Cost Implications of New Address Listing Technology: Efficiency and Data Quality

Katie Dekker, Ned English,
Krishna Winfrey, Josh Seeger

FedCASIC
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Overview

- How to List
- Listing Types
- Methods
- Results
- Limitations
- Conclusions

What is Listing?

- A process where one carefully and correctly records all housing units (HUs) within specified boundaries.
    - Prepares sampling frames for survey research
    - Used in areas where there is USPS Delivery Sequence File undercoverage – largely *rural* areas

How to List

Step 1:

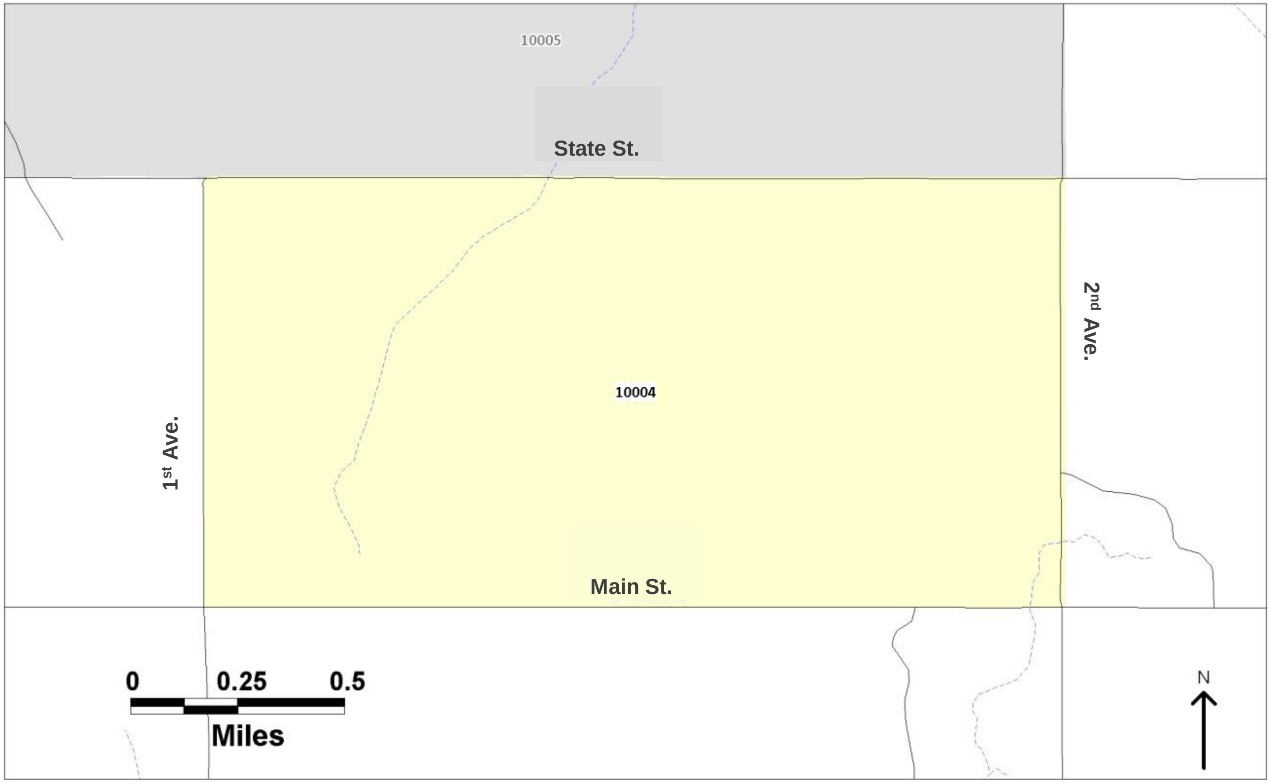
- Examine maps to determine segment boundaries
- List one Census block at a time

How to List

National Frame 2010 Listing

ASSIGNMENT: MT001N
BLOCK:

City: Unincorporated County: Roosevelt State: MT


10005
State St.
2nd Ave.
10004
1st Ave.
Main St.
0
0.25
0.5
Miles
N

Created: 8/15/2011

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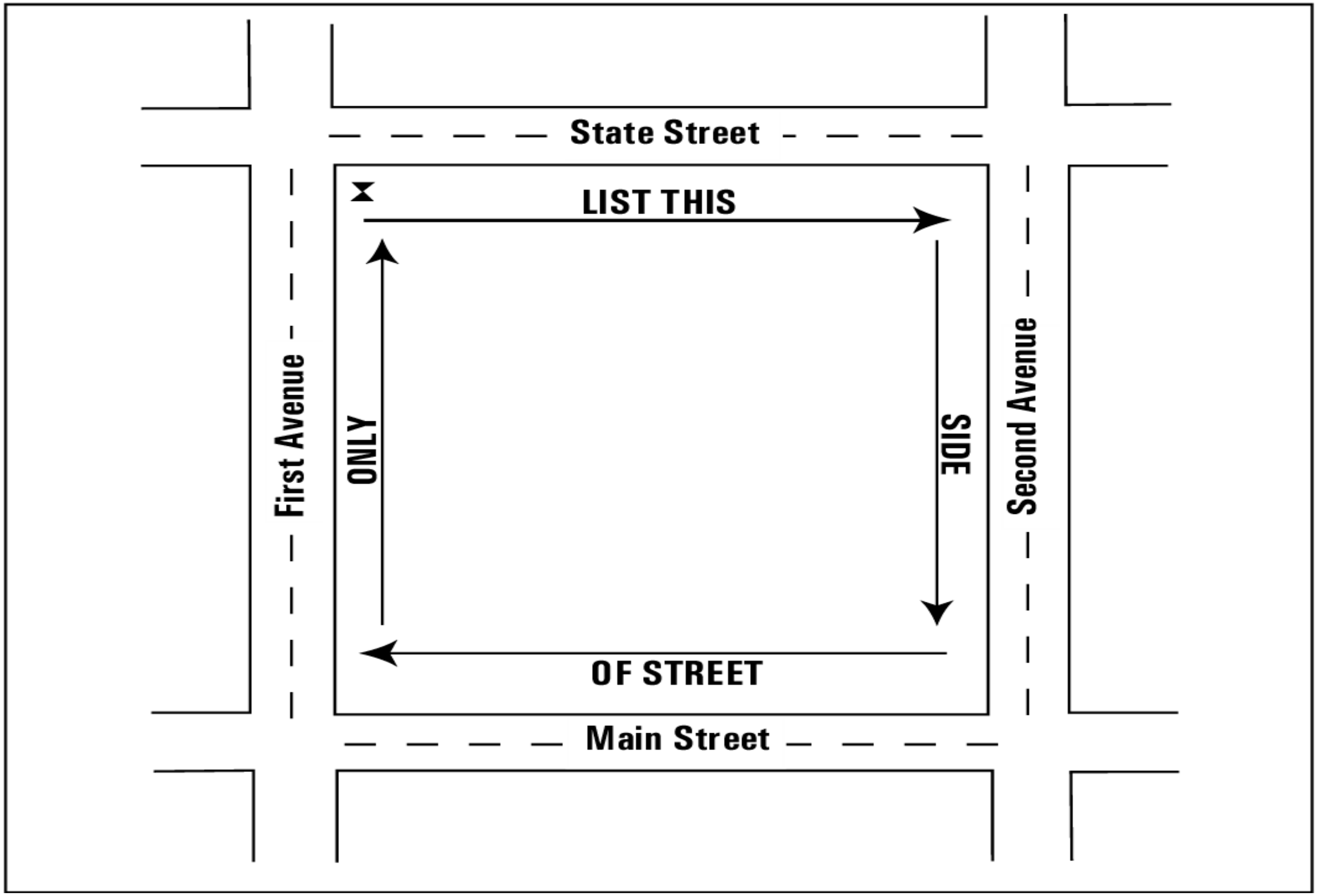
How to List

- Start at northwest corner of block
- Move clockwise around the block, recording all addresses in the segment

How to List


State Street
LIST THIS
ONLY
SIDE
OF STREET
First Avenue
Second Avenue
Main Street

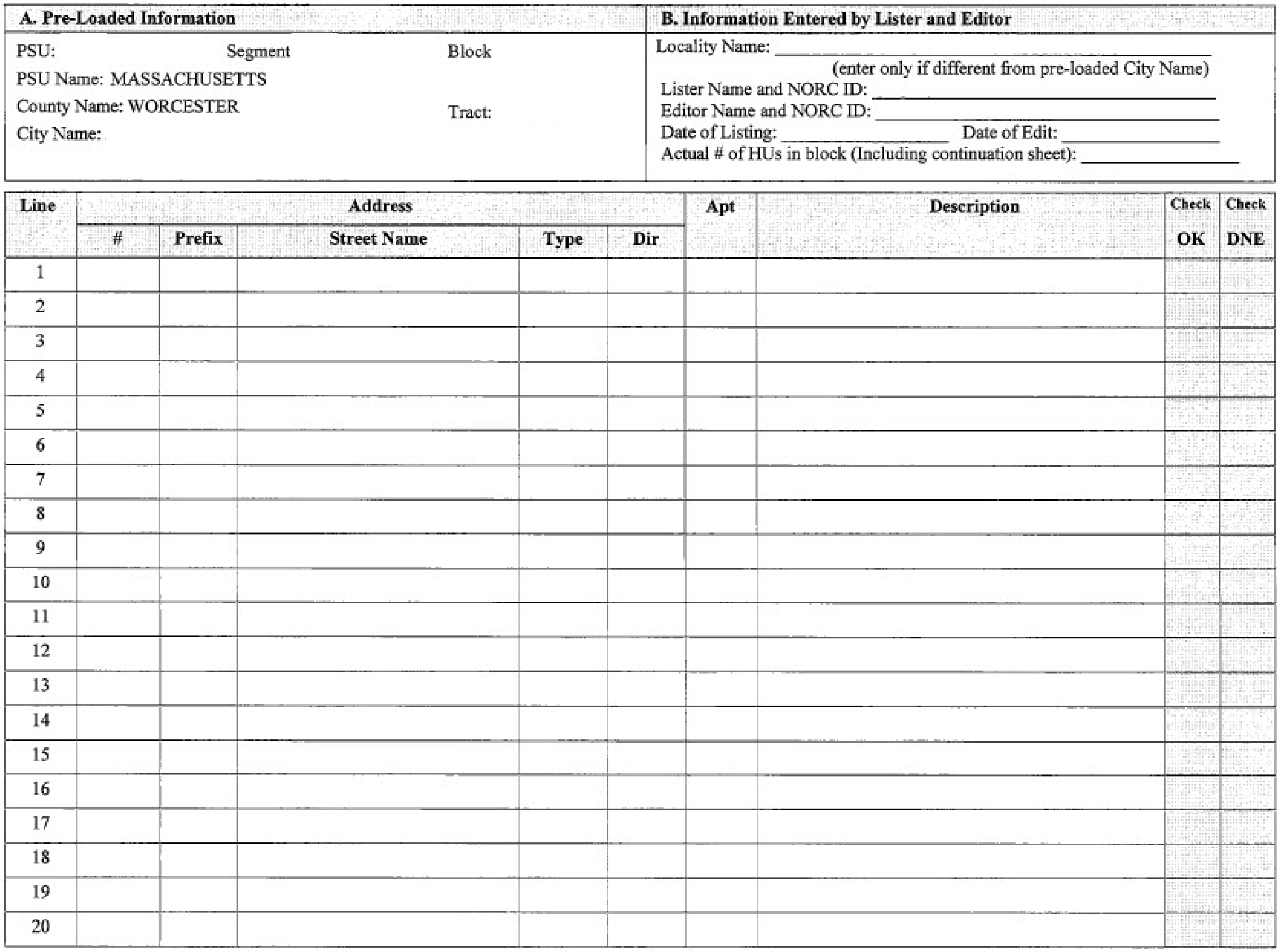
How to List

- Listing challenges
  - Incomplete street names (e.g. Main St. instead of North Main St.)
  - Unnamed streets
  - Invisible block boundaries
  - Nonexistent streets on physical maps

Listing Types

- Traditional Listing
  - Paper maps and listing sheets
  - Lister records addresses from scratch using paper and pencil

Traditional Listing Sheet



A. Pre-Loaded Information

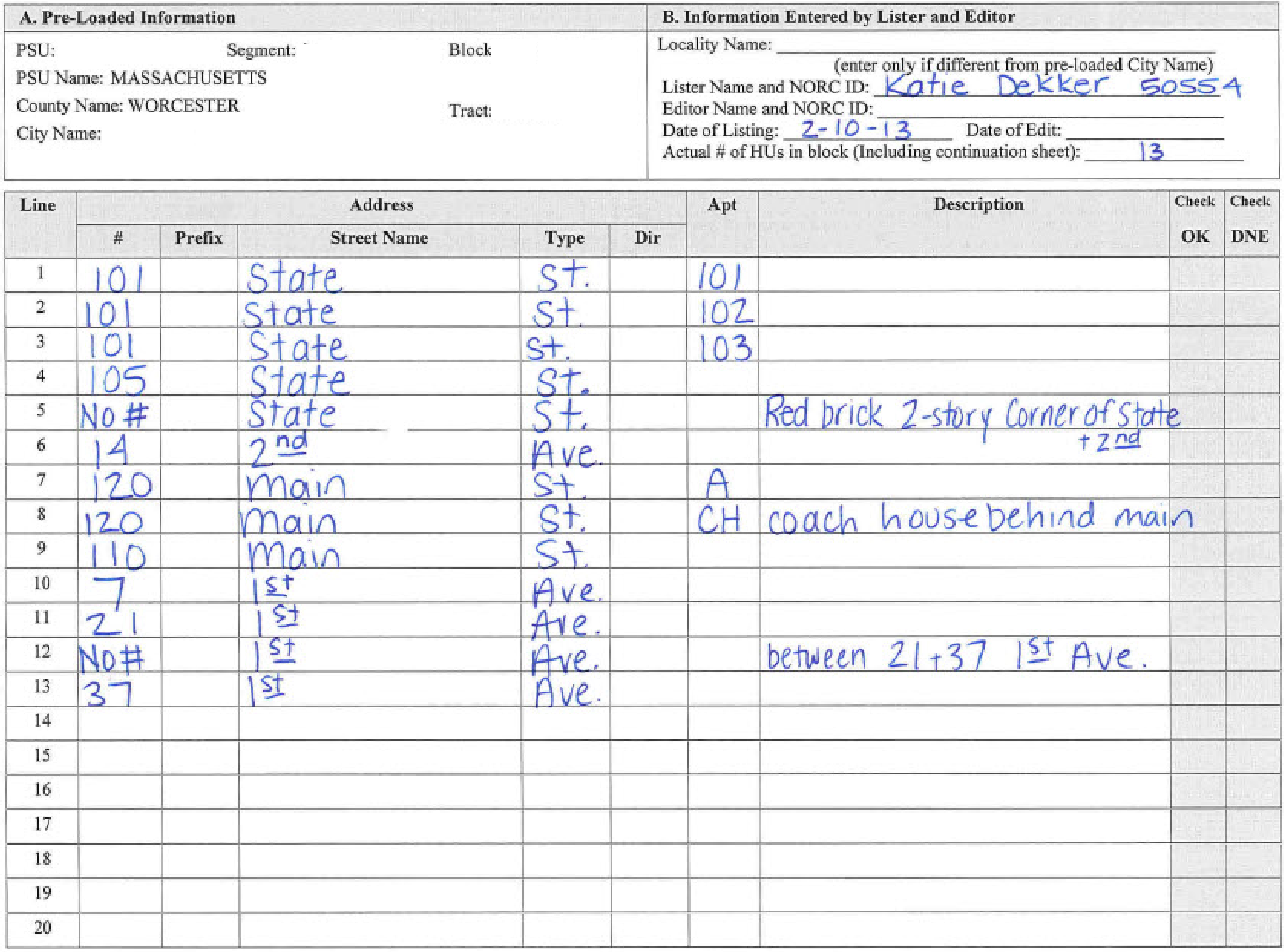
PSU: Segment Block
PSU Name: MASSACHUSETTS
County Name: WORCESTER Tract:
City Name:

B. Information Entered by Lister and Editor

Locality Name: ____________________
(enter only if different from pre-loaded City Name)
Lister Name and NORC ID: ____________________
Editor Name and NORC ID: ____________________
Date of Listing: ____________ Date of Edit: ____________
Actual # of HUs in block (Including continuation sheet): ____________

Line	**Address**					**Apt**	**Description**	**Check**	**Check**
	#	**Prefix**	**Street Name**	**Type**	**Dir**			**OK**	**DNE**
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Traditional Listing Sheet (Completed)



A. Pre-Loaded Information

PSU: Segment: Block
PSU Name: MASSACHUSETTS
County Name: WORCESTER Tract:
City Name:

B. Information Entered by Lister and Editor

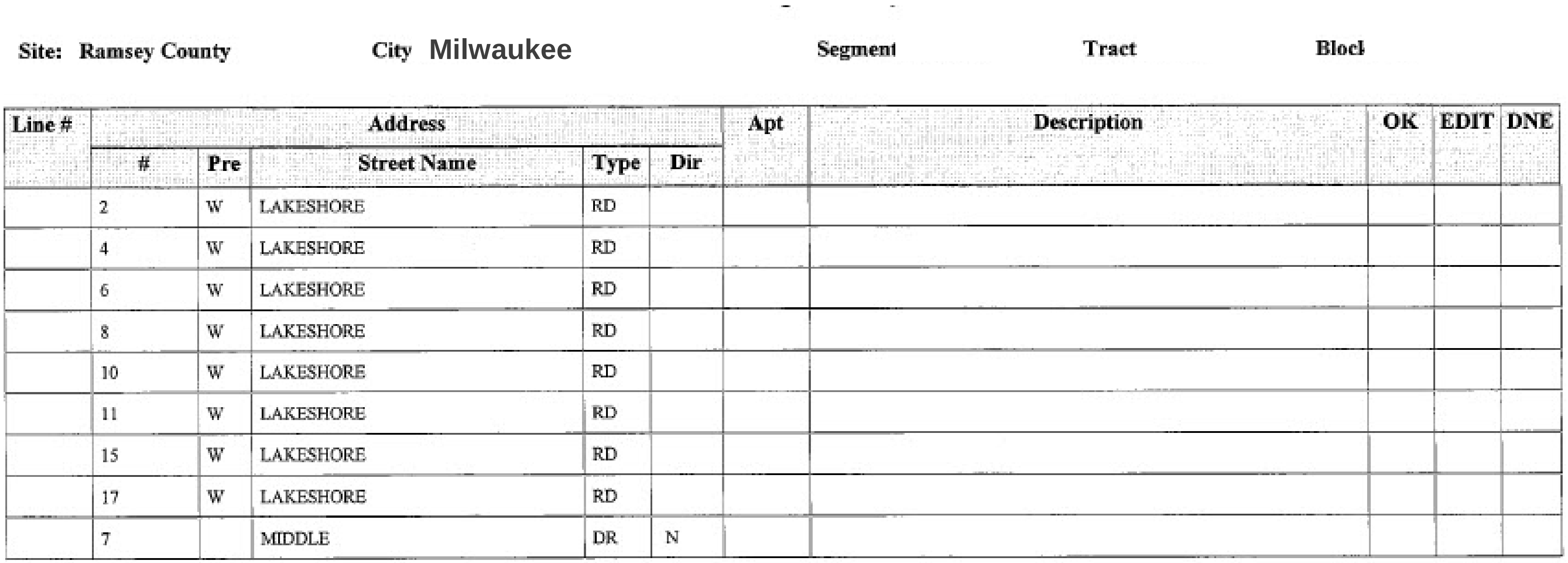
Locality Name: ____________
(enter only if different from pre-loaded City Name)
Lister Name and NORC ID: Katie Dekker 50554
Editor Name and NORC ID: ____________
Date of Listing: 2-10-13 Date of Edit: ____________
Actual # of HUs in block (Including continuation sheet): 13

Line	Address					Apt	Description	Check	Check
	#	Prefix	Street Name	Type	Dir			OK	DNE
1	101		State	St.		101			
2	101		State	St.		102			
3	101		State	St.		103			
4	105		State	St.					
5	No #		State	St.			Red brick 2-story Corner of State + 2nd		
6	14		2nd	Ave.					
7	120		Main	St.		A			
8	120		Main	St.		CH	coach house behind main		
9	110		Main	St.					
10	7		1st	Ave.					
11	21		1st	Ave.					
12	No #		1st	Ave.			between 21 + 37 1st Ave.		
13	37		1st	Ave.					
14									
15									
16									
17									
18									
19									
20									

Listing Types (cont.)

- Enhanced (Dependent) Listing
  - Paper maps and listing sheets
  - Addresses from Delivery Sequence File (DSF) are geocoded and preprinted on listing sheets
  - Lister confirms/denies existence of DSF lines and adds new addresses to listing sheet

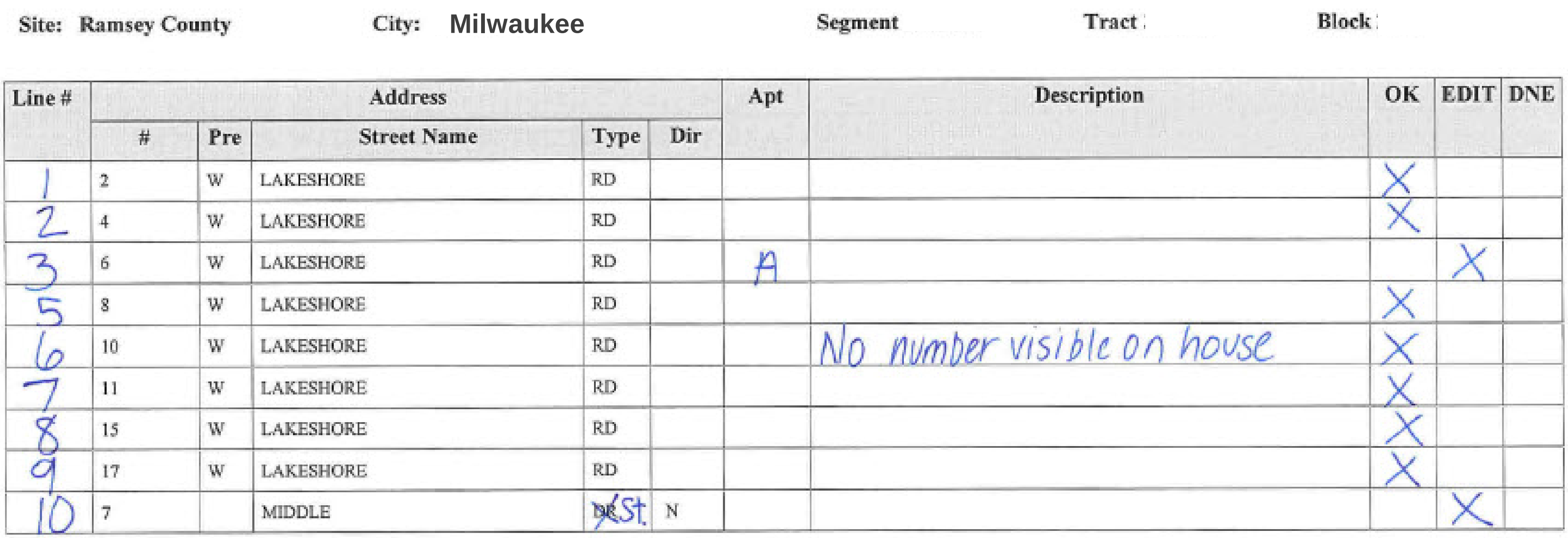
Enhanced Listing Sheet



Site: Ramsey County **City** Milwaukee **Segment** **Tract** **Blocl**

Line #	Address					Apt	Description	OK	EDIT	DNE
	#	Pre	Street Name	Type	Dir					
	2	W	LAKESHORE	RD						
	4	W	LAKESHORE	RD						
	6	W	LAKESHORE	RD						
	8	W	LAKESHORE	RD						
	10	W	LAKESHORE	RD						
	11	W	LAKESHORE	RD						
	15	W	LAKESHORE	RD						
	17	W	LAKESHORE	RD						
	7		MIDDLE	DR	N					

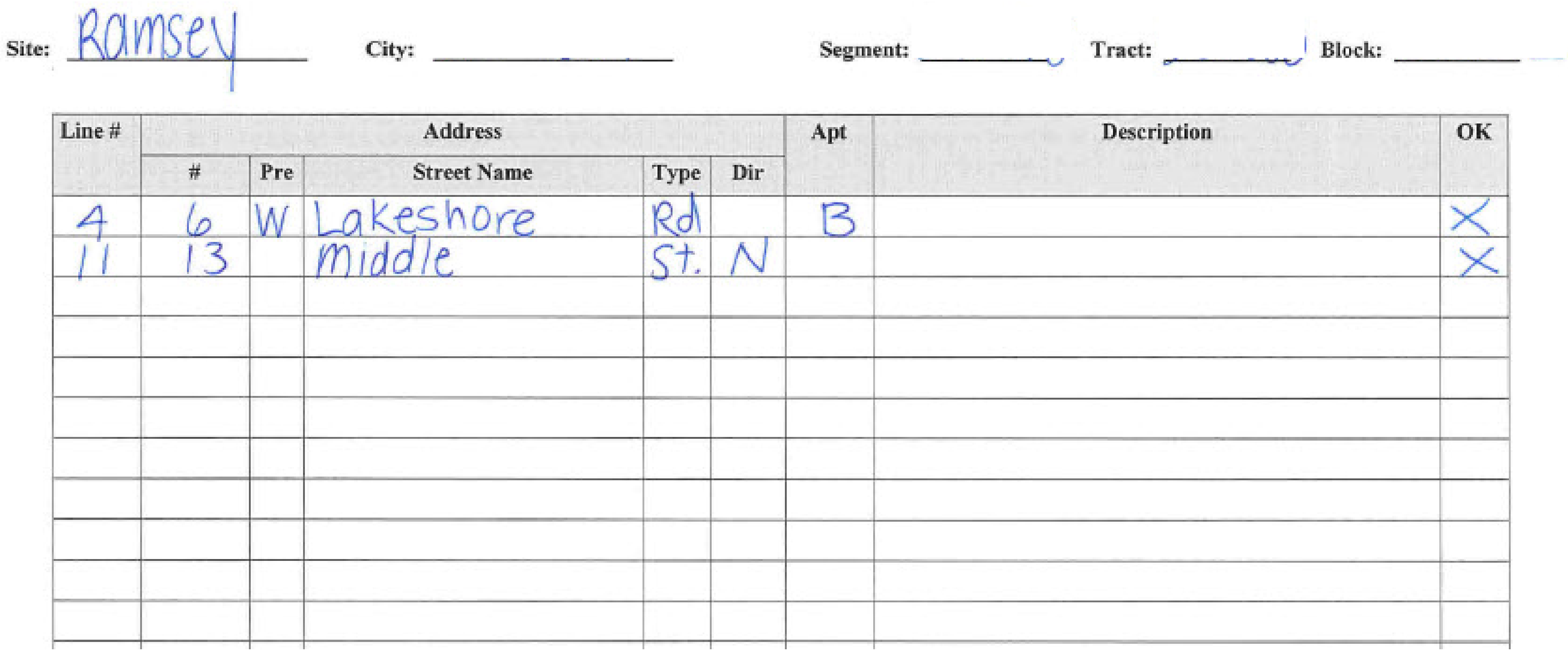
Enhanced Listing Sheet (Completed)



Site: Ramsey County **City:** Milwaukee **Segment** **Tract** : **Block** :

Line #	Address					Apt	Description	OK	EDIT	DNE
	#	Pre	Street Name	Type	Dir					
1	2	W	LAKESHORE	RD				X		
2	4	W	LAKESHORE	RD				X		
3	6	W	LAKESHORE	RD		A			X	
5	8	W	LAKESHORE	RD				X		
6	10	W	LAKESHORE	RD			No number visible on house	X		
7	11	W	LAKESHORE	RD				X		
8	15	W	LAKESHORE	RD				X		
9	17	W	LAKESHORE	RD				X		
10	7		MIDDLE	~~DR~~ St.	N				X	

Enhanced Listing Sheet (Completed Continuation)



Site: Ramsey City: ______ Segment: ______ Tract: ______ Block: ______

Line #	Address					Apt	Description	OK
	#	Pre	Street Name	Type	Dir			
4	6	W	Lakeshore	Rd		B		X
11	13		Middle	St.	N			X

Listing Types (cont.)

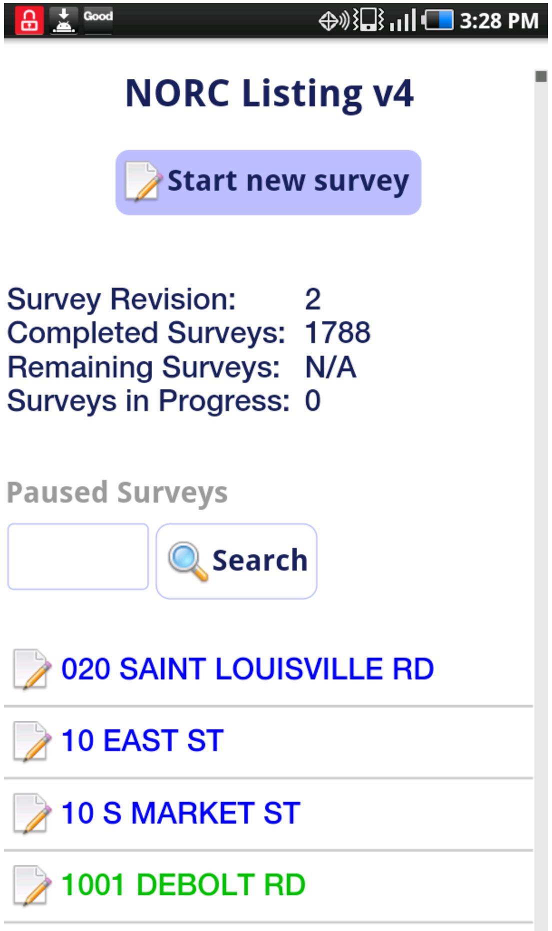
- Device-Based Listing (Samsung Galaxy Tab)
  - Hybrid of traditional and enhanced listing
  - Electronic maps and data entry
  - DSF addresses are preloaded on device
  - Lister begins to record addresses as encountered, but if already preloaded, enhanced search feature will pull up appropriate housing unit for confirmation.
  - If not on DSF, lister adds housing unit to the address frame

Device-Based Listing

Enter address not on preloaded list

Search for preloaded addresses

Sort preloaded addresses as desired



NORC Listing v4

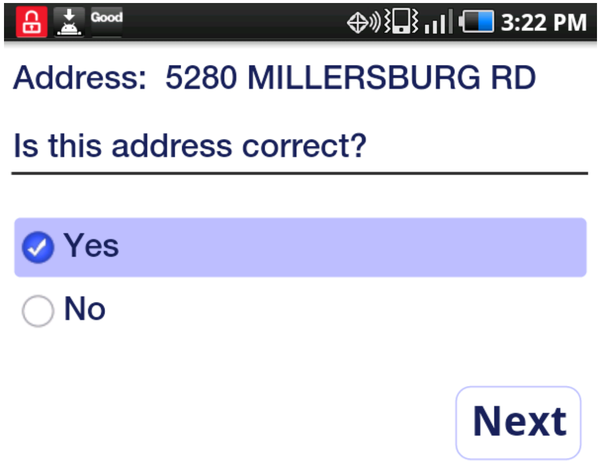
Survey Revision: 2
Completed Surveys: 1788
Remaining Surveys: N/A
Surveys in Progress: 0

Paused Surveys

020 SAINT LOUISVILLE RD
10 EAST ST
10 S MARKET ST
1001 DEBOLT RD

Device-Based Listing

- If on preloaded list



Address: 5280 MILLERSBURG RD

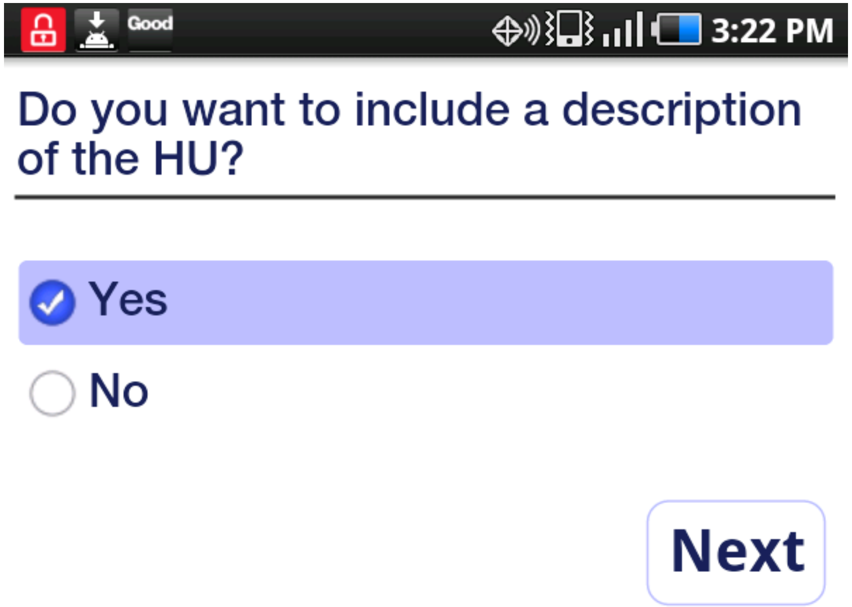
Is this address correct?

● Yes

○ No

Device-Based Listing

- Option to enter description of housing unit

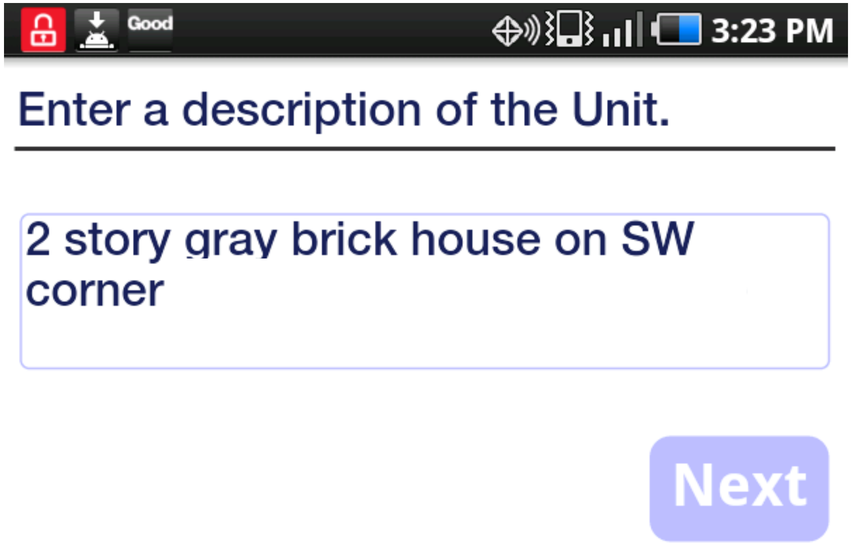

Good
3:22 PM

Do you want to include a description of the HU?

● Yes

○ No

Next


Good
3:23 PM

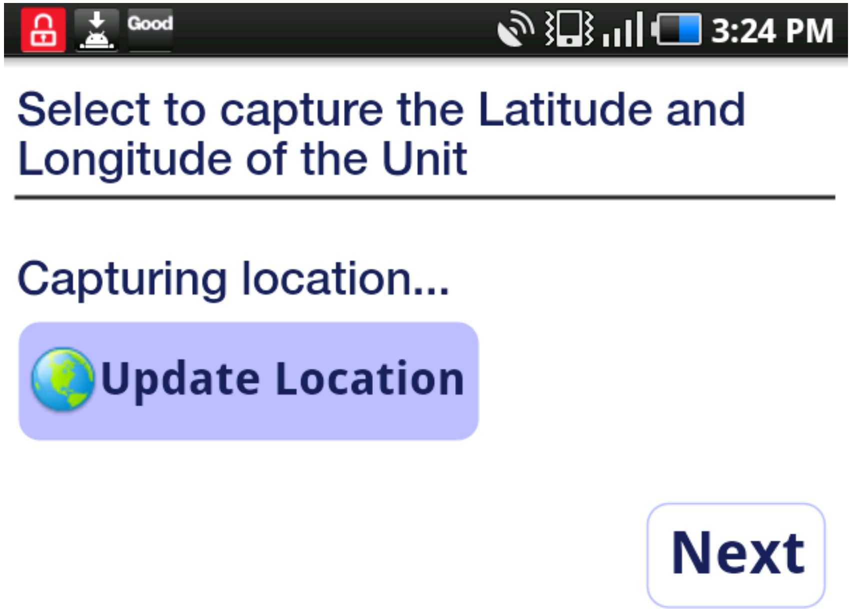
Enter a description of the Unit.

2 story gray brick house on SW corner

Next

Device-Based Listing

- Captures coordinates of housing unit


Good
3:24 PM

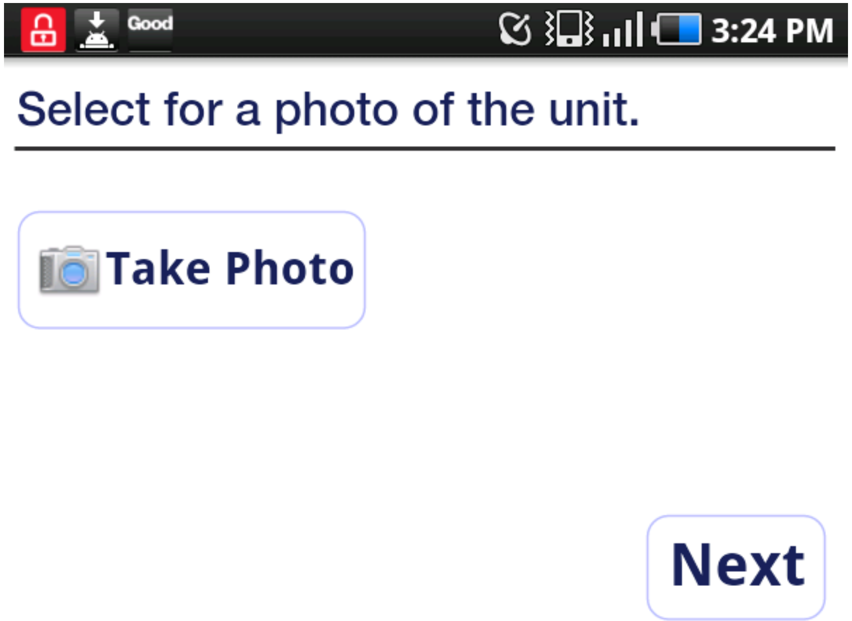
Select to capture the Latitude and Longitude of the Unit

Capturing location...

Update Location
Next

Device-Based Listing

- Captures photograph for housing units with no visible housing unit number

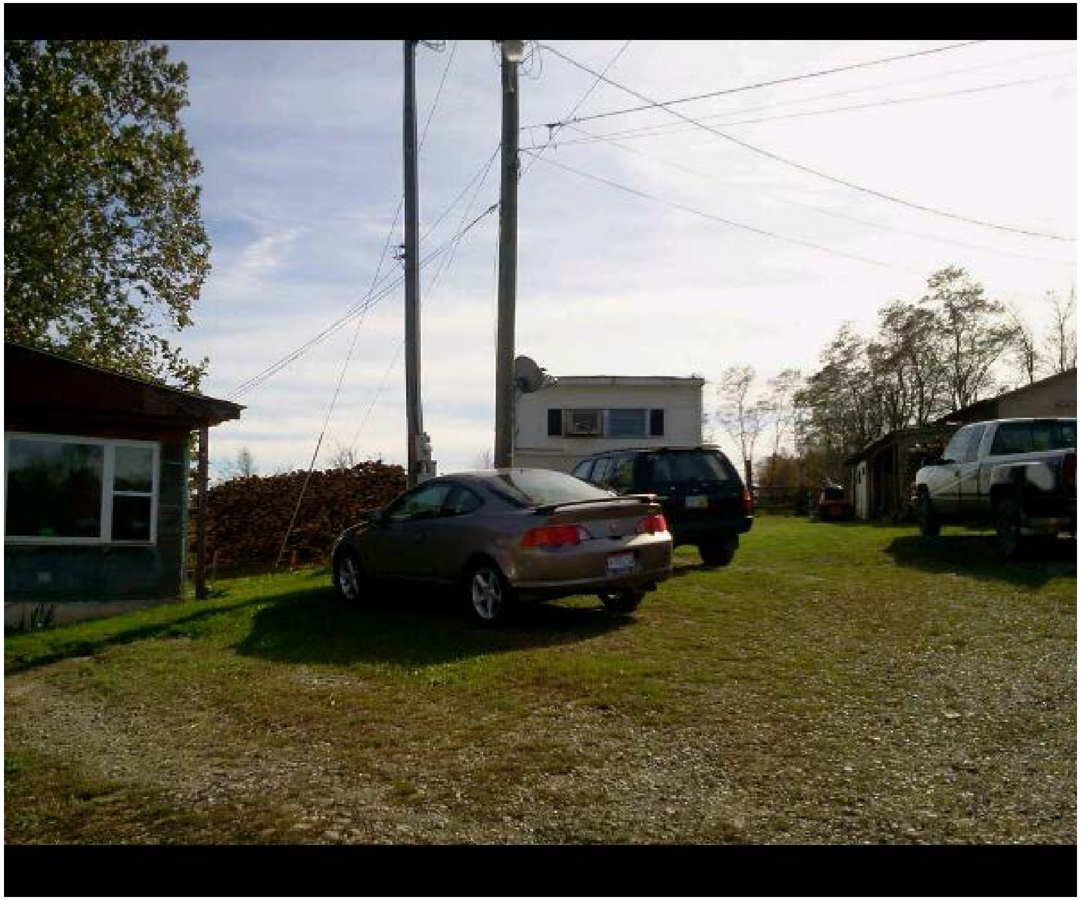


Select for a photo of the unit.

Good
3:24 PM
Take Photo
Next

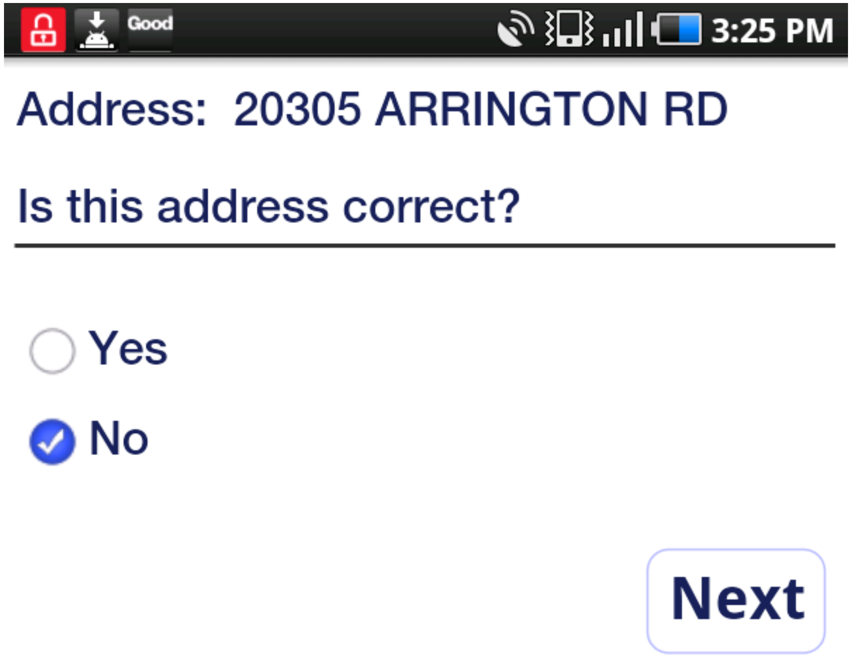
Device-Based Listing

- Photograph of complicated housing situation



Device-Based Listing

- If on preload list but not in reality

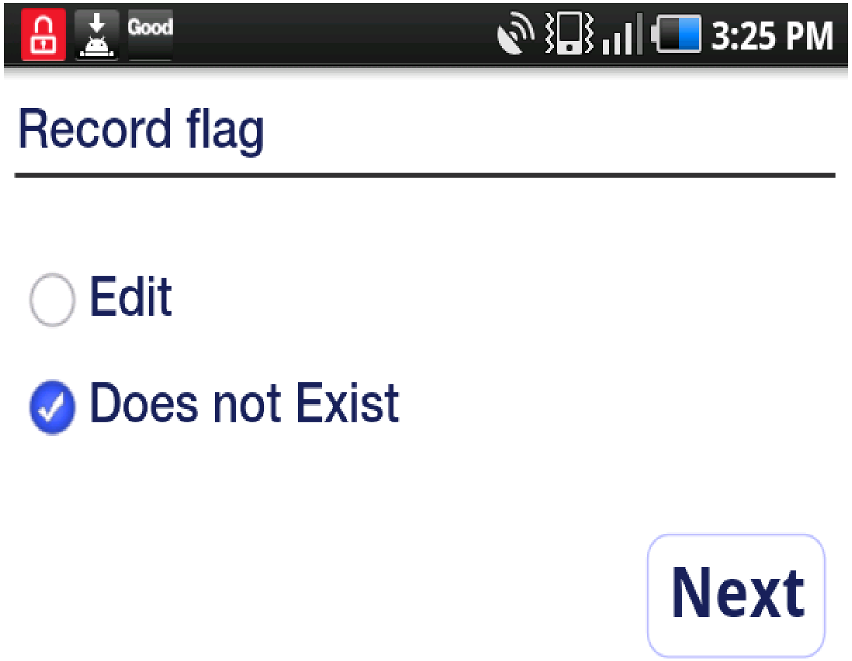

Good
3:25 PM
Next

Address: 20305 ARRINGTON RD

Is this address correct?

○ Yes

● No


Good
3:25 PM
Next

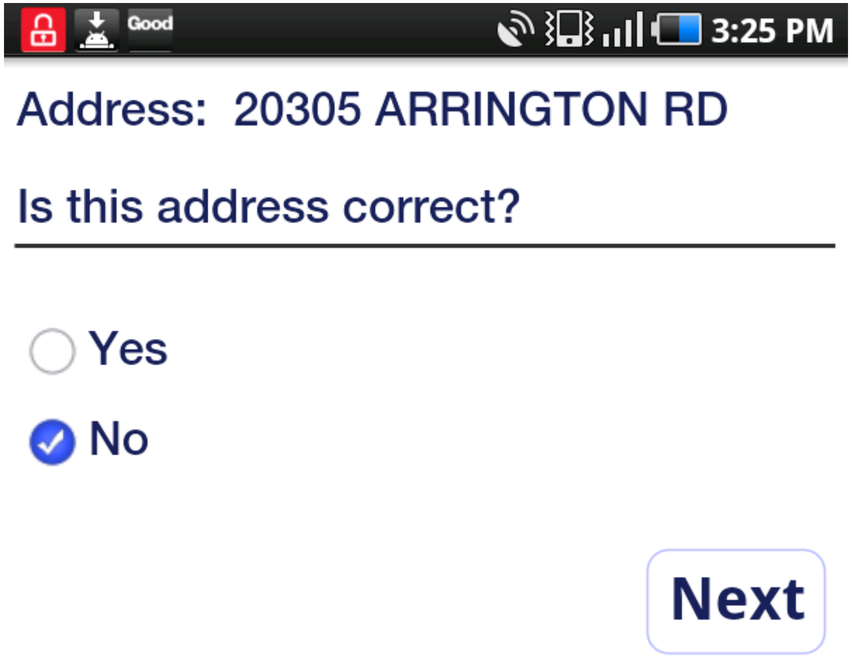
Record flag

○ Edit

● Does not Exist

Device-Based Listing

- If on preload list but needs edit


Good
3:25 PM

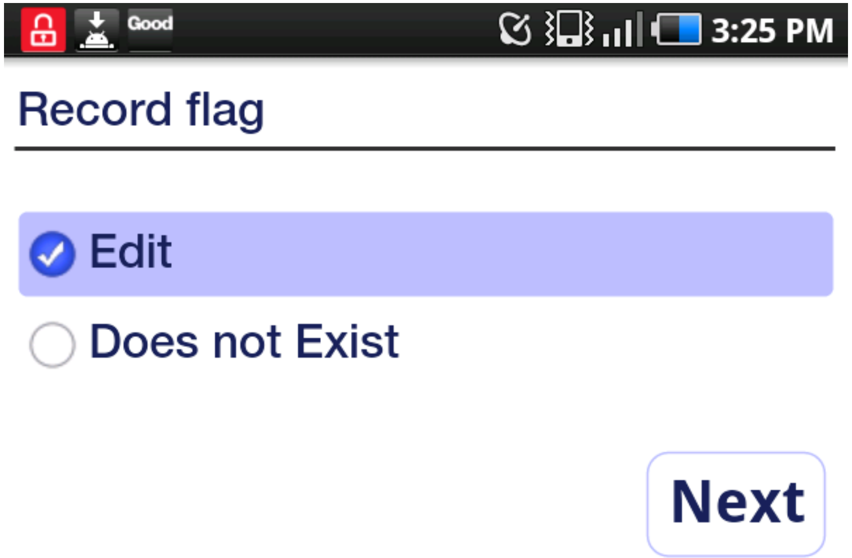
Address: 20305 ARRINGTON RD

Is this address correct?

○ Yes

● No

Next


Good
3:25 PM

Record flag

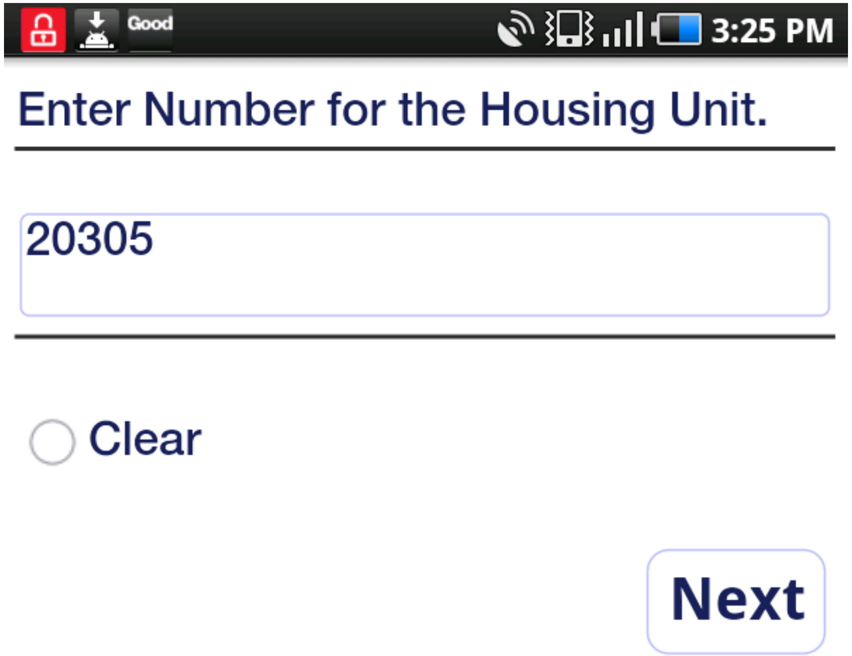
● Edit

○ Does not Exist

Next

Device-Based Listing

- If on preload list but needs edit



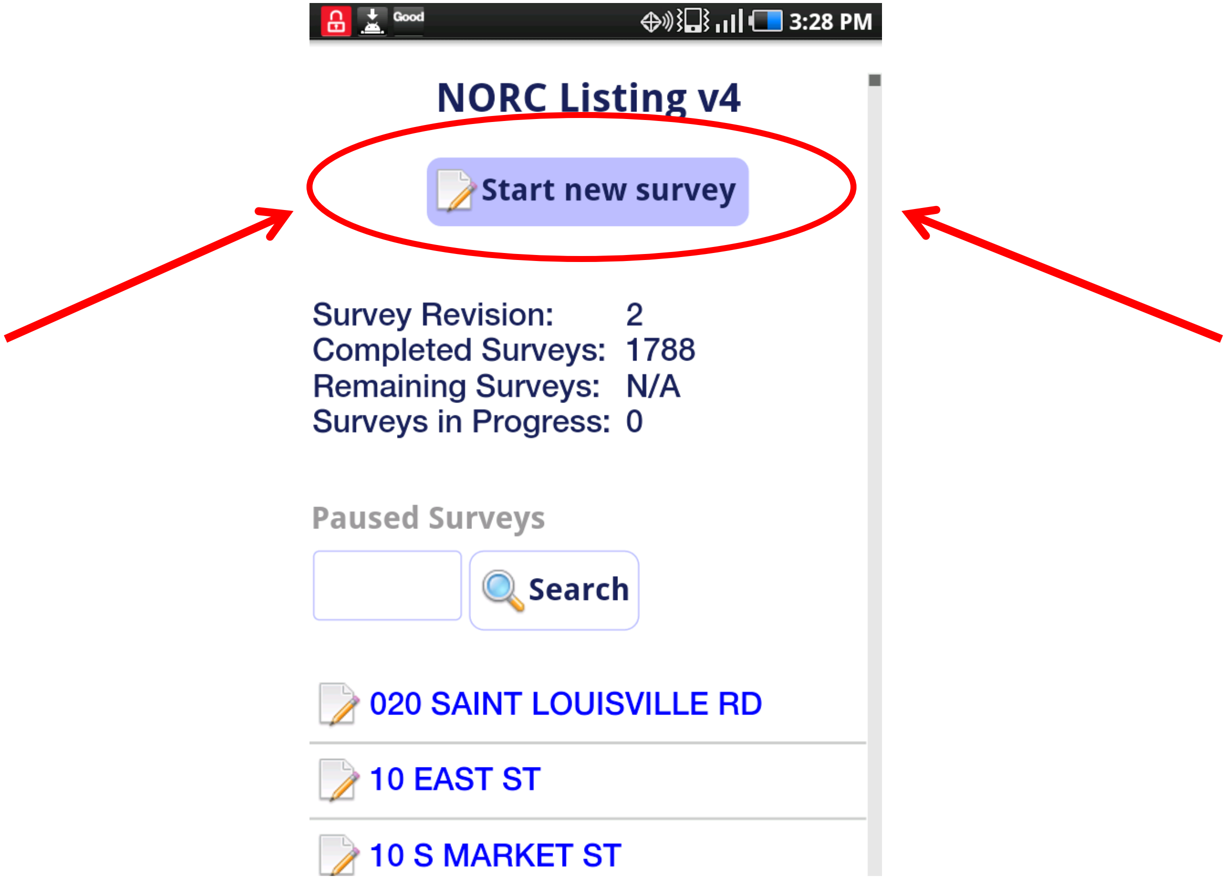
Enter Number for the Housing Unit.

20305

○ Clear

Device-Based Listing

- If not on preload list



Good
3:28 PM

NORC Listing v4

Start new survey

Survey Revision:	2
Completed Surveys:	1788
Remaining Surveys:	N/A
Surveys in Progress:	0

Paused Surveys

Search

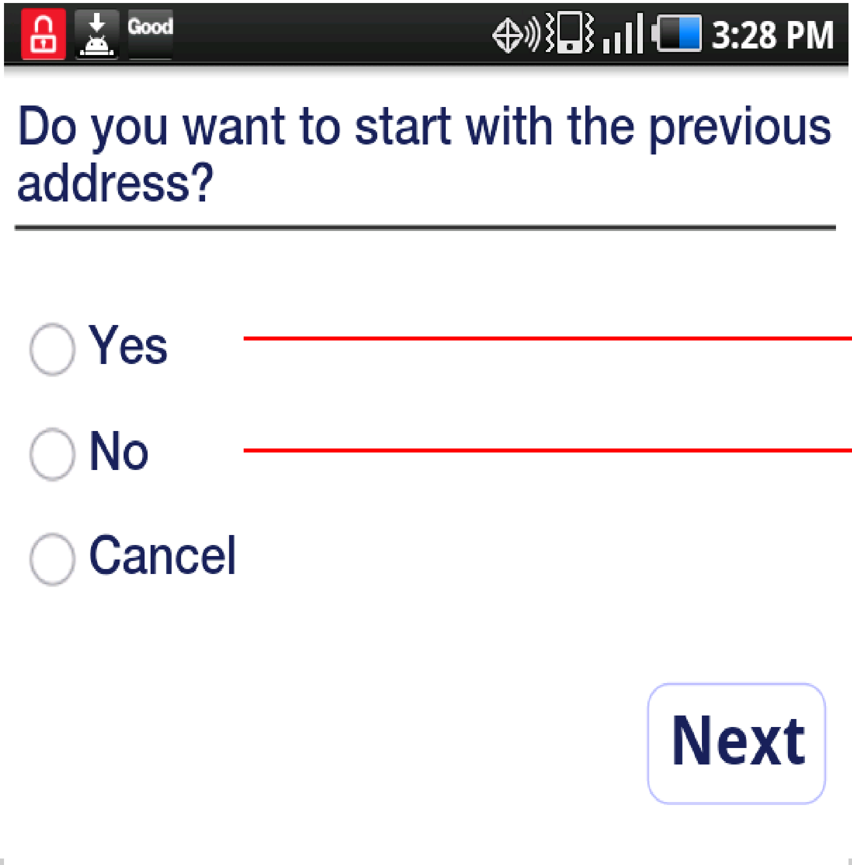
020 SAINT LOUISVILLE RD

10 EAST ST

10 S MARKET ST

Device-Based Listing

- If not on preload list



Do you want to start with the previous address?

○ Yes

○ No

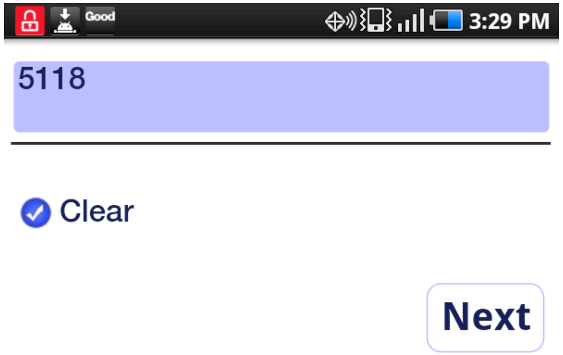
○ Cancel

If yes, fields are preloaded with previous address

If no, fields are empty

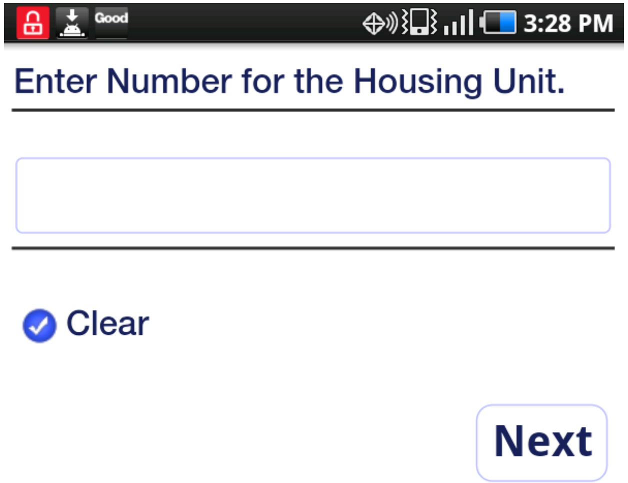
Device-Based Listing

- If using preload


Good
3:29 PM
Clear
Next

5118

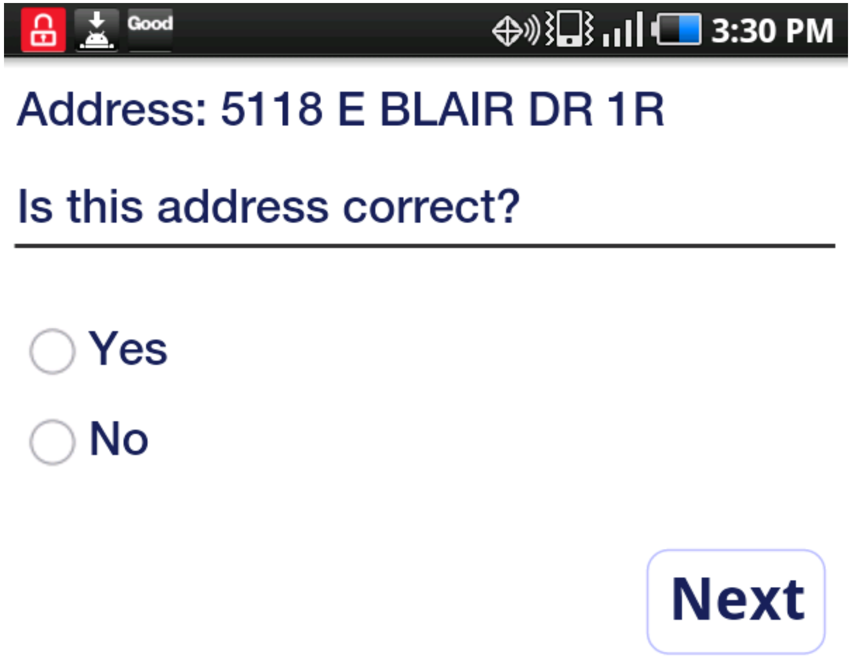
- If not using preload


Good
3:28 PM
Clear
Next

Enter Number for the Housing Unit.

Device-Based Listing

- Address confirmation



Address: 5118 E BLAIR DR 1R

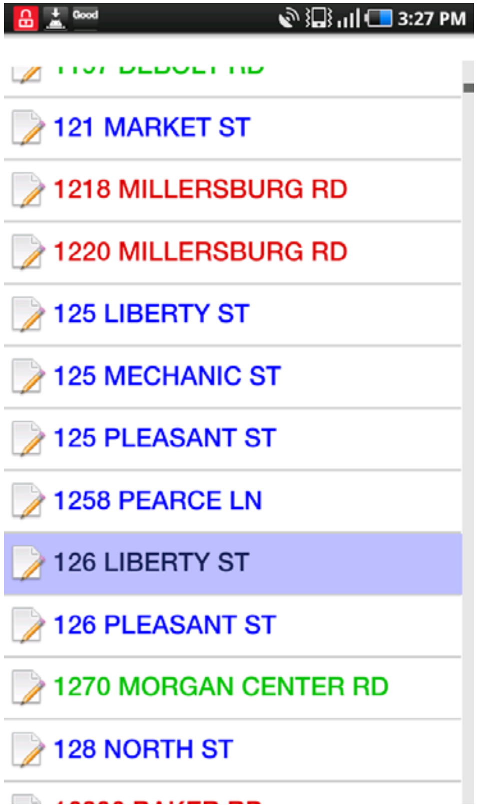
Is this address correct?

○ Yes

○ No

Device-Based Listing

- At-a-glance indication of whether an address was preloaded, does not exist, or added



121 MARKET ST

1218 MILLERSBURG RD

1220 MILLERSBURG RD

125 LIBERTY ST

125 MECHANIC ST

125 PLEASANT ST

1258 PEARCE LN

126 LIBERTY ST

126 PLEASANT ST

1270 MORGAN CENTER RD

128 NORTH ST

Green records are confirmed

Red records have been deleted

Blue records have been added to preloaded list

Black records have not yet been worked

Methods

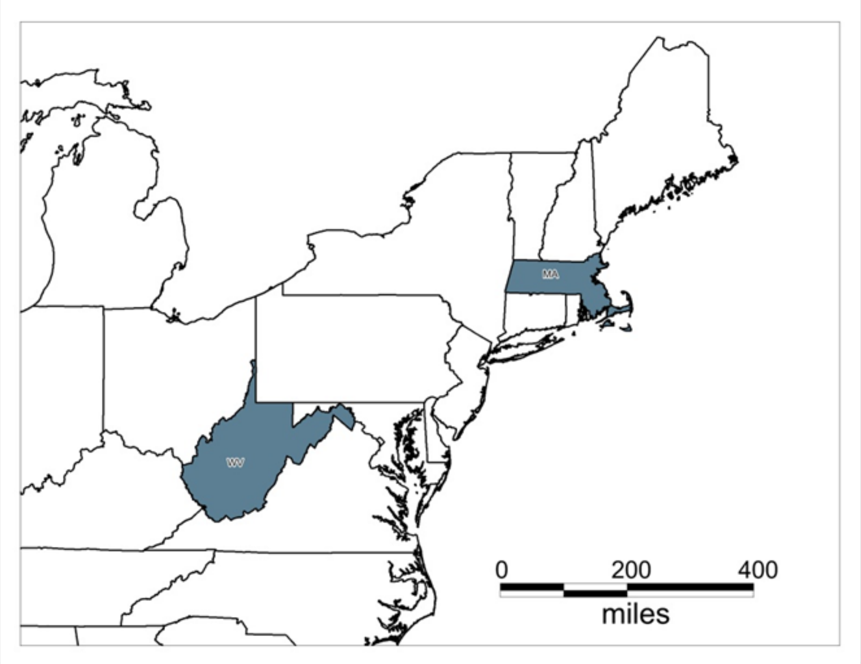
- National Children’s Study
  - Summer of 2011
  - NORC worked with Worcester County, MA and Marion County, WV to compare listing techniques
  - List 22,000 housing units, half traditionally and half enhanced

Methods (cont.)

- 2010 National Frame
  - Fall of 2011
  - NORC conduced large-scale listing effort to construct a national address frame
  - Listed 80,000 housing units in 32 states
  - Used device-based listing
  - Capture location, listing time, appearance, etc.

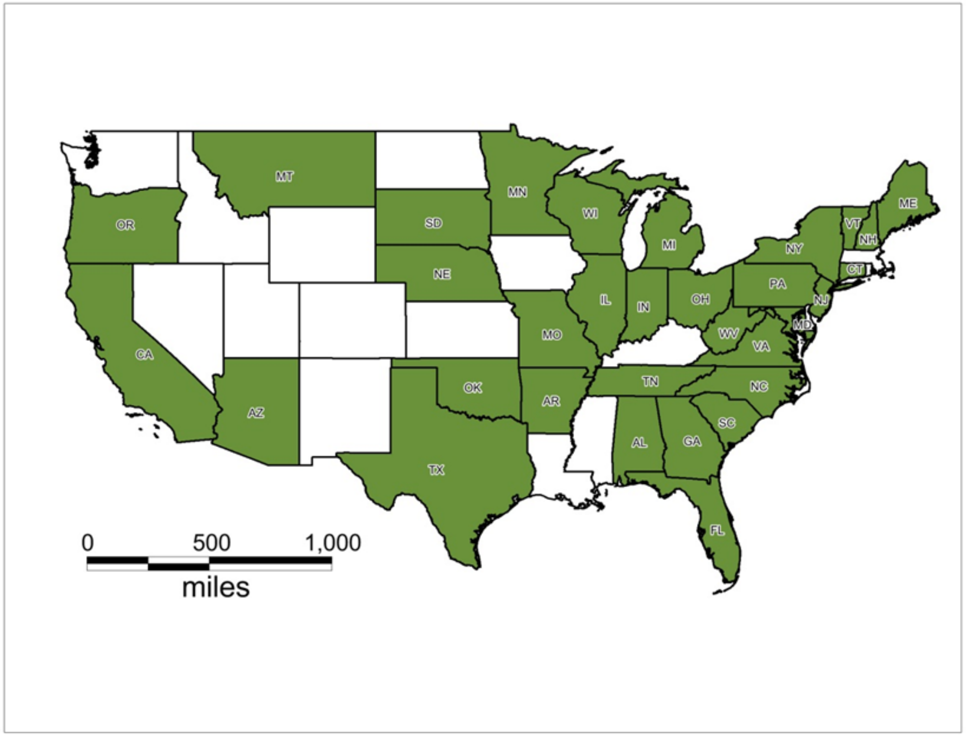
Traditional/Enhanced Listing Locations

States Containing Traditional and Enhanced Listed Segments


MA
WV
0
200
400
miles

Device Listing Locations

States Containing Device Listed Segments


MT
OR
SD
MN
WI
MI
NE
ME
VT
NH
NY
CT
PA
NJ
IL
IN
OH
MD
MO
WV
VA
CA
AZ
OK
TX
AR
TN
NC
SC
AL
GA
FL
0
500
1,000
miles

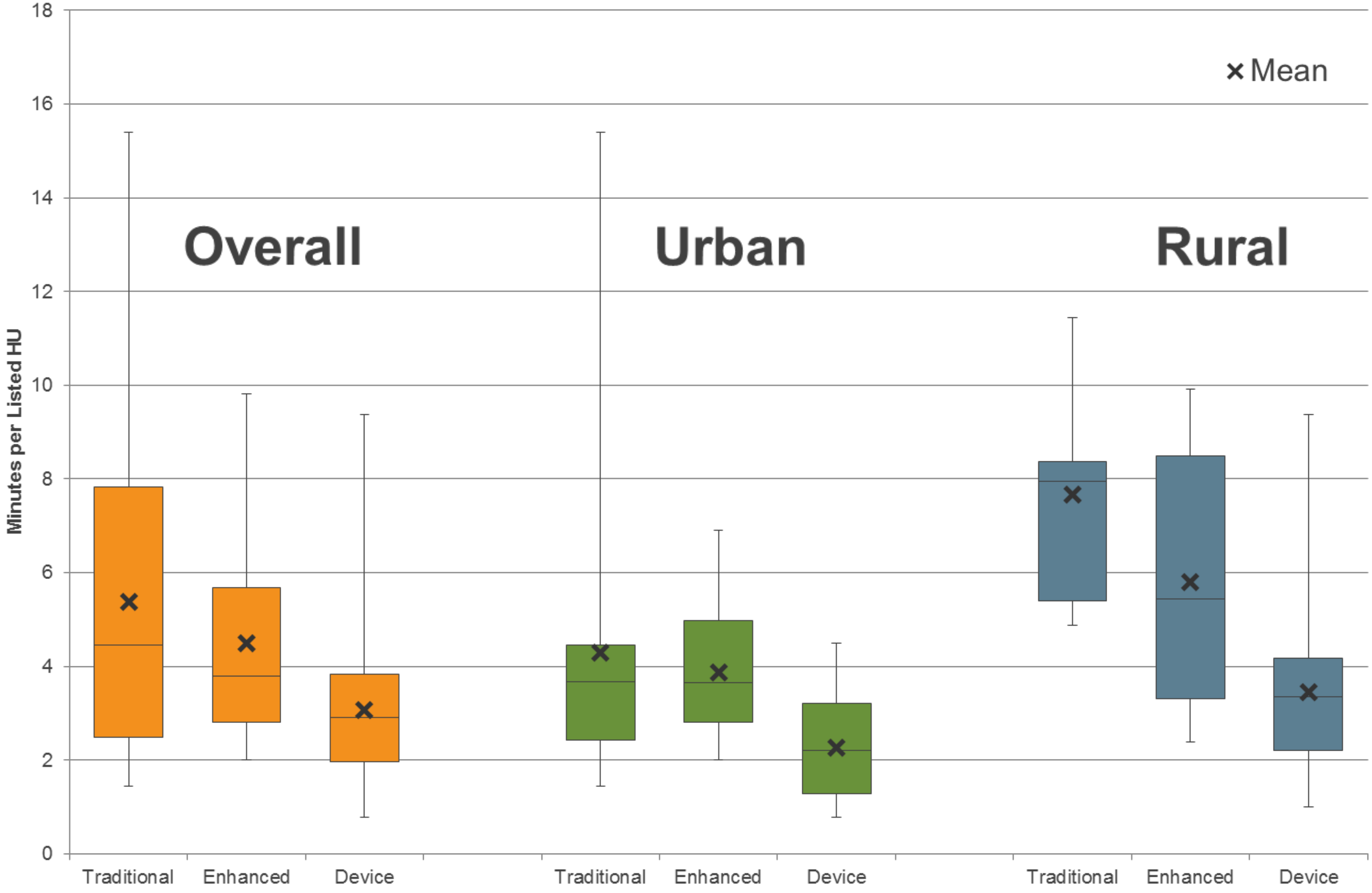
Methods (cont.)

- Split ALL listed segments (NCS and National Frame) into urban/suburban and rural categories
  - Housing unit density is big determinant of listing time
  - Compare like segments whenever possible
- Calculated average time taken to list each housing unit across segment types and listing methods

Segment Count/Density

	# Segments	Mean Density
Overall Traditional	19	1,479 HU/square mile
Overall Enhanced	19	1,303 HU/square mile
Overall Device	144	309 HU/square mile
Urban Traditional	13	2,134 HU/square mile
Urban Enhanced	13	1,860 HU/square mile
Urban Device	46	835 HU/square mile
Rural Traditional	6	59 HU/square mile
Rural Enhanced	6	95 HU/square mile
Rural Device	98	69 HU/square mile

Results


× Mean
Overall
Urban
Rural
Minutes per Listed HU
0
2
4
6
8
10
12
14
16
18
Traditional
Enhanced
Device
Traditional
Enhanced
Device
Traditional
Enhanced
Device

Results (cont.)

- In both urban and rural locations, device listing took less time per housing unit listed than traditional or enhanced listing
- This held true even though the traditional and enhanced segments were overall more dense than device listed segments (which should have slowed down device listing)
- Time is not the only cost/savings measure

Device-Based Listing Costs

- Requires new training materials and procedures
- Software development
- Listing order can be lost if a lister edits a record at a later date
- Listing with a device can be time-consuming at large multi-unit buildings

Device-Based Listing Savings

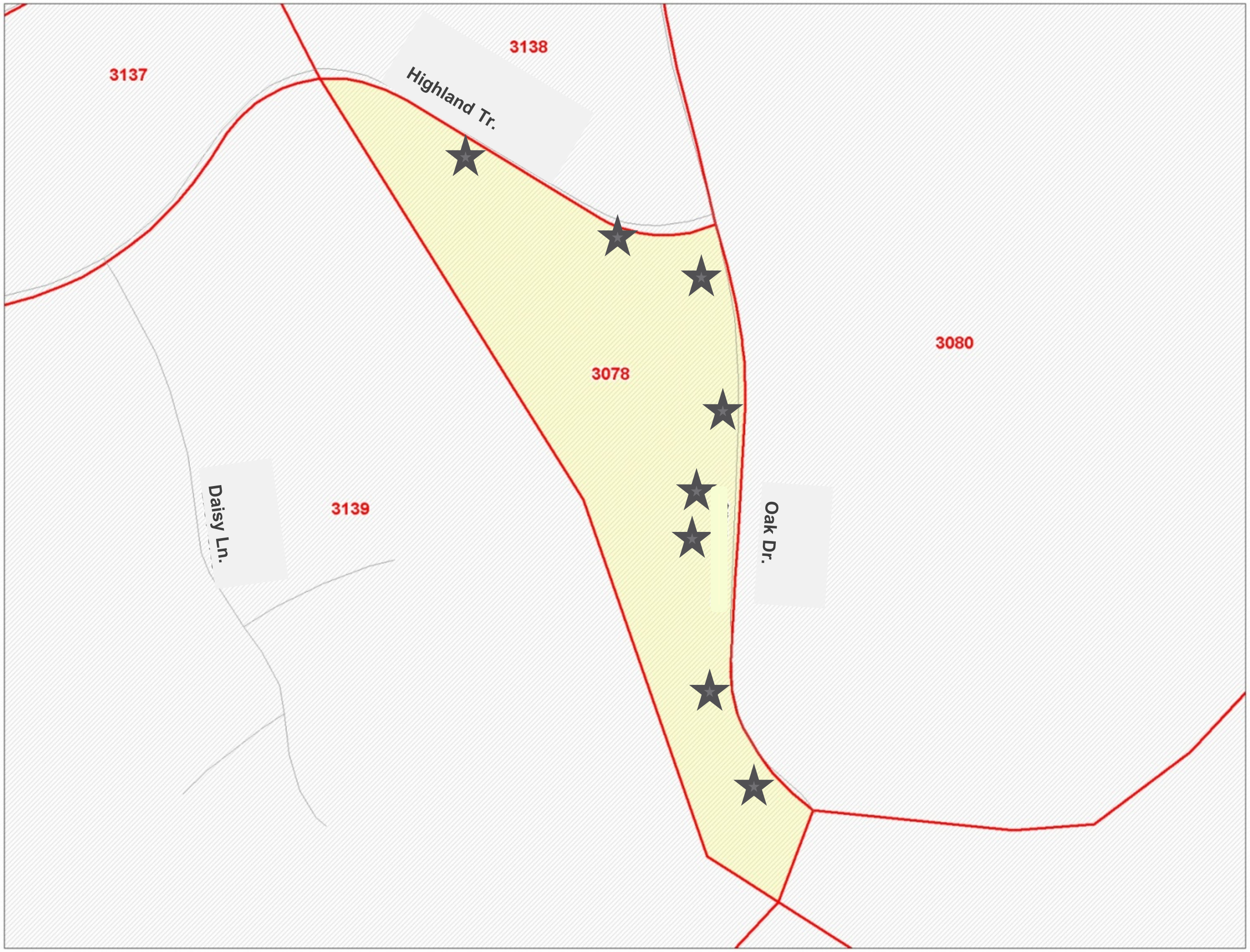
- Allows for real-time QC of listing efforts
- Greater usability than paper and pencil
  - Lister can choose address sort order
  - Dynamic color-coding
    - Green records are confirmed
    - Red records have been deleted
    - Blue records have been added to preloaded list
    - Black records have not yet been worked

Device-Based Listing Savings (cont.)

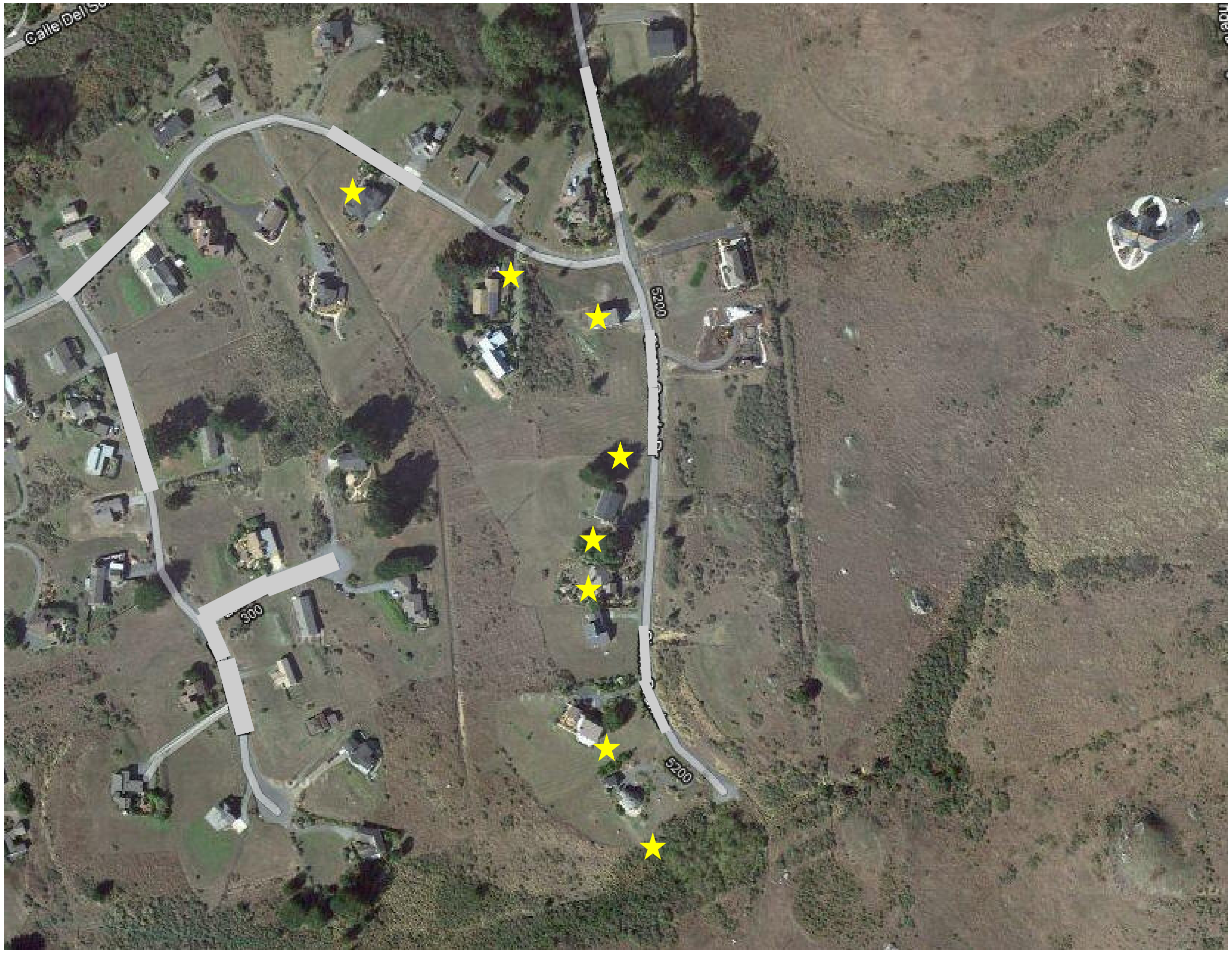
- Maps can be loaded on the device
- Eliminates the need for data entry of paper records
- GPS on device saves coordinates
- Photographs taken and linked to record

Example Savings - GPS

Example of actual GPS coordinates captured during listing


3137
3138
Highland Tr.
3078
3080
3139
Daisy Ln.
Oak Dr.

Example Savings - GPS


Calle Del So
5200
300
5200

Study Limitations

- Many more device-listed segments than enhanced and traditional
- Device-listed segments were scattered across US; enhanced and traditional were in West Virginia and Massachusetts only
- Varying densities
- Does not control for lister experience

Conclusions

- Minutes per housing unit were consistently lower when using a device for listing
  - True in both urban and rural areas
  - True even though overall housing unit density of traditional/enhanced areas was greater
- Device-specific costs are mostly upfront and associated with development
- Device-specific savings hold true for each listing effort

Thank You!

NORC at the UNIVERSITY of CHICAGO

insight for informed decisions™