

**APPENDIX O**  
**The potential seriousness of the forthcoming  
environmental impacts and the use of  
machineries**

<b>A list of potential environmental impacts</b>	<b>The advice includes, but is not limited to, the following</b>	<b>Consideration of possible alternative methods</b>
<b>Visual Impact:</b> The presence of machinery, equipment, and temporary structures associated with ground investigation and plate load testing may have visual impacts on the surrounding landscape, altering the aesthetic qualities of the area.	Screening and Camouflage: Use screening techniques, such as temporary fencing, barriers, or landscaping, to visually conceal the machinery, equipment, and temporary structures from view. This can help minimize the visual impact on the surrounding landscape.	N.A.
<b>Noise and Vibration:</b> The operation of heavy machinery can contribute to noise and vibration pollution, which can disturb local wildlife or sensitive wildlife habitats.	Use of Low Noise and Vibration Equipment: Whenever possible, equipment produces lower levels of noise and vibration should be used. The use of noise barriers around the site can also help to mitigate the impact on local communities and wildlife.	Use of Electric-Powered Equipment: Electric- powered equipment is generally quieter than diesel powered equipment to help reduce noise pollution.
<b>Disturbance of Local Ecosystems:</b> The drilling operations, particularly those involving excavation, can potentially disturb the local ecosystems and impacting biodiversity.	Training and Awareness: trainings are provided for site personal about the importance of minimizing disturbance to local ecosystems, such as minimized noise and light pollution, how to handle waste properly, and what to do if they encounter local wildlife.	Employing construction methods of a low-impact nature, such as the utilization of machinery that is lightweight and drilling techniques which are minimally invasive
<b>Air Pollution:</b> Machinery used in construction sites can emit pollutants into the air. These pollutants may include Particulate Matter (PM), Nitrogen Oxides (NOx), Sulfur Oxides (SOx), and Volatile Organic Compounds (VOCs), contributing to air pollution and potentially impacting air quality in the surrounding area.	Dust Control Measures: Implement dust control measures such as water sprays, dust screens, or using dust suppression chemicals to reduce particulate matter emissions, and training for all staff on the importance of air quality and measures to reduce air pollution.	<ol style="list-style-type: none"> <li>1. Improved Fuel Efficiency and Maintenance: Promoting fuel-efficient practices and regular maintenance of machinery can help reduce emissions.</li> <li>2. Properly maintained equipment operates more efficiently, resulting in lower fuel consumption and reduced emissions. Implementing fuel-saving measures, such as reducing idling time and optimizing equipment usage, can further minimize air pollution during construction.</li> </ol>
<b>Water Pollution:</b> Drilling operations have the	Proper containment and lining of mud pools is crucial to	<ol style="list-style-type: none"> <li>1. Horizontal Directional Drilling (HDD): HDD is a</li> </ol>

<p>potential to contaminate local water sources, particularly if improper waste management practices are used.</p>	<p>prevent contamination. Mud pools should have an impermeable liner, such as HDPE or bentonite clay, to prevent seepage into the ground. Berms can be constructed around the perimeter to contain any overflow. Regular inspection and maintenance of the liner integrity is important.</p>	<p>trenchless method that causes less disturbance to the surrounding environment and mitigates the risk of water contamination. It could be a viable alternative depending on the geology of the site and the purpose of the drilling operation.</p> <p>2. Dry Drilling Techniques: Depending on the geology of the site, dry drilling techniques could be considered. These methods do not use drilling fluids and therefore reduce the risk of water contamination from these sources.</p>
<p><b>Soil Disturbance:</b> The use of heavy machinery can cause soil compaction and disturbance, particularly during drilling operations or movement of equipment. This soil disturbance can disrupt the natural structure and composition of the soil, affecting its ability to support vegetation growth and nutrient cycling.</p>	<ol style="list-style-type: none"> <li>1. Proper Planning and Design: Incorporate soil protection measures into the initial planning and design phase of construction projects. This includes identifying sensitive areas and implementing appropriate construction techniques to minimize soil disturbance.</li> <li>2. Ground Improvement Techniques: Techniques like soil stabilization, grouting, and compaction can help improve the soil's strength and stability, reducing the likelihood of soil disturbance during construction.</li> </ol>	<p>A helical pile is a type of deep foundation system used in construction. It consists of a steel shaft with helical plates or blades that are twisted into the ground to provide support for structures. Helical piles are commonly used in situations where traditional foundation methods are impractical or costly, such as in areas with poor soil conditions or limited access for heavy machinery.</p>
<p><b>Energy Consumption:</b> The operation of machinery requires energy, typically derived from fossil fuels. The extraction, processing, and combustion of these fuels contribute to greenhouse gas emissions and contribute to climate change.</p>	<ol style="list-style-type: none"> <li>1. Training: workers are trained in the importance of energy conservation and efficiency. This could involve instruction on when to turn off equipment, how to use machinery efficiently, and the benefits of energy conservation.</li> <li>2. Efficient Equipment and Machinery: Use energy-efficient machinery and equipment that consume less energy during operation. Regular maintenance and proper calibration of machinery can also improve energy efficiency and reduce energy waste.</li> </ol>	<ol style="list-style-type: none"> <li>1. Prefabrication and Modular Construction: Prefabrication and modular construction methods involve manufacturing building components off-site and assembling them on-site. This approach reduces energy consumption by streamlining the construction process, minimizing material waste, and optimizing energy usage during manufacturing.</li> <li>2. Lean Construction: This methodology helps energy optimization in construction processes.</li> </ol>

<p><b>Waste Generation:</b> Ground investigation and plate load testing may generate various types of waste, including drilling cuttings, excess soil, and construction debris. Improper disposal or management of these wastes can result in soil and water contamination or contribute to landfill usage.</p>	<p><b>Education and Training:</b> education and training are provided to construction workers and staff on proper waste management practices. Raise awareness about the importance of waste reduction, recycling, and responsible disposal methods. Encourage worker participation and engagement in waste management initiatives.</p>	<p><b>Cone Penetration Testing (CPT):</b> CPT is a method of ground investigation that produces minimal waste compared to traditional drilling methods. It involves pushing a cone-shaped probe into the ground and measuring the resistance, which can provide valuable information about the soil conditions with less soil disturbance.</p>
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