i. Thermography: An infrared thermometer or camera allows for an accurate, non-contact assessment of temperature. Applications for motors include bearing and electrical contact assessments on motor systems and motor control centers.
ii. Ultrasonic Analyzer: Electric motor systems emit very distinct sound patterns around bearings. In most cases, these sounds are not audible to the unaided ear or are drown-out by other equipment noises. Using an ultrasonic detector, the analyst is able to isolate the frequency of sound being emitted by the bearing. Changes in these ultrasonic wave emissions are indicative of changes in equipment condition-some of these changes can be a precursor to component degradation and failure.
iii. Vibration Analyzer: The rotational motion within electric motors generates distinct patterns and levels of vibration. Using a vibration analyzer and signature analysis software, the analyst can discern the vibration amplitude of the point on the motor being monitored. This amplitude is then compared with trended readings. Changes in these readings are indicative of changes in equipment condition.
iv. Other Motor Analysis: Motor faults or conditions including winding short-circuits, open coils, improper torque settings, as well as many mechanical problems can be diagnosed using a variety of motor analysis techniques. These techniques are usually very specialized to specific motor types and expected faults.

3.13 Operational Maintenance

Operational Maintenance shall be provided for all assets and shall include, but not be limited to, the following activities:

3.13.1 M&E (Non-Infrastructure Assets)

a) Inspect, monitor and cleanse all M&E Assets
b) Replacement of normally consumable (wearable, short-lived) items such as lubricants, seals, packings, bearings, bushes, shaft sleeves, wear-rings, O-rings, gaskets, filters and belts; record the usage of all consumables.
c) Align and readjust equipment mounts or couplings.
d) Repair/replace breaker operating mechanisms. Clean and re-lubricate operating mechanisms.
e) Repair / replace eroded / contaminated / damaged / loose contacts.
f) Replacement of relays, fuses, bulbs, holders, terminal blocks, lights, lamps and contactors.
g) General cleaning and debris/dust removal from motors, switchgear, transformers, and other such electrical equipment and conductor contact surfaces.
h) Regular tightening of fasteners on electrical equipment to appropriate torque values.
i) Regular measurement of insulation resistance, breaker trip times, check current settings and protective, calibrate relays.
j) Routine earth resistance monitoring, power quality and harmonics monitoring.
k) Repair of pipeline joints, valve, coupling and tee leaks.
l) Maintain and service air conditioning equipment.
m) Preventative maintenance activities designed to maximize asset life.
n) Rust patch touch up using DMAT approved epoxy paint.

3.13.2 Civil (Non-Infrastructure Assets)

a) Undertake buildings and ground maintenance. cleansing, painting, pest and insect control.
b) Undertake local excavation to attend to minor leaks or minor structural repairs.
c) Inspect, monitor and cleanse all civil assets.
d) Undertake minor repairs to joint seals, concrete cracks.
e) Concrete minor repairs.