

# INCOG Population Projection Model

2030 Projections To the Transportation  
Analysis Zone (TAZ) Level

Prepared by: INCOG

December 3, 2004

# The Projections

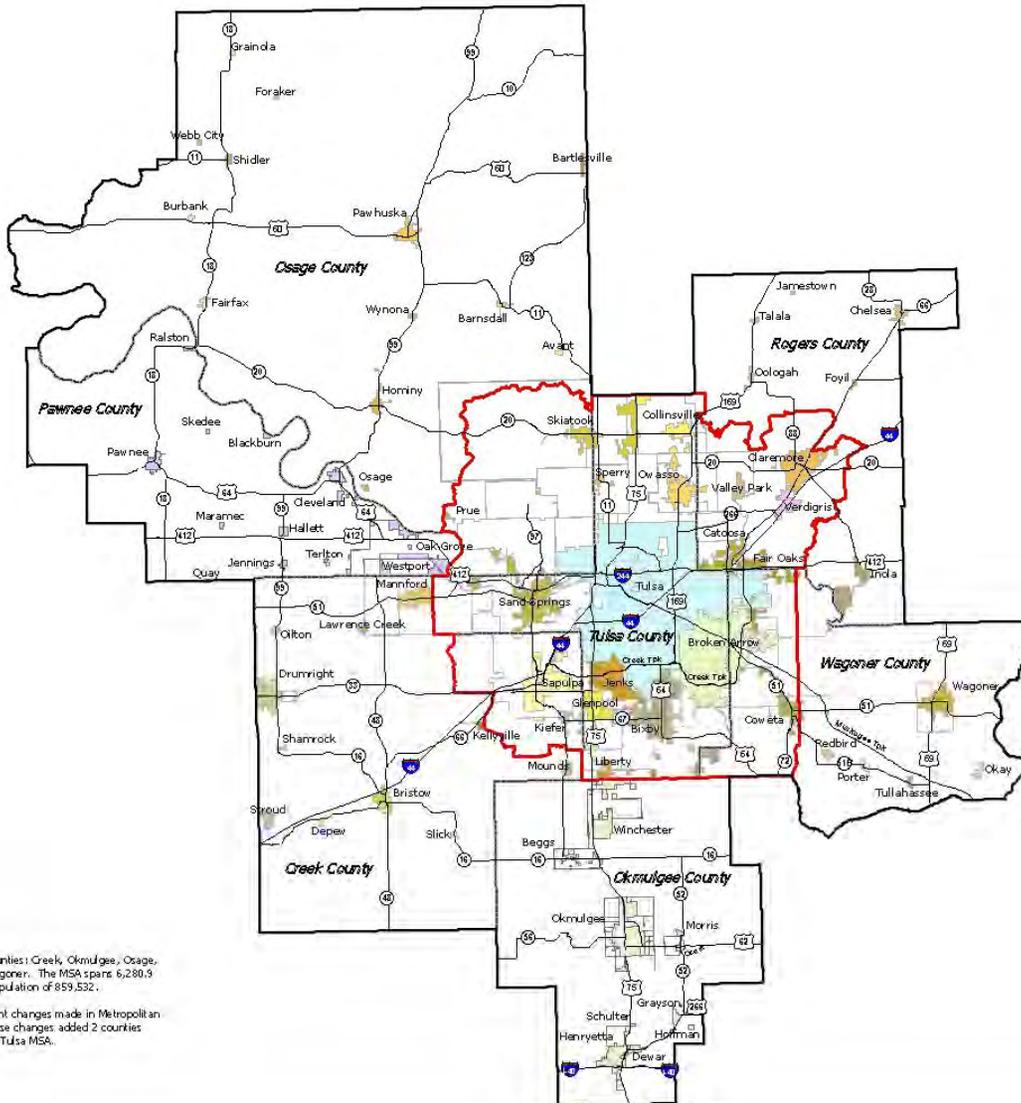
- Two Levels to the question:
  - Overall, total projections for the TMA region
  - Where will the growth occur within the boundaries of the region

# TMA projections

- Regional projections are taken from the Census Bureau's and the Oklahoma Department of Commerce's projections
- These projections are done at the county level
- The county projections are split into the portions of each county located within the TMA. These are the control totals used.

# 1990, 2000 and Projected 2030 Population, Tulsa TMA

TMA Portion of:	1990 Population	2000 Population	Change 2000-2030	2030 Population
Creek County	33,347	36,086	13,533	49,619
Osage County	17,325	20,521	10,260	30,781
Rogers County	32,602	45,619	23,441	69,060
Tulsa County	503,341	563,299	95,201	658,500
Wagoner County	29,470	36,055	21,509	57,564



**NOTE:**

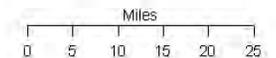
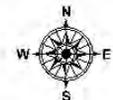
The Tulsa MSA consists of 7 counties: Creek, Okmulgee, Osage, Pawnee, Rogers, Tulsa and, Wagoner. The MSA spans 6,280.3 square miles and has a 2000 population of 859,532.

This map reflects the most recent changes made in Metropolitan Statistical Areas nationally. These changes added 2 counties (Okmulgee and Pawnee) to the Tulsa MSA.

## The Tulsa Metropolitan Area and the Transportation Management Area

### Legend

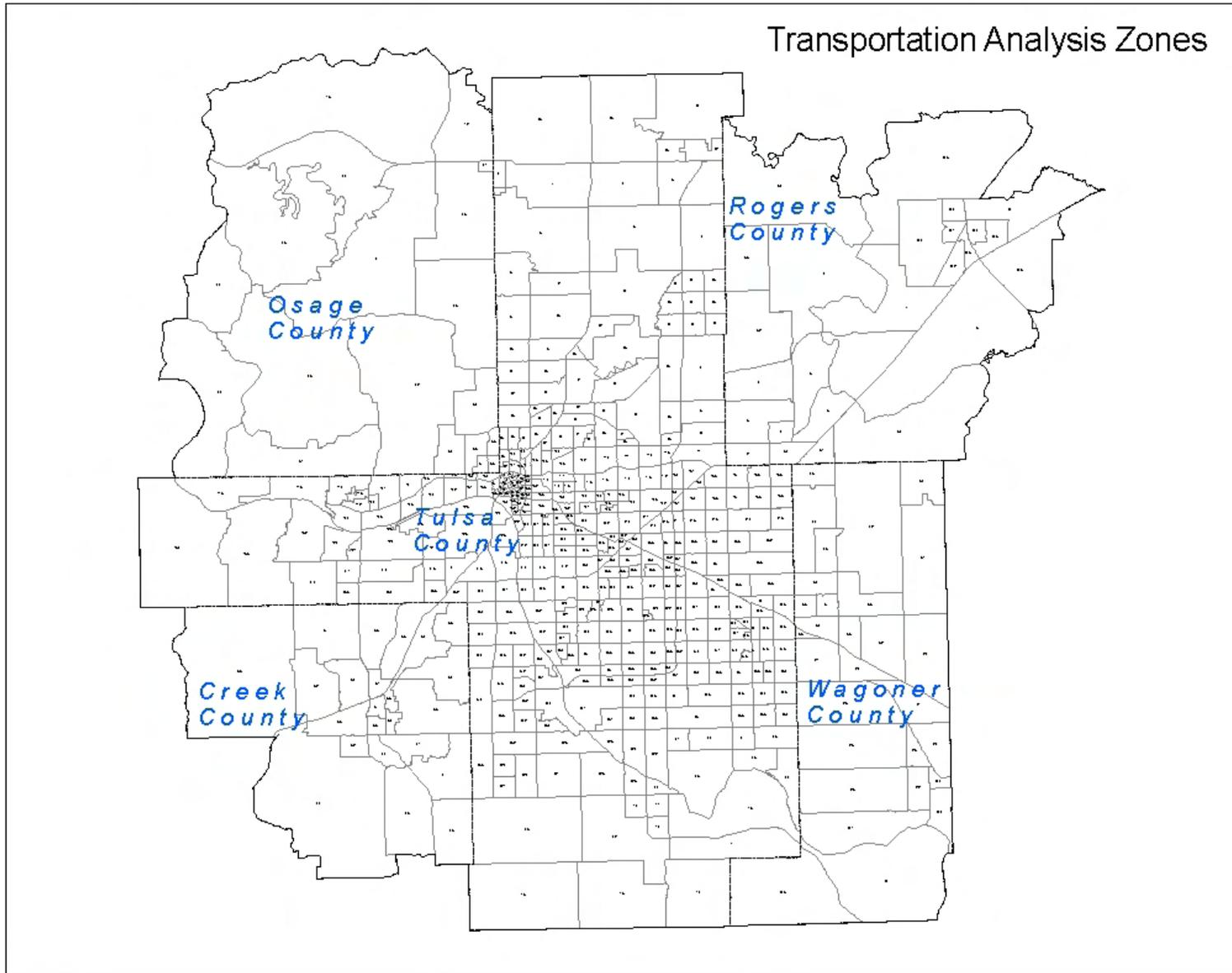
-  Transportation Planning Area
-  County Boundaries
-  Highways
-  Cities and Towns



Prepared by: INCOG  
2/8/03

This document is the property of INCOG and is not to be distributed outside of INCOG.

# Transportation Analysis Zones



# Residential Growth Location is a Function of Two Items:

- Available Land
- The Attractiveness or Desirability of the Land to Residential Development

# Available land is a Function of:

- Not being located in a 100 year floodplain
- Not being located in a river, lake or pond
- Not being located in a park or nature preserve
- Not being located on very steep slopes
- Not being owned by a governmental entity or by a nonprofit organization
- Being vacant - defined as having a total improvement value of zero \$
- Not identified as being an industrial or commercial use

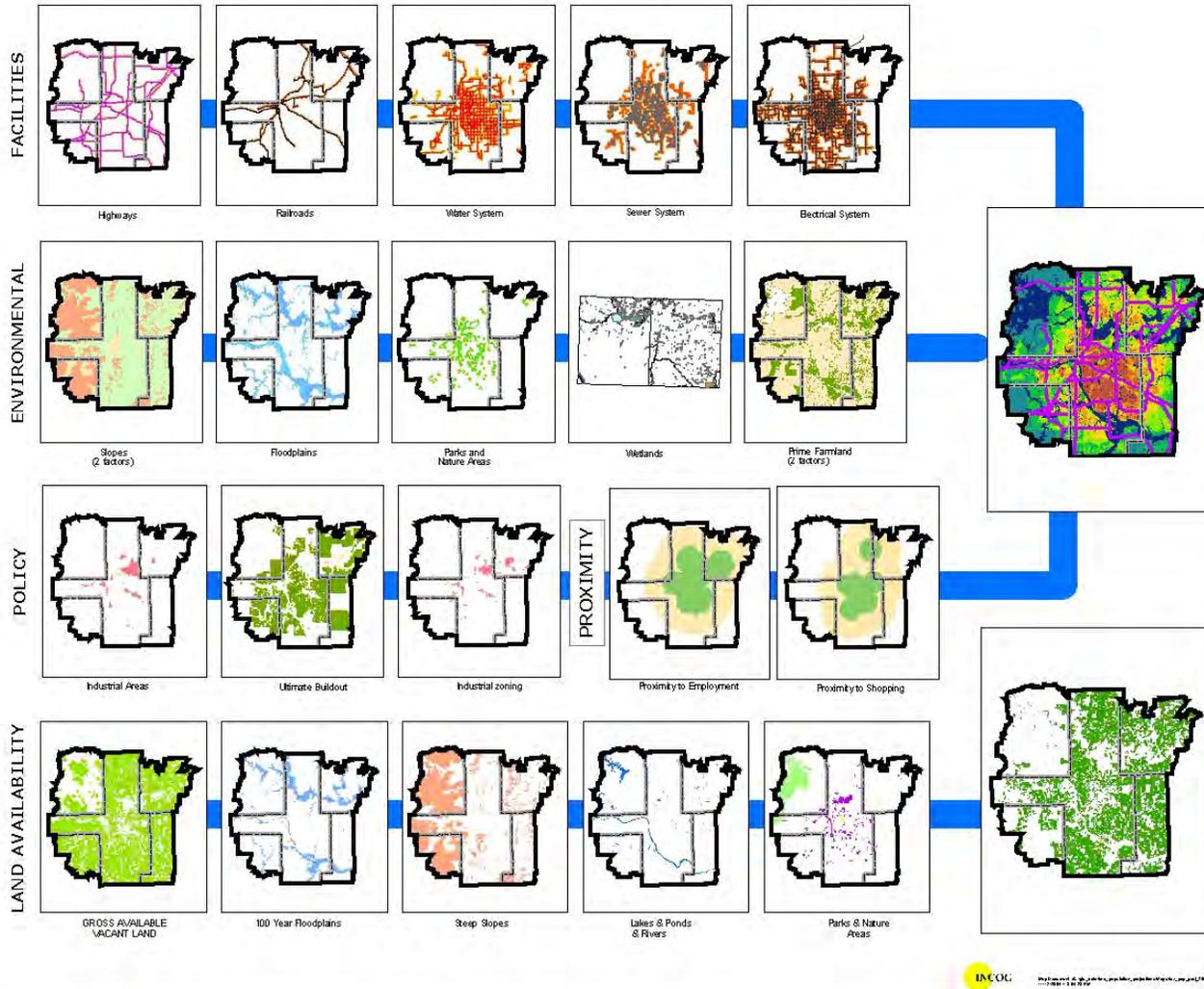
# Attractiveness is a Function of:

- **Available Facilities/Services**
  - Not Adjacent to Highways
  - Not Close to Railroads
  - Availability of Water Service
  - Availability of Sewer Service
  - Availability of Electrical Service
- **Proximity issues**
  - Distance from Major employment Centers
  - Distance from major Retail Centers
- **Environmental Factors**
  - Slopes
  - Floodplains
  - Parks and nature Preserves
  - Prime farmland
  - Wetlands
- **Public Policy Issues**
  - Not in Industrial Areas
  - Not Industrially Zoned
  - In an Area Identified as being for Low Intensity uses in Comprehensive Plans
  - School District

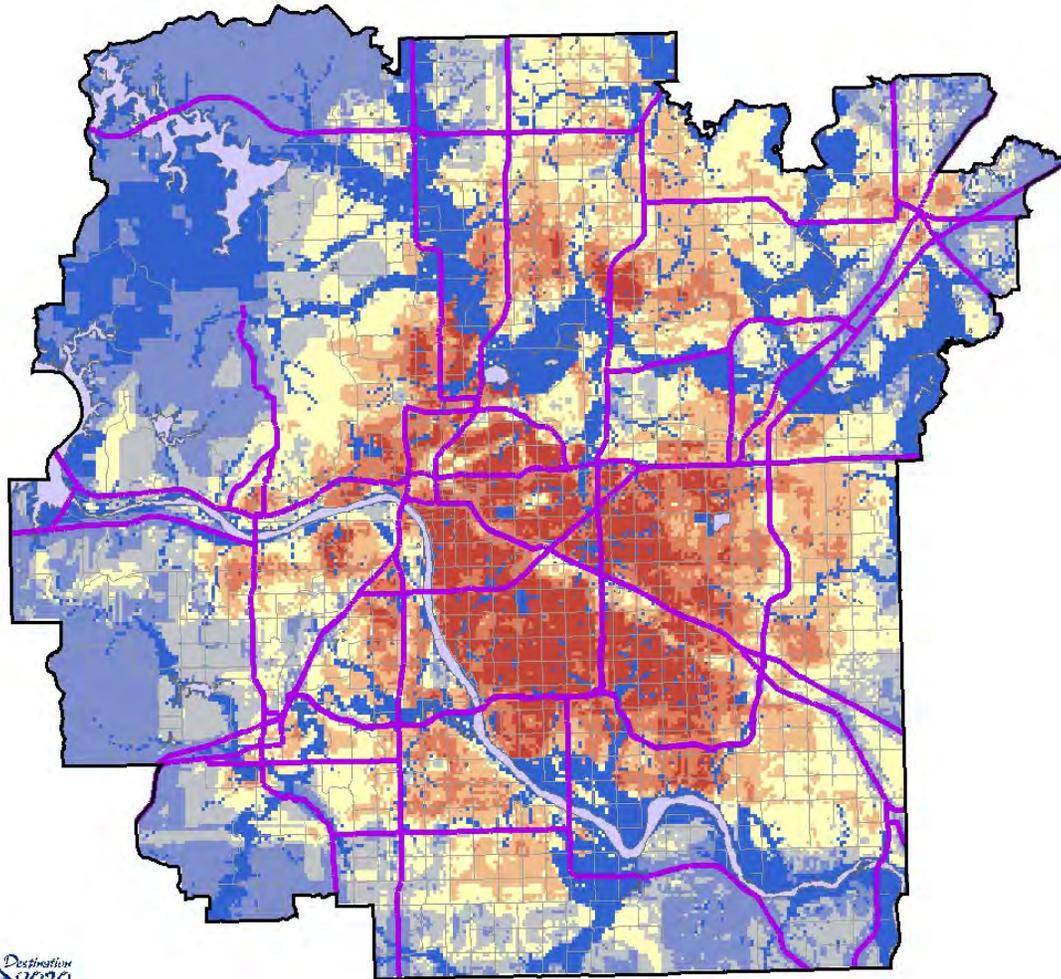
# The Residential Attractiveness Index (RAI)

- The Tulsa Transportation Management Area (TMA) is divided into a grid consisting of 150 foot by 150 foot cells
- Each individual cell is rated on each of the 15 factors relating to Attractiveness
- The ratings, or scores, are added together for each individual cell
- The average score is calculated. This is the RAI.

## Attractiveness Index For Residential Growth and Its Components

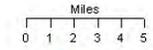


## Attractiveness Index for Residential Growth



- based on:
- \*\* FACILITIES FACTORS
    1. highways
    2. railroads
    3. sewer lines
    4. water lines
    5. electrical system
  - \*\* PROXIMITY FACTORS
    1. distance to major retail areas
    2. distance to major employment areas
  - \*\* POLICY FACTORS
    1. non-industrial areas
    2. non-industrial zoning
    3. ultimate buildout
  - \*\* ENVIRONMENTAL FACTORS
    1. slopes
    2. parkland
    3. floodplains
    4. prime farmland

- Legend**
- Highway: Present and Committed
  - Arterial Street
  - TMA Boundary
  - Lakes and Ponds
  - Residential Attractiveness Index Value
  - 0 Not Applicable
  - 0.01 - 0.07 Very Low
  - 0.08 - 1 Low
  - 1.1 - 1.2 Moderately Low
  - 1.3 - 1.4 Moderately High
  - 1.5 - 1.6 High
  - 1.7 - 2 Very High

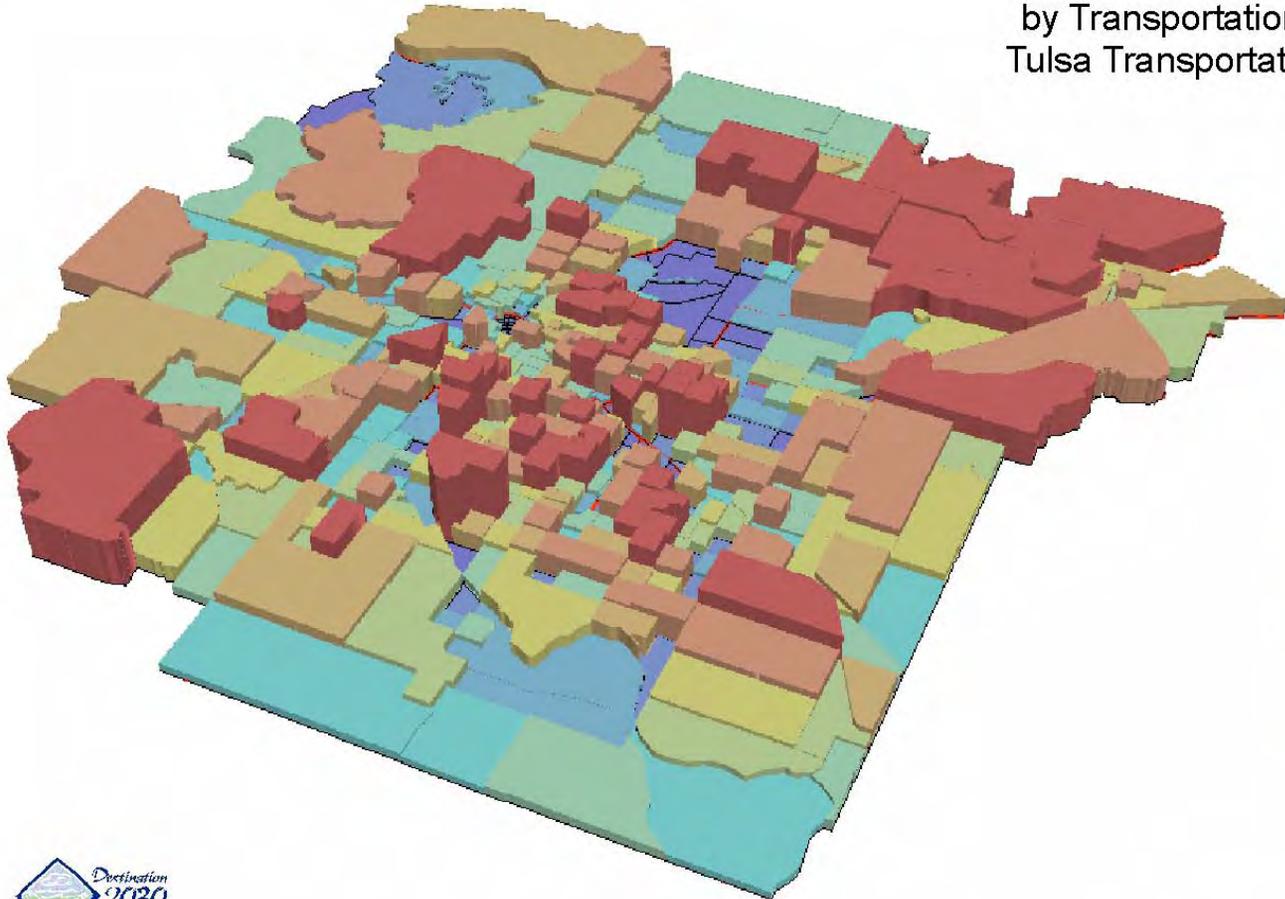


Map Document: (C:\gis\_data\ma\_population\_projection\Maps\Residential\_Index(11x17 size).mxd)  
11/19/2004 - 11:07:44 AM

# TAZ Projections

- Each county portion of the TMA is handled independently of the other portions (there are, in affect, five separate projections)
- Available vacant land in a cell is then multiplied by the Residential Attractiveness Index (RAI) for that cell
  - Examples:
    - 20 acres vacant \* .5 RAI = 1
    - 20 acres vacant \* 2 RAI = 40
    - 20 acres vacant \* 0 RAI = 0
- The resulting values are aggregated to the TAZ level and then normalized, that is, expressed as a percentage of the respective county
- This value is used to allocate the respective county projected growth to the TAZs within that county
- The resulting projected population for each TAZ is adjusted for: (a) growth known to have already occurred; (b) development known to be occurring over the near future and; (c) other local knowledge of local development patterns

# 2030 Population Projection by Transportation Analysis Zones Tulsa Transportation Planning Area



**Legend**

**Population 2030**  
**Persons**

0 - 76	Lowest 10%
77 - 296	
297 - 697	
698 - 1,101	
1,102 - 1,441	
1,442 - 1,774	
1,775 - 2,204	
2,205 - 2,747	
2,748 - 3,735	
3,736 - 8,151	Highest 10%



NOTE: Heights exaggerated by a factor of 2 for display purposes.

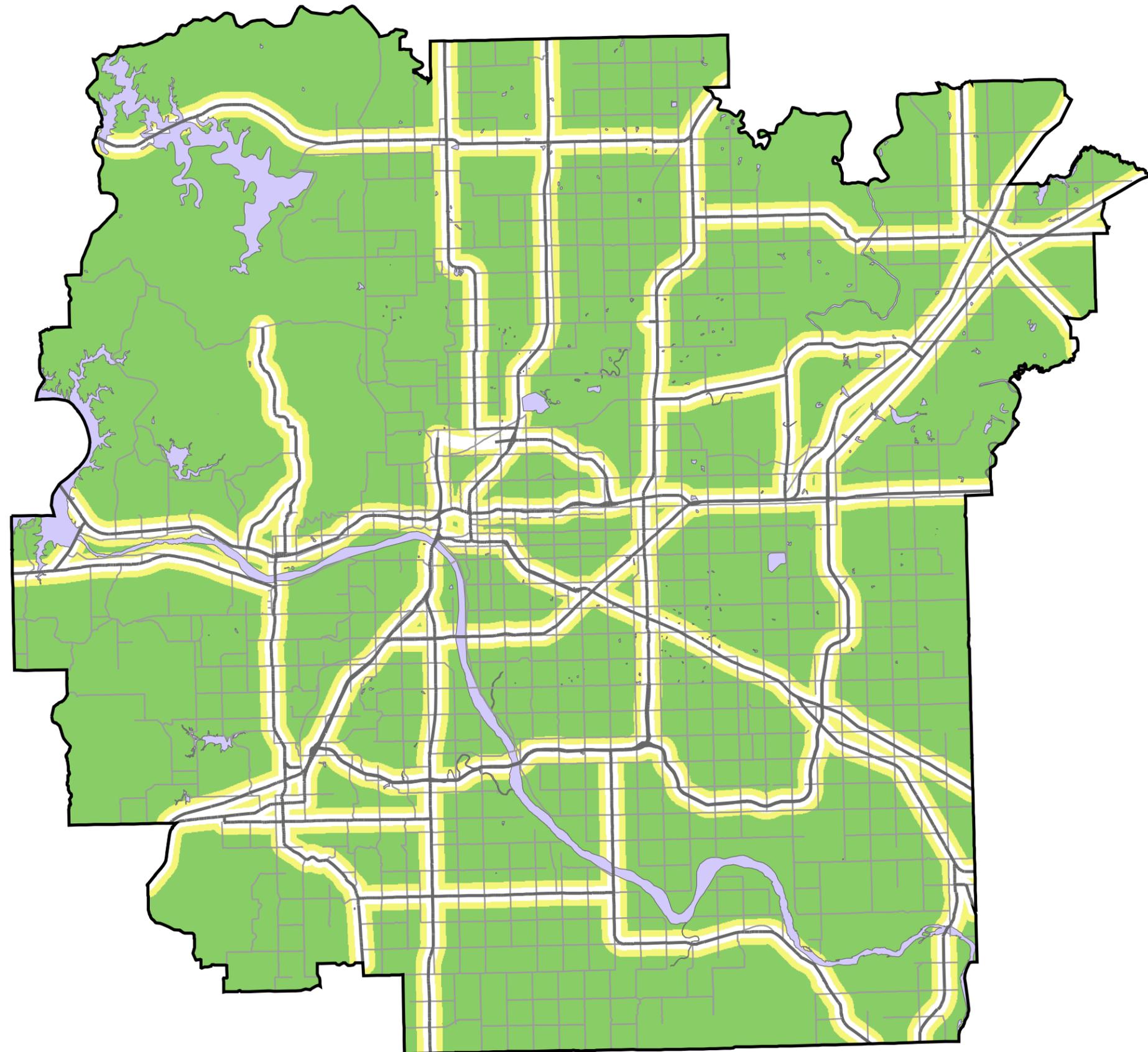
Map Document: (...population\_proj\_taz\_2030\_3D\_(11x17).mxd)  
12/7/2004 - 6:23:03 PM

# Technical Notes

- The entire projection model is done within the framework of a Geographic Information system (GIS).
- Specifically, ESRI ArcGIS version 9 is used. Both the spatial analyst and 3D spatial analyst extensions are utilized.
- The modeling language provided as part of version 9 is used whenever possible and extensively.

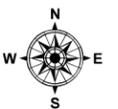
# **Attractiveness of Land for Residential Development: Input Variables**

# Residential Attractiveness Index Factor: Highways



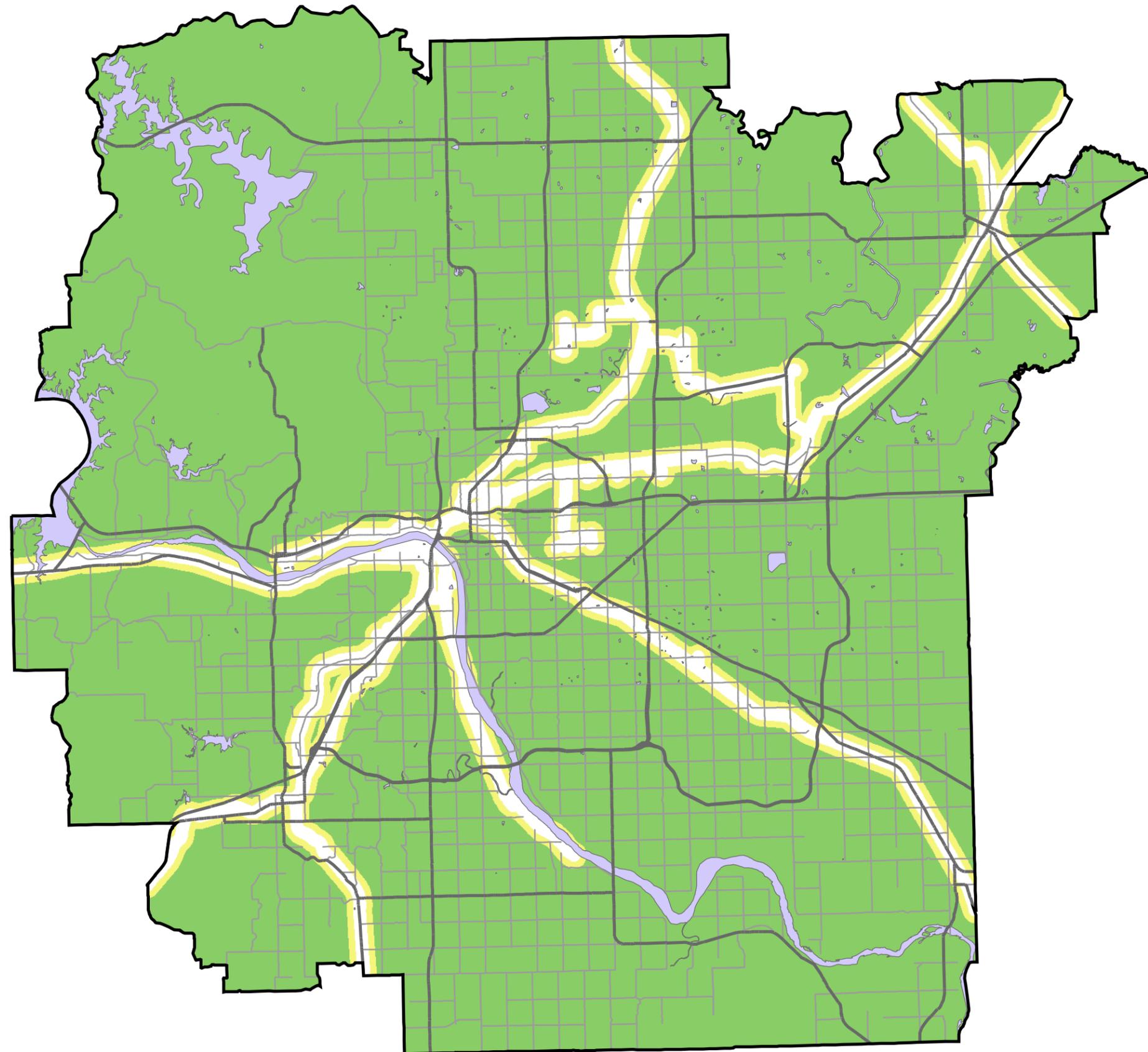
## Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds
- 0 Not Attractive
- 1 Attractive
- 2 Very Attractive



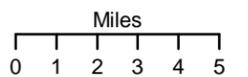
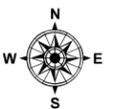
INCOG

# Residential Attractiveness Index Factor: Railroads



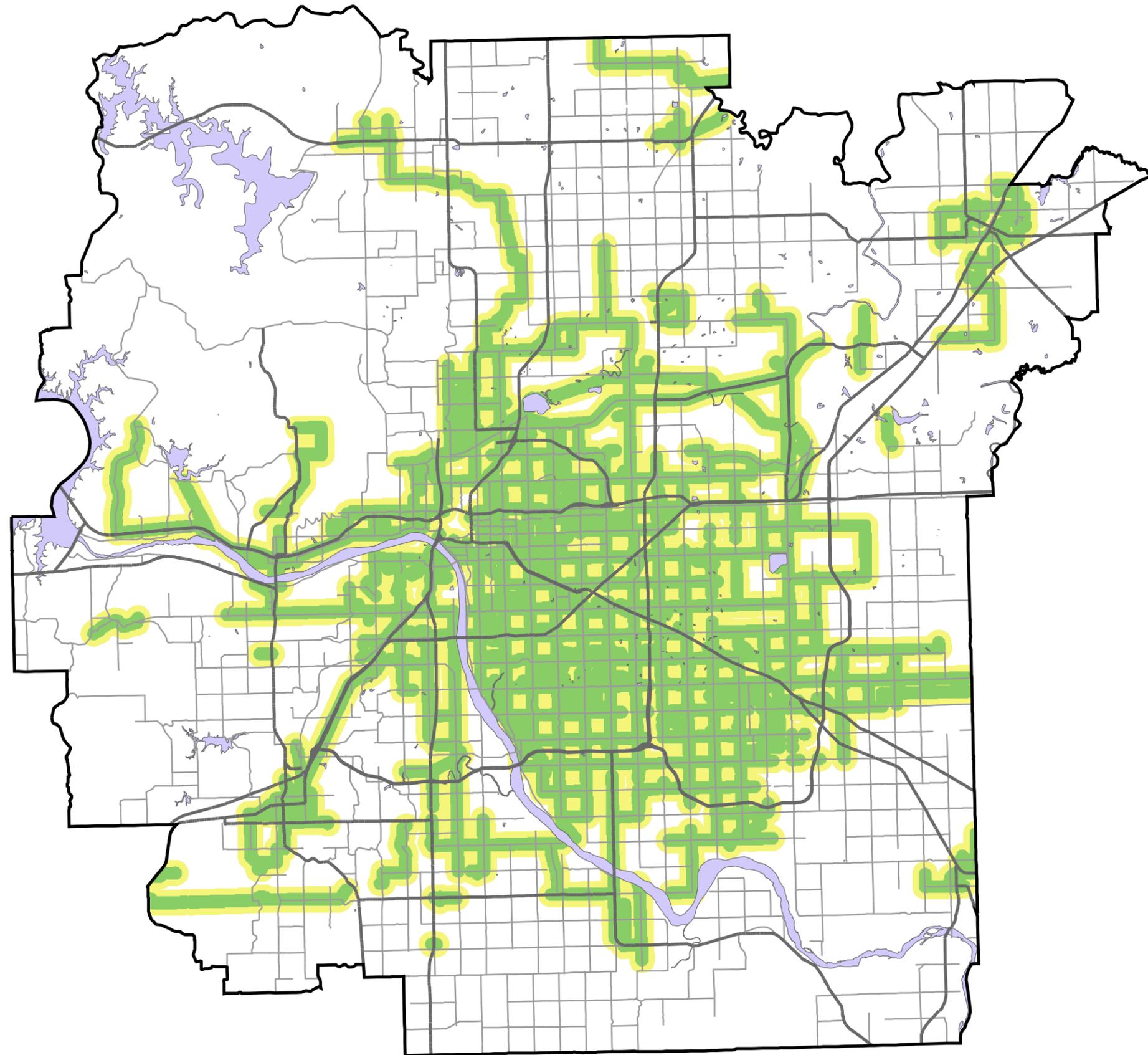
## Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds
- 0 Not attractive
- 1 Attractive
- 2 Very Attractive



INCOG

# Residential Attractiveness Index Factor: Water System

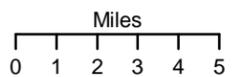
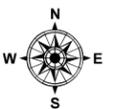


### Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds

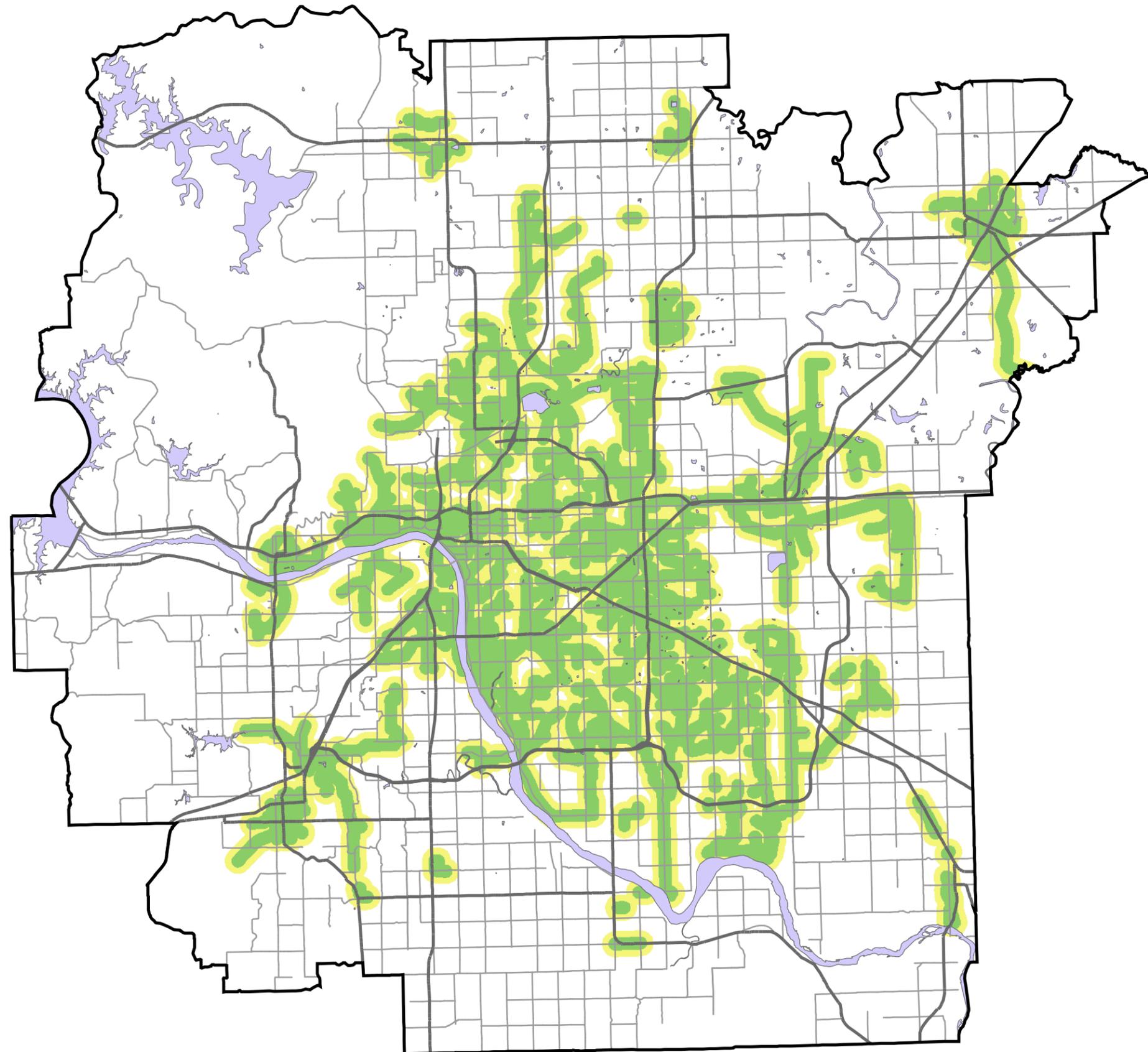
### Water Factor

- Value
- 0 Not Attractive
  - 1 Attractive
  - 2 Very Attractive



INCOG

# Residential Attractiveness Index Factor: Sewer System

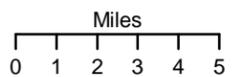
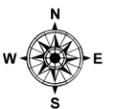


### Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds

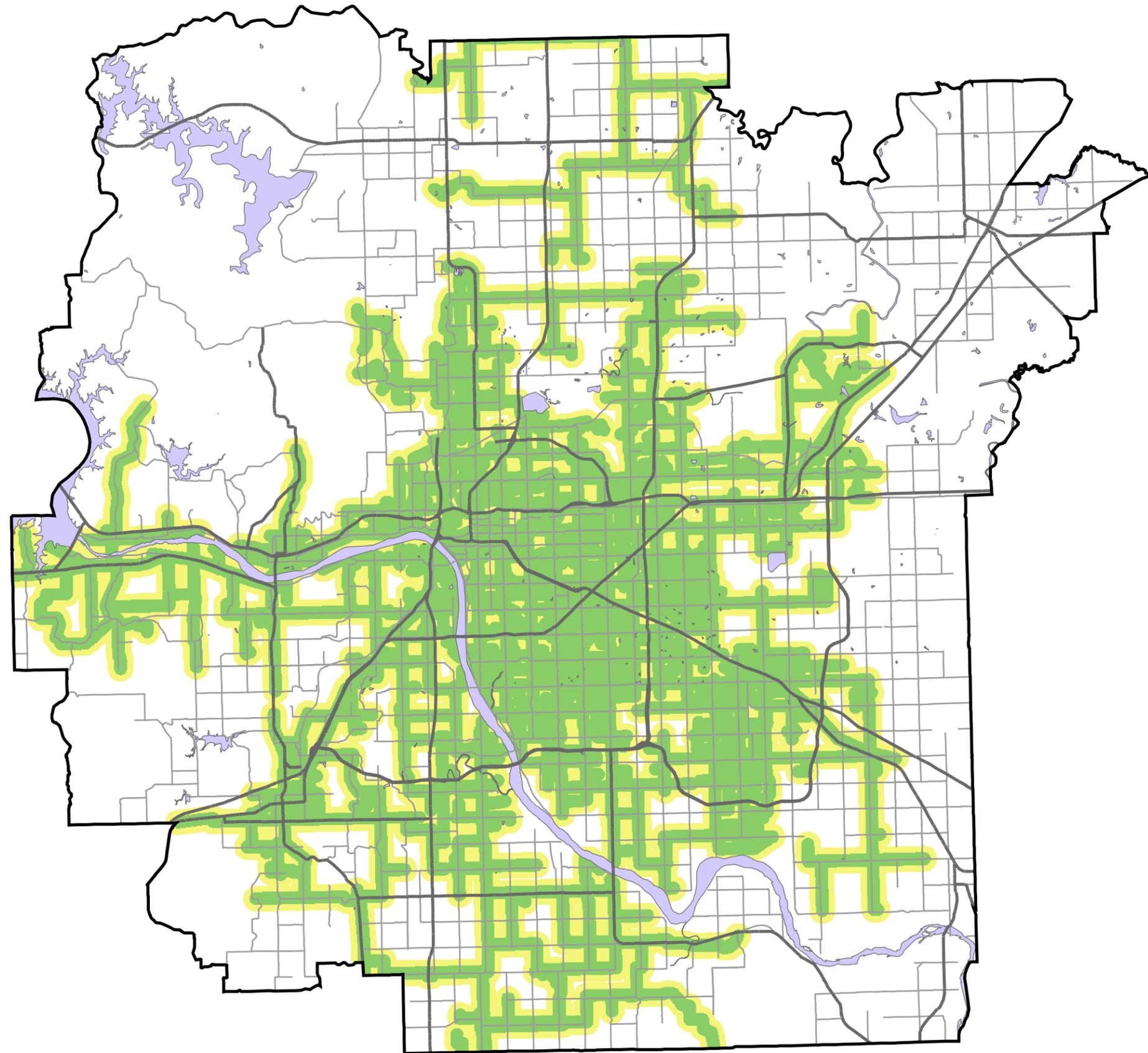
### Sewer Factor

- Value
- 0 Not Attractive
  - 1 Attractive
  - 2 Very Attractive



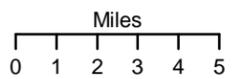
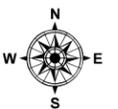
INCOG

# Residential Attractiveness Index Factor: Electrical System



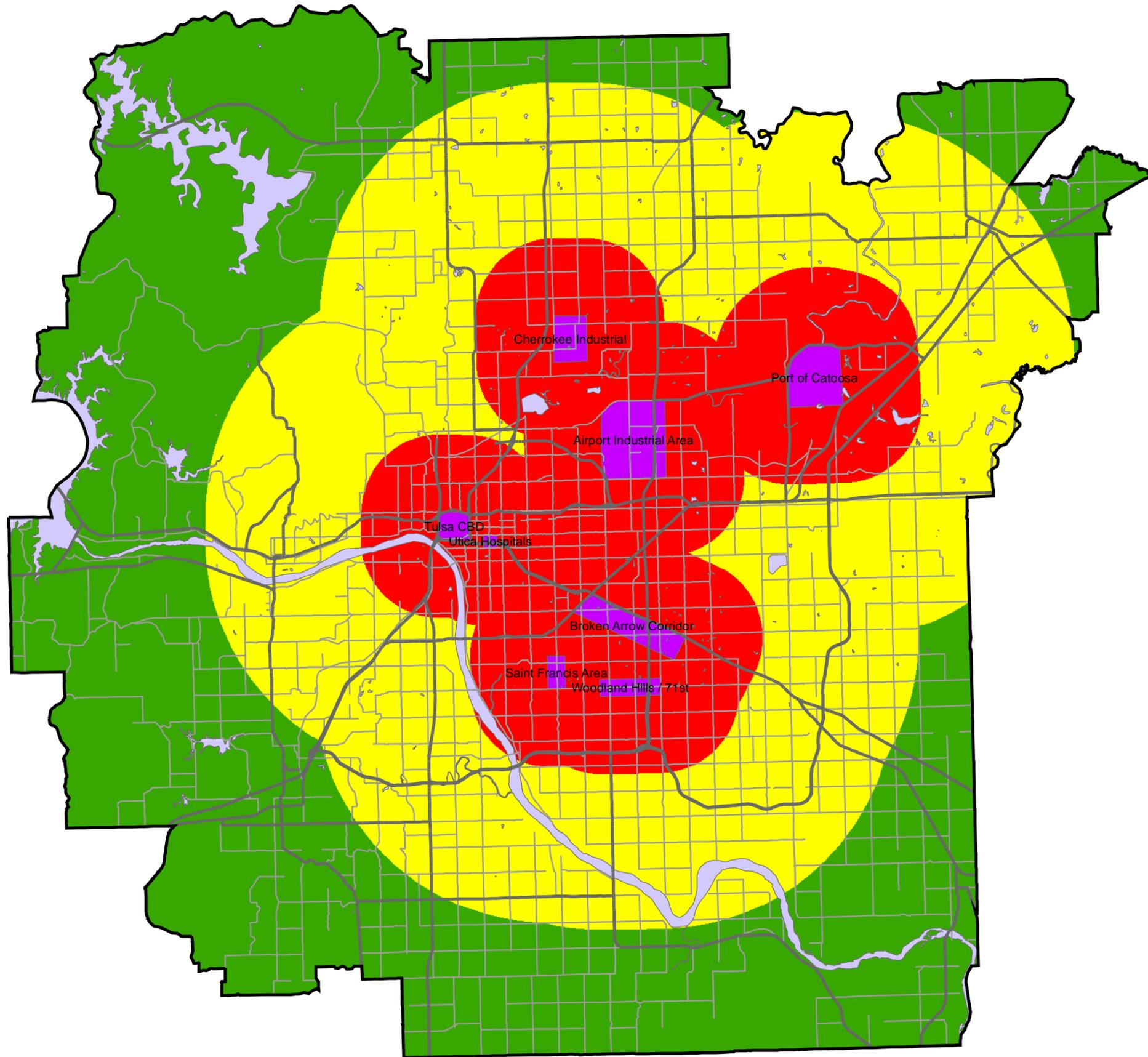
## Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds
- 0 Not Attractive
- 1 Attractive
- 2 Very Attractive

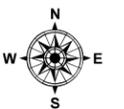


INCOG

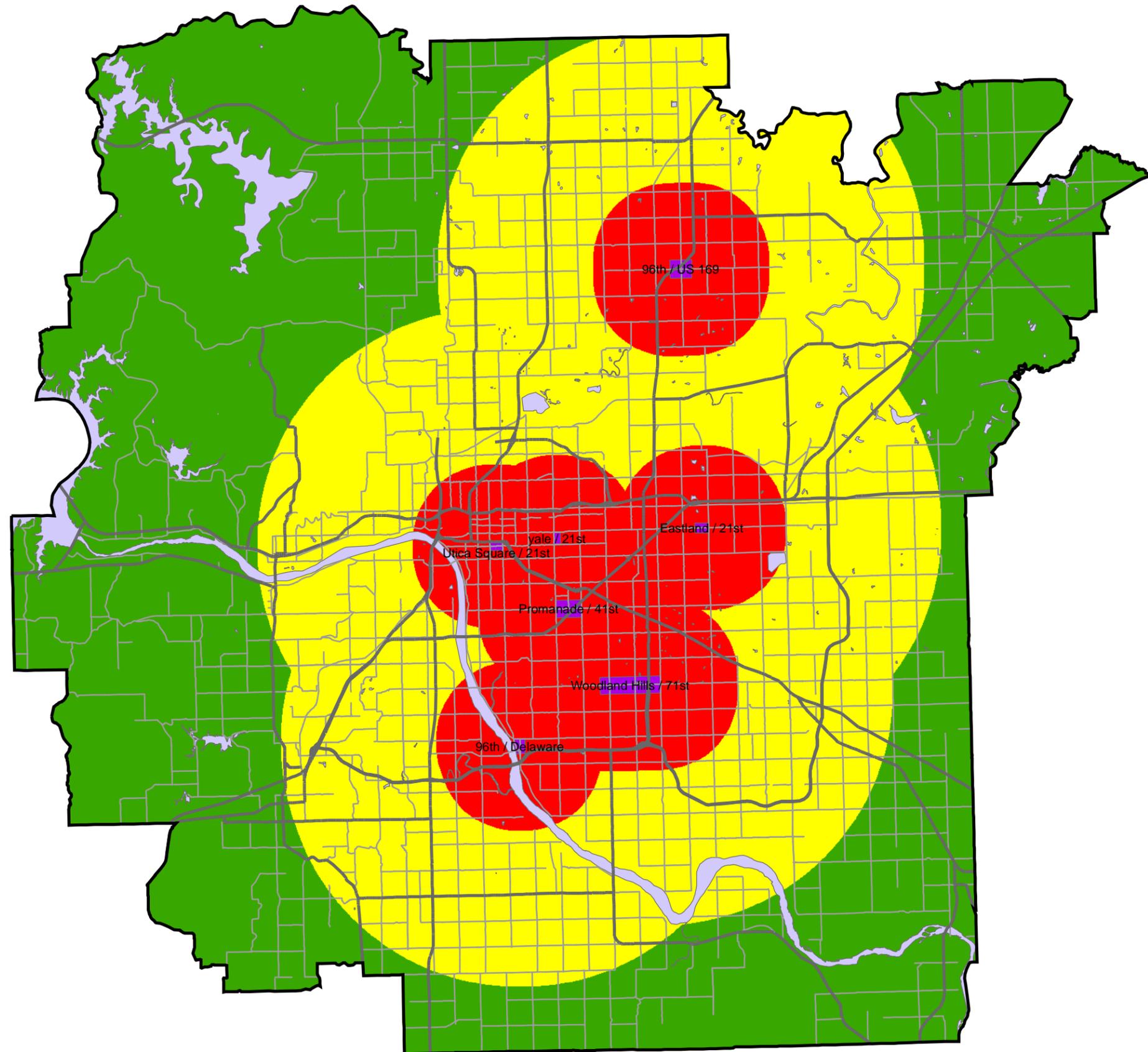
# Distance From Major Employment Areas



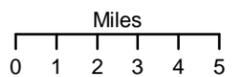
- Legend**
- tma2000
  - Highways
  - Arterial Streets
  - Lakes and Ponds
  - pop\_emp\_centers
  - 2 -- Under 3 Miles
  - 1 -- 3 to 9 Miles
  - 0 -- Over 9 Miles



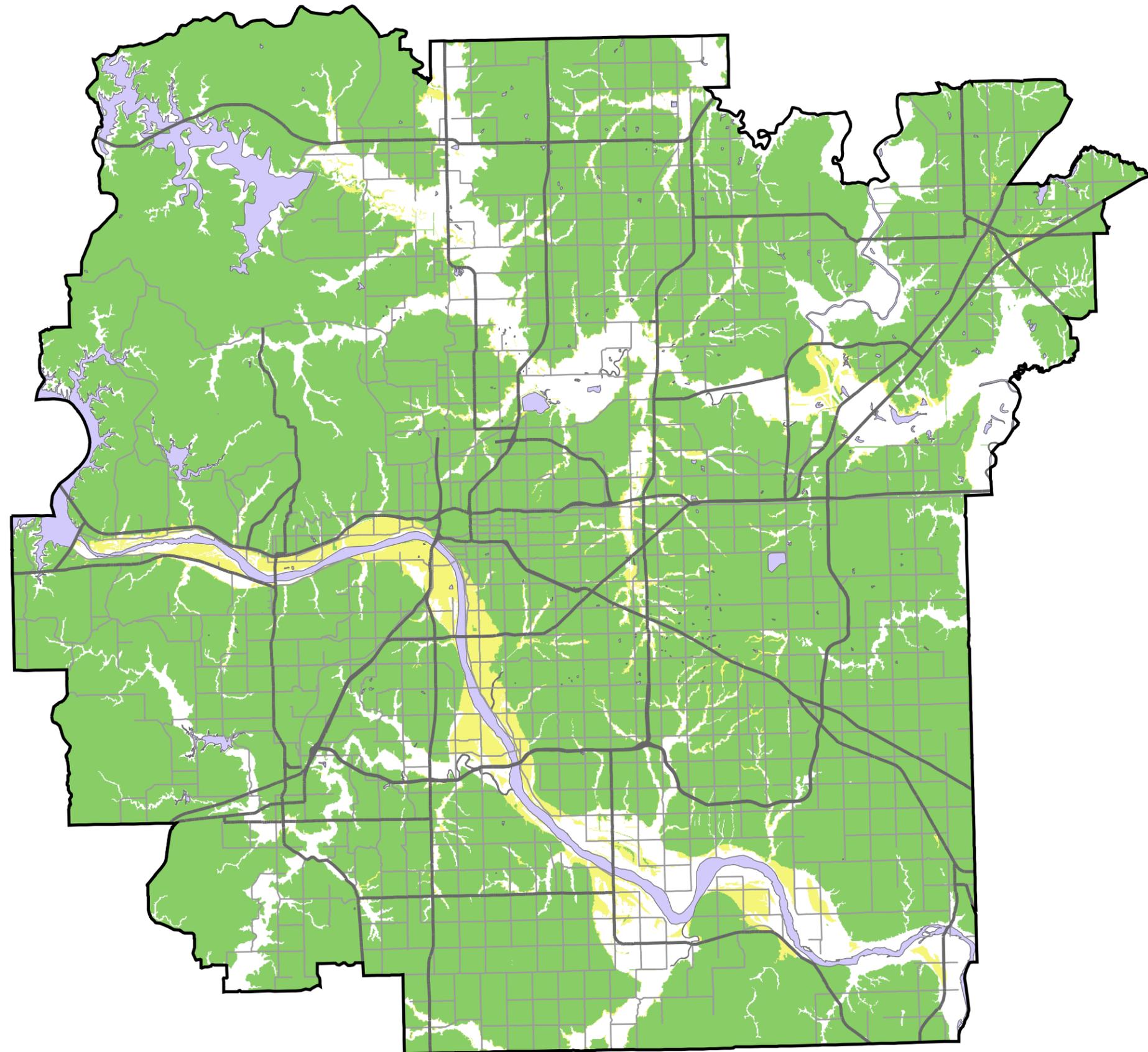
# Distance From major Shopping Areas



- Legend**
- tma2000
  - Highways
  - Arterial Streets
  - Lakes and Ponds
  - tma\_shopping==poly
  - 0 -- Over 9 Miles
  - 1 -- 3 to 9 Miles
  - 2 -- Within 3 miles

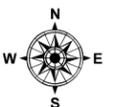


# Residential Attractiveness Index Factor: Floodplains

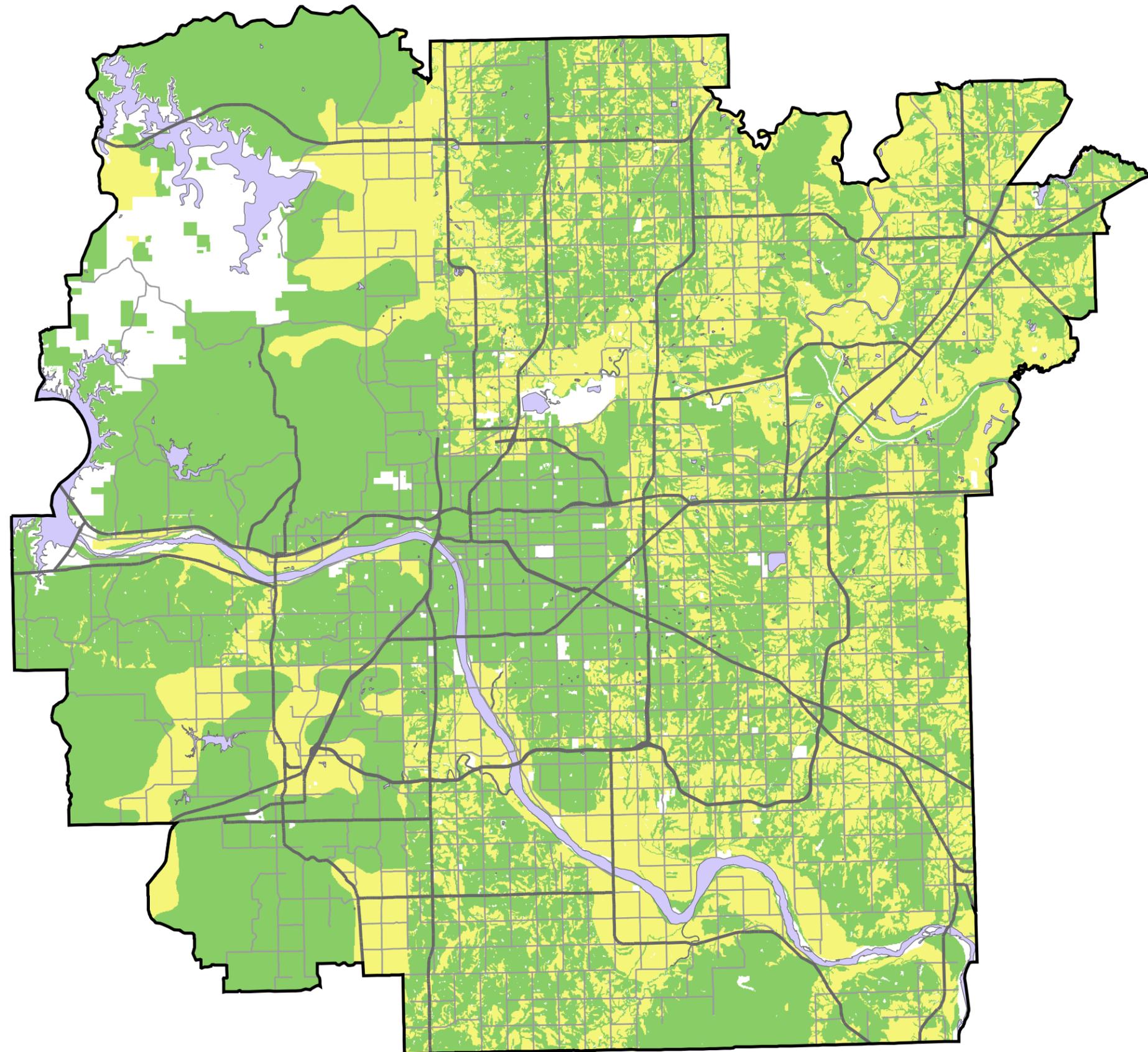


## Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds
- 0 Not Attractive
- 1 Attractive
- 2 Very Attractive



# Residential Attractiveness Index Factor: Prime Farmland

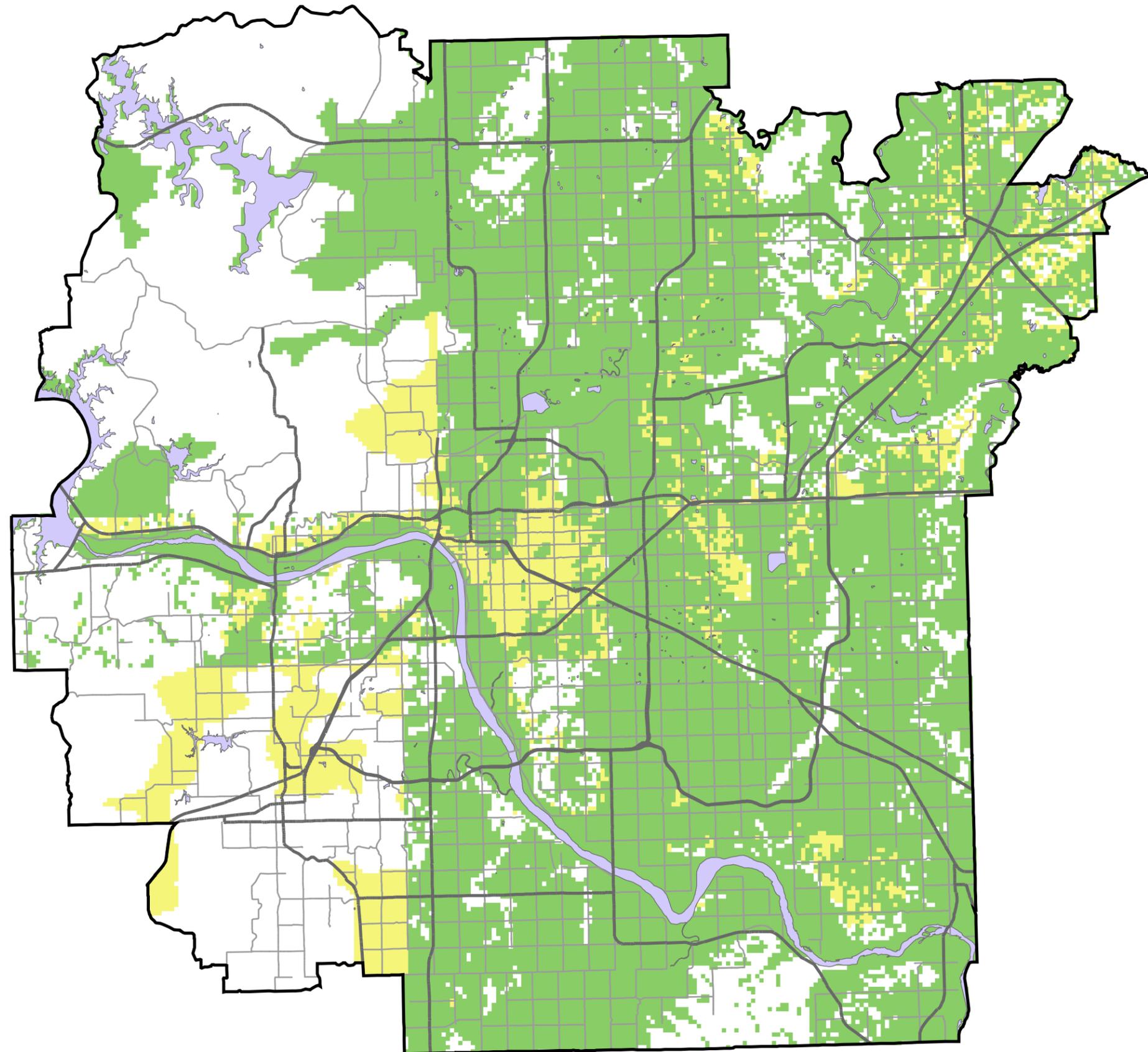


### Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds
- 0 Not Available
- 1 Attractive (prime farmland)
- 2 Very Attractive

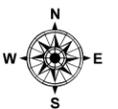


# Residential Attractiveness Index Factor: Slopes



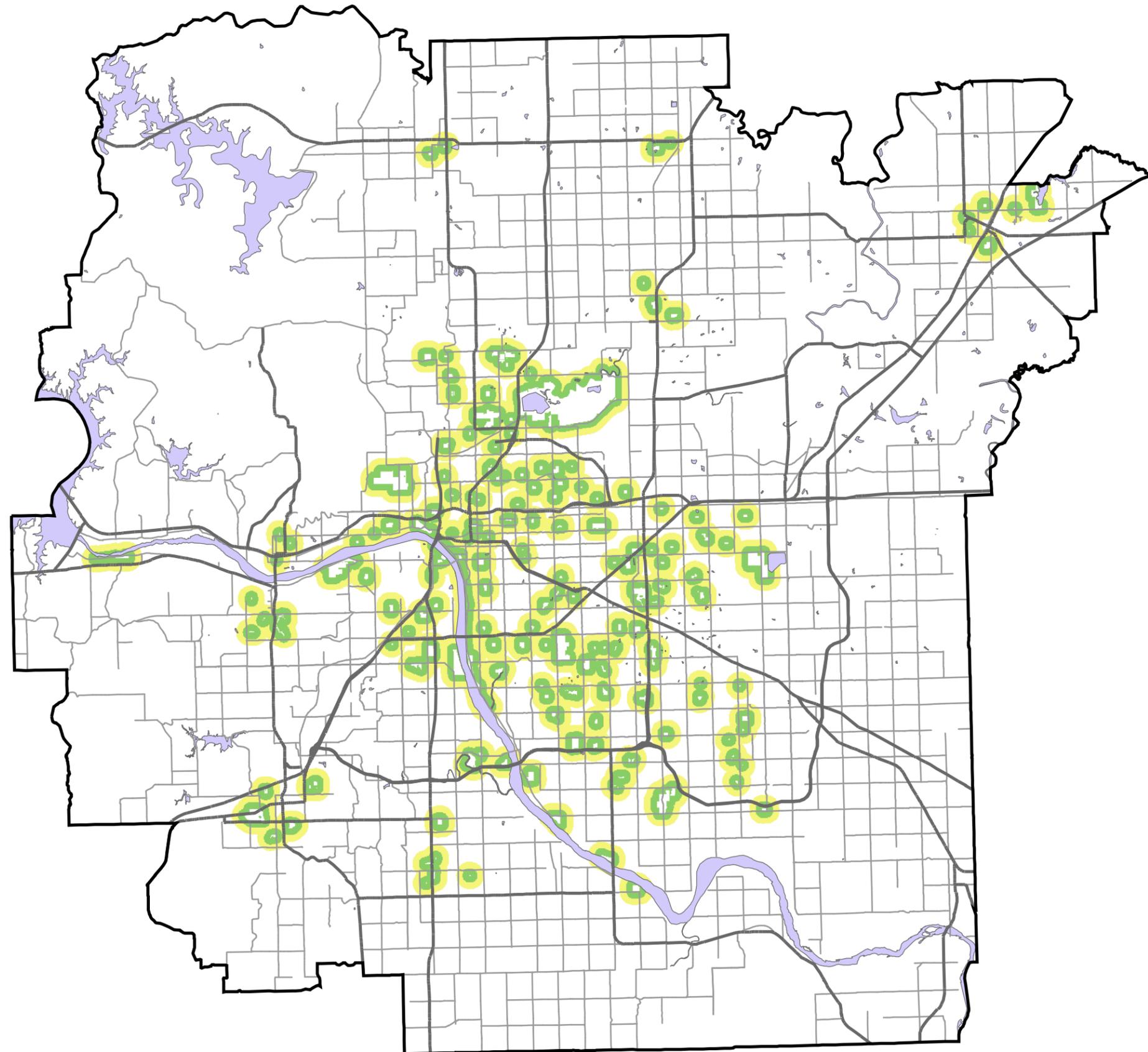
## Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds
- 0 Not Attractive (ver high slopes)
- 1 Attractive
- 2 Very Attractive (low slopes)



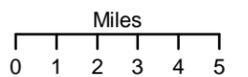
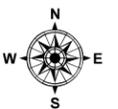
INCOG

# Residential Attractiveness Index Factor: Adjacency to Parks

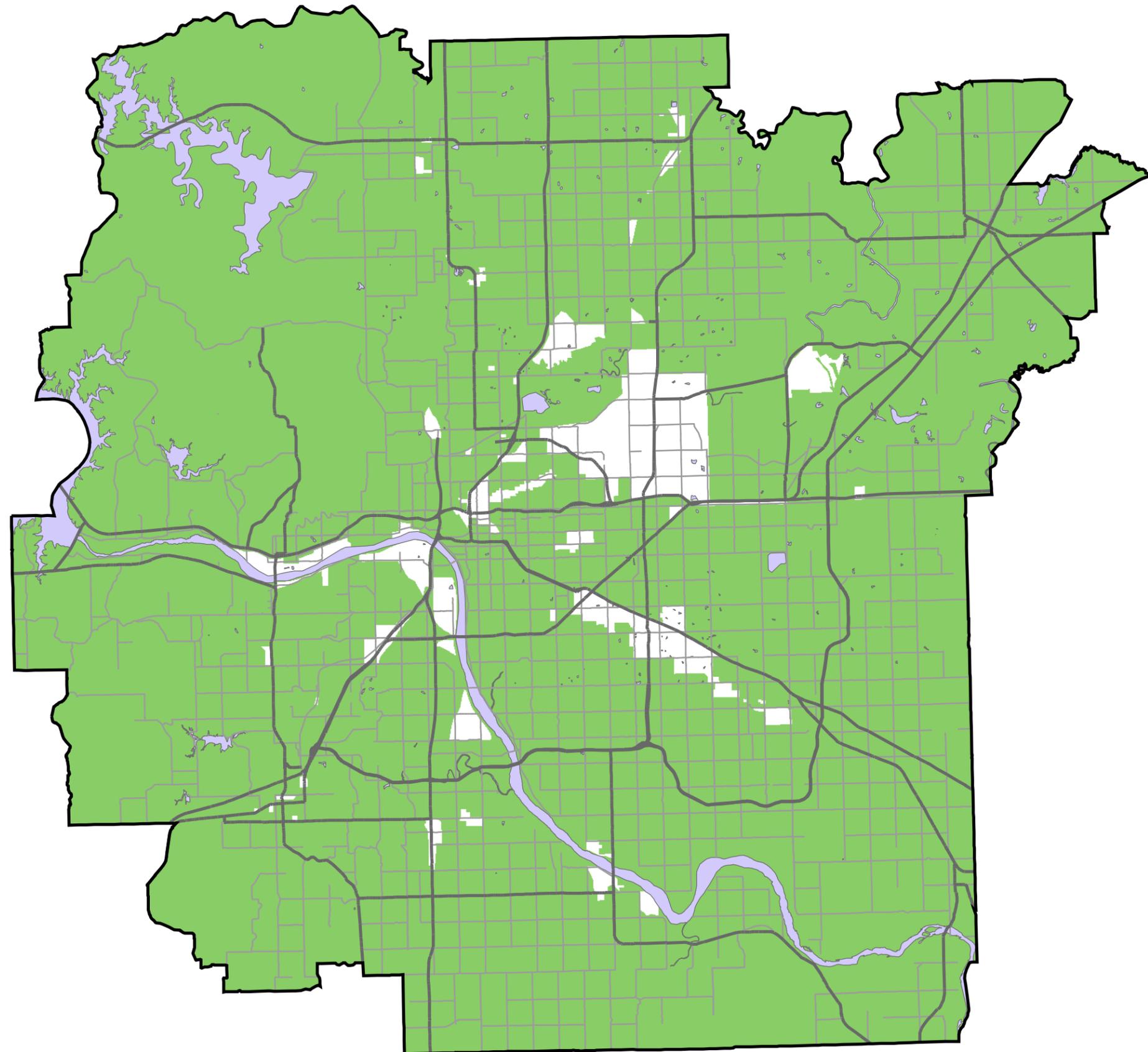


### Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds
- 0 Not Attractive
- 1 Attractive
- 2 Very Attractive

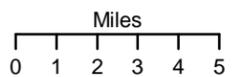
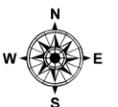


# Residential Attractiveness Index Factor: Non-industrial Areas



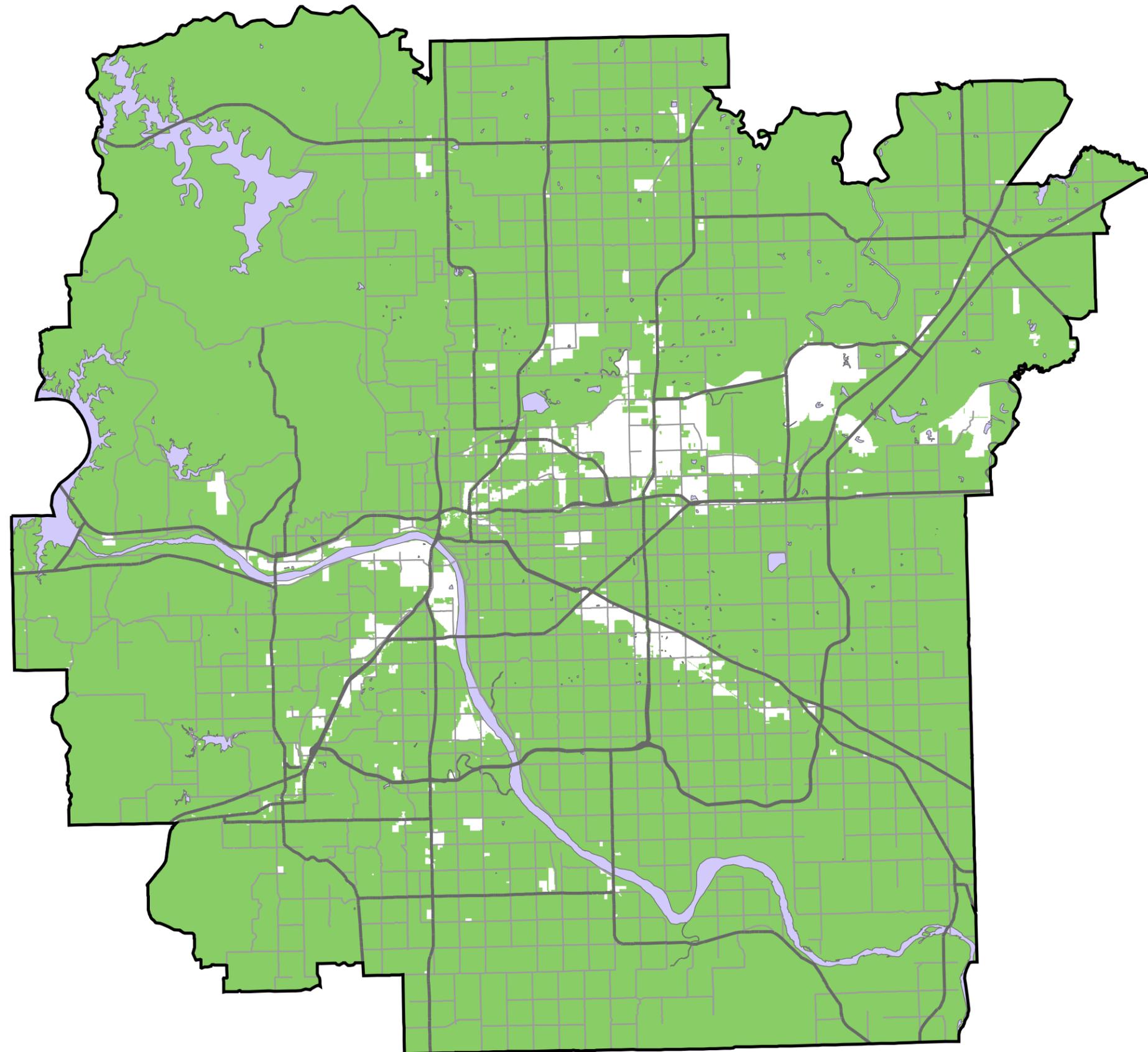
## Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds
- 0 Not attractive
- 2 Very attractive



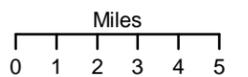
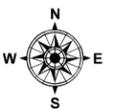
INCOG

# Residential Attractiveness Index Factor: Non-Industrially Zoned Areas

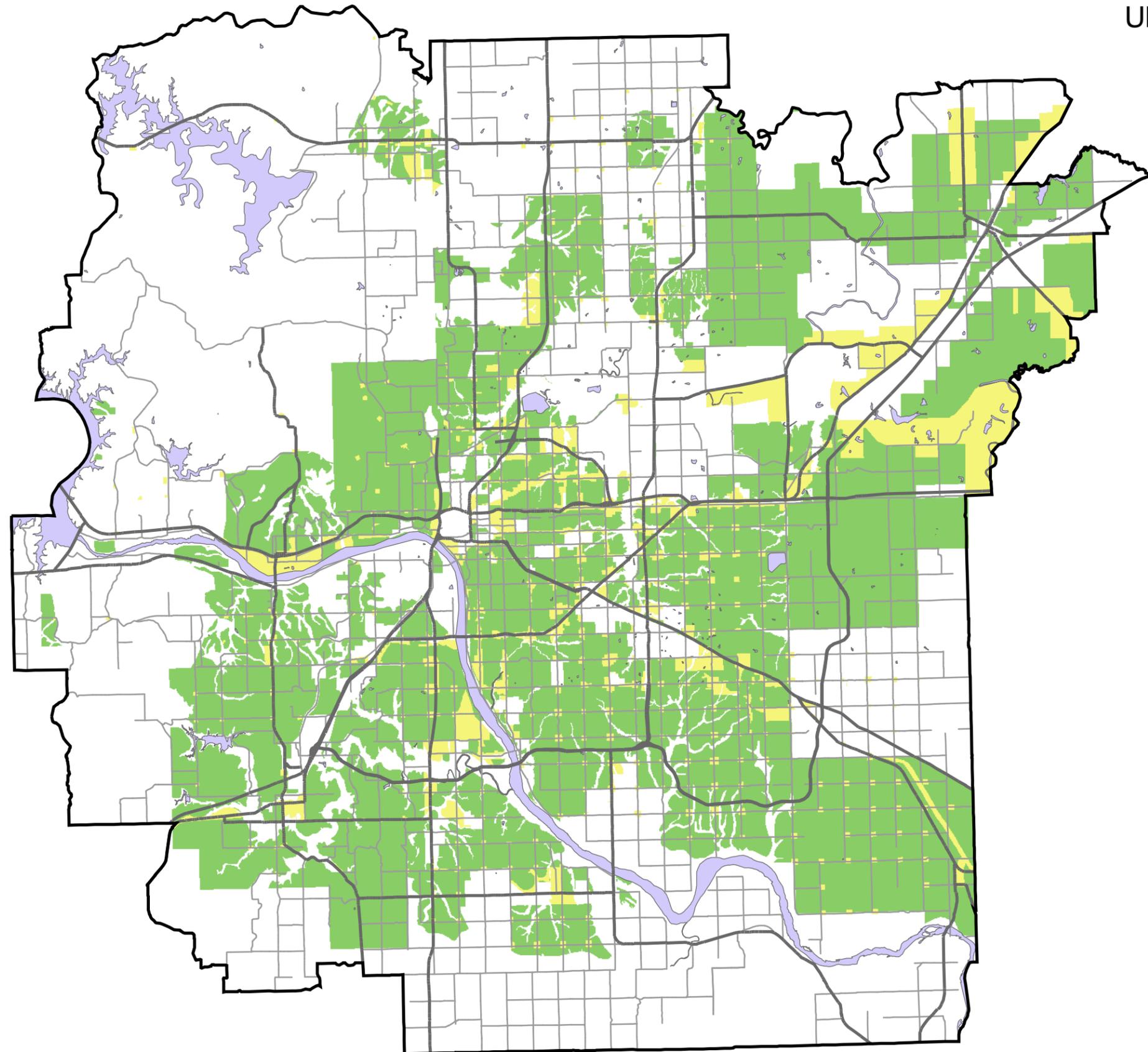


## Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds
- 0 Not Attractive
- 2 Very Attractive



# Residential Attractiveness Index Factor: Ultimate Buildout (comprehensive plans)



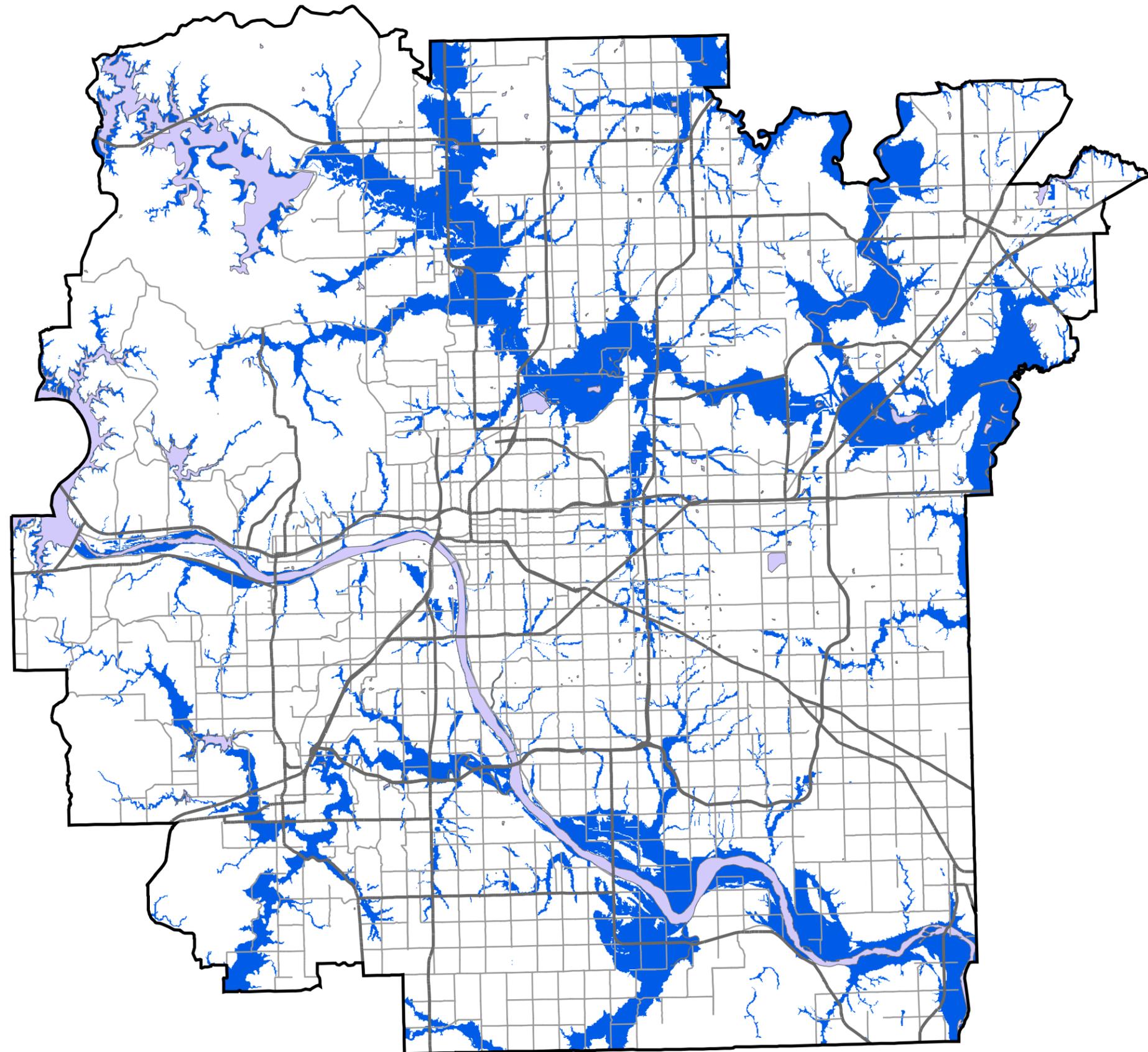
## Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds
- 0 Not Attractive
- 1 Attractive
- 2 Very Attractive

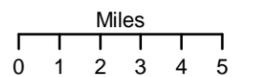
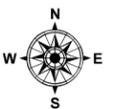


**Available Vacant Land for Residential Development:  
Input Variables**

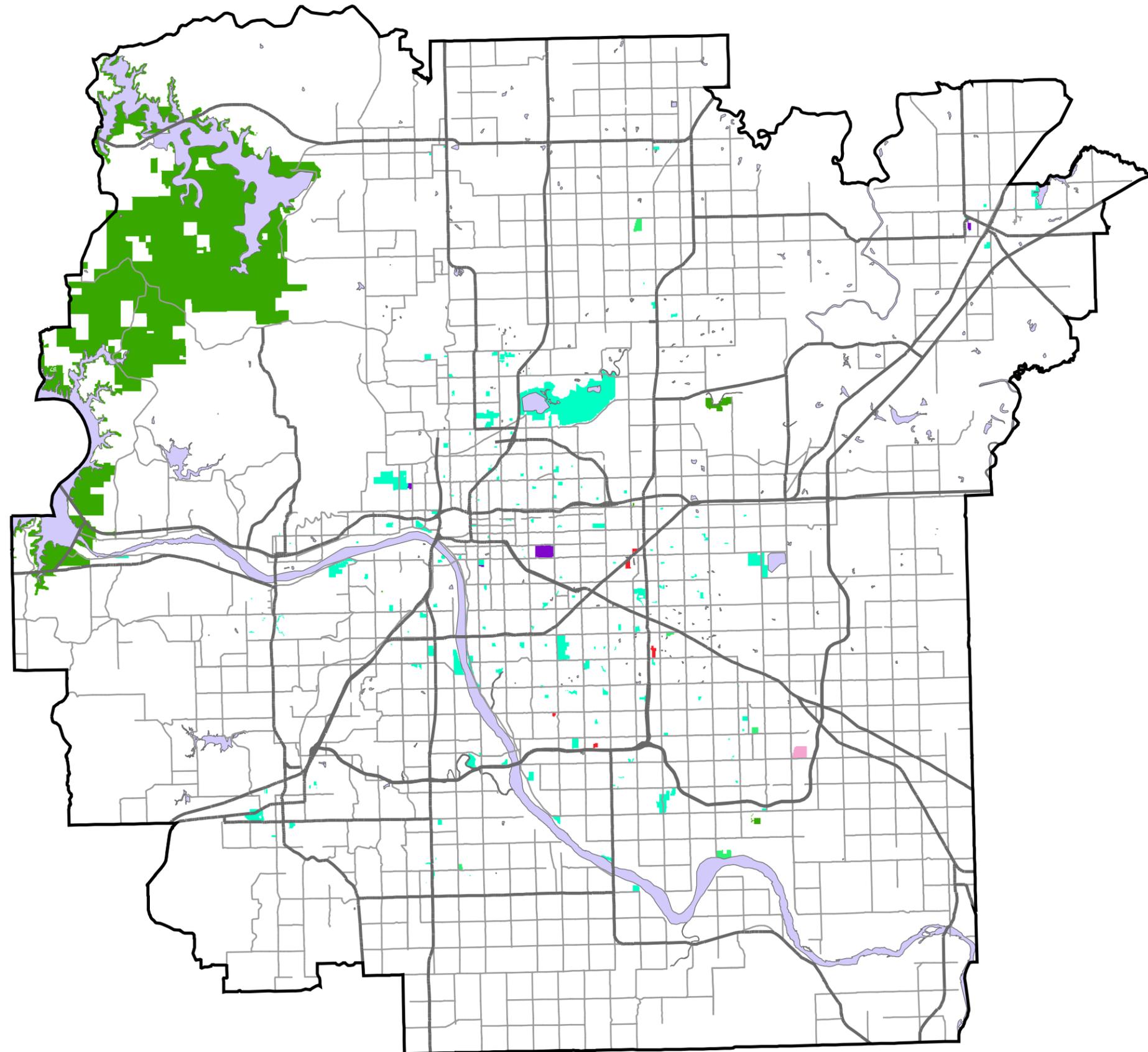
# Residential Vacant land Factor: 100 Year Floodplain



- Legend**
- Highways
  - Arterial Streets
  - tma2000
  - Lakes and Ponds
  - 0 100 year floodplain
  - 1; 2



# Residential Vacant land Factor: Parkland



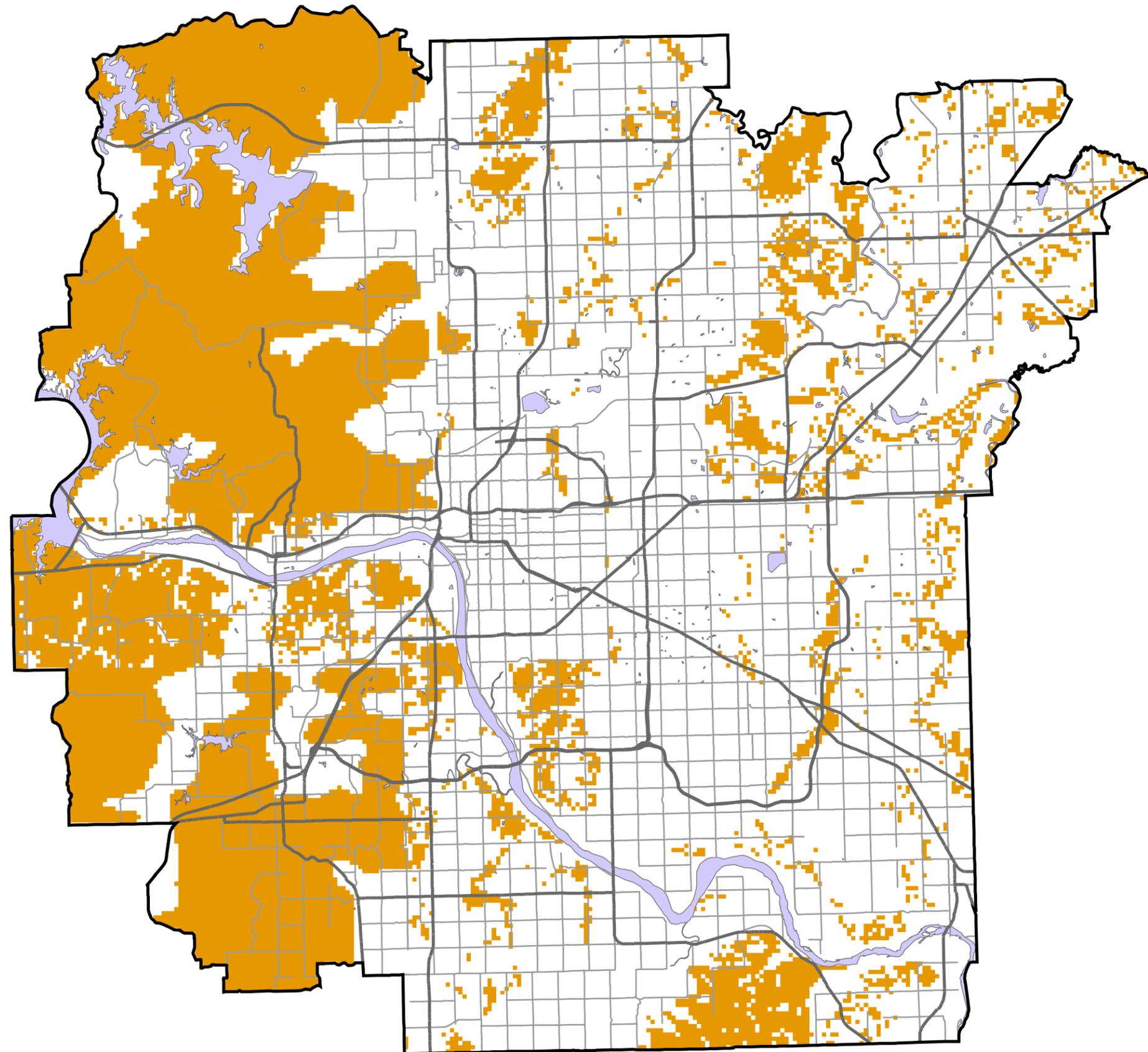
### Legend

- Highways
- Arterial Streets
- ▭ tma2000
- ☁ Lakes and Ponds
- 1 Regular
- 2 Special Facility
- 3 Flood Detention + Recreation
- 4 Nature Preserve
- 5 Other
- 6 Sports Complex



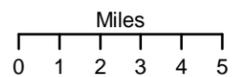
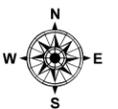
INCOG

# Residential Vacant land Factor: Steep Slopes



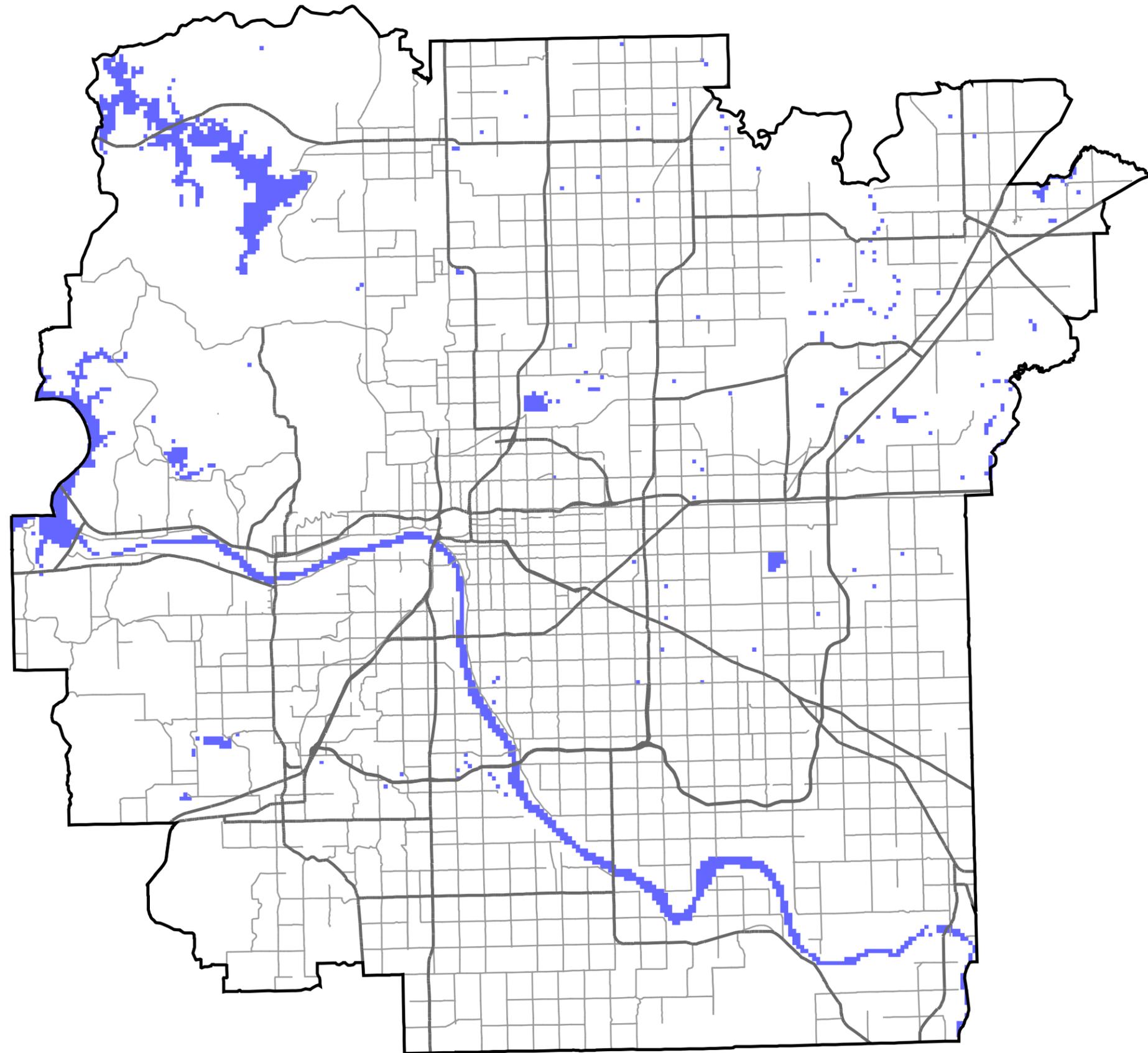
## Legend

- Highways
- Arterial Streets
- tma2000
- Lakes and Ponds
- 0 Steep slopes
- 1; 2



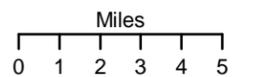
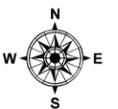
INCOG

# Residential Vacant land Factor: Water Bodies

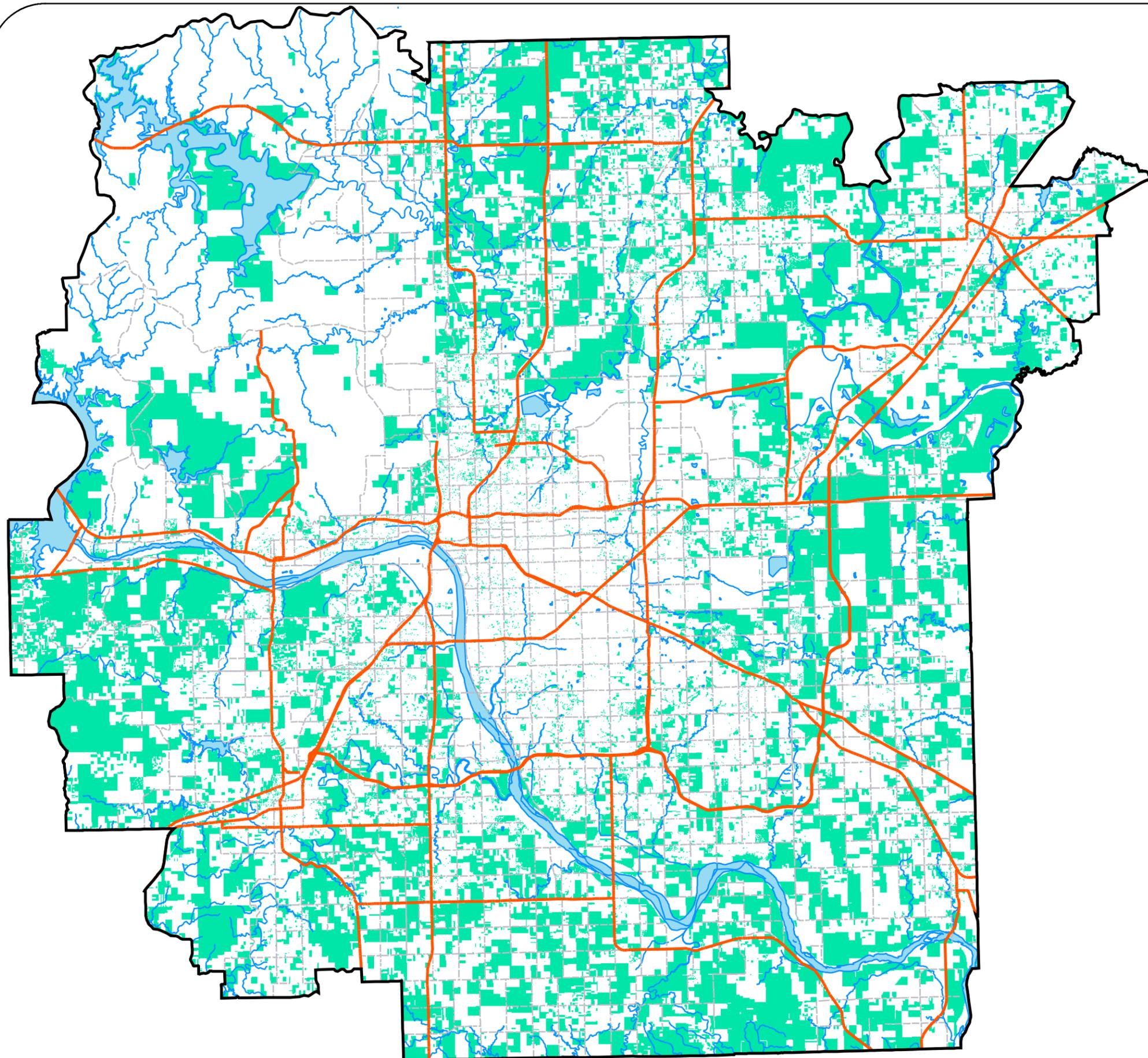


### Legend

- Highways
- Arterial Streets
- tma2000
- Rivers, Lakes, Ponds



# Land Availability: Gross Vacant Land Available for Residential Development



*Selection Criteria for Land Available for Residential Development*

Creek County

[USE] in( '1', '2', '4', '5')  
AND [IMPR] = 0  
AND [MOBILE] = 0

Wagoner County

wagoner\_parcel\_data.property\_class in( 'UR', 'UA', 'RR', 'RA')  
and tma\_parcel\_data.IMPR\_MARK = 0  
AND tma\_parcel\_data.MOBHM\_MAR = 0

Rogers County

'ACCT\_TYPE' in( 'RR', 'UR', 'RA', 'UA')  
and "IMPR\_MARK" = 0  
AND "MOBHM\_MAR" = 0

Osage County

[ASSESSED] = 0  
AND [PROPERTY] in( 'UR', 'RR', 'RA', 'UA')

Tulsa County

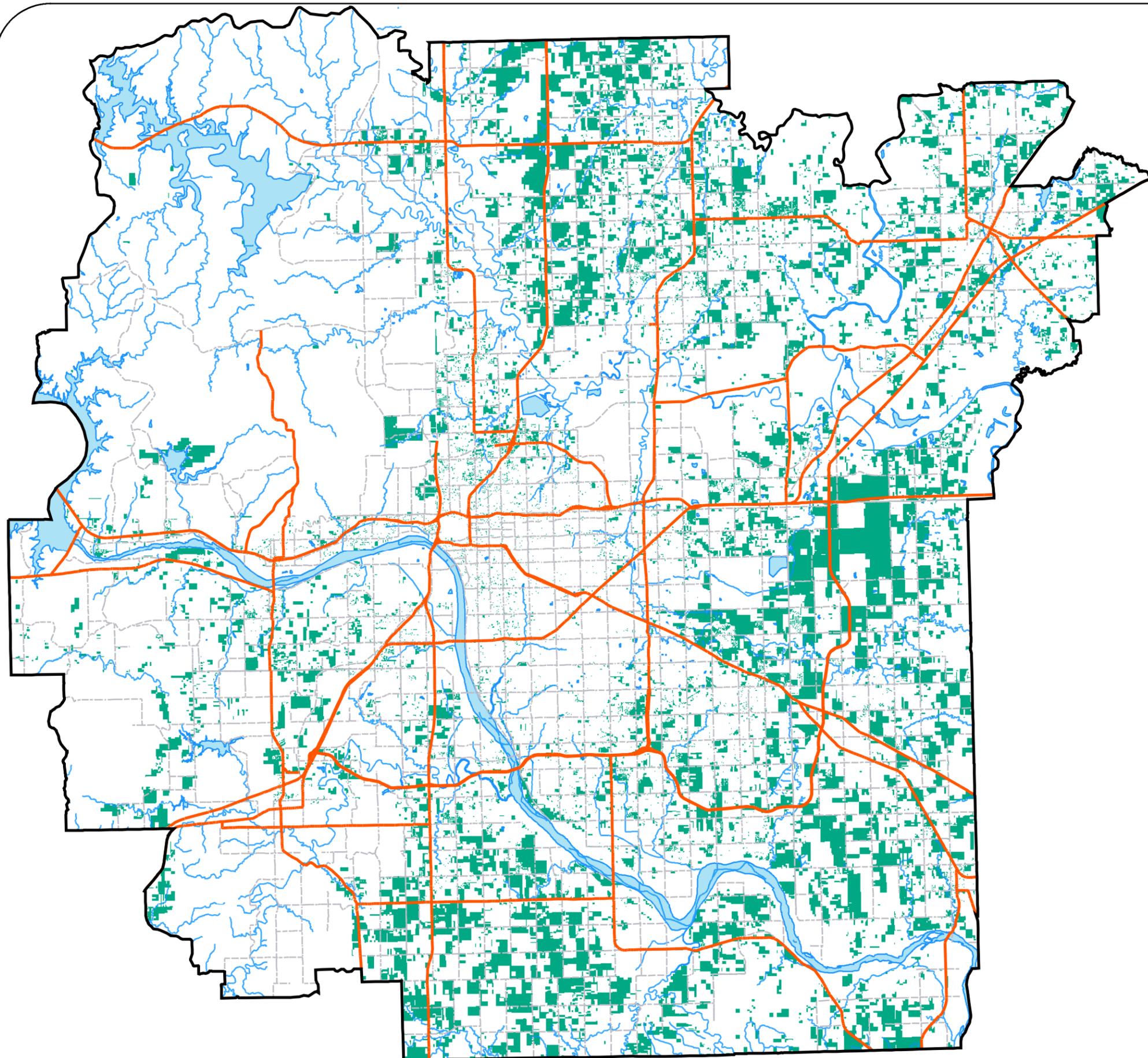
("CLASS" in( 'VR', 'VRS', 'VRG', 'AKV', 'VRF', 'VP', 'AKP', 'XVR', '200', '210')  
OR ("SND\_IMPR" = 0)  
AND "ZONE" not in( 'IL', 'IL', 'IM', 'IM', 'I', 'I1', 'I2', 'IC', 'IH', 'IL', 'ILO', 'IM', 'IM0',  
'IR', 'NCU' ))  
and "EXEMPT" = ''  
AND "PAR\_TYPE" NOT in( 'ARK\_RIV', 'RAIL', 'ROW', 'SUBD\_ROW', 'UNPLAT\_RAIL',  
'UNPLAT\_ROW')

**Legend**

- TMA Boundary
- Highways
- Arterial Streets
- Rivers and Creeks
- Lakes and Ponds
- Undeveloped Land Value**
- Available land



# Land Availability: NET Vacant Land Available for Residential Development



Gross Available land NOT:

- (1) in the 100 year floodplain
- (2) located in a lake or river
- (3) located in a park or nature preserve
- (4) located on slopes > 8.5%

## Legend

-  TMA Boundary
-  Highways
-  Arterial Streets
-  Lakes and Ponds
-  Rivers and Creeks
- Undeveloped Land**
- Value**
-  Available land

