

DOCUMENTATION OF COASTAL PROTECTION WORKS
UPGRADED ROCK REVETMENT
 AT FLIGHT DECK, 1114 PITTWATER ROAD, COLLAROY, NSW
HORTON COASTAL ENGINEERING PTY LTD

18 Reynolds Cres. Beacon Hill NSW 2100

TEL: +61 (0)407 012 538

peter@hortoncoastal.com.au www.hortoncoastal.com.au

JAMES TAYLOR AND ASSOCIATES

SUITE 301, 115 MILITARY ROAD NEUTRAL BAY NSW 2089 A.C.N. 002 376 454

Tel: (02) 9969 1999 Email: mail@jamestaylorassociates.com.au

DRAWING LIST

Sheet Number	Sheet Title
S01	GENERAL NOTES
S02	UPGRADED REVETMENT PLAN
S03	LANDSCAPE PLAN
S04	EROSION AND SEDIMENT CONTROL PLAN AND WASTE MANAGEMENT PLAN
S10	SECTION 1
S20	ACCESS STAIRS

REFERENCE DOCUMENTS

- SURVEY DRAWING PREPARED BY:
 DETAILED SURVEYS
 Ph. (02) 9913 9525
 REF No. 05/17
 DATED: 01.03.2017
- PRE-STORM PROFILES
 DERIVED FROM OEH PHOTOGRAMMETRIC
 DATA DATED: 05.04.16
- POST-STORM PROFILES
 DERIVED UNSW WATER RESEARCH
 LABORATORY DATA
 DATED: 10.06.16



ROCK

- R1. INDIVIDUAL ROCKS SHALL BE FREE FROM CRACKS, CLEAVAGE PLANES, SEAMS AND DEFECTS WHICH WOULD RESULT IN THE BREAKDOWN OF THE ROCK IN A MARINE ENVIRONMENT
- R2. ROCK SHALL BE ROUGH AND ANGULAR
- R3. ROCK SHALL BE IGNEOUS WITH A MINIMUM DRY DENSITY OF 2,650kg/m³
- R4. PRIMARY ARMOUR ROCK SHALL HAVE A MASS GRADING AS FOLLOWS: MINIMUM MASS OF 2,250kg, MAXIMUM MASS OF 3,750kg, AND THE MEDIAN MASS OF ALL ROCKS SHALL EXCEED 3,000kg (NOMINAL MINIMUM DIAMETER OF 1100mm, MAXIMUM DIAMETER OF 1300mm AND 50%ILE DIAMETER OF 1200mm)
- R5. ROCK SHALL HAVE A MINIMUM SATURATED POINT LOAD STRENGTH INDEX I_{S(50)} OF 5.0MPa
- R6. ROCK SHALL HAVE A MAXIMUM LOS ANGELES ABRASION VALUE OF 30%
- R7. ROCK SHALL HAVE A MAXIMUM SODIUM SULFATE WEIGHT LOSS OF 12%
- R8. ROCK SHALL BE UNWEATHERED, WITHOUT SIGNIFICANT QUANTITIES OF DELETERIOUS MINERALS SUCH AS ANALCIME (HYDRATED SODIUM ALUMINIUM SILICATE) AND EXPANSIVE CLAY MINERALS OR UNFAVOURABLE LINEATIONS WITHIN THE MICROFABRIC
- R9. ROCK SHALL HAVE NOT MORE THAN 15% (BY VOLUME) OLIVINE AND SHALL EXHIBIT NO ZONES OF SECONDARY ALTERATION SUCH AS CHLORITISATION
- R10. ROCK SHALL SHOW NO SIGNS OF STRESS-RELIEF
- R11. ROCK SHALL NOT BE ROLLED OR DROPPED INTO POSITION, IT SHALL BE PLACED.
- R12. PLACED ROCKS SHALL BE WEDGED AND LOCKED TOGETHER SUCH THAT THEY ARE NOT FREE TO MOVE
- R13. THE RATIO OF THE MAXIMUM DIMENSION OF ANY ROCK TO THE MINIMUM DIMENSION, MEASURED AT RIGHT ANGLES TO THE MAXIMUM DIMENSION, SHALL NOT EXCEED 2.5
- R14. THE TOE ROCK IN EACH SECTION IS PERMITTED TO BE LARGER THAN THE MAXIMUM GRADING SPECIFIED ABOVE, AND SHOULD BE AT LEAST THE MAXIMUM MASS. ROCKS WITH A RELATIVELY FLAT BASE ARE PREFERRED, PLACED WITH THE BROADEST DIMENSION ON THE CEMENTED SAND LAYER OR AT -1m AHD (WHATEVER IS HIGHER)

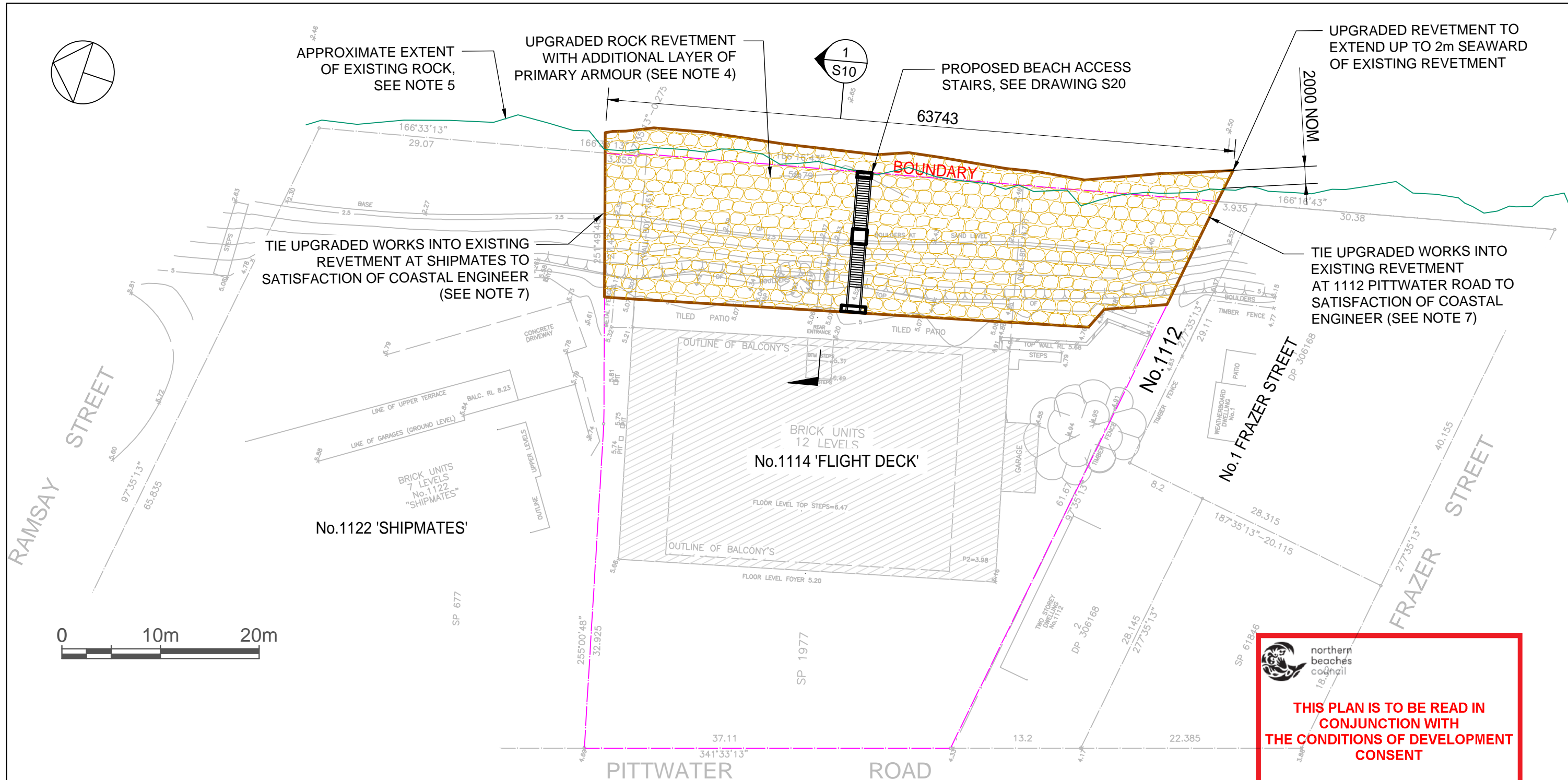
STRUCTURAL

- S1. ALL STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH AS4100
- S2. ALL TIMBER STRUCTURES SHALL BE IN ACCORDANCE WITH AS 1720, AS1684 AS REQUIRED
- S3. ALL PILING AND CONCRETE STRUCTURES SHALL BE IN ACCORDANCE WITH RELEVANT AUSTRALIAN STANDARDS

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P.P.	R.Y.	REVISED DA	17.01.19	C
P.P.	R.Y.	ISSUED FOR DA	24.08.17	B
P.P.	R.Y.	ISSUED FOR DA	15.08.17	A
BY	CHKD	DESCRIPTION	DATE	REV

UPGRADED ROCK REVETMENT COASTAL PROTECTION WORKS AT FLIGHT DECK, 1114 PITTWATER ROAD, COLLAROY, NSW	COASTAL ENGINEERING DESIGN: HORTON COASTAL ENGINEERING PTY LTD 18 Reynolds Cres Beacon Hill NSW 2100 TEL: +61 (0)407 012 538 peter@hortoncoastal.com.au www.hortoncoastal.com.au	STRUCTURAL ENGINEERING DESIGN: James Taylor & Associates Civil & Structural Consulting Engineers SUITE 301, 115 MILITARY ROAD NEUTRAL BAY NSW 2090 TEL: 02 99691999 EMAIL: mail@jamestaylorassociates.com.au	DESIGN P.H.	DRAWN P.P.	PROJECT NO. 5989	
			CHKD. R.Y.			
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			SCALE	DATE JAN 2019		

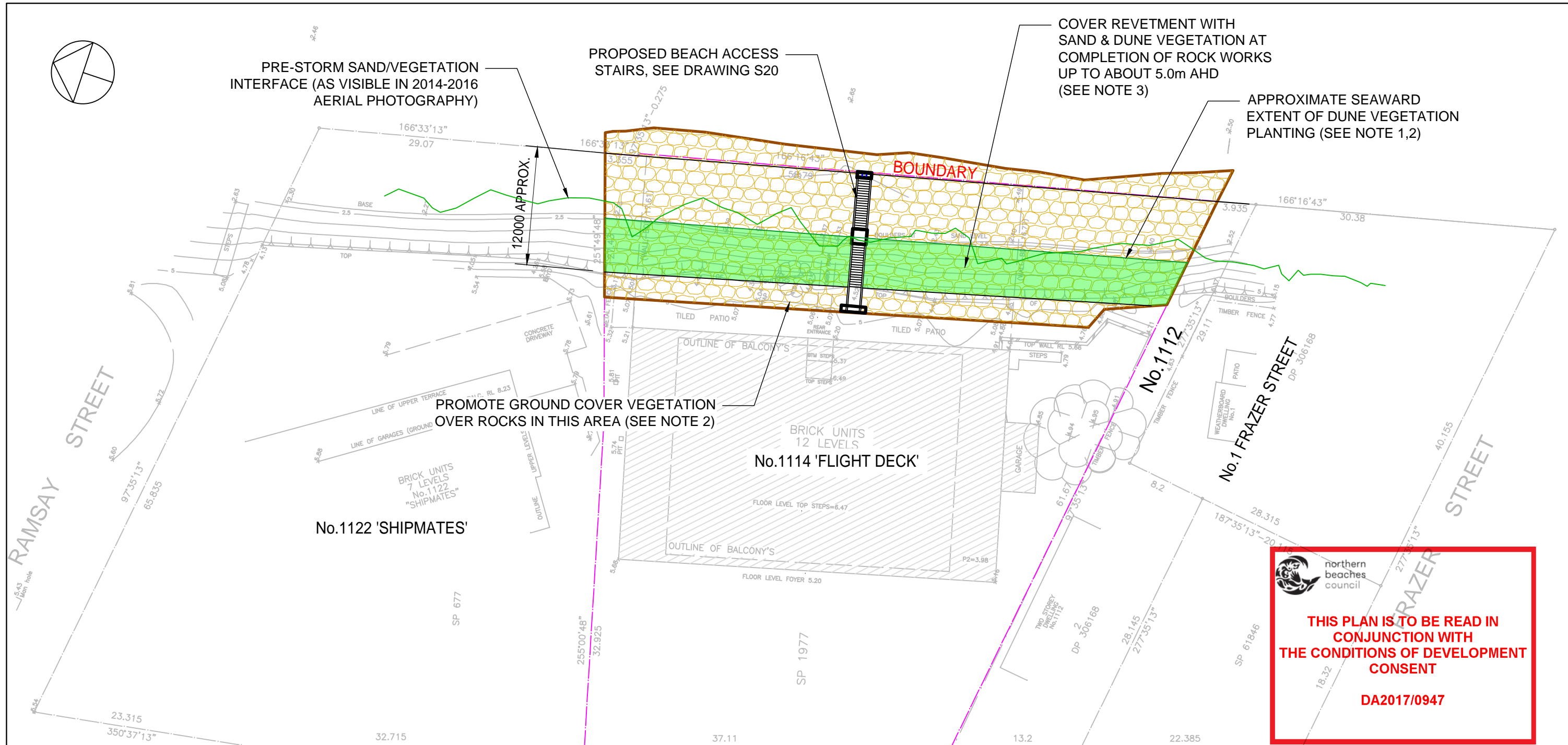


1. BASE INFORMATION FROM SURVEY UNDERTAKEN BY DETAILED SURVEYS DATED 1 MARCH 2017 (REFERENCE 015/17)
2. ELEVATIONS ARE IN METRES RELATIVE TO AUSTRALIAN HEIGHT DATUM (AHD)
3. 2016 ROCK EXTENT DERIVED FROM AERIAL PHOTOGRAPHY DATED 8 AND 10 JUNE 2016 AND CAPTURED BY UNSW WATER RESEARCH LABORATORY
4. FILL GAPS IN EXISTING ROCK ARMOUR WITH NEW ARMOUR AND REMOVE AND REPOSITION EXISTING ROCK AS REQUIRED AND AS DIRECTED BY COASTAL ENGINEER, PRIOR TO PLACING ADDITIONAL PRIMARY ARMOUR LAYER.
5. REPOSITION ANY LOOSE (NON-INTERLOCKED) ROCKS SEAWARD OF TOE AS NECESSARY, MOVING THESE ROCKS LANDWARD TO BE PART OF UPGRADED REVETMENT
6. REVETMENT FOOTPRINT SHOWN IS FOR A TOE LEVEL ON CEMENTED SAND OF ABOUT 0m AHD. THE SEAWARD EXTENT OF THE REVETMENT WOULD INCREASE BY UP TO ABOUT 1.5m IF THE MINIMUM TOE LEVEL OF -1m AHD WAS ADOPTED, OR REDUCE BY ABOUT 0.8m IF THE CEMENTED SAND LEVEL (AND TOE LEVEL) WAS 0.5m AHD
7. A BATTER IN THE ROCK MAY NEED TO BE CREATED TO EFFECTIVELY TIE INTO ADJACENT WORKS, PARTICULARLY TO THE NORTH

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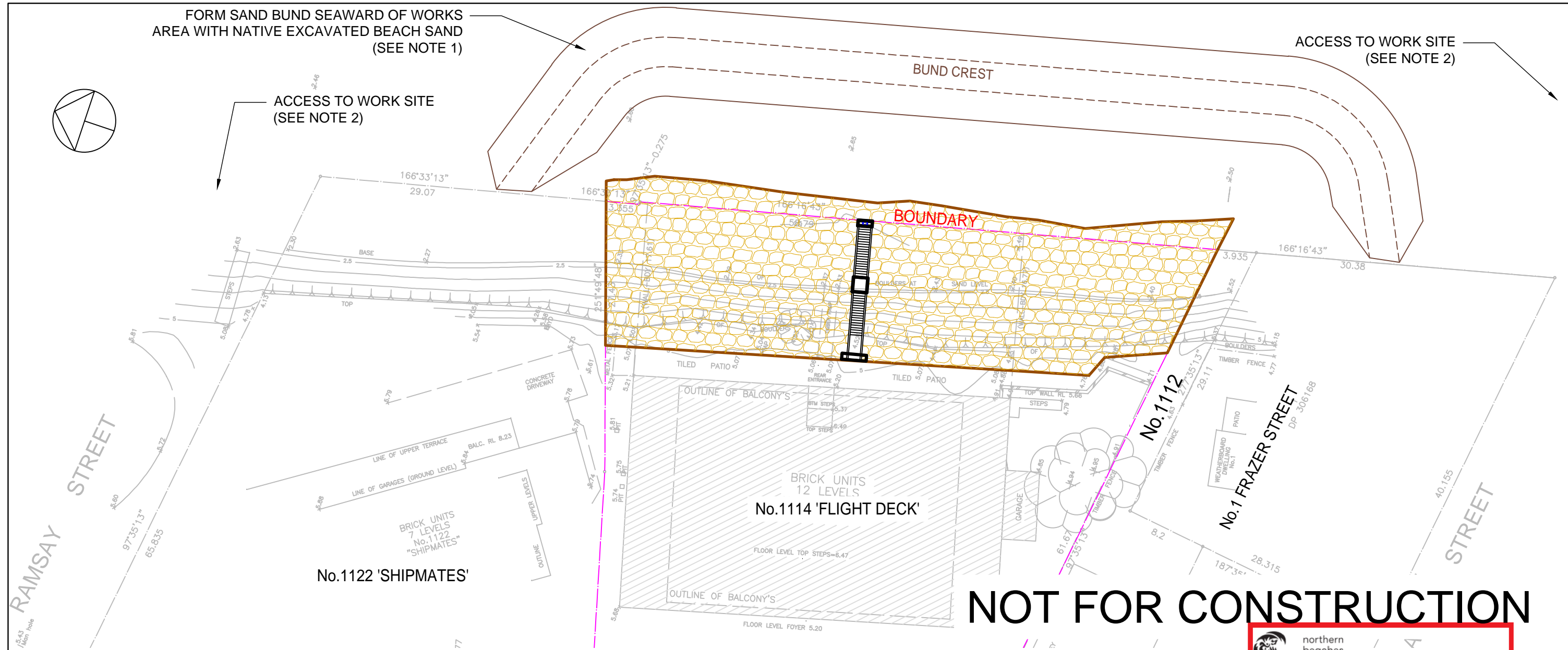
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1. PLANTING DENSITY EXPECTED TO BE 4 TUBESTOCK PLANTS PER m². SEAWARD EXTENT OF VEGETATION PLANTING TO BE CONFIRMED ON SITE (WILL DEPEND ON BEACH STATE AT TIME)
2. POTENTIAL VEGETATION SPECIES ARE DISCUSSED IN A REPORT PREPARED BY DIANE WIESNER AND DATED 6 JUNE 2017.
3. WASH SAND INTO VOIDS OF THE ROCK REVETMENT TO ENSURE SINKHOLES WILL NOT FORM IN REINSTATED BEACH SURFACE, AND SHAPE SAND SEAWARD OF THE REVETMENT TO A NATURAL PROFILE AT THE COMPLETION OF THE ROCK WORKS. EXCAVATED BEACH SAND SEAWARD OF THE SUBJECT PROPERTY MAY BE PLACED OVER THE ROCK REVETMENT, BUT NOT LANDWARD OF IT
4. SAND SIZED MATERIAL FOR BACKFILL (IF ANY) SHALL NOT BE SOURCED FROM THE BEACH SEAWARD OF THE SUBJECT PROPERTY. BACKFILL MATERIAL IMPORTED TO THE SITE SHALL BE CLASSIFIED AS VIRGIN EXCAVATED NATURAL MATERIAL (VENM), EXCAVATED NATURAL MATERIAL (ENM), OR RECYCLED MATERIALS OBTAINED FROM AN EPA LICENSED FACILITY. ANY BACKFILL MATERIAL MUST BE CONSISTENT WITH SECTION 9(D) OF COUNCIL'S COASTAL EROSION POLICY 2016. FOR ENM AND RECYCLED MATERIALS, SUPPORTING DOCUMENTATION SHOULD BE REVIEWED BY A SUITABLY QUALIFIED ENVIRONMENTAL CONSULTANT WHO IS A MEMBER OF THE AUSTRALIAN CONTAMINATED LAND CONSULTANTS ASSOCIATION INC. ALL BACKFILL SHALL BE TO THE SATISFACTION OF THE GEOTECHNICAL ENGINEER



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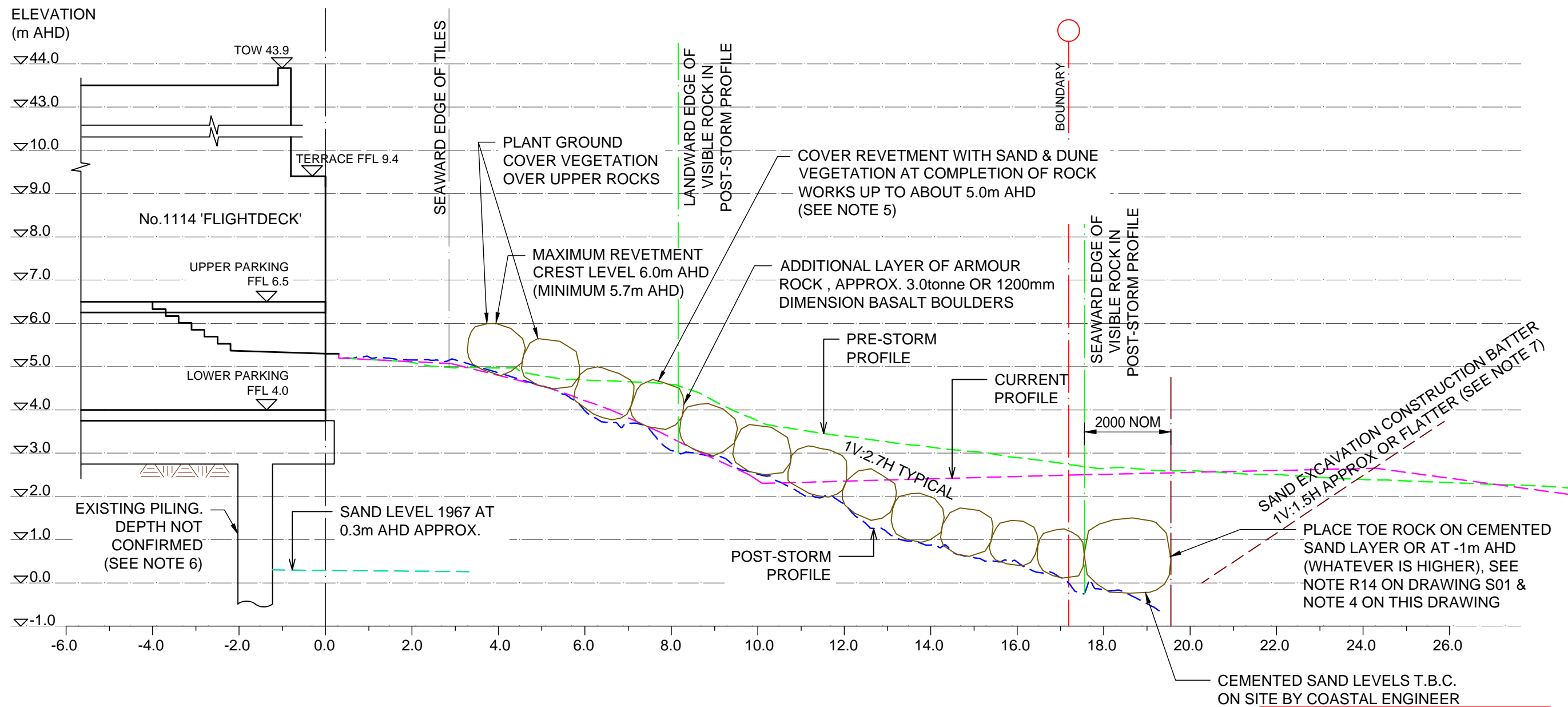
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1. BUND MAY BE FORMED OVER A PORTION OR OVER THE ENTIRETY OF THE WORKS AREA DEPENDING ON CONSTRUCTION PROGRAM AND WAVE AND WATER LEVEL CONDITIONS, AS DIRECTED BY COASTAL ENGINEER OR CONTRACTOR. TEMPORARY STEEL SHEET PILING COULD ALSO BE USED IF PREFERRED BY CONTRACTOR, IN CONJUNCTION WITH A BUND, TO PROVIDE ADDITIONAL PROTECTION TO WORKS AREA AGAINST MILD COASTAL STORMS (SUBJECT TO COUNCIL APPROVAL THROUGH "WORKING ON AND ACCESS TO RESERVES PERMIT")
2. ACCESS TO WORKS SITE WILL BE VIA RAMSAY AND/OR FRAZER STREET AND/OR FRAZER RESERVE (SOUTH OF 1104 PITTWATER ROAD), AS AGREED BETWEEN CONTRACTOR AND COUNCIL
3. RUBBLE AND OTHER MATERIALS OR WASTE THAT WOULD BE UNSUITABLE ON A BEACH ARE TO BE SEPARATED AND STOCKPILED WHERE ENCOUNTERED DURING EXCAVATION (WITH RUBBLE POTENTIALLY TO BE REUSED, SEE NOTE 8). EXCAVATED AND/OR IMPORTED ROCK BOULDERS MAY BE TEMPORARILY PLACED ON BEACH, ON LANDWARD SIDE OF BUND (WHERE POSSIBLE), AS DIRECTED BY COASTAL ENGINEER, TO PROVIDE SOME PROTECTION TO WORKS AREA
4. ALL DELETERIOUS MATERIALS AND EQUIPMENT THAT COULD BE DAMAGED ARE TO BE REMOVED FROM WORKS AREA IF BUND OR SHEET PILING CANNOT BE MAINTAINED DUE TO ELEVATED WAVES AND WATER LEVELS. WORKS IN BEACH AREA MAY NEED TO TEMPORARILY CEASE UNDER THESE CONDITIONS
5. ALL MATERIAL STOCKPILES ARE TO BE LOCATED LANDWARD OF THE EXISTING ROCK REVETMENT. ANY STOCKPILE LOCATIONS ON COUNCIL LAND ARE TO BE AGREED BETWEEN COUNCIL AND CONTRACTOR
6. WHEN PLACING SAND OVER THE REVETMENT AT THE COMPLETION OF ROCK WORKS, SCREENING IS TO BE UNDERTAKEN TO REMOVE RUBBLE, ROCK FRAGMENTS AND OTHER MATERIALS THAT WOULD BE UNSUITABLE ON A BEACH. ALSO SEE NOTE 3 ON DWG S03
7. ANY WASTE MATERIALS SHALL BE DISPOSED OF AT AN APPROPRIATE WASTE MANAGEMENT FACILITY OFF SITE.
8. WASTE AND RUBBLE MATERIALS MAY BE BURIED LANDWARD OF THE REVETMENT AS AGREED BY GEOTECHNICAL ENGINEER, SUBJECT TO A WASTE CLASSIFICATION UNDERTAKEN BY A SUITABLY QUALIFIED ENVIRONMENTAL CONSULTANT (WHO IS A MEMBER OF THE AUSTRALIAN CONTAMINATED LAND CONSULTANTS ASSOCIATION INC). ALSO SEE NOTE 4 ON DWG S.03
9. BUND IS TO BE REMOVED, WITH SAND SHAPED TO A NATURAL PROFILE, PRIOR TO COMPLETION OF THE WORKS

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1. PRE-STORM PROFILE DATED 5 APRIL 2016, SOURCED FROM OEH
2. POST-STORM PROFILE DATED 10 JUNE 2016, SOURCED FROM UNSW WATER RESEARCH LABORATORY
3. CURRENT PROFILE FROM DETAILED SURVEYS SURVEY DATED 1 MARCH 2017
4. PLACE LONGEST TOE ROCK HORIZONTAL DIMENSION ALONGSHORE TO MINIMISE SEAWARD EXTENT OF WORKS.
5. WASH SAND INTO VOIDS OF THE ROCK REVETMENT TO ENSURE SINKHOLES WILL NOT FORM IN REINSTATED BEACH SURFACE, AND SHAPE SAND SEAWARD OF THE REVETMENT TO A NATURAL PROFILE AT THE COMPLETION OF THE ROCK WORKS. EXCAVATED BEACH SAND SEAWARD OF THE SUBJECT PROPERTY MAY BE PLACED OVER THE ROCK REVETMENT, BUT NOT LANDWARD OF IT
6. THE FLIGHT DECK TOWER IS UNDERSTOOD TO STAND ON APPROXIMATELY 180 CONCRETE PILES DRIVEN TO SOLID ROCK AT DEPTHS OF ABOUT 17.1m (SEE "COASTAL ENGINEERING REPORT FOR CONSTRUCTION OF UPGRADED COASTAL PROTECTION WORKS AT FLIGHT DECK, 1114 PITTWATER ROAD COLLAROY", DATED 20 SEPTEMBER 2017)
7. IT WOULD BE DIFFICULT TO MAINTAIN A TEMPORARY EXCAVATION BATTER AT 1V:1.5H IN SAND BELOW THE GROUNDWATER LEVEL. THEREFORE, TEMPORARY SUPPORT OF THE EXCAVATION (SUCH AS WITH SAND BAGS) AND/OR USE OF SUITABLE ROCK TO FORM A BATTER OF APPROXIMATELY 1V:2.5H MAY BE REQUIRED BELOW THE GROUNDWATER LEVEL



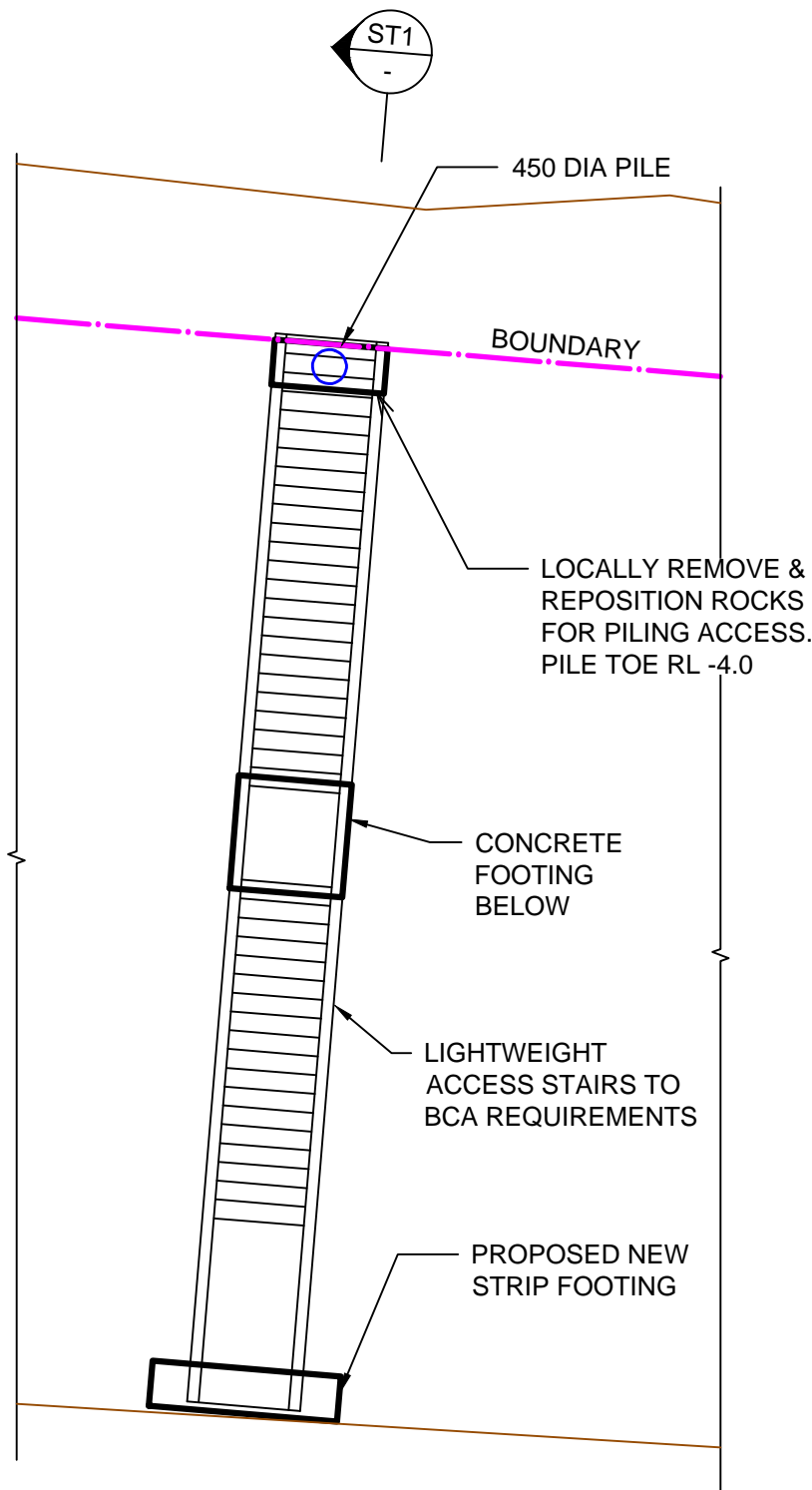
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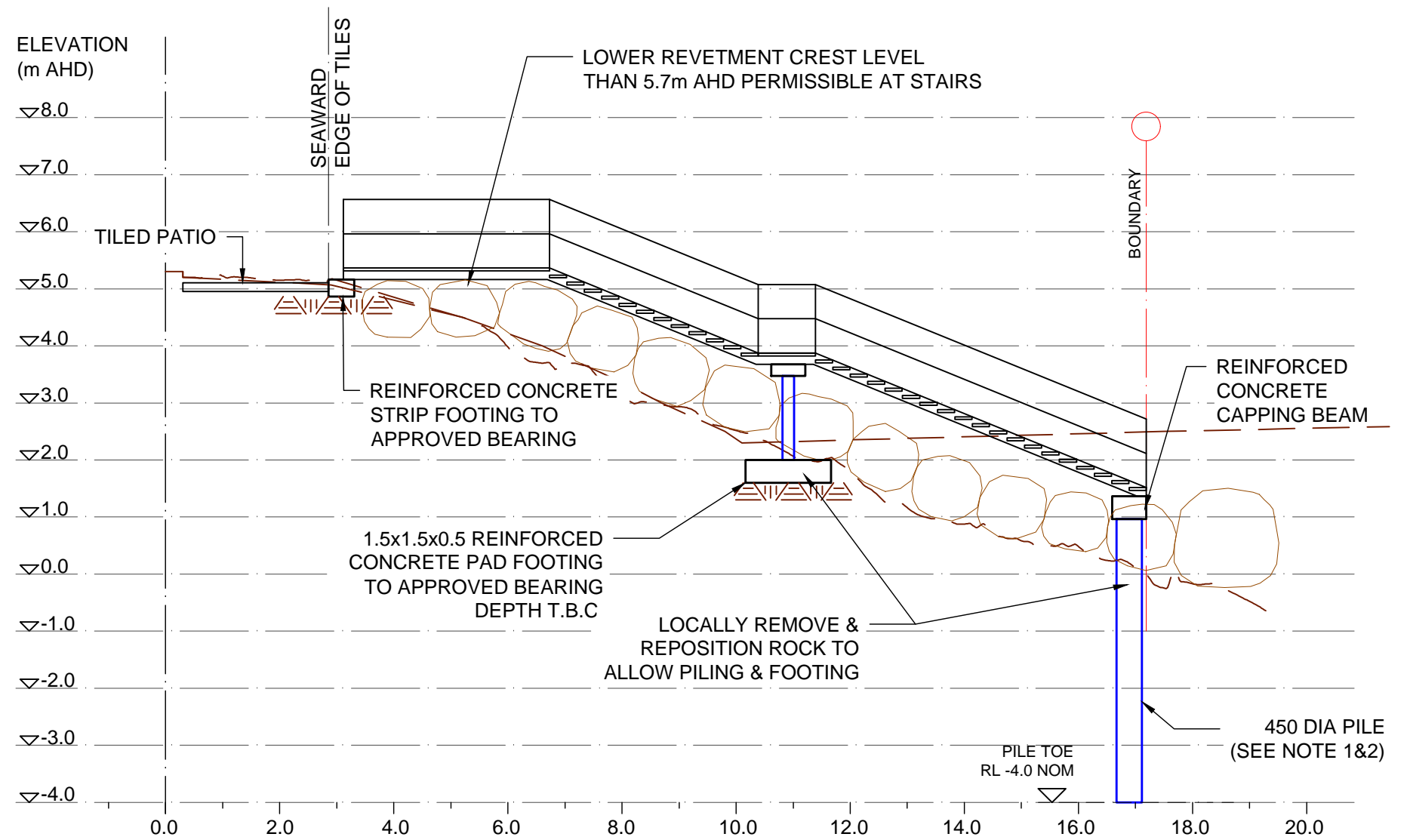
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ACCESS STAIRS

SCALE 1:100



ST1 Section ST1
1 : 100



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1. IF AGREED BY A COASTAL ENGINEER, PILE MAY BE SUBSTITUTED WITH A CONCRETE FOOTING SITTING ON A SUITABLE SELECTED ARMOUR ROCK BOULDER, WITH VERTICAL STARTER BARS PENETRATING THE BOULDER AND TIED INTO THE FOOTING REINFORCEMENT.
2. SCREW PILES MAY BE SUBSTITUTED FOR 450Ø CFA PILE. ALLOW FOR RAKING PILE.

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	<h2 style="font-size: 24px;">ACCESS STAIRS</h2>	COPYRIGHT: THIS DESIGN AND PLANS ARE NOT TO BE USED OR REPRODUCED WHOLLY OR IN PART WITHOUT WRITTEN PERMISSION FROM HORTON COASTAL ENGINEERING AND JAMES TAYLOR & ASSOCIATES	SCALE 1 : 100	DRAWING NO. <h2 style="text-align: center;">S20</h2>	REV <h2 style="text-align: center;">C</h2>