**Network Analysis Steps**

This document outlines the step-by-step workflow for reproducing the network road distance analysis to map hospital accessibility zones within the Greater Toronto Area (GTA) using ArcGIS.

**Objective**

To calculate driving distances (1, 2, 5, and 10 km) from hospitals within the GTA, identifying accessibility zones and creating a map with clear symbology.

**Steps**

**Part 1: Data Preparation**

1. **Download and Unzip Data**:
   * Obtain the road network, hospital locations, and GTA boundary shapefiles from the provided data source.
   * Unzip each folder and navigate to the spatial subfolder to locate the shapefiles.
2. **Clip Data to GTA Boundary**:
   * Open ArcGIS and load the Ontario-wide road network, hospital locations, and GTA boundary layers.
   * Use the **Clip Tool**:
     + Input Feature: Ontario-wide roads or hospitals.
     + Clip Feature: GTA boundary layer.
     + Output Feature: Save as a new shapefile.
   * Remove the original layers after clipping.
3. **Reproject Data**:
   * Open the **Project Tool**: Data Management Tools > Projections and Transformations > Project.
   * Input Dataset: Clipped road and hospital layers.
   * Output Coordinate System: NAD83/UTM Zone 17N.
   * Save the reprojected layers and remove the original layers.
4. **Export Features**:
   * Right-click each reprojected layer > Data > Export Features.
   * Save the final datasets for the next steps.

**Part 2: Create Network Dataset**

1. **Create a Feature Dataset**:
   * In the Catalog pane, navigate to your workspace.
   * Right-click the .gdb file > New > Feature Dataset > Name it Network.
   * Drag the reprojected road feature into this dataset.
2. **Create a Network Dataset**:
   * Right-click the road feature > New > Network Dataset.
   * Name the dataset and select the road feature as the input.
   * For Elevation Model, select No Elevation.
3. **Set Travel Attributes**:
   * Right-click the Network Dataset > Properties.
   * Under **Travel Attributes**, add Length as the cost attribute.
   * Save and click Build to calculate the topology.

**Part 3: Perform Network Analysis**

1. **Create Service Area Layer**:
   * In the **Analysis** panel, click Network Analysis > New Service Area.
   * Right-click the Service Area layer > Properties.
2. **Import Hospital Locations**:
   * Under Facilities, click Import Facilities and select the hospital locations layer.
3. **Set Distance Cutoffs**:
   * In the Service Area layer, set distance cutoffs to 1000, 2000, 5000, 10000 meters.
   * Under Output Geometry, select Dissolve.
4. **Run the Analysis**:
   * Click Run to calculate the service areas for each distance range.

**Part 4: Create the Map**

1. **Style the Service Area Layer**:
   * Apply symbology to differentiate the four distance ranges (e.g., different colors for 1 km, 2 km, 5 km, and 10 km).
2. **Add Key Map Elements**:
   * Include a legend, north arrow, scale bar, and title.
   * Ensure the map layout is clear and readable.
3. **Export the Map**:
   * Export the final map as a high-resolution PDF or image for presentation.