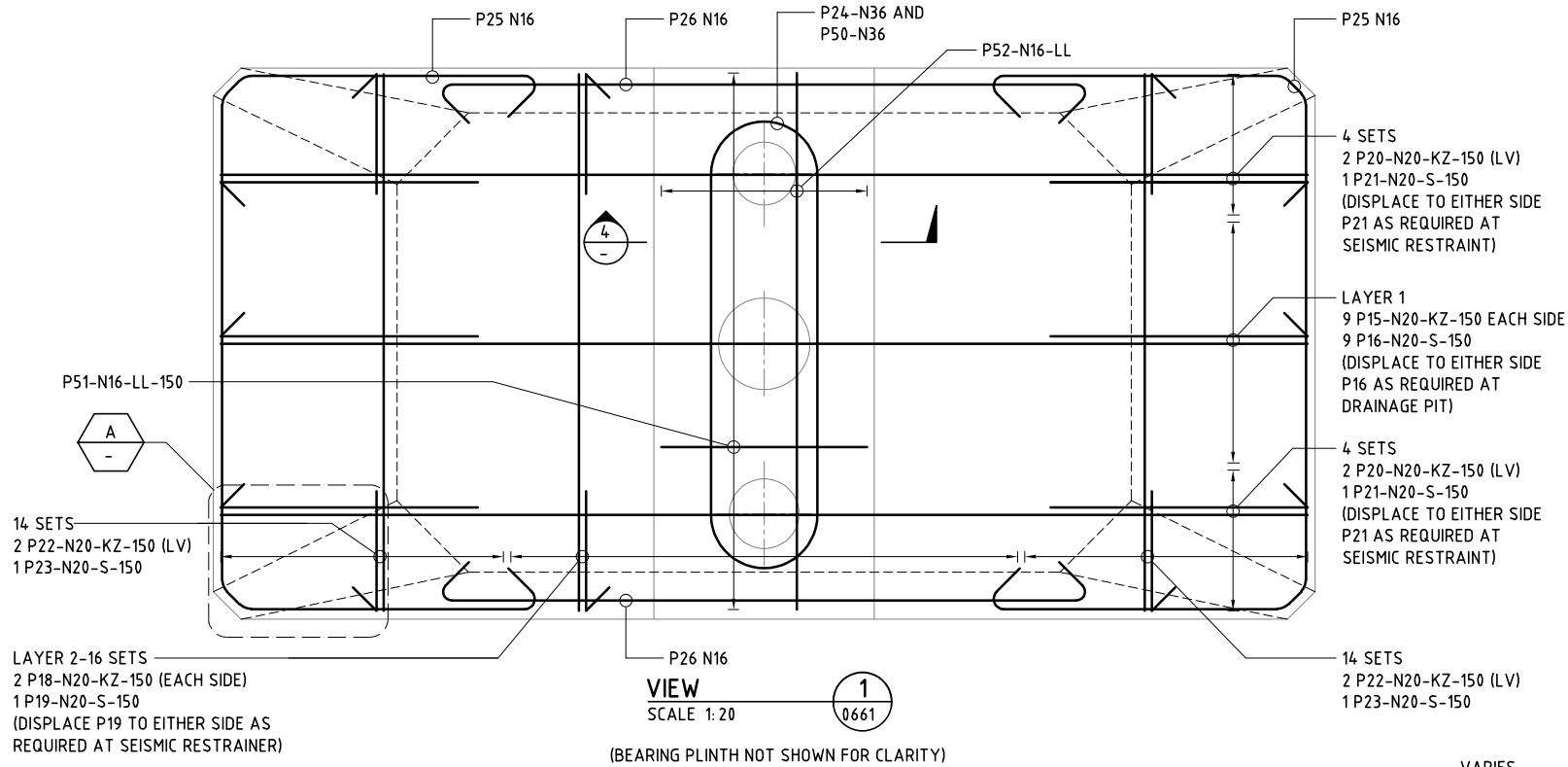


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Reviewed by NSTren
[Signature]
Jorge Müller
Project Director

This Drawing was originally prepared by JICA design team and reviewed/adjusted by NSTren Consortium

BAR MARKING LEGEND:
THE METHOD USED TO LABEL REINFORCEMENT ON THE DRAWINGS IS AS FOLLOWS:

TACK WELDING OR WELDING OF REINFORCEMENT IS PROHIBITED DUE TO FATIGUE CONCERNS IN RAILWAY BRIDGES.

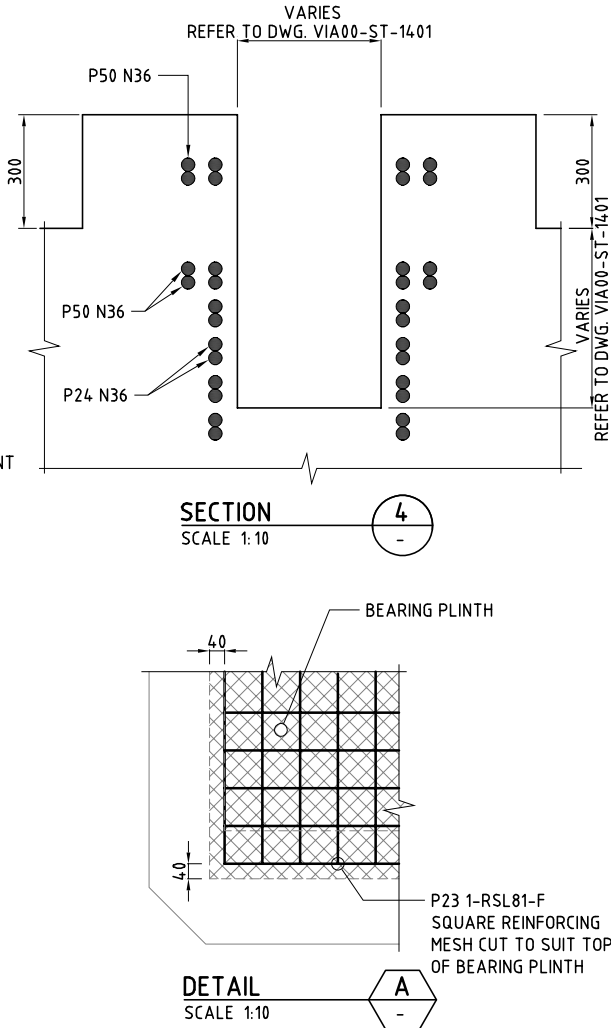
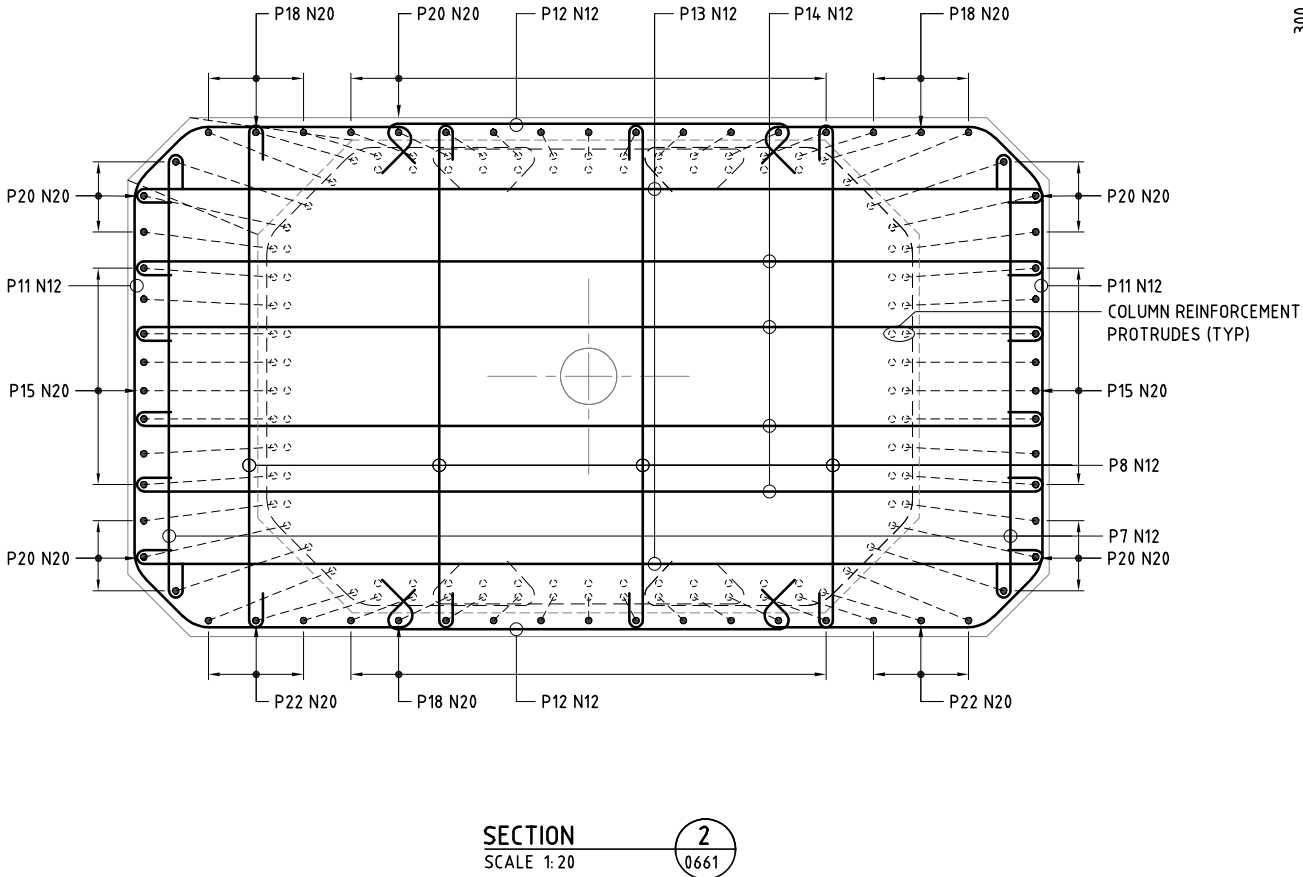
BAR MARK
2 P1-N12-S-150
↑ ↑ ↑ ↑ ↑
↑ SPACING OF BARS ALONG LIMIT LINE IN MILLIMETERS
↑ BAR SHAPE CODE
↑ BAR SIZE IN MILLIMETERS
↑ BAR STRUCTURAL PROPERTIES
↑ BAR NUMBER IN SEQUENCE
↑ STRUCTURAL ELEMENT DENOTATION
↑ NUMBER OF BARS IN THE SET

- NOTES:**
1. CONCRETE EXPOSURE CLASSIFICATION: B2.
 2. MINIMUM 28 DAY CYLINDER COMPRESSIVE STRENGTH OF STRUCTURAL CONCRETE SHALL BE 40 MPa.
 3. REINFORCEMENT SHALL BE GRADE 75, $f_y=520$ MPa TO ASTM 615 - DENOTED N.
 4. NOMINAL COVER TO REINFORCEMENT NEAREST TO THE CONCRETE SURFACE SHALL BE 40mm, UNLESS SPECIFIED OTHERWISE.
 5. UNLESS OTHERWISE SPECIFIED, THE MINIMUM DEVELOPMENT LENGTHS AND LENGTHS OF LAPS SHALL BE AS FOLLOWS:

TABLE 1 – REINFORCEMENT DEVELOPMENT LENGTHS






CONCRETE GRADE 40MPa							
BAR SIZE	N12	N16	N20	N24	N28	N32	N36
A) HORIZONTAL BARS WITH > 300mm OF CONCRETE CAST BELOW THE BAR.	400	500	650	750	1000	1300	1650
B) OTHER BARS	300	400	500	600	800	1050	1300

6. 'ABS' DENOTES ALTERNATE BAR STAGGERED.
7. 'LV' DENOTES LENGTH VARIES.
8. 'CJ' DENOTES CONSTRUCTION JOINT.
9. LAPS NOT SHOWN ON THE DRAWINGS SHALL BE STAGGERED NO LESS THAN THE LAP LENGTH SO THAT NO MORE THAN 50% OF BARS ARE LAPPED IN ANY ONE CROSS SECTION. WHERE MORE THAN 50% OF BARS ARE LAPPED IN ANY ONE CROSS SECTION, THE LAPS SHOWN IN THE TABLE ABOVE ARE INCREASED BY A FACTOR OF 1.3.
10. REINFORCEMENT MAY BE DISPLACED SLIGHTLY WHERE NECESSARY TO CLEAR PENETRATIONS, FORMED HOLES, RECESSES, PRESTRESSING TENDONS AND OTHER CAST IN INSERTS.
11. WHERE TWO BARS OF DIFFERENT DIAMETERS LAP SPLICE, THE LAP LENGTH OF SMALLER DIAMETER SHALL BE USED.
12. REINFORCEMENT SHALL BE EQUALLY SPACED UNLESS STATED OTHERWISE.



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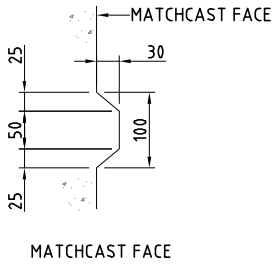
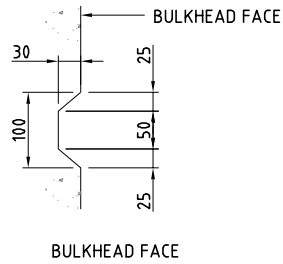


DESIGN CONSULTANT		
JICA DETAILED DESIGN STUDY TEAM		
 ORIENTAL CONSULTANTS GLOBAL CO., LTD.	 KATAHIRA & ENGINEERS INTERNATIONAL	 JAPAN INTERNATIONAL CONSULTANTS FOR TRANSPORTATION CO., LTD.
 PACIFIC CONSULTANTS CO., LTD.	 TONICHI ENGINEERING CONSULTANTS INC.	

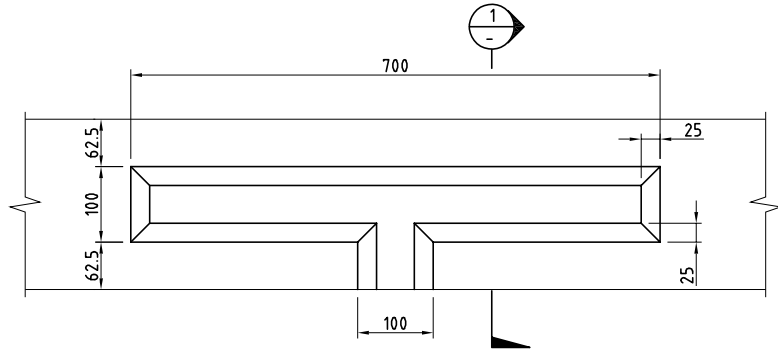
THE DETAILED DESIGN STUDY OF THE NORTH-SOUTH COMMUTER RAILWAY PROJECT (MALOLOS-TUTUBAN)	
DETAILED DESIGN	
PIER TYPE P7 - REINFORCEMENT DETAILS SHEET 2	

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DRG No.	NSCR-DWG-VIA00-ST-0662
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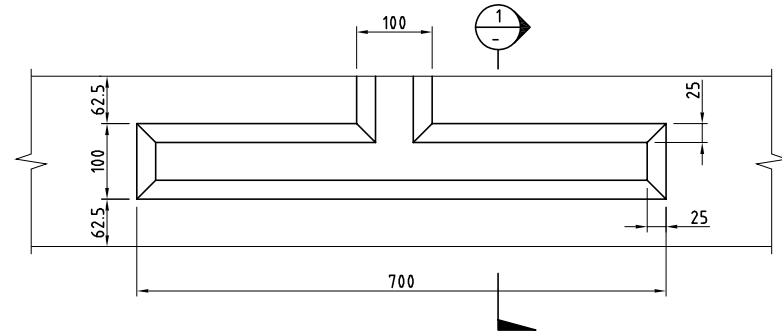
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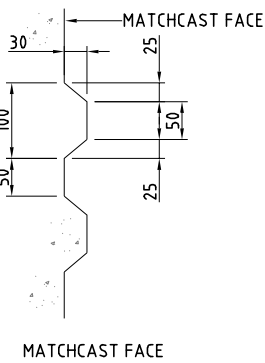
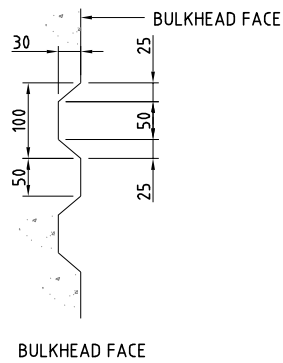
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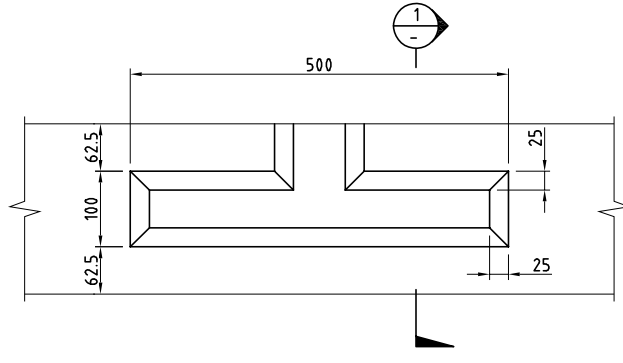
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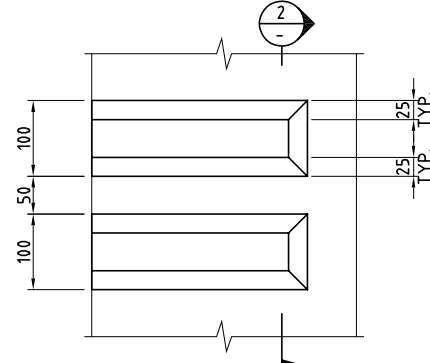
TYPICAL SHEAR KEY DETAIL - TYPE B
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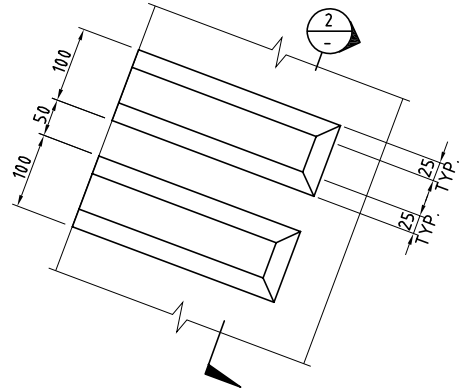
SECTION
SCALE 1:5



TYPICAL SHEAR KEY DETAIL - TYPE C
SCALE 1:5



5.1m AND 6.3m BOX SHEAR KEY DETAIL - TYPE D
SCALE 1:5



10.3m BOX SHEAR KEY DETAIL - TYPE D
SCALE 1:5

Reviewed by NSTren

Jorge Müller
Project Director

This Drawing was originally prepared by JICA design team and reviewed/adjusted by NSTren Consortium

- NOTES:
- DIMENSIONS ARE IN MILLIMETERS.
 - 'CJ' DENOTES CONSTRUCTION JOINTS.

SCALE 1:5

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DEPARTMENT OF TRANSPORTATION
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PHILIPPINE NATIONAL RAILWAYS

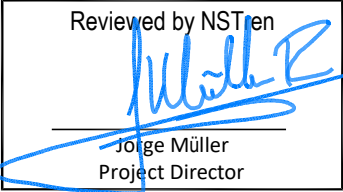
JICA
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

DESIGN CONSULTANT			
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	TONICHI ENGINEERING CONSULTANTS INC.		R. YUZON, JR.

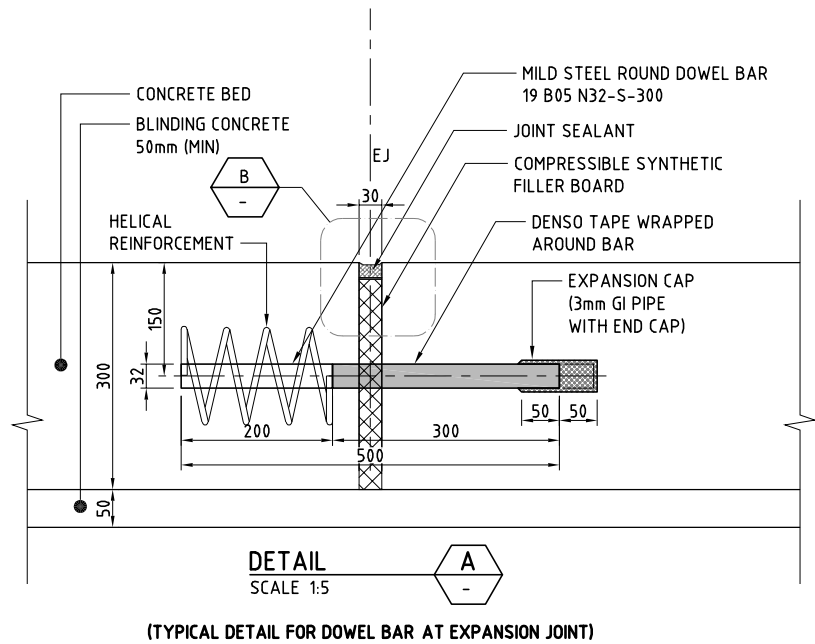
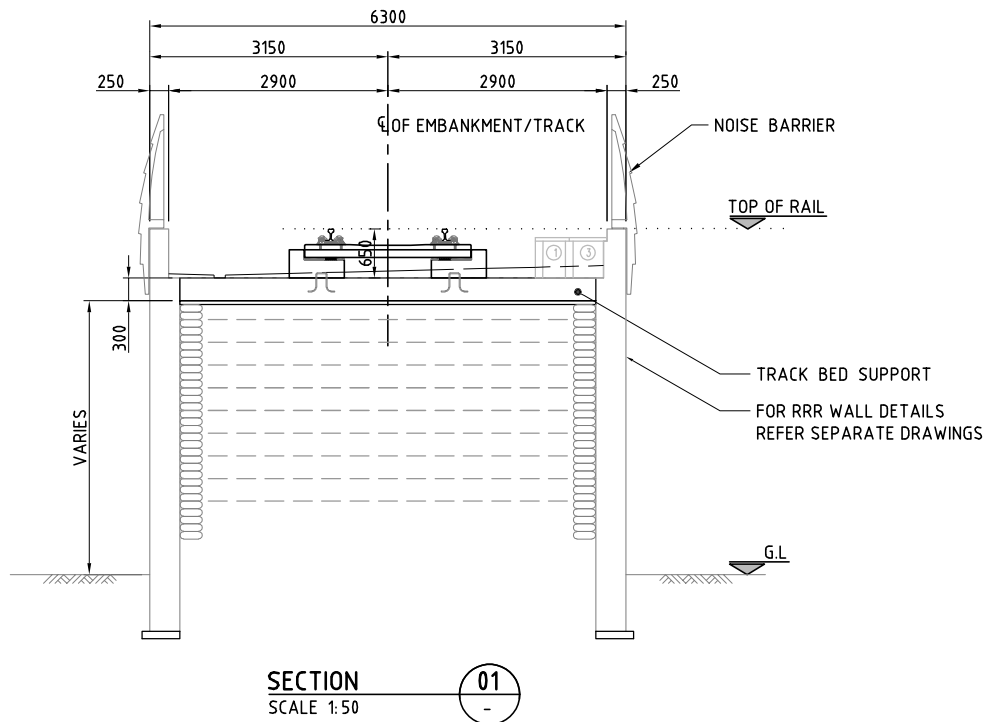
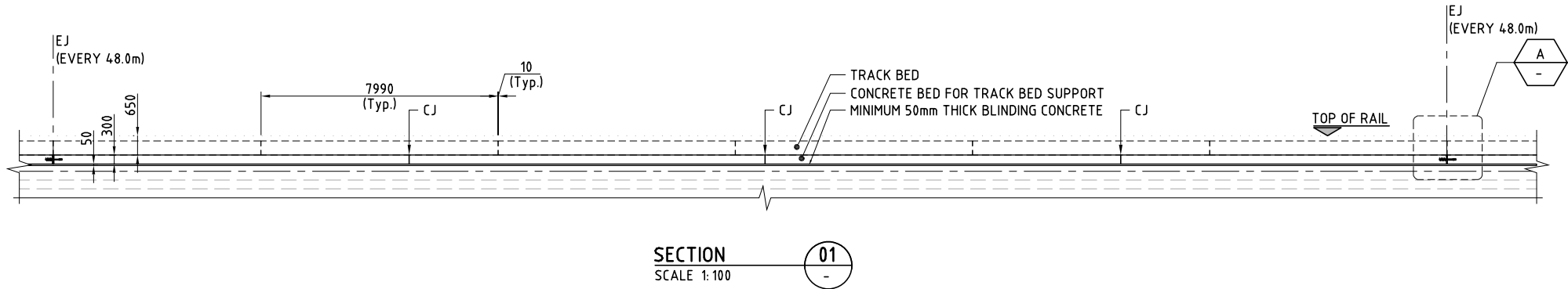
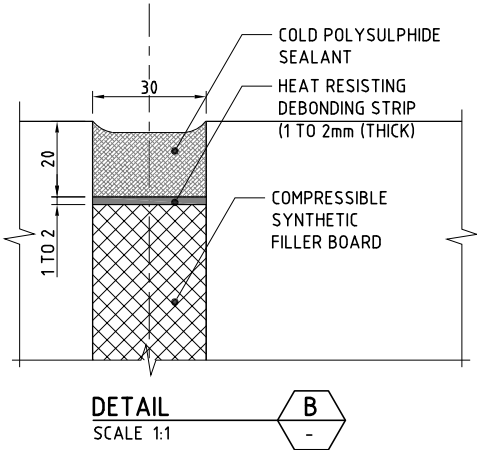
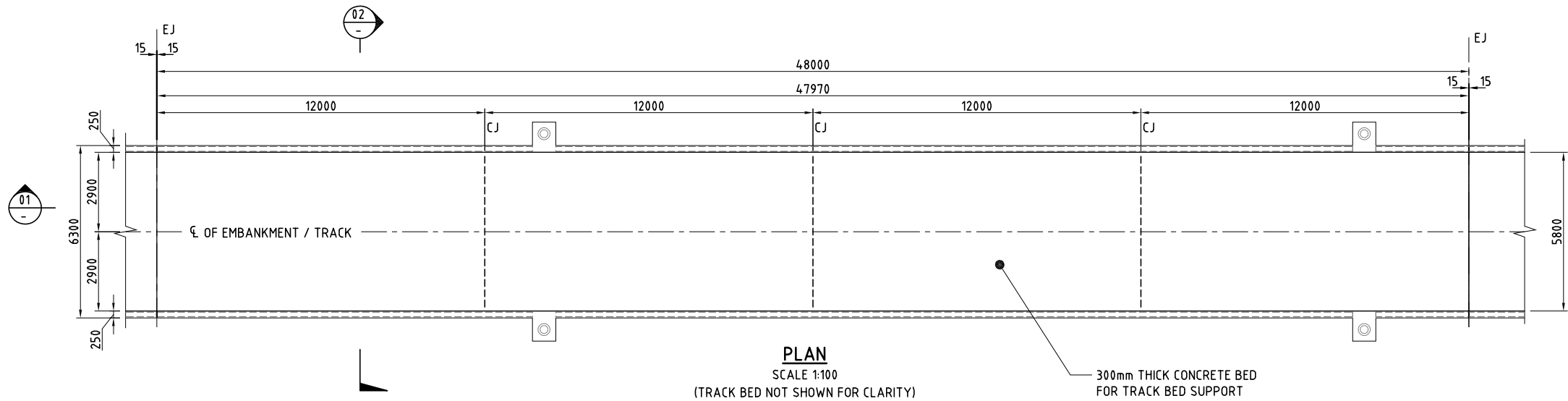
THE DETAILED DESIGN STUDY OF THE NORTH-SOUTH COMMUTER RAILWAY PROJECT (MALOLOS-TUTUBAN)
DETAILED DESIGN
PRECAST SEGMENTAL CONSTRUCTION TYPICAL DETAILS SHEET 4

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Reviewed by NSTren

Jorge Müller
Project Director

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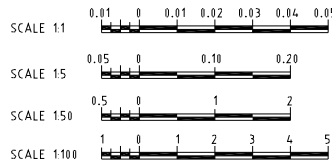


LEGEND:

CJ - CONSTRUCTION JOINT
EJ - EXPANSION JOINT

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED.
- FOR DRAINAGE ARRANGEMENT REFER SEPARATE DRAWING.
- FOR SHEAR CONNECTOR DETAILS REFER NSCR-DWG-GEN-TK-0152
- THE CIVIL CONTRACTOR SHALL COORDINATE THE DRAINAGE ARRANGEMENT FROM THE TRACK BED TO THE MAIN DRAINS WITH THE TRACK CONTRACTOR.
- LOCATION AND INSTALLATION OF SHEAR CONNECTORS SHALL BE DONE IN COORDINATION WITH THE TRACK CONTRACTOR PRIOR TO CASTING OF THE CONCRETE BED (TRACK BED SUPPORT).



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DESIGN CONSULTANT

JICA DETAILED DESIGN STUDY TEAM			
 ORIENTAL CONSULTANTS GLOBAL CO., LTD.	 KATAHIRA & ENGINEERS INTERNATIONAL	 JAPAN INTERNATIONAL CONSULTANTS FOR TRANSPORTATION CO., LTD.	 TONICHI ENGINEERING CONSULTANTS INC.
 PACIFIC CONSULTANTS CO., LTD.	 TONICHI ENGINEERING CONSULTANTS INC.		

TITLE	JDT	SMEC
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CHECK	I. HAYASHI	V. BALAKRISHNAN
TEAM LEADER	N. MATSUMOTO	J. BARNES
PROJ. MANAGER	M. MIYATA	R. YUZON, JR.

THE DETAILED DESIGN STUDY OF THE NORTH-SOUTH COMMUTER RAILWAY PROJECT (MALOLOS-TUTUBAN)
DETAILED DESIGN
TRACK BED SUPPORT FOR 6.3m WIDTH EMBANKMENT AREAS GENERAL ARRANGEMENT

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