

## CHAPTER 7.0. CONCLUSIONS AND RECOMMENDATIONS

The results of this study and the method evaluations revealed the following conclusions and recommendations.

### 7.1 CONCLUSION

The methods described below are listed in order of their capability and cost-effectiveness in detecting near surface voids.

#### Ground Penetrating Radar

- Effective in detecting voids to 4.0 m without calibration.
- Practical for determining shallow void characteristics.

#### Magnetics

- Rapid data collection, processing, and interpretation.
- Field survey can be conducted over large area.

#### Electrical Resistivity

- Effective in detecting voids at each site.
- Difficult to collect data in confined areas, over single lane roads, or over roads with tight curves.

#### High Resolution Shear Wave

- Effective in identifying each of the known caves.
- Effective in locating voids with greater overburden.
- Data processing and interpretation is time consuming and requires experienced geophysicist.

### 7.2 RECOMMENDATIONS

The combined GPR and magnetic methods would be the most economical and least time consuming for detecting voids over large areas. These geophysical methods can locate and characterize voids whose depths range between 0 to 9 m (0 to 30 ft). Magnetic surveys should be performed first as a reconnaissance tool in order to locate the position of magnetic anomalies that may indicate the presence of potential voids. A focused GPR survey would then be conducted to evaluate each magnetic anomaly and to determine the depth and lateral extent of the features.