# Address Points *for the Nation*

Contrasting the functions of Address Points and Parcel Maps

## Government needs a Central Address Database with Map Coordinates (Points)

### To Save Lives

Addresses are the most commonly used way to communicate the location of an emergency. Fire and police agencies respond to emergencies that are reported to the 911 call centers known as Public Safety Answering Points (PSAPs). The PSAPs across the nation use many different ways of locating people in distress. Address points allow them to pinpoint the locations of structures so that even at night, or in a dense fog or snow that limits visibility you can get to the correct location right away. Going to the wrong house in the case of a heart attack can waste several minutes and cost lives.

### To Save Energy & Time

Many government agencies operate large fleets of vehicles. For example, the U.S. Postal Service manages over 218,000 vehicles in the largest civilian fleet on Earth. Its vehicles are driven 4.1 million miles per day to 150 million residences and consume over 400,000 gallons of fuel each day. While the USPS routing may already be optimized, many other fleet operations are not. The use of precise address points is required to achieve the maximum efficiency in Automated Vehicle Routing software that can typically save up to 15% of the fuel and maintenance costs for a vehicle fleet and allow existing staff to accomplish their work more efficiently.

### To Improve Services

Addresses are used to locate residences, businesses and other "built" locations, for the provision of nearly all government services such as utility hookups, in-home social services, licensing and permitting. The private sector also uses accurate addresses to improve its bottom line and customer service. In 2003, Sears reported that they reduced their route planning time from four hours per day to less than one for appliance deliveries and improved its customer delivery window from four hours to two in 82 percent of deliveries. Simultaneously, delivery mileage was reduced and equipment utilization and stops per vehicle increased.

## Current Situation

In the first half of 2009, the **U.S. Census Bureau** developed a highly accurate, national address database of residential structures that included x & y map coordinates with the addresses. The cost of this effort was $444 million. Because this file is not publicly available, in 2010 the **National Telecommunications Information Agency** (NTIA) issued millions of dollars in grants to states to create address point files as part of their broadband mapping efforts. The **U.S. Postal Service** also plans to build an address point file in 2011 that will not be publicly accessible. **Local governments** routinely produce address point files for **E-911** and other applications. Some states already integrate the efforts of local government into comprehensive statewide files. Multiple files of varying quality and completeness exist throughout the country that are based on varying standards. This has happened, because there is no national program or leadership to address this issue. Congress has contributed to the problem by authorizing agencies like the Census Bureau through Title 13 and the U.S. Postal Service through Title 39 to treat addresses as confidential information which they are not. NTIA is taking the right approach to build publicly accessible data. Agencies that must restrict access to data should be consumers and not producers of address data.

# Finding Citizens in Need

Government agencies must maintain precise address locations for structures to ensure timely delivery of emergency services and for a host of other applications.  This is especially important in rural areas where ingress points to properties may not be obvious, such as in large wooded lots (example below) or where road signage is not adequate.  Firefighters  and police officers often waste significant time searching for homes in these areas.

**Rural areas present complex addressing problems for service delivery due to the 'hidden' nature of many homes and the way that addresses are assigned.  The five homes at right share one ingress point from a county road.  Signage, often inadequate for properties of this type, becomes much less important when first responders have precise address point data to quickly locate a home or business.**

This address point is misplaced for its corresponding property and users can't be certain which of these five homes it identifies.

# Precision Improves Efficiency

Currently, most in-car GPS systems and internet based mapping systems use address ranges that are associated with road segments such as the two block segment of a road in the graphic below to the left.  This allows a person to find the general area of the address they are seeking.  Often, the actual location of a structure can be several hundred feet from the point estimated by a GPS unit and it can even be on the wrong side of a major highway.  While this approach works reasonably well for general uses, it is unacceptable for many government services like fire and police response to emergencies.  Precise address points look more like the graphic in the blue oval on the right where the red "+" symbols represent the actual locations of individual structures along the street that are just evenly spaced in the blue oval at left.  Tremendous improvements in efficiency can be realized by providing widespread access to accurate government address point files.

**Theoretical Locations**
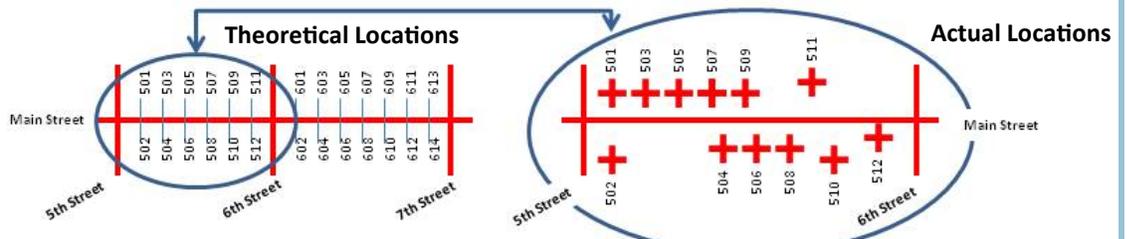
**Actual Locations**

The above graphic shows evenly spaced addressing (at left) that is similar to the data used in today's GPS navigation units and 'actual' address points for structures (at right) which are required to find exact locations.  This becomes a much greater concern over long distances or when homes don't display numbers or are hidden from public view.

# Address & Building Relationships

**One Address with Many Buildings -** Government or business complexes, and college campuses like the one pictured below are typically located on one or more parcels and only have one address for mail delivery. Mail is distributed throughout the campus by a 'mailroom' facility. This works well in the normal course of business, but when emergencies strike (i.e. Virginia Tech shootings), first responders must reach the right building which may not even be readily accessible from some parts of the campus. They can't be expected to know the names of each building or their placement in very large complexes. This requires a concerted effort to address each building in a campus setting, even when it is perfectly acceptable for the entire campus to be registered to one owner.
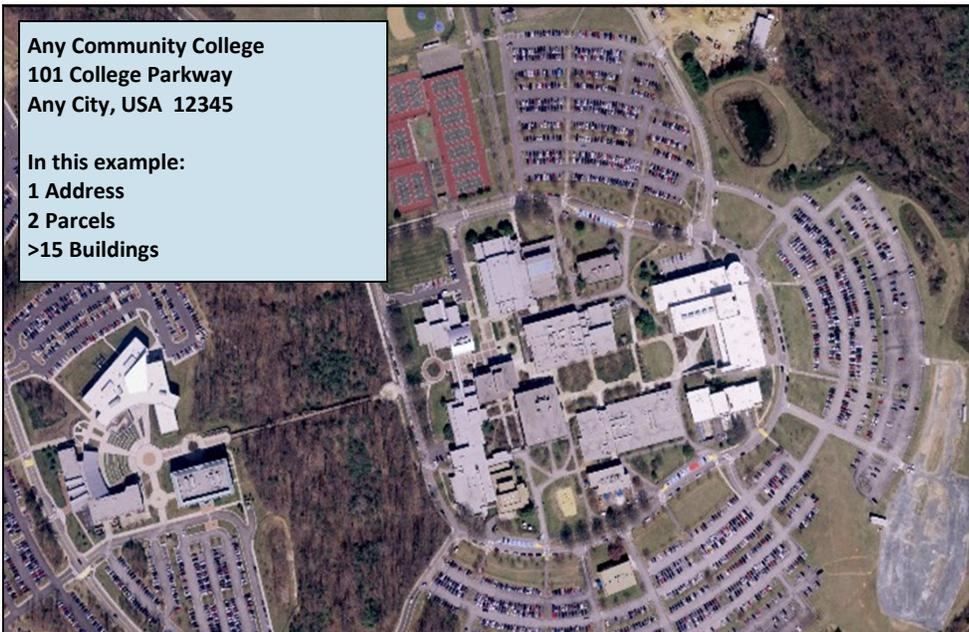


**Any Community College**
**101 College Parkway**
**Any City, USA  12345**

**In this example:**
**1 Address**
**2 Parcels**
**>15 Buildings**

Urbanized areas present their own unique problems related to multiple housing units at a single address (e.g. condominiums and apartment buildings) and single campus locations with multiple buildings such as universities. Address point data can carry building names and access directions in addition to the actual address.

**One Building with Many Owner Occupied Structures and Many Addresses -** A condominium building like the one pictured at right may use one address for each building with additional unit number identifiers for mail delivery. This works well even when emergencies strike, because first responders reach the right building and can find the individual unit. Single address with unit number modifiers are in common use and widely understood.

- Unit 2108
- Unit 2008
- Unit 1908
- Unit 1808
- Unit 1708
- Unit 1608
- Unit 1508
- Unit 1408
- Unit 1308
- Unit 1208
  Etc.
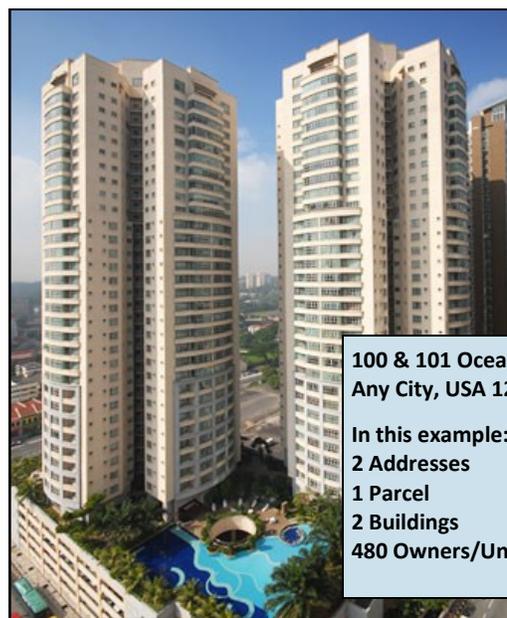


**100 & 101 Ocean View Ave**
**Any City, USA 12345**

**In this example:**
**2 Addresses**
**1 Parcel**
**2 Buildings**
**480 Owners/Units**

## ADDRESS POINTS

are defined and created for different purposes. They can show the point where ingress to a property can be made, or they can fall directly on improved structures such as a home or business. Other variations are often used.

## PARCEL MAPS

"Best Fit" parcel maps show the approximate locations of parcel boundaries. They are usually based on some consistent map base such as the USGS 7.5' topographic map or more current orthoimagery.

Survey grade parcel boundaries are constructed from Deed descriptions. They are built from an identifiable starting point using precise boundary distances and angles that are described each time the parcel boundary changes direction.

# Address Point Progression

### ADDRESS

24760 Logans Woods Dr.
Denton, Maryland 21629



**SAMPLE USES:**
- Mail Delivery
- Relating government records for fraud detection (if standardized)

### ADDRESS POINTS

24760 Logans Woods Dr.
Denton, Maryland  21629

**+** X & Y Map Coordinates



**SAMPLE USES:**
- Locating residences or businesses in emergencies (i.e. wild fires)
- Determining voter precincts
- GPS Navigation

### ADDRESS POINTS with LIMITED PARCEL DATA

24760 Logans Woods Dr.
Denton, Maryland  21629

**+** X & Y Map Coordinates

Parcel ID with links to:
**+** Ownership
**+** Value of Land/Structures
**+** Age/Type of Structures
**+** Sales Data, Etc.

**SAMPLE USES:**
- Analyzing property ownership in contrast to population demographics
- Monitoring the health of the housing industry

**Increasing Complexity and Cost for Address Point and Parcel Data** →

# Parcel Data Progression

### PARCEL CHARACTERISTICS
There are many types of Parcel databases. They are generally developed by government agencies to assist in identifying land ownership and for tax assessment purposes. They include general ownership information and the characteristics of the property, including address and value. Computer Aided Mass Appraisal (CAMA) files generally have additional detailed information about the characteristics of the property.

**SAMPLE USES:**
- Identify ownership
- Tax Assessment
- Analysis

### PARCEL POINTS
This type of data uses digital parcel points identified by various means such as center locations (red dots below).
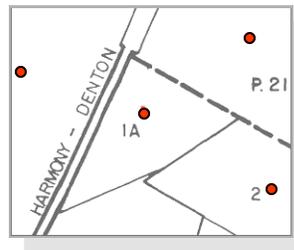


**SAMPLE USES:**
- Analyzing the completeness of tax records
- Identifying contacts to access stream sampling sites or other features that require passage across private property

### PARCEL POLYGONS
This type of map can be generated using different techniques that essentially range from 'visual' placement to a legal representation of the boundary.



**SAMPLE USES:**
- Determining lands with no apparent ownership
- Determining what portion of a property falls within the floodplain
- Legal and precise definition of parcel boundaries to ensure accurate information and results

# Why Should We Do Anything?

The Danish Government has determined the direct economic benefit of building and sharing their national address data is $18 million annually with 70% of that going to the private sector. Given the size ratios of the two countries, this would equate to over $1 billion annually for the U.S. economy. If this isn't enough incentive, consider the following.

The Government Accountability Office (GAO) has been directed by Congress to identify federal programs, agencies, offices and initiatives, either within departments or government-wide,

which have duplicative goals or activities. In their first annual report (GAO-11-318SP, March 2011), they have identified many duplicative programs and provided supporting information about their wasteful practices. Nothing in this report relates to the production or maintenance of geospatial data which can be among the most costly of all data types.

In the 112th Congress, Representative Brady (TX) introduced HR 235 which calls for the Federal Office of Management and Budget (OMB) to provide additional oversight and help Congress identify duplicative and

wasteful programs through language contained in Section 11.

OMB Circular A-16 already identifies Federal agencies that should be the stewards of select geospatial data types. Unfortunately, many agencies ignore their mandate to become the custodian, which results in other agencies duplicating effort to serve their own purposes.

The existing duplication of effort at all levels of government to create address point files easily exceeds $1 billion and most of the data is not publicly accessible.

> **By not coordinating the development of a national address point file, the United States is losing $1 billion annually in economic benefits and wasting over $1 billion through duplication of effort.**

# Using Address Points and Parcel Maps

Parcels are units of land with well-defined boundaries and are most often used in conjunction with analyses related to land ownership. Addresses are conceptual locations that are paired with a commonly used reference name.

Addresses may refer to several locations within the same general area (entrance, structure, lot, campus, etc.), and there are valid cases for representing addresses as a single point, collection of points, or a polygon. Parcels often have many attributes and the relationship between site addresses and parcels can be 'many to many.' A single address may refer to a collection of parcels and a single parcel may have many addresses that fall within its bounds. For this reason, parcel data is not

a good substitute for address point data.

Both parcels and addresses are important data resources, but each is a poor substitute for the other. Parcels are needed for applications where details of land ownership and extent are important. The key question for potential parcel data usage should be, "Are depictions of land ownership boundaries necessary?" If the answer is 'yes,' parcels are needed. If 'no,' and locations are referenced to structures or addresses, then address points are likely to be the less costly option, in addition to being simpler to build, maintain and utilize.

Many data integration projects exist where addresses in tabular (non-geographic) form are the greatest common factor between disjointed data resources.

In some cases, both parcels and addresses are required. For example, during a flood event, no one will provide their parcel ID number as a rescue location. An address or location description based on streets will most likely be used to find the person in distress. However, for flood insurance payments and other analyses of flooding impacts, a parcel dataset will be the best reference layer, because it can show the specific level of impacts for each property.

Due to the complexities and cost of developing digital parcel maps, joining parcel data attributes such as acreage and assessed value to address point files can be a valuable interim product.

The National States Geographic Information Council (NSGIC) is a nonpartisan 501 (c) 6 organization committed to efficient and effective government through the prudent adoption of geospatial technologies. Established in 1991, NSGIC voting members include senior state geographic information officers, coordinators, managers and statewide GIS Councils. NSGIC's mission is to promote statewide geospatial coordination activities in all states and be an effective advocate for states in national geospatial policy initiatives, thereby enabling the National Spatial Data Infrastructure

# Steps that Need to be Taken

A framework allowing Federal, state and local government agencies to partner on production of Address Points must be encouraged/mandated and funded. Opportunities should also exist for the private sector to participate. The following steps will promote this partnership:

- Congress should instruct Federal agencies to jointly develop a common address point file in cooperation with state and local governments and ensure that this file will be publicly available to promote economic growth and government efficiency.

- Congress should look at the multiple efforts of federal agencies to maintain nation-wide address data and move to eliminate duplication.

- If a national address point file can be publicly shareable, the U.S. Census Bureau should become the data steward for this file and adhere to the new Supplemental Guidance in OMB Circular A-16.
- If existing privacy constraints cannot be addressed, another Federal agency without such constraints should become the custodian of address points and all other agencies should obtain their information from this unrestricted source.
- States must coordinate the development of address point files working with local governments.
- In anticipation of the 2020 decennial Census, and to support the American Community Survey, the U.S. Census Bureau should

contract with willing States to coordinate state and local government address data activity and to provide pass-through funding to maintain local address point files. These data should be developed locally with local and state agencies acting as data integrators.
- A national business plan for address points must be created and adopted by all Federal, state and local agencies, including a suitable data standard, data model, exchange standard and funding model.