



Energy Benchmarking with UBIDs - Draft

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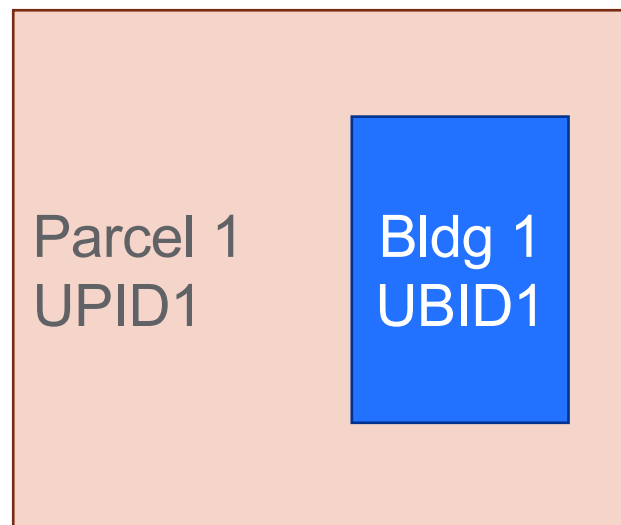
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Working Backwards: What Should It Look Like in Portfolio Manager?

Note: This presentation does not delve into the format or implementation of UBIDs for parcels. In this deck we refer to UPIDs for parcels and USIDs for tenant spaces for communication purposes.

1 Building, 1 Parcel



If single reporter and meter for entire building

Entry	UBID	Parcel UBID	Energy Data
PM ID 1	UBID1	UPID1	Whole Building

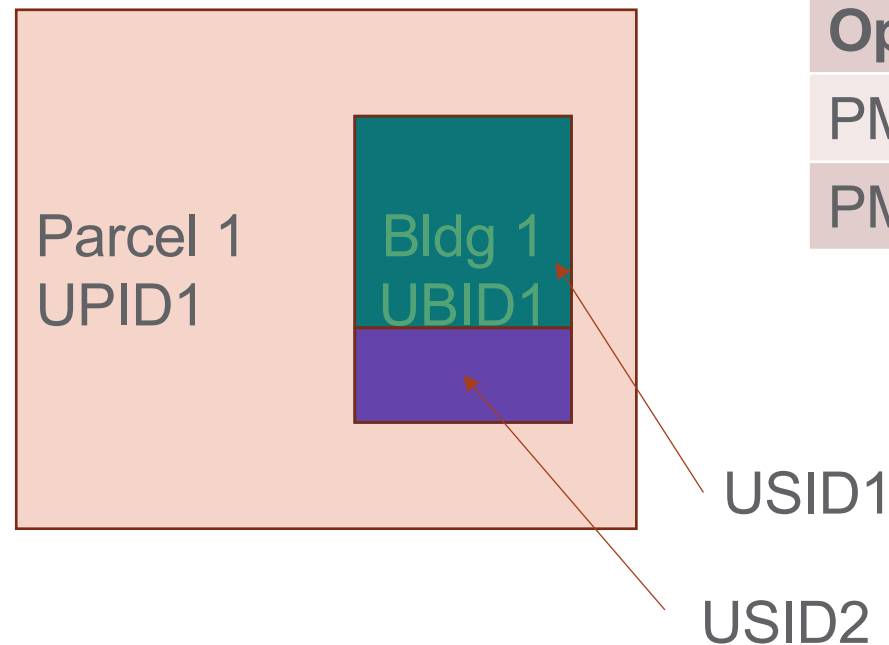
If multiple reporters in building with separate meter/energy data

Entry	UBID	Parcel UBID	Energy Data
Option 1:			
PM ID 1	UBID1	UPID1	Submeter
PM ID 2	UBID1	UPID1	Submeter

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If multiple reporters in building with separate meter/energy data

1 Building, 1 Parcel
Option 2



Entry	UBID	Unique Space ID	Unique Parcel ID	Energy Data
Option 2				
PM ID 1	UBID1	USID1	UPID1	Submeter
PM ID 2	UBID1	USID2	UPID1	Submeter

- Ask reporters with submeters to draw the space that applies to their energy data
- Question for partners: would this additional granularity be useful for potential use cases? Is it worth the additional lift for collecting and managing it?

Working Backwards: What Should It Look Like in Portfolio Manager?

Many Building, 1 Parcel



If single reporter and meter for entire property

Entry	UBID	Parcel UBID	Energy Data
PM ID 1	UBID1; UBID2	UPID1	Multi-Building

If separate reporters and meters for each building

Entry	UBID	Parcel UBID	Energy Data
PM ID 1	UBID1	UPID1	Whole Building
PM ID 2	UBID2	UPID1	Whole Building

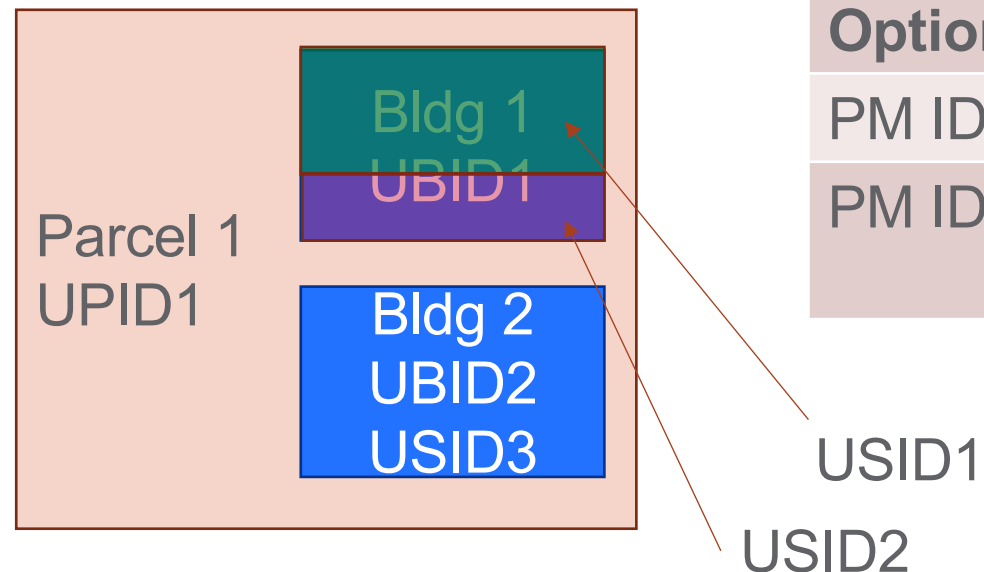
If reporter and meter data do not align with buildings
(e.g. reporter 1 owns part of Bldg1 and reporter 2 owns the remainder of Bldg1 and all of Bldg2)

Entry	UBID	Parcel UBID	Energy Data
Option 1:			
PM ID 1	UBID1	UPID1	Submeter
PM ID 2	UBID1; UBID2	UPID1	Multi-Building

Working Backwards: What Should It Look Like in Portfolio Manager?

If reporter and meter data do not align with buildings
(e.g. reporter 1 owns part of Bldg1 and reporter 2 owns the remainder of Bldg1 and all of Bldg2)

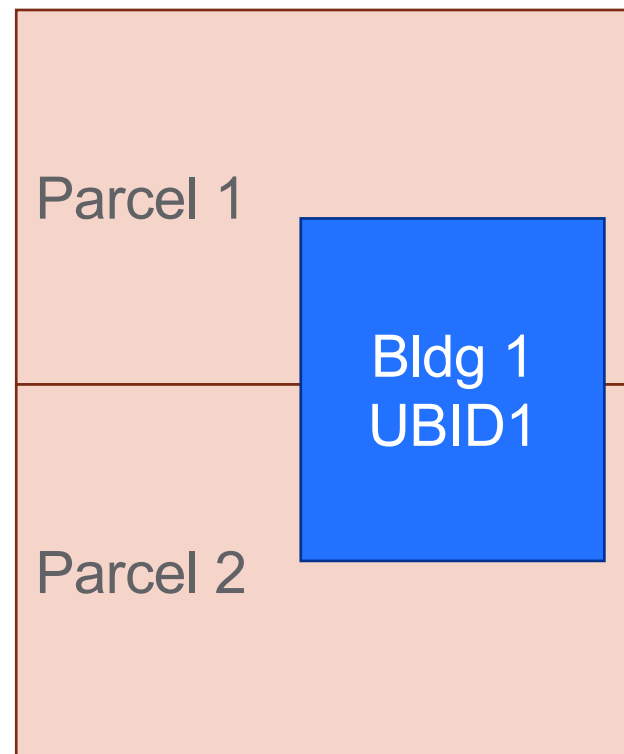
Many Building, 1 Parcel



Entry	UBID	Unique Space ID	Unique Parcel ID	Energy Data
Option 2:				
PM ID 1	UBID1	USID1	UPID1	Submeter
PM ID 2	UBID1; UBID2	USID2; USID3	UPID1	Multi-Building

Working Backwards: What Should It Look Like in Portfolio Manager?

1 Building, Many Parcel



If single reporter and meter for entire building

Entry	UBID	Parcel UBID	Energy Data
PM ID 1	UBID1	UPID1; UPID2	Whole Building

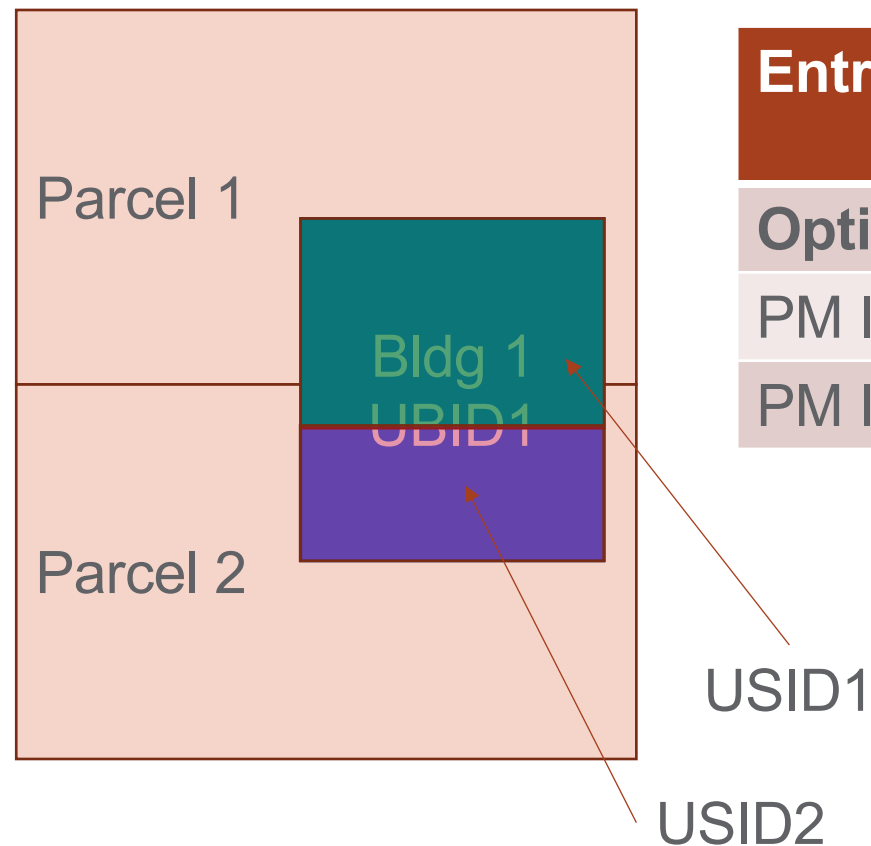
If multiple tenants/reporters with separate meters

Entry	UBID	Parcel UBID	Energy Data
Option 1:			
PM ID 1	UBID1	UPID1; UPID2	Submeter
PM ID 2	UBID1	UPID1; UPID2	Submeter

Working Backwards: What Should It Look Like in Portfolio Manager?

1 Building, Many Parcel

If multiple tenants/reporters with separate meters



Entry	UBID	Unique Space ID	Unique Parcel ID	Energy Data
Option 2:				
PM ID 1	UBID1	USID1	UPID1; UPID2	Submeter
PM ID 2	UBID1	USID2	UPID1; UPID2	Submeter

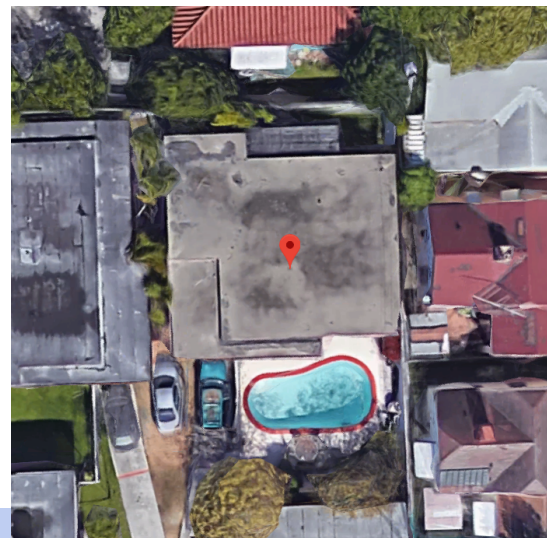
- Note: we could align the spaces with the parcel association (i.e. UPID1; UPID2 for the first entry and just UPID2 for the second entry) – but probably cleaner to maintain building-parcel relationships than space-parcel relationships

Proposed Workflow

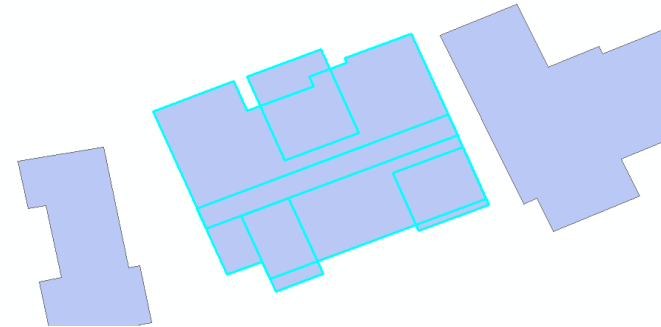
1. Clean footprint data if necessary
2. Assign UBIDs to building footprints
3. Understand parcel data organization
4. Match covered parcels to buildings geospatially
5. Send parcel(s) and associated UBIDs to reporters
6. Reporters confirm the parcel and associated building/UBID information when reporting

1. Clean Data (if necessary)

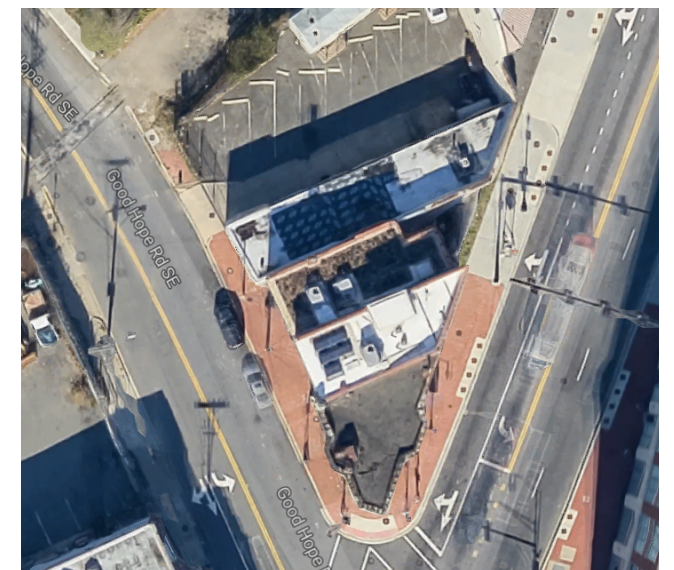
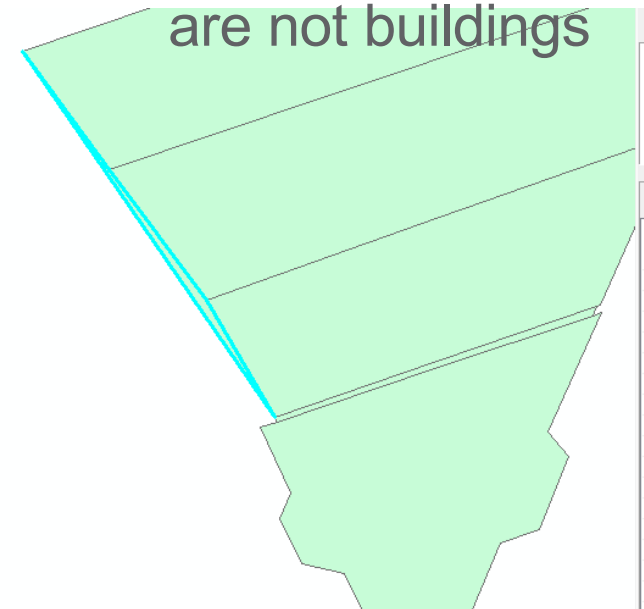
Remove
duplicates



Dissolve
fragmented
footprints



Remove objects that
are not buildings



2. Assign UBID to Building Footprints

<https://github.com/pnnl/buildingid-py/blob/master/README.rst>

Tutorials

Instructions in this section use [Bash](#) syntax.

Append UBID field to CSV file

Prerequisites

1. `buildingid` command is installed.
 - o Verify installation:
 - `buildingid --version`
 - Expected output: "buildingid, version 2.0.0" (or higher version)

Step-by-step instructions

1. Locate input CSV file, e.g., `path/to/in.csv`.
2. Locate output CSV file (generated), e.g., `path/to/out.csv`.
3. Locate errors CSV file (generated), e.g., `path/to/err.csv`.
4. Identify number of digits in [Open Location Code \(OLC\)](#) part of UBID code string, e.g., 11.
5. Identify column of output CSV file that contains UBID code strings, e.g., "UBID".
6. If input CSV file contains latitude and longitude coordinates for a centroid only:
 - i. Identify columns of input CSV file that contain latitude and longitude coordinates, e.g., "Latitude" and "Longitude".
 - ii. Assign UBIDs:
 - `buildingid append2csv latlng --code-length=11 --fieldname-code="UBID" --fieldname-center-latitude="Latitude" --fieldname-center-longitude="Longitude" < path/to/in.csv > path/to/out.csv 2> path/to/err.csv`
7. If input CSV file contains latitude and longitude coordinates for (i) a centroid and (ii) the northeast and southwest corners of a bounding box:
 - i. Identify columns of input CSV file that contain latitude and longitude coordinates, e.g., "Latitude_C", "Longitude_C", "Latitude_N", "Longitude_E", "Latitude_S", and "Longitude_W".

3. Understand Parcel Organization

- History and organization of parcels can be complicated – very important to understand the organization to create a workflow for Step 4

Common Ownership Lots

Description:

Abstract: The common ownership lots is a single polygon layer that is built from various polygon feature classes of the District's Vector Property Mapping database including the below. It represents all lands that are outside right-of-way. Record Lots Tax Lots Parcel Lots Reservation Lots Air Rights Lots All of which are found separately on <http://data.dc.gov>. The Office of Tax and Revenue maintains a database known as Information Tax System (ITS) that contains the accounts for the real property taxes. ITS records reference record lots, tax lots, parcels, condominiums and federally owned lands such as reservations. Information from ITS is conflated to Common Ownership Lot features by SSL (Square, Suffix and Lot). Note: this layer does not include condo records. These can be found in condo relate tables also found on <http://data.dc.gov>. This layer is regenerated WEEKLY with an automated algorithm using the latest Public Extract information for attribution.

Purpose: A single polygon layer that is created from various polygon feature classes of the District's Vector Property Mapping database.

Supplemental Information: The Vector Property data was developed with the oversight of the Office of Chief Technology Officer (OCTO) - DC GIS, Department of Consumer of Regulatory Affairs (DCRA) - Office of the Surveyor (OS), and Office of Tax and Revenue (OTR) - Real Property Tax Administration (RPTA). This effort was undertaken with 2 primary goals: - Support and improve the daily business processes of the two DC agencies that originate and manage land record in the District of Columbia. - Provide important GIS base layers which will be used extensively by many DC government agencies and private companies. Below are the responsibilities which DC agencies have provided throughout the Vector Property data creation and maintenance application lifecycle. Office of the Surveyor- subject matter expertise, provides access and understanding of source documents, extensive resource support, and assists with Vector Property GDB and Maintenance requirements. RPTA- subject matter expertise, provides access and understanding of source documents, extensive resource and IT support, and assists with Vector Property GDB and Maintenance requirements. OCTO- Assists with Geodatabase and Maintenance requirements, QC and Program Management staffing. Vector Property database and Citrix Support. Project oversight. Air Rights (AirRightsLotsPT, AirRightsLotsLN, AirRightsLotsPLY) - Air right lots are established by RPTA to reflect a party's right to construct an improvement above an existing area of land that is not owned by the constructor. They are a type of development right in real estate referring to the empty space about a property. These tax lot numbers start at 7000. There are approximately 704 air rights lots. Air rights are taxed in DC. Condo Approval Lots - Condo lots are individual lots for each condominium. The lot numbers normally range from 2000-6999. These condo lots are not geographically defined other than being within a air rights, record, tax or a combination of lots that has one or more condo buildings within it. A condo regime number is assigned to each residential Condo application or Article of Confederation regardless of how many buildings there are at any one site. The Regime number starts with a 1, 2, or 3 depending upon where the condo is located and where they fall in the tri-annual assessment process of RPTA. All numbers after the first are consecutive. RPTA maintains the master list of Regime numbers for residential properties. Commercial condos are not associated with a Regime number and in order to properly track all condos, a unique Regime number was created. RPTA then establishes individual accounts for each condominium unit and assigns a condo lot number to that account. RPTA maintains the master list of Regime numbers and their relationship to approved condos. There are roughly 66571 condo lots and there associations are as follows: 49486 condos were approved for record lots, 16867 were approved for tax lots, 2817 were approved for air rights lots, and 2600 were approved for both air rights and tax lots. The CondoPLY layer was created to assist users in visualizing the relationship between ground surface lots (Record Lots), overlay lots (Air Rights & Tax Lots), and the associated Condos. When Condos are approved for ground lots, those lots remain in the production (active) layer and attributes updated to reflect the new condos. When Condos are approved for overlay lots, those lots are killed (dead lots) and archived to their respective history layer. Condo dwellings can also be queried city-wide via the individual VPM layers (active Record lots, dead Air Rights & Tax lots) where the value in the "UNDERLIES_CONDO" field is equal to 1. Parcel Lots (ParcelsLotsPT, ParcelsLotsLN, ParcelsLotsPLY) - There is still land within the District of Columbia that has never been subdivided into either Record or Tax Lots through the two offices that manage land records (OS & RPTA), this land is referred to as Parcels, expressed as fractions (Ex Parcel 117/36). In this example, the number "36" would be the 36th out conveyance from original Parcel 117. The tracking of parcels was started in 1905 when, by Act of Congress, all the District's unsubdivided properties which were mostly rural farms at the time were given parcel numbers. Their boundaries were also depicted (in many cases approximated), in large books in DCRA's Office of the Surveyor. Until the late 1960s, building permits were routinely issued by the city for new construction on Parcels, but today all Parcels, like Tax Lots, must be converted into subdivision Lots of Record before permits will be issued for exterior work. Parcels are only found in the old "County of Washington," north of Florida Ave and east of the Anacostia River. There are no Parcels found within the original city limits or Georgetown. Parcels are not in Squares. There are examples where parcel land may be physically located in the middle of a city Square, but Parcels are not considered part of a Square until they are duly subdivided by the D.C. Surveyor's Office. Record Lots - Record lots are defined by the Department of Consumer of Regulatory Affairs (DCRA) - Office of the Surveyor (OS) - DC Surveyor. They are official, platted, recorded subdivision lots created by the D.C Surveyor's Office in compliance with the Subdivision Ordinance of the District of Columbia (must have public street frontage etc). Typically, these lots are numbered 1 through 799 with no number being used more than once in a Square. Exceptions to this rule: • When the 1-799 range has been exhausted within a square, the Surveyor's Office assigns numbers from 1200 or may even use 8000 and above • For reasons unknown, 42 Squares have record lot numbers greater than 799 but less than 1200 Additionally, in most case scenario's, a piece of property must be a Record Lot before a building permit will be issued for that site in the District of Columbia, and all proposed Record Lots are carefully reviewed by Zoning Administration officials for compliance with the city's Zoning Ordinances. Other agencies that review new record lots besides OS are Office of Zoning, Office of Planning, the Dept. of Public Works, Historic Preservation and DDOT. Record lots are defined only when requested by property owners, normally when they are seeking a building permit. Record lots are recorded in Plat Books and Subdivision Books in the Office of the Surveyor. These documents are bound volumes of historical representations of the locations of property lines, and they include record dimensions, though typically no bearings of lines. These lots are located within squares, which usually correspond to one or two city blocks. Certain record lots can also be classified as "of-lots". An "Of-Lot" is the D.C. Surveyor's Office term for describing "Remaining/Part of Original Lot X" In the record lot feature class, if a domain value of 1 resides in the "OF_LOT" field, you can assume that at one time the original lot was modified. Typically, any of these of-lots will also have a tax lot overlaying them since it is a piece or remainder of a Record Lot. Tax Lots (TaxLotsPT, TaxLotsLN, TaxLotsPLY) - RPTA defines assessment and taxation lots, often referred to as A&T lots or simply tax lots. These lots are strictly for real estate taxation purposes and normally defined under two circumstances: • When property owners ask

4. Match Building Footprints Geospatially to Parcels

- GIS currently, UBID cross-reference in future if no GIS skillset available
- Set threshold to prevent slight overlaps from being matched

Building Footprint		Covered Parcel List		
UBID	Footprint_Area_sq	DC_Real_Property_U	Address_random	Owner_Co
87C4WXGP+W6P-22-32-31-47	214688.85207800000	3129-0801	111 MICHIGAN AVE NW	WASHINGT
87C4WXH8+QHP-42-24-28-34	185470.00958899999	2674-1933	3100 14TH ST NW	DC USA CO
87C4WXX9+262-33-30-34-18	175204.66345600001	2811-0802	4701 14TH ST NW	WMATA RE
87C5W2X2+648-34-11-39-16	110935.18704000000	3788-0813	4900 PUERTO RICO AVE NE	CAPITAL AF
87C4XX6F+Q3G-26-18-26-17	108658.35471499999	2986-0039	5929 GEORGIA AV NW	SCG 5929 G
87C4WXXMX+8PQ-26-16-25-18	78414.00764110000	3821-0040	400 MICHIGAN AVE NE	NATIONAL
87C4WXP6+HX2-15-29-16-37	73343.95806980001	2624-0832; 2624-0831	3636 16TH ST NW	ROCK CREE
87C4XX9P+9PR-20-13-22-14	68381.52838580000	3368-0822	6501 - 6527 CHILLUM PL NW	MFS CHILLU
87C4XXFP+G94-29-21-30-21	62925.03669260000	3359-0048	6856 EASTERN AV NW	JEMAL'S TA
87C4XX7R+67F-14-26-12-25	62348.10727570000	3379-0820	6031 KANSAS AVE NW	KANSAS AV
87C4WXJP+6MC-12-19-14-20	62274.06231910000	3129-0804	110 IRVING ST NW	WASHINGT
87C4XX9Q+F35-17-12-21-21	61575.39439820000	3368-0822	6501 - 6527 CHILLUM PL NW	MFS CHILLU
87C5W2Q3+PCG-19-12-22-15	56307.54369410000	3820-0082	655 TAYLOR ST NE	MECO LLC
87C4XX6R+PG8-11-27-14-30	54014.29093870000	3379-0823	5909 BLAIR RD NW	BLAIR ROA
87C4XX9F+R9G-10-17-11-17	52175.94052830000	2974-0020	6500 PINEY BRANCH RD NW	NAI SATUR
87C4WXFH+QQ9-13-34-10-22	51288.81302390000	3057-0092	2440 6TH ST NW	HOWARD L
87C5W2W3+3M7-23-17-17-16	51126.59620670000	3894-0021	725 BUCHANAN ST NE	PROVIDEN
87C4WXGW+X92-19-22-23-18	50062.88961350000	PAR01200034	125 MICHIGAN AVE NE	TRINITY CO
87C4WXJ9+C8Q-15-18-15-17	49163.15304370000	2837-0079	1345 PARK RD NW	TIVOLI PAR
87C4WXRC+GJC-18-10-15-11	47398.79992370000	2911-0004	1291 TAYLOR ST NW	PENN B RE
87C4WXH8+9G5-11-25-16-15	46587.77715090000	2672-0888	1400 IRVING ST NW	COLUMBIA
87C5W2F4+66G-12-16-20-15	44381.73985140000	3846-0860	0806 CHANNING PL NE	JEMAL'S CH

5. Send Parcels and Associated UBIDs to Reporters

- Similar to typical action, but includes the associated UBID/UPID/USID information from the previous steps

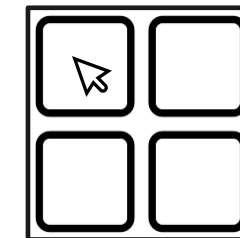
6. Reporters Confirm/modify the Information

- Visual representation of UBID in demonstrator will be important
- Option for reporters to draw their own footprint (crowd-source data) or make footprint dataset the authoritative building set?

Reporters are shown their parcel(s) in City Block if there are more than one buildings associated with it



“Select the buildings that are associated with your entry”





Thank you

