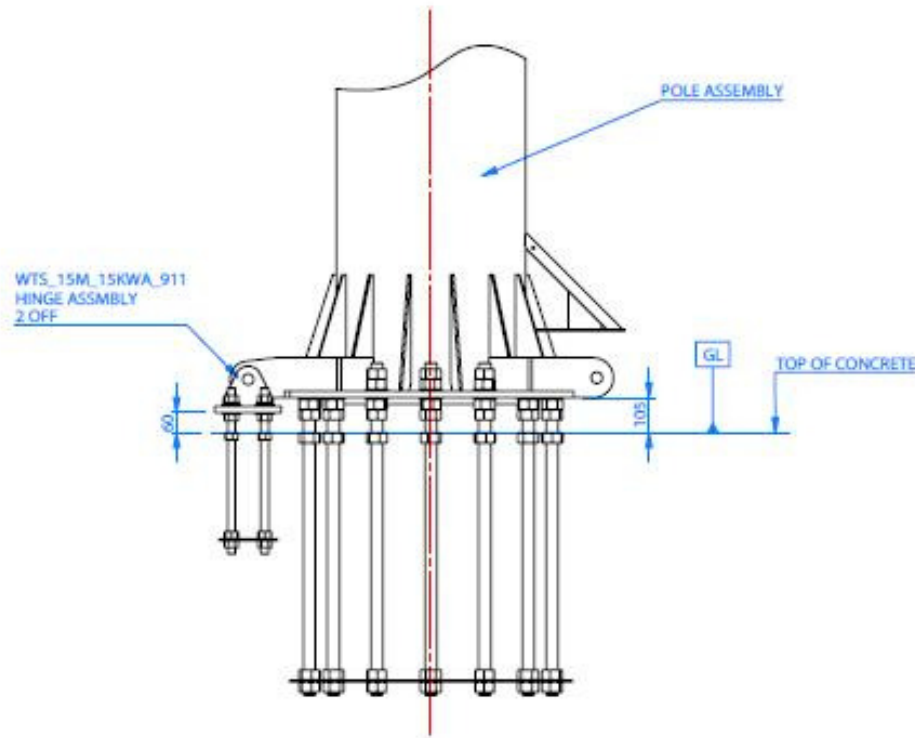


# PROVEN 35 FOUNDATION PACK

## Hutchinson 15m Tower Pad Foundation Instructions v1.1



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## FOUNDATION PREPARATION

**NB: Before setting the foundation kit into the concrete foundation consider which way your wind turbine will be lowered/raised and position the hinge accordingly**

The main foundation consists of a large block of high-strength concrete. See enclosed diagrams for foundation details. The foundation should be prepared with one continuous pour of concrete.

### BASE FOUNDATION

The base foundation consists of approximately 19m<sup>3</sup> of concrete. This is prepared with the bottom part being 4800mm x 4800mm x 800mm and the top part 1500mm x 1500mm x 200mm as shown in the drawings.

This two tier foundation minimises the visual impact of the foundation as only the top part is seen once soil is placed on top of the foundation base part.

As and when required soil analysis can be conducted to identify exactly what type and dimension of foundations are to be used in certain ground-types. Professional advice should be sought when an exact soil analysis is required. The foundation design presented in this manual is for an assumed bearing pressure of 100kN/m<sup>2</sup>.

Use vibrating concrete poker as necessary to remove air bubbles from the concrete.

Ensure concrete level is at underside of installation template, as the plate is to be removed once concrete has set. Levels to be checked before and upon completion of the concrete pour.

When concrete is set, undo nuts above installation template, and remove the plate. This can be kept for future use on another site.

Install the levelling nuts at the correct height and install the hinge brackets on the studs. Ensure the nuts are level and are tight during pole installation (see drawing for correct height).

### WINCH ANCHOR FOUNDATION

Refer to foundation diagrams and tower specific installation manual for positioning. The anchor block consists of approximately 3.5m<sup>3</sup> of concrete. This is prepared as a 2200mm x 2000mm x 800mm cube. It should be located on the opposite side of the base plate to the hinge attachment.

Ensure anchor pad is located at the correct distance from the root (6500mm from centre to centre - see installation drawing for details).

Anchor points must be masked off whilst the concrete is poured, as to not damage the threads for the removable eye nuts.

**NB: It is important that the anchor is placed exactly in line with the centre of the base plate and perpendicular to the line of the hinge brackets.**

## CONCRETE SPECIFICATION

Concrete to be grade RC35 to BS EN 206-1 and BS 8500-2 for foundations in design chemical class 1 ground. Concrete to each base to be placed in one continuous pour and to be compacted with a vibrating concrete poker. We recommend that you use a ready-mix concrete supplier considering the amount and the quality of the concrete required. Concrete cover to reinforcement mesh to be minimum of 50mm to top and 75mm to bottom and sides.

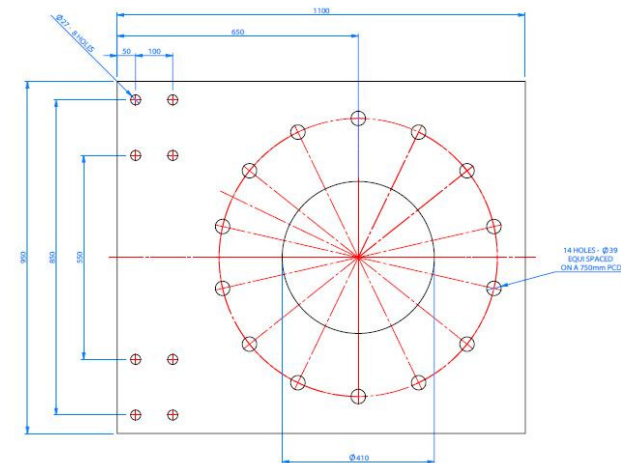
## HARDENING TIME

You should allow plenty of time for the foundation to set and harden fully before erecting the turbine. We recommend a hardening period of approximately 2 weeks depending on weather conditions. For this reason, foundations are normally prepared in advance of the main installation. Note that the hardening time may be lengthened by poor weather conditions and shortened by the use of a quick-setting concrete additive.

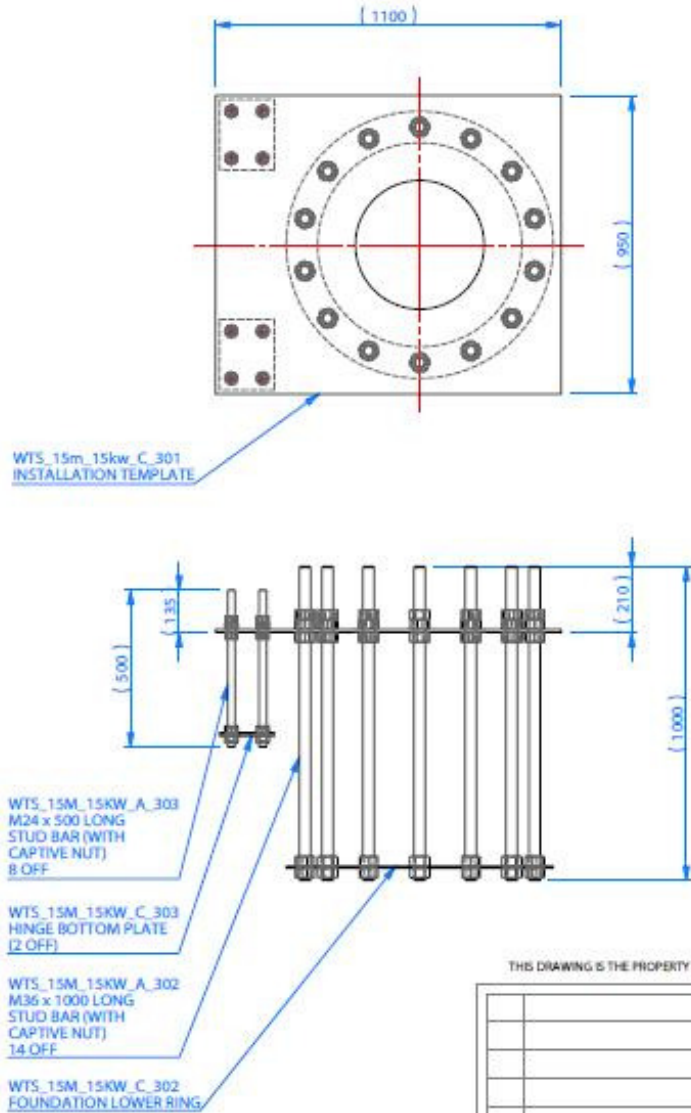
## POOR FOUNDATION PREPARATIONS

Proven Energy Ltd reserve the right to cancel an installation of a turbine if it is thought the foundations are of a poor quality. Subsequent costs in repairing the foundation and any further site visits will be met by the customer. It is recommended that you keep photographic evidence of the foundation work progress. Please complete and return your Foundation Confirmation to Proven Energy Ltd on completion of your foundation work (see page 10).

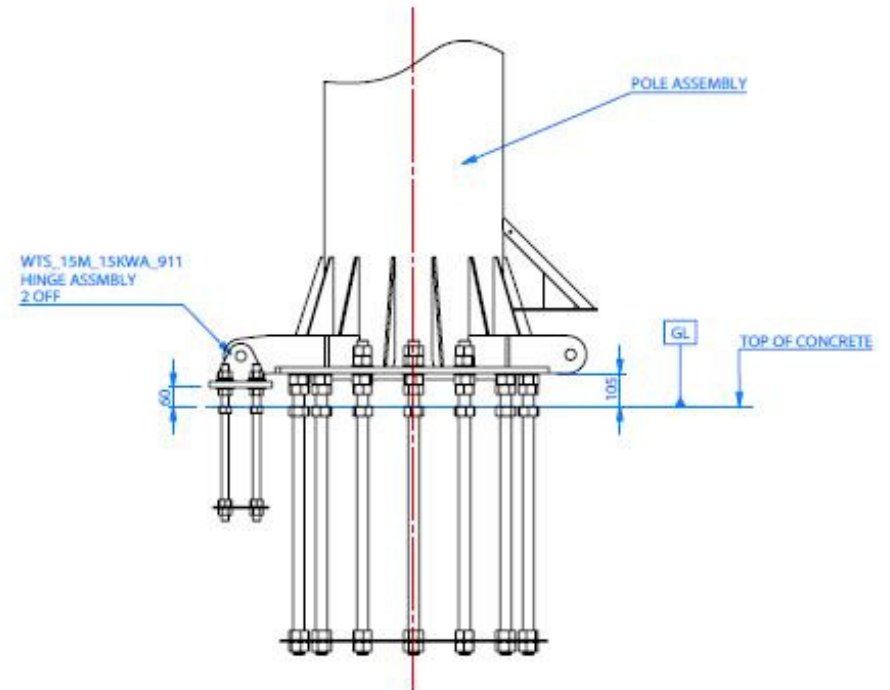
NB: Remember to remove the foundation template (shown below) once the concrete has set



BASE ASSEMBLY SHOWN WITH INSTALLATION PLATE

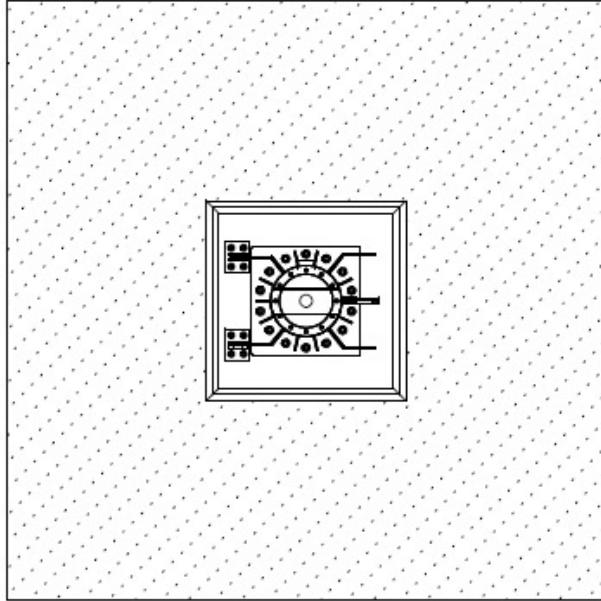


BASE ASSEMBLY SHOWN WITH HINGE ASSEMBLY AND POLE  
(TO BE FITTED ONCE BASE INSTALLATION PLATE HAS BEEN REMOVED AND BASE HAS SET IN CONCRETE)



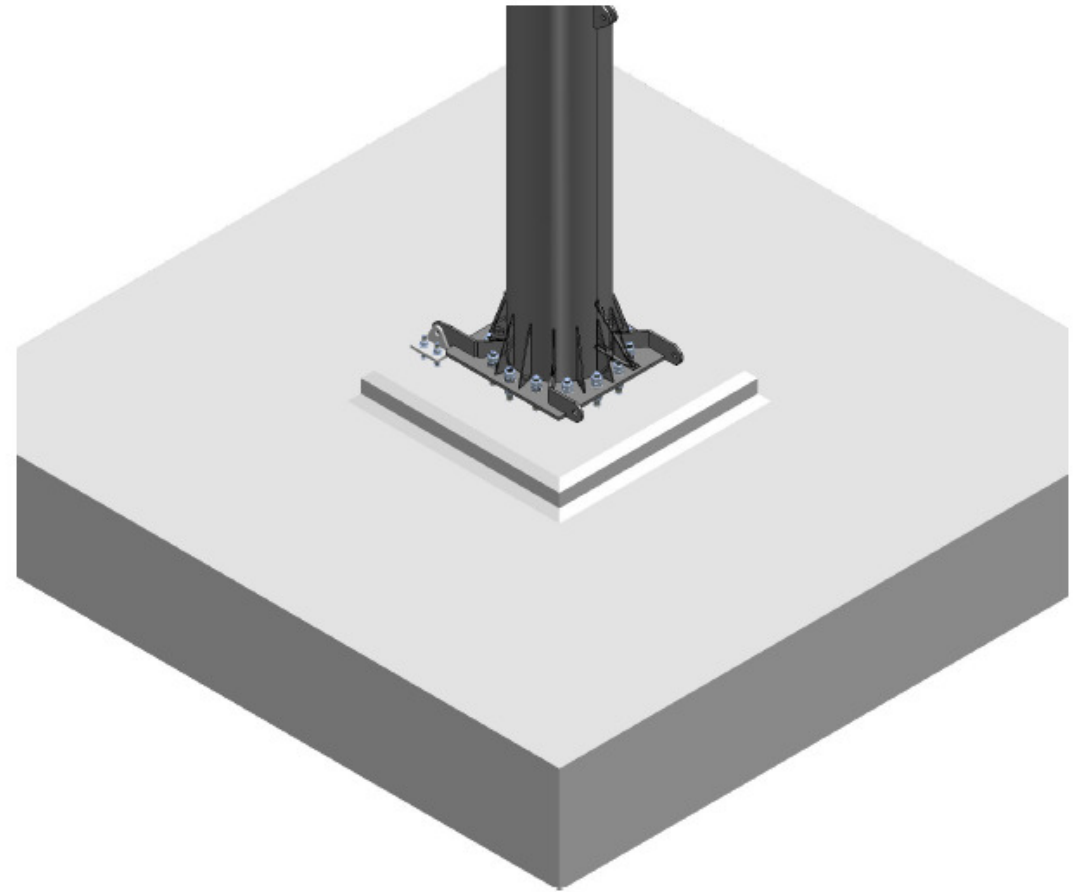
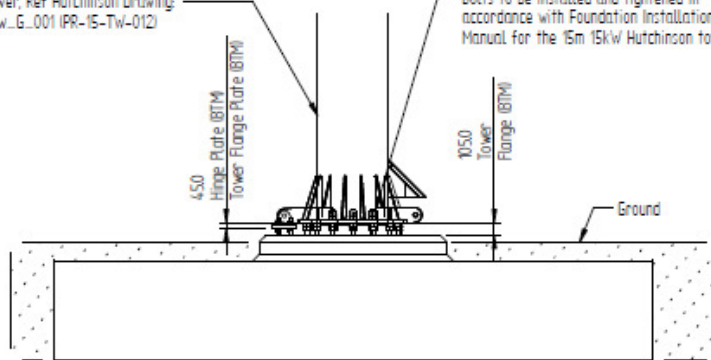
THIS DRAWING IS THE PROPERTY OF HUTCHINSON ENGINEERING LTD. IT MUST NOT BE COPIED OR LENT WITHOUT PRIOR CONSENT OF HUTCHINSON ENGINEERING LTD. DO NOT SCALE FROM THIS DRAWING. IF IN DOUBT ASK.

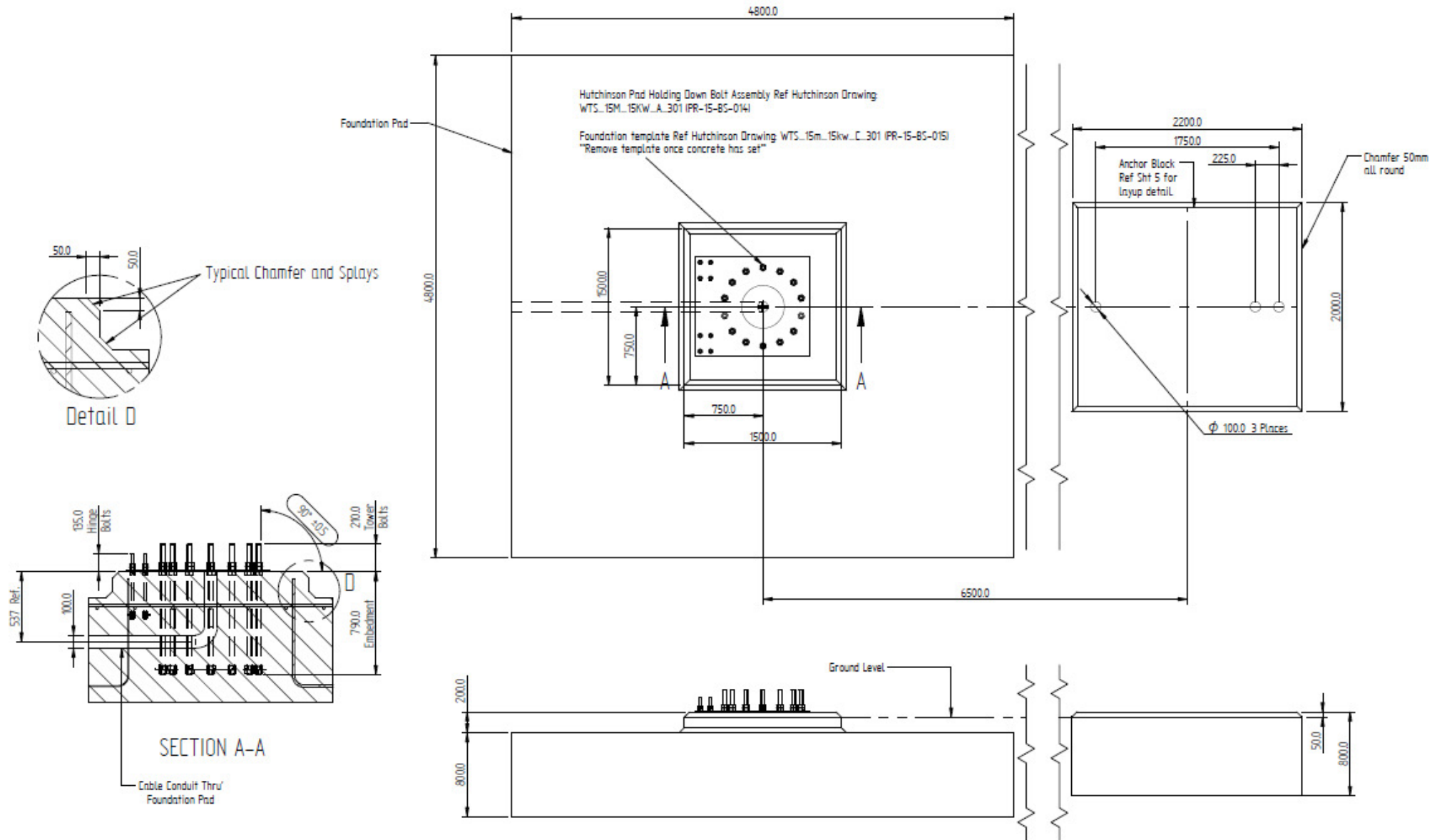
<p><b>NOTES:</b></p> <ol style="list-style-type: none"> <li>ALL DIMENSIONS ARE IN MILLIMETRES WITH LEVELS SHOWN IN METRES.</li> <li>ALL DIMENSIONS NOT TOLERANCES TO BE MET FOR ASSEMBLY.</li> <li>STEELWORK TO BE TO BS 7000000S ON 1013-B-1 GRADE SIZES AND FABRICATED IN ACCORDANCE WITH BS 5955.</li> <li>ALL BOLTS TO BE GRADE 8.8 (SPLIN GALVANISED TO BS 680).</li> <li>ALL STEELWORK TO BE PEELDED AND NOT END GALVANISED IN ACCORDANCE WITH BS EN 10210-2.</li> <li>REMOVE ALL BURRS AND SHARP EDGES.</li> </ol>				<p><b>MATERIAL:</b> SEE DETAILS</p> <p><b>FINISH:</b> GALVANISED</p> <p><b>MASS (kg.):</b> 108.35</p>		<p><b>Hutchinson Engineering</b></p> <p>TEL: +44 (0)151 422 9990 FAX: +44 (0)151 420 5100</p> <p>www.hutchinsonengineering.co.uk</p> <p>EVENTS ROAD, WIDNES, CHESHIRE, WA9 8PT</p>		<p>CLIENT: PROVEN PROJECT: 15M 15KW PAD FOUNDATION TITLE: PAD BASE ASSEMBLY</p> <p>SCALE: A3 DATE: 01/10/2008</p> <p>WTS_15m_15kw_A_301</p>		<p><b>A3</b></p> <p><b>A</b></p>							
<table border="1"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>DRAWN</th> <th>APPD</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>FOR MANUFACTURE</td> <td>AJH</td> <td>LJR</td> <td>01/10/2008</td> </tr> </tbody> </table>		NO.	DESCRIPTION	DRAWN	APPD	DATE	A	FOR MANUFACTURE	AJH	LJR	01/10/2008						
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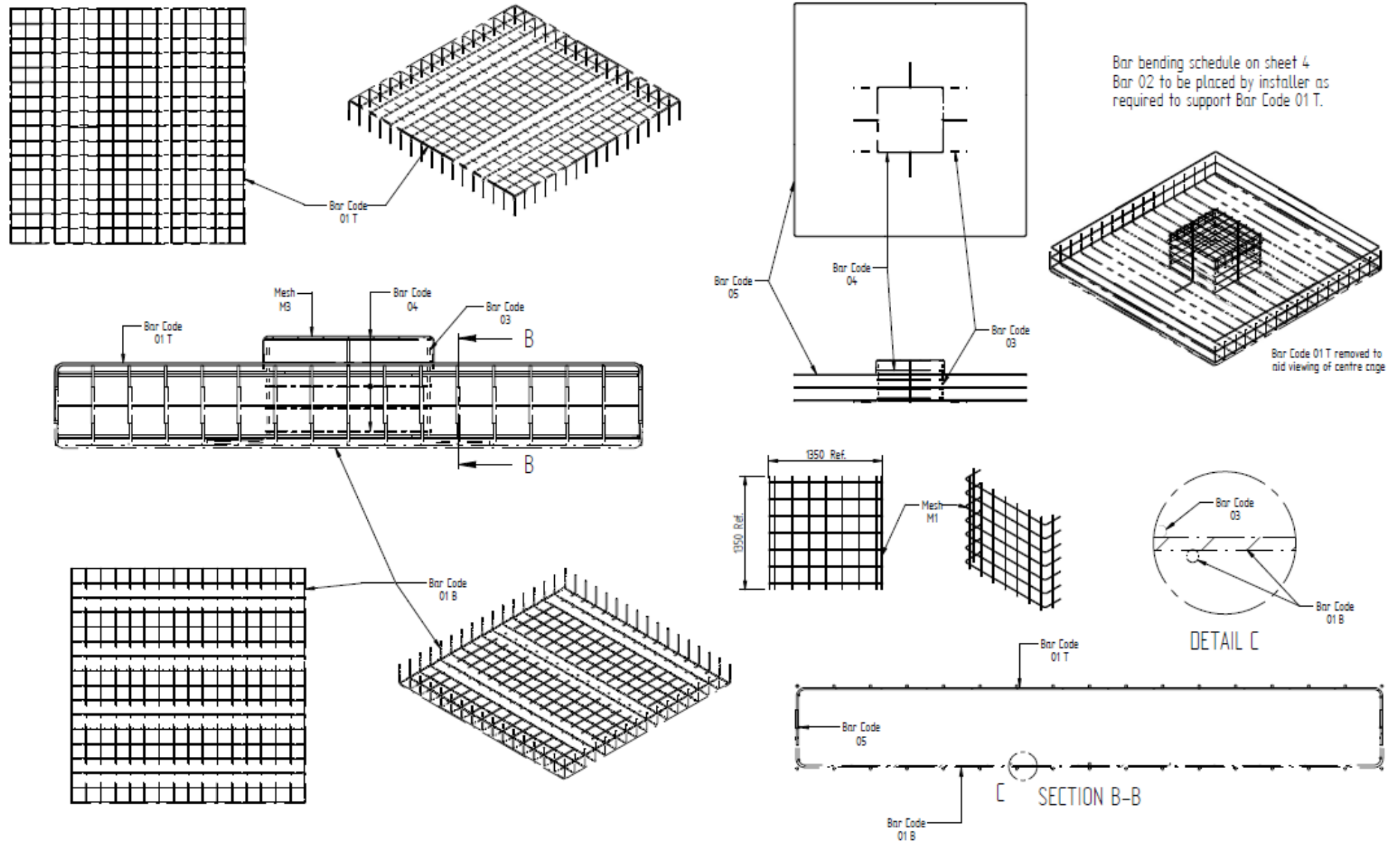


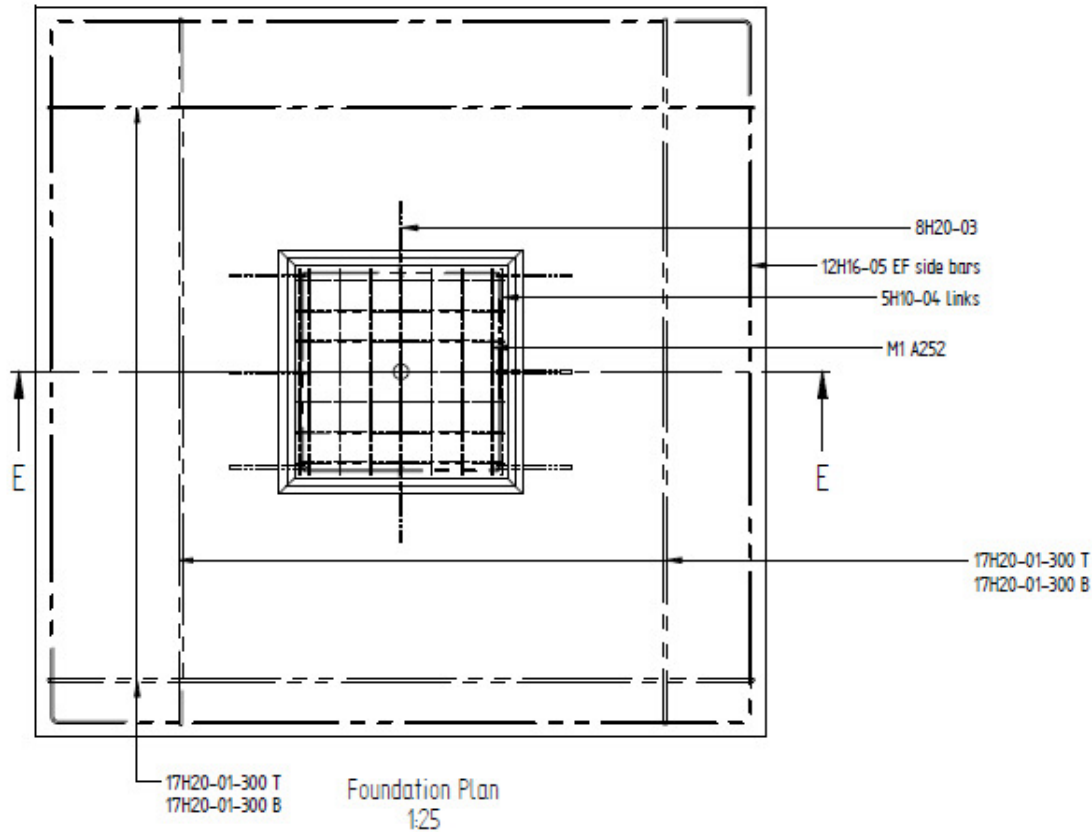
Hutchinson Tower, Ref Hutchinson Drawing: WTS\_15m\_15kw\_G\_001 (PR-15-Tw-012)

Bolts to be installed and tightened in accordance with Foundation Installation Manual for the 15m 15kw Hutchinson tower.





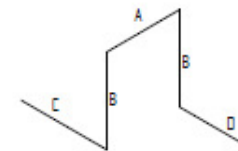




Bar Bending Schedule										
Mark	Type and Size	No. of Mbars	No. of Bars in Each	Total No.	Length of Each Bar	Shape Code	A (mm)	B (mm)	C (mm)	D (mm)
01	H20	1	68	68	5425	21	450	4620	-	-
02	H20	1	16	16	2325	98	500	595	500	-
03	H20	1	8	8	1275	11	500	-	-	-
04	H10	1	5	5	4975	51	1300	1300	-	-
05	H16	1	12	12	5550	11	2800	2800	-	-
M1	A252	1	1	1	1750	21	200	-	-	-

Notes:

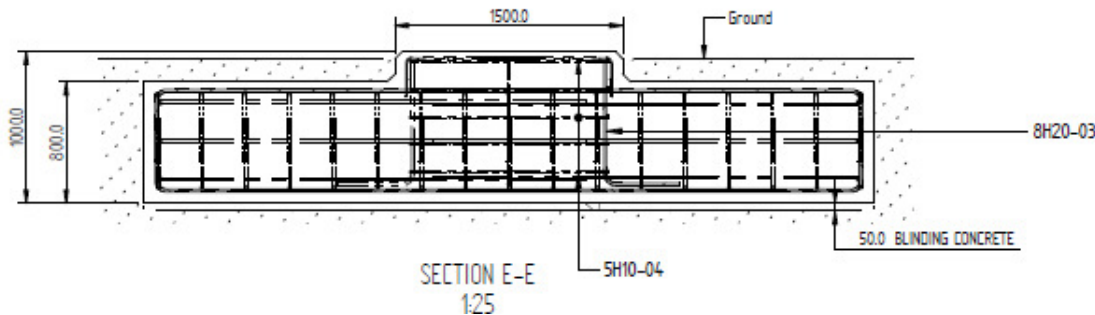
1. Do not scale
2. Assume all site details are existing unless otherwise specified.
3. Concrete to be Grade RC35 to BS EN 206-1 and BS 8500-2 for foundations in chemical class 1 ground.
4. Cover to reinforcement to be 50mm top and 75mm sides and bottom.
5. Foundation design for an assumed bearing pressure of 100kN/m<sup>2</sup>
6. Foundation bearing strata to be inspected by a competent Engineer prior to placing concrete.
7. Reinforcement to be high yield type 2 to BS 4449:1998 cut and bent in accordance with BS 8666:2005
8. All chamfers and splays indicated to be adhered to, they are integral features of the foundation design.
9. Concrete for base to be placed in one continuous pour.
10. All soft spots to be excavated and back-filled with either blinding concrete or well compacted granular fill.
11. The contractor is to provide adequate temporary access and surfacing to the base during the construction period, including that required for the cabin and tower installation.
12. Load parameters used for foundation design meet or exceed requirements in IEC 61400-2, for a Class 1 turbine. Installation must take into account site specific conditions and not exceed the design limits for the turbine. If in doubt seek professional advice.



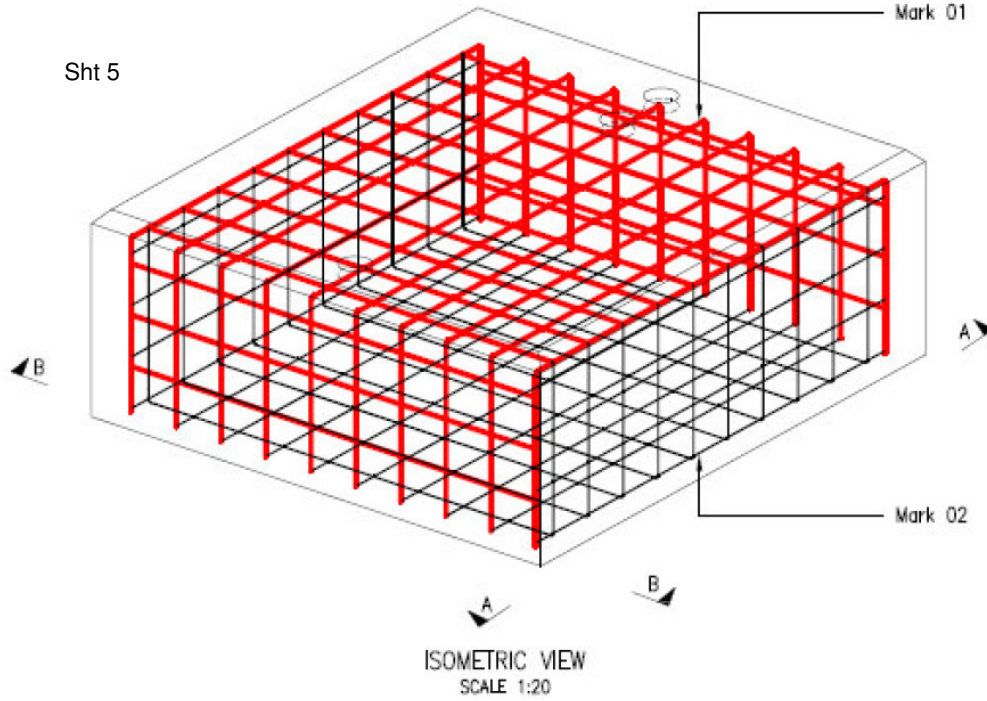
BAR MARK 02

(ISOMETRIC VIEW)  
NOT TO SCALE

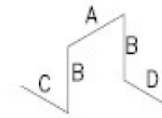
NOTE:  
02 BARS TO BE RANDOMLY PLACED BETWEEN TOP AND BOTTOM CAGE BY INSTALLER TO SUPPORT TOP CAGE DURING CONCRETE POUR.



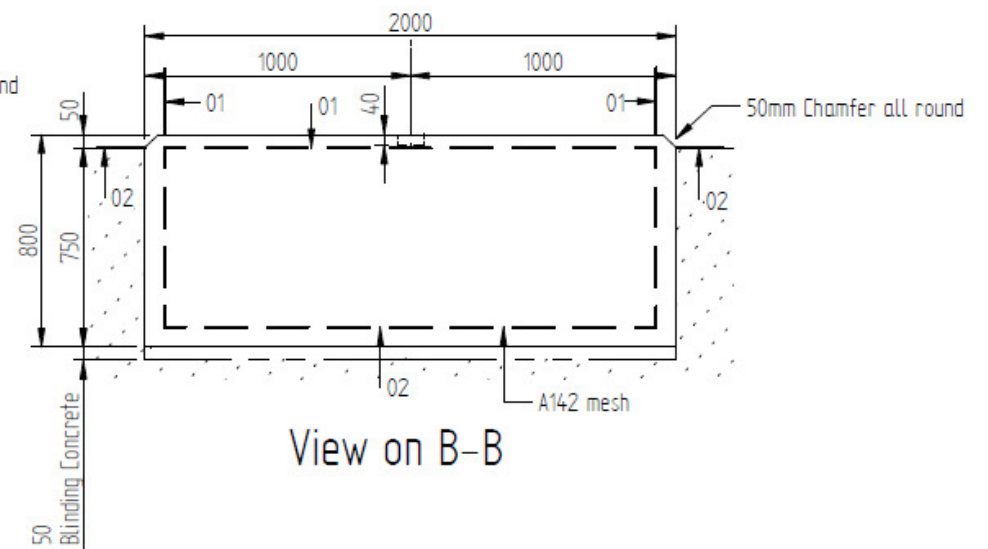
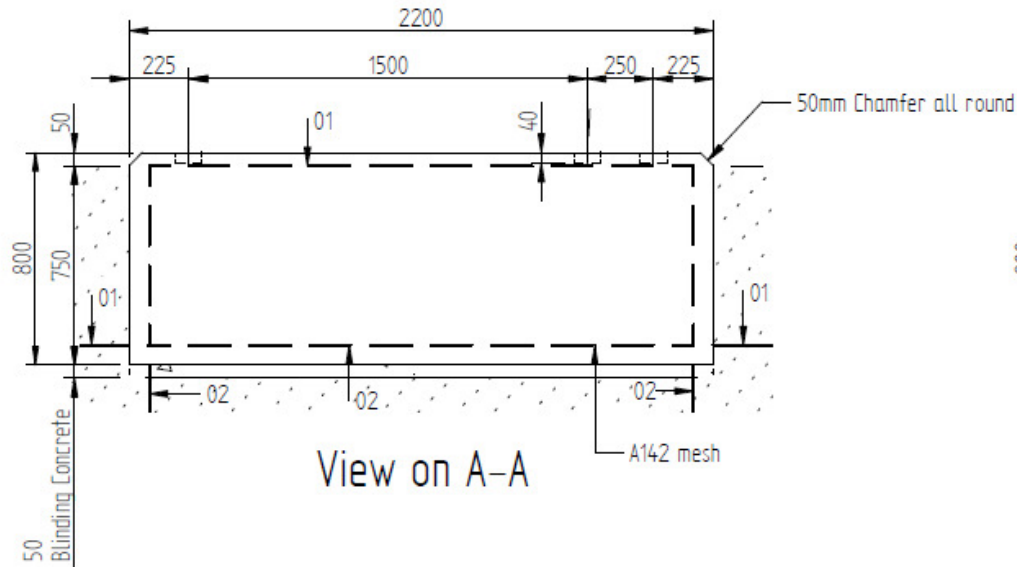
Sht 5



Bar Bending Schedule										
Mark	Type and Size	No. of Mbars	No. of Bars in Each	Total No.	Length of Each Bar	Shape Code	A (mm)	B (mm)	C (mm)	D (mm)
01	A142 MESH	1	1	1	3350	21	675	2000	-	-
02	A142 MESH	1	1	1	3150	21	675	1800	-	-
03	H16	1	12	12	2375	98	400	650	400	-



BAR MARK 03  
(ISOMETRIC VIEW)  
NOT TO SCALE



## Customer Foundation Confirmation

Dear Customer,

Proven Energy Ltd reserve the right to cancel an installation of a turbine if it is thought the foundations are of a poor quality. Subsequent costs in repairing the foundation and any further site visits will be met by the customer. It is recommended that you keep photographic evidence of the foundation work progress.

Please read the following statement.

On completion of your foundation work please sign the statement and return to Proven Energy Ltd at the address below:

Proven Energy Ltd  
The Torus Building, Rankine Avenue  
Scottish Enterprise Technology Park  
East Kilbride G75 0QF



**I CERTIFY THAT THE FOUNDATIONS FOR THE WIND TURBINE AND TOWER (TO BE INSTALLED AT THE ADDRESS BELOW) ARE COMPLETED AS PER PROVEN ENERGY LTD INSTRUCTIONS\*.**

**I UNDERSTAND THAT I MAY BE CHARGED FOR ADDITIONAL INSTALLATION WORK IF REQUIRED DUE TO ANY DEVIATION FROM THE PROVEN ENERGY LTD SPECIFICATION\*\*.**

SIGNED: \_\_\_\_\_

DATE: \_\_\_\_\_

NAME (CAPITALS): \_\_\_\_\_

SITE ADDRESS: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\* Foundation specification for each wind turbine model is available from Proven Energy Ltd. Please check that you have the current Proven Foundation Pack for your particular wind turbine and tower combination.

\*\* e.g. lack of anchor block, wrong hinge orientation etc.