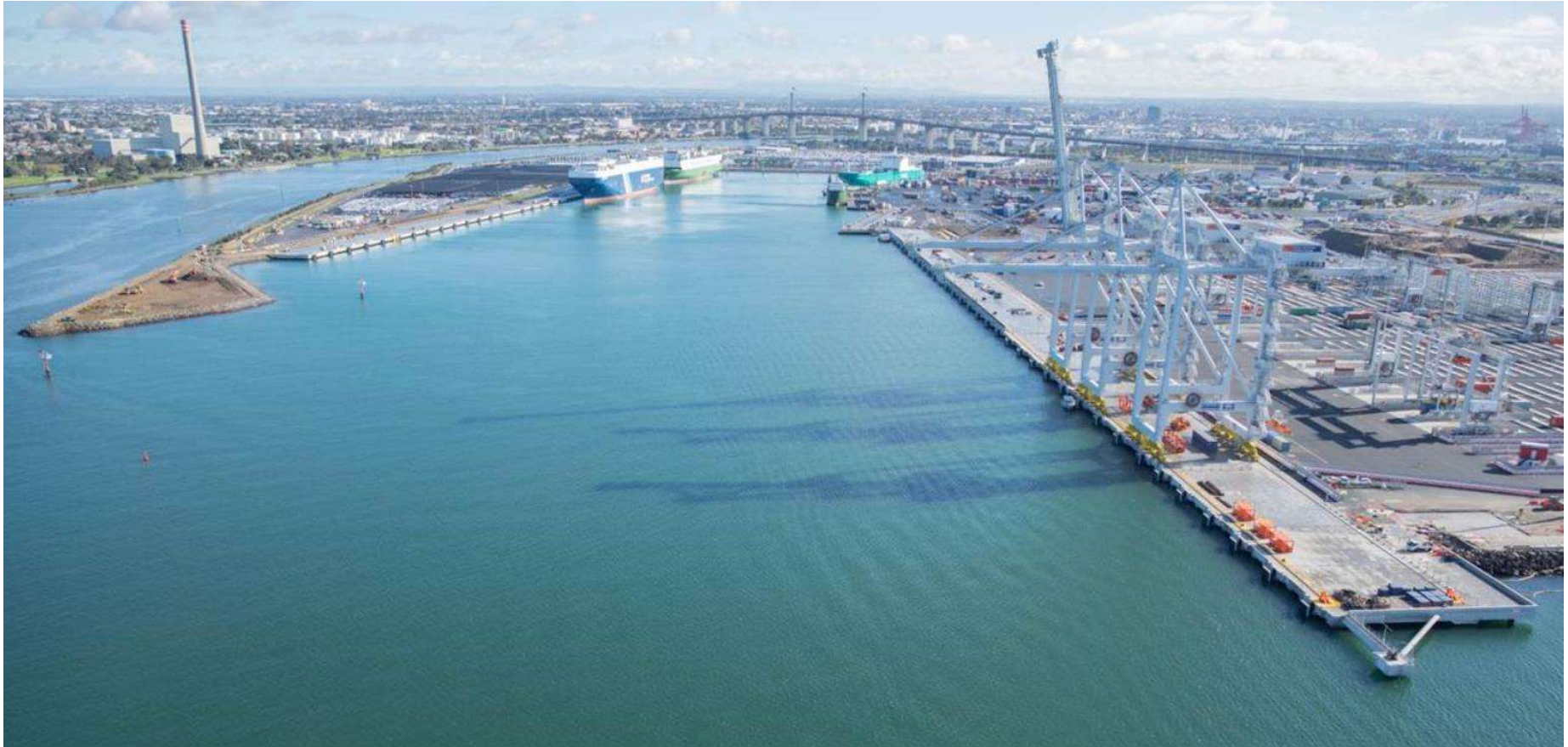
SHEET PILE ID	CHAINAGE (m)	CUT OFF LEVEL (mCD)	TOE LEVEL (mCD)	BOTTOM LEVEL OF PROTECTIVE COATING (mCD)
PSH-51	30 TO 565.44 ADJACENT TO GRID EA	-11.0	-23.0	-18.7
PSH-52	19.77 TO 29.3 ADJACENT TO GRID EA	-7.0	-18.7	-18.7
PSH-53	3.8 TO 19.5 ADJACENT TO GRID EA	-3.0	-18.7	-18.7
PSH-54	REFER TO ADJACENT PLAN	-3.0	-18.7	-18.7
PSH-55	REFER TO ADJACENT PLAN	-4.0	-18.7	-18.7
PSH-56	REFER TO ADJACENT PLAN	-7.0	-18.7	-18.7
PSH-57	REFER TO ADJACENT PLAN	-11.0	-23.0	-18.7
PSH-58	REFER TO ADJACENT PLAN	-11.0	-19.0	-18.7

NOTE:  
1. PAINTING OF SHEET PILE WALLING TO BE CARRIED OUT ON BOTH SIDES OF WALL SURFACES ABOVE THE NOMINATED BOTTOM LEVEL OF COATING PRIOR TO INSTALLATION. REFER TO DRG NO. S80420-05-ST-0110-5201 FOR SHEET PILE CONNECTIONS AND COATING DETAILS.





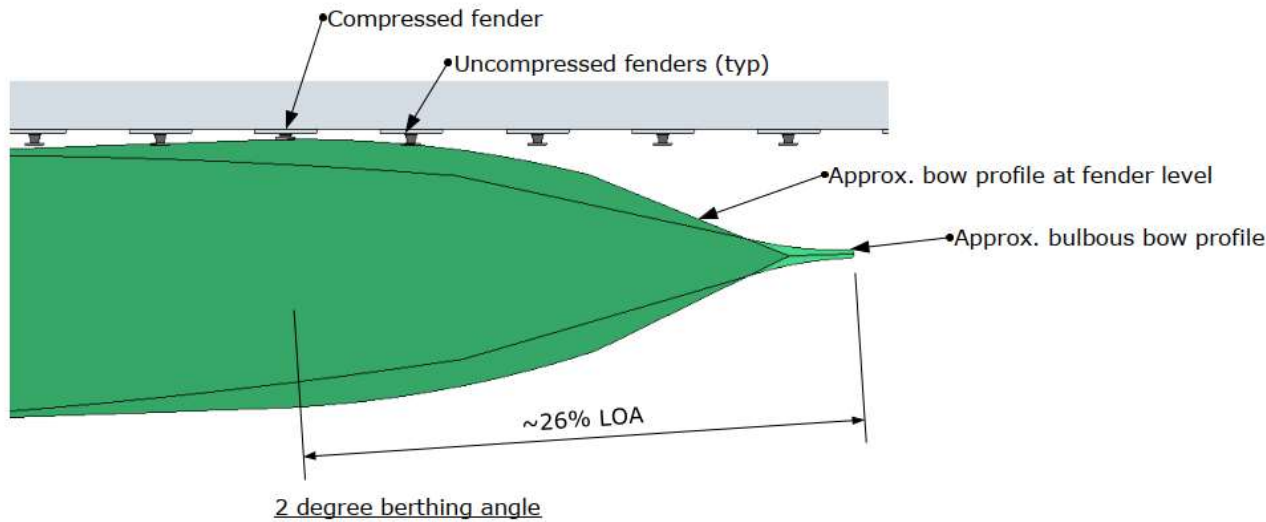
# Completed PCP works and VICT container terminal



# Larger vessels – berthing?

**VESSEL DATA**

	LOA (m)	B (m)	Summer D(m)	Summer Disp (t)	Block volume (see Note 1)	Block coefficient $C_B$ (see note 2)	DWT	DISP/DWT	GT	DISP/GT	$C_g$ at waterline	TPC	Disp @ 14m	Disp @ 14.5m
OOCL Shenzhen	323	42.8	14.53	133,844	200,869	0.65	99,602	1.34	89,097	1.50	0.75	106	128,211	133,525
Sovereign Maersk	347	42.8	14.52	142,796	215,645	0.65	104,696	1.36	91,560	1.56	0.75	114	136,859	142,568
MSC Altamira	299	48.2	14.50	128,517	208,971	0.60	112,150	1.15	108,000	1.19	0.75	111	122,978	128,517



**Sovereign Maersk vessel information:**

Overall length (LOA): 347m  
 Beam: 42.8m  
 Bow radius at fender level: 187m

**WDE Berth 4 & 5 fender information:**

Fender type: SCN1300 E3.0  
 Maximum fender pitch: 20m  
 Fender compression: 936mm (72% of 1300mm)



# Larger vessels – mooring?

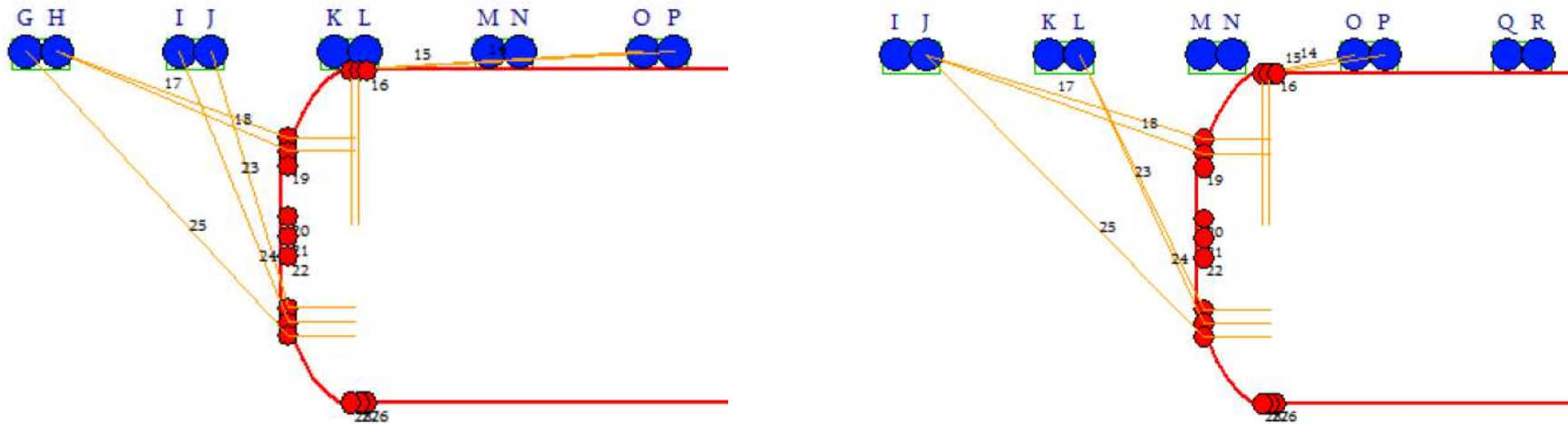


Table 3 Wind speed limits for large vessels at WDE5

	Sovereign Maersk	OOCL Shenzhen
<b>Layout Option 1 - Single vessel in port</b>		
Maximum allowable wind speed	60 kts	60 kts
Lateral movement of vessel at wind limit	2.1m	2.0m
<b>Layout Option 2 - Two vessels in port</b>		
Maximum allowable wind speed	50 kts	53 kts

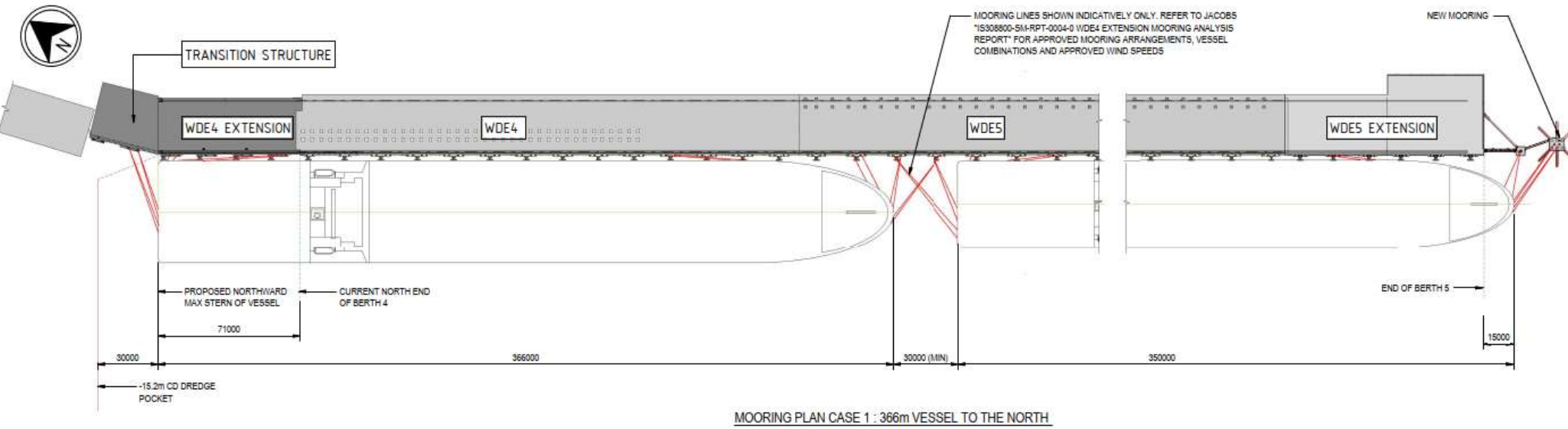


# Webb Dock East 4 Extension project





# Webb Dock East 4 Extension project





# WDE4 Ext - design vessel class type



PARAMETER	VESSEL 1	VESSEL 2	VESSEL 3	VESSEL 4
DISPLACEMENT, MD (T)	176000	137000	118000	14000
OVERALL LENGTH, LOA (m)	366	347	300	130
LENGTH BETWEEN PERPENDICULARS, Lpp (m)	350	332	284	124
BEAM, B (m)	51.2	42.8	42.9	21.2
MAXIMUM DRAFT AT BERTH, D(m)	14.0	14.0	14.0	7.3

# WDE4 Extension - options

- Wharf extension length
- Southern mooring dolphin
- Dredging
- Transition to WDE3 berth pocket
- Demolition
- Construction methodology

1. Fully land-backed combi wall
2. Piled deck over water with revetment and submerged cut-off wall
3. Mixed solution with intermediate sheet pile wall

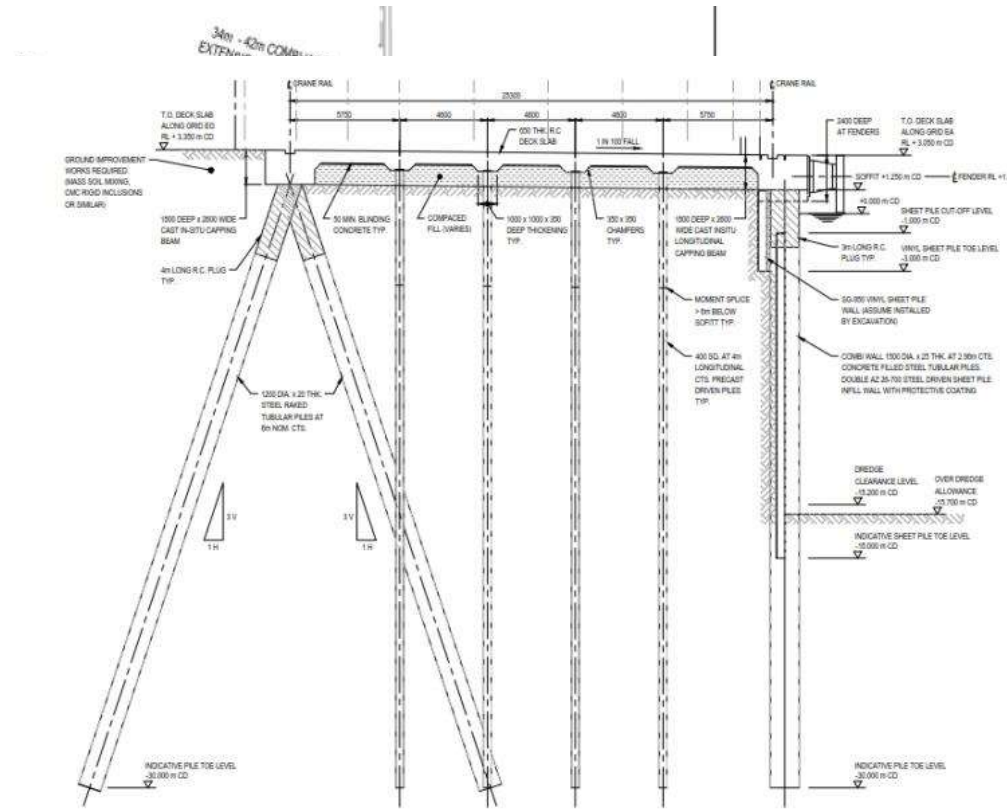
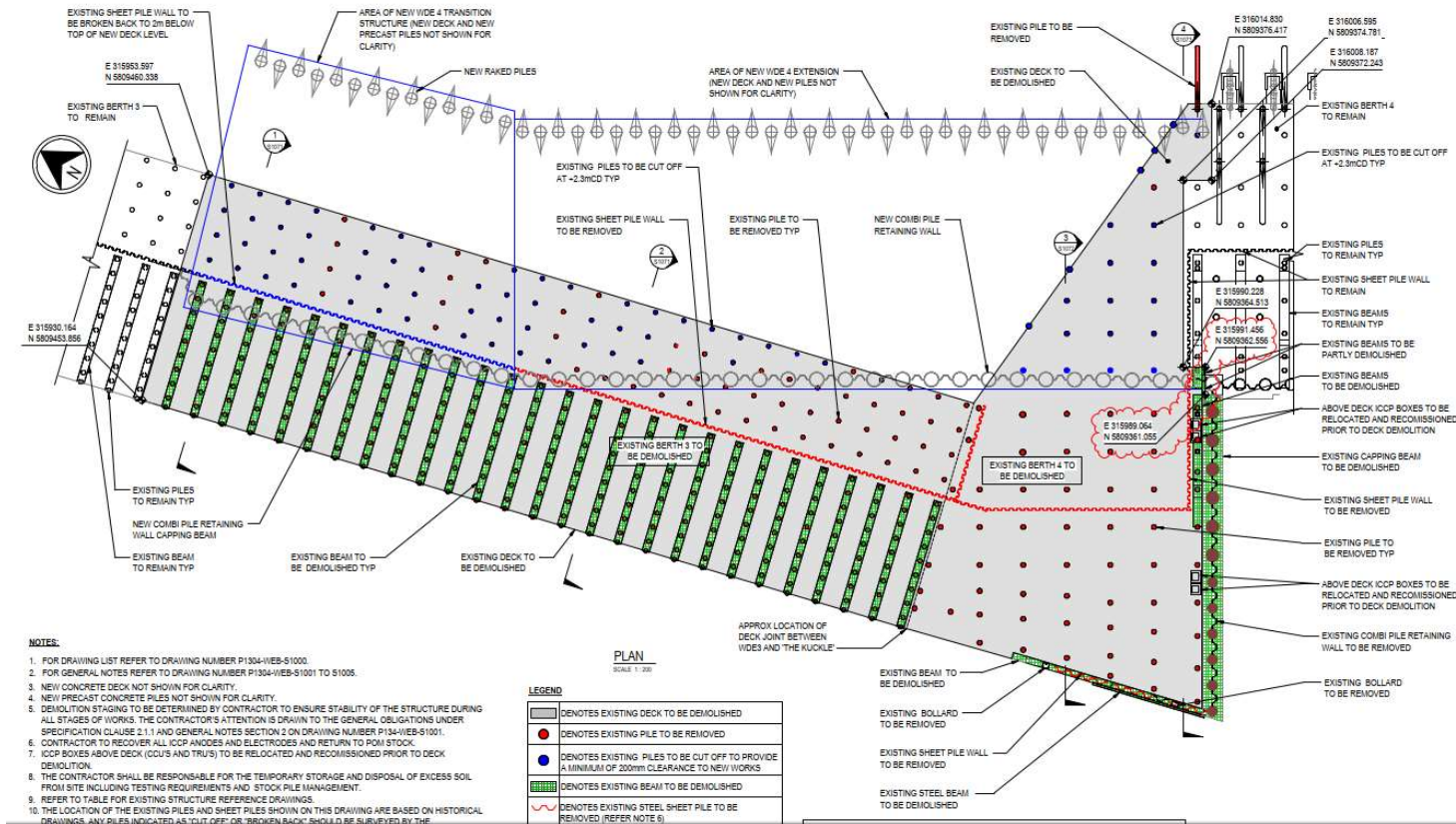


Figure 6.2: Construction option 1 cross section

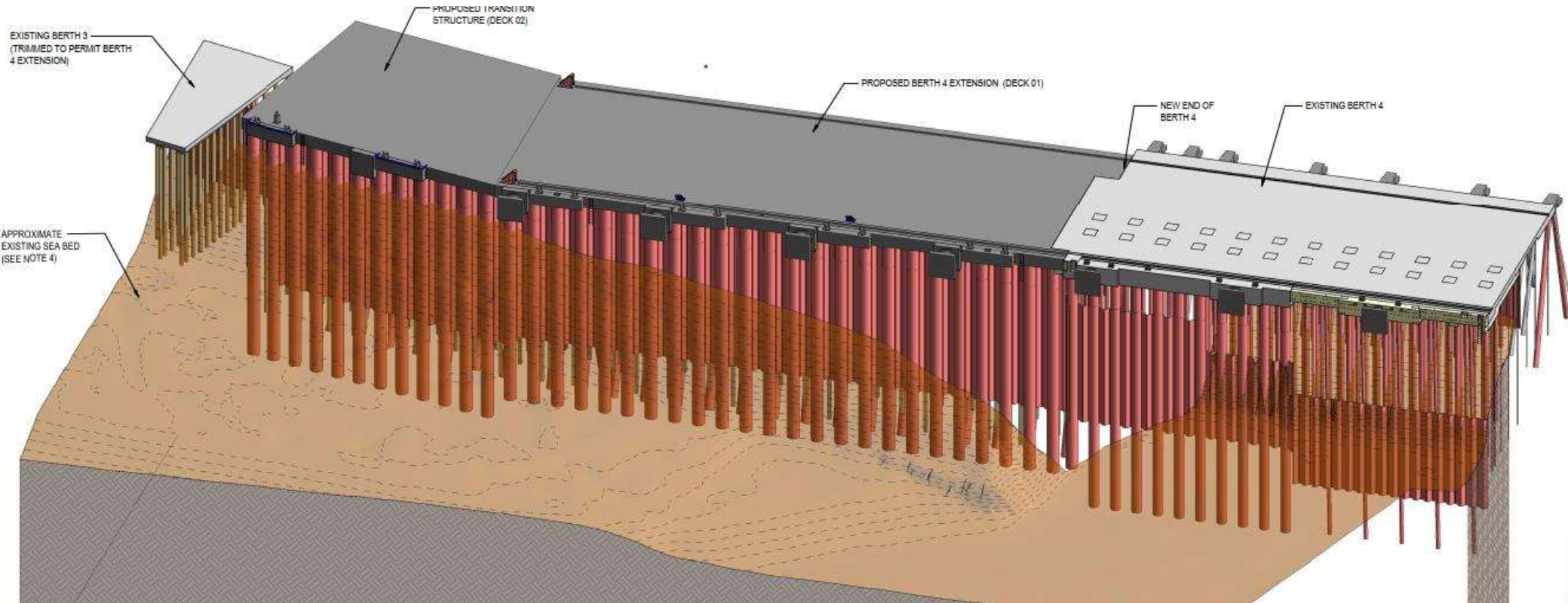


# WDE4 Extension – general arrangement





# WDE4 Extension – general arrangement





## WDE4 Extension – construction





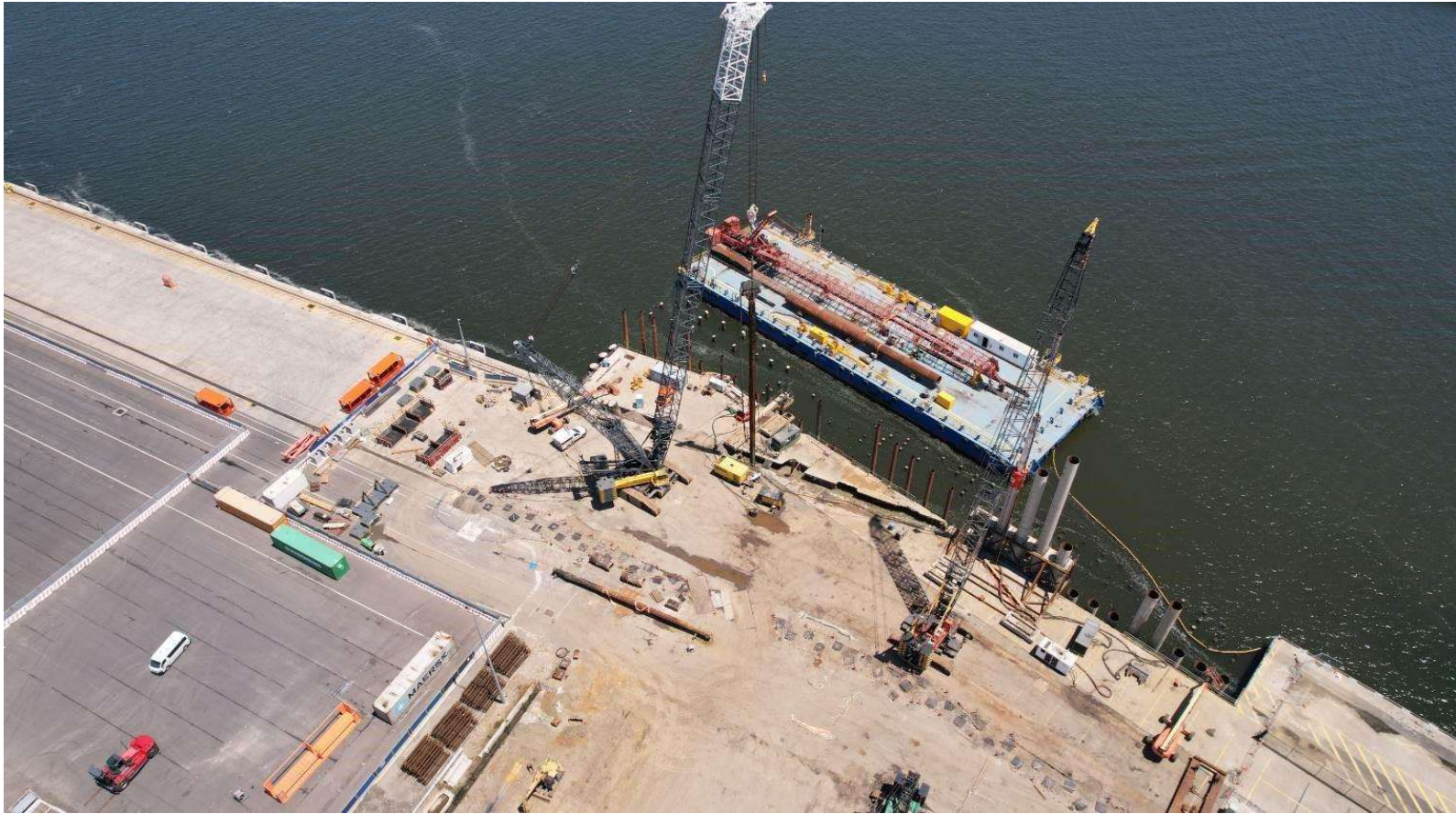


# WDE4 Extension – construction



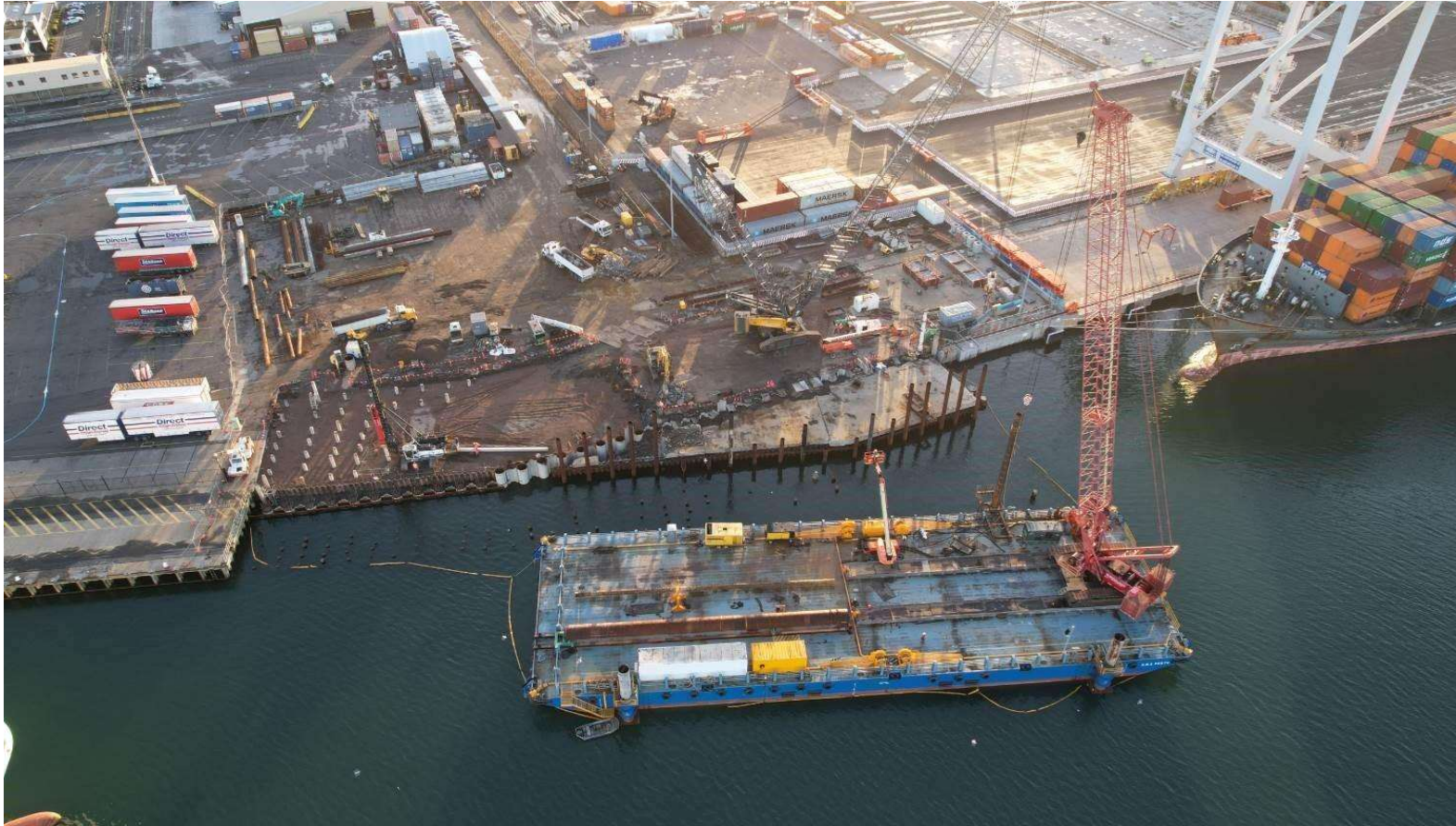


# WDE4 Extension – construction





# WDE4 Extension – construction





## WDE4 Extension – construction





# WDE4 Extension – construction





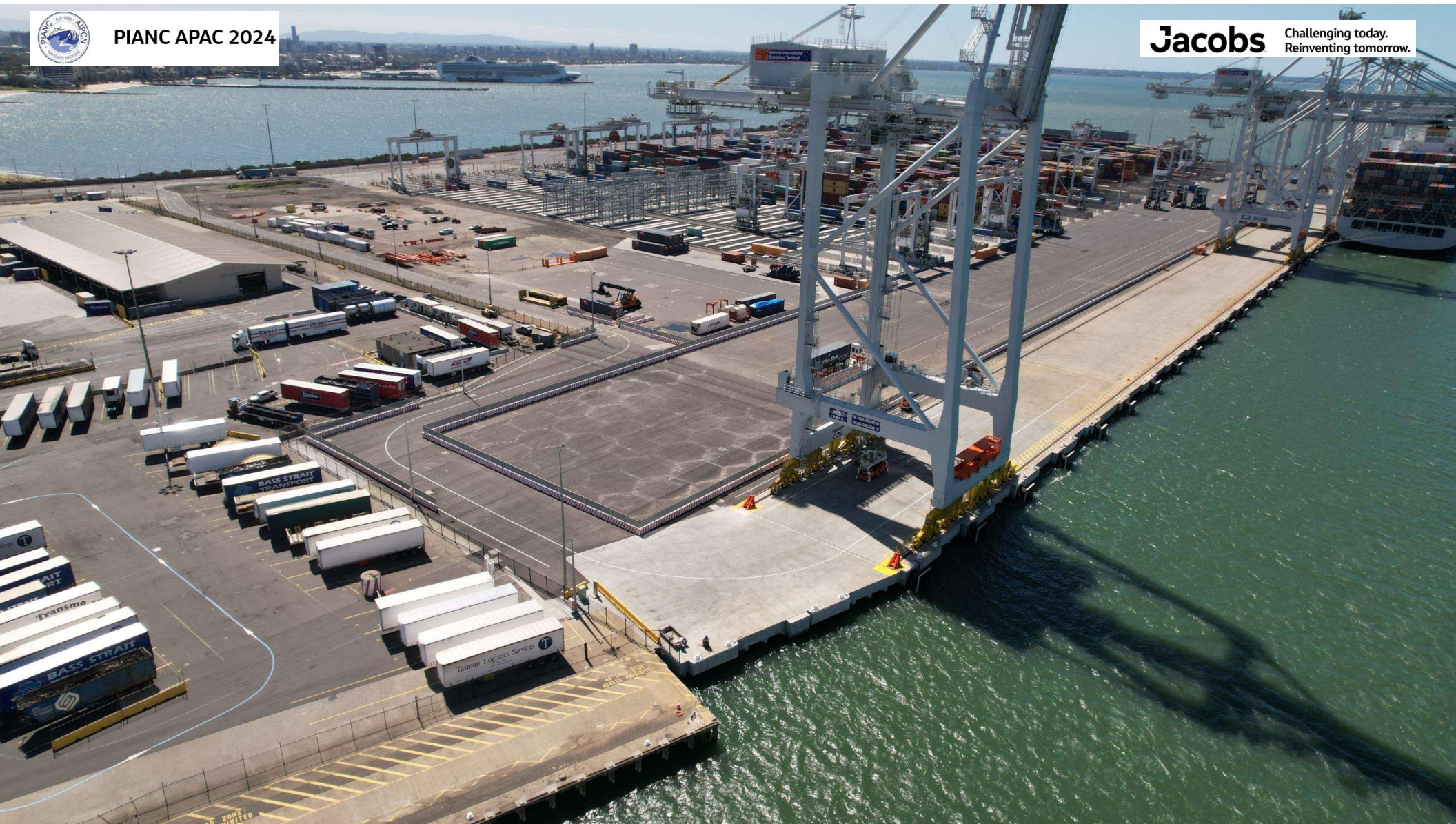
# WDE4 Extension – construction





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# Ship to Shore Crane upgrading





# Ship to Shore Crane upgrading

## Critical wharf elements

- Rear raking piles under lateral load and uplift
- Forward wharf compression piles under front crane rail loads

## Altered crane wheel arrangements

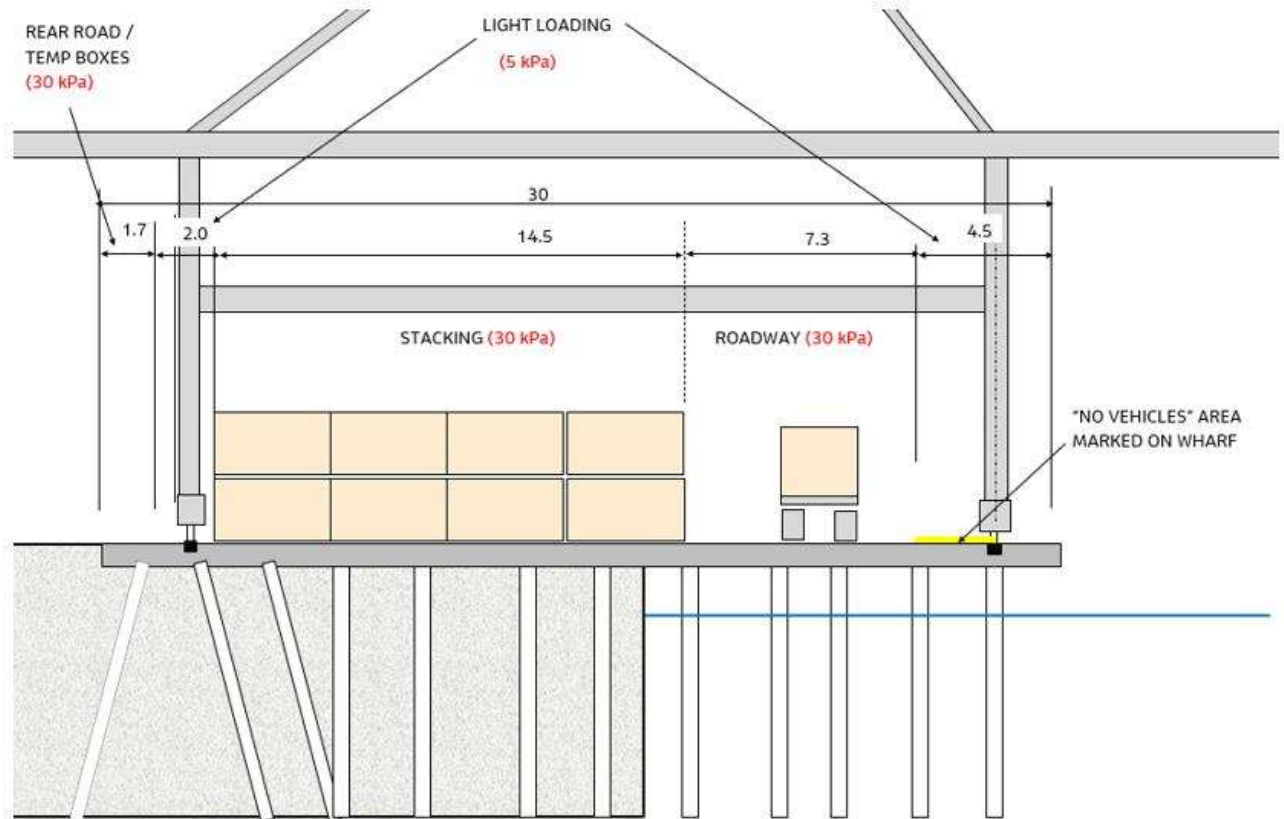
## Crane uplift loads

## Load factoring for ULS conditions

## Modified wharf loading

Allowable ULS crane rail load increased from 56 t/m to 61 t/m

Final crane design details within capacity



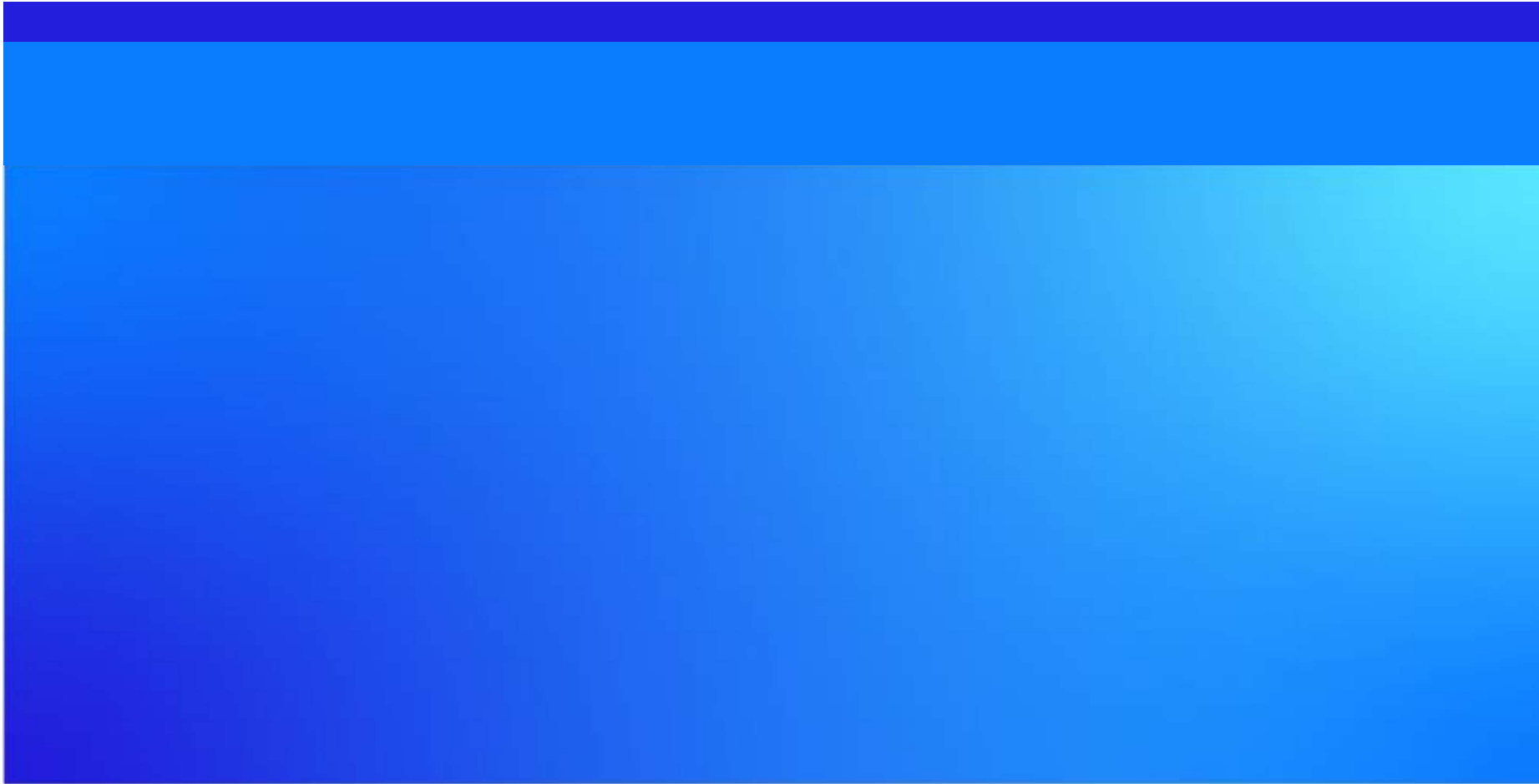


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September 2023 - Largest container ship to visit Australia  
350m / +10,000 TEU  
Photo: ictsi.com.au



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