MTMUG

DATA SOURCES FOR MODEL DEVELOPMENT AND VALIDATION

HDR

Jason Carbee, AICP
jason.carbee@hdrinc.com 402.399.1370

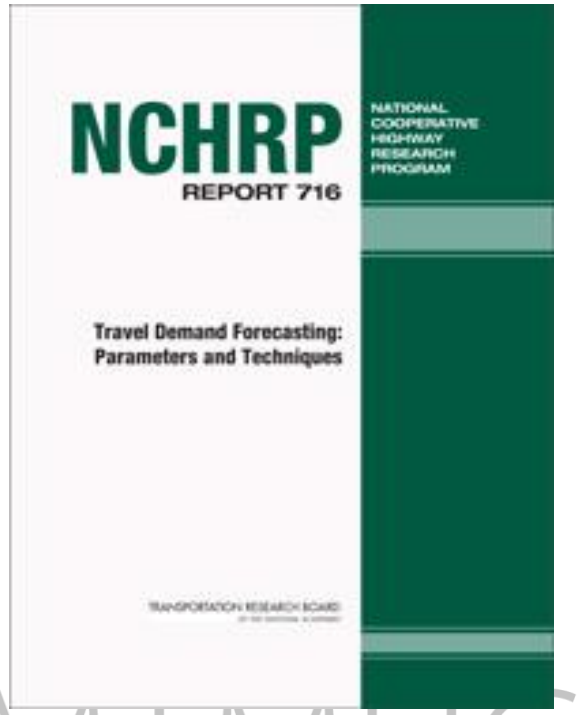
Presentation Agenda

- Back to Basics!
- Open Discussion
- Topics:
  - Brief Overview of NCHRP 716
  - Data Sources / Validation Techniques
    - Socio-Economic Data
    - Trip Generation
    - Trip Distribution
  - Combing Data Sources Where Appropriate

NCHRP 716 – WHAT'S DIFFERENT?

What's New?

- Acknowledges Increased Complexity:
  - Vehicle Availability Models
  - ABM, Tour-Based, etc.
- Discussion of Best Practices
- NHTS 2009 for Default Parameters
- Database of 69 MPOs' parameters
- NCHRP 735 supplements for Long-Distance and Rural Travel



NCHRP 716 Data Source Discussion

Table 3.5. Example primary and secondary model validation tests.

Model Component	Primary Tests	Secondary Tests	Potential Validation Data Sources
Networks/Zones	• Correct distances on links • Network topology, including balance between roadway network detail and zone detail • Appropriateness of zone size given spatial distribution of population and employment • Network attributes (managed lanes, area types, speeds, capacities) • Network connectivity • Transit run times	• Intrazonal travel distances (model design issue) • Zone structure compatibility with transit analysis needs (model design issue) • Final quality control checks based on review by end users • Transit paths by mode on selected interchanges	• GIS center line files • Transit on-board or household survey data
Socioeconomic Data/Models	• Households by income or auto ownership • Jobs by employment sector by geographic location • Locations of special generators • Qualitative logic test on growth • Population by geographic area • Types and locations of group quarters • Frequency distribution of households and jobs (or household and job densities) by TAZ	• Dwelling units by geographic location or jurisdiction • Households and population by land use type and land use density categories • Historical zonal data trends and projections to identify "large" changes (e.g., in autos/ household from 1995 to 2005)	• Census SF-3 data • QCEW • Private sources, such as Dun & Bradstreet
Trip Generation	• Reasonableness check of trip rates versus other areas • Logic check of trip rate relationships	• Checks on proportions or rates of nonmotorized trips • Reasonableness check of tour rates • Cordon lines by homogeneous land use type	• Chapter 4 of this report • Traffic counts (or intercept survey data) for cordon lines • Historic household survey data for region • NHTS (2001 or 2009)
Trip Distribution	• Trip length frequency distributions (time and distance) by market segments • Worker flows by district • District-to-district flows/desire lines • Intrazonal trips • External station volumes by vehicle class	• Area biases (psychological barrier—e.g., river) • Use of k-factors (Design Issue) • Comparison to roadside intercept origin-destination surveys • Small market movements • Special groups/markets • Balancing methods	• ACS/CTPP data • Chapter 4 of this report • Traffic counts (or intercept survey data) for screenlines • Historic household survey data for region • NHTS (2001 or 2009)

NCHRP 716 Data Source Discussion

Table 3.5. Example primary and secondary model validation tests.

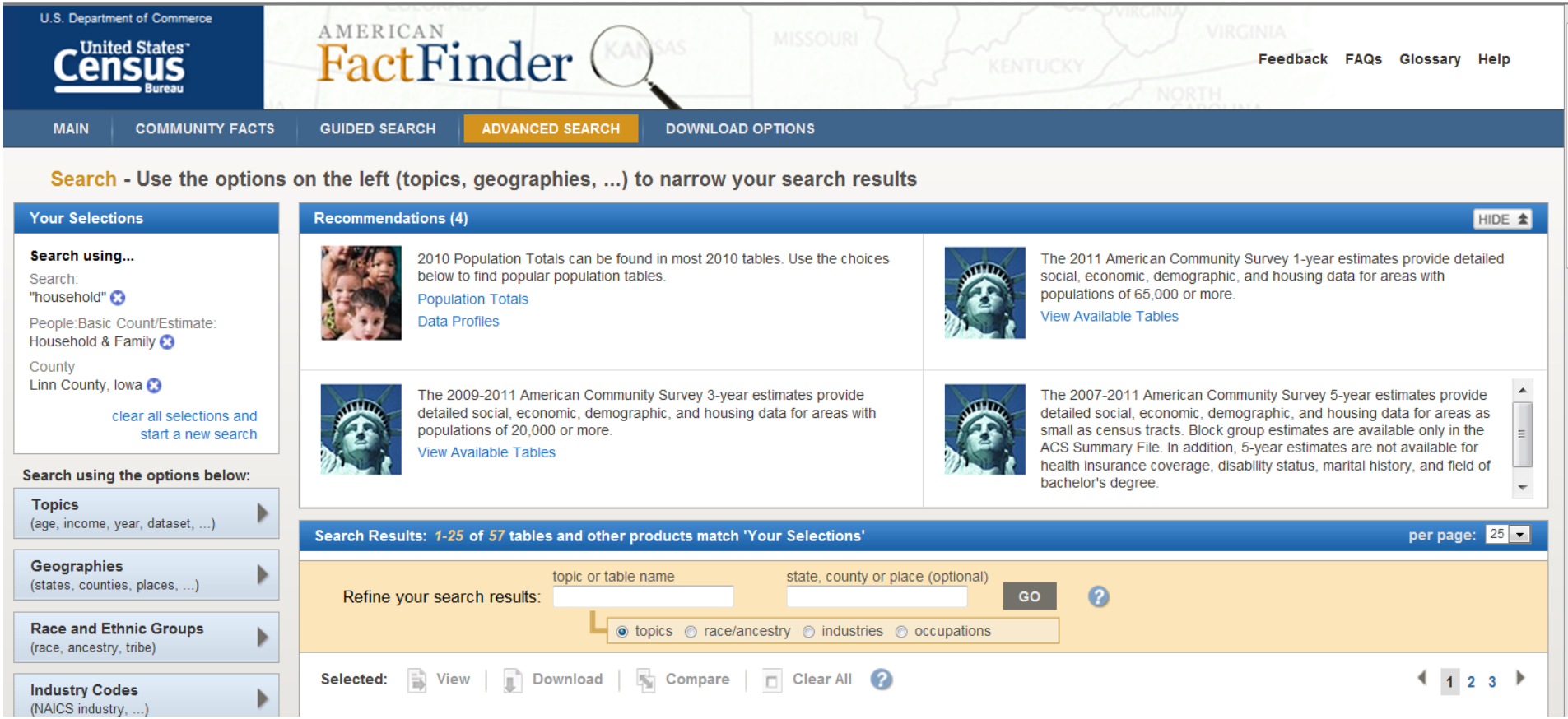
Model Component	Primary Tests	Secondary Tests	Potential Validation Data Sources
Networks/Zones	• Correct distances on links • Network topology, including balance between roadway network detail and zone detail • Appropriateness of zone size given spatial distribution of population and employment • Network attributes (managed lanes, area types, speeds, capacities) • Network connectivity • Transit run times	• Intrazonal travel distances (model design issue) • Zone structure compatibility with transit analysis needs (model design issue) • Final quality control checks based on review by end users • Transit paths by mode on selected interchanges	• GIS center line files • Transit on-board or household survey data
Socioeconomic Data/Models	• Households by income or auto ownership • Jobs by employment sector by geographic location • Locations of special generators • Qualitative logic test on growth • Population by geographic area • Types and locations of group quarters • Frequency distribution of households and jobs (or household and job densities) by TAZ	• Dwelling units by geographic location or jurisdiction • Households and population by land use type and land use density categories • Historical zonal data trends and projections to identify "large" changes (e.g., in autos/ household from 1995 to 2005)	• Census SF-3 data • QCEW • Private sources, such as Dun & Bradstreet
Trip Generation	• Reasonableness check of trip rates versus other areas • Logic check of trip rate relationships	• Checks on proportions or rates of nonmotorized trips • Reasonableness check of tour rates • Cordon lines by homogeneous land use type	• Chapter 4 of this report • Traffic counts (or intercept survey data) for cordon lines • Historic household survey data for region • NHTS (2001 or 2009)
Trip Distribution	• Trip length frequency distributions (time and distance) by market segments • Worker flows by district • District-to-district flows/desire lines • Intrazonal trips • External station volumes by vehicle class	• Area biases (psychological barrier—e.g., river) • Use of k-factors (Design Issue) • Comparison to roadside intercept origin-destination surveys • Small market movements • Special groups/markets • Balancing methods	• ACS/CTPP data • Chapter 4 of this report • Traffic counts (or intercept survey data) for screenlines • Historic household survey data for region • NHTS (2001 or 2009)

DATA SOURCES / VALIDATION APPROACHES

Data Source Examples

- SE Data Development / Checking
  - Control Total Data Sources
  - TAZ-level Data Development / Sources
- Trip Generation
  - Data Sources
  - Validation Methods
- Trip Distribution
  - Data Sources

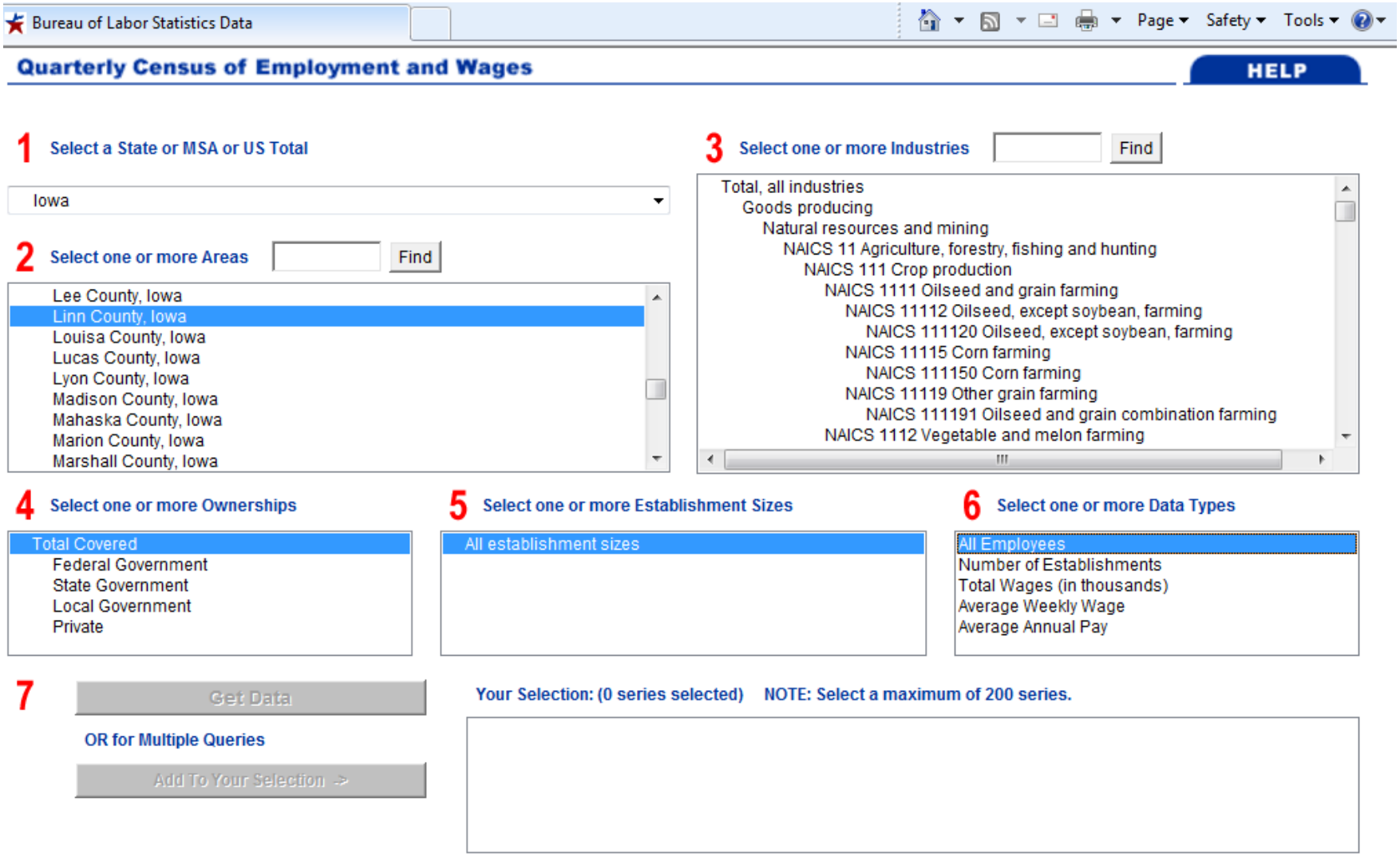
Census / ACS Data



QCEW Data

- Quarterly Census of Employment and Wages (QCEW).
  - Was ES-202.
  - Employment and Wage Information at 6-digit NAICS level.
  - Workers Covered by State Unemployment Insurance (UI) laws and Federal Unemployment Compensation for Federal Employees (UCFE) program.
  - Aggregated to County Level.

QCEW Online Tool – Linn County



QCEW Example – Linn County

Quarterly Census of Employment and Wages

```
Series Id:   ENU1911310010
State:       Iowa
Area:        Linn County, Iowa
Industry:    Total, all industries
Owner:       Total Covered
Size:        All establishment sizes
Type:        All Employees
```

Download: .xls

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2002	115698	115163	115877	117556	118263	118659	115514	115892	116581	117387	118300	117438	116861
2003	113544	113059	114007	115085	115569	115988	114035	114441	115186	115995	116120	115921	114913
2004	113621	113506	114407	115736	116164	117262	115371	115540	116231	117623	117864	118441	115981
2005	115145	115852	117417	118547	118553	119269	116810	116726	118601	118859	119696	119639	117926
2006	116787	117376	118838	120058	120846	122650	119488	119907	121086	121997	122703	122806	120379
2007	120068	120641	121142	122755	124224	126155	122621	122926	123850	124765	125911	125735	123399
2008	123038	123364	124168	125435	126808	127362	125267	125298	126485	127530	128001	127319	125840
2009	123518	123965	123786	124593	124668	125406	122603	121979	123190	123968	124213	123777	123806
2010	120917	120851	121684	123606	124704	125876	123905	123858	124943	126041	126799	126586	124148
2011	121870	122418	123182	125068	125985	127525	124213	124136	125840	125962	126897	127024	125010
2012	124418(P)	124130(P)	125299(P)	126392(P)	127543(P)	129013(P)	124943(P)	125550(P)	126645(P)				

QCEW Example – Linn County

Quarterly Census of Employment and Wages

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2002	115698	115163	115877	117556	118263	118659	115514	115892	116581	117387	118300	117438	116861
2003	113544	113059	114007	115085	115569	115988	114035	114441	115186	115995	116120	115921	114913
2004	113621	113506	114407	115736	116164	117262	115371	115540	116231	117623	117864	118441	115981
2005	115145	115852	117417	118547	118553	119269	116810	116726	118601	118859	119696	119639	117926
2006	116787	117376	118838	120058	120846	122650	119488	119907	121086	121997	122703	122806	120379
2007	120068	120641	121142	122755	124224	126155	122621	122926	123850	124765	125911	125735	123399
2008	123038	123364	124168	125435	126808	127362	125267	125298	126485	127530	128001	127319	125840
2009	123518	123965	123786	124593	124668	125406	122603	121979	123190	123968	124213	123777	123806
2010	120917	120851	121684	123606	124704	125876	123905	123858	124943	126041	126799	126586	124148
2011	121870	122418	123182	125068	125985	127525	124213	124136	125840	125962	126897	127024	125010
2012	124418(P)	124130(P)	125299(P)	126392(P)	127543(P)	129013(P)	124943(P)	125550(P)	126645(P)				

Table 2-4: 2005 Employment by Type (Corridor MPO)

Employment Type	Employees (2005, Corridor MPO)	Percent
Retail	20,294	18.1%
Service	54,559	48.6%
Basic	37,494	33.4%
Total	**112,347**	**100.0%**

- QCEW Available at Industry Level

Woods and Poole Projections

- One of Multiple Private Economic Projections Sources
- Econometric Model for Population, Household, Employment (by Sector)
- Data Available at County / MSA Level
- Historical and Projections, 1969 to 2040

Woods and Poole Example

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
TOTAL POPULATION (in thousands)	24.445	24.481	24.519	24.558	24.6	24.643	24.688	24.733	24.78	24.827	24.874	24.922	24.968	25.016	25.063	25.109
TOTAL POPULATION AGE 0 to 19 YEARS (in thousands)	7.733	7.798	7.87	7.939	8.017	8.094	8.137	8.182	8.227	8.258	8.303	8.326	8.38	8.427	8.466	8.589
TOTAL POPULATION AGE 20 to 64 YEARS (in thousands)	13.178	13.101	13.03	12.927	12.844	12.754	12.676	12.623	12.574	12.564	12.47	12.433	12.389	12.364	12.324	12.25
TOTAL POPULATION AGE 65 YEARS and OVER (in thousands)	3.534	3.582	3.619	3.692	3.739	3.795	3.875	3.928	3.979	4.005	4.101	4.163	4.199	4.225	4.273	4.27
WHITE NON-HISPANIC POPULATION (in thousands)	15.117	14.946	14.759	14.584	14.394	14.193	13.986	13.773	13.544	13.318	13.087	12.862	12.613	12.364	12.107	11.851
BLACK NON-HISPANIC POPULATION (in thousands)	0.813	0.816	0.822	0.835	0.837	0.839	0.85	0.853	0.863	0.868	0.871	0.876	0.877	0.89	0.888	0.894
NATIVE AMERICAN NON-HISPANIC POPULATION (in thousands)	0.093	0.094	0.096	0.099	0.098	0.098	0.1	0.101	0.103	0.105	0.105	0.107	0.107	0.11	0.113	0.114
ASIAN AMERICAN and PACIFIC ISLANDER NON-HISPANIC POPULATION (in thousands)	0.221	0.226	0.231	0.234	0.237	0.247	0.251	0.257	0.266	0.268	0.275	0.28	0.279	0.282	0.291	0.287
HISPANIC or LATINO POPULATION of ANY RACE (in thousands)	8.201	8.399	8.611	8.806	9.034	9.266	9.501	9.749	10.004	10.268	10.536	10.797	11.092	11.37	11.664	11.963
TOTAL POPULATION AGE 16 YEARS and OVER (in thousands)	18.088	18.056	18.048	18.04	18.069	18.071	18.094	18.11	18.115	18.105	18.132	18.075	18.046	18.093	18.095	18.139
TOTAL POPULATION AGE 18 YEARS and OVER (in thousands)	17.329	17.311	17.268	17.237	17.229	17.214	17.25	17.26	17.265	17.274	17.278	17.281	17.303	17.242	17.216	17.245
TOTAL POPULATION AGE 0 to 6 YEARS (in thousands)	2.773	2.784	2.876	2.927	2.938	2.976	2.969	2.97	2.977	2.982	2.988	2.981	2.985	2.978	2.976	2.985
TOTAL POPULATION AGE 7 to 11 YEARS (in thousands)	2.004	2.019	1.95	1.924	1.939	1.949	1.959	2.06	2.121	2.137	2.171	2.172	2.176	2.171	2.179	2.179
TOTAL POPULATION AGE 12 to 14 YEARS (in thousands)	1.216	1.237	1.258	1.247	1.249	1.24	1.256	1.186	1.171	1.175	1.246	1.31	1.327	1.364	1.363	1.358
TOTAL POPULATION AGE 15 to 17 YEARS (in thousands)	1.123	1.13	1.167	1.223	1.245	1.264	1.254	1.257	1.246	1.259	1.191	1.178	1.177	1.261	1.329	1.342
TOTAL POPULATION AGE 15 to 44 YEARS (in thousands)	8.965	8.949	8.931	8.976	8.986	9.042	9.094	9.132	9.174	9.242	9.208	9.221	9.302	9.36	9.401	9.493
TOTAL EMPLOYMENT (in thousands of jobs)	15.566	15.72	15.873	16.025	16.18	16.335	16.49	16.644	16.8	16.955	17.113	17.27	17.427	17.588	17.747	17.902
FARM EMPLOYMENT (in thousands of jobs)	0.866	0.862	0.858	0.854	0.85	0.846	0.842	0.838	0.833	0.829	0.824	0.82	0.815	0.81	0.805	0.801
NON-FARM EMPLOYMENT (in thousands of jobs)	14.7	14.858	15.015	15.171	15.33	15.489	15.648	15.806	15.967	16.126	16.289	16.45	16.612	16.778	16.942	17.101
PRIVATE NON-FARM EMPLOYMENT (in thousands of jobs)	12.506	12.653	12.8	12.944	13.093	13.242	13.392	13.541	13.692	13.842	13.996	14.149	14.302	14.459	14.615	14.767
FORESTRY, FISHING, RELATED ACTIVITIES and OTHER EMPLOYMENT (in thousands of jobs)	0.237	0.239	0.24	0.241	0.243	0.244	0.245	0.246	0.247	0.249	0.25	0.251	0.252	0.253	0.254	0.255
MINING EMPLOYMENT (in thousands of jobs)	0.07	0.071	0.072	0.072	0.073	0.074	0.075	0.076	0.076	0.077	0.078	0.079	0.08	0.08	0.081	0.082
UTILITIES EMPLOYMENT (in thousands of jobs)	0.017	0.017	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.019	0.019	0.019
CONSTRUCTION EMPLOYMENT (in thousands of jobs)	0.844	0.859	0.874	0.889	0.903	0.918	0.934	0.949	0.964	0.979	0.995	1.01	1.026	1.042	1.058	1.074
MANUFACTURING EMPLOYMENT (in thousands of jobs)	3.934	3.944	3.954	3.963	3.971	3.979	3.986	3.992	3.997	4.002	4.005	4.009	4.011	4.013	4.013	4.013
WHOLESALE TRADE EMPLOYMENT (in thousands of jobs)	0.597	0.597	0.596	0.595	0.594	0.593	0.591	0.59	0.589	0.587	0.586	0.584	0.583	0.581	0.579	0.577
RETAIL TRADE EMPLOYMENT (in thousands of jobs)	1.473	1.491	1.509	1.526	1.544	1.562	1.58	1.597	1.615	1.632	1.65	1.667	1.684	1.701	1.718	1.735
TRANSPORTATION and WAREHOUSING EMPLOYMENT (in thousands of jobs)	0.521	0.529	0.538	0.546	0.555	0.564	0.572	0.581	0.59	0.598	0.607	0.616	0.625	0.634	0.643	0.651
INFORMATION EMPLOYMENT (in thousands of jobs)	0.114	0.114	0.114	0.114	0.114	0.113	0.113	0.113	0.113	0.113	0.113	0.112	0.112	0.112	0.112	0.111
FINANCE and INSURANCE EMPLOYMENT (in thousands of jobs)	0.519	0.521	0.523	0.526	0.528	0.53	0.532	0.533	0.535	0.537	0.538	0.54	0.541	0.542	0.543	0.544
REAL ESTATE and RENTAL and LEASE EMPLOYMENT (in thousands of jobs)	0.294	0.299	0.305	0.31	0.316	0.322	0.328	0.334	0.34	0.346	0.352	0.358	0.364	0.371	0.377	0.383
PROFESSIONAL and TECHNICAL SERVICES EMPLOYMENT (in thousands of jobs)	0.352	0.355	0.359	0.363	0.366	0.369	0.373	0.376	0.379	0.382	0.385	0.388	0.391	0.394	0.397	0.399
MANAGEMENT of COMPANIES and ENTERPRISES EMPLOYMENT (in thousands of jobs)	0.167	0.173	0.179	0.185	0.192	0.198	0.205	0.212	0.22	0.227	0.235	0.243	0.251	0.259	0.268	0.276
ADMINISTRATIVE and WASTE SERVICES EMPLOYMENT (in thousands of jobs)	0.527	0.543	0.559	0.575	0.592	0.609	0.626	0.644	0.662	0.68	0.699	0.718	0.737	0.757	0.777	0.798
EDUCATIONAL SERVICES EMPLOYMENT (in thousands of jobs)	0.126	0.129	0.132	0.135	0.138	0.141	0.145	0.148	0.151	0.154	0.158	0.161	0.165	0.168	0.172	0.175
HEALTH CARE and SOCIAL ASSISTANCE EMPLOYMENT (in thousands of jobs)	0.979	1.014	1.049	1.085	1.122	1.161	1.2	1.24	1.282	1.324	1.368	1.413	1.458	1.506	1.554	1.603
ARTS, ENTERTAINMENT, and RECREATION EMPLOYMENT (in thousands of jobs)	0.13	0.133	0.135	0.137	0.139	0.142	0.144	0.147	0.149	0.151	0.154	0.156	0.159	0.161	0.164	0.166
ACCOMMODATION and FOOD SERVICES EMPLOYMENT (in thousanc											0.778	0.781	0.783	0.786	0.788	0.79
OTHER SERVICES, EXCEPT PUBLIC ADMINISTRATION EMPLOYMENT (											1.027	1.045	1.062	1.08	1.098	1.116

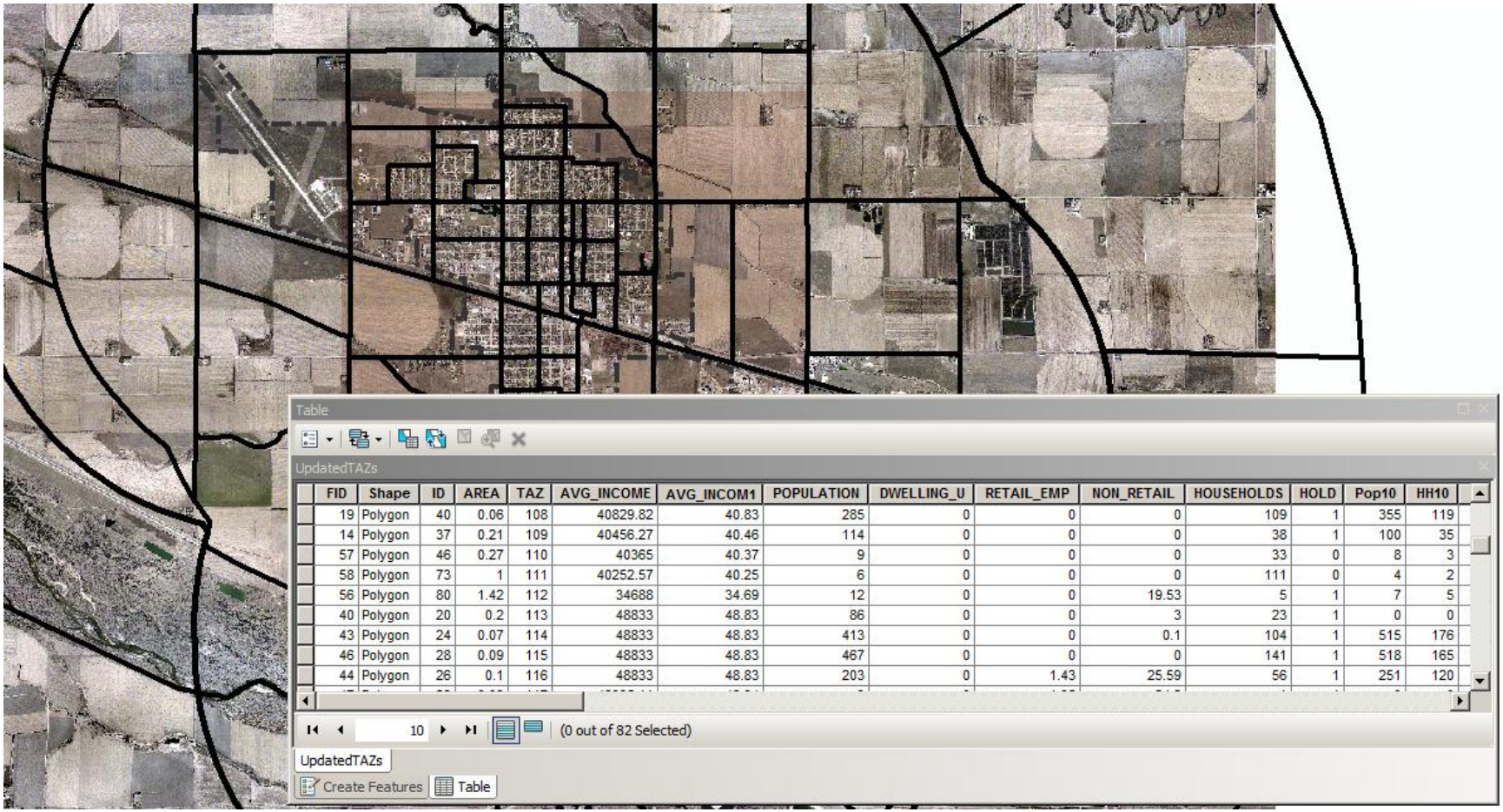
Woods and Poole Employment	Retail	Service	Other	Total
2010 County	1,492	4,080	9,476	15,048
Sector Share	9.9%	27.1%	63.0%	
2035 County	1,851	5,917	11,266	19,034
Sector Share	9.7%	31.1%	59.2%	

Extracting Sub-County Study Area

- How to Fit County Level Data to Sub-County Model Area?
  - LEHD Can Interpret Current Break Down
  - Make assumptions on future proportions

LEHD	Retail	Service	Other	Total
2010 County	1,137	3,756	6,991	11,884
2010 Study Area	709	1,715	4,313	6,737
Study Area Share of County	62%	46%	62%	57%

Developing TAZ-Level Data



Table

UpdatedTAZs

FID	Shape	ID	AREA	TAZ	AVG_INCOME	AVG_INCOM1	POPULATION	DWELLING_U	RETAIL_EMP	NON_RETAIL	HOUSEHOLDS	HOLD	Pop10	HH10
19	Polygon	40	0.06	108	40829.82	40.83	285	0	0	0	109	1	355	119
14	Polygon	37	0.21	109	40456.27	40.46	114	0	0	0	38	1	100	35
57	Polygon	46	0.27	110	40365	40.37	9	0	0	0	33	0	8	3
58	Polygon	73	1	111	40252.57	40.25	6	0	0	0	111	0	4	2
56	Polygon	80	1.42	112	34688	34.69	12	0	0	19.53	5	1	7	5
40	Polygon	20	0.2	113	48833	48.83	86	0	0	3	23	1	0	0
43	Polygon	24	0.07	114	48833	48.83	413	0	0	0.1	104	1	515	176
46	Polygon	28	0.09	115	48833	48.83	467	0	0	0	141	1	518	165
44	Polygon	26	0.1	116	48833	48.83	203	0	1.43	25.59	56	1	251	120

10 (0 out of 82 Selected)

UpdatedTAZs

Create Features | Table

SE Data: TAZ – Level Households

- Production Data
  - ACS Level Population / Households: Block Level
  - ACS Level Cross-Tab Data: Block-Group Level
    - Auto Ownership
    - Income

Example NCHRP 716
Trip Production Rates

Table C.5. Home-based work trip rates.

Number of Workers by Number of Autos

	Workers				
Autos	**0**	**1**	**2**	**3+**	**Average**
0	0.0	1.0	2.4	5.1	**0.5**
1	0.0	1.0	2.6	5.1	**0.8**
2	0.0	1.3	2.6	5.1	**1.6**
3+	0.0	1.3	2.6	5.1	**2.3**
Average	**0.0**	**1.2**	**2.6**	**5.1**	**1.4**

Number of Persons by Number of Autos

	Persons					
Autos	**1**	**2**	**3**	**4**	**5+**	**Average**
0	0.2	0.7	1.0	1.0	1.0	**0.5**
1	0.6	0.8	1.2	1.7	1.5	**0.8**
2	0.7	1.3	2.0	2.0	2.3	**1.6**
3+	0.9	1.4	2.6	2.9	3.3	**2.3**
Average	**0.5**	**1.2**	**2.0**	**2.3**	**2.4**	**1.4**

Number of Persons by Income Level

	Persons					
Household Income	**1**	**2**	**3**	**4**	**5+**	**Average**
i	0.2	0.6	0.8	1.3	1.8	**0.6**
ii	0.3	0.8	1.5	1.6	2.0	**0.8**
iii	0.7	1.0	1.8	2.3	2.6	**1.3**
iv	0.8	1.5	2.4	2.4	2.6	**1.9**
v	0.9	1.6	2.4	2.4	2.6	**2.0**
Average	**0.5**	**1.2**	**2.0**	**2.3**	**2.4**	**1.4**

Note: All averages are weighted.
Source: 2009 NHTS.

SE Data: TAZ – Level Employment

- Attraction Data:
  - Employment by Sector

Example NCHRP 716
Trip Attraction Rates

Table 4.4. Trip attraction rates from selected MPOs (person trips per unit).

	Number of MPO Models Summarized	Households[a]	School Enrollment[b]	Employment			
				Basic[c]	Retail[d]	Service[e]	Total
All Person Trips							
Home-Based Work							
Model 1	16						1.2
Home-Based Nonwork							
Model 1	2	1.2	1.4	0.2	8.1	1.5	
Model 2	8	2.4	1.1		7.7	0.7	
Model 3	2	0.7		0.7	8.4	3.5	
Nonhome Based							
Model 1	5	0.6		0.5	4.7	1.4	
Model 2	8	1.4			6.9	0.9	
Motorized Person Trips							
Home-Based Work							
Model 1	8						1.2
Home-Based Nonwork							
Model 1	1	0.4	1.1	0.6	4.4	2.5	
Model 3	4	1.0		0.3	5.9	2.3	
Nonhome Based							
Model 1	6	0.6		0.7	2.6	1.0	

[a] The number of households in a zone.
[b] The number of elementary, high school, or college/university students in a zone.
[c] Employment primarily in two-digit North American Industry Classification System (NAICS) codes 1–42 and 48–51 [Standard Industrial Classification (SIC) codes 1–51].
[d] Employment primarily in two-digit NAICS codes 44–45 (SIC codes 52–59).
[e] Employment primarily in two-digit NAICS codes 52–92 (SIC codes 60–97).

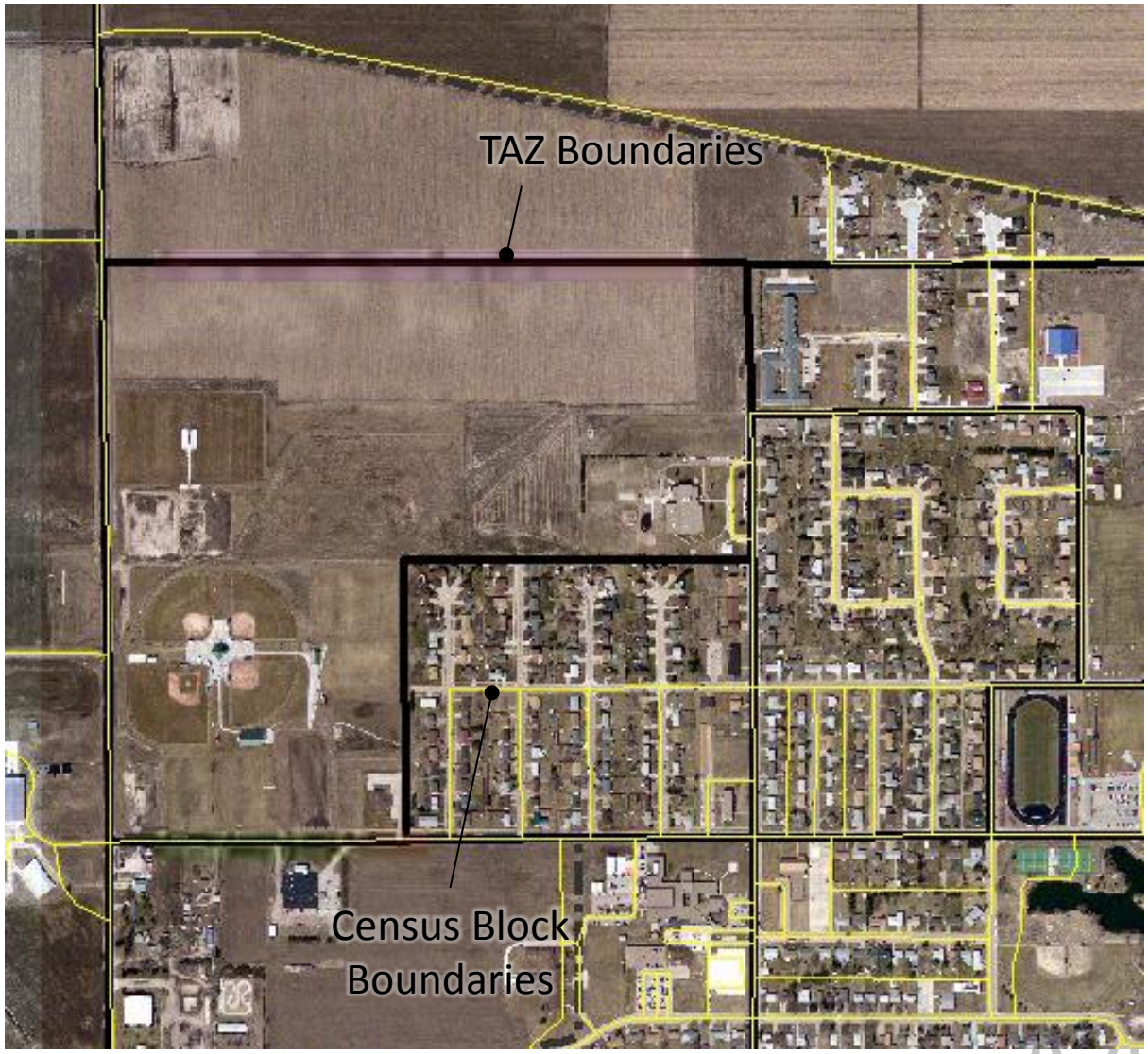
Source: MPO Documentation Database.

Employment Data Lessons Learned

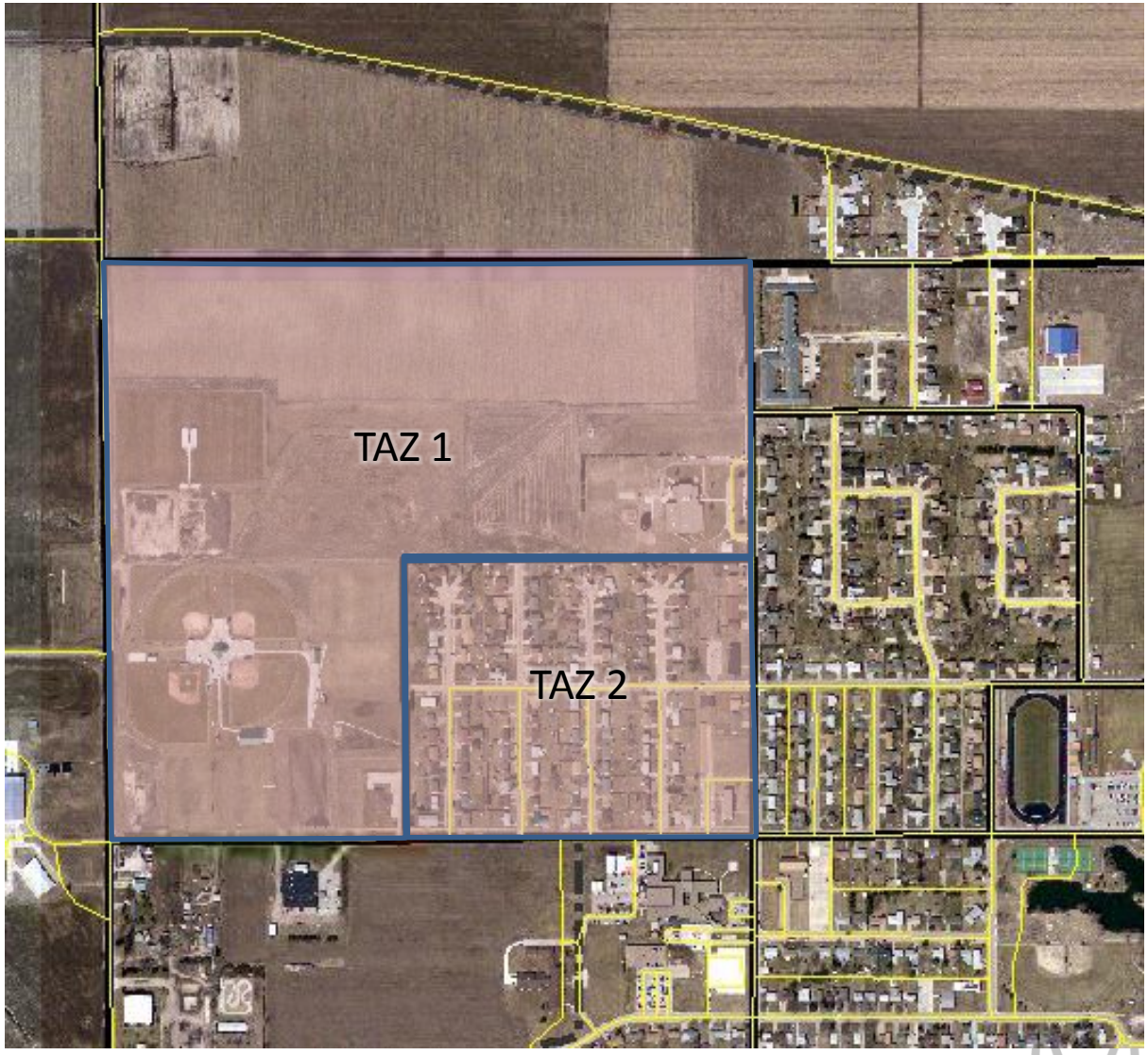
- How to Define a "Job"
  - Data Sources Count Different Jobs
    - QCEW / ES-202 Count Jobs Paying into Unemployment Insurance Pool
      - No Military Jobs
      - No Self-Employed
      - No Proprietors
      - No Railroad Jobs
    - Private Databases Count More
  - FTEs / Primary vs Secondary Jobs
- Headquarters – Plant Issue
  - Multi-plant operations
  - Government
  - Schools

SE Data Allocation: Block – TAZ "Perfect Fit"

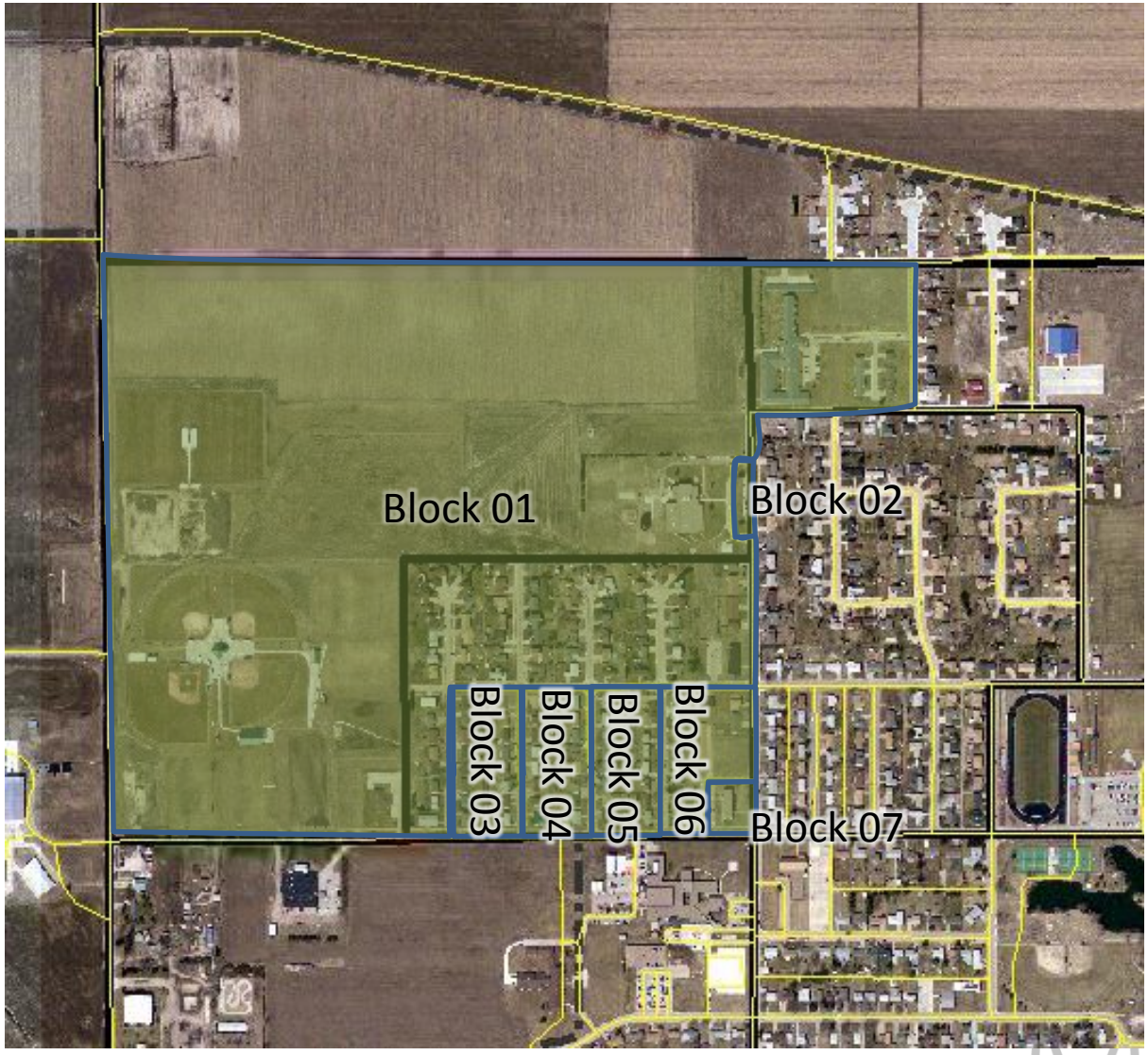
SE Data Allocation: Block – TAZ "Post-Processing"



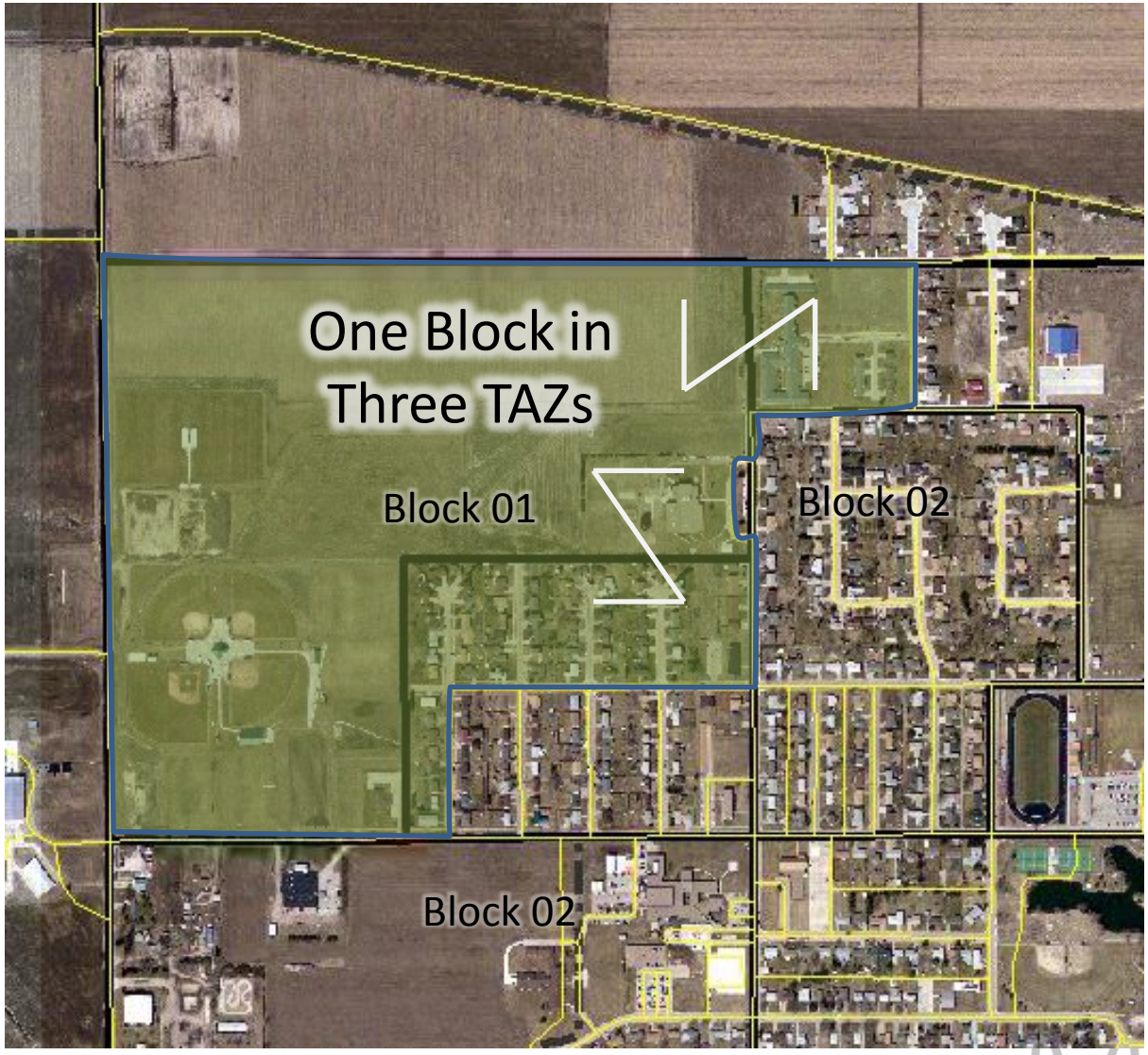
TAZ “Post-Processing”: TAZ Boundaries Example



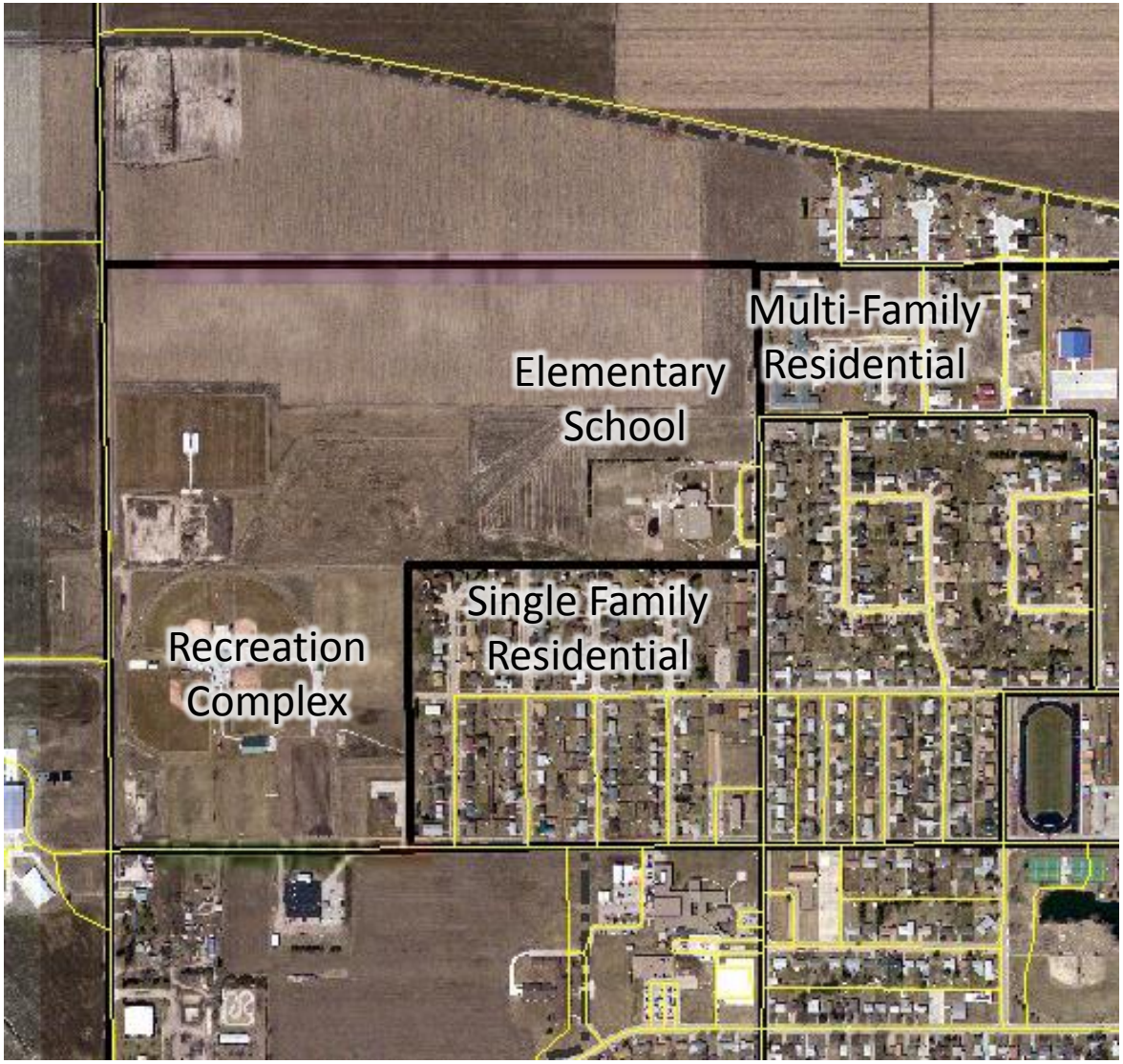
TAZ “Post-Processing”: Block Boundaries Example



TAZ “Post-Processing”: The Issue



TAZ "Post-Processing": Dig In and Get Your Hands Dirty



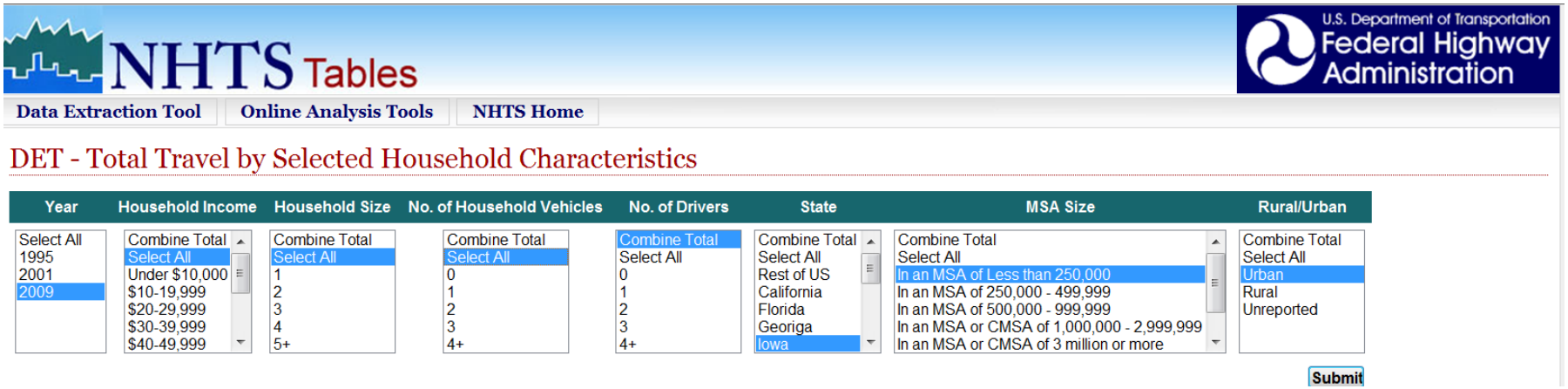
- Find Schools, Employers
- Count SF Housing
- Field Verify / Estimate MF Housing
- Know Aerial Date
- Review Online Mapping

Trip Generation

- Reasonable Regional Trip Rate Average
- Evaluate Real Trip Rates from Homogenous Land Uses

Trip Generation

- NHTS 2009 Data for Trip Gen Rates
  - Relevant Geography
  - Relevant Cross-Classification Variables
  - By Trip Purpose



Trip Generation – Example NHTS Validation Check

- NHTS 2009 Trip Productions
  - Iowa MSAs
  - Urban
  - Under 250,000 population
- NHTS Rate: 9.42 Person Trips / HH (AADT)
- Current Model Rate: 13.52 Person Trips / HH (AWDT)
- Refine NHTS Data / Evaluate Model Data
  - Refine NHTS data to Weekday Data
  - Is your model Peak Workday or Average Day of Week?

Trip Generation Validation - Macro

Table 5.7. Comparison of household trip rates.

Urban Area Population	Daily Person Trips per Household		
	NCHRP Report 187[a,c] (Published 1978)	*NCHRP Report 365*[a,c] (Published 1998)	2009 NHTS Data[b]
50,000 to 100,000	14.1	9.2	9.1
100,000 to 200,000	14.5	9.2	9.1
200,000 to 500,000	11.8	9.0	9.1
500,000 to 1,000,000	7.6	8.6	9.6
1,000,000 to 3,000,000	7.6	8.5	9.6
More than 3,000,000	7.6	8.5	9.6

[a] Trip rates are total person trips in motorized vehicles.

[b] Trip rates are total person trips by all modes.

[c] Because of differences between urban area categories in the three reports, the rates shown were chosen from the closest matching category.

Source: Sosslau et al. (1978), Martin and McGuckin (1998), 2009 NHTS.

Example NCHRP 716 Trip Rates

Table 5.8. Comparison of shares of trips by trip purpose.

Urbanized Area Population	Percentage of Daily Person Trips by Trip Purpose								
	NCHRP Report 187[a] (Published 1978)			*NCHRP Report 365*[a] (Published 1998)			2009 NHTS Data[b]		
	HBW	HBNW	NHB	HBW	HBNW	NHB	HBW	HBNW	NHB
50,000 to 100,000	16	61	23[c]	20[c]	57[c]	23[c]	15	54	31
100,000 to 200,000	20	57	23[c]	20[c]	57[c]	23[c]	15	54	31
200,000 to 500,000	20	55	25[c]	21[c]	56[c]	23[c]	15	54	31
500,000 to 1,000,000	25	54	21[c]	22	56[c]	22[c]	14	56	30
1,000,000 to 3,000,000	25	54	21[c]	22[c]	56[c]	22[c]	14	56	30
More than 3,000,000	25	54	21[c]	22[c]	56[c]	22[c]	14	56	30

[a] Shares by purpose are based on person trips in motorized vehicles.

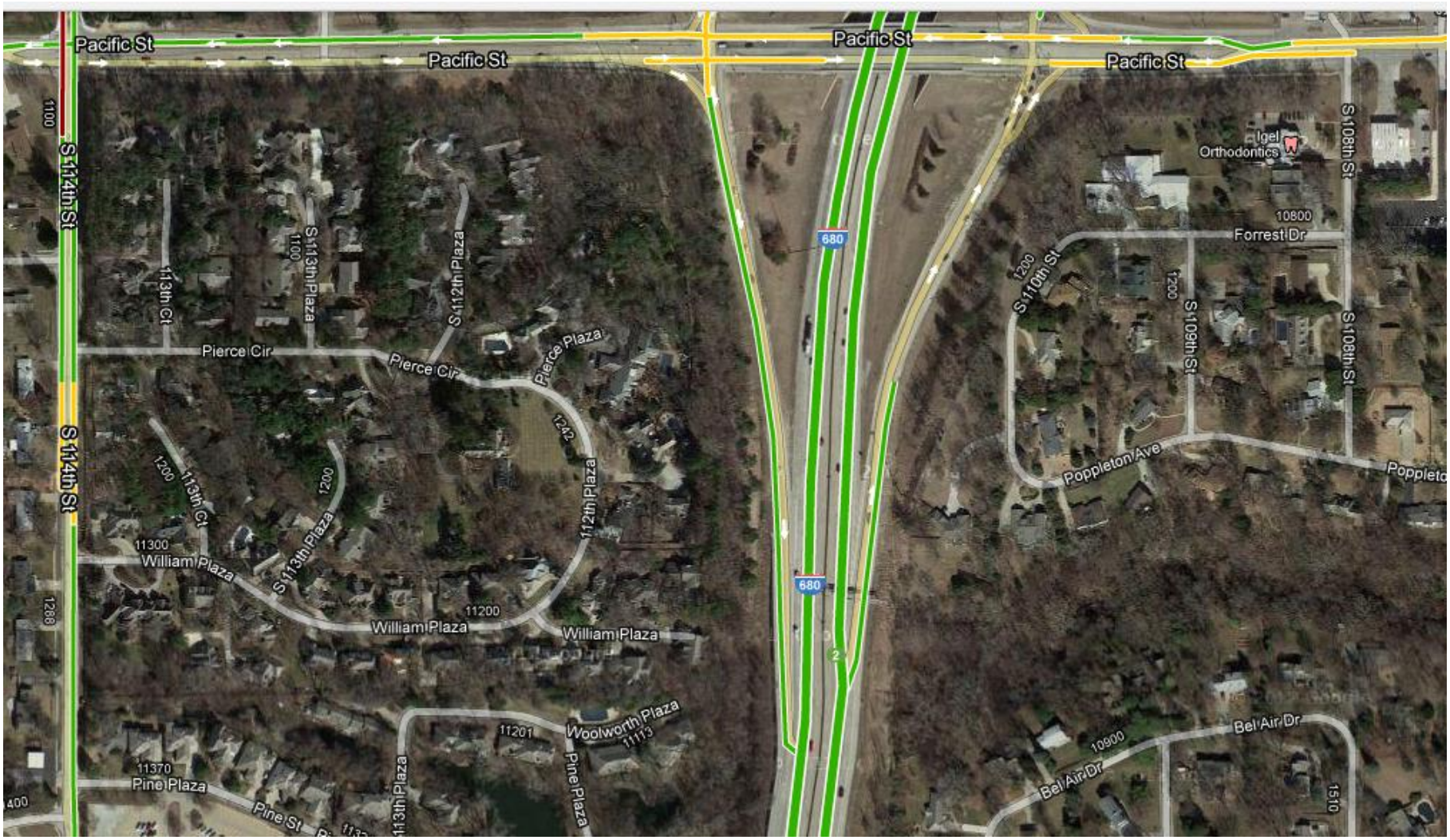
[b] Shares by purpose are based on person trips by all modes.

[c] Because of differences between urban area categories in the three reports, the rates shown were chosen from the closest matching category.

HBW = home-based work; HBNW = home-based nonwork; NHB = nonhome based.

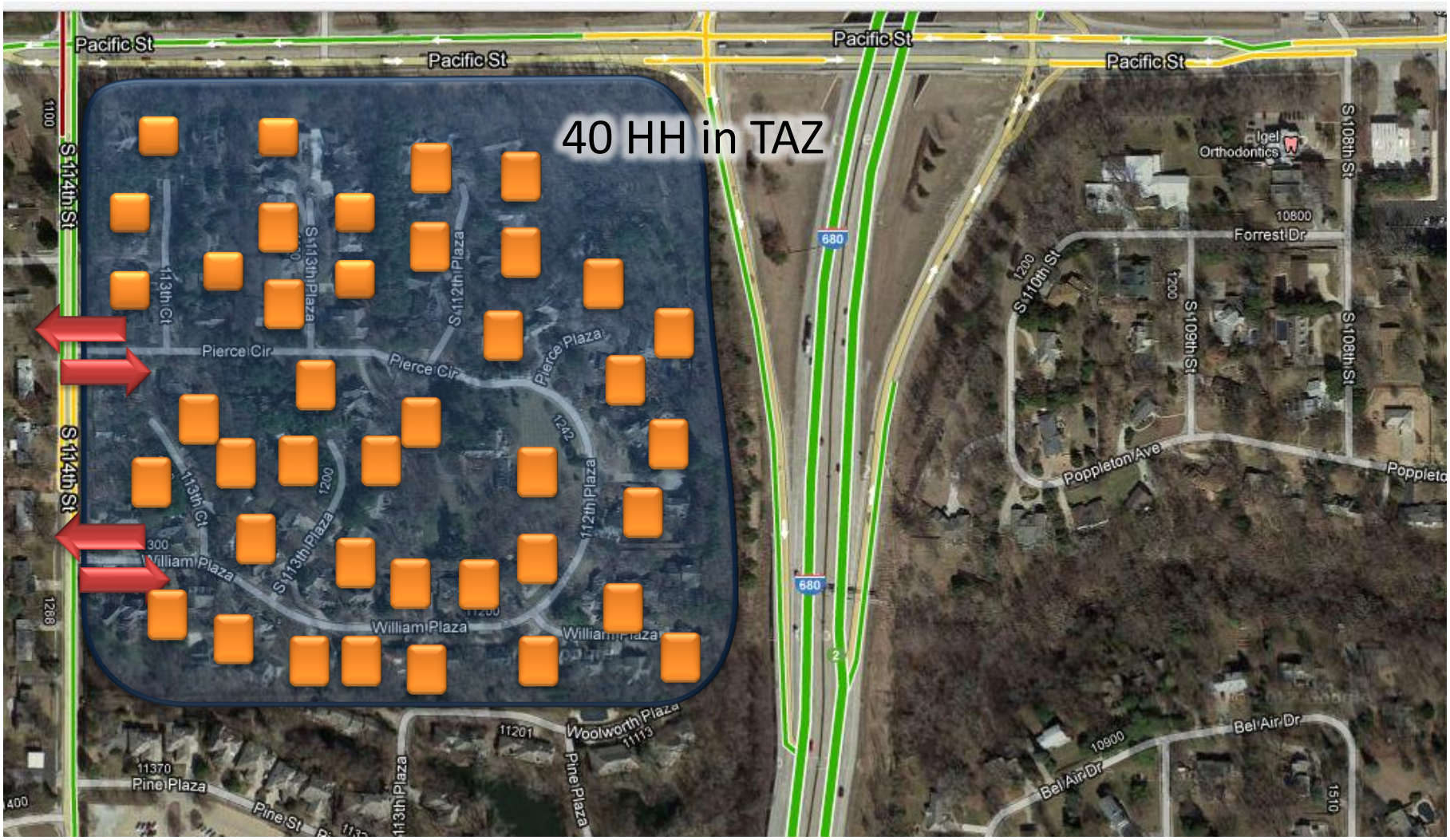
Source: Sosslau et al. (1978), Martin and McGuckin (1998), 2009 NHTS.

Example Cordon Trip Gen Check

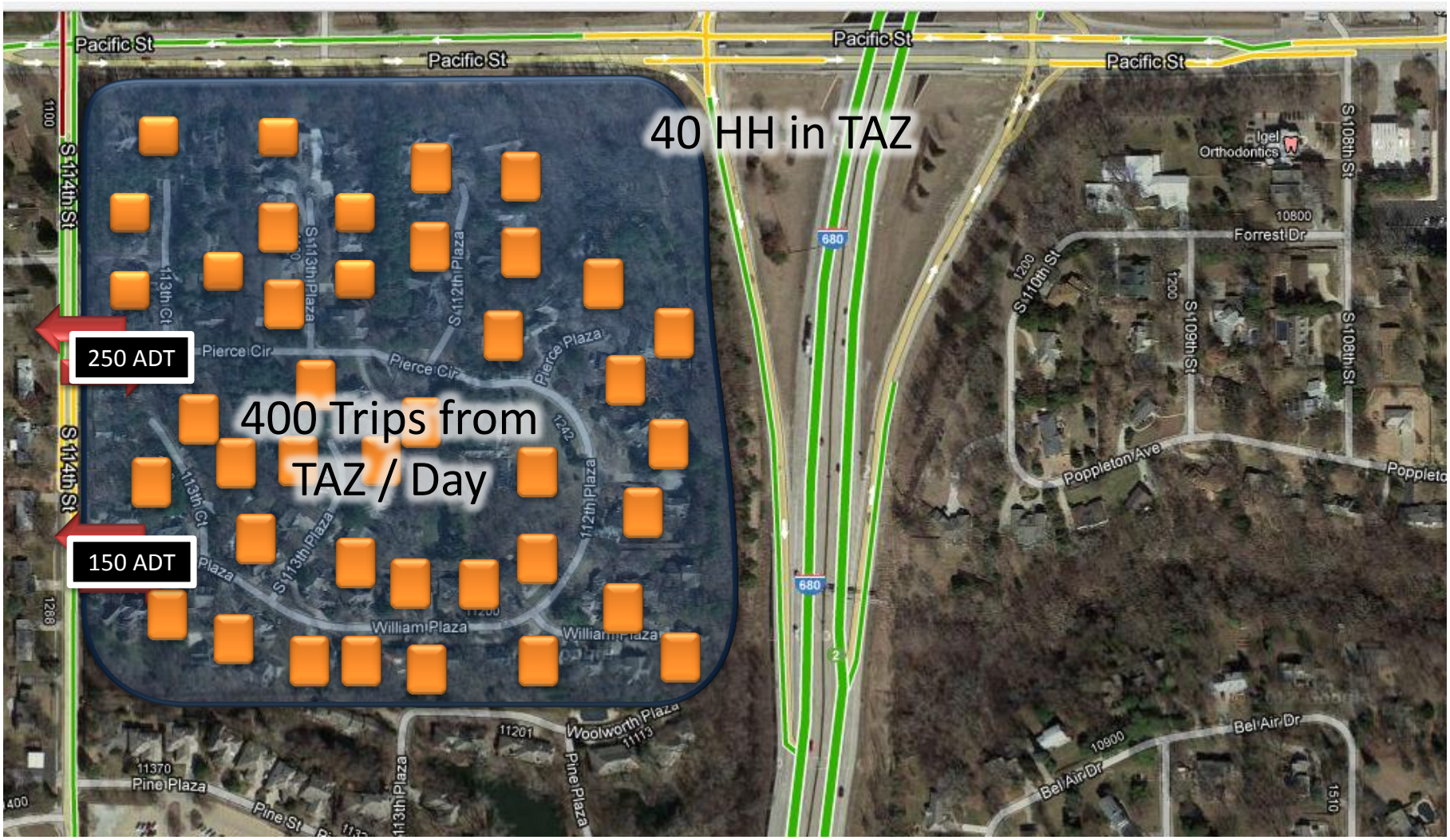


Define Homogenous Development Area

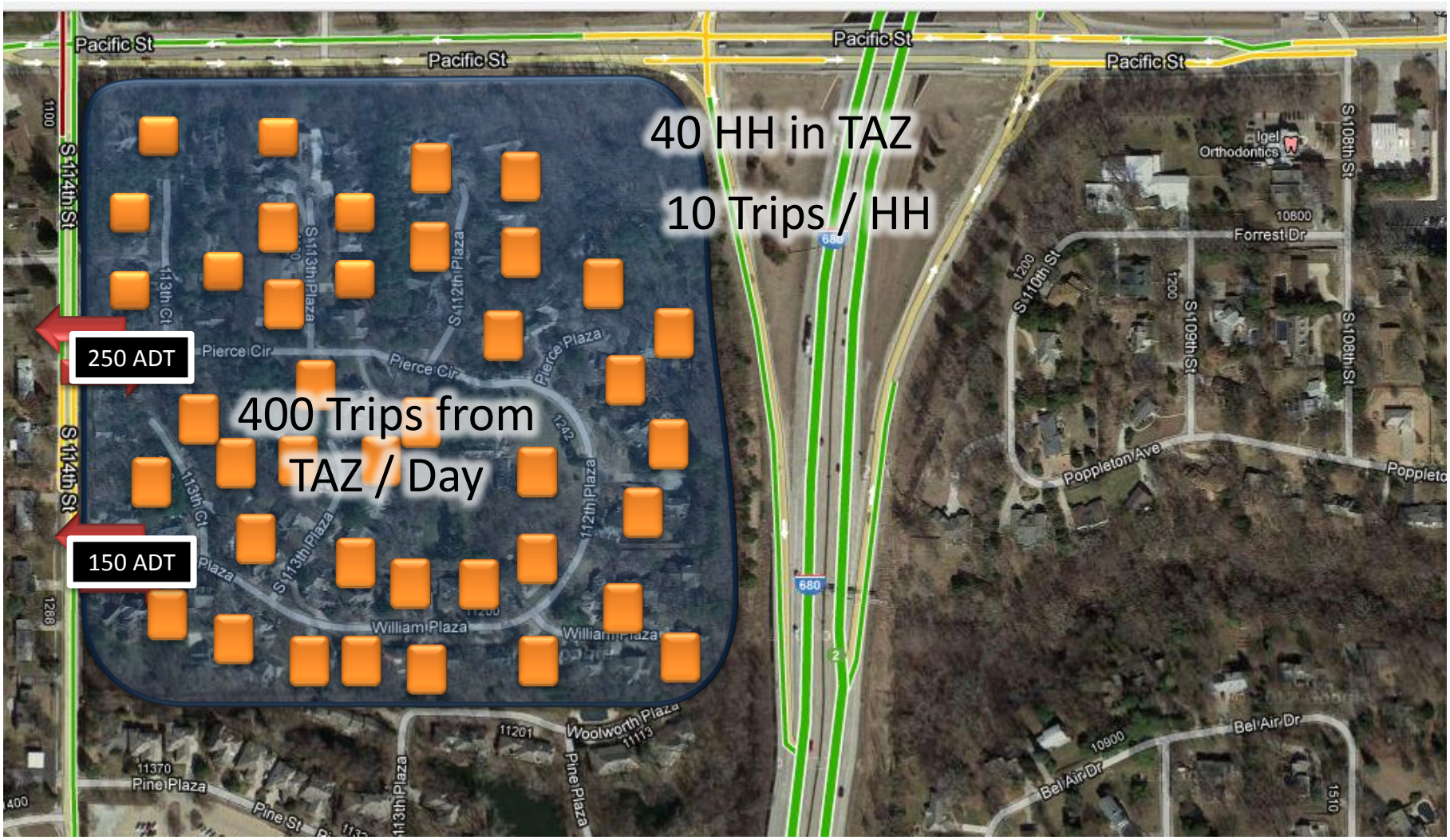
How Much Development?



How Much Traffic at Cordon?



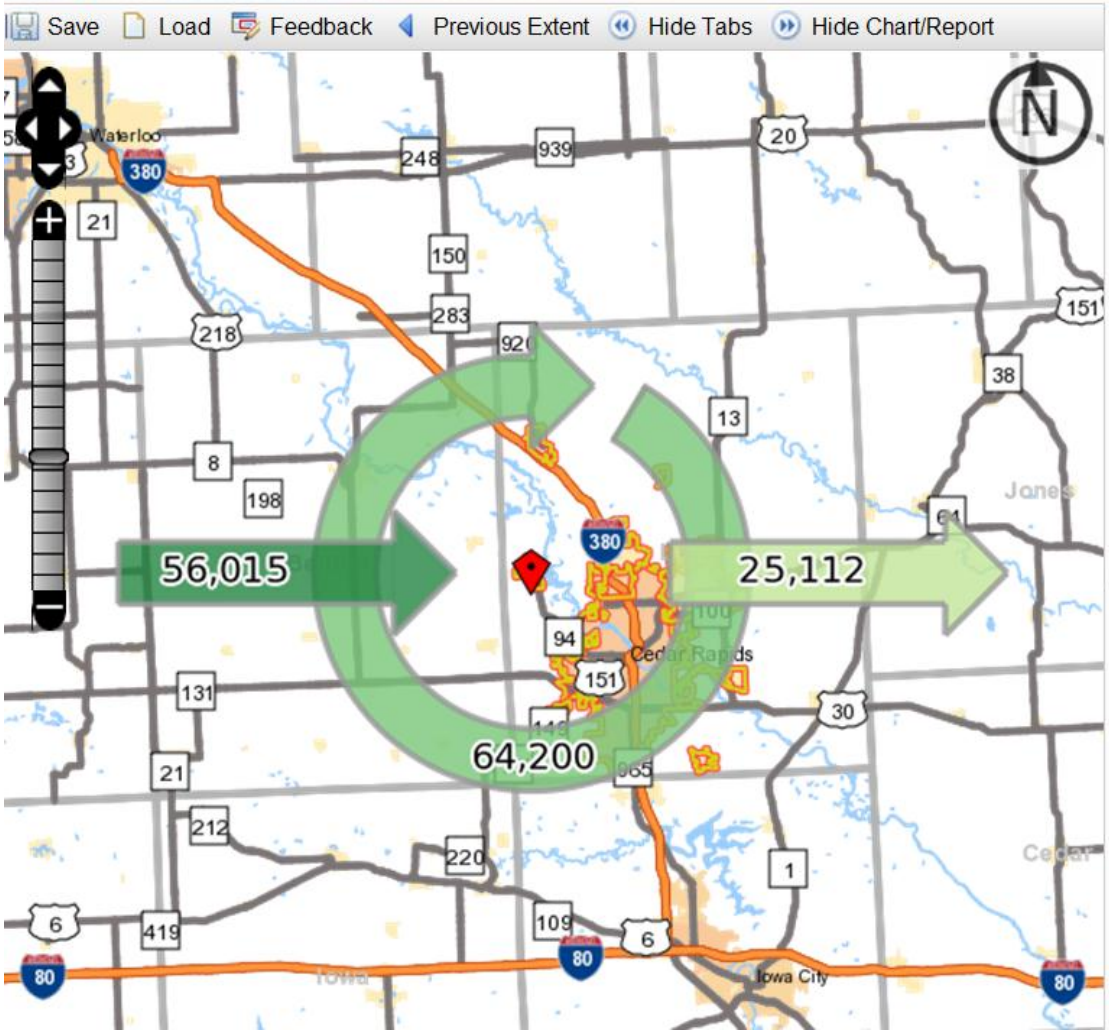
How Does Trip Rate Compare?

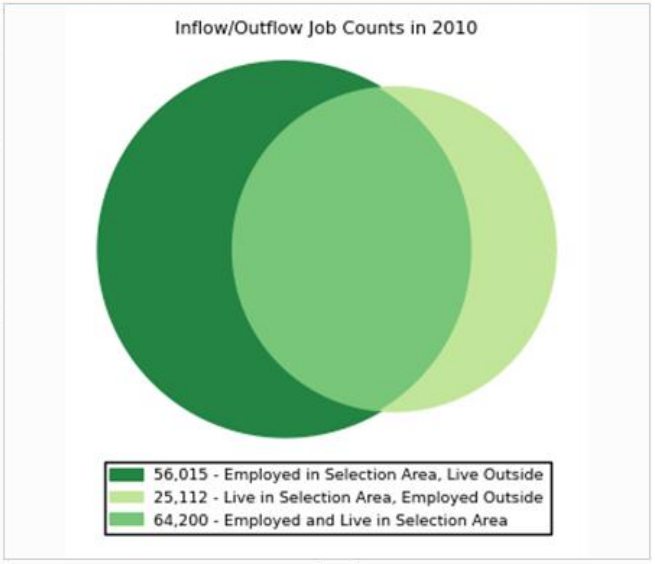


Trip Distribution – Data Sources

- CTPP (5-year ACS): Soon?
  - At Traffic Analysis District (TAD) level (20,000 pop)
- LEHD
  - On-The-Map interface
  - Block-Level
  - Analysis exportable to SHP
  - Some "Fuzzy" Data – Use with Caution

ON-THE-MAP: Commute Flows

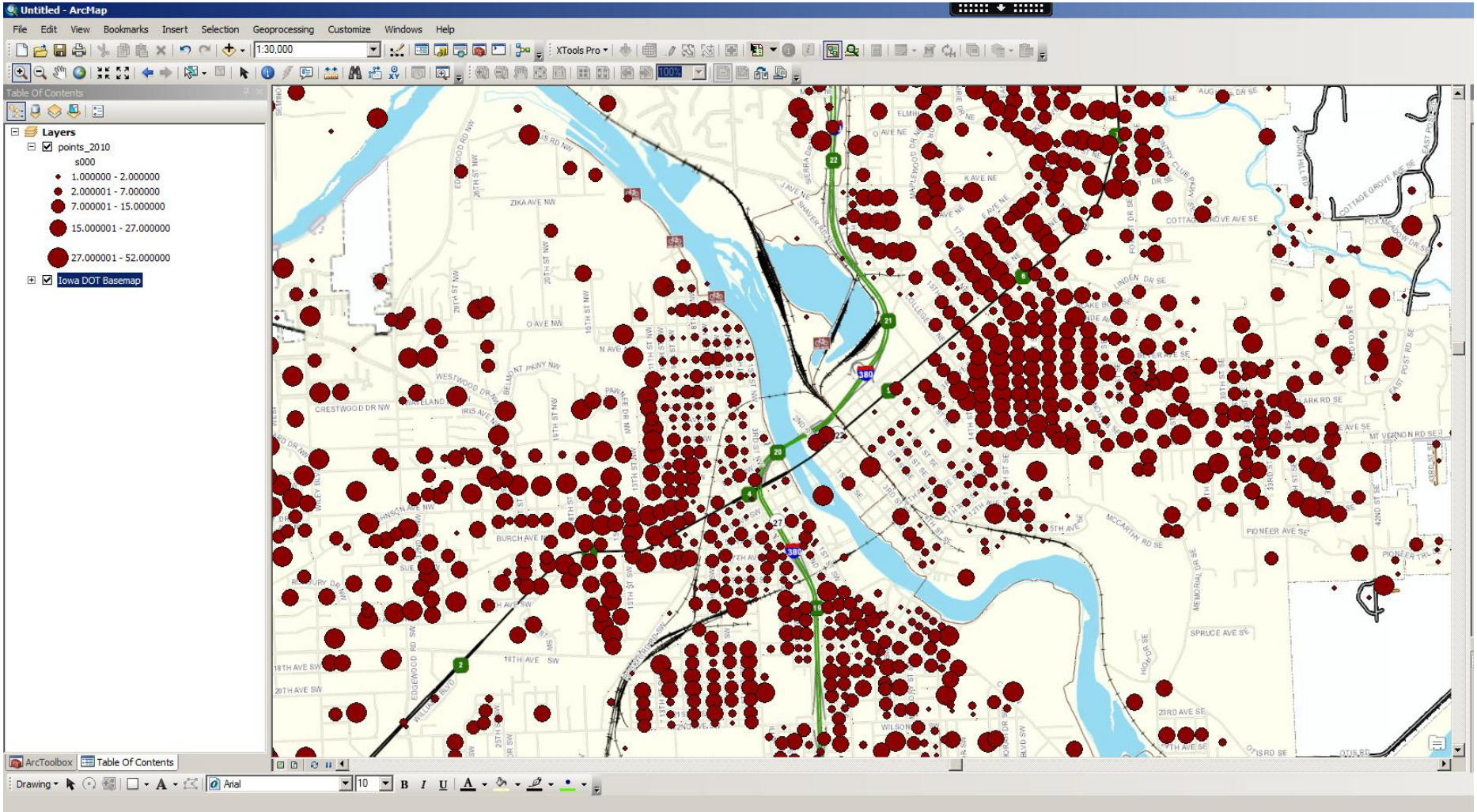




Inflow/Outflow Job Counts (All Jobs)

	2010 Count	Share
Employed in the Selection Area	120,215	100.0%
Employed in the Selection Area but Living Outside	56,015	46.6%
Employed and Living in the Selection Area	64,200	53.4%
Living in the Selection Area	89,312	100.0%
Living in the Selection Area but Employed Outside	25,112	28.1%
Living and Employed in the Selection Area	64,200	71.9%

Where do Downtown CR Workers Live?



Thank You!

- Questions?
- Additional Discussion