

DESIGN STANDARD

- STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, AASHTO-1996
- BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE, ACI 318-99
- DOH STANDARD DRAWINGS.

DESIGN LOAD

- LIVE LOAD WALKWAY = 400 KG/M^2 - LIVE LOAD OF ROOF = 50 KG/M^2

GENERAL

THE LAYOUT AND LOCATIONS OF GUTTERS, STAIRS, HANDRAILS, DRAIN HOLES, DOWEL SLEEVES AND LIGHTING
POLES SHOWN THIS DRAWING ARE ONLY FOR INFORMATION. THE CONTRACTOR HAS TO VERIFY THE CORRECT
LOCATIONS, DIMENSIONS AND DETAILS OF ABOVE MENTIONED ELEMENTS TO MEET THE OWNERS REQUIREMENT
OR AS SPECIFIED IN THE GENERAL LAYOUT DRAWING.

CONCRETE

| DESCRIDTION | CLASS OF CONCRETE | MIN. CEMENT (Kg./M. ³) | MIN. STRENGTH AT 28 DAY** (Kg./CM.) | | |
|---------------------------------|----------------------|---------------------------------------|----------------------------------------|--|--|
| PRESTRESSED CONCRETE STRUCTURES | SPECIAL A | 400 | 420* | | |
| ORDINARY REINFORCED CONCRETE | A (1 1/2) | 330 | 300 | | |
| CONCRETE BORED PILE | A (1 1/2) | 330 | 300 | | |
| LEAN CONCRETE | С | - | 180 | | |

- * REQUIRED 15 CM. CUBE COMPRESSIVE STRENGTH FOR PRESTRESSED CONCRETE STRUCTRAL AT JACKING FORCE STATE SHALL BE AT LEAST 330 Kg/CM.
- ** SPECIFIED FOR 15 CM. CUBE COMPRESSIVE STRENGTH

REINFORCING STEEL

- 1. DEFORM BARS (DB) SHALL CONFORM TO TIS 24 GRADE SD40.
- 2. ROUND BARS (RB) SHALL CONFORM TO TIS 20 GRADE SR24.

CUTTIN

- BARS SHALL BE SHEARED, FLAME CUTTING SHALL NOT BE PERMITTED UNLESS APPROVED BY THE ENGINEER.

DEVELOPMENT LENGTH

- UNLESS OTHERWISE SPECIFIED, THE DEVELOPMENT LENGTH FOR VARIOUS CASES SHALL BE COMPUTED ACCORDING TO ARTICLE 8.24 TO 8.31 OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGE 1996

SPLICING

- 1. SPLICES, OTHER THAN THOSE SHOWN ON THE DRAWING. MAY BE MADE ONLY WITH THE APPROVAL OF THE ENGINEER
- SPLICES IN ADJACENT BARS SHALL BE STAGGERED AT LEAST 60 CM. ALL LAP SPLICE LENGTH OF DEFORMED BARS
 SHALL BE COMPUTED ACCORDING TO ARTICLE 8.32 OF AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES 1996
 EDITION. PLAIN ROUND BARS SHALL HAVE A MINIMUM LAP LENGTH OF 60 BAR DIAMETERS WITH HOOKED END.
- 3. WELDED SPLICES OR OTHER MECHANICAL CONNECTIONS MAY USED IF AUTHORIZED BY THE ENGINEER. A FULL WELDED SPLICE OR A MECHANICAL CONNECTION SHALL DEVELOP IN TENSION OR COMPRESSION AS REQUIRED AT LEAST 125 PERCENT OF THE SPECIFIED YIELD STRENGTH OF THE BAR

BENDING

- BARS SHALL BE COLD BENT AROUND A PIN WITH THE FOLLOWING MINIMUM DIAMETER (D) IN RELATION TO THE DIAMETER OF THE BAR (d):

FOR MAIN REINFORCING BAR

D = 6d FOR RB6, RB9 , DB12 , DB16 , DB20 , DB25D = 8d FOR DB28 , DB32

FOR STIRRUP AND TIE

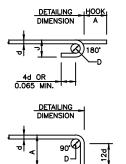
D = 4d FOR DB16 OR SMALLER

D = 6d FOR DB20 , DB25

HOOKS

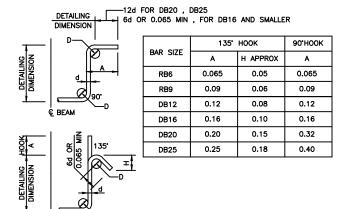
- ALL HOOKS, IF NOT SHOWN ON THE DRAWING, SHALL COMPLY WITH ACI STANDARD HOOK AS SET FORTH FOLLOW:

MAIN REINFORCING BAR HOOK DIMENSIONS (IN METER)



| | 180° | 90°НООК | | | |
|----------|------|---------|----------------------|--|--|
| BAR SIZE | Α | J | Α | | |
| RB6 | 0.11 | 0.06 | 0.10 0.15 0.20 | | |
| RB9 | 0.13 | 0.08 | | | |
| DB12 | 0.15 | 0.10 | | | |
| DB16 | 0.20 | 0.13 | 0.25 | | |
| DB20 | 0.24 | 0.15 | 0.30 | | |
| DB25 | 0.30 | 0.20 | 0.40 | | |
| DB28 | 0.40 | 0.28 | 0.50 | | |
| DB32 | 0.45 | 0.32 | 0.55 | | |

STIRRUP AND TIE HOOK DIMENSIONS (IN METER)



SPACING

- 1. CLEAR HORIZONTAL DISTANCE BETWEEN BARS OR PAIR OF BARS SHALL BE AT LEAST 1.5 BAR DIAMETER OR 40 MM.
- 2. CLEAR VERTICAL DISTANCE BETWEEN INDIVIDUAL BARS SHALL BE AT LEAST 25 MM.
- 3. CLEAR VERTICAL DISTANCE BETWEEN PAIR OF BARS SHALL BE AT LEAST 40 MM.
- 4. CLEAR HORIZONTAL AND VERTICAL DISTANCE BETWEEN TENDONS SHALL BE AT LEAST 50 MM.
- 5. CLEAR HORIZONTAL AND VERTICAL DISTANCE BETWEEN STRANDS SHALL BE AS SHOWN ON THE DRAWINGS.

CONCRETE COVER

UNLESS NOTED ON THE DRAWINGS THE FOLLOWING MINIMUM CONCRETE COVER (FROM FACE OF CONCRETE TO FACE OF BAR) SHALL BE PROVIDED:

| - BOTTOM OF ALL PILE CAPS. | 7.5 | CM. |
|------------------------------------------------------------|-----|-----|
| - SIDE AND TOP OF PILE CAPS. | 5 | CM. |
| - SIDE AND TOP OF ALL COLUMNS, PIERS, ABUTMENTS AND WALLS. | 4 | CM. |
| - ALL FACES OF BOX CULVERTS AND CHANNEL TRANSITIONS. | 4 | CM. |
| - TOP OF ALL DECK SLABS. | 4 | CM. |
| - BOTTOM OF ALL DECK SLABS. | 2.5 | CM. |
| - ALL FACES OF BARRIERS, CURBS AND PARAPETS. | 3 | CM. |
| - TOP OF STAIRS AND STAIR SLABS. | 3.5 | CM. |
| - SIDE AND BOTTOM OF STAIRS AND STAIR SLABS. | 2.5 | CM. |
| - ALL FACES OF BEAMS, GIRDERS AND DIAPHRAGMS. | 4 | CM. |

CHAMFERING

- ALL EXPOSED CONCRETE CORNERS SHALL BE 2.0 CM. CHAMFER UNLESS OTHERWISE NOTED.

REV. NO. DESCRIPTION ENGINEER DOH REV. NO. APPROVED BY Image: Control of the control of



| HIGHWAY ROUTE NO. 9 | OWNER | PROJECT TITLE |
|---------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| TOLL GATE | The Inter-City Motorways Division Department of Highways Ministry of Transport | The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road |

CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.

| D. | DESIGNED BY | CHECKED BY | DATE : AUGUST 2012 | SCALE : | |
|----|----------------------------------|-----------------------------------|--------------------|---------------|--|
| | SAGARA Hidetaka ROAD ENGINEER | WATANABE Ryohei CHIEF ENGINEER | DWG. NO. | SHEET NO. 127 | |

STRUCTURAL STEEL

- ALL STRUCTURAL STEEL SHAPES AND PLATES, UNLESS SPECIFIED ON THE DRAWINGS, SHALL BE OF STRUCTURAL STEEL GRADE CONFORMING TO THE REQUIREMENTS STATED IN THE SPECIFICATIONS, WITH A MINIMUM YIELD STRENGTH OF 2400 KG/CM.
- ALL STRUCTURAL STEEL PREFABRICATED WORKS INCLUDING THEIR FASTENERS SHALL BE GALVANIZED AS
 MENTIONED IN THE SPECIFICATIONS. THE WEIGHT OF ZINC COATING SHALL NOT BE LESS THAN 1,100 GRAMS/M².
- 3. ALL ANCHOR BOLTS SHALL BE GALVANIZED ONLY AT THE EXPOSED PORTIONS.
- 4. ALL WELDING SYMBOLS ARE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY (AWS).
- 5. SIZE, INCREMENT LENGTH AND PITCH OF WELD SHOWN ARE IN MILLIMETERS.

MISCELLANEOUS

FOOTING

TOP OF SPREAD FOOTING SHALL BE AT LEAST 1.00 M. BELOWER THAN THE ORIGINAL GROUND LEVEL. ALLOWABLE BEARING CAPACITY OF SOIL UNDER TOLL ISLAND AND COLUMN BASE SHALL NOT BE LESS THAN 5 TONNE/M. 2

DRAWINGS

THIS DRAWINGS REFERED TO DOH'S STANDARD DRAWINGS.

PAINTING METAL STRUCTURES

1 MATERIAL

a) SHOP COAT (PRIME COAT)

THE SHOP OR PRIME COAT OF PAINT FOR METAL SHALL BE A RED LEAD PAINT AND SHALL CONFORM TO THE SPECIFICATION FOR RED LEAD READY-MIXED PAINT M72. RED LEAD PIGMENT IN THE DRY FORM OR AS A PASTE IN OIL SHALL CONFORM TO ASTM D83. THE 97% GRADE SHALL BE SPECIFIED FOR DRY PIGMENT.

b) FIRST FIELD COAT

WHEN THE FINISHED COAT OF PAINT IS SPECIFIED TO BE ALUMINIUM, BLACK OR GRAPHITE PAINT, OR COLORED GREEN BROWN OR DARK GRAY. THE FIRST FIELD COAT SHALL BE A RED LEAD PAINT AS SPECIFIED FOR THE SHOP COAT, TINTED LIGHT BROWN AS REQUIRED, WITH LAMP BLACK IN THE AMOUNT NOT EXCEED 1/4 POUND PER GALLON OF LINSEED OIL.

WHEN THE FINISHED COAT IS TO BE WHITE OR GRAY, A FIRST FIELD COAT CONFORMING TO THE SPECIFICATION FOR WHITE AND TINTED READY—MIXED PAINT (LEAD AND ZINC BASE), AASHTO M70 MAY BE USED IN LIEU OF RED LEAD PAINT. THE PAINT SHALL BE TINTED AS DIRECTED BY DOH

c) SECOND FIELD COAT (FINISH COAT)

THE PAINT TO BE USED FOR THE SECOND FIELD COAT SHALL BE AS REQUIRED BY THE SPECIAL PROVISIONS OR AS NOTED ON THE PLANS. IT SHALL CONFORM TO ONE OF THE FOLLOWING AASHTO SPECIFICATIONS:

- (1) FOLIAGE GREEN BRIDGE PAINT, M67
- (2) BLACK BRIDGE PAINT, M68
- (3) ALUMINUM PAINT (PASTE-MIXING VEHICLE), M69
- (4) WHITE AND TINTED READY-MIXED PAINT (LEAD AND ZINC BASE), M70
- (5) RED LEAD (DRY AND PASTE IN OIL) AND PAINT MADE THEREFROM, M70
- (6) RED LEAD READY-MIXED PAINT, M72

IF RED LEAD IS USED FOR THE SECOND FIELD COAT IT SHALL BE TINTED WITH LAMP BLACK AS DIRECTED BY THE ENGINEER.

2 NUMBER OF COATS AND COLOR

ALL STEEL SHALL BE PAINTED ONE SHOP OR PRIME COAT, AND WITH NOT LESS THAN TWO FIELD COATS AS SPECIFIED ABOVE. THE COLOR SHALL BE AS SPECIFIED OR DETERMINED BY THE ENGINEER. THE COATS SHALL BE SUFFICIENTLY DIFFERENT IN COLOR TO PERMIT DETECTION OF INCOMPLETE APPLICATION.

MIXING OF PAINT

PAINT SHALL BE FACTORY MIXED. ALL PAINT SHALL ALSO BE FIELD MIXED BEFORE APPLYING IN ORDER TO KEEP THE PIGMENTS IN UNIFORM SUSPENSIONS.

4 WEATHER CONDITIONS

PAINT SHALL NOT BE APPLIED WHEN THE AIR TEMPERATURE IS BELOW 40°F OR WHEN THE AIR IS MISTY, OR WHEN, IN THE OPINION OF THE ENGINEER, CONDITIONS ARE OTHERWISE UNSATISFACTORY FOR THE WORK. IF SHALL NOT BE APPLIED UPON DAMP OR FROSTED SURFACES.

5 APPLICATION

PAINTING SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER. PAINT MAY BE APPLIED WITH HAND BRUSHES OR BY SPRAYING EXCEPT THAT ALUMINUM PAINT PREFERABLY SHALL BE APPLIED BY SPRAYING. BY EITHER METHOD THE COATING OF PAINT APPLIED SHALL BE SMOOTHLY AND UNIFORMLY SPREAD SO THAT NO EXCESS PAINT WILL COLLECT AT ANY POINT. IF WORKDONE BY SPRAYING IS NOT SATISFACTORY TO THE ENGINEER, HAND BRUSHING WILL BE REQUIRED.

WELDING

- 1 WELDING OF STEEL STRUCTURES SHALL BE IN GENERAL ACCORDANCE WITH THE SPECIFICATIONS FOR WELDED HIGHWAY AND RAILWAY BRIDGES OF THE AMERICAN WELDING SOCIETY AWS D1.1.
- 2 WELDING SHALL BE CARRIED OUT WITH ELECTRODES OF MANUAL SHIELDED METAL—ARC WELDING (SMAW). SUCH ELECTRODES SHALL CONFORM TO THE LOW—HYDROGEN CLASSIFICATION REQUIREMENTS OF THE LATEST EDITION OF THE AMERICAN WELDING SOCIETY'S FILLER METAL SPECIFICATION AWS A5.1 OR AWS A5.5 AND BE CAPABLE OF PRODUCING WELD METAL HAVING AN IMPACT STRENGTH OF AT LEAST 20 FT—LBS AT 0 'F.
- 3 ELECTRODES CONFORMING TO AWS A5.1 SHALL BE PURCHASED IN HERMETICALLY SEALED CONTAINERS OR SHALL BE DRIED FOR AT LEAST TWO HOURS BETWEEN 450-500 'F BEFORE THEY ARE USED. ELECTRODES CONFORMING TO AWS A5.5 SHALL BE PURCHASED IN HERMETICALLY SEALED CONTAINERS OR SHALL BE DRIED ONE HOUR ± 15 MINUTUES AT A TEMPERATURE OF 800 'F ± 25 'F BEFORE BEING USED.
- 4 INSPECTION OF WELDS IN SPECTION OF WELDS IN ALL STRUCTURAL STEELS MAY
 BEGIN IMMEDIATELY AFTER THEY ARE COMPLETED. IN ADDITION TO INSPECTION AS
 REQUIRED BY AWS D1.1 ALL WELDS SHALL BE VISUALLY EXAMINED. PROCEDURES
 TECHNIQUE AND STANDARDS OF ACCEPTANCE SHALL BE IN ACCORDANCE WITH AWS D.1.

5 STUD WELDING

- a) THE AREAS TO WHICH STUDS ARE TO BE WELDED SHALL BE FREE OF SCALE, RUST, MOISTURE, OR OTHER INJURIOUS MATERIAL TO THE EXTENT NECESSARY TO OBTAIN SATISFACTORY WELDS.
- b) FOR FILLET WELDS, THE STUD BASE SHALL BE PREPARED SO THAT THE BASE OF THE STUD FITS AGAINST THE BASE METAL. THE STUD BASE SHALL NOT BE PAINTED, GALVANIZED, OR CADMIUM—PLATED PRIOR TO WELDING.
- 6 MINIMUM SIZE OF FILLET WELDS ARE AS FOLLOWS:

| MATERIAL THICKNESS | MINIMUM SIZE | MAXIMUM SIZE | | |
|------------------------------------------|---------------|---------------|--|--|
| OF THICKER PART | OF FILLET | OF FILLET | | |
| JOINTED, t (MM.) | WELD, a (MM.) | WELD, a (MM.) | | |
| t<6 | 3 | 6 | | |
| 6 <t≼13</t | 5 | t-2 | | |
| 13 <t≼19</t | 6 | t-2 | | |
| 19 <t< td=""><td>8</td><td>t-2</td></t<> | 8 | t-2 | | |
| | | | | |

7 MINIMUM THICKNESS OF GROOVE WELDS ARE AS FOLLOWS :

| MATERIAL THICKNESS OF THICKER PART JOINTED, t (MM.) | EFFECTIVE MINIMUM THICKNESS, (MM.) | | | | | |
|-------------------------------------------------------|------------------------------------|--|--|--|--|--|
| t≼6 | 3 | | | | | |
| 6 <t≼13</t | 5 | | | | | |
| 13 <t≼19</t | 6 | | | | | |
| 19 <t<38< td=""><td>8</td></t<38<> | 8 | | | | | |
| 38 <t<57< td=""><td>10</td></t<57<> | 10 | | | | | |
| 57 <t<150< td=""><td>13</td></t<150<> | 13 | | | | | |
| 150 <t< td=""><td>16</td></t<> | 16 | | | | | |

- 8 WELDING TO CONNECT MAJOR STRUCTURAL PARTS SHALL BE FILLET WELD
 TO THE FULL LENGTH OF COVER PLATE AND FULL DEPTH GUTT JOINT GROOVE WELD.
- 9 GROOVE WELD SHALL BE SINGLE V-SHAPE, FOR METAL THICKNESS LESS THAN AND EQUAL TO 6 MM. THICKER PART SHALL BE DOUBLE V-SHAPE.
- 10 SEAL WELD SHALL BE REQUIRED IN ORDER TO COMBINE THE FUNCTIONS OF SEALING AND STRENGTH.

OTHER REQUIREMENTS

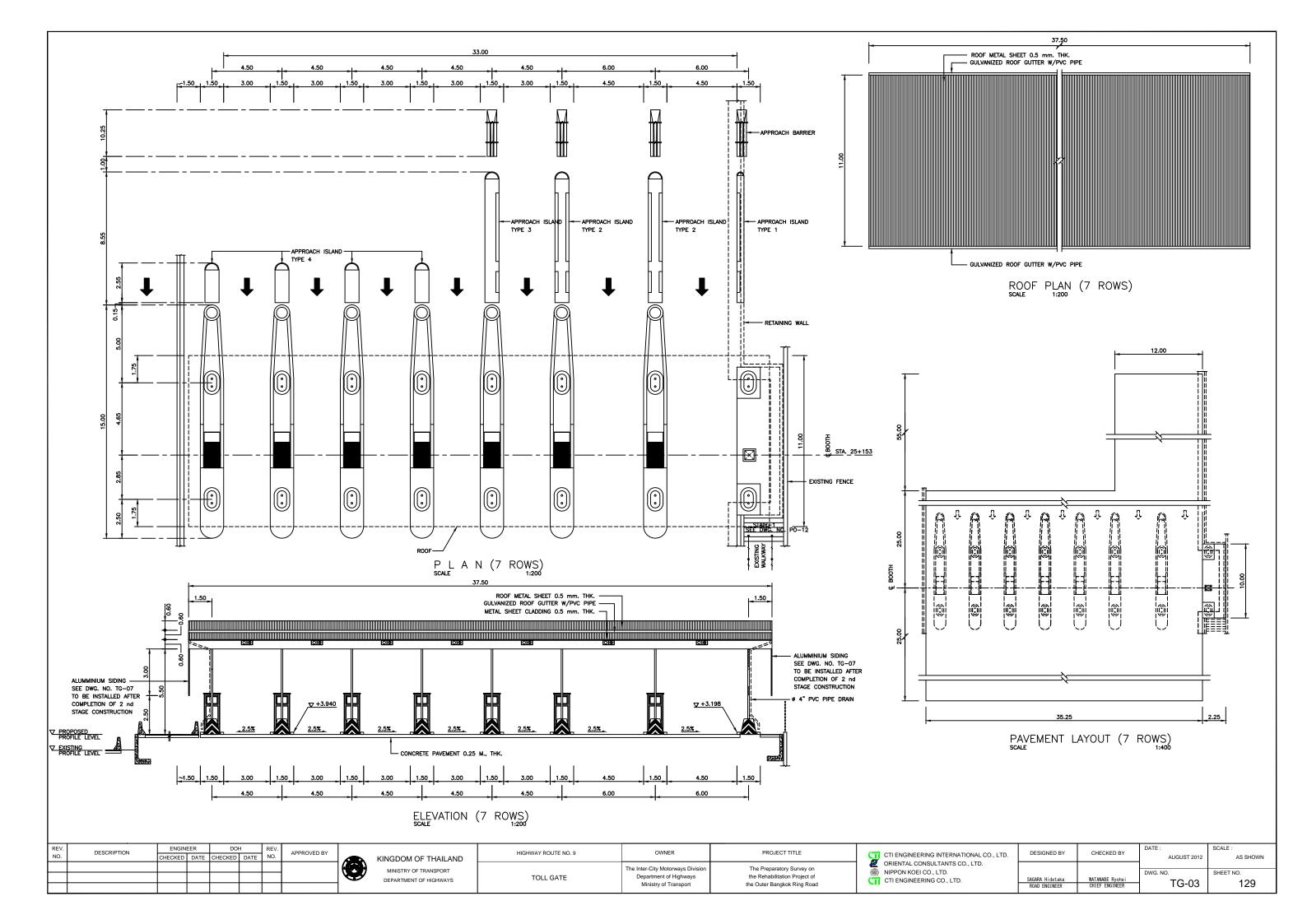
IN CASE OF NOT SPECIFIED IN THIS NOTE. AASHTO'S STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES SHALL BE APPLIED.

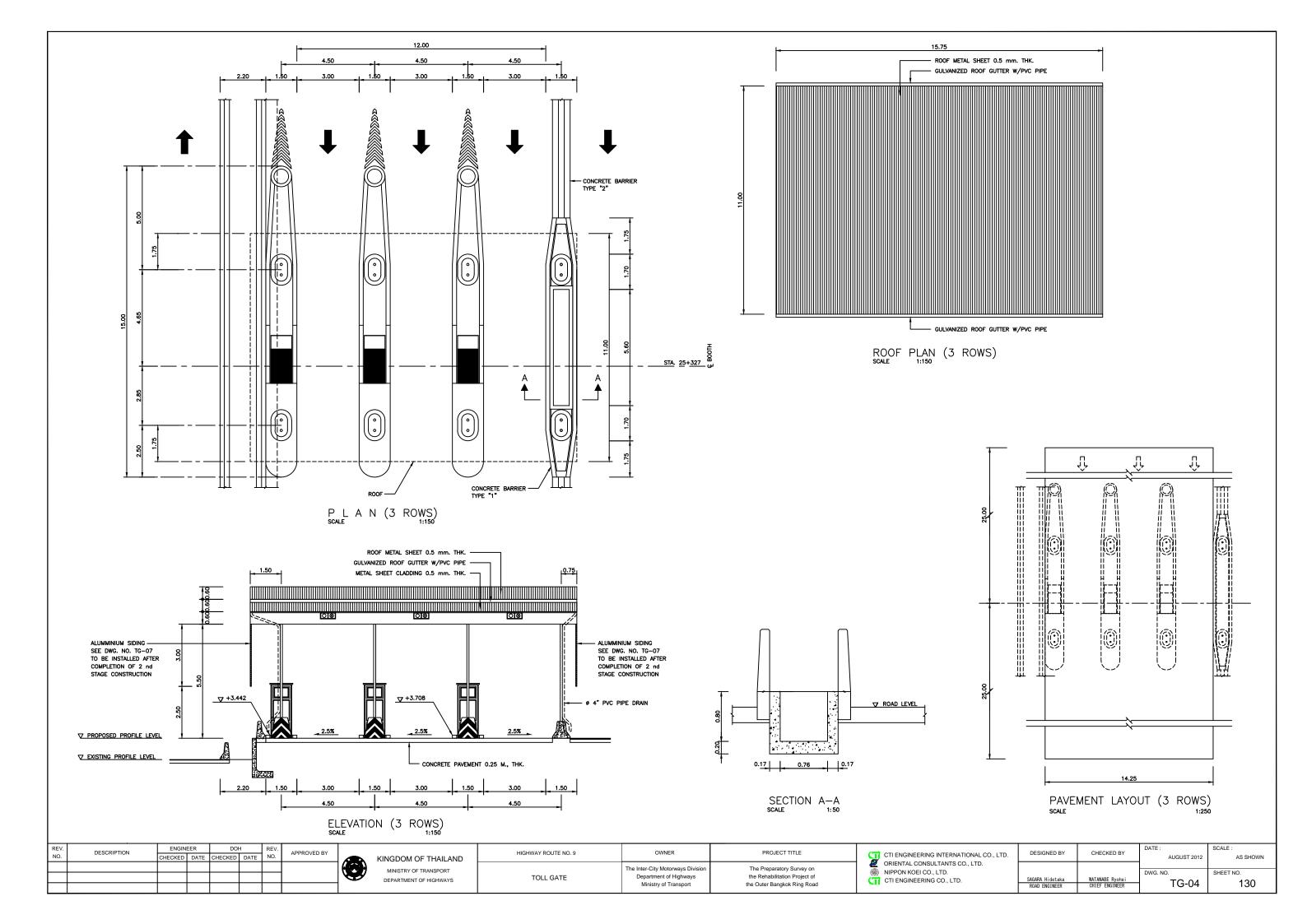
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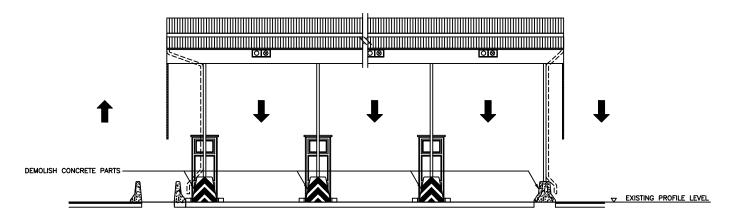
| IGHWAY ROUTE NO. 9 | OWNER | PROJECT TITLE |
|--------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| TOLL GATE | The Inter-City Motorways Division Department of Highways Ministry of Transport | The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road |

| DESIGNED BY | CHECKED BY | DATE: | SCALE: |
|-----------------|-----------------|-------------|-----------|
| | | AUGUST 2012 | - |
| | | | |
| | | DWG. NO. | SHEET NO. |
| SAGARA Hidetaka | WATANABE Ryohei | TG-02 | 128 |
| ROAD ENGINEER | CHIEF ENGINEER | 16-02 | 128 |
| | | | |

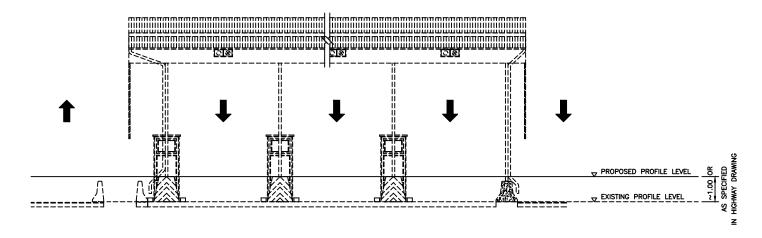




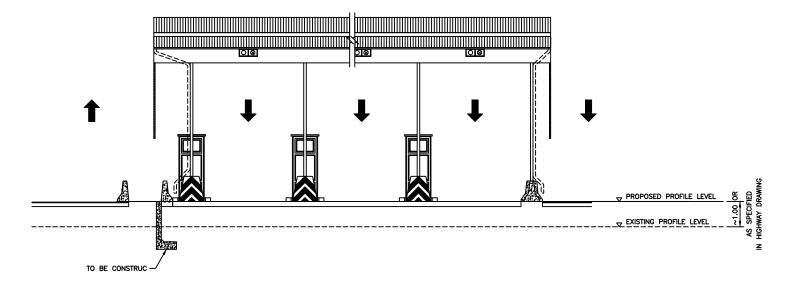
1. EXISTING TOLL GATE TO BE REMOVED.



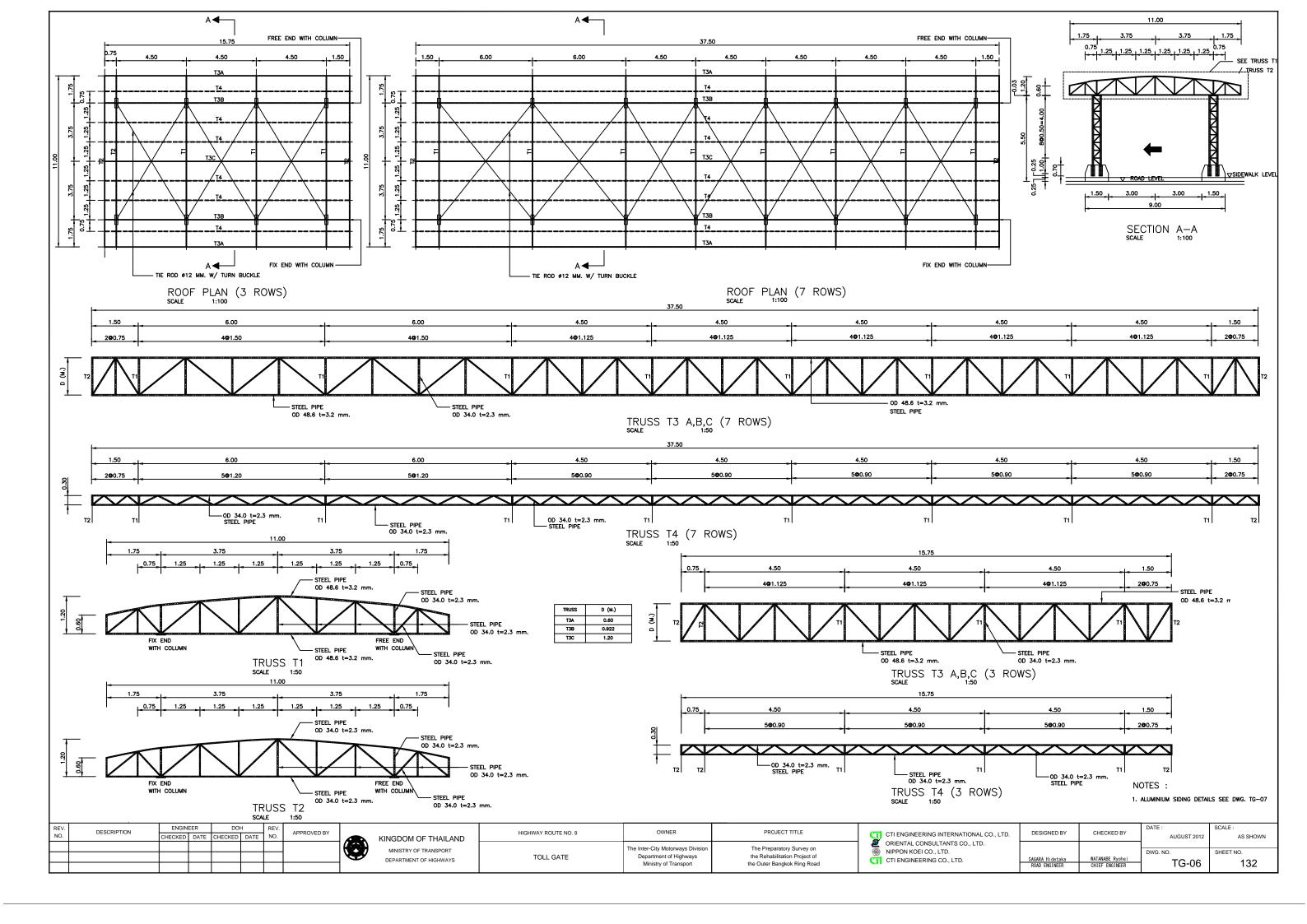
2. FILL AND COMPACT ROADWAY TO NEW ELEVATION AFTER REMOVED ALL EXISTING TOLL GATE.

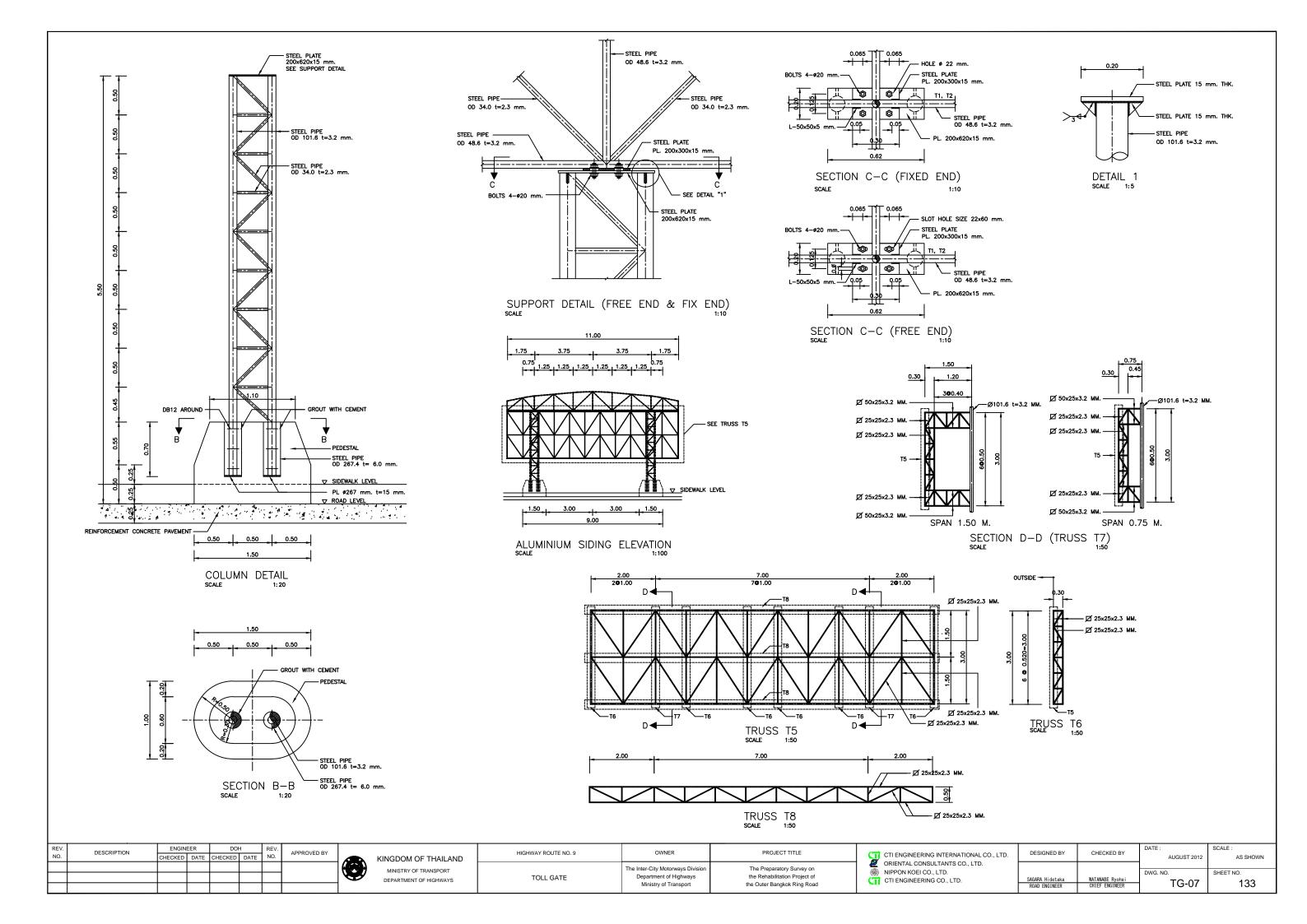


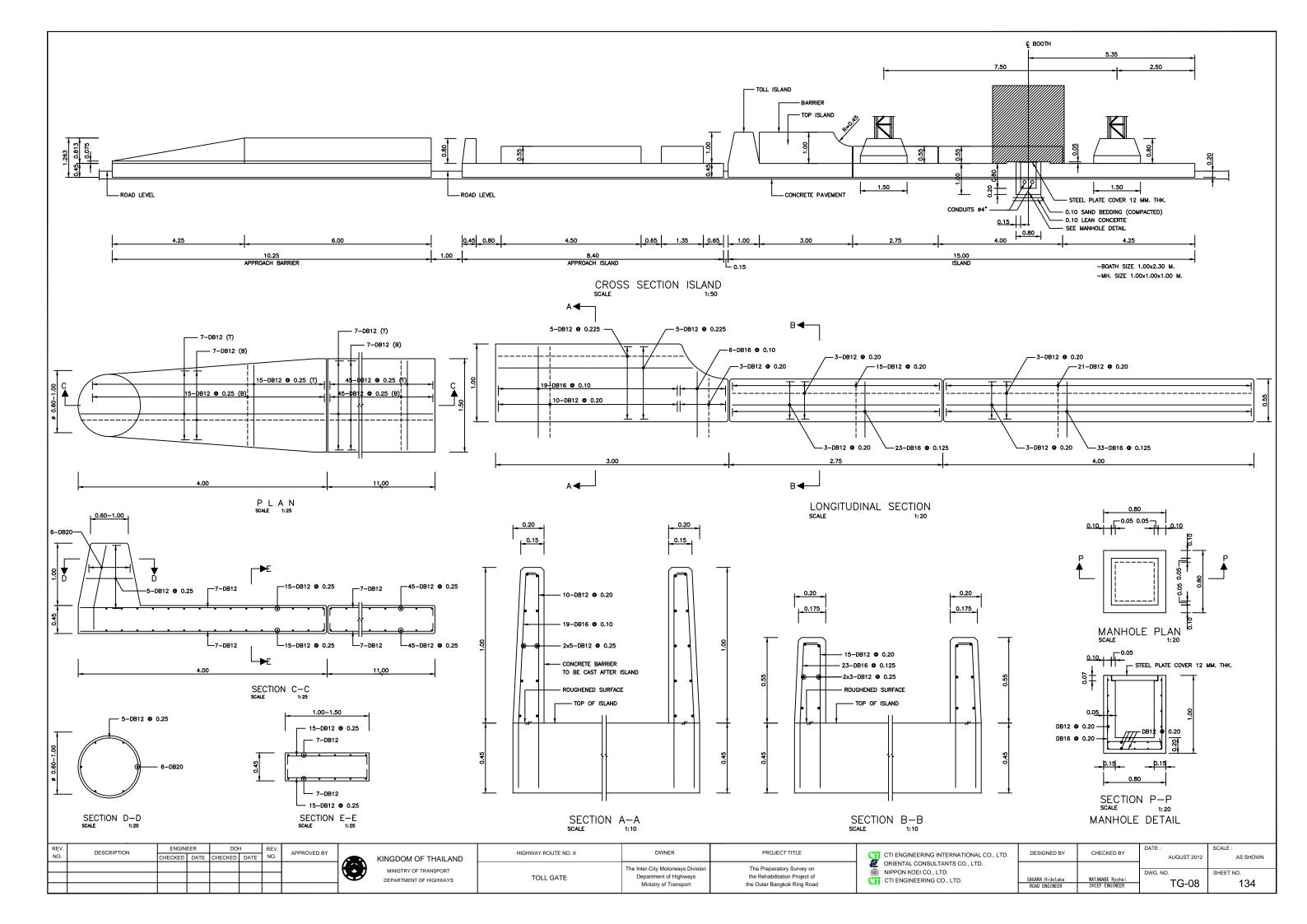
3. CONSTRUCT NEW TOLL GATE BY USING THE FOLLOWING DRAWINGS.

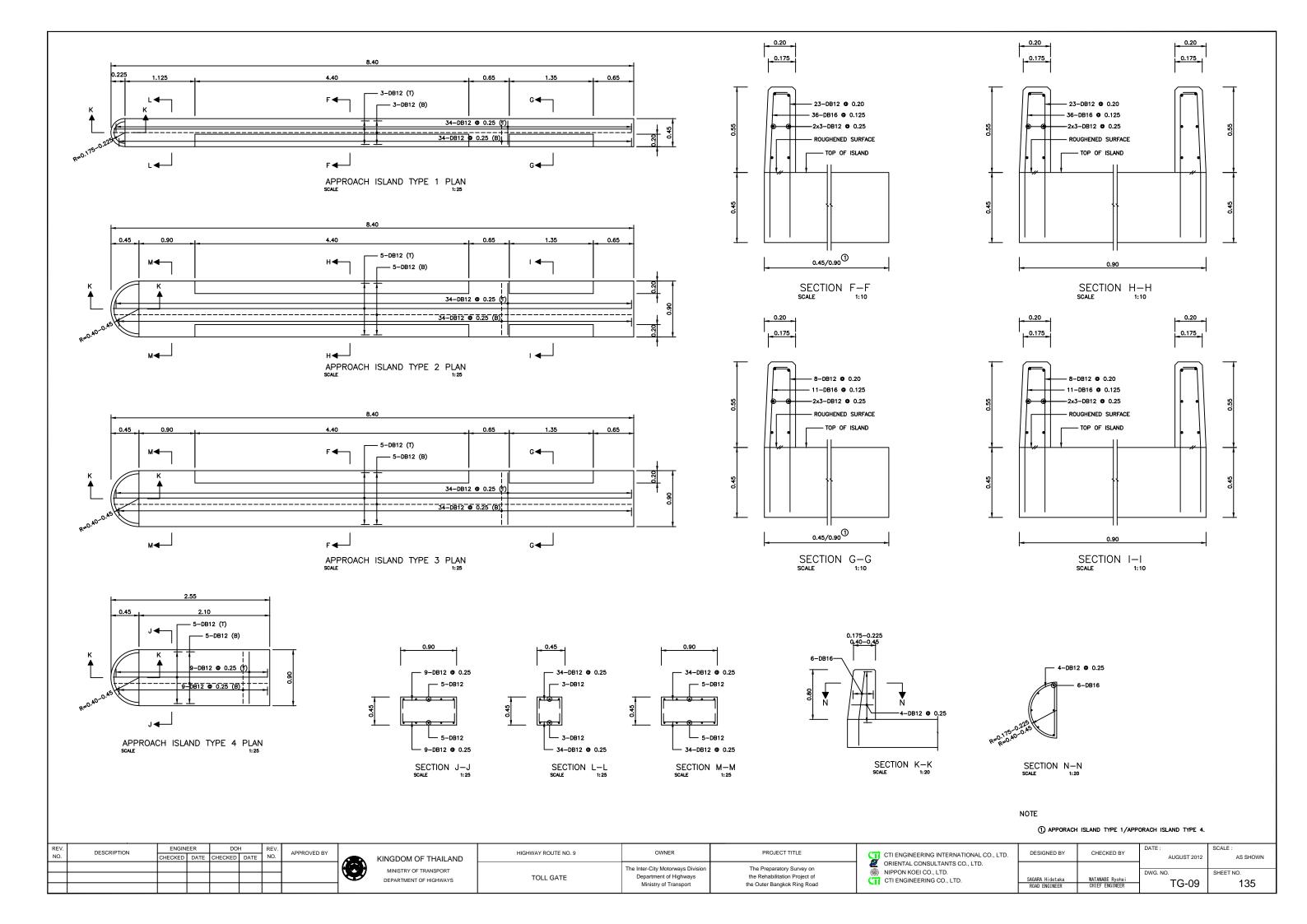


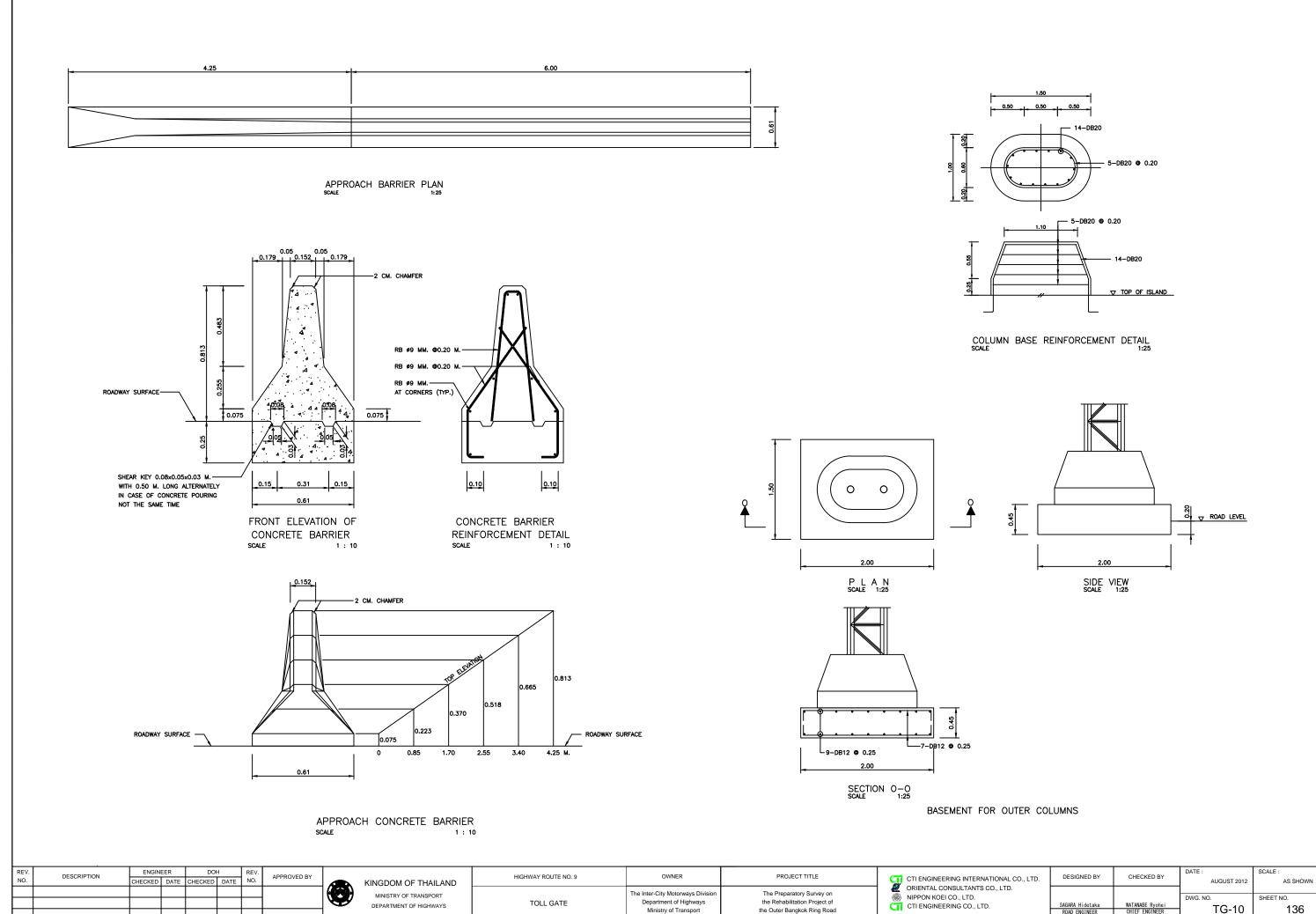
| | NO. | DESCRIPTION | CHECKE | D DATE | E CHECKED | DATE NO | D. APPROVED BY | | KINGDOM OF THAILAND | HIGHWAY ROUTE NO. 9 | OWNER | PROJECT TITLE | CTI ENGINEERING INTERNATIONAL CO., LTD. | DESIGNED BY | CHECKED BY | AUGUST 2012 | AS SHOWN |
|---|-----|-------------|--------|--------|-----------|---------|----------------|--------------------|------------------------|---------------------|----------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------|----------------------------------|-----------------------------------|-------------|-----------|
| F | | | | | | | | | MINISTRY OF TRANSPORT | TOLL CATE | The Inter-City Motorways Division Department of Highways | The Preparatory Survey on the Rehabilitation Project of | ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. | | | DWG. NO. | SHEET NO. |
| ŀ | _ | | + | | + | | | \dashv \bullet | DEPARTMENT OF HIGHWAYS | TOLL GATE | Ministry of Transport | the Outer Bangkok Ring Road | CTI ENGINEERING CO., LTD. | SAGARA Hidetaka ROAD ENGINEER | WATANABE Ryohei CHIEF ENGINEER | TG-05 | 131 |









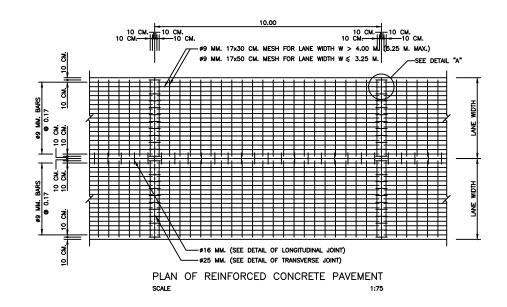


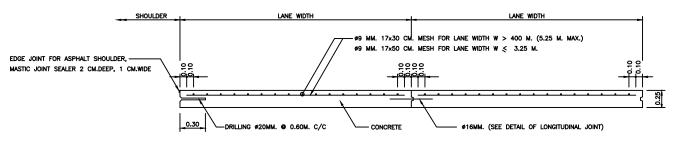
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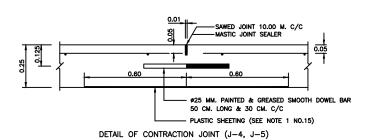
TOLL GATE

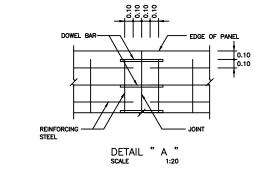
DEPARTMENT OF HIGHWAYS





REINFORCEMENT DETAIL OF CONCRETE PAVEMENT CROSS-SECTION SCALE



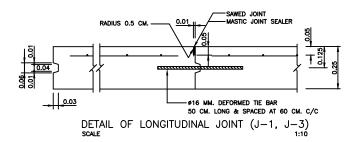


SAWED JOINT SEALER

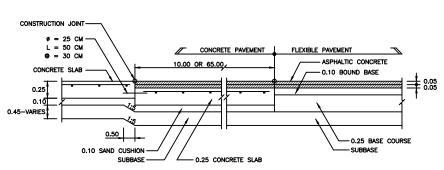
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FIRST SLAB

O.60



DETAIL OF CONSTRUCTION JOINT (J-2)
DETAIL OF TRANSVERSE JOINTS



DETAIL OF JOINT BETWEEN CONCRETE PAVEMENT & FLEXIBLE PAVEMENT

NOTES 1:

- 1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
- EXPANSION JOINT SHALL BE CONSTRUCTED AT THE INTERVAL OF 350 METERS. IF THE LAST INTERVAL IS LESS THAN 350 METERS, THE INTERVALS SHALL BE AVERAGED BUT BETWEEN 300 AND 350 METERS.
- EXPANSION JOINT SHALL BE PROVIDED AT THE OUTER EDGE OF BOTH SIDES OF THE BOX CULVERT CROSSING.
- MASTIC JOINT SEALER SHALL BE OF THE HOT POURED ELASTIC TYPE CONFORMING TO TIS, 479.
- JOINT FILLER SHALL CONFORM TO THE AASHTO M. 213-74 OR ASTM. D1751-73 SPECIFICATION.
- CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 325 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATE MIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOWS:

| PORTLAND CEMENT TYPE 1 | 350 | KG. (MIN.) |
|------------------------|------|------------|
| SAND | 0.43 | M.3 |
| CRUSHED ROCK OR GRAVEL | 0.86 | м.3 |
| CONCRETE SLUMP | 7 | CM. (MAX.) |

- REINFORCING STEEL SHALL CONFORM TIS.20 GRADE SR 24 FOR ROUND BARS AND TIS. 24 GRADE SD 30 FOR DEFORMED BAR.
- 8. WELDED WIRE CAN BE USED IN PLACE OF BAR MESH. (SEE NOTE 2)
- CONCRETE PAVER SHALL BE REQUIRED FOR CONCRETE POURING. IN CASE OF NECESSARY POURING CONCRETE BY MAN-POWER, CONCRETE SHALL BE POURED ONLY GAP SPACE NOT MORE THAN 30.00 METERS LONG.
- 10. ALL JOINTS EXCEPT EXPANSION JOINT SHALL BE MADE BY SLOT CUTTING MACHINE ONLY. FOAM SHEET, PLYWOOD, TIMBER OR MATERIAL OF THE SAME TYPE SHALL NOT BE ALLOWED.
- 11. TRAFFIC SHALL BE ALLOWED ONLY IF THE ULTIMATE COMPRESSIVE STRENGTH
 OF CONCRETE CUBE CONFORMS TO THE REQUIREMENT IN NOTE NO.6
- 12. ROAD CONSTRUCTION MATERIAL NOT SPECIFIED IN THIS DRAWING SHALL CONFORM TO THE STANDARD OF THE DEPARTMENT OF HIGHWAYS.
- 13. PREPARATION OF JOINT FOR MASTIC JOINT SEALER.
 - 13.1 THE JOINT SHALL BE CLEANED WITH A BLOWER TO GET RID OF ALL KINDS OF DIRT THE JOINT SHALL BE COMPLETELY DRY.
 - 13.2 PRIMER SHALL BE APPLIED TO THE JOINT WITH A BRUSH OR SPRAYER THE JOINT SHALL BE LET DRY BEFORE THE POURING OF MASTIC JOINT SEALER WHICH HAS BEEN BOILED AND DISSOLVED BY MEANS OF HEAT CONDUCTIVITY TO THE SPECIFIED TEMPERATURE.
- 13.3 JOINTS SHALL BE CUT AND MASTIC JOINT SEALER SHALL BE DROPPED AS SOON
 AS POSSIBLE.
 13.4 MASTIC JOINT SEALER SHALL BE DROPPED WITH JOINT SEALANT APPLYING MACHINE.
- THE THICKNESS OF FLEXIBLE PAVEMENT CORRESPONDED TO THE FIGURE CONFORMING
 TO TYPICAL CROSS—SECTION
- PLASTIC SHEET USED IN CONSTRUCTION SHALL HAVE THE FOLLOWING REQUIREMENTS:
 14.1 THICKNESS OF 0.07 MM. WITH A TOLERANCE OF NOT MORE THAN 7%
 SHALL BE REQUIRED.
 - 14.2 WIDTH SHALL NOT BE LESS THAN 1.20 M.

PROJECT TITLE

the Rehabilitation Project of

the Outer Bangkok Ring Road

- 14.3 IT SHALL BE COLOURLESS, TRANSPARENT AND WATERROOF, FREE FROM POROUS AREA, TURN AREA AND BLISTERING AREA WHICH ARE VISIBLE BY NAKED EYE. EDGE SHALL BE STRAIGHT.
- 14.4 CONTINUOUS LENGTH SHALL BE REQUIREMENT TO THE WIDTH OF TRAFFIC LANES. CONNECTION ALLOWED AT LONGITUDINAL JOINTS WITH NOT LESS THAN 20 CM. OVERLAPPING SHALL BE REQUIRED.
- 16. CONCRETE PAVEMENT CONSTRUCTION CONTROL SHALL CONFORM TO THE STANDARD DH-S 409/2530 REGARDING "REGULATIONS OF CONSTRUCTION CONTROL OF PORTLAND CEMENT CONCRETE PAVEMENT."

NOTES 2:

- 1. BAR MESH 9 MM. AS SHOWN IN THIS DRAWING SHALL BE REPLACED BY WELDED STEEL WIRE WITH PROPERTIES CONFORMING TO STANDARD SPECIFICATION FOR WELDED STEEL WIRE FABRIC FOR CONCRETE REINFORCEMENT, AASHTO DESIGNATION M 55 75 (ASTM. DESIGNATION A 185 73). BEFORE USING WELDED STEEL WIRE FABRIC, THE SAMPLES SHALL BE SENT TO MATERIAL AND RESEARCH DIVISION DOH. FOR APPROVING.
- 2. MINIMUM SIZE OF WIRE TO BE USED SHALL NOT BE LESS THAN STANDARD WIRE AASHTO DESIGNATION M 32 78 (ASTM DESIGNATION A 82 76) SIZE NUMBER W. 12 AT NOMINAL DIAMETER OF 3.15 MM. AND NOMINAL AREA OF 0.007 CM. WIRE TO BE USED SHALL HAVE YIELD STRENGTH OF NOT LESS THAN 65,000 16/NCH. (PSI.)
- LAP SPLICES OF BAR MESH SHALL NOT BE LESS THAN 40 TIMES OF WIRE DIAMETER AND NOT LESS THAN SPACING OF CROSS WIRE + 5 CM.
- QUANTITY OF STEEL WIRE FABRIC CALCULATED FROM NOMINAL AREA AND SPACING IN EACH DIRECTION SHALL CONFORM TO THE FOLLOWING REQUIREMENT:
 - 4.1 LONGITUDINALL STEEL (STEEL BETWEEN TRANSVERSE JOINT) SHALL HAVE THE MINIMUM AREA OF 1.511 CM²/M.
 - 4.2 TRANSVERSE STEEL:
 - 4.2.1 MINIMUM OF 0.453 CM²/M. SHALL REQUIRED IF SPACE BETWEEN LONGITUDINAL JOINT OR FREE EDGE IS MEASURED AT 3.00 M.
 4.2.2 MINIMUM OF 0.491 CM²/M. SHALL REQUIRED IF SPACE BETWEEN
 - 4.2.2 MINIMUM OF U.491 CM./M. SPALL REQUIRED IT SPACE BEHWEEN
 LONGITUDINAL JOINT OF FREE EDGE IS MEASURED AT 3.25 M.
 4.3.3 MINIMUM OF 0.529 CM./M. SHALL REQUIRED IF SPACE BETWEEN
 - LONGITUDINAL JOINT OR FREE EDGE IS MEASURE AT 3.50 M.
 QUANTITY OF WELDED STEEL WIRE FABRIC SPECIFIED REFERS TO QUANTITY
 OF WELDED STEEL WIRE FABRIC MEASURED AGAINST AVERAGE SPACE
 LENGTH OF 1 METER FROM THE TOTAL SPACE LENGTH BETWENN JOINT
 OR FREE EDGE.
- 5. WELDING POINTS SHALL BE ADEQUATELY STRONG AND SHALL NOT COME OFF DURING TRANSPORTATION OR PLACING. HOWEVER, THEY SHALL NOT BE SUBJECT TO REJECTION IF COMING OFF DURING CONSTRUCTION WITH WHATEVER REASON EXCEPT THAT DISCONNECTED POINTS EXCEED 1% OF ALL WELDING POINTS. IF ROLLED OVER, DISCONNECTED POINTS SHALL NOT EXCEED 1% OF ALL POINTS IN THE AREA OF 14 M2 DISCONNECTED POINTS FOR ONE WELDED STEEL WIRE FABRIC SHALL NOT EXCEED HALF OF ALL ALLOWABLE DISCONNECTED WELDING POINTS.
- 6. WELDED STEEL WIRE FABRIC SHEET SHALL BE SMOOTH NOT ROLL OR TWIST ALL DIRECTIONS, WHILE BEING PLACED DURING CONSTRUCTION.
- CLEAR CONCRETE COVER SPACE OF WELDED STEEL WIRE FABRIC SHALL CONFORM TO BAR MESH SPECIFICATION IN THIS DRAWING.

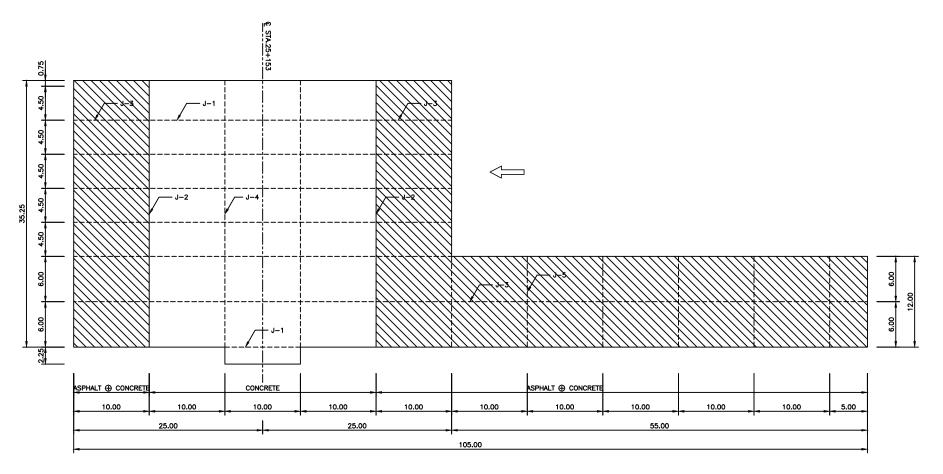
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| (23) | MINISTRY OF TRANSPORT |
| 3 | DEPARTMENT OF HIGHWAYS |
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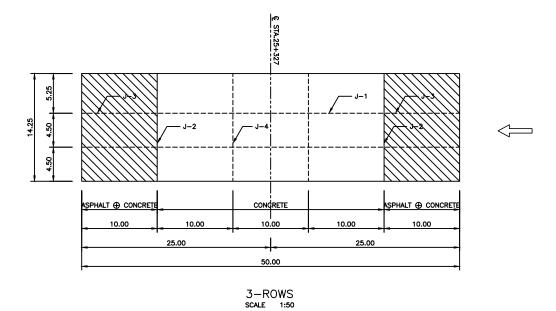
| HIGHWAY ROUTE NO. 9 | OWNER |
|-----------------------------------------------|--------------------------------------------------------------------------------|
| TOLL GATE 25 CM. CONCRETE PAVEMENT (1 / 2) | The Inter-City Motorways Division Department of Highways Ministry of Transport |



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| | SAGARA Hidetaka | WATANABE Ryohei | DWG. NO. | SHEET NO. |
| | ROAD ENGINEER | CHIEF ENGINEER | TG-11 | 137 |



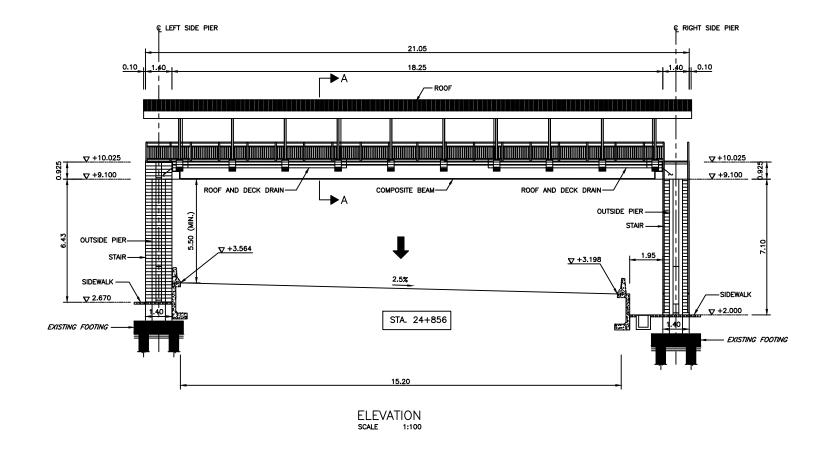
7-ROWS SCALE 1:50

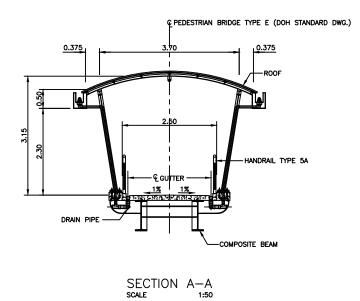


PAVEMENT AND JOINT LAYOUT PLAN

| REV. NO. | DESCRIPTION | ENGINEER CHECKED DATE | DOH CHECKED DATE | REV. NO. | APPROVED BY | KINGDOM OF THAILAND | HIGHWAY ROUTE NO. 9 | OWNER | PROJECT TITLE | CTI ENGINEERING INTERNATIONAL CO., LTD. | DESIGNED BY | CHECKED BY | DATE : AUGUST 2012 | SCALE : 1:50 |
|-------------|-------------|-----------------------|------------------|-------------|-------------|----------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|----------------------------------|-----------------------------------|--------------------|---------------|
| | | | | | | MINISTRY OF TRANSPORT DEPARTMENT OF HIGHWAYS | TOLL GATE 25 CM. CONCRETE PAVEMENT (2 / 2) | The Inter-City Motorways Division Department of Highways Ministry of Transport | The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road | ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD. | SAGARA Hidetaka ROAD ENGINEER | WATANABE Ryohei CHIEF ENGINEER | DWG. NO. | SHEET NO. 138 |

4. PEDESTRIAN OVERPASS FOR TOLL GATE ACCESS





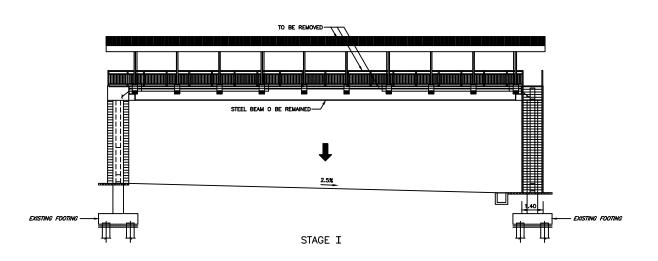
NOTES:

- 1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
- STAIRS AND PIER ARE REINFORCED CONCRETE, WHEREAS THE BRIDGES THEMSELVES ARE COMPOSITE MEMBER OF STEEL GIRDER AND REINFORCED CONCRETE DECK.
- 3. FOR STRUCTURAL NOTES AND GENERAL LAYOUTS OF PEDESTRIAN SEE DWG. NO. TG-01 TO TG-02.
- 4. FOR COMPOSITE BEAM OF BRIDGE SEE DWG. NO. PO-03.
- 5. FOR PIER DETAILS SEE DWG. NO. PO-04.
- 6. FOR STAIR DETAILS SEE DWG. NO. PO-05 TO PO-06.
- 7. FOR ROOF FRAME STRUCTURE TYPE 5 DETAILS SEE DWG. NO. PO-07 TO PO-08.
- 8. FOR ROOF AND DECK DRAIN DETAILS SEE DWG. NO. PO-10 TO PO-11.
- 10. FOR RETAINING WALL DETAILS SEE DWG. NO. PO-12.

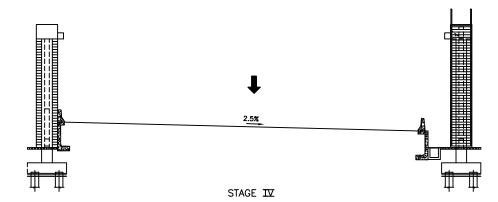
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| | | | | | | | | | (43) | MINISTRY OF TRANSPORT | TOLL GATE | The Inter-City Motorways Division | The Preparatory Survey on |
| | | | | | | | | | Y | DEPARTMENT OF HIGHWAYS | PEDESTRIAN BRIDGE | Department of Highways | the Rehabilitation Project of |
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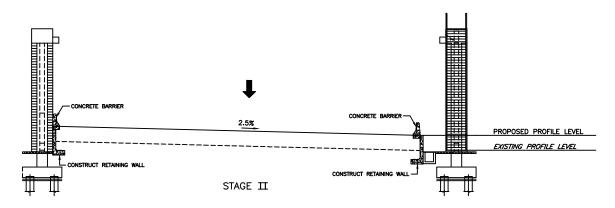
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| | | DWG. NO. | SHEET NO. |
| SAGARA Hidetaka | WATANABE Ryohei | PO-01 | 420 |
| ROAD ENGINEER | CHIEF ENGINEER | PO-01 | 139 |



- 1. REMOVE STEEL ROOF ON DECK AND DECK SLAB.
- 2. REMOVE STEEL BEAM BY LIFT AND PLACE BESIDE THE PEDESTRAIN BRIDGE.



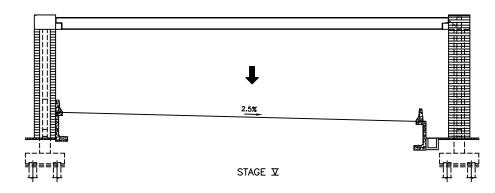
1. RECONSTRUCT RC. BEAM AND RC. STAIR.



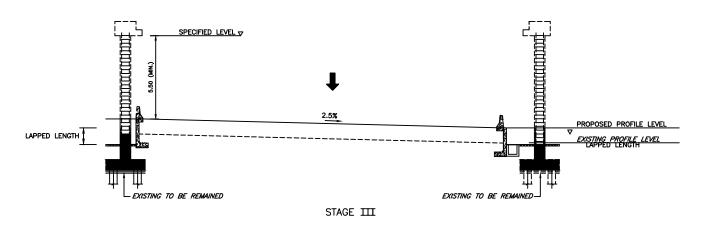
- 1. DEMOLISH STAIR AND BEAM.
- 2. DEMOLISH COLUMN AND PIER HEAD BY KEEPING THE REINFORLING STEEL OF COLUMN, AT SPECIFIED LEVEL.
- 3. FILL ROADWAY TO PROPOSED PROFILE LEVEL.

1. EXTEND RC. COLUMN W/PIER HEAD TO SPECIFIED LEVEL.

4. CONSTRUCT RETAINING WALL AND BARRIER.



1. PLACE EXISTING STEEL BEAM ON NEW PIER HEAD.



STAGE VI

PROJECT TITLE

1. CONSTRUCT DECK SLAB ,STEEL ROOF AND RAILING FOR STAIR AND DECK OF NEW PEDESTRIAN BRIDGE.

CTI ENGINEERING CO., LTD.

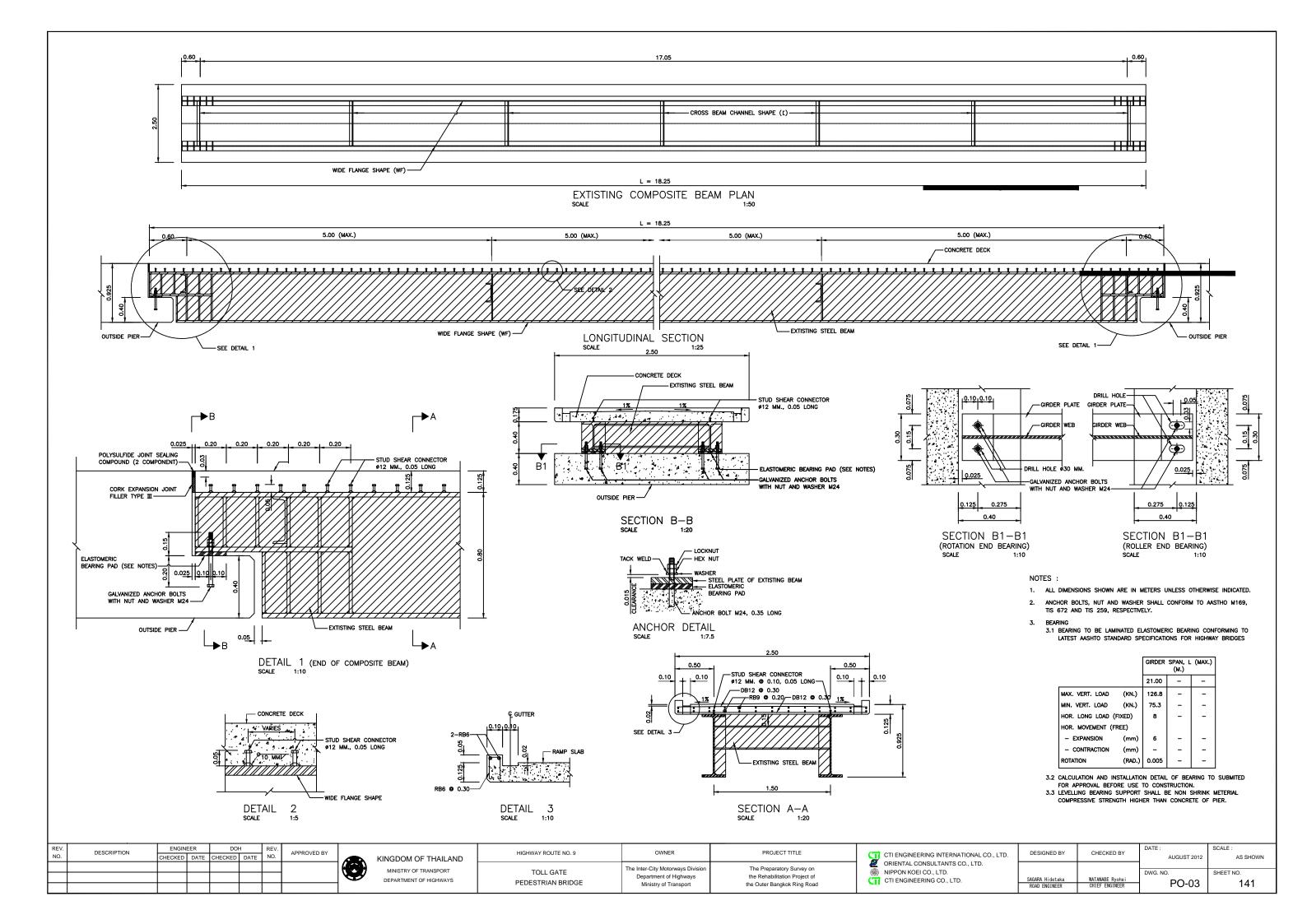
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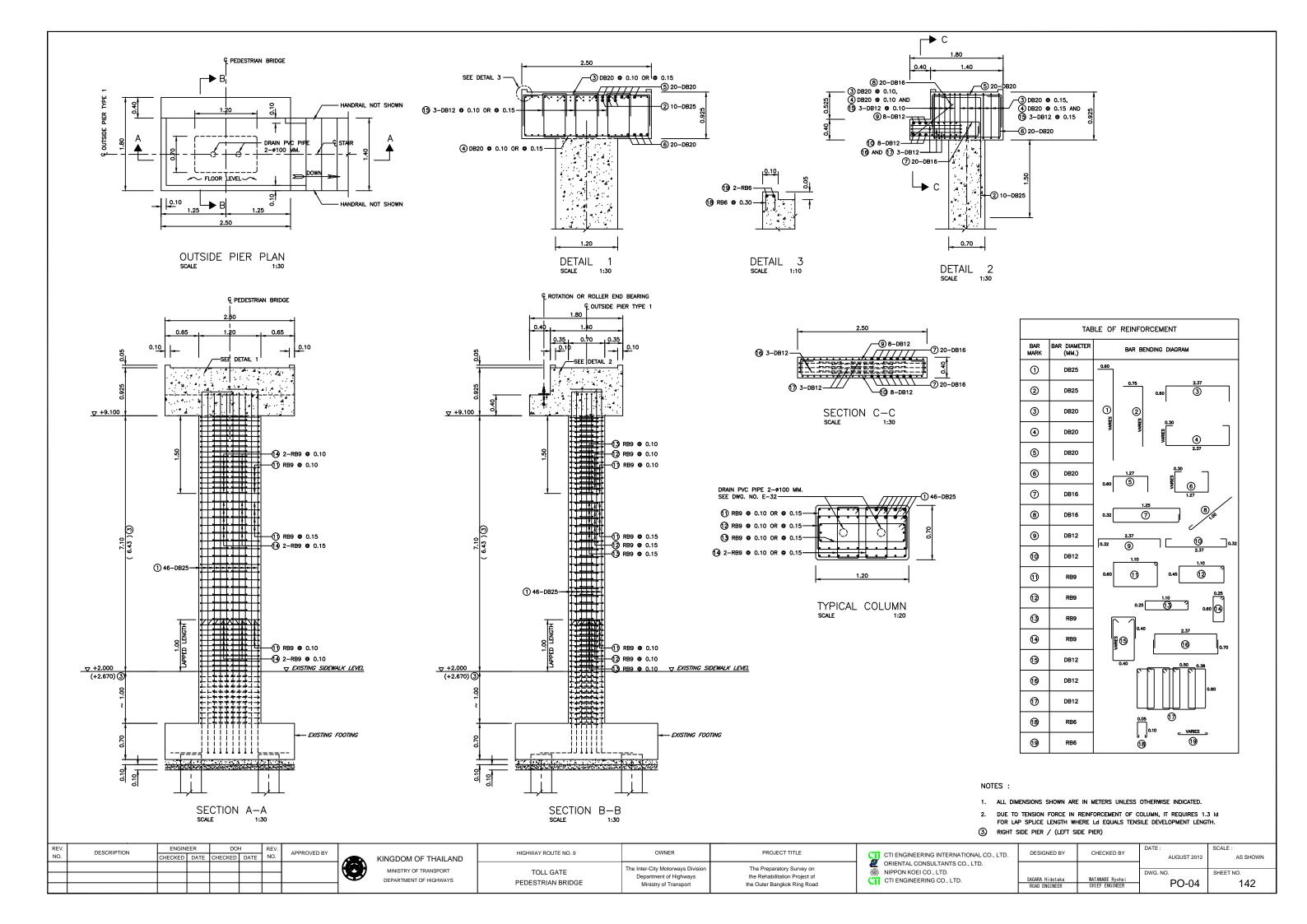
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| MINISTRY OF TRANSPORT |
| DEPARTMENT OF HIGHWAYS |
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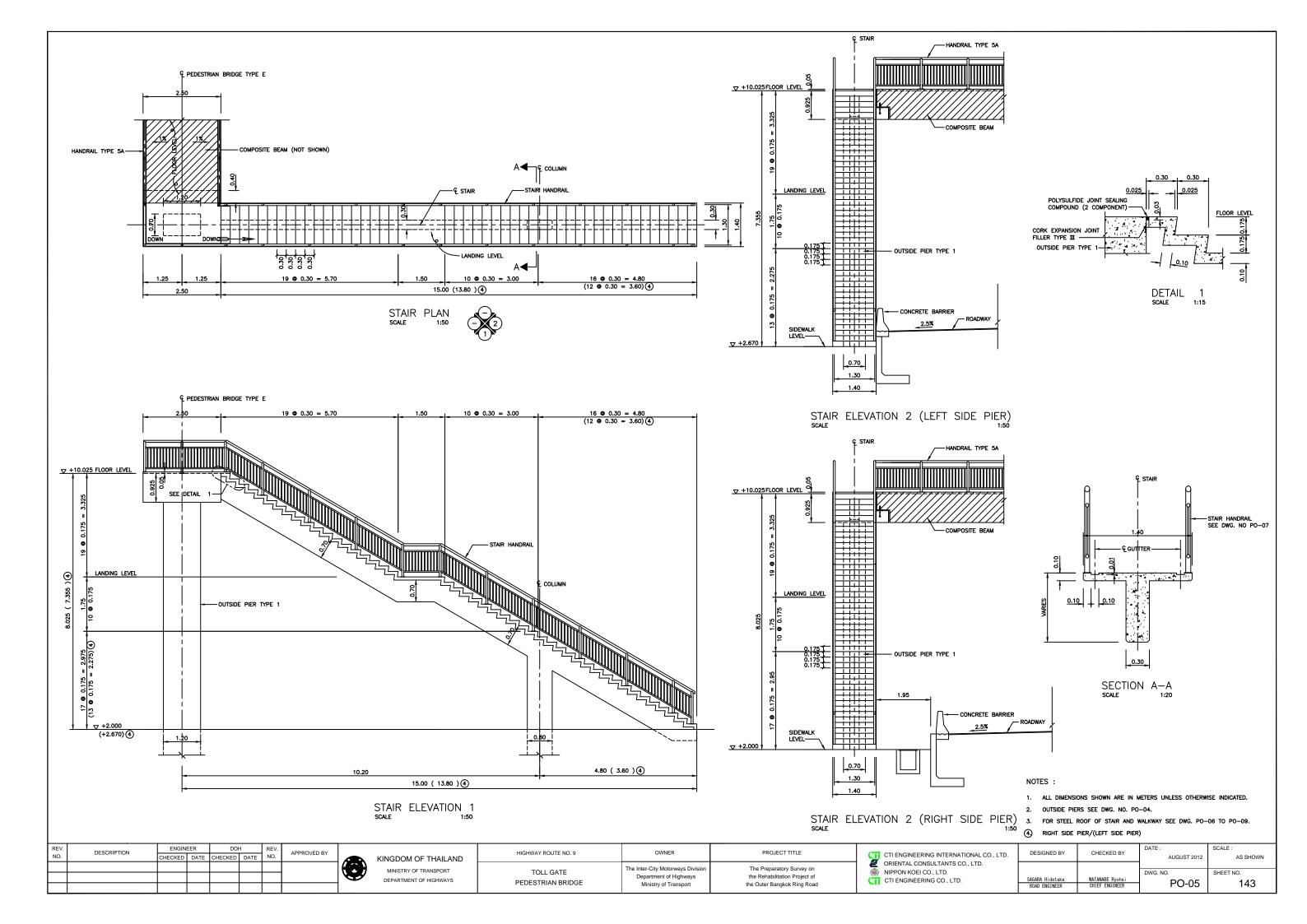
| HIGHWAY ROUTE NO. 9 | OWNER | PROJECT TITLE | |
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| TOLL GATE PEDESTRIAN BRIDGE | The Inter-City Motorways Division Department of Highways Ministry of Transport | The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road | |

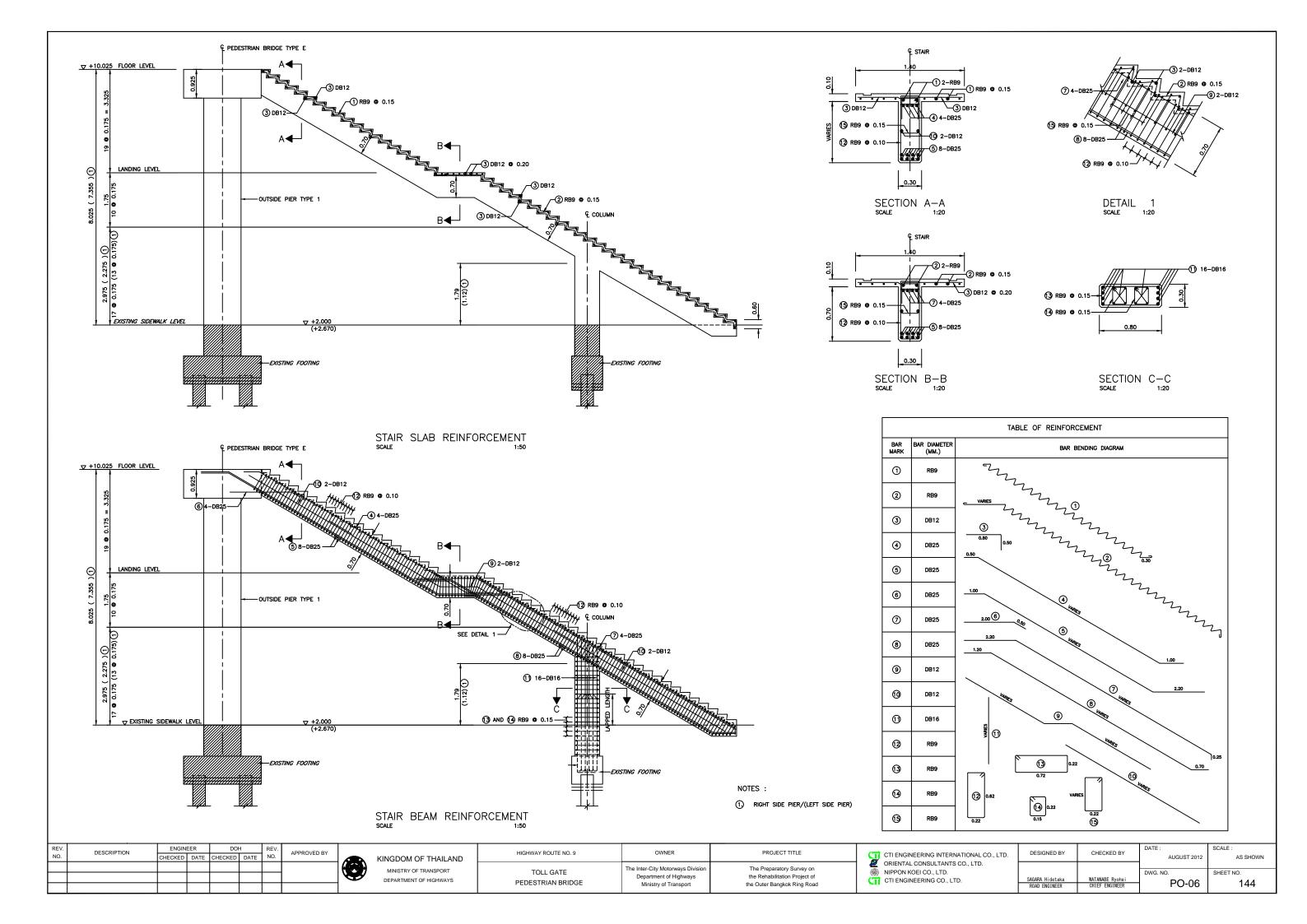
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| (G) | NIPPON KOEI CO., LTD. |

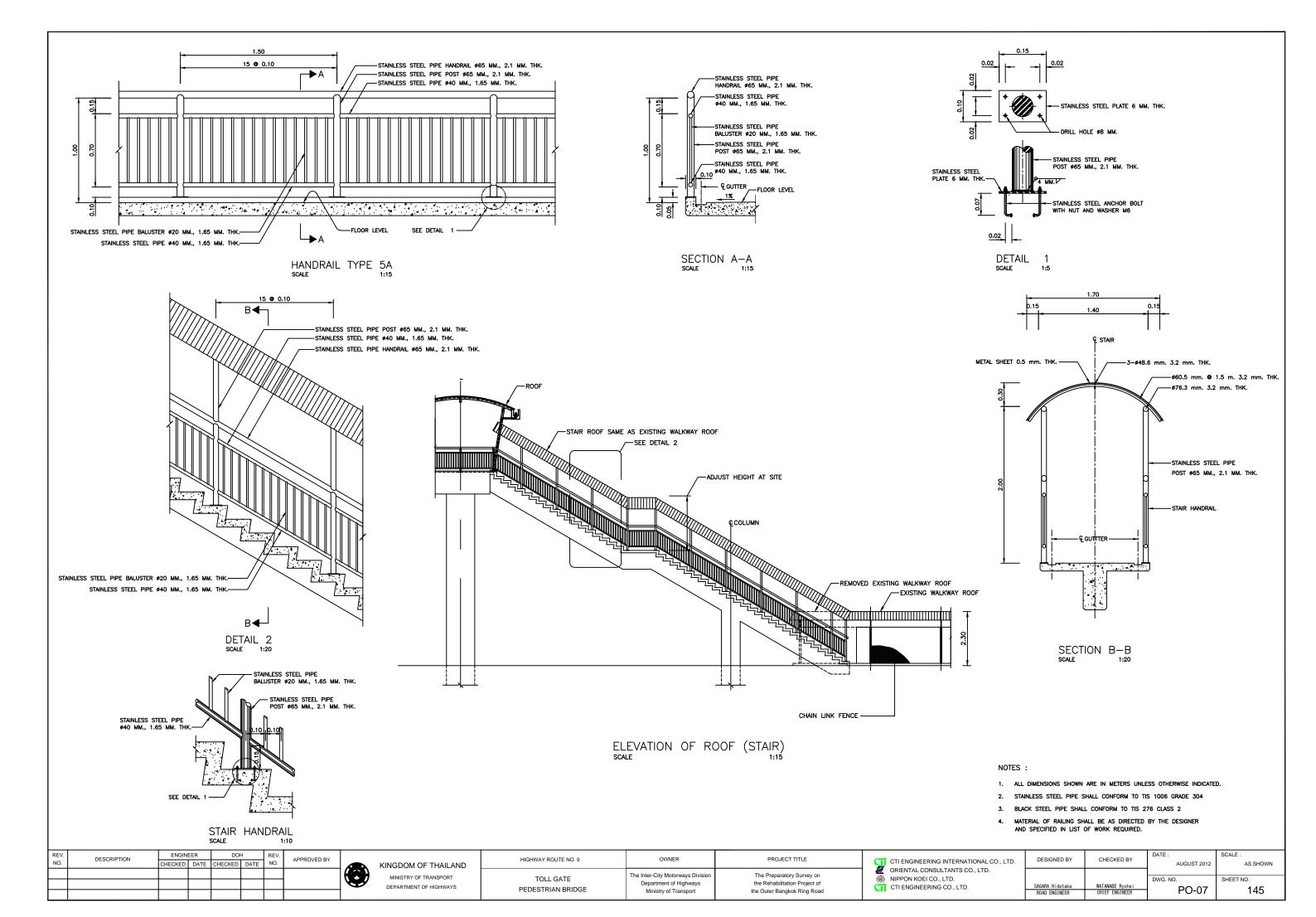
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| | SAGARA Hidetaka | WATANABE Ryohei | DWG. NO. PO-02 | SHEET NO. 140 |
| | ROAD ENGINEER | CHIEF ENGINEER | 1 0-02 | 140 |

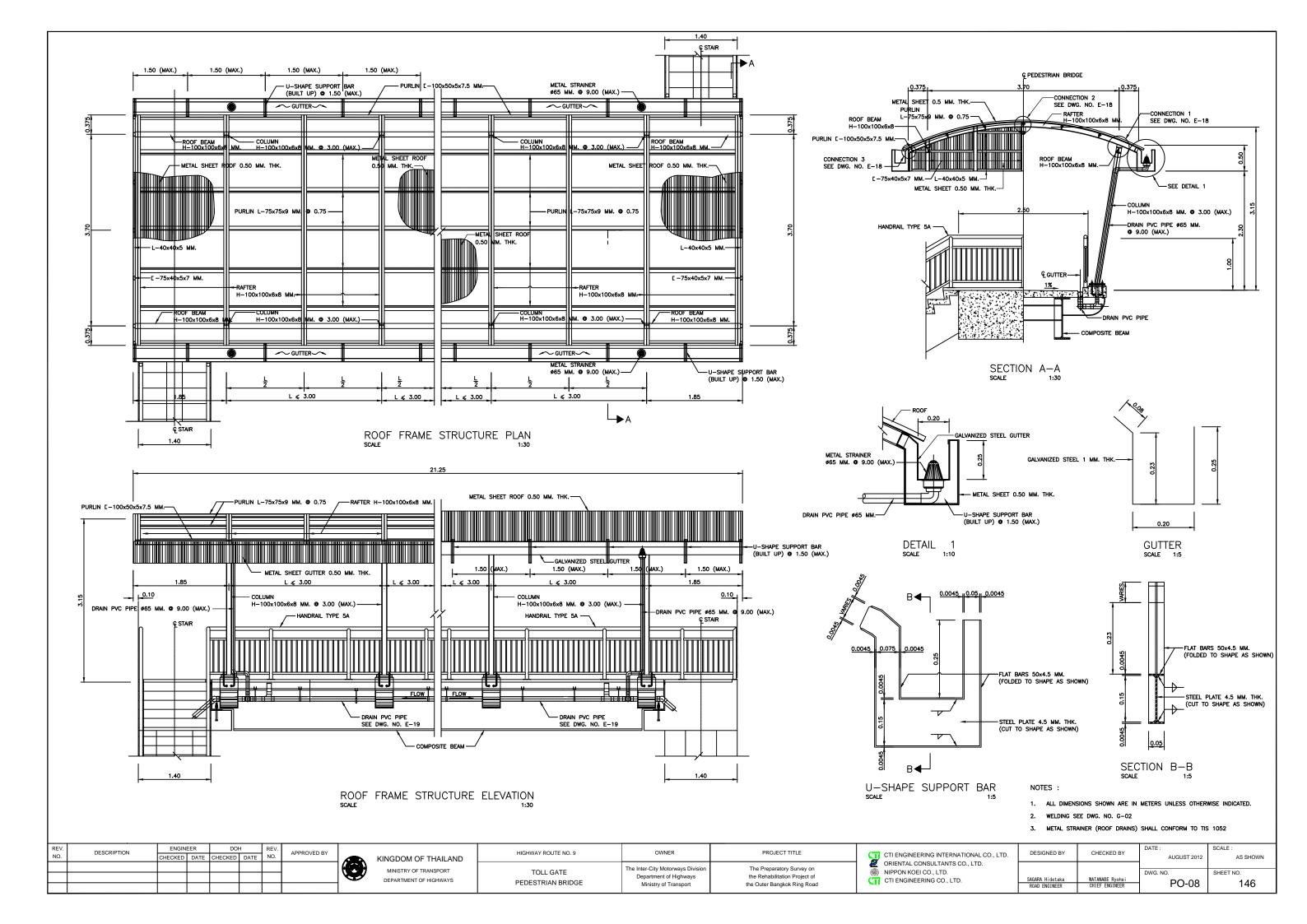


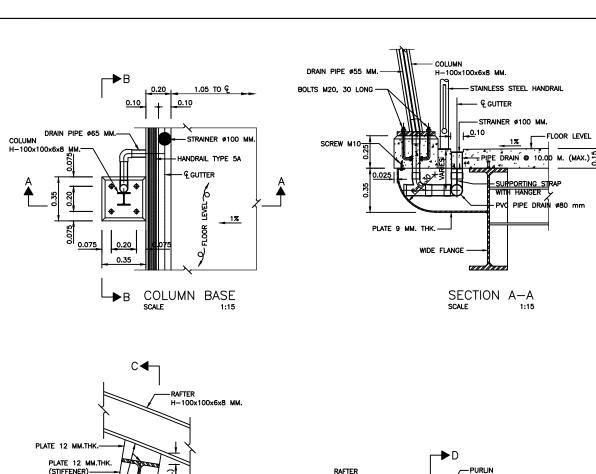


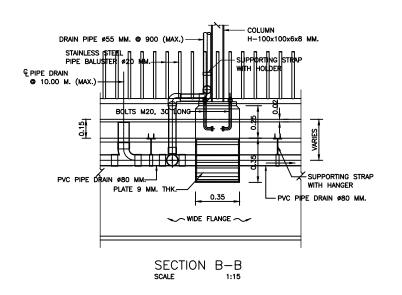


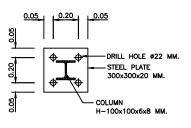




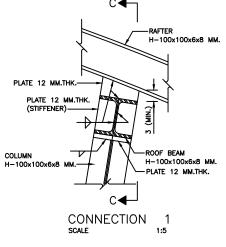


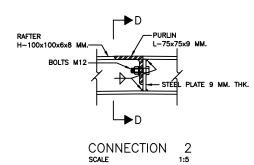


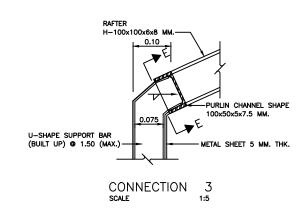


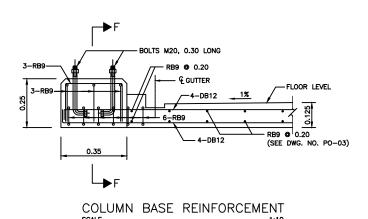


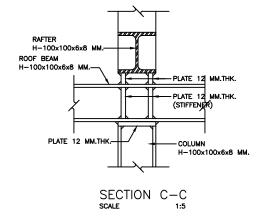
STEEL PLATE SCALE

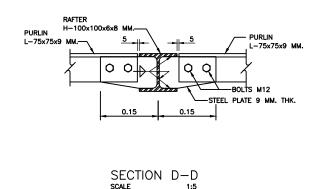


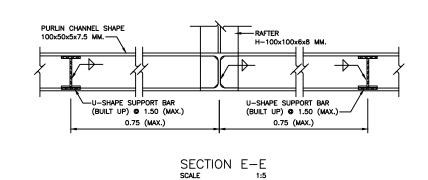


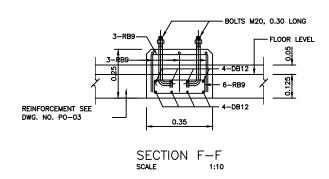












NOTES:

- 1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
- 2. WELDING SEE DWG, NO. TG-02
- 3. METAL SHEET
- - 3.1.1 METAL SHEET SHALL BE HIGH TENSILE STEEL SHEET HOT DIP ZINC-ALUMINIUM ALLOY COATING (AL%=50-55%) AND PVDF (20-25 MICRONS THICK) PAINT COATING
 3.1.2 THE TOTAL METAL SHEET THICKNESS SHALL NOT BE LESS THAN 0.53 MM.
- 3.2 FINISH COATING
- ALL ALLIMINUM-ZINC ALLOY COATED METAL SHEET SHALL HAVE A CONVERSION AND A PRIMER (NOT LESS THAN 5 MICRONS THICK) COATING BEFORE RECEIVING THE FINISH COATING
- FOR ROOFING SHALL RECEIVE ALUMINIUM AND ZINC ALLOY COATING OF NOT LESS THAN 150 G/M.²
 3.3 METAL SHEET PROFILE SHALL HAVE SPACING OF CREST NOT MORE THAN 130 MM. AND HIGH OF CREST NOT LESS THAN 23 MM. OR CORRUGATED PROFILE
- 4. METAL SHEET FIXING SYSTEM MUST BE HEX DRILL POINT SCREW WITH EPDM SEAL FASTENER GUAGE 12
- 5. METAL SHEET SDREW FIXING SPACING SHALL BE EVERY INTERNAL ALTERNATE CREST.

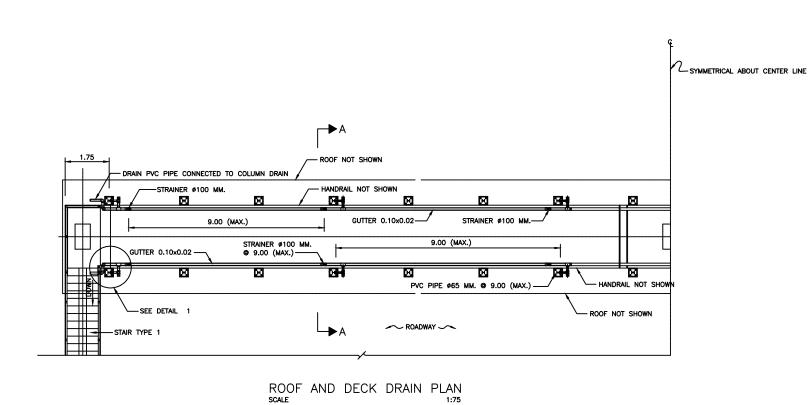
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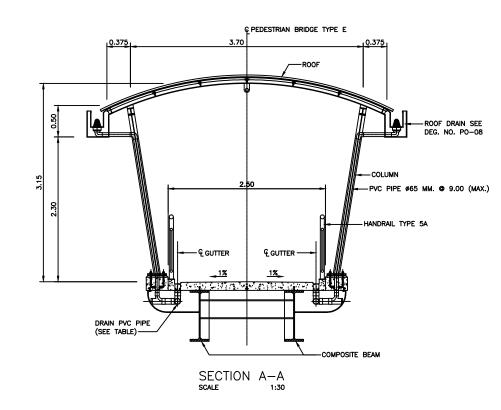
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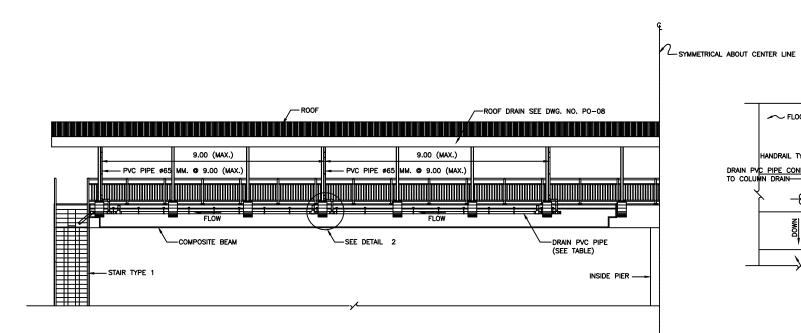
| HIGHWAY ROUTE NO. 9 | OWNER | PROJECT TITLE |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| The Preparatory Survey on the Rehabilitation Project of the BENIAN PRINCE | The Inter-City Motorways Division Department of Highways Ministry of Transport | The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road |

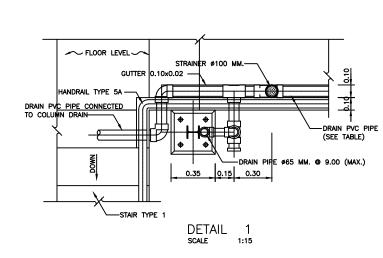
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| NIPPON KOEI CO., LTD. | |
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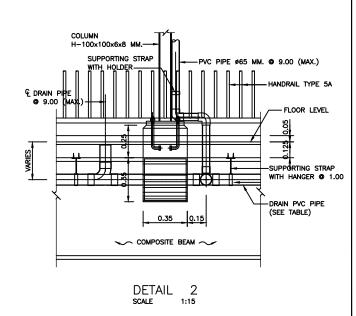
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| SAGARA Hidetaka ROAD ENGINEER | WATANABE Ryohei CHIEF ENGINEER | DWG. NO. | SHEET NO. 147 |











ROOF AND DECK DRAIN ELEVATION SCALE 1:75

| DRAIN PVC PIPE | | | | | | |
|----------------------------------|------------------------|--|--|--|--|--|
| PEDESTRIAN BRIDGE LENGTH (M.) | DIAMETER OF PIPE (MM.) | | | | | |
| 30-40 | ø80 | | | | | |
| 50-80 | ø100 | | | | | |
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PROJECT TITLE

The Preparatory Survey on the Rehabilitation Project of

the Outer Bangkok Ring Road

NOTES :

- 1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
- UNPLASTICIZED POLYVINYL CHLORIDE PIPES SHALL CONFORM TO TIS 17 CLASS 8.5
 AND EXPOSED SURFACE SHALL BE PAINTED WITH OIL PAINT COFORMING TO TIS 327,
 ITS COLOUR SIMILAR TO CONCRETE SURFACE.
- THE DETAILS ABOVE ARE TENTATIVE LAYOUT OF WHICH THE CONTRACTOR SHALL SUBMITTED SHOP DRAWING TO THE ENGINEER FOR APPROVAL.

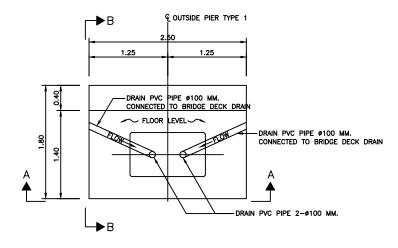
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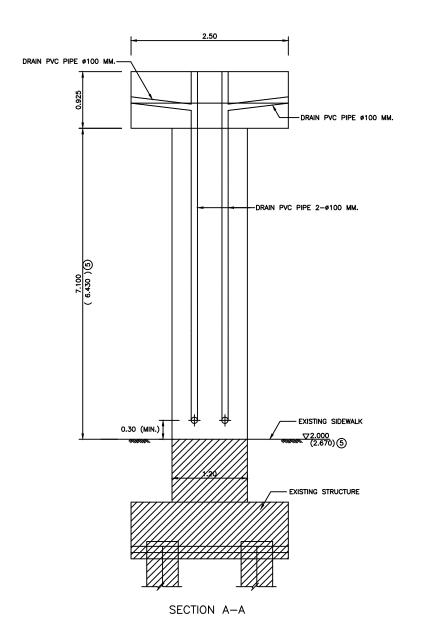
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| TOLL GATE PEDESTRIAN BRIDGE | The Inter-City Motorways Divis Department of Highways Ministry of Transport |

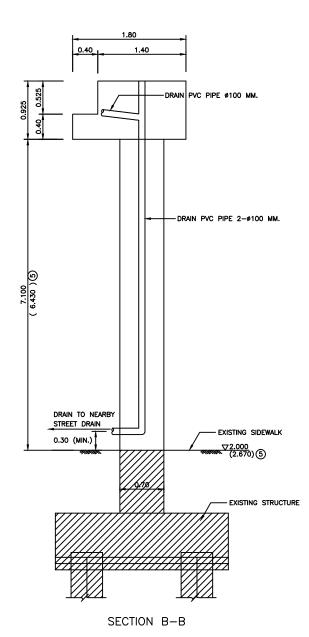
| | CTI ENGINEERING INTERNATIONAL CO., LTD. |
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| 2 | ORIENTAL CONSULTANTS CO., LTD. |
| | NIPPON KOEI CO., LTD. |
| CT | CTI ENGINEERING CO., LTD. |

| DESIGNED BY | CHECKED BY | DATE: AUGUST 2012 | SCALE : AS SHOWN |
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| | | DWG. NO. | SHEET NO. |
| SAGARA Hidetaka ROAD ENGINEER | WATANABE Ryohei CHIEF ENGINEER | PO-10 | 148 |



PLAN





PROJECT TITLE

the Rehabilitation Project of the Outer Bangkok Ring Road

COLUMN DRAIN PIPE FOR OUTSIDE PIER TYPE 1 scale 1:30

NOTES :

- 1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED.
- 2. ROOF AND DECK DRAIN DETAILS SEE DWG. NO. PO-10.
- 3. UNPLASTICIZED POLYVINYL CHLORIDE PIPES SHALL CONFORM TO TIS 17 CLASS 13.5
- THE DETAILS ABOVE ARE TENTATIVE LAYOUT OF WHICH THE CONTRACTOR SHALL SUBMITTED SHOP DRAWING TO THE ENGINEER FOR APPROVAL.
- (5) RIGTH SIDE PIER/(LEFT SIDE PIER)

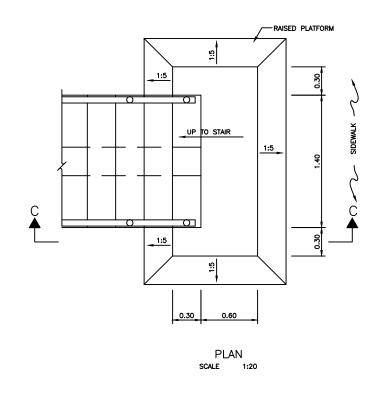
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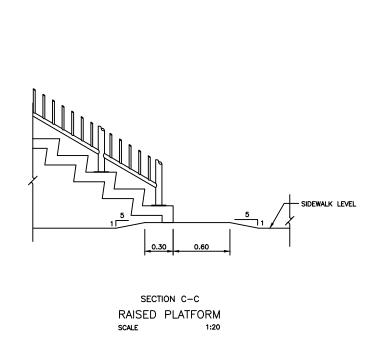
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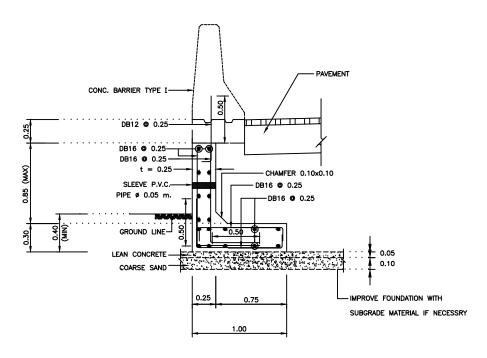
| HIGHWAY ROUTE NO. 9 | OWNER |
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| TOLL GATE PEDESTRIAN BRIDGE | The Inter-City Motorways Divisior Department of Highways Ministry of Transport |

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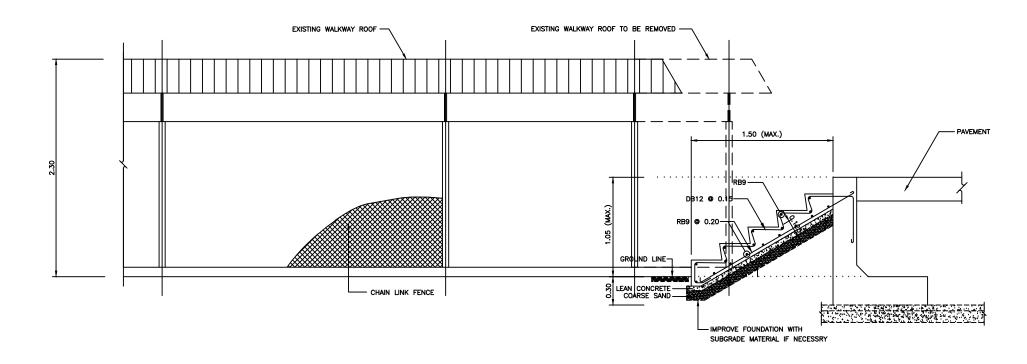
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| SAGARA Hidetaka ROAD ENGINEER | WATANABE Ryohei CHIEF ENGINEER | DWG. NO. PO-11 | SHEET NO. 149 |







RETAINING WALL TYPE I (RETAINING R.C. WALL) scale 1:20



STAIR-1 DETAIL scale 1:20

PROJECT TITLE

The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road

NOTES :

- 1. ALL DIMENSIONS SHOWN ARE IN METERS UNLESS OTHERWISE INDICATED
- 2. STAINLESS STEEL PIPE SHALL CONFORM TO TIS 1006
- MATERIAL OF RAILING SHALL BE AS DIRECTED BY THE DESIGNER AND SPECIFIED IN LIST OF WORK REQUIRED

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| KINGDOM OF THAILAND |
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| MINISTRY OF TRANSPORT |
| DEPARTMENT OF HIGHWAYS |

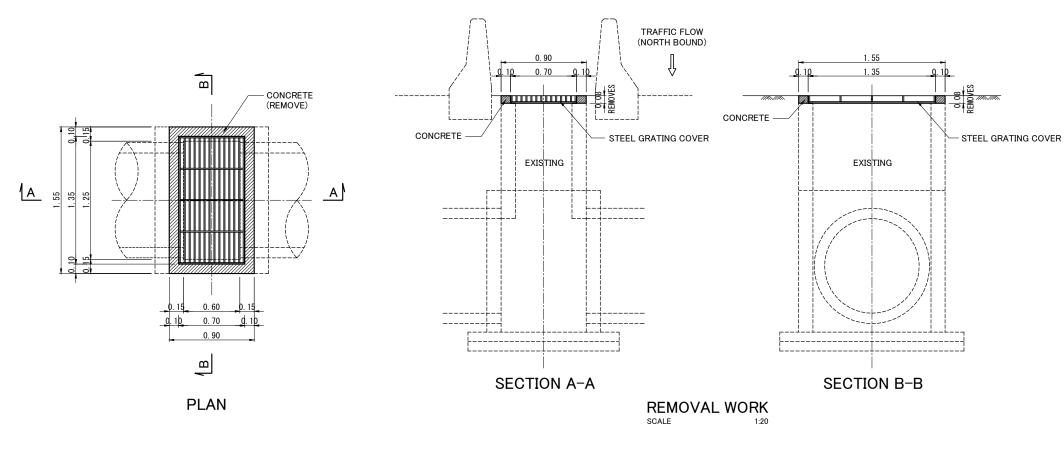
| TOLL GATE PEDESTRIAN BRIDGE | OWNER | |
|-----------------------------|--------------------------------------------------------------------------------------|--|
| | The Inter-City Motorways Division Department of Highways Ministry of Transport | |

| | TI ENGINEERING INTERNATIONAL CO., LTD. |
|-------------|----------------------------------------|
| Æ OF | RIENTAL CONSULTANTS CO., LTD. |
| ⊕ NI | PPON KOEI CO., LTD. |
| CT CT | ΓΙ ENGINEERING CO., LTD. |

| _ | DESIGNED BY | CHECKED BY | DATE: | SCALE : |
|----|-----------------|-----------------|-------------|-----------|
| D. | DESIGNED BY | CHECKED BY | AUGUST 2012 | AS SHOWN |
| | | | | |
| | | | DWG. NO. | SHEET NO. |
| | SAGARA Hidetaka | WATANABE Ryohei | PO-12 | 150 |
| | ROAD ENGINEER | CHIEF ENGINEER | PU-12 | 150 |

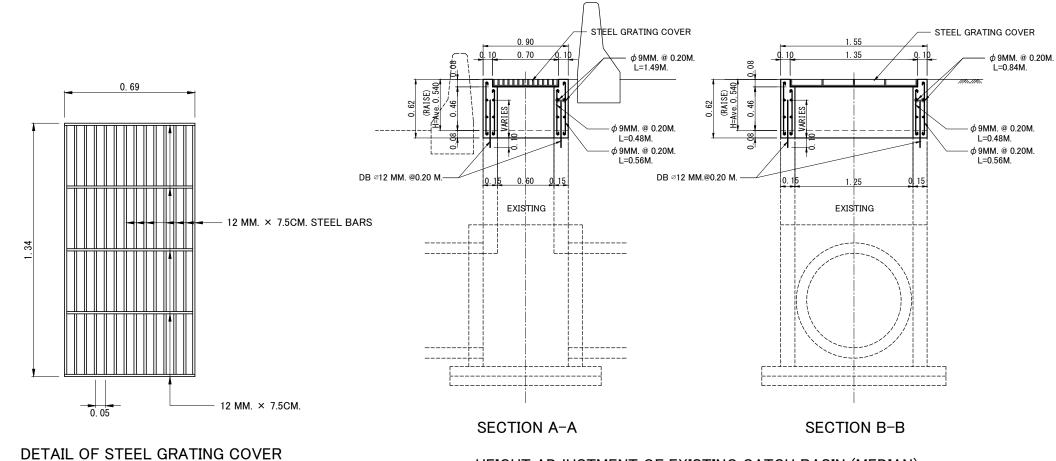


5-1 HEIGHT ADJUSTMENT OF EXISTING CATCH BASIN AT **MEDIAN**



SCHEDULED LIST OF HEIGHT ADJUSTMENT OF EXISTING CATCH BASIN (MEDIAN)

| NO. | STA | H (m) | NO. | STA | H (m) | NO. | STA | H (m) |
|-----|--------------|-------|-----|--------------|-------|---------------|-----------------|-------|
| 1 | STA 10+613.9 | 0.630 | 31 | STA 15+193.3 | 0.590 | 61 | STA 24+230.6 | 0.00 |
| 2 | STA 10+615.9 | 0,630 | 32 | STA 15+331.7 | 0.580 | 62 | STA 25+820.9 | 0.60 |
| 3 | STA 10+830.0 | 0.570 | 33 | STA 15+490.4 | 0.550 | 63 | STA 25+940.5 | 0.600 |
| 4 | STA 11+629.8 | 0.570 | 34 | STA 15+605.5 | 0.580 | 64 | STA 26+165.0 | 0.600 |
| 5 | STA 11+745.3 | 0.610 | 35 | STA 15+726.3 | 0.520 | 65 | STA 26+261.0 | 0.590 |
| 6 | STA 11+832.8 | 0.600 | 36 | STA 15+958.4 | 0.550 | 66 | STA 26+397.8 | 0.580 |
| 7 | STA 12+087.3 | 0.610 | 37 | STA 16+205.3 | 0.610 | 67 | STA 26+675.6 | 0.600 |
| 8 | STA 12+239.8 | 0.610 | 38 | STA 16+320.0 | 0.610 | 68 | STA 27+014.5 | 0.590 |
| 9 | STA 12+371.2 | 0.600 | 39 | STA 16+461.9 | 0.600 | 69 | STA 27+320.1 | 0.590 |
| 10 | STA 12+373.5 | 0.600 | 40 | STA 16+609.5 | 0.490 | 70 | STA 27+577.6 | 0.600 |
| 11 | STA 12+470.7 | 0.460 | 41 | STA 16+707.7 | 0.560 | 71 | STA 27+670.9 | 0.570 |
| 12 | STA 12+649.0 | 0.350 | 42 | STA 16+863.4 | 0.250 | 72 | STA 27+930.0 | 0.590 |
| 13 | STA 12+809.0 | 0.100 | 43 | STA 17+026.2 | 0.600 | 73 | STA 28+169.1 | 0.520 |
| 14 | STA 13+024.0 | 0.610 | 44 | STA 17+340.5 | 0.600 | 74 | STA 28+533.9 | 0.076 |
| 15 | STA 13+398.8 | 0.460 | 45 | STA 17+460.3 | 0.610 | 75 | STA 28+815.3 | 0.570 |
| 16 | STA 13+402.4 | 0.460 | 46 | STA 17+609.8 | 0.550 | 76 | STA 29+049.2 | 0.620 |
| 17 | STA 13+619.9 | 0.630 | 47 | STA 17+791.9 | 0.600 | | | 100 |
| 18 | STA 13+791.2 | 0.620 | 48 | STA 17+868.9 | 0.630 | | | 11 |
| 19 | STA 14+022.6 | 0.610 | 49 | STA 18+083.2 | 0.610 | | | |
| 20 | STA 14+136.9 | 0.530 | 50 | STA 18+439.B | 0.620 | | 1 | |
| 21 | STA 14+296.5 | 0.560 | 51 | STA 18+713.0 | 0.610 | | | |
| 22 | STA 14+416.6 | 0.560 | 52 | STA 18+863.8 | 0.610 | | | |
| 23 | STA 14+538.2 | 0.620 | 53 | STA 19+046.0 | 0.610 | | 2 | |
| 24 | STA 14+662.4 | 0.590 | 54 | STA 19+281.0 | 0.630 | | 1 2 | |
| 25 | STA 14+718.6 | 0.570 | 55 | STA 19+487.8 | 0.610 | | | |
| 26 | STA 14+830.8 | 0.580 | 56 | STA 19+674.6 | 0.540 | | | |
| 27 | STA 14+942.7 | 0.610 | 57 | STA 20+579.9 | 0.560 | | | - |
| 28 | STA 15+022.9 | 0.550 | 58 | STA 23+762.6 | 0.560 | | | |
| 29 | STA 15+189.0 | 0.590 | 59 | STA 23+946.5 | 0.040 | | | |
| 30 | STA 15+1912 | 0.590 | 60 | STA 24+073.0 | 0.000 | | | |
| | | | | | | | Total H=40.510m | i. |
| | | | | | | Ave. H=0.540m | | |



NOTES:

- 1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
- 2. THE SHADED AREAS REPRESENT PORTIONS TO BE DEMOLISHED.
- 3. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATEMIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOW:

PORTLAND CEMENT TYPE 1 350 KG. (MIN.)

SAND 0.43 M.

CRUSHED ROCK OR GRAVEL 0.86 M.

CONCRETE SLUMP

10 CM.

- 4. REINFORCING STEEL SHALL CONORM TO TIS.20 GRADE SR24 FOR ROUND BARS AND TIS.24 GRADE SD30 FOR DEFORMED BARS.
- 5. STRUCTURAL STEEL SHALL CONFORM TO TIS.116 GRADE FE 30.

| REV. | DESCRIPTION | ENGIN | EER | DOI | Н | REV. | APPROVED BY | |
|------|---------------|---------|------|---------|------|------|-------------|---|
| NO. | BESSIAII HOIV | CHECKED | DATE | CHECKED | DATE | NO. | AFFROVEDBI | 4 |
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KINGDOM OF THAILAND
MINISTRY OF TRANSPORT
DEPARTMENT OF HIGHWAYS

HIGHWAY ROUTE NO. 9

OWNER

The Inter-City Motorw
Department of Hig
Ministry of Tran

HEIGHT ADJUSTMENT OF EXISTING CATCH BASIN (MEDIAN)

OWNER PROJECT TITLE

Inter-City Motorways Division
Department of Highways
Ministry of Transport

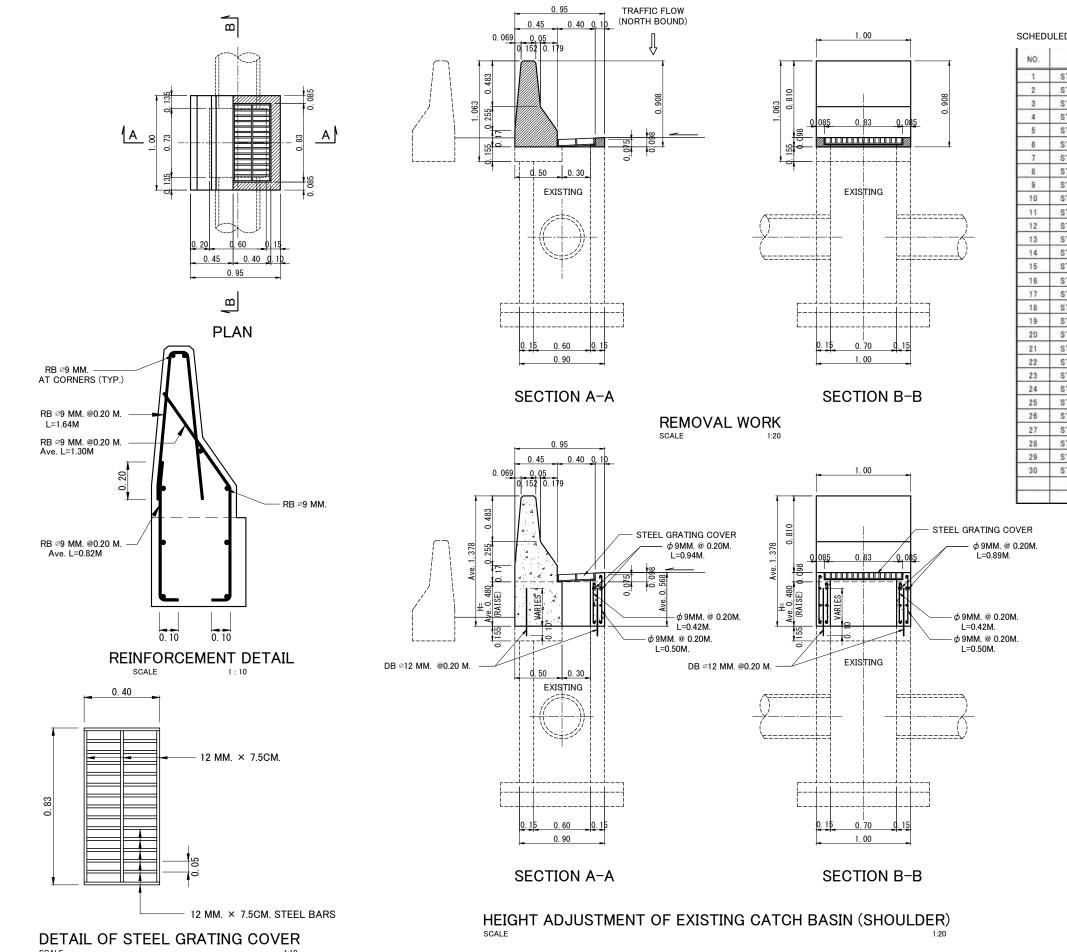
PROJECT TITLE

The Preparatory Survey on the Rehabilitation Project of the Outer Bangkok Ring Road

| CI | CTI ENGINEERING INTERNATIONAL CO., LTD. |
|-----|-----------------------------------------|
| 2 | ORIENTAL CONSULTANTS CO., LTD. |
| (G) | NIPPON KOEI CO., LTD. |
| ্ৰো | CTI ENGINEERING CO., LTD. |

| CICNED DV | OUEOKED DV | DATE: | SCALE: |
|-------------|-----------------|-----------------------------|--------------------------------------------------------------------------|
| SIGNED BY | CHECKED BY | AUGUST 2012 | 1:10 / 1:20 |
| | | | |
| | | DWG. NO. | SHEET NO. |
| RA Hidetaka | WATANABE Ryohei | DD 1 | 151 |
| D ENGINEER | CHIEF ENGINEER | DK-1 | 151 |
| | | RA Hidetaka WATANABE Ryohei | SIGNED BY CHECKED BY AUGUST 2012 DWG. NO. RA Hildetaka WATAMABE Ryohei |

5-2 HEIGHT ADJUSTMENT OF EXISTING CATCH BASIN AT **SHOULDER**



SCHEDULED LIST OF HEIGHT ADJUSTMENT OF EXISTING CATCH BASIN (SHOULDER)

| NO. | STA | H (m) | NO. | STA | H (m) | NO. | STA | H (m) |
|-----|--------------|-------|-----|--------------|-------|-----|-------------------|-------|
| 1 | STA 19+718.4 | 0.442 | 31 | STA 19+967.5 | 0.572 | 61 | STA 20+160.6 | 0.413 |
| 2 | STA 19+729.3 | 0.442 | 32 | STA 19+973.2 | 0.562 | 62 | STA 20+169.9 | 0.382 |
| 3 | STA 19+738.1 | 0.442 | 33 | STA 19+979.1 | 0.562 | 63 | STA 20+178.9 | 0.352 |
| 4 | STA 19+747.9 | 0.442 | 34 | STA 19+984.8 | 0.562 | 64 | STA 20+187.9 | 0.352 |
| 5 | STA 19+756.6 | 0.442 | 35 | STA 19+995.0 | 0.562 | 65 | STA 20+196.8 | 0.342 |
| 6 | STA 19+765.6 | 0.442 | 36 | STA 20+000.6 | 0,562 | 66 | STA 20+205.8 | 0.342 |
| 7 | STA 19+774.4 | 0.442 | 37 | STA 20+006.5 | 0.562 | 67 | STA 20+215.0 | 0.332 |
| 8 | STA 19+783.2 | 0.442 | 38 | STA 20+012.3 | 0.552 | 68 | STA 20+223.9 | 0.322 |
| 9 | STA 19+792.2 | 0.432 | 39 | STA 20+018.4 | 0.552 | 69 | STA 20+232.6 | 0.312 |
| 10 | STA 19+801.1 | 0.432 | 40 | STA 20+0242 | 0.542 | 70 | STA 20+242.2 | 0.302 |
| 11 | STA 19+810.1 | 0.452 | 41 | STA 20+030.1 | 0.542 | 71 | STA 20+251.1 | 0.282 |
| 12 | STA 19+818.2 | 0.462 | 42 | STA 20+036.0 | 0.542 | 72 | STA 20+259.8 | 0.282 |
| 13 | STA 19+827.1 | 0.482 | 43 | STA 20+042.5 | 0.542 | 73 | STA 20+268.9 | 0.272 |
| 14 | STA 19+836.0 | 0.512 | 44 | STA 20+048.0 | 0.542 | 74 | STA 20+277.7 | 0.272 |
| 15 | STA 19+845.2 | 0.532 | 45 | STA 20+054.5 | 0.542 | 75 | STA 20+286.7 | 0.252 |
| 16 | STA 19+854.3 | 0.552 | 46 | STA 20+060.7 | 0.542 | 76 | STA 20+295.9 | 0.232 |
| 17 | STA 19+875.0 | 0.592 | 47 | STA 20+067.0 | 0.532 | 77 | STA 20+305.0 | 0.212 |
| 18 | STA 19+884.2 | 0.592 | 48 | STA 20+072.8 | 0.532 | | | |
| 19 | STA 19+896.0 | 0.612 | 49 | STA 20+078.5 | 0.532 | | | |
| 20 | STA 19+902.9 | 0.612 | 50 | STA 20+088.7 | 0.522 | | | |
| 21 | STA 19+908.6 | 0.602 | 51 | STA 20+095.6 | 0.512 | | | |
| 22 | STA 19+914.6 | 0.632 | 52 | STA 20+101.5 | 0.512 | | | |
| 23 | STA 19+920.3 | 0.642 | 53 | STA 20+107.0 | 0,502 | | | |
| 24 | STA 19+926.1 | 0.632 | 54 | STA 20+113.2 | 0.492 | | | |
| 25 | STA 19+931.9 | 0.622 | 55 | STA 20+118.9 | 0.492 | | | |
| 26 | STA 19+938.4 | 0.612 | 56 | STA 20+124.6 | 0.482 | | | |
| 27 | STA 19+944.1 | 0.592 | 57 | STA 20+130.5 | 0.462 | | | |
| 28 | STA 19+950.0 | 0.582 | 58 | STA 20+136.1 | 0.462 | | | |
| 29 | STA 19+955.6 | 0.572 | 59 | STA 20+142.5 | 0.452 | | | |
| 30 | STA 19+961.7 | 0.572 | 60 | STA 20+151.6 | 0.422 | | | |
| | | | | | | | Total H= 36.864 r | n |
| | | | | | | | Ave. H= 0.48 m | |

NOTES:

- 1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
- 2. THE SHADED AREAS REPRESENT PORTIONS TO BE DEMOLISHED.
- 3. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATEMIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOW:

PORTLAND CEMENT TYPE 1 350 KG. (MIN.)

SAND 0.43 M.

CRUSHED ROCK OR GRAVEL 0.86 M.

CONCRETE SLUMP 10 CM.

- REINFORCING STEEL SHALL CONORM TO TIS.20 GRADE SR24 FOR ROUND BARS
 AND TIS.24 GRADE SD30 FOR DEFORMED BARS.
- 5. STRUCTURAL STEEL SHALL CONFORM TO TIS.116 GRADE FE 30.

| REV. | DESCRIPTION | ENGIN | EER | DOI | Н | REV. | APPROVED BY | |
|------|-------------|---------|------|---------|------|------|-------------|---|
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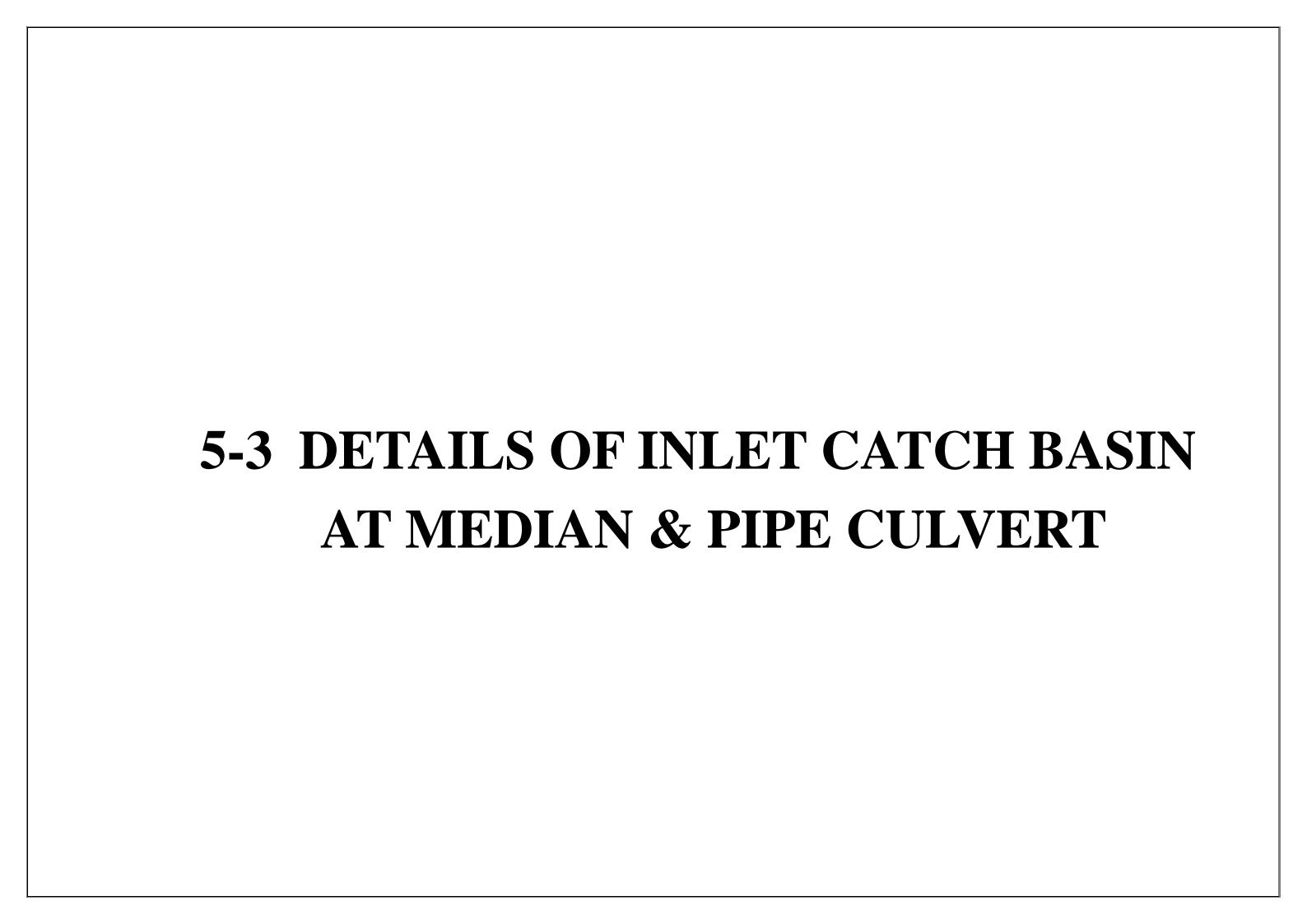
| THAILAND | HIGHWAY ROUTE NO. 9 |
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| NSPORT | HEIGHT ADJUSTMENT OF E |
| HIGHWAYS | CATCH BASIN AT SHOUL |

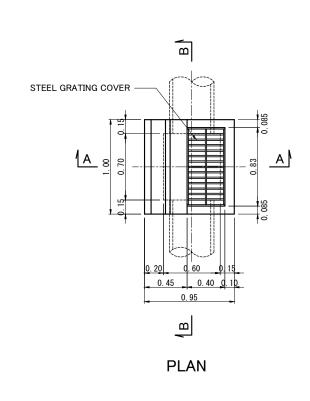
| TIIGHWAT ROOTE NO. 9 | OWNER | TROSEOT TITLE |
|----------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| SHT ADJUSTMENT OF EXISTING CATCH BASIN AT SHOULDER | The Inter-City Motorways Division Department of Highways Ministry of Transport | The Preparatory Survey of the Rehabilitation Project the Outer Bangkok Ring Ro |

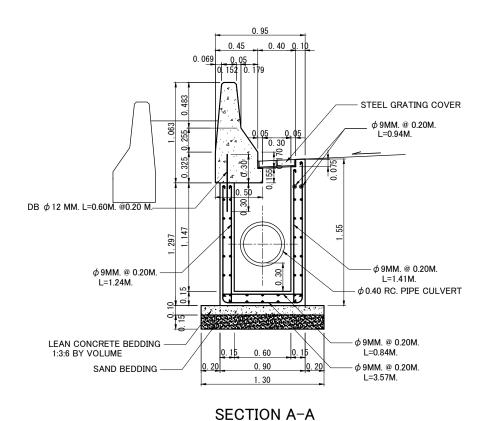
PRO IECT TITLE

| | CTI ENGINEERING INTERNATIONAL CO., LTD. |
|-----|-----------------------------------------|
| 2 | ORIENTAL CONSULTANTS CO., LTD. |
| | NIPPON KOEI CO., LTD. |
| ্ৰো | CTI ENGINEERING CO., LTD. |

| DESIGNED BY | CHECKED BY | DATE : AUGUST 2012 | SCALE : 1:10 / 1:20 |
|-----------------|-----------------|--------------------|---------------------|
| | | | |
| | | DWG. NO. | SHEET NO. |
| SAGARA Hidetaka | WATANABE Ryohei | DR-2 | 152 |
| ROAD ENGINEER | CHIEF ENGINEER | DK-2 | 132 |



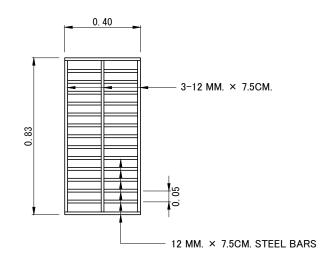




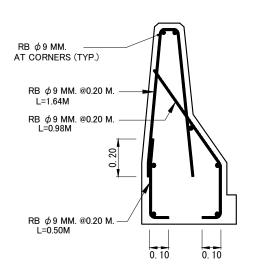
SECTION B-B

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CATCH BASIN (SHOULDER)







REINFORCEMENT DETAIL

SCHEDULED LIST OF CATCH BASIN (SHOULDER) STA Nos. REMARKS

| | 1400. | INCHIANCO |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STA 19+666.5 | 1 | |
| STA 19+674.6 | 1 | |
| STA 19+678.4 | 1 | |
| STA 19+698.4 | 1 | |
| STA 19+708.4 | 1 | |
| STA 19+765.6 | 1 | |
| STA 20+313.2 | 1 | |
| STA 20+322.5 | 1 | |
| STA 20+327.5 | 1 | |
| STA 20+342.5 | 1 | |
| STA 20+352.5 | 1 | |
| STA 20+362.5 | 1 | |
| STA 20+372.5 | 1 | |
| STA 20+382.5 | 1 | |
| | | |
| | | |
| | | |
| | STA 19+674.6 STA 19+678.4 STA 19+708.4 STA 19+765.6 STA 20+313.2 STA 20+322.5 STA 20+327.5 STA 20+342.5 STA 20+352.5 STA 20+362.5 STA 20+372.5 STA 20+372.5 | STA 19+666.5 STA 19+674.6 STA 19+678.4 STA 19+698.4 STA 19+708.4 STA 19+765.6 STA 20+313.2 STA 20+322.5 STA 20+322.5 STA 20+342.5 STA 20+362.5 STA 20+372.5 STA 20+372.5 STA 20+372.5 STA 20+372.5 STA 20+372.5 |

NOTES:

- 1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
- 2. THE SHADED AREAS REPRESENT PORTIONS TO BE DEMOLISHED.
- 3. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF
 210 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATEMIX DESIGN
 PER CUBIC METER IS SUGGESTED AS FOLLOW:

PORTLAND CEMENT TYPE 1 350 KG. (MIN.)

SAND 0.43 M.
CRUSHED ROCK OR GRAVEL 0.86 M.

CONCRETE SLUMP 10 CM.

- REINFORCING STEEL SHALL CONORM TO TIS.20 GRADE SR24 FOR ROUND BARS AND TIS.24 GRADE SD30 FOR DEFORMED BARS.
- 5. STRUCTURAL STEEL SHALL CONFORM TO TIS.116 GRADE FE 30.

| REV. | DESCRIPTION | ENGIN | EER | DOI | 1 | REV. | APPROVED BY | ĺ |
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| 1 | KINGDOM OF THAILAND | | | | | |
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| | MINISTRY OF TRANSPORT | | | | | |
| • | DEPARTMENT OF HIGHWAYS | | | | | |
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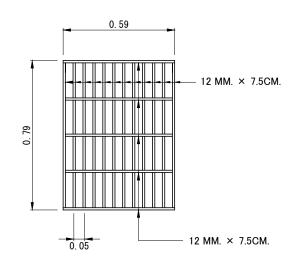
| HIGHWAY ROUTE NO. 9 |
|----------------------------------------------------------|
| HEIGHT ADJUSTMENT OF EXISTING CATCH BASIN AT SHOULDER |

| OWNER | PROJECT TITLE |
|-----------------------------------|-------------------------------|
| The Inter-City Motorways Division | The Preparatory Survey on |
| Department of Highways | the Rehabilitation Project of |
| Ministry of Transport | the Outer Bangkok Ring Road |

| | CTI ENGINEERING INTERNATIONAL CO., LTD. |
|----------|-----------------------------------------|
| 2 | ORIENTAL CONSULTANTS CO., LTD. |
| ® | NIPPON KOEI CO., LTD. |
| Ci | CTI ENGINEERING CO., LTD. |

| TD. | DESIGNED BY | CHECKED BY | DATE: AUGUST 2012 | SCALE : 1:10 / 1:20 |
|-----|----------------------------------|-----------------------------------|----------------------|------------------------|
| | | | DWG. NO. | SHEET NO. |
| | SAGARA Hidetaka ROAD ENGINEER | WATANABE Ryohei CHIEF ENGINEER | DR-3 | 153 |

STEEL GRATING COVER ϕ 0.40 RC. PIPE CULVERT (OUTLET) m



DETAIL OF STEEL GRATING COVER

SCHEDULED LIST OF ϕ 0.40 RC. PIPE CULVERT FOR CROSSING

| | STA | DISTANCE (m) | REMARKS |
|-----|--------------|--------------|---------|
| 1) | STA 19+674.6 | 1.0 | |
| 2) | STA 20+382.5 | 30.0 | |
| 3) | STA 24+430.0 | 29.0 | |
| 4) | STA 24+512.0 | 24.0 | |
| 5) | STA 24+594.0 | 20.0 | |
| 6) | STA 24+650.0 | 20.0 | |
| 7) | STA 24+690.0 | 20.0 | |
| 8) | STA 24+750.0 | 20.0 | |
| 9) | STA 24+815.0 | 20.0 | |
| 10) | STA 24+867.0 | 17.0 | |
| 11) | STA 24+920.0 | 17.0 | |
| 12) | STA 24+975.0 | 19.0 | |

SCHEDULED LIST OF ϕ 0.40 RC. PIPE CULVERT FOR LONGITUDINAL

| | STA | DISTANCE (m) | REMARKS |
|----|-----------------------------|--------------|---------|
| 1) | STA.19+667.0 - STA.19+718.3 | 51.3 | |
| 2) | STA.20+313.7 - STA.20+382.0 | 68.3 | |

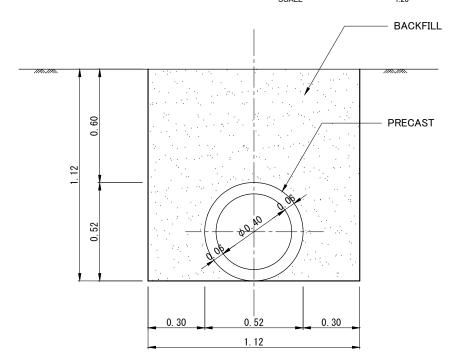
TRAFFIC FLOW (NORTH BOUND) STEEL GRATING COVER 0.60 ϕ 9MM. @ 0.20M. L=0.94M. L $50 \times 50 \times 6$ mm. ϕ 9MM. @ 0.20M. L=2.92M. ϕ 9MM. @ 0.20M. ϕ 0.40 RC. PIPE CULVERT L=1.01M. (OUTLET) LEAN CONCRETE BEDDING 1:3:6 BY VOLUME φ9MM. @ 0.20M. 0. 15 L=0.74M. SAND BEDDING

SECTION A-A

STEEL GRATING COVER L 50 × 50 × 6mm. ϕ 9MM. @ 0.20M. L=3.12M. ϕ 9MM. @ 0.20M. L=1.01M. ϕ 9MM. @ 0.20M. L=0.94M.

SECTION B-B

CATCH BASIN (MEDIAN)



(ORDINARY BEDDING) SCALE

RC. PIPE CULVERT

DETAILS OF INLET CATCH BASIN AT MEDIAN AND PIPE CULVERT

The Inter-

| REV. | DESCRIPTION | ENGINEER | | DOH | | REV. | APPROVED BY | |
|------|-------------|----------|------|---------|------|------|-------------|---|
| NO. | DESCRIPTION | CHECKED | DATE | CHECKED | DATE | NO. | AFFROVED BI | |
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| | KINGDOM OF THAILAND |
|---|------------------------|
| | MINISTRY OF TRANSPORT |
| • | DEPARTMENT OF HIGHWAYS |

| HIGHWAY ROUTE NO. 9 | |
|---------------------------------|--|
| DETAILS OF INLET CATCH BASIN AT | |
| MEDIAN & PIPE CULVERT | |

| ne Inter-City Motorways Division | The Preparatory Survey on |
|----------------------------------|-------------------------------|
| Department of Highways | the Rehabilitation Project of |
| Ministry of Transport | the Outer Bangkok Ring Road |
| | |

PROJECT TITLE

CTI ENGINEERING INTERNATIONAL CO., LTD. ORIENTAL CONSULTANTS CO., LTD. NIPPON KOEI CO., LTD. CTI ENGINEERING CO., LTD.

| DESIGNED BY | CHECKED BY | DATE: | SCALE: |
|-----------------|-----------------|-------------|-------------|
| DESIGNED BY | CHECKED BY | AUGUST 2012 | 1:10 / 1:20 |
| | | | |
| | | DWG. NO. | SHEET NO. |
| SAGARA Hidetaka | WATANABE Ryohei | DR-4 | 151 |
| ROAD ENGINEER | CHIEF ENGINEER | DR-4 | 154 |

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.

SCHEDULED LIST OF CATCH BASIN (MEDIAN)

 ϕ 9MM. @ 0.20M. L=0.74M.

 ϕ 0.40 RC. PIPE CULVERT

- SAND BEDDING

LEAN CONCRETE BEDDING 1:3:6 BY VOLUME

(OUTLET)

Nos.

STA

STA 24+430.0 STA 24+512.0

STA 24+594.0

STA 24+650.0 STA 24+690.0 STA 24+750.0 STA 24+815.0 STA 24+867.0 STA 24+920.0 STA 24+975.0

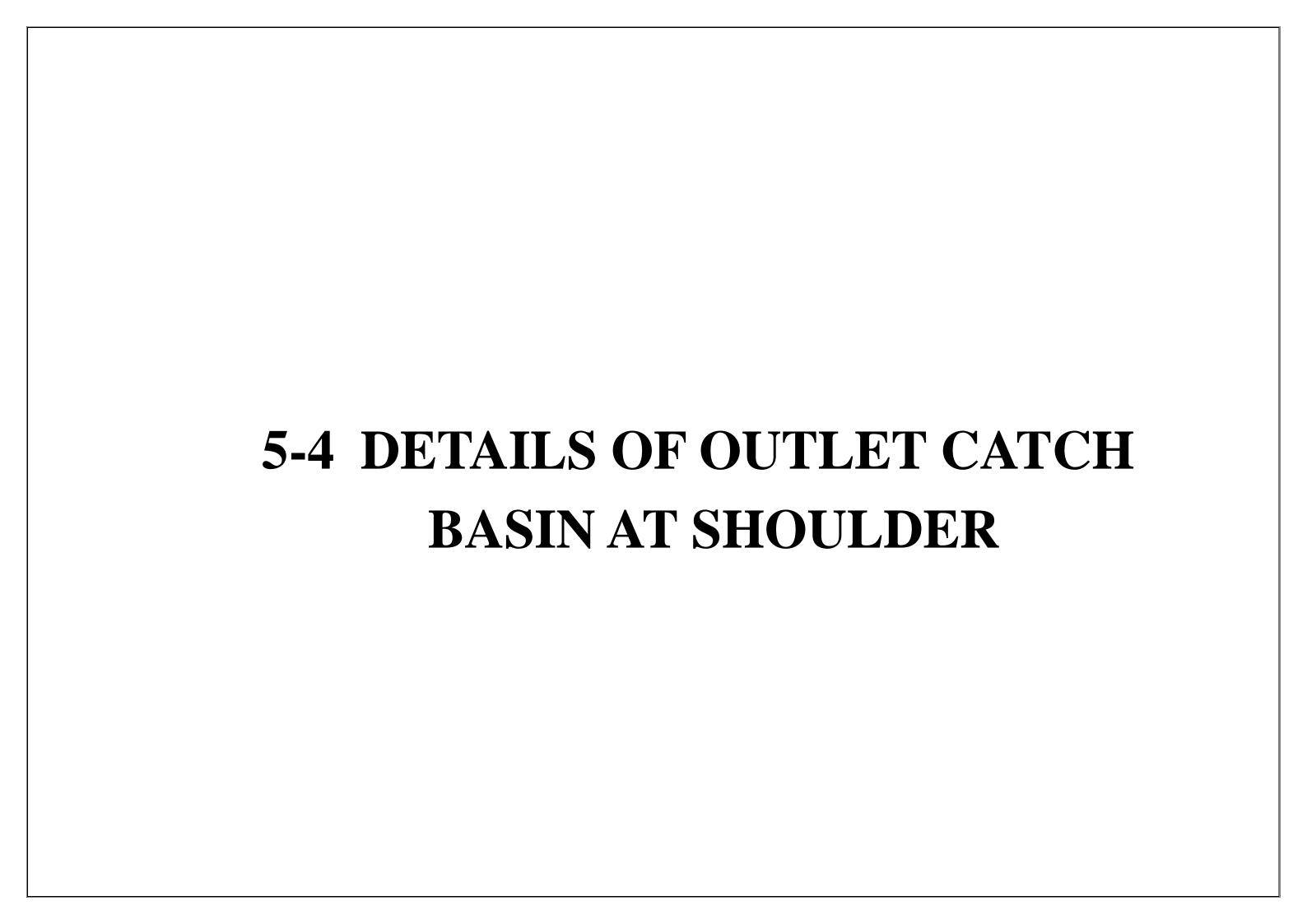
- 2. THE SHADED AREAS REPRESENT PORTIONS TO BE DEMOLISHED.
- 3. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 210 KSC. FOR 15x15x15 CM. CUBE AT 28 DAYS. AN APPROXIMATEMIX DESIGN PER CUBIC METER IS SUGGESTED AS FOLLOW:

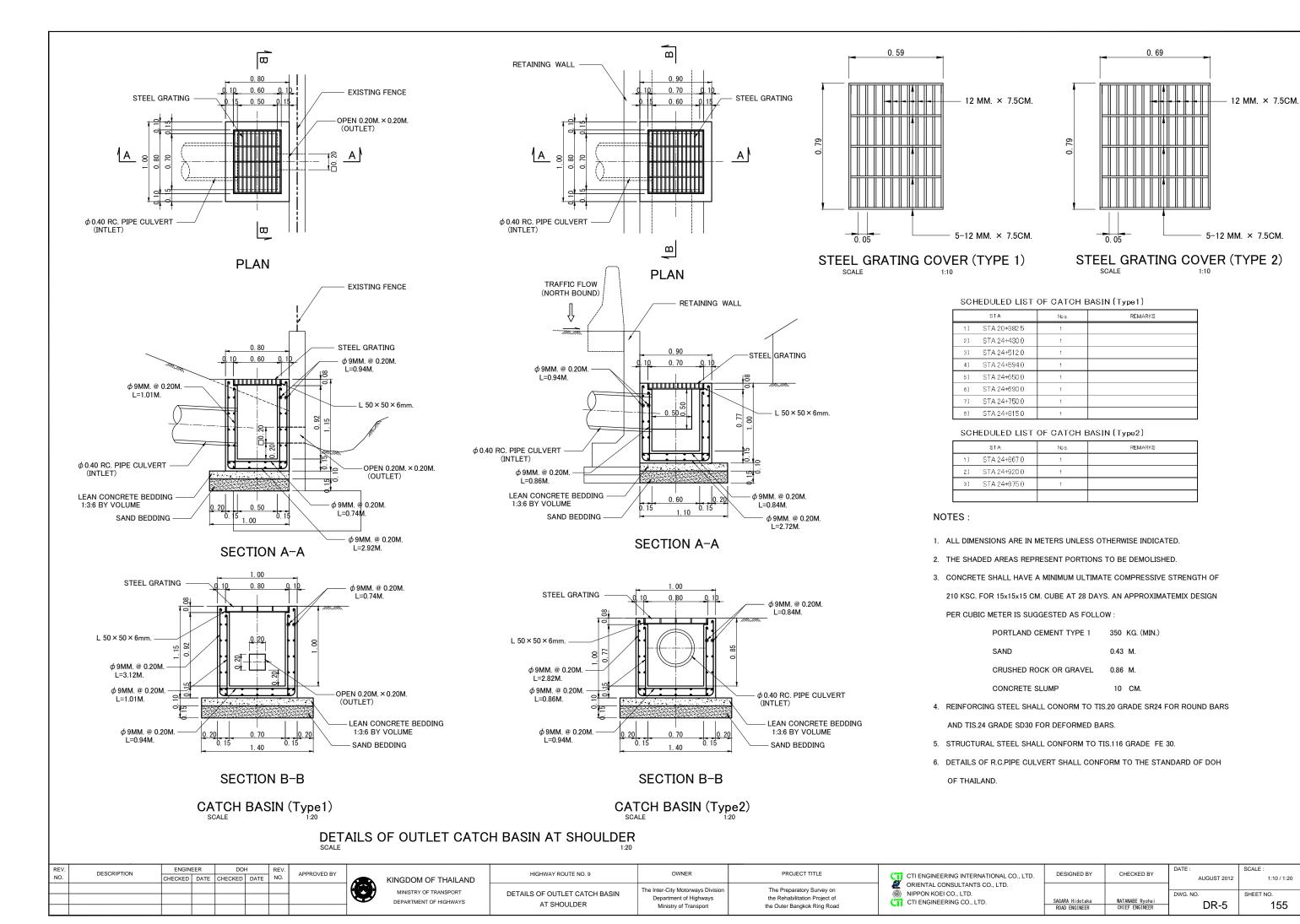
PORTLAND CEMENT TYPE 1 350 KG. (MIN.)

SAND 0.43 M. CRUSHED ROCK OR GRAVEL 0.86 M.

CONCRETE SLUMP 10 CM.

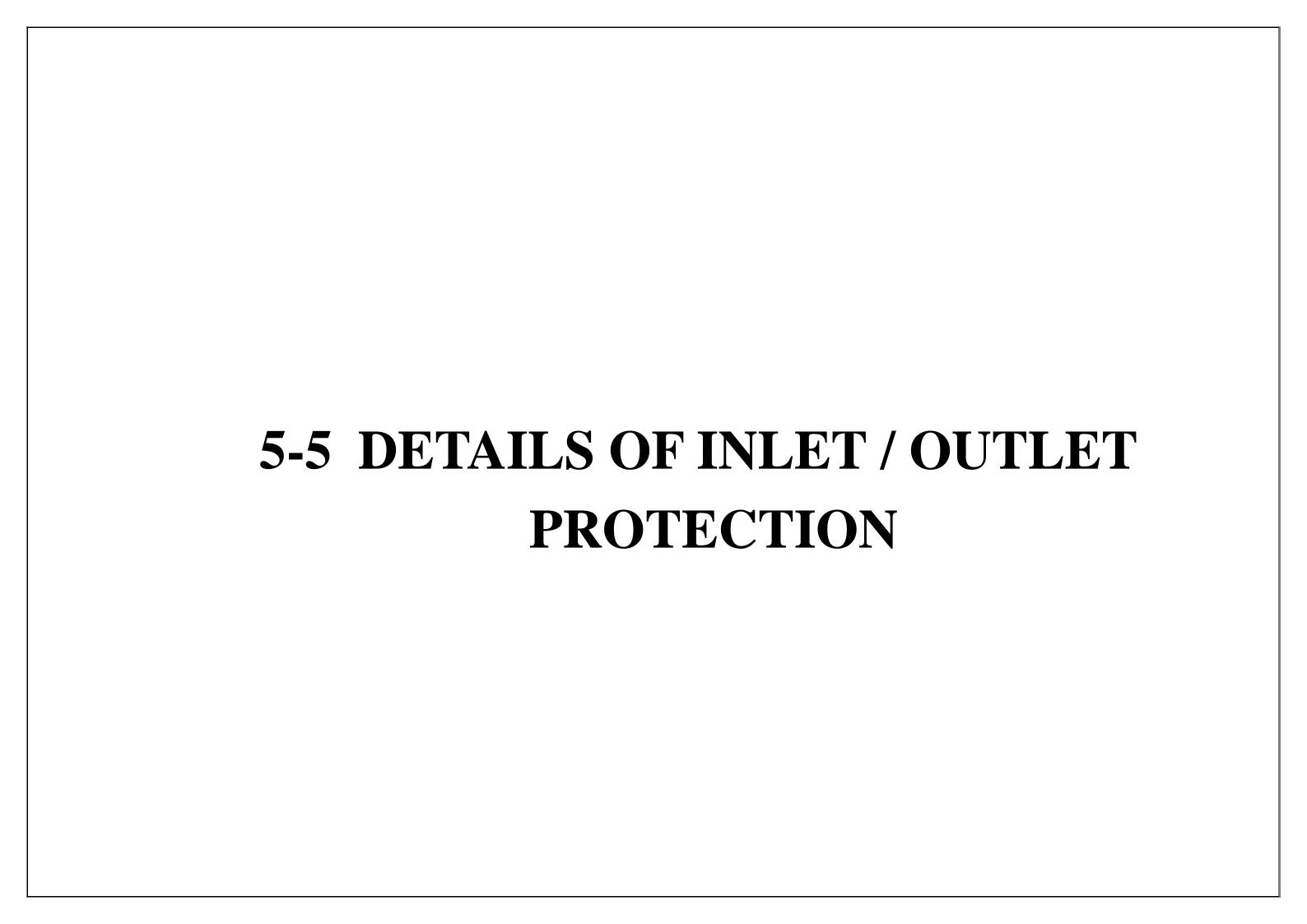
- 4. REINFORCING STEEL SHALL CONORM TO TIS.20 GRADE SR24 FOR ROUND BARS AND TIS.24 GRADE SD30 FOR DEFORMED BARS.
- 5. STRUCTURAL STEEL SHALL CONFORM TO TIS.116 GRADE FE 30.
- 6. DETAILS OF R.C.PIPE CULVERT SHALL CONFORM TO THE STANDARD OF DOH OF THAILAND.

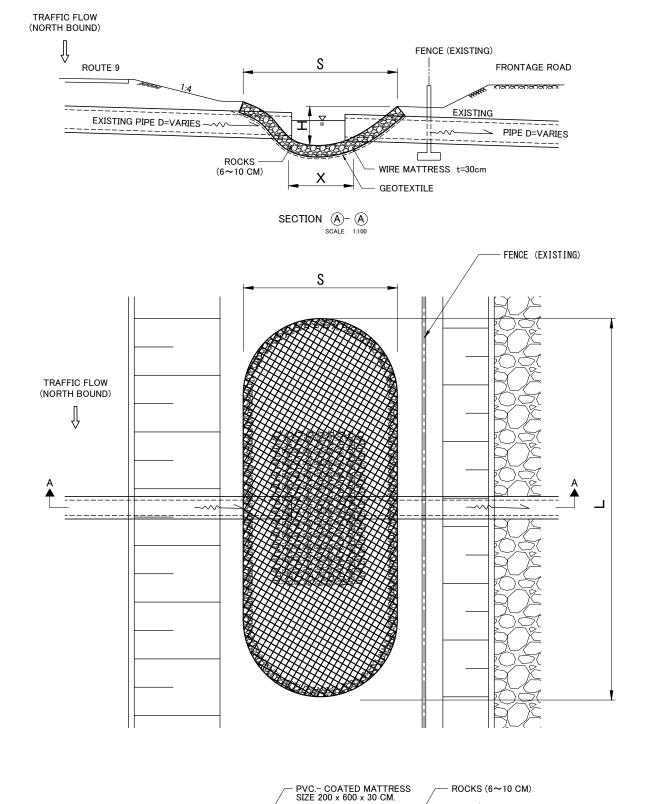




1:10 / 1:20

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WIRE MATTRESS

PVC.- COATED RENO MATTRESS: OR GALVANIZED WIRES THAT IS COATED WITH DVC. DETAILS ARE AS FOLLOWS:

1. NETTING

THE GALVANIZED WIRES COATED WITH PVC. ARE MADE INTO 6 x 8 CM.(+10%)
HEXAGONAL NETTING JOINED TOGETHER BY TWISTING THE WIRES ROUND EACH
OTHER TWCE AS SHOWN IN THE PICTURE.



2. WIRES

THE WIRE MUST BE ABLE TO RESIST THE TENSION OF 28.5-51 KG./MM.²
(ACCORDING TO BS 1052/1980 STANDARD)
THE DIAMETER OF WIRE FOR FRAME IS AT LEAST 2.7 MM.
THE DIAMETER OF WIRE FOR NETTING IS AT LEAST 2.0 MM.
THE DIAMETER OF WIRE FOR BOX WRAPPING IS AT LEAST 2.0 M.
AND THE WIRE IS LONG ENOUGH TO BE USED IN INSTALLATION
(ABRUIT 58 OF BENO MATERSS * WIFICITY)

3. GALVANIZING

THE WIRES MUST BE GALVANIZED ACCORDING TO BS 443/1982 STANDARD.

THE ROCKS USED FOR THIS WORK MUST BE HARD ENOUGH AND NOT CRUMBLE WHEN WET AND ENDURE REGARDLESS OF THE CLIMATE.THEY ARE GRANITE, SIZE OF THE ROCKS SHOULD BE 6-10 CM. OR \pm (5%-7%).

SCHEDULED LIST OF DRAINAGE INLET/OUTLET PROTECTION

| NO. | STA | Heigth (H) | Gap (X) | Width (S) | Length (L) | REMARKS |
|-----|------------|------------|---------|-----------|------------|---------------------------|
| NO. | SIA | (m) | (m) | (m) | (m) | REWARKS |
| 1 | STA 23+961 | 2.00 | 1.80 | 7.20 | 13.20 | |
| 2 | STA 24+079 | 2.00 | 1.80 | 7.50 | 14.70 | |
| 3 | STA 24+240 | 2.10 | 1.90 | 7.50 | 30.00 | |
| 4 | STA 25+502 | 2.10 | 1.00 | 7.70 | 12.70 | |
| 5 | STA 25+828 | 2.20 | 1.75 | 8.00 | 13.80 | |
| 6 | STA 25+947 | 2.20 | 1.80 | 7.50 | 9.90 | |
| 7 | STA 26+050 | 2.30 | 0.00 | 7.60 | 10.00 | No Drainage on R9 |
| 8 | STA 26+172 | 2.20 | 1.45 | 7.80 | 11.70 | |
| 9 | STA 26+404 | 2.20 | 1.65 | 8.00 | 12.50 | |
| 10 | STA 26+682 | 2.20 | 0.90 | 7.60 | 14.40 | |
| 11 | STA 27+021 | 2.10 | 1.30 | 8.70 | 12.30 | |
| 12 | STA 27+327 | 2.30 | 1.45 | 7.80 | 15.20 | |
| 13 | STA 27+584 | 2.20 | 0.80 | 7.50 | 15.00 | Concrete slope around pip |
| 14 | STA 27+678 | 2.00 | 0.90 | 7.00 | 13.20 | |
| 15 | STA 27+937 | 2.40 | 1.10 | 7.70 | 13.50 | |
| 16 | STA 28+184 | 2.10 | 1.40 | 7.80 | 12.30 | |
| 17 | STA 28+544 | 2.30 | 0.75 | 6.50 | 13.90 | |

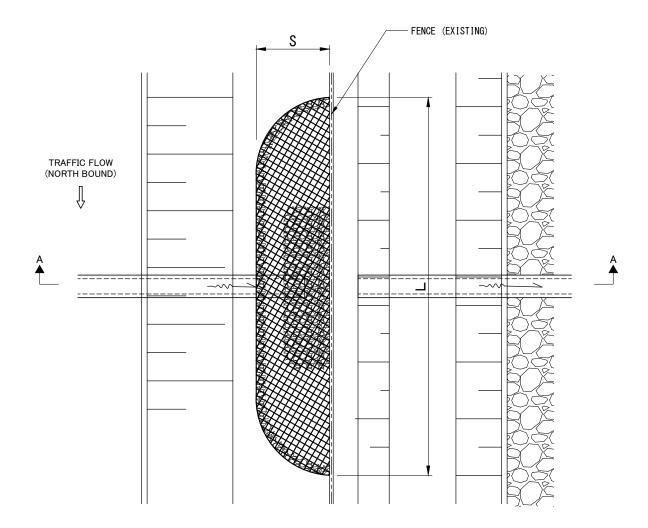
DETAILS OF DRAINAGE INLET/OUTLET PROTECTION

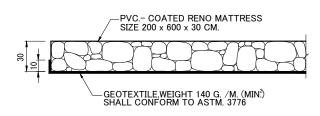
| R | EV. DESCRIPTION | | ENGINE | ER | DOH | Н | REV. | APPROVED BY | | | LUCUMAN POLITE NO 0 | OWNER | PROJECT TITLE | | |
|---|-----------------|-----|--------|------|---------|------|------|-------------|--|-----------------------|---------------------------|-----------------------------------|-----------------------------|-------------------------------|--|
| N | O. DESCRIPTION | CHE | IECKED | DATE | CHECKED | DATE | NO. | APPROVED BY | | KINGDOM OF THAILAND | HIGHWAY ROUTE NO. 9 | OWNER | PROJECT TITLE | Ç | |
| | | | | | | | | | | MINISTRY OF TRANSPORT | DETAILS OF INLET / OUTLET | The Inter-City Motorways Division | The Preparatory Survey on | 1 | |
| | | | | | | | | | | | DEPARTMENT OF HIGHWAYS | PROTECTION | Department of Highways | the Rehabilitation Project of | |
| | | | | | | | | | | | PROTECTION | Ministry of Transport | the Outer Bangkok Ring Road | 1 | |

-GEOTEXTILE,WEIGHT 140 G. /M. (MIN²) SHALL CONFORM TO ASTM. 3776

| CTI ENGINEERING INTERNATIONAL CO., LTD. | DESIGNED BY | CHECKED BY | DATE : AUGUST 2012 | SCALE : 1:100 |
|-----------------------------------------|-----------------|-----------------|--------------------|---------------|
| ORIENTAL CONSULTANTS CO., LTD. | | | | |
| NIPPON KOEI CO., LTD. | | | DWG. NO. | SHEET NO. |
| CTI ENGINEERING CO., LTD. | SAGARA Hidetaka | WATANABE Ryohei | DR-6 | 150 |
| | ROAD ENGINEER | CHIEF ENGINEER | ס-אט | 156 |

TRAFFIC FLOW (NORTH BOUND) FENCE (EXISTING) ROUTE 9 FRONTAGE ROAD EXISTING EXISTING PIPE D=VARIES -PIPE D=VARIES WIRE MATTRESS t=30cm GEDTEXTILE SECTION A-A





DETAILS OF DRAINAGE INLET/OUTLET PROTECTION

RENO OR WIRE MATTRESS

PVC.- COATED RENO MATTRESS: OR GALVANIZED WIRES THAT IS COATED WITH PVC. DETAILS ARE AS FOLLOWS:

1. NETTING

THE GALVANIZED WIRES COATED WITH PVC. ARE MADE INTO 6 x 8 CM.(+10%)
HEXAGONAL NETTING JOINED TOGETHER BY TWISTING THE WIRES ROUND EACH OTHER TWCE AS SHOWN IN THE PICTURE.



2. WIRES

THE WIRE MUST BE ABLE TO RESIST THE TENSION OF 28.5-51 KG./MM. ² (ACCORDING TO BS 1052/1980 STANDARD)
THE DIAMETER OF WIRE FOR FRAME IS AT LEAST 2.7 MM. THE DIAMETER OF WIRE FOR NETTING IS AT LEAST 2.0 MM.
THE DIAMETER OF WIRE FOR BOX WRAPPING IS AT LEAST 2.0 M. AND THE WIRE IS LONG ENOUGH TO BE USED IN INSTALLATION (ABOUT 5% OF RENO MATRESS ' WEIGHT).

3. GALVANIZING

THE WIRES MUST BE GALVANIZED ACCORDING TO BS 443/1982 STANDARD.

THE DEVIATION OF THE WIRE'S DIAMETER SHALL BE LESS THAN \pm 2.5%

5. ROCKS

THE ROCKS USED FOR THIS WORK MUST BE HARD ENOUGH AND NOT CRUMBLE WHEN WET AND ENDURE REGARDLESS OF THE CLIMATE. THE SIZE OF THE ROCKS SHOULD BE 6–10 CM. OR \pm (5%–7%).

SCHEDULED LIST OF DRAINAGE INLET/OUTLET PROTECTION

| NO | OT 4 | Heigth (H) | Between (X) | Width (S) | Length (L) | DDMADIC |
|-----|--------------|------------|-------------|-----------|------------|--------------|
| NO. | . STA | (m) | (m) | (m) | (m) | REMARKS |
| 1 | STA 12+651.0 | 2.10 | 0.50 | 2.50 | 15.00 | fence is low |
| 2 | STA 12+810.8 | 2.10 | 0.50 | 2.50 | 15.00 | fence is low |
| 3 | STA 15+616.2 | 2.00 | 0.80 | 4.50 | 12.00 | |
| 4 | STA 15+736.1 | 2.00 | 2.40 | 3.90 | 9.00 | |
| 5 | STA 19+878.4 | 2.10 | 2.20 | 3.50 | 8.00 | |
| 6 | STA 20+103.2 | 2.10 | 2.00 | 3.30 | 8.00 | |
| 7 | STA 20+319.6 | 2.10 | 0.00 | 3.00 | 7.40 | |
| 8 | STA 20+581.7 | 2.10 | 1.50 | 3.50 | 6.40 | |
| | | | | | | |

| REV. | DESCRIPTION | ENGIN | EER | DOI | Н | REV. | APPROVED BY | |
|------|-------------|---------|------|---------|------|------|-------------|----|
| NO. | DESCRIPTION | CHECKED | DATE | CHECKED | DATE | NO. | APPROVED BY | ١. |
| | | | | | | | | 6 |
| | | | | | | | | ١, |
| | | | | | | | | 1 |



| HIGHWAT ROUTE NO. 9 | OWNER |
|--------------------------------------|--------------------------------------------------------------------------------------|
| DETAILS OF INLET / OUTLET PROTECTION | The Inter-City Motorways Division Department of Highways Ministry of Transport |

| CII | CTI ENGINEERING INTERNATIONAL C |
|----------|---------------------------------|
| 2 | ORIENTAL CONSULTANTS CO., LTD. |
| (| NIPPON KOEI CO., LTD. |
| ্ৰো | CTI ENGINEERING CO., LTD. |
| | |

PROJECT TITLE

the Rehabilitation Project of the Outer Bangkok Ring Road

| ERNATIONAL CO., LTD. | DESIGNED BY | CHECKED BY | DATE : AUGUST 2012 | SCALE : 1:100 | |
|----------------------|-----------------|-----------------|--------------------|---------------|--|
| NTS CO., LTD. | | | DWG. NO. | SHEET NO. | |
| J. | | | DWG. NO. | SHEET NO. | |
|) LTD. | SAGARA Hidetaka | WATANABE Ryohei | DD 7 | 457 | |
| ., 2.2. | ROAD ENGINEER | CHIEF ENGINEER | DR-7 | 157 | |
| | | | | | |