



Via Email: [joshb@revisionenergy.com](mailto:joshb@revisionenergy.com)

July 18, 2017

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Project Supervisor, Revision Energy, LLC

RE: Evo Rock and Fitness, 65 Warren Ave, Portland, ME 04103

Josh,

Intelligent Design Engineering is pleased to submit this summary of our findings and recommendations related to the installation of a PV Solar array and its effects on the structural performance of the existing roof at the referenced address.

**Project Description and Scope of Work:**

Evo Rock and Fitness along with Revision Energy is proposing to install a racked PV solar installation on Evo’s facility in Portland, ME. Our task was to determine the affect of the additional solar array load on the structural capacity of the roof systems.

Our scope of work includes the following:

- Reviewing all existing building plans for the structure
- Analyzing the roof for the existing dead load and the theoretical snow loads.
- Comparing theoretical loads before the PV array is installed to theoretical loads after the PV array is installed.

**Assumptions and Analysis Criteria:**

- Existing Metal Roof Finish
- Existing steel members assumed to be the following ASTM Designations based on drawings provided by Kirby Building Systems:

Structural Steel Plate -----	A529/A572/A1011
Hot Rolled Mill Shapes -----	A36/A529/A572/A1011
Cold Form Shapes -----	A653/A1011

-Dead loads calculated based on steel self-weight, rigid insulation weight of 3psf (Base on 12” thickness), Metal roof weight of 1psf, metal roof decking weight of 2psf, and a mechanical duct and sprinkler allowance of 10psf. A racked solar array of approximately 4psf was assumed for the analysis.

-Snow load calculations based on the following values from ASCE 7-10 and the assumption of additional drift weight due to the installation of the PV panels and racking systems.

Ground Snow Load -----	60psf
Importance Factor-----	1.0
Thermal Factor-----	1.0
Exposure Factor -----	1.0

**Results of Roof Structure Evaluation:**

Existing Structure Overview:

The existing structure consists of a pre-fabricated steel structure with steel moment frames at 20'-0" on center spanning 60'-0" across the building. The rafters consist of 9 1/2" light gauge Z-Purlins at 2'-0" pm center at the ends and 4'-10" on center along the center of the main moment frames.

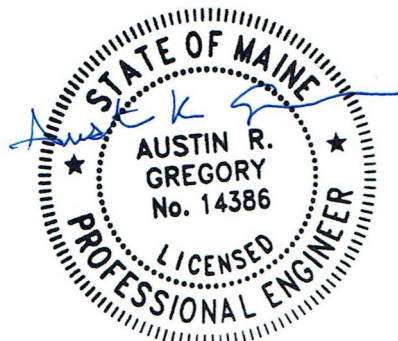
**Conclusion and Recommendations:**

My theoretical analysis of the roof structure based on the building documents indicates that the existing roof structure is adequate to support the existing dead load, the additional 4psf dead load of a racked PV solar array, and the ground snow load of 60psf as required by the City of Portland, ME. This analysis was based on strength and serviceability values previously mentioned and the original building documents provided by the Evo Rock Gym. The results of my analysis assume that the building was built per the original plans.

The report covers only those systems and components expressly and specifically identified. It is agreed that the Report does not constitute a guarantee or warranty of adequacy, performance or condition of any structure, item or system. The Report is prepared for the sole, confidential and exclusive use of the Client. Should you have any questions regarding this report, please feel free to call.

Sincerely,

Austin Gregory, PE  
ME License #14386



7/18/17