



Seaspan Vancouver Shipyards Outfitting Pier Extension

**Appendix E     DETAILED DESIGN DRAWINGS**



**GENERAL NOTES**

**GENERAL**

- THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE TECHNICAL SPECIFICATIONS. FOR CONVENIENCE, CERTAIN EXTRACTS ARE REPRODUCED HERE. IN THE EVENT OF CONFLICT, THE SPECIFICATIONS WILL GOVERN AND CONFLICT SHALL BE BROUGHT TO THE ATTENTION OF STANTEC.
- BATHYMETRY IS DEVELOPED FROM POINT FILE INFORMATION DRAWINGS PROVIDED BY MCCOI MARINE LTD.  
BATHYMETRY SURVEY CONTOUR PLAN, DATED JUL 02, 2020  
BATHYMETRY SURVEY SPOT ELEVATION PLAN, DATED JUL 02, 2020  
BATHYMETRY SURVEY RELIEF IMAGE PLAN, DATED JUL 02, 2020
- ALL DEPTHS ARE IN METERS AND ARE REFERENCED TO CHART DATUM, TO CONVERT TO GEODETIC THE GEODETIC DATUM (0m GD) IS 2.98 METERS HIGHER THAN THE CHART DATUM (0m CD).
- HORIZONTAL DATUM IS BASED ON UTM NAD83, ZONE 10 GROUND LEVEL COORDINATES.
- DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
- THE CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND DETAILS PRIOR TO FABRICATION AND/OR CONSTRUCTION. ANY DISCREPANCIES SHALL BE PROMPTLY BROUGHT TO THE ATTENTION OF STANTEC.

**DEMOLITION**

- THE CONTRACTOR SHALL VERIFY THE EXTENT AND LOCATION OF ITEMS TO BE REMOVED AND ITEMS TO REMAIN WITH THE ENGINEER OF RECORD.
- THE CONTRACTOR SHALL PREVENT MOVEMENT, SETTLEMENT OR DAMAGE TO ADJACENT STRUCTURES THAT REMAIN IN PLACE.

**EXCAVATION**

- UNDERCUTTING OF SLOPES SHALL NOT BE ALLOWED. SLOPES SHALL BE EXCAVATED STARTING AT THE UPPER END OF THE SLOPE.
- INTERIM SLOPES AND FINAL SLOPES SHALL NOT BE STEEPER THAN THE FINAL DESIGN SLOPE AS INDICATED ON THE DRAWINGS. THE CONTRACTOR MAY BOX-CUT OR STEP-CUT THE SLOPES WITH A MAXIMUM VERTICAL CUT OF 1.0m IN HEIGHT.
- THE CONTRACTOR SHALL CHECK THE EXCAVATED AREA FOR SOFT SPOTS AS SOON AS PRACTICAL AFTER IT IS COMPLETED.

**STEEL PIPE PILE SUPPLY AND FABRICATION**

- PIPE PILES SHALL BE IN ACCORDANCE WITH ASTM A572 GRADE50 KSI (WITH A MINIMUM YIELD STRENGTH OF 350 MPa). SEE ADDITIONAL REQUIREMENTS IN SPECIFICATION - SUPPLY OF STEEL PILES.
- REINFORCING PLATE SHALL HAVE A MINIMUM CVN TOUGHNESS OF 27 J AT -20°C.
- IF FIELD SPICINGS BECOMES NECESSARY, SPICINGS SHALL BE MADE BY FULL PENETRATION BUTT WELDS WITH BACKING PLATE PROCEDURES CONFORMING TO CSA W59. FIELD SPICING IS ONLY PERMITTED AS SHOWN ON THE DRAWINGS OR WHEN APPROVED BY STANTEC.
- THE CONTRACTOR IS RESPONSIBLE FOR THE INSPECTION OF ALL SHOP AND FIELD WELDS.
- PIPE SECTIONS SHORTER THAN 6 METERS IN LENGTH SHALL NOT BE USED FOR FABRICATION INTO PILES UNLESS APPROVED BY STANTEC.
- STEEL PIPE PILES SHALL BE MANUFACTURED IN STRICT ACCORDANCE WITH SPECIFICATION - SUPPLY OF STEEL PILES.

**CATHODIC PROTECTION**

- OUTFITTING PIER PILES SHALL BE PROTECTED BY AN IMPRESSED CURRENT CP-SYSTEM.

**STEEL PIPE PILE INSTALLATION**

- PILE LOCATIONS PROVIDED ON THE DRAWINGS ARE TO CUT-OFF ELEVATIONS.
- THE CONTRACTOR SHALL CLEARLY MARK EACH PILE WITH ITS NUMBER AND REFERENCED OVERALL LENGTH.
- THE CONTRACTOR SHALL CUT OFF PILES NEATLY AND SQUARELY AT THE ELEVATIONS INDICATED AND REMOVE CUT-OFF LENGTHS FROM SITE.
- THE INTEGRITY OF THE PILES DURING CONSTRUCTION SHALL REMAIN AT ALL TIMES THE RESPONSIBILITY OF THE CONTRACTOR.
- INSTALLATION OF EACH PILE SHALL BE APPROVED BY STANTEC. PIPE PILES SHALL BE INSTALLED TO THE MINIMUM TIP ELEVATIONS INDICATED.
- STEEL PIPE PILE INSTALLATION TOLERANCES:
  - PILE HEADS SHALL BE WITHIN 75mm OF LOCATIONS INDICATED.
  - OVERALL PILE SHALL BE ±1% FROM INTENDED BATTER OR VERTICALITY.
  - ANY SECTION OF PILE SHALL NOT BE MORE THAN 1/150 OF LENGTH OUT OF VERTICAL ALIGNMENT.
  - PILE CUT-OFF SHALL BE WITHIN 10mm OF ELEVATIONS INDICATED.
- MORE INFORMATION FOR STEEL PIPE PILES IS SPECIFIED IN SPECIFICATION SUPPLY OF STEEL PILE.
- IT IS ACCEPTABLE TO INSTALL PILING WITH VIBRATORY METHODS FOR THE ENTIRE EMBEDMENT LENGTH.
- AFTER CUTTING PIPE PILES TO REQUIRED TOP ELEVATION, TOP OF PILE TO BE MADE SMOOTH AND ROUND WITH R=6mm.
- THE CONTRACTOR SHALL COMPLETE PILE DRIVING IN CONFORMANCE WITH BEST MANAGEMENT PRACTICES FOR PILE DRIVING RELATED OPERATIONS - BC MARINE AND PILE DRIVING CONTRACTORS ASSOCIATION (BCMPDCA) (DRAFT DATED MARCH 2003) AND APPROPRIATE LOCAL NOISE BY-LAWS.
- THE CONTRACTOR SHALL COMPLY WITH ALL REGULATORY AND ENVIRONMENTAL REQUIREMENTS FOR DRIVING PILES IN-WATER TO LIMIT OVERPRESSURE TO A LEVEL ACCEPTABLE TO THE REGULATORY AGENCIES. DESIGN OF BUBBLE CURTAIN OR SIMILAR SYSTEMS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, BUT MUST ADHERE TO BCMPDCA (2003) GUIDELINES AND MEET DEPARTMENT OF FISHERIES AND OCEANS FISHERIES REQUIREMENTS.

**CONCRETE**

- CONCRETE MATERIALS AND CONSTRUCTION SHALL CONFORM TO CSA A23.1/A23.2.
- THE CONTRACTOR SHALL ENSURE CONCRETE SUPPLIER'S CERTIFICATION FOR BOTH BATCH PLANT AND MATERIALS MEET CSA A23.1/A23.2 REQUIREMENTS AND BCMA REQUIREMENTS.
- CONCRETE MIX DESIGNS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS AND BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW:
  - CLASS OF EXPOSURE ACCORDING TO CSA A23.1: C-1 AND S-3
  - MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS: 45 MPa
  - MAXIMUM AGGREGATE SIZE: 20 mm
- MINIMUM COVER TO REINFORCEMENT:
  - CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 75 mm
  - SOFFITS OF BEAMS AND PILE CAPS: 60 mm
  - ELSEWHERE (UNLESS NOTED OTHERWISE): 50 mm
- SET EMBEDDED STEEL TRUE TO POSITION SHOWN WITHIN ±12 mm.
- PLACE ANCHOR BOLTS TO MEET THE FOLLOWING TOLERANCES:
  - BOLTS WITHIN A GROUP: ±3 mm -BOLT GROUP TO ADJACENT BOLT GROUP: ±6 mm
  - PROJECTION FROM DESIGNATED SURFACES: -0 TO +6 mm
- ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 25 mm UNLESS NOTED OTHERWISE.
- CONCRETE SURFACES SHALL HAVE THE FOLLOWING FINISH IN ACCORDANCE WITH CSA A23.1 UNLESS NOTED OTHERWISE:
  - BROOM FINISH FOR TOP SURFACES EXPOSED TO TRAFFIC (VEHICLE OR PEDESTRIAN)
  - ROUGH-FORM FINISH FOR SURFACES NOT EXPOSED TO PUBLIC VIEW
  - SMOOTH-FORM FINISH FOR TOP SURFACES AND FOR SURFACES EXPOSED TO PUBLIC VIEW
- CONSTRUCTION JOINT LOCATIONS SHALL BE PROPOSED BY THE CONTRACTOR AND ARE SUBJECT TO PRIOR APPROVAL BY STANTEC. ALL CONSTRUCTION JOINTS SHALL BE ROUGHENED TO A 5 mm AMPLITUDE AND THOROUGHLY CLEANED.
- ALL FORMWORK TIES, BOLTS AND OTHER METAL SHALL BE REMOVED OR CUT BACK 25 mm FROM THE CONCRETE SURFACE. ALL TIE HOLES, HONEY COMBS AND VOIDS OVER 25 mm SHALL BE FILLED WITH AN APPROVED CEMENTITIOUS PATCHING MORTAR.

**CONCRETE REINFORCEMENT**

- REINFORCEMENT STEEL SHALL BE DEFORMED BARS TO CSA G30.18, GRADE 400R (F<sub>y</sub>=400 MPa).
- REINFORCEMENT STEEL FABRICATION SHALL BE IN ACCORDANCE WITH CSA A23.1/A23.2.
- SPICES SHALL BE USED ONLY AS PERMITTED BY STANTEC. APPROVED LAP SPICES SHALL BE IN ACCORDANCE WITH CSA S6 CLASS B TENSION SPICES UNLESS DIRECTED OTHERWISE.
- SPICES NOT INDICATED ON THE DRAWINGS SHALL BE STAGGERED TO AVOID CONGESTION.
- NO WELDING OF REINFORCEMENT STEEL IS PERMITTED UNLESS DIRECTED OTHERWISE BY THE ENGINEER FOR RECORD IN WRITING.
- REINFORCEMENT DESIGNATION:
  - H1E: STANDARD 90 DEGREE HOOK AT ONE END
  - H2E: STANDARD 90 DEGREE HOOK AT BOTH ENDS
- ONLY NON-FERROUS REINFORCING BAR SUPPORTS (CHAIRS) SHALL BE USED.
- UNLESS NOTED OTHERWISE ON THE DRAWINGS THE FOLLOWING REINFORCEMENT EMBEDMENT LENGTHS SHALL APPLY. USE TENSION AND COMPRESSION EMBEDMENT LENGTHS AS INDICATED ON THE DRAWINGS. USE TENSION EMBEDMENT WHERE NO SPLICE TYPE IS INDICATED ON THE DRAWINGS.

BAR SIZE	TOP REBAR EMBEDMENT (mm)		BOTTOM REBAR EMBEDMENT (mm)		
	CONCRETE STRENGTH (MPa)		CONCRETE STRENGTH (MPa)		
	30 (+)		35	40	45
10M	200	300	300	300	300
15M	280	390	365	365	345
20M	345	475	445	445	420
25M	445	765	715	715	675
30M	525	910	850	850	800
35M	630	1085	1015	1015	960

**STRUCTURAL STEEL**

- THE CONTRACTOR SHALL FABRICATE AND ERECT STRUCTURAL STEEL TO CSA S16.
- STRUCTURAL STEEL SHALL CONFORM TO CSA G40.20/G40.21 WITH THE FOLLOWING GRADES AS A MINIMUM:
  - W SHAPES, HSS AND PLATES : GRADE 350W
  - STANDARD CHANNELS AND ANGLES: GRADE 300W
  - WELDED SECTIONS: GRADE 350W
- THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS FOR ALL STEEL WORK PRIOR TO COMMENCING FABRICATION. ENGINEER'S REVIEW OF FABRICATION DRAWINGS WILL BE TO ASCERTAIN COMPLIANCE WITH THE DESIGN CONCEPT ONLY AND SHALL NOT RELIEVE THE FABRICATOR OF RESPONSIBILITIES UNDER THEIR CONTRACT.

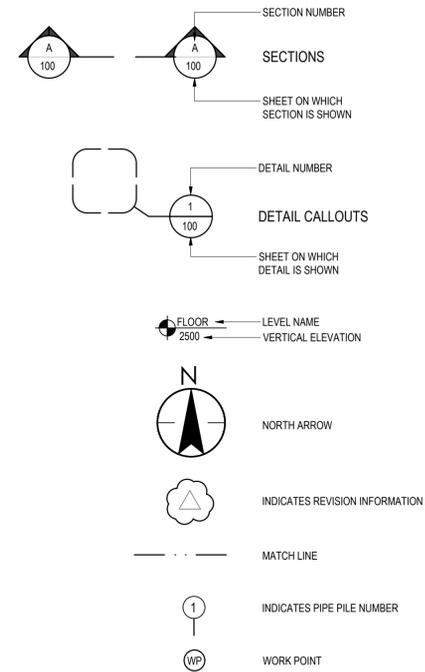
**MISCELLANEOUS METALS**

- MISCELLANEOUS PIPE FOR METAL FABRICATIONS AND HANDRAILS SHALL CONFORM TO ASTM A53 TYPE XS, GRADE A.
- GUSSET PLATES AND STIFFENER PLATES SHALL HAVE A MINIMUM THICKNESS OF 10 mm UNLESS NOTED OTHERWISE.
- END COVER PLATES SHALL HAVE A MINIMUM THICKNESS OF 6 mm UNLESS NOTED OTHERWISE.
- BOLTED CONNECTIONS SHALL BE COMPRISED OF ASTM A325, TYPE 1 HIGH STRENGTH BOLTS, GALVANIZED UNLESS NOTED OTHERWISE.
- CAST-IN ANCHORS SHALL BE HOT-DIP GALVANIZED TO ASTM A153 AND CONFORM TO ASTM A307, UNLESS NOTED OTHERWISE.
- ALL BOLTS SHALL BE 20 mm DIAMETER UNLESS NOTED OTHERWISE, WITH THREADS EXCLUDED FROM SHEAR PLANES UNLESS NOTED OTHERWISE.
- THE WIDTH OF BOLT HOLES SHALL BE NOT LARGER THAN 2 mm OF THE BOLT DIAMETER, UNLESS NOTED OTHERWISE.
- ALL FENDER MOUNT, ROPE GUARD AND LADDER MATERIAL SHALL BE HOT DIPPED GALVANIZED.

**WELDING**

- THE CONTRACTOR SHALL PERFORM WELDING IN ACCORDANCE WITH CSA W59.
- THE CONTRACTOR SHALL ENSURE THAT COMPANIES UNDERTAKING WELDING WORK ARE QUALIFIED AND CERTIFIED AS STATED IN THE REQUIREMENTS IN CSA W47.1.
- WELDING ELECTRODES SHALL CONFORM TO CSA W48, CLASS E490XX (E70XX).
- MINIMUM WELD SIZE SHALL BE 6mm UNLESS NOTED OTHERWISE.
- ALL WELDS SHALL BE CONTINUOUS UNLESS NOTED OTHERWISE.

**LEGEND**



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11/18/2020 8:12 AM

Revision	By	Appd.	YYMMDD	
B	ISSUED FOR PERMITTING	LM	CR	20.11.18
A	ISSUED FOR 60% REVIEW	LM	CR	20.10.14

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SEASPAN VANCOUVER SHIPYARDS  
OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

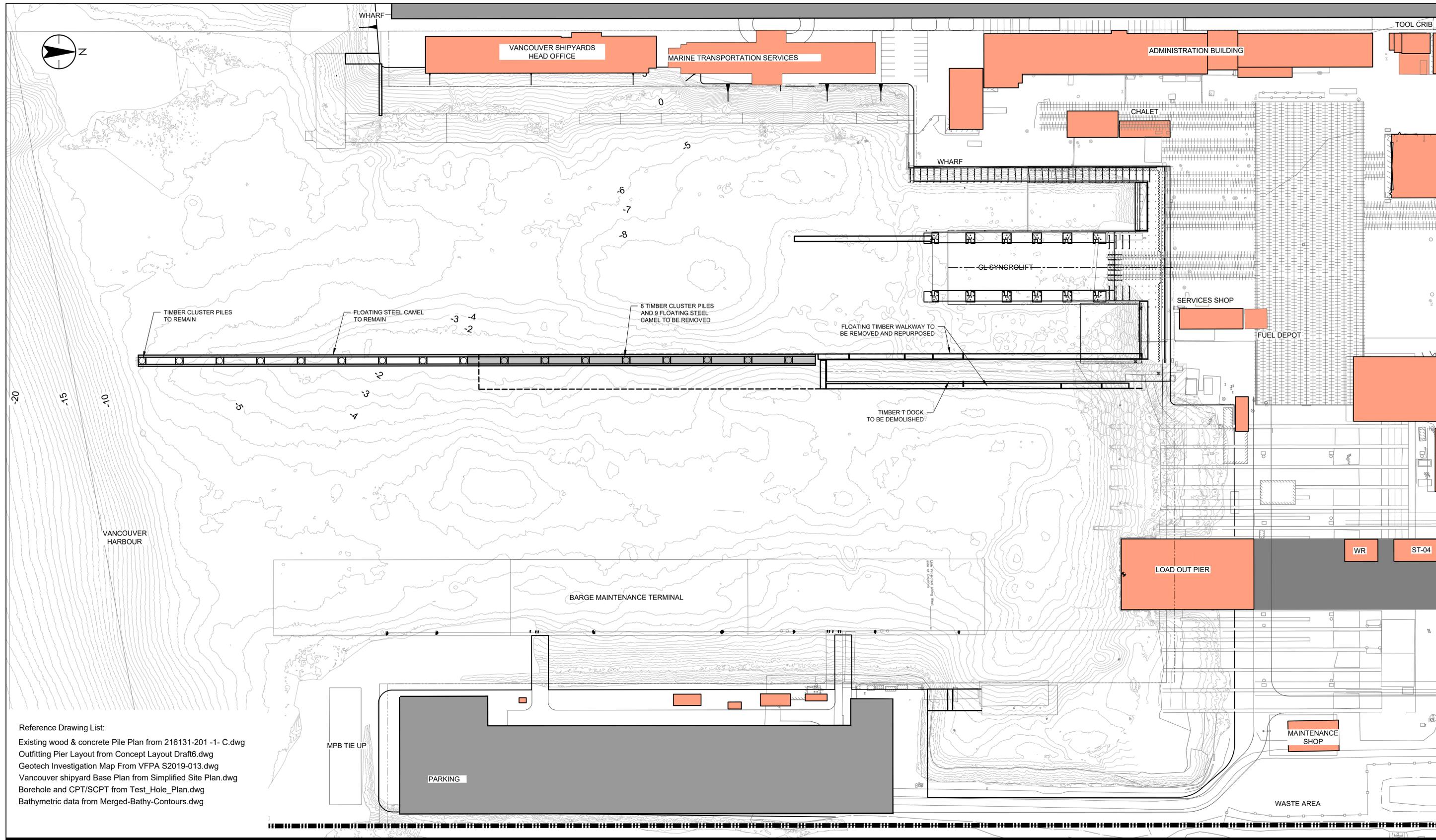
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LM	CR	LM	20.09.25
Dwn.	Chkd.	Dgrr.	YYMMDD

Title

OUTFITTING PIER  
GENERAL NOTES

Project No.	Scale
115619249	NONE
Drawing No.	Revision
115619249-002	B



- Reference Drawing List:
- Existing wood & concrete Pile Plan from 216131-201 -1- C.dwg
  - Outfitting Pier Layout from Concept Layout Draft6.dwg
  - Geotech Investigation Map From VFPA S2019-013.dwg
  - Vancouver shipyard Base Plan from Simplified Site Plan.dwg
  - Borehole and CPT/SCPT from Test\_Hole\_Plan.dwg
  - Bathymetric data from Merged-Bathy-Contours.dwg

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17/10/2020 8:11 AM

Revision	By	Appd.	YYMMDD
C	LM	CR	20.11.18
B	LM	CR	20.10.14
A	LM	CR	20.06.15

**LEGEND:**

- EXISTING PIER TO BE REMOVED/ DEMOLISHED
- BUILDINGS
- MARINE TRANSPORTATION SERVICES

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File Name: 115619249-101.DWG

JL	CR	LM	20.05.16
Dwn.	Chkd.	Dgrn.	YYMMDD

Title

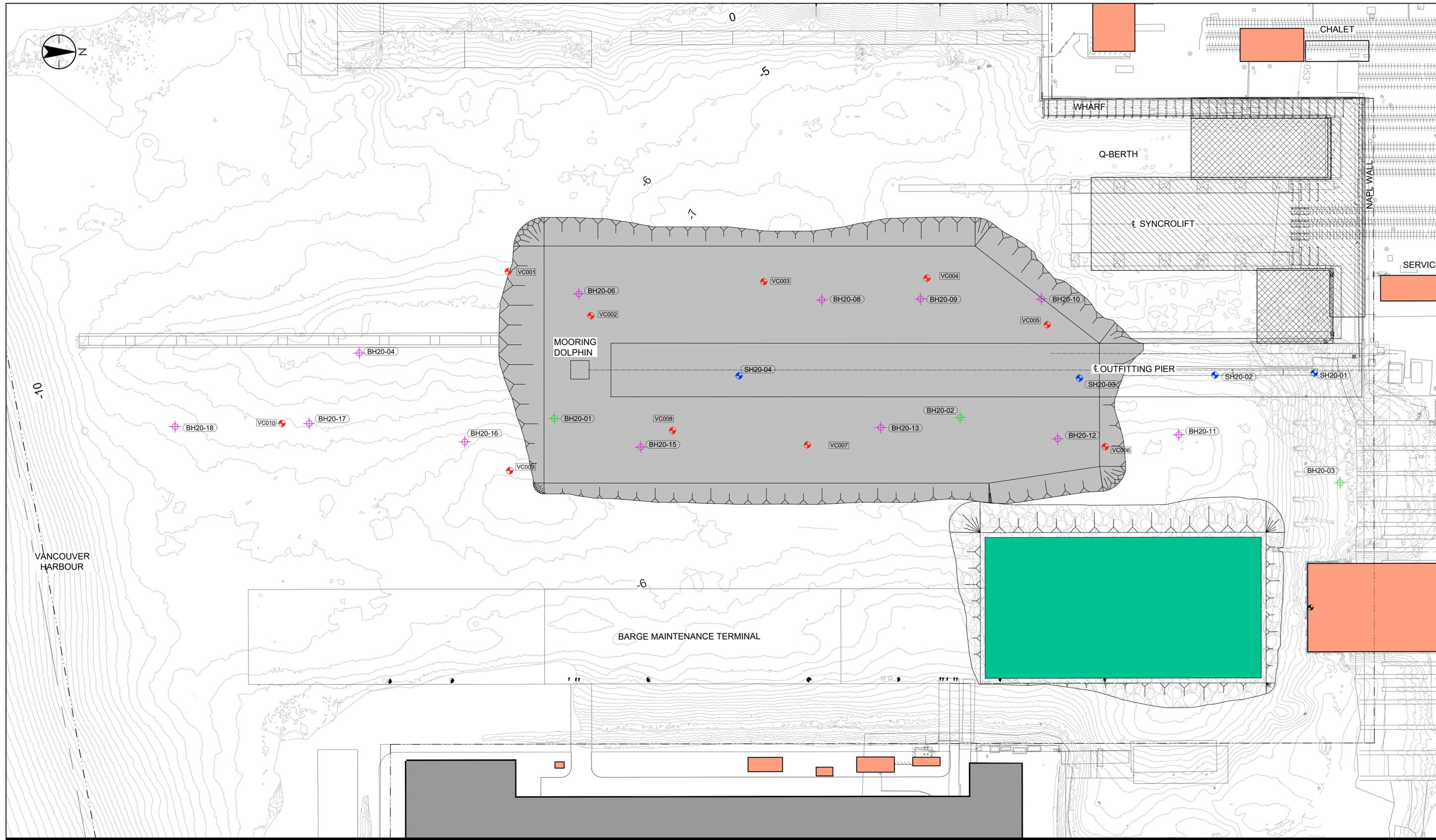
OUTFITTING PIER  
SITE DEMOLITION PLAN

Project No. 115619249

Drawing No. 115619249-101

Scale 0 7.5 22.5 37.5m  
1:750

Revision C



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 ORIGINAL SHEET - ARCH D

Revision	By	Appd.	YYMMDD
D	ISSUED FOR PERMITTING	LM	CR 20.11.18
C	ISSUED FOR 60% MODIFIED	LM	CR 20.11.10
B	ISSUED FOR 60% REVIEW	LM	CR 20.10.14
A	ISSUED FOR 30% REVIEW	LM	CR 20.06.15

**LEGEND:**

- COMPLETED VIBRACORE HOLE ~5m
- PROPOSED VIBRACORE
- DREDGE POCKET
- COMPLETED GEOTECHNICAL BOREHOLE
- PROPOSED GEOTECHNICAL BOREHOLE

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File Name: 115619249-102.DWG

LM	CR	LM	20.05.16
Dwn.	Chkd.	Dgdn.	YYMMDD

Title

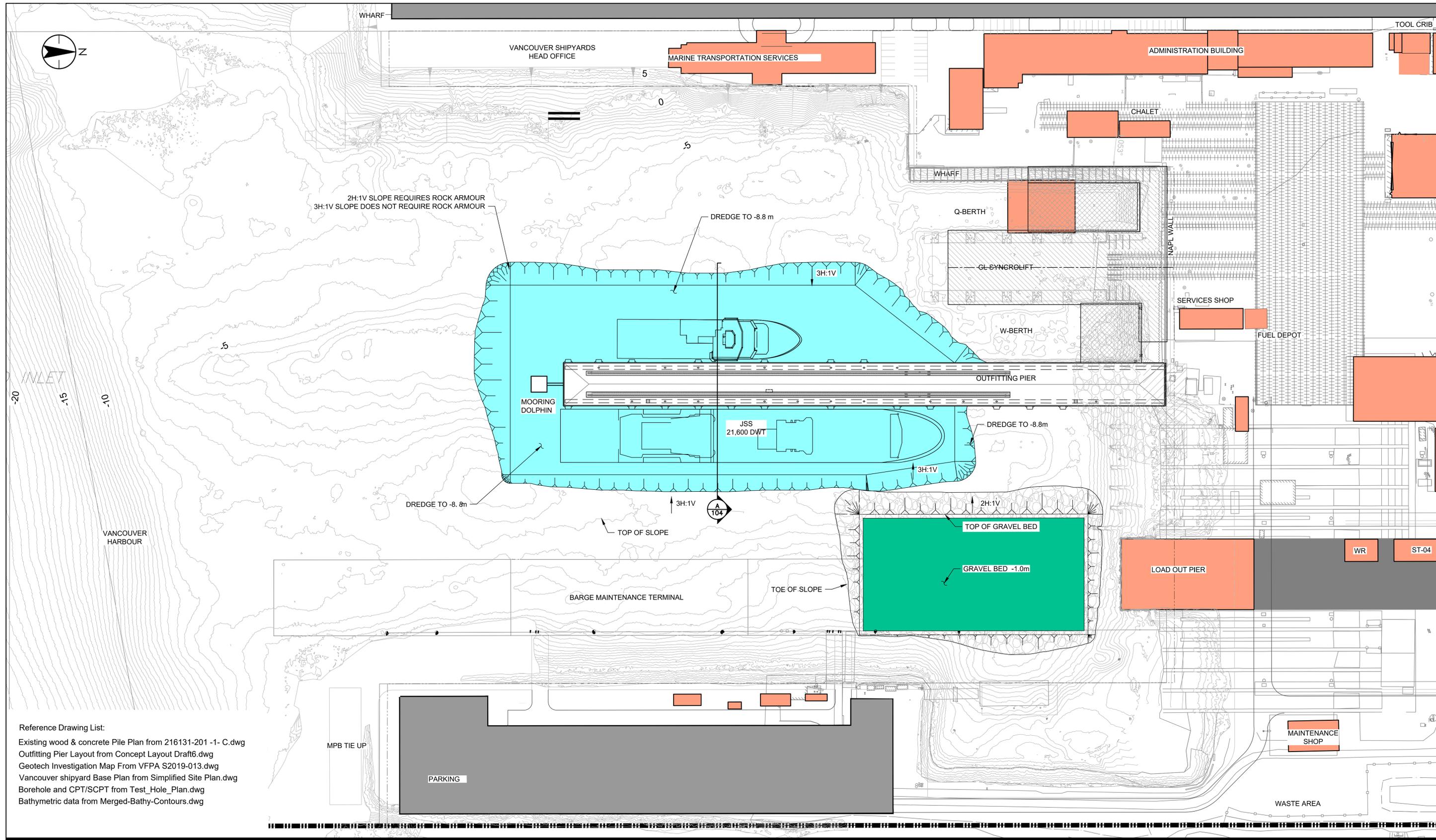
OUTFITTING PIER  
 SITE DRILLING LOCATIONS

Project No. 115619249

Drawing No. 115919249-102

Scale 1:600

Revision D



Reference Drawing List:  
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 Outfitting Pier Layout from Concept Layout Draft6.dwg  
 Geotech Investigation Map From VFPA S2019-013.dwg  
 Vancouver shipyard Base Plan from Simplified Site Plan.dwg  
 Borehole and CPT/SCPT from Test\_Hole\_Plan.dwg  
 Bathymetric data from Merged-Bathy-Contours.dwg

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 ORIGINAL SHEET - ARCH 10

Revision	By	Appd.	YYMMDD
D	LM	CR	20.11.18
C	LM	CR	20.11.10
B	LM	CR	20.10.14
A	LM	CR	20.06.15

**LEGEND:**

- DREDGE POCKET
- VESSEL OUTLINES
- OUTFITTING PIER
- BUILDINGS
- MARINE TRANSPORTATION SERVICES
- DREDGED AREA

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File Name: 115619249-103.DWG

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Dwn.	Chkd.	Dgrn.	YYMMDD

Title

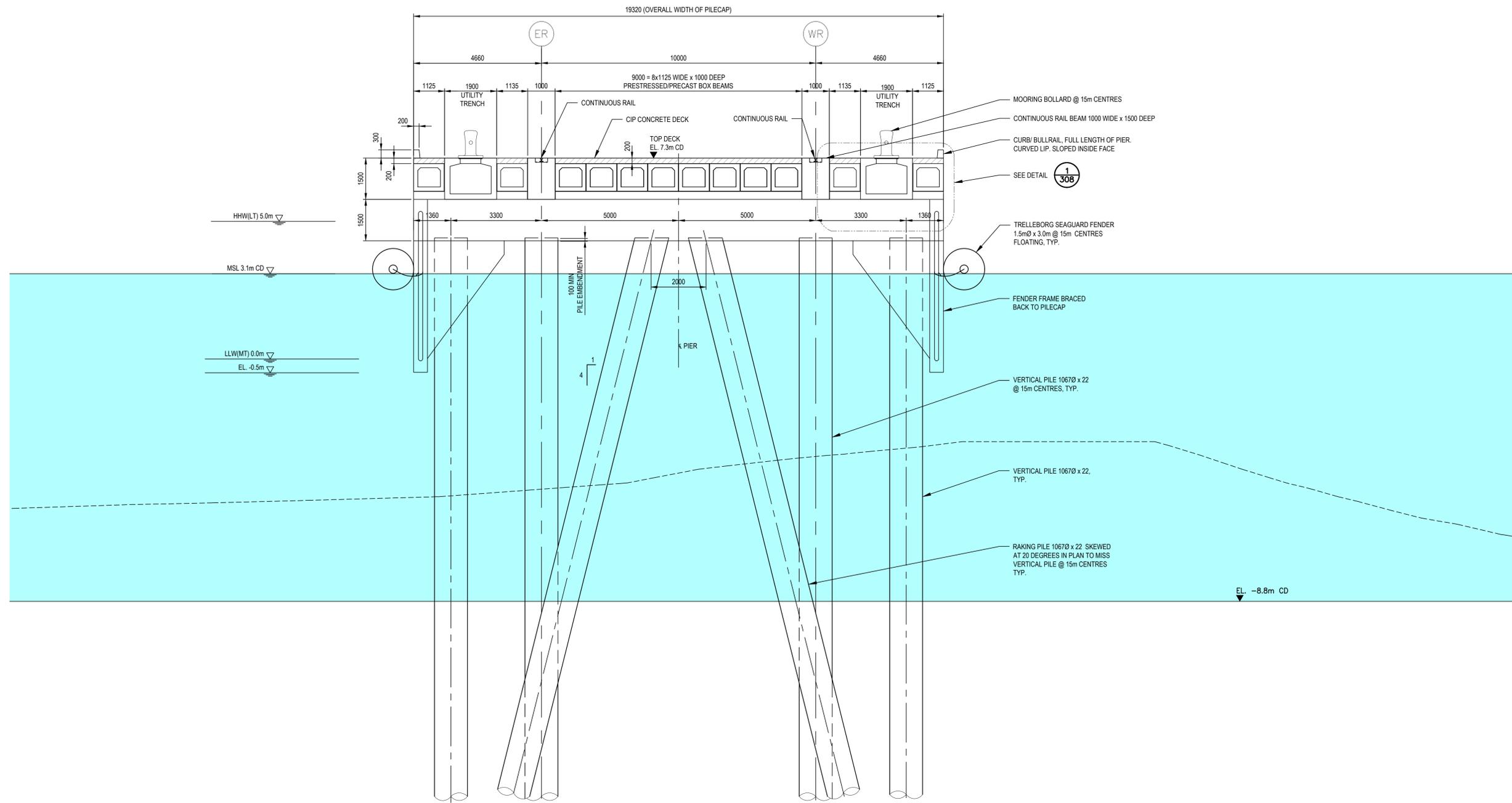
OUTFITTING PIER  
 SITE GENERAL ARRANGEMENT

Project No. 115619249

Drawing No. 115619249-103

Scale 0 7.5 22.5 37.5m  
 1:750

Revision D



**A SECTION**  
103 SCALE: 1:75

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Revision	By	Appd.	YY.MM.DD
C	LM	CR	20.11.18
B	LM	CR	20.10.14
A	LM	CR	20.06.15

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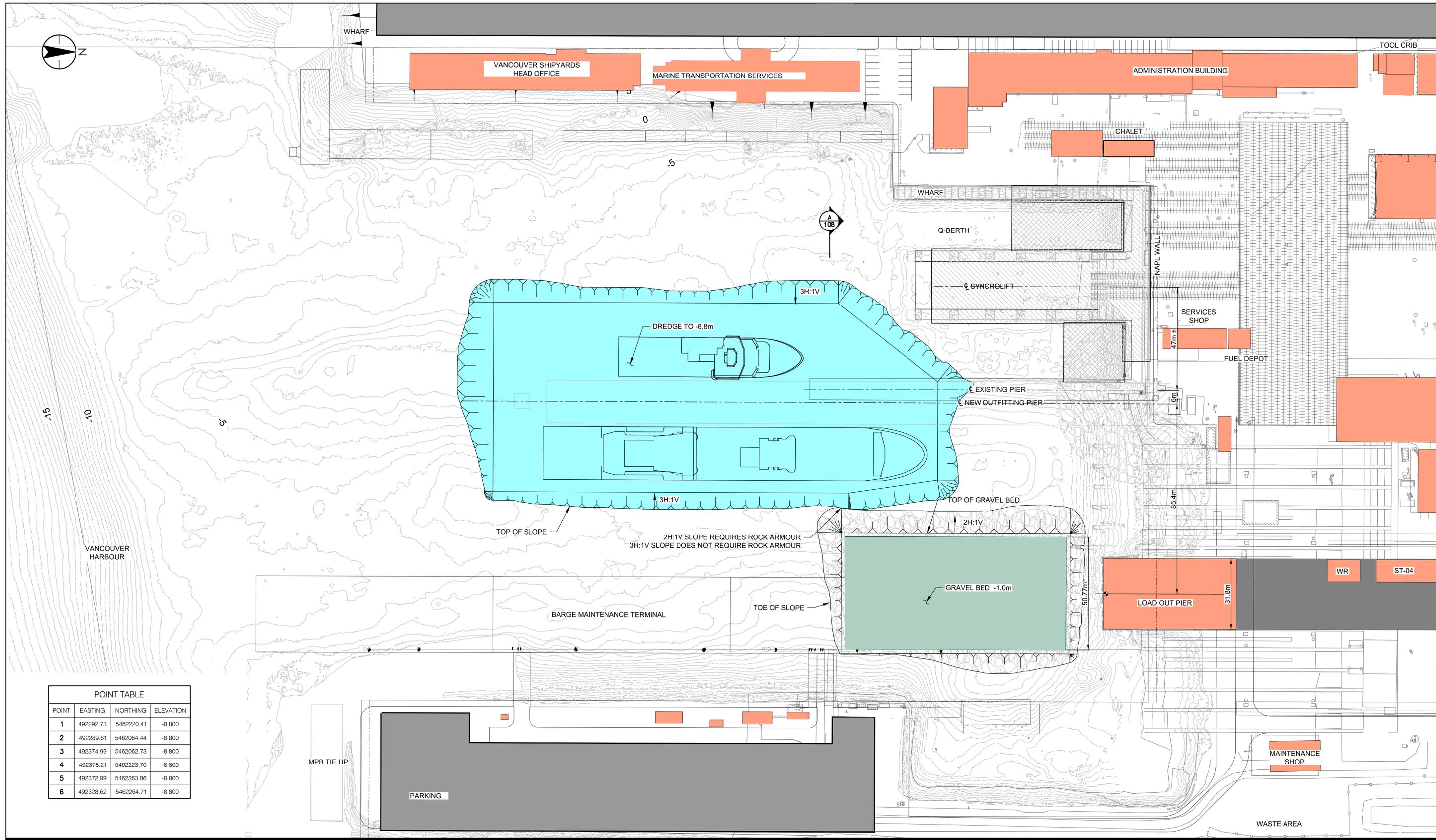
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OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

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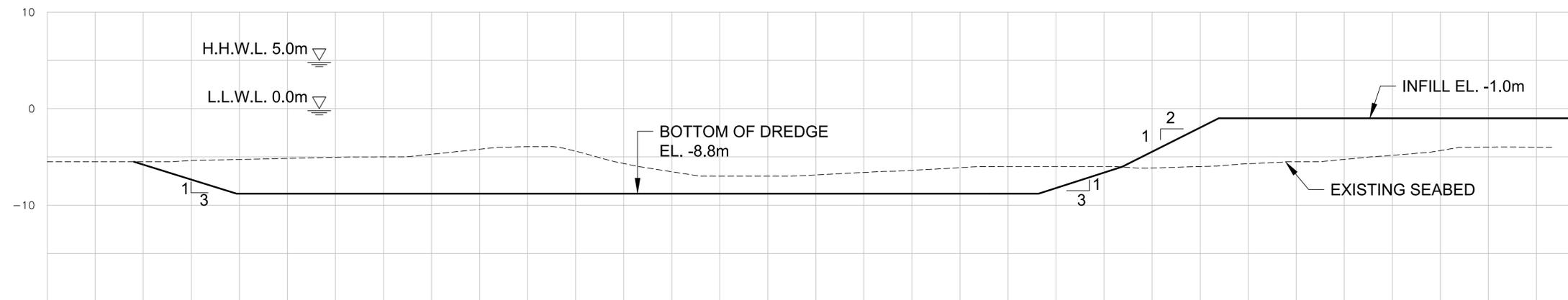
OUTFITTING PIER  
GENERAL ARRANGEMENT  
CROSS SECTION

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Drawing No.	115619249-104	Revision	C



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ORIGINAL SHEET - ARCH D



**A SECTION**  
SCALE: 1:400

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11/18/2020 8:15 AM

Revision	By	Appd.	YYMMDD
D	LM	CR	20.11.18
C	LM	CR	20.11.10
B	LM	CR	20.10.14
A	LM	CR	20.06.15

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OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-108.DWG

LM	CR	LM	20.05.30
Dwn.	Chkd.	Dsgn.	YYMMDD

Title

OUTFITTING PIER  
DREDGE CROSS SECTIONS

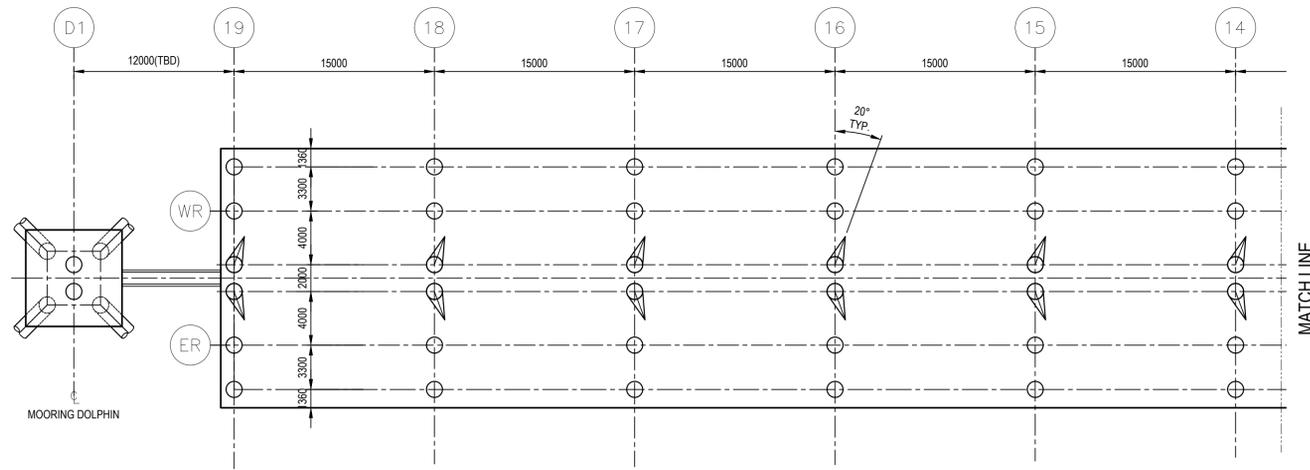
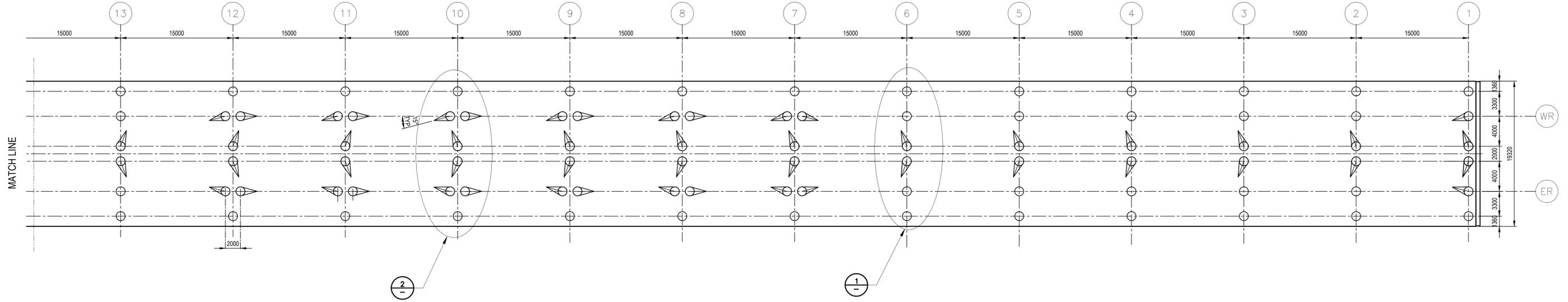
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Drawing No.  
115619249-108

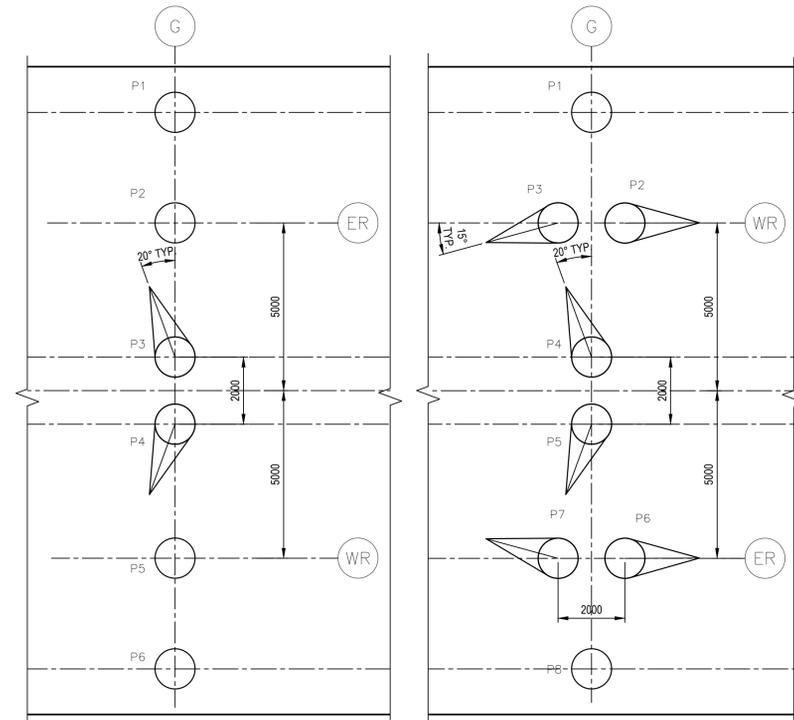
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Revision  
D

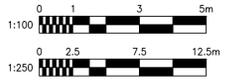


**PIER DECK PLAN**  
SCALE: 1:400



**1 TYPICAL DETAIL**  
SCALE: 1:100  
(P3 & P4 SKEW ANGLE REVERSED GRID 12-21)

**2 DETAIL**  
SCALE: 1:100



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Revision	By	Appd.	YY.MM.DD
C	LM	CR	20.11.18
B	LM	CR	20.11.10
A	LM	CR	20.10.14

**LEGEND:**

- VERTICAL PILE
- PAKER PILE
- CENTERLINE EAST RAIL
- CENTERLINE WEST RAIL
- DOLPHIN NUMBER
- PIER GRID NUMBER

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NORTH VANCOUVER, BRITISH COLUMBIA

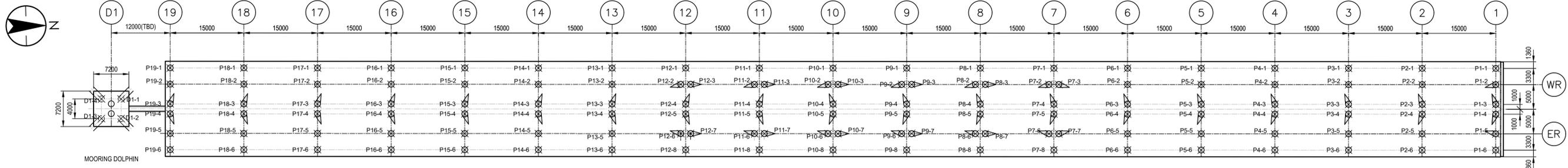
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Chkd. Dgrh. YY.MM.DD

Title

OUTFITTING PIER  
PILING  
GENERAL ARRANGEMENT

Project No. 115619249 Scale

Drawing No. 115619249-201 Revision C



POINT TABLE			
PILE NUMBER	PILE Ø (mm)	NORTHING (m)	EASTING (m)
P1-1	1067	5462358.66	492331.87
P1-2	1219	5462358.59	492335.17
P1-3	1067	5462358.51	492339.17
P1-4	1067	5462358.47	492341.17
P1-5	1219	5462358.39	492345.17
P1-6	1067	5462358.33	492348.47
P2-1	1067	5462343.66	492331.57
P2-2	1067	5462343.60	492334.87
P2-3	1067	5462343.52	492338.87
P2-4	1067	5462343.48	492340.87
P2-5	1067	5462343.40	492344.87
P2-6	1067	5462343.33	492348.17
P3-1	1067	5462328.67	492331.27
P3-2	1067	5462328.60	492334.57
P3-3	1067	5462328.52	492338.57
P3-4	1067	5462328.48	492340.57
P3-5	1067	5462328.40	492344.57
P3-6	1067	5462328.33	492347.87
P4-1	1067	5462313.67	492330.97
P4-2	1067	5462313.60	492334.27
P4-3	1067	5462313.52	492338.27
P4-4	1067	5462313.48	492340.27
P4-5	1067	5462313.40	492344.27
P4-6	1067	5462313.34	492347.57
P5-1	1067	5462298.67	492330.67
P5-2	1067	5462298.61	492333.97
P5-3	1067	5462298.53	492337.97
P5-4	1067	5462298.49	492339.96
P5-5	1067	5462298.41	492343.96
P5-6	1067	5462298.34	492347.26
P6-1	1067	5462283.68	492330.36
P6-2	1067	5462283.61	492333.66
P6-3	1067	5462283.53	492337.66
P6-4	1067	5462283.49	492339.66
P6-5	1067	5462283.41	492343.66
P6-6	1067	5462283.34	492346.96
P7-1	1067	5462268.68	492330.06
P7-2	1219	5462267.61	492333.34
P7-3	1219	5462269.61	492333.38
P7-4	1067	5462268.53	492337.38
P7-5	1067	5462268.49	492339.36
P7-6	1219	5462267.41	492343.34
P7-7	1219	5462268.41	492343.38
P7-8	1067	5462268.34	492346.68
P8-1	1067	5462253.68	492329.76
P8-2	1219	5462252.62	492333.04

POINT TABLE			
PILE NUMBER	PILE Ø (mm)	NORTHING (m)	EASTING (m)
P8-3	1219	5462254.62	492333.08
P8-4	1067	5462253.54	492337.06
P8-5	1067	5462253.50	492339.06
P8-6	1219	5462252.41	492343.04
P8-7	1219	5462254.41	492343.08
P8-8	1067	5462253.35	492346.36
P9-1	1067	5462238.69	492329.46
P9-2	1219	5462237.62	492332.74
P9-3	1219	5462239.62	492332.78
P9-4	1067	5462238.54	492336.76
P9-5	1067	5462238.50	492338.76
P9-6	1219	5462237.42	492342.74
P9-7	1219	5462239.46	492342.74
P9-8	1067	5462238.36	492346.05
P10-1	1067	5462223.69	492329.16
P10-2	1219	5462222.62	492332.44
P10-3	1219	5462224.62	492332.48
P10-4	1067	5462223.54	492336.45
P10-5	1067	5462223.50	492338.45
P10-6	1219	5462222.42	492342.43
P10-7	1219	5462224.42	492342.47
P10-8	1067	5462223.35	492345.75
P11-1	1067	5462208.69	492328.85
P11-2	1219	5462207.62	492332.13
P11-3	1219	5462209.67	492332.17
P11-4	1067	5462208.54	492336.15
P11-5	1067	5462208.50	492338.15
P11-6	1219	5462207.46	492342.14
P11-7	1219	5462209.46	492342.17
P11-8	1067	5462208.36	492345.45
P12-1	1067	5462193.69	492328.55
P12-2	1219	5462192.63	492331.83
P12-3	1219	5462194.67	492331.87
P12-4	1067	5462193.55	492335.85
P12-5	1067	5462193.51	492337.85
P12-6	1219	5462192.43	492341.83
P12-7	1219	5462194.43	492341.87
P12-8	1067	5462193.36	492345.15
P13-1	1067	5462178.70	492328.25
P13-2	1067	5462178.63	492331.55
P13-3	1067	5462178.55	492335.55
P13-4	1067	5462178.51	492337.55
P13-5	1067	5462178.43	492341.55
P13-6	1067	5462178.36	492344.85
P14-1	1067	5462163.70	492327.95
P14-2	1067	5462163.63	492331.25

POINT TABLE			
PILE NUMBER	PILE Ø (mm)	NORTHING (m)	EASTING (m)
P14-3	1067	5462163.55	492335.25
P14-4	1067	5462163.51	492337.25
P14-5	1067	5462163.43	492341.25
P14-6	1067	5462163.37	492344.54
P15-1	1067	5462148.70	492327.65
P15-2	1067	5462148.64	492330.95
P15-3	1067	5462148.56	492334.94
P15-4	1067	5462148.52	492336.94
P15-5	1067	5462148.44	492340.94
P15-6	1067	5462148.37	492344.24
P16-1	1067	5462133.71	492327.34
P16-2	1067	5462133.64	492330.64
P16-3	1067	5462133.56	492334.64
P16-4	1067	5462133.52	492336.64
P16-5	1067	5462133.44	492340.64
P16-6	1067	5462133.37	492343.94
P17-1	1067	5462118.71	492327.04
P17-2	1067	5462118.64	492330.34
P17-3	1067	5462118.56	492334.34
P17-4	1067	5462118.52	492336.34
P17-5	1067	5462118.44	492340.34
P17-6	1067	5462118.38	492343.64
P18-1	1067	5462103.71	492326.74
P18-2	1067	5462103.65	492330.04
P18-3	1067	5462103.57	492334.04
P18-4	1067	5462103.53	492336.04
P18-5	1067	5462103.44	492340.04
P18-6	1067	5462103.38	492343.34
P19-1	1067	5462088.72	492326.44
P19-2	1067	5462088.65	492329.74
P19-3	1067	5462088.57	492333.74
P19-4	1067	5462088.53	492335.74
P19-5	1067	5462088.45	492339.74
P19-6	1067	5462088.38	492343.03

POINT TABLE			
PILE NUMBER	PILE Ø (mm)	NORTHING (m)	EASTING (m)
D1-1	1219	5462078.59	492332.54
D1-2	1219	5462078.51	492336.53
D1-3	1219	5462074.51	492336.45
D1-4	1219	5462074.59	492332.45

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11/18/2020 8:19 AM

Revision	By	Appd.	YY.MM.DD
C	ISSUED FOR PERMITTING	LM	CR 20.11.18
B	ISSUED FOR 60% MODIFIED	LM	CR 20.11.10
A	ISSUED FOR 60% VIEW	LM	CR 20.10.16

**LEGEND:**

- ⊗ VERTICAL PILE
- ⊗ PAKER PILE
- ⊕ CENTERLINE EAST RAIL
- ⊖ CENTERLINE WEST RAIL
- ⊙ DOLPHIN NUMBER
- ⊙ PIER GRID NUMBER

Permit-Seal

**PRELIMINARY**

FOR INFORMATION ONLY

Consultants

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Client/Project

SEASPAN VANCOUVER SHIPYARDS  
OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-202.DWG

LM	CR	LM	20.10.15
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Title

OUTFITTING PIER  
PILE POINT TABLE COORDINATES

Project No. 115619249

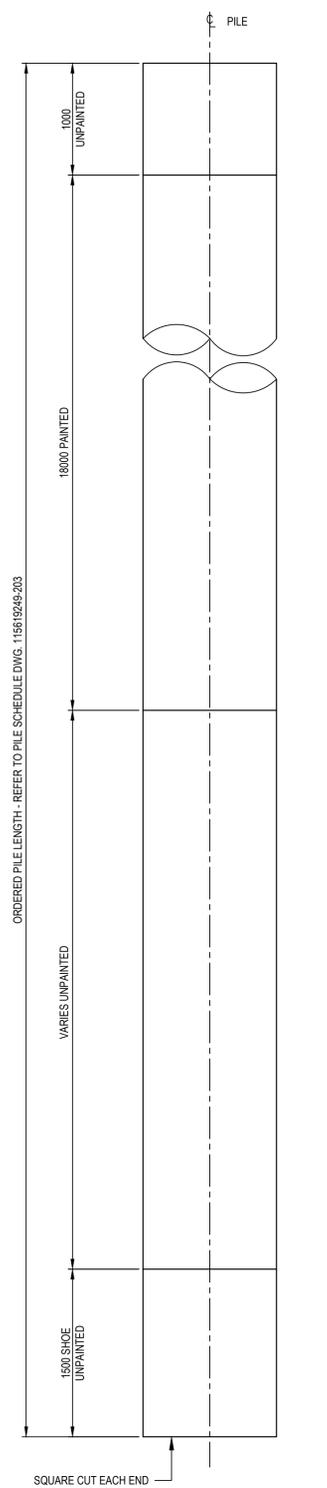
Drawing No. 115619249-202

Scale 0 4 12 20m  
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Revision C

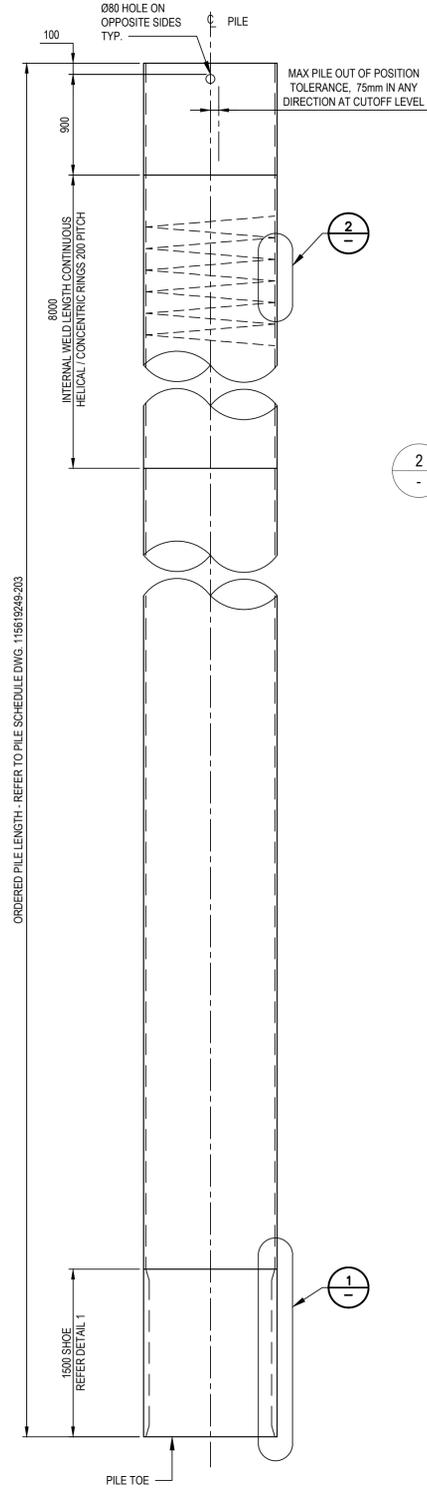
1	A	B	C	D	E	F	G	H	I	J	K
2	PILE SCHEDULE										
3	PILE PLAN GRAD	PILE No.	PILE SIZE	PILE RAKE	SUPPLIED PILE LENGTH (m)	PILE CUT-OFF LEVEL RL (m CD)	APPROX. SEABED LEVEL RL (m CD)	ESTIMATED MINIMUM EMBEDMENT DEPTH (m)	ESTIMATED TOE LEVEL RL (m CD)	DESIGN ULTIMATE COMPRESSION DESIGN ACTION EFFECT (kN)	DESIGN ULTIMATE TENSION DESIGN ACTION EFFECT (kN)
4	P1	P1-1	1067 x 25.4	VERT.	49.0	3.9	-3.8	39.7	-43.5	4000	2000
5		P1-2	1219 x 25.4	1H:4V	66.0	3.9	-3.8	49.2	-58.0	11000*	7500*
6		P1-3	1067 x 25.4	1H:4V	60.0	3.9	-3.8	48.7	-52.5	6500	3500
7		P1-4	1067 x 25.4	1H:4V	60.0	3.9	-3.8	48.7	-52.5	6500	3500
8		P1-5	1219 x 25.4	1H:4V	66.0	3.9	-3.8	49.2	-58.0	11000*	7500*
9		P1-6	1067 x 25.4	VERT.	49.0	3.9	-3.8	39.7	-43.5	4000	2000
10	P2	P2-1	1067 x 25.4	VERT.	58.0	4.4	-1.5	51.0	-52.5	6500	2000
11		P2-2	1067 x 25.4	VERT.	58.0	4.4	-1.5	51.0	-52.5	6500	2000
12		P2-3	1067 x 25.4	1H:4V	65.0	4.4	-1.5	56.0	-57.5	8000	3500
13		P2-4	1067 x 25.4	1H:4V	65.0	4.4	-1.5	56.0	-57.5	8000	3500
14	P3	P2-5	1067 x 25.4	VERT.	58.0	4.4	-1.5	51.0	-52.5	6500	2000
15		P2-6	1067 x 25.4	VERT.	58.0	4.4	-1.5	51.0	-52.5	6500	2000
16		P3-1	1067 x 25.4	VERT.	58.0	4.4	-3.7	48.8	-52.5	6000	2000
17		P3-2	1067 x 25.4	VERT.	58.0	4.4	-3.7	48.8	-52.5	6000	2000
18		P3-3	1067 x 25.4	1H:4V	65.0	4.4	-3.7	53.8	-57.5	8000	3500
19		P3-4	1067 x 25.4	1H:4V	65.0	4.4	-3.7	53.8	-57.5	8000	3500
20	P4	P3-5	1067 x 25.4	VERT.	58.0	4.4	-3.7	48.8	-52.5	6000	2000
21		P3-6	1067 x 25.4	VERT.	58.0	4.4	-3.7	48.8	-52.5	6000	2000
22		P4-1	1067 x 25.4	VERT.	58.0	4.4	-5.9	46.6	-52.5	6000	2000
23		P4-2	1067 x 25.4	VERT.	58.0	4.4	-5.9	46.6	-52.5	6000	2000
24		P4-3	1067 x 25.4	1H:4V	65.0	4.4	-5.9	51.6	-57.5	8000	3500
25		P4-4	1067 x 25.4	1H:4V	65.0	4.4	-5.9	51.6	-57.5	8000	3500
26	P5	P4-5	1067 x 25.4	VERT.	58.0	4.4	-5.9	46.6	-52.5	6000	2000
27		P4-6	1067 x 25.4	VERT.	58.0	4.4	-5.9	46.6	-52.5	6000	2000
28		P5-1	1067 x 22.2	VERT.	57.0	4.4	-7.1	44.4	-51.5	6000	2000
29		P5-2	1067 x 22.2	VERT.	57.0	4.4	-7.1	44.4	-51.5	6000	2000
30		P5-3	1067 x 22.2	1H:4V	65.0	4.4	-7.1	50.4	-57.5	8000	3500
31		P5-4	1067 x 22.2	1H:4V	65.0	4.4	-7.1	50.4	-57.5	8000	3500
32	P6	P5-5	1067 x 22.2	VERT.	57.0	4.4	-7.1	44.4	-51.5	6000	2000
33		P5-6	1067 x 22.2	VERT.	57.0	4.4	-7.1	44.4	-51.5	6000	2000
34		P6-1	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000
35		P6-2	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000
36		P6-3	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500
37		P6-4	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500
38	P7	P6-5	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000
39		P6-6	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000
40		P7-1	1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000
41		P7-2	1219 x 25.4	1H:4V	65.0	4.4	-8.8	48.7	-57.5	9500*	9500*
42		P7-3	1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*
43		P7-4	1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500
44	P8	P7-5	1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500
45		P7-6	1219 x 25.4	1H:4V	65.0	4.4	-8.8	48.7	-57.5	9500*	9500*
46		P7-7	1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*
47		P7-8	1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000
48		P8-1	1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000
49		P8-2	1219 x 25.4	1H:4V	65.0	4.4	-8.8	48.7	-57.5	9500*	9500*
50	P9	P8-3	1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*
51		P8-4	1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500
52		P8-5	1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500
53		P8-6	1219 x 25.4	1H:4V	65.0	4.4	-8.8	48.7	-57.5	9500*	9500*
54		P8-7	1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*
55		P8-8	1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000
56	P10	P9-1	1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000
57		P9-2	1219 x 25.4	1H:4V	65.0	4.4	-8.8	48.7	-57.5	9500*	9500*
58		P9-3	1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*
59		P9-4	1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500
60		P9-5	1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500
61		P9-6	1219 x 25.4	1H:4V	65.0	4.4	-8.8	48.7	-57.5	9500*	9500*
62	P10	P9-7	1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*
63		P9-8	1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000
64		P10-1	1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000
65		P10-2	1219 x 25.4	1H:4V	65.0	4.4	-8.8	48.7	-57.5	9500*	9500*
66		P10-3	1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*
67		P10-4	1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500
68		P10-5	1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500
69		P10-6	1219 x 25.4	1H:4V	65.0	4.4	-8.8	48.7	-57.5	9500*	9500*
70	P10-7	1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*	
	P10-8	1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000	

PILE SCHEDULE											
PILE PLAN GRAD	PILE No.	PILE SIZE	PILE RAKE	SUPPLIED PILE LENGTH (m)	PILE CUT-OFF LEVEL RL (m CD)	APPROX. SEABED LEVEL RL (m CD)	ESTIMATED MINIMUM EMBEDMENT DEPTH (m)	ESTIMATED TOE LEVEL RL (m CD)	DESIGN ULTIMATE COMPRESSION DESIGN ACTION EFFECT (kN)	DESIGN ULTIMATE TENSION DESIGN ACTION EFFECT (kN)	
P11	P11-1	1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000	
	P11-2	1219 x 25.4	1H:4V	65.0	4.4	-8.8	48.7	-57.5	9500*	9500*	
	P11-3	1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*	
	P11-4	1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500	
	P11-5	1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500	
	P11-6	1219 x 25.4	1H:4V	65.0	4.4	-8.8	48.7	-57.5	9500*	9500*	
	P11-7	1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*	
	P11-8	1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000	
	P12	P12-1	1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000
		P12-2	1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*
		P12-3	1219 x 25.4	1H:4V	68.0	4.4	-8.8	51.2	-60.0	12500*	7000*
P12-4		1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500	
P12-5		1067 x 22.2	1H:4V	62.0	4.4	-8.8	45.7	-54.5	7000	3500	
P12-6		1219 x 25.4	1H:4V	66.0	4.4	-8.8	49.2	-58.0	11000*	7500*	
P12-7		1219 x 25.4	1H:4V	68.0	4.4	-8.8	51.2	-60.0	12500*	7000*	
P12-8		1067 x 22.2	VERT.	57.0	4.4	-8.8	42.7	-51.5	6000	2000	
P13	P13-1	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P13-2	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P13-3	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500	
	P13-4	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500	
	P13-5	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P13-6	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
P14	P14-1	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P14-2	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P14-3	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500	
	P14-4	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500	
	P14-5	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P14-6	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
P15	P15-1	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P15-2	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P15-3	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500	
	P15-4	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500	
	P15-5	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P15-6	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
P16	P16-1	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P16-2	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P16-3	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500	
	P16-4	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500	
	P16-5	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P16-6	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
P17	P17-1	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P17-2	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P17-3	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500	
	P17-4	1067 x 22.2	1H:4V	65.0	4.4	-8.8	48.7	-57.5	8000	3500	
	P17-5	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
	P17-6	1067 x 22.2	VERT.	60.0	4.4	-8.8	45.7	-54.5	7000	2000	
P18	P18-1	1067 x 22.2									



**TYPICAL PILE PAINT DETAIL**  
SCALE: N.T.S.

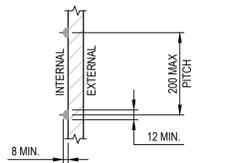
NOTE: PAINT DETAIL TYPICAL FOR ALL PILE DIAMETERS.  
ALL PILES PAINTED U.N.O. - FOR PAINT DFT REQUIREMENTS  
REFER TO PAINT SPECIFICATION



**TYPICAL Ø 1067 & Ø1219 PILE DETAIL**  
SCALE: N.T.S.

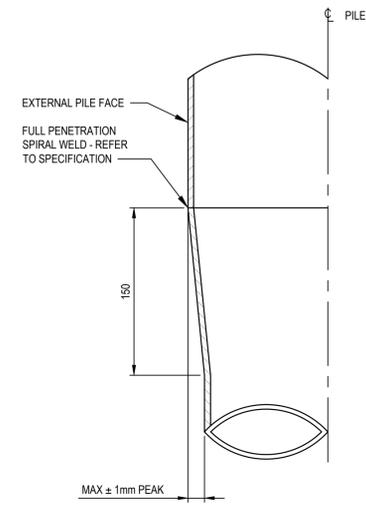
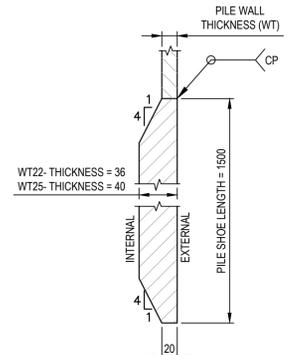
2

**INTERNAL WELD DETAIL FOR ABUTMENT PILE**  
SCALE: N.T.S.



1

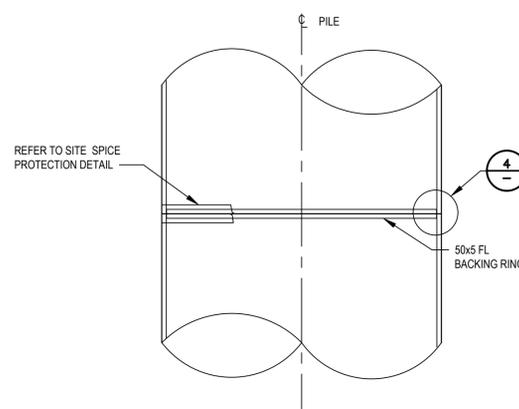
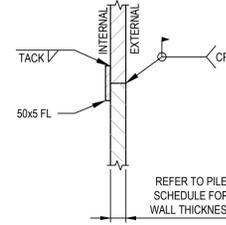
**PILE SHOE DETAIL**  
SCALE: N.T.S.



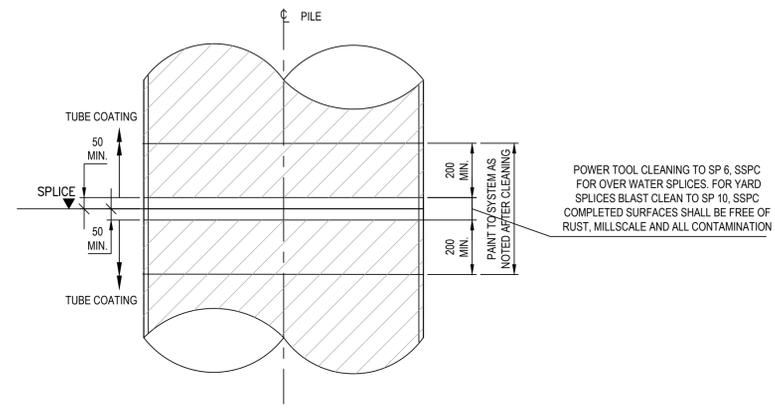
**PILE PEAKING TOLERANCE DETAIL**  
SCALE: N.T.S.

4

**DETAIL**  
SCALE: N.T.S.



**TYPICAL PILE SITE SPLICE DETAIL**  
SCALE: N.T.S.



**TYPICAL PILE SITE SPLICE PROTECTION DETAIL**  
SCALE: N.T.S.

**NOTES:**

1. THIS SHALL BE READ IN CONJUNCTION WITH THE GENERAL NOTES DWG 115619249-001.
2. PILE SCHEDULE IS SHOWN ON DWG 115619249-203.
3. STEEL PIPE PILE MINIMUM YIELD STRESS  $F_y = 350$  MPA, MEETING CSA Z245.1 SPECIFICATION OR APPROVED EQUIVALENT.



U:\115619249\4 DRAWINGS\02 WORK IN PROGRESS DRAWINGS\115619249-204-203.DWG  
11/18/2018 8:24 AM

Revision	By	Appd.	YY.MM.DD
B	ISSUED FOR PERMITTING	LM	CR 20.11.18
A	ISSUED FOR REVIEW	LM	CR 20.10.14

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SEASpan VANCOUVER SHIPYARDS  
OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-204\_203.DWG  
JL Dwn. CR Chkd. LM Dgrr. 20.09.20 YY.MM.DD

Title

OUTFITTING PIER  
STEEL PILING DETAILS  
SHEET 1

Project No.

115619249

Scale

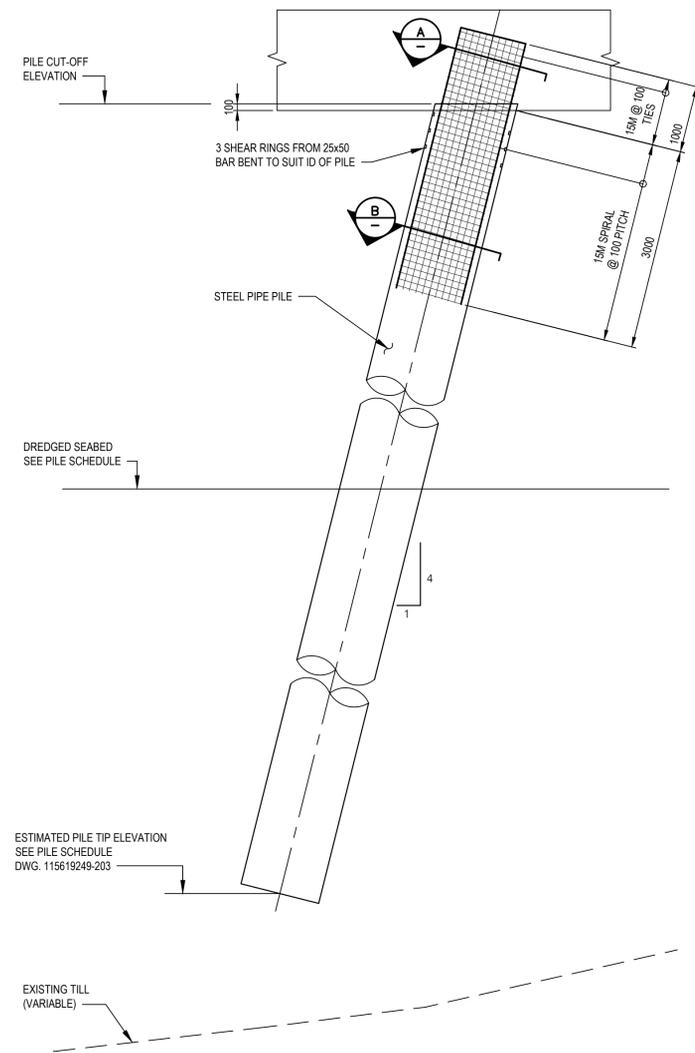
AS NOTED

Drawing No.

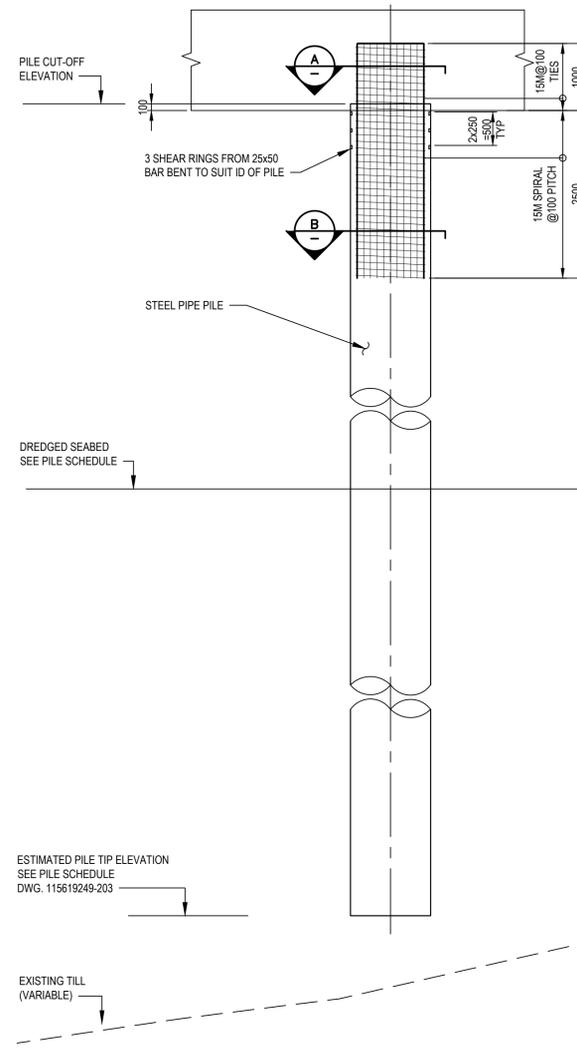
115619249-204

Revision

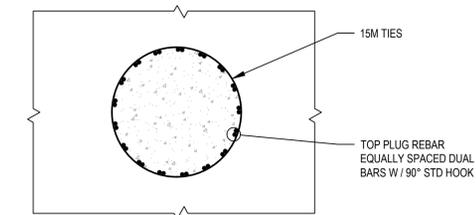
B



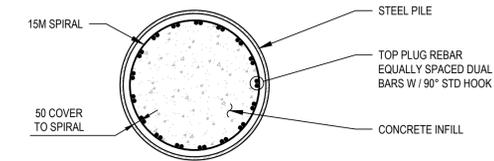
**TYPICAL BATTERED PILE ELEVATION**  
SCALE: 1:50



**TYPICAL VERTICAL PILE ELEVATION**  
SCALE: 1:50

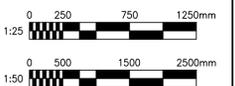


**A SECTION**  
SCALE: 1:25



**B SECTION**  
SCALE: 1:25

PILE REBAR DESIGN DETAILS		
PILE SIZE (mm)	TOP PLUG REBAR	SPIRAL DIAMETER (OD)
Ø 1067 x 22	2 - 35M x 17	15M
Ø 1067 x 25	2 - 35M x 17	15M
Ø 1219 x 25	2 - 35M x 20	15M



U:\115619249\4 DRAWINGS\02 WORK IN PROGRESS DRAWINGS\01 PERMITTING\115619249-204\_205.DWG  
11/18/2018 8:24 AM

Revision	By	Appd.	YY.MM.DD
B	ISSUED FOR PERMITTING	LM	CR 20.11.18
A	ISSUED FOR REVIEW	LM	CR 20.10.14

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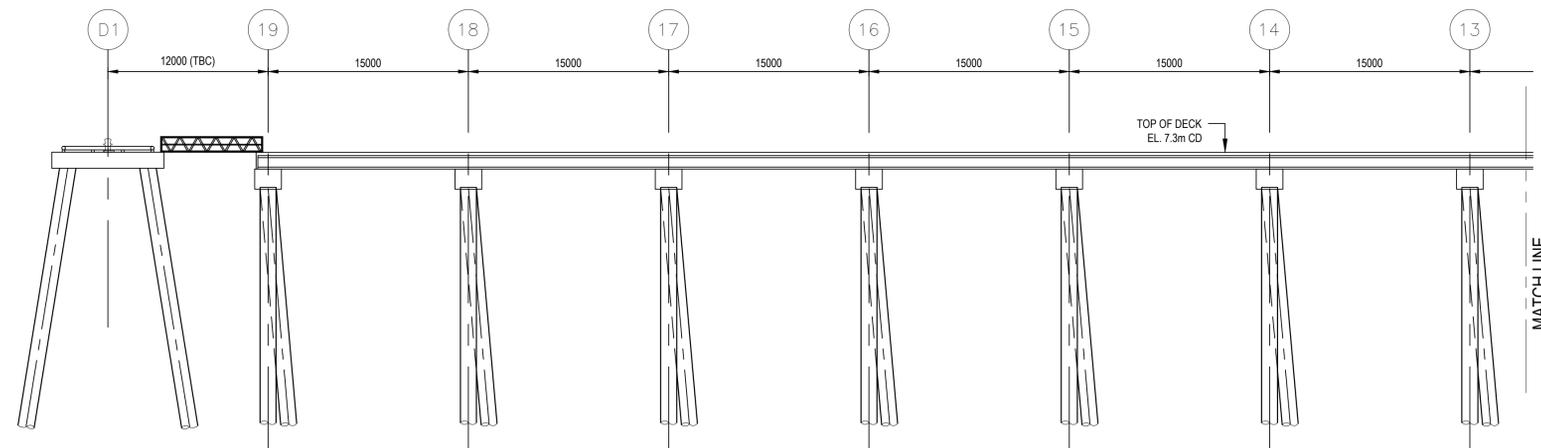
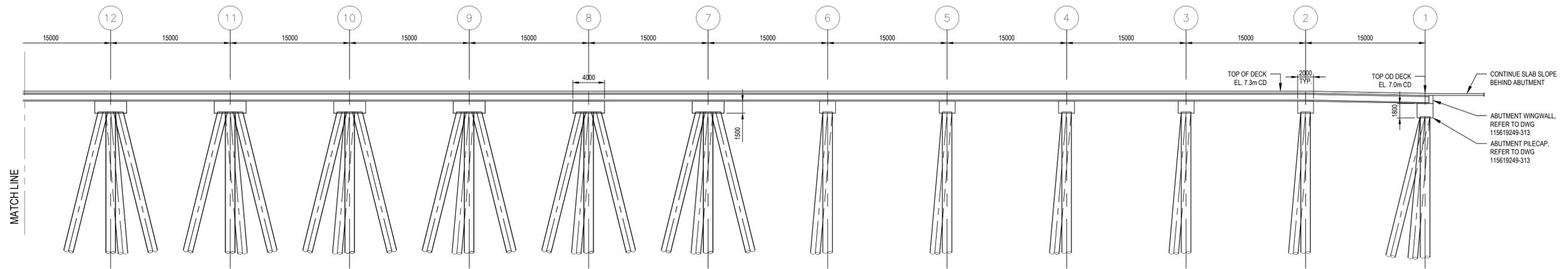
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OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

Client/Project	Title
<p>115619249-204_205.DWG</p> <p>JL CR LM 20.09.15 Dwn. Chkd. Dgdn. YY.MM.DD</p>	<p>OUTFITTING PIER STEEL PILING DETAILS SHEET 2</p>
<p>Project No. 115619249</p> <p>Drawing No. 115619249-205</p>	<p>Scale AS NOTED</p> <p>Revision B</p>

Permit-Seal	Consultants
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17/10/2018 8:30 AM

Revision	By	Appd.	YY.MM.DD
D	LM	CR	20.11.18
C	LM	CR	20.11.10
B	LM	CR	20.10.14
A	LM	CR	20.06.15

**LEGEND:**

- VERTICAL PILE
- PAKER PILE
- CENTERLINE EAST RAIL
- CENTERLINE WEST RAIL
- DOLPHIN NUMBER
- PIER GRID NUMBER

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NORTH VANCOUVER, BRITISH COLUMBIA

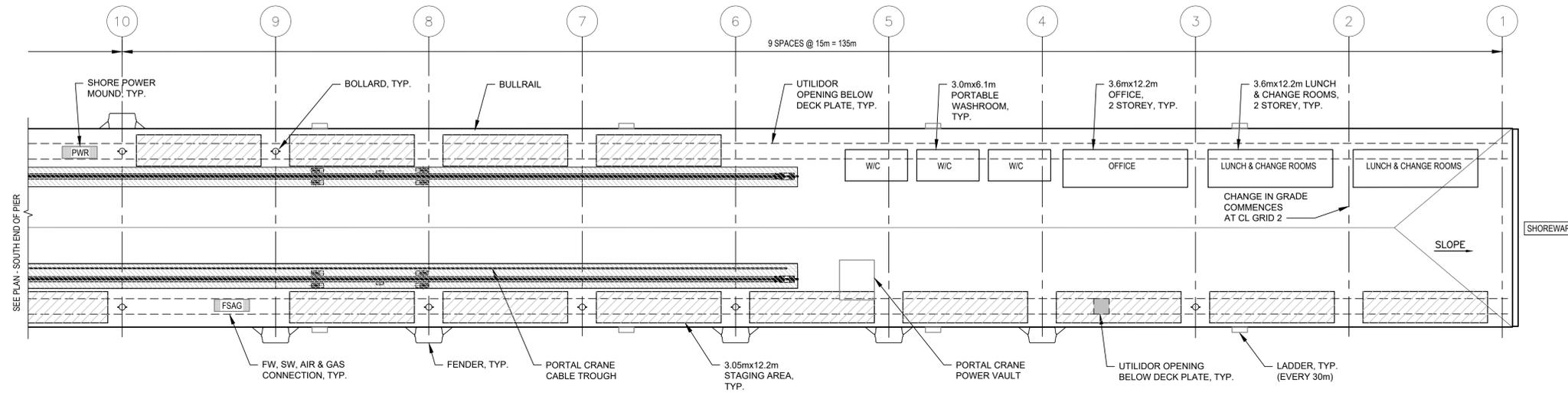
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Dwn. CR LM 20.11.09  
Dwn. Chkd. Dgrn. YY.MM.DD

Title

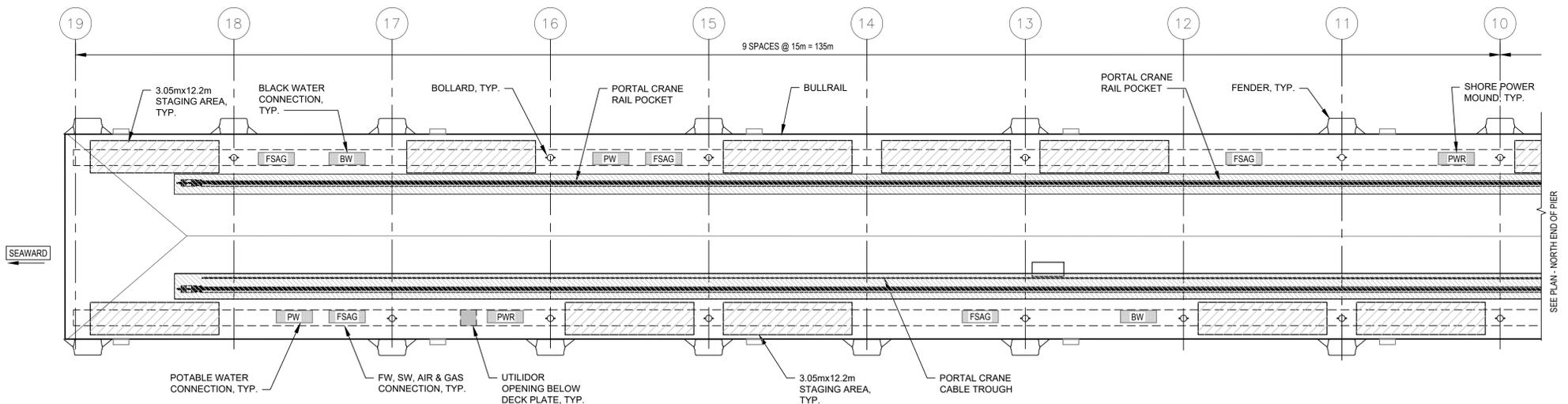
1156OUTFITTING PIER  
GENERAL ARRANGEMENT  
PIER ELEVATION

Project No. 115619249 Scale

Drawing No. 115619249-301 Revision D



PLAN - NORTH END PIER  
SCALE: 1:250



PLAN - SOUTH END PIER  
SCALE: 1:250

U:\115619249\4\_DRAWINGS\02\_WORK IN PROGRESS\_DRAWINGS\FOR PERMITTING\115619249-302.DWG  
17/10/2018 8:36 AM

Revision	By	Appd.	YY.MM.DD
D	LM	CR	20.11.18
C	LM	CR	20.11.10
B	LM	CR	20.10.24
A	LM	CR	20.04.15

**LEGEND:**

- PIER GRID NUMBER
- STAGING AREA

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NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-302.DWG

LM	CR	LM	20.10.28
Dwn.	Chkd.	Dsgn.	YY.MM.DD

Title

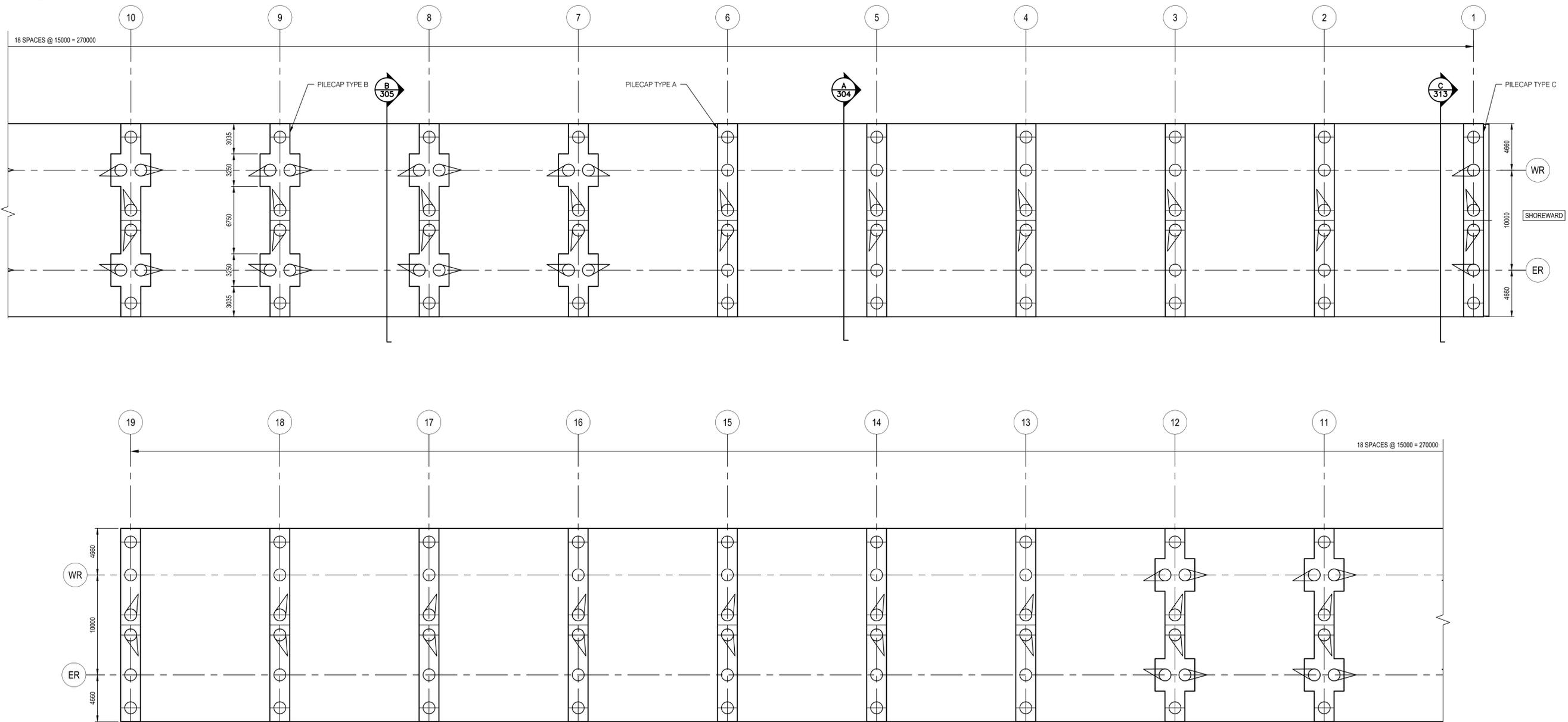
OUTFITTING PIER  
GENERAL ARRANGEMENT  
PIER DECK PLAN

Project No.  
115619249

Drawing No.  
115619249-302

Scale 0 2.5 20.0 37.5  
1:250

Revision  
D



U:\115619249\4 DRAWINGS\02 WORK IN PROGRESS DRAWINGS\FOR PERMITTING\115619249-303.DWG  
11/18/2018 8:49 AM

Revision	By	Appd.	YYMMDD
C	LM	CR	20.11.18
B	LM	CR	20.11.10
A	LM	CR	20.10.14

**LEGEND:**

- (ER) CENTERLINE EAST RAIL
- (WR) CENTERLINE WEST RAIL
- (9) PIER GRID NUMBER

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NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-303.DWG

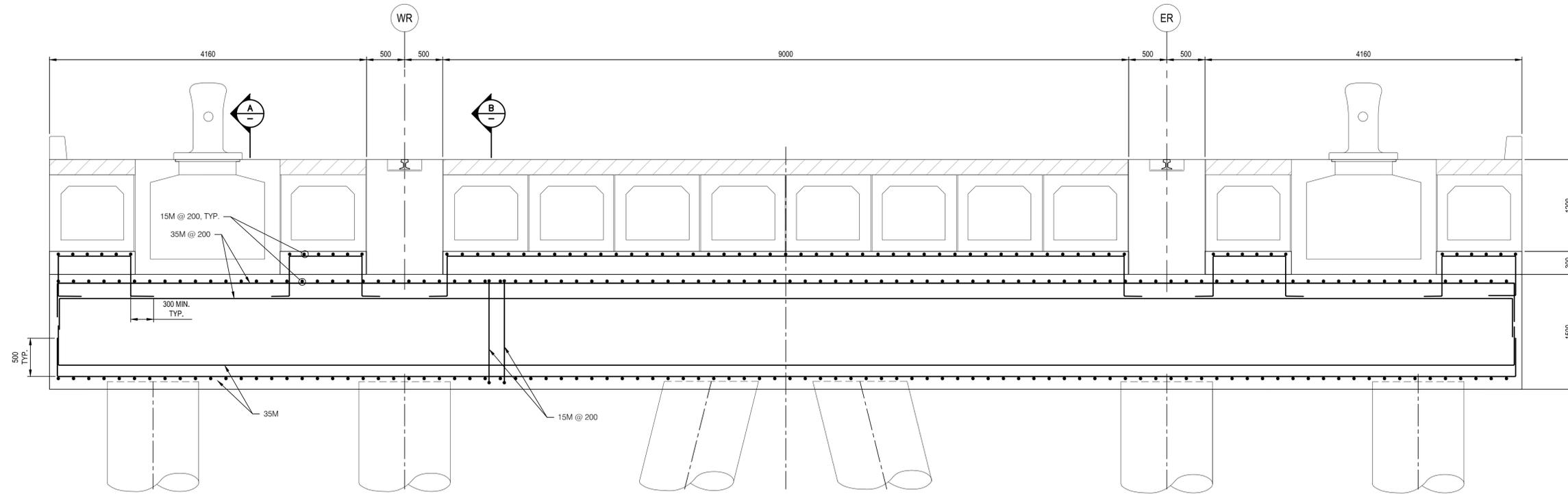
JL	CR	RB	20.11.10
Dwn.	Chkd.	Dgmn.	YYMMDD

Title

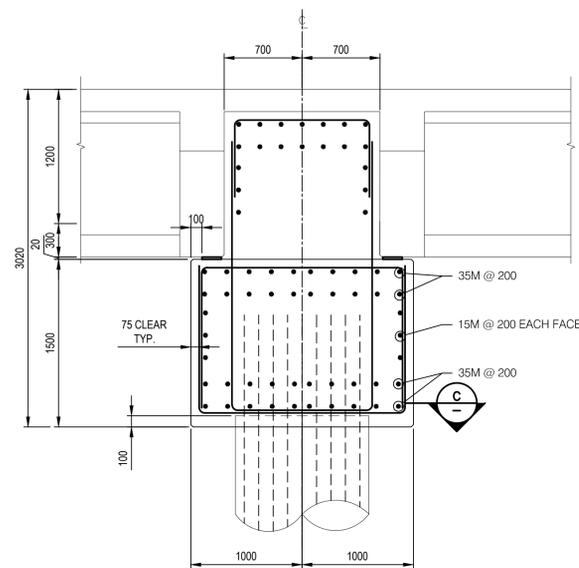
**OUTFITTING PIER  
PILECAP PLAN**

Project No. 115619249 Scale

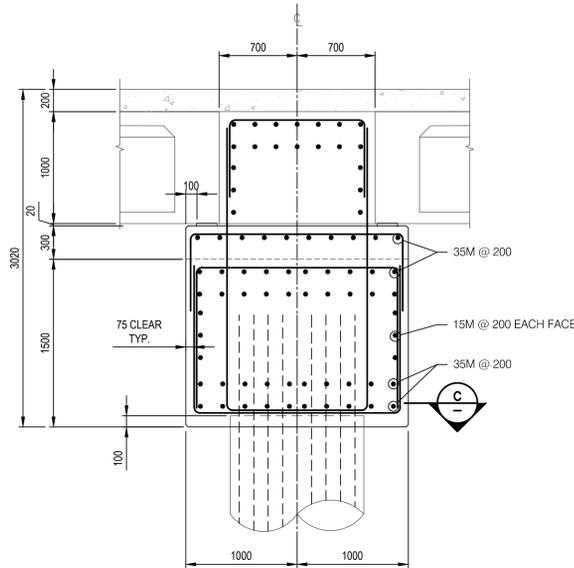
Drawing No. 115619249-303 Revision C



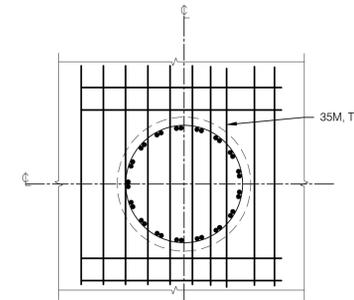
**A** SECTION - PILECAP TYPE A (GRID 2 - 6 & GRID 13 - 19)  
SCALE: 1:30



**A** SECTION - PILECAP TYPE A (GRID 2 - 6 & GRID 13 - 19)  
SCALE: 1:30



**B** SECTION - PILECAP TYPE A (GRID 2 - 6 & GRID 13 - 19)  
SCALE: 1:30



**C** SECTION  
SCALE: 1:30



U:\115619249\4 DRAWINGS\02 WORK IN PROGRESS DRAWINGS\FOR PERMITTING\115619249-303\_305.DWG  
17/10/2018 8:47 AM

Revision	By	Appd.	CR	LM	CR	20.11.18
C			LM	CR		20.11.18
B			LM	CR		20.11.10
A			LM	CR		20.10.16

**LEGEND:**  
 CENTERLINE EAST RAIL  
 CENTERLINE WEST RAIL

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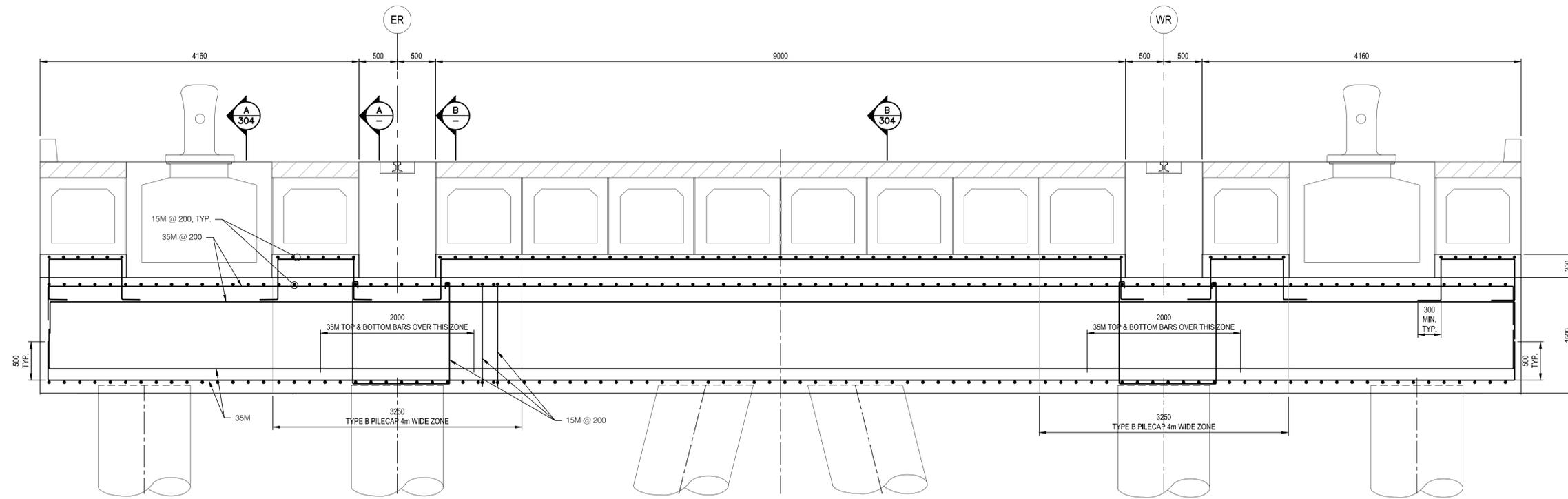
Client/Project

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 OUTFITTING PIER EXPANSION  
 NORTH VANCOUVER, BRITISH COLUMBIA

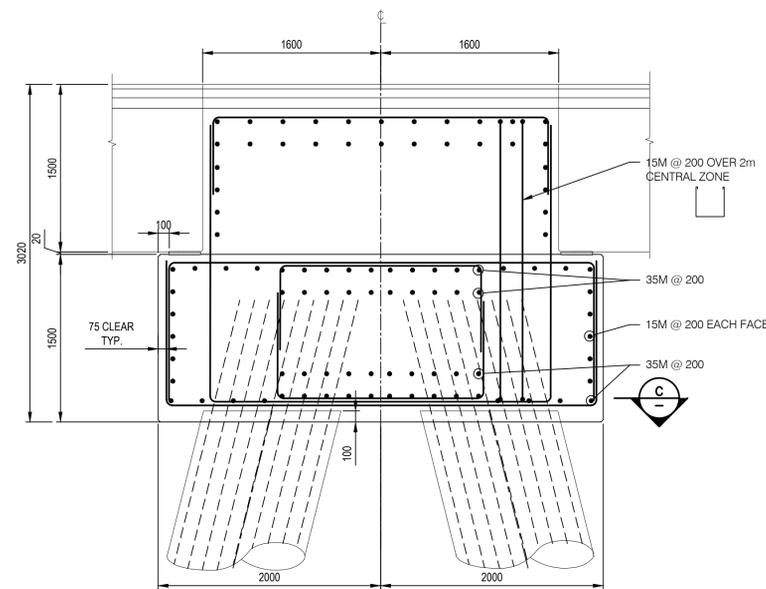
File Name: 115619249-303\_305.DWG

JL	CR	LM	20.
Dwn.	Chkd.	Dgnt.	YY.MM.DD

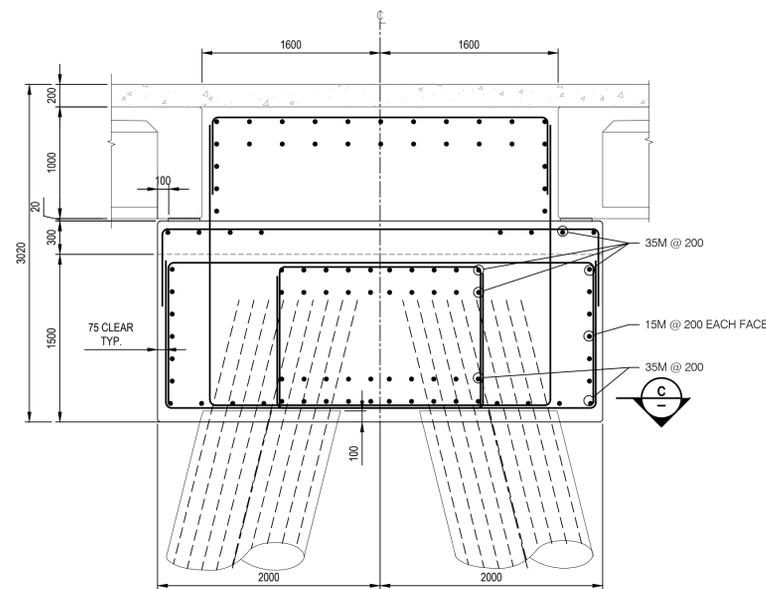
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Project No.	Scale	115619249	
Drawing No.	Revision	115619249-304	C



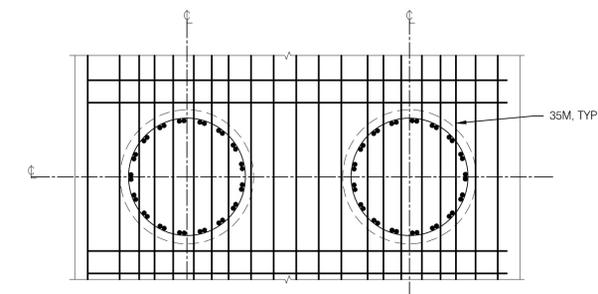
**B SECTION - PILECAP TYPE B (GRID 7 - 12)**  
SCALE: 1:30



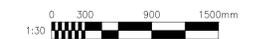
**A SECTION - PILECAP TYPE B (GRID 7 - 12)**  
SCALE: 1:30



**B SECTION - PILECAP TYPE B (GRID 7 - 12)**  
SCALE: 1:30



**C SECTION**  
SCALE: 1:30



U:\115619249\4 DRAWINGS\02 WORK IN PROGRESS DRAWINGS\FOR PERMITTING\115619249-303\_305.DWG  
17/10/2020 8:46 AM

Revision	By	Appd.	CR	LM	CR	20.11.18
C			LM	CR		20.11.18
B			LM	CR		20.11.10
A			LM	CR		20.10.14

**LEGEND:**  
 CENTERLINE EAST RAIL  
 CENTERLINE WEST RAIL

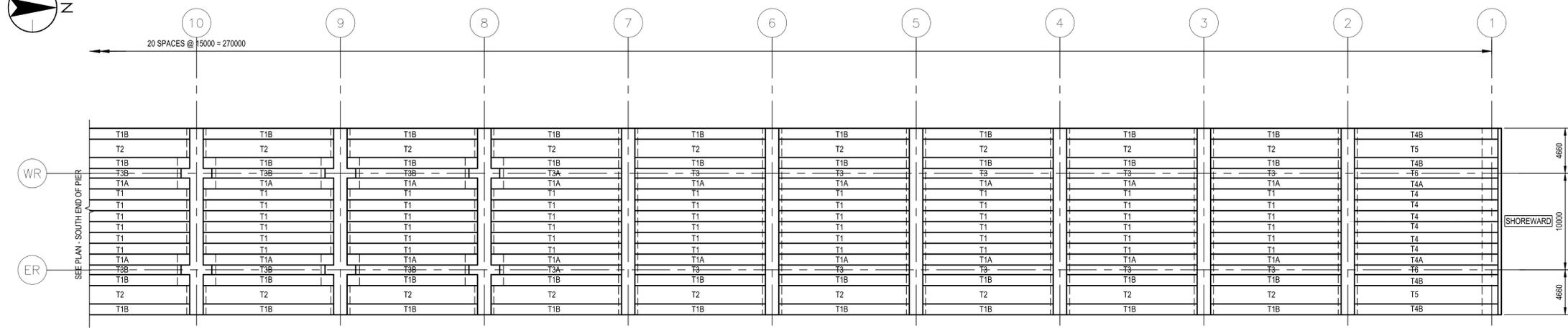
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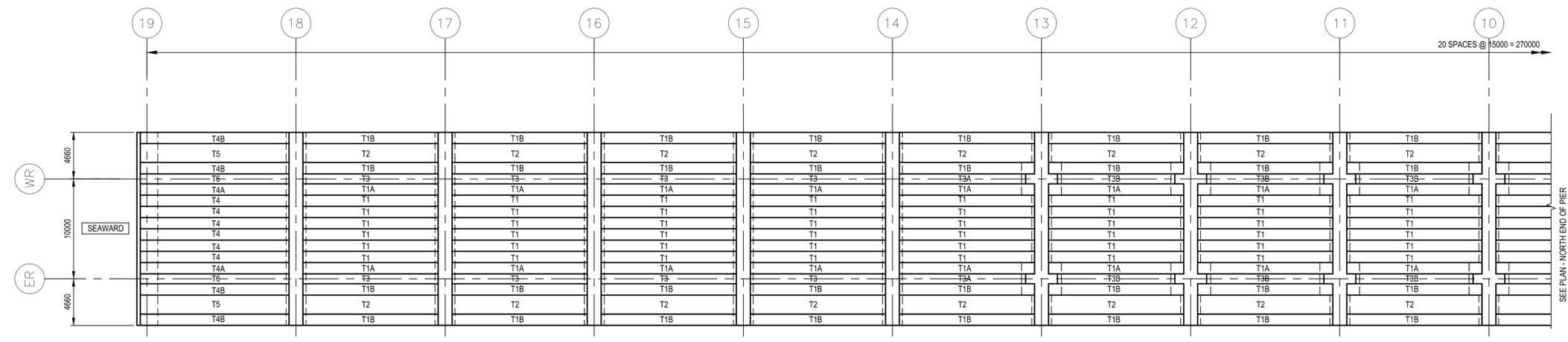
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 OUTFITTING PIER EXPANSION  
 NORTH VANCOUVER, BRITISH COLUMBIA  
 File Name: 115619249-303\_305.DWG  
 J.L. CR RB 20.09.24  
 Dwn. Chkd. Dgdn. YYJMMDD

Title  
 OUTFITTING PIER  
 PILECAP DETAILS  
 PILECAP TYPE B  
 Project No. 115619249 Scale  
 Drawing No. 115619249-305 Revision  
 C



PLAN - NORTH END PIER  
SCALE: 1:250



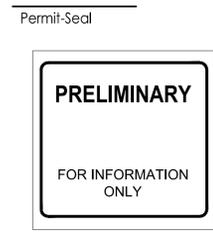
PLAN - SOUTH END PIER  
SCALE: 1:250

PRECAST STRINGERS TABLE					
LABEL	QUANTITY	LENGTH (m)	WIDTH (m)	HEIGHT(m)	PANEL WEIGHT (t)
T1	96	13.60	1.109	1.0	14.9
T1A	32	13.60	1.109	1.0	15.2
T1B	64	13.60	1.109	1.0	15.4
T2	32	13.60	1.9	1.5	42.1
T3	18	13.60	1.0	1.5	48.7
T3A	4	12.70	1.0	1.5	45.5
T3B	10	11.80	1.0	1.5	42.3
T4	12	14.95	1.109	1.0	16.4
T4A	4	14.95	1.109	1.0	16.7
T4B	8	14.95	1.109	1.0	16.9
T5	4	14.95	1.9	1.5	46.2
T6	4	14.95	1.0	1.2	42.3

U:\115619249\4 DRAWINGS\02 WORK IN PROGRESS DRAWINGS\FOR PERMITTING\115619249-306.DWG  
11/18/2020 8:52 AM

Revision	By	Appd.	YYMMDD
C	LM	CR	20.11.18
B	LM	CR	20.10.14
A	JF	CR	20.04.15

- LEGEND:**
- T1 PRECAST PANEL NUMBER
  - ⊕ CENTRELINE EAST RAIL
  - ⊖ CENTRELINE WEST RAIL
  - ⊙ PIER GRID NUMBER



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File Name: 115619249-306.DWG

JL	CR	JF	20.05.30
Dwn.	Chkd.	Dsgn.	YYMMDD

Title

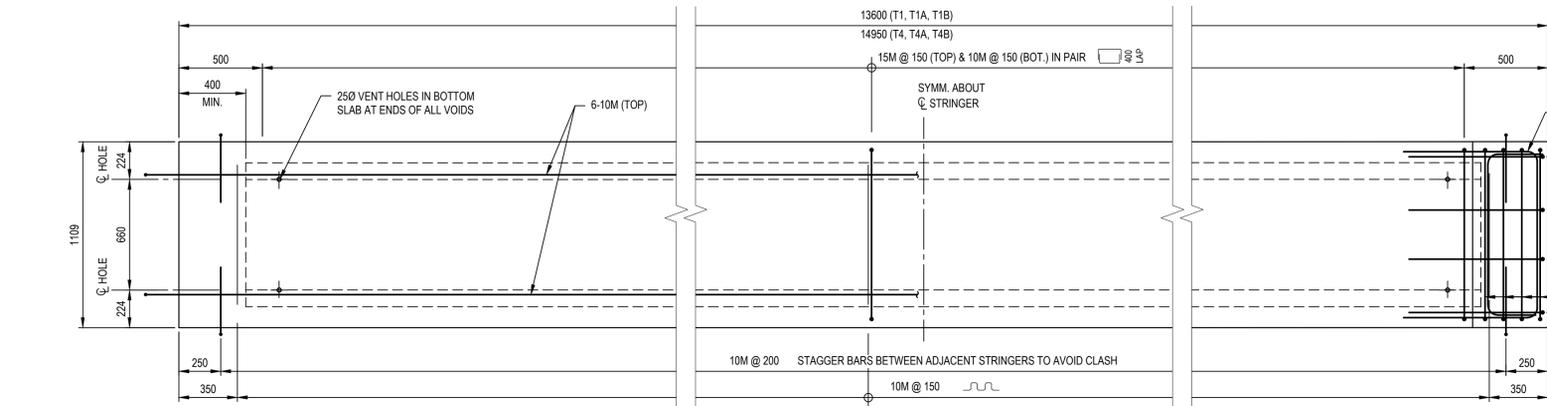
OUTFITTING PIER  
PRECAST UNITS PLAN

Project No.  
115619249

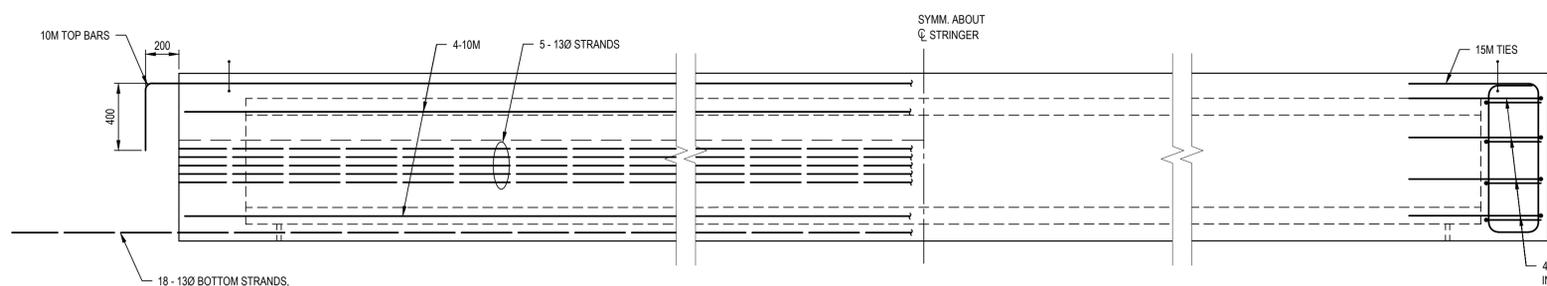
Drawing No.  
115619249-306

Scale 0 2.5 20.0 50.0 100.0 150.0 200.0 250.0 300.0 350.0 400.0 450.0 500.0 550.0 600.0 650.0 700.0 750.0 800.0 850.0 900.0 950.0 1000.0

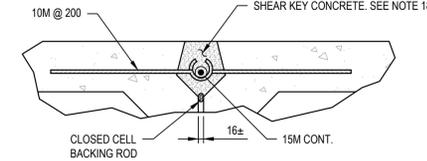
Revision  
C



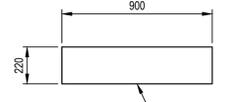
**PLAN**  
SCALE: 1:20



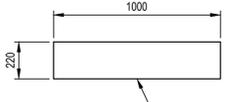
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(STRINGER T1, T4 SHOWN, T1A, T1B, T4A, T4B SIMILAR, SEE DWG. 306 FOR LOCATIONS)



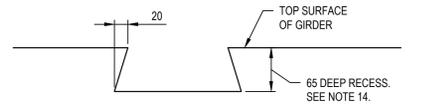
**SHEAR KEY DETAIL**  
SCALE: 1:10



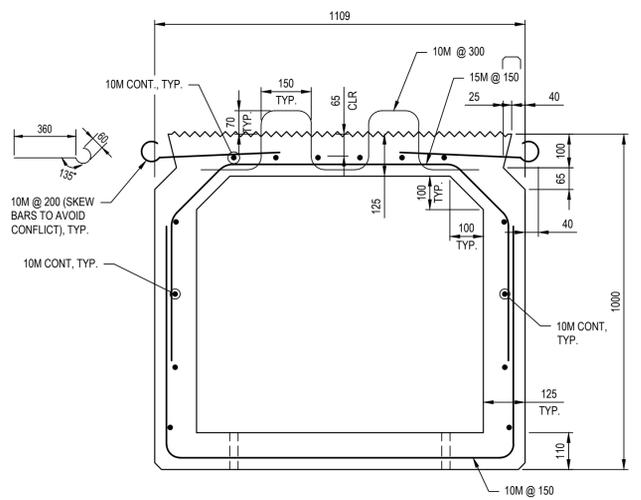
**BEARING PAD DETAIL - STRINGER**  
SCALE: 1:20



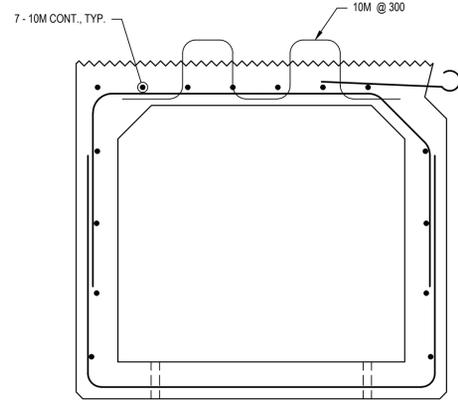
**BEARING PAD DETAIL - UTILITY TRENCH**  
SCALE: 1:20



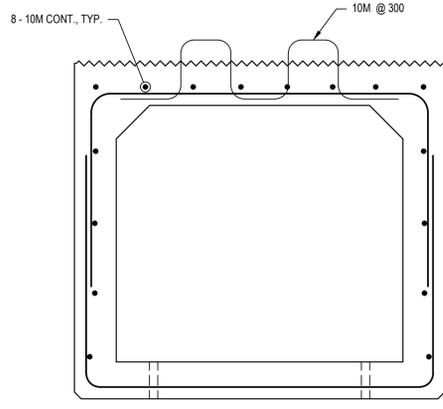
**LIFTING DEVICE RECESS DETAIL**  
SCALE: 1:5



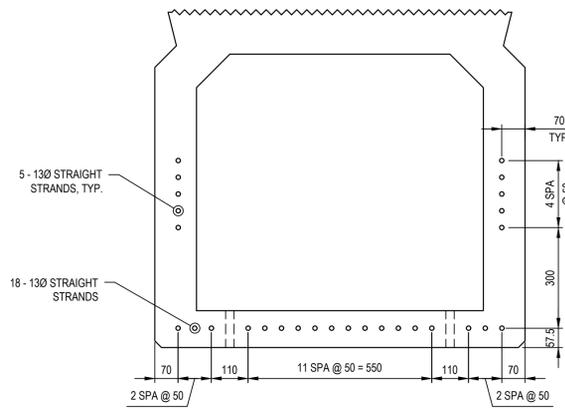
**STRINGER T1, T4 - REINFORCEMENT LAYOUT**  
SCALE: 1:10



**STRINGER T1A, T4A - REINFORCEMENT LAYOUT**  
SCALE: 1:10  
REFER TO T1 & T4 FOR DETAILS NOT SHOWN



**STRINGER T1B, T4B - REINFORCEMENT LAYOUT**  
SCALE: 1:10  
REFER TO T1 & T4 FOR DETAILS NOT SHOWN



**TYPICAL STRAND LAYOUT**  
SCALE: 1:10

**NOTES:**

- DESIGN SPECIFICATIONS: CAN/CSA-S6-14 INCLUDING MoTI SUPPLEMENT TO S6-14
- DESIGN LOAD: LIVE LOAD: BCL-625 PORTABLE CRANE LOAD: MAXIMUM LOAD OF ONE OUTRIGGER = 90 METRIC TONES UNIFORMLY DISTRIBUTED LOAD: 40 kPa
- STRINGERS SHALL BE MANUFACTURED IN ACCORDANCE WITH THE MoTI STANDARD SPECIFICATION 415: MANUFACTURE AND ERECTION OF PRECAST AND PRESTRESSED CONCRETE MEMBERS.
- PRESTRESSING STRANDS SHALL BE 130 (7 WIRE) UNCOATED LOW RELAXATION STRANDS ASTM A416, 1860 MPa GRADE OR EQUIVALENT.
- MINIMUM ULTIMATE TENSILE STRENGTH = 184 kN/STRAND. TENSION IMMEDIATELY BEFORE RELEASE = 143 kN/STRAND (0.78 fpu).
- MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT TIME OF RELEASE OF STRANDS = 40 MPa AND AT 28 DAYS = 50 MPa. TOP SLAB TO HAVE MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS = 40 MPa.
- REINFORCING STEEL SHALL CONFORM TO C.S.A. G30.18M GRADE 400R.
- REINFORCING STEEL SHALL HAVE 50 mm COVER UNLESS OTHERWISE NOTED.
- LAP OF BARS FOR SPLICES TO BE AS FOLLOWS U.N.O.  
10M BARS - 550      10MS BARS - 700  
15M BARS - 650      15MS BARS - 800  
20M BARS - 710      20MS BARS - 920
- BOTTOM EDGES OF STRINGERS SHALL BE CHAMFERED 20 mm.
- TOP OF STRINGERS SHALL HAVE ROUGHENED FINISH TO AN AMPLITUDE OF 6 mm.
- ENDS OF BOX STRINGERS SHALL BE COMPLETELY COATED WITH A MINIMUM 3 mm OF THIXOTROPIC EPOXY. MANUFACTURER'S INSTRUCTIONS TO BE STRICTLY ADHERED TO.
- LIFTING DEVICES SATISFACTORY TO THE ENGINEER SHALL BE PROVIDED OVER THE BEARINGS. ONLY VERTICAL LIFTS WILL BE PERMITTED. CARE SHALL BE TAKEN TO PREVENT SUDDEN IMPACT LOADS ON THE STRINGERS.
- THE CONCRETE IMMEDIATELY SURROUNDING ALL LIFTING DEVICES SHALL HAVE A FORMED RECESS 65mm DEEP. THE RECESS SHALL BE THOROUGHLY SANDBLASTED IN THE SHOP. AFTER ERECTION, THE LIFTING DEVICE SHALL BE BURNED OFF AT THE BOTTOM OF THE RECESS. THE BURNED OFF LIFTING HOOK ENDS SHALL BE PAINTED WITH GALVAON AND THE RECESS SHALL BE PATCHED WITH AN APPROVED SHRINKAGE-COMPENSATING GROUT.
- SHEAR KEYS BETWEEN ADJACENT STRINGERS SHALL BE FILLED WITH 14 mm AGG. CONCRETE HAVING A MINIMUM COMPRESSIVE STRENGTH OF 50 MPa AT 28 DAYS.



U:\115619249\4 DRAWINGS\02 WORK IN PROGRESS DRAWINGS\115619249-307.DWG  
11/18/2020 8:56 AM

Revision	By	Appd.	Date
B	ISSUED FOR PERMITTING	LM	CR 20.11.18
A	ISSUED FOR 60% REVIEW	JP	CR 20.10.14
		YY	MM.DD

**LEGEND:**

Permit-Seal	Consultants
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Permit-Seal

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SEASPAN VANCOUVER SHIPYARDS  
OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

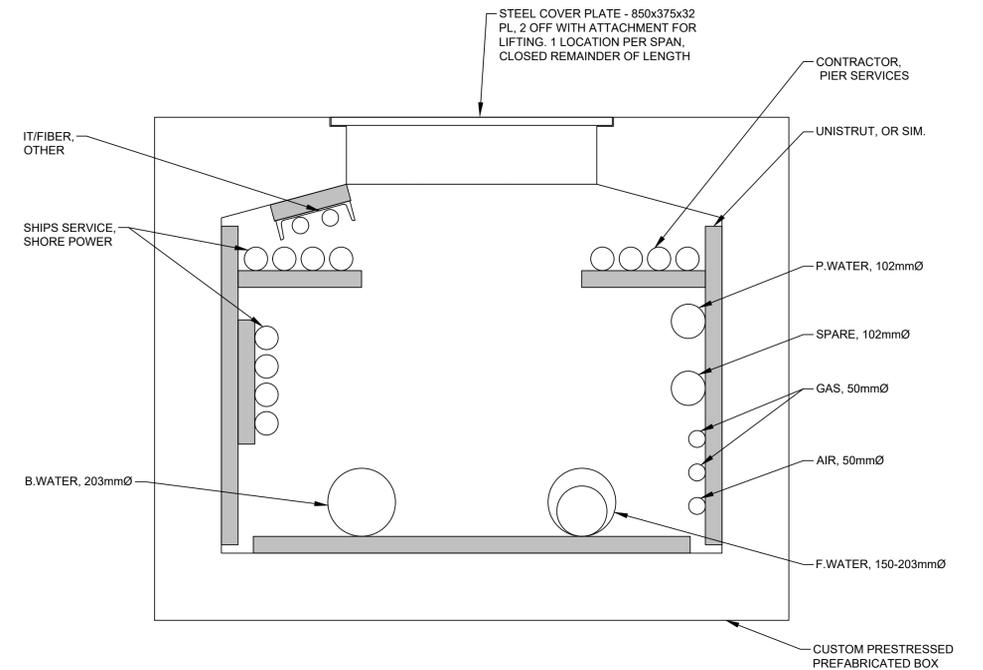
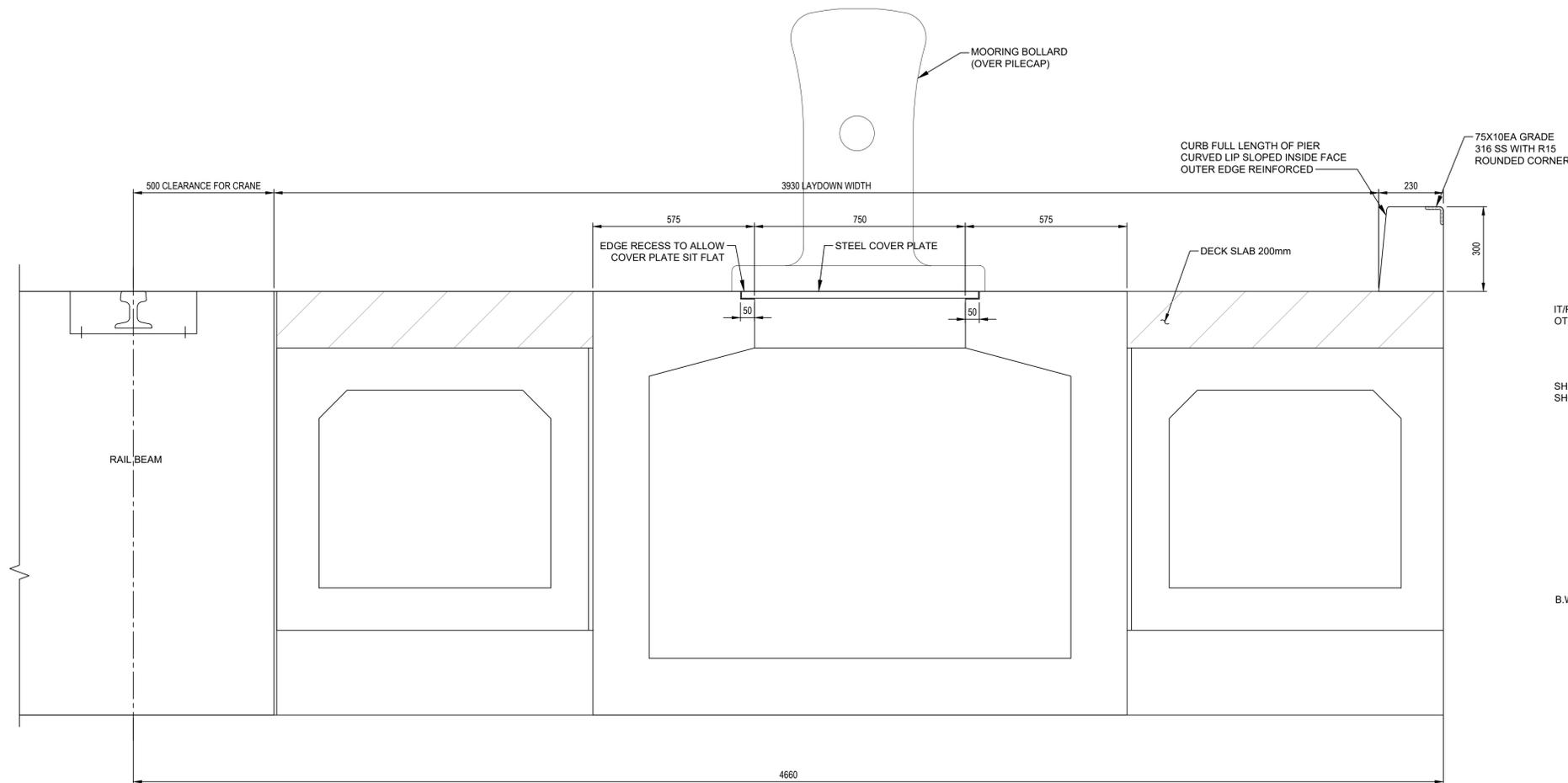
File Name: 115619249-307.DWG      CN      CR      JP      20.09.24  
Dwn.      Chkd.      Dgdn.      YY.MM.DD

Title

OUTFITTING PIER  
PIER PRECAST UNITS  
CROSS SECTIONS AND DETAILS

Project No. 115619249      Scale AS NOTED

Drawing No. 115619249-307      Revision B



1  
104  
DETAIL  
SCALE: 1:10

UTILIDOR CROSS SECTION  
SCALE: 1:10

U:\115619249\4\_DRAWINGS\02\_WORK\_IN\_PROGRESS\_DRAWINGS\FOR PERMITTING\115619249-308.DWG  
11/18/2018 9:02 AM

Revision	By	Appd.	YY.MM.DD
C	LM	CR	20.11.18
B	LM	CR	20.10.14
A	LM	CR	20.06.15

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OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-308.DWG  
JL CR LM 20.06.01  
Dwn. Chkd. Dsgn. YY.MM.DD

Title

OUTFITTING PIER  
UTILITY TRENCH  
SERVICE DETAILS

Project No.  
115619249



Drawing No.

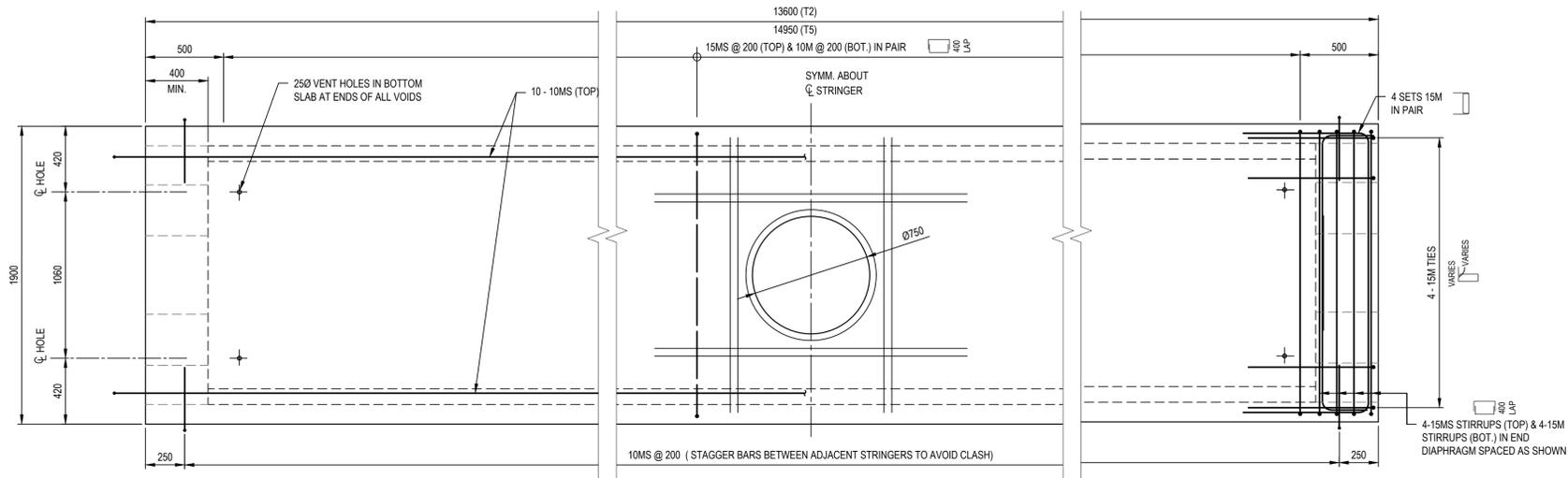
115619249-308

Revision

C

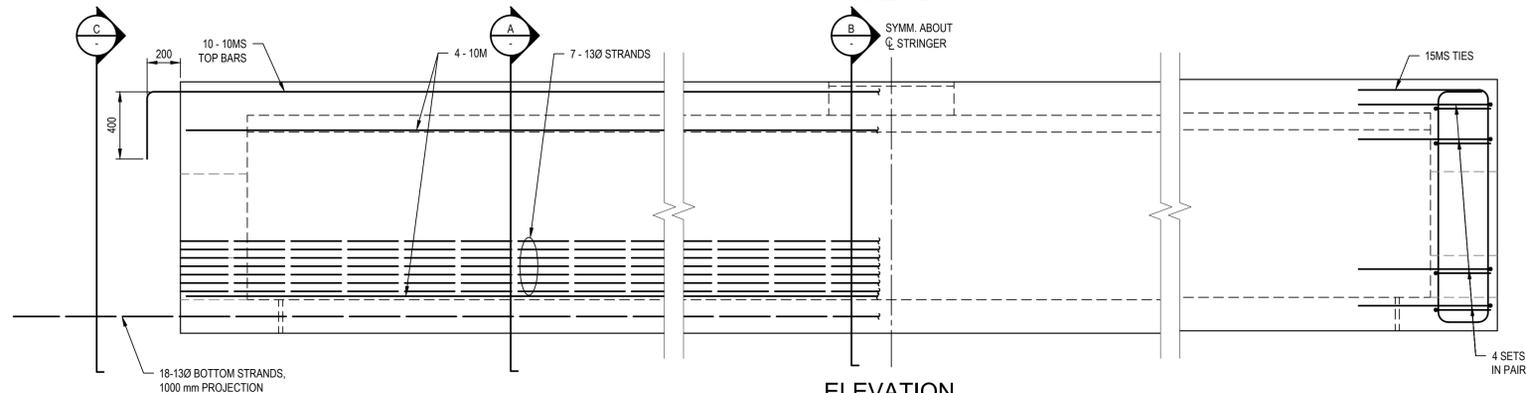
**NOTES:**

1. REFER TO NOTES ON DWG. 115619249-307.



**PLAN**

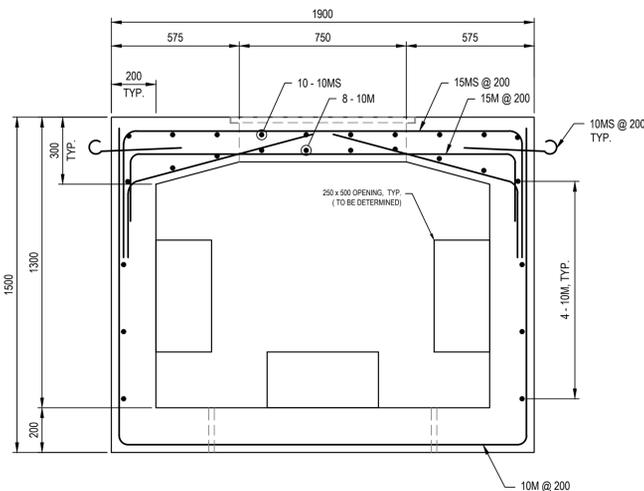
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**ELEVATION**

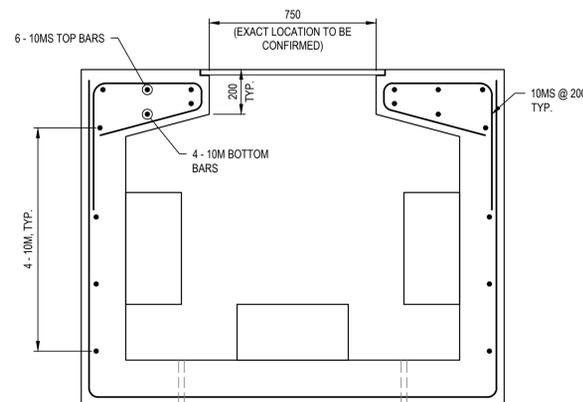
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(UTILITY TRENCH T2, T5 SHOWN, SEE DWG. 306 FOR LOCATIONS)



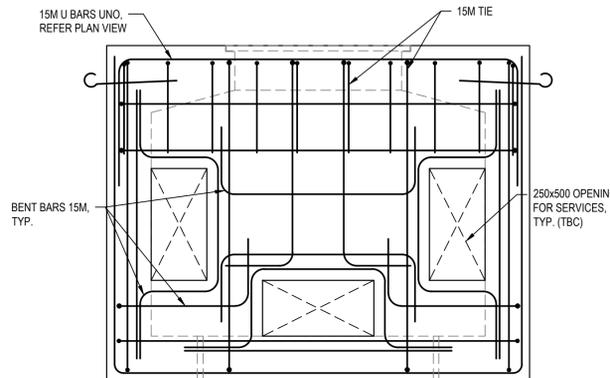
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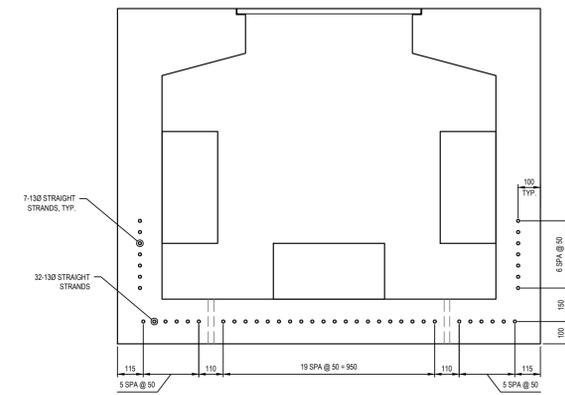
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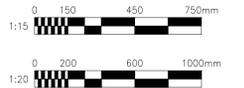
**C SECTION**

SCALE: 1:15



**STRAND LAYOUT**

SCALE: 1:15



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11/18/2016 9:05 AM

Revision	By	App'd.	CR	YYMMDD
B	LM	CR	20.11.18	
A	lm	CR	20.10.14	

**LEGEND:**

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OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-307.DWG

CN	CR	JP	20.09.24
Dwn.	Chkd.	Dgpr.	YYMMDD

Title

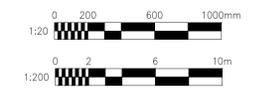
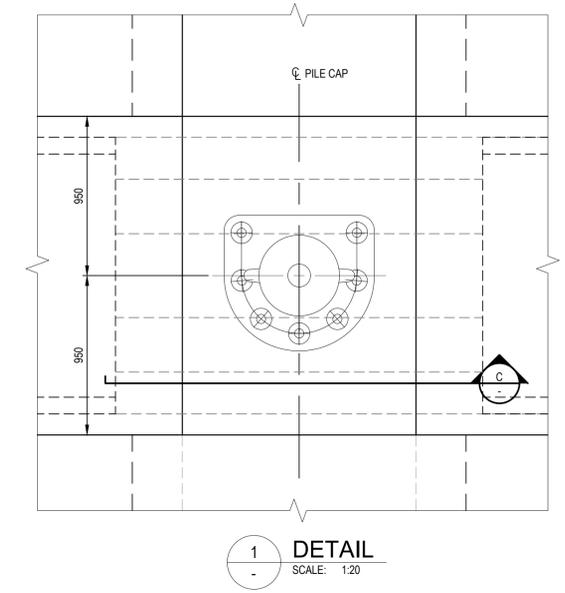
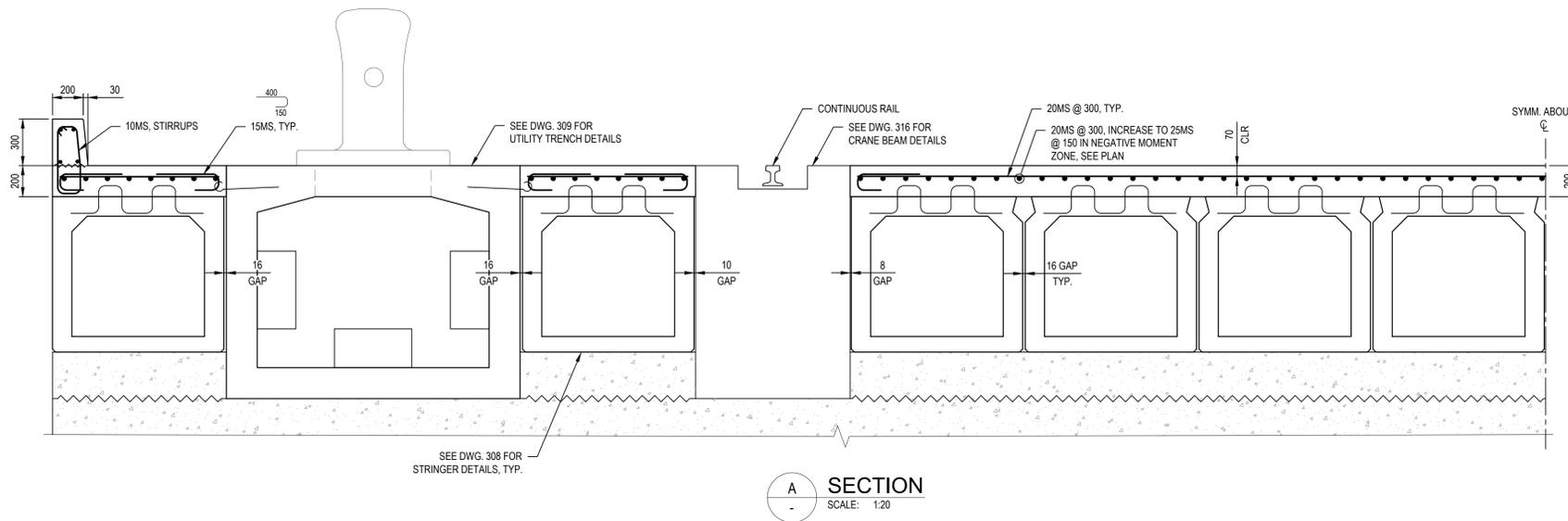
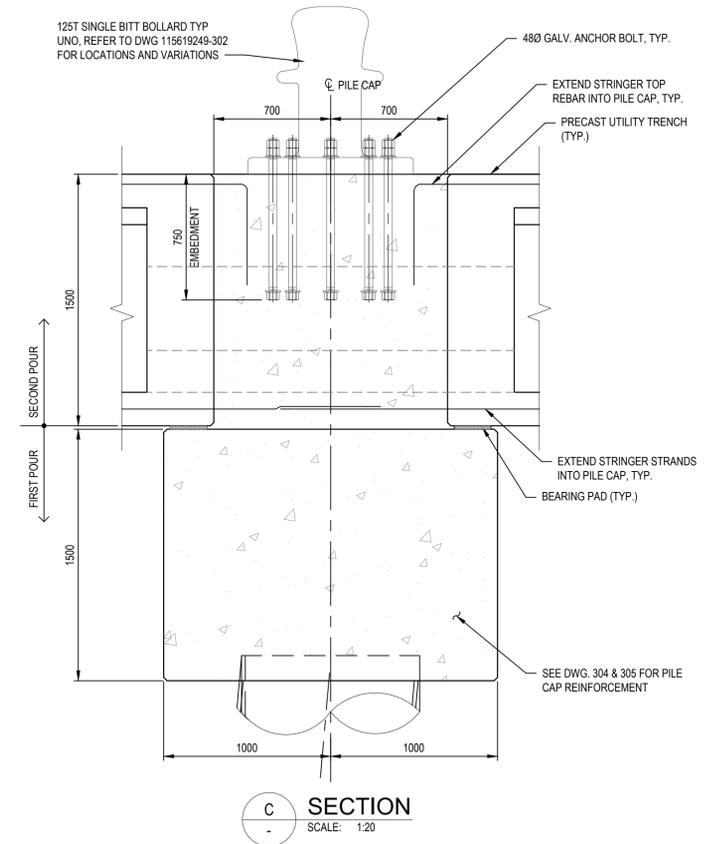
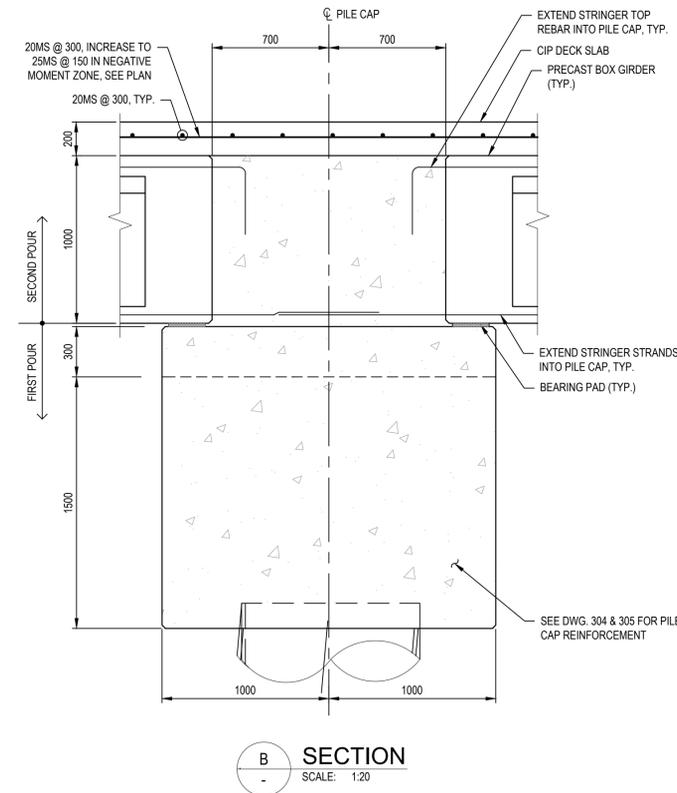
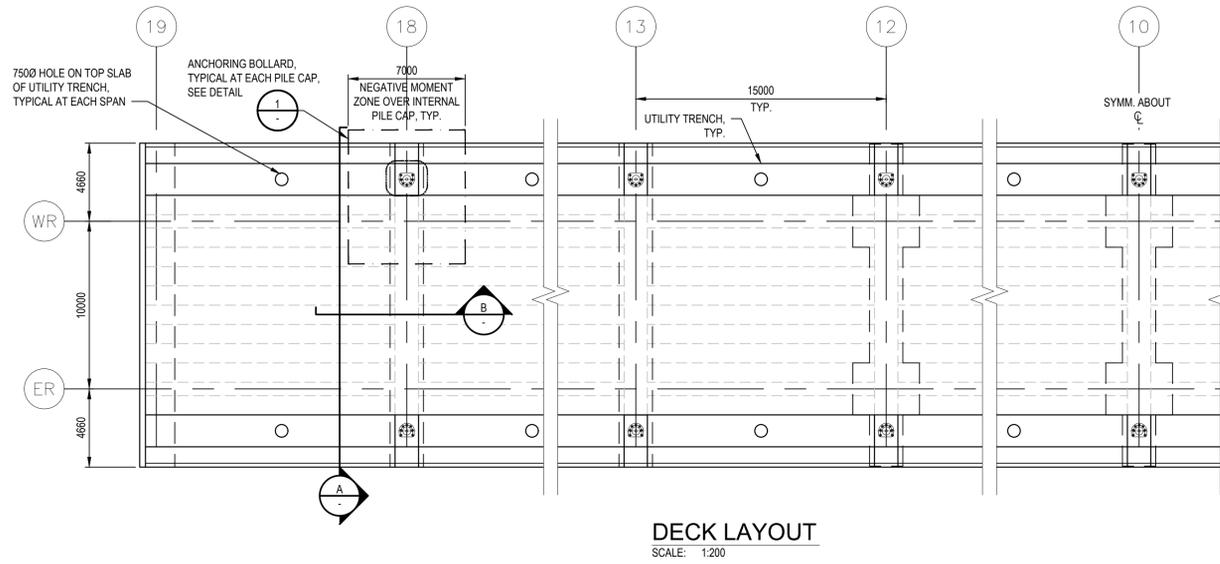
OUTFITTING PIER  
UTILITY TRENCH DETAILS

Project No. 115619249

Scale AS NOTED

Drawing No. 115619249-309

Revision B



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Revision	By	Appd.	YY.MM.DD
C	LM	CR	20.11.18
B	LM	CR	20.11.10
A	JP	CR	20.10.14

**LEGEND:**

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OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

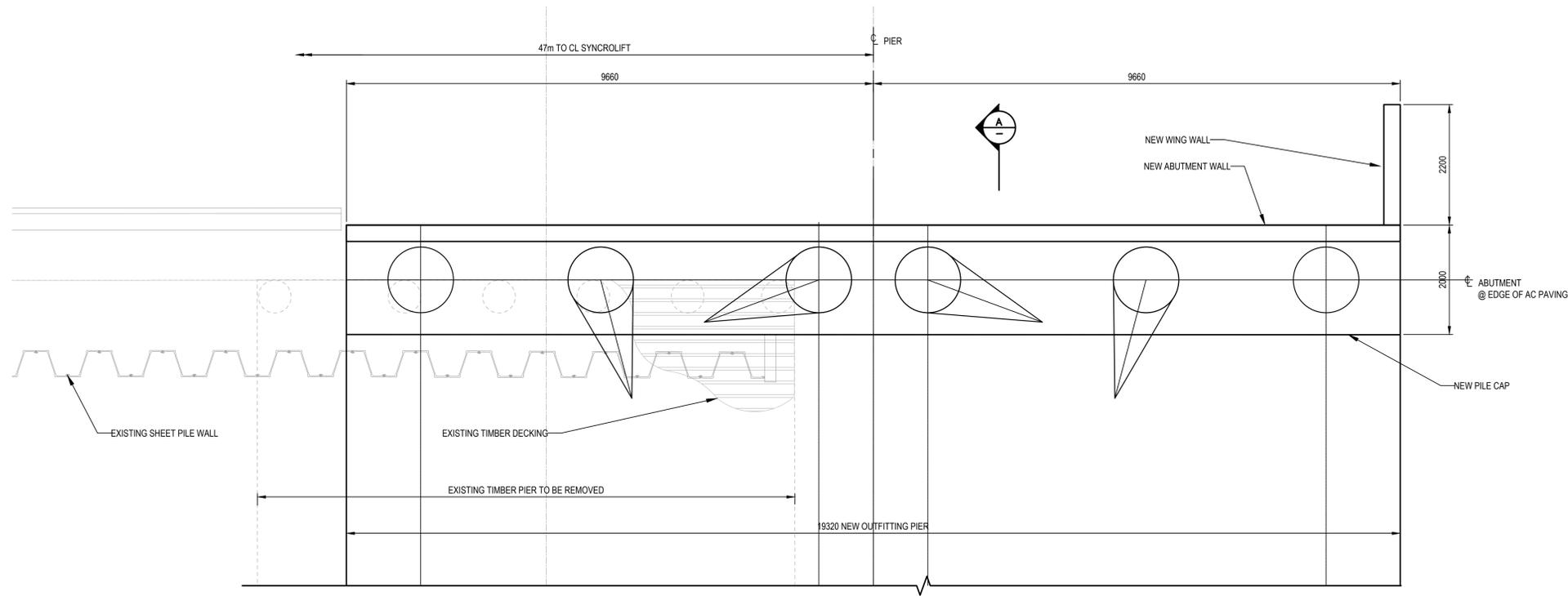
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Dwn.    Chkd.    Dgmn.    YY.MM.DD

Title

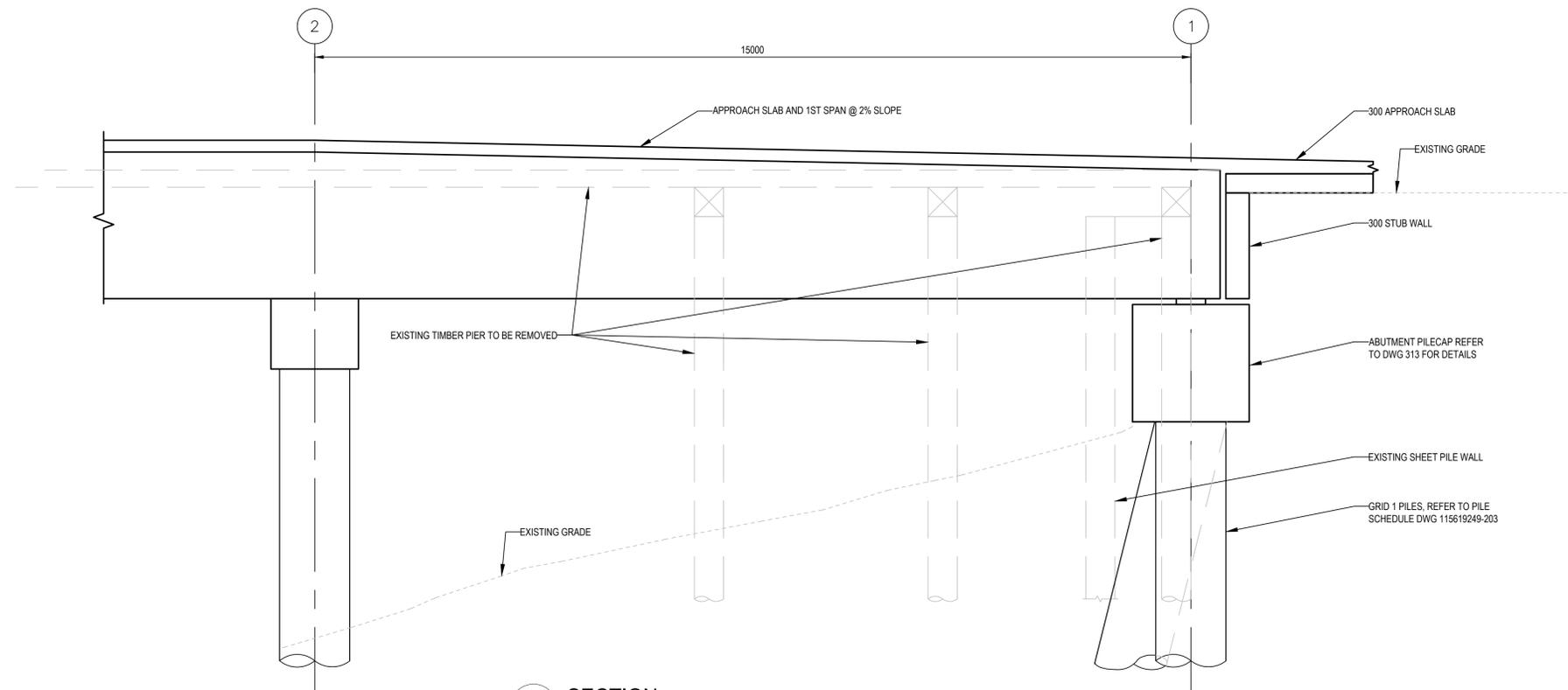
OUTFITTING PIER  
PIER SLAB DETAILS

Project No. 115619249    Scale

Drawing No. 115619249-310    Revision C



PLAN  
SCALE: 1:50



A SECTION  
SCALE: 1:50

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11/18/2016 9:15 AM

Revision	By	Appd.	YYMMDD
C	LM	CR	20.11.18
B	LM	CR	20.10.14
A	LM	CR	20.06.15

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OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-312.DWG

JL	CR	LM	20.06.09
Dwn.	Chkd.	Dgfr.	YYMMDD

Title

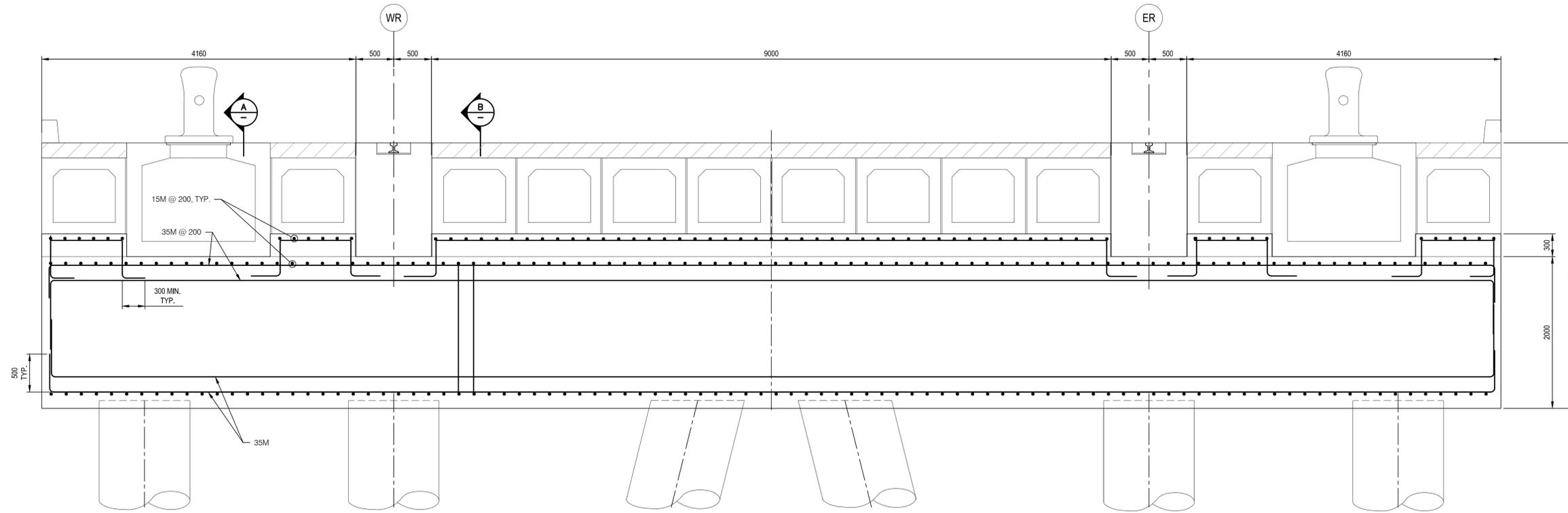
OUTFITTING PIER  
PIER ABUTMENT GENERAL ARRANGMENT

Project No. 115619249

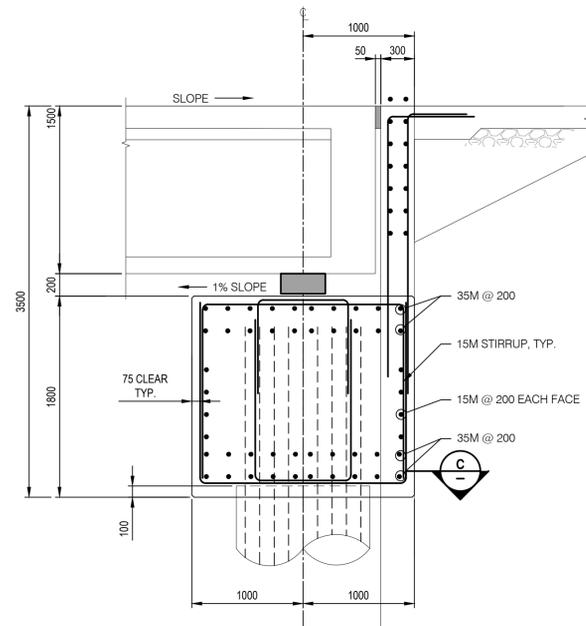
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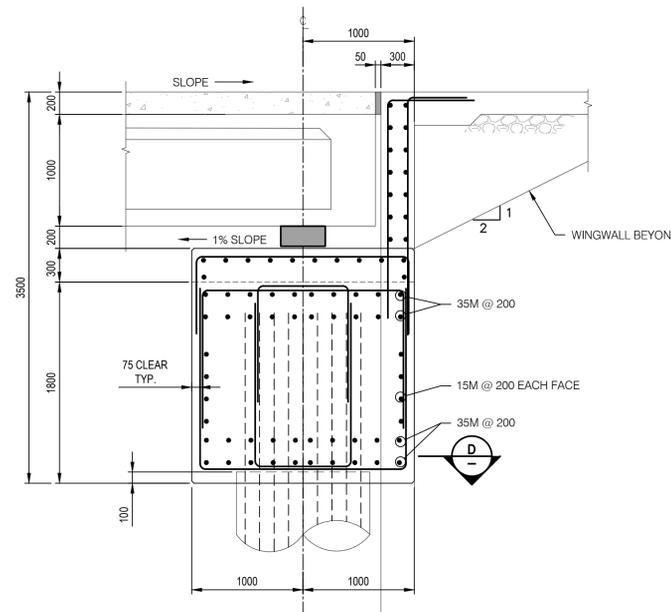
Revision C



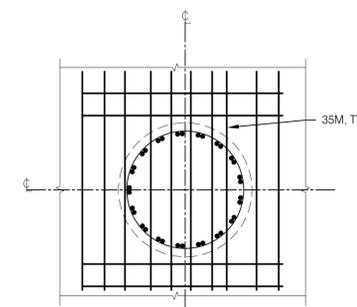
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SCALE: 1:30



**A SECTION - PILECAP TYPE C (GRID 1)**  
SCALE: 1:30



**B SECTION - PILECAP TYPE C (GRID 1)**  
SCALE: 1:30



**C SECTION**  
SCALE: 1:30



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Revision	By	Appd.	YY.MM.DD
B	LM	CR	20.11.18
A	RB	CR	20.10.14

**LEGEND:**  
 CENTERLINE EAST RAIL  
 CENTERLINE WEST RAIL

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NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-313.DWG  
 JL CR RB 20.09.25  
 Dwn. Chkd. Dgnt. YY.MM.DD

Title

OUTFITTING PIER  
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PILECAP TYPE C

Project No.

115619249

Scale

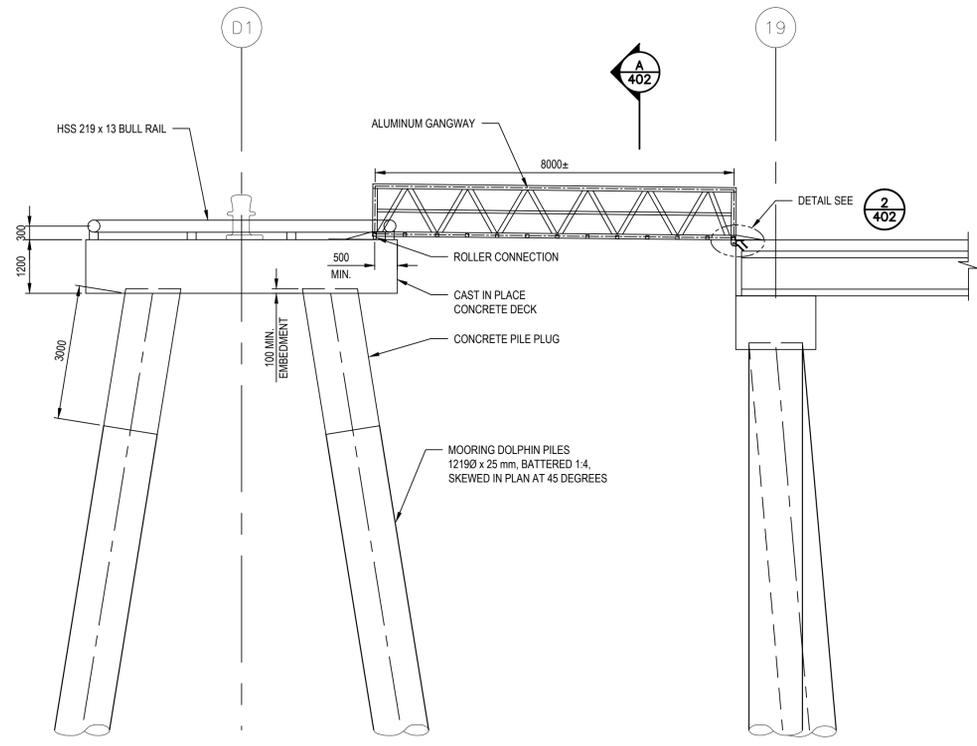
AS NOTED

Drawing No.

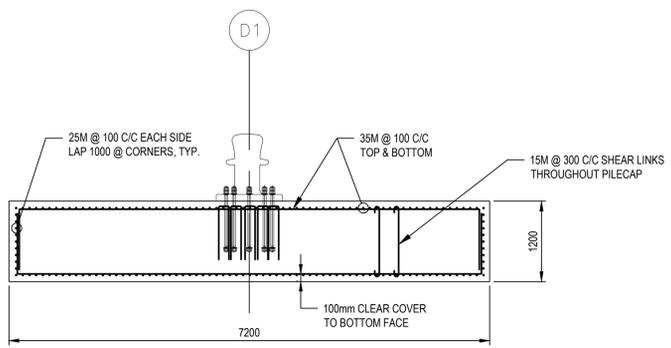
115619249-313

Revision

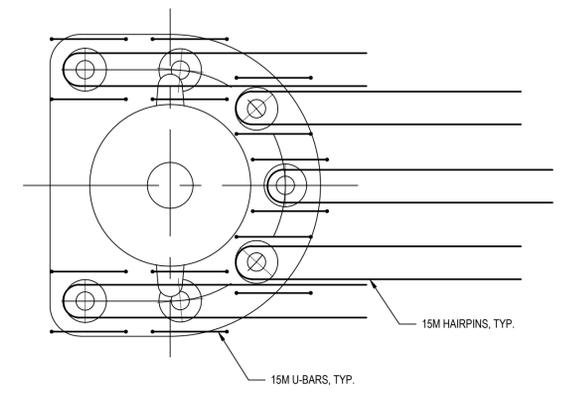
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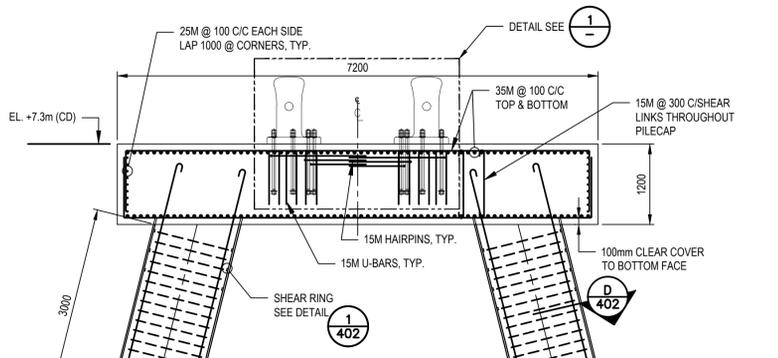
**MOORING DOLPHIN & CATWALK ELEVATION**  
SCALE: 1:75



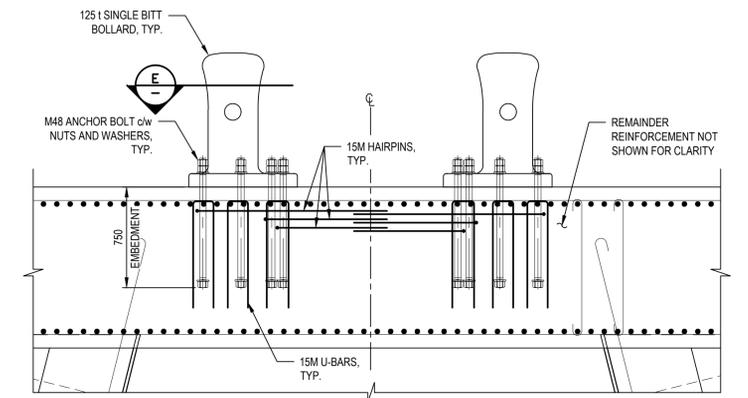
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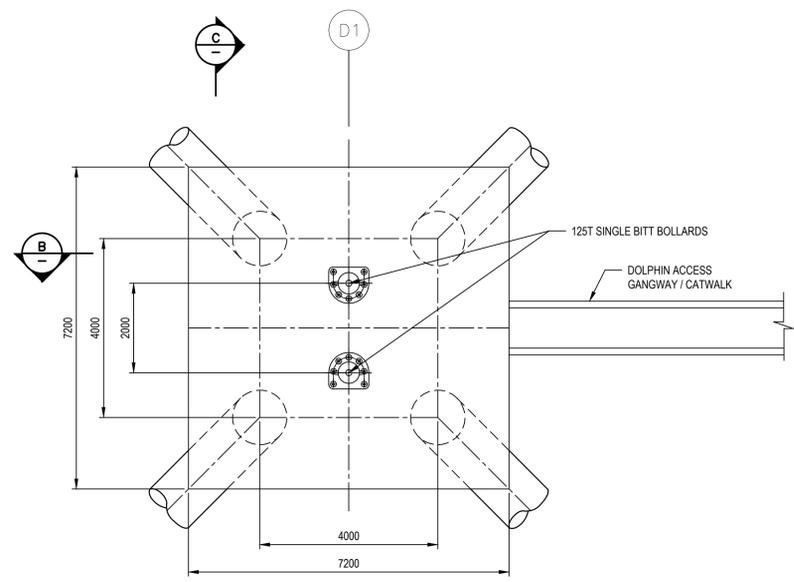
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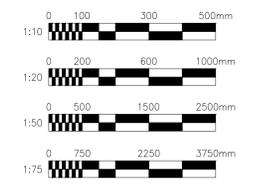
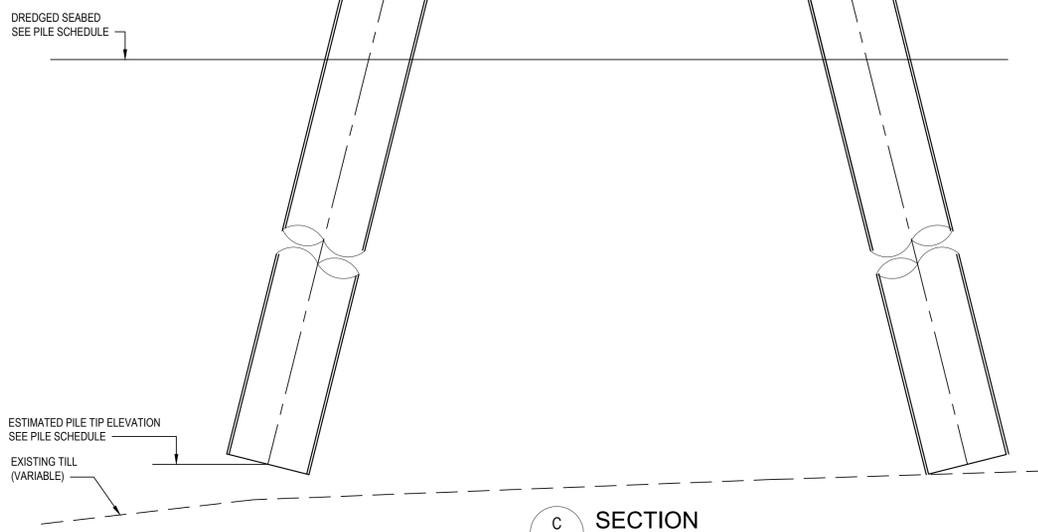
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SCALE: 1:50



**1 DETAIL**  
SCALE: 1:25



**MOORING DOLPHIN & CATWALK PLAN**  
SCALE: 1:75



U:\115619249\4 DRAWINGS\02 WORK IN PROGRESS DRAWINGS\115619249-401.DWG  
11/18/2020 9:21 AM

Revision	By	Appd.	YYMMDD
D	LM	CR	20.11.18
C	LM	CR	20.11.10
B	LM	CR	20.10.14
A	LM	CR	20.06.15

PILE REBAR DESIGN DETAILS		
PILE SIZE Ø (mm)	TOP PLUG REBAR	TIE REBAR
1219x25	28 x 45M	15M @ 150C/C

Permit-Seal

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SEASpan VANCOUVER SHIPYARDS  
OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

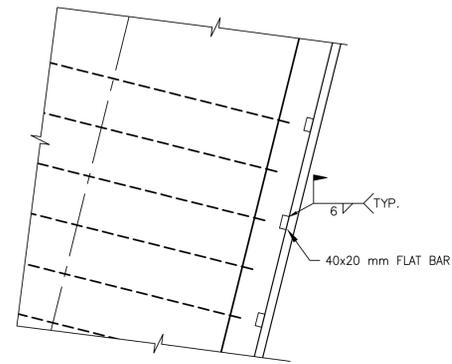
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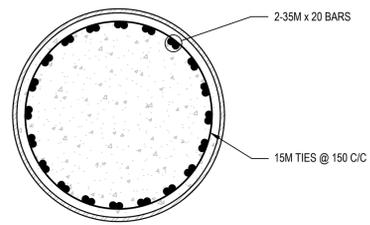
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PLANS FOR OPERATIONAL CONDITIONS

Project No. 115619249 Scale

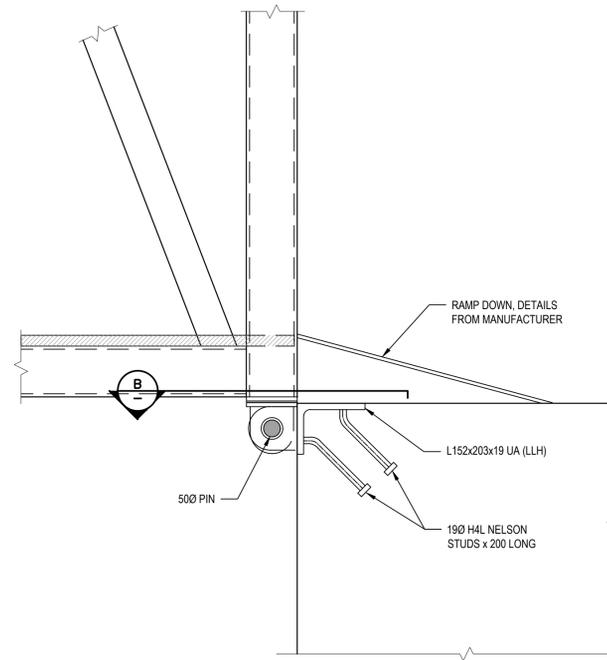
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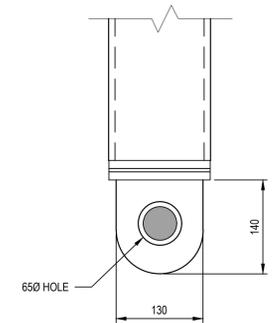
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DETAIL  
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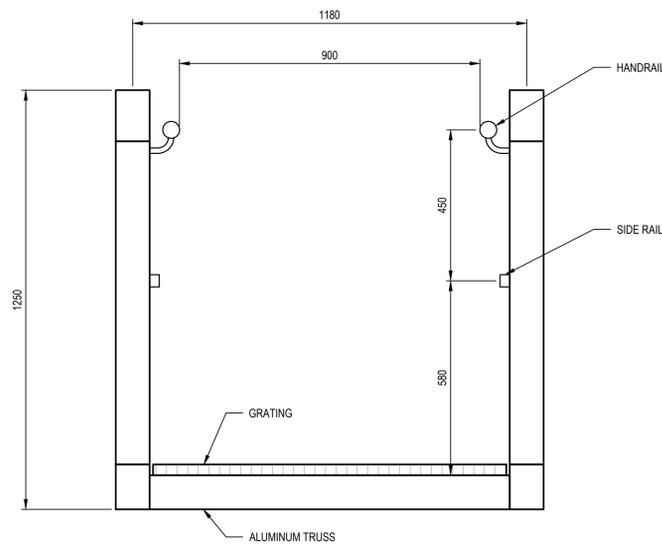
D  
401  
PILE REINFORCEMENT  
SCALE: 1:20  
(REFER TO DWG. 115619249-204 FOR ALL OTHER PILE DETAILS)



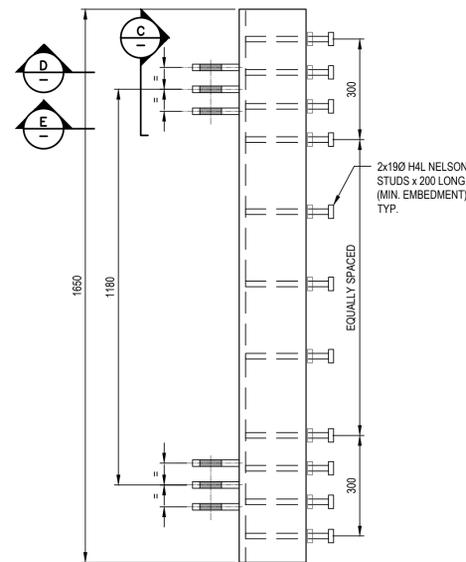
2  
401  
DETAIL  
SCALE: N.T.S.



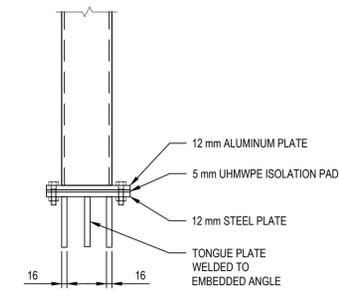
E  
SECTION  
SCALE: 1:5



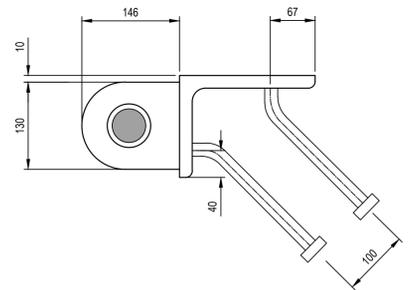
A  
401  
SECTION  
SCALE: 1:10



B  
SECTION  
SCALE: N.T.S.



C  
SECTION  
SCALE: N.T.S.



D  
SECTION  
SCALE: 1:5



U:\115619249\4 DRAWINGS\02 WORK IN PROGRESS DRAWINGS\115619249-402.DWG  
11/18/2018 9:25 AM

Revision	By	Appd.	Date
B	LM	CR	20.11.18
A	LM	CR	20.10.14

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SEASpan VANCOUVER SHIPYARDS  
OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

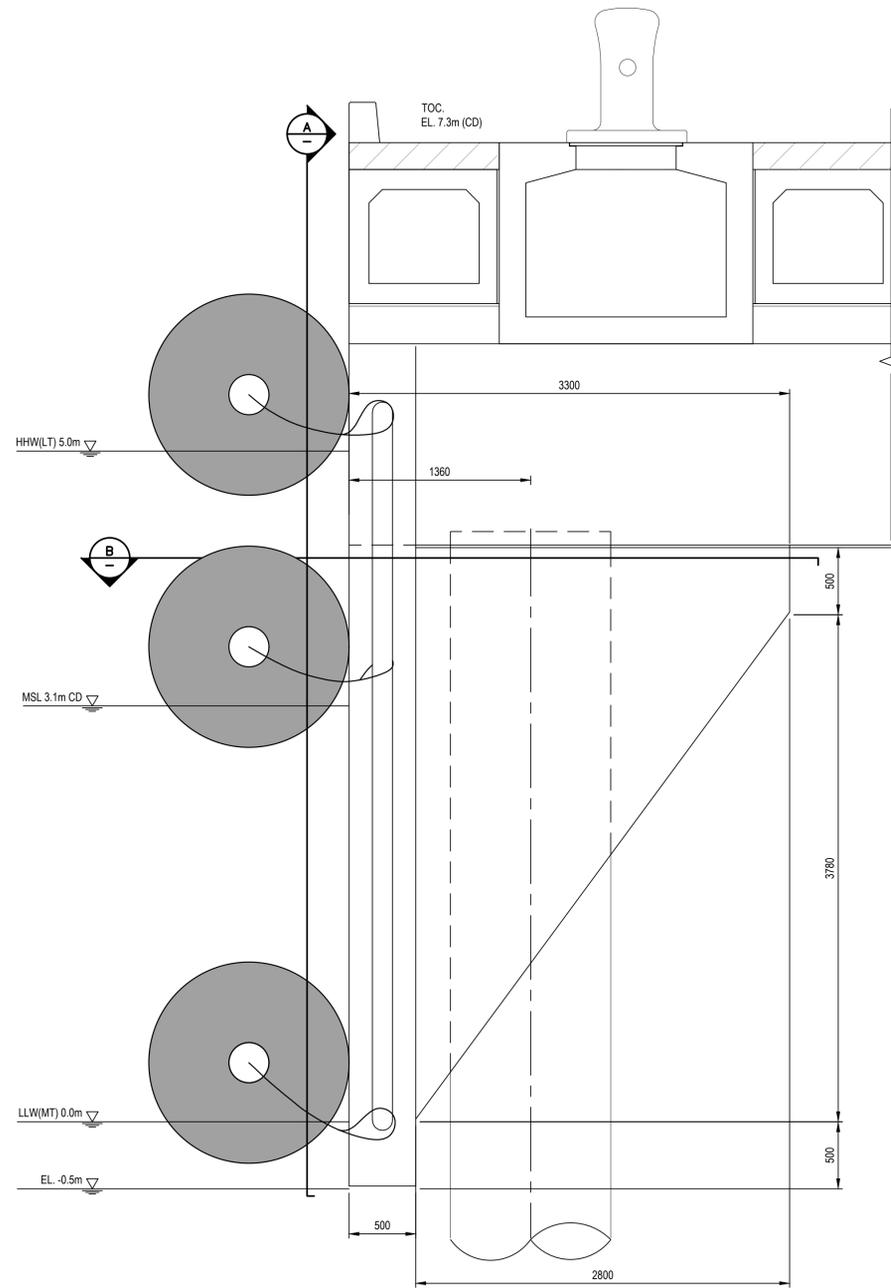
File Name: 115619249-402.DWG  
JL CR LM 20.09.28  
Dwn. Chkd. Dgdn. YY.MM.DD

Title

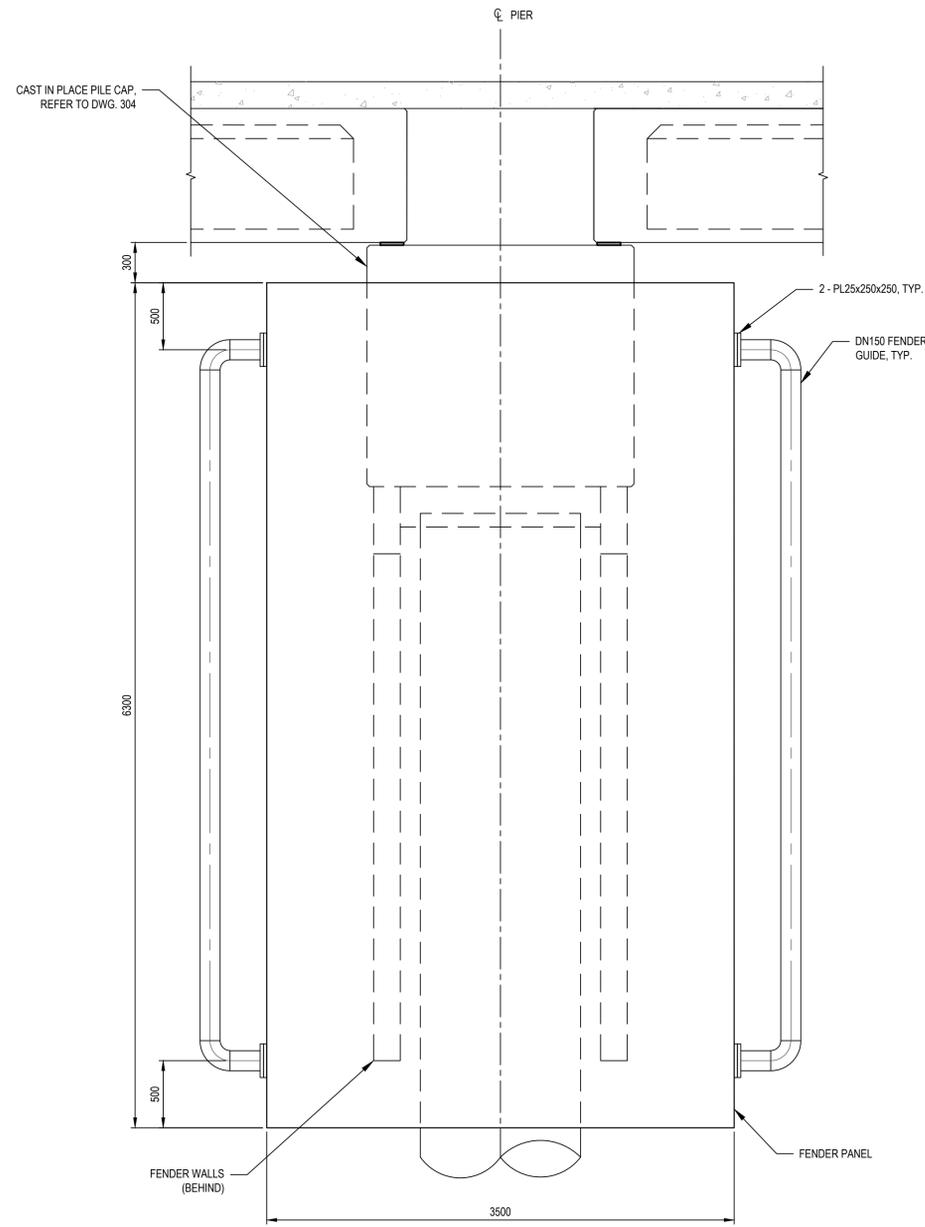
OUTFITTING PIER  
MOORING DOLPIN  
STEEL PILE DETAILS

Project No. 115619249  
Scale

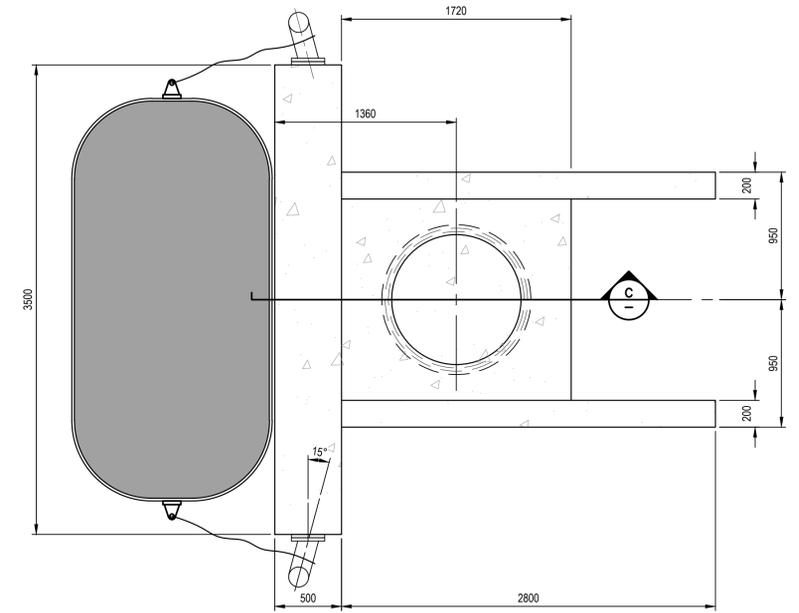
Drawing No. 115619249-402  
Revision B



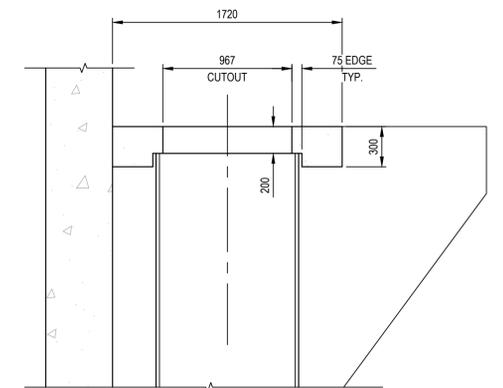
**ELEVATION**  
SCALE: 1:25



**A SECTION - PILECAP TYPE A (GRID 2 - 7 & GRID 14 - 21)**  
SCALE: 1:25



**B SECTION**  
SCALE: 1:25



**C SECTION**  
SCALE: 1:25

U:\115619249\4 DRAWINGS\02 WORK IN PROGRESS DRAWINGS\FOR PERMITTING\115619249-404.DWG  
11/15/2018 9:28 AM

Revision	By	Appd.	YY.MM.DD
B	LM	CR	20.11.18
A	LM	CR	20.10.14

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OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-404.DWG  
Dwn. CR LM 20.09.30  
Chkd. Dgpr. YY.MM.DD

Title

OUTFITTING PIER  
FENDER LAYOUT ELEVATION

Project No.  
115619249

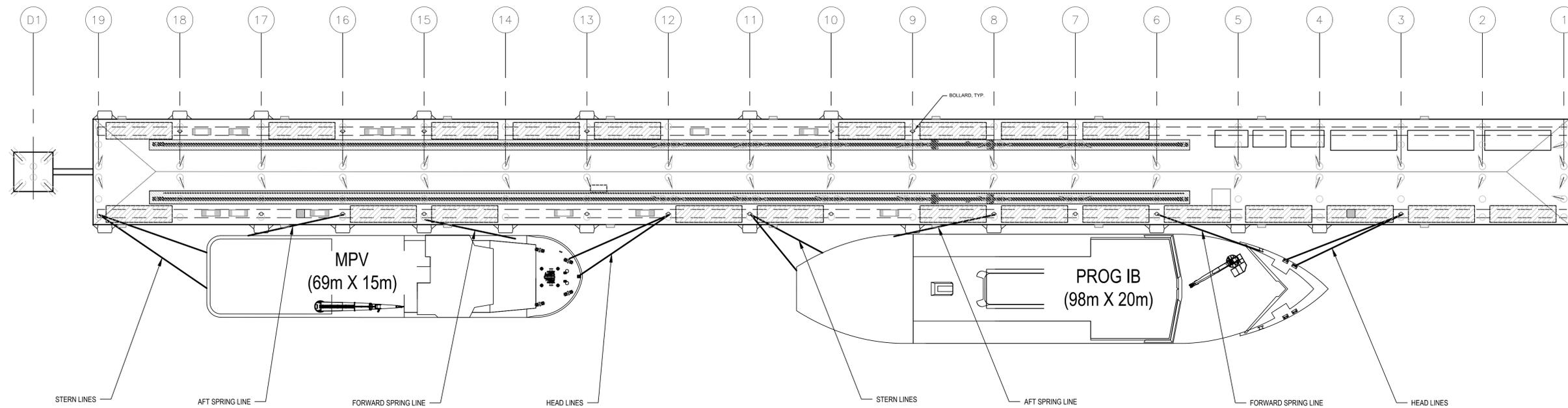
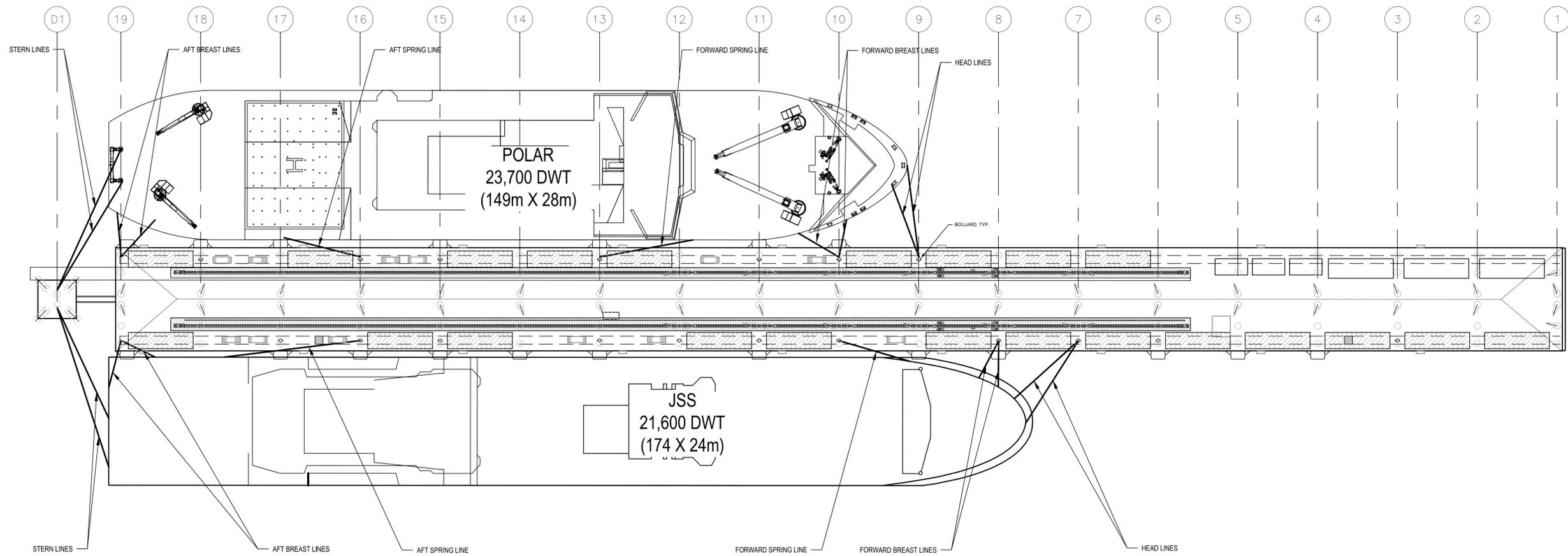
Scale  
1:75 0 750 2250 3750mm

Drawing No.

115619249-404

Revision

B



NOTE:  
 1. THE MOORING ANALYSIS WAS CONDUCTED FOR THE JSS AND POLAR VESSELS, EXCLUDING OOSV, MPV AND PROG IB VESSELS.

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 OUTFITTING PIER EXPANSION  
 NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-501.DWG  
 J.L. CR LA 20.10.26  
 Dwn. Chkd. Dgrr. YY.MM.DD

Title

OUTFITTING PIER  
 GENERAL ARRANGEMENT VESSEL MOORING  
 PLAN FOR OPERATIONAL CONDITIONS

Project No.  
 115619249

Scale  
 1:400

Drawing No.

115619249-501

Revision

D

PROG IB

JSS

UPPER DECK

LOWER DECK

UPPER DECK

HHW(LT) 5.0m

MSL 3.1m CD

LLW(MT) 0.0m

ER

WR

EL. -8.8m CD

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11/17/2020 10:03 AM

Revision	By	Appd.	YY.MM.DD
C	LM	CR	20.11.18
B	LA	CR	20.10.14
A	LA	CR	20.05.11

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OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

File Name:	115619249-504_505.DWG	JL	CR	LA	20.05.04
		Dwn.	Chkd.	Dgnt.	YY.MM.DD

Title

TYPICAL PIER SECTION  
WITH PROG IB AND JSS  
AT LOW TIDE

Project No.  
115619249



Drawing No.

115619249-504

Revision

C

PROG IB

JSS

UPPER DECK

LOWER DECK

UPPER DECK

HHW(LT) 5.0m

MSL 3.1m CD

LLW(MT) 0.0m

EL. -8.8m CD

ER

WR

U:\115619249\_4\_DRAWINGS\02\_WORK IN PROGRESS\_DRAWINGS\01 PERMITTING\115619249-504\_505.DWG  
11/19/2020 10:07 AM

Revision	By	Appd.	YY.MM.DD
C	LM	CR	20.11.18
B	LA	CR	20.10.14
A	LA	CR	20.05.11

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OUTFITTING PIER EXPANSION  
NORTH VANCOUVER, BRITISH COLUMBIA

File Name: 115619249-504\_505.DWG  
Dwn. CR LA 20.05.11  
Dwn. Chkd. Dgnt. YY.MM.DD

Title

TYPICAL PIER SECTION  
WITH PROG IB AND JSS  
AT HIGH TIDE

Project No.  
115619249

Scale  
1:125  
0 1250 3750 6250mm

Drawing No.

115619249-505

Revision

C