

## **What is a Geographic Information System?**

GIS stands for *geographic information system*. A GIS is made up of digital map layers, each with an underlying database. Each map layer has real world coordinates so that layers can be overlaid to view map layers in relation to other map layers. Each layer's database contains information about the map features in that layer. For example, the streets map layer contains information about whether a street is paved or unpaved. This information is stored in the database for each street. Database information can be queried or used to color-code the map. In addition, external databases can be joined to a map layer so that additional information can be displayed on a map. GIS is intelligent mapping.

## **How is GIS used in North Reading?**

GIS provides Town staff a powerful tool to make better decisions through query and visualization of geographic information. In North Reading the Department of Public Works is responsible for managing the GIS program for the Town. Hosting of the GIS interactive property map is done via a consultant & maps are produced in-house and by consultants.

## **How does GIS differ from Internet sites such as MapQuest, Google Maps, or Bing?**

There is more and more overlap between free, on-line mapping sites and GIS. Some of the same imagery that you see in Google Maps, for example, is also used in North Reading's GIS. Some on-line sites offer driving directions or are aimed at consumer needs (*Where is the nearest coffee shop?*). Others allow the user to virtually fly around the Eifel Tower or the Grand Canyon. The on-line sites are primarily "viewers", however, while GIS is primarily an analysis tool. GIS uses spatial analysis tools to, for example, notify abutters to a proposed subdivision, calculate impervious surface areas, or find properties over five acres in size within a particular zoning district. Recently completed water and drain GIS layers will be used to plan the replacement of older pipes, and could be used to notify home owners affected by a water main break. GIS can be a regulatory tool, an asset maintenance tool, or a public safety tool. In North Reading, we strive to maintain current map layers and build new map layers to support the types of analysis that Town staffs are doing now or that they may need in the future.

Another distinction between on-line mapping sites and GIS is the importance of spatial accuracy in the GIS. GIS requires that each map layer have highly accurate coordinates so that layers will overlay each other precisely. This is particularly important with aerial imagery. Aerial photos developed for municipal GIS purposes typically have a pixel resolution of six, or even three, inches. State-wide aerials, such as those seen in Google Maps, have a pixel resolution of about 18 inches, while satellite images have a resolution of 2.5 feet or more. The latter are excellent resources for regional analysis, but are not sufficient for most local uses.

Bing, Google, MapQuest and other such sites rarely acquire data directly from towns. Third party firms or aggregators such as state GIS agencies generally provide the data. Consequently, the data are likely to be less up-to-date than our local GIS data.

## **Where does North Reading's GIS data come from and how often is it updated?**

The Town's most important GIS layers are developed by or for the Town of North Reading. These include parcels and "planimetric" layers such as building footprints, roads, sidewalks, driveways, parking areas, streams, and wetlands. Parcels are updated annually by Town consultants. Planimetric layers are created by tracing around features visible in aerial photographs. Ours are based on 2003 aerial photos and were created by the firm that did the photography - these are unlikely to be updated until another flyover is done. Smaller datasets such as zoning, voting precinct maps, street maps, census tracts, flood zones, street & sidewalk snowplow routes, and historic properties are created and updated in-house as needed. Utility data such as water and drain layers are usually created by consultants and updated in-house. MassGIS, the state's GIS agency, is another important source of data; these layers include flood zones, vernal pools, highways, and many other state-wide layers.