IRONRIDGE

TECHTIPS

ALTERNATIVE FOUNDATION METHODS FOR **GROUND MOUNT SYSTEMS**

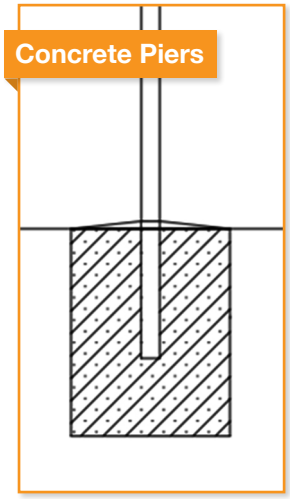
There are various foundation methods for ground-based solar installations outside of poured concrete. This document will discuss each option in detail, and go over the unique considerations associated with each foundation type.

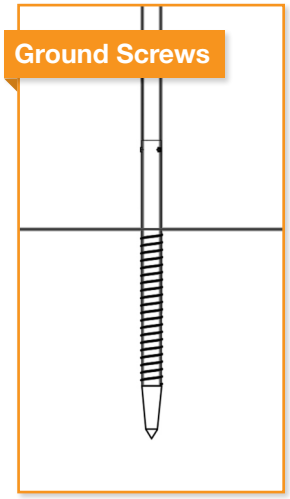
GROUND MOUNT SYSTEM

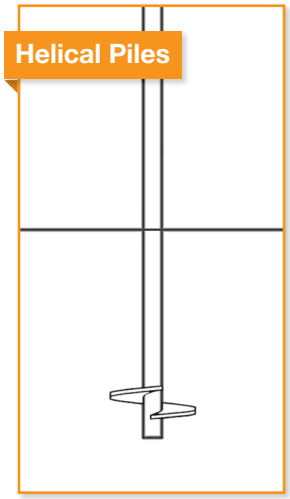
In the IronRidge Ground Mount System, poured concrete piers or ground screws are used as the standard foundation types. The concrete piers provide excellent resistance to vertical and lateral loads, and can be constructed with readily available materials. Ground (soil/earth) screws are gaining popularity because they're versatile, quick to install, and have a low impact on land drainage.

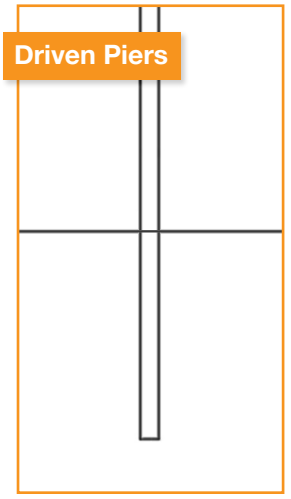
Using Ground-based Design Assistant for concrete piers or ground screws gives you standardized design options that will meet a wide range of requirements—and are backed by stamped engineering letters. That approach lowers engineering and permitting costs, enables faster timelines, and reduces risk. You can learn more about the installation process in the Ground Mount Installation Manual.

However, the Ground Mount System can also be installed using alternative foundation methods such as helical piles, driven piers, or even above-ground ballast blocks. Each of these foundation methods comes with its own set of challenges, considerations, and benefits.









HELICAL PILES

These products provide very good resistance to uplift, but provide minimal resistance to lateral loads compared to the standard IronRidge concrete foundations.

Lower lateral load resistance results in:

- Shorter E-W pier spans
- More piers (foundations)
- Additional bracing

All of these factors will increase system costs. From an installation standpoint, these anchors may be faster to install, but increased material, equipment and engineering costs may outweigh any labor savings.

To design a Ground Mount system with these anchors, a Professional Engineer (PE) will need to know the bearing capacity of the soil. For smaller systems, manufacturers of these anchors will come on-site to conduct pull tests to evaluate pullout strength and lateral resistance failure with their anchors. For larger systems, a soils report is typically required in addition to the pull tests. After the capacity of the anchor is determined, the PE can compare it to the reaction forces acting on each footing (provided by Ground-based Design Assistant) to determine the allowable pier spans. The PE can then provide a letter for the foundation design.

PILE-DRIVEN OR VIBRATORY-DRIVEN PIERS

This foundation method requires analysis to understand the bearing capacity and corrosivity of the soil (performed by a Geotechnical Engineer). From an installation standpoint, specialized equipment and operators are required to install these types of foundations which increases the overall system costs.

Additionally, this option does not utilize a helical blade or screw, which means that it will have a lower resistance to uplift forces. This necessitates deeper foundations. As with a helical pile, a PE will be required to determine the pier depth and spacing, and provide a letter for the foundation design.

BALLASTED SYSTEMS

This is a common foundation method especially for brownfield sites, such as landfills, where there is a cap layer that cannot be penetrated. Ballast foundations can be either cast-in-place or pre-cast depending on project requirements and shipping costs.

To design a system with this foundation type, a PE must determine how large the concrete blocks need to be based on the reaction forces of the system (provided by Ground-based Design Assistant). The PE can then provide a letter for the foundation design.