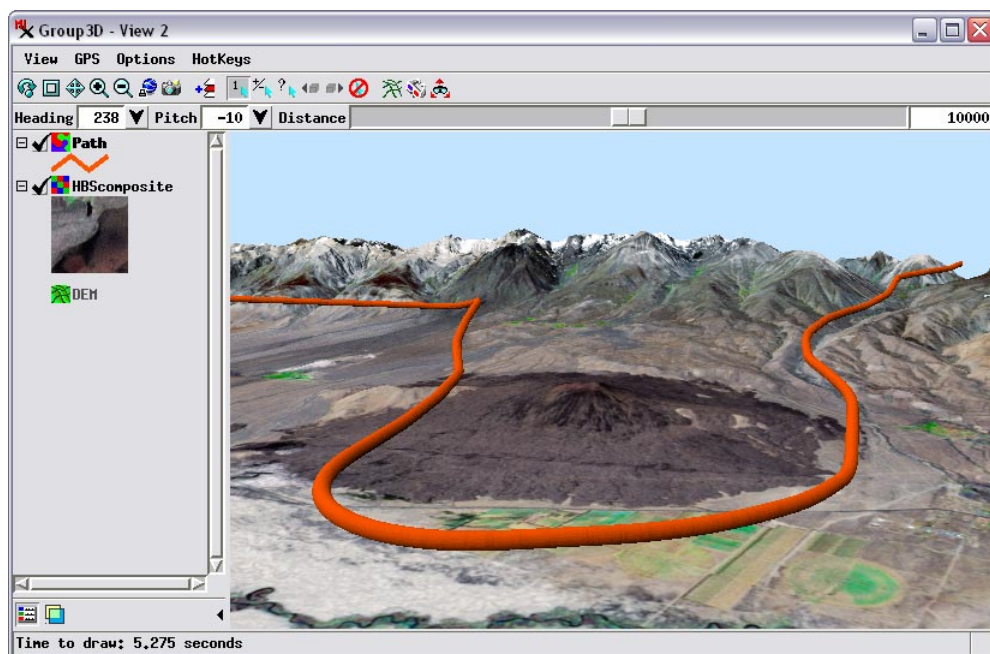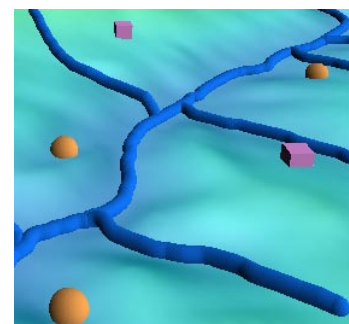# Render 3D Elements as 3D Shapes

Vector objects with 3D (XYZ) coordinates can be used in 3D Views with or without a surface layer. All elements in a 3D vector object are rendered in the 3D space at the XYZ positions specified by their stored coordinates; they are not "draped" over a surface layer even when one is present.

Point and line elements in 3D vector objects are automatically rendered in 3D Views as solid shapes with appropriate illumination shading. 3D points are rendered in 3D views as solid spheres (if styled for 2D with a standard circle symbol) or solid cubes (if styled with a standard square or other symbol). Solid 3D lines are rendered as continuous cylindrical pipes. 3D lines that use line patterns in 2D are represented in 3D as combinations of pipes and pipe segments (solid and dashed components) and spheres (dots). The size and width criteria you have set up for these symbols are maintained in the 3D View. Sizing symbols to a design scale or map scale produces the expected decrease in symbol size from foreground to background that is consis-
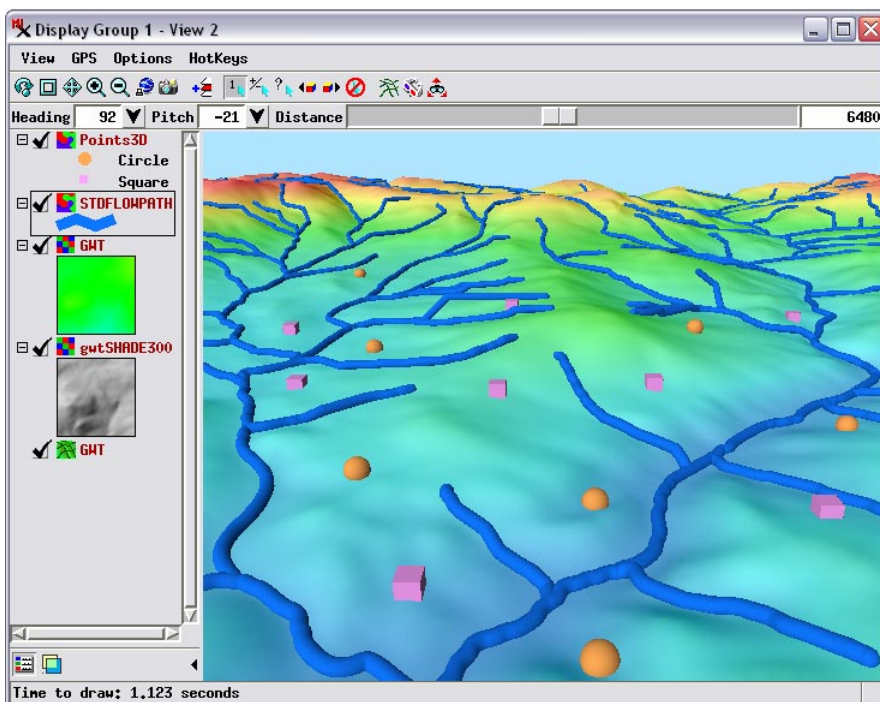
The perspective View above combines 3D vector lines rendered as solid pipes (representing streams) with points rendered as spheres and cubes. Some of the solid point symbols intersect the underlying color-shaded surface (which represents the ground-water table). The inset to the right shows a portion of the view with different illumination direction.

tent with the other perspective effects in the 3D View.

Where 3D points or lines lie on or just above the terrain surface, their symbols intersect the surface and are rendered appropriately; the portion of the symbol below the surface is hidden by any opaque layer draping that surface.

Shading effects for the 3D solid shapes can be adjusted using the Sun Elevation Angle and Sun Azimuth Angle sliders on the 3D Viewpoint Controls window for the 3D group.

Perspective view with a 3D line representing a flight path above the terrain. Solid lines and line patterns for 3D lines are automatically rendered using 3D shapes.