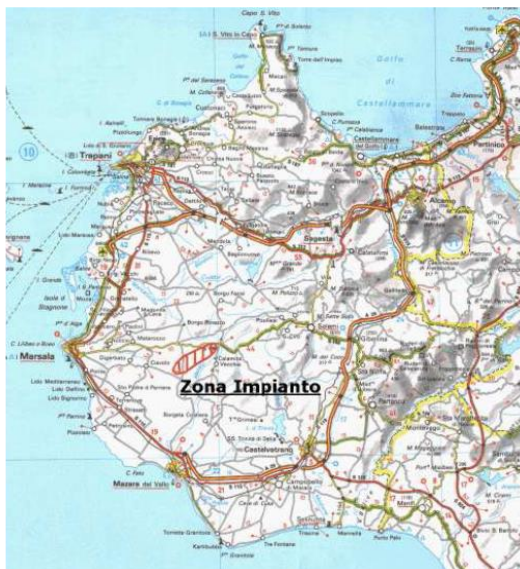


GL Garrad Hassan



LIBECCIO srl,
Via A. Mauceri 18, Noto (Siracusa), Sicily, Italy

“VENTO DI VINO” Wind Farm,
Mazara del Vallo (Trapani), Sicily, Italy



TECHNICAL DUE DILIGENCE, REVIEW OF TURBINE FOUNDATIONS DESIGN **REPORT**

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CLIENT: GL-GARRAD HASSAN ITALIA Srl
PROJECT: "VENTO DI VINO" Wind Farm, Mazara del Vallo, Sicily, Italy
DOCUMENT: Technical Due Diligence -, Foundations Design Review – REPORT-Rev-1
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1. INTRODUCTION

1.1 How to read this document

This document is 'front-loaded', so to speak. Its salient parts are the 'Executive Summary and the Recommendations / List of Required Additions Chapters (pages 8 and 9), which give a succinct but comprehensive overview of the due diligence findings and suggested remedies to problems detected in proposed design. Key issues at each stage of assessment are shown in Tables (Synoptic Table, Evaluation Tables). Comments and results of independent calculations are given in the 'Remarks' column of Tables and text of Assessment documents which mark the milestones of the review process. These documents are attached here as Annexes (please refer to Executive Summary).

1.2 General

This assessment covers the design for the foundations of wind turbines in the wind farm developed by LIBECCIO S.r.l. of Noto (Siracusa), Sicily, Italy, in areas of the Municipality of Mazara del Vallo in the Province of Trapani, Sicily, Italy. The project comprises No. 7 wind turbines **REpower** type 3,4M104, capacity 3,37 MW, hub height 96,5 m (at all sites).

1.3 Authors of Proposed Design

The developer is LIBECCIO S.r.l., Via A. Mauceri 18, Noto (Siracusa), Sicily, Italy.

The developer's Consultants are:

- Dott. Ing. L. Pennisi, (Progettista Generale);P
- Dott. Ing. F. Carcara (Progettista Opere Civili);
- Dott. Ing. P. Montanari (Progettista Opere in Elevazione);
- Dott. Ing. D. Vinci (Direzione Lavori Opere Civili);
- Dott. Ing. N. Rizzo (Direzione Lavori Strutture in Elevazione)
- Dott. Geol. G. Belfiore - Author of the Geological Investigation

The General Contractor is:

- SOLO RINNOVABILI S.r.l., Brescia, Contrada S. Croce 13

1.4 Authors of Review

- Dott. Ing. Luigi Cesare Speranza, Roma (SCANGEA);
- Dott. Ing. Marco Franceschini, Bologna (SCANGEA, External Consultant);
- Prof. Ing. Claudio Scarponi, Roma (UNIVERSITA' 'LA SAPIENZA', ROMA – SCANGEA).

1.5 Documentation Reviewed

List of documents reviewed constitutes APPENDIX A to this Report.

1.6 Description of Proposed Design

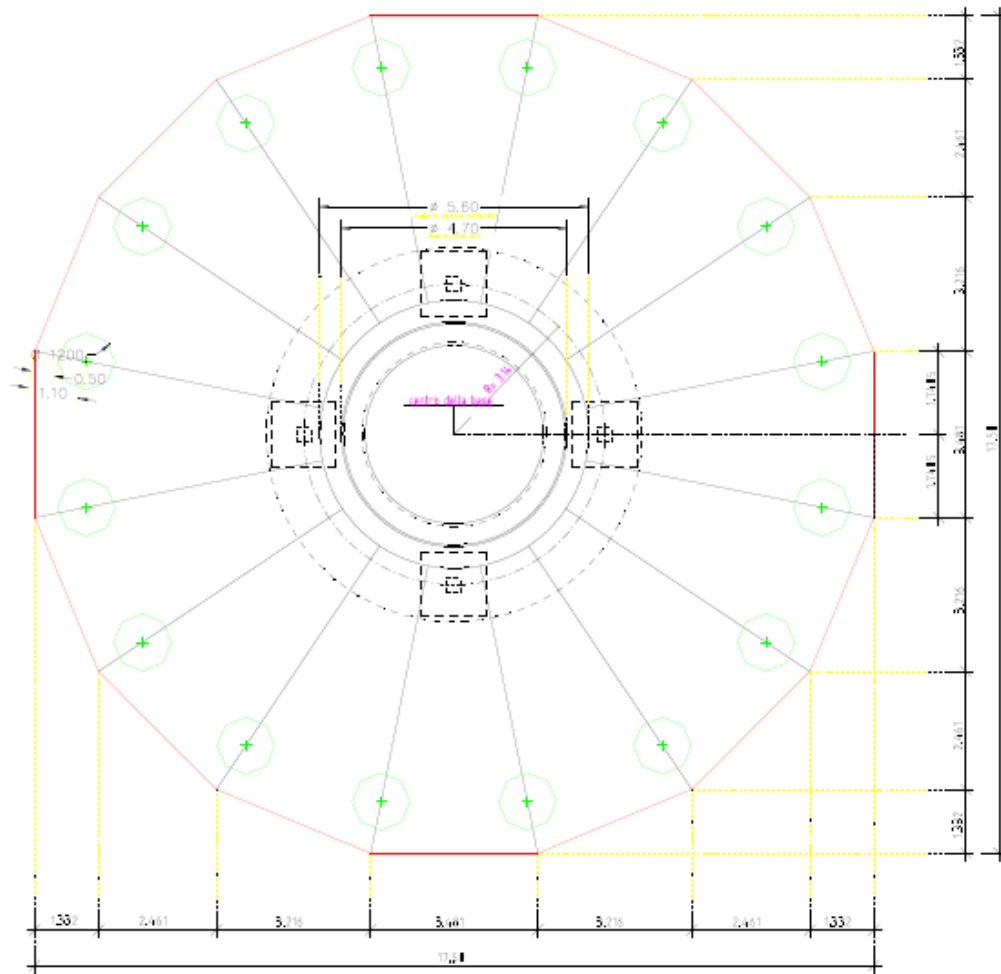
Proposed design consists of one foundation type to be constructed at all WTG sites, as follows:

a) Type A - Piled

Polygonal plinth with following geometric characteristics:

- 16 sides (side length: 3,48 m);
- Diameter of inscribed circle: 17,6 m;
- Plinth height varies from 1,60 m to 2,70 m;
- 16 no. piles, diameter 1200 mm, length: 24,0 m

Please refer to drawings in following page:



estradosso plinto di fondazione con indicazione pali ϕ 1200

FIG. 1-01
 FOUNDATION PLAN

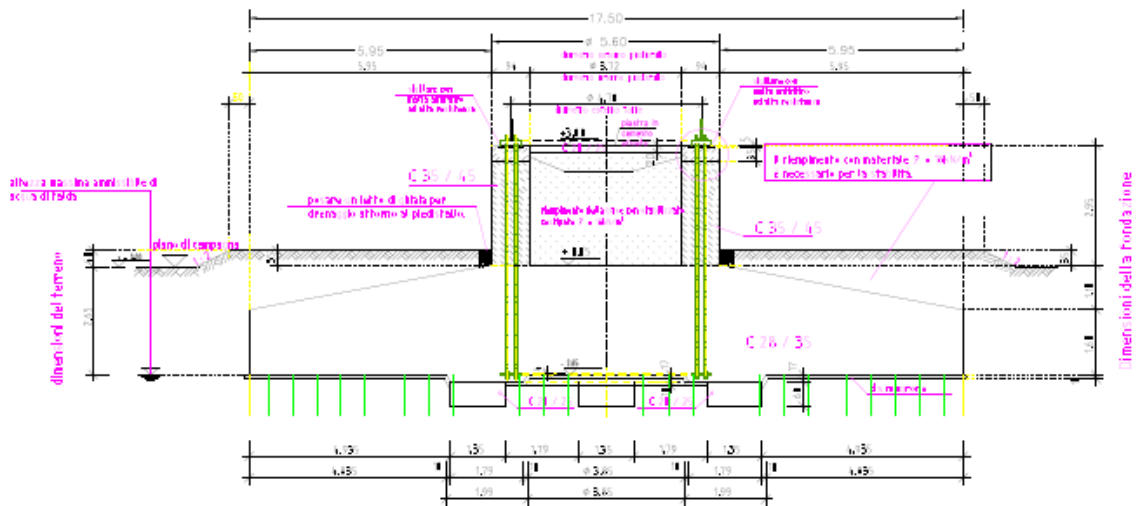


FIG. 1-01
 FOUNDATION – PLINTH CROSS SECTION

1.7 Method of Review - Guidelines

The aim of GL-GH's technical due diligence review is ordinarily two-fold:

- a) to verify the viability of the proposed foundation structures via independent calculations complying with international standards of calculation (Euro-Codes, IEC 61400-1 and Italian NTC-2008);
- b) to evaluate the calculations and ancillary documentation of the proposed design so as to assess their compliance with current Italian standards. This in order to foresee potential bottlenecks in the path of approvals from Italian Authorities (Regione, Genio Civile etc.) and ensure that an adequate maintenance plan is drawn up and enforced.

In this particular case, as all permits have been granted to the Developer and construction has already commenced, the second aim of the review is less important. Nevertheless, lack of compliance with the codes found in proposed design has been brought to evidence in so far as it has resulted in questionable design choices.

1.8 Method of Review – Checks in Evaluation Tables

Checks in Evaluation Tables are given separately to structure soundness (evaluated with independent calculations) and design documentation quality. Checks are given by crossing in the applicable cell in the criteria columns. Colour of crosses in the third column ('Insufficient or Omitted') can be either black or red. Black is given when the issue, though rated insufficiently dealt with, or omitted, is not deemed crucial. Red is given for issues which are deemed to be crucial.