

|   |  |  |   |   |  |  |                             |                      |
|---|--|--|---|---|--|--|-----------------------------|----------------------|
| <br>Republic of the Philippines<br><b>METROPOLITAN NAGA WATER DISTRICT</b><br>40 J. Miranda Avenue, Naga City | PREPARED BY:<br><br><b>SHARMAINE E. BRACIA</b><br>OIC, PDCD | CHECKED BY:<br><br><b>SON JUN O. MILLARES</b><br>OIC, EED | RECOMMENDING APPVL:<br><br><b>NOEL A. MARTINEZ, JR.</b><br>OIC, PAMD | APPROVED BY:<br><br><b>ROQUE S. FRANCISCO</b><br>AGM, O&TS | APPROVED BY:<br><br><b>FLORENCIO T. MONGOSO, JR.</b><br>General Manager A | PROJECT TITLE/LOCATION:<br><b>PROPOSED TRANSMISSION LINE PROJECT</b><br>Talidtid/Bell to DPWH Boulevard Road to Pangpang,<br>Canaman, Camarines Sur<br>Total Length = 1,750 LM | SHEET CONT:<br>Vicinity Map | SHEET NO.:<br>1 / 15 |
|   |  |  |   |   |  |  | CADD BY: Juliet             | 05 - 2025            |

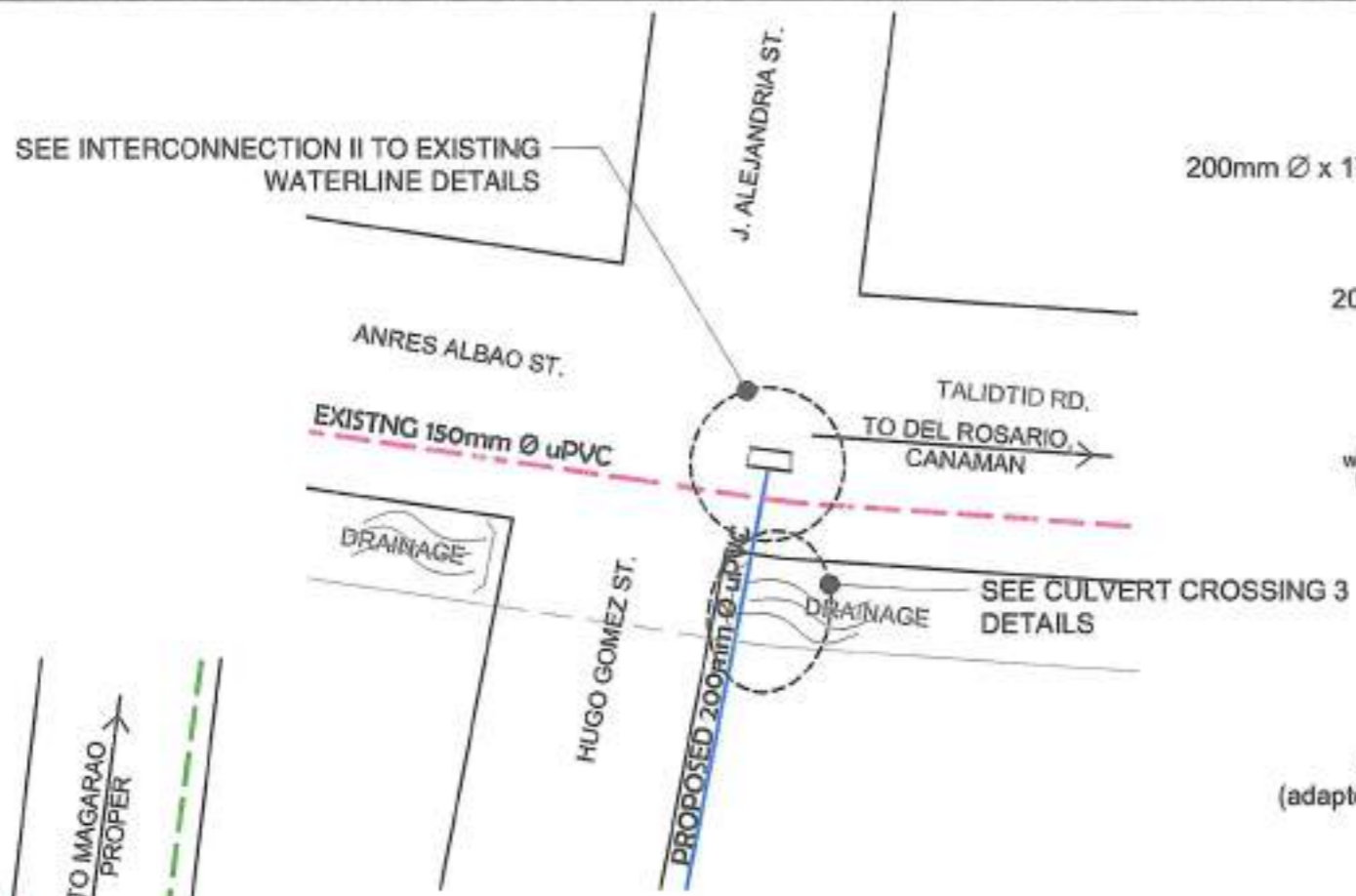
**LEGEND:**

-  PROPOSED 200mm Ø uPVC PIPE, CL 150  
w/ Machine installed plastic ring  
Homogenously Bonded w/RR
-  PROPOSED 150mm Ø FIRE HYDRANT
-  EXISTING 200mm Ø uPVC PIPE
-  EXISTING 150mm Ø uPVC PIPE



  
**LAYOUT PLAN**  
 Scale 1: 7500mts.

|   |  |  |   |   |  |  |                            |  |
|---|--|--|---|---|--|--|----------------------------|--|
| <br>Republic of the Philippines<br><b>METROPOLITAN NAGA WATER DISTRICT</b><br>40 J. Miranda Avenue, Naga City | PREPARED BY:<br><br><b>SHARMAINE E. BRACIA</b><br>OIC, RDCD | CHECKED BY:<br><br><b>SON JUN O. MILLARES</b><br>OIC, EED | RECOMMENDING APPVL:<br><br><b>NOEL A. MARTINEZ, JR.</b><br>OIC, PAMD | APPROVED BY:<br><br><b>ROQUE S. FRANCISCO</b><br>AGM, O&TS | APPROVED BY:<br><br><b>FLORENCIO T. MONGOSO, JR.</b><br>General Manager A | PROJECT TITLE/LOCATION:<br><b>PROPOSED TRANSMISSION LINE PROJECT</b><br>Talidtid/Bell to DPWH Boulevard Road to Pangpang,<br>Canaman, Camarines Sur<br>Total Length = 1,750 LM | SHEET CONT:<br>Layout Plan | SHEET NO.:<br>2 / 15<br>CADD BY: Juliet<br>05 - 2025 |
|   | BEDF17, REV. 00, AUG. 05, 2019   |  |   |   |  |  |                            |  |

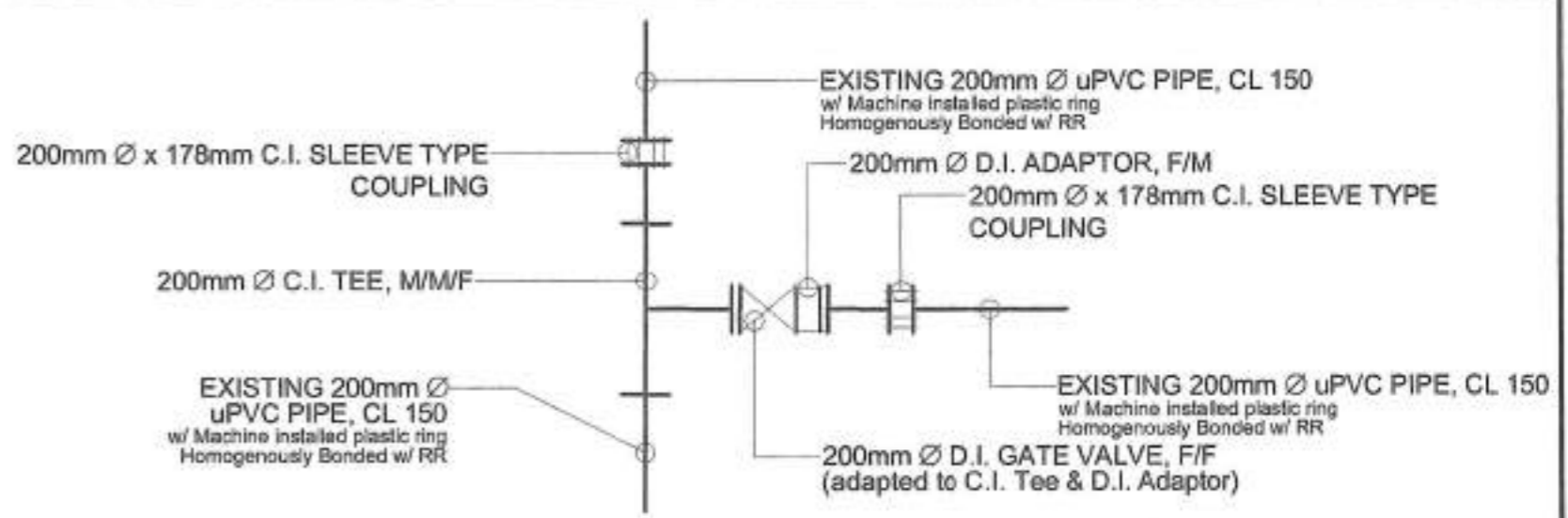


**BLOW UP 2 LAYOUT**  
N T S

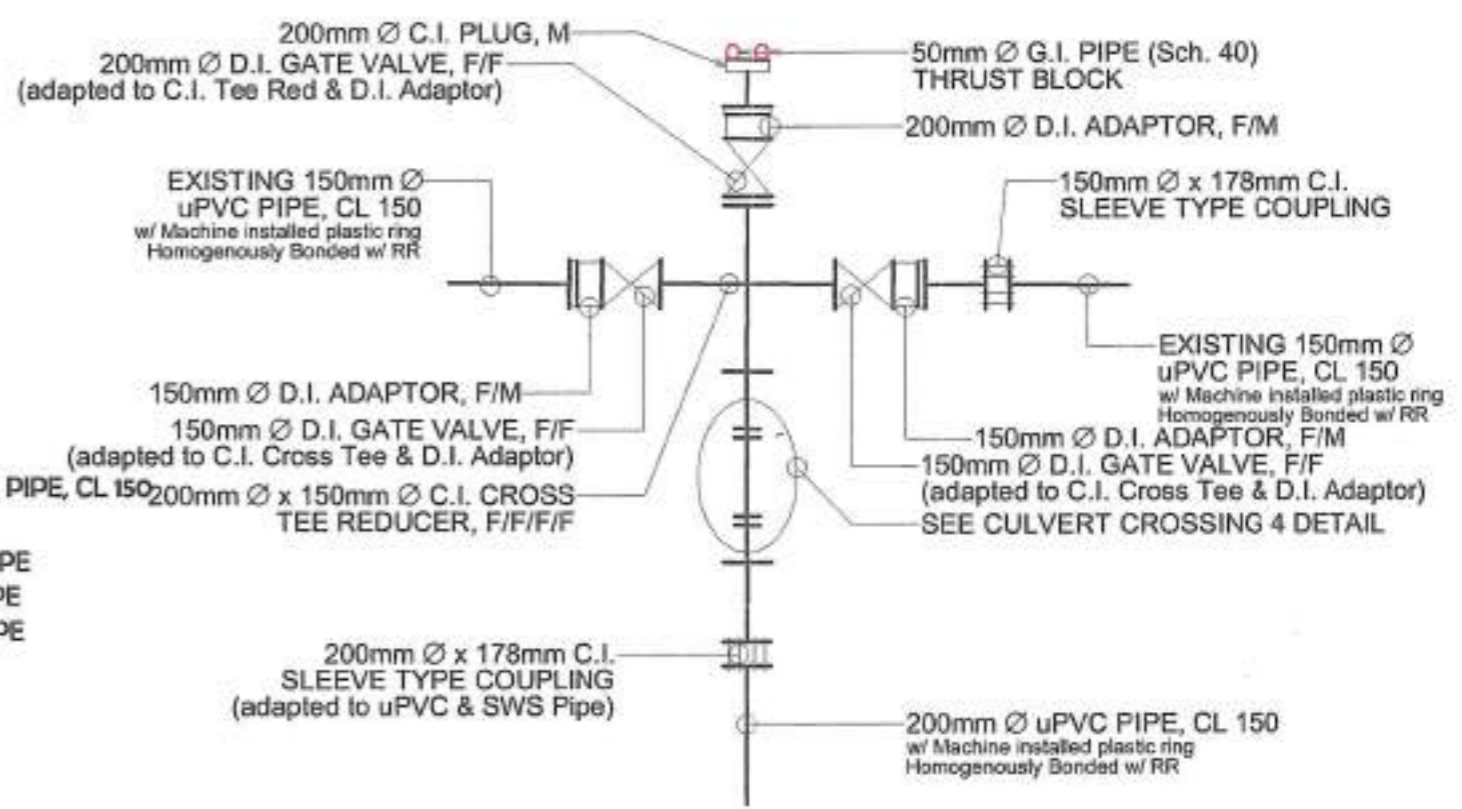
- LEGEND:**
- PROPOSED 200mm Ø uPVC PIPE, CL 150 w/ Machine installed plastic ring Homogenously Bonded w/ RR
  - EXISTING 200mm Ø uPVC PIPE
  - EXISTING 150mm Ø uPVC PIPE
  - EXISTING 100mm Ø uPVC PIPE



**BLOW UP 1 LAYOUT**  
N T S



**INTERCONNECTION I**



**INTERCONNECTION II**

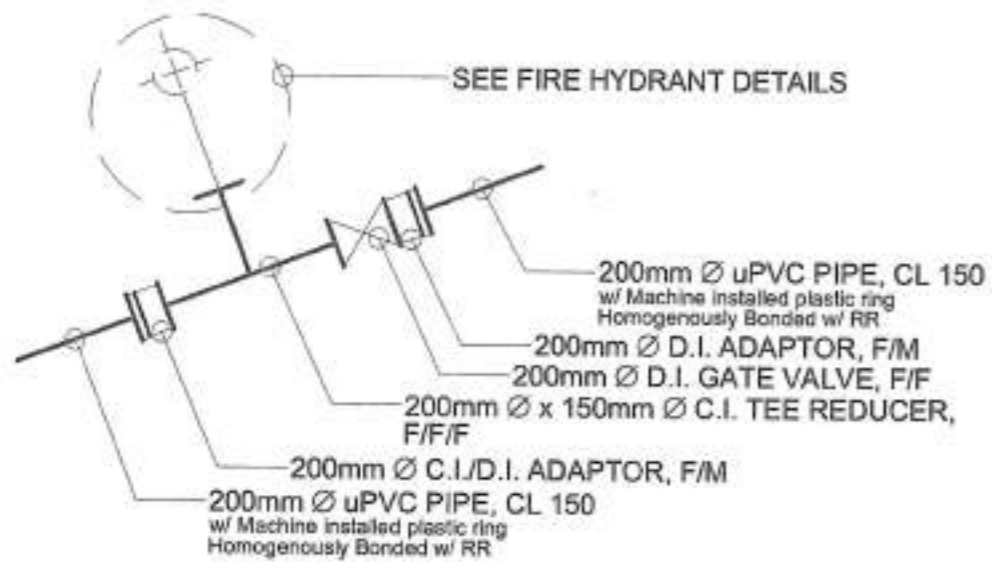
**INTERCONNECTION TO EXISTING WATERLINE DETAILS**  
N T S

Republic of the Philippines  
**METROPOLITAN NAGA WATER DISTRICT**  
40 J. Miranda Avenue, Naga City

|   |  |  |  |   |
|---|--|--|--|---|
| PREPARED BY:<br><i>[Signature]</i><br><b>SHARMAINE E. BRACIA</b><br>OIC, PDCD | CHECKED BY:<br><i>[Signature]</i><br><b>SONJUN O. MILLARES</b><br>OIC, EED | RECOMMENDING APPVL:<br><i>[Signature]</i><br><b>NOEL A. MARTINEZ, JR.</b><br>OIC, PAMD | APPROVED BY:<br><i>[Signature]</i><br><b>ROQUE S. FRANCISCO</b><br>AGM, O&TS | APPROVED BY:<br><i>[Signature]</i><br><b>FLORENCIO T. MONGOSO, JR.</b><br>General Manager A |
|---|--|--|--|---|

PROJECT TITLE/LOCATION:  
**PROPOSED TRANSMISSION LINE PROJECT**  
Talidtid/Bell to DPWH Boulevard Road to Pangpang,  
Canaman, Camarines Sur  
Total Length = 1,750 LM

|                         |                 |
|-------------------------|-----------------|
| SHEET CONT:<br>As shown | SHEET NO.:<br>3 |
|                         | 15              |
| CADD BY: Juliet         | 05 - 2025       |



**INTERCONNECTION A**



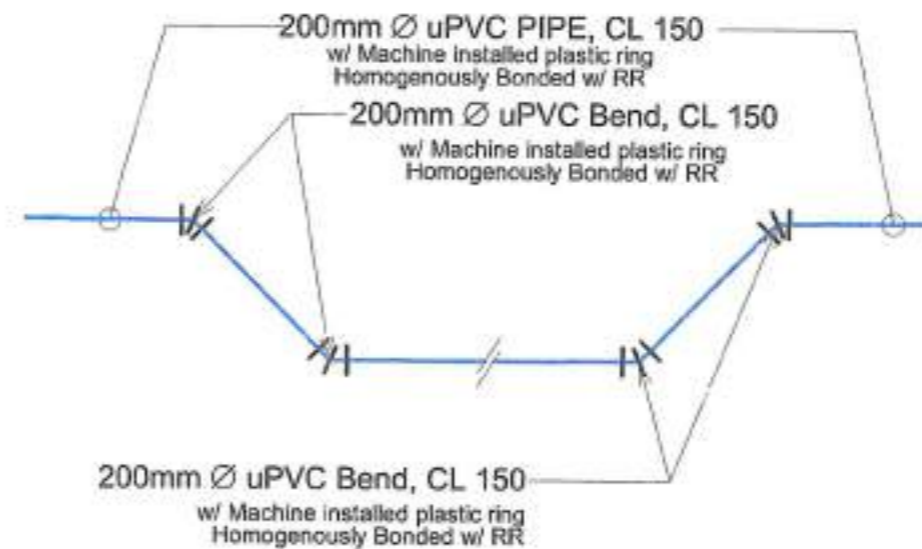
**FITTINGS A & B**



**FITTINGS C & D**



**INTERCONNECTION B**



**FITTINGS E**

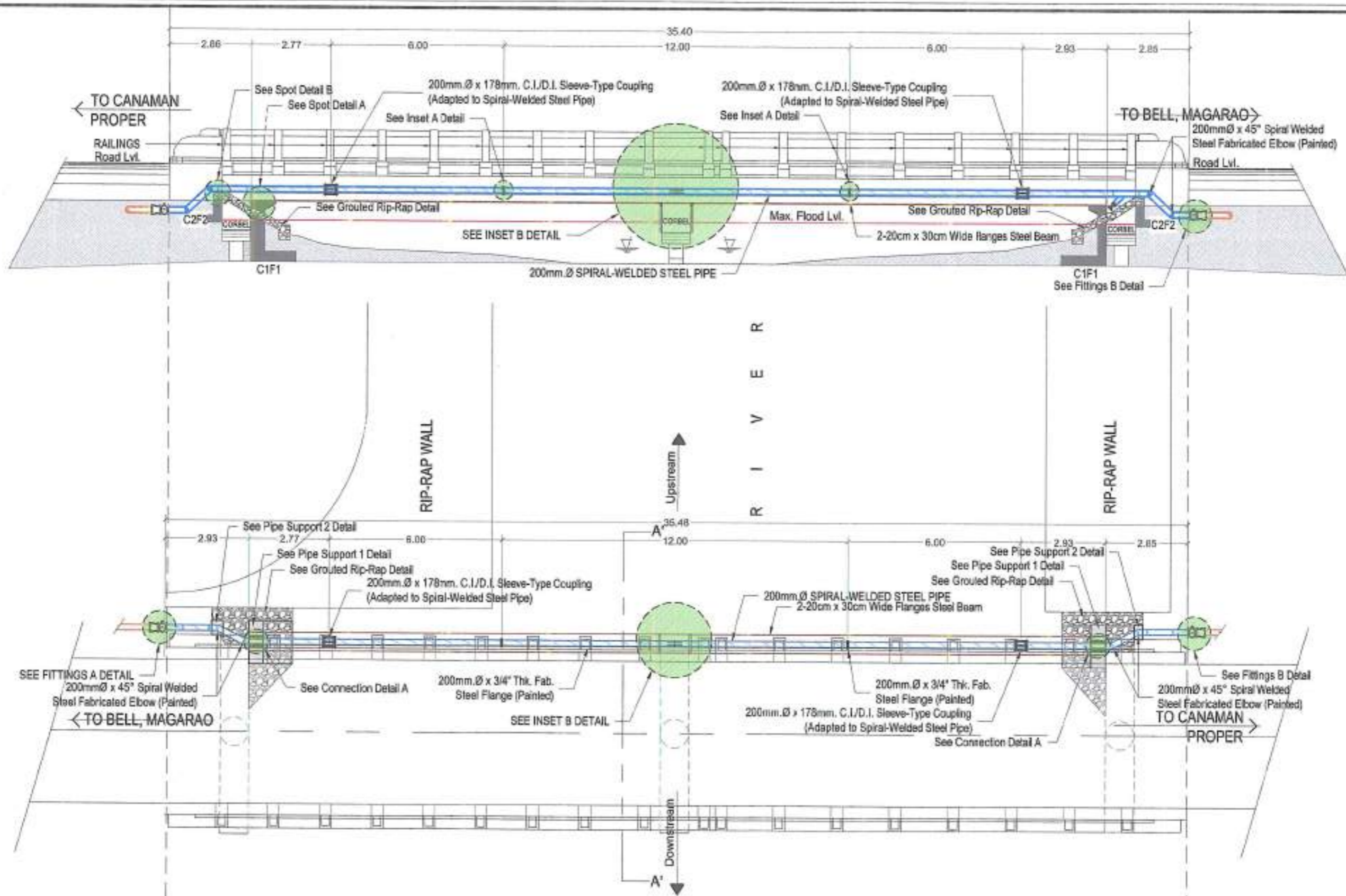


**INTERCONNECTION DETAILS**



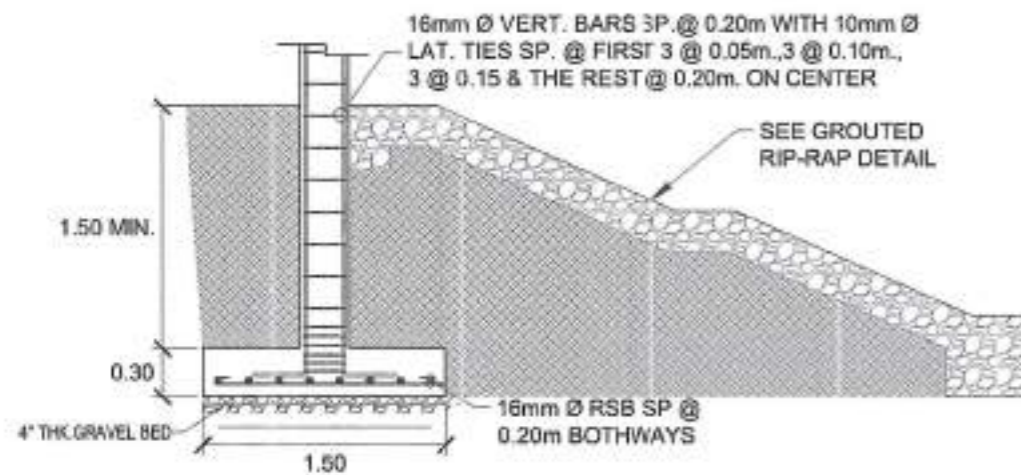
**FITTINGS DETAILS**

|  |                                      |                                    |  |                                     |  |  |                 |           |
|--|--------------------------------------|------------------------------------|--|-------------------------------------|--|--|-----------------|-----------|
| <p>Republic of the Philippines<br/><b>METROPOLITAN NAGA WATER DISTRICT</b><br/>40 J. Miranda Avenue, Naga City</p> | PREPARED BY:                         | CHECKED BY:                        | RECOMMENDING APPVL:                    | APPROVED BY:                        | PROJECT TITLE/LOCATION:                            | SHEET CONT:  | SHEET NO.:      |           |
|  | <br>SHARMAINE E. BRACIA<br>OIC, RDCC | <br>SONJUN O. MILLARES<br>OIC, EED | <br>NOEL A. MARTINEZ, JR.<br>OIC, PAMD | <br>ROQUE S. FRANCISCO<br>AGM, O&TS | <br>FLORENCIO T. MONGOSO, JR.<br>General Manager A | <b>PROPOSED TRANSMISSION LINE PROJECT</b><br>Talitid/Bell to DPWH Boulevard Road to Pangpang,<br>Canaman, Camarines Sur<br>Total Length = 1,750 LM | Interconnection | 4         |
|  |                                      |                                    |  |                                     |  |  | Det.            | 15        |
|  |                                      |                                    |  |                                     |  |  | CADD BY: Juliet | 06 - 2025 |

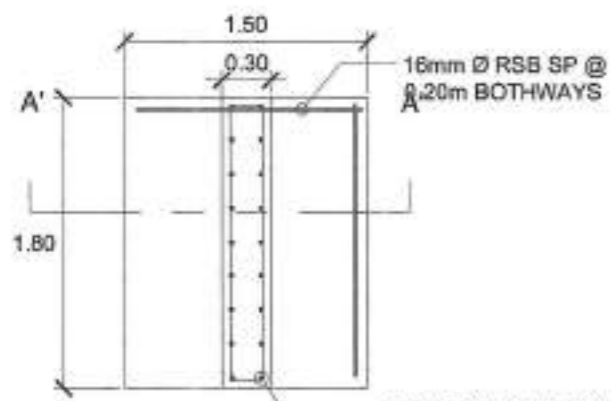


**BRIDGE CROSSING I DETAILS**

Not to Scale



**SECTION A'-A' DETAIL**

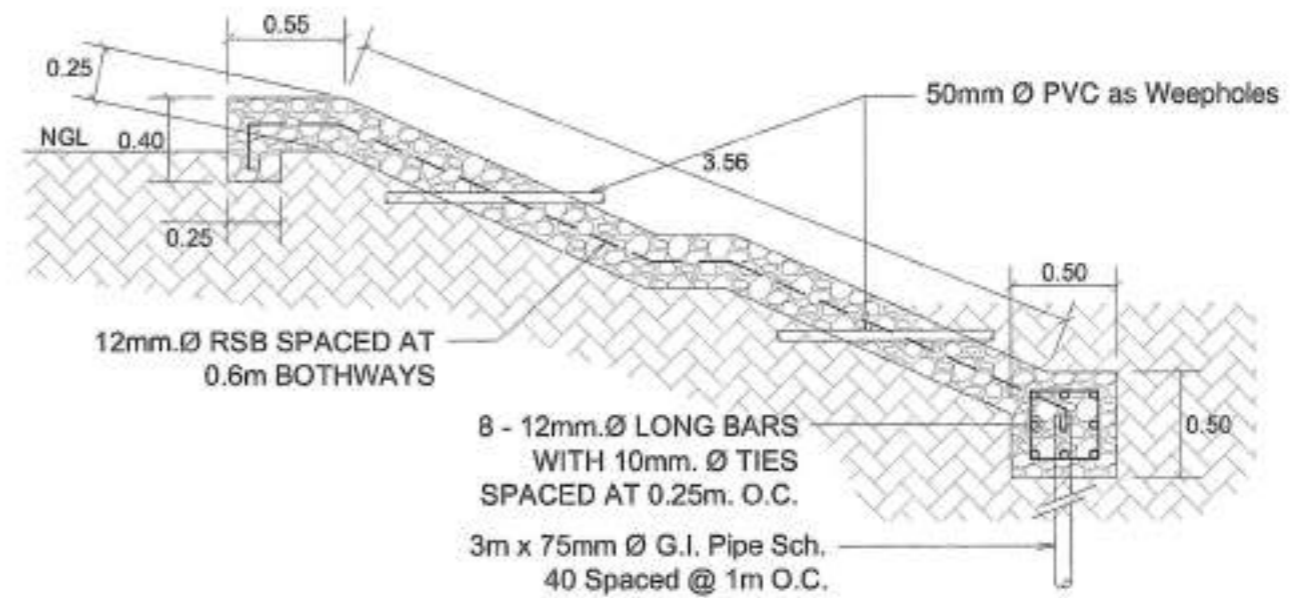


16mm Ø VERT. BARS SP @ 0.20m WITH 10mm Ø LAT. TIES SP. @ FIRST 3 @ 0.05m., 3 @ 0.10m., 3 @ 0.15 & THE REST @ 0.20m. ON CENTER

**COLUMN/FOOTING DETAILS**

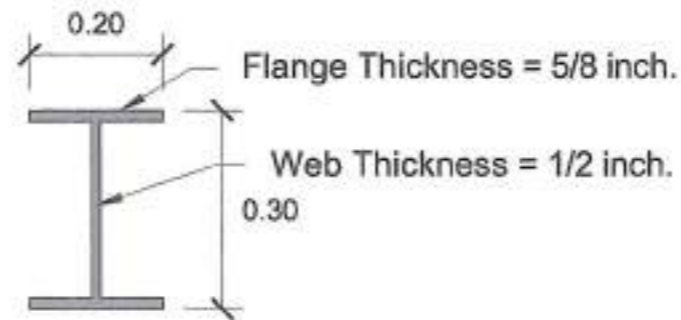
**PIPE SUPPORT 1 DETAILS**

N T S



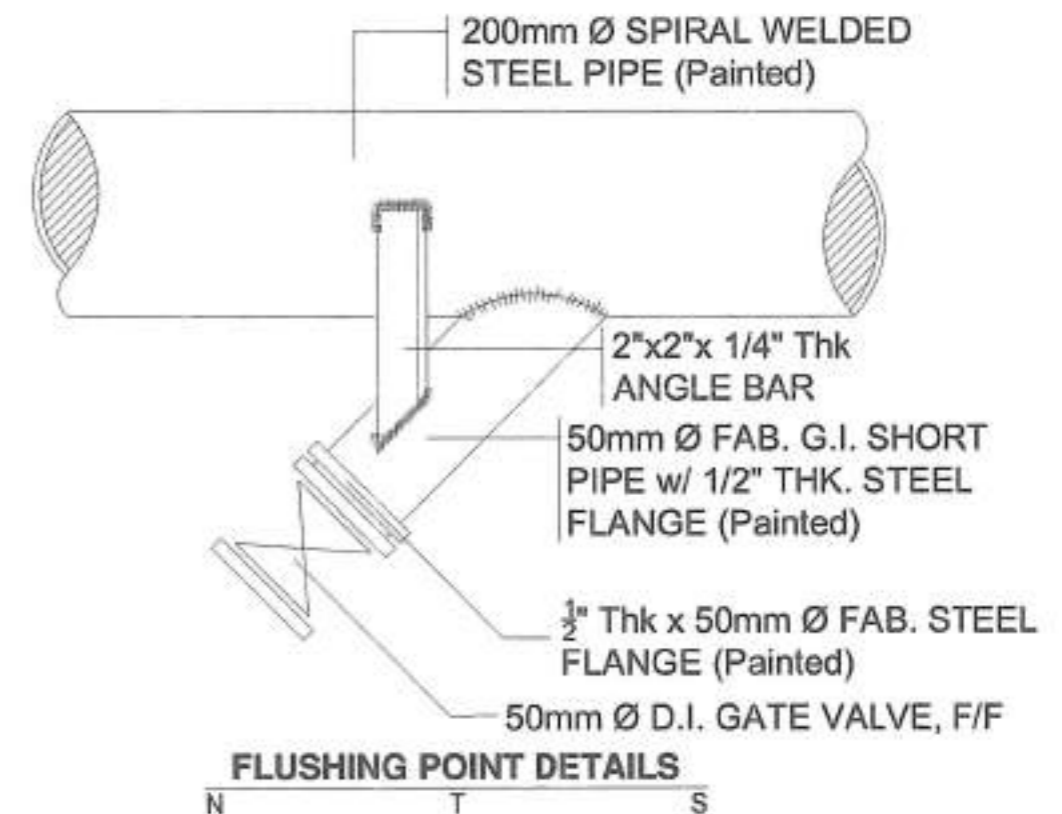
**GROUDED RIP-RAP DETAILS**

Not to Scale

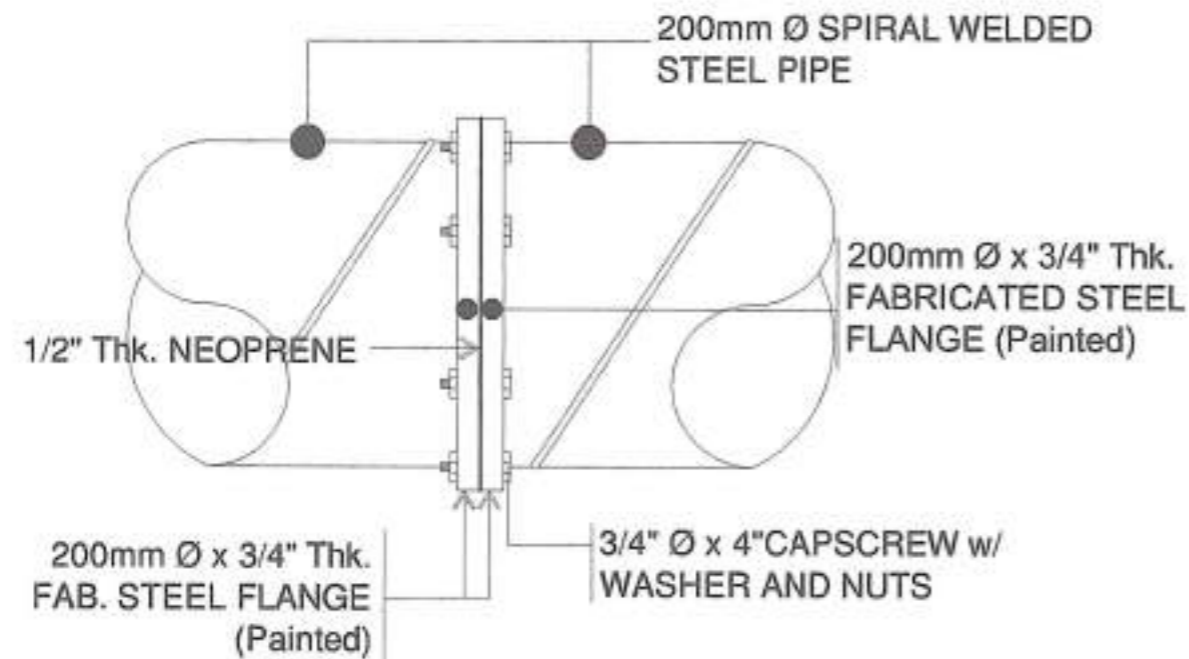


**WIDE FLANGE STEEL BEAM DETAILS**

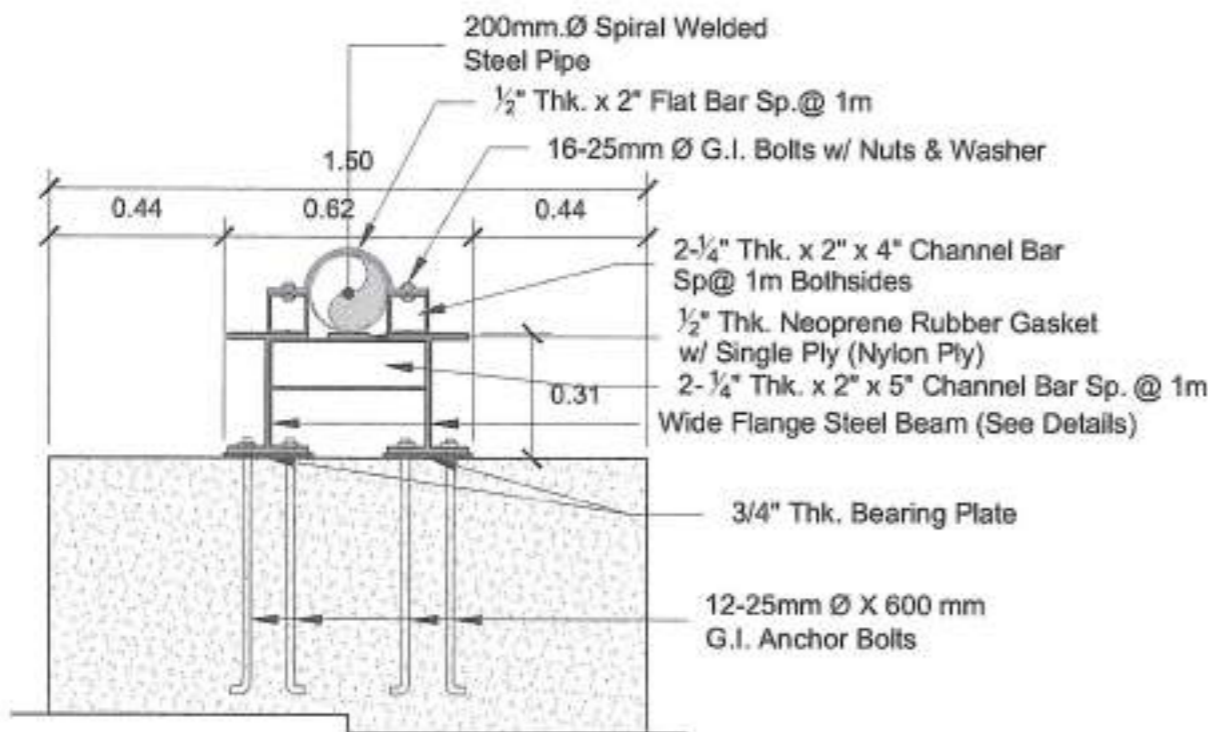
Scale 1:15mts.



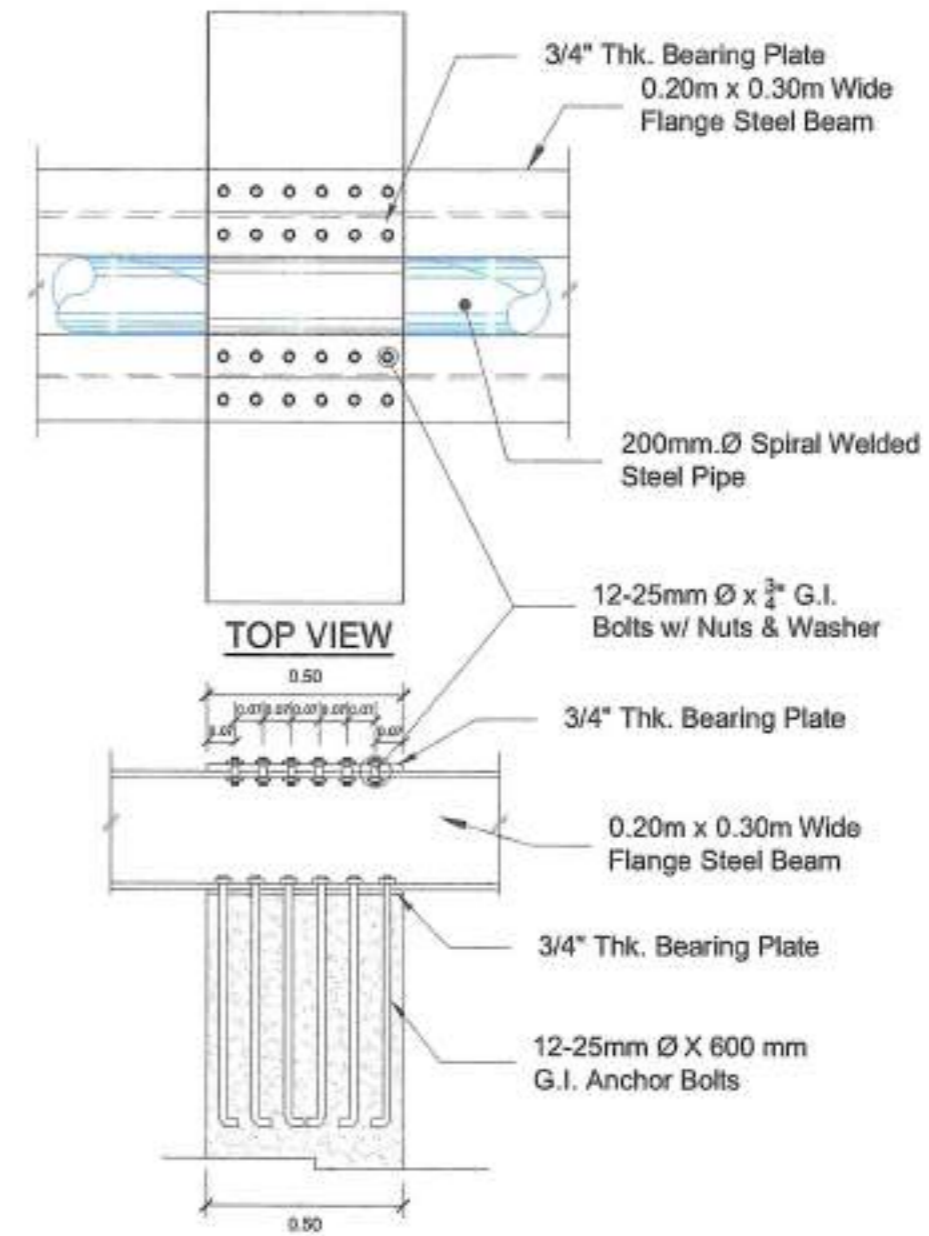
**FLUSHING POINT DETAILS**



**INSET A DETAILS**  
N T S

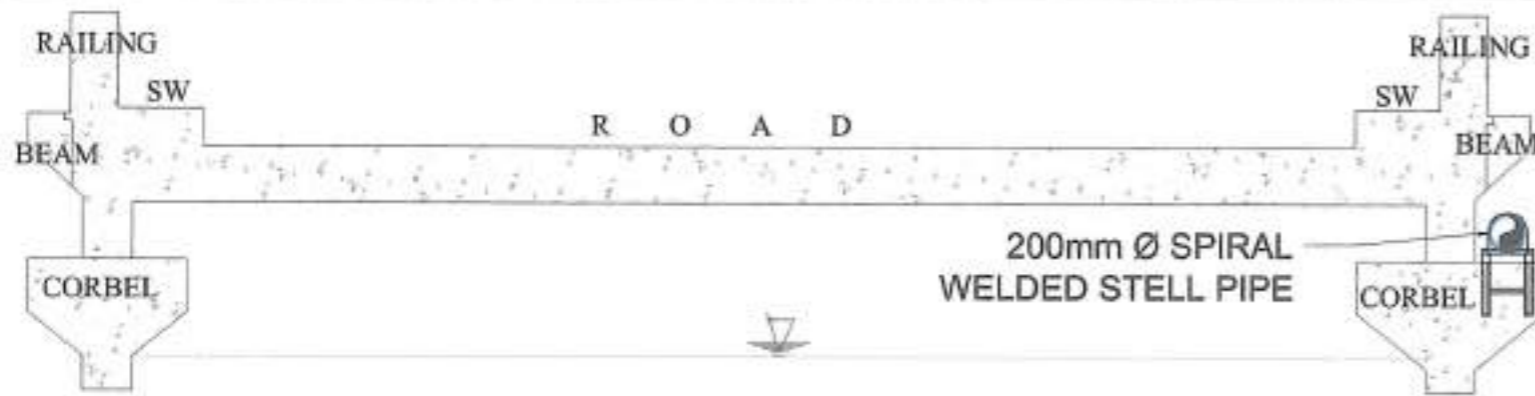


**SPOT DETAIL A**  
Not to Scale



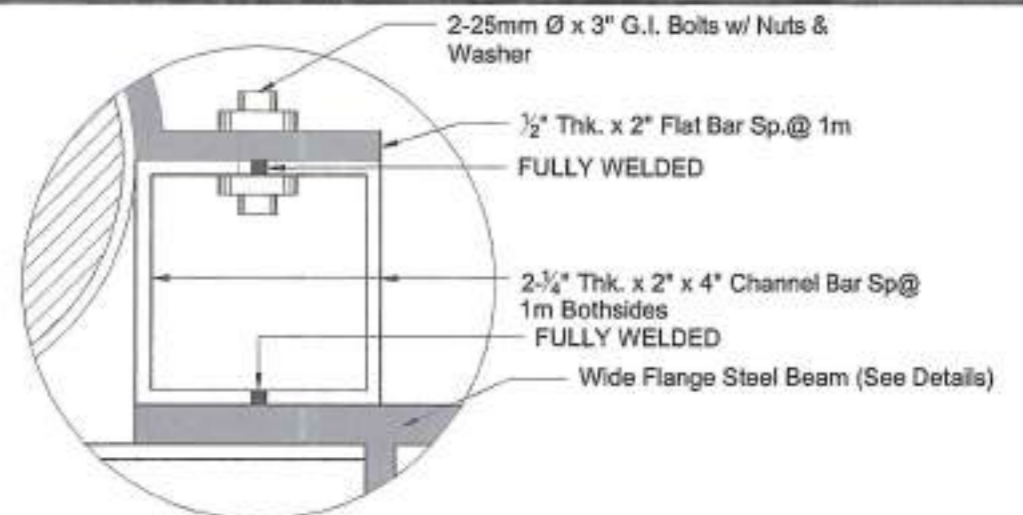
**CONNECTION DETAIL B**  
Scale 1:30mts.

|  |  |   |   |   |  |   |   |   |
|--|--|---|---|---|--|---|---|---|
| <p>Republic of the Philippines<br/><b>METROPOLITAN NAGA WATER DISTRICT</b><br/>40 J. Miranda Avenue, Naga City</p> | <p>PREPARED BY:</p> <p><i>[Signature]</i><br/><b>SHARMAINE E. BRACIA</b><br/>OIC, PDCD</p>                         | <p>CHECKED BY:</p> <p><i>[Signature]</i><br/><b>SONJUN O. MILLARES</b><br/>OIC, EED</p> | <p>RECOMMENDING APPVL:</p> <p><i>[Signature]</i><br/><b>NOEL A. MARTINEZ, JR.</b><br/>OIC, PAMD</p> | <p>APPROVED BY:</p> <p><i>[Signature]</i><br/><b>ROQUE S. FRANCISCO</b><br/>AGM, O&amp;TS</p> | <p>APPROVED BY:</p> <p><i>[Signature]</i><br/><b>FLORENCIO T. MONGOSO, JR.</b><br/>General Manager A</p> | <p>PROJECT TITLE/LOCATION:</p> <p><b>PROPOSED TRANSMISSION LINE PROJECT</b><br/>Talidid/Bell to DPWH Boulevard Road to Pangpang,<br/>Canaman, Camarines Sur<br/>Total Length = 1,750 LM</p> | <p>SHEET CONT:</p> <p>Bridge Crossing<br/>1 Det.<br/>As shown<br/>CADD BY: Juliet</p> | <p>SHEET NO.:</p> <p>7<br/>15<br/>05 - 2025</p> |
|  | <p>Republic of the Philippines<br/><b>METROPOLITAN NAGA WATER DISTRICT</b><br/>40 J. Miranda Avenue, Naga City</p> |   |   |   |  |   |   |   |

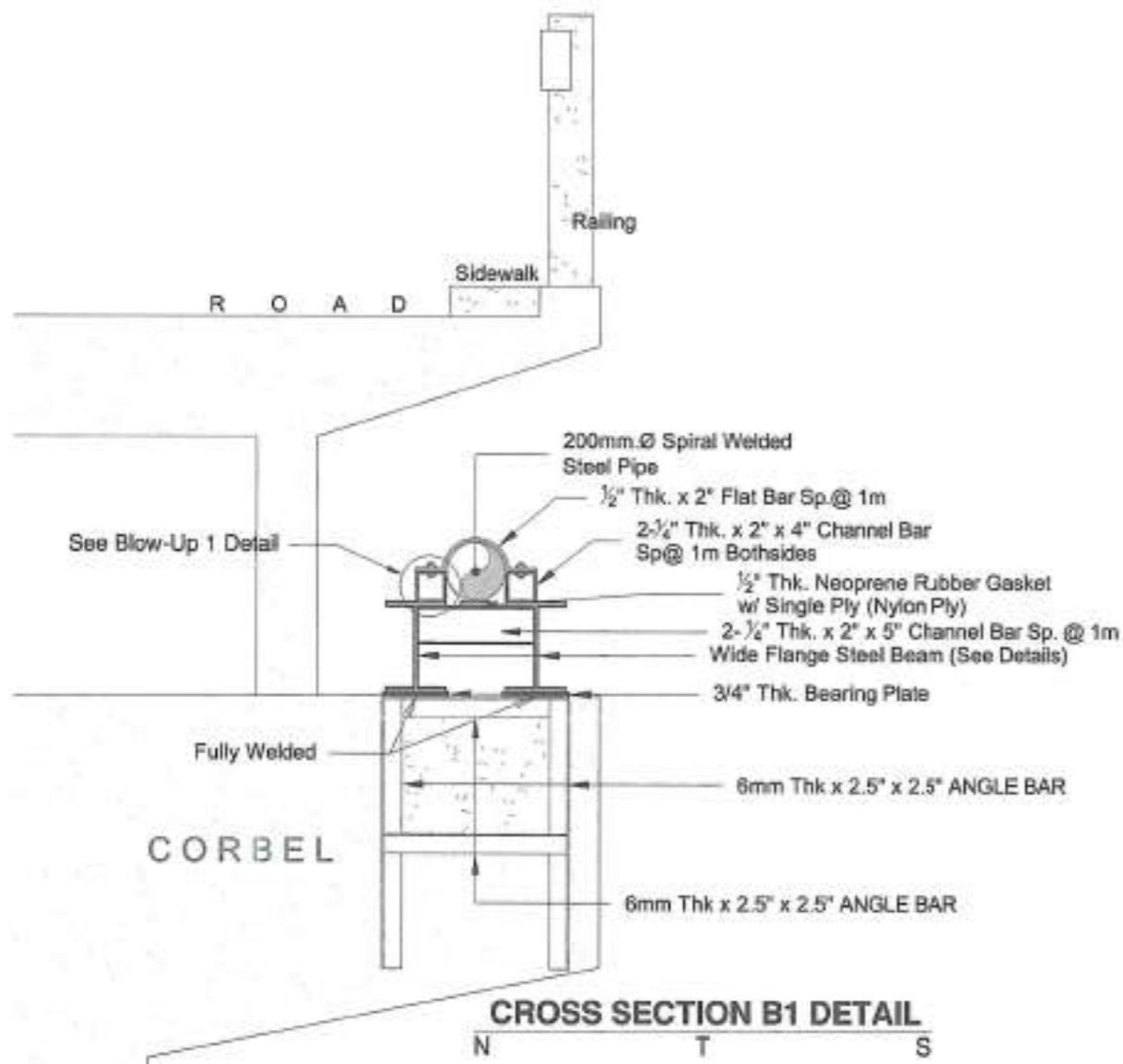


CROSS SECTION A' - A'

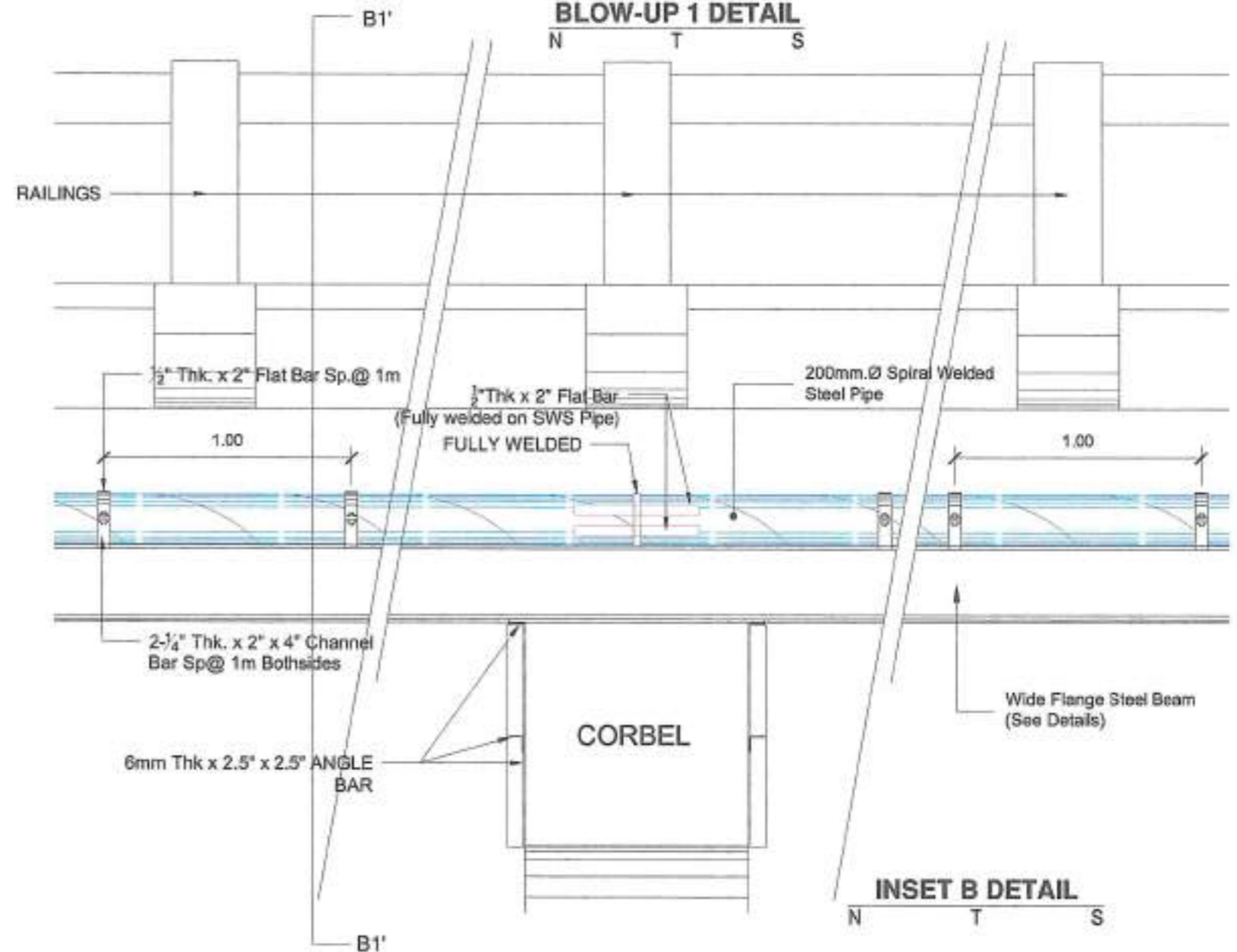
CROSS SECTION DETAILS



BLOW-UP 1 DETAIL



CROSS SECTION B1 DETAIL

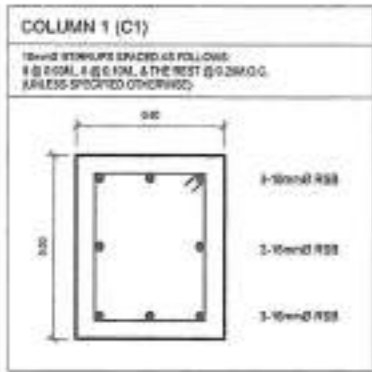


INSET B DETAIL

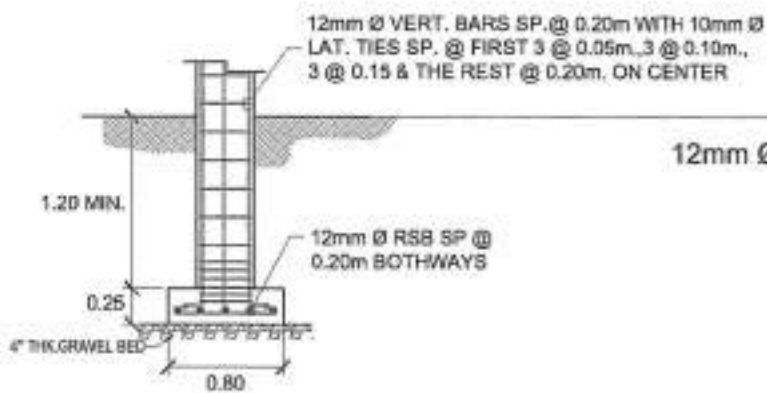
| PREPARED BY:                     | CHECKED BY:                    | RECOMMENDING APPVL:                | APPROVED BY:                                   |
|----------------------------------|--------------------------------|------------------------------------|--|
| SHARMAINE E. BRACIA<br>OIC, PDCD | SONJUN O. MILLARES<br>OIC, EED | NOEL A. MARTINEZ, JR.<br>OIC, PAMD | FLORENCIO T. MONGOSO, JR.<br>General Manager A |
|                                  |                                | ROQUE S. FRANCISCO<br>AGM, O&TS    |  |

| PROJECT TITLE/LOCATION:   |
|---|
| <b>PROPOSED TRANSMISSION LINE PROJECT</b><br>Talidid/Bell to DPWH Boulevard Road to Pangang,<br>Canaman, Camarines Sur<br>Total Length = 1,750 LM |

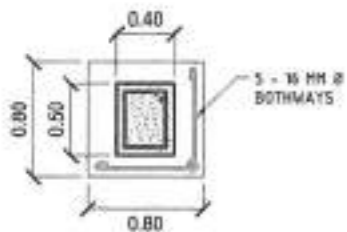
| SHEET CONT:               | SHEET NO.: |
|---------------------------|------------|
| Bridge Crossing<br>1 Det. | 8          |
| As shown                  | 15         |
| CADD BY: Juliet           | 05 - 2025  |



**SCHEDULE OF COLUMN**

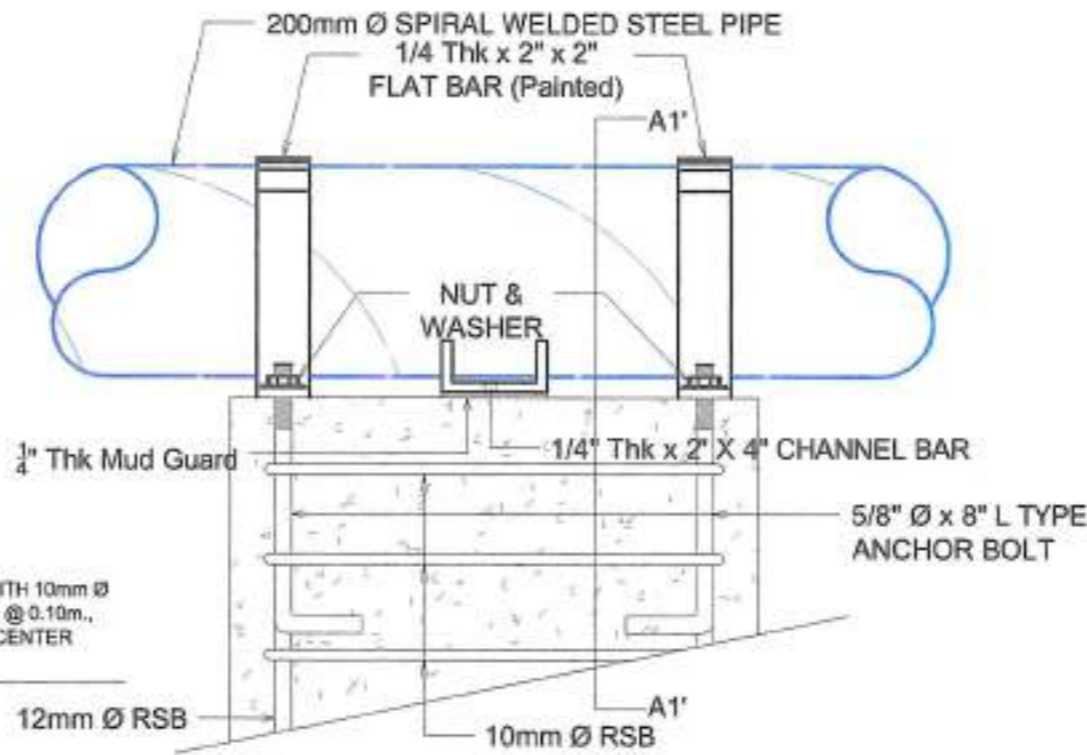


**SECTION**

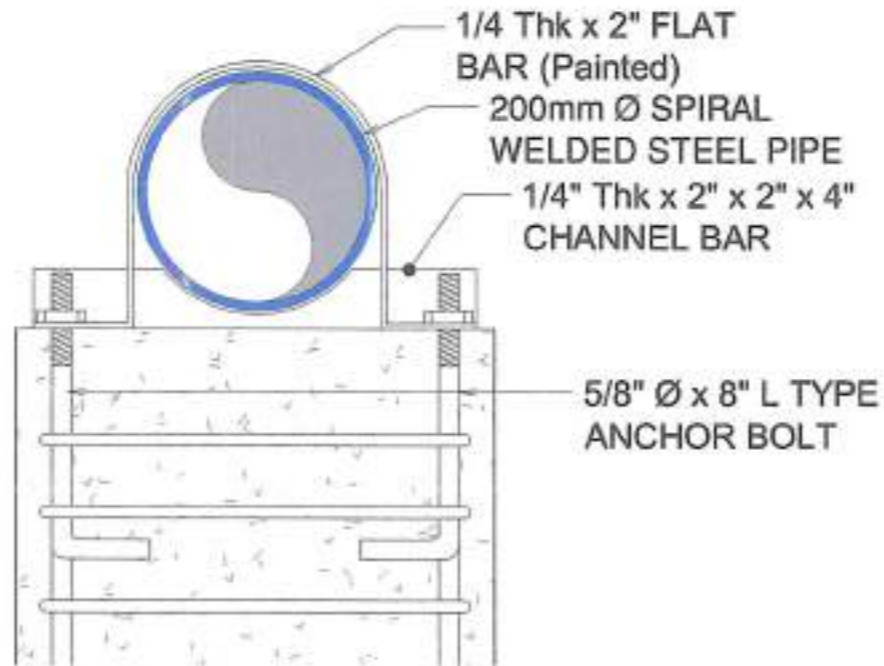


**PLAN C2F2**

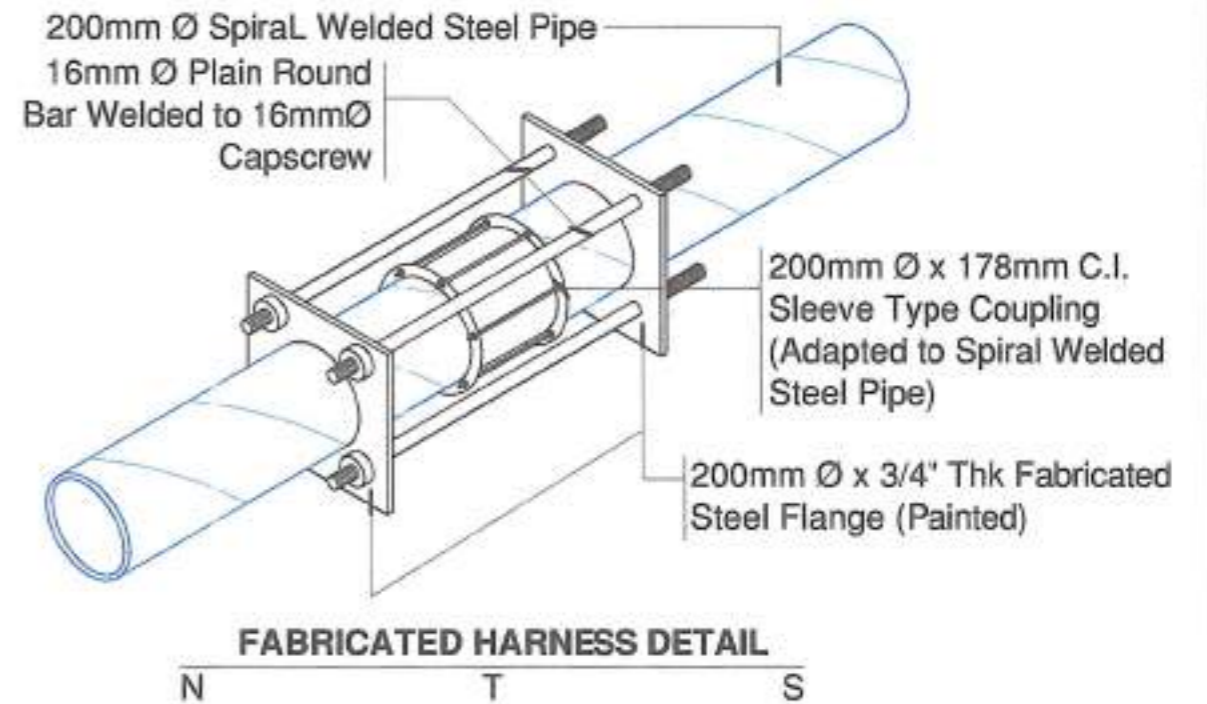
**COLUMN/FOOTING DETAILS**



**SPOT DETAIL B**



**SECTION A1' - A1' DETAILS**



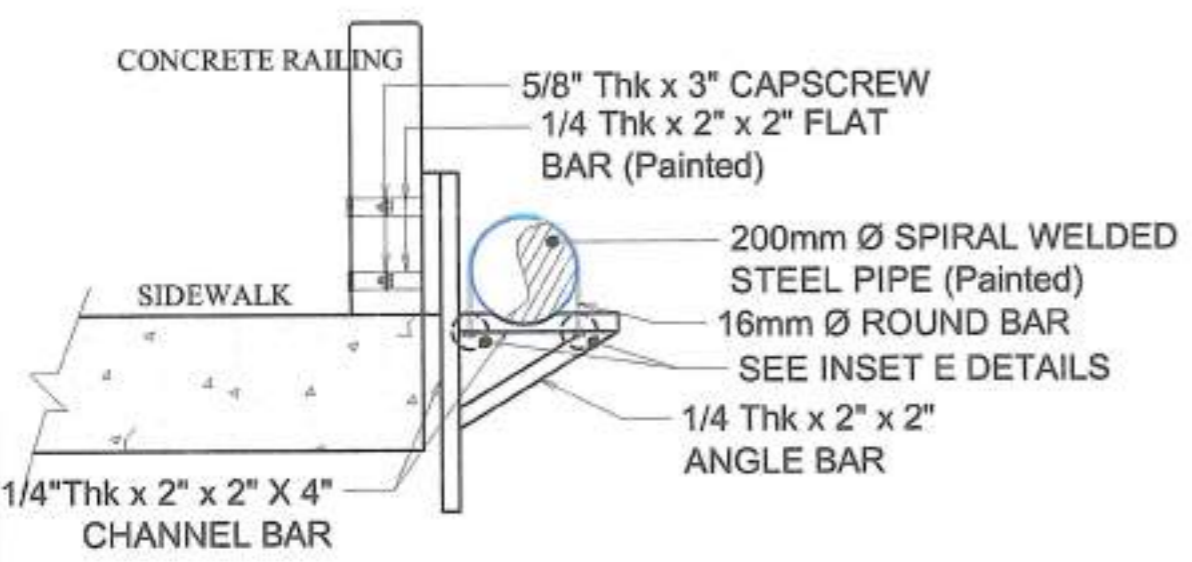
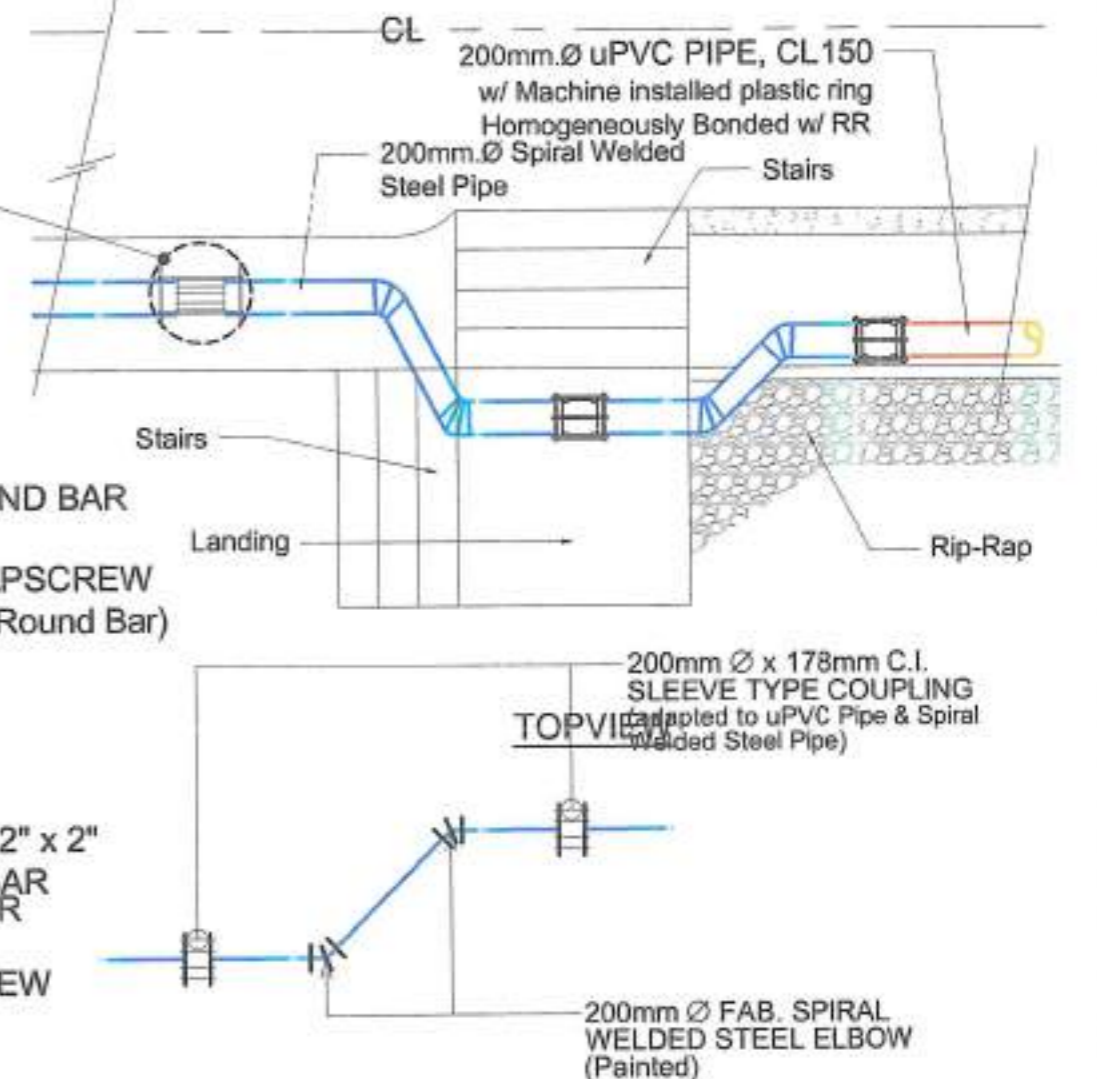
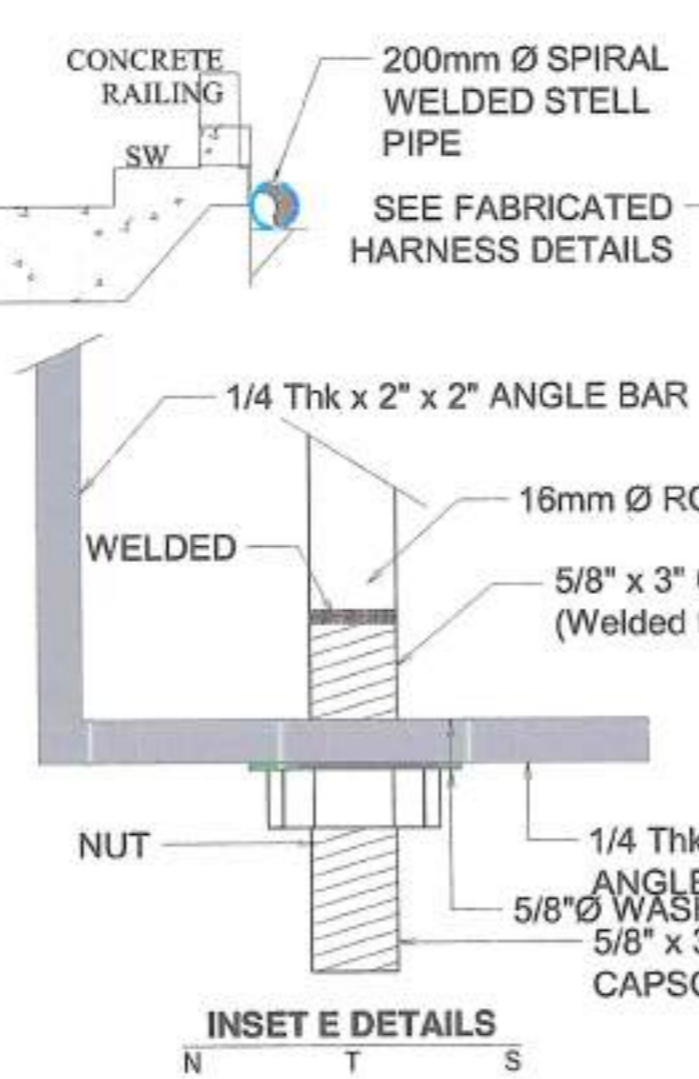
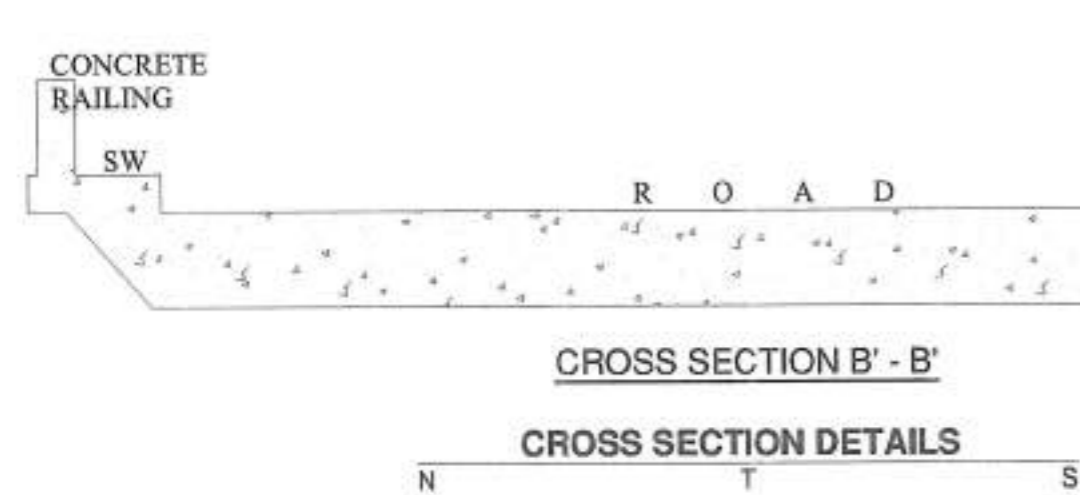
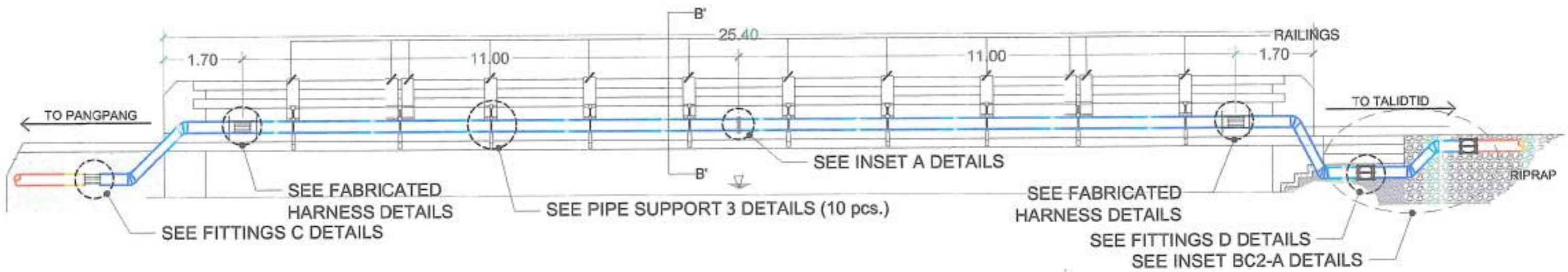
**FABRICATED HARNESS DETAIL**

**PIPE SUPPORT 2 DETAILS**

N T S

**BRIDGE CROSSING I DETAILS**

N T S

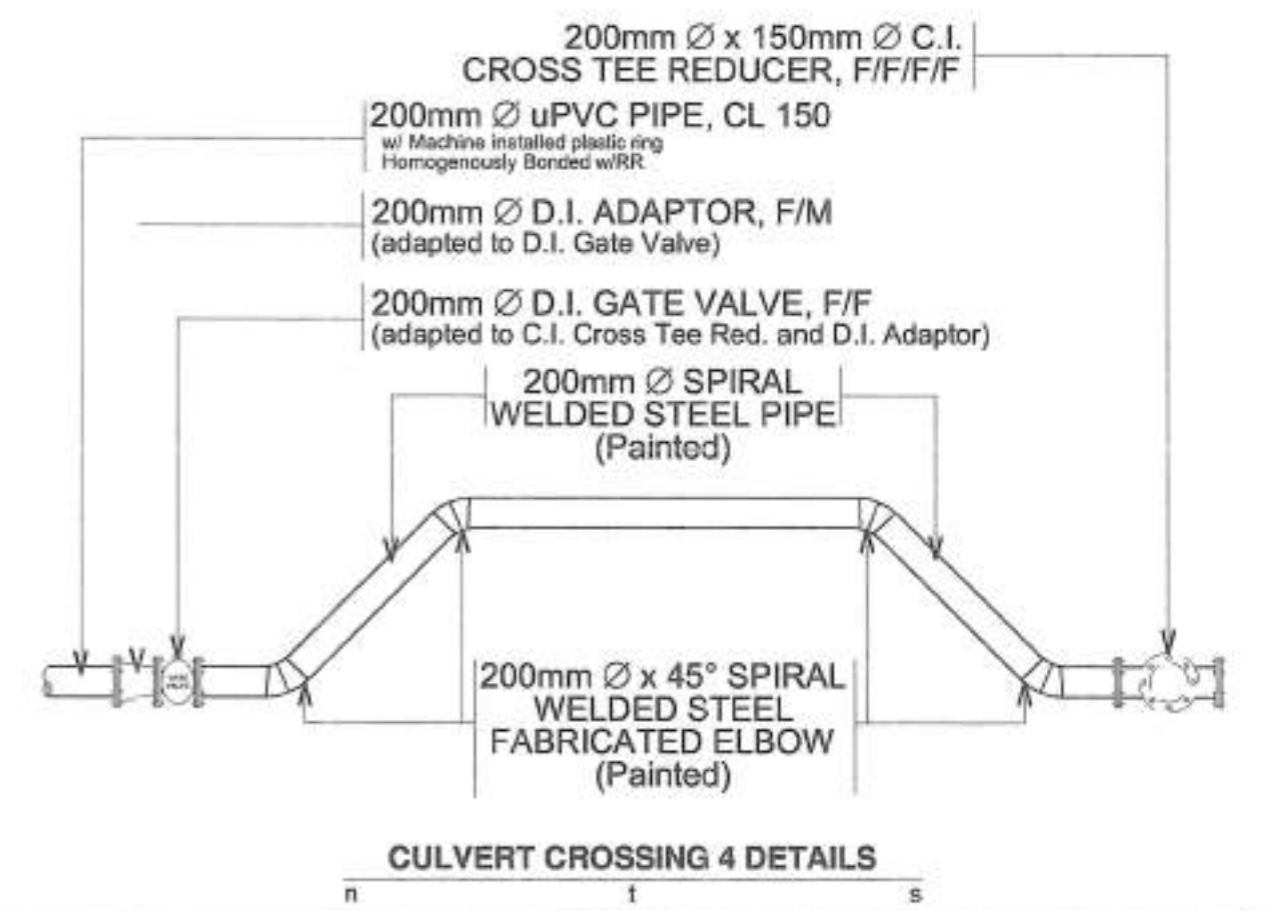
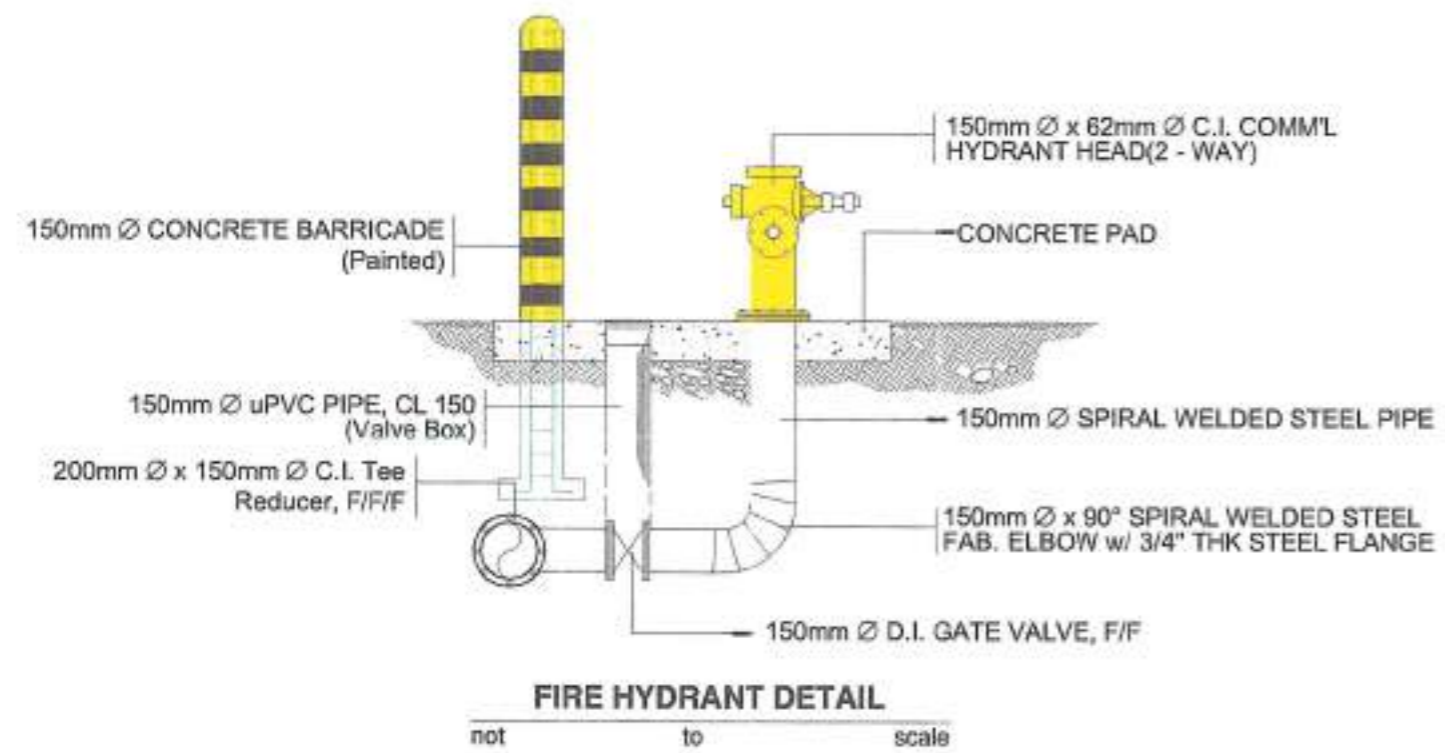
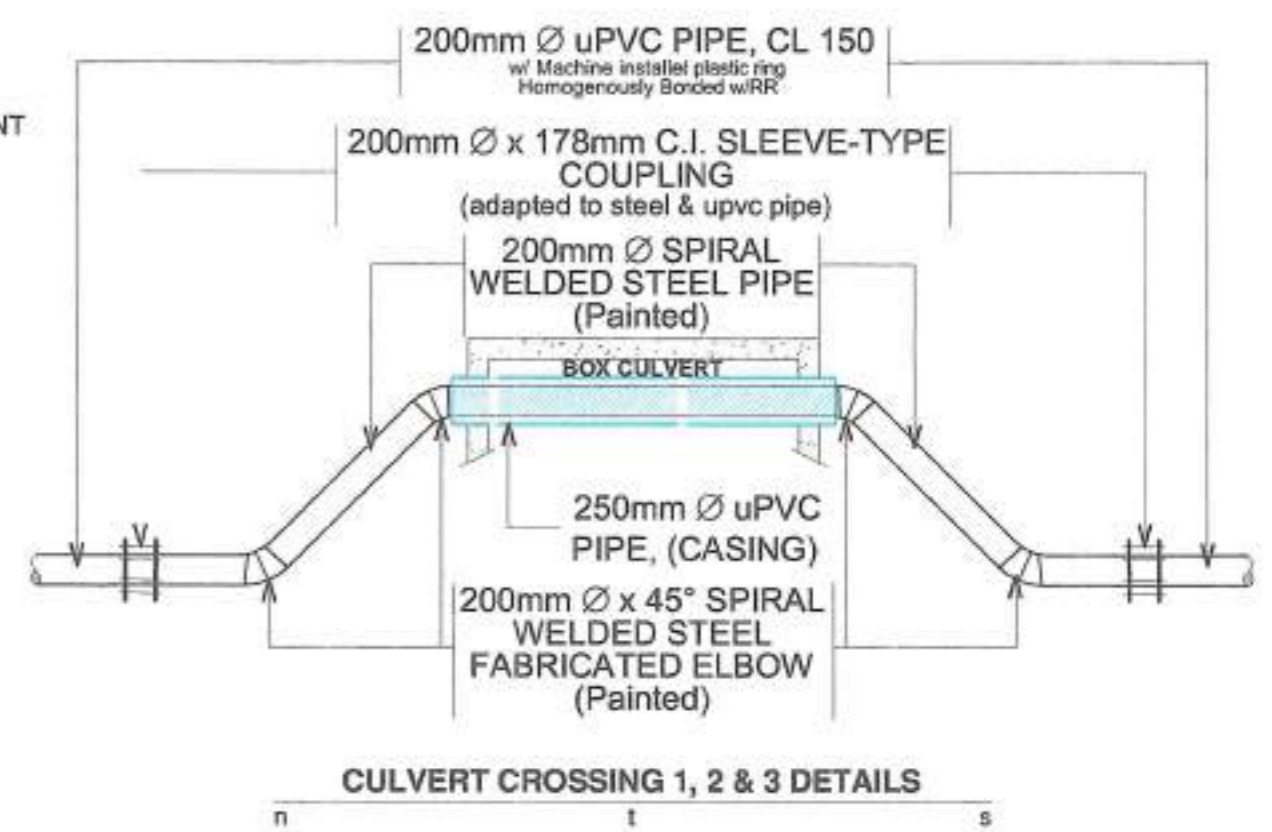
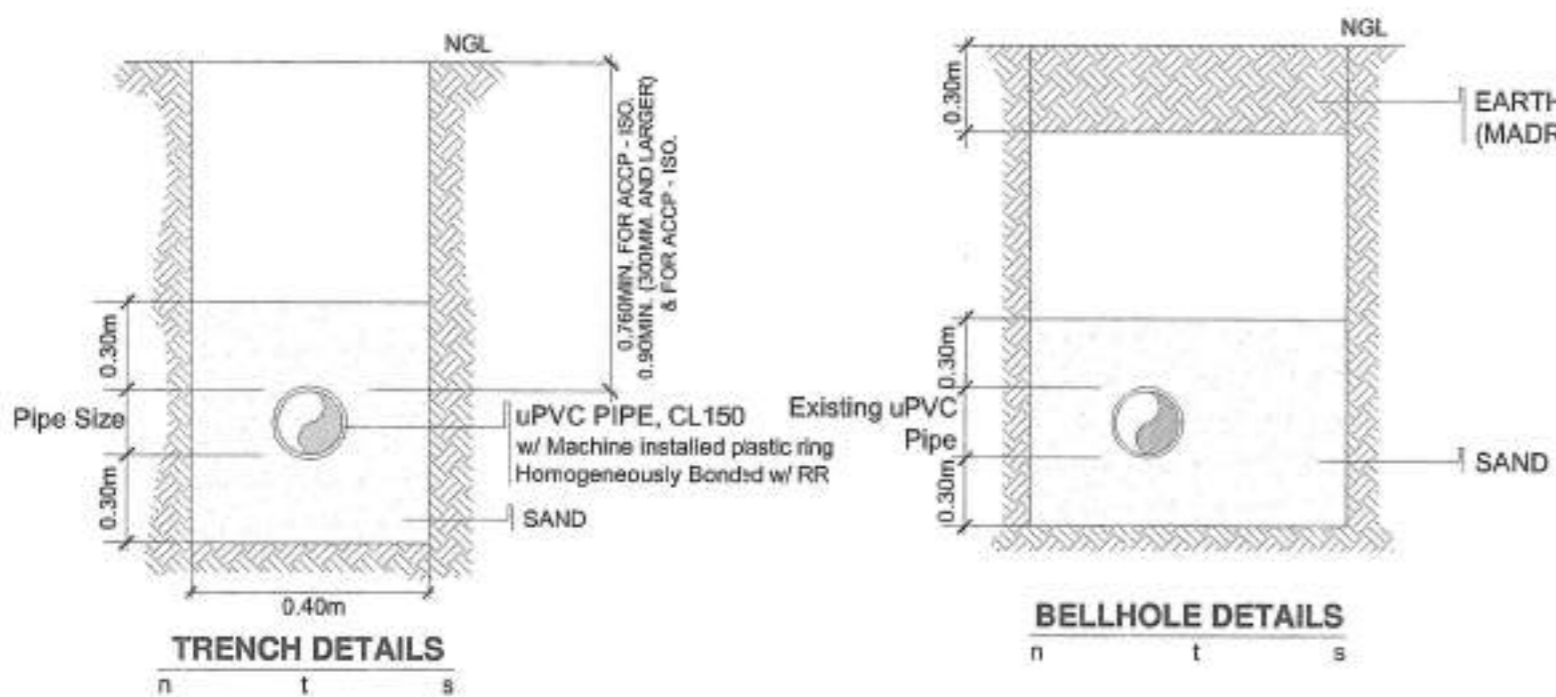


**PIPE SUPPORT 3 DETAILS**  
N T S

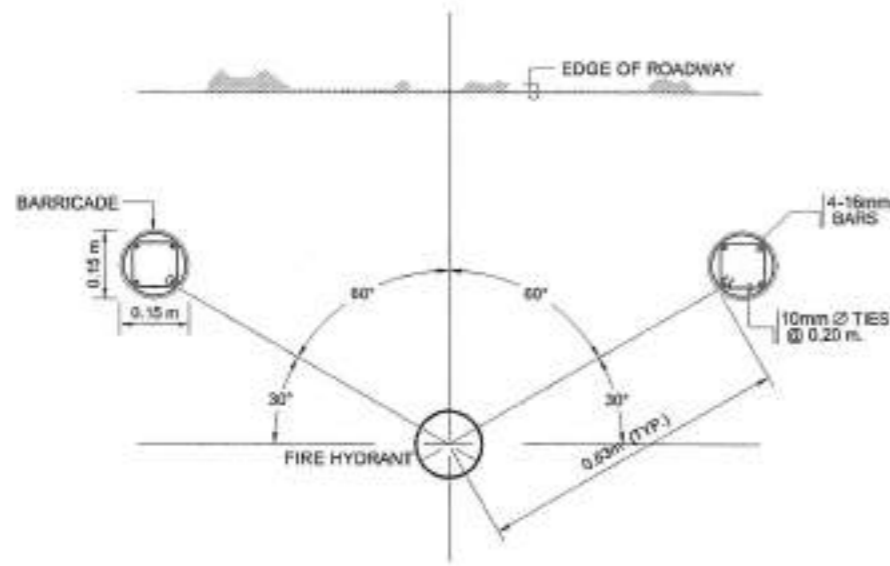
**BRIDGE CROSSING II DETAILS**  
N T S

**INSET BC2-A DETAILS**  
N T S

|  |   |   |   |  |   |  |  |                       |
|--|---|---|---|--|---|--|--|-----------------------|
| <p>Republic of the Philippines<br/><b>METROPOLITAN NAGA WATER DISTRICT</b><br/>40 J. Miranda Avenue, Naga City</p> | PREPARED BY:                                | CHECKED BY:                               | RECOMMENDING APPVL:                           | APPROVED BY:                               | PROJECT TITLE/LOCATION:                                   | SHEET CONT:  | SHEET NO.:   |                       |
|  | <br><b>SHARMAINE E. BRACIA</b><br>OIC, PDCD | <br><b>SONJUN O. MILLARES</b><br>OIC, EED | <br><b>NOEL A. MARTINEZ, JR.</b><br>OIC, PAMD | <br><b>ROQUE S. FRANCISCO</b><br>AGM, O&TS | <br><b>FLORENCIO T. MONGOSO, JR.</b><br>General Manager A | <b>PROPOSED TRANSMISSION LINE PROJECT</b><br>Talitid/Bell to DPWH Boulevard Road to Pangpang,<br>Canaman, Camarines Sur<br>Total Length = 1,750 LM | Bridge Crossing<br>2 Det.<br>As shown<br>CADD BY: Juliet | 10<br>15<br>05 - 2025 |
|  | ©EDF17, REV. 00, AUG. 05, 2019              |   |   |  |   |  |  |                       |

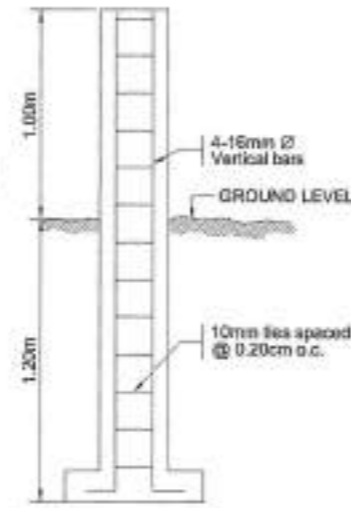


|  |  |  |  |   |  |  |            |    |
|--|--|--|--|---|--|--|------------|----|
| <p>Republic of the Philippines<br/><b>METROPOLITAN NAGA WATER DISTRICT</b><br/>40 J. Miranda Avenue, Naga City</p> | PREPARED BY:   | CHECKED BY:  | RECOMMENDING APPVL:                                      | APPROVED BY:  | PROJECT TITLE/LOCATION:  | SHEET CONT:  | SHEET NO.: |    |
|  | <i>[Signature]</i><br>SHARMAINE E. BRACIA<br>OIC, PDCD | <i>[Signature]</i><br>SONJUN O. MILLARES<br>OIC, EED | <i>[Signature]</i><br>NOEL A. MARTINEZ, JR.<br>OIC, PAMD | <i>[Signature]</i><br>ROQUE S. FRANCISCO<br>AGM, O&TS | <i>[Signature]</i><br>FLORENCIO T. MONGOSO, JR.<br>General Manager A | <b>PROPOSED TRANSMISSION LINE PROJECT</b><br>Talidid/Bell to DPWH Boulevard Road to Pangpang,<br>Canaman, Camarines Sur<br>Total Length = 1,750 LM | As shown   | 11 |
|  |  |  |  |   |  | CADD BY: Julez   | 05 - 2025  | 15 |



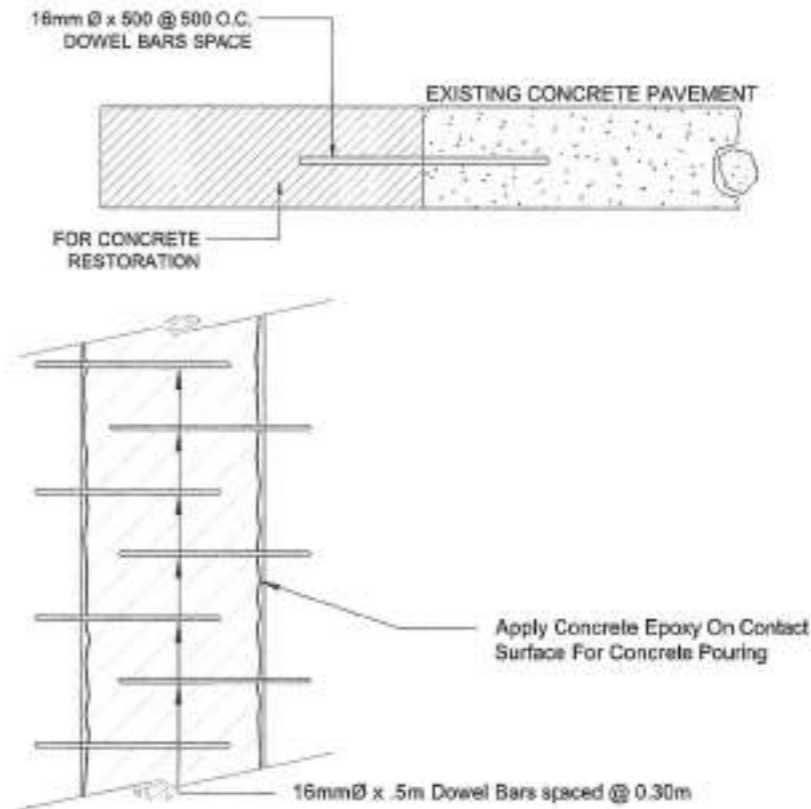
**PLAN FOR SETTING BARRICADE**

not to scale



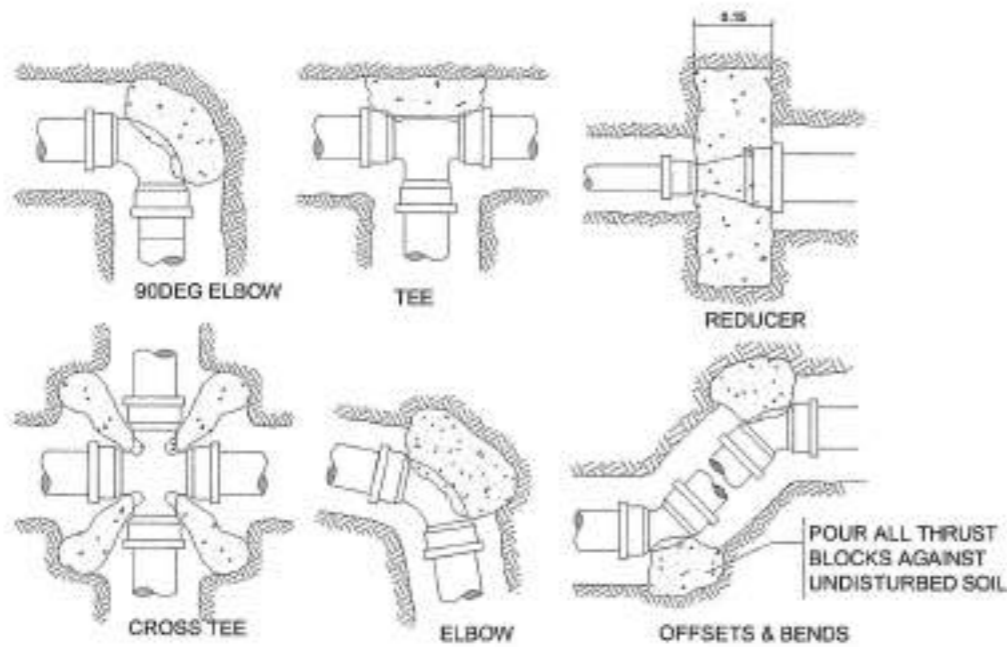
**ELEV. OF CONC. BARRICADE**

not to scale



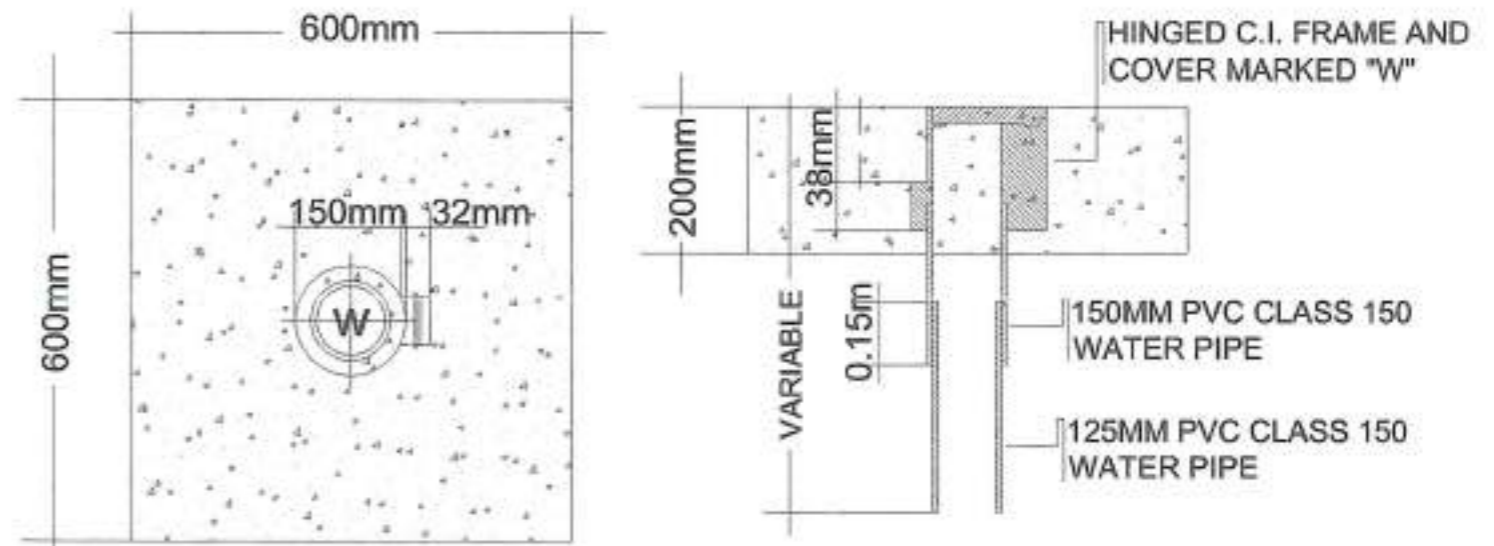
**DOWELLED DETAIL**

not to scale



**CONCRETE THRUST BLOCK DETAILS**

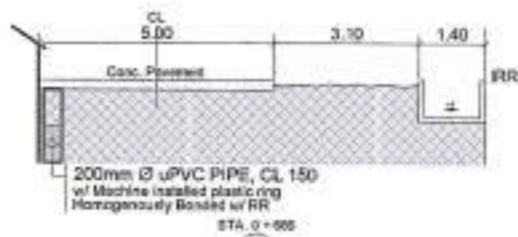
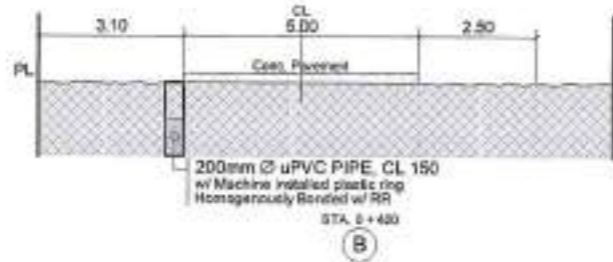
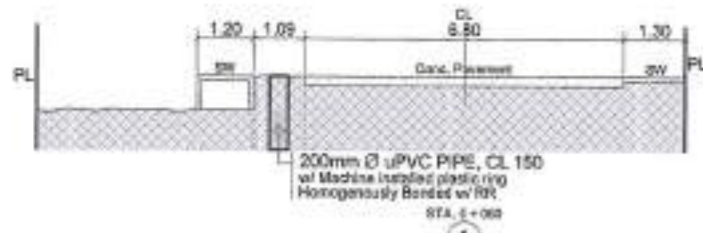
not to scale



**VALVE BOX AND COVER DETAILS**

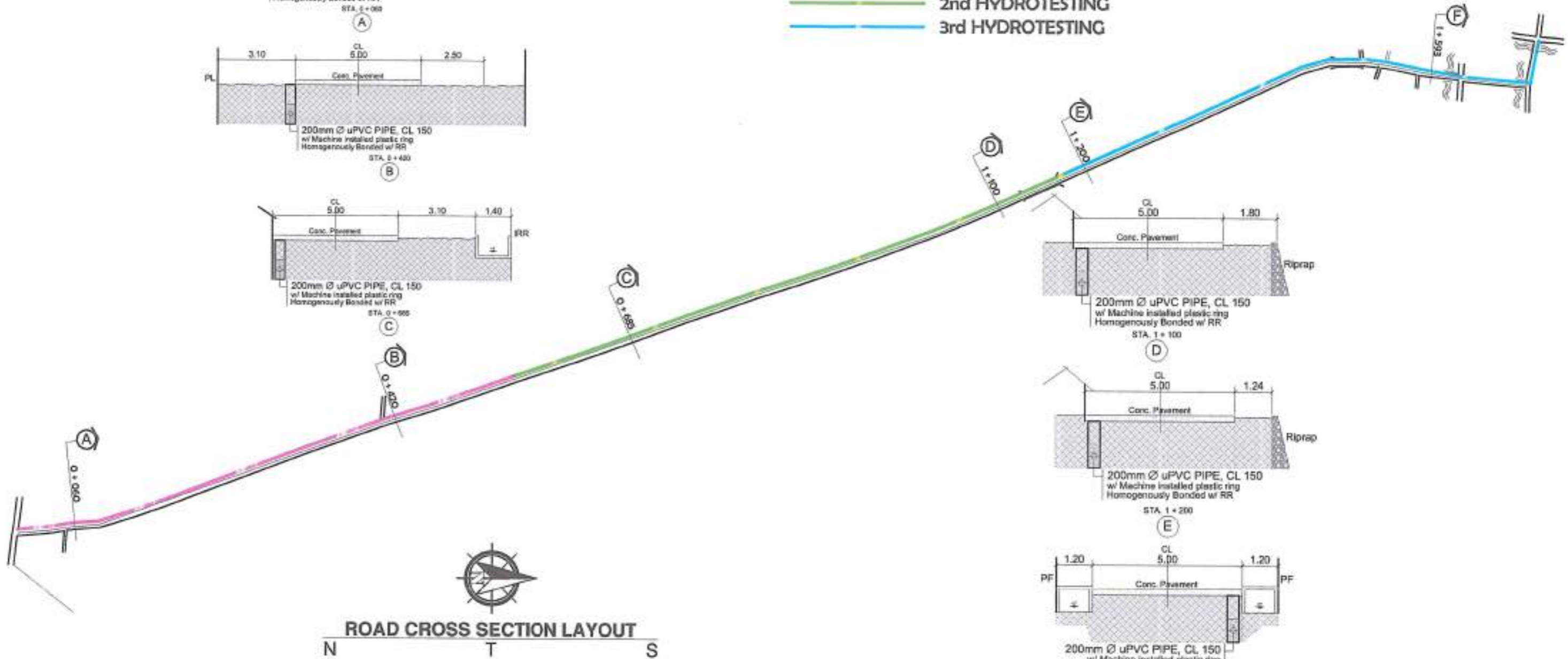
not to scale

|  |   |  |   |  |   |   |                         |                       |
|--|---|--|---|--|---|---|-------------------------|-----------------------|
| <p>Republic of the Philippines<br/><b>METROPOLITAN NAGA WATER DISTRICT</b><br/>40 J. Miranda Avenue, Naga City</p> | PREPARED BY:<br><br><b>SHARMAINE E. BRACIA</b><br>OIC, PDCD | CHECKED BY:<br><br><b>SONJUN O. MILLARES</b><br>OIC, EED | <br><b>NOEL A. MARTINEZ, JR.</b><br>OIC, PAMD | <br><b>BOQUE S. FRANCISCO</b><br>AGM, O&TS | <br><b>FLORENCIO T. MONGOSO, JR.</b><br>General Manager A | PROJECT TITLE/LOCATION:<br><b>PROPOSED TRANSMISSION LINE PROJECT</b><br>Talidid/Bell to DPWH Boulevard Road to Pangpang,<br>Canaman, Camarines Sur<br>Total Length = 1,750 LM | SHEET CONT:<br>As shown | SHEET NO.:<br>12 / 15 |
|  |   |  |   |  |   |   | CADD BY: Juliet         | 05 - 2025             |
|  | EEDF17, REV. 00, AUG. 05, 2019                              |  |   |  |   |   |                         |                       |



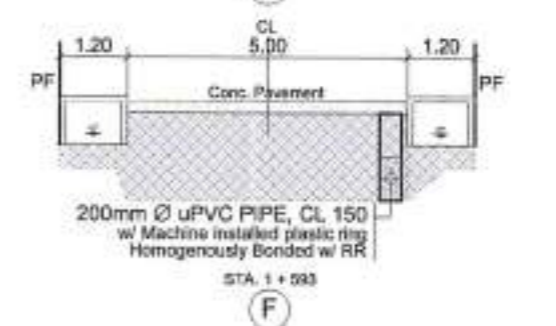
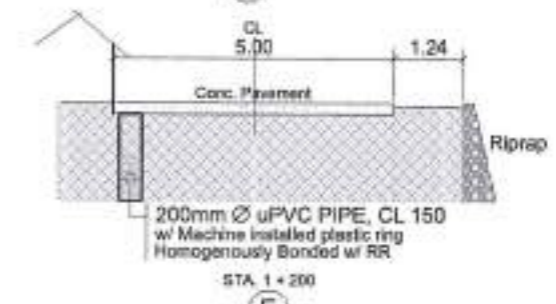
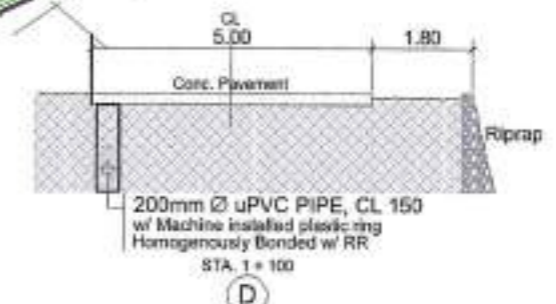
**LEGEND :**

- 1st HYDROTESTING
- 2nd HYDROTESTING
- 3rd HYDROTESTING



**ROAD CROSS SECTION LAYOUT**

N T S



**ROAD CROSS SECTION DETAIL**

N T S

Republic of the Philippines  
**METROPOLITAN NAGA WATER DISTRICT**  
 40 J. Miranda Avenue, Naga City

PREPARED BY:  
 SHARMAINE E. BRACIA  
 OIC, PDCD

CHECKED BY:  
 SONJUN O. MILLARES  
 OIC, EED

NOEL A. MARTINEZ, JR.  
 OIC, PAMD

RECOMMENDING APPVL:  
 ROQUE S. FRANCISCO  
 AGM, O&TS

APPROVED BY:  
 FLORENCIO T. MONGOSO, JR.  
 General Manager A

PROJECT TITLE/LOCATION:  
**PROPOSED TRANSMISSION LINE PROJECT**  
 Talidid/Bell to DPWH Boulevard Road to Pangpang,  
 Canaman, Camarines Sur  
 Total Length = 1,750 LM

| SHEET CONT:     | SHEET NO.: |
|-----------------|------------|
| Rd. Cross Sec.  | 13         |
| Def.            | 15         |
| As shown        |            |
| CADD BY: Juliet | 05 - 2025  |

## SPECIFICATIONS:

### 1. WARNING SIGNS

#### a. National and Main Streets :

The Contractor shall provide the following signs :

- a.1 Slow down signs (WS-1) at 50 meters before and after the project. (See WS-1 details)
- a.2 Slow down signs (WS-1) at 25 meters before and after the project. (See WS-1 details)
- a.3 Road signs (WS-2) at every 10 meters along the entire length of the excavation with warning tape stretch on top of the road signs. (See WS-2 details)

#### b. Secondary or Interior Streets

The Contractor shall provide the following signs :

- b.1 Road signs (WS-2) at 25 meters and 10 meters before and after the project. (See WS-2 details)
- b.2 Road signs (WS-2) at every 10 meters along the entire length of the excavation with warning tape stretch on top of the road signs. (See WS-2 details)

#### c. Pathways/Footwalks :

The Contractor shall provide the following signs :

- c.1 Road signs (WS-2) at 5 meters before and after the project. (See WS-2 details)
- c.2 Road signs (WS-2) at every 10 meters along the entire length of the excavation with warning tape stretch on top of the road signs. (See WS-2 details)

### 2. EXCAVATION WORKS

- a. The contractor shall furnish labor, tools, materials and other facilities for the satisfactory performance to complete the excavation works. The contractor shall make all necessary excavation to grade as indicated on the plans and provided in these specifications.
- b. Trenches for water pipelines shall be made wide enough to allow good workmanship. A table shown on the drawing gives the recommended widths and depths for various pipe sizes.
- c. Whenever the methods used for the dewatering trenches and the other pits are found ineffective and inadequate, the contractor shall construct dewatering trenches or wells in order to rapidly collect the water as the case may be.

### 3. SHEETING AND BRACING

- a. The contractor shall provide all shoring, sheeting and bracing necessary or required to perform and protect the excavation work and to safeguard the workmen and the public.
- b. The contractor shall provide a steel plate covering with a minimum thickness of 1" for all excavation works on national and main streets; and a minimum thickness of 3/4" for all excavation works on the secondary and interior streets to ensure safety of the pedestrians.
- c. All sheeting and bracing works shall be provided at the expense of the contractor.

### 4. PIPE AND FITTING LAYING

- a. uPVC(unplasticized polyvinyl chloride) Pipes/Bends, Class 150 with machine installed plastic ring, homogenously bonded with rubber ring and should conform with ISO standard.
- b. G.I.(Galvanized Iron) Pipes/Elbows, Heavy Duty, schedule 40 and should conform with ISO standard.
- c. D.I.(Ductile Iron) FITTINGS

Relevant characteristics and performance requirements for gate valves, ductile iron body, bonnet guard flange and wrench nut, electronically applied fusion bonded epoxy resin coating, stainless stem, ductile iron encapsulated with EPDM-rubber compound wedge, bronze wedge nut, stainless steel 304 hexagon gland bolts, ASTM D2000 buna "N" nitrile rubber bonnet gasket, open O-ring stem seals, O-ring gland seal with 2 major components (Body and Bonnet).

Relevant characteristics and performance requirements for universal flange adaptor with complete bolts, nuts and gaskets - ductile iron body with epoxy resin coating with stainless steel 304 hexagon bolts.

Should conform with ISO standard.

#### d. C.I.(Cast Iron) FITTINGS

Relevant characteristics and performance requirements for universal various fittings with complete bolts, nuts and gasket.

Gasket should be 2 ply neoprene or equivalent.

Should conform with ISO standard

- e. No fabricated fitting material shall be used/installed unless it has been approved by the Engineer-in-Charge.
- f. The pipe shall be located/installed within road right-of-way
- g. Any pipe having its grade, alignment or joint disturbed after laying shall be taken up and relaid. No pipe shall be laid after in water or when trench or weather conditions are unsuitable for work. Water shall be kept out of trench until the jointing is completed. When work is not in progress, open ends of pipe and fittings shall be plugged or closed so that no trench water, earth or foreign substance will enter the pipes or fittings.
- h. Pipe under drainage structures and/or culverts shall have reinforced concrete encasement unless otherwise specified by Engineer-in-Charge.
- i. Proper equipment, tools, instruments and facilities satisfactory to the engineer-in-charge shall be provided and used by the contractor for the safe and efficient execution of the work. All pipes, fittings, valves and accessories shall be carefully lowered into the trench by means of suitable equipment and in such manner as to prevent damage to them. Under no circumstances shall pipes or accessories be dropped or dump into the trench, all foreign matter or dirt shall be thoroughly removed from the interior of the pipes and accessories, before lowering into the trench, any defective, damaged or unsound pipe shall not be lowered into the trench.
- j. Deflection from a straight line or grade, as required by horizontal curves, vertical curves or effect shall be made with proper bends and elbows.
- k. Install caution/warning tape 30 cm below the natural grade line.
- l. No installation of pipes/fittings shall be done unless excavation has been approved by the Engineer-in-Charge.

### 5. CONCRETE THRUST BLOCK

- a. Concrete thrust blocks, anchor blocks or welded joints shall be provided at all junctions, changes in direction exceeding 11 1/2 degrees or where otherwise shown.

**TABLE OF MINIMUM THRUST BLOCK BEARING AREAS IN SQUARE METERS FOR PIPE SIZES 50mm TO 600mm Ø**

| PIPE SIZE mm (in) | TEE & DEAD END | 90 DEG. BEND | 45 DEG. END | 22.5 DEG. BEND |
|-------------------|----------------|--------------|-------------|----------------|
| 50 (2")           |                |              |             |                |
| 75 (3")           | 0.0500         | 0.0700       | 0.0400      | 0.0200         |
| 100 (4")          | 0.0900         | 0.1200       | 0.0700      | 0.0400         |
| 150 (6")          | 0.2000         | 0.2800       | 0.1500      | 0.0800         |
| 200 (8")          | 0.3500         | 0.5000       | 0.2700      | 0.1400         |
| 250 (10")         | 0.5500         | 0.7700       | 0.4200      | 0.2100         |
| 300 (12")         | 0.7900         | 1.1100       | 0.6000      | 0.3100         |
| 350 (14")         | 1.0700         | 1.5200       | 0.8200      | 0.4200         |
| 400 (16")         | 1.4000         | 1.9800       | 1.0700      | 0.5500         |
| 450 (18")         | 1.7700         | 2.5100       | 1.3600      | 0.6900         |
| 500 (20")         | 2.1900         | 3.1000       | 1.6800      | 0.8500         |
| 600 (24")         | 3.1500         | 4.4600       | 2.4200      | 1.2300         |

### 6. PIPELINE TRENCH BACKFILL

- a. Selected borrow materials having the sand equivalent shall first be brought up to mid diameter of the pipe and compacted, then backfilling at 150mm(6in.) and compaction shall be repeatedly done until fully backfilled.
- b. Blasted rock, broken concrete or broken pavement materials and large boulders, shall not be used as backfill materials.
- c. Backfill shall be brought to a suitable elevation above grade to provide for anticipated settlement and shrinkage.
- d. When backfill material is not enough, it shall be sourced from outside but must conform with the general condition on materials quality.
- e. Prior to backfilling, a backfilling permit shall be secured from the MNWD Engineer-in-Charge.

### 7. INSTALLATION OF VALVES AND VALVE BOX COVER

- a. Valves and valve box covers shall be installed as shown on the drawings. Valves shall be set plumb center with valve box cover. Valves shall have the interiors cleaned of all foregoing matters before installation.

|   |  |  |  |   |  |  |               |
|---|--|--|--|---|--|--|---------------|
|  <p>Republic of the Philippines<br/><b>METROPOLITAN NAGA WATER DISTRICT</b><br/>40 J. Miranda Avenue, Naga City</p> | PREPARED BY:   | CHECKED BY:  | RECOMMENDING APPVL:  | APPROVED BY:  | PROJECT TITLE/LOCATION:  | SHEET CONT:  | SHEET NO.:    |
|   | <br><b>SHARMAINE E. BRACIA</b><br>OIC, PDCD | <br><b>SONJUN O. MILLARES</b><br>OIC, EED | <br><b>NOEL A. MARTINEZ, JR.</b><br>OIC, PAMD | <br><b>ROQUE S. FRANCISCO</b><br>AGM, O&TS | <br><b>FLORENCIO T. MONGOSO, JR.</b><br>General Manager A | <b>PROPOSED TRANSMISSION LINE PROJECT</b><br>Talidid/Bell to DPWH Boulevard Road to Pangpang,<br>Canaman, Camarines Sur<br>Total Length = 1,750 LM | Specification |
|   |  |  |  |   |  | CADD BY: Juliet  | 05 - 2025     |

**8. FIRE HYDRANTS AND BLOW OFFS**

- a. Where no curbs exist, the hydrant/blow-off shall be located within 1.50 meters of the road right-of-way or as directed by the Engineer-in-Charge and barricades shall be installed as shown in the drawing

**9. BRIDGE AND CULVERT CROSSING**

- a. The work shall include furnishing of all materials, labor, tools equipment and other facilities for the satisfactory performance to complete the bridge and culvert crossing as specified herein.
- b. Bridge and culvert crossing shall be installed in accordance with the MNWD approved design.
- c. Steel or G.I. pipes shall be painted blue.

**10. CONCRETE CUTTING AND BREAKING**

- a. The work shall include furnishing of all labor, tools equipment and other facilities for the satisfactory performance to complete the concrete cutting and breaking works as specified herein.

**11. RESTORATION WORKS**

- a. Furnish all materials, labor, tools, equipment and perform all works necessary as specified herein.
- b. All damaged roads and driveways, if any, on account of the performance of the work covered by the contract, the same shall be restored into its original condition.
- c. ASTM ISO type 1 for normal Portland cement, unless the Engineer-in-Charge approved as change.
- d. Fine aggregate to be used in the composition of concrete shall consist of sand, stone or other inert materials with similar characteristics or a combination thereof having clean, hard, strong, durable, uncoated grains and free from injurious amount of dust, lumps, soft or flaky particles, shale, alkali, organic matter, ham or clay.
- e. Coarse aggregate shall consist of crushed stones, gravel or other approved inert materials with similar characteristics as the fine aggregate and shall well graded as to maximum size of 3/4" in diameter.
- f. Cold mix asphalt with emulsifier, unless the Engineer-in-Charge approved as change.
- g. Class "A" concrete shall consist of one(1) part cement to a total of five(5) parts of fine and coarse aggregates measured separately.
- h. Concrete mixing shall be done using one(1) bagger concrete mixer / transit mixer.
- i. **Depositing Concrete**  
Before pouring of concrete, debris shall be removed from space to be occupied by the concrete.  
During concrete pouring, it shall be thoroughly spanted and compacted by means of a rod.  
Water shall be removed from excavated portion before concrete is poured.
- j. **Depositing of Asphalt**  
Before pouring of cold mix asphalt, debris shall be removed from cured concrete. Used of vibratory compactor/roller must be observed during compaction of cold mix asphalt.

**12. HYDROTESTING**

- a. Furnish all materials, labor, tools equipment and perform all unless necessary or specified herein.
- b. After the pipes have been laid, the joints completed and the trench partially backfilled but with joints exposed for examination, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of 150 psi.
- c. The duration of each pressure test shall be at least two (2) hour unless otherwise specified by the engineer.
- d. Each section of pipeline shall be slowly filled with water and the specified test pressure, measured at the point of lowest elevation, shall be applied by means of a hydrotesting machine connected to the pipe in manner satisfactory to the engineer. During the filling of the pipe and before applying the test pressure, all air shall be expelled from the pipeline. To accomplish this, taps shall be made, if necessary at points of highest elevation, and after completion of the test, the taps shall be tightly plugged unless otherwise specified.
- e. During the test, all exposed pipes, fittings, valves, hydrants, joints and coupling shall be carefully examined. If found to be cracked or defective, they shall be removed and replaced by the contractor. The test shall be repeated until satisfactory results are obtained.
- f. Hydrotesting points are indicated in the plans and it should be strictly followed, no further works are allowed before the start of hydrotesting prior to the mentioned work.

**13. DISINFECTION**

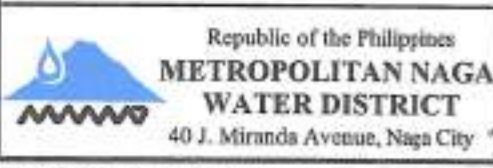
- a. Furnish all materials, labor, tools equipment and perform all unless necessary or specified herein.
- b. Before being placed in service, and before certification of completion by the engineer, all new water mains or extensions to existing system, or valved section of such extension or any replacement in the existing water system shall be disinfected with chlorine.
- c. The preferred point of applications of the chlorinating agent is at the beginning of the pipeline, extensions, or any valved section and through a corporation stop inserted on the top of the newly laid pipe.

**14. FLUSHING**

- a. Furnish all materials, labor, tools equipment and perform all unless necessary or specified herein.
- b. After chlorination, all treated water shall be thoroughly flushed from newly laid pipeline and replaced with water throughout its entire length. Water sample shall be collected by MNWD for laboratory examination, with cost chargeable to the Contractor until all samples passes the NSDW requirement.

**15. AS-BUILT PLAN**

- a. After completion of works, the contractor shall submit a preliminary "As-Built Plan" of the project prior to the conduct of the final inspection of MNWD project Engineer-in-Charge.



|   |  |  |  |   |   |                              |                       |
|---|--|--|--|---|---|------------------------------|-----------------------|
| PREPARED BY:<br><br><b>SHARMAINE E. BRACIA</b><br>OIC, PDCD | CHECKED BY:<br><br><b>SONJUN O. MILLARES</b><br>OIC, EED | RECOMMENDING APPVL:<br><br><b>NOEL A. MARTINEZ, JR.</b><br>OIC, PAMD | APPROVED BY:<br><br><b>ROQUE S. FRANCISCO</b><br>AGM, O&TS | APPROVED BY:<br><br><b>FLORENCIO T. MONGOSO, JR.</b><br>General Manager A | PROJECT TITLE/LOCATION:<br><b>PROPOSED TRANSMISSION LINE PROJECT</b><br>Talitid/Bell to DPWH Boulevard Road to Pangpang,<br>Canaman, Camarines Sur<br>Total Length = 1,750 LM | SHEET CONT:<br>Specification | SHEET NO.:<br>15 / 15 |
| CADD BY: Juliet   |  |  |  |   |   | 05 - 2025                    |                       |