

**GENERAL STRUCTURAL NOTES**

**1. GENERAL**

1.1 DESIGN CODE AND STANDARD: CAN/CSA-S6-14

1.2 DESIGN LIVE LOAD FOR BRIDGE STRUCTURES:

- a) PEDESTRIAN LIVE LOAD: 4 kPa UNIFORM
- b) MAINTENANCE VEHICLE: 80 kN AS PER CSA S6-14  
DYNAMIC LOAD ALLOWANCE: 1.10
- c) CONSTRUCTION LIVE LOAD: 2 kPa UNIFORM

FATIGUE DESIGN: NOT CONSIDERED

d) SEISMIC DESIGN FOR BRIDGE STRUCTURES:  
BRIDGE CLASSIFICATION:  
PER 2015 NATIONAL BUILDING CODE, 2% PROBABILITY OF EXCEEDANCE IN 50 YEARS, SEISMIC HAZARD CALCS, SITE CLASS: E

Sa(0.2) =	1.446
Sa(0.5) =	1.346
Sa(1.0) =	0.872
Sa(2.0) =	0.529
Sa(5.0) =	0.169
Sa(10.0) =	0.059
PGA =	0.688g

1.3 DESIGN LIVE LOAD FOR BOARDWALK STRUCTURES:

- a) PEDESTRIAN LIVE LOAD: 4 kPa UNIFORM
- b) MAX. WEIGHT OF GATOR CLASS VEHICLE OR EQUIVALENT: 20 kN
- c) MAX. OF CONSTRUCTION VEHICLE LOAD + MATERIAL: 40 kN
- d) SEISMIC LOADING NOT CONSIDERED

1.4 DESIGN LIFE:

BRIDGE STRUCTURES:	50 YEARS
BOARDWALK STRUCTURES:	
TIMBER DECK:	10 YEARS
TIMBER STRINGER:	20 YEARS
FOUNDATION & PIER:	50 YEARS

1.5 STEEL CORROSION RATES FOR STRUCTURAL ELEMENTS IN NON AGGRESSIVE FILL:  
GALVANIZATION LOSS: 15 MICROMETRES/YEAR FIRST 2 YEARS  
4 MICROMETRES/YEAR FOR SUBSEQUENT YEARS  
CARBON STEEL LOSS: 12 MICROMETRES/YEAR AFTER ZINC DEPLETION

1.6 STEEL CORROSION ALLOWANCE FOR DESIGN OF WEATHERING (GRADE A) STEEL NOT EXPOSED TO EARTH IS 1 mm FOR EACH EXPOSED SURFACE.

1.7 CONSTRUCTION OF THE WORKS SHALL COMPLY WITH THE FOLLOWING IN ORDER OF PRECEDENCE:

- a) DRAWINGS AND DRAWING NOTES
- b) PROJECT SPECIAL PROVISIONS

**MATERIAL**

**2. CONCRETE**

2.1 PORTLAND CEMENT SHALL CONFORM TO THE REQUIREMENTS OF CSA STANDARD A5, TYPE GU, WITH FLY ASH REPLACEMENT WHICH SHALL CONFORM TO CSA STANDARD A3000 SERIES TYPE C1, C-XL OR F1.

2.2 CONCRETE SHALL CONFORM TO CAN/CSA-A23.1 AND SHALL HAVE A MINIMUM 28 DAYS COMPRESSIVE STRENGTH, EXPOSURE CLASS AND W/C RATIO AS FOLLOWS:

STRUCTURE ELEMENT OR LOCATION	EXPOSURE CLASS	28 DAYS STRENGTH (MPa)	MAX. W/C RATIO <sup>a</sup>	NOM. AGG. SIZE (mm)	SUPPLEMENTARY CEMENTING MATERIALS <sup>a</sup>	
					FLY ASH	SILICA FUME
SUBSTRUCTURE <sup>b</sup>	C1	35	0.40	20	40% MAX.	8% MAX.
SUPERSTRUCTURE: DECK, CURB, APPROACH SLAB <sup>c</sup>	C1	40	0.40	20	20% MAX.	8% MAX.
PRECAST PRESTRESSED CONCRETE GIRDER	C-XL	60	0.40	20	25% MAX.	8% MAX.
PIPE PILE INFILL	F1	30	0.50	20	40% MAX.	-

- a) PERCENTAGE BY MASS OF CEMENTING MATERIAL.
- b) SUBSTRUCTURE INCLUDES: ABUTMENTS, PILE CAPS, FOUNDATION, WINGWALLS.
- c) FOR CONCRETE WITHOUT SILICA FUME, MAX W/C RATIO SHALL BE 0.33.

2.3 CONCRETE MINIMUM COVER TO REINFORCEMENT TO BE AS FOLLOWS (mm):

SURFACES CAST AGAINST EARTH	100
FOOTINGS, ABUTMENTS EXPOSED TO EARTH	70
CIP RETAINING WALLS	70
DECK SLABS	60
PRECAST GIRDERS	
REINFORCING STEEL	30
PRETENSIONING STRANDS	40
OTHER SURFACES NOT SPECIFIED ABOVE	50
BARS LARGER THAN 35M	1.5 Db
RATIO OF COVER TO MAX. NOMINAL AGGREGATE SIZE	1.5

2.4 ALL EXPOSED EDGES OF CONCRETE TO BE CHAMFERED 20 mm U.N.O.

2.5 CONCRETE SURFACES TO HAVE THE FOLLOWING FINISHES:

- CLASS 1 : FORMED/UNFORMED SURFACES NOT EXPOSED TO VIEW – ALL SUBMERGED OR BURIED SURFACES.
- CLASS 2 : ORDINARY FORMED SURFACE FINISH – OUTER SURFACE OF CURBS, PARAPET, OUTER EDGES OF DECK, UNDERSIDE OF DECK, ABUTMENTS AND PIERS, AND CIP RETAINING WALLS.
- TROWELED FINISH: UNFORMED SURFACES OF BEARING SEATS.
- BROOM FINISH: UNFORMED SURFACE OF DECK & APPROACH SLABS.

2.6 ROUGHENED CONCRETE SURFACES AND ALL CONSTRUCTION JOINTS SHALL BE WET ABRASIVE BLAST CLEANED TO SOUND CONCRETE IN ACCORDANCE WITH ASTM STANDARD D4259 TO A MINIMUM PROFILE 6 mm. ALTERNATIVELY CONCRETE SURFACES CAN BE "GREEN CUT" TO A 6 mm AMPLITUDE.

2.7 CONCRETE FOR PRECAST BOX GIRDERS SHALL HAVE A MINIMUM 28 DAY STRENGTH OF 60 MPa AND A RELEASE STRENGTH OF 40 MPa.

2.8 CONCRETE DECK SHALL BE MOIST CURED FOR A MINIMUM OF 7 DAYS BY: FOG CURING AS SOON AS THE SURFACE HAS BEEN STRUCK OFF. MOIST CURED BY CONTINUOUS SPRINKLING AND ABSORPTIVE MAT OR FABRIC APPLIED AS SOON AS THE CONCRETE HAS HARDENED SUFFICIENTLY TO PREVENT SURFACE DAMAGE.

2.9 EPOXY SHALL MEET THE REQUIREMENTS OF ASTM C881 WITH APPROPRIATE CLASS FOR THE SITE TEMPERATURE AND THE FOLLOWING TYPE AND GRADE CLASSIFICATIONS:

- REBAR AND ANCHOR BOLT – TYPE IV, GRADE 1, 2, OR 3 (70 MPa)
- LEVELING COURSE FOR NON-LOAD BEARING APPLICATION – TYPE I, GRADE 3
- LEVELING COURSE FOR LOAD BEARING APPLICATION – TYPE IV, GRADE 3.

**3. REINFORCING STEEL**

3.1 REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18 GRADE 400W.

3.2 GIRDER STIRRUP PROJECTIONS AND CIP DECK INTO DECK SHALL BE LOW CARBON/CHROMIUM STEEL CONFORMING TO ASTM A1035/A1035M ALLOY TYPE CS WITH A MINIMUM YIELD STRENGTH OF 690 MPa AND A DESIGN STRENGTH OF 500 MPa.

3.3 WELDING OF GRADE 400W REBAR FOR SPLICE IS NOT PERMITTED.

3.4 SPLICING OF TRANSVERSE DECK REINFORCING STEEL, OTHER THAN AT LOCATIONS SHOWN ON THE DRAWINGS, IS NOT PERMITTED. SPLICES OF LONGITUDINAL REINFORCING STEEL ARE TO BE STAGGERED SO THAT NOT MORE THAN ONE THIRD REINFORCING BAR IS SPLICED AT ANY CROSS SECTION OF THE DECK.

3.5 LAP SPLICES OF REINFORCING BARS SHALL BE AS FOLLOWS (mm) U.N.O.

BAR SIZE	UNCOATED BOTTOM BAR	UNCOATED TOP BAR	EPOXY COATED BOTTOM BAR	EPOXY COATED TOP BAR	COLUMN BAR (60Db)
10M	390	470	430	560	680
15M	510	660	610	790	960
20M	620	800	740	970	1170
25M	1000	1300	1500	1700	1520
30M	1190	1540	1780	1850*	1800
35M	1410	1840	2120	2200*	2150

\* BASED ON RIGOROUS METHOD. BARS HAVE LARGE SPACING AND ADEQUATE COVER WITH AT LEAST 15M @ 300 CONFINEMENT

SPLICE LENGTHS ASSUME CLASS B TENSION SPLICES, MINIMUM STIRRUPS OR SLABS WITH CLEAR SPACING BETWEEN BARS NOT LESS THAN 2 Db. BAR IS CONSIDERED A "TOP BAR" IF MORE THEN 300 mm OF FRESH CONCRETE IS CAST BELOW THE BAR.

3.6 WELDED WIRE FABRIC SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF ASTM STANDARD A497-01 AND ASTM A185-01 WITH A MINIMUM YIELD OF 485 MPa.

3.7 PRESTRESSING STRAND SHALL CONFORM TO ASTM A416/A416M GRADE 1860 AND SHALL BE 15.2 mm  $\phi$ , 7-WIRE LOW RELAXATION STRAND ( $f_{pu}$  = 1860 MPa).

3.8 DEVELOPMENT LENGTH OF REINFORCING BARS FOR CONCRETE STRENGTH OF  $f_c' = 35$  MPa OR ABOVE SHALL BE AS FOLLOWS (mm).

BAR SIZE	TENSION DEVELOPMENT LENGTHS				HOOK DEVELOPMENT LENGTHS	
	UNCOATED BOTTOM BAR	UNCOATED TOP BAR	EPOXY COATED BOTTOM BAR	EPOXY COATED TOP BAR	UNCOATED BAR	EPOXY COATED BAR
10M	300	360	330	430	150	160
15M	390	510	470	610	190	230
20M	480	620	570	740	230	280
25M	770	1000	910 *	1030 *	300	360
30M	910	1190	1070 *	1210 *	360	430
35M	1090	1410	1280 *	1450 *	420	510

\* BASED ON RIGOROUS METHOD. BARS HAVE LARGE SPACING AND ADEQUATE COVER WITH AT LEAST 15M @ 300 CONFINEMENT

**4. STRUCTURAL STEEL**

4.1 STRUCTURAL STEEL SHALL CONFORM TO CAN/CSA-G40.20, CAN/CSA-G40.21 AND BE OF THE FOLLOWING GRADE AND CATEGORY:

GIRDER FLANGES, WEBS AND SPLICE PLATES – GRADE 350AT CATEGORY 3 C

- STIFFENER, GIRDER MISCELLANEOUS PLATES & BEARING TOP PLATES – GRADE 350A
- STEEL GIRDER BRACING ROLLED SECTIONS & GUSSET PLATES – GRADE 350A
- HOLLOW SECTIONS – GRADE 350W CLASS

4.2 ALL WELDING SHALL CONFORM TO CAN/CSA STANDARD W59, INCLUDING CLAUSE 12, AND WITH A MINIMUM WELD SIZE OF 5 mm.

4.3 SHEAR CONNECTORS SHALL CONFORM TO ASTM STANDARD A108, GRADES 1015, 1018 OR 1020, WITH A MINIMUM TENSILE STRENGTH OF 413 MPa. SHEAR CONNECTORS SHALL BE 22 DIA. 150 LONG U.N.O.

4.4 ALL BOLTS SHALL BE 22 DIA WITH THREADS EXCLUDED FROM THE SHEAR PLANE, BOLT HOLES TO BE 24 mm U.N.O. BOLTS TO BE INSTALLED BY TURN OF THE NUT METHOD.

4.5 ALL BOLTS SHALL BE HIGH STRENGTH STRUCTURAL BOLTS CONFORMING TO ASTM A325. TYPE 3 FOR UNCOATED GRADE 'A' STEEL AND TYPE 1 HOT DIPPED GALVANIZED FOR GALVANIZED AND COATED STEEL.

4.6 FLAT COUNTERSUNK CAP SCREWS (SFHCS) SHALL CONFORM TO ASTM STANDARD F835.

4.7 STEEL BRACING NOT FABRICATED FROM GRADE A STEEL SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH CAN/CSA-G164. FAYING SURFACES OF GALVANIZED STEEL IN CONTACT WITH UNCOATED GRADE A STEEL SHALL BE GIVEN ONE COAT OF ZINC RICH PRIMER.

**5. STEEL PIPE PILES**

5.1 STEEL PIPE PILES SHALL CONFORM TO API SPECIFICATION 5L, GRADE X46 ( $f_y$  = 317 MPa.) OR ASTM A252 GRADE 3 AND FABRICATED WITH FULL PENETRATION BUTT WELDS. SEAMS FOR WELDED PIPE PILES MAY BE STRAIGHT OR SPIRAL BUTT CONSTRUCTION.

**6. HELICAL SCREW PILE**

6.1 ROUND SHAFT SHALL BE STRUCTURAL STEEL TUBE OR PIPE, SEAMLESS OR STRAIGHT-SEAM WELDED PER ASTM A500 OR A513, MINIMUM YIELD STRENGTH 345 MPa OR EQUIVALENT.

6.2 HELIX MATERIAL TO BE LOW CARBON STEEL MEETING THE REQUIREMENTS OF ASTM A572, MINIMUM YIELD STRENGTH 345 MPa OR EQUIVALENT.

6.3 HOT DIP GALVANIZED PER ASTM A123.

6.4 CONNECTION BOLTS PER SAE J429, GRADE 13 OR EQUIVALENT.

6.5 PLATE AND PILE CAP PER ASTM A572 GRADE 50 OR EQUIVALENT.

6.6 COUPLING SHALL EITHER BE FORMED AS AN INTEGRAL PART OF THE PLAIN AND HELICAL EXTENSION MATERIAL AS HOT FORGE EXPANDED SOCKETS, OR AS INTERNAL SLEEVE WROUGHT STEEL CONNECTORS. STEEL CONNECTORS CAN BE EITHER TUBING OR SOLID BAR WITH HOLES FOR CONNECTING SHAFT SECTIONS TOGETHER.

**7. MISCELLANEOUS STEEL**

7.1 MISCELLANEOUS STEEL SHALL CONFORM TO CAN/CSA-G40.21, GRADE 300W.

7.2 WELDING OF MISCELLANEOUS STEEL SHALL CONFORM TO CAN/CSA STANDARD W59, INCLUDING CLAUSE 11, WITH A MINIMUM WELD SIZE OF 5 mm.

7.3 ALL MISCELLANEOUS STEEL SHALL BE HOT DIPPED GALVANIZED TO ASTM A123.

7.4 ANCHOR BOLTS SHALL CONFORM TO ASTM STANDARD A307, HOT DIPPED GALVANIZED, IN ACCORDANCE WITH ASTM A123.

7.5 ALL EMBEDDED METALS AND BEARING PLATES USED IN CONJUNCTION WITH PRESTRESSED CONCRETE GIRDERS SHALL BE HOT DIPPED GALVANIZED TO ASTM A123.

7.6 DRAIN PIPE TO BE FABRICATED FROM PIPE MEETING ASTM A53 GRADE 205.

**8. COATINGS**

8.1 WHEN COATING IS SPECIFIED STEEL SURFACES SHALL BE BLAST CLEANED TO NEAR WHITE METAL BLAST, TO A 50 MICROMETERS PROFILE, AND PAINTED WITH A THREE COAT PAINT SYSTEM AS FOLLOWS:

PRIME AND STRIPE	ZINC RICH PRIMER	60 TO 70 MICROMETERS
MIDCOAT	HIGH PERFORMANCE EPOXY	125 TO 150 MICROMETERS
TOPCOAT	ALIPHATIC POLYURETHANE	40 TO 50 MICROMETERS

8.2 FIELD TOUCH-UP FOR GALVANIZED STEEL SHALL BE 2 COATS COLD APPLIED ZINC RICH PRIMER (GALVACOM, ZINGA, OR APPROVED EQUIVALENT) AS PER MANUFACTURERS DIRECTIONS.

**9. TIMBER**

9.1 UNLESS OTHERWISE SPECIFIED BY THE DEPARTMENTAL REPRESENTATIVE, ALL SUPPLIED LUMBER MUST BE NEW ROUGH LUMBER MATERIAL CONFORMING TO THE SPECIES, GRADE, MANUFACTURE AND TRIM REQUIREMENTS DESCRIBED HEREIN.

9.2 ROUGH LUMBER MUST BE GRADED IN ACCORDANCE WITH:

- a) NLGA GRADING RULES, WHICH MEET THE PROVISIONS OF CSA 0141 "SOFTWOOD LUMBER"; OR
- b) ALSO BOARD OF REVIEW APPROVED GRADING RULES, WHICH MEET THE PROVISIONS OF PRODUCT STANDARD PS 20 "AMERICAN SOFTWOOD LUMBER STANDARD".

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Revision/	Description/Description	Date/Date
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Client/Client

Project title/Titre du projet  
**TOFINO, BC**

**PACIFIC RIM NATIONAL PARK RESERVE**  
**?apsçik tašii (Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**

Consultant Signature Only

Designed by/Concept par  
DANIEL YANG / 2018-11

Drawn by/Dessiné par  
SHAWN LI / 2018-12

PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin

**?apsçik tašii (Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**  
**BRIDGE & ELEVATED BOARDWALK GENERAL NOTES**  
**SHEET 1**

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- 9.3 LUMBER SPECIES, GRADE, MANUFACTURE AND TRIM REQUIREMENTS
- 9.3.1 ALL TIMBER MATERIAL USED IN ELEVATED BOARDWALK AND BRIDGE #3 ARE UNTREATED.
- 9.3.2 ELEVATED BOARDWALK TIMBER:
- a) TIMBER STRINGER: D FIR-L GRADE SELECT STRUCTURAL;
  - b) TIMBER TIE AT TIMBER POST: D FIR-L GRADE SELECT STRUCTURAL;
  - c) TIMBER DECK, CURB/RISER, POST, HANDRAIL: WESTERN RED CEDAR, GRADE SELECT STRUCTURAL
- 9.3.3 BRIDGE #3 TIMBER:
- a) TIMBER TIE BEAM: D FIR-L GRADE 1 OR BETTER
  - b) TIMBER DECK, CURB/RISER, POST, HANDRAIL: WESTERN RED CEDAR, GRADE SELECT STRUCTURAL
- 9.3.4 UNLESS OTHERWISE SPECIFIED BY THE DEPARTMENTAL REPRESENTATIVE, ALL ROUGH LUMBER MUST CONFORM WITH BRIDGE TIMBER AND LUMBER MATERIAL STANDARDS, MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCES OPERATIONS (FNLR) OF BRITISH COLUMBIA:
- a) FULL SAWN.
  - b) TRIMMED SUCH THAT PIECES ARE: TRIMMED FOR REMOVAL OF SNIPED, SPLINTERED OR UNEVEN LOG LENGTHS.
  - c) DET: THE TRIMMED LENGTH OF ANY LUMBER PIECE MUST BE DOUBLE END TRIMMED (DET) SUCH THAT BOTH ENDS OF THE PIECE ARE TRIMMED SQUARE TO AN OUT-OF-SQUARE MANUFACTURING TOLERANCE LIMITED TO 2 mm FOR EACH NOMINAL 25 mm OF THICKNESS OR WIDTH CONSISTENT WITH NLGA PARA. 748B – "DOUBLE END TRIMMED (DET)".

## CONSTRUCTION

### 10. FOUNDATION

- 10.1 FOUNDATION DESIGN AND CONSTRUCTION REFER TO "GEOTECHNICAL SITE ASSESSMENT REPORT – PHASE 3 PACIFIC TRAVERSE TRAIL, PACIFIC RIM NATIONAL PARK RESERVE" BY WOOD, FILE # KA21151, DATED DEC. 17, 2018.
- 10.2 UPON EXCAVATION TO THE FOUNDATION, ABUTMENT SEAT / PILE CAP ELEVATION, ANY DISTURBED NATIVE SOILS SHALL BE REMOVED BEFORE CONSTRUCTING THE FOUNDATION.
- 10.3 THE DEPARTMENTAL REPRESENTATIVE SHALL BE NOTIFIED ONCE EXCAVATION HAS BEEN CARRIED OUT TO DESIGN ELEVATIONS.
- 10.4 CURRENT AVAILABLE BOREHOLE LOCATIONS AND DEPTHS FOR THE BRIDGE #3 & BRIDGE #20 SITES MAY NOT ACCURATELY REPRESENT ACTUAL GROUND SOIL CONDITIONS AT THOSE SITES. CONTRACTOR SHALL DRILL AT LEAST ONE ADDITIONAL BOREHOLE CLOSE TO BOTH BRIDGE #3 & BRIDGE #20, INVESTIGATE THE SOIL PROPERTIES, AND PROVIDE SOIL PARAMETER DATA TO THE DEPARTMENT REPRESENTATIVE TO VERIFY PILE FOUNDATION CAPACITY AND FINAL PILE ELEVATIONS PRIOR TO COMMENCING FOUNDATION CONSTRUCTION.

### 11. DECK CONSTRUCTION

- 11.1 CAST-IN-PLACE DECK SHALL NOT BE COMMENCED UNTIL CONCRETE DIAPHRAGM (IF ANY) HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 20 MPa.
- 11.2 DEFLECTION AND DIFFERENCE IN CAMBER WILL BE ACCOMMODATED BY DECK SCREED ELEVATIONS. GIRDER HAUNCH HEIGHTS WILL VARY AS REQUIRED TO MAINTAIN A CONSTANT DECK SLAB THICKNESS BETWEEN GIRDERS.

### 12. BRIDGE END FILL

- 12.1 BRIDGE END FILL SHALL MEET REQUIREMENTS OF PROJECT SPECIFICATIONS.

### 13. JOINT FILLERS

- 13.1 COMPRESSIBLE MATERIAL OR EVAZOTE TO BE EVAZOTE EV50 (ETHYLENE VINYL ACETATE) WITH A NOMINAL, RECOVERABLE COMPRESSIVE STIFFNESS OF 42 kPa AT 25% STRAIN.
- 13.2 ASPHALT IMPREGNATED FIBER BOARD (AIFB) SHALL MEET THE REQUIREMENTS OF ASTM D 1751. THE BOARD SHALL HAVE A MINIMUM DENSITY OF 300 kg/m<sup>3</sup> WITH OF THE WEIGHT OF THE FINISHED BOARD TO ASPHALT. THE COMPRESSIVE STRENGTH OF THE BOARD SHALL BE BETWEEN 0.7 MPa AND 5.0 MPa AT 50% STRAIN.

## ENVIRONMENTAL CONSIDERATION

### 14. ENVIRONMENT

- 14.1 NO CONCRETE POURS TO COMMENCE WITHOUT WRITTEN APPROVAL OF THE OWNER'S ENVIRONMENTAL WORKS MONITOR (OEM).
- 14.2 UNCURED CEMENT-BASED PRODUCTS INCLUDING GROUTS AND CONCRETE CAN BE LETHAL TO FISH AND MANY OTHER AQUATIC ORGANISMS. RAW PRODUCT OR LEACHATE ENTERING A WATERCOURSE ALTERS WATER CHEMISTRY, MAKING IT MORE BASIC OR ALKALINE. AS LITTLE AS ONE LITRE OF CONCRETE WASH WATER OR LEACHATE IN 1000 L OF WATER CAN KILL FISH. AS SUCH, CONTRACTORS MUST TAKE EXTREME PRECAUTIONS WHEN COMPLETING THE CAST-IN-PLACE CONCRETE WORKS PRESCRIBED FOR THE BRIDGES.
- 14.3 ALL CAST-IN-PLACE CONCRETE WORKS COMPLETED WITHIN 30 m OF A WATERCOURSE MUST STRICTLY ADHERE TO THE MITIGATION MEASURES OUTLINED IN THE CONCRETE HANDLING MITIGATIONS SPECIFICATION AND THE ENVIRONMENTAL PROCEDURES SPECIFICATION INCLUDED IN THE TENDER PACKAGE.
- 14.4 THE PROJECT IS LOCATED IN ENVIRONMENT SENSITIVE AREA. ALL CONSTRUCTION AND SURVEY WORKS SHOULD BE DONE WITH GREAT CAUTION, THE CONTRACTOR SHOULD TAKE MITIGATION MEASURES NOT TO HARM FISH OR FISH HABITAT AND HIGH VALUE RESOURCES, SUCH AS ISOLATE THE LEACHATE FROM AQUATIC HABITAT FOR MIN. 48 HOURS, WHEN POURING CAST-IN-PLACE ABUTMENT SEAT CONCRETE, COMPLETING CONCRETE IN DRY WEATHER.
- 14.5 FOR BRIDGE CONSTRUCTION, NO INSTREAM WORKS ARE PERMITTED, CONTRACTOR SHALL CONFIRM WITH SPECIFICATIONS 01-35-43 FOR ENVIRONMENTAL PROCEDURE.
- 14.6 BRIDGE #19 AND #20 SPAN THE MAIN STREAM OF LOST SHOE CREEK AND SANDHILL CREEK RESPECTIVELY, WHICH IS CONSIDERED VERY HIGH VALUE FISH HABITAT, THERE IS CONFIRMED ADULT SALMON SPAWNING AND JUVENILE SALMONID REARING LOCATED IMMEDIATELY UNDER AND DOWNSTREAM OF BRIDGE #19 AND #20. AS SUCH, DURING CONSTRUCTION OF BRIDGE #19 AND #20, THE CONTRACTOR WILL NEED TO STRICTLY ADHERE TO THE MITIGATION MEASURES OUTLINED IN THE CONCRETE HANDLING MITIGATIONS SPECIFICATION AND THE ENVIRONMENTAL PROCEDURES SPECIFICATION INCLUDED IN THE TENDER PACKAGE. ALL THE HIGHEST RISK WORK INCLUDING EXCAVATION FOUNDATION, INSTALLATION OF FOUNDATION, AND EARTHWORK IMMEDIATELY ADJACENT TO CREEK MUST BE DONE DURING LEAST RISK WORK WINDOW FOR FISH, WHICH FOR NON-INSTREAM WORKS ONLY, IS JUNE 15TH TO SEPTEMBER 15TH.

## LIST OF ABBREVIATIONS

ABUT.	–	ABUTMENT
AGG.	–	AGGREGATE
AIFB	–	ASPHALT IMPREGNATED FIBRE BOARD
ALT.	–	ALTERNATE
APPROX.	–	APPROXIMATE
BOT.	–	BOTTOM
B/S	–	BOTH SIDE
C.I.P.	–	CAST IN PLACE
C.J.	–	CONSTRUCTION JOINT
c/c	–	CENTER TO CENTER
c/w	–	COMPLETE WITH
CL	–	CENTERLINE
CLR.	–	CLEAR
CONC.	–	CONCRETE
CONST.	–	CONSTRUCTION
CONT.	–	CONTINUOUS
DET	–	DOUBLE END TRIMMED
D FIR-L	–	DOUGLAS-FIR/LARCH
DIA.	–	DIAMETER
DP.	–	DEEP
DWG.	–	DRAWING
E.E.	–	EACH END
E.F.	–	EACH FACE
EL.	–	ELEVATION
E.O.	–	END OF
EW	–	EACH WAY
EXIST.	–	EXISTING
FF	–	FAR FACE
FIN.	–	FINISHED
FTG.	–	FOOTING
GALV.	–	GALVANIZED
HOR.	–	HORIZONTAL
HWL	–	HIGH WATER LEVEL
LG.	–	LONG
LONGIT.	–	LONGITUDINAL
m	–	METRE
MAX.	–	MAXIMUM
MIN.	–	MINIMUM
mm	–	MILLIMETRE
NF	–	NEAR FACE
NTS	–	NOT TO SCALE
No.	–	NUMBER
NOM.	–	NOMINAL
OPP.	–	OPPOSITE
PL.	–	PLATE
PROJ.	–	PROJECTION
REQ'D	–	REQUIRED
REINF.	–	REINFORCEMENT
SP.	–	SPACES
SS	–	STAINLESS STEEL
STA.	–	STATION
STIFF.	–	STIFFENER
SYM.	–	SYMMETRICAL
T&B	–	TOP AND BOTTOM
T.O.	–	TOP OF
TEMP.	–	TEMPORARY
THK.	–	THICK
THS	–	TRAVERSE HUB SPIKE
TYP.	–	TYPICAL
UNO	–	UNLESS NOTED OTHERWISE
U/S	–	UNDERSIDE
VERT.	–	VERTICAL
W/	–	WITH
W/C	–	WATER/CEMENT
WP	–	WORK POINT

**PARSONS**

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0	ISSUED FOR TENDER	18/12/2018

Revision/	Description/Description	Date/Date
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Client/client  
Parks Canada L'Agence Parcs  
Agency Canada Canada

Project title/Titre du projet  
**TOFINO, BC**  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**?apsçik tasii (Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**

Consultant Signature Only

Designed by/Concept par  
DANIEL YANG / 2018-11  
Drawn by/Dessine par  
SHAWN LI / 2018-12

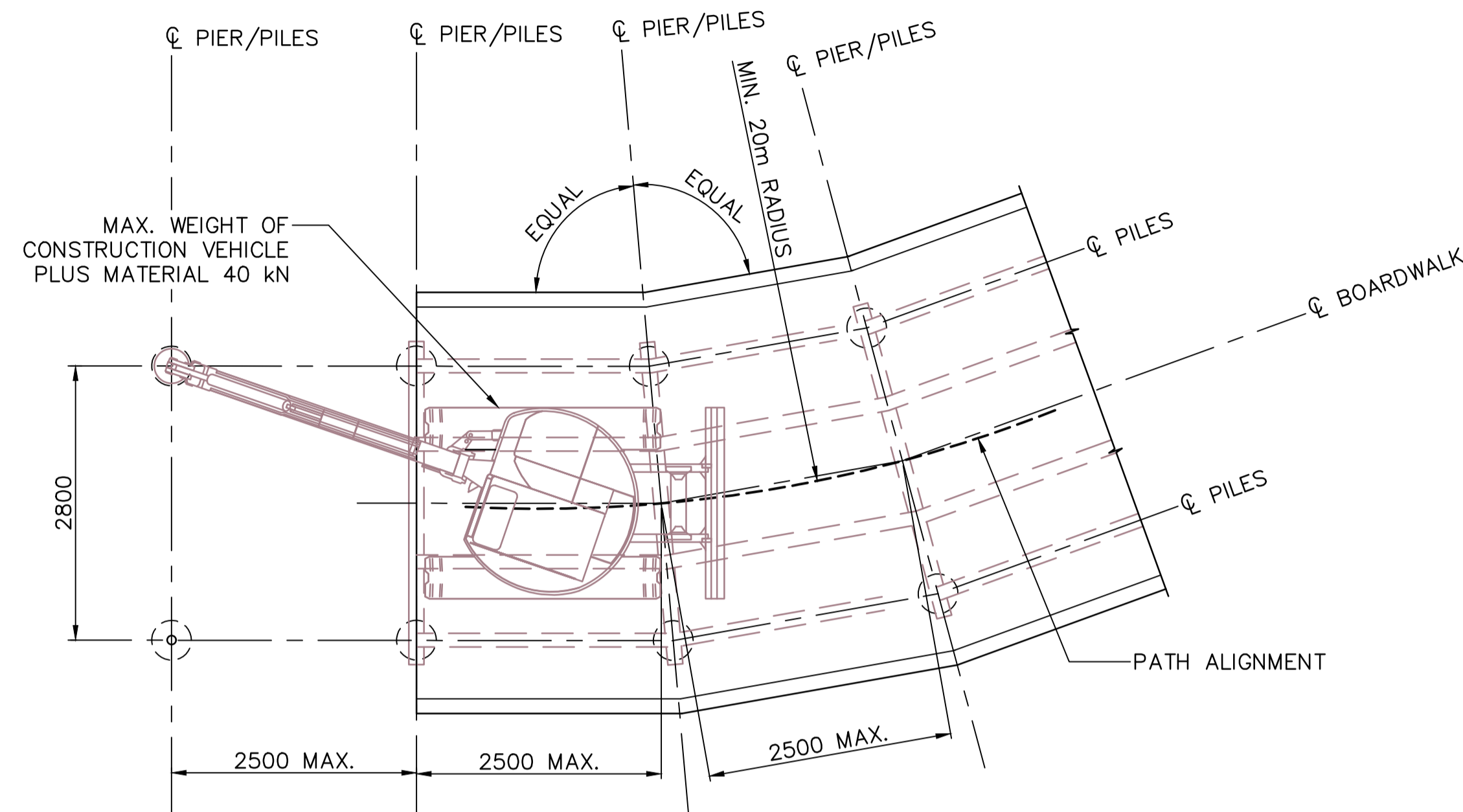
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**?apsçik tasii (Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**  
**BRIDGE & ELEVATED BOARDWALK GENERAL NOTES**  
**SHEET 2**

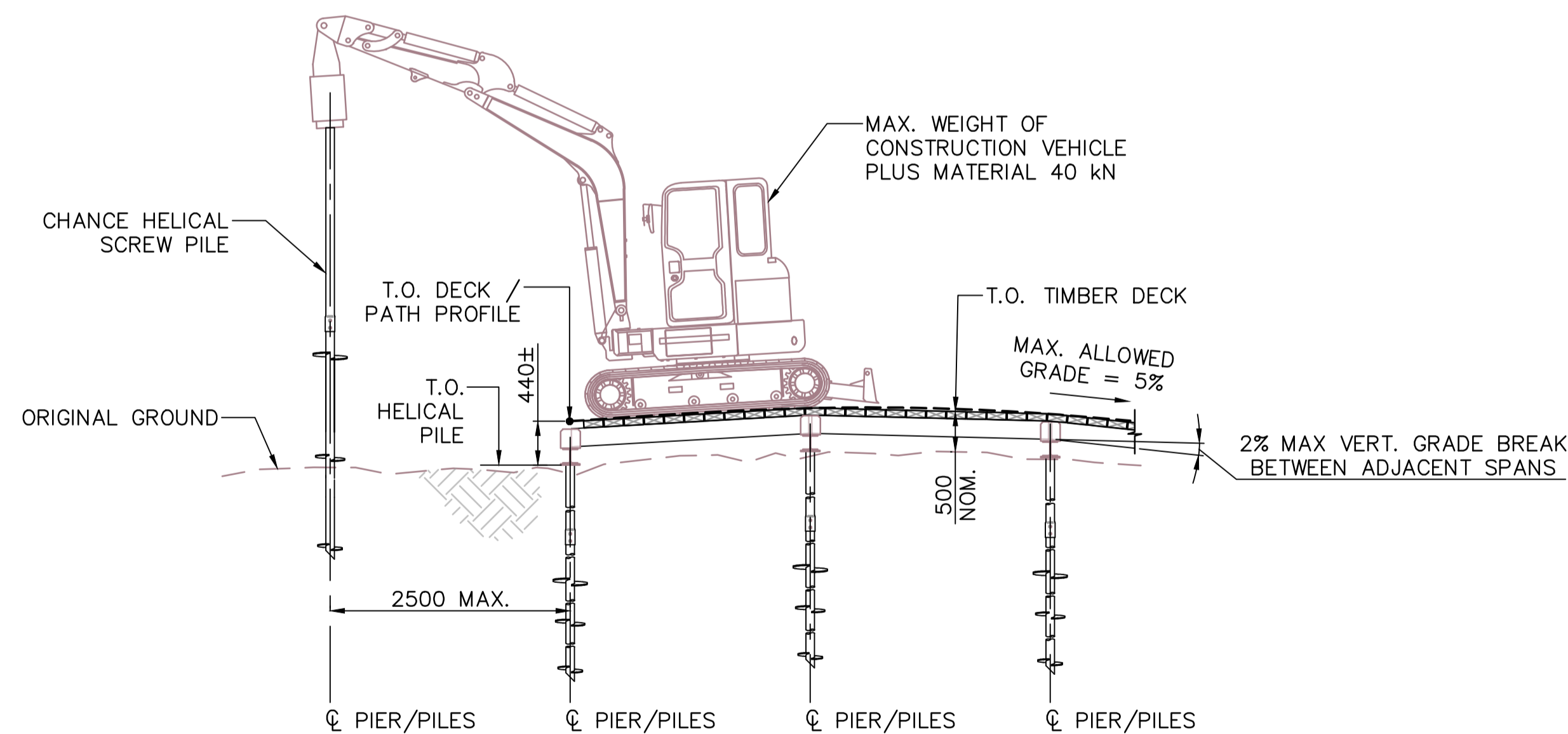
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**PARSONS**



**SCHMATIC PLAN - TYPICAL BOARDWALK CONSTRUCTION**  
1:50



**SCHMATIC ELEVATION - TYPICAL BOARDWALK CONSTRUCTION**

1:50  
BOARDWALK GEOMETRY SHOWN IS INDICATIVE ONLY. SEE NOTE 4.

**NOTES:**

- FOR HELICAL SCREW PILE DETAILS SEE S2.5.
- FOR BOARDWALK STRUCTURAL DETAILS, SEE S2.2, S2.3, AND S2.4.
- RAILINGS ARE NOT REQUIRED FOR ELEVATED TRAIL AS FINISHED LEVEL OF DECK IS TO BE NOMINALLY 500 mm ABOVE ADJACENT GROUND OR LOWER.
- THE FINAL ALIGNMENT OF THE ELEVATED TRAIL SHALL BE DETERMINED BY THE CONTRACTOR TO IT WITHIN THE CLEARED ALIGNMENT WHO SHALL CONDUCT A SURVEY. THE CONTRACTOR'S PROPOSED ALIGNMENT SHALL BE DOCUMENTED BY THE CONTRACTOR IN PLAN SHOWING PILE LOCATIONS, FOUNDATIONS, AND ELEVATED TRAIL SEGMENTS. THIS DOCUMENT SHALL BE SUBMITTED TO THE DEPARTMENTAL REPRESENTATIVE FOR REVIEW AND APPROVAL TWO WEEKS BEFORE COMMENCING WORK IN THE FIELD. THE ALIGNMENT SHALL BE STAKED OUT OF IN THE FIELD FOR REVIEW OF HORIZONTAL AND VERTICAL ALIGNMENT BY OEM OR THE DEPARTMENT REPRESENTATIVE.
- WHERE LOCAL EXCAVATION IS REQUIRED TO ENSURE SMOOTH VERTICAL ALIGNMENT, THIS SHALL BE APPROVED BY THE OEM PRIOR TO COMMENCEMENT.
- THE VERTICAL PROFILE OF THE K SHALL BE SMOOTH AND AVOID THE "ROLLER-COASTER" EFFECT. CHANGE OF GRADE BETWEEN ADJACENT PANELS SHALL NOT EXCEED 2% AND VERTICAL ALIGNMENT SHALL BE AGREED ON SITE BY THE DEPARTMENTAL REPRESENTATIVES.
- HORIZONTAL ALIGNMENT SHALL AIM FOR MAXIMUM RADIUS CURVES WITHIN THE CLEARED ALIGNMENT AND SHALL BE AGREED ON SITE BY THE DEPARTMENTAL REPRESENTATIVES.
- BOARDWALK PATH HORIZONTAL CURVES HAVE A MINIMUM TURNING RADIUS OF 20 m. IF APPLIED, VERTICAL CURVES SHALL HAVE A MINIMUM K OF 2.5.
- BOARDWALK WAS DESIGNED TO TAKE INTO ACCOUNT OF MAXIMUM WEIGHT OF CONSTRUCTION VEHICLE PLUS MATERIAL 40 kN ; AND 20 kN GATOR CLASS VEHICLE AS MAINTENANCE LOAD.
- CONSTRUCTION VEHICLE OR GATOR VEHICLE SHALL BE POSITIONED ALONG CENTER LINE OF BOARDWALK WITH MAX ECCENTRICITY OF 100 mm.
- CONSTRUCTION VEHICLE AND GATOR VEHICLE SHALL BE OPERATED AT SPEEDS NOT GREATER THAN 5 km/h.
- CONTRACTOR SHALL MONITOR HELICAL SCREW PILE DEFORMATION CLOSELY DURING CONSTRUCTION, THE CONTRACTOR SHALL TEMPORARILY SHORE AND BRACE THE BOARDWALK TO PROVIDE STRUCTURE SYSTEM STABILITY AND PREVENT DAMAGE TO THE DECK AND PILES FROM TORSION/TORQUE FORCE DURING HELICAL PILE INSTALLATION. NO PERMANENT LATERAL DEFLECTION ON HELICAL PILE IS PERMITTED DURING / AFTER CONSTRUCTION.
- NEWLY COMPLETED TIMBER DECK SHALL BE COVERED OR PROTECTED FROM DAMAGE DURING CONSTRUCTION OPERATION.
- CONTRACTOR SHALL TAKE MEASURES TO AVOID DAMAGE TO SENSITIVE WETLANDS. CONSTRUCTION EQUIPMENT, MATERIALS, AND VEHICLES ARE NOT PERMITTED TO ACCESS THE WETLANDS AND SHALL REMAIN ON THE BOARDWALK AT ALL TIMES. THIS WILL REQUIRE SEQUENTIAL SPAN BY SPAN CONSTRUCTION METHODS.
- WORKING IS ONLY PERMITTED DURING DRY SEASONS AS APPROVED BY OEM IN WETLANDS.
- ALL WORKS TO BE IN ACCORDANCE WITH ENVIRONMENT SPECIFICATION 01-35-38 AND 01-35-44.

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Revision/	Description/Description	Date/Date
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Client/client

Project title/Titre du projet  
**TOFINO, BC**  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsc̓iik tašii (Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**

Consultant Signature Only

Designed by/Concept par  
DANIEL YANG / 2018-11

Drawn by/Dessiné par  
STEVEN ZIVIN / 2018-12

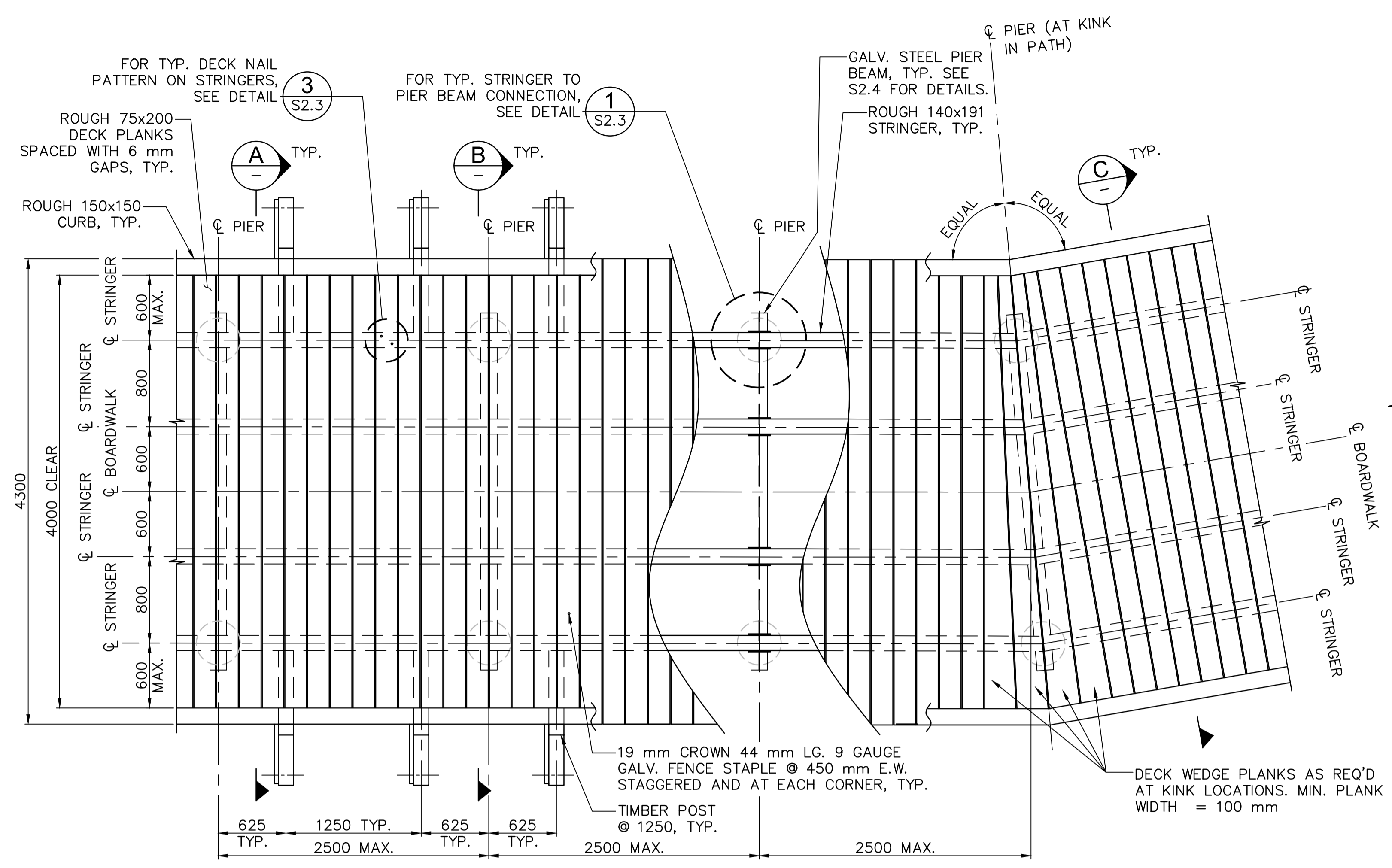
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsc̓iik tašii (Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**  
**BOARDWALK CONSTRUCTION AND GEOMETRY**

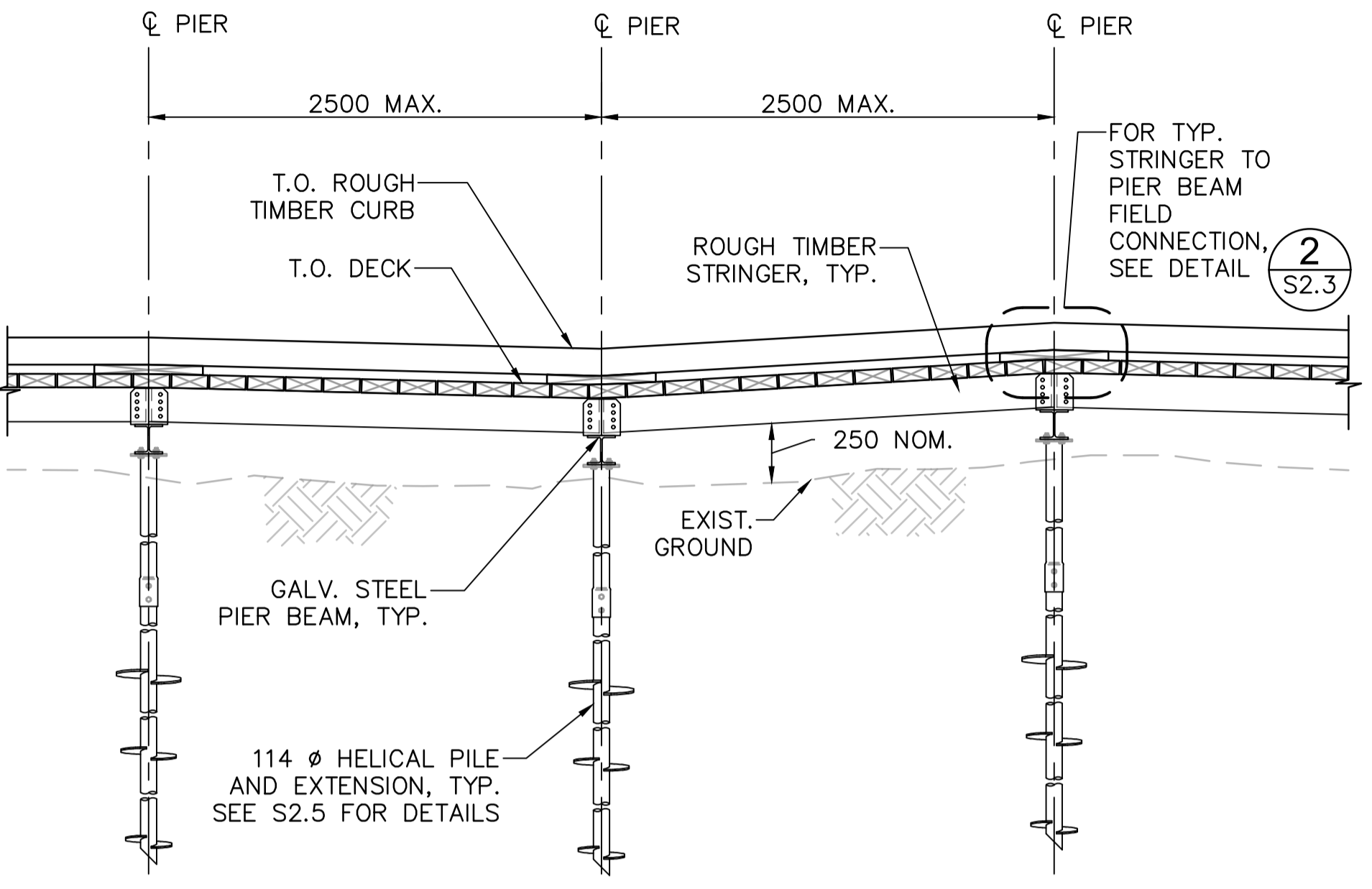
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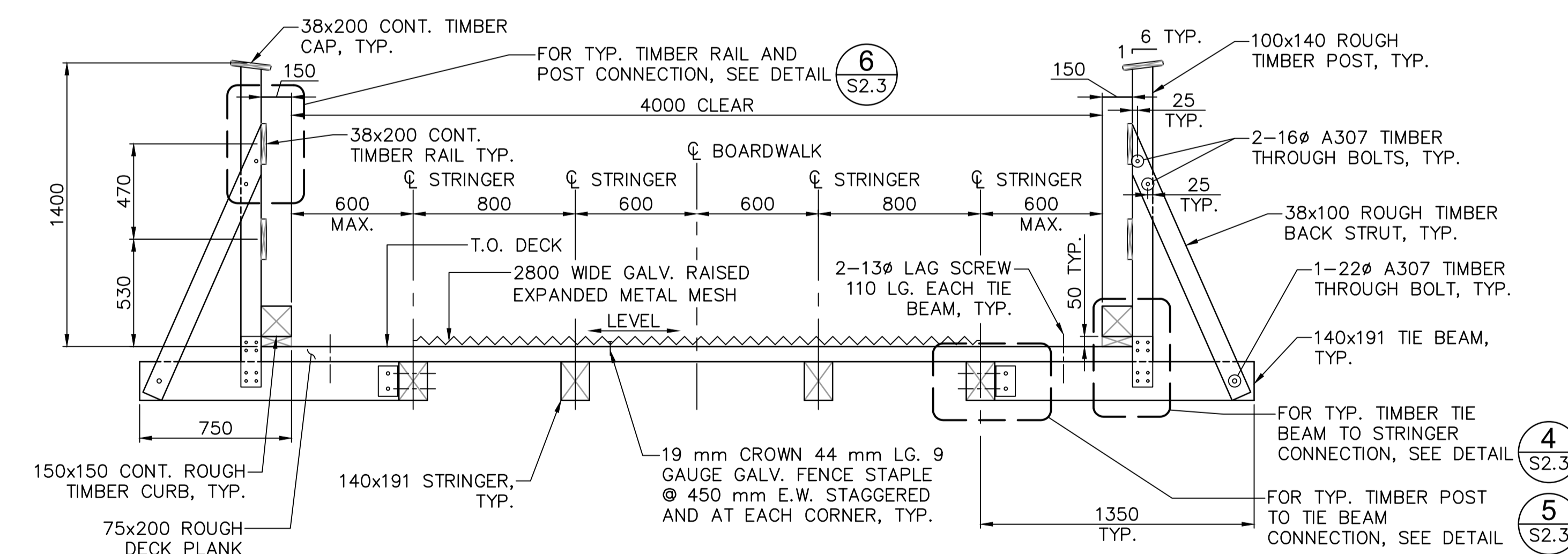
**PARSONS**



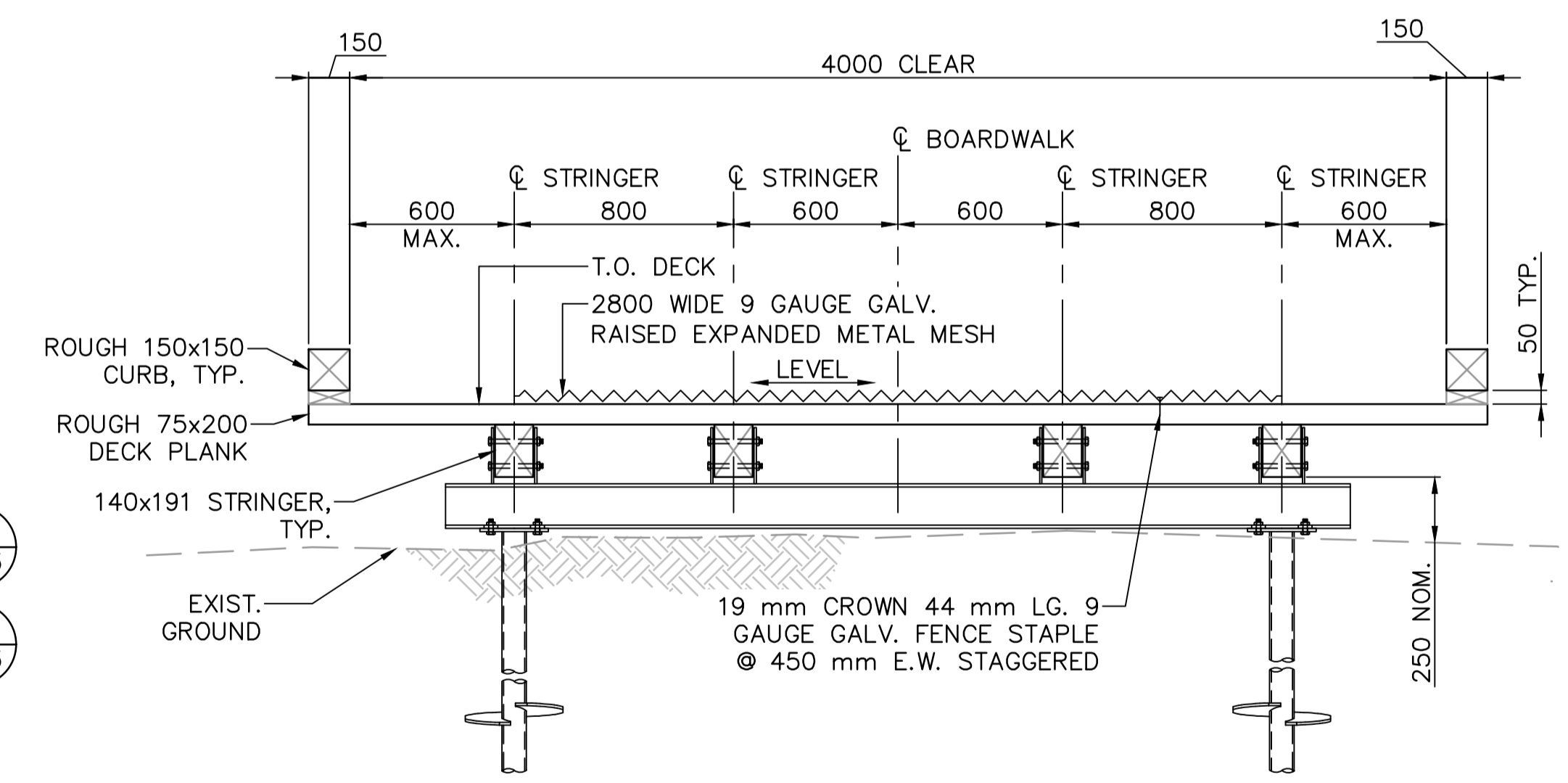
**PLAN - TYPICAL BOARDWALK**  
1:30  
GALV. RAISED EXPANDED METAL MESH NOT SHOWN FOR CLARITY



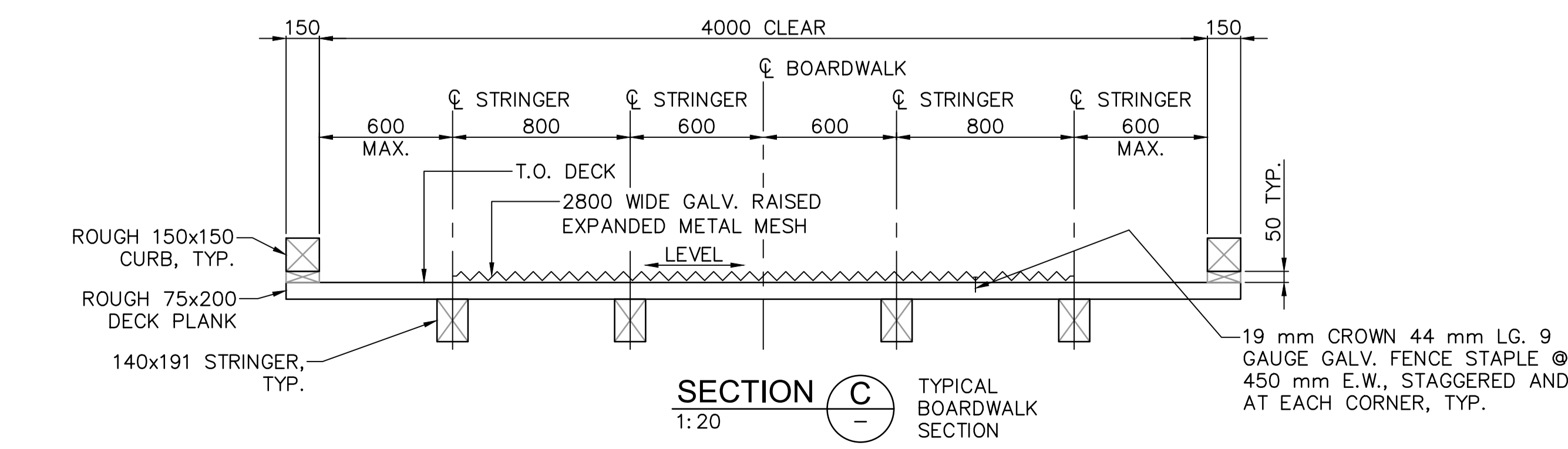
**ELEVATION - TYPICAL BOARDWALK**  
1:30



**SECTION A**  
1:20  
AT ELEVATED BOARDWALK MORE THAN 600 mm ABOVE EXISTING GROUND OR WHERE NEEDED TO PROTECT ENVIRONMENTAL FEATURES AS DIRECTED BY OEM / DEPARTMENT REPRESENTATIVE



**SECTION B**  
1:20  
AT PIER



**SECTION C**  
1:20  
TYPICAL BOARDWALK SECTION

NOTES:  
1. FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.

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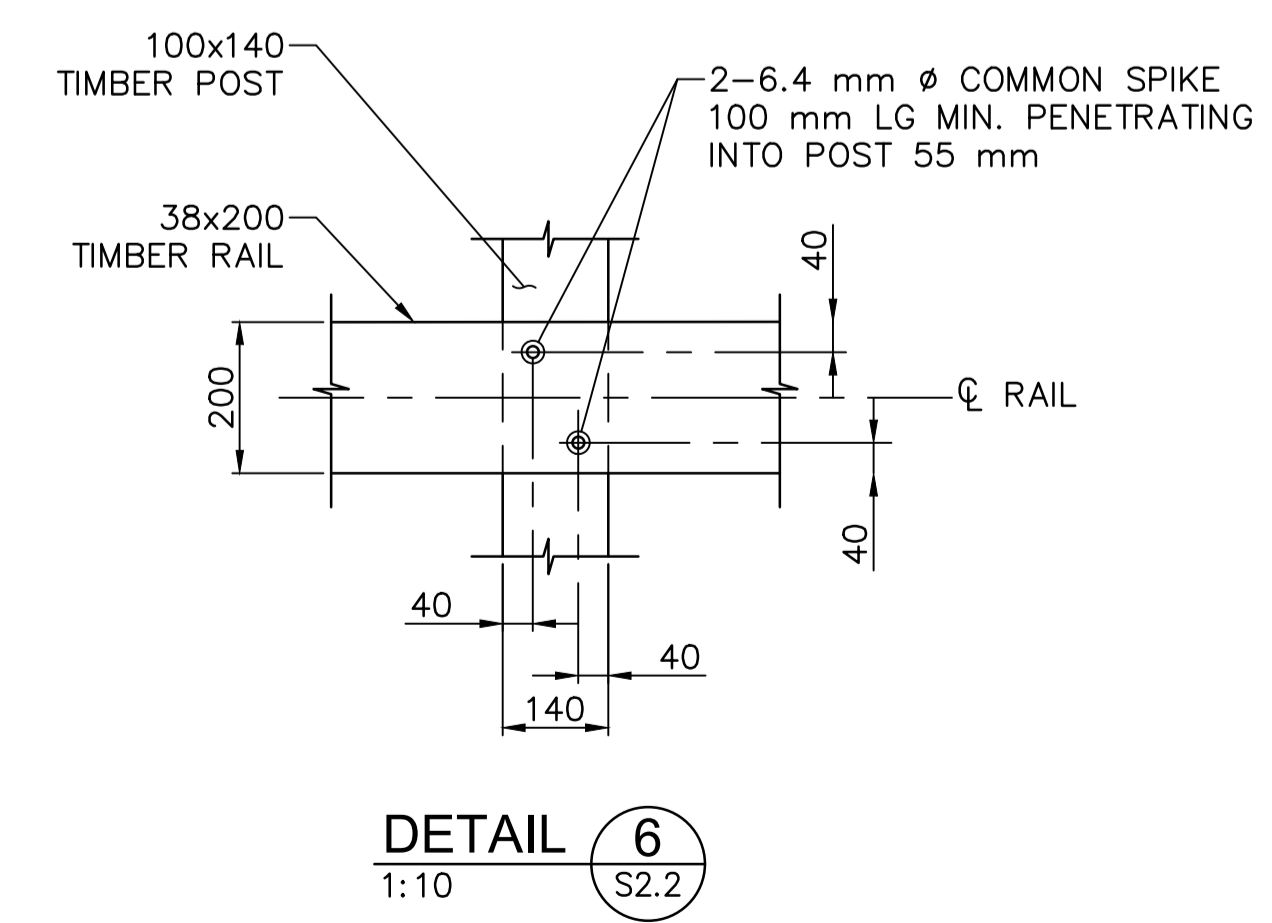
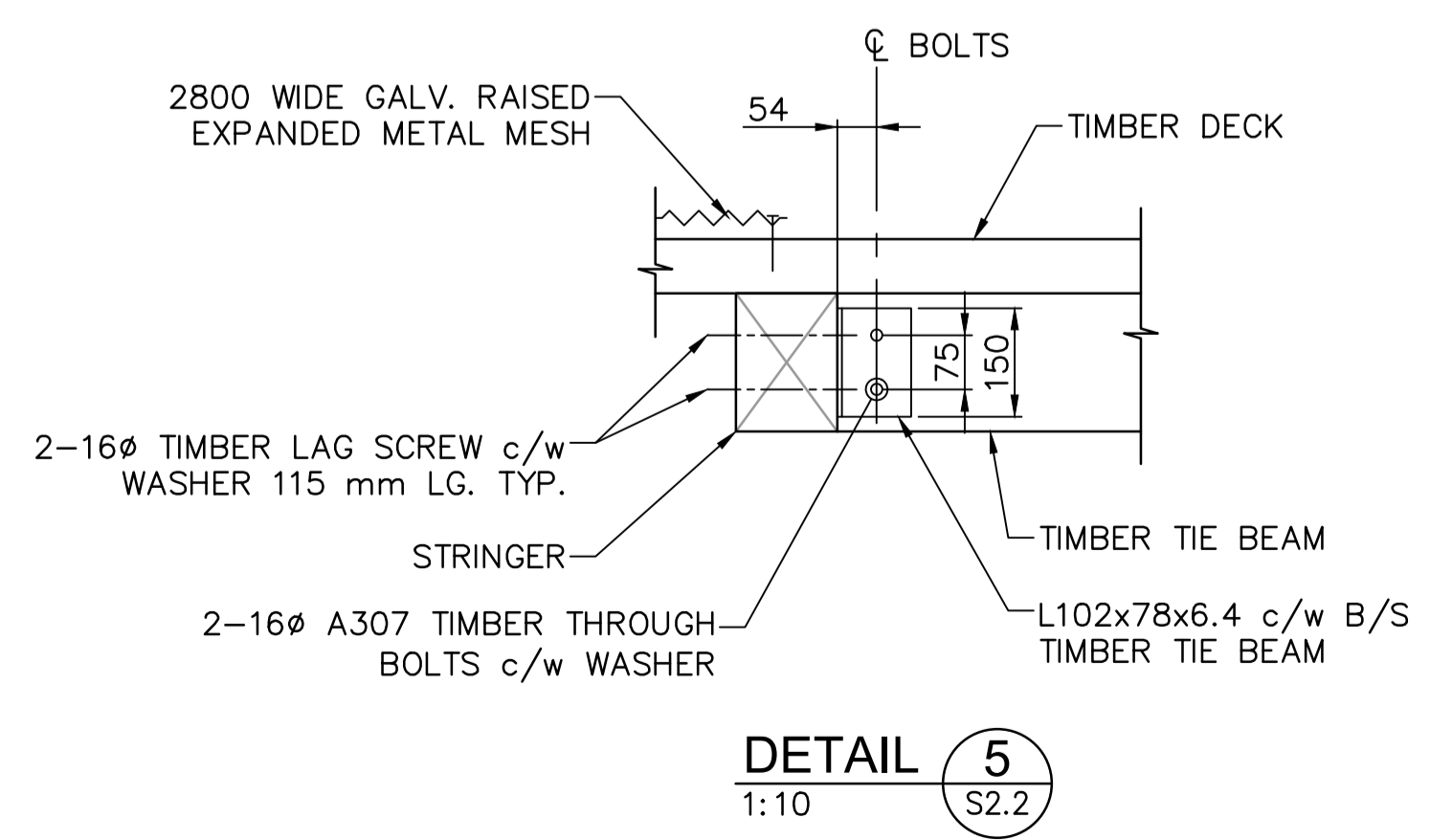
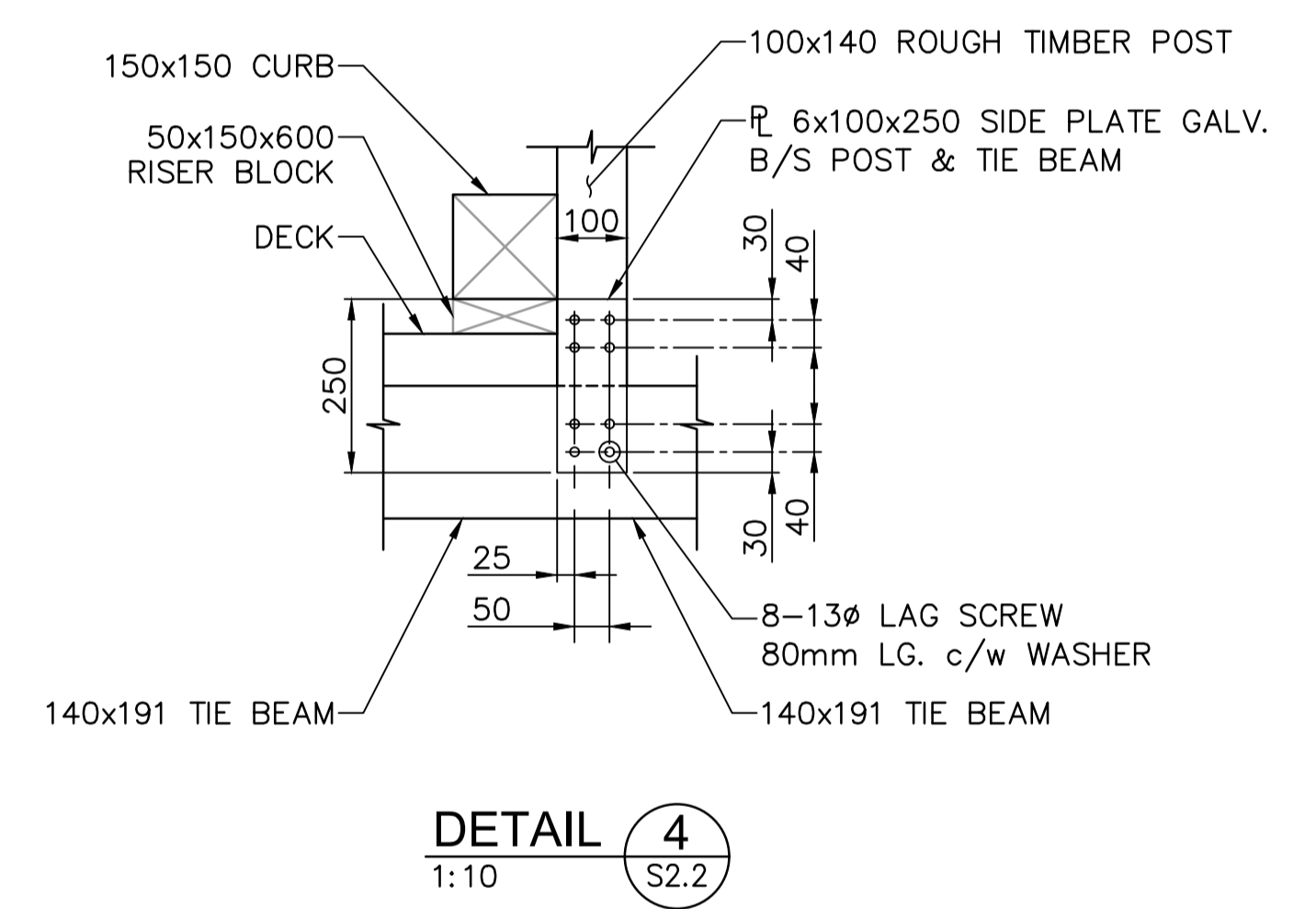
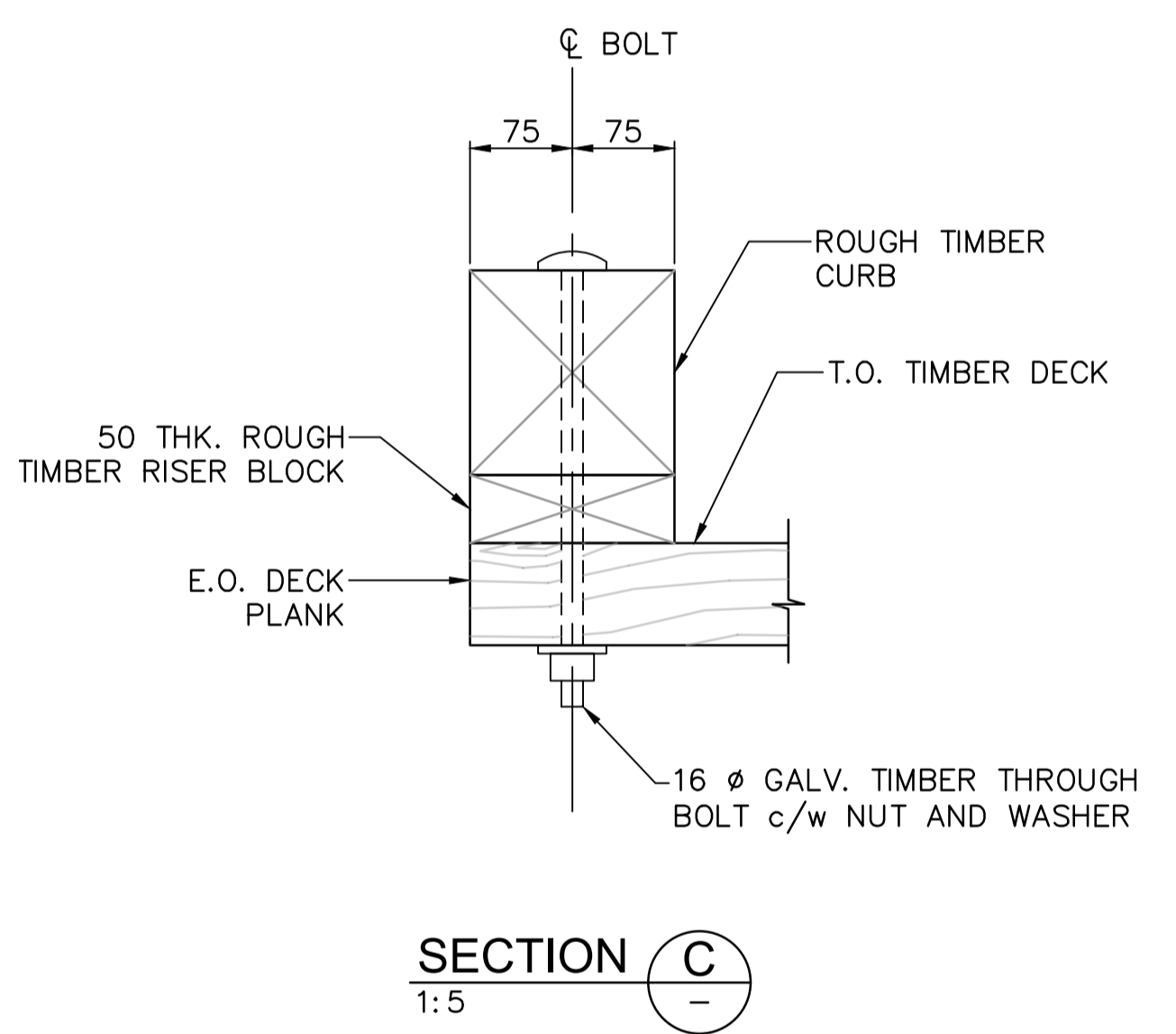
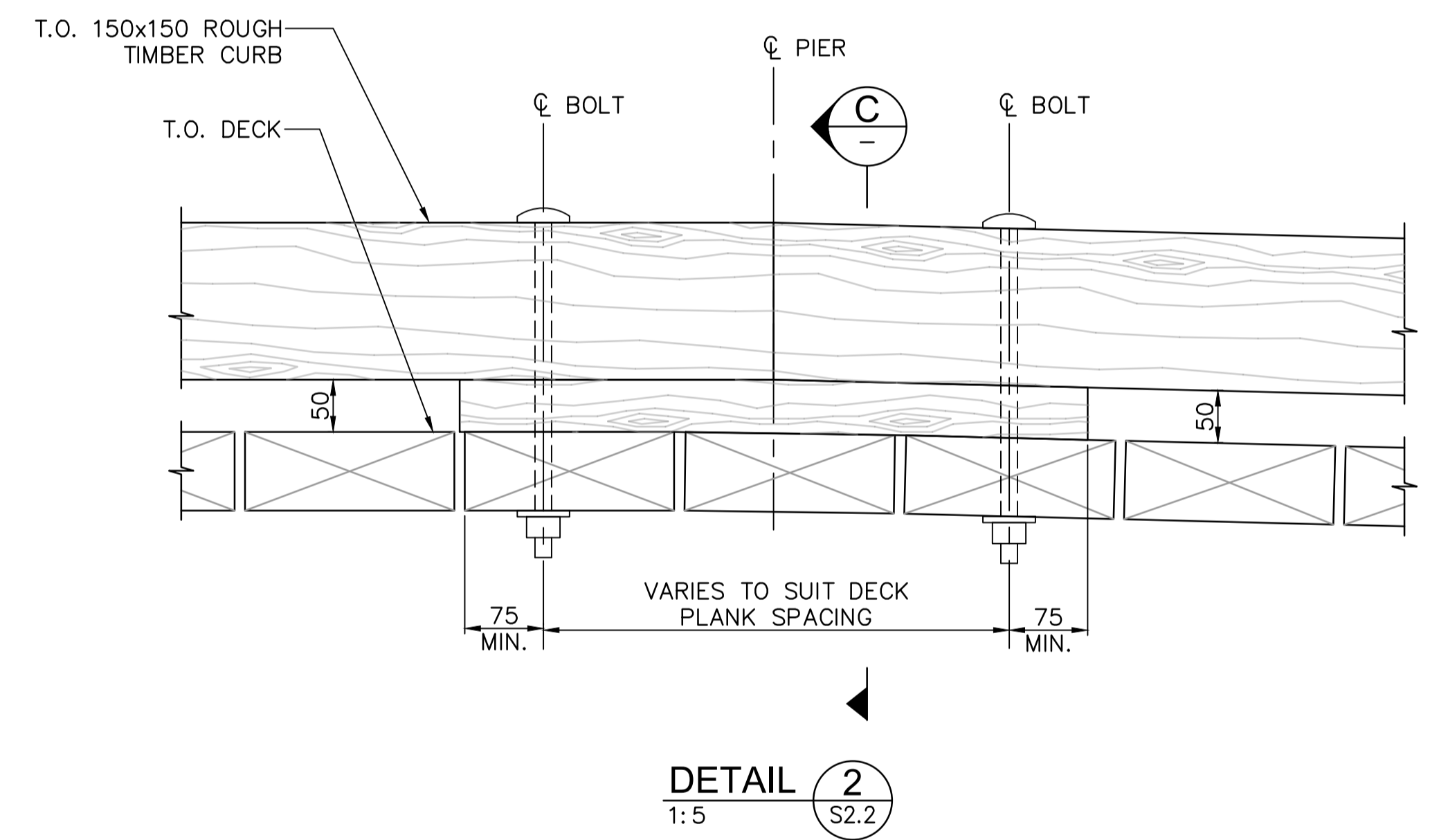
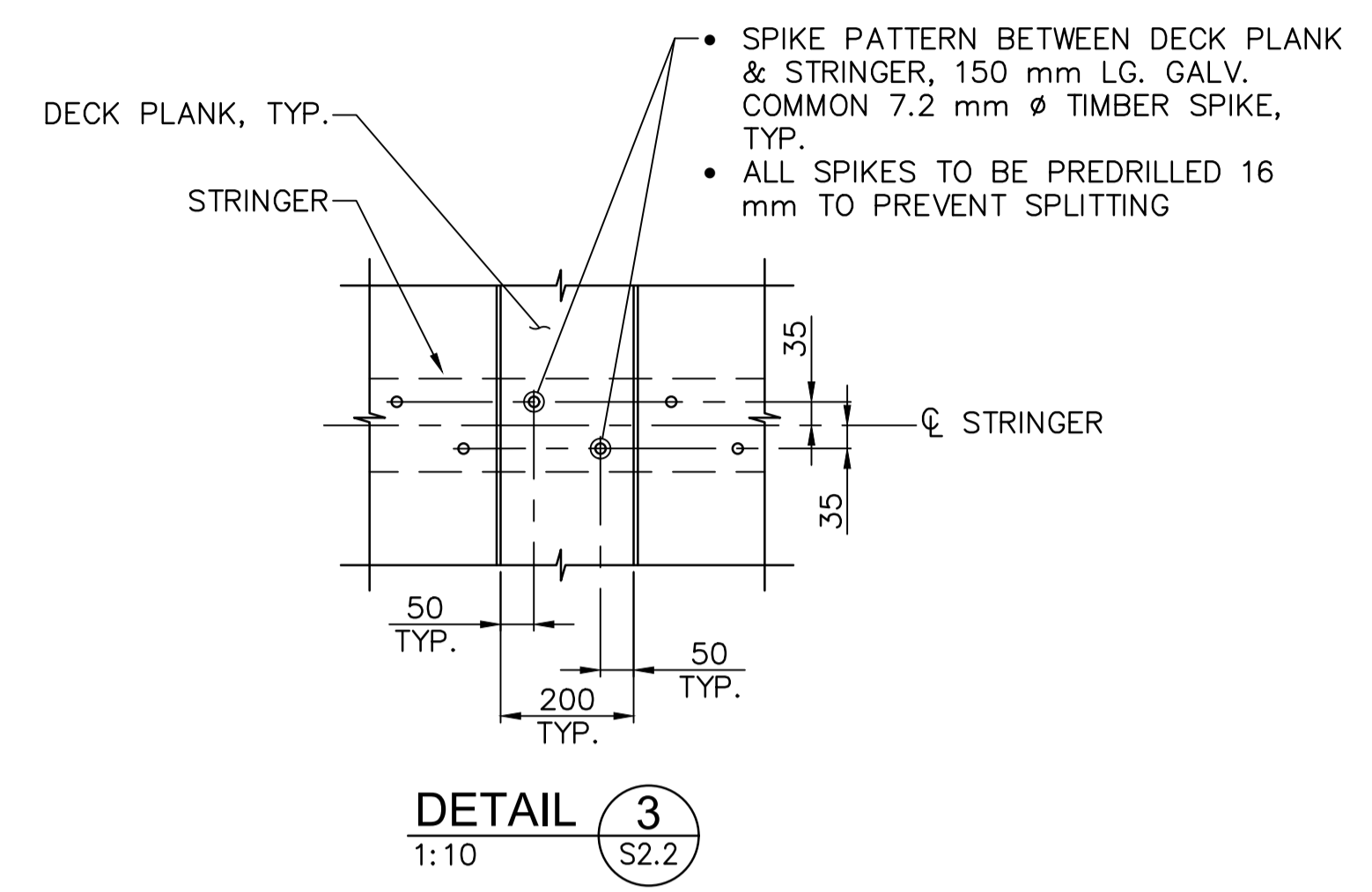
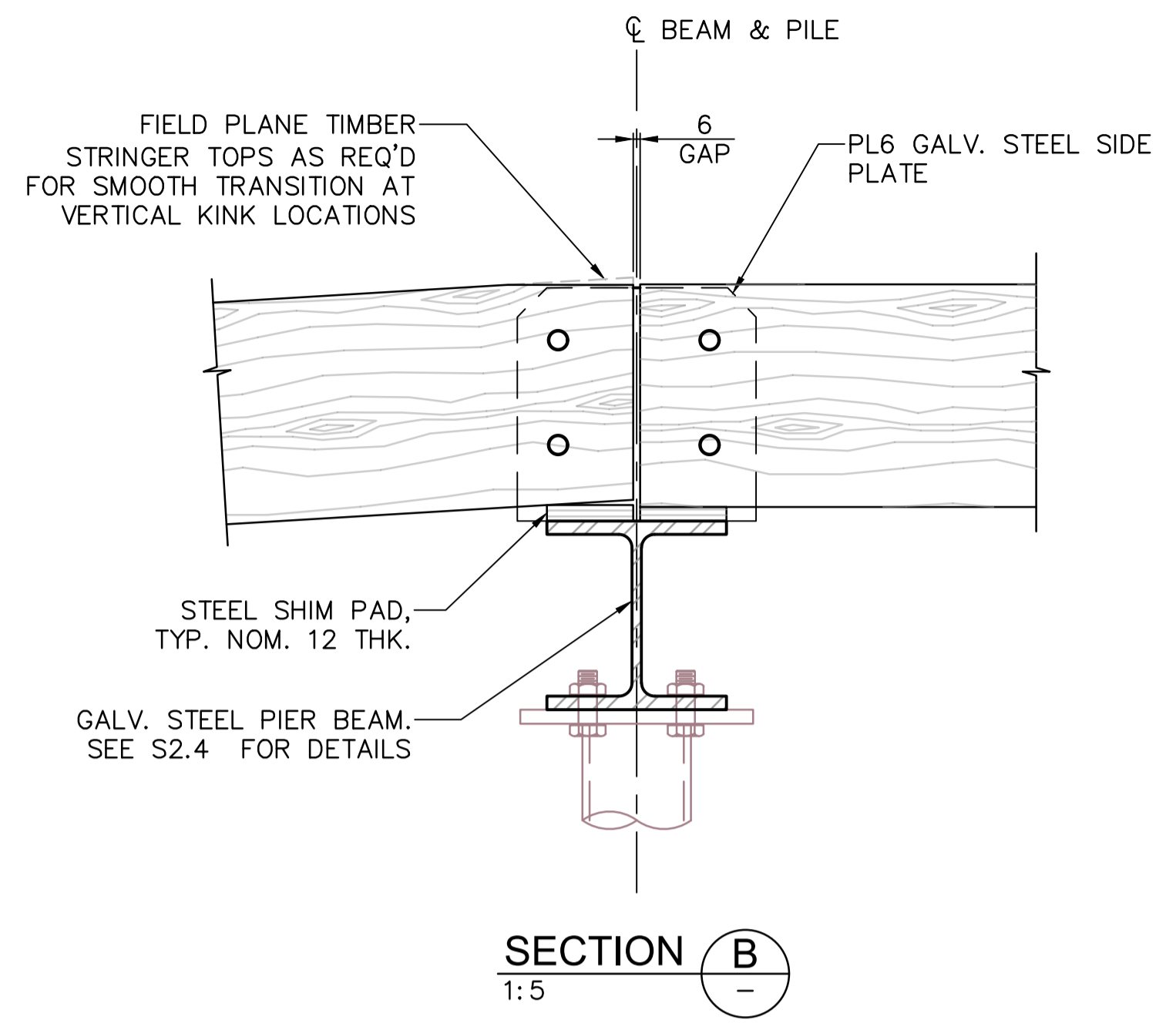
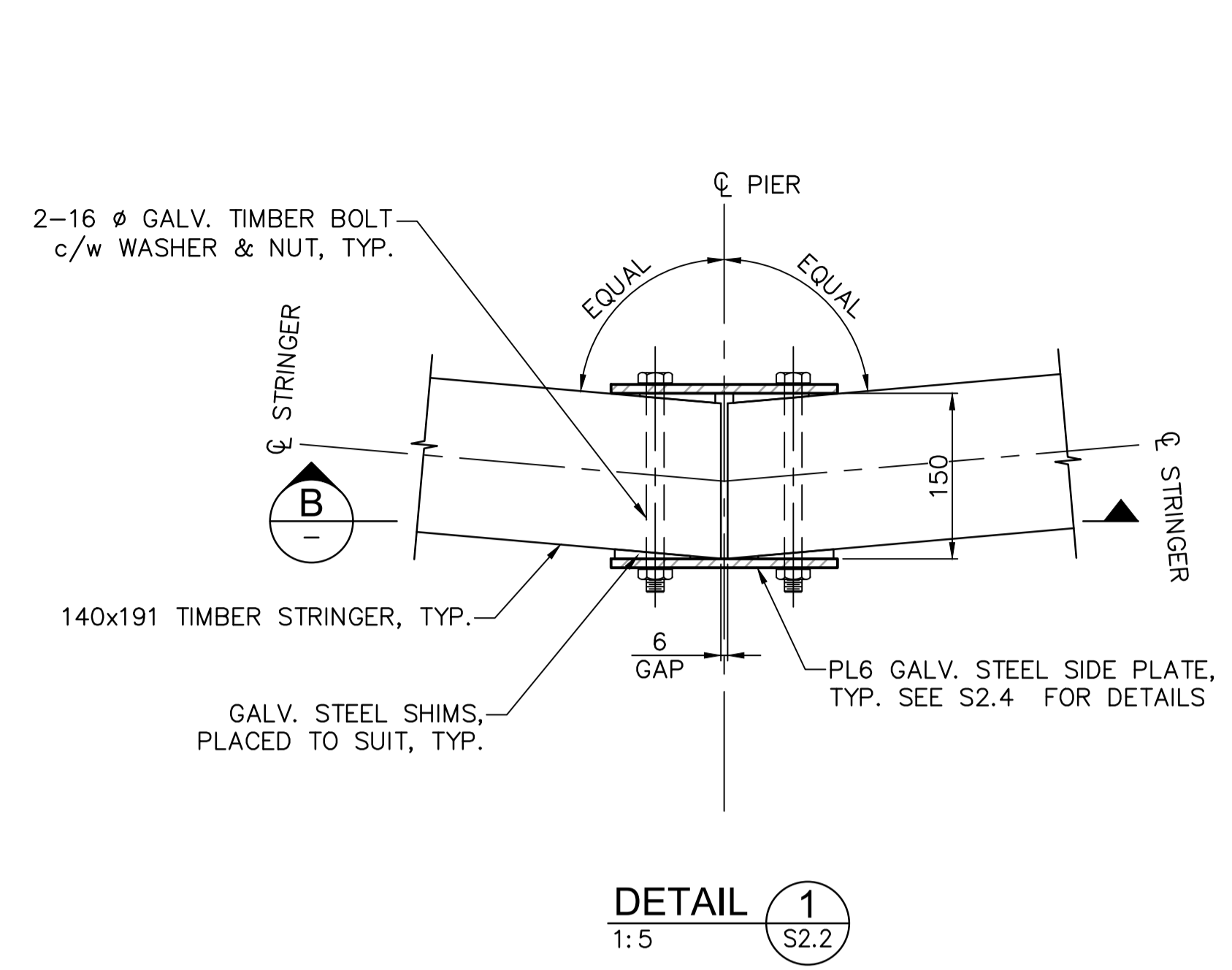
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DANIEL YANG / 2018-11  
Drawn by/Dessiné par  
STEVEN ZIVIN / 2018-12  
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsčik tašii**  
**“Going in the right direction on the trail”**  
**BOARDWALK GENERAL ARRANGEMENT**  
**SHEET 1**

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NOTES:  
1. FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.

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**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsc̓iik taʔii**  
**“Going in the right direction on the trail”**

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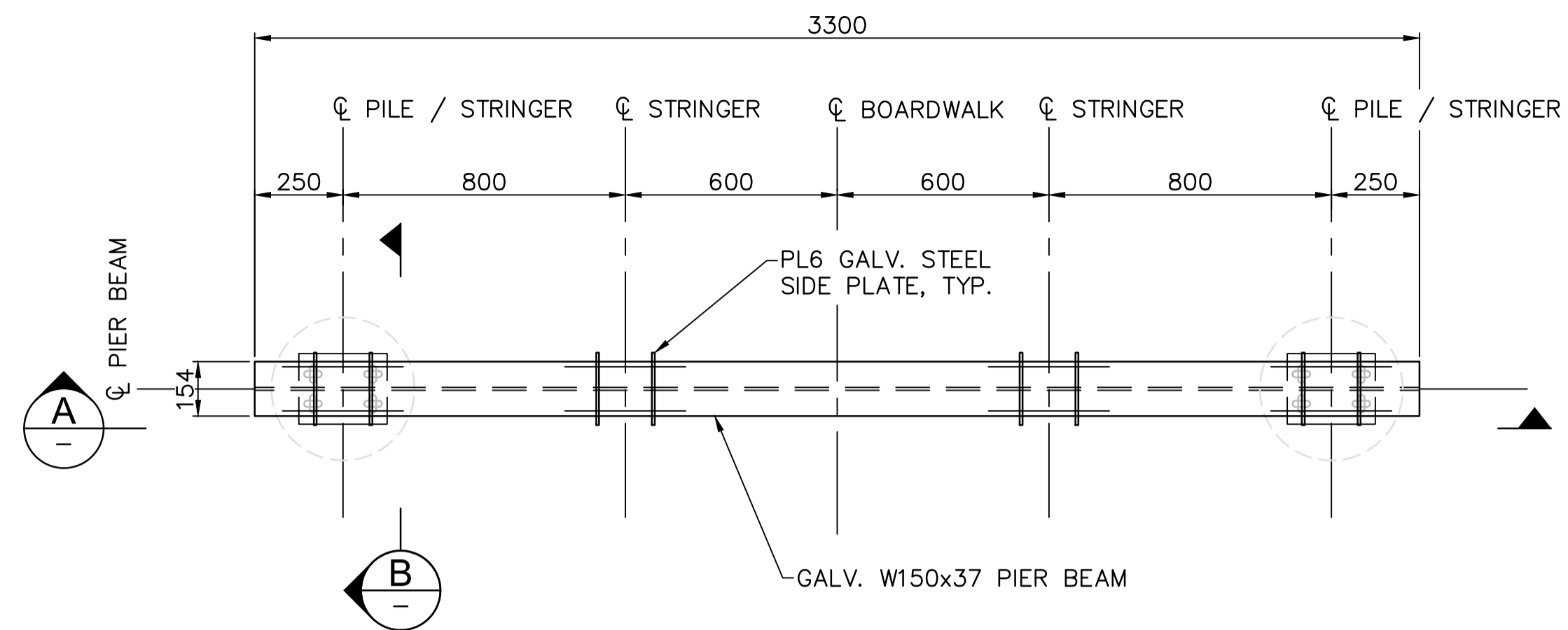
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

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**“Going in the right direction on the trail”**  
**BOARDWALK GENERAL ARRANGEMENT SHEET 2**

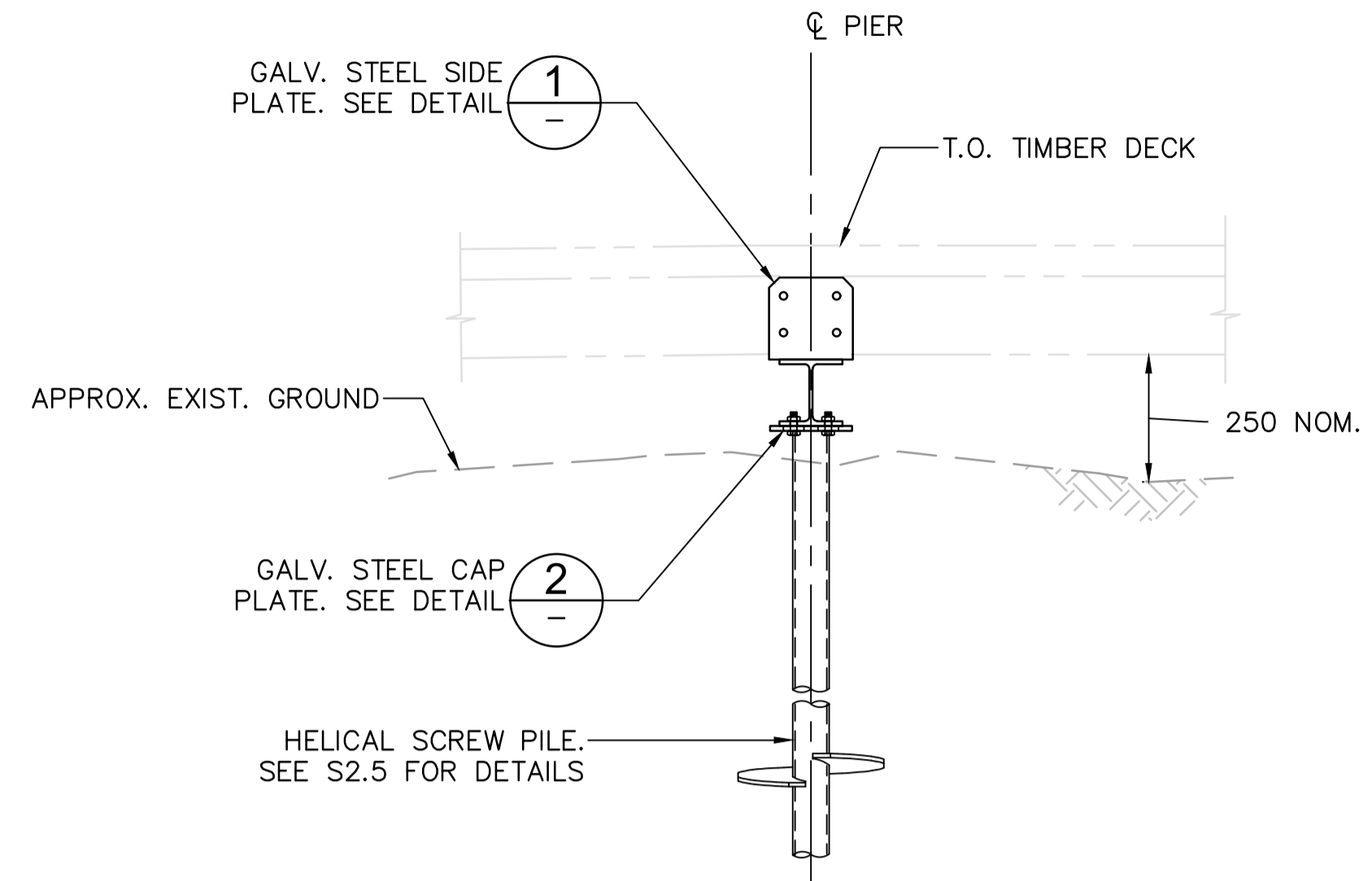
Project No./No. du projet PCA #1522	Sheet/Feuille S-2.3 OF	Revision no./La Révision no. 0
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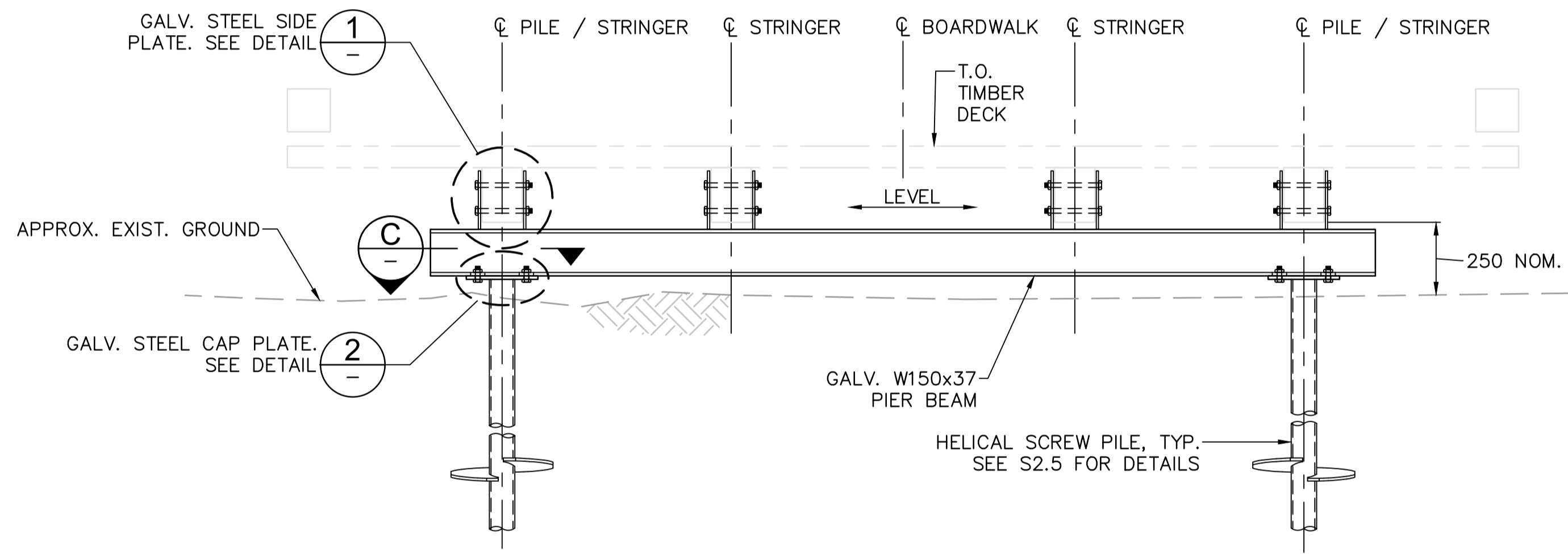
**PARSONS**



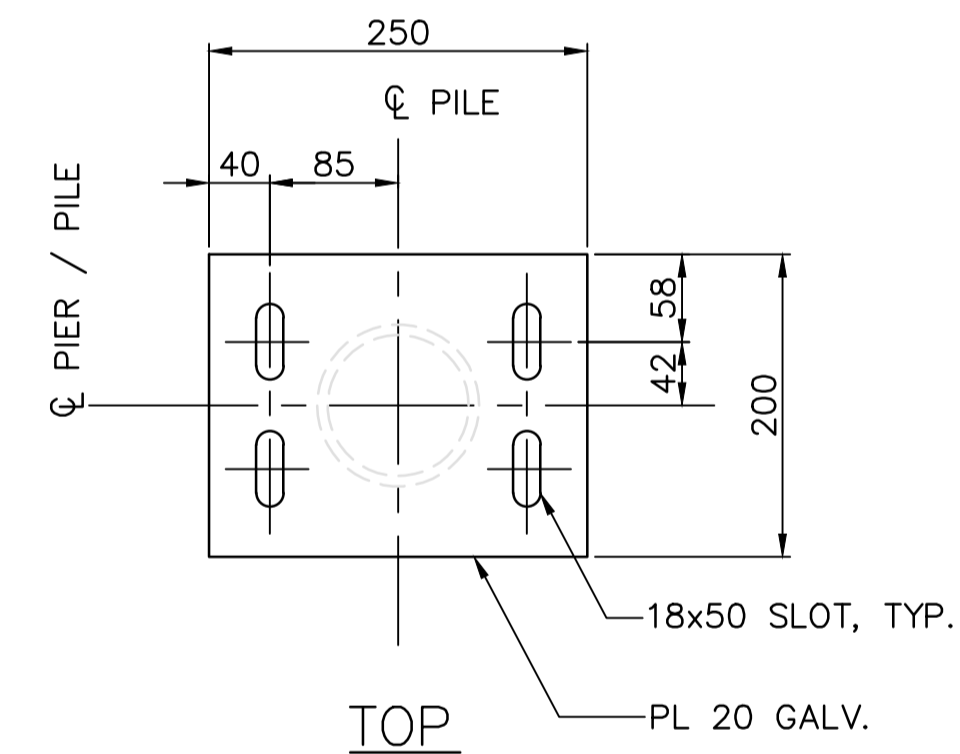
**PLAN - GALVANISED STEEL PIER BEAM**  
1:15



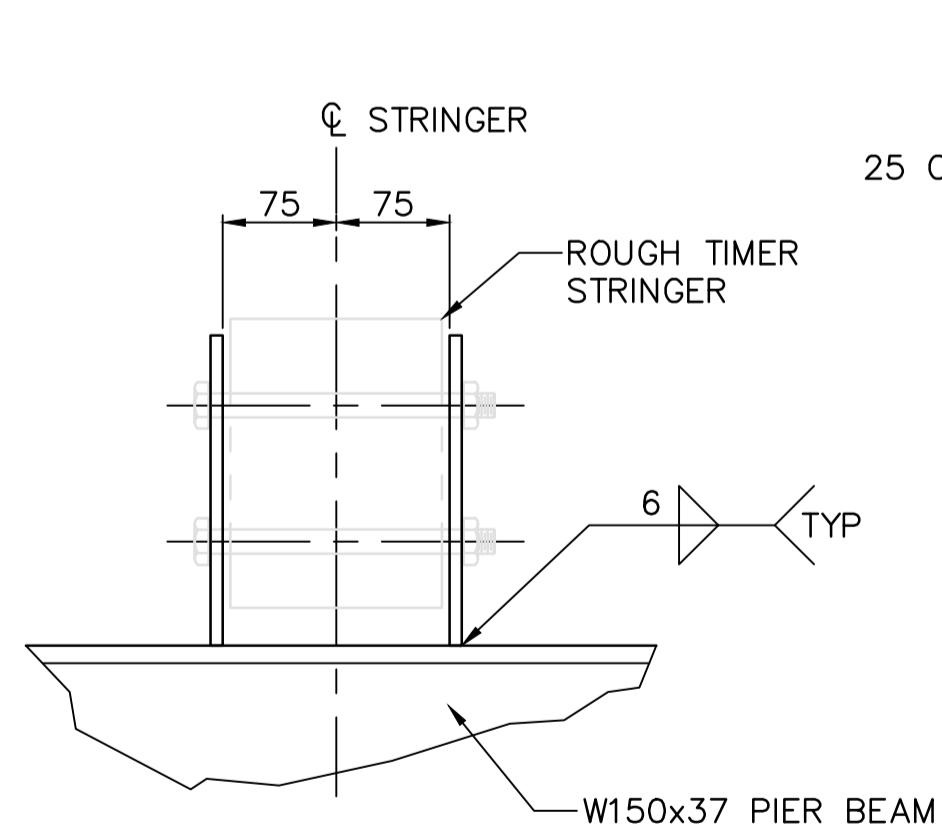
**SECTION B**  
1:15



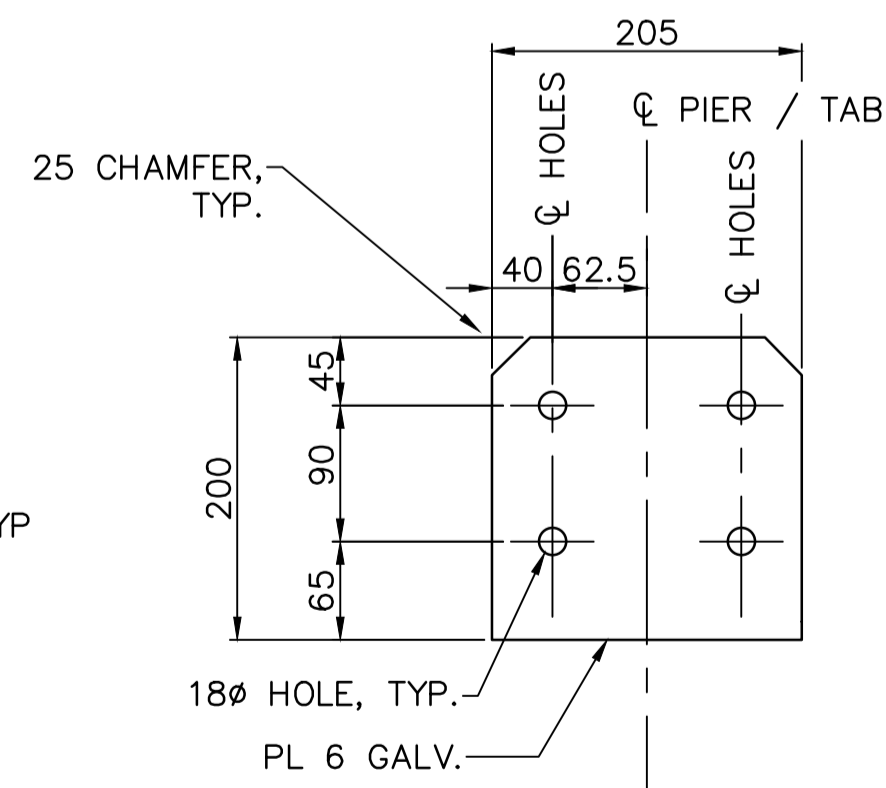
**ELEVATION A**  
1:15



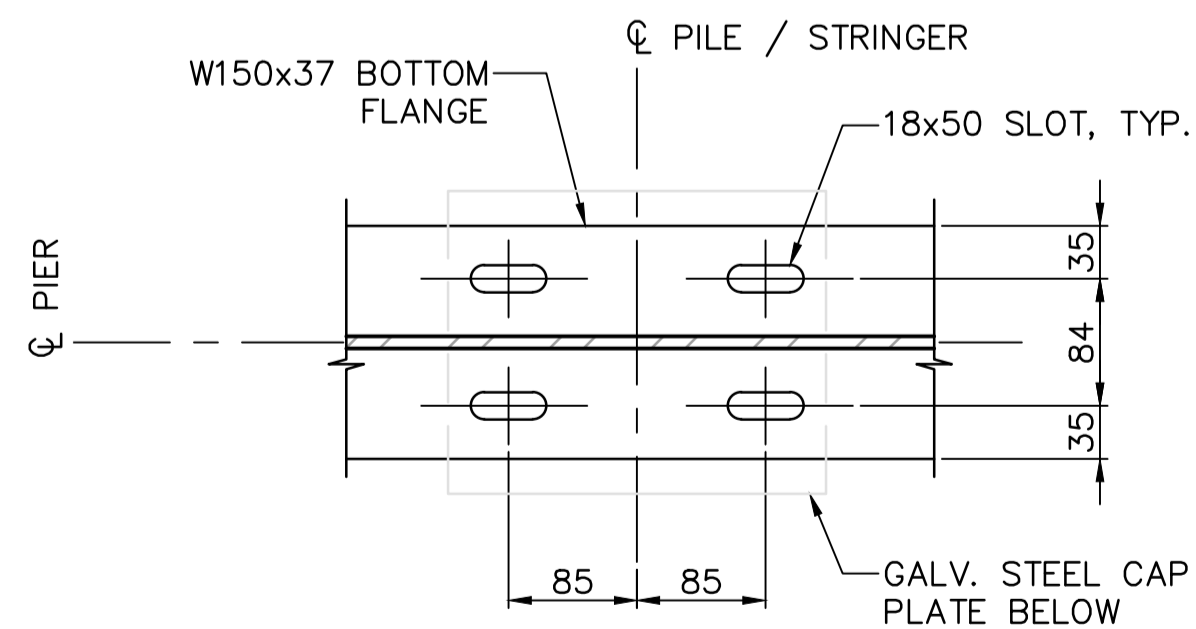
**TOP**



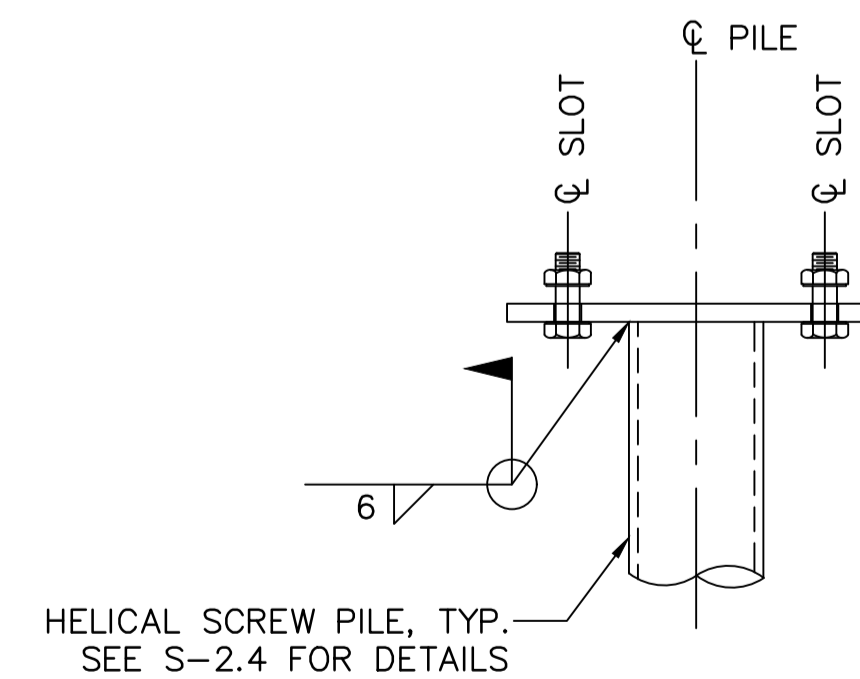
**FRONT**



**SIDE**



**SECTION C**  
1:5



**FRONT**

**PILE CAP PLATE DETAIL 2**  
1:5

**STEEL SIDE PLATE DETAIL 1**  
1:5

**NOTES:**

1. FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.

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**ʔapsčik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

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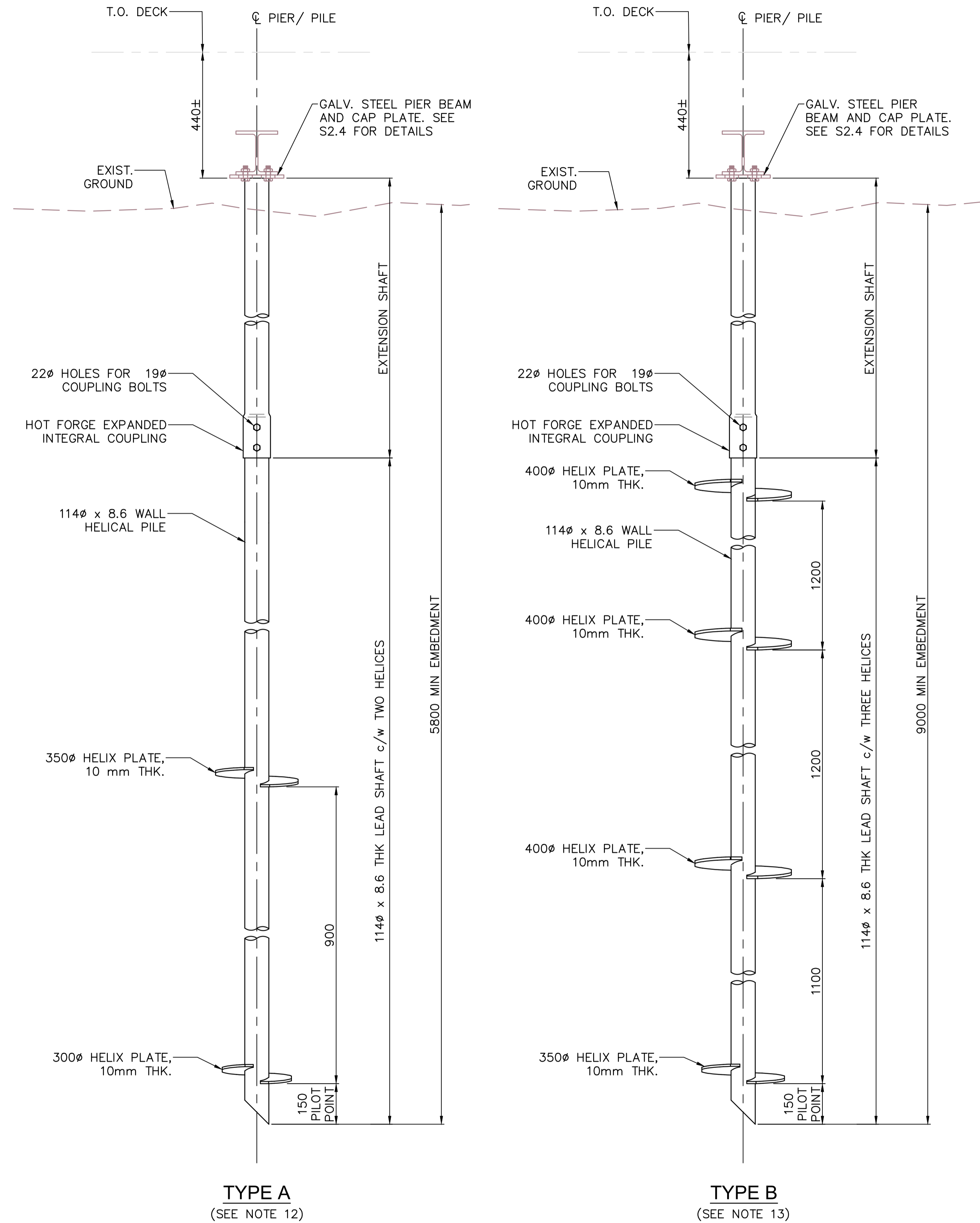
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Administrateur de Projets APC  
JACKIE HICKS

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**ʔapsčik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BOARDWALK STEEL PIER BEAM**

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**PARSONS**



**ELEVATION - TYPICAL HELICAL PILE**  
1:10

**NOTES:**

- FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.
- HELICAL SCREW PILE SHOWN IN DRAWING IS CONCEPTUAL AND FOR COST ESTIMATES AND CONSTRUCTION PLANNING ONLY. UPON APPROVAL OF THE DEPARTMENTAL REPRESENTATIVE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO SELECT DESIGN, SUPPLY AND INSTALL ALL HELICAL SCREW PILES TO MEET THE LOADS REQUIRED.
- CONTRACTOR TO REFER TO HELICAL PILE MANUFACTURER'S SPECIFICATIONS FOR PILE ASSEMBLY DETAIL AND INSTALLATION REQUIREMENTS. LEAD, EXTENSION SHAFT AND PILOT POINT LENGTHS SHOWN ON DRAWINGS ARE NOMINAL.
- MINIMUM SPACING BETWEEN HELIX PLATES IS THREE TIMES DIAMETER OF THE LARGER HELIX PLATE.
- ALL HELICES TO HAVE SHARPENED LEADING EDGES.
- EXTENSION SHAFTS MUST BE PROVIDED WITH A HOT FORGE EXPANDED INTEGRAL COUPLING CONNECTION ON ONE END.
- CORROSION ALLOWANCE OF 0.6 mm TO BE CONSIDERED (EXTERNAL SURFACES ONLY).
- THE CALCULATED PER PILE LOADS ARE AS FOLLOW:
  - AXIAL LOAD (COMPRESSION):
    - AT SLS: EXTREME LOAD (SLS1) = 44 kN  
PERMANENT LOAD = 17 kN
    - AT ULS: EXTREME LOAD (ULS1) = 63 kN  
PERMANENT LOAD = 21 kN
  - LATERAL LOAD:
    - LATERAL LOAD IN SERVICE = 3.3 kN
    - LATERAL LOAD AT CONSTRUCTION = 6 kN
  - UNFACTORED CONSTRUCTION VEHICLE:
    - MAX WEIGHT OF VEHICLE AND MATERIAL = 40 kN (VERTICAL)
    - UNFACTORED TORQUE (HORIZONTAL) FOR PILE INSTALLATION = 6 kNm
- LOAD TESTS SHALL BE CARRIED OUT TO VERIFY THE SUITABILITY AND CAPACITY OF THE PROPOSED HELICAL PILES AND THE PROPOSED INSTALLATION PROCEDURES. THE CONTRACTOR SHALL PERFORM AT LEAST ONE PRE-CONSTRUCTION LOAD TEST PRIOR TO INSTALLATION OF THE PERMANENT HELICAL PILES AS PER THE DESIGN DRAWING.
- THE CONTRACTOR SHALL PERFORM AXIAL LOAD TESTING ON AT LEAST 2% OF INSTALLED HELICAL PILES, BUT NOT LESS THAN TWO PILES IN EACH BOARDWALK SEGMENT.
- THE CONTRACTOR SHALL CONFORM TO MANUFACTURER'S PRODUCT SPECIFICATIONS FOR LOAD TESTING PROCEDURES & DETAILS.
- TYPE A HELICAL PILES TO BE USED ON BOARDWALK SEGMENT BETWEEN THE FOLLOWING STATIONS:
  - STA. 12+186 TO 12+226
  - STA. 13+057 TO 13+075
  - STA. 13+213 TO 13+345
  - STA. 20+020 TO 20+100
  - STA. 25+867 TO 25+934
 ESTIMATED AVERAGE PILE LENGTH 6.00 m
- TYPE B HELICAL PILES TO BE USED ON BOARDWALK SEGMENT BETWEEN THE FOLLOWING STATIONS:
  - STA. 11+800 TO 11+855
 ESTIMATED AVERAGE PILE LENGTH 9.20 m
- ESTIMATED CONSTRUCTION MATERIALS:
 

• TIMBER STRINGER (140x191)	DOUGLAS FIR-L	GRADE SELECT STRUCTURAL	V=86.5 m <sup>3</sup>
• ROUGH DECK PLANK (75x200)	WEST COAST RED CEDAR	GRADE SELECT STRUCTURAL	V=50 m <sup>3</sup>
• ROUGH TIMBER CURB & RISER	WEST COAST RED CEDAR	GRADE SELECT STRUCTURAL	V=23 m <sup>3</sup>
• ROUGH TIMBER POST (100x140x1600)	WEST COAST RED CEDAR	GRADE SELECT STRUCTURAL	V=18 m <sup>3</sup>
• ROUGH TIMBER HANDRAIL & STRUT	WEST COAST RED CEDAR	GRADE SELECT STRUCTURAL	V=15 m <sup>3</sup>
• W150x37 BEAM	(fy=350 MPa)		W=24.5 TONNE
• MISC PLATE			W=16 TONNE
• 114Ø 8.6 WALL HELICAL PILE			L=2435 m

 CONTRACTOR SHALL VERIFY MATERIAL QUANTITY PRIOR TO COMMENCING WORK.

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Agency Canada

Project title/Titre du projet  
TOFINO, BC

**PACIFIC RIM NATIONAL PARK RESERVE**  
**?apsçik tašii (Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**

Consultant Signature Only

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DANIEL YANG / 2018-11

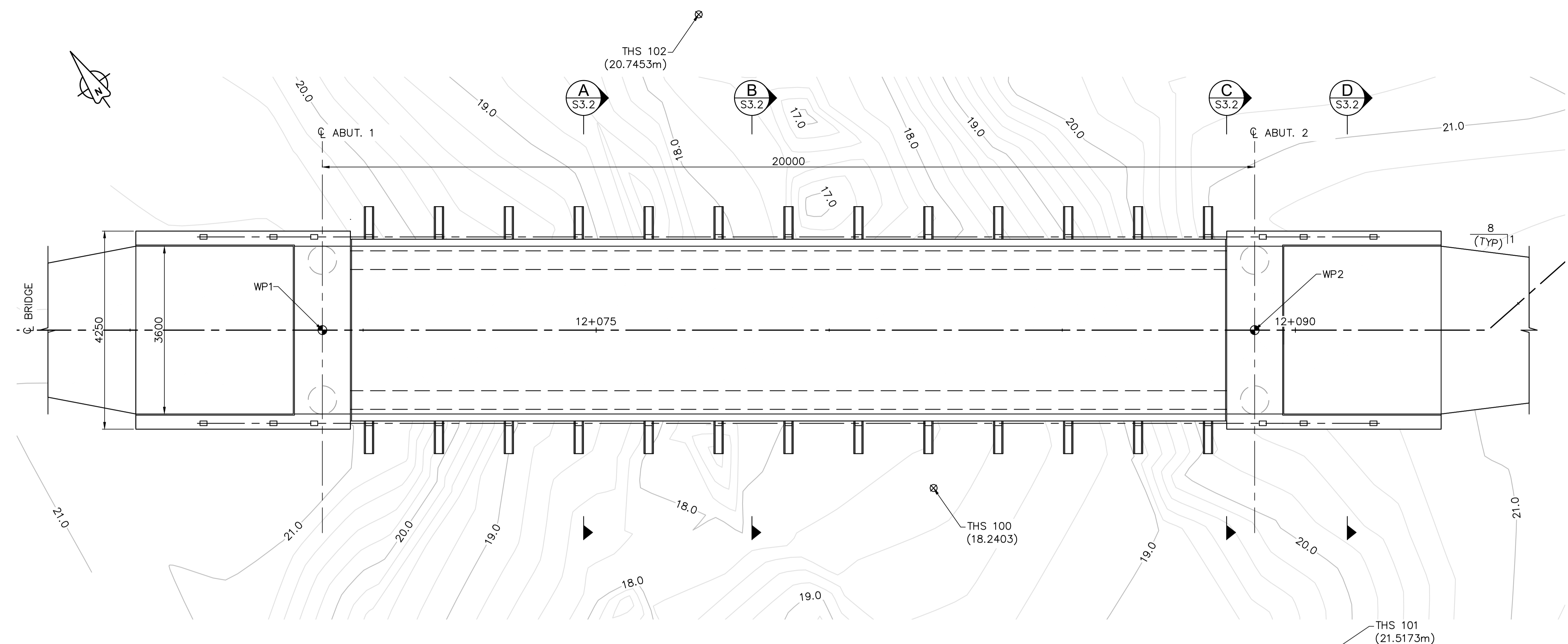
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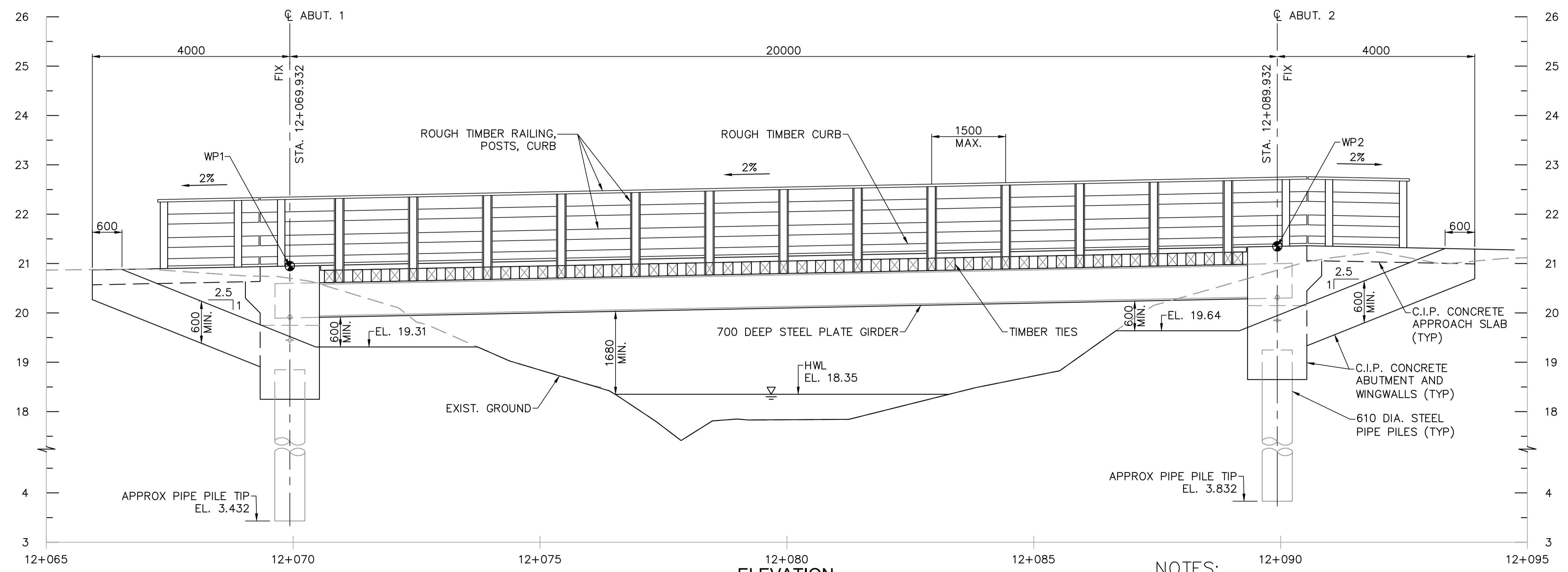
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**"Going in the right direction on the trail"**  
**BOARDWALK HELICAL PILES**

Project No./No. du projet PCA #1522	Sheet/Feuille S-2.5 OF	Revision no./La Révision no. 0
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**PLAN**  
1:50



**ELEVATION**  
1:50

- NOTES:**
- HIGH WATER LEVEL (HWL) BASED ON 1:200 YEAR EVENT.
  - FOUNDATION DETAILS TO BE CONFIRMED FOLLOWING GROUND INVESTIGATION ON SITE.
  - FOR WORK POINTS TABLE AND BENCHMARKS TABLE, SEE DRAWING S-3.2.

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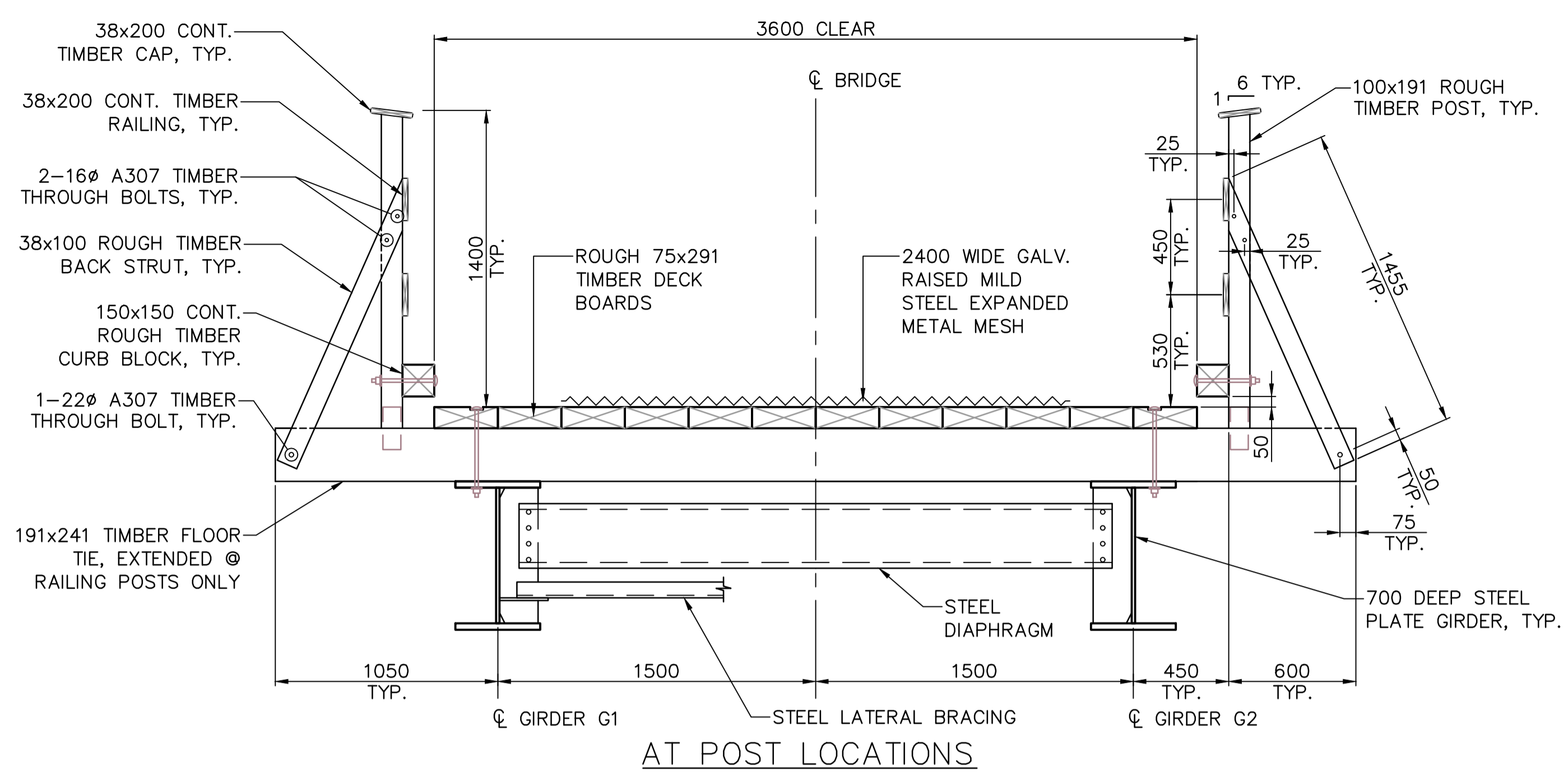
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**(Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**  
**BRIDGE #3**  
**GENERAL ARRANGEMENT**  
**SHEET 1**

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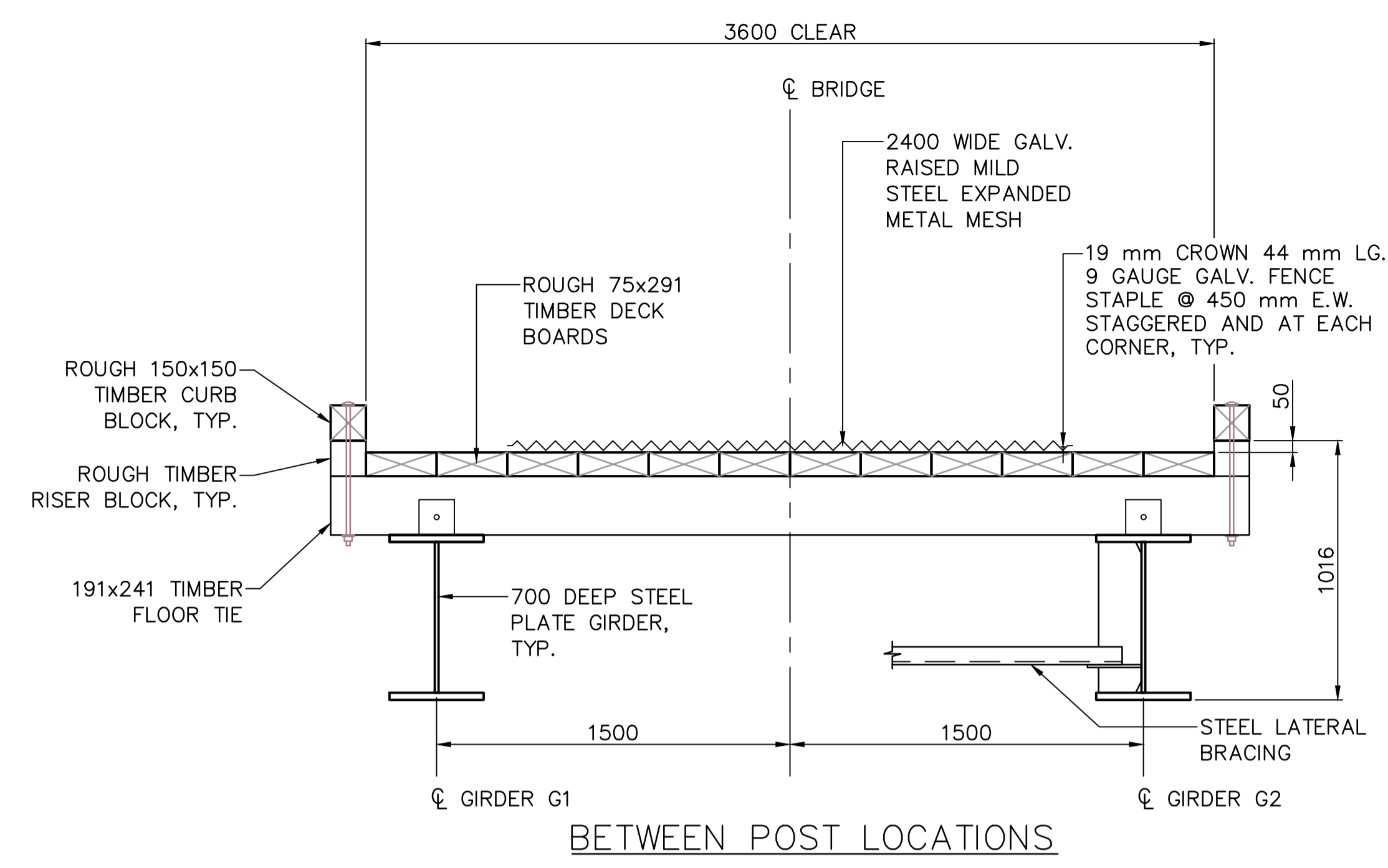




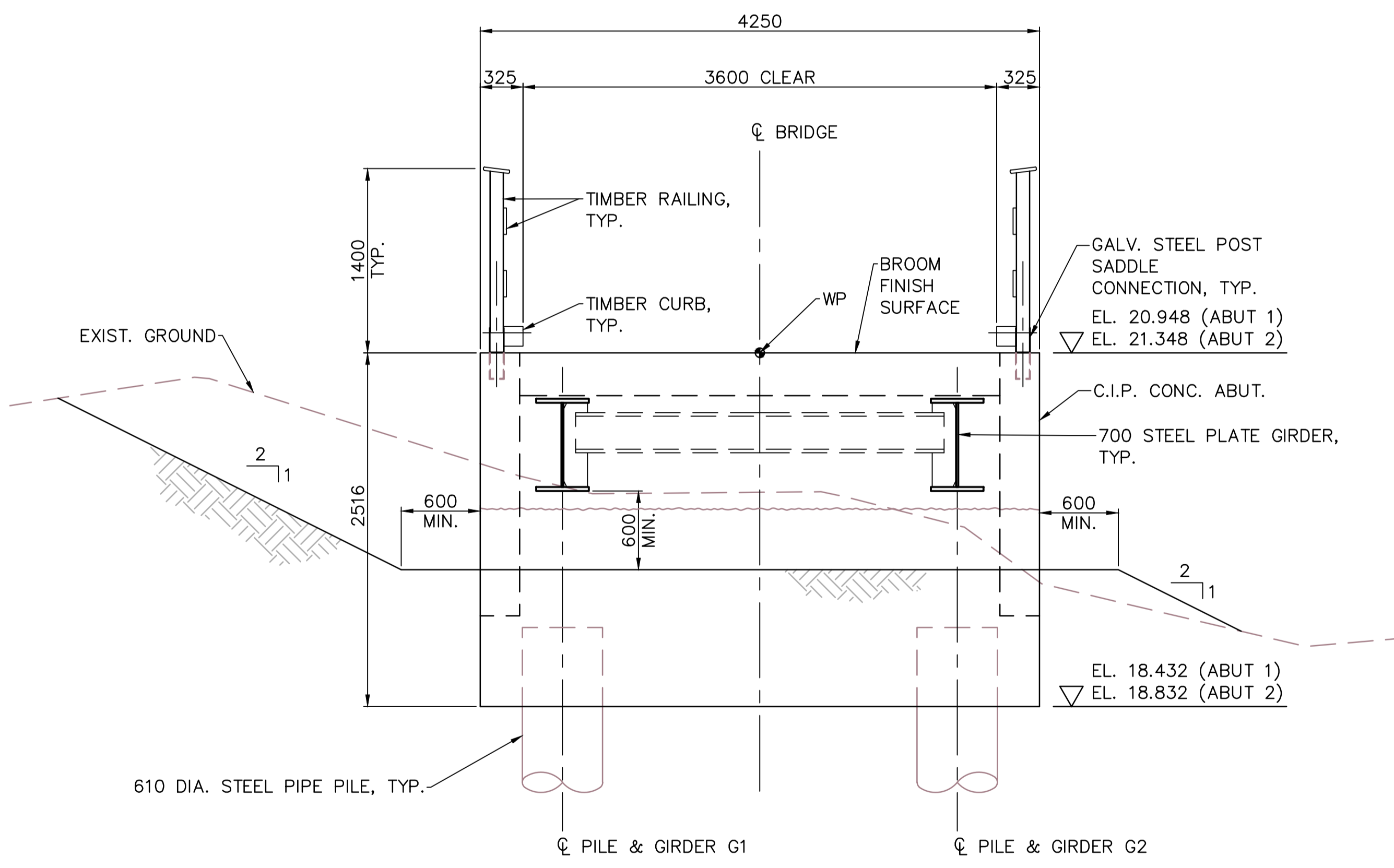
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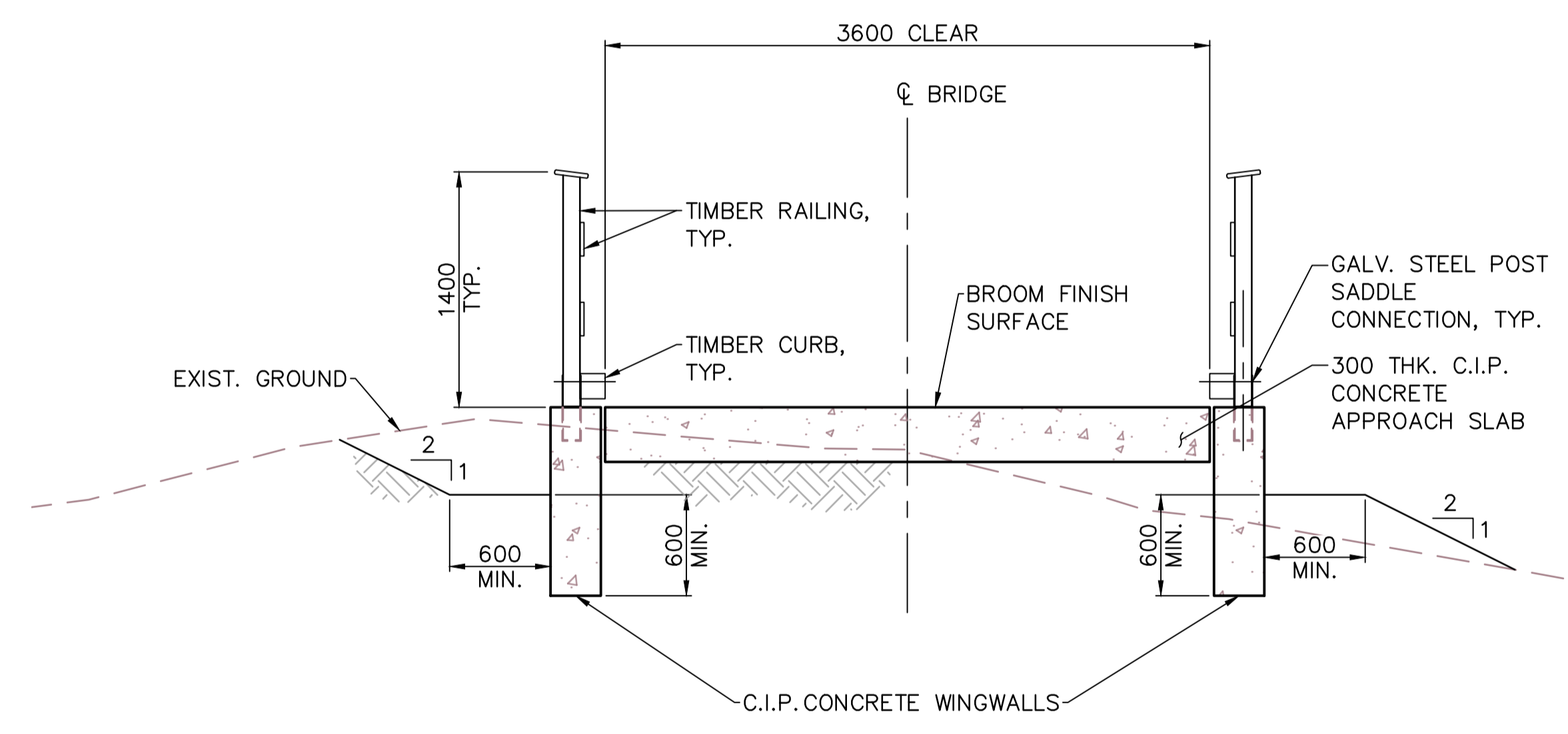
**SECTION A**  
1:20 S3.1



**SECTION B**  
1:20 S3.1



**SECTION C**  
1:30 S3.1



**SECTION D**  
1:30 S3.1

**NOTES:**

- FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.
- DURING CONSTRUCTION, THE CONTRACTOR WILL NEED TO STRICTLY ADHERE TO THE MITIGATION MEASURES OUTLINED IN THE CONCRETE HANDLING MITIGATIONS SPECIFICATION AND THE ENVIRONMENTAL PROCEDURES SPECIFICATION INCLUDED IN THE TENDER PACKAGE.
- ALL THE HIGHEST RISK WORK INCLUDING EXCAVATION FOUNDATION, INSTALLATION OF FOUNDATION, AND EARTHWORK IMMEDIATELY ADJACENT TO CREEKS MUST BE DONE DURING LEAST RISK WORK WINDOW FOR FISH, WHICH FOR NON-INSTREAM WORKS ONLY IS JUNE 15TH TO SEPTEMBER 15TH.
- THE CONTRACTOR SHALL CONFIRM WITH DEPARTMENT REPRESENTATIVE PRIOR TO COMMENCE THE HIGH RISK CONSTRUCTION WORK, INCLUDING EXCAVATION, FOOTINGS, INSTALLATION OF FOOTINGS AND EARTHWORKS IMMEDIATELY ADJACENT TO CREEK.
- NO CONCRETE WORK TO COMMENCE WITHOUT WRITTEN APPROVAL OF THE OWNER'S ENVIRONMENTAL MONITOR. NO INSTREAM WORKS PERMITTED FOR BRIDGE CONSTRUCTION.
- ALL CONCRETE POURS SHALL BE COMPLETELY ISOLATED FROM THE CREEK, WITH SECONDARY CONTAINMENT TO PREVENT GROUT ENTERING THE CREEK. THE CONTRACTOR SHALL SUBMIT A GROUT CONTAINMENT PLAN TO THE ENVIRONMENTAL MONITOR FOR APPROVAL AND REQUEST INSPECTION AND APPROVAL OF FORMWORK BY THE ENVIRONMENTAL MONITOR PRIOR TO ANY CONCRETE POURS.
- SURVEY DATA IS BASED UPON THE UTM NAD83 COORDINATE SYSTEM.
- BROOM CONCRETE RUNNING SURFACE BY CONCRETE BROOM APPLYING PERPENDICULAR TO THE ALIGNMENT.

WORK POINTS TABLE			
WORK POINT	NORTHING	EASTING	EL.
WP1	5441037.607	294367.656	20.948
WP2	5441028.265	294385.340	21.348

BENCHMARKS TABLE			
PK NAIL	NORTHING	EASTING	EL.
100	5441028.486	294377.666	18.240
101	5441012.507	294378.535	21.517
102	5441050.354	294383.521	20.745

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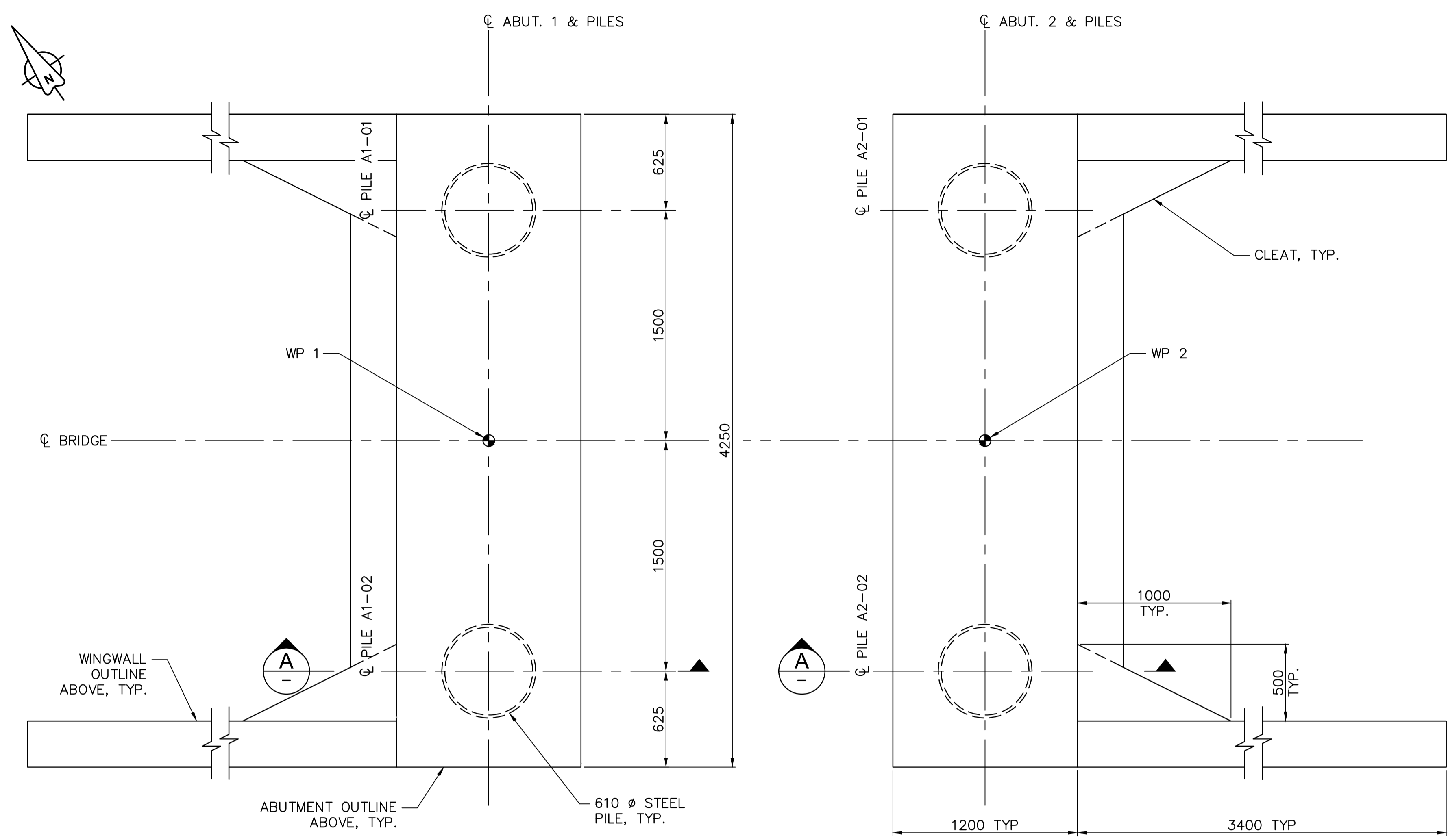
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PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ᑕᐱᓄᓕᓴᓴᓴ ᓄᐱᓴᓴᓴ**  
**(Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**  
**BRIDGE #3**  
**GENERAL ARRANGEMENT**  
**SHEET 2**

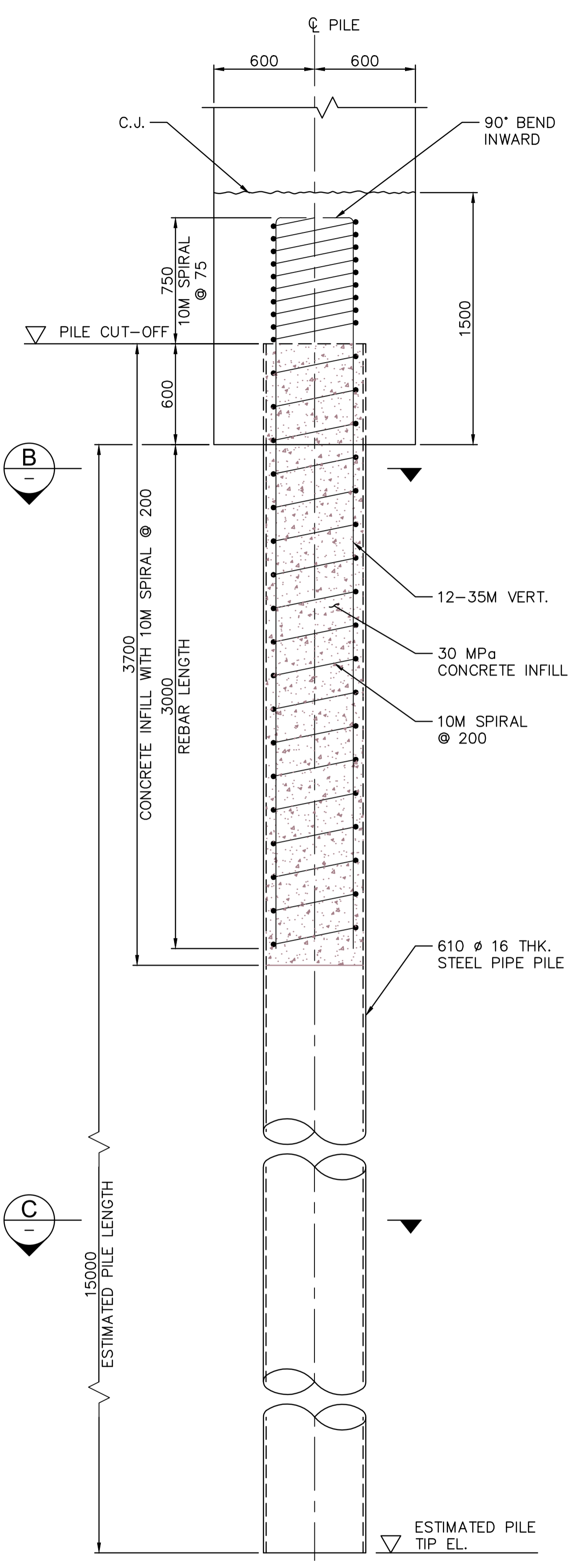
Project No./No. du projet	Sheet/Feuille	Revision no./La Révision no.
PCA #1522	S-3.2 OF	0



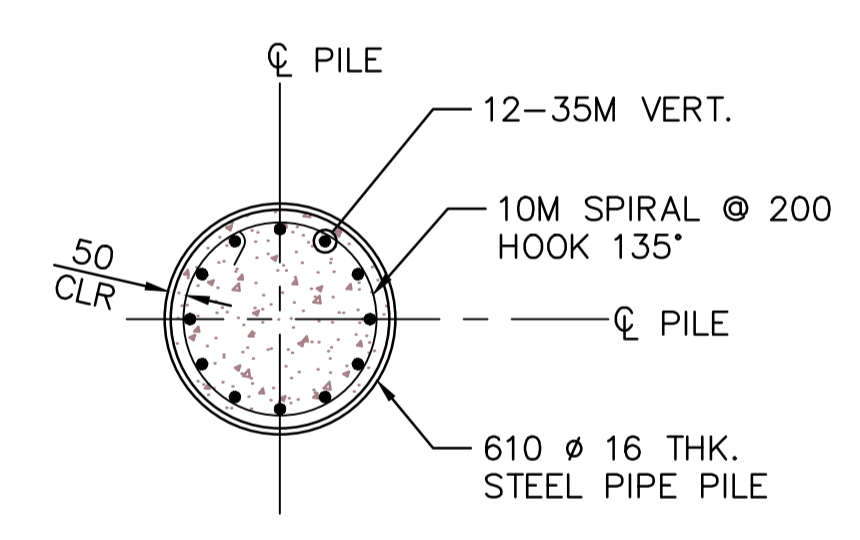
**PARSONS**



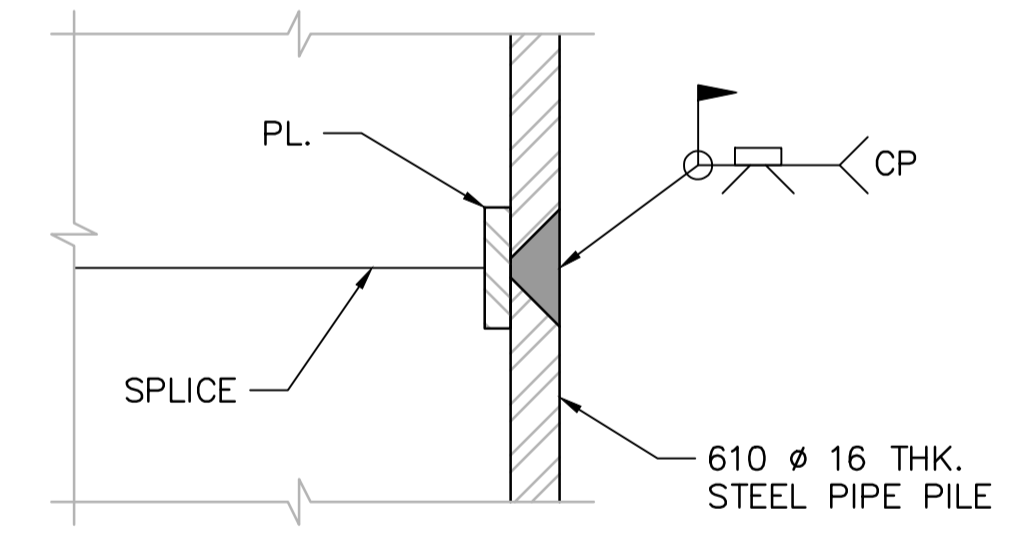
**PILING LAYOUT PLAN**  
1:20



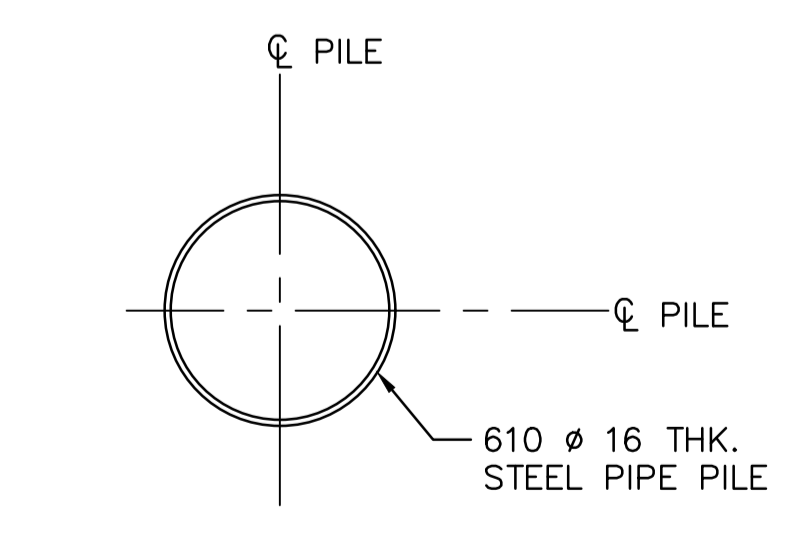
**SECTION A**  
1:20



**SECTION B**  
1:20



**TYPICAL PIPE PILE SPLICE DETAIL**  
1:2



**SECTION C**  
1:20

PILE DATA TABLE			
LOCATION	PILE	PILE CUT-OFF EL. (m)	ESTIMATED PILE TIP EL. (m)
ABUT 1	A1-01	19.032	3.432
	A1-02	19.032	3.432
ABUT 2	A2-01	19.432	3.832
	A2-02	19.432	3.832

**NOTES:**

- FOR WORK POINTS SEE S3.1.
- PILE SPACING SHALL BE MEASURED AT THE UNDERSIDE OF THE ABUTMENT SEAT.
- PILES TO BE FITTED WITH A CUTTING SHOE AT THE TIP EQUIVALENT TO ASSOCIATED PILE AND FITTING MODEL APF 0-14000.
- THE FACTORED PER PILE LOADS (AXIAL COMPRESSION LOAD)
  - SLS1: PERMANENT: 300 kN
  - MAX: 370 kN
  - ULS1: PERMANENT: 400 kN
  - MAX: 535 kN
  - ULS5 (SEISMIC): 595 kN
- PROPOSED PILE CAPACITY AND PILE ELEVATION DESIGNED ARE BASED ON GEOTECHNICAL INFORMATION OBTAINED FROM BOREHOLE BH17-11, BH17-01, BH17-02, BH17-03, WHICH MAYBE NOT WELL REPRESENT GROUND SOIL CONDITION OF BRIDGE #3 LOCATIONS. CONTRACTOR SHALL DRILL AT LEAST ONE NEW BOREHOLE CLOSE TO EITHER OF ABUTMENT 1 OR 2 SIDE, CARRY OUT SOIL TEST, OBTAIN ACCURATE GEOTECHNICAL DATA/INFORMATION, NOTIFY THE DEPARTMENT REPRESENTATIVE TO VERIFY PILE CAPACITY AND FINAL PILE TIP ELEVATION PRIOR TO COMMENCE FOUNDATION CONSTRUCTION.

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Client/client  
Parks Canada Agency L'Agence Parcs Canada

Project title/Titre du projet  
TOFINO, BC  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsc̓iik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

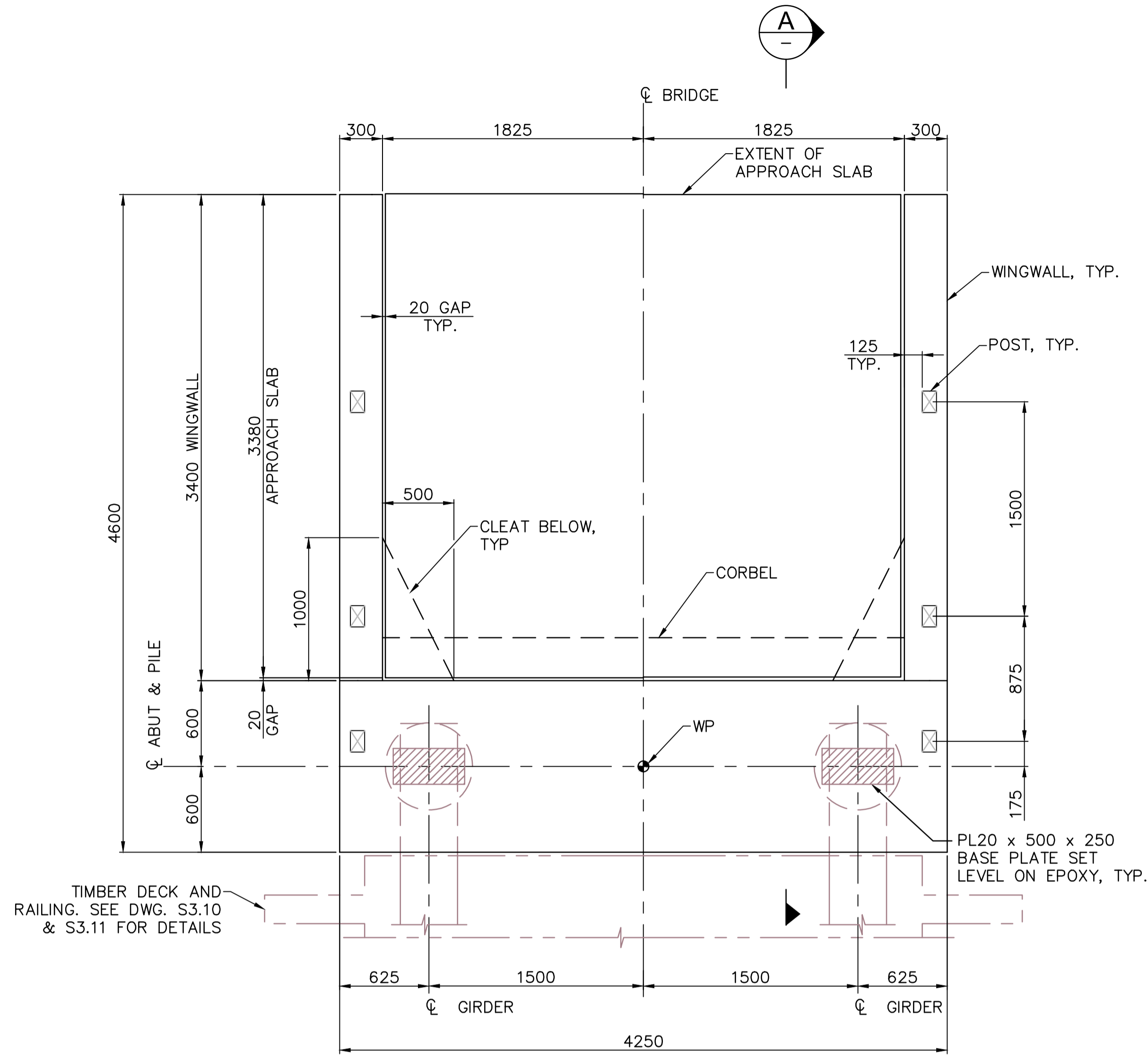
Designed by/Concept par  
DANIEL YANG / 2018-11  
Drawn by/Dessiné par  
STEVEN ZIVIN / 2018-12  
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsc̓iik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #3**  
**PILING LAYOUT AND DETAILS**

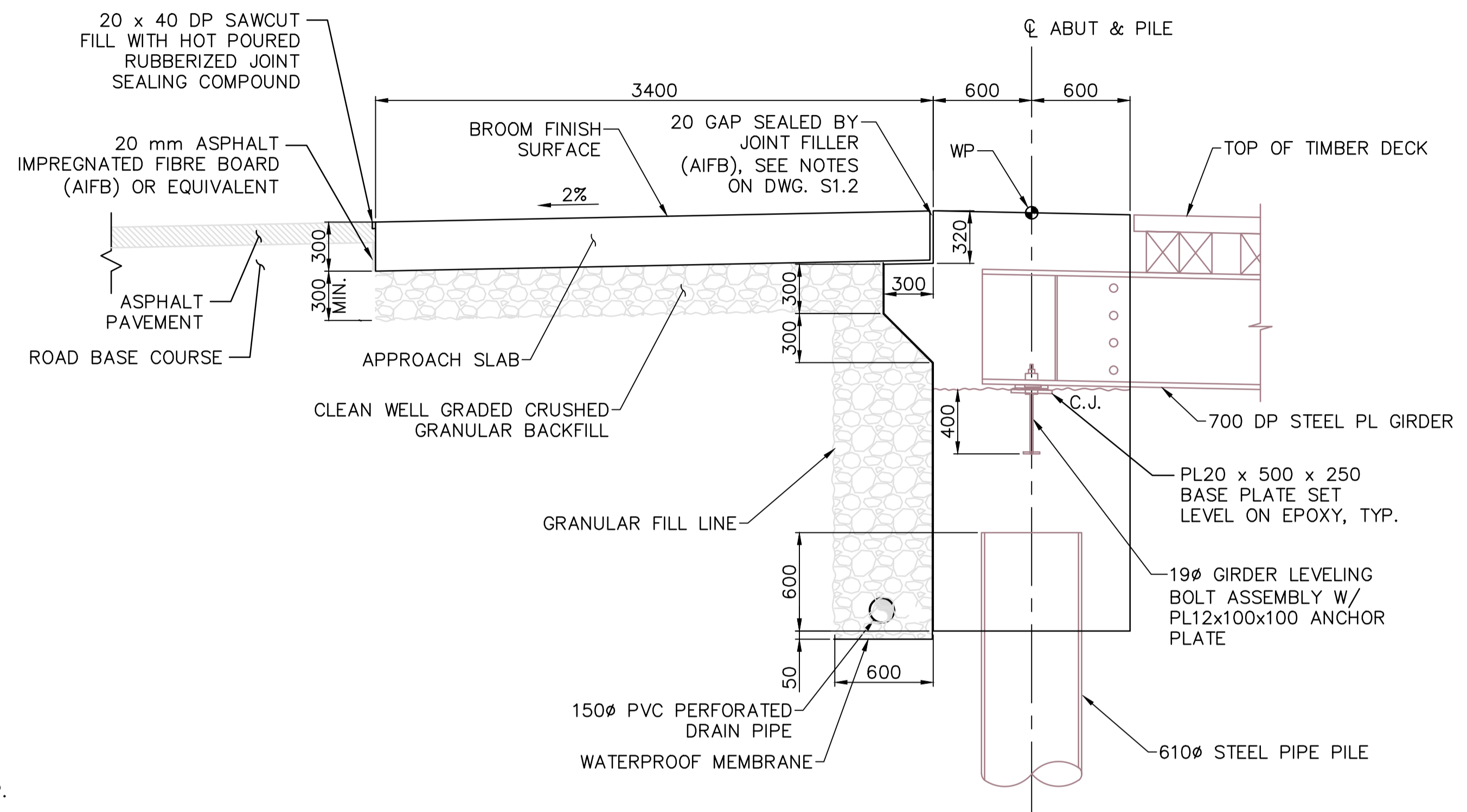
Project No./No. du projet PCA #1522	Sheet/Feuille S-3.3 OF	Revision no./La Révision no. 0
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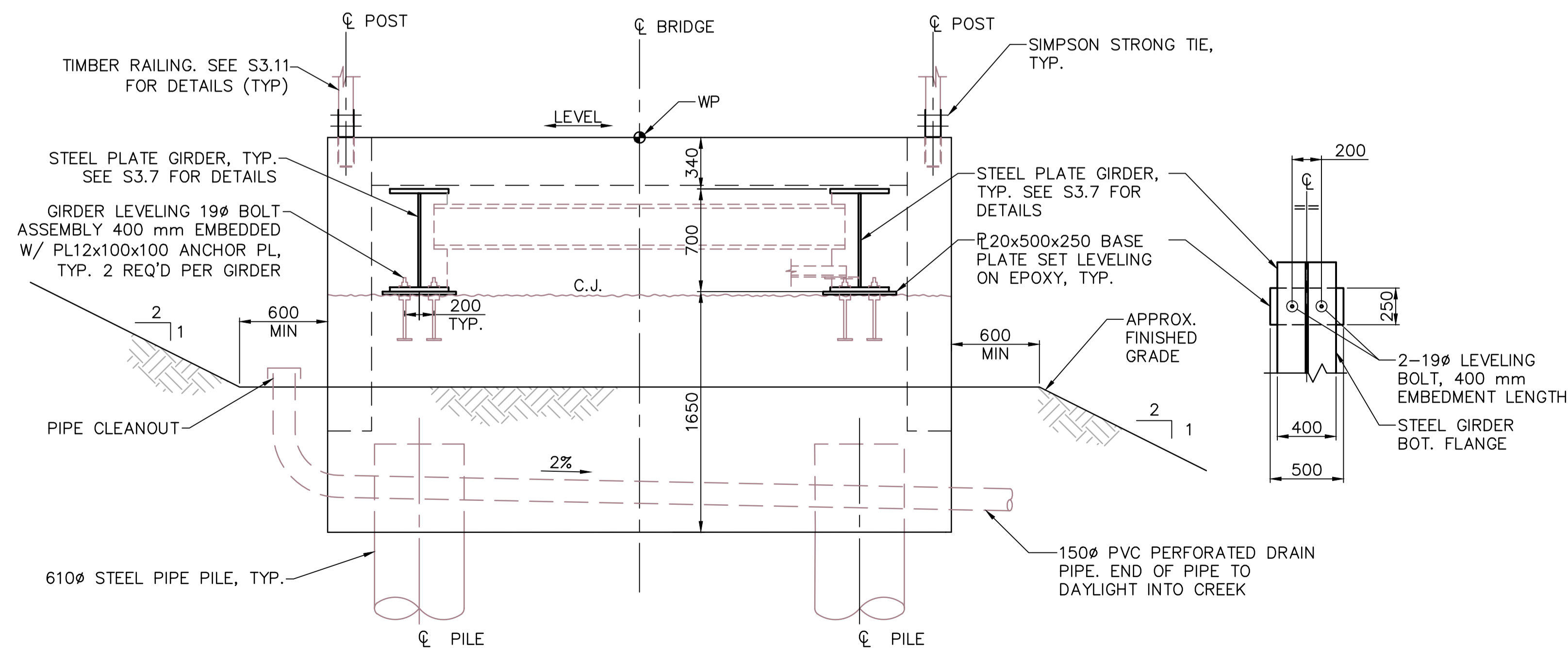
**PARSONS**



**ABUTMENT PLAN** (ABUT 1 / ABUT 2)  
1:25



**SECTION A**  
1:25



**ABUTMENT ELEVATION**  
1:25

**NOTES:**

- FOR STRUCTURAL NOTES SEE DWG. S1.1 AND S1.2.
- THE SURFACE OF CONCRETE AT CONSTRUCTION JOINTS SHALL INTENTIONALLY ROUGHENED AND CLEAN AND FREE OF LAITANCE AT TIME OF CASTING.
- GRANULAR BACKFILL AND LOW PLASTIC CLAY FILL SHALL BE COMPACTED TO 98% STANDARD PROCTOR AND 100% STANDARD PROCTOR BEHIND ABUTMENTS AND WINGWALLS. COMPACTION WITHIN A HORIZONTAL DISTANCE EQUAL TO ONE HALF OF THE WALL HEIGHT SHALL USE HAND TAMPERS.

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Project title/Titre du projet  
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**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsc̓iik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

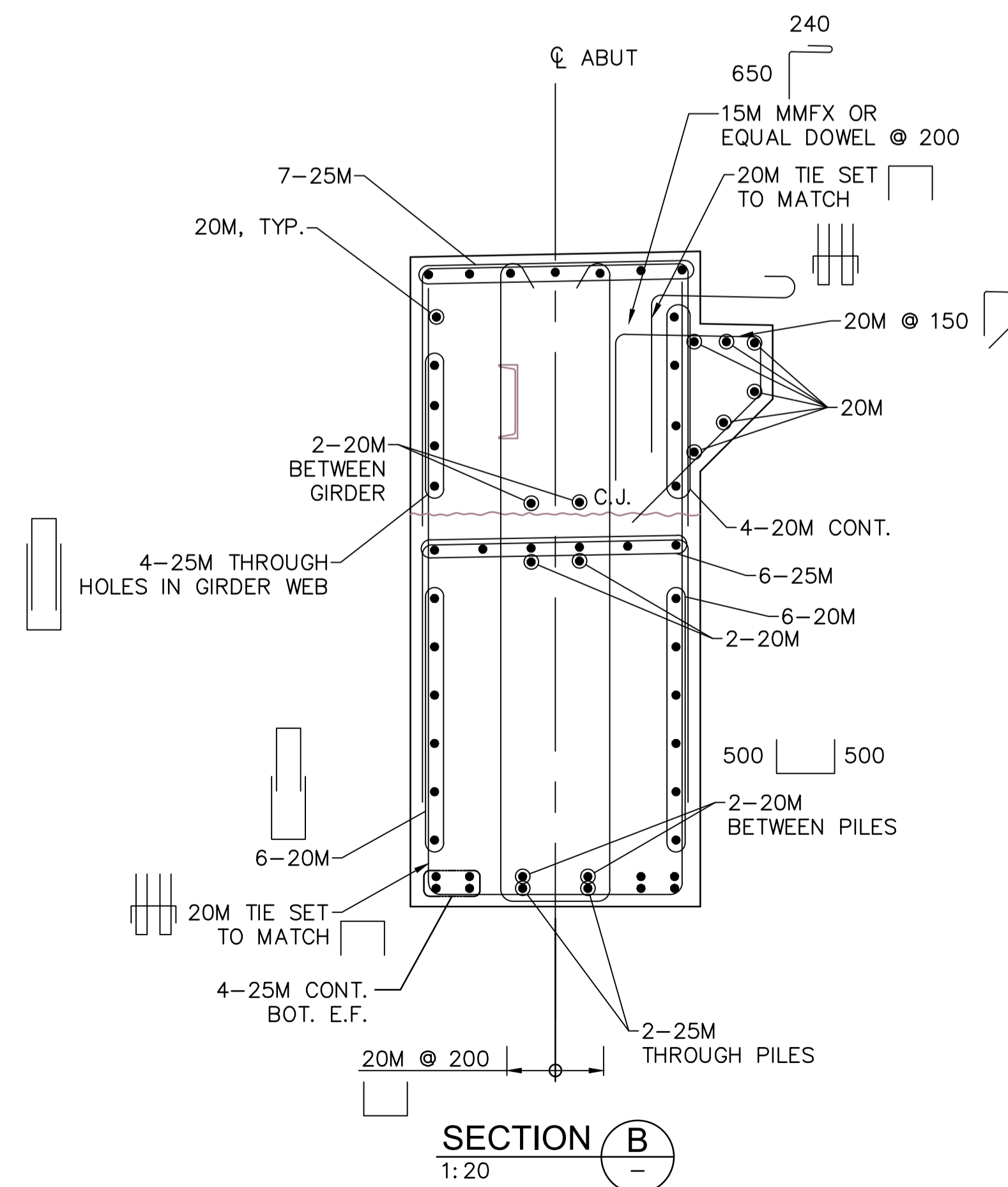
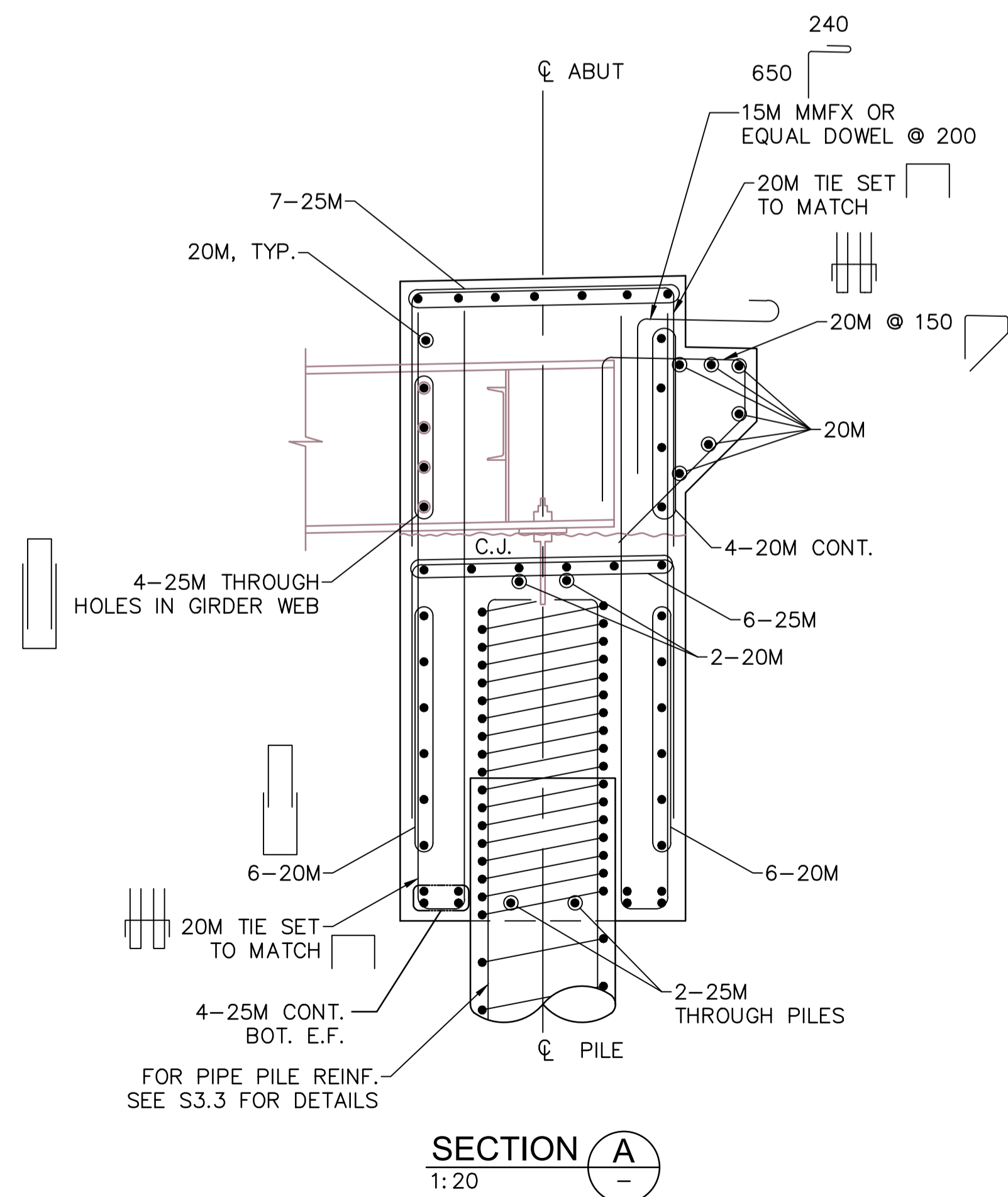
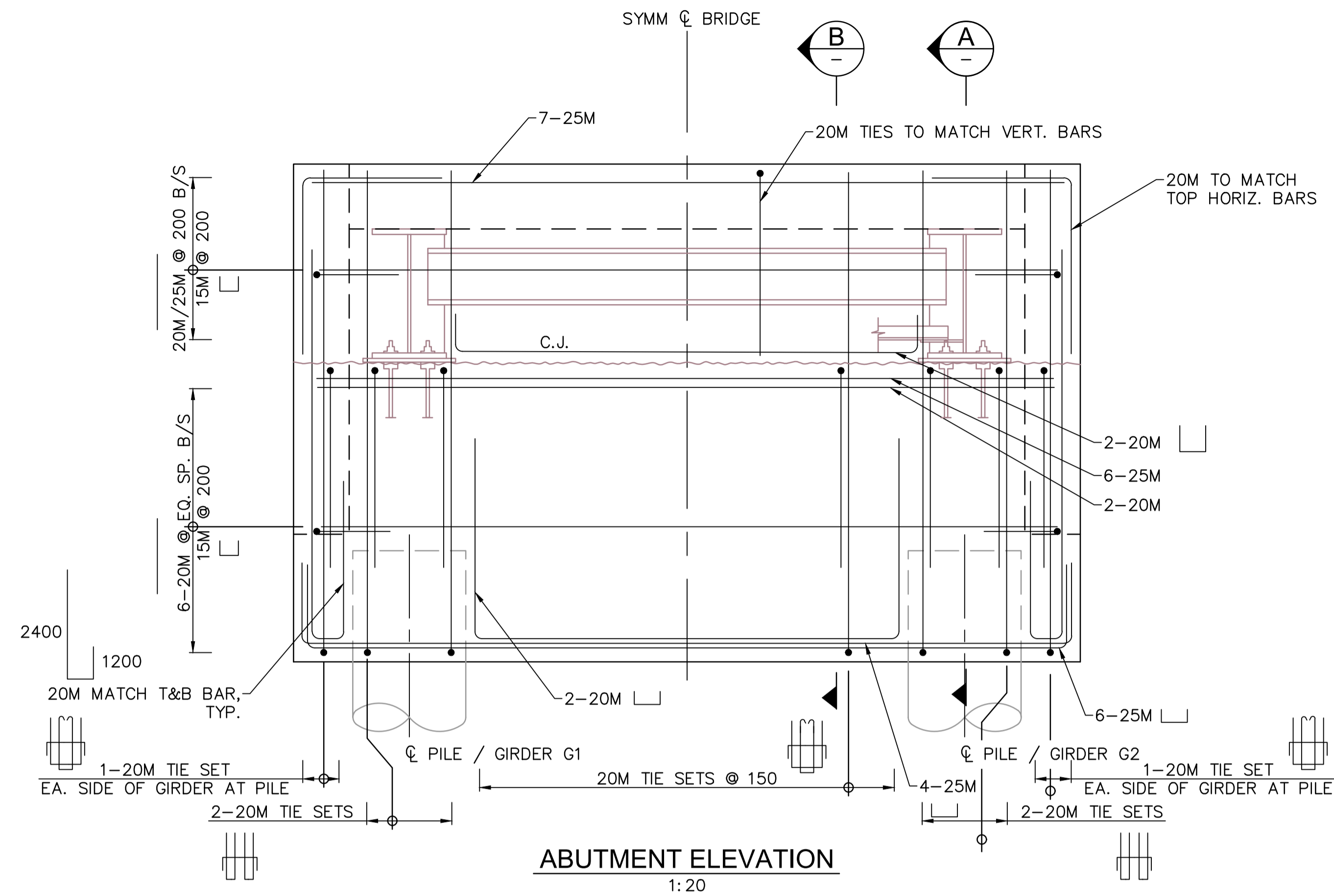
Consultant Signature Only  
Designed by/Concept par DANIEL YANG / 2018-11  
Drawn by/Dessiné par STEVEN ZIVIN / 2018-12  
PCA Project Manager/Technical Authority Administrateur de Projets APC JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsc̓iik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #3**  
**ABUTMENT LAYOUT**

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**PARSONS**



**NOTES:**

1. FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.

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Project title/Titre du projet  
**TOFINO, BC**  
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**ʔapsc̓iik taʔii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

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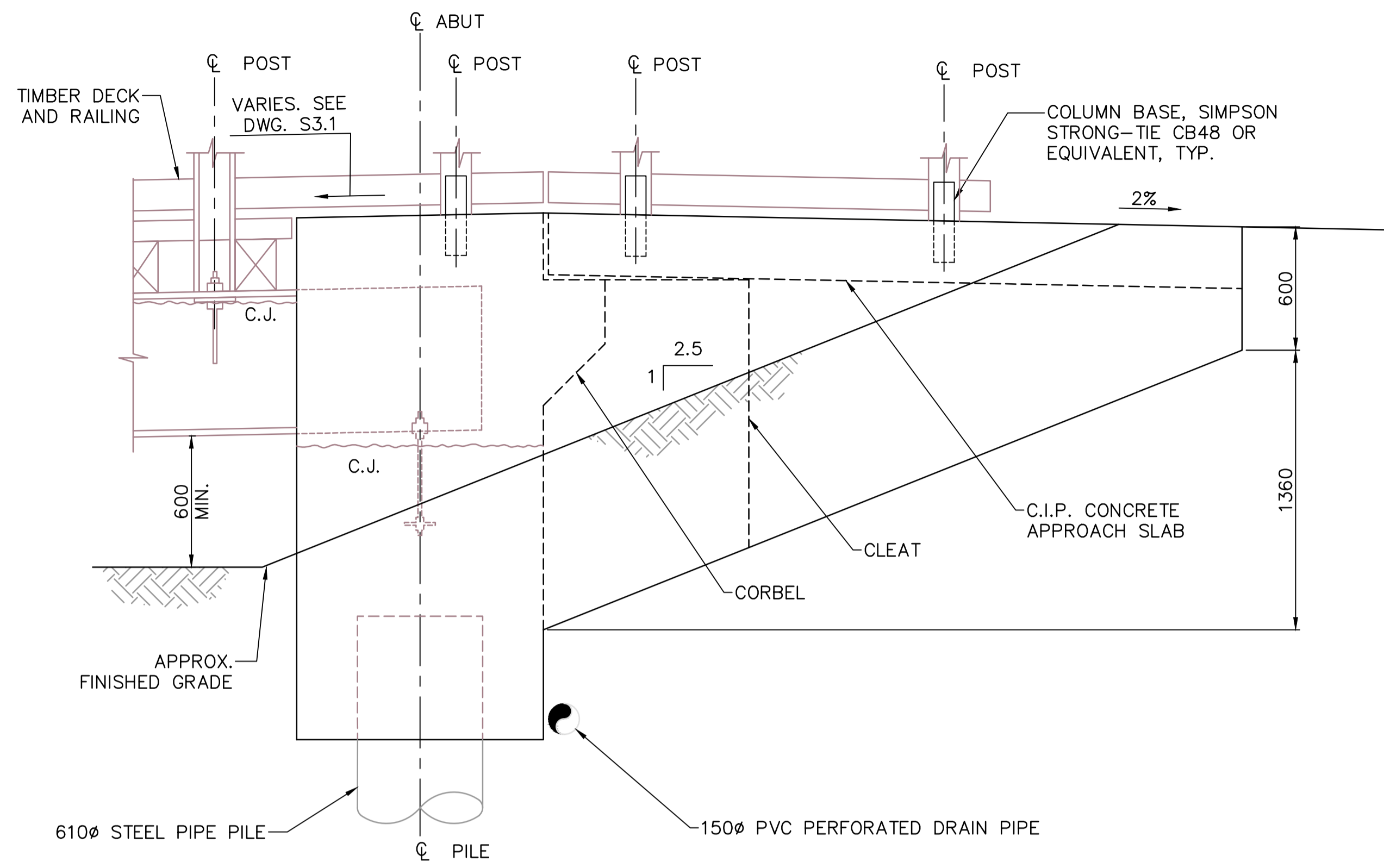
PCA Project Manager/Technical Authority Administrateur de Projets APC JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsc̓iik taʔii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #3**  
**ABUTMENT DETAILS**

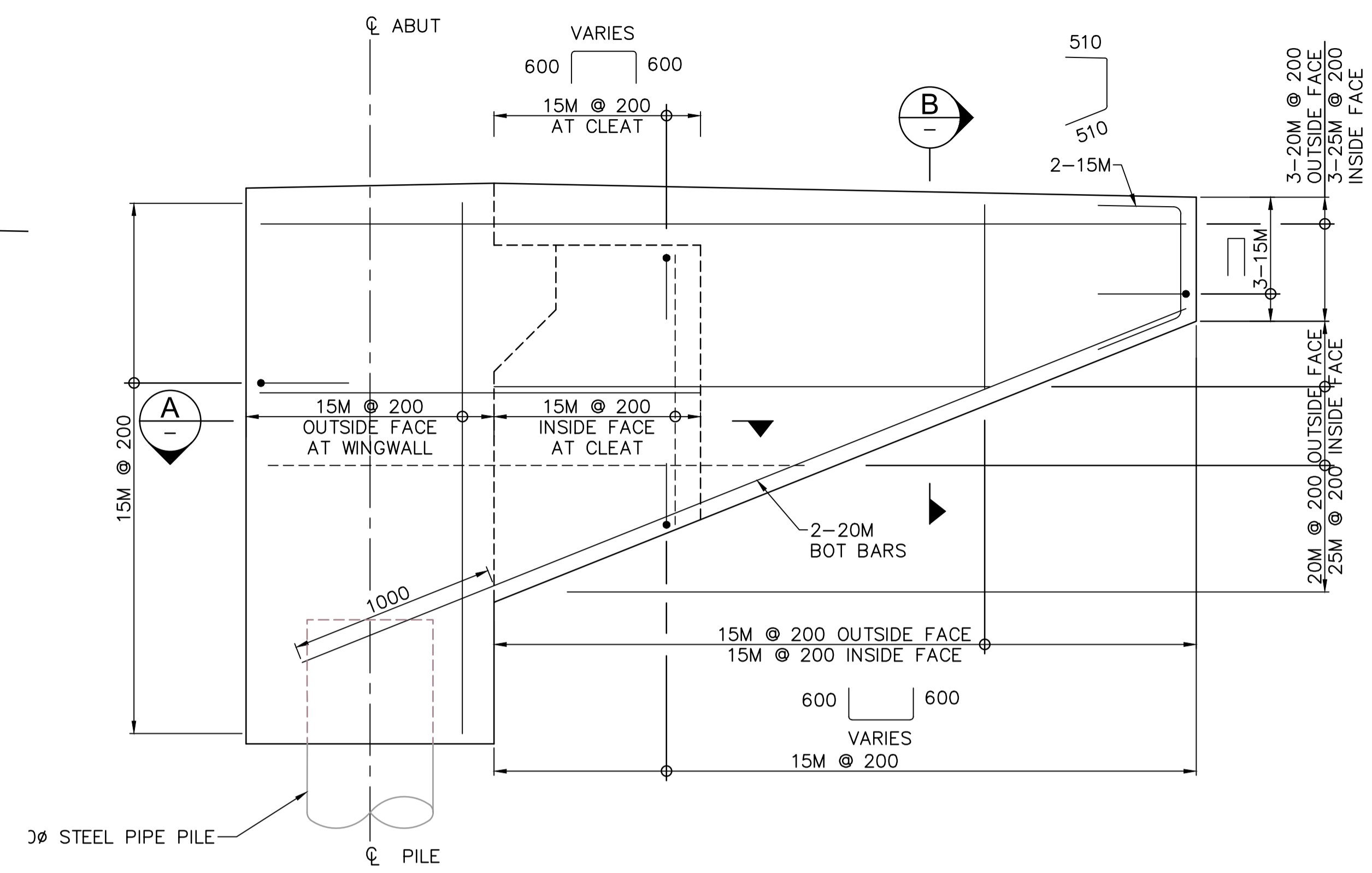
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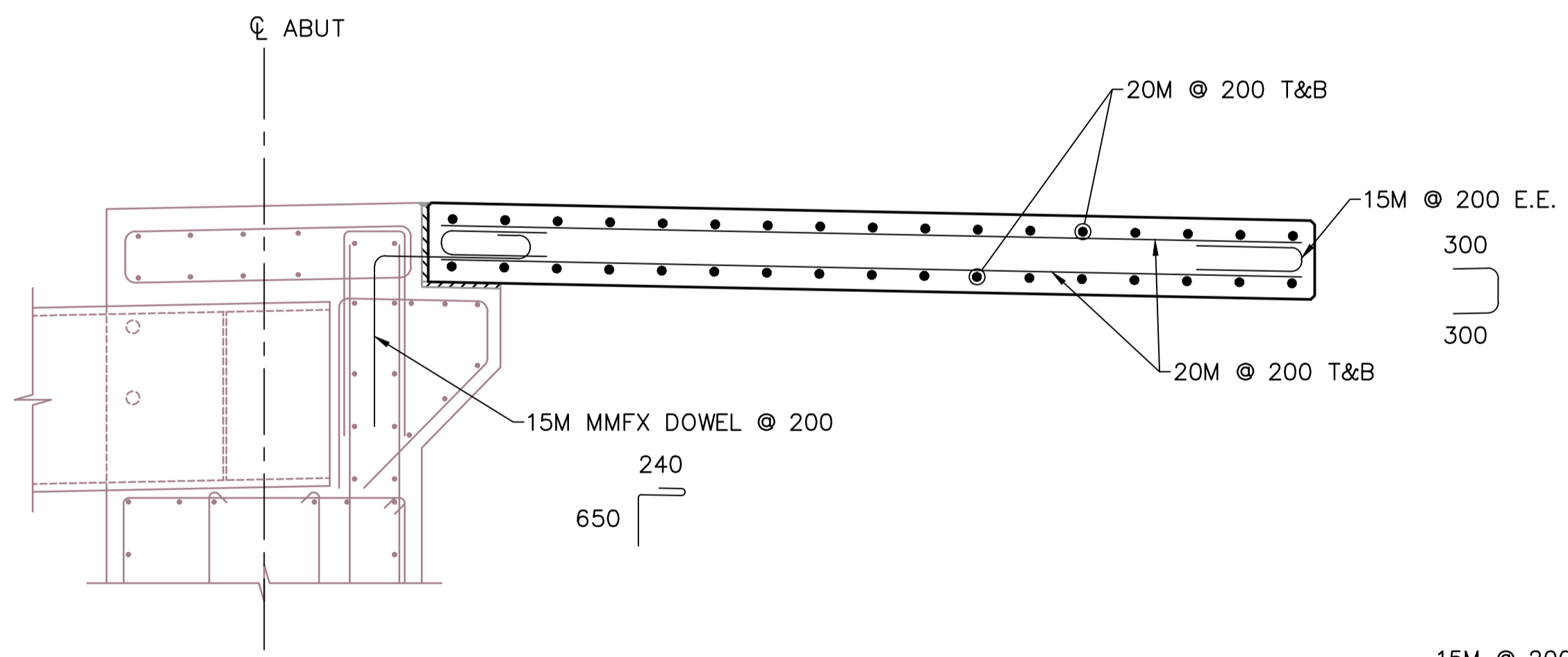
**PARSONS**



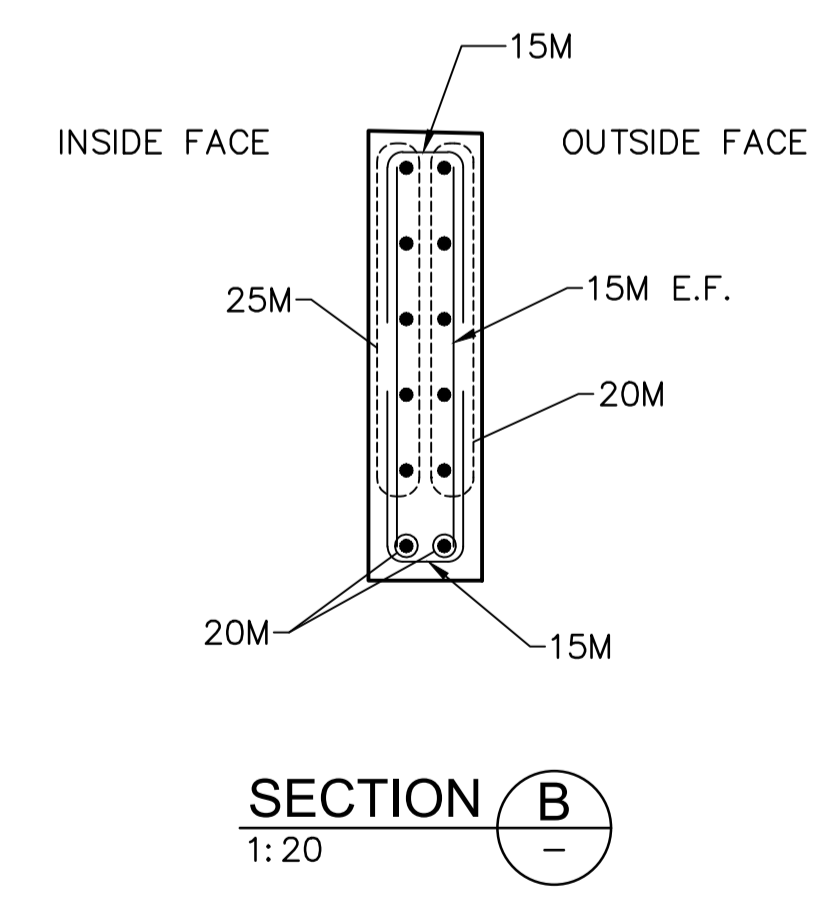
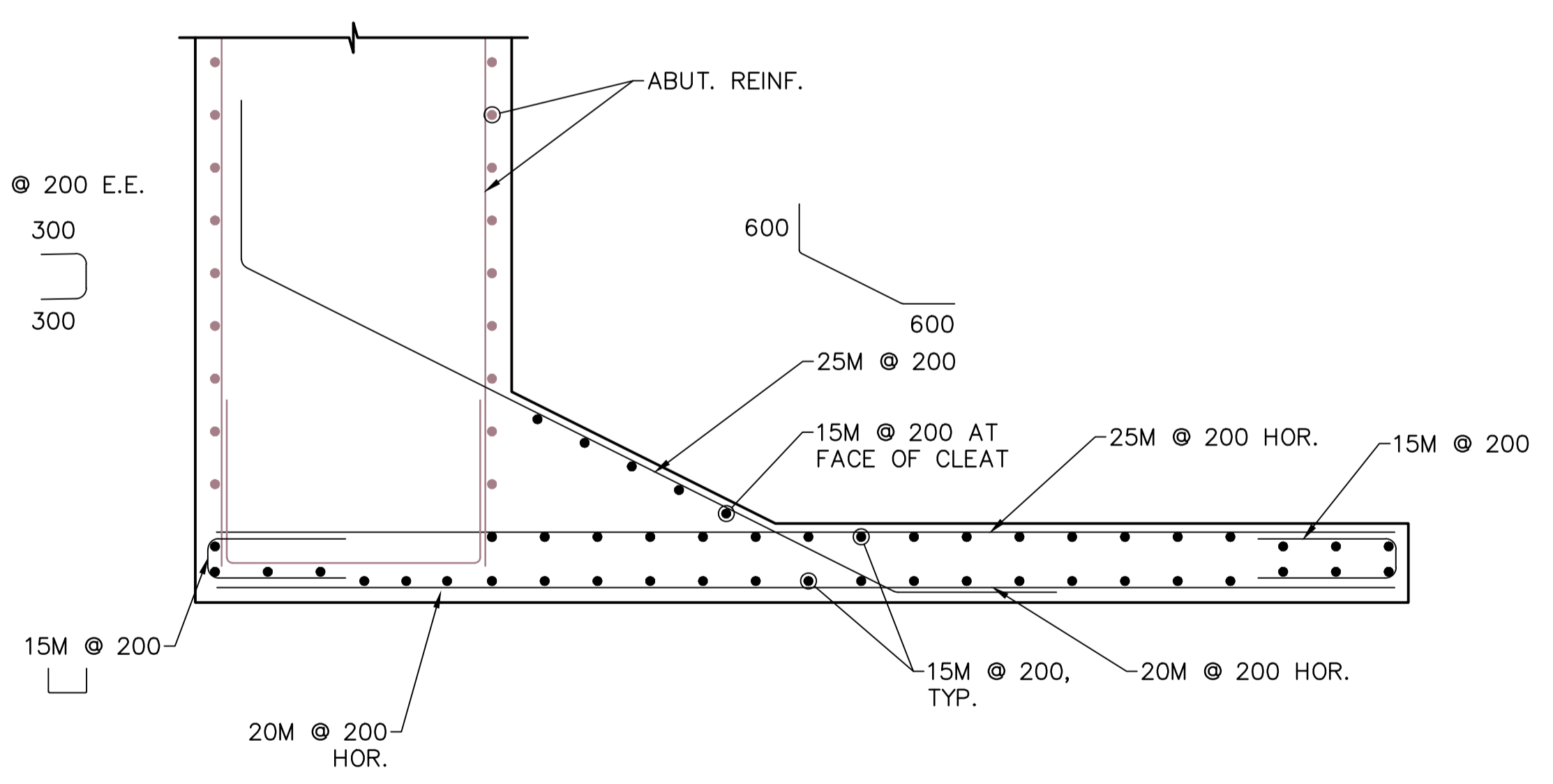
**WINGWALL ELEVATION**  
1:20  
ABUTMENT 2 SHOWN  
ABUTMENT 1 SIMILAR



**WINGWALL REINFORCEMENT ELEVATION**  
1:20



**APPROACH SLAB REINFORCEMENT ELEVATION**  
1:20



**SECTION B**  
1:20

NOTES:  
1. FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.

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**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsc̓iik taʔii**  
**(Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

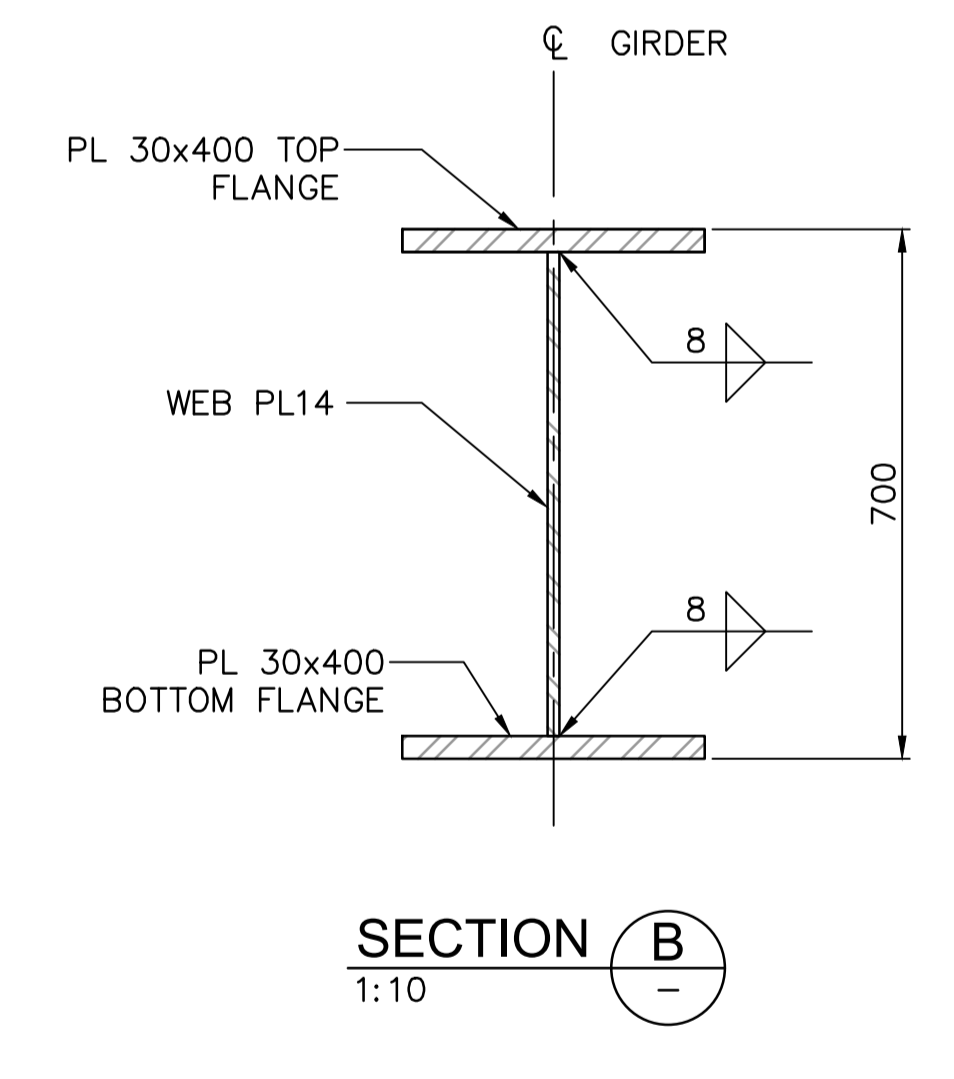
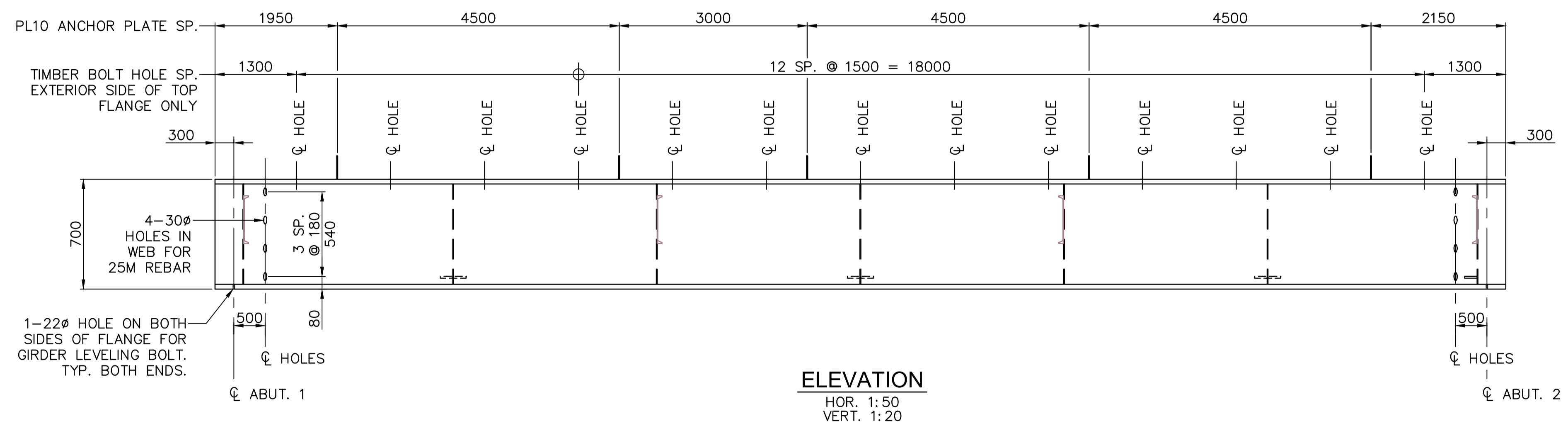
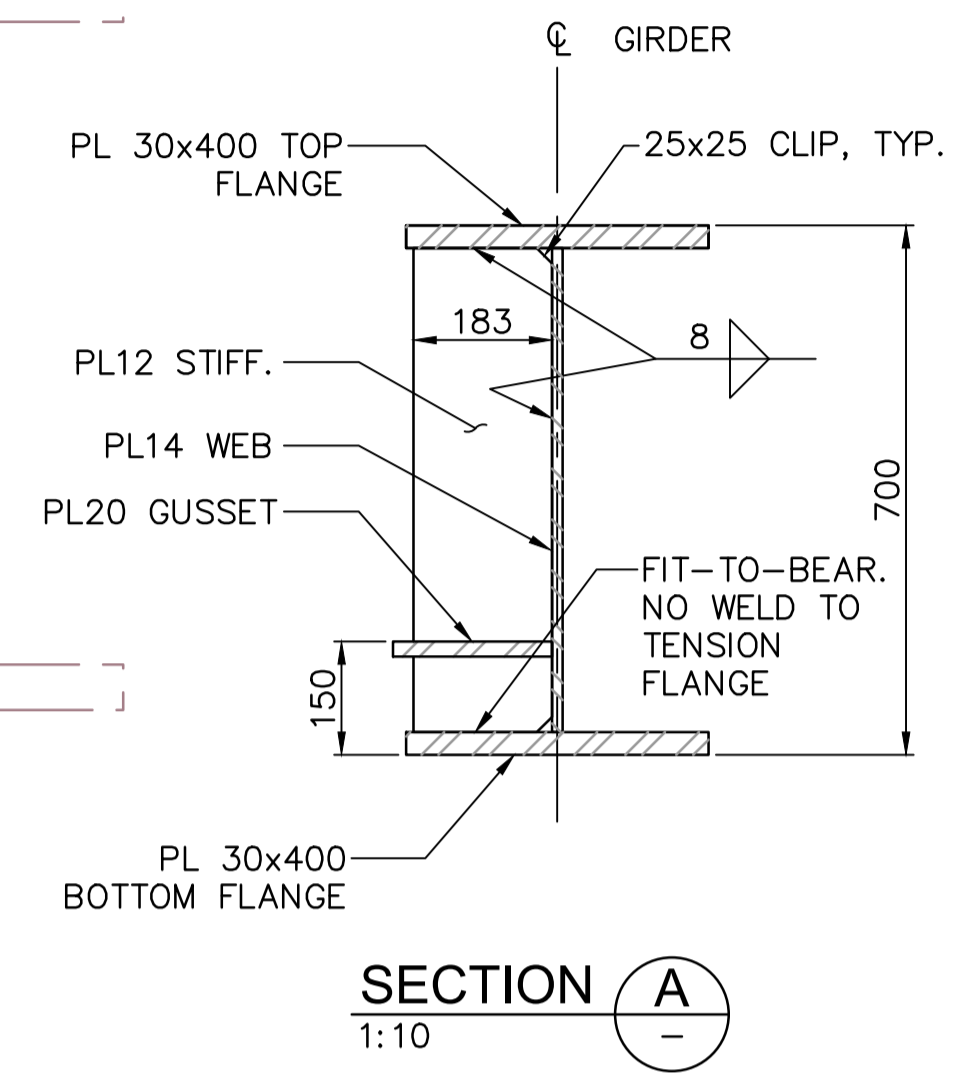
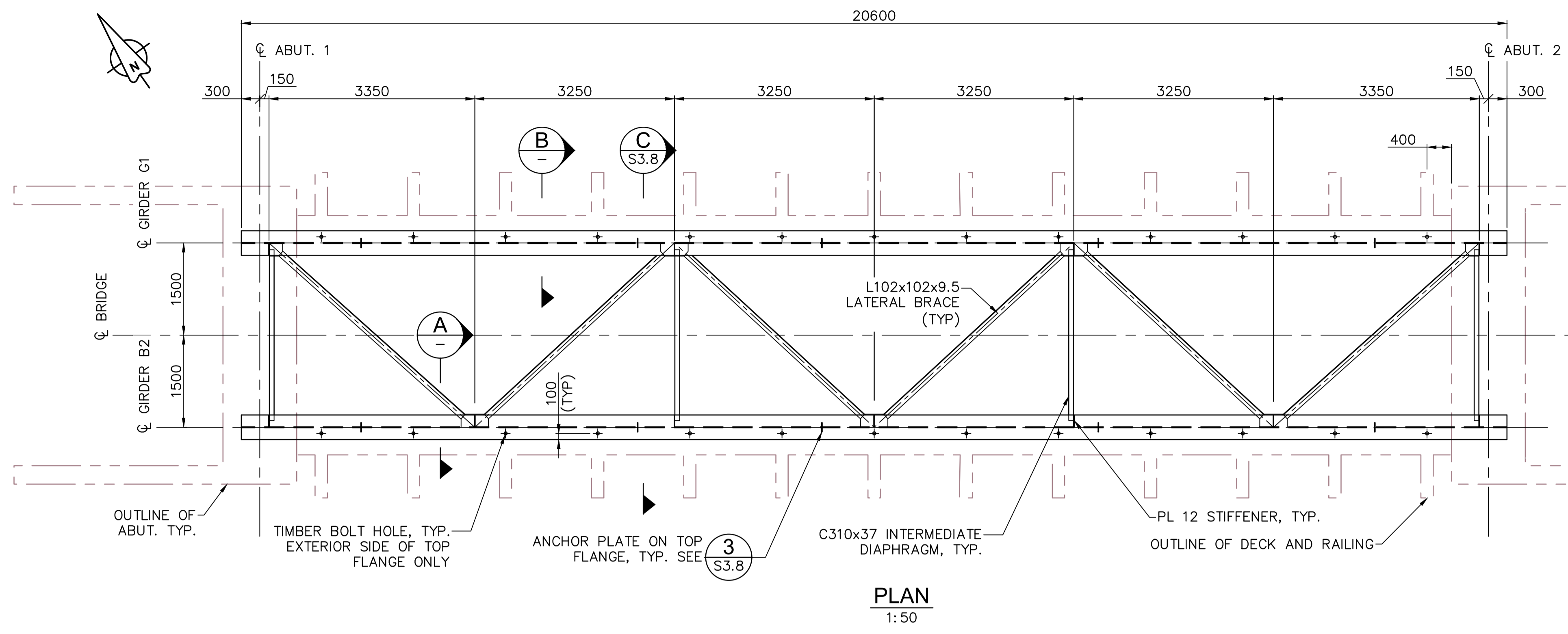
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PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsc̓iik taʔii**  
**(Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #3**  
**ABUTMENT WINGWALL AND APPROACH SLAB DETAILS**

Project No./No. du projet <b>PCA #1522</b>	Sheet/Feuille <b>S-3.6</b> OF	Revision no./La Révision no. <b>0</b>
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**PARSONS**



- NOTES:**
- FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.
  - FOR CAMBER DIAGRAM SEE DWG. S3.9.

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**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsčik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

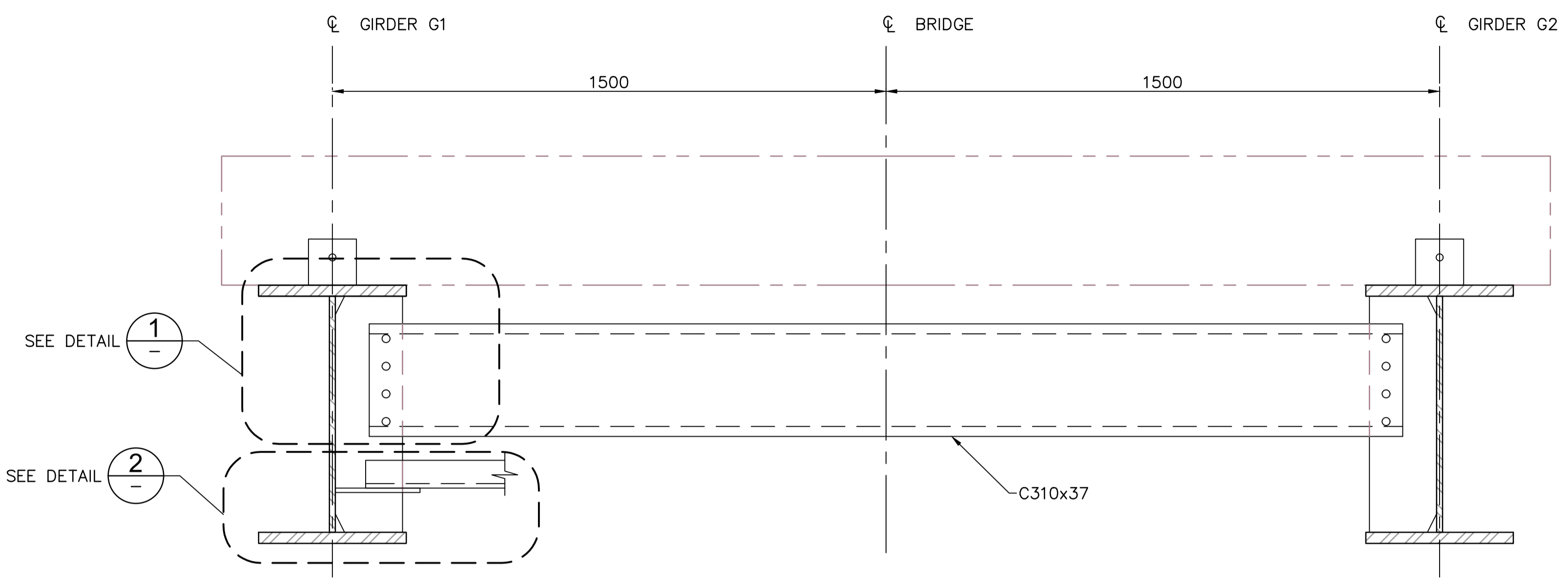
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Drawn by/Dessiné par  
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PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsčik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #3 GIRDER LAYOUT**

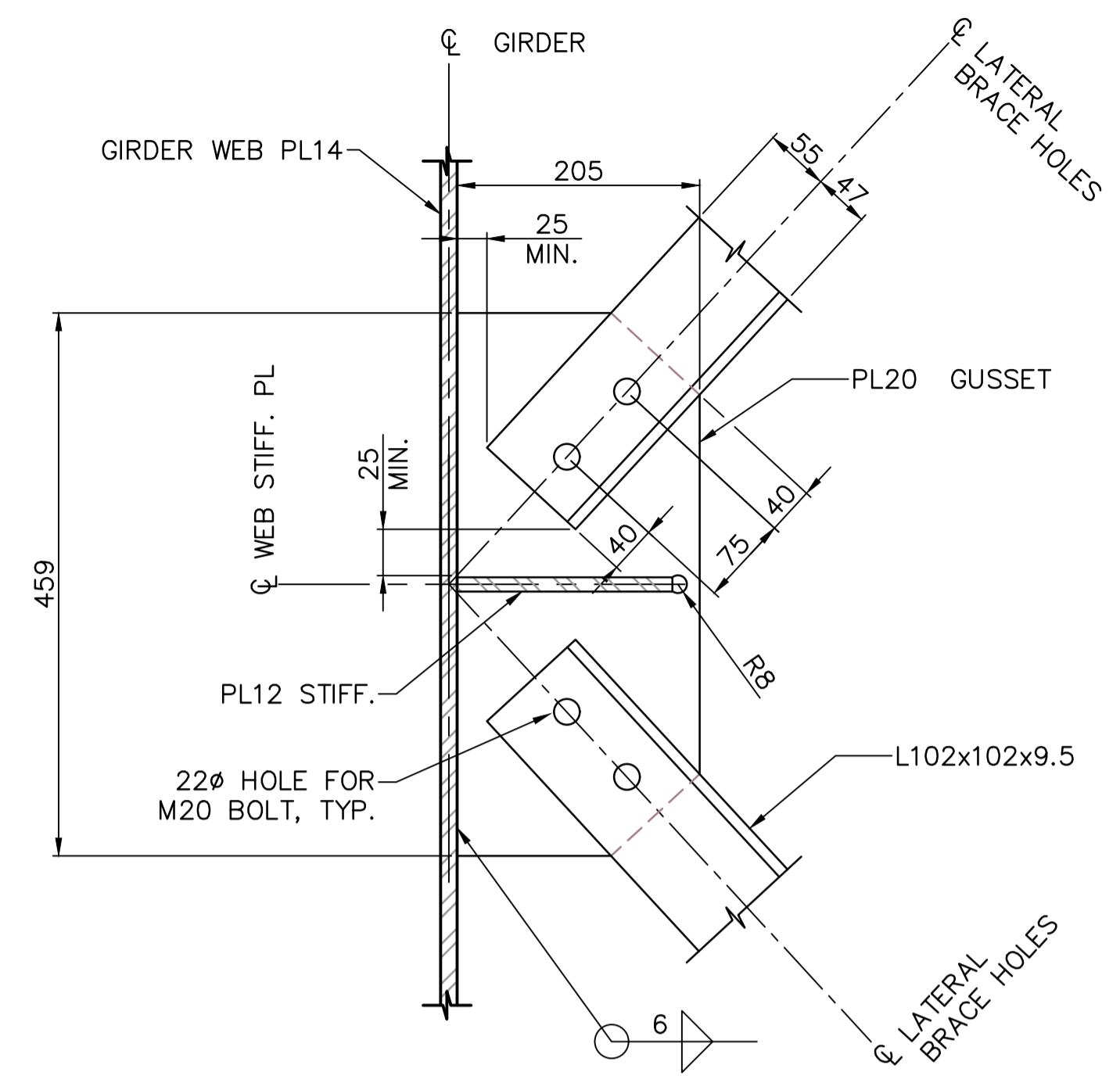
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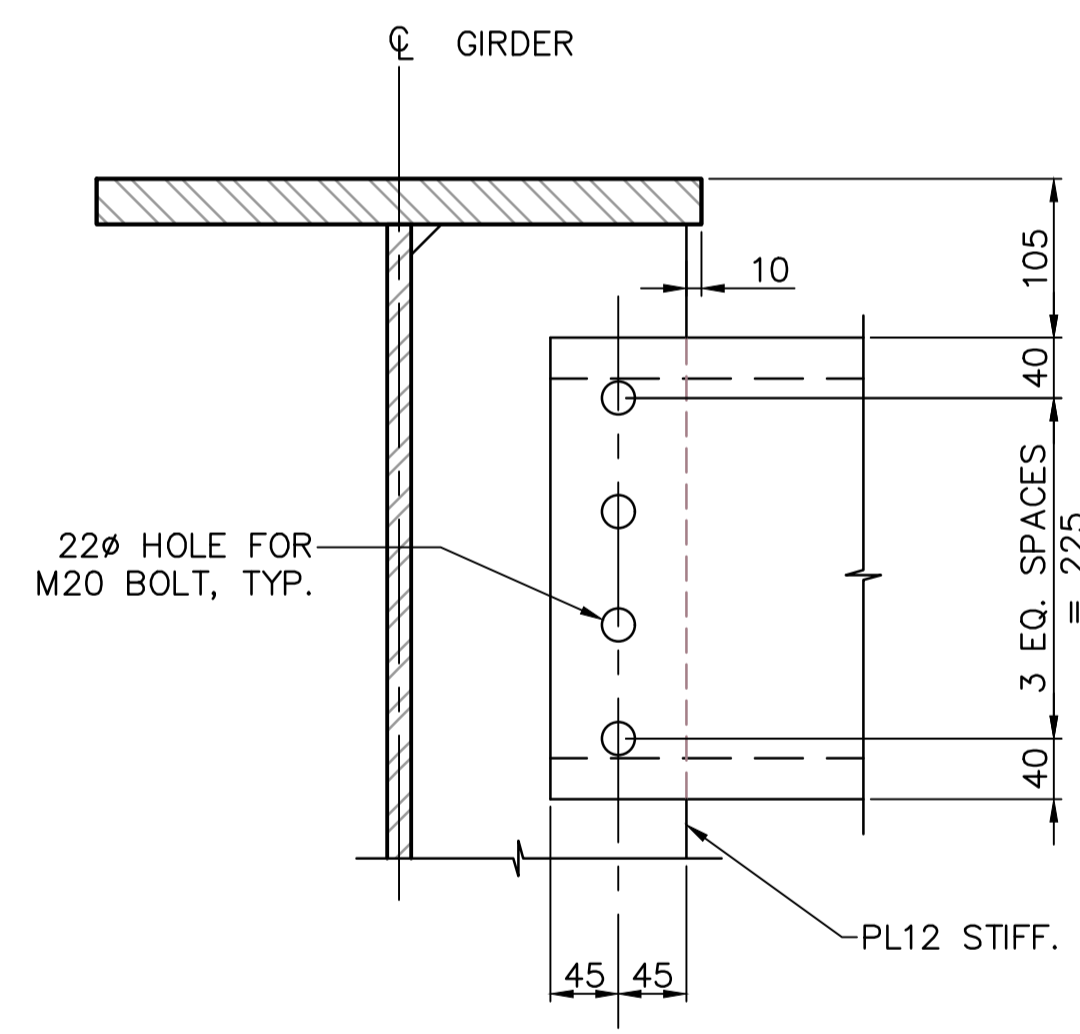
**PARSONS**



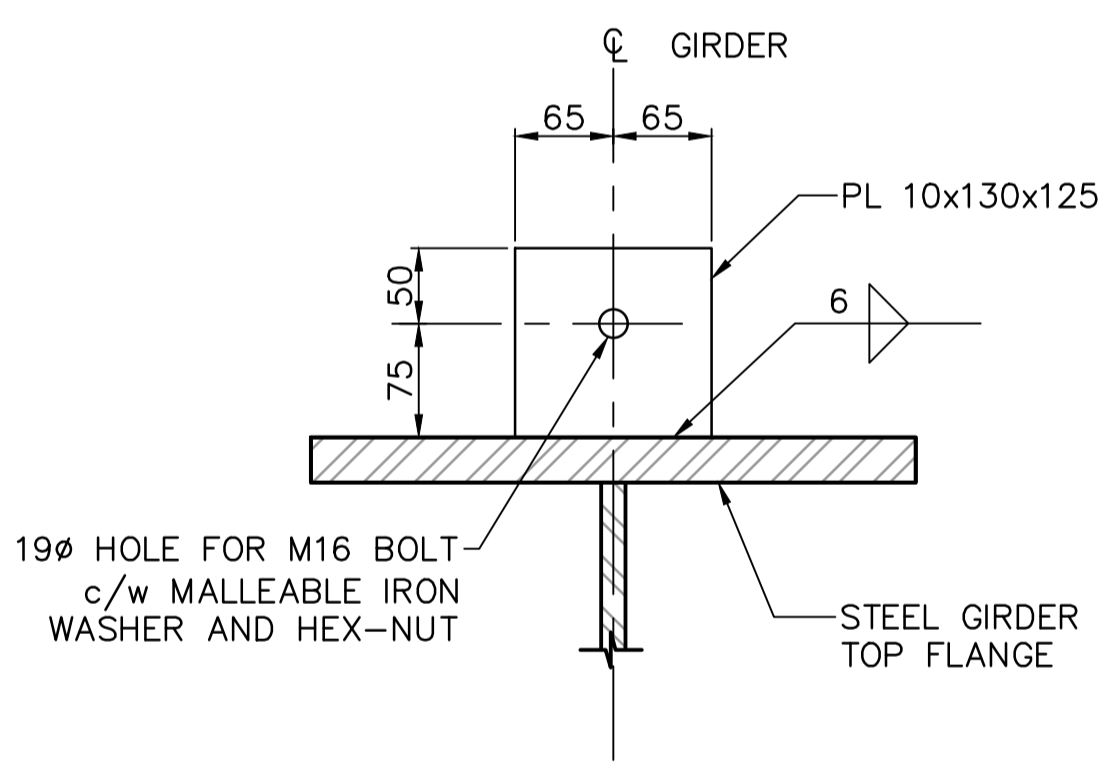
**SECTION C**  
1:10 (S3.7)



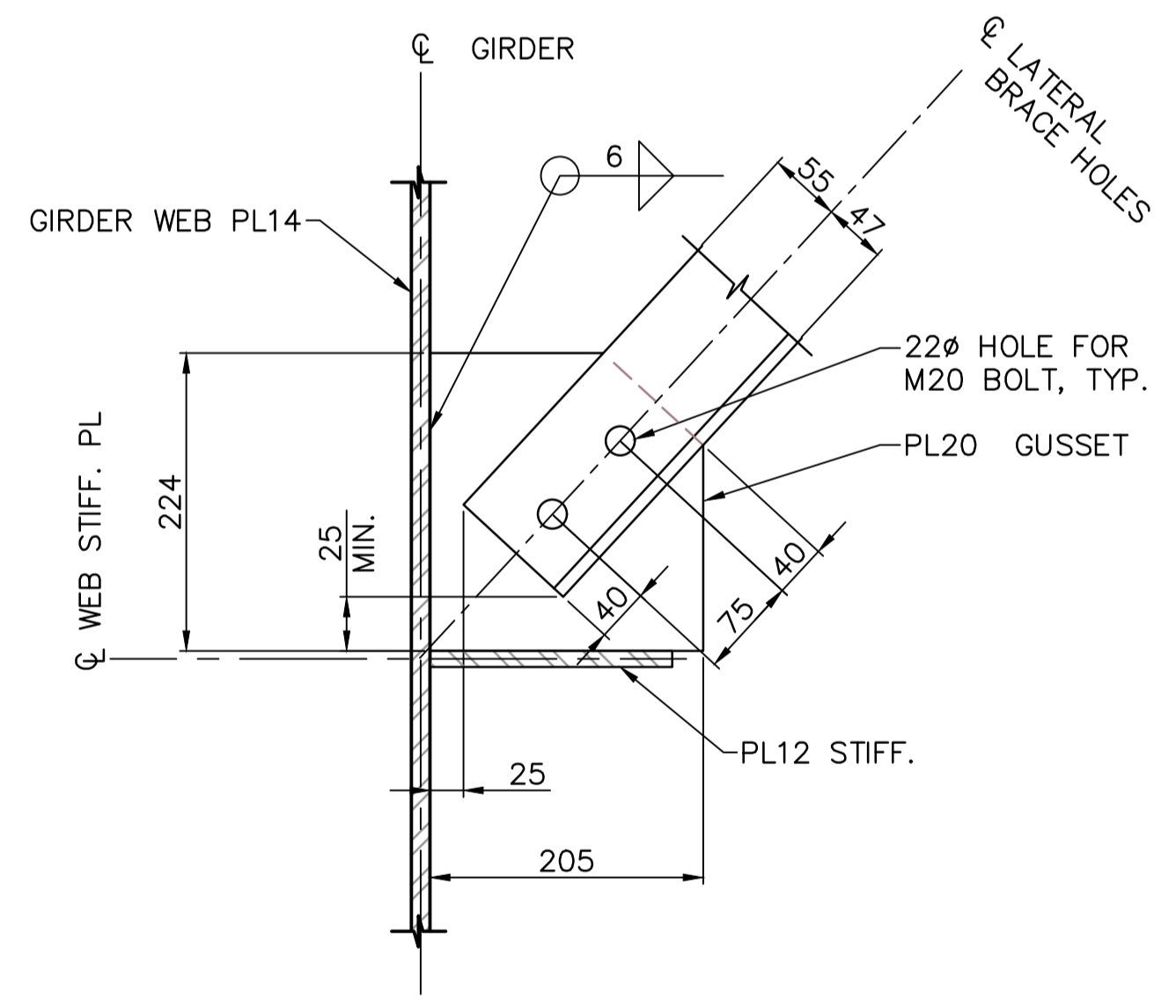
**SECTION A**  
1:5 (GUSSET PL AT INTERMEDIATE LOCATION)



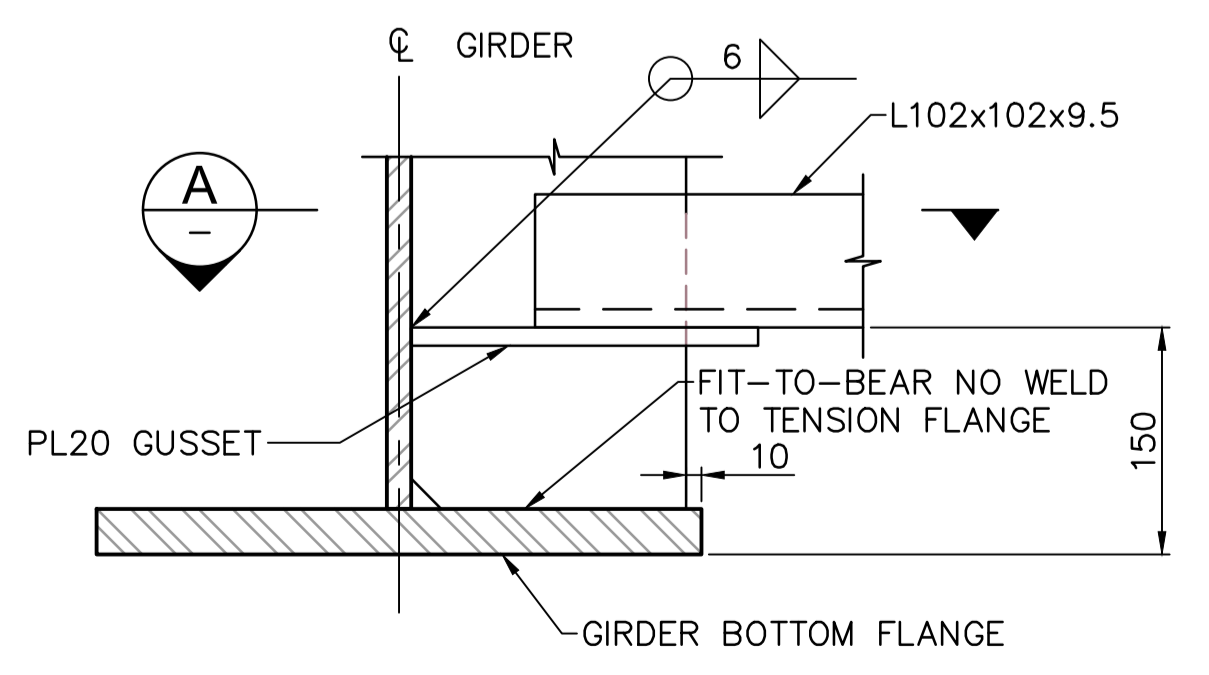
**DETAIL 1**  
1:5



**DETAIL 3**  
1:5 (S3.7)



**SECTION A**  
1:5 (GUSSET PL AT ABUTMENTS)



**DETAIL 2**  
1:5

NOTES:  
1. FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.

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**TOFINO, BC**

**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsčik tašii**  
**(Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

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STEVEN ZIVIN / 2018-12

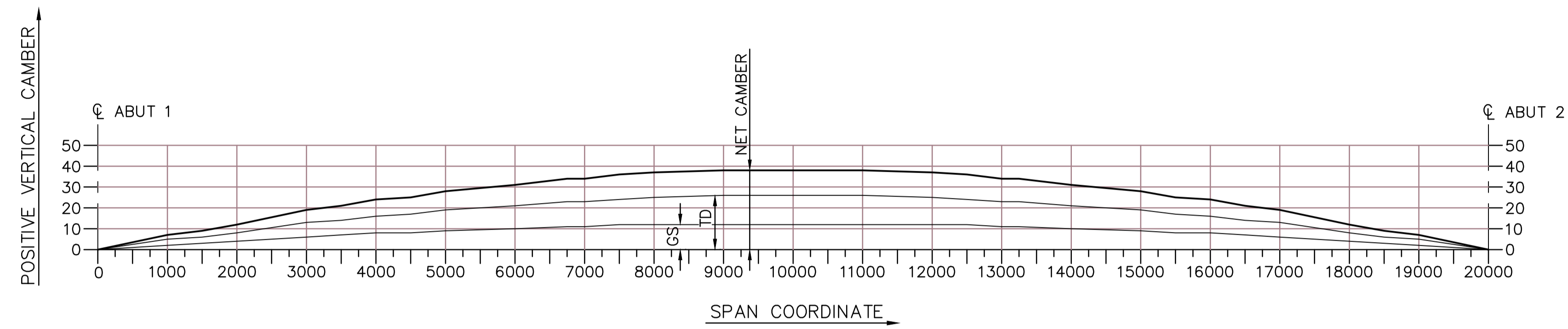
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsčik tašii**  
**(Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #3**  
**GIRDER SECTIONS AND DETAILS**

Project No./No. du projet <b>PCA #1522</b>	Sheet/Feuille <b>S-3.8</b> OF	Revision no./La Révision no. <b>0</b>
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**PARSONS**



**CAMBER DIAGRAM - STEEL GIRDERS**

HORIZONTAL SCALE: 1:50  
VERTICAL SCALE: 1:1.6667

SYM. C BRIDGE #3

COMPONENT	SPAN COORDINATE															
	0	1000	1500	2000	3000	3500	4000	4500	5000	6000	6750	7000	7500	8000	9000	10000
NET CAMBER (GS + TD)	0	6	8	10	16	18	21	22	24	27	29	29	31	32	33	33
GIRDER STEEL (GS)	0	2	3	4	6	7	8	8	9	10	11	11	12	12	12	12
TIMBER DECK + RAILING (TD)	0	4	5	6	10	11	13	14	15	17	18	18	19	20	21	21

**TABLE - GIRDER CAMBER VALUES**  
(CAMBER VALUES SYMMETRIC ABOUT BRIDGE CENTERLINE)

**NOTES:**

- FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.
- NET CAMBER = A + B.
- NET CAMBER FIGURES ARE FOR GIRDER SECTIONS IN ZERO LOAD CONDITIONS.
- FABRICATOR IS RESPONSIBLE FOR MAKING ALLOWANCES SUCH THAT CAMBER ON COMPLETED GIRDER SECTIONS WILL BE WITHIN ALLOWABLE TOLERANCES. ALL PROCEDURES FOR CAMBER ADJUSTMENT MUST BE APPROVED PRIOR TO USE.
- LONGITUDINAL GIRDER DIMENSIONS (SHOWN HORIZONTALLY) ARE MEASURED ALONG THE BOTTOM FLANGE AND ARE CORRECT AT +20°C.

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TOFINO, BC

**PACIFIC RIM  
NATIONAL PARK RESERVE**  
**ʔapsc̓iik tašii**  
**“Ups-cheek ta-shee”**  
**“Going in the right direction on the trail”**

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Drawn by/Dessiné par  
SHAWN LI / 2018-12

PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin

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**“Ups-cheek ta-shee”**  
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**BRIDGE #3**  
**GIRDER CAMBER**

Project No./No. du projet  
PCA #1522

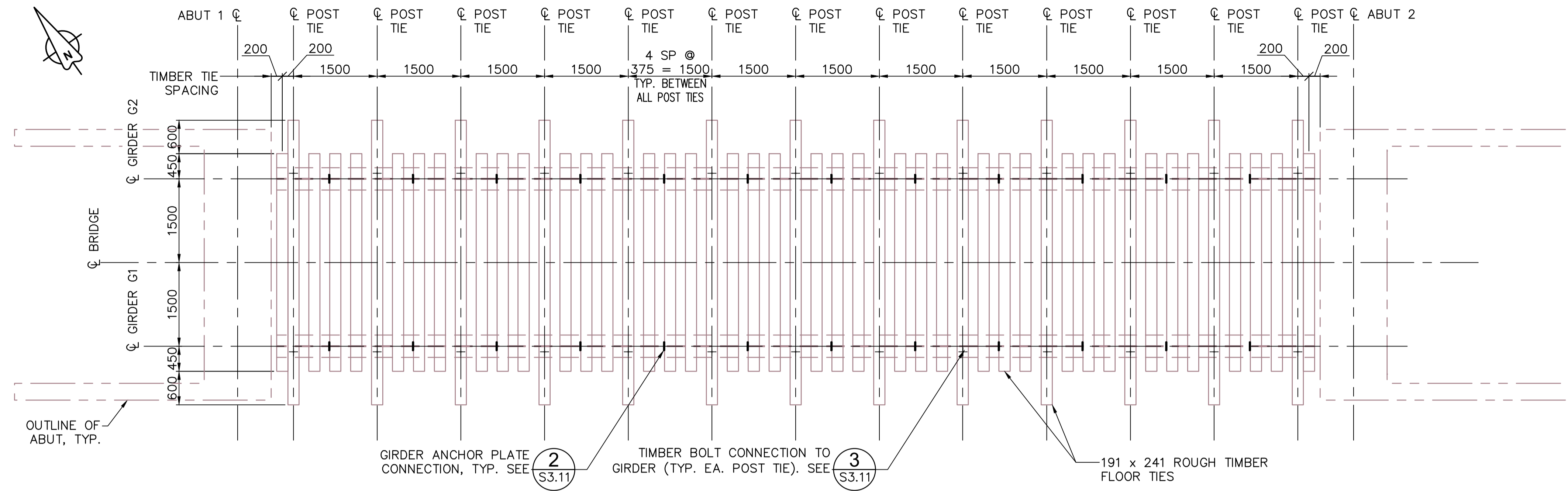
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**S-3.9**  
OF

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La Révision  
no.  
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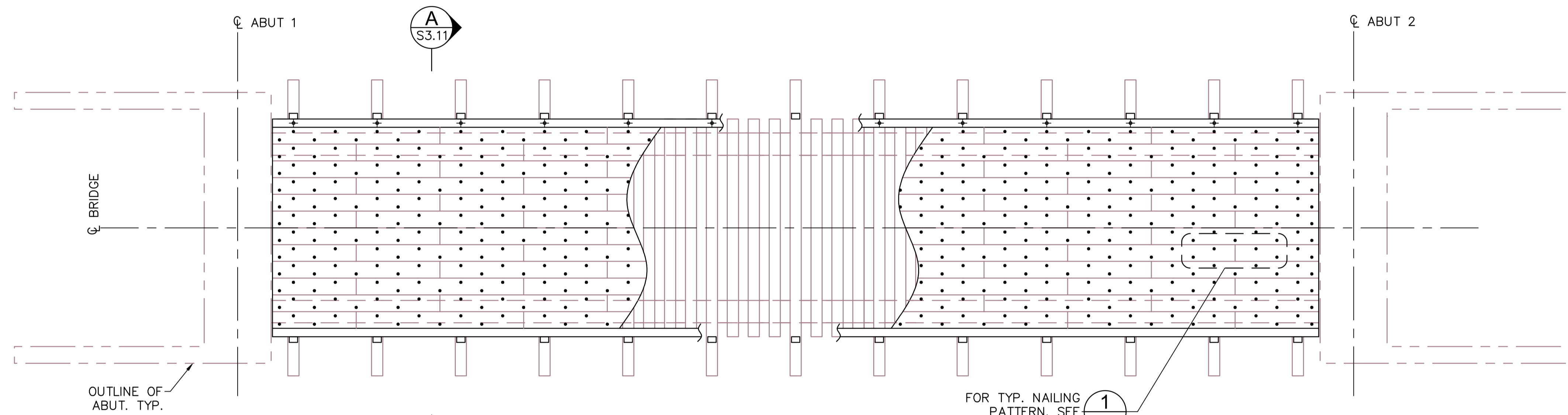




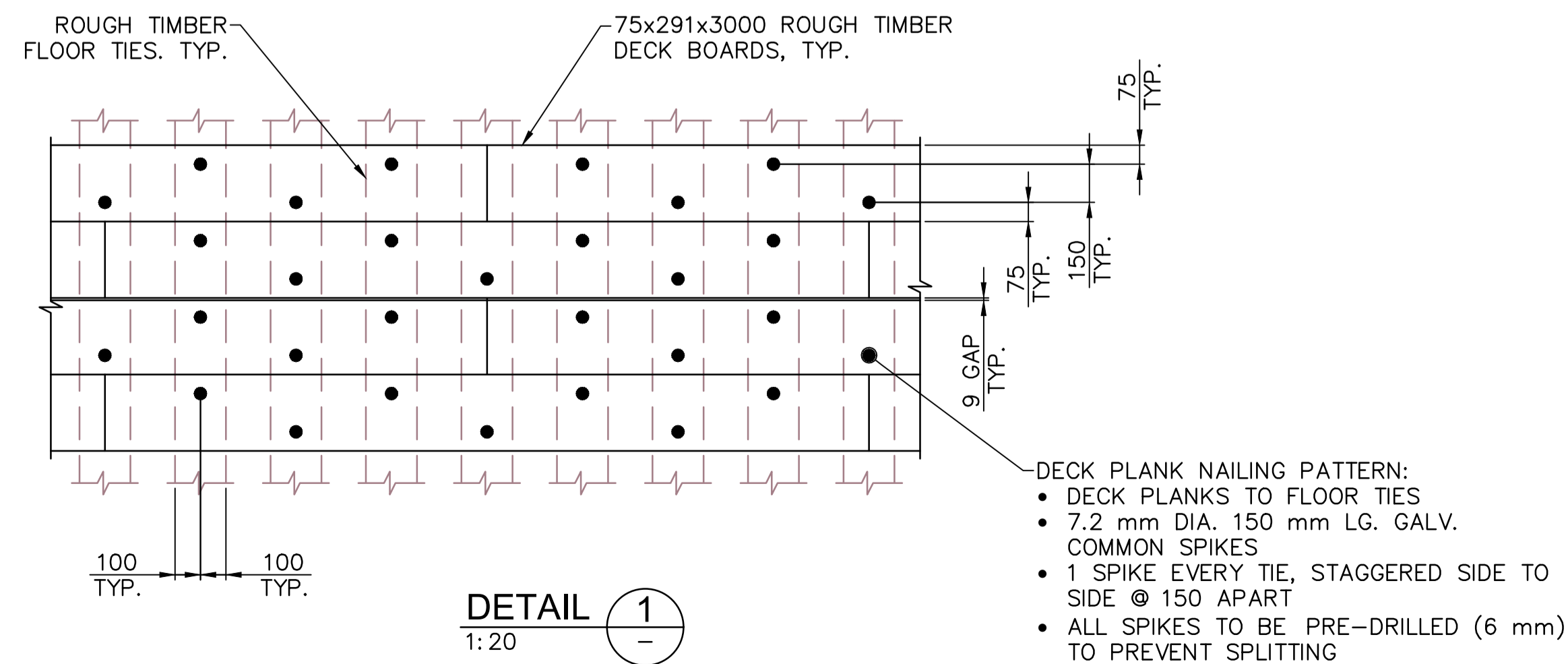
**PARSONS**



**DECK FRAMING PLAN**  
1:50



**DECK PLAN**  
1:50



**DETAIL 1**  
1:20

- DECK PLANK NAILING PATTERN:
- DECK PLANKS TO FLOOR TIES
  - 7.2 mm DIA. 150 mm LG. GALV. COMMON SPIKES
  - 1 SPIKE EVERY TIE, STAGGERED SIDE TO SIDE @ 150 APART
  - ALL SPIKES TO BE PRE-DRILLED (6 mm) TO PREVENT SPLITTING

**NOTES:**

1. FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.

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**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsčik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

Designed by/Concept par  
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STEVEN ZIVIN / 2018-12

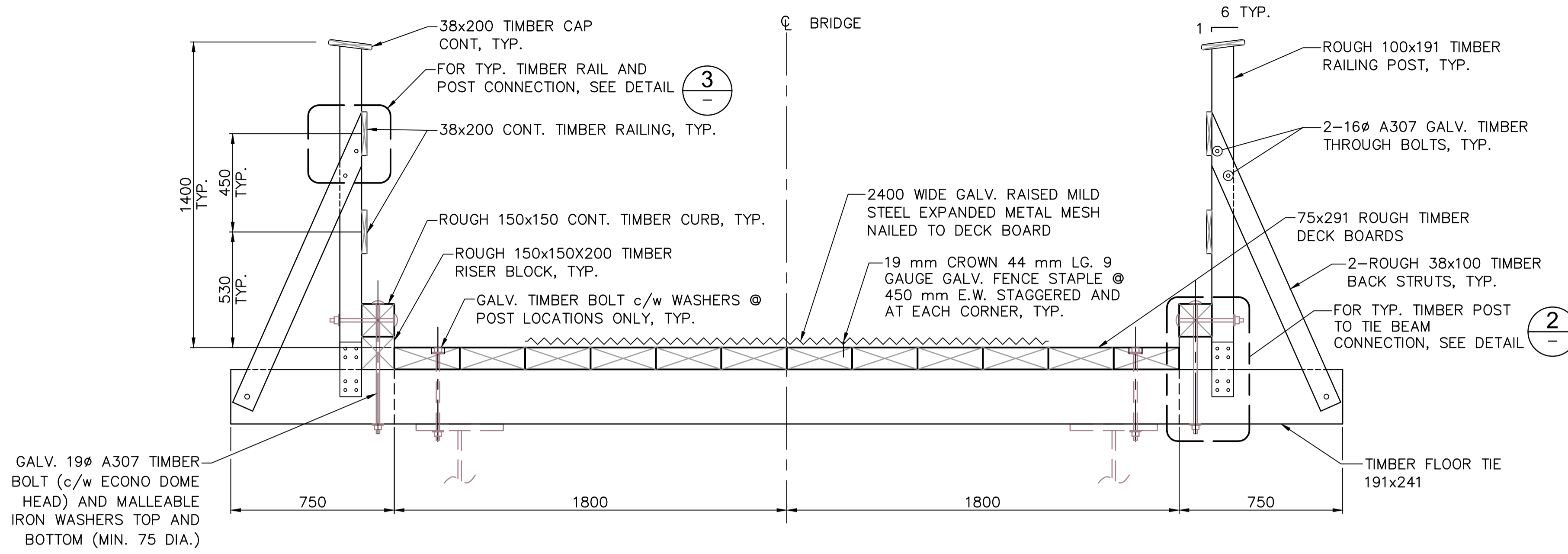
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsčik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #3**  
**DECK PLAN AND DETAILS**  
**SHEET 1**

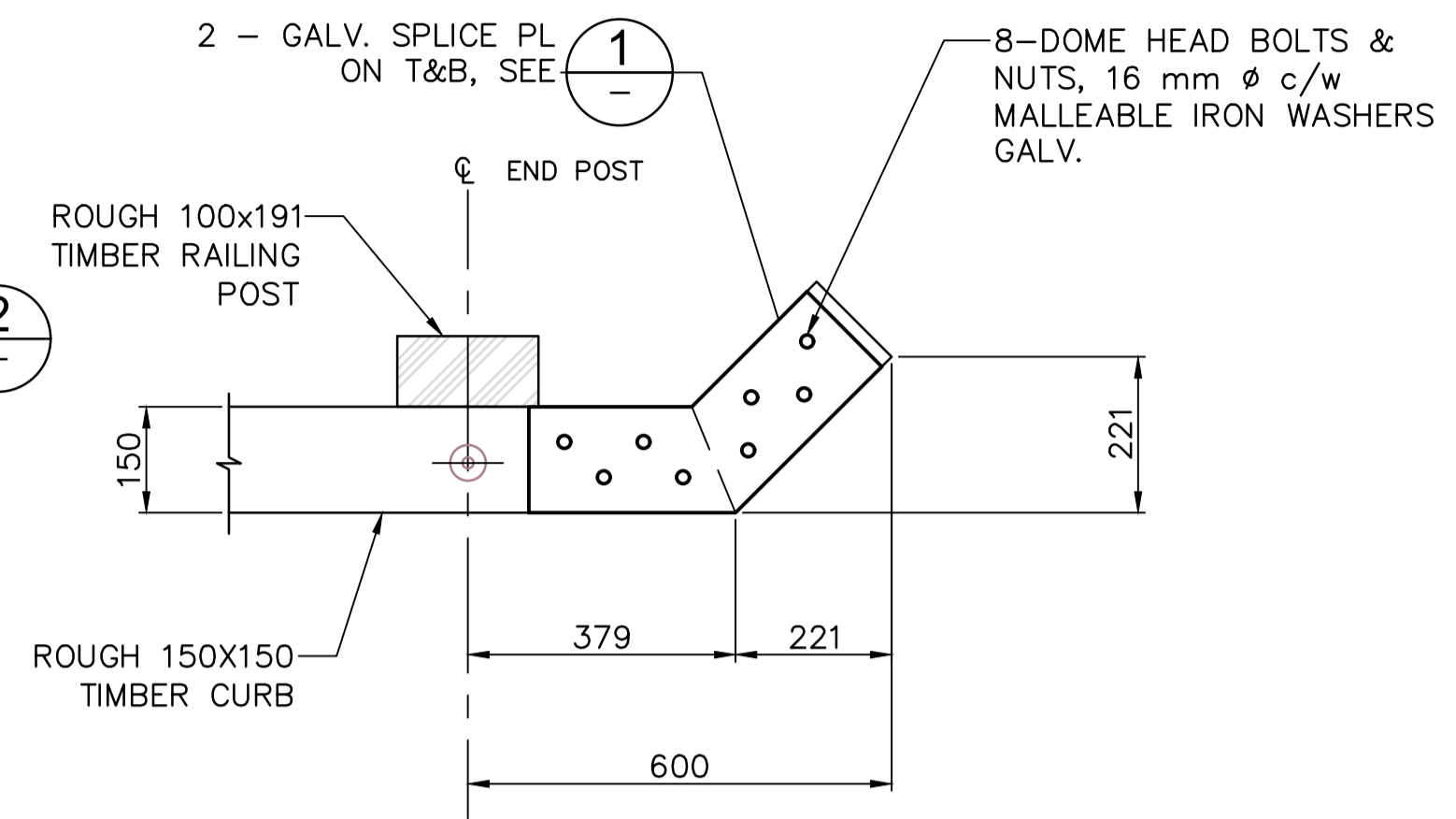
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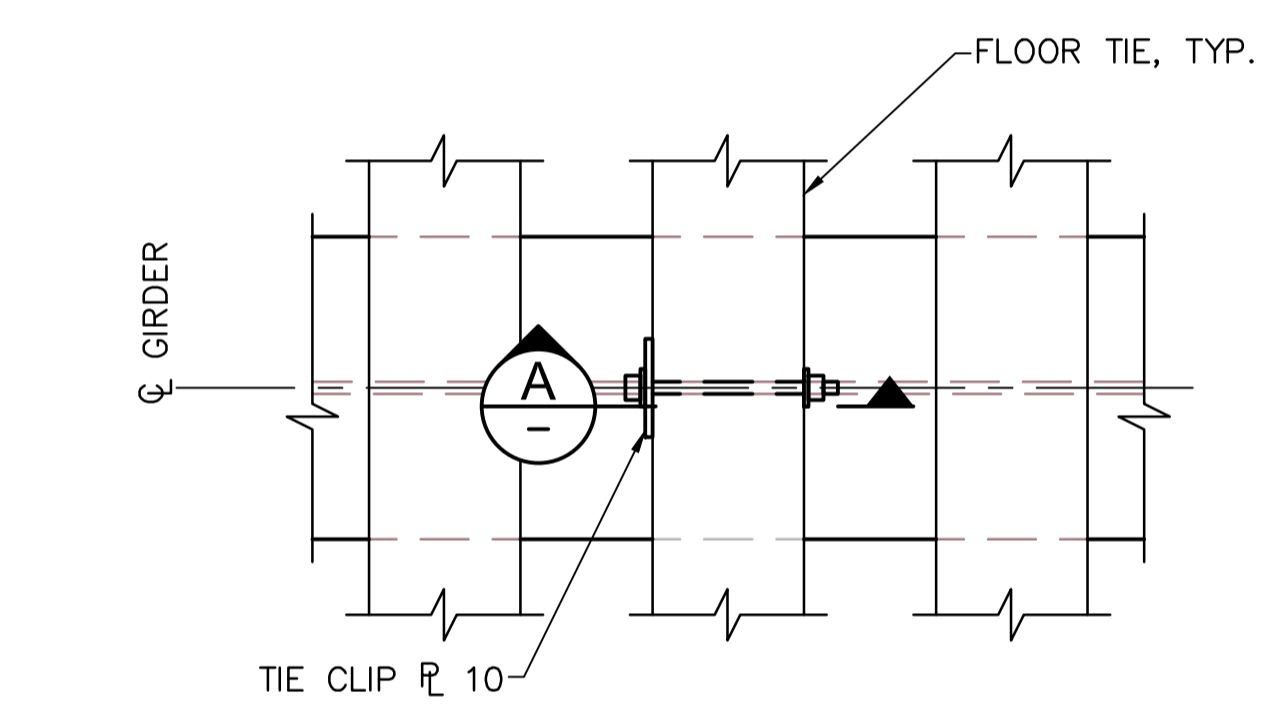
PARSONS



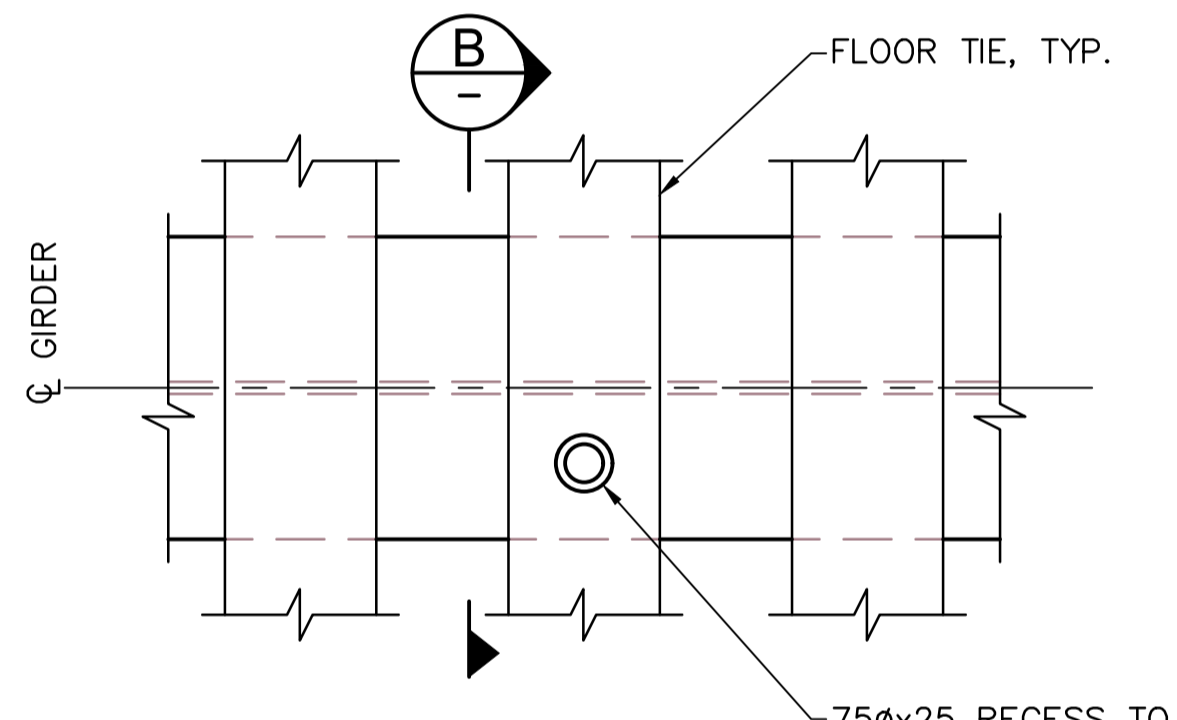
SECTION A  
1:15 S3.10



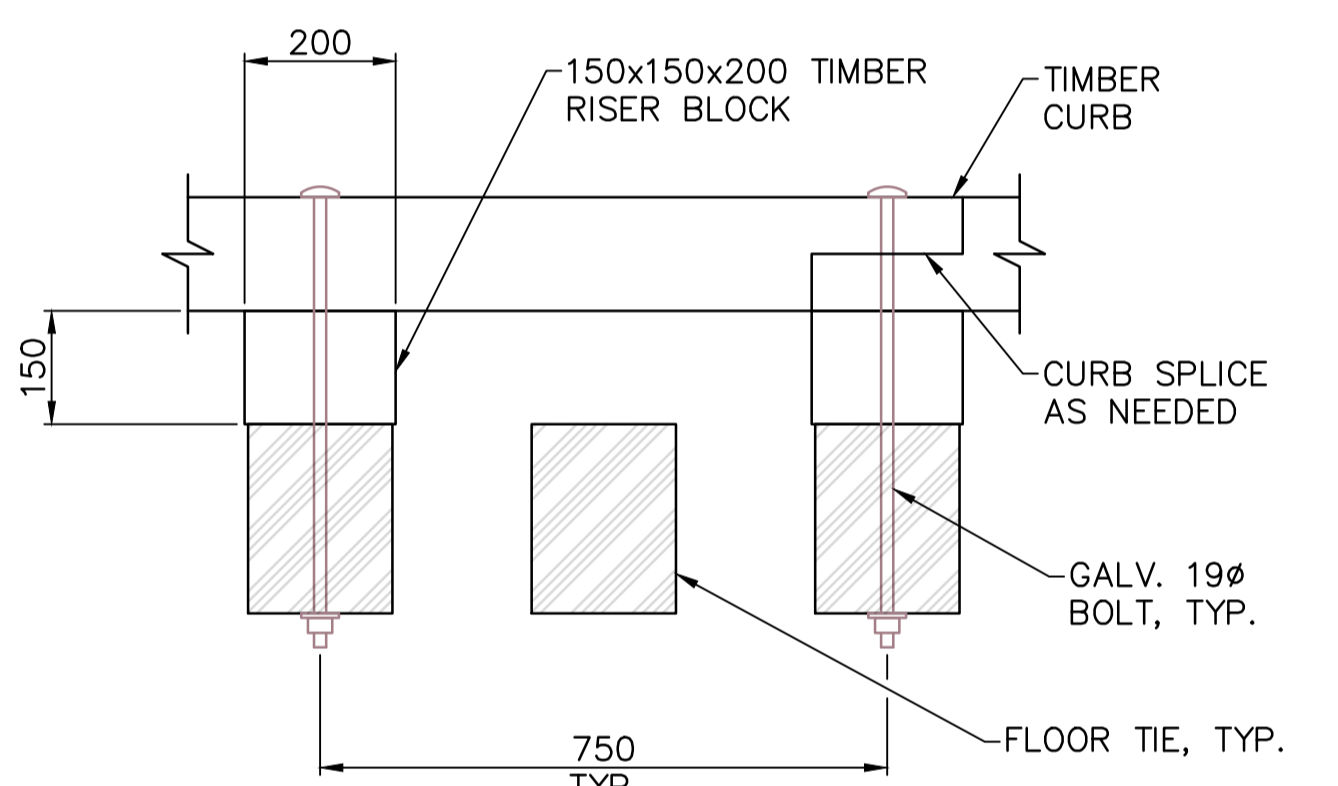
TIMBER CURB END DETAIL  
1:10



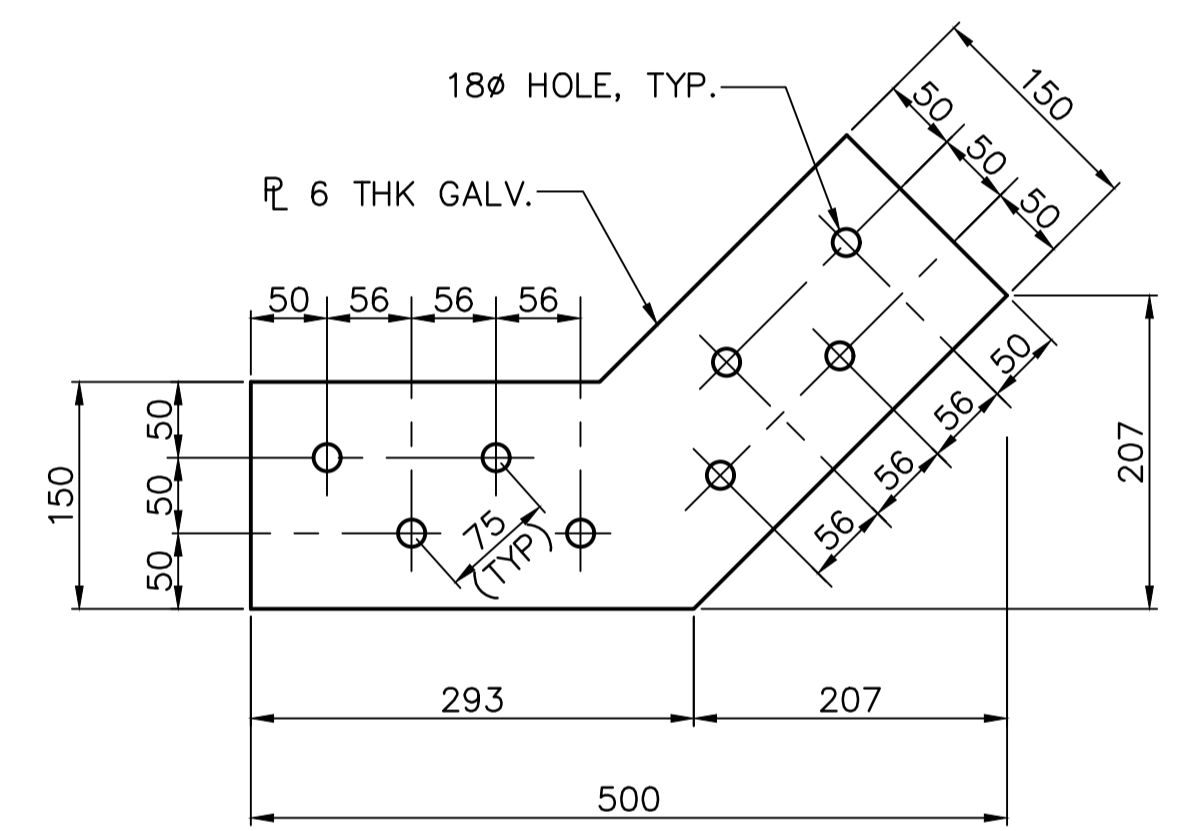
DETAIL 2  
1:10 S3.10



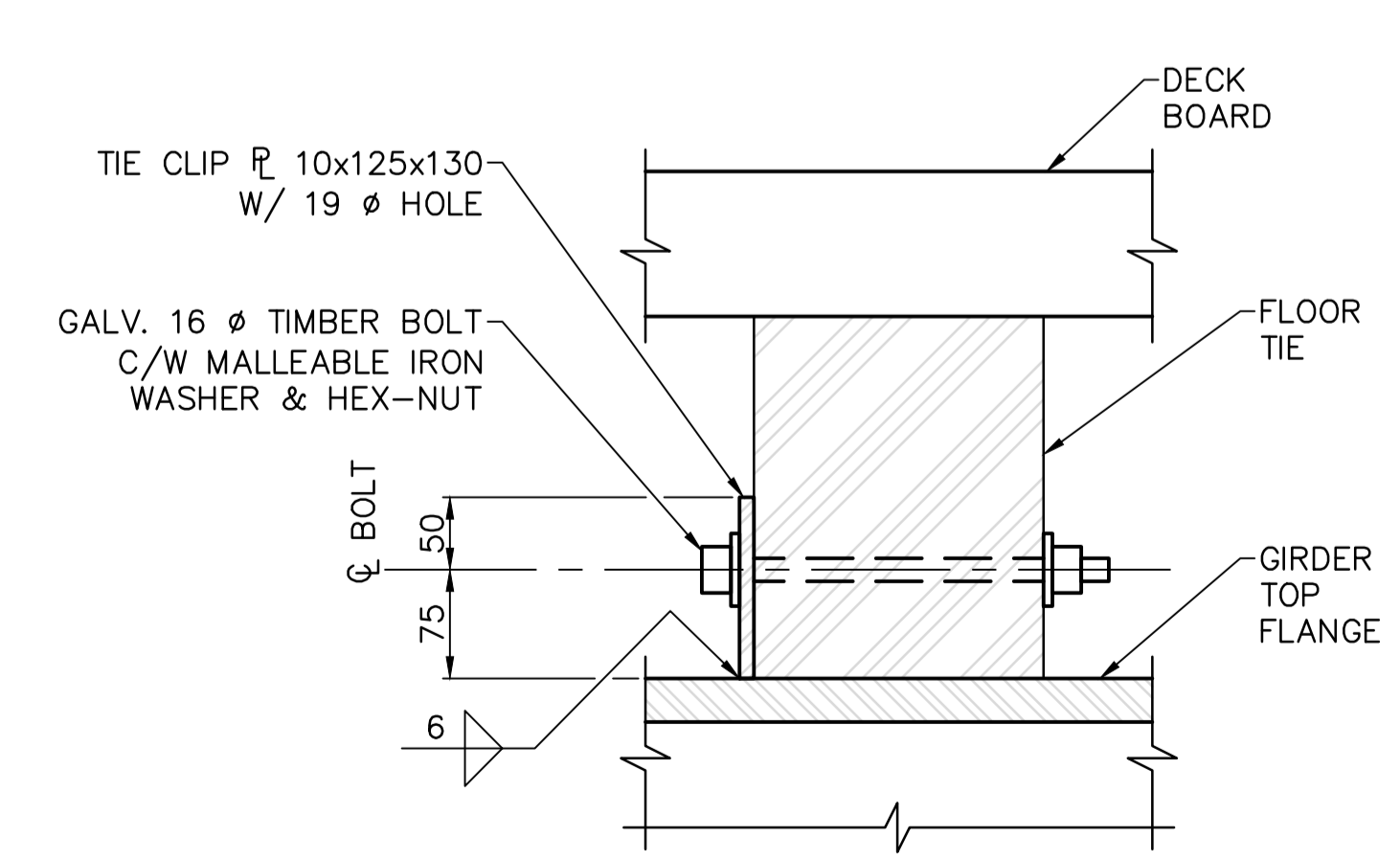
DETAIL 3  
1:10 S3.10



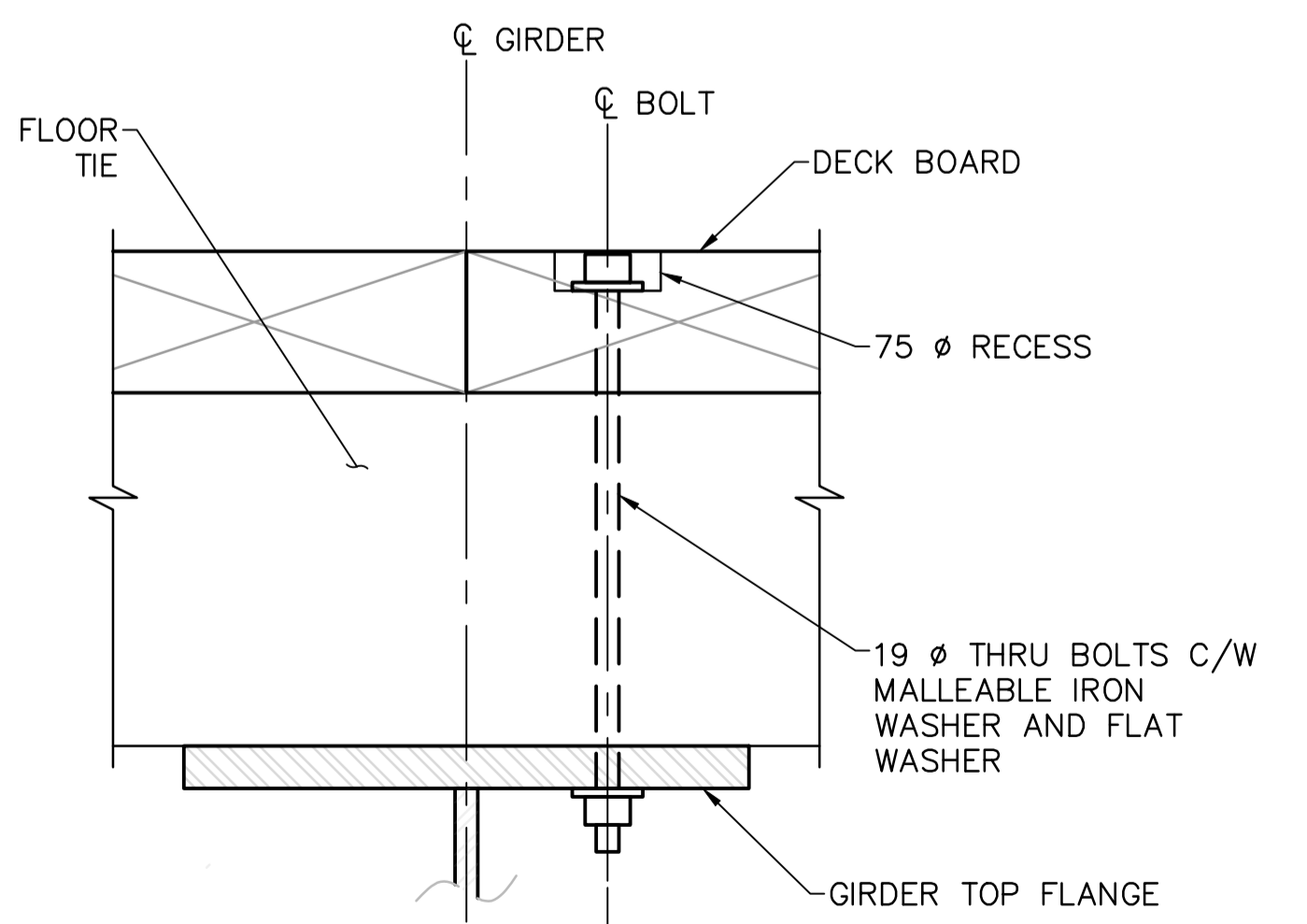
TIMBER CURB AND RISER BLOCK DETAIL  
1:10



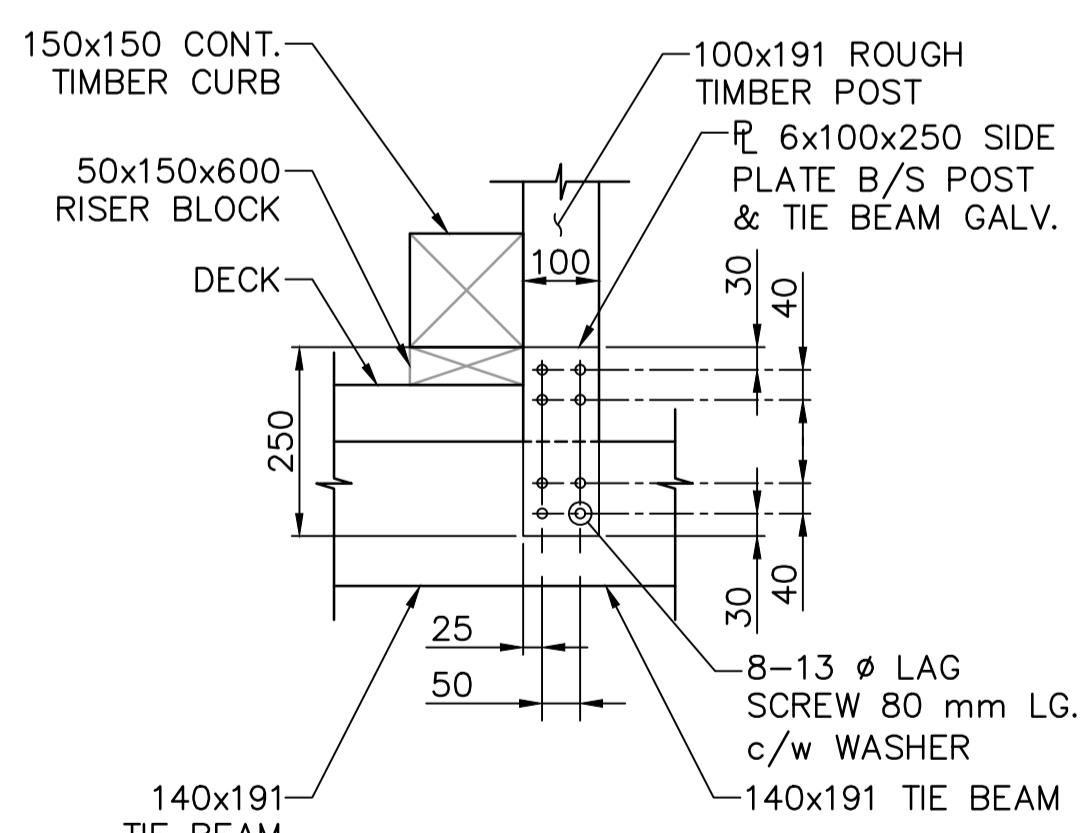
DETAIL 1  
1:5



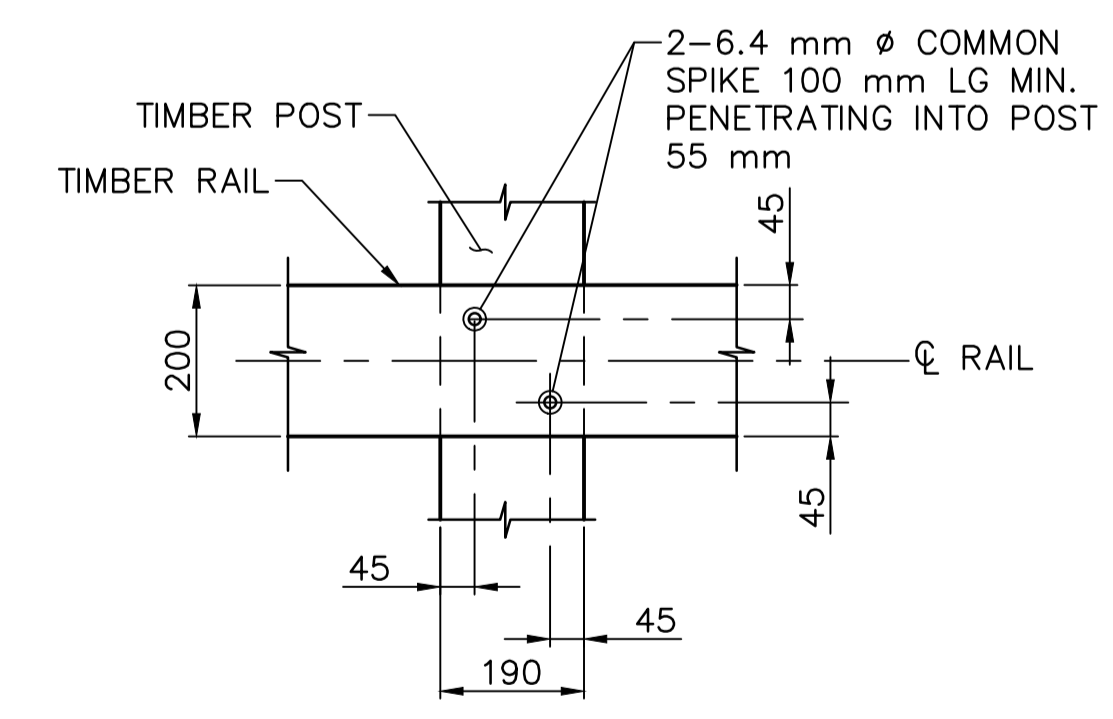
SECTION A  
1:5



SECTION B  
1:5



DETAIL 2  
1:10



DETAIL 3  
1:10

NOTES:

- FOR GENERAL NOTES SEE DWG. S1.1 AND S1.2.
  - ESTIMATED MATERIAL QUANTITY:
    - STEEL GIRDER 19,200 kg
    - TIMBER FLOOR TIE (191x241) D. FIR L GRADE 1 12.0 m<sup>3</sup>
    - ROUGH TIMBER WESTERN RED CEDAR 10.0 m<sup>3</sup>
    - STEEL PIPE PILES 610ø x 16 62.5 m
    - SUBSTRUCTURE CONCRETE 57 m<sup>3</sup>
- CONTRACTOR SHALL VERIFY MATERIAL QUANTITY PRIOR TO COMMENCING WORK.

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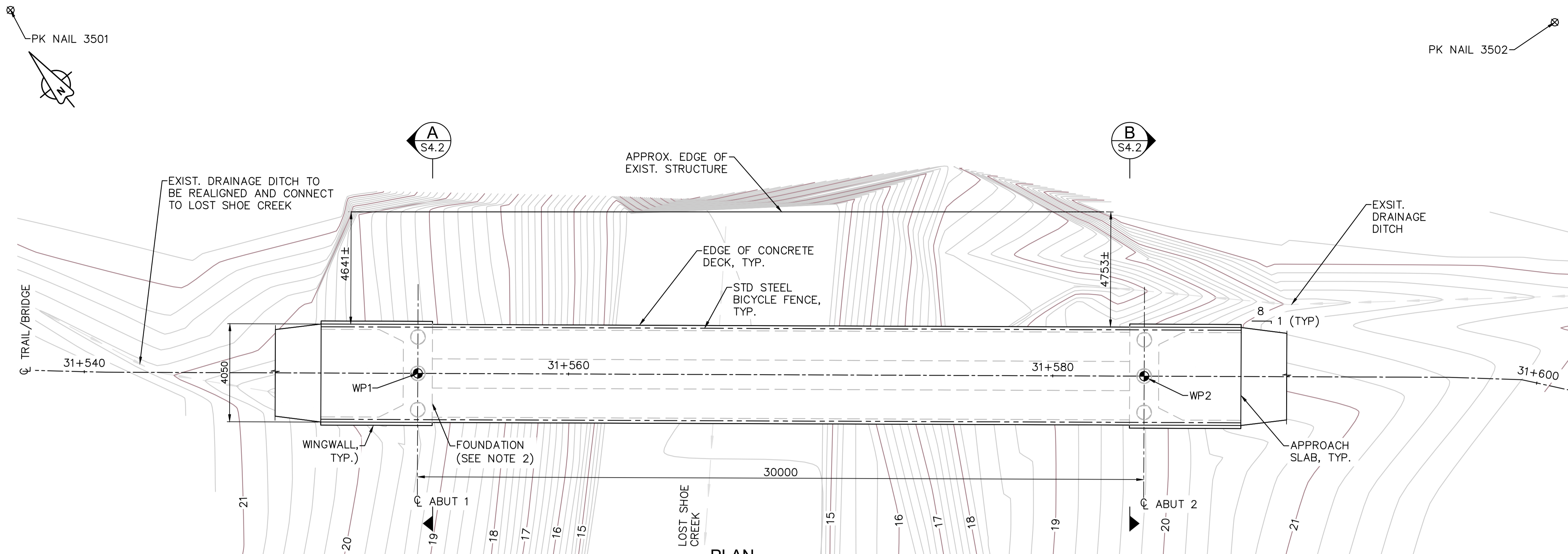
Project title/Titre du projet  
TOFINO, BC  
**PACIFIC RIM NATIONAL PARK RESERVE**  
?apsçliik tašii (Ups-cheek ta-shee)  
"Going in the right direction on the trail"

Designed by/Concept par DANIEL YANG / 2018-11  
Drawn by/Dessiné par STEVEN ZIVIN / 2018-12  
PCA Project Manager/Technical Authority Administrateur de Projets APC JACKIE HICKS

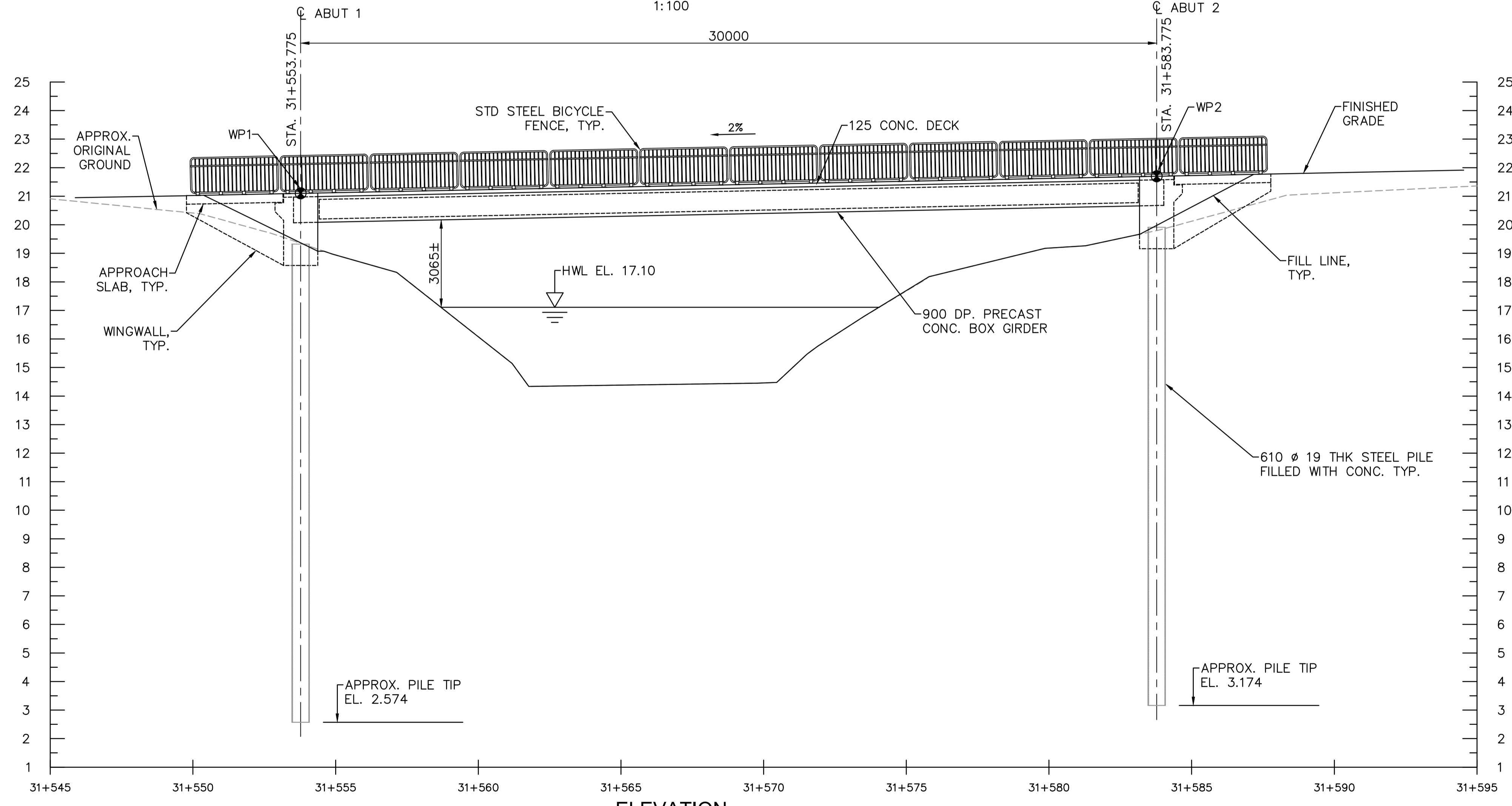
Drawing title/Titre du dessin  
?apsçliik tašii (Ups-cheek ta-shee)  
"Going in the right direction on the trail"  
**BRIDGE #3 DECK PLAN AND DETAILS**  
**SHEET 2**

Project No./No. du projet PCA #1522  
Sheet/Feuille S-3.11  
Revision no./La Révision no. 0





**PLAN**  
1:100



**ELEVATION**  
1:100

**NOTES:**

- HIGH WATER LEVEL (HWL) BASED ON 1:200 YEAR EVENT.
- FOUNDATION DETAILS TO BE CONFIRMED FOLLOWING GROUND INVESTIGATION ON SITE.
- FOR WORK POINTS TABLE AND SURVEY BENCHMARKS TABLE, SEE DRAWING S-4.2.
- FOR RETAINING WALL, SEE DRAWINGS W-10.1 TO 10.5.

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Revision/Revision	Description/Description	Date/Date

Client/client  
Parks Canada Agency L'Agence Parcs Canada

Project title/Titre du projet  
**TOFINO, BC**  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsc̓iik tašii**  
**“Going in the right direction on the trail”**

Consultant Signature Only

Designed by/Concept par  
DANIEL YANG / 2018-11

Drawn by/Dessiné par  
SHAWN LI / 2018-12

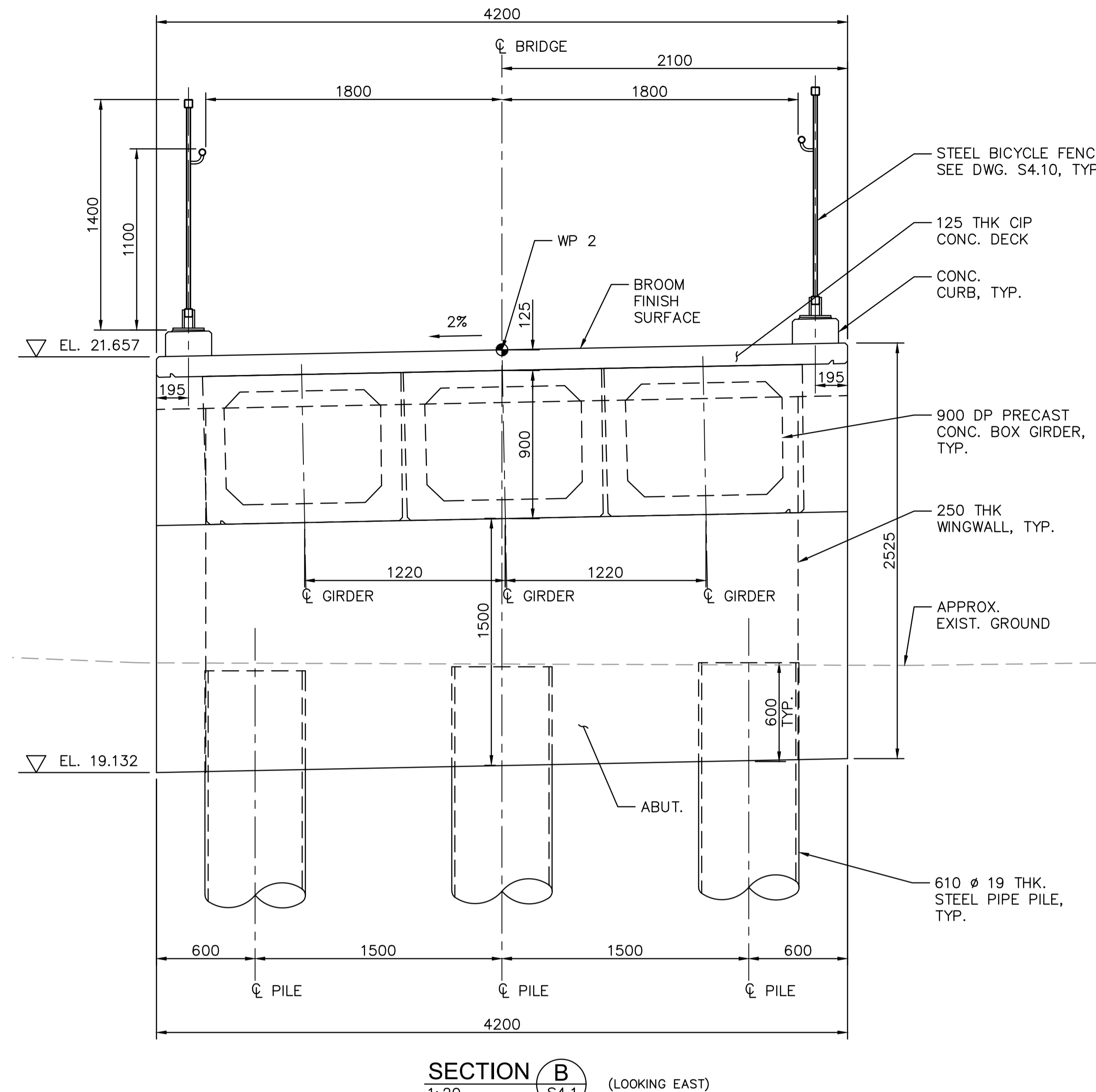
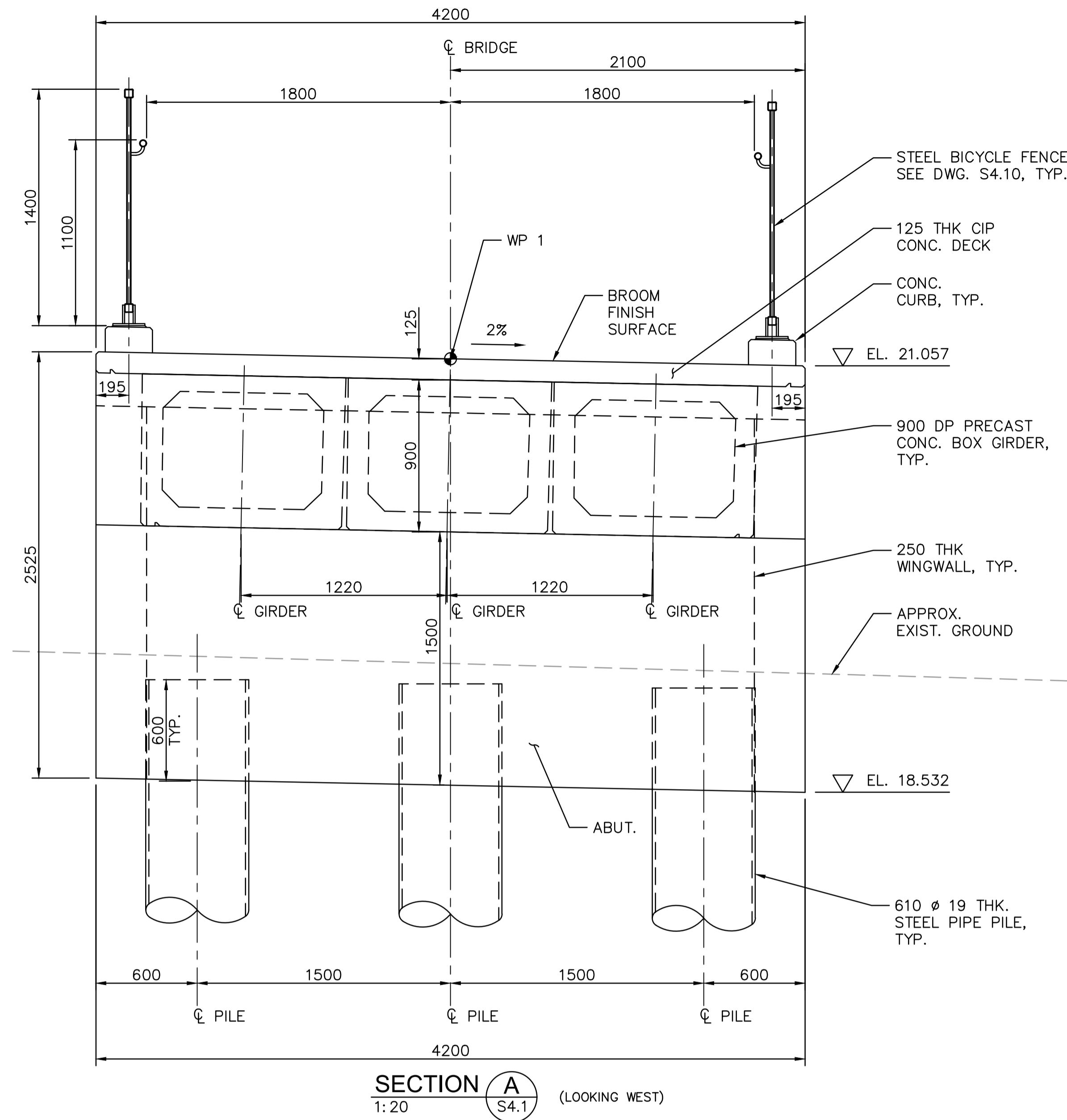
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsc̓iik tašii**  
**(Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #19**  
**GENERAL ARRANGEMENT**  
**SHEET 1**

Project No./No. du projet <b>PCA #1522</b>	Sheet/Feuille <b>S-4.1</b> OF	Revision no./La Révision no. <b>0</b>
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**PARSONS**



SECTION A (LOOKING WEST)  
1:20 S4.1

SECTION B (LOOKING EAST)  
1:20 S4.1

**NOTES:**

- BRIDGE #19 SPANS THE MAIN STREAM OF LOST SHOE CREEK, WHICH IS CONSIDERED VERY HIGH VALUE FISH HABITAT, THERE IS CONFIRMED ADULT SALMON SPAWNING AND JUVENILE SALMONID REARING LOCATED IMMEDIATELY UNDER AND DOWNSTREAM OF BRIDGE #19. AS SUCH, DURING CONSTRUCTION OF BRIDGE #19, THE CONTRACTOR WILL NEED TO STRICTLY ADHERE TO THE MITIGATION MEASURES OUTLINED IN THE CONCRETE HANDLING MITIGATIONS SPECIFICATION AND THE ENVIRONMENTAL PROCEDURES SPECIFICATION INCLUDED IN THE TENDER PACKAGE.
- ALTHOUGH THERE ARE NO INSTREAM WORKS PROPOSED FOR BRIDGE #19, THE WORKS REQUIRED WITHIN THE RIPARIAN AREA AND ON THE BANKS OF LOST SHOE CREEK ARE CONSIDERED MODERATE TO HIGH RISK IN TERMS OF SEDIMENT AND EROSION CONTROL. AS SUCH, ALL THE HIGHEST RISK WORK INCLUDING EXCAVATION FOUNDATION, INSTALLATION OF FOUNDATION, AND EARTHWORK IMMEDIATELY ADJACENT TO CREEK MUST BE DONE DURING LEAST RISK WORK WINDOW FOR FISH, WHICH FOR NON-INSTREAM WORKS ONLY IS JUNE 15TH TO SEPTEMBER 15TH.
- THE CONTRACTOR SHALL CONFIRM WITH DEPARTMENT REPRESENTATIVE PRIOR TO COMMENCE THE HIGH RISK CONSTRUCTION WORK, INCLUDING EXCAVATION, FOOTINGS, INSTALLATION OF FOOTINGS AND EARTHWORKS IMMEDIATELY ADJACENT TO CREEK.
- NO CONCRETE WORK TO COMMENCE WITHOUT WRITTEN APPROVAL OF THE OWNER'S ENVIRONMENTAL MONITOR. NO INSTREAM WORKS PERMITTED FOR BRIDGE CONSTRUCTION.
- ALL CONCRETE POURS SHALL BE COMPLETELY ISOLATED FROM THE CREEK, WITH SECONDARY CONTAINMENT TO PREVENT GROUT ENTERING THE CREEK. THE CONTRACTOR SHALL SUBMIT A GROUT CONTAINMENT PLAN TO THE ENVIRONMENTAL MONITOR FOR APPROVAL AND REQUEST INSPECTION AND APPROVAL OF FORMWORK BY THE ENVIRONMENTAL MONITOR PRIOR TO ANY CONCRETE POURS.
- SURVEY DATA IS BASED UPON THE UTM NAD83 COORDINATE SYSTEM.
- BROOM CONCRETE RUNNING SURFACE BY CONCRETE BROOM APPLYING PERPENDICULAR TO THE ALIGNMENT, AND BROOM MARKS SHOULD BE RUN TOWARDS LOWER SIDE OF THE LATERAL SLOPE.
- ESTIMATED MATERIAL QUANTITY:
  - 900 mm DEEP PRECAST CONCRETE BOX GIRDER: 3 GIRDERS 30.5 m LONG 17 m<sup>3</sup>
  - CIP CONCRETE DECK: 55 m<sup>3</sup>
  - CIP CONCRETE - OTHERS: 4760 kg
  - MMFX OR EQUAL REINFORCING STEEL: 13200 kg
  - REINFORCING STEEL: 100 m LONG
  - 610x19 STEEL PIPE PILES: 82.4 m
  - BC MOT STANDARD BICYCLE RAIL:
 CONTRACTOR SHALL VERIFY MATERIAL QUANTITY PRIOR TO COMMENCING WORK.

WORK POINTS TABLE			
WORK POINT	NORTHING	EASTING	EL.
WP1	5431531.089	308829.407	21.099
WP2	5431510.297	308851.033	21.699

BENCHMARKS TABLE			
PK NAIL	NORTHING	EASTING	EL.
3501	5431574.736	308807.591	18.417
3502	5431510.434	308874.600	18.482

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Project title/Titre du projet  
**TOFINO, BC**  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsčik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

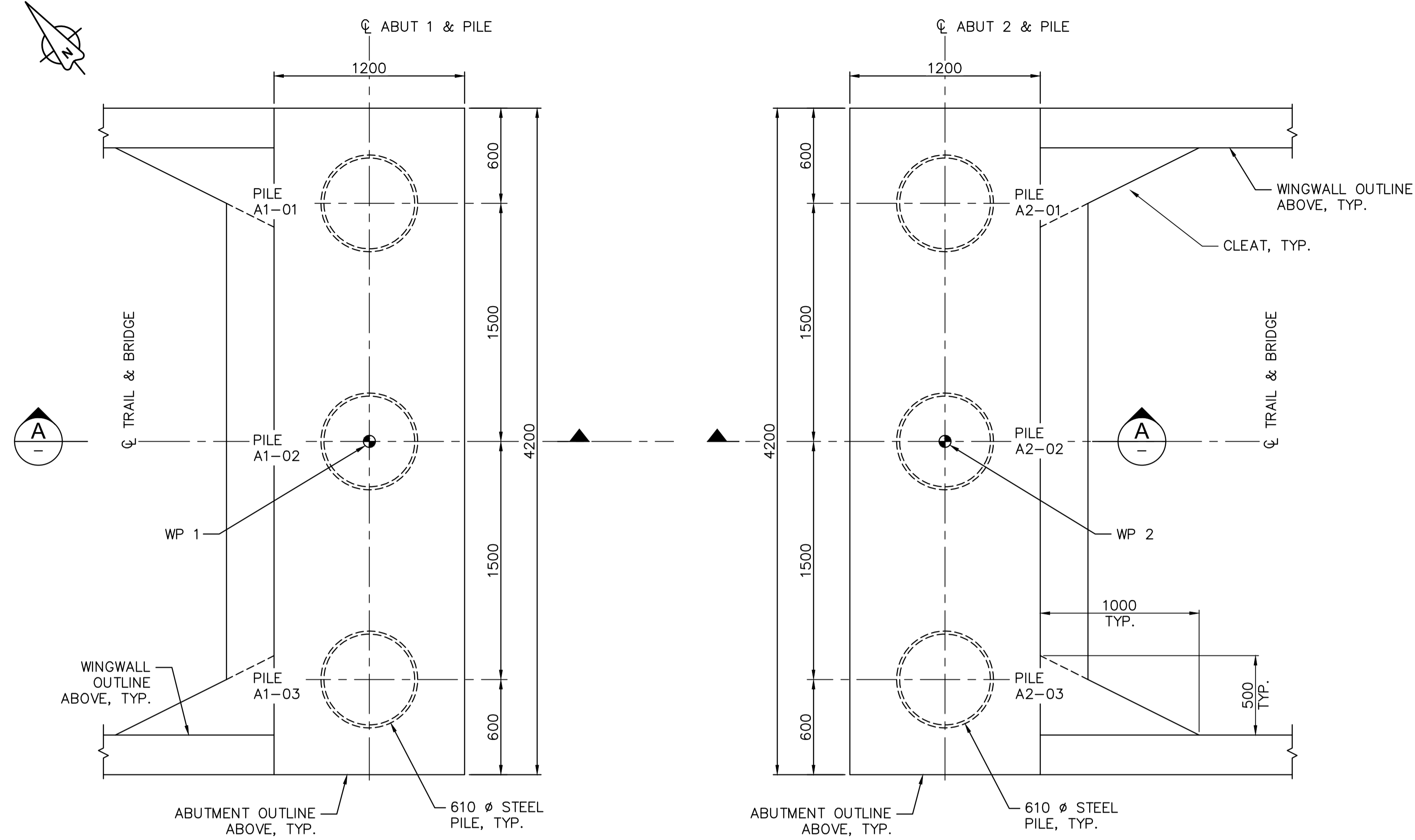
Designed by/Concept par DANIEL YANG / 2018-11  
Drawn by/Dessiné par SHAWN LI / 2018-12  
PCA Project Manager/Technical Authority Administrateur de Projets APC JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsčik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #19 GENERAL ARRANGEMENT SHEET 2**

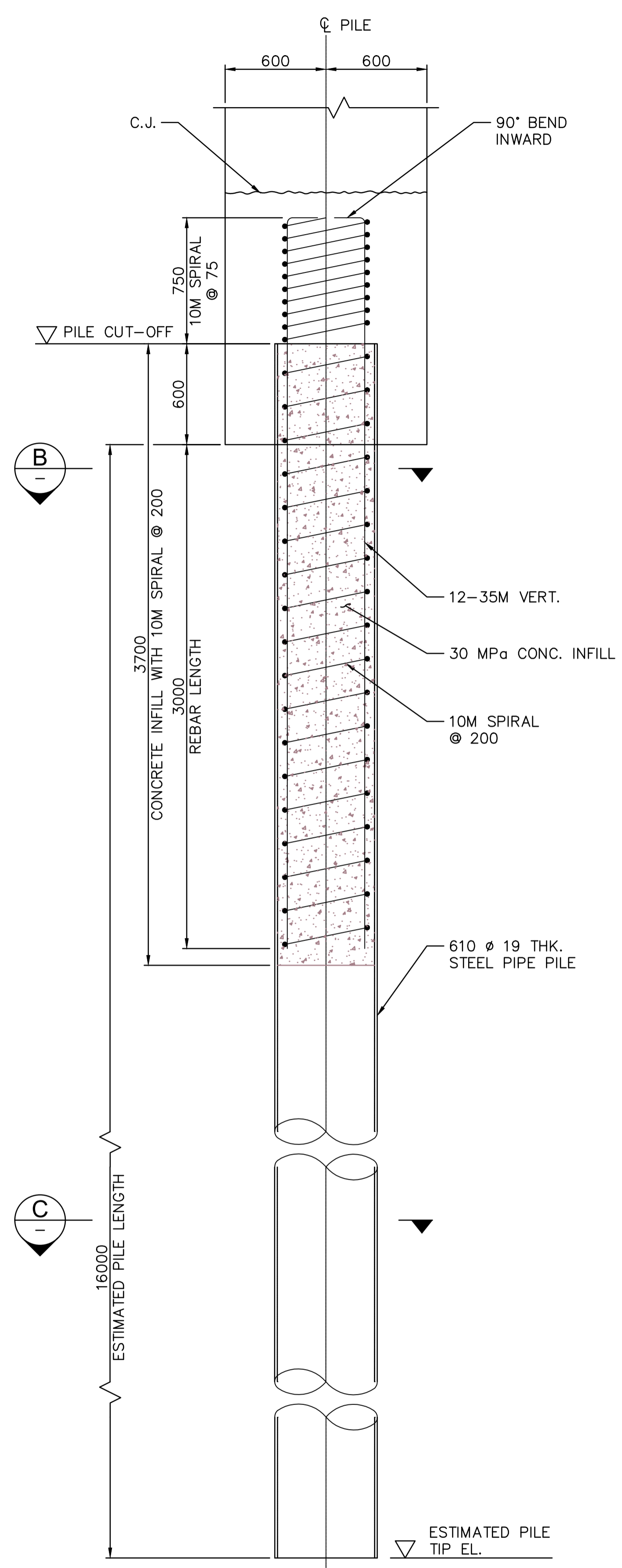
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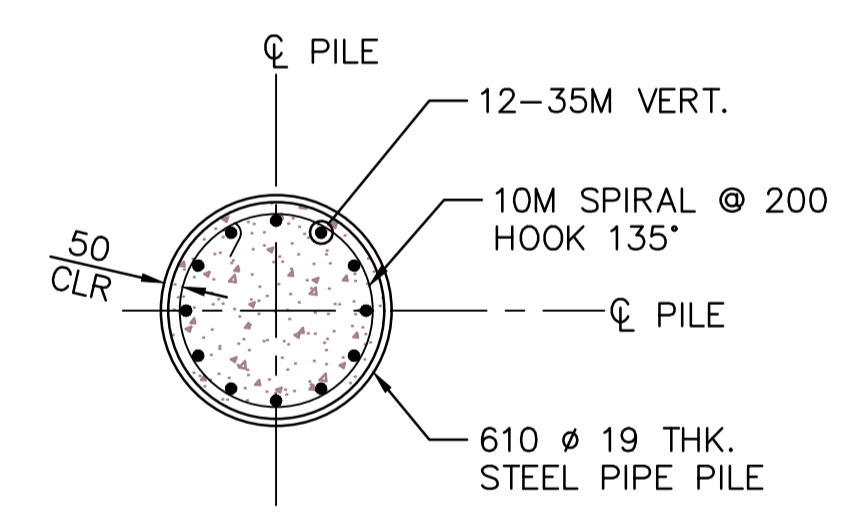
**PARSONS**



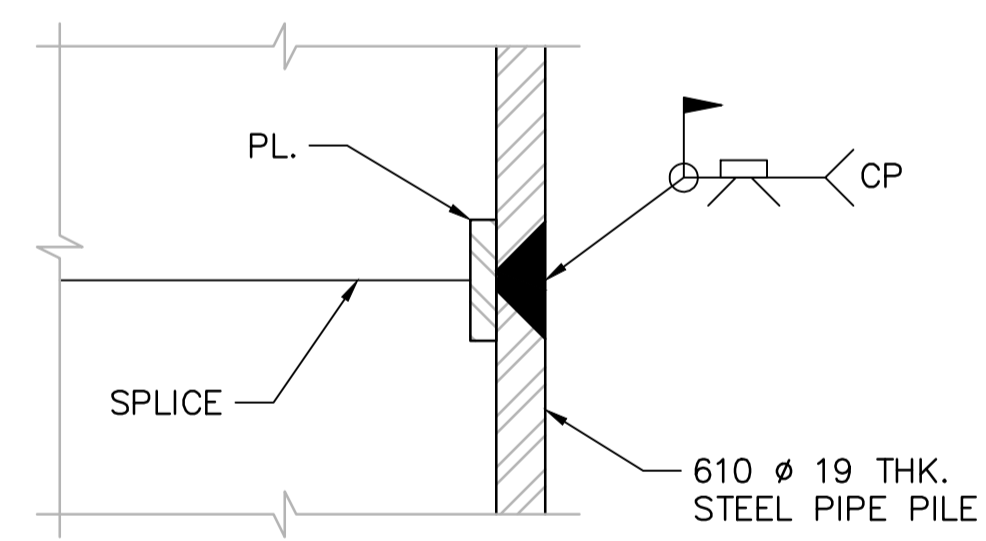
**PILING LAYOUT PLAN**  
1:20



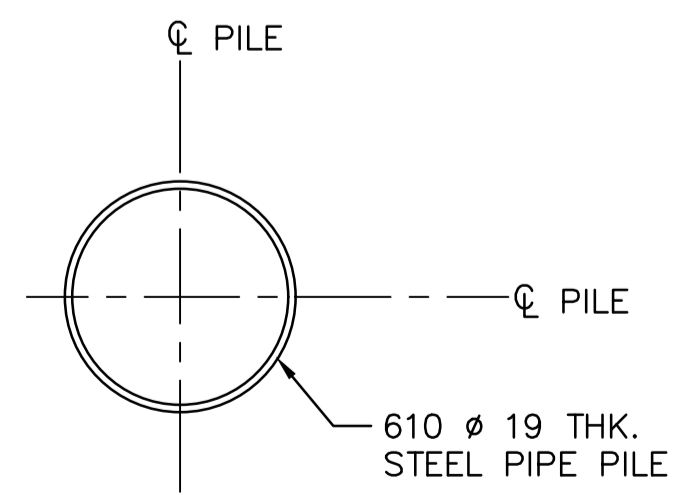
**SECTION A**  
1:20



**SECTION B**  
1:20



**TYPICAL PIPE PILE SPLICE DETAIL**  
1:2



**SECTION C**  
1:20

PILE DATA TABLE			
LOCATION	PILE	PILE CUT-OFF EL. (m)	ESTIMATED PILE TIP EL. (m)
ABUT 1	A1-01	19.144	2.544
	A1-02	19.174	2.574
	A1-03	19.204	2.604
ABUT 2	A2-01	19.744	3.144
	A2-02	19.774	3.174
	A2-03	19.804	3.204

**NOTES:**

- FOR WORK POINTS SEE S4.1.
- PILE SPACING SHALL BE MEASURED AT THE UNDERSIDE OF THE ABUTMENT SEAT.
- PILES TO BE FITTED WITH A CUTTING SHOE AT THE TIP EQUIVALENT TO ASSOCIATED PILE AND FITTING MODEL APF 0-14000.

**4. THE FACTORED PER PILE LOADS (AXIAL COMPRESSION LOAD)**

SLS1: PERMANENT:	391 kN
MAX:	456 kN
ULS1: PERMANENT:	470 kN
MAX:	595 kN
ULS5 (SEISMIC):	870 kN

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Revision/Revision	Description/Description	Date/Date
Client/client		

Project title/Titre du projet  
**TOFINO, BC**  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsc̓iik taʔii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
Consultant Signature Only

Designed by/Concept par  
DANIEL YANG / 2018-11  
Drawn by/Dessiné par  
SHAWN LI / 2018-12  
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

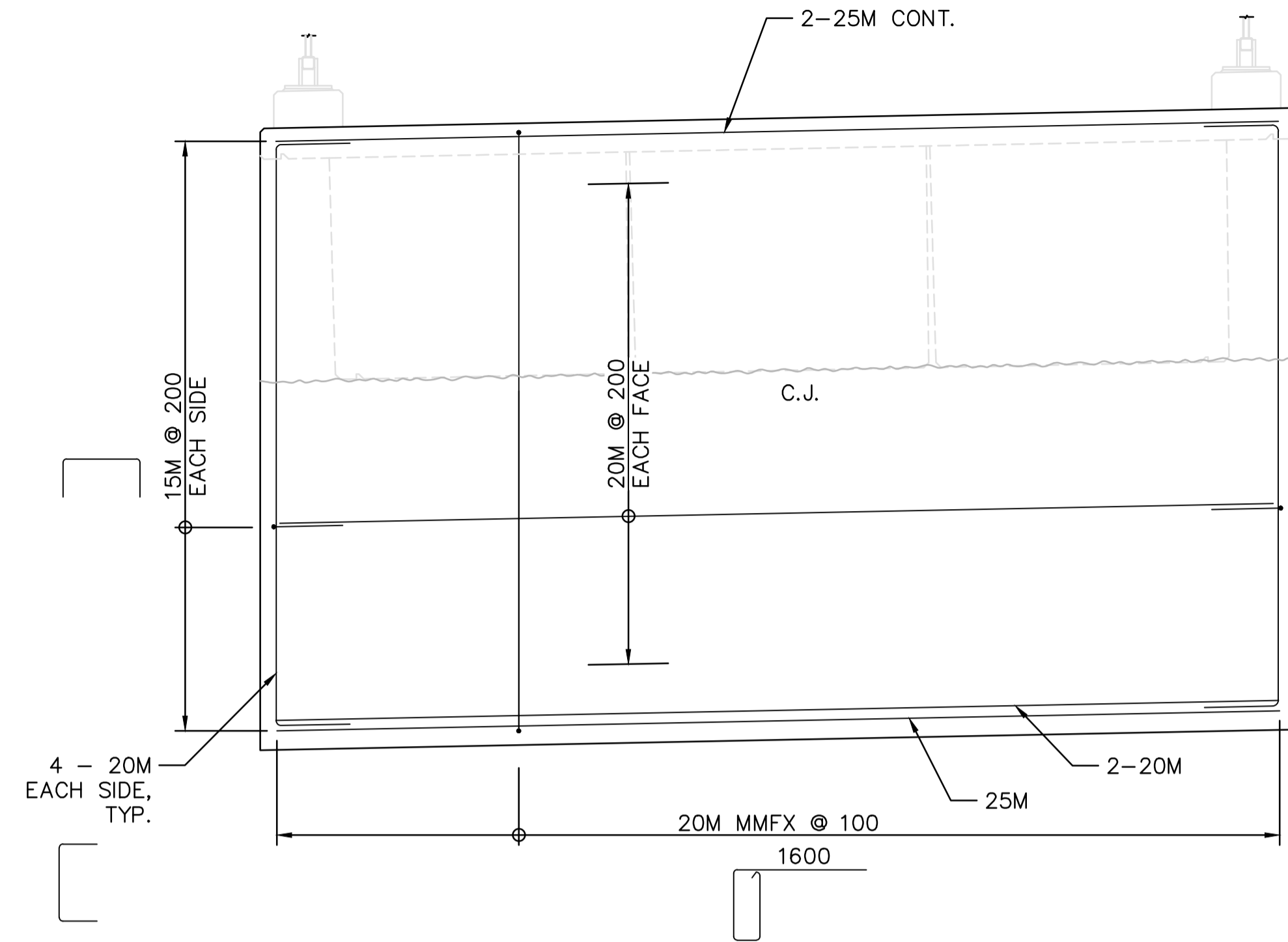
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**ʔapsc̓iik taʔii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #19**  
**PILE LAYOUT AND DETAILS**

Project No./No. du projet <b>PCA #1522</b>	Sheet/Feuille <b>S-4.3</b> OF	Revision no./La Révision no. <b>0</b>
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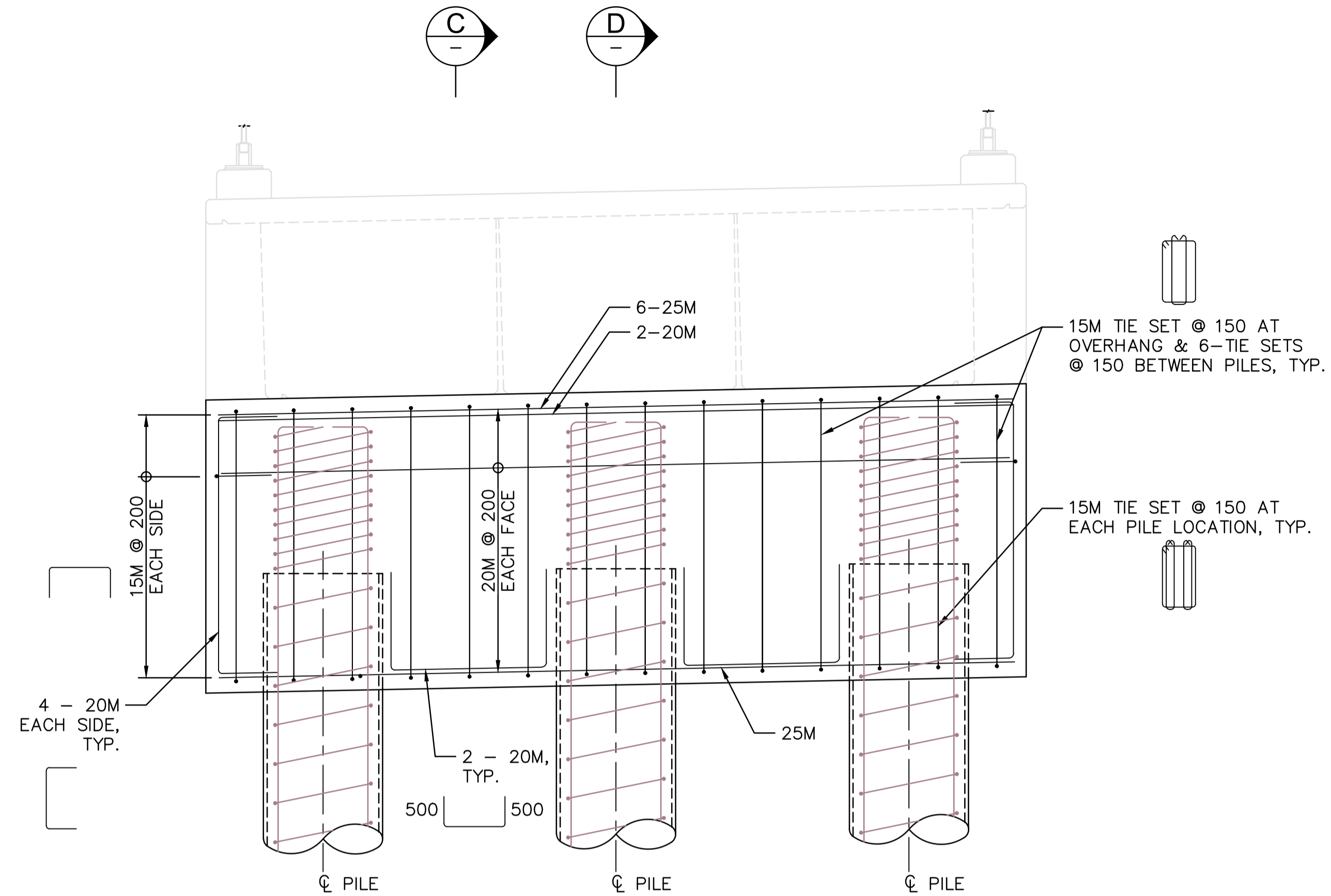




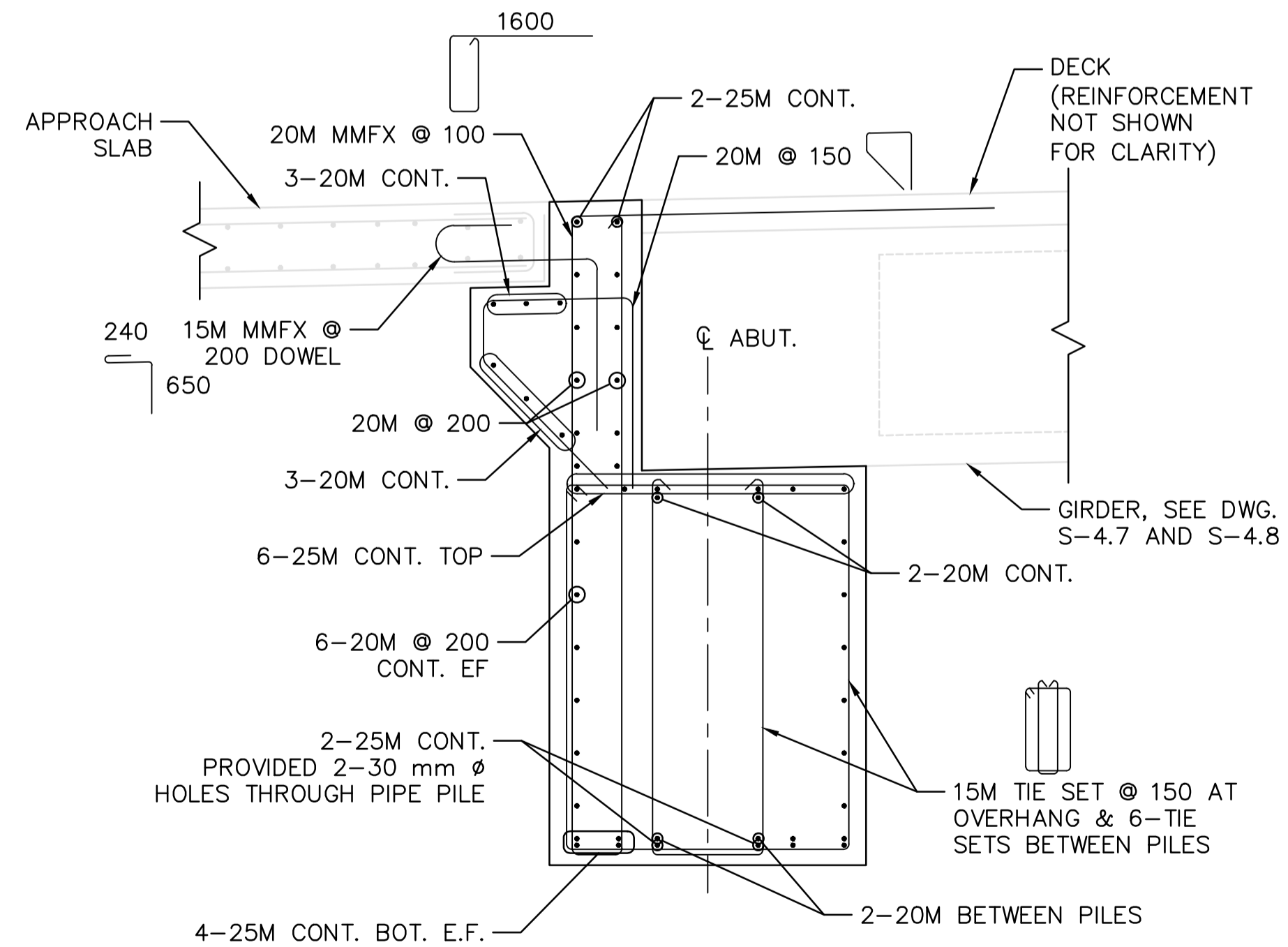
**PARSONS**



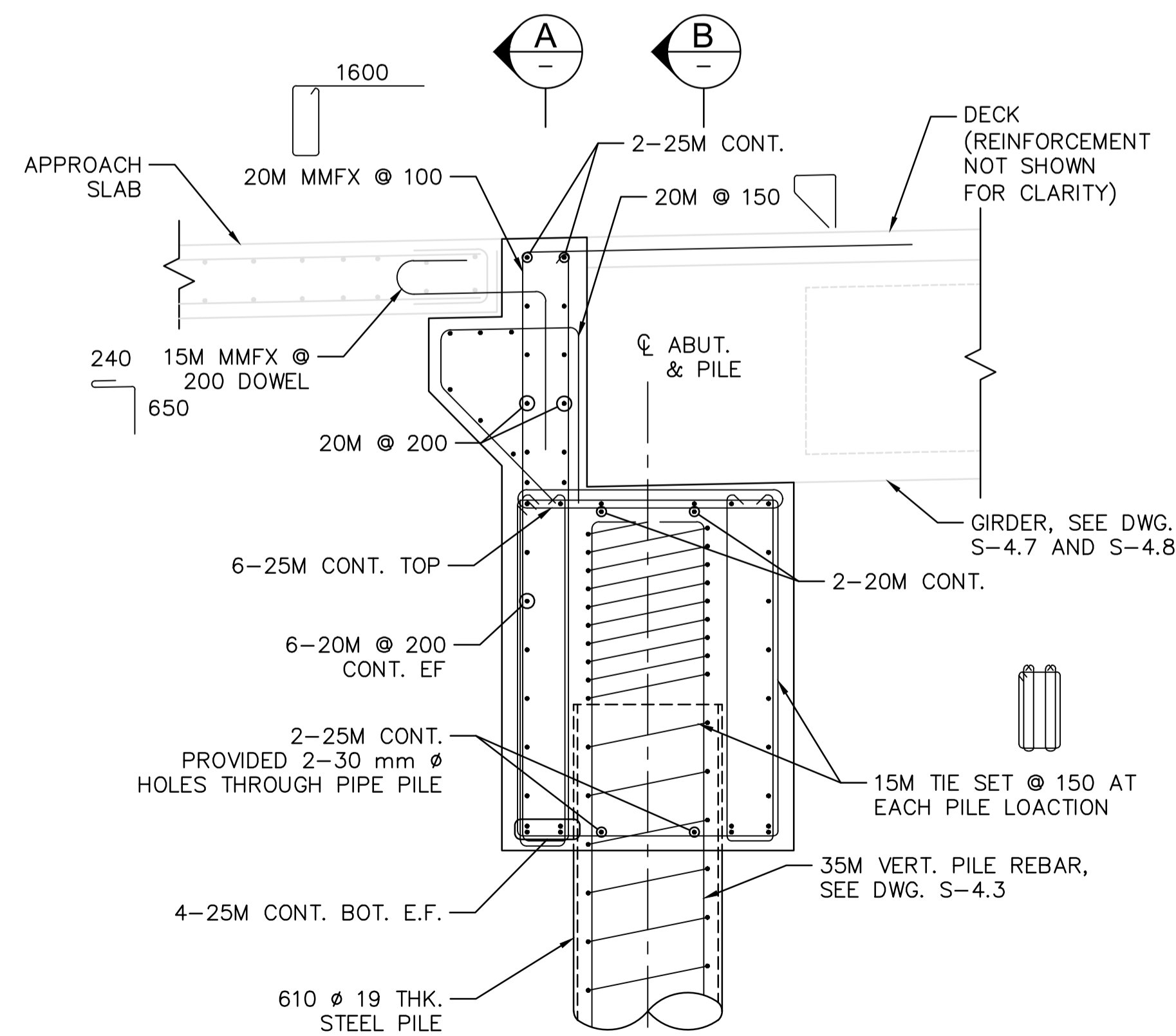
**SECTION A**  
1:20



**SECTION B**  
1:20



**SECTION C**  
1:20



**SECTION D**  
1:20

NOTES:

- FOR GENERAL NOTES SEE S-1.1 AND S-1.2.

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Client/client

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TOFINO, BC

**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsčik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

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DANIEL YANG / 2018-11

Drawn by/Dessiné par  
SHAWN LI / 2018-12

PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin

**ʔapsčik tašii (Ups-cheek ta-shee)**  
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**BRIDGE #19 ABUTMENT REINFORCEMENT**

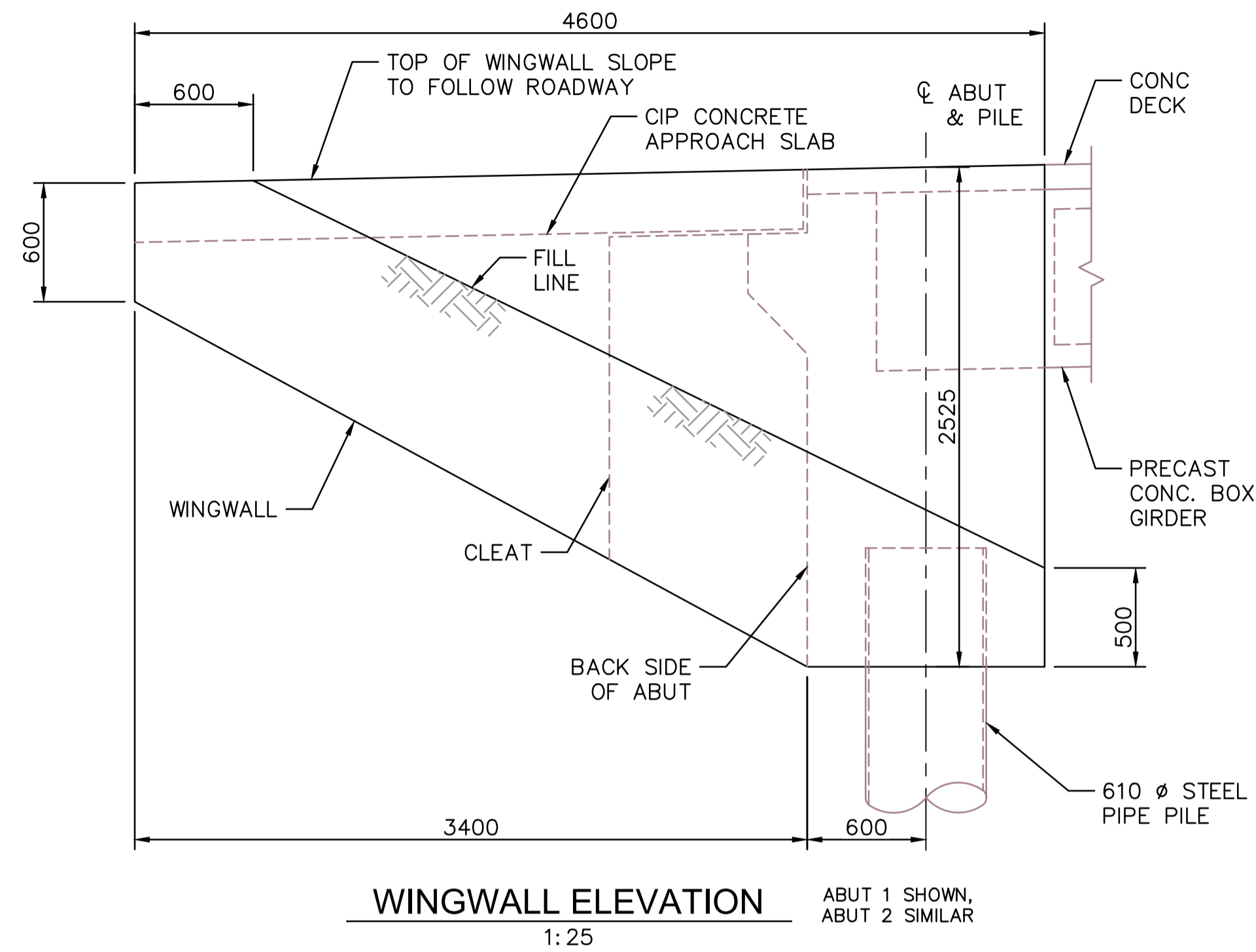
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PCA #1522

Sheet/Feuille  
**S-4.5**

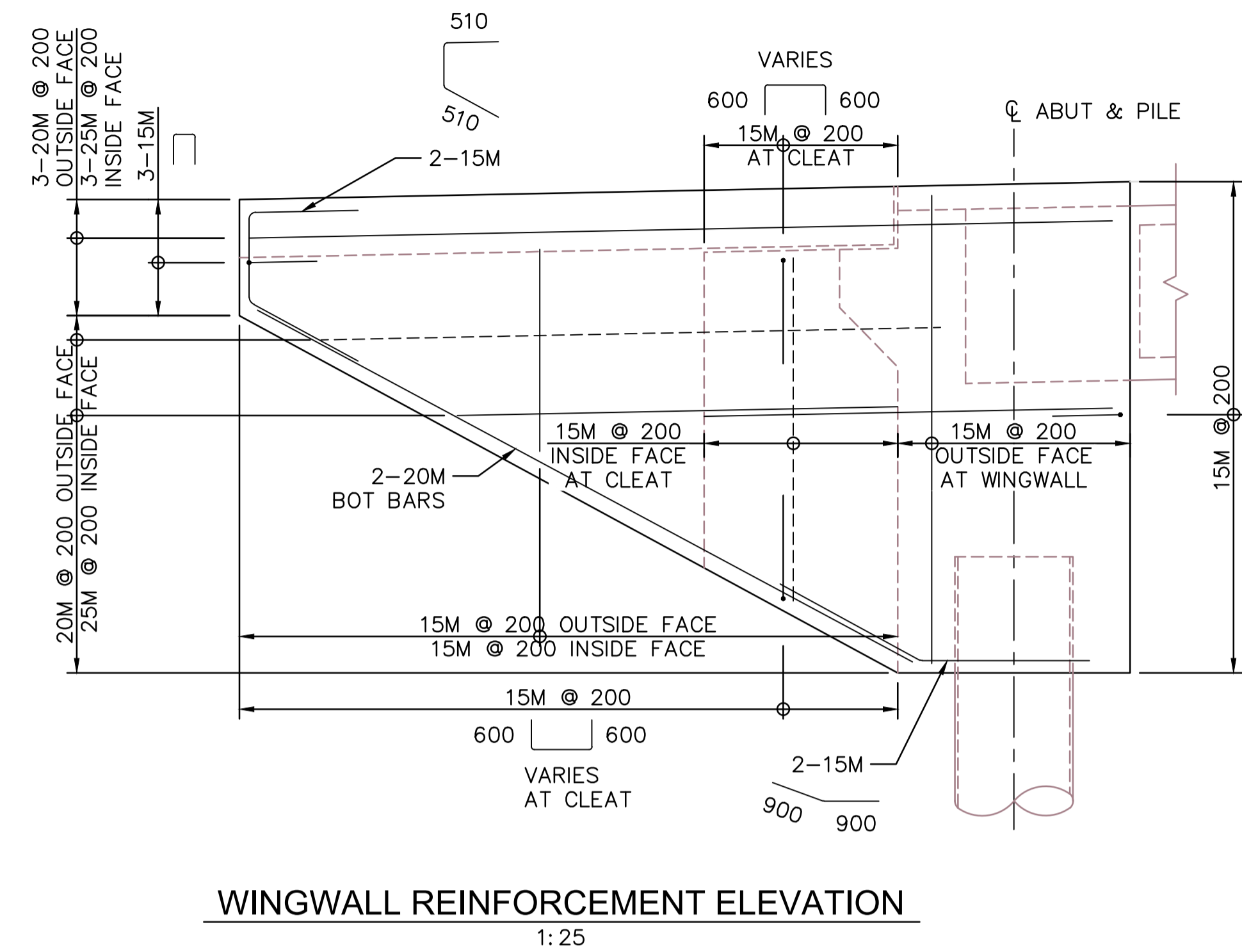
Revision no./La Révision no.  
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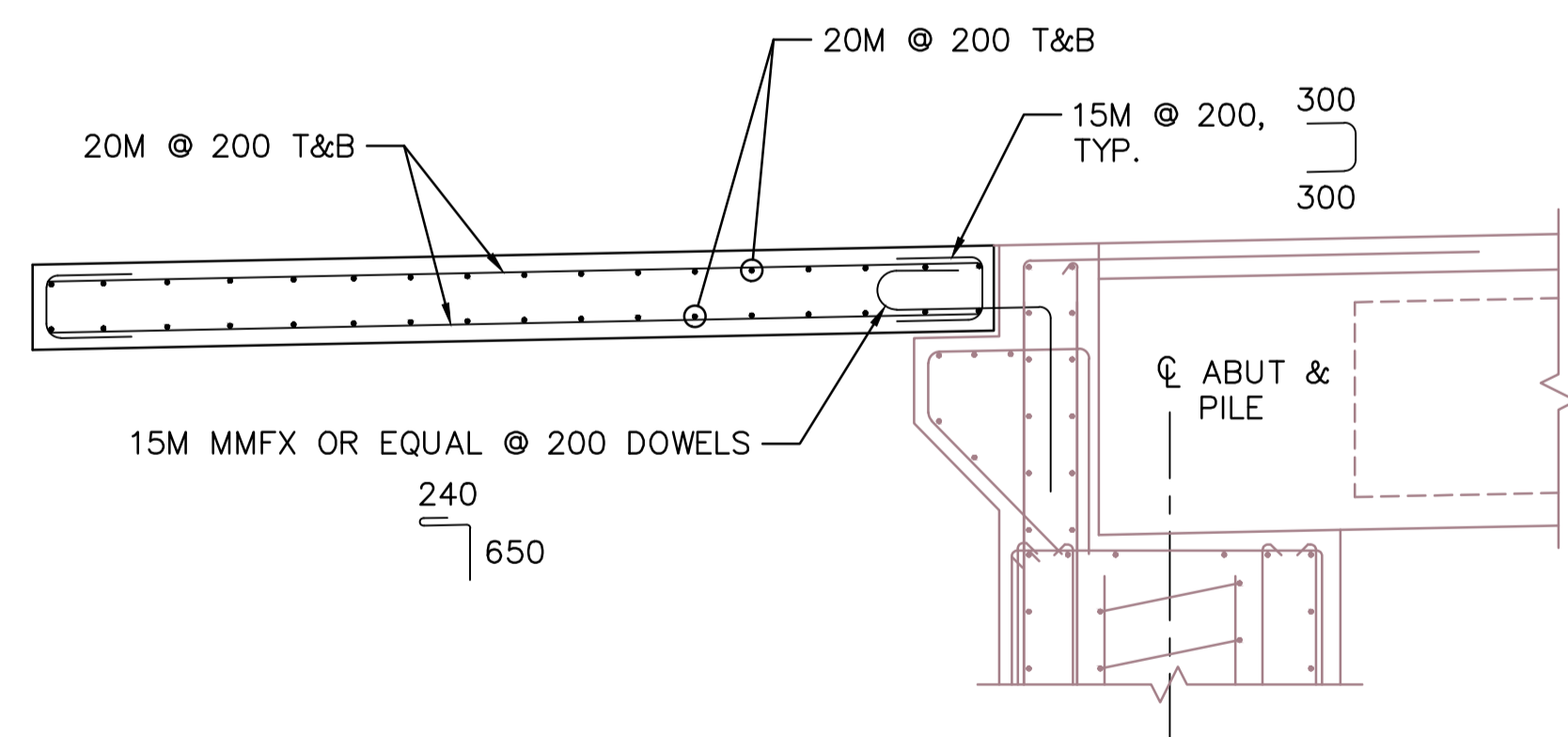
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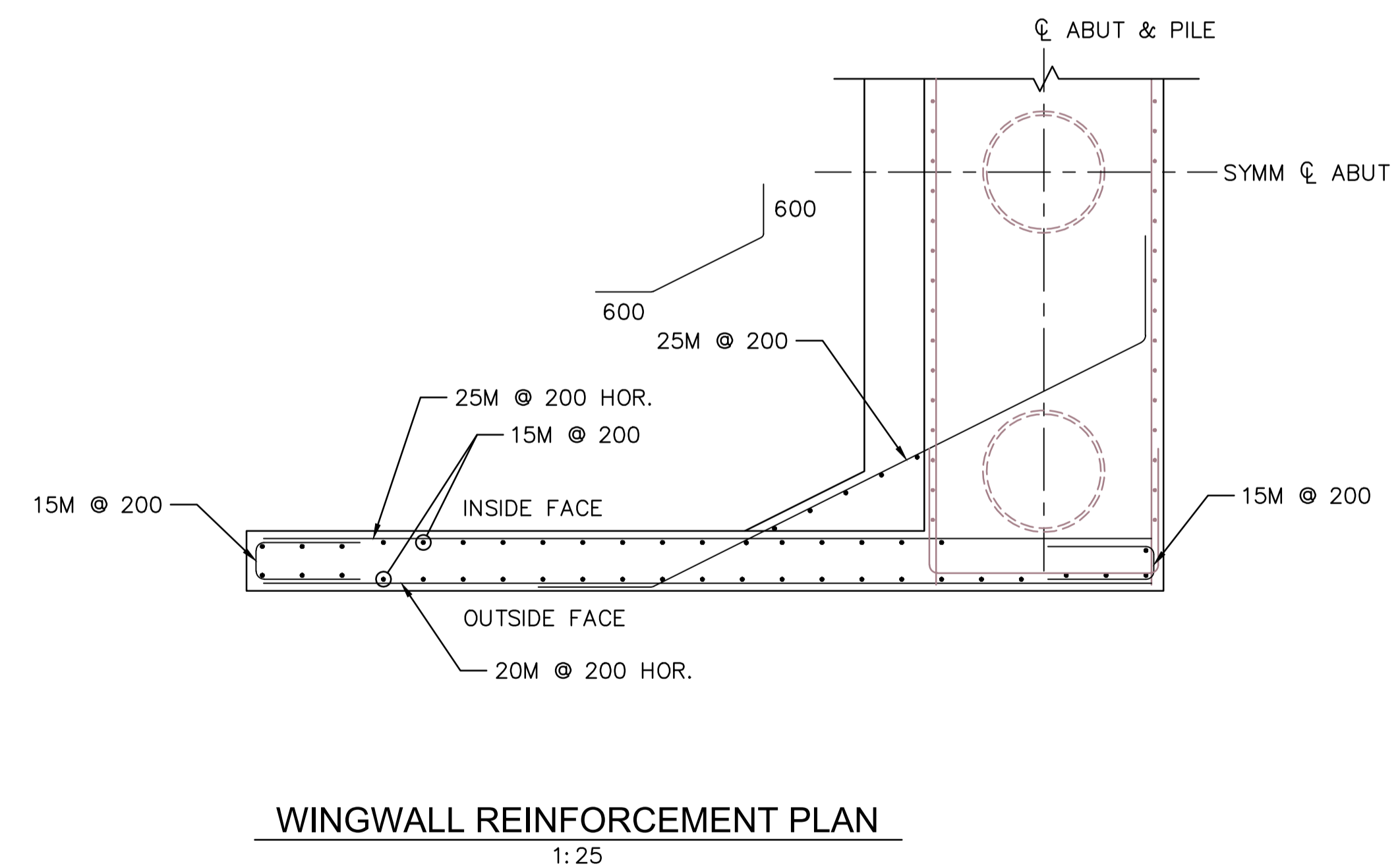
**WINGWALL ELEVATION**  
1:25  
ABUT 1 SHOWN, ABUT 2 SIMILAR



**WINGWALL REINFORCEMENT ELEVATION**  
1:25



**APPROACH SLAB REINFORCEMENT ELEVATION**  
1:25



**WINGWALL REINFORCEMENT PLAN**  
1:25

**NOTES:**

- FOR GENERAL NOTES SEE S-1.1 AND S-1.2.

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Project title/Titre du projet  
**TOFINO, BC**  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsc̓iik tašii**  
**“Going in the right direction on the trail”**

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SHAWN LI / 2018-12

PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

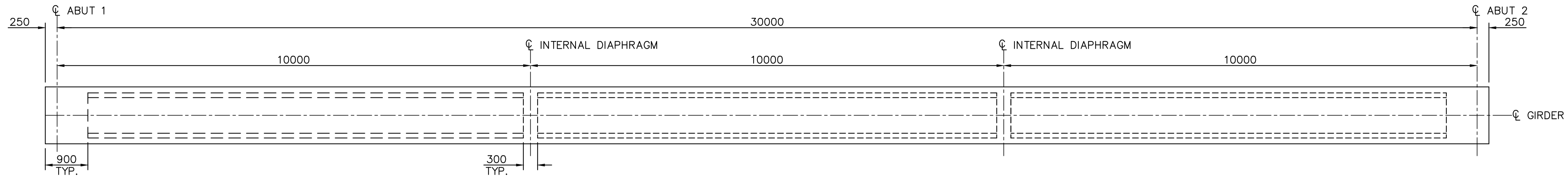
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**ʔapsc̓iik tašii**  
**(Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #19**  
**WINGWALL & APPROACH SLAB**  
**REINFORCEMENT**

Project No./No. du projet <b>PCA #1522</b>	Sheet/Feuille <b>S-4.6</b> OF	Revision no./La Révision no. <b>0</b>
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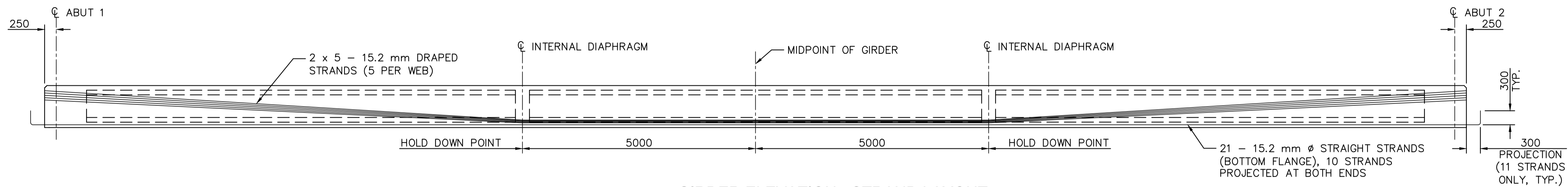




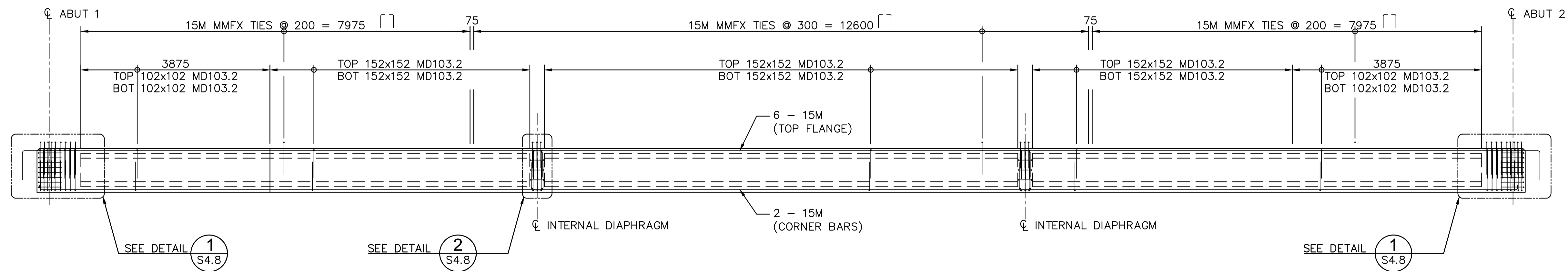
**PARSONS**



**GIRDER PLAN**  
1:50



**GIRDER ELEVATION - STRAND LAYOUT**  
1:50



**GIRDER ELEVATION - REBAR LAYOUT**  
1:50

NOTE:

1. FOR GENERAL NOTES, SEE DRAWINGS S-1.1 AND S-1.2.

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**ʔapsc̓iik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

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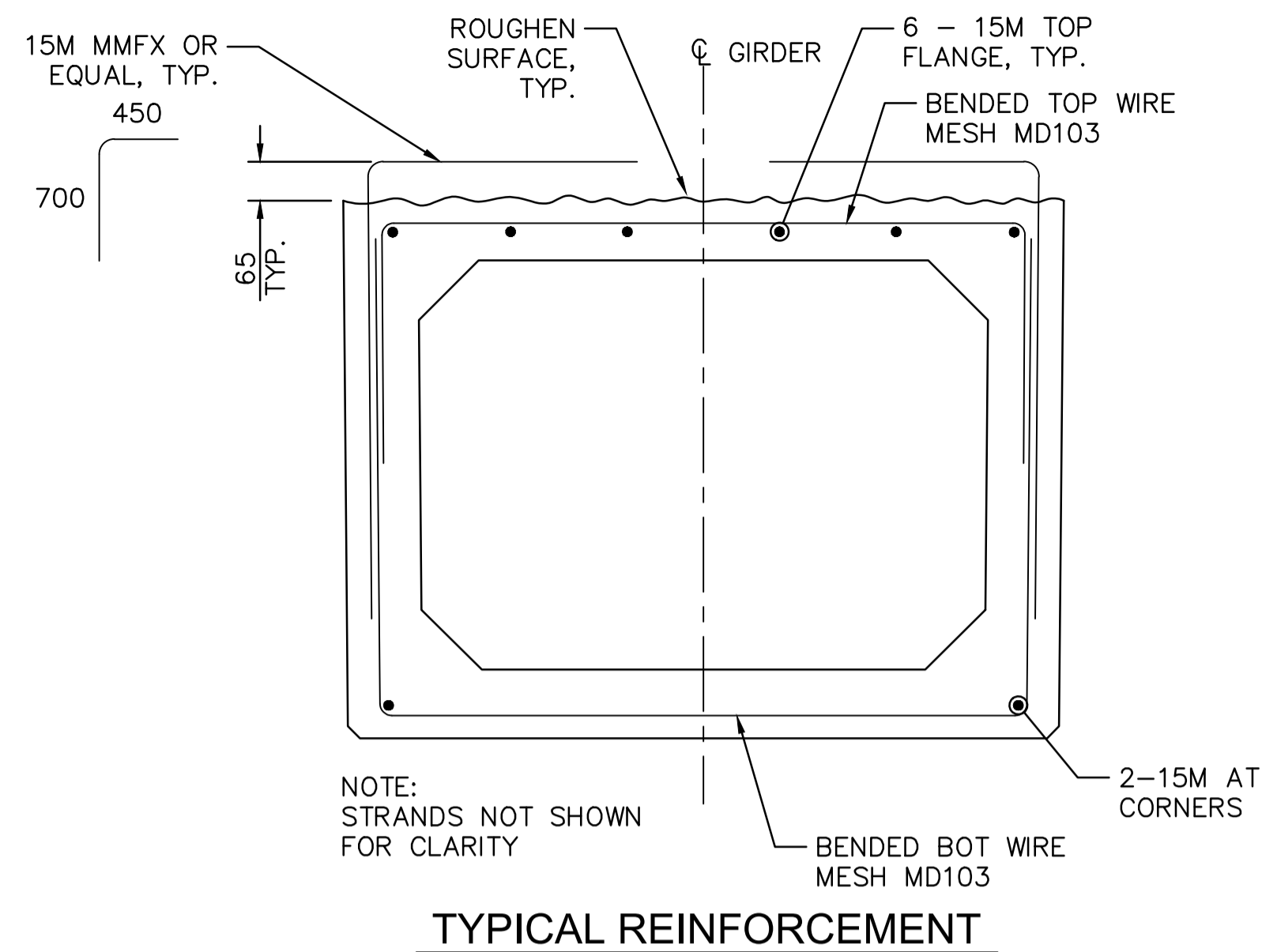
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Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsc̓iik tašii (Ups-cheek ta-shee)**  
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**BRIDGE #19 GIRDER SHEET 1**

Project No./No. du projet PCA #1522	Sheet/Feuille <b>S-4.7</b> OF	Revision no./La Révision no. <b>0</b>
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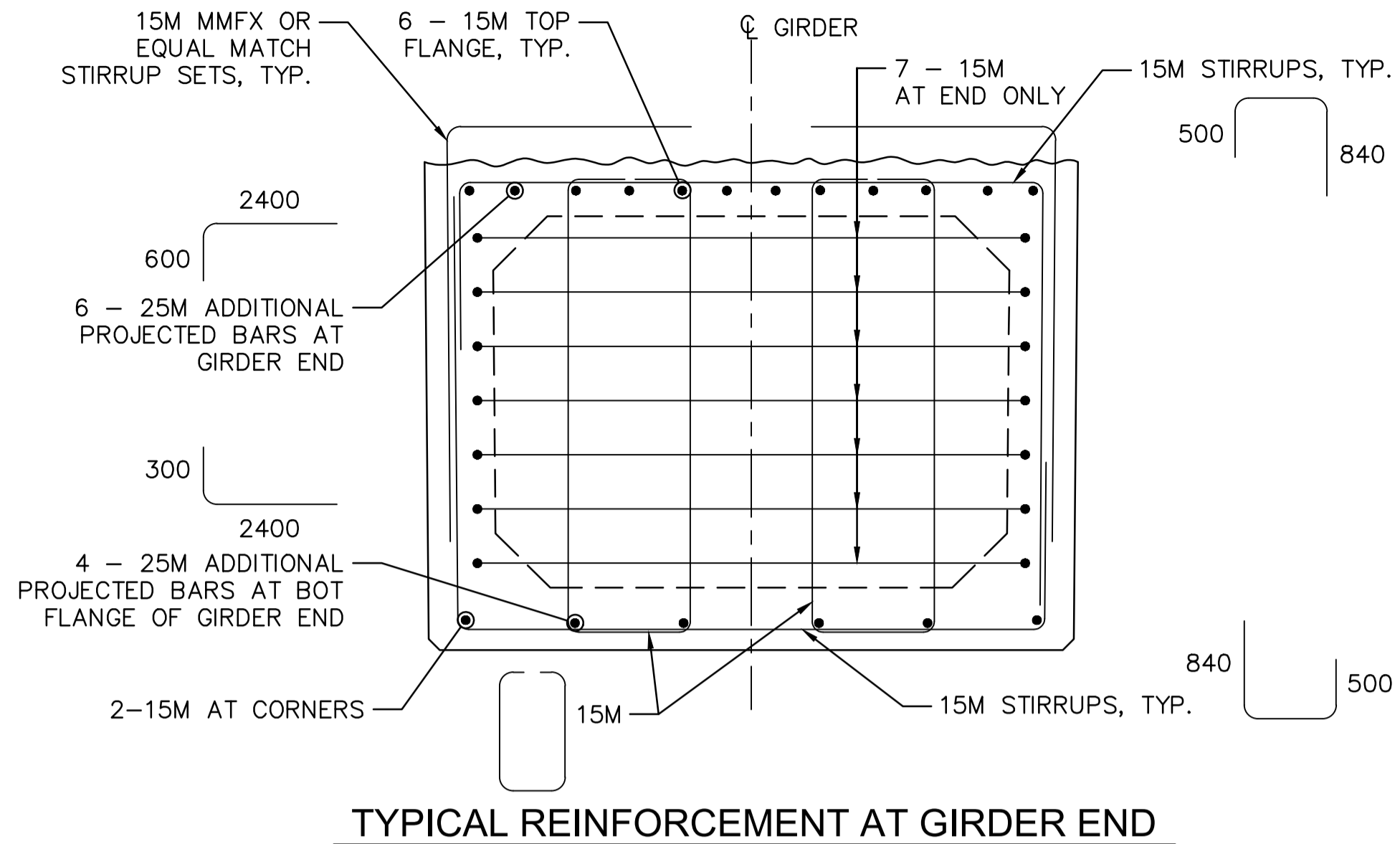


**PARSONS**



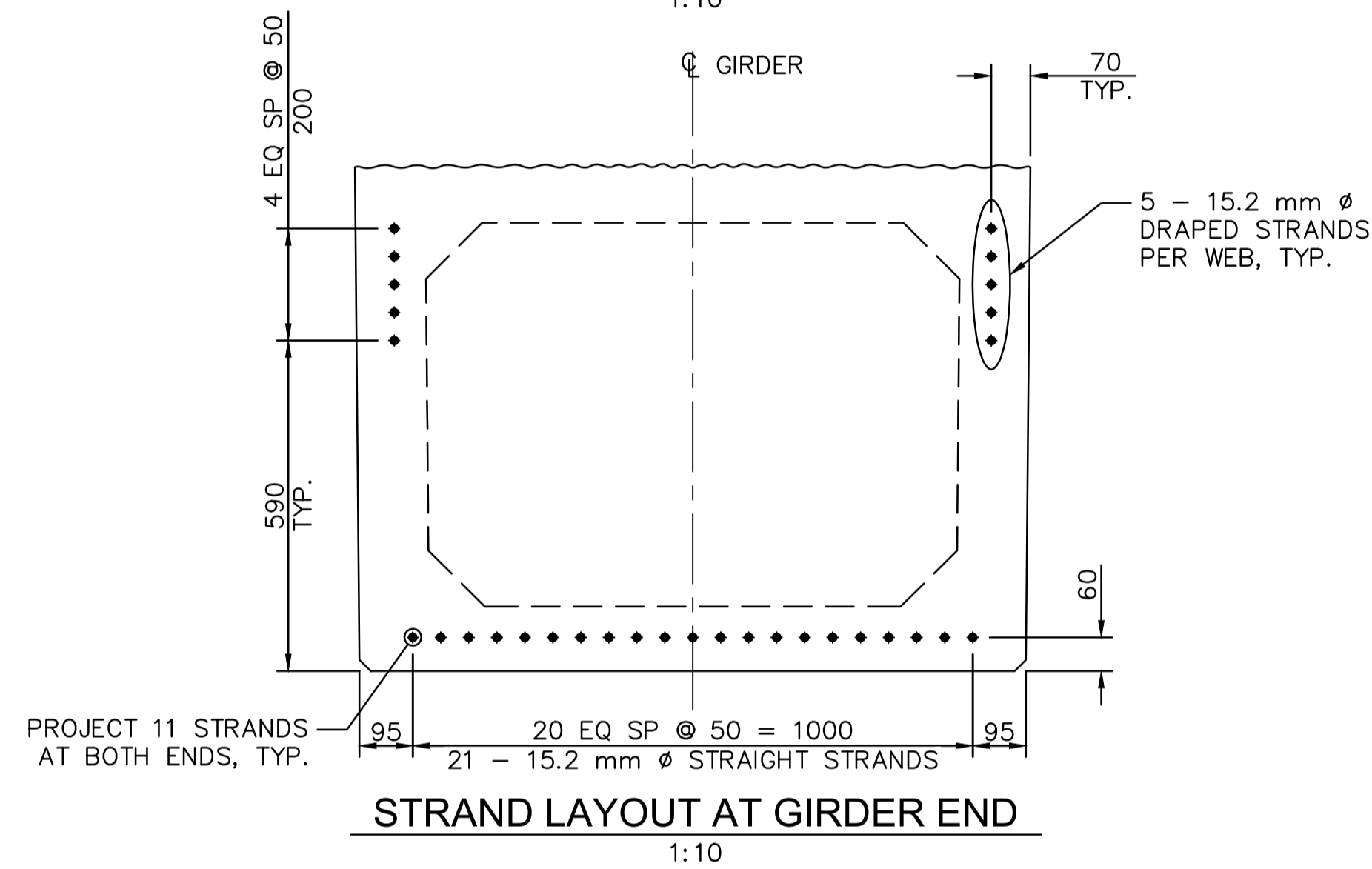
**TYPICAL REINFORCEMENT**

1:10



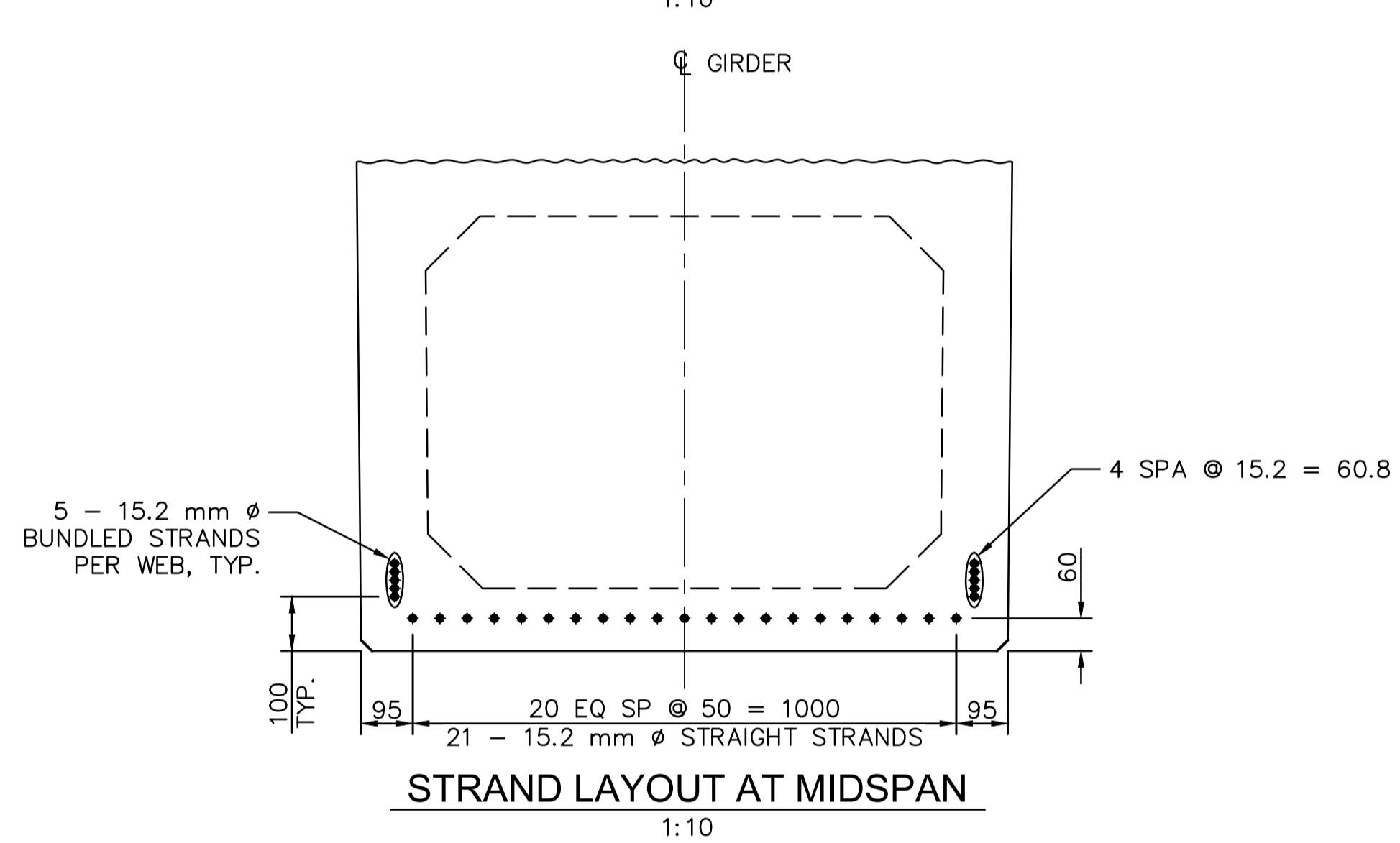
**TYPICAL REINFORCEMENT AT GIRDER END**

1:10



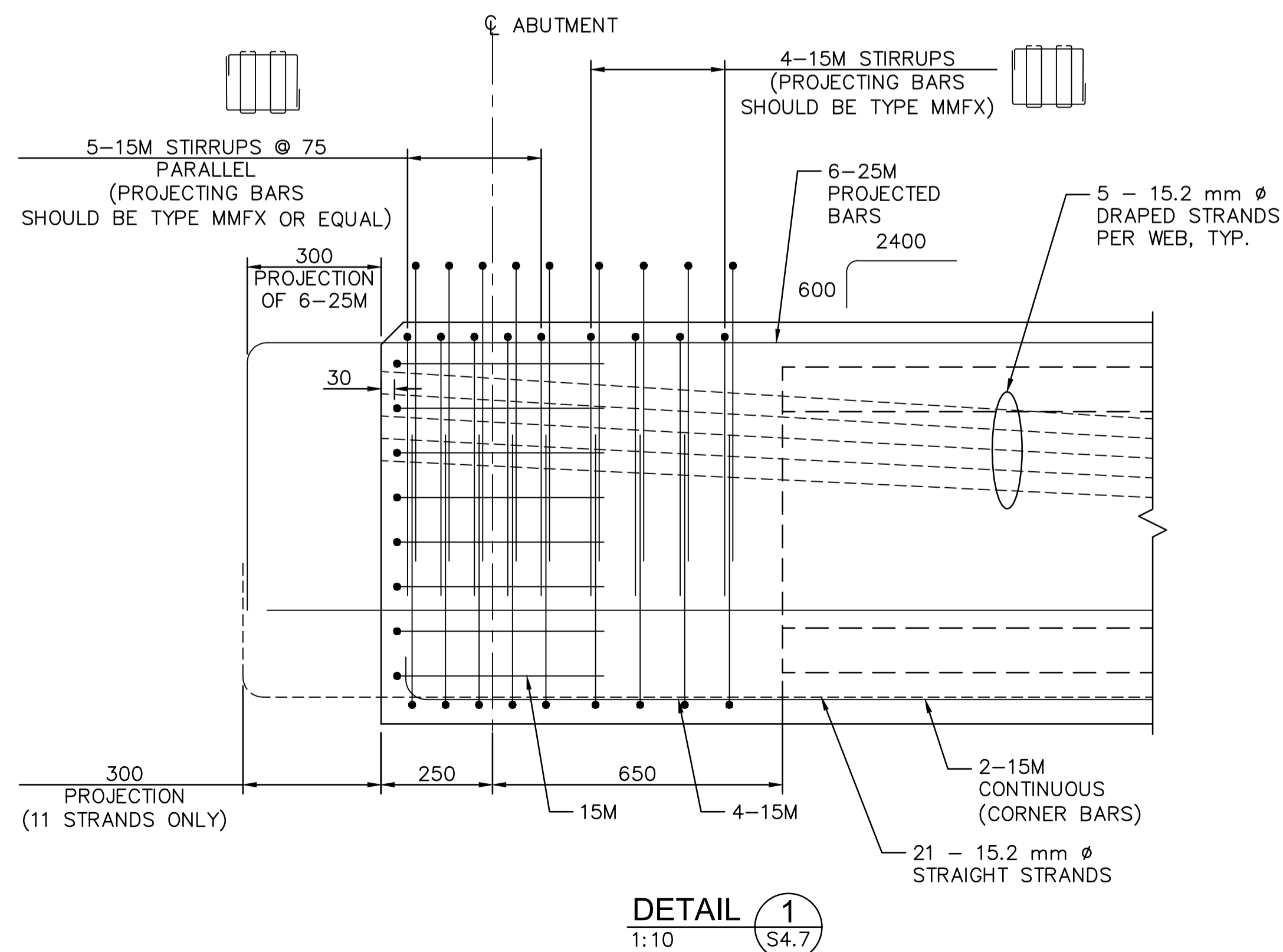
**STRAND LAYOUT AT GIRDER END**

1:10

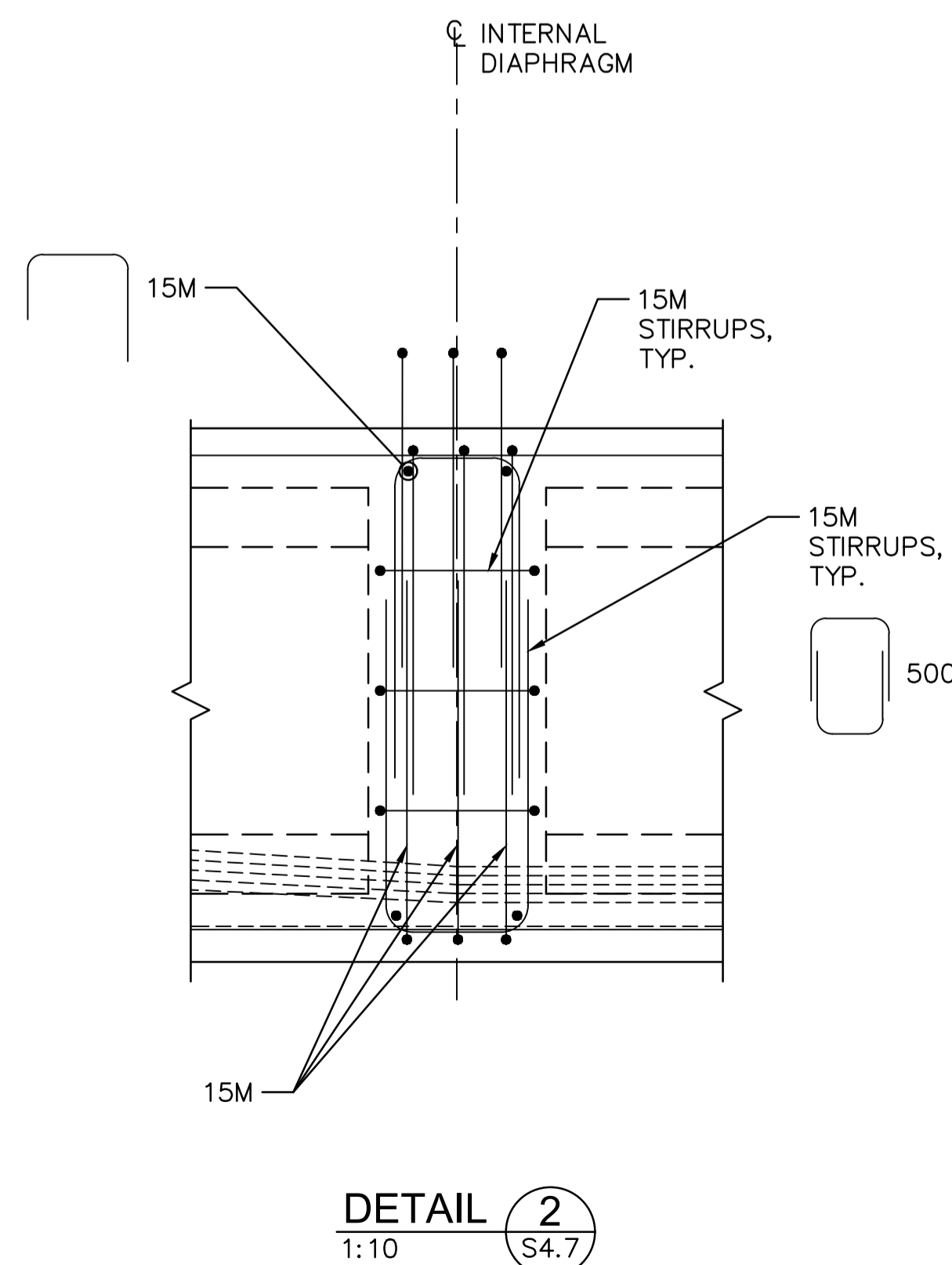


**STRAND LAYOUT AT MIDSPAN**

1:10



**DETAIL 1**  
1:10 S4.7



**DETAIL 2**  
1:10 S4.7

**NOTES:**

- FOR GENERAL NOTES SEE S-1.1 AND S-1.2.

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0	ISSUED FOR TENDER	18/12/2016

Revision/Revision	Description/Description	Date/Date
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Client/client  
Parks Canada Agency L'Agence Parcs Canada

Project title/Titre du projet  
**TOFINO, BC**  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsčik tašii**  
**“Going in the right direction on the trail”**

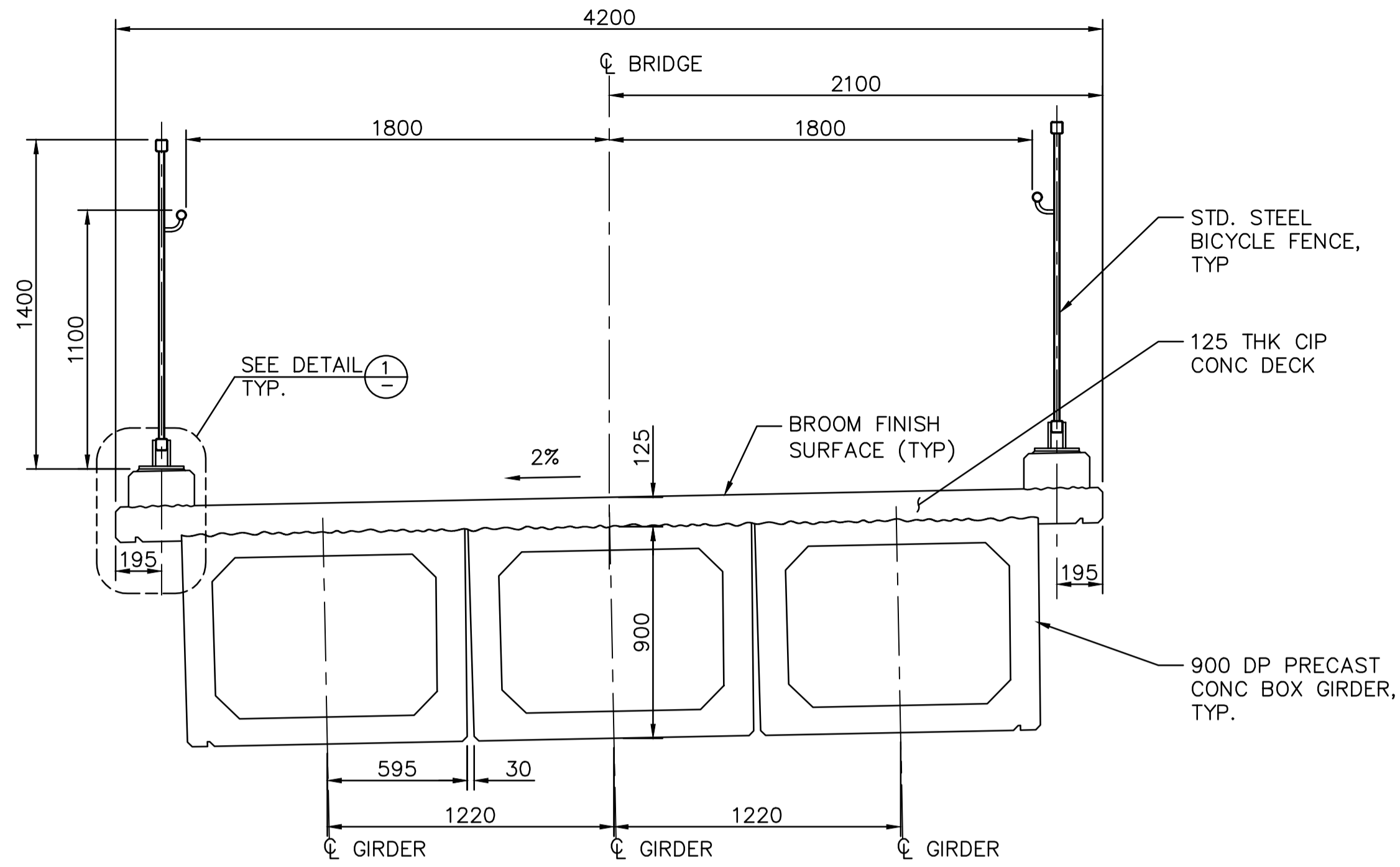
Consultant Signature Only  
Designed by/Concept par  
DANIEL YANG / 2018-11  
Drawn by/Dessiné par  
SHAWN LI / 2018-12  
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsčik tašii**  
**“Going in the right direction on the trail”**  
**BRIDGE #19**  
**GIRDER**  
**SHEET 2**

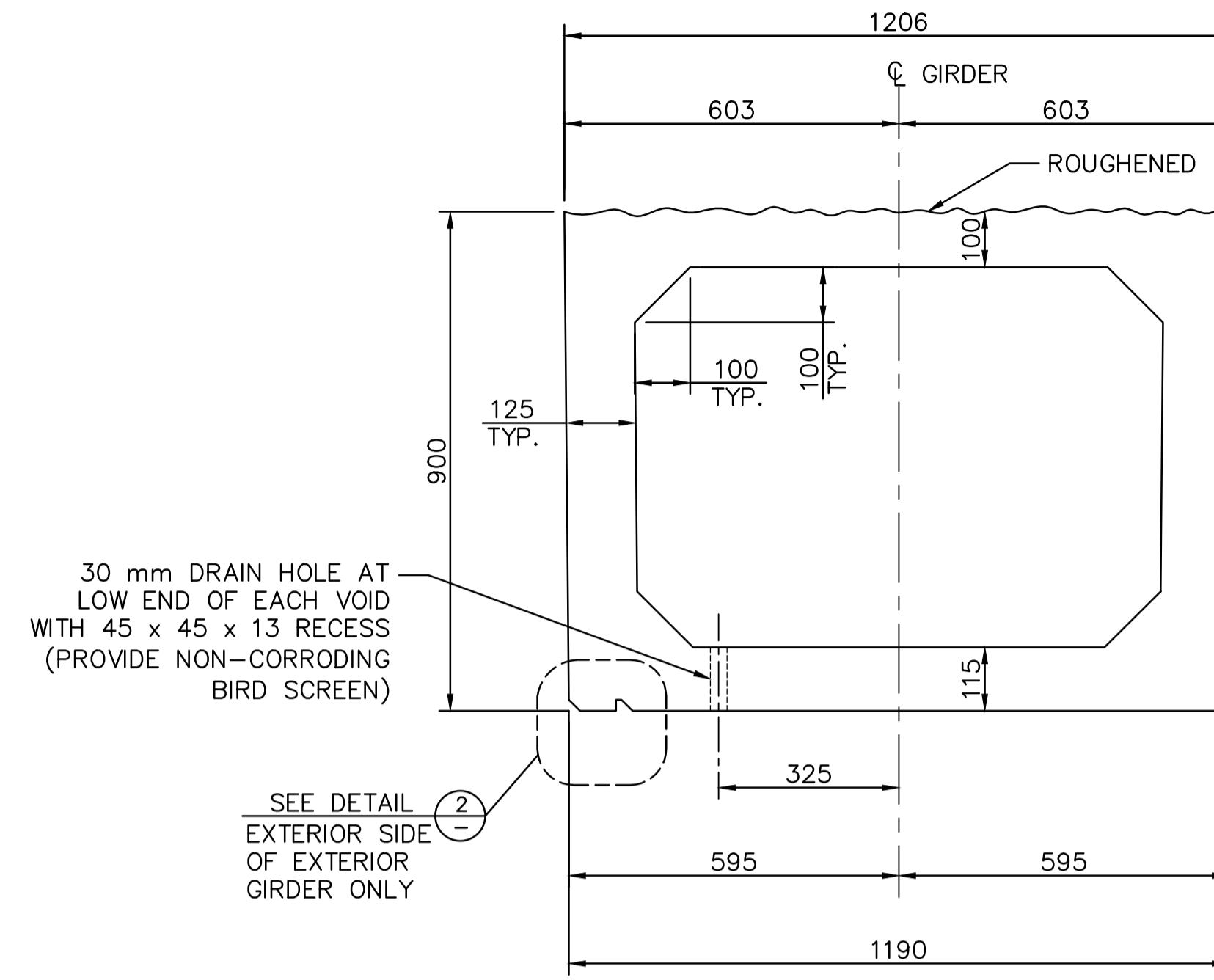
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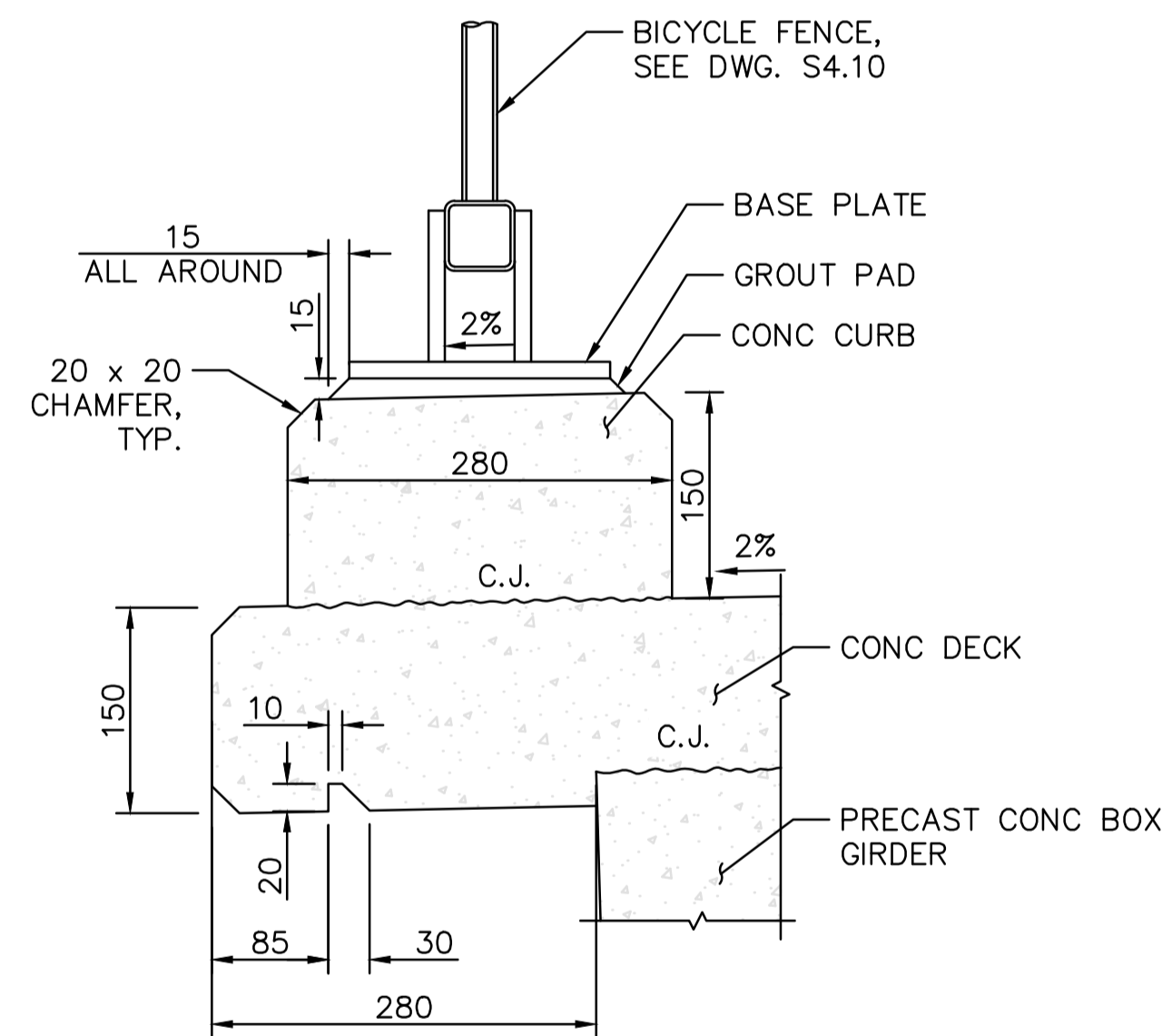
**PARSONS**



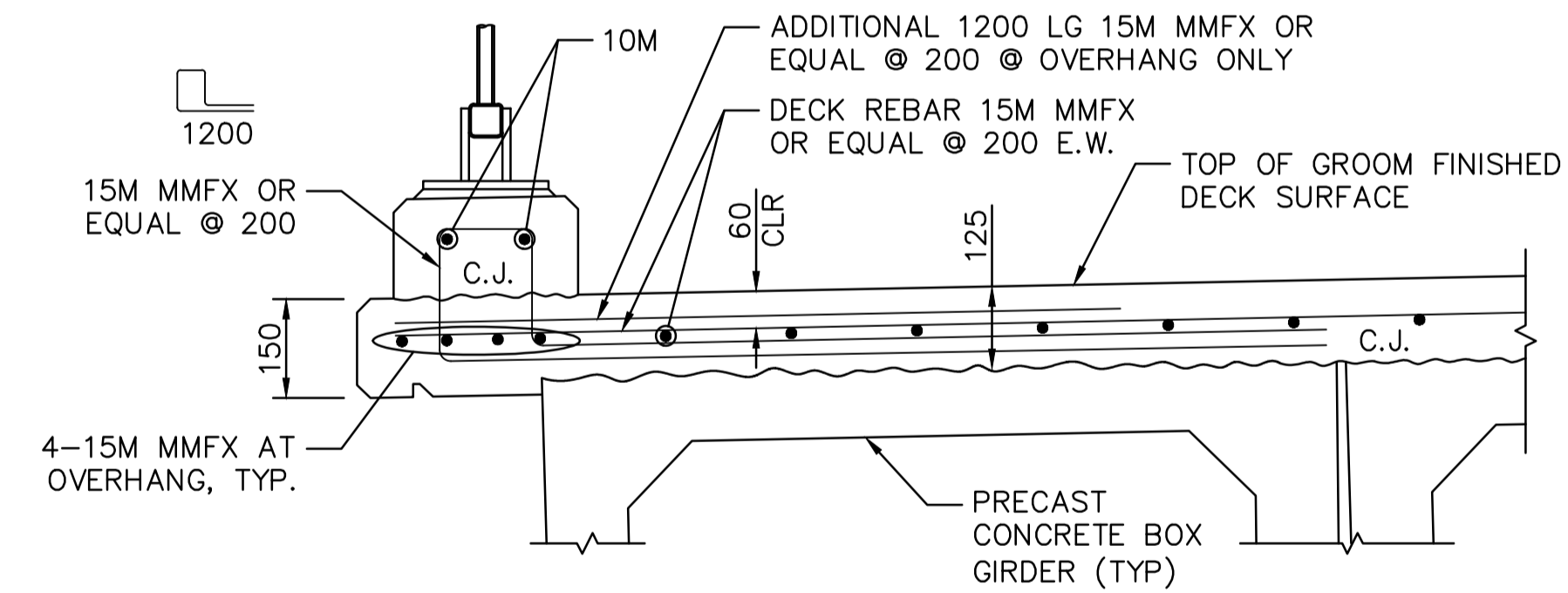
**TYPICAL DECK LAYOUT**  
1:20



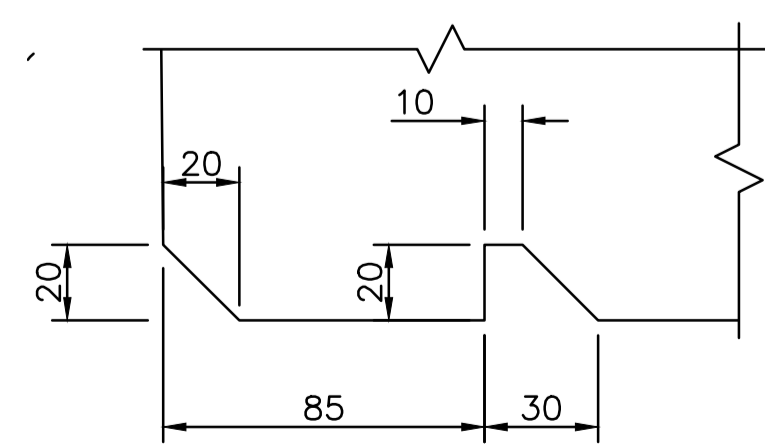
**TYPICAL BOX GIRDER SECTION**  
1:10



**DETAIL 1**  
1:5



**DECK REINFORCEMENT**  
1:10



**DETAIL 2**  
1:2

**NOTES:**

1. HIGH WATER LEVEL (HWL) BASED ON 1:200 YEAR EVENT.
2. FOUNDATION DETAILS TO BE CONFIRMED FOLLOWING GROUND INVESTIGATION ON SITE.
3. ALL CONCRETE WORKS SHALL BE COMPLETELY ISOLATED FROM THE CREEK, WITH SECONDARY CONTAINMENT TO PREVENT GROUT ENTERING THE CREEK. THE CONTRACTOR SHALL SUBMIT A GROUT CONTAINMENT PLAN TO THE ENVIRONMENTAL MONITOR FOR APPROVAL AND REQUEST INSPECTION AND APPROVAL OF FORMWORK BY THE ENVIRONMENTAL MONITOR PRIOR TO ANY CONCRETE POURS.

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0	ISSUED FOR TENDER	18/12/2018

Revision/	Description/Description	Date/Date
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Client/Client

Project title/Titre du projet  
**TOFINO, BC**  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsčik tašii**  
**“Going in the right direction on the trail”**

Consultant Signature Only

Designed by/Concept par  
DANIEL YANG / 2018-11

Drawn by/Dessiné par  
SHAWN LI / 2018-12

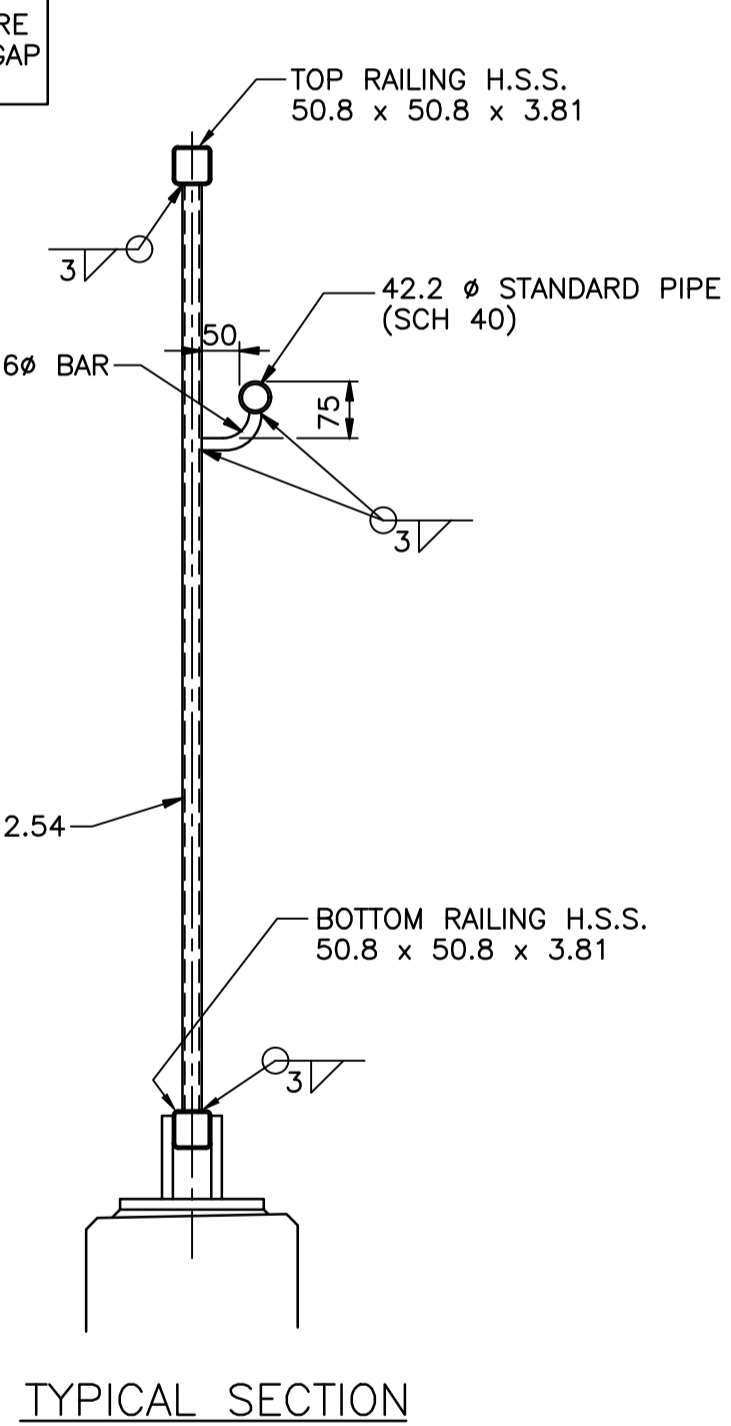
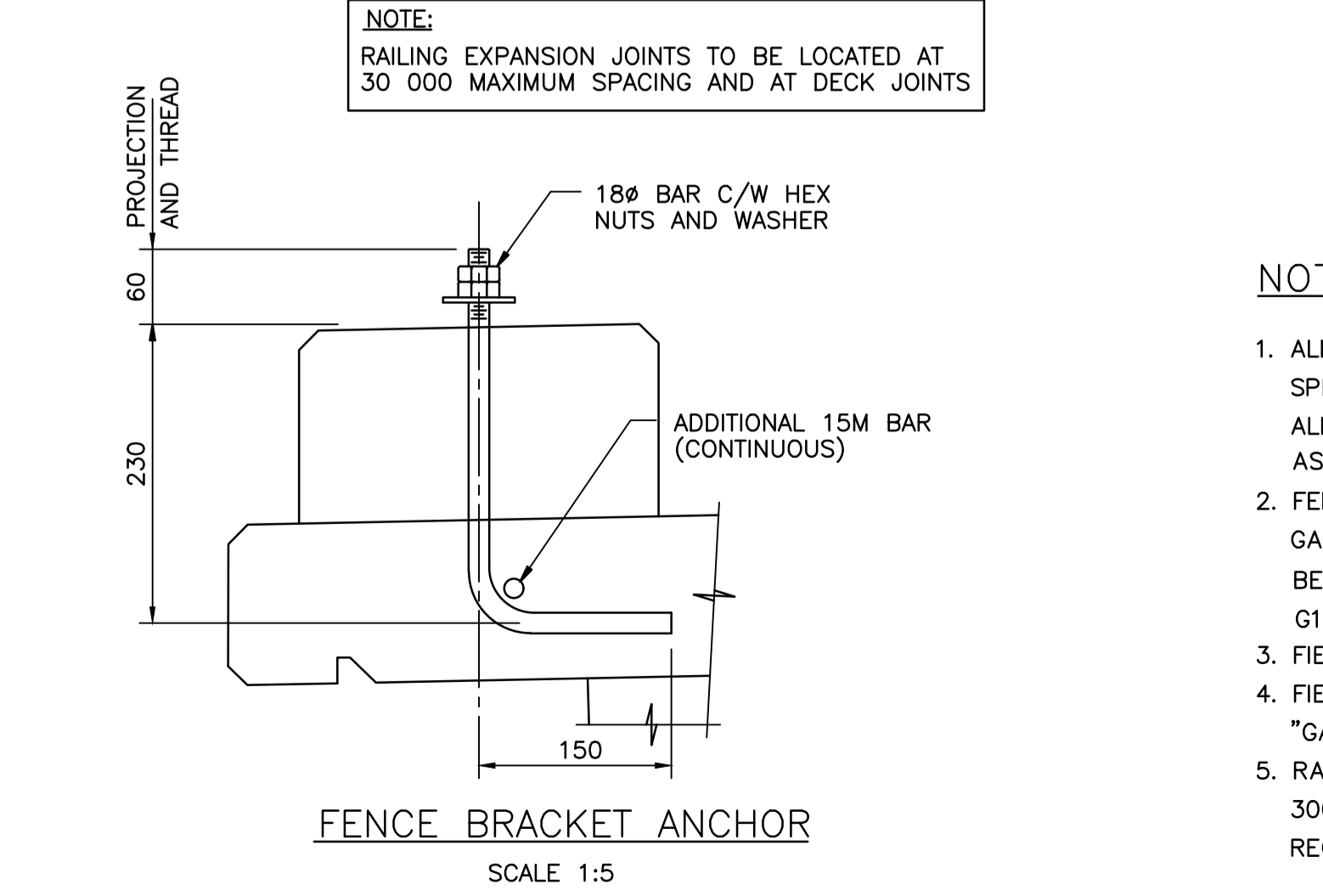
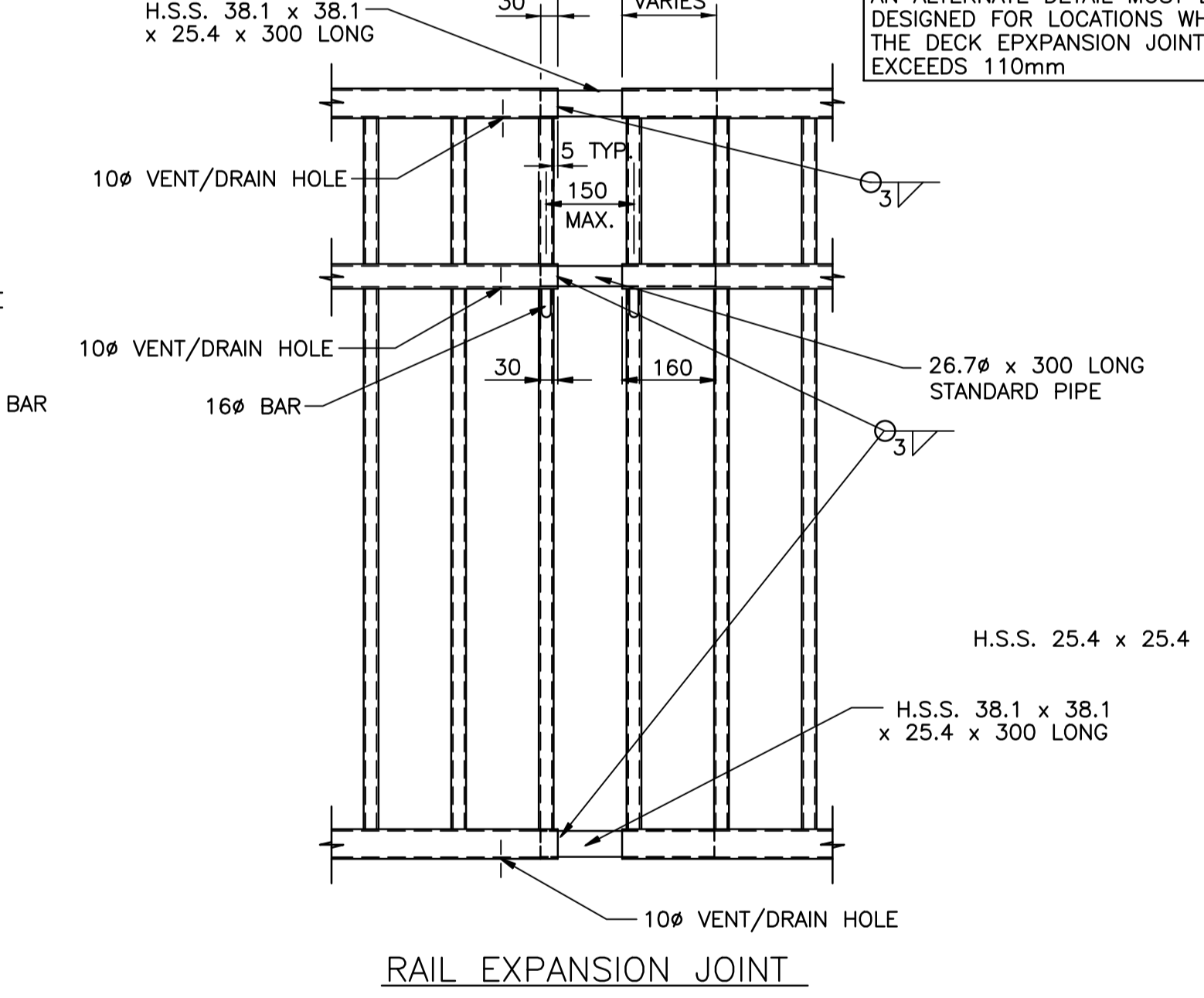
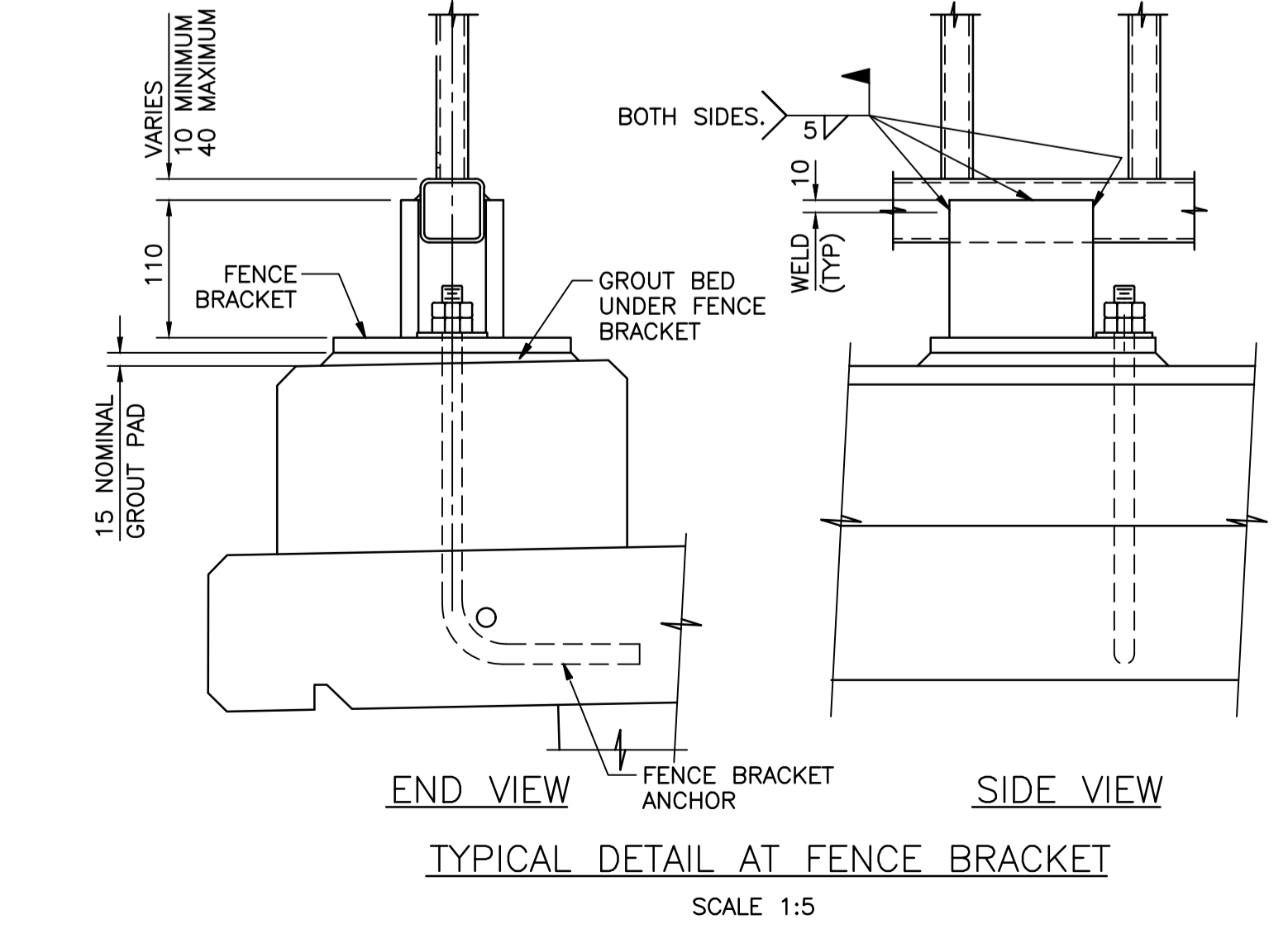
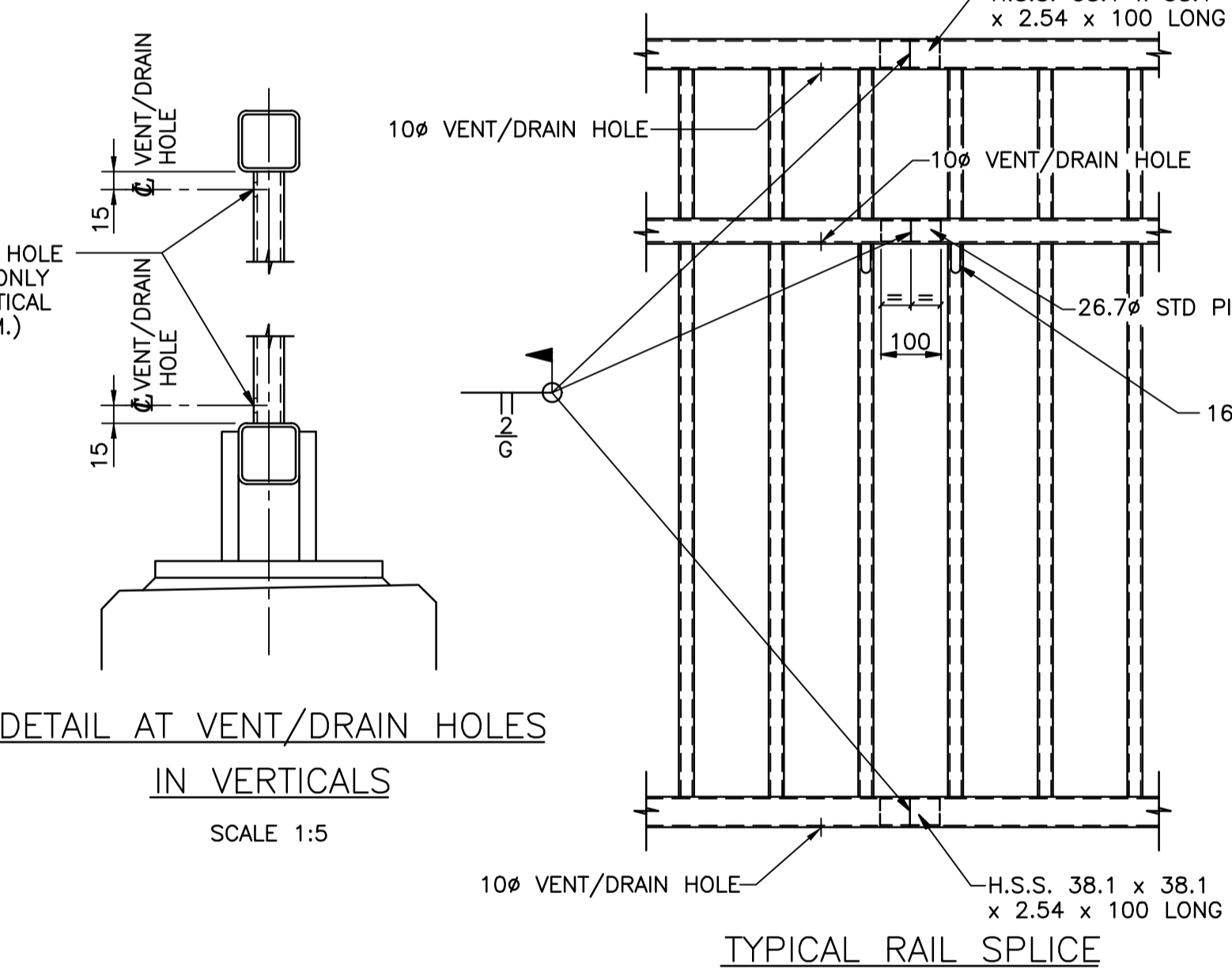
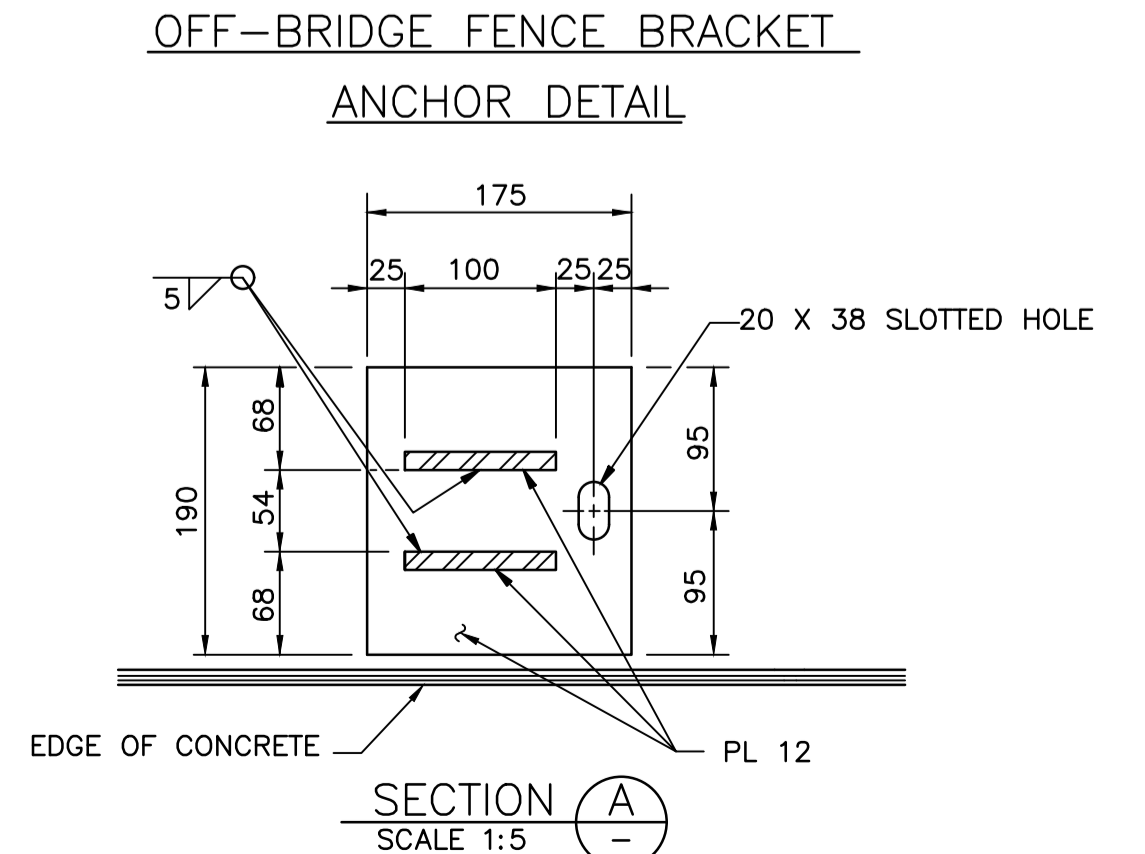
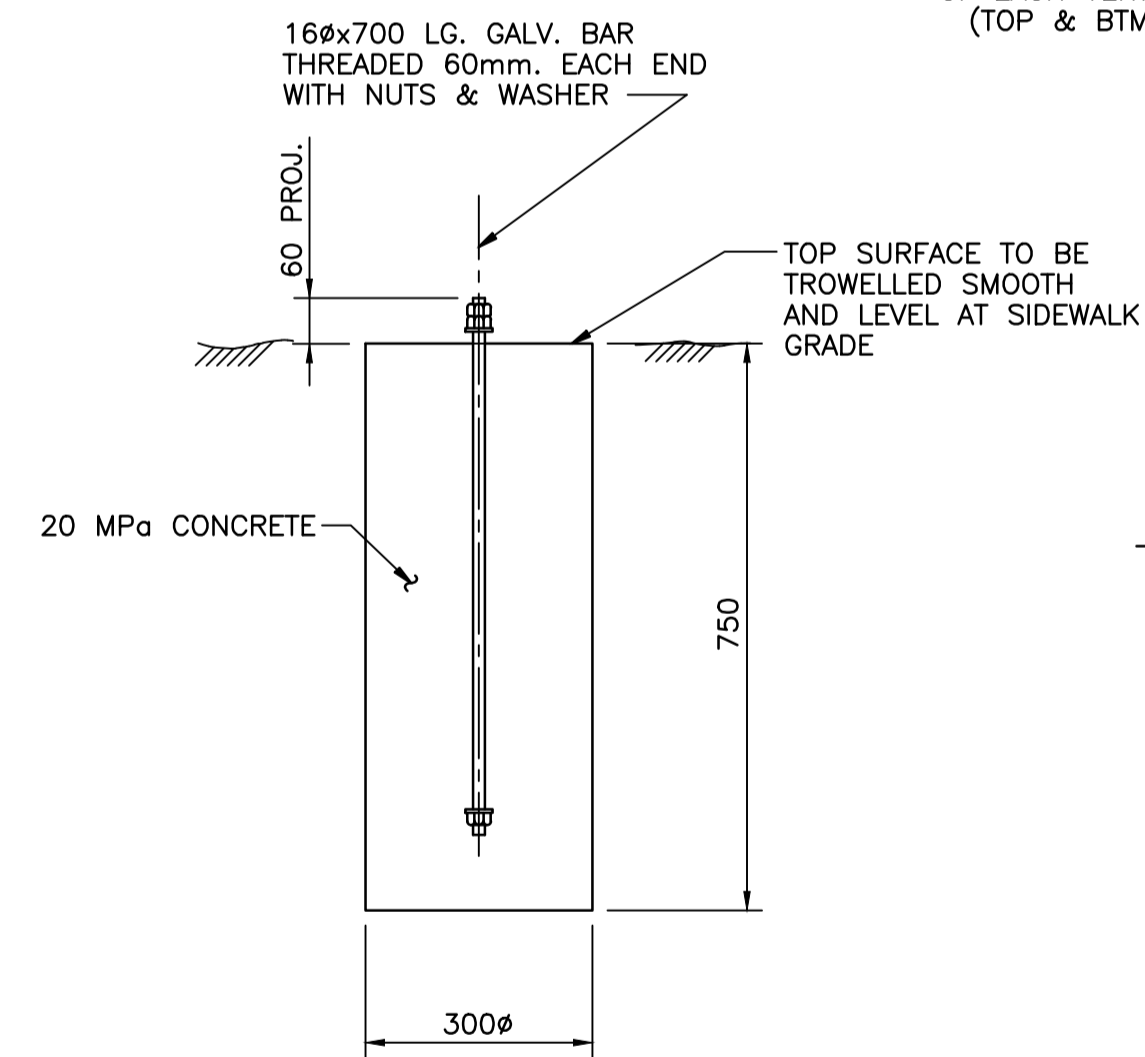
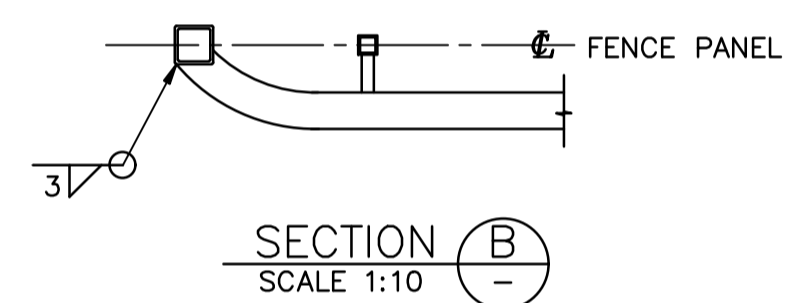
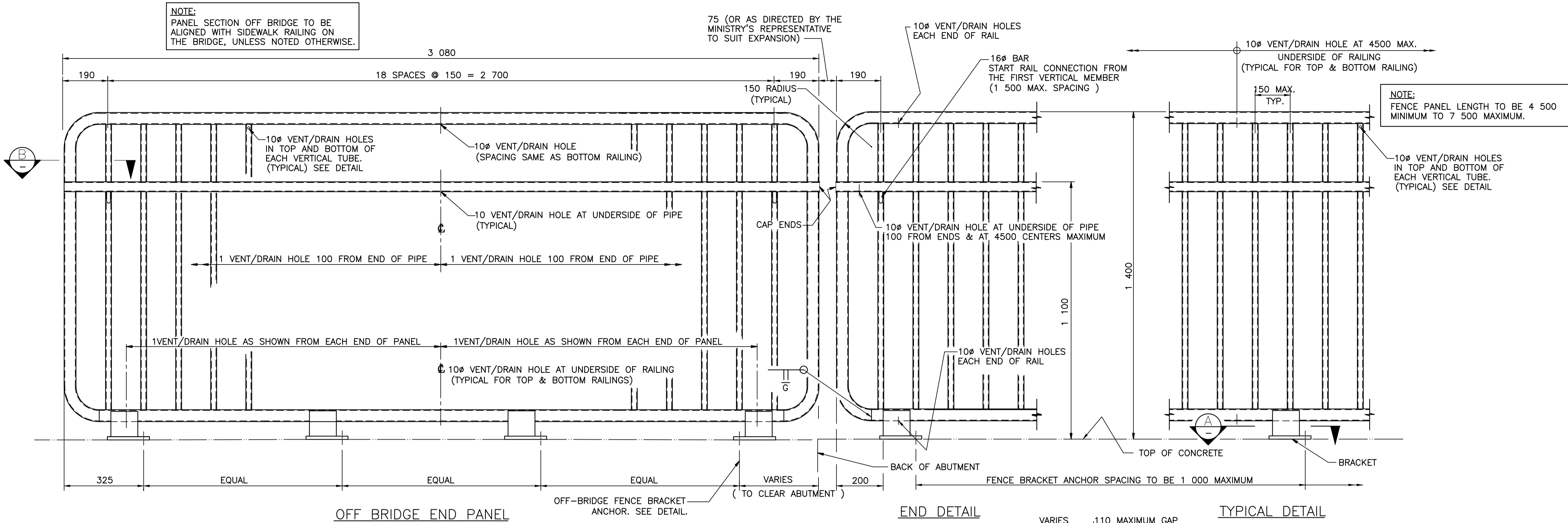
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Drawing title/Titre du dessin  
**ʔapsčik tašii**  
**(Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #19**  
**DECK LAYOUT AND DETAILS**

Project No./No. du projet <b>PCA #1522</b>	Sheet/Feuille <b>S-4.9</b> OF	Revision no./La Révision no. <b>0</b>
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**PARSONS**



- NOTES:**
- ALL H.S.S. STEELWORK FOR FENCES TO BE C.S.A. SPECIFICATION G40.21M GRADE 350W CLASS C. ALL OTHER STEELWORK TO BE 260W. PIPE TO BE ASTM STD. A53, GRADE B.
  - FENCE SECTIONS, BRACKETS AND ANCHORS TO BE GALVANIZED AFTER FABRICATION. GALVANIZING TO BE IN ACCORDANCE WITH C.S.A. SPECIFICATION G164, TABLE 1.
  - FIELD CONNECTIONS TO BE WELDED EXCEPT AS NOTED.
  - FIELD WELDS TO BE PAINTED WITH 2 COATS OF "GALVAON" OR EQUAL.
  - RAIL ELEMENTS TO BE USED IN CURVES HAVING RADII 300m OR LESS SHALL BE SHOP FORMED TO THE REQUIRED CURVATURE.

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**TOFINO, BC**  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsčik tašii (Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**

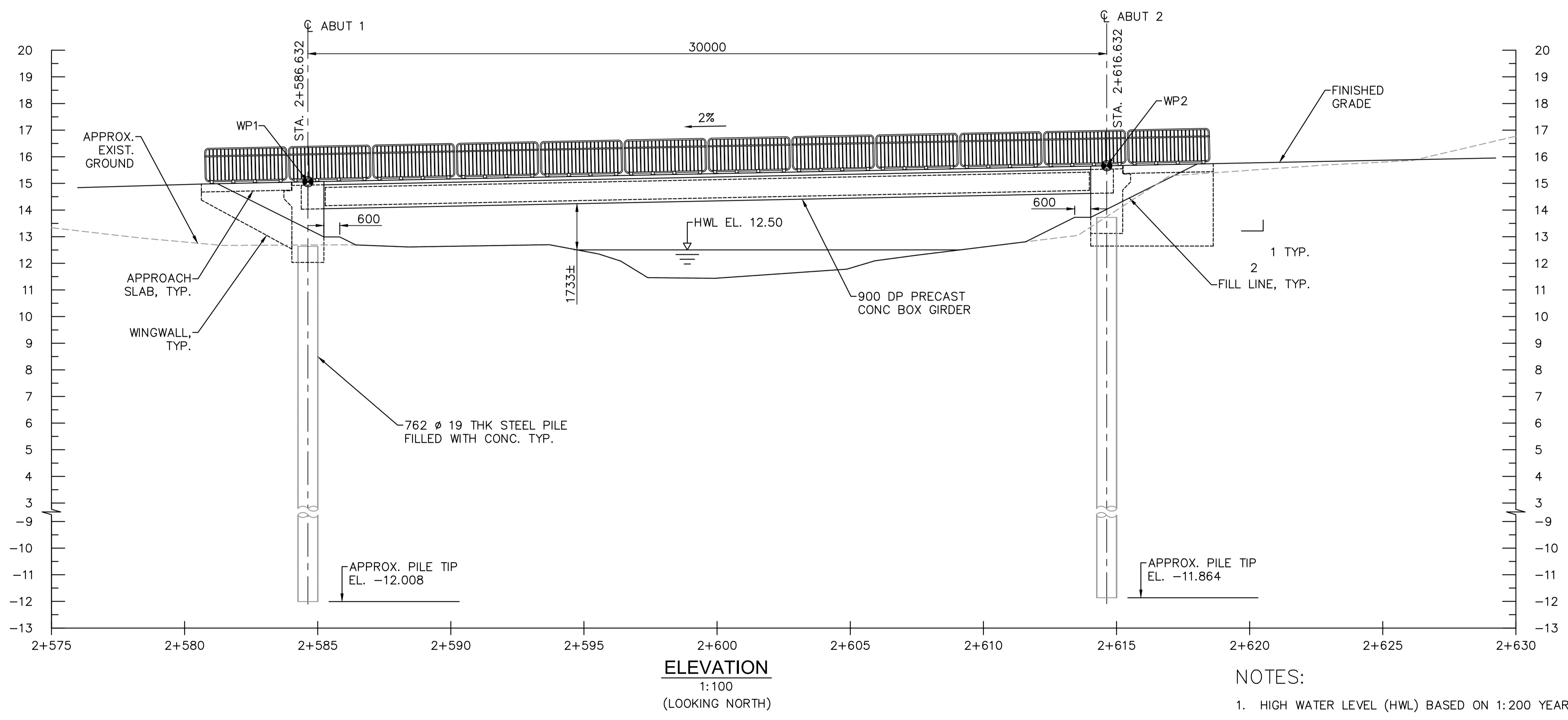
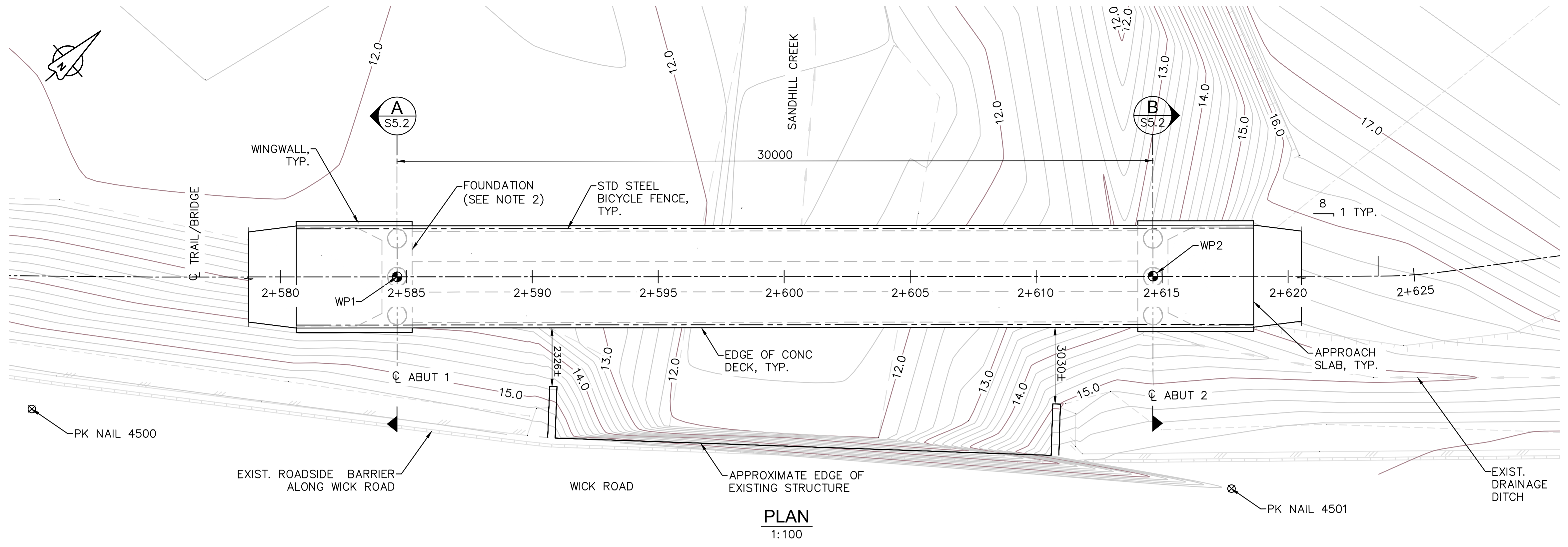
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JACKIE HICKS

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**"Going in the right direction on the trail"**  
**BRIDGE #19**  
**BICYCLE FENCE**

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PCA #1522  
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**PARSONS**



- NOTES:**
1. HIGH WATER LEVEL (HWL) BASED ON 1:200 YEAR EVENT.
  2. FOUNDATION DETAILS TO BE CONFIRMED FOLLOWING GROUND INVESTIGATION ON SITE.
  3. FOR WORK POINTS TABLE AND SURVEY BENCHMARKS TABLE, SEE DRAWING S-5.2.
  4. FOR RETAINING WALL, SEE DRAWINGS W-11.1 TO 11.5.

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**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsc̓iik taʔii**  
**“Going in the right direction on the trail”**

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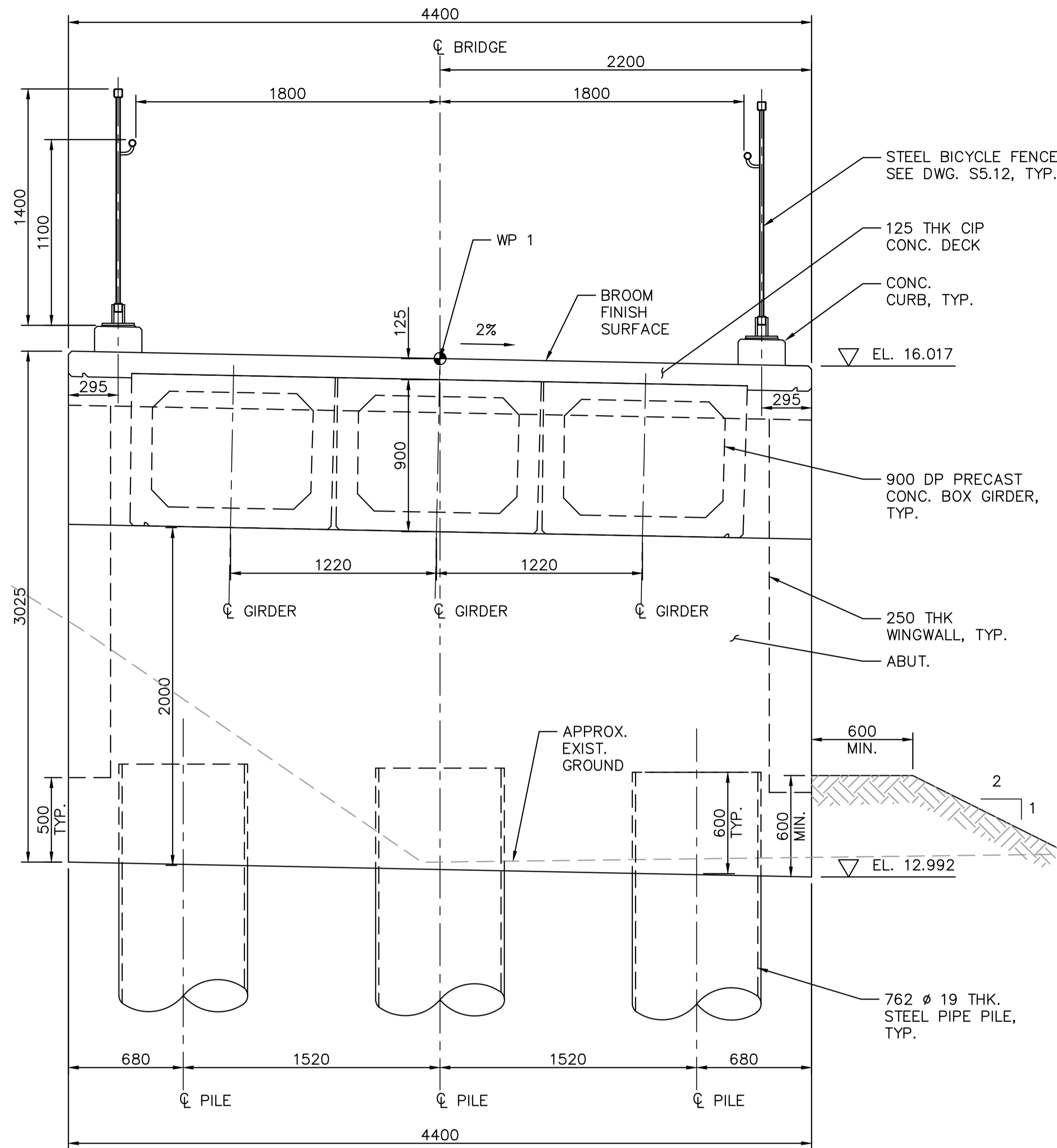
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**“Going in the right direction on the trail”**  
**BRIDGE #20**  
**GENERAL ARRANGEMENT**  
**SHEET 1**

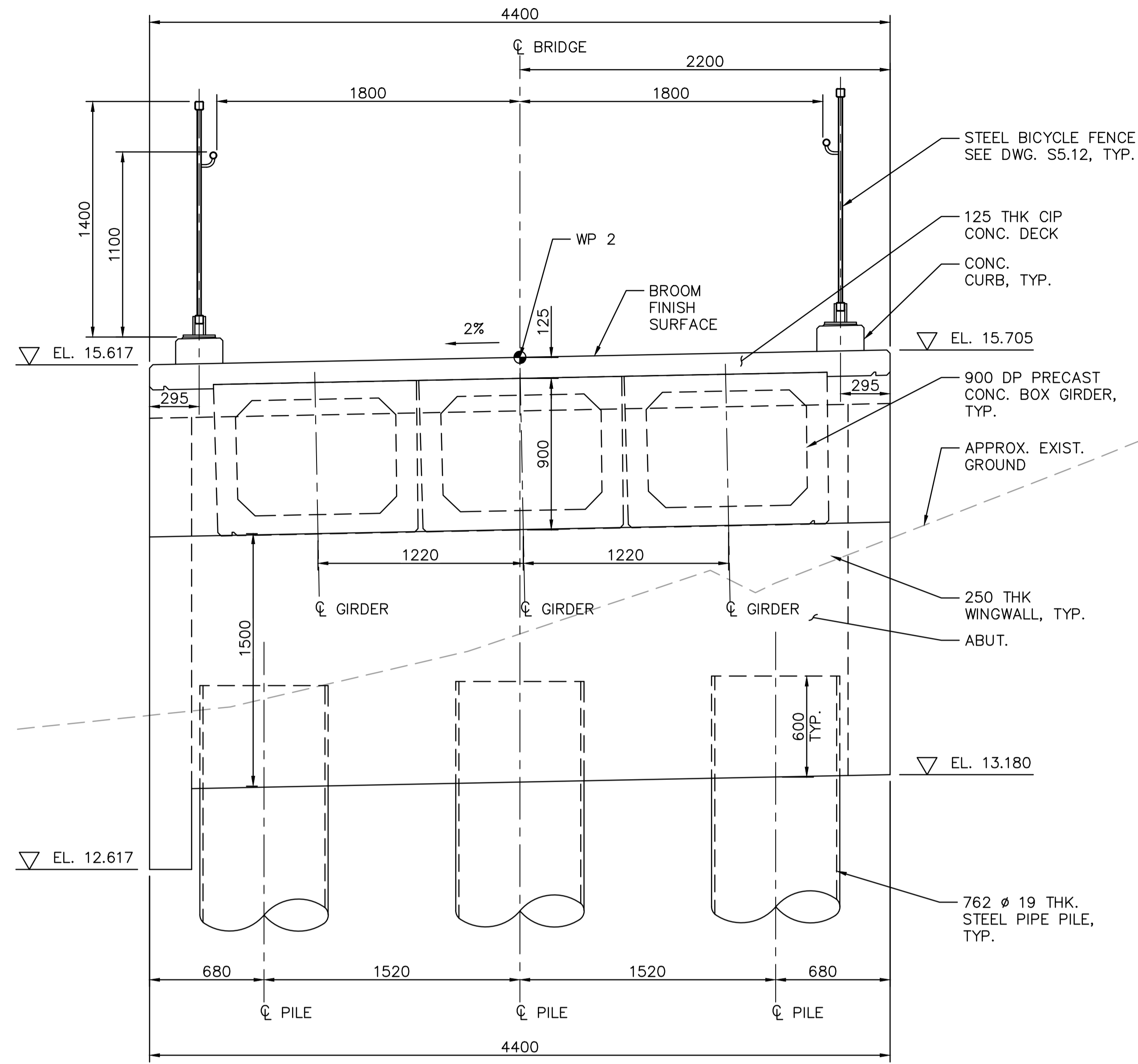
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**PARSONS**



**SECTION A** (LOOKING WEST)  
1:20 S5.1



**SECTION B** (LOOKING EAST)  
1:20 S5.1

**NOTES:**

- BRIDGE #20 SPANS THE MAIN STREAM OF SANDHILL CREEK, WHICH IS CONSIDERED VERY HIGH VALUE FISH HABITAT, THERE IS CONFIRMED ADULT SALMON SPAWNING AND JUVENILE SALMONID REARING LOCATED IMMEDIATELY UNDER AND DOWNSTREAM OF BRIDGE #20. AS SUCH, DURING CONSTRUCTION OF BRIDGE #20, THE CONTRACTOR WILL NEED TO STRICTLY ADHERE TO THE MITIGATION MEASURES OUTLINED IN THE CONCRETE HANDLING MITIGATIONS SPECIFICATION AND THE ENVIRONMENTAL PROCEDURES SPECIFICATION INCLUDED IN THE TENDER PACKAGE.
- ALTHOUGH THERE ARE NO INSTREAM WORKS PROPOSED FOR BRIDGE #20, THE WORKS REQUIRED WITHIN THE RIPARIAN AREA AND ON THE BANKS OF SANDHILL CREEK ARE CONSIDERED MODERATE TO HIGH RISK IN TERMS OF SEDIMENT AND EROSION CONTROL. AS SUCH, ALL THE HIGHEST RISK WORK INCLUDING EXCAVATION FOUNDATION, INSTALLATION OF FOUNDATION, AND EARTHWORK IMMEDIATELY ADJACENT TO CREEK MUST BE DONE DURING LEAST RISK WORK WINDOW FOR FISH, WHICH FOR NON-INSTREAM WORKS ONLY IS JUNE 15TH TO SEPTEMBER 15TH.
- THE CONTRACTOR SHALL CONFIRM WITH DEPARTMENT REPRESENTATIVE PRIOR TO COMMENCE THE HIGH RISK CONSTRUCTION WORK, INCLUDING EXCAVATION, FOOTINGS, INSTALLATION OF FOOTINGS AND EARTHWORKS IMMEDIATELY ADJACENT TO CREEK.
- NO CONCRETE POURS TO COMMENCE WITHOUT WRITTEN APPROVAL OF THE ENVIRONMENTAL REPRESENTATIVES.
- ALL CONCRETE POURS SHALL BE COMPLETELY ISOLATED FROM THE CREEK, WITH SECONDARY CONTAINMENT TO PREVENT GROUT ENTERING THE CREEK. THE CONTRACTOR SHALL SUBMIT A GROUT CONTAINMENT PLAN TO THE ENVIRONMENTAL MONITOR FOR APPROVAL AND REQUEST INSPECTION AND APPROVAL OF FORMWORK BY THE ENVIRONMENTAL MONITOR PRIOR TO ANY CONCRETE POURS.
- SURVEY DATA IS BASED UPON THE UTM NAD83 COORDINATE SYSTEM.
- BROOM CONCRETE RUNNING SURFACE BY CONCRETE BROOM APPLYING PERPENDICULAR TO THE ALIGNMENT, AND BROOM MARKS SHOULD BE RUN TOWARDS LOWER SIDE OF THE LATERAL SLOPE.
- ESTIMATED MATERIAL QUANTITY:
  - 900 mm DEEP PRECAST CONCRETE BOX GIRDER: 3 GIRDERS 30.5 m LONG
  - CIP CONCRETE DECK: 17 m<sup>3</sup>
  - CIP CONCRETE - OTHERS: 56.5 m<sup>3</sup>
  - MMFX OR EQUAL REINFORCING STEEL: 4760 kg
  - REINFORCING STEEL: 13560 kg
  - 610x19 STEEL PIPE PILES: 148 m LONG
  - BC MOT STANDARD BICYCLE RAIL: 82.4 m
 CONTRACTOR SHALL VERIFY MATERIAL QUANTITY PRIOR TO COMMENCING WORK.

WORK POINTS TABLE			
WORK POINT	NORTHING	EASTING	EL.
WP1	5432762.007	306866.296	15.061
WP2	5432783.949	306886.755	15.661

BENCHMARKS TABLE			
PK NAIL	NORTHING	EASTING	EL.
4500	5432747.835	306860.231	15.670
4501	5431780.475	306895.042	15.909

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**TOFINO, BC**  
**PACIFIC RIM NATIONAL PARK RESERVE**  
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**(Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**

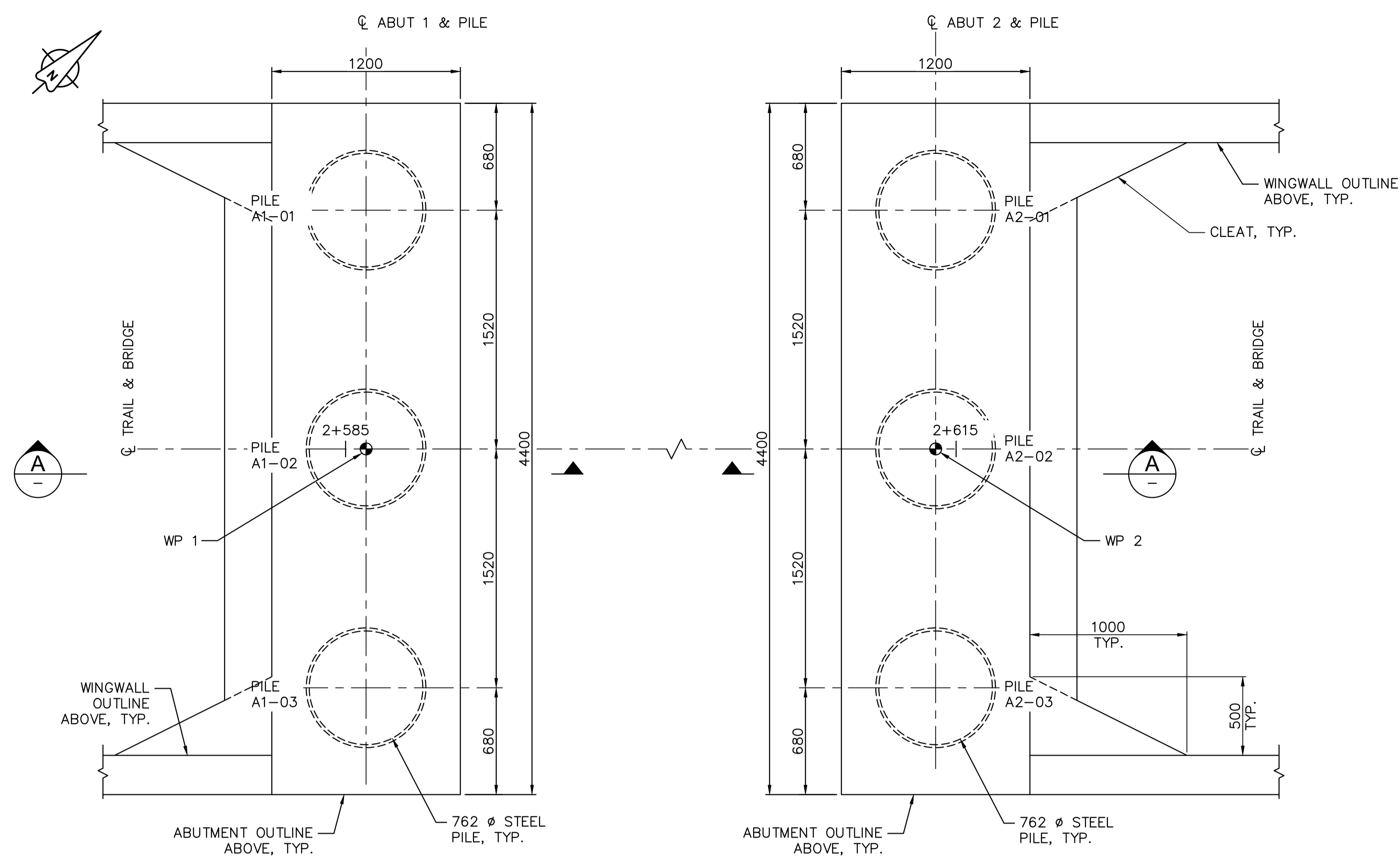
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Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
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**(Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**  
**BRIDGE #20**  
**GENERAL ARRANGEMENT**  
**SHEET 2**

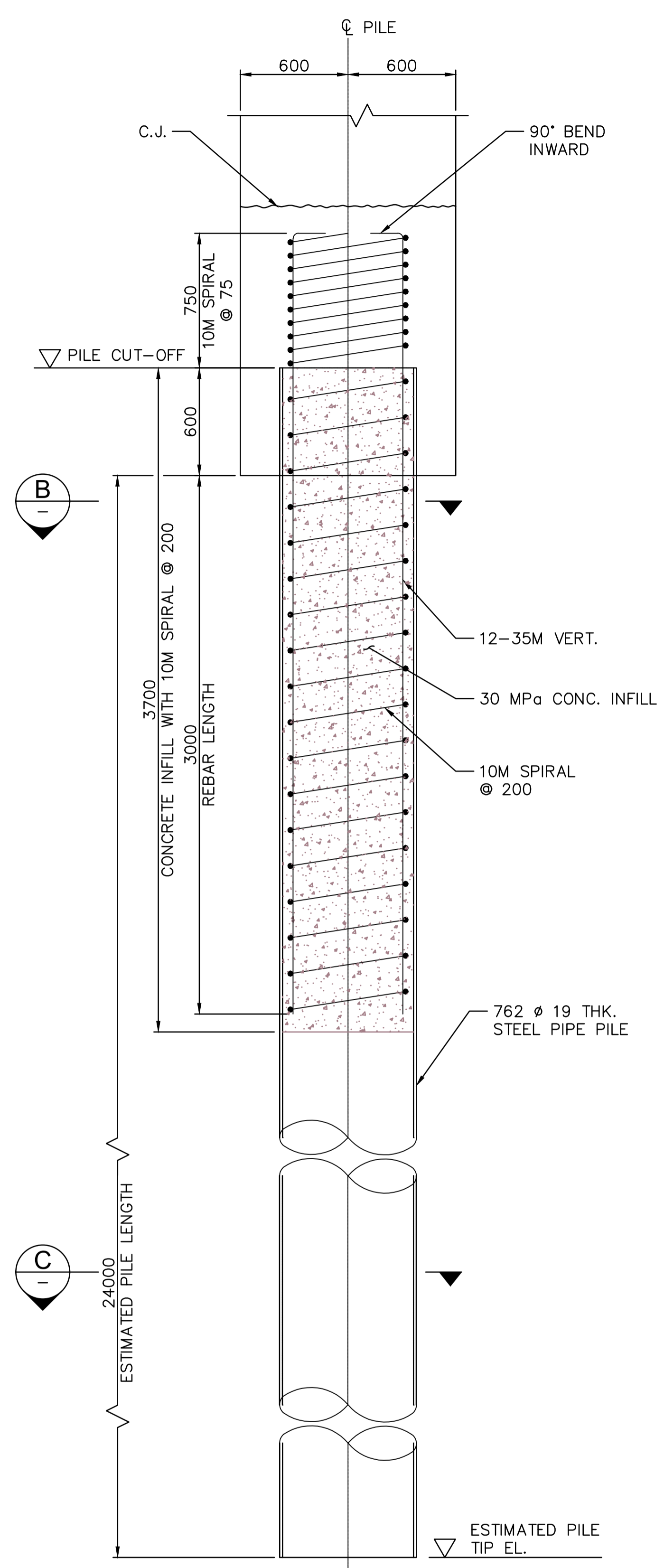
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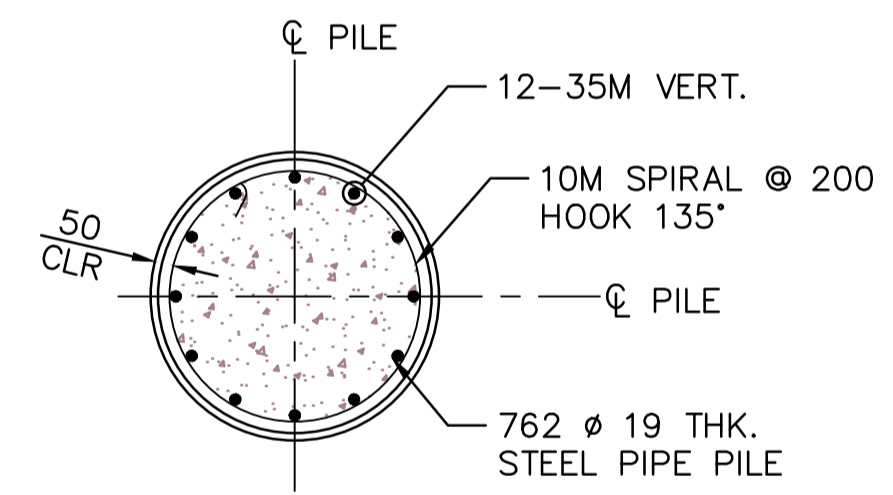
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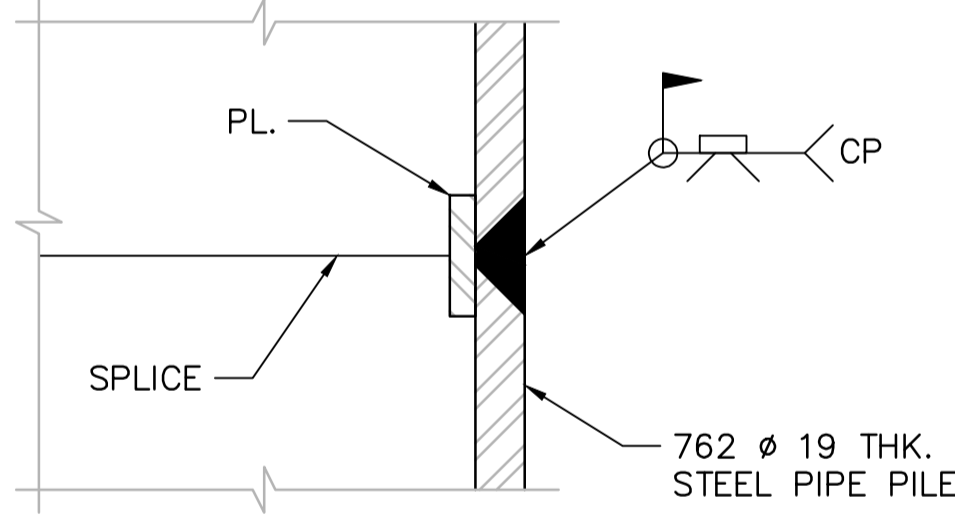
**PILING LAYOUT PLAN**  
1:20



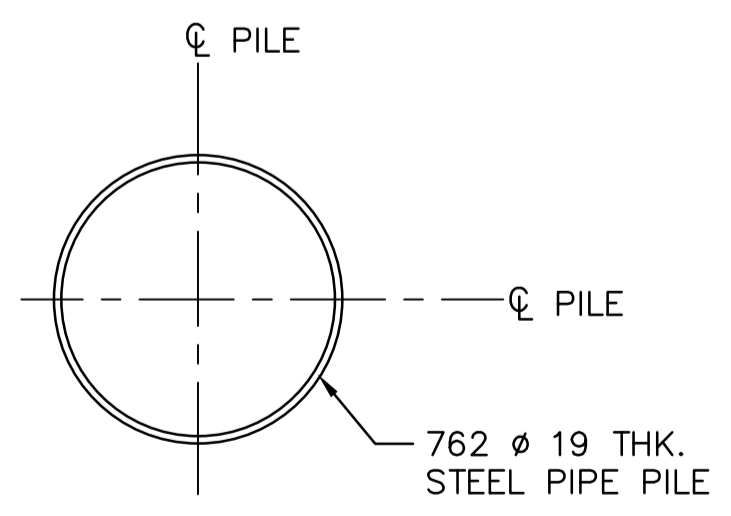
**SECTION A**  
1:20



**SECTION B**  
1:20



**TYPICAL PIPE PILE SPLICE DETAIL**  
1:2



**SECTION C**  
1:20

PILE DATA TABLE			
LOCATION	PILE	PILE CUT-OFF EL. (m)	ESTIMATED PILE TIP EL. (m)
ABUT 1	A1-01	12.606	-12.038
	A1-02	12.636	-12.008
	A1-03	12.666	-11.978
ABUT 2	A2-01	13.706	-11.894
	A2-02	13.736	-11.864
	A2-03	13.766	-11.834

**NOTES:**

- FOR WORK POINTS SEE S5.1.
- PILE SPACING SHALL BE MEASURED AT THE UNDERSIDE OF THE ABUTMENT SEAT.
- PILES TO BE FITTED WITH A CUTTING SHOE AT THE TIP EQUIVALENT TO ASSOCIATED PILE AND FITTING MODEL APF 0-14000.
- THE FACTORED PER PILE LOADS (AXIAL COMPRESSION LOAD)
  - SLS1: PERMANENT: 391 kN
  - MAX: 456 kN
  - ULS1: PERMANENT: 470 kN
  - MAX: 595 kN
  - ULS5 (SEISMIC): 870 kN

- PROPOSED PILE CAPACITY AND PILE ELEVATION DESIGNED ARE BASED ON GEOTECHNICAL INFORMATION OBTAINED FROM BOREHOLE BH17-08, BH17-14, BH17-15, WHICH MAYBE NOT WELL REPRESENT DEEP SOIL LAYER GEOTECHNICAL CONDITION OF BRIDGE #20 LOCATIONS. CONTRACTOR SHALL INVESTIGATE DEEP LAYER SOIL BY INCREASING BOREHOLE DEPTH AT BH17-08, OR DRILL AN ADDITIONAL BOREHOLE CLOSE TO EITHER OF ABUTMENT 1 OR 2 SIDE, CARRY OUT SOIL TEST, OBTAIN ACCURATE GEOTECHNICAL DATA/INFORMATION, NOTIFY THE DEPARTMENT REPRESENTATIVE TO VERIFY PILE CAPACITY AND PILE TIP ELEVATION PRIOR TO COMMENCE FOUNDATION CONSTRUCTION.

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**TOFINO, BC**

**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsc̓iik tašii**  
**“Going in the right direction on the trail”**

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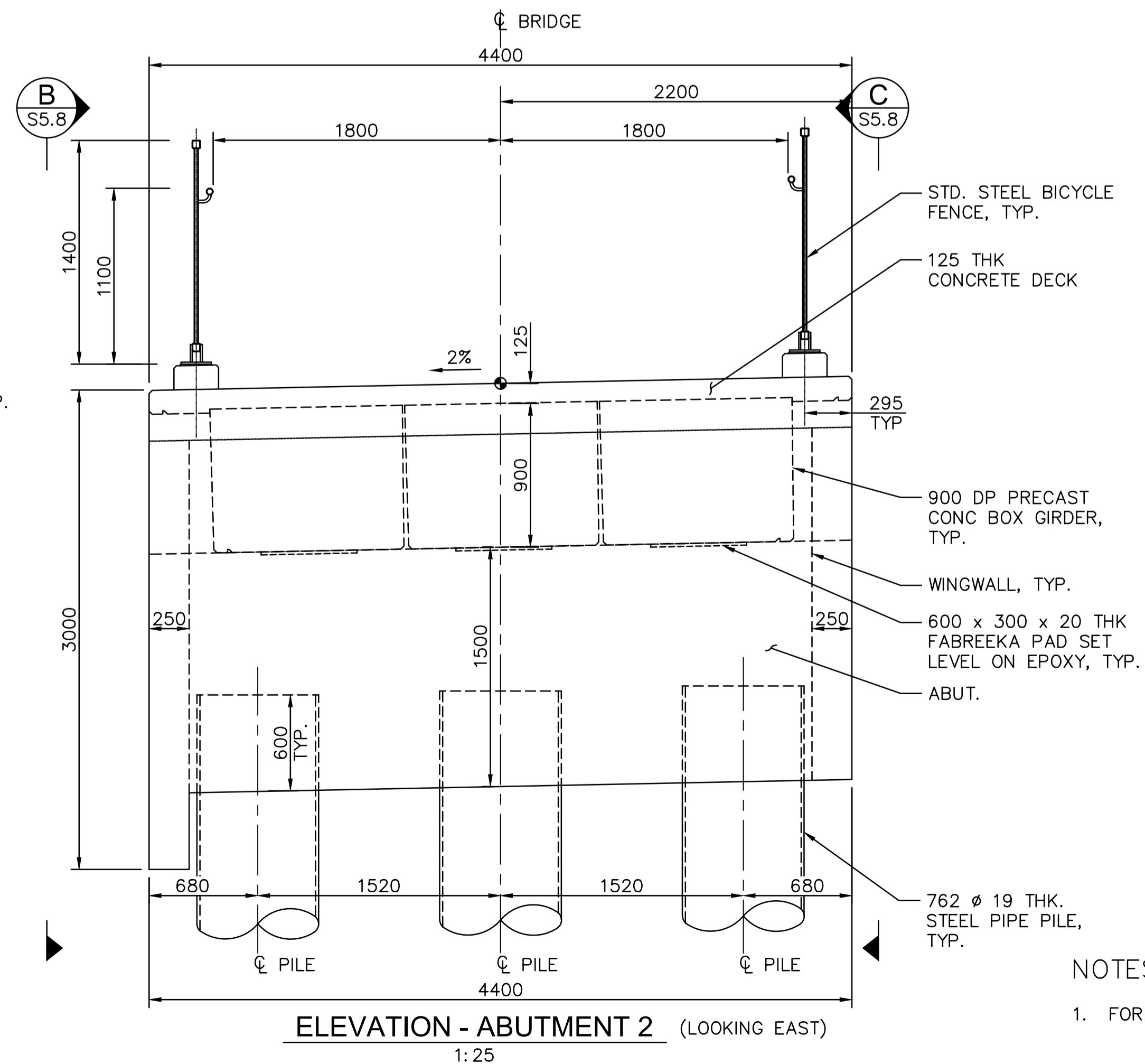
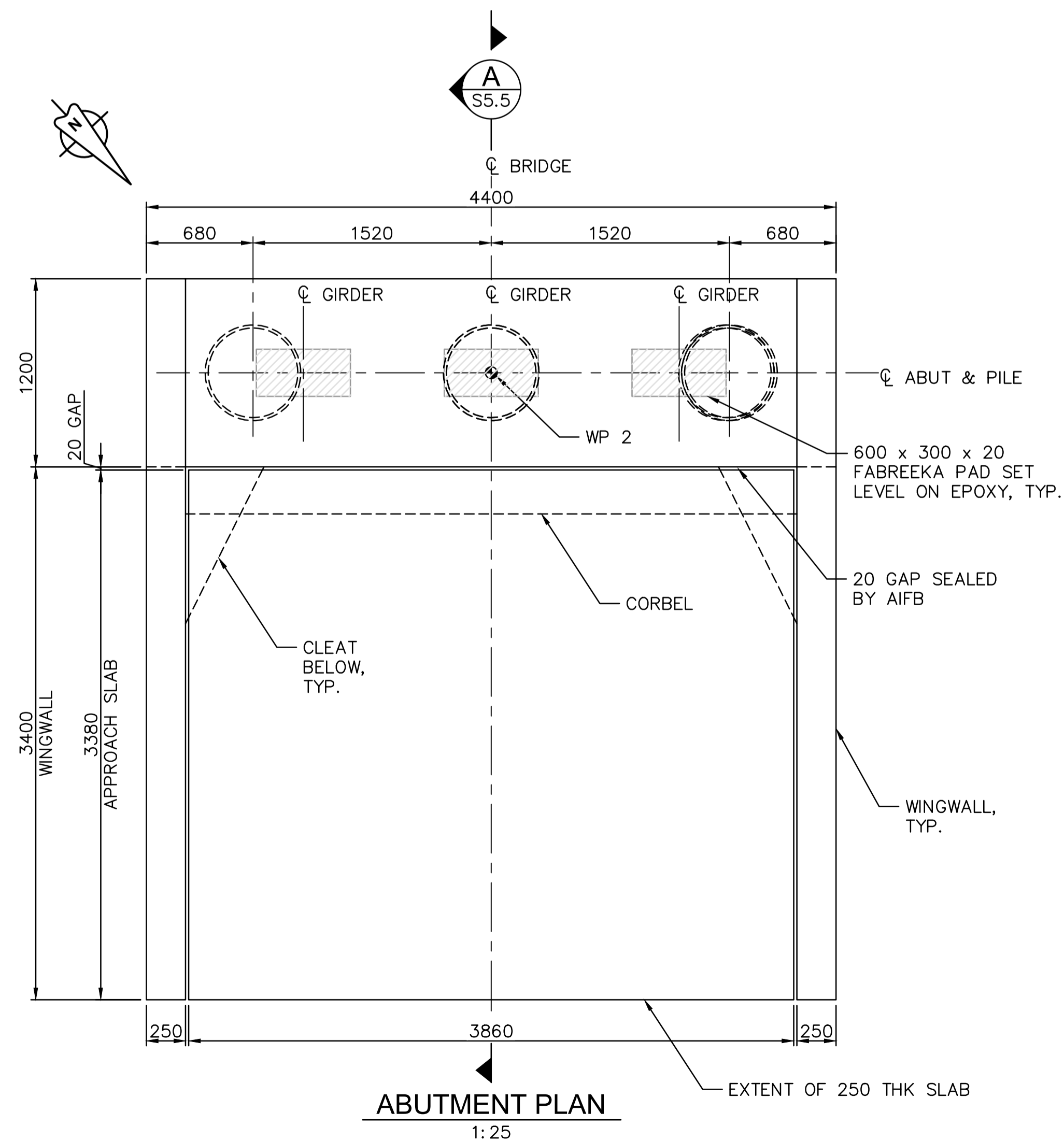
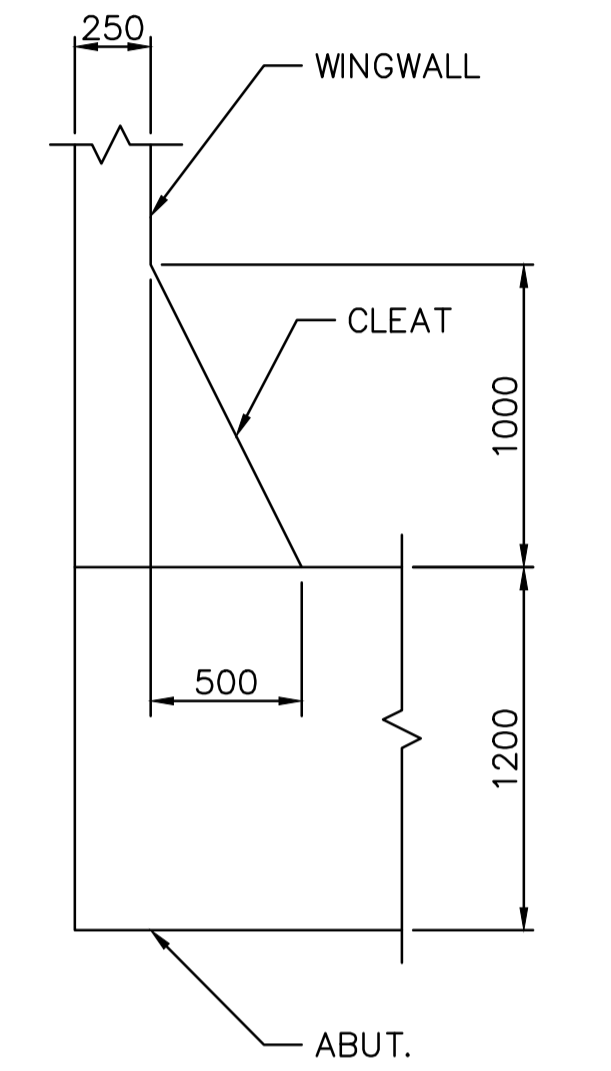
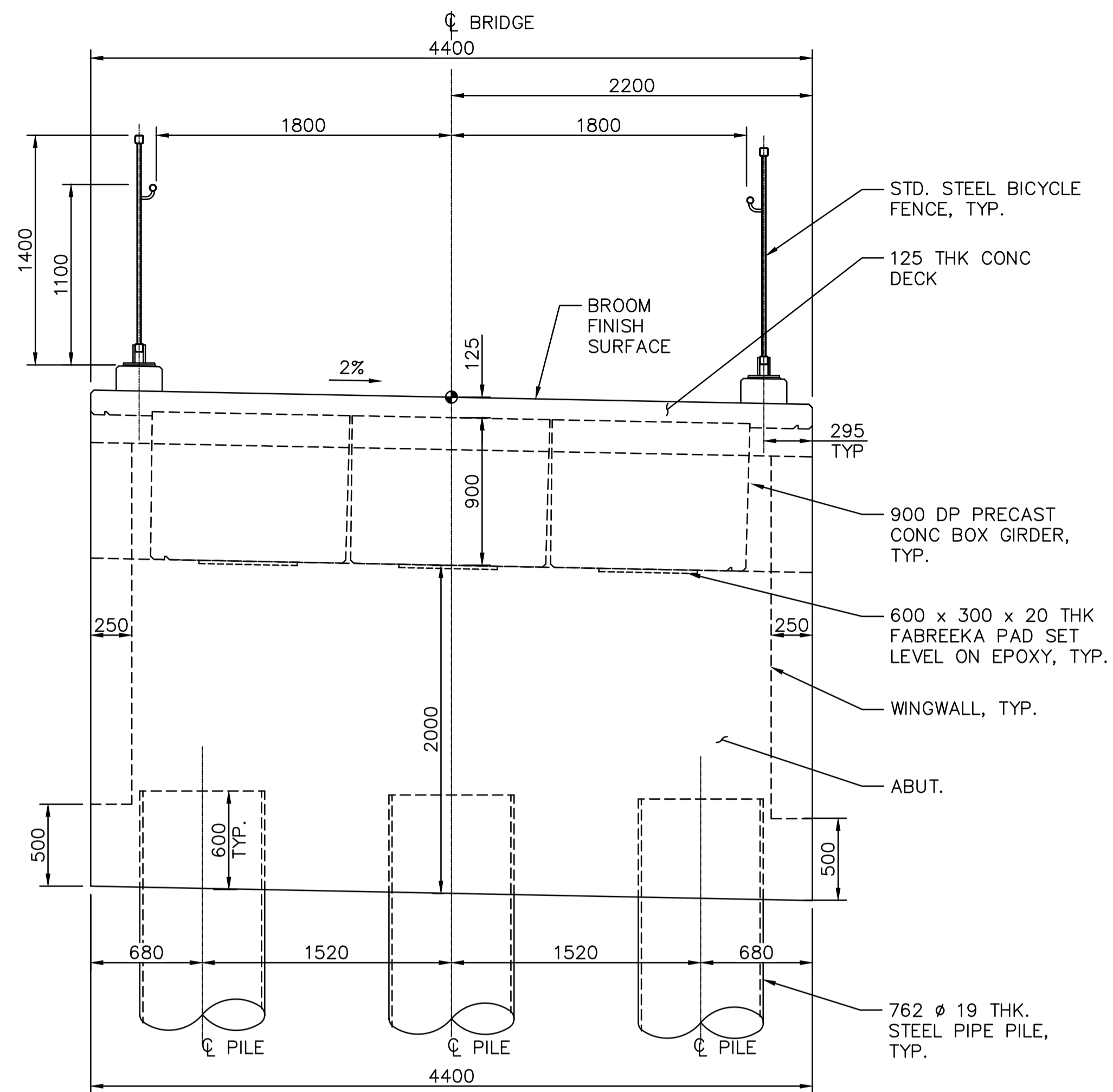
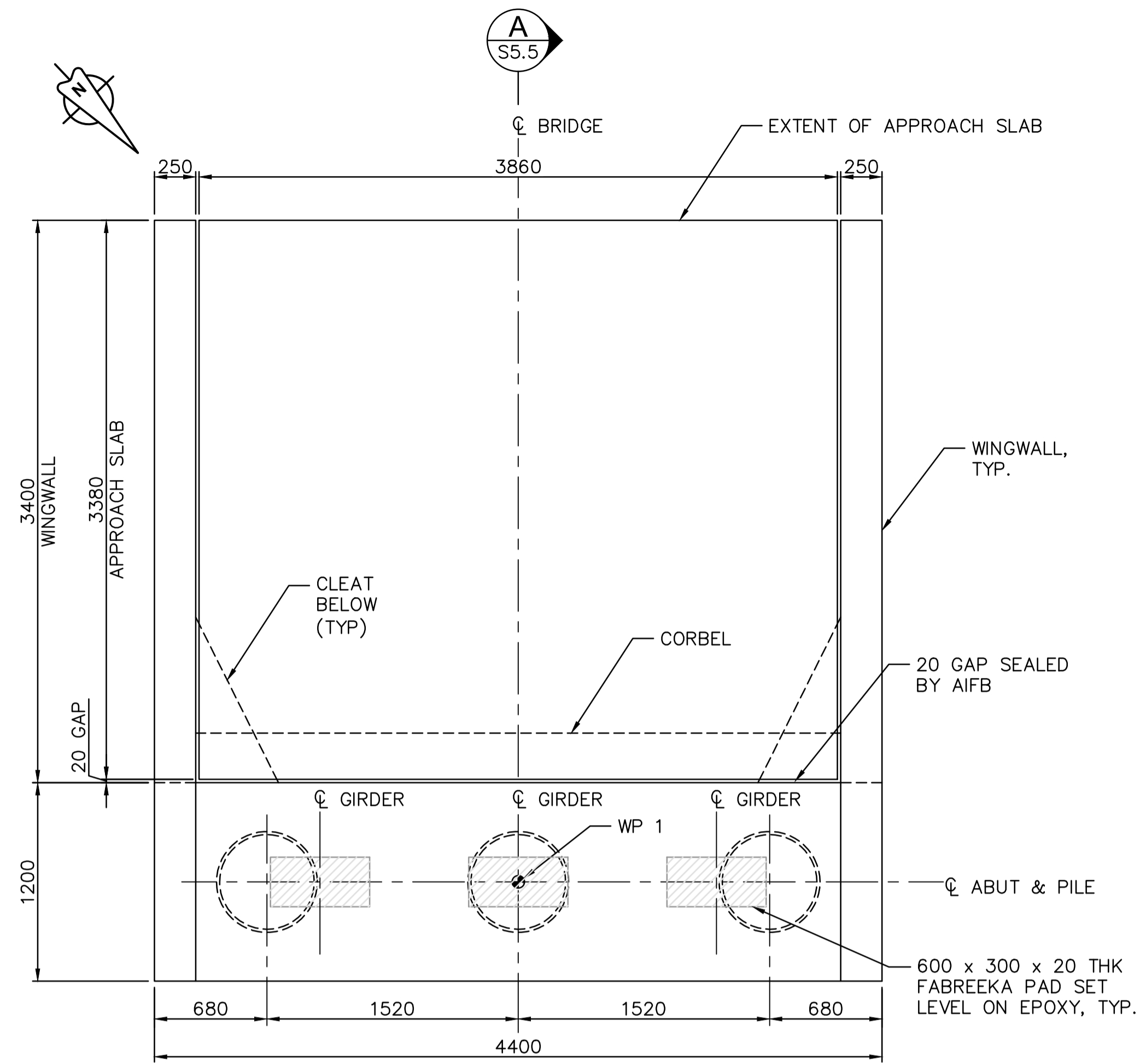
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Administrateur de Projets APC  
JACKIE HICKS

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**BRIDGE #20**  
**PILE LAYOUT AND DETAILS**

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NOTES:

1. FOR NOTES, SEE DRAWINGS S-1.1, S1.2 AND S-5.5.

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Client/Client: Parks Canada Agency L'Agence Parcs Canada

Project title/Titre du projet: TOFINO, BC  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsčlik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

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 PCA Project Manager/Technical Authority: JACKIE HICKS

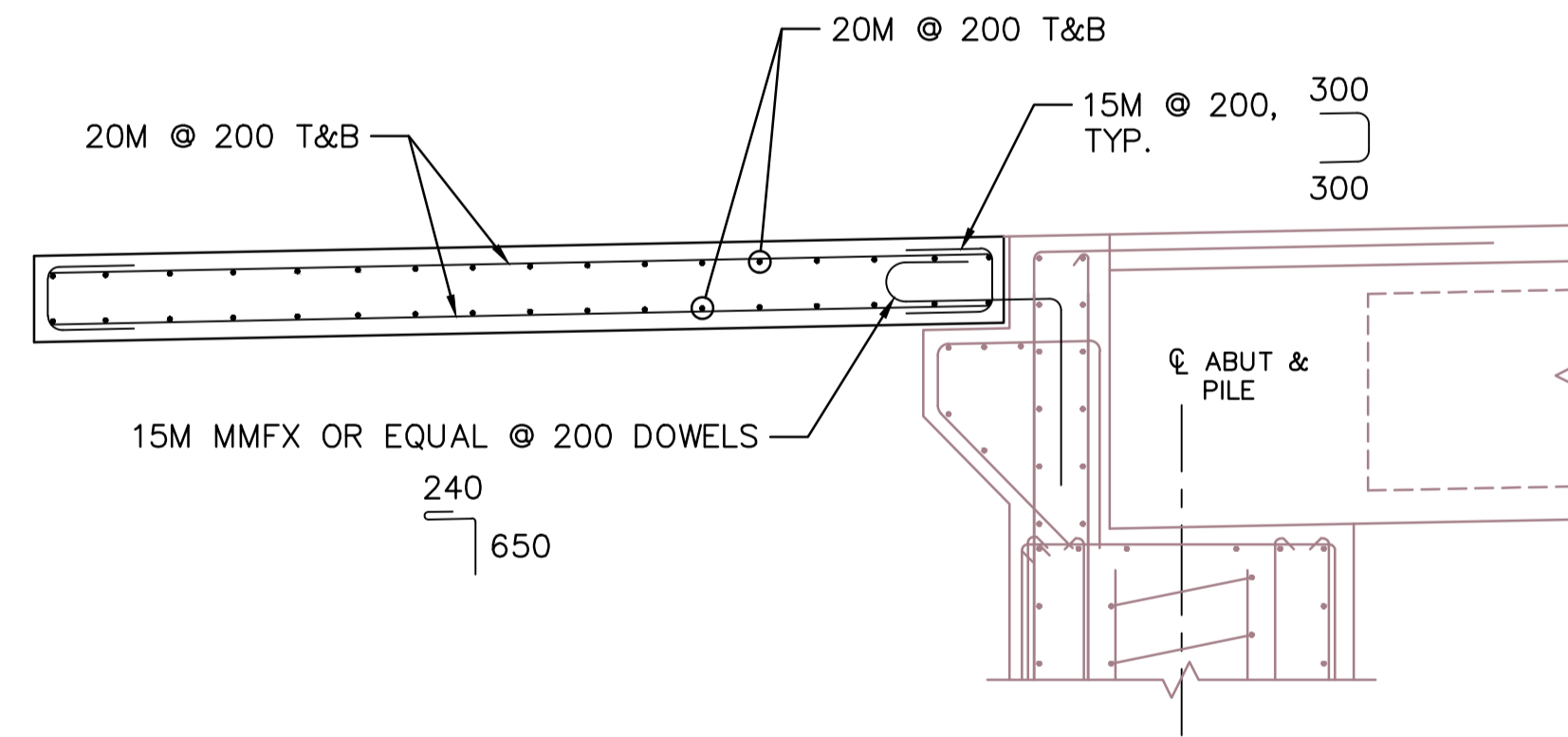
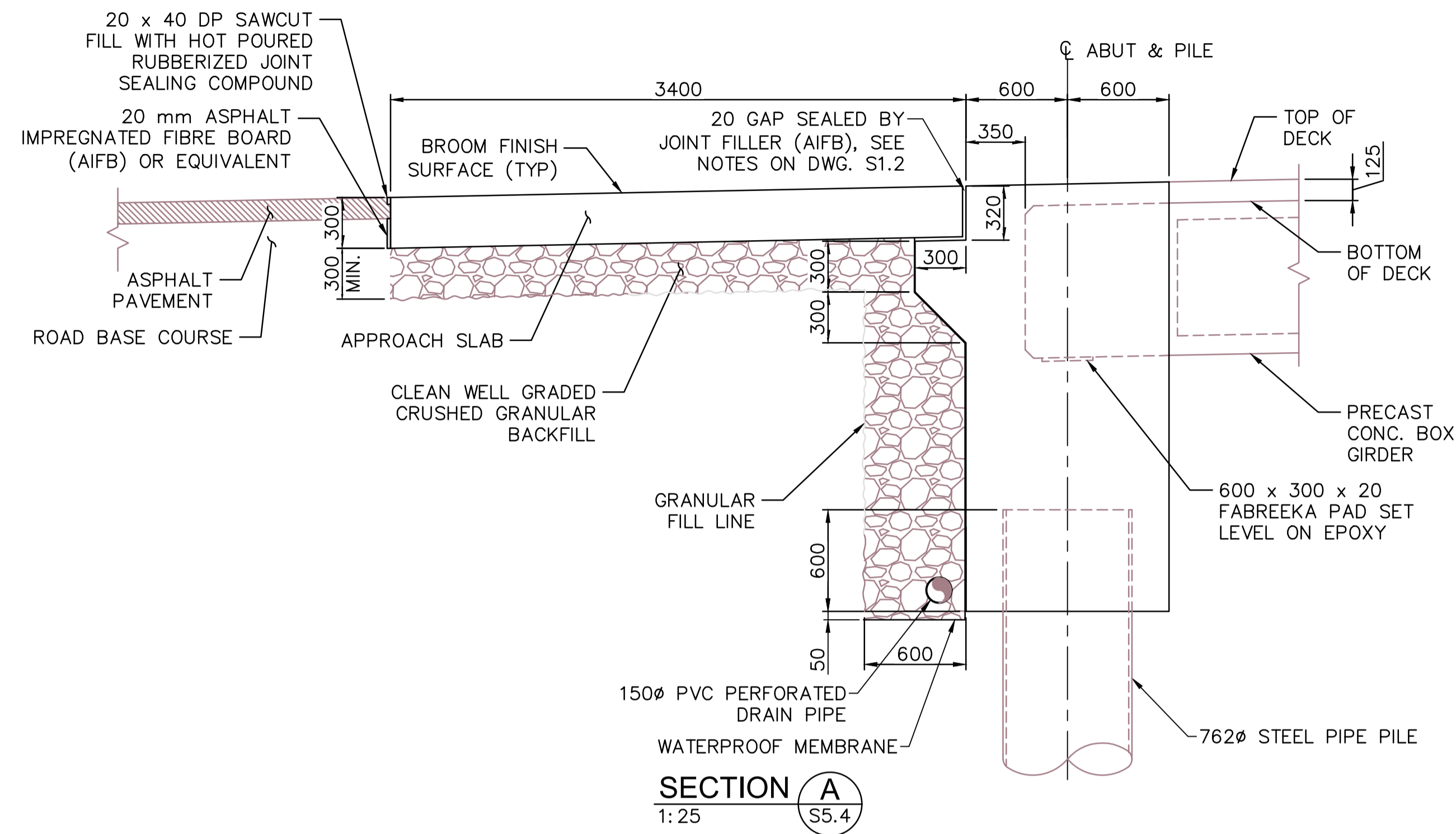
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**BRIDGE #20 ABUTMENT LAYOUT**

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**PARSONS**



**APPROACH SLAB REINFORCEMENT ELEVATION**  
1:25

**NOTES:**

- FOR STRUCTURAL NOTES SEE DWG. S1.1 AND S1.2.
- THE SURFACE OF CONCRETE AT CONSTRUCTION JOINTS SHALL INTENTIONALLY ROUGHENED AND CLEAN AND FREE OF LAITANCE AT TIME OF CASTING.
- GRANULAR BACKFILL AND LOW PLASTIC CLAY FILL SHALL BE COMPACTED TO 98% STANDARD PROCTOR AND 100% STANDARD PROCTOR BEHIND ABUTMENTS AND WINGWALLS. COMPACTION WITHIN A HORIZONTAL DISTANCE EQUAL TO ONE HALF OF THE WALL HEIGHT SHALL USE HAND TAMPERS.
- BROOM CONCRETE RUNNING SURFACE BY CONCRETE BROOM APPLYING PERPENDICULAR TO THE ALIGNMENT, AND BROOM MARKS SHOULD BE RUN TOWARDS LOWER SIDE OF THE LATERAL SLOPE.

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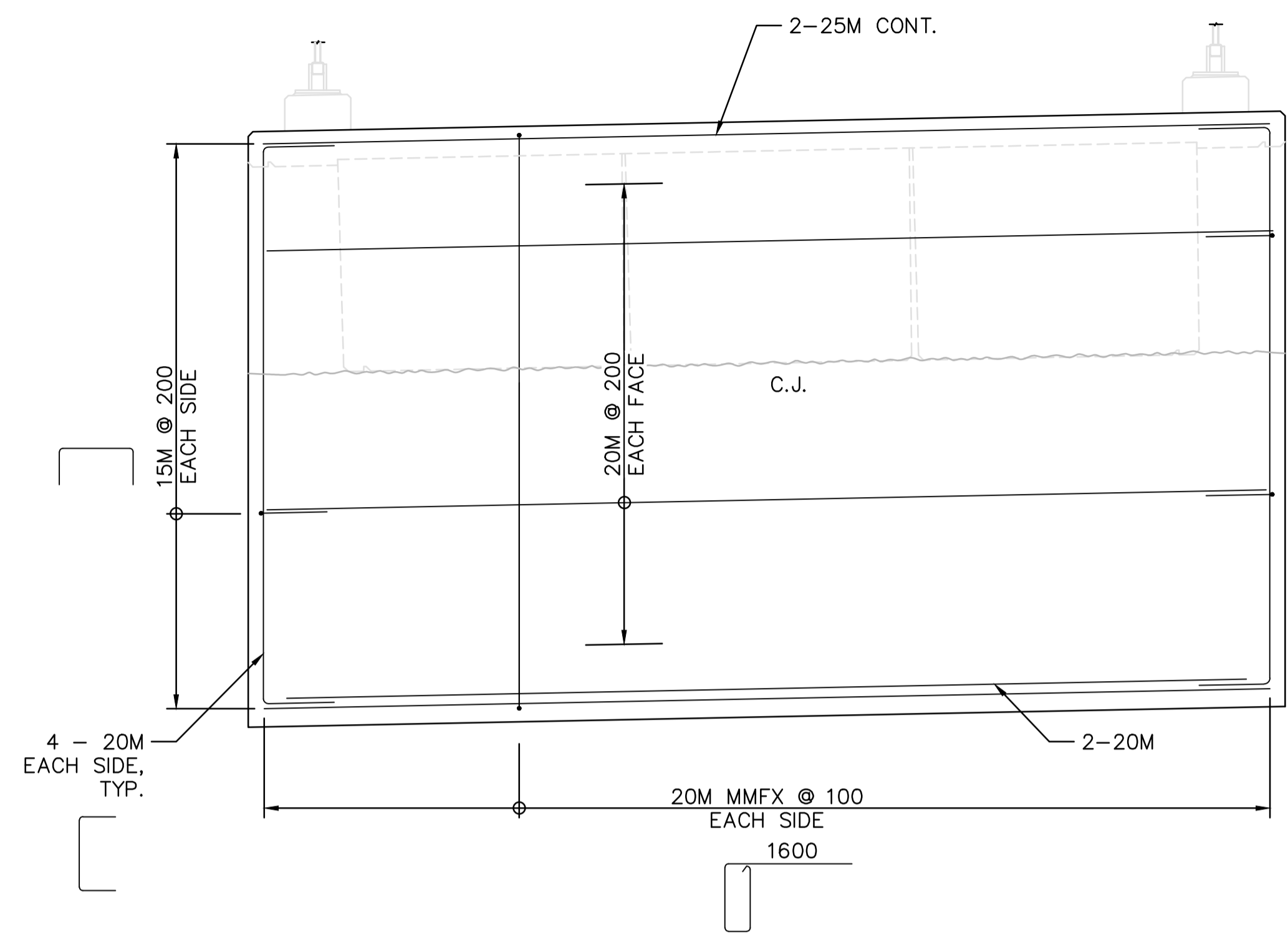
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**"Going in the right direction on the trail"**  
**BRIDGE #20**  
**APPROACH SLAB DETAILS**

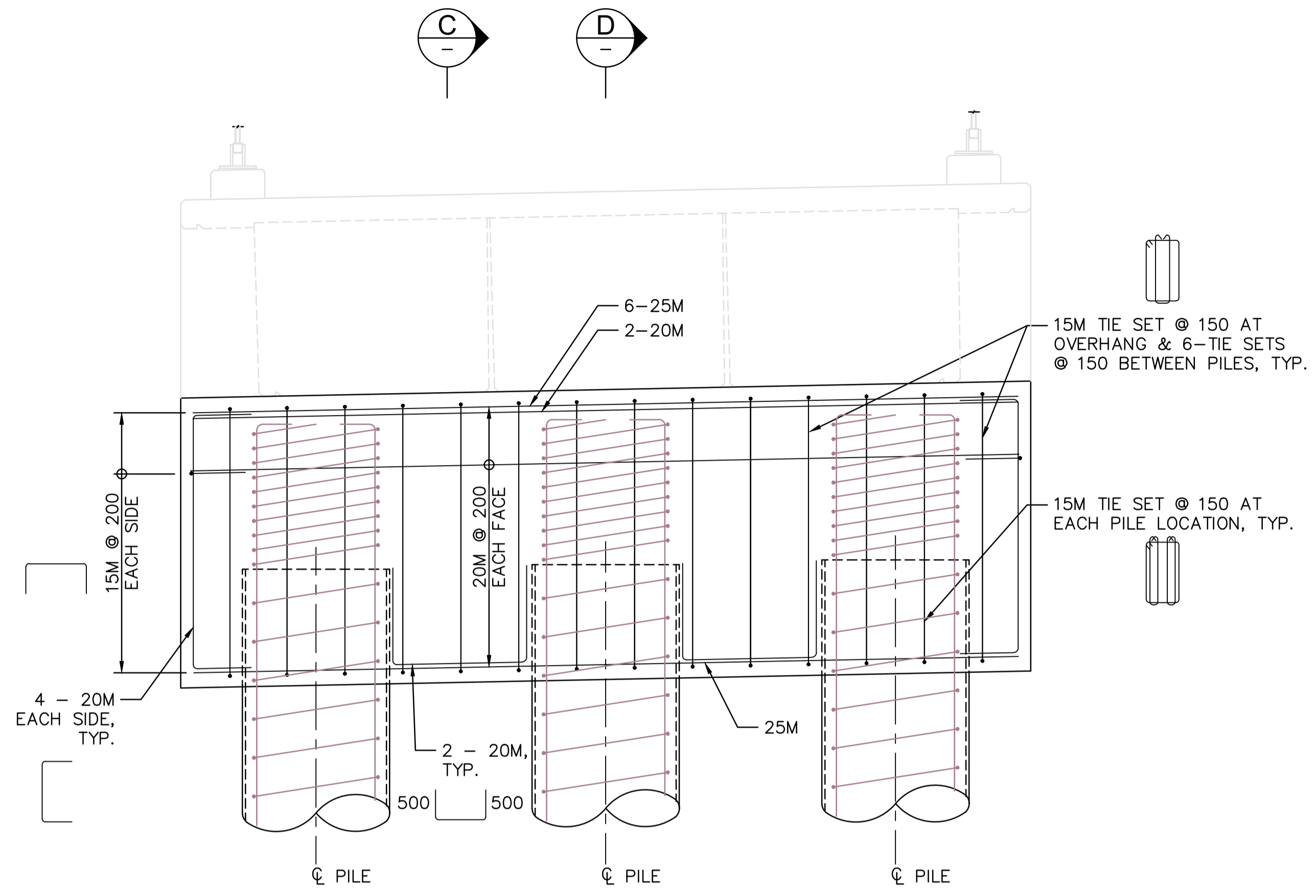
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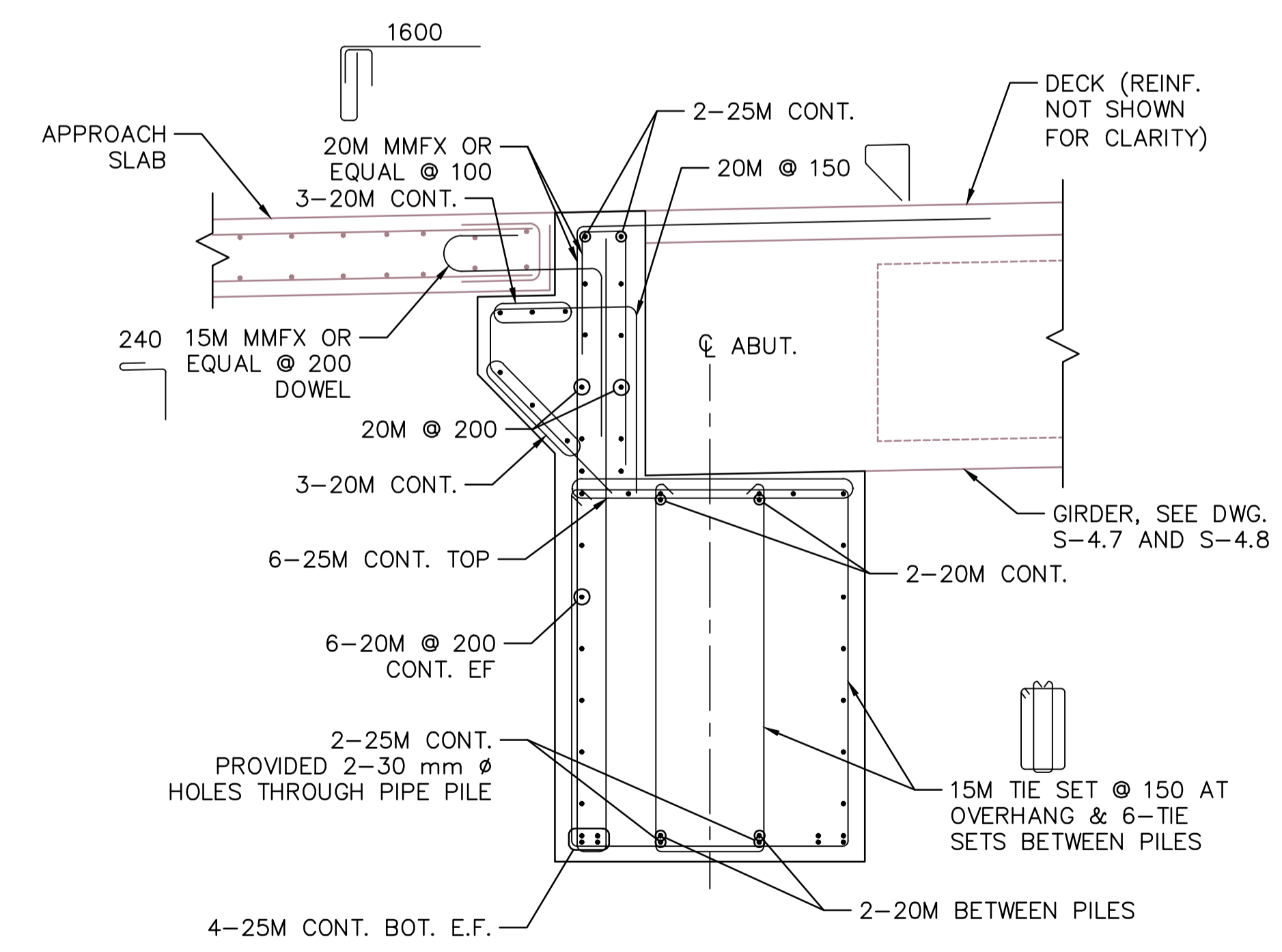
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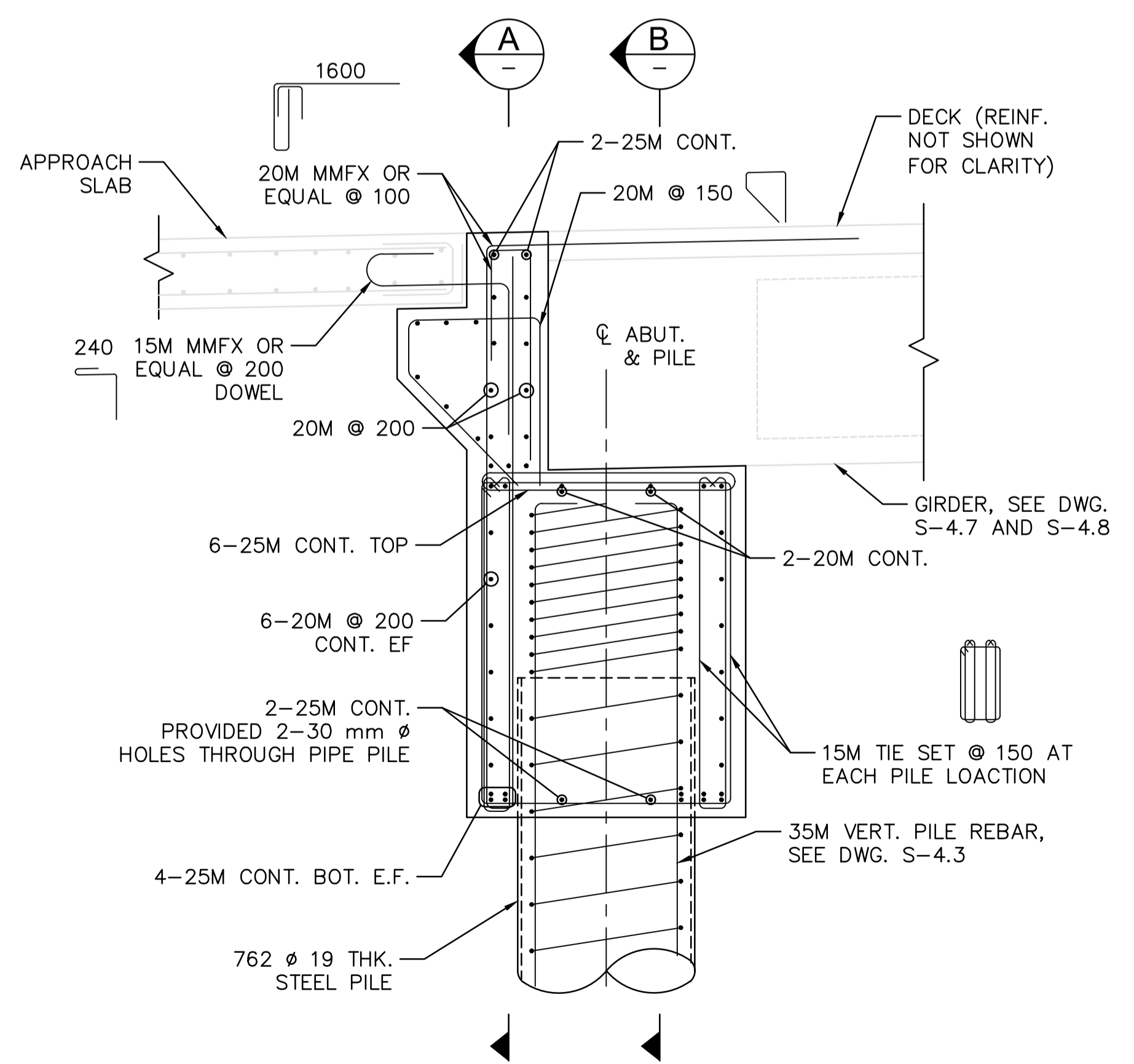
**SECTION A**  
1:20



**SECTION B**  
1:20



**SECTION C**  
1:20



**SECTION D**  
1:20

NOTES:  
1. FOR GENERAL NOTES SEE S-1.1 AND S-1.2.

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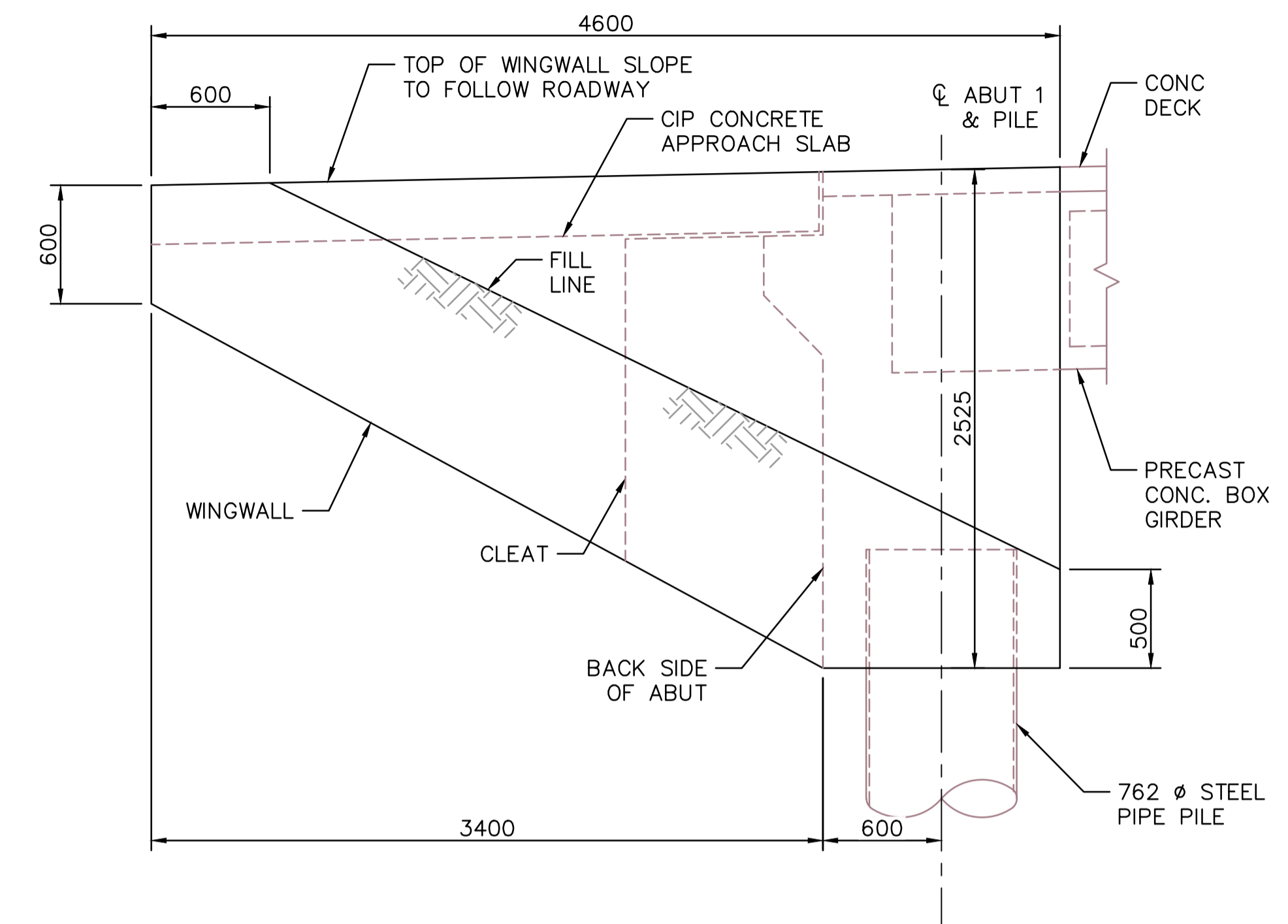
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**“Going in the right direction on the trail”**  
**BRIDGE #20**  
**ABUTMENT DETAILS**

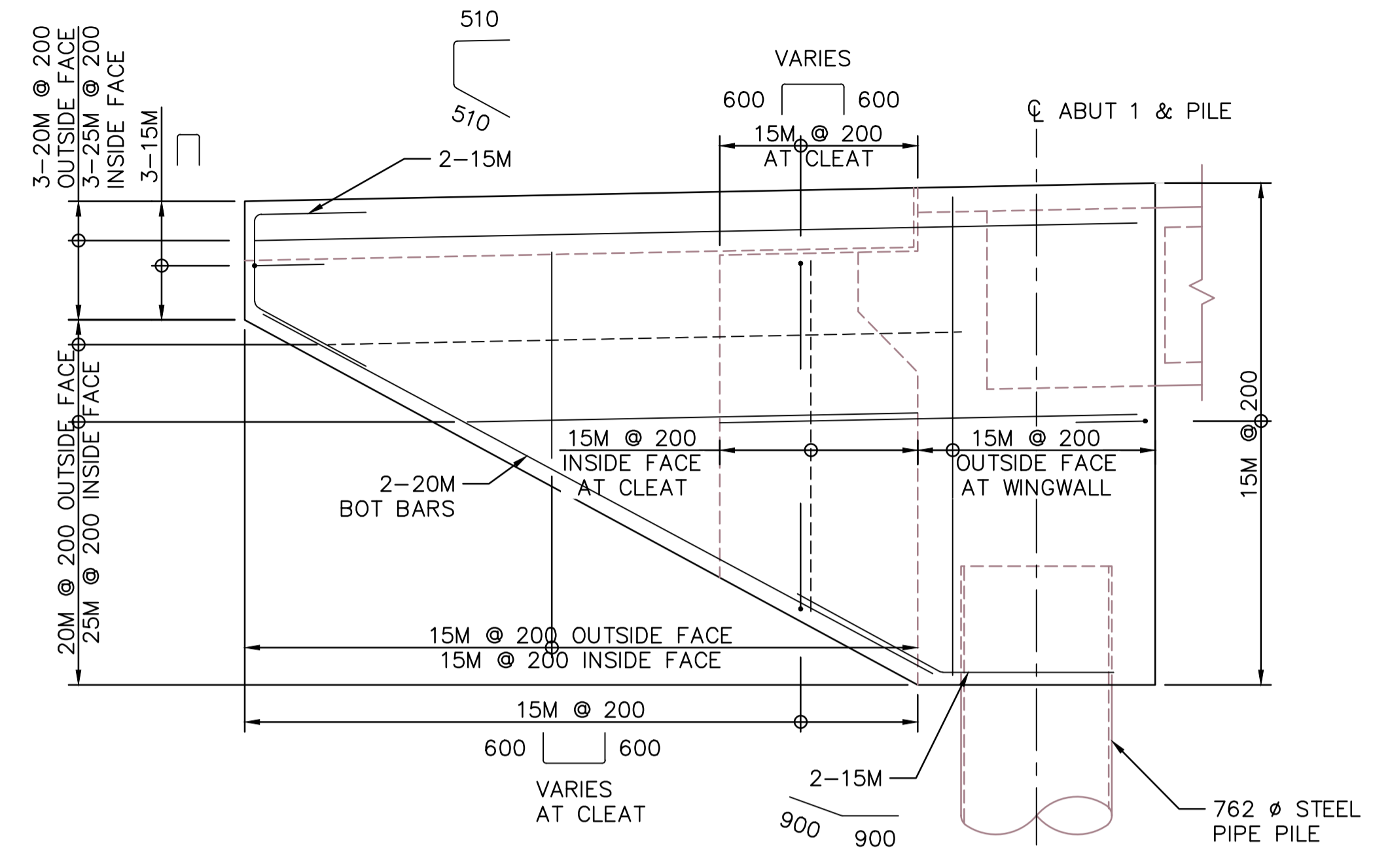
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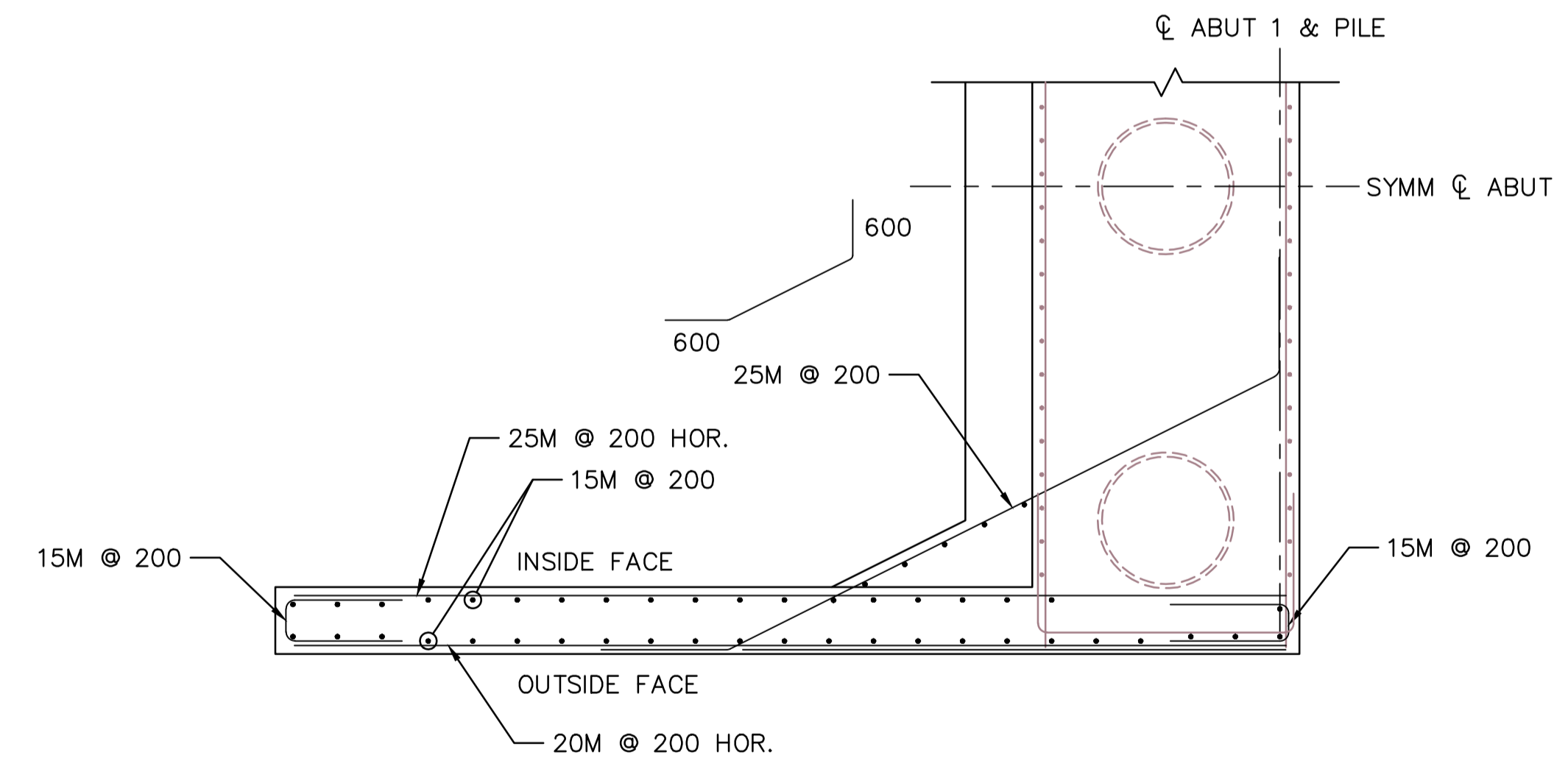
**PARSONS**



**WINGWALL ELEVATION**  
1:25



**WINGWALL REINFORCEMENT ELEVATION**  
1:25



**WINGWALL REINFORCEMENT PLAN**  
1:25  
(ABUT 1 SHOWN, ABUT 2 SIMILAR)

NOTES:  
1. FOR GENERAL NOTES SEE S-1.1 AND S-1.2.

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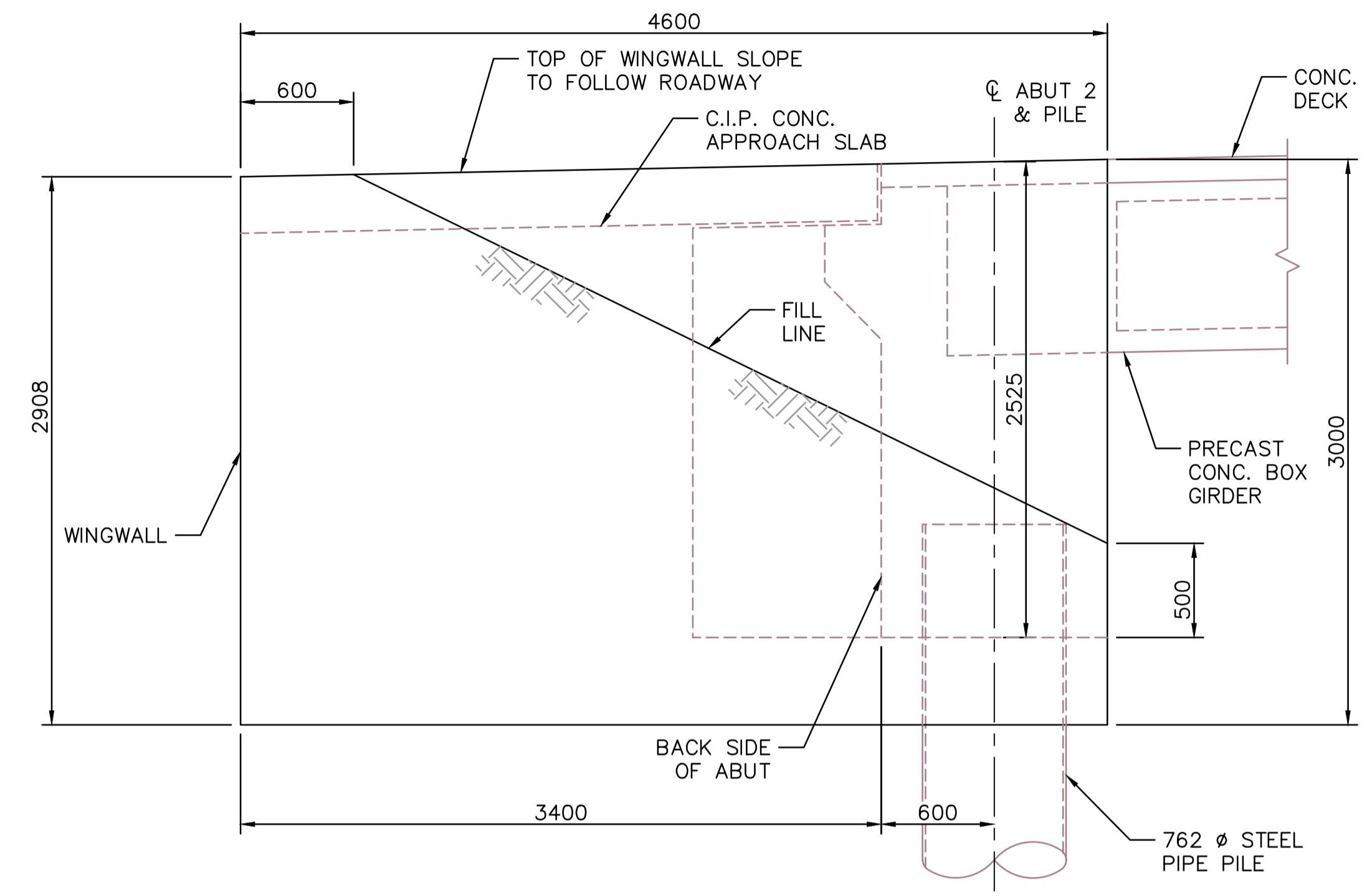
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**(Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #20**  
**ABUTMENT 1 WINGWALL DETAILS**

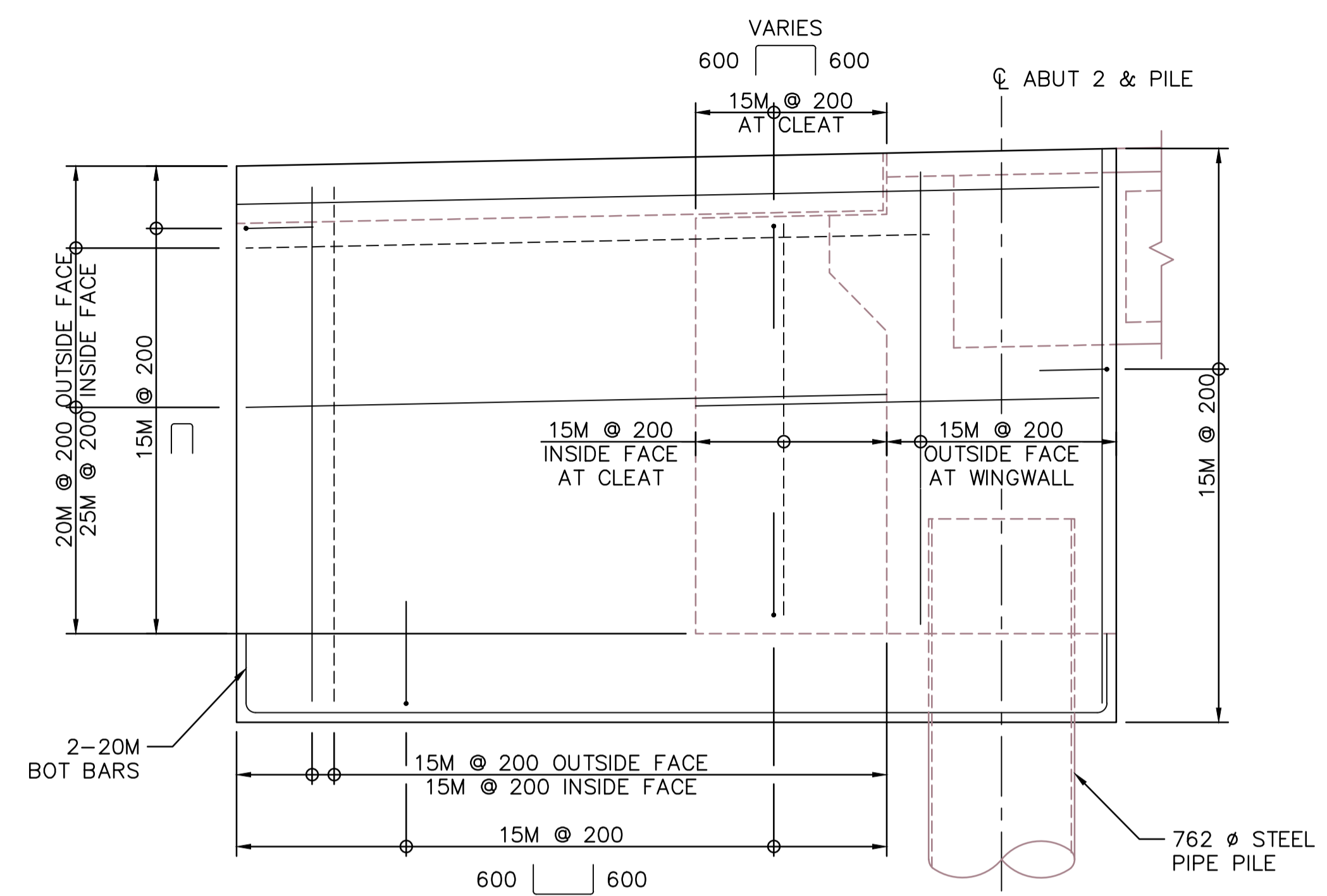
Project No./No. du projet <b>PCA #1522</b>	Sheet/Feuille <b>S-5.7</b> OF	Revision no./La Révision no. <b>0</b>
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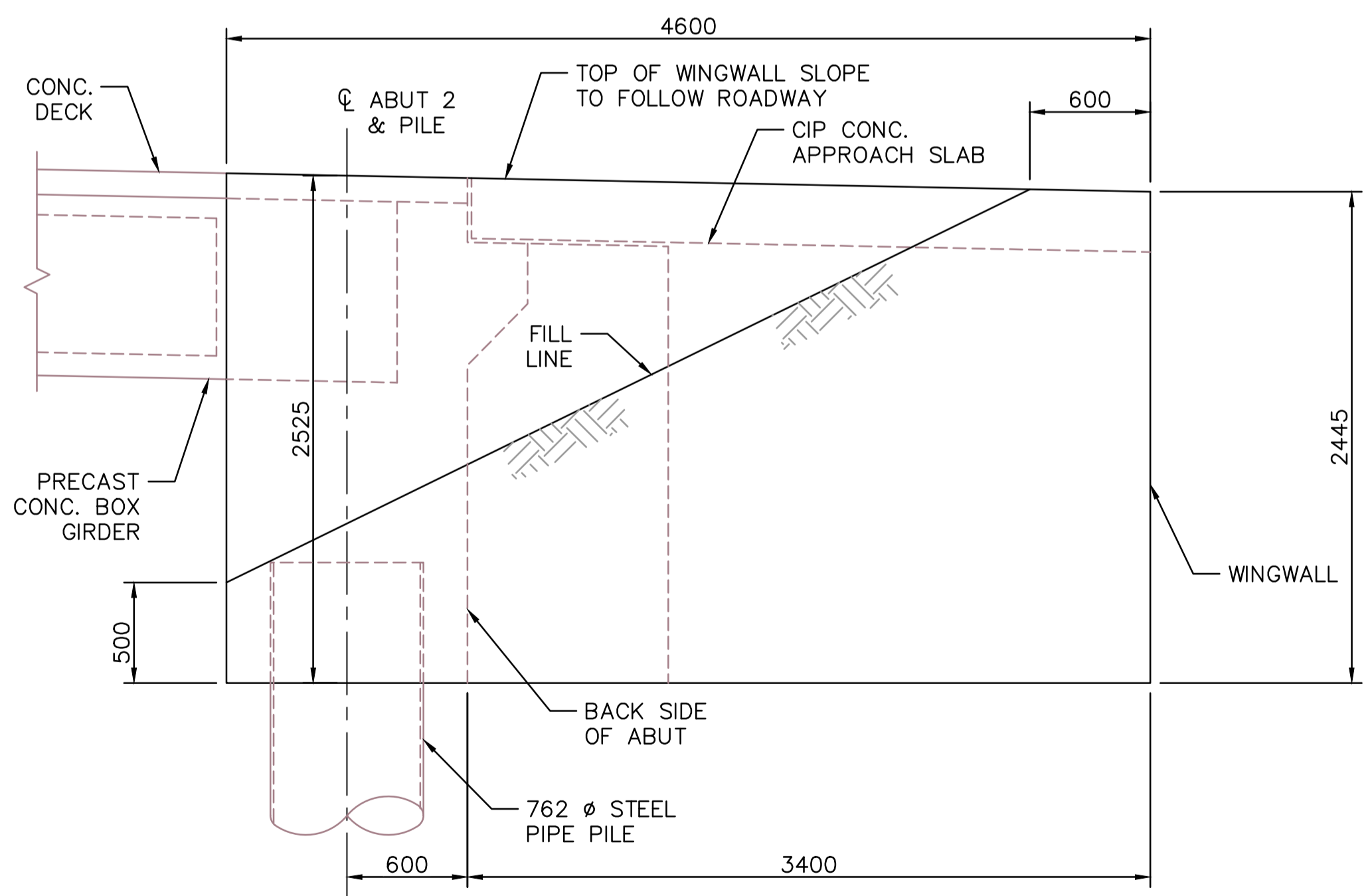
**PARSONS**



**SECTION B**  
1:25 (S5.4)



**WINGWALL REINFORCEMENT ELEVATION**  
1:25 (NORTH WINGWALL SHOWN, SOUTH WINGWALL SIMILAR)



**SECTION C**  
1:25 (S5.4)

NOTES:

- FOR GENERAL NOTES SEE S-1.1 AND S-1.2.

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Revision/Revision Description/Description Date/Date

Client/client  
Parks Canada L'Agence Parcs  
Agency Canada

Project title/Titre du projet  
**TOFINO, BC**  
**PACIFIC RIM NATIONAL PARK RESERVE**  
**?apsčik tašii (Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**

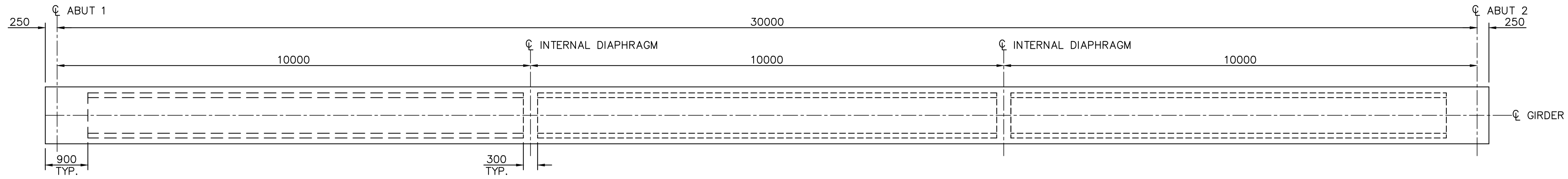
Designed by/Concept par  
DANIEL YANG / 2018-11  
Drawn by/Dessiné par  
SHAWN LI / 2018-12  
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**?apsčik tašii (Ups-cheek ta-shee)**  
**"Going in the right direction on the trail"**  
**BRIDGE #20**  
**ABUTMENT 2 WINGWALL DETAILS**

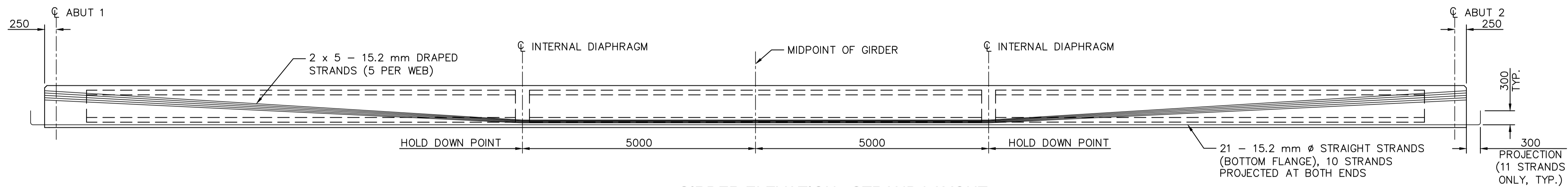
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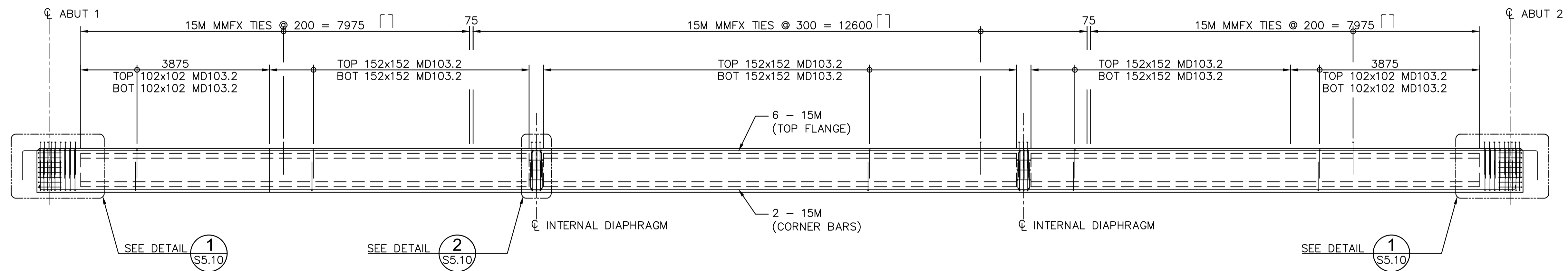
**PARSONS**



**GIRDER PLAN**  
1:50



**GIRDER ELEVATION - STRAND LAYOUT**  
1:50



**GIRDER ELEVATION - REBAR LAYOUT**  
1:50

NOTE:

1. FOR GENERAL NOTES, SEE DRAWINGS S-1.1 AND S-1.2.

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**ʔapsc̓iik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

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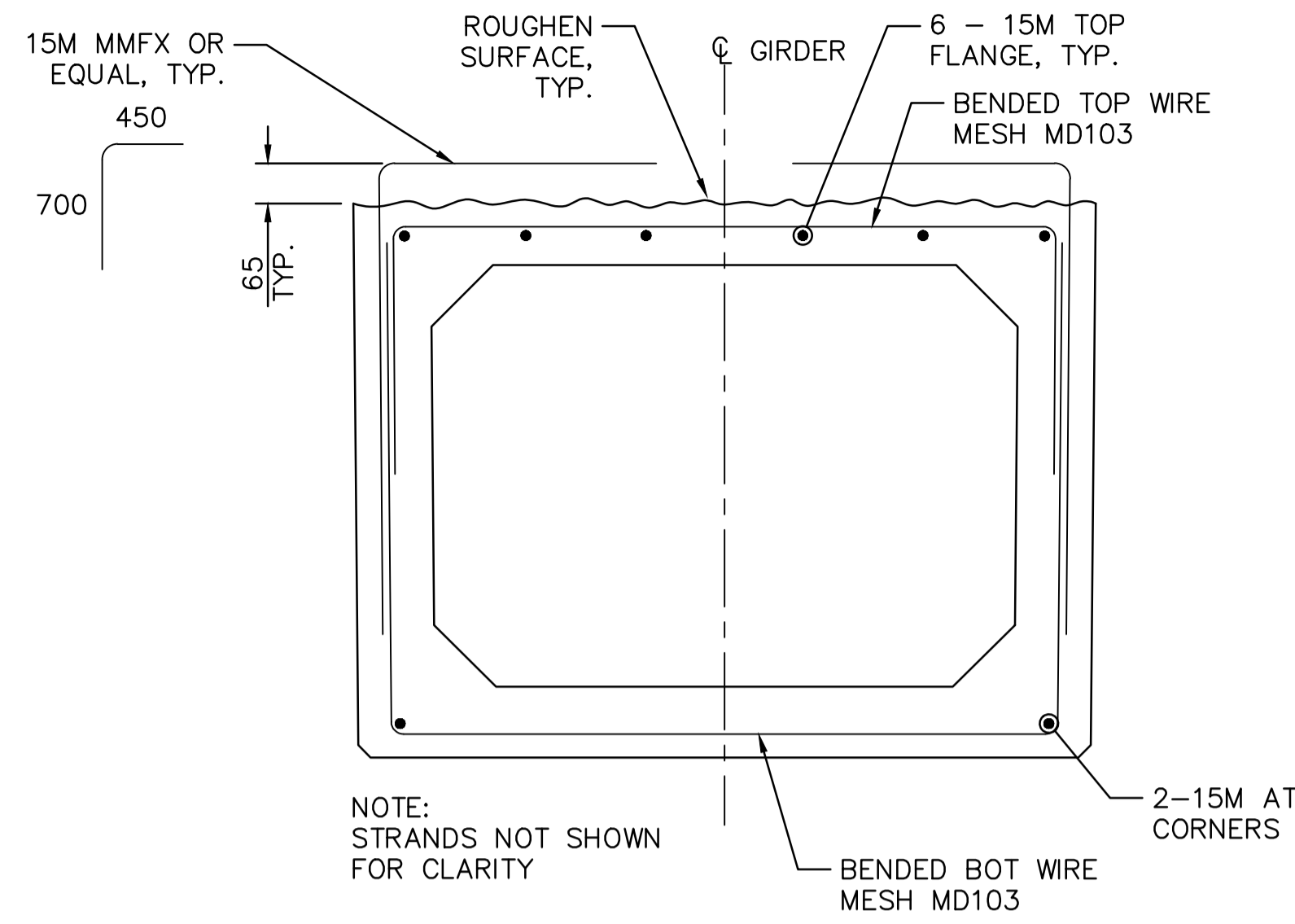
Designed by/Concept par  
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Drawn by/Dessiné par  
SHAWN LI / 2018-12  
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsc̓iik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #20**  
**GIRDER**  
**SHEET 1**

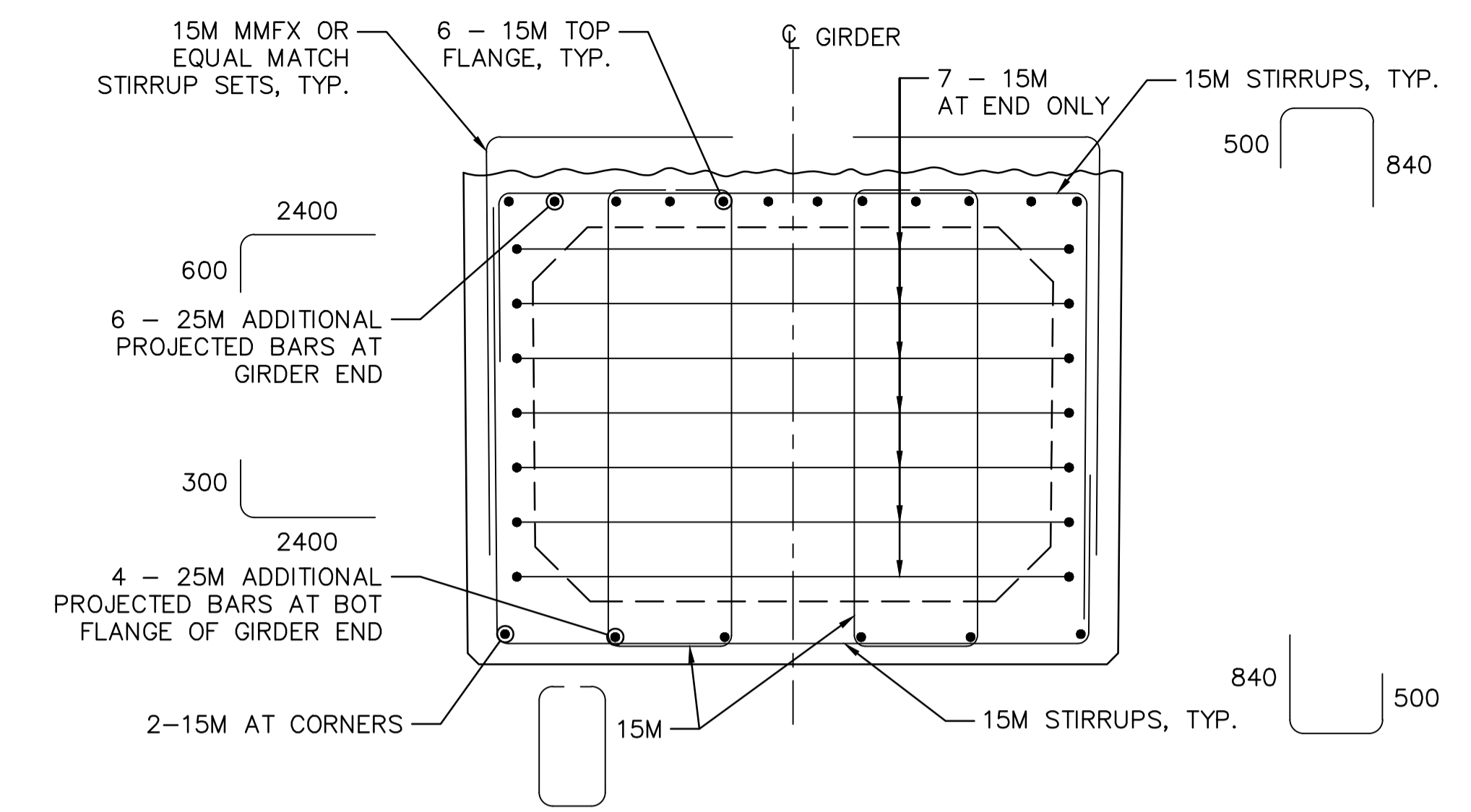
Project No./No. du projet <b>PCA #1522</b>	Sheet/Feuille <b>S-5.9</b> OF	Revision no./La Révision no. <b>0</b>
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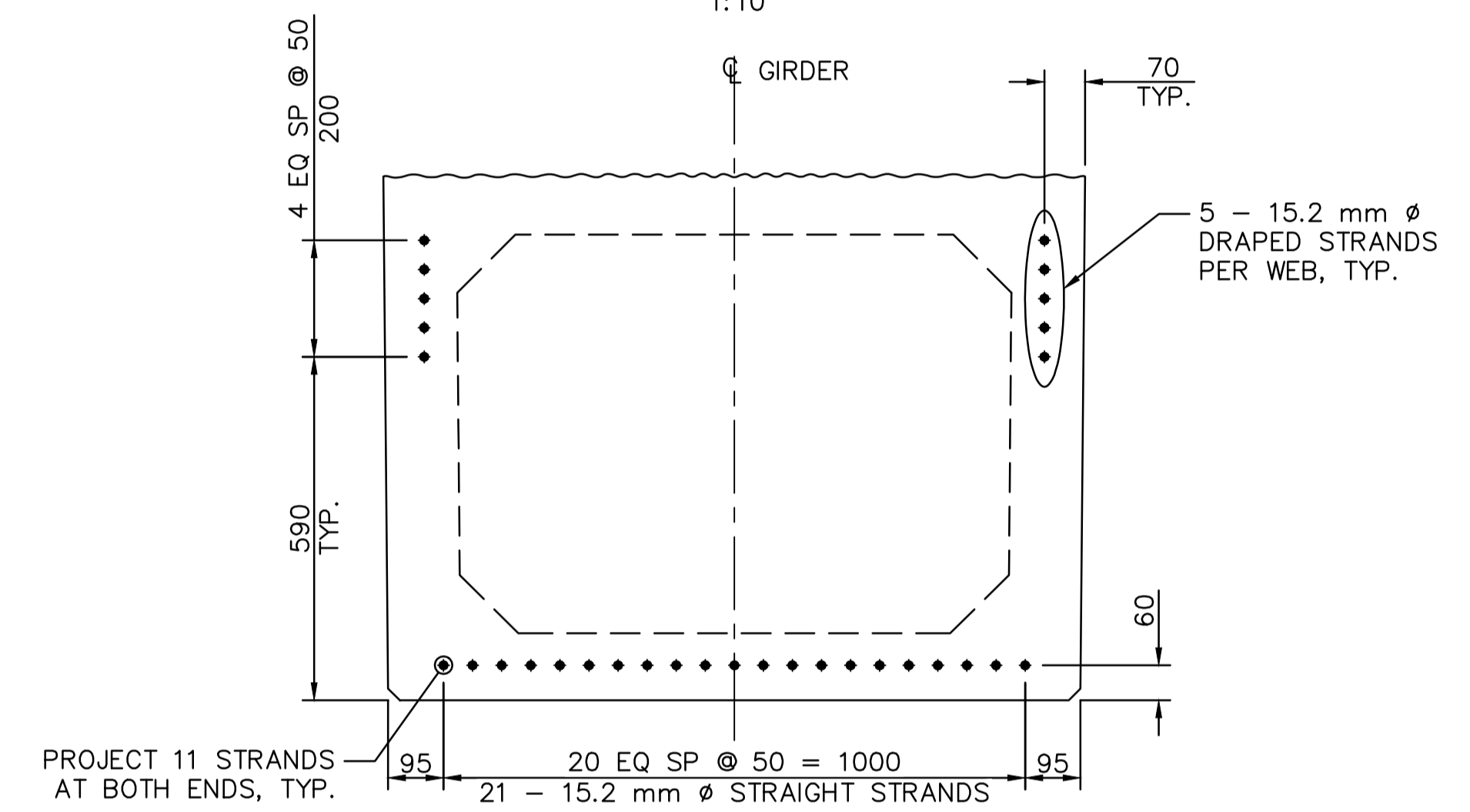
**PARSONS**



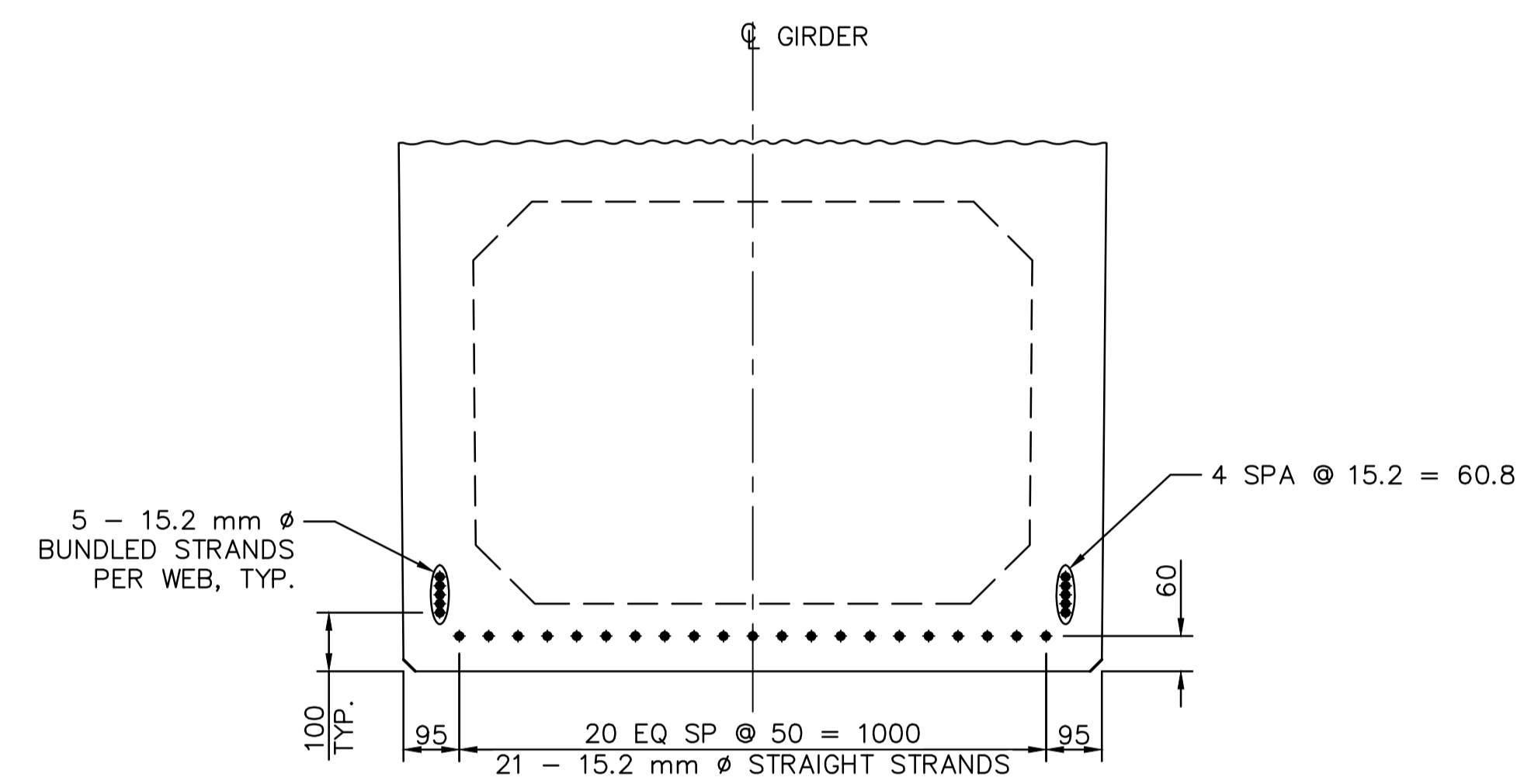
**TYPICAL REINFORCEMENT**  
1:10



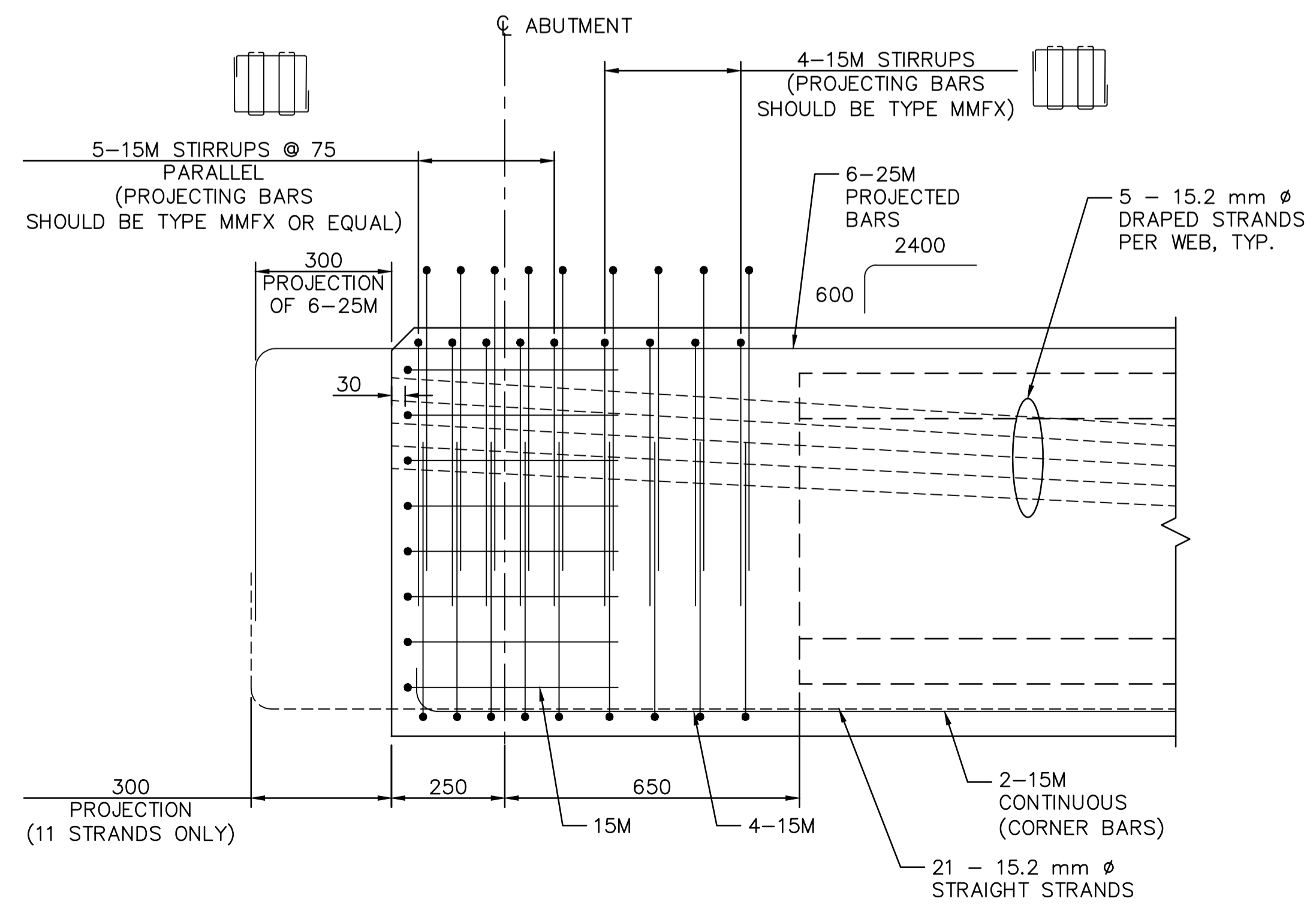
**TYPICAL REINFORCEMENT AT GIRDER END**  
1:10



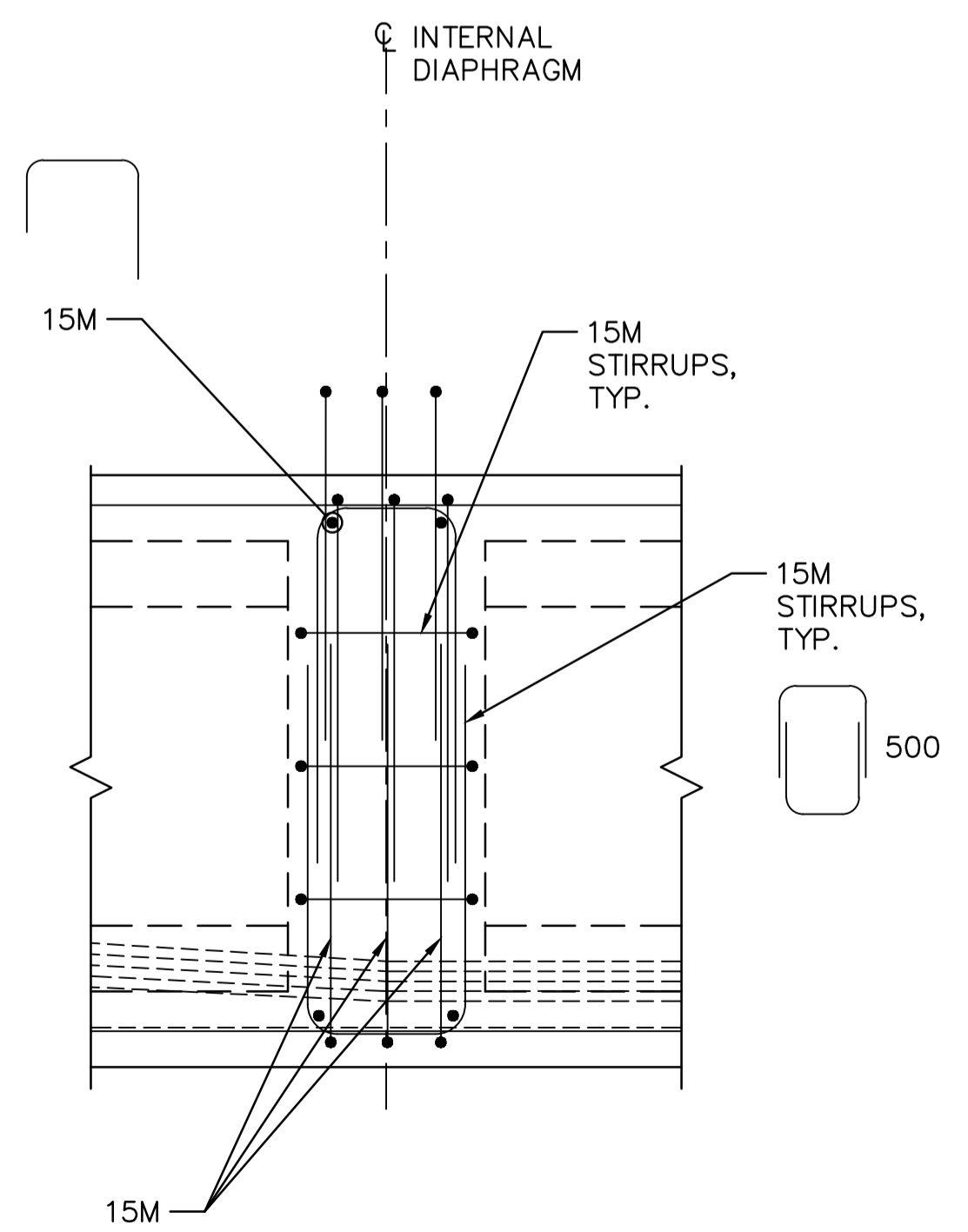
**STRAND LAYOUT AT GIRDER END**  
1:10



**STRAND LAYOUT AT MIDSPAN**  
1:10



**DETAIL 1**  
1:10 S5.9



**DETAIL 2**  
1:10 S5.9

NOTES:  
1. FOR GENERAL NOTES SEE S-1.1 AND S-1.2.

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**PACIFIC RIM NATIONAL PARK RESERVE**  
**ʔapsčliik tašii**  
**“Going in the right direction on the trail”**

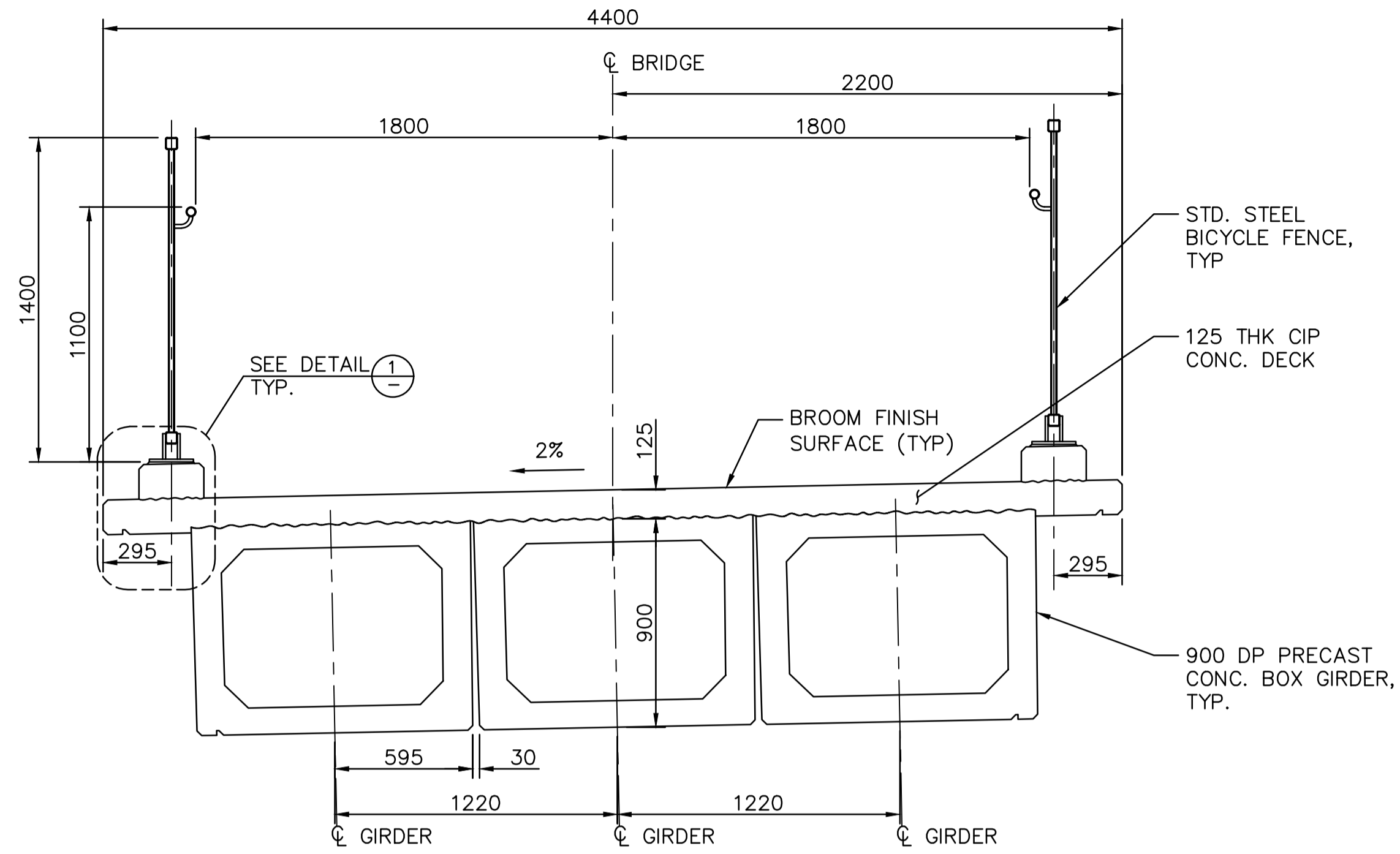
Designed by/Concept par  
DANIEL YANG / 2018-11  
Drawn by/Dessiné par  
SHAWN LI / 2018-12  
PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsčliik tašii**  
**“Going in the right direction on the trail”**  
**BRIDGE #20**  
**GIRDER**  
**SHEET 2**

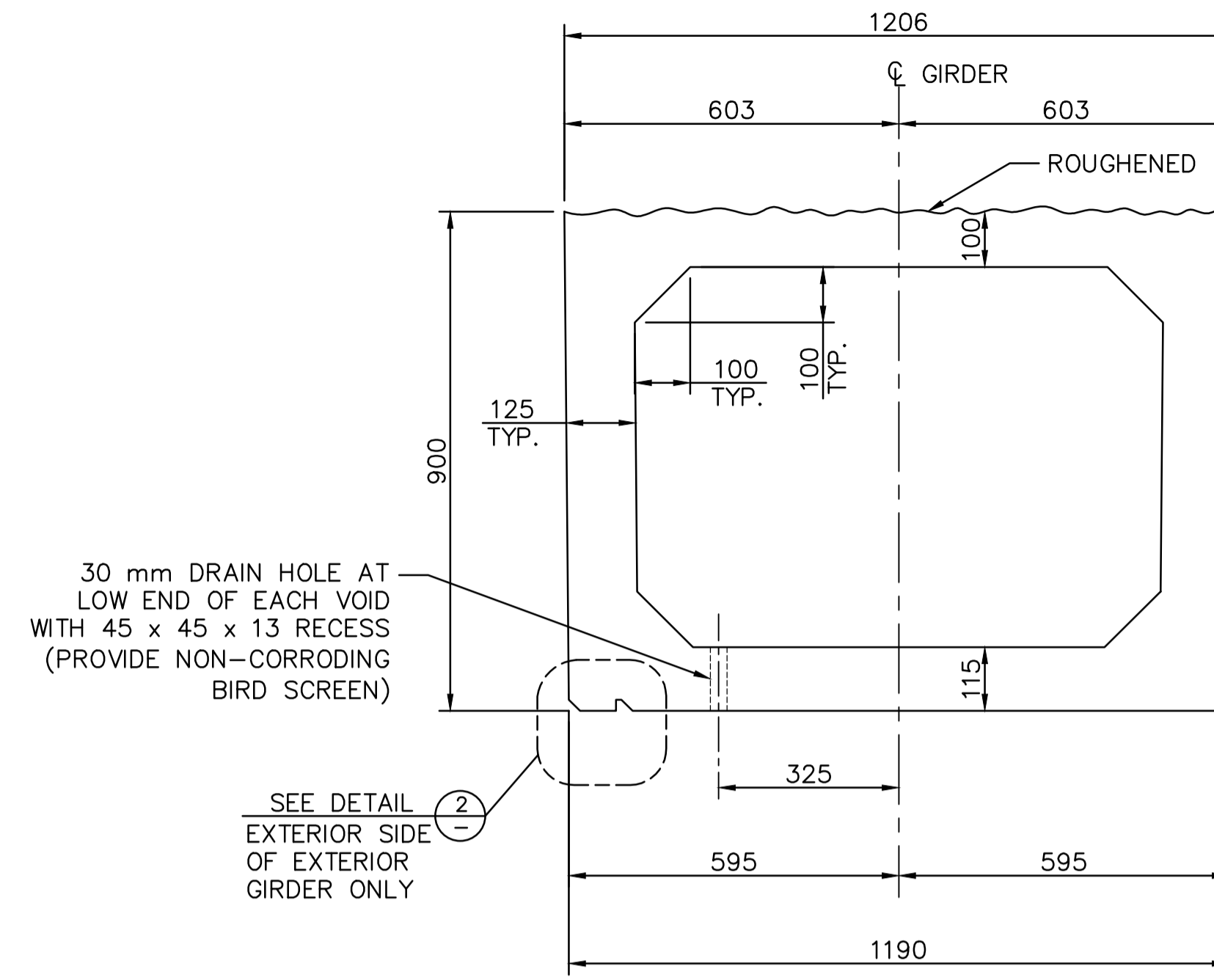
Project No./No. du projet <b>PCA #1522</b>	Sheet/Feuille <b>S-5.10</b> OF	Revision no./La Révision no. <b>0</b>
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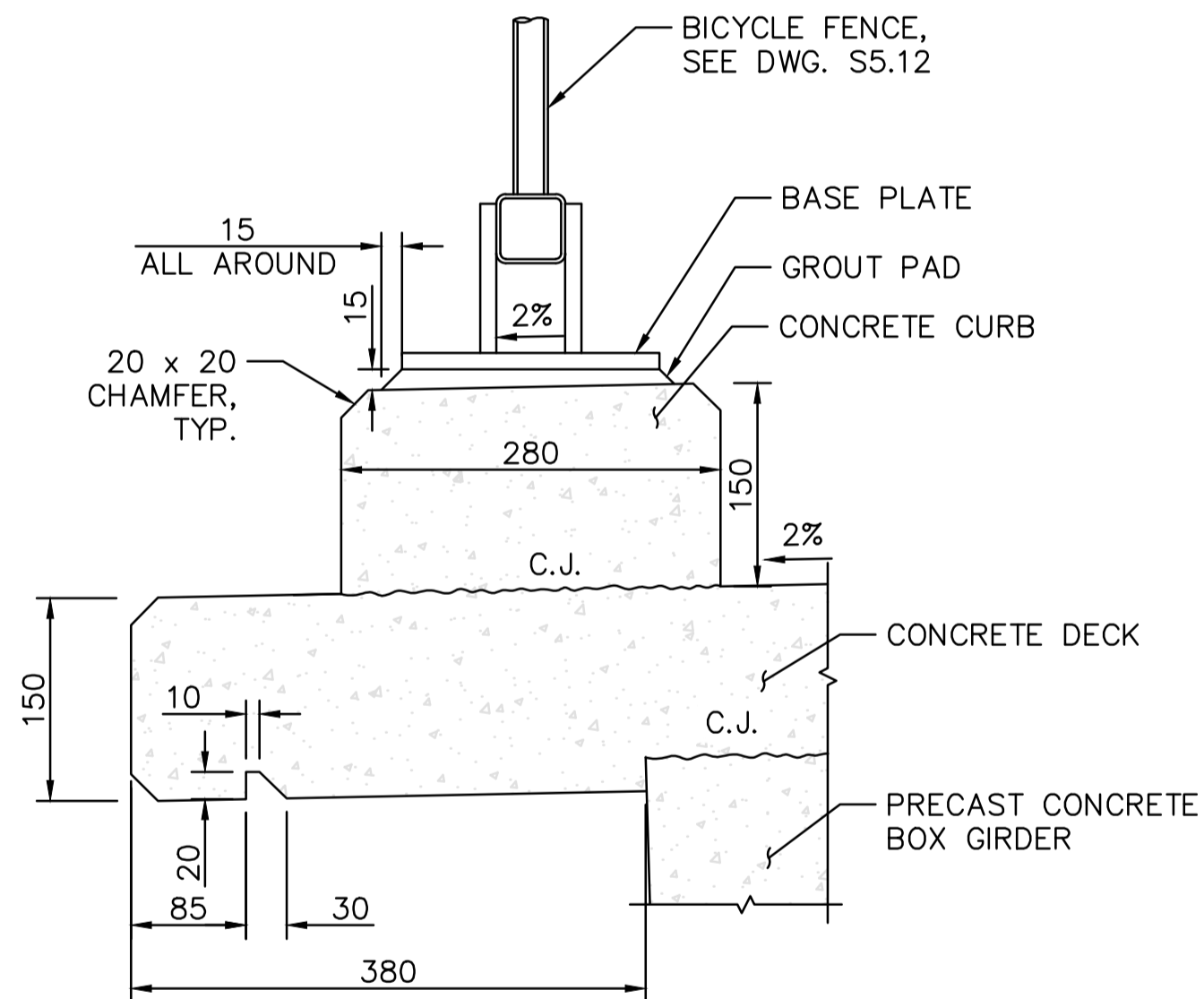
**PARSONS**



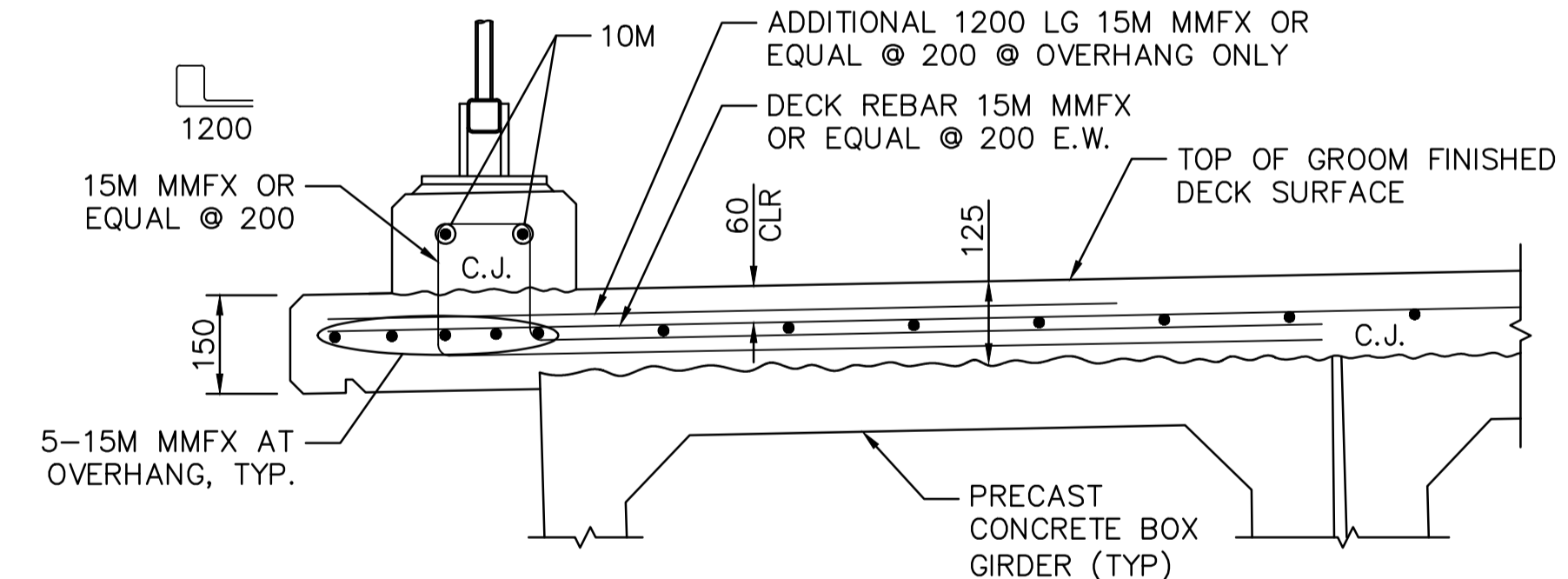
**TYPICAL DECK LAYOUT**  
1:20



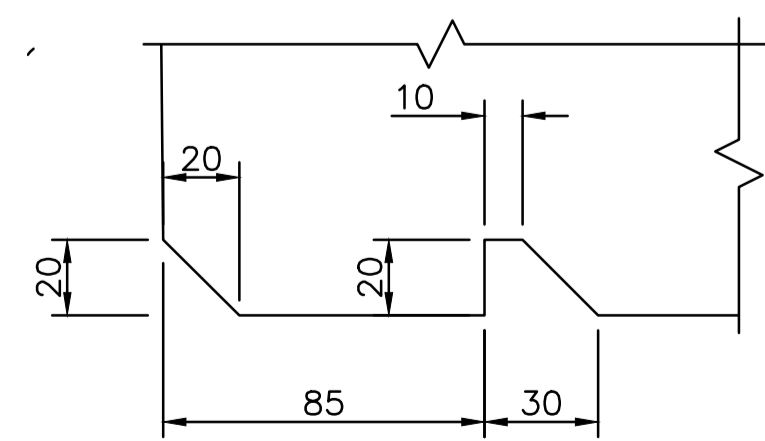
**TYPICAL BOX GIRDER SECTION**  
1:10



**DETAIL 1**  
1:5



**DECK REINFORCEMENT**  
1:10



**DETAIL 2**  
1:2

**NOTES:**

- HIGH WATER LEVEL (HWL) BASED ON 1:200 YEAR EVENT.
- FOUNDATION DETAILS TO BE CONFIRMED FOLLOWING GROUND INVESTIGATION ON SITE.
- ALL CONCRETE WORKS SHALL BE COMPLETELY ISOLATED FROM THE CREEK, WITH SECONDARY CONTAINMENT TO PREVENT GROUT ENTERING THE CREEK. THE CONTRACTOR SHALL SUBMIT A GROUT CONTAINMENT PLAN TO THE ENVIRONMENTAL MONITOR FOR APPROVAL AND REQUEST INSPECTION AND APPROVAL OF FORMWORK BY THE ENVIRONMENTAL MONITOR PRIOR TO ANY CONCRETE POURS.

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**ʔapsčik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**

Consultant Signature Only

Designed by/Concept par  
DANIEL YANG / 2018-11

Drawn by/Dessiné par  
SHAWN LI / 2018-12

PCA Project Manager/Technical Authority  
Administrateur de Projets APC  
JACKIE HICKS

Drawing title/Titre du dessin  
**ʔapsčik tašii (Ups-cheek ta-shee)**  
**“Going in the right direction on the trail”**  
**BRIDGE #20**  
**DECK LAYOUT AND DETAILS**

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