

## HD NON-PENETRATING ROOF MOUNT ASSEMBLY INSTRUCTIONS

### **WARNING!!**

**CONSULT A QUALIFIED ENGINEER REGARDING ROOF LOAD CAPACITIES PRIOR TO INSTALLATION OF THIS MOUNT. FAILURE TO ASSESS THIS HAZARD MAY RESULT IN SERIOUS INJURY OR DEATH.**

**REVIEW ALL INSTALLATION NOTES PRIOR TO INSTALLATION!**

### INSTALLATION NOTES

#### General

- 1) These general structural notes are intended to augment the drawings and specifications. Should conflicts exist between the drawings, specifications and/or the general structural notes, the strictest provision shall govern.
- 2) The structure is designed to be stable after the construction is fully completed. The crew must follow approved erection procedures in order to ensure the safety of the construction and its parts during erection.
- 3) All construction shall comply fully with the applicable provisions of the Canada labour code, and all local governing codes. All requirements specified in the codes shall be adhered to as if they were called for or are shown on the drawings.
- 4) All work constructed according to these drawings shall be checked and verified for quality assurance, as determined by the engineer.
- 5) Where standards are identified without a release date in these general notes, the most recent version shall apply.

#### Design Loads

- 1) Wind and ice loads as per CSA S37-13. Reference wind pressure: 500Pa.
- 2) Radial ice: 25mm.
- 3) Maximum antenna height of 30m from grade level
- 4) Total NPRM weight, not including the mast or ballast weight is 130Kg.
- 5) Loads based on a maximum drag factor of 1.58

#### Design Notes

- 1) Roof structures should be reviewed to ensure they are structurally adequate for HD-NPRM with ballast weight.
- 2) Maximum appurtenance loading as per load charts on pages 6 & 7 of this instruction manual.
- 3) The mounting frame is designed to accept a maximum of one pipe mount, location to be determined by user.
- 4) Neoprene mat to be installed under HD-NPRM.

#### Structural

- 1) All bolts, washers, and nuts shall be Grade 5, Hot Dip Galvanized.
- 2) Bolts shall be tightened using the turn-of-the-nut method as described in CSA standard S16.1, unless noted otherwise.

#### Field Erection

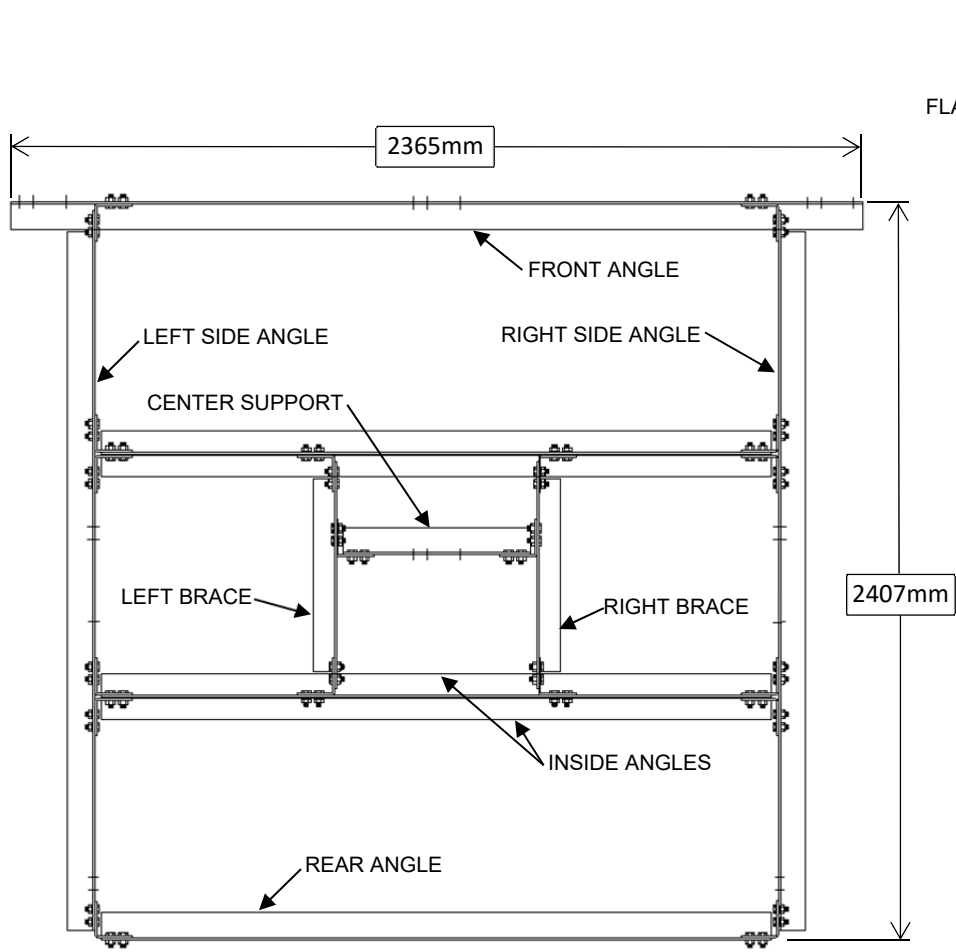
- 1) CAUTION. Sharp edges may be present. Wear gloves during installation.
- 2) The installer should comply with all installation procedures. Safeguards and means and methods of construction. All work shall be performed in accordance with the requirements of OHSA and the Canadian labour code (latest edition).
- 3) Erection methods and tolerances shall comply with CSA standard S37-13. Minimum recommended weather conditions that should be observed to ensure a safe working condition shall be: wind speed not to exceed 25Km/h, and no thunderstorms forecasted.
- 4) Any structural members that have damaged galvanized surfaces shall be cleaned and touched up with three coats of zinc-rich paint, according to CSA standard G211.
- 5) Contractor to supply mounting mast. Mast size is to be dictated by the charts located on pages 6 and 7 with a maximum length of 3050mm.
- 6) Depending on configuration of mount; there will be parts that will be unused.

**BALLAST FRAME ASSEMBLY**

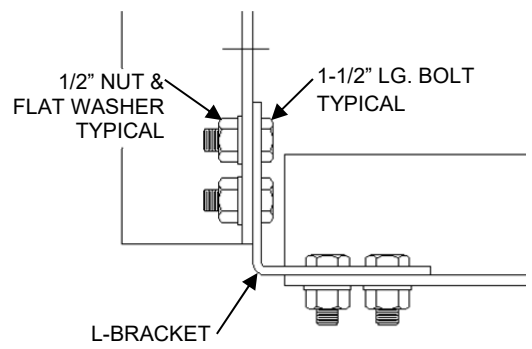
**Supplied Hardware**

(1)Front Angle (1)Rear Angle	(1)Left Brace (1)Right Brace	(1)Left Side Angle (1)Right Side Angle	(1)Center Support (4) Inside Angle	(18) L-Bracket (1)Hardware Package
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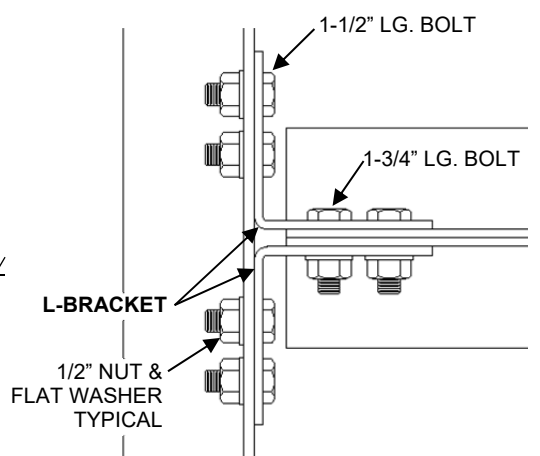
- 1) Assemble front and rear angle pieces to the left side angle using (2)L-Brackets and (8)1-1/2" bolts, (8)nuts and (8)washers. Washers go on nut side of bolt). See Figure 2.
- 2) Attach the 4 inside angle pieces to left side angle using (4) L-brackets and (4) 1-3/4" bolts, (8)1-1/2" bolts, (12)nuts & (12)washers. See Figure 3.
- 3) Attach the right side angle to the already assembled front, rear and inside angle pieces in the same way as the left side angle.
- 4) Assemble the left and right braces to the inside angle pieces using (4) L-brackets, (16) 1-1/2" bolts, (16) nuts, & (16) washers.
- 5) Attach the center support to the braces using (2) L-brackets, (8) 1-1/2" bolts, (8) nuts and (8) washers.



**FIGURE 1 – TOP VIEW**



**FIGURE 2  
TYP. CORNER CONNECTION**



**FIGURE 3  
T-CONNECTION(4 PLCS)**

**MAST ASSEMBLIES**

**Supplied Hardware**

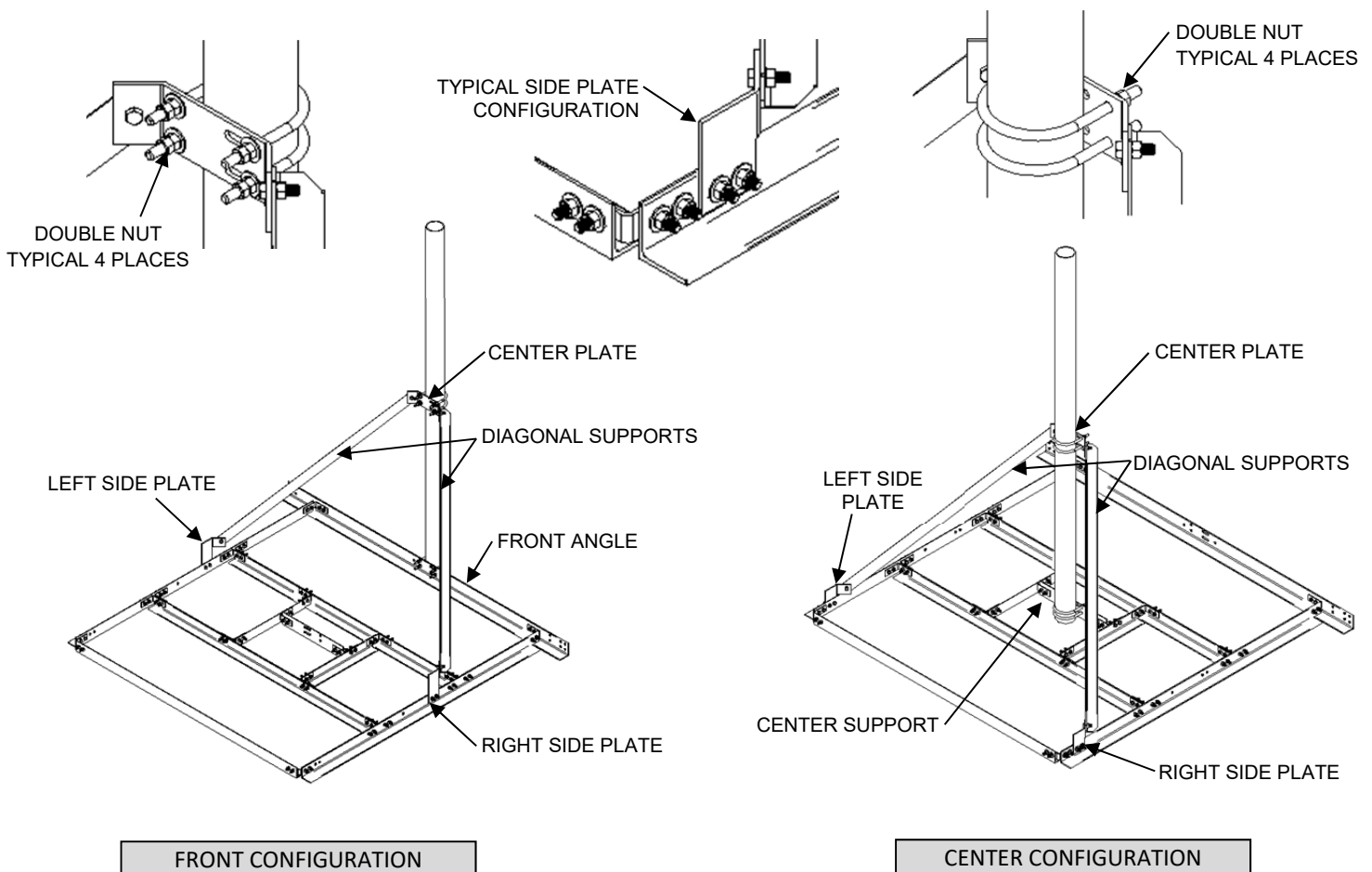
(1)Left Side Plate	(1)Corner Plate	(2)Diagonal Supports
(1)Right Side Plate	(1)Center Plate	(1)Hardware Package

Once the ballast frame is assembled the mast can be attached to it, there are 4 distinct ways in which the mast can be attached. There will be unused components and hardware based on which mast configuration is used.

**FRONT AND CENTER CONFIGURATION**

- 1) Attach Left and Right Side Plates to the base frame using (4)1-1/2" bolts, (4)nuts, and (4)washers.
- 2) Bolt (1) Diagonal Support to each Side Plate using (1) 1-1/2" bolt, (1)nut, and (1) washer for each support.
- 3) Bolt the other end of the Diagonal Supports to the center plate using (2)1-1/2" bolts, (2)nuts, and (2)washers. You will need to raise the Diagonal Supports for this to be possible.
- 4) Then using the supplied U-Bolts, bolt the base of the mast to the Front Angle of the frame (Front Configuration only) or the Center Support (Center Configuration only) using (2)U-Bolts, (8)nuts, and (4)washers.
- 5) Using the (2) other U-Bolts, (8)nuts, & (4)washers, bolt the mast to the Center Plate.

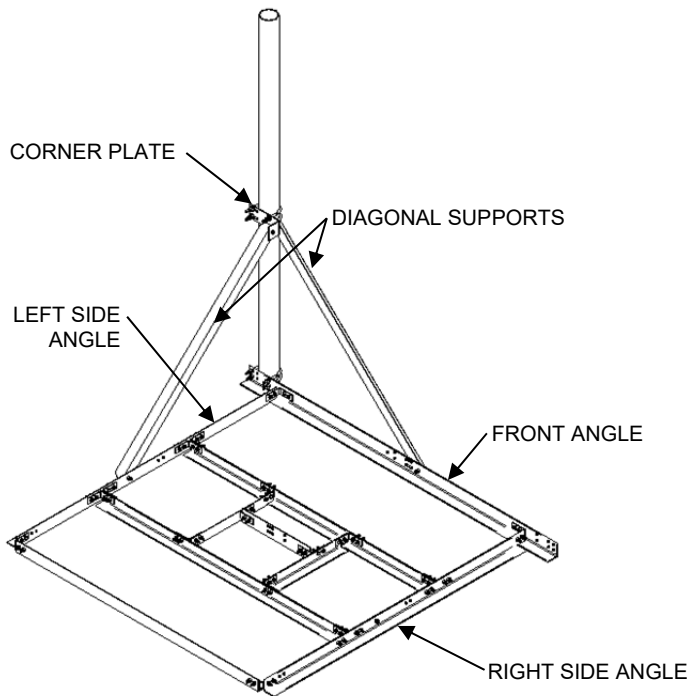
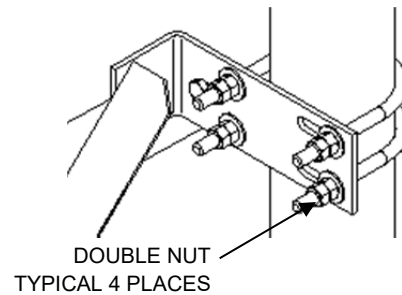
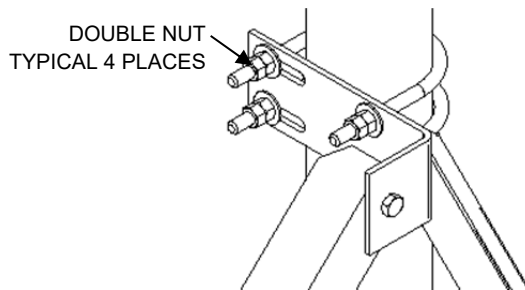
**Note:** with this configuration you will not use the Corner Plate.



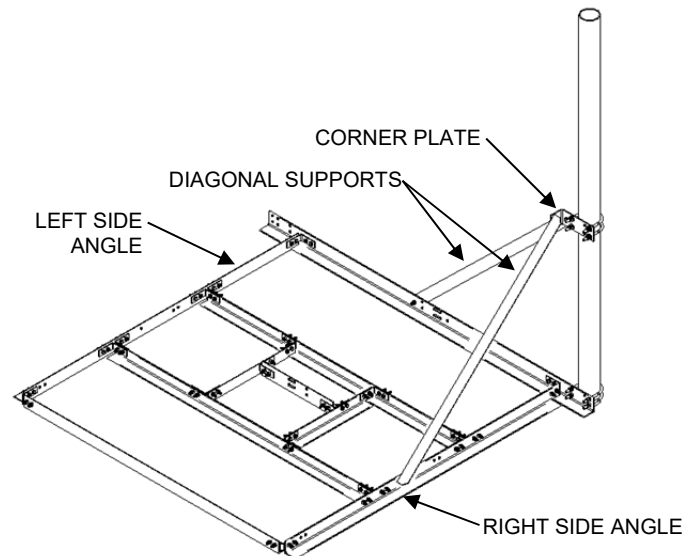
**LEFT AND RIGHT CORNER CONFIGURATION**

- 1) Bolt 1 Diagonal Support to the Front Angle using (1)1-1/2" bolt, (1)nut, and (1)washer. Bolt the other Diagonal Support to the Left Side or Right Side Angle using (1)1-1/2" bolt, (1)nut, and (1)washer.
- 2) Bolt the other end of the Diagonal Supports to the Corner Plate using (2)1-1/2" bolts, (2)nuts, and (2)washers. You will need to raise the Diagonal Supports for this to be possible.
- 3) Then using the supplied U-Bolts, bolt the base of the mast to the Front Angle of the frame using (2)U-Bolts, (8)nuts, and (4)washers.
- 4) Using the 2 other U-Bolts, (8)nuts, and (4)washers, bolt the mast to the Corner Plate.

**Note:** with this configuration you will not use: Left Side Plate, Right Side Plate or the Center Plate.



LEFT CORNER CONFIGURATION



RIGHT CORNER CONFIGURATION

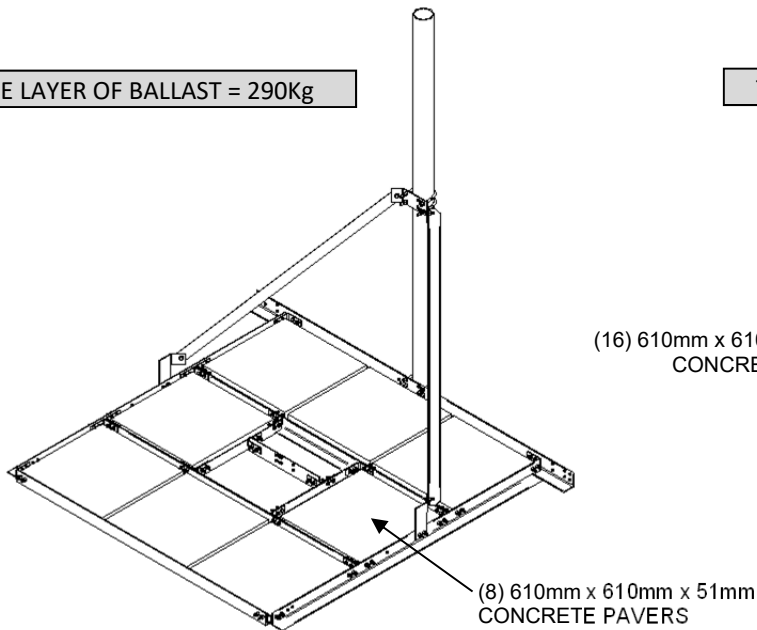
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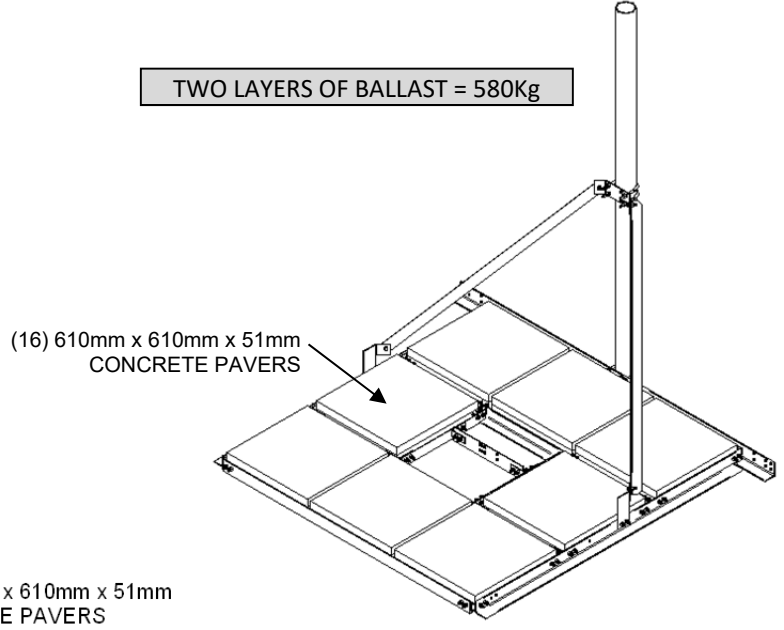
**BALLAST REQUIREMENTS**

The roof mount is to be weighted down using 610mm x 610mm x 51mm concrete paver stones. The paver stones are to be arranged as shown below with a minimum of 8 stones per layer. The number of layers required will range from 1 to 3, depending on the wind area of the antenna and its mounting height from the base and is to be determined using the load charts on the following 2 pages.

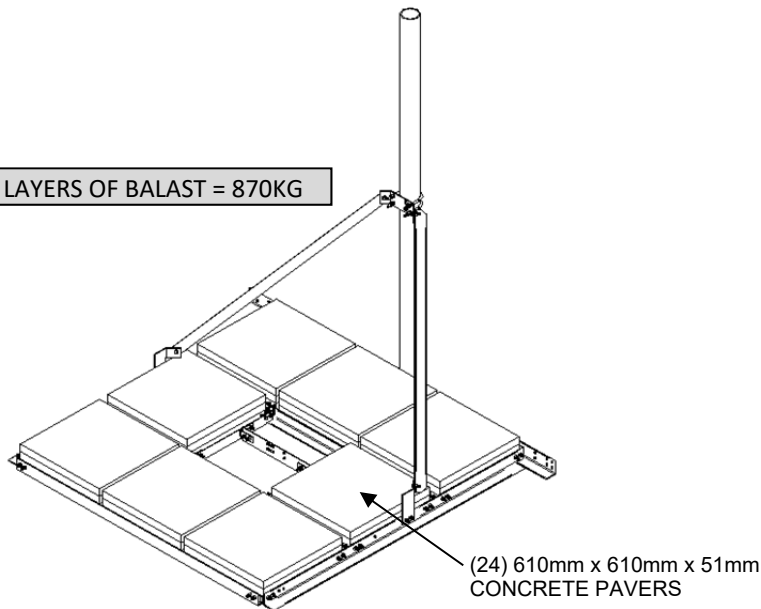
**ONE LAYER OF BALLAST = 290Kg**



**TWO LAYERS OF BALLAST = 580Kg**



**THREE LAYERS OF BALLAST = 870KG**

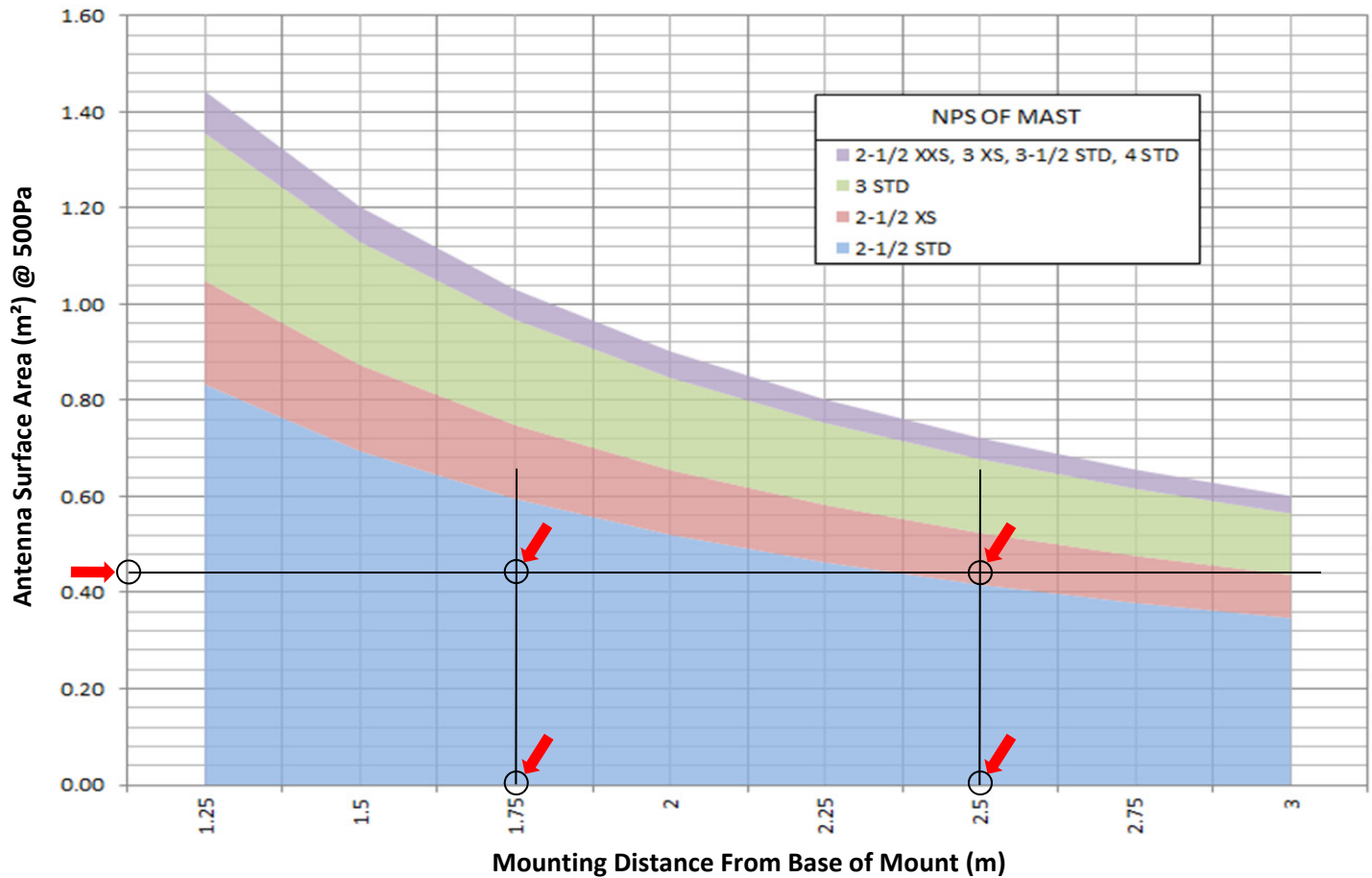


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**MAST SIZE DETERMINATION  
ANTENNA SURFACE AREA vs. MOUNTING HEIGHT**

**SURFACE AREA vs. MOUNTING HEIGHT**



**Determining Antenna Mounting Height**

- 1) Identify the wind area(m<sup>2</sup>) of your antenna on the left vertical axis and mark that point.
- 2) Draw a horizontal line from the marked point in step 1 across the entire graph.
- 3) On the bottom horizontal axis identify the distance at which the antenna will be mounted, from the base of the mount to the center of the antenna.
- 4) Draw a vertical line from the marked point in step 3 upwards till it intersects the line drawn in step 2.
- 5) The shaded region in which the intersection point from step 4 falls dictates the minimum required pipe size.

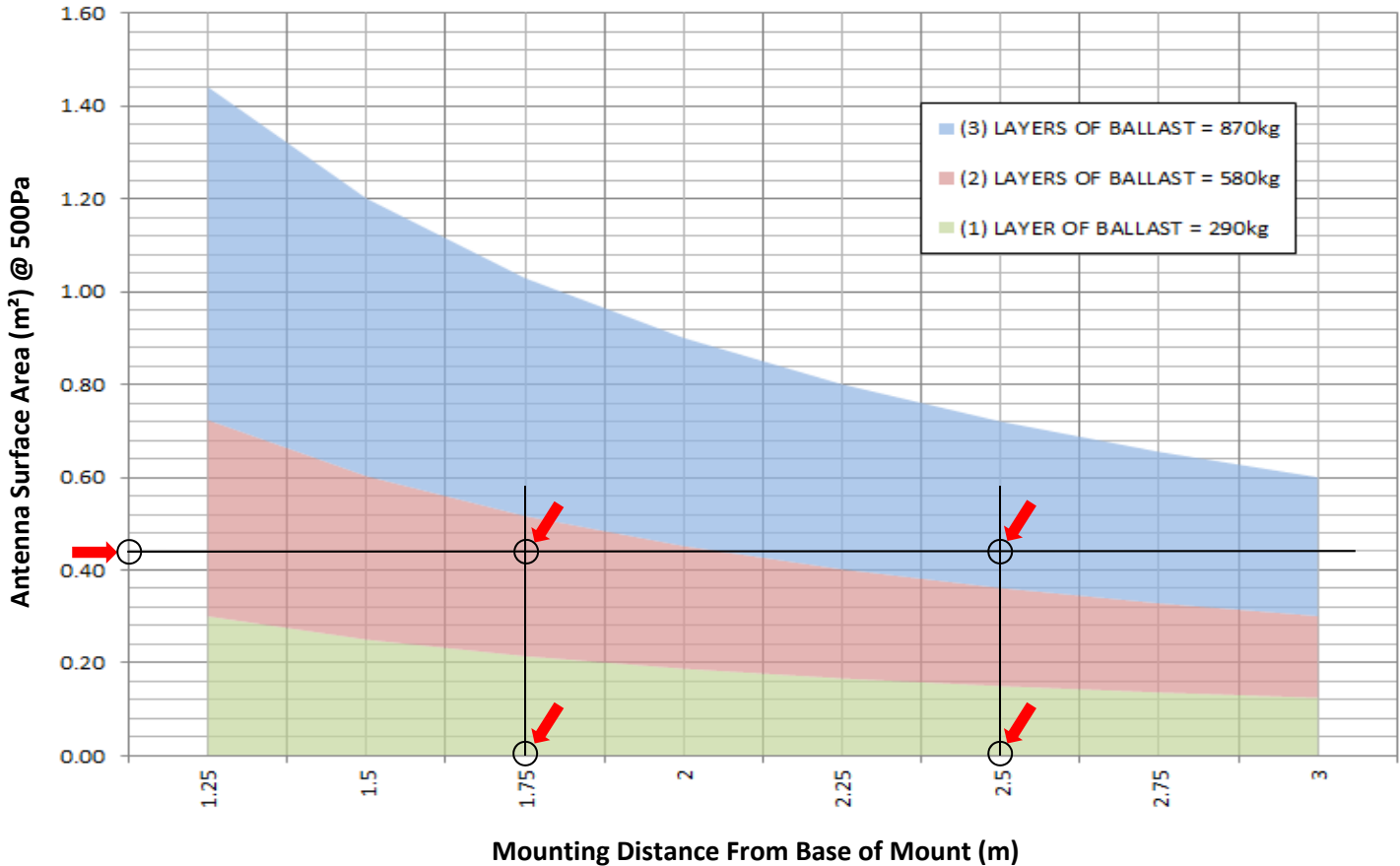
Example shown: Antenna Wind Area is 0.44m<sup>2</sup> and the center of the antenna will be mounted at 1.75m from the base of the mount, this will require at minimum a NPS 2-1/2 STD Mast, any mast size located higher on the graph such as a NPS 3 STD mast could also be used. OR if the center of the antenna were to be mounted at 2.50m from the base of the mount a NPS 2-1/2 XS Mast or larger would be required.

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**BALLAST WEIGHT DETERMINATION  
ANTENNA SURFACE AREA vs. MOUNTING HEIGHT**

**SURFACE AREA vs. BALLAST WEIGHT**



**Determining Ballast Requirements**

- 1) Identify the wind area(m<sup>2</sup>) of your antenna on the left vertical axis and mark that point.
- 2) Draw a horizontal line from the marked point in step 1 across the entire graph.
- 3) On the bottom horizontal axis identify the distance at which the antenna will be mounted, from the base of the mount to the center of the antenna.
- 4) Draw a vertical line from the marked point in step 3 upwards till it intersects the line drawn in step 2.
- 5) The shaded region in which the intersection point from step 4 falls dictates the required ballast weight.

Example shown: Continuing with the previous example, the antenna wind area is 0.44m<sup>2</sup> and the center of the antenna will be mounted at 1.75m from the base of the mount, this corresponds to a required ballast weight of 580Kg. OR if the center of the antenna were to be mounted at 2.50m from the base of the mount, a weight of 870Kg would be required.