the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

HRTPO REGIONAL CONNECTORS STUDY

SCENARIO PLANNING UPDATE

February 14, 2019

Michael Baker INTERNATIONAL

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Scenario Planning Schedule

Regional Connectors Study - Phase 2 Schedule

Task No	Task	2019 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	2020 JAN
TASK 4	CONDUCT SCENARIO PLANNING													
4.1	Building the Base Data, Models, and Scenarios													
4.2	Defining Alternative Future Scenarios													
4.3	Defining Measures of Success													
4.4	Evaluate 2015 Current Regional Conditions													
4.5	Modeling the 2045 Baseline Alternative													
4.6	Building the Alternative Scenarios													

- Draft Deliverables
- Final Deliverables
- Steering Committee Meetings and Presentations
- Working Group Coordination Meeting
- Draft Task Schedule
- HRTPO to approve updated Prioritization Tool
- 2015 Regional Travel Demand Model available
- 2045 Regional Travel Demand Model available

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TASK 4.1 UPDATE – LAND USE COMPONENTS OF BUILDING THE BASE DATA, MODELS, AND SCENARIOS

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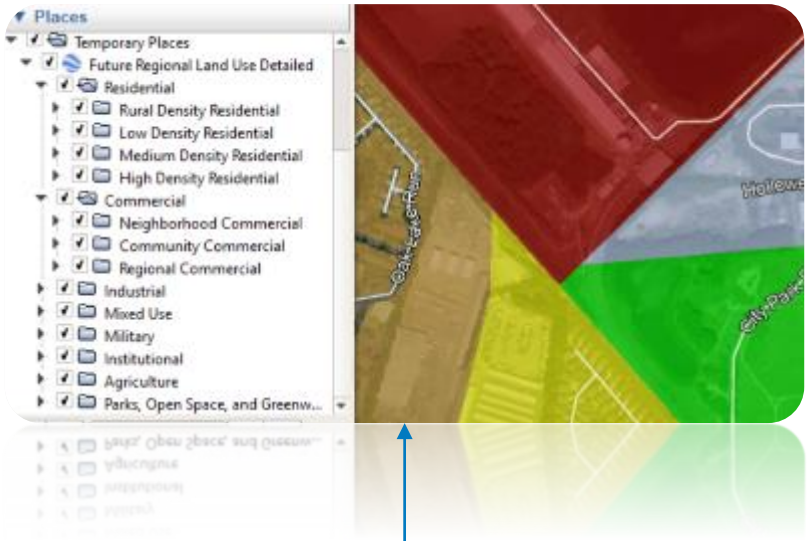
Task 4.1c: Build Place Types

Task Summary:

1. Profile existing and future land use types in the region to develop a unified set of Place Types that describe regional development patterns
2. Develop quantitative summaries of each Place type that summarize land uses, developed areas, and environmental data for each
3. Develop summary visualizations of each Place type, to clearly explain them to stakeholders and the public

Starting Assumptions



- Place types will need to accommodate several **purposes** in this study:
  - Allocate to match 2015 (existing) development (**The Virtual Present**)
  - Allocate to match 2045 (future) development (**The Virtual Future**)
  - Allocate to match Beyond 2045 **Alternate Scenario** development
- Place types should relate to **development in the region**
- Place types should relate to localities' **future land use categories**
- Place types should be **usable** by the TPO and the region for future planning efforts

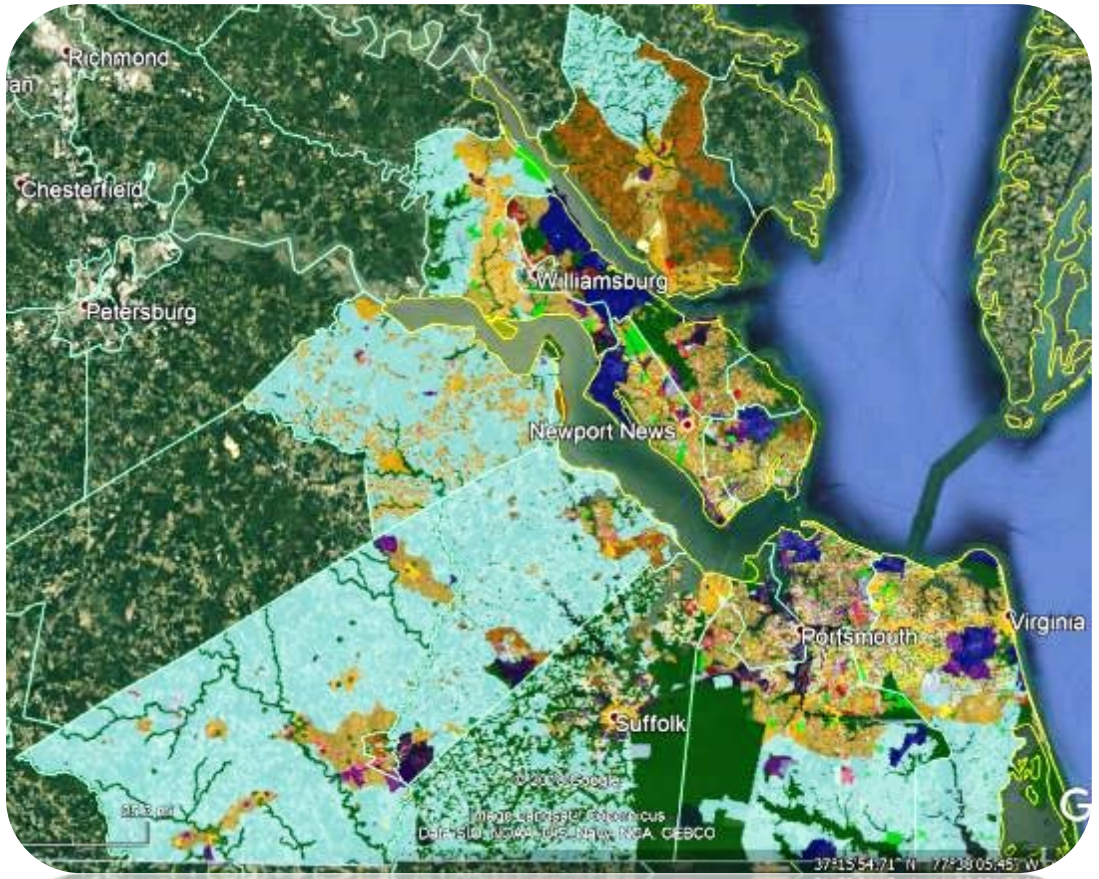
Therefore:

Utilize the **HRTPO'S REGIONAL LAND USE MAP** as the **basis** for the development of Place Types in this study

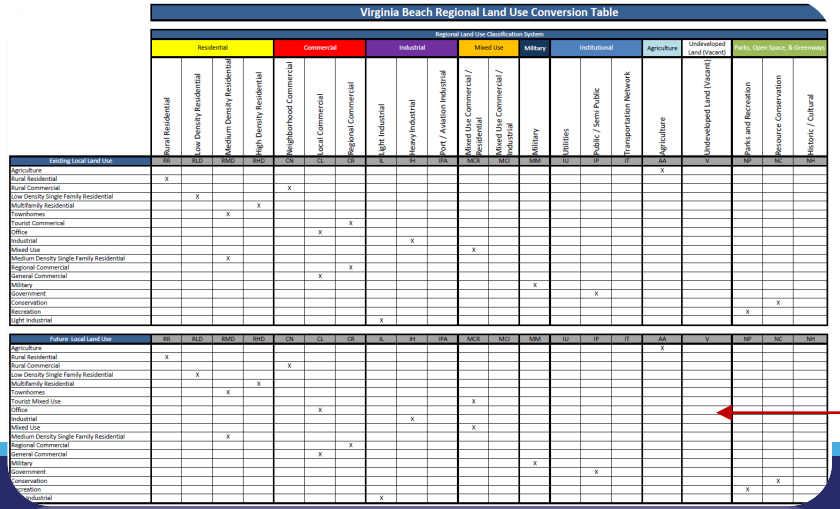
HRTPO Regional Land Use Map

Why it's useful:

- Covers the entire region (**HRPDC boundaries**)
- Methodology **approved by the HRTPO Board** & coordinated with **localities' staff**
- Used & **updated** by HRPDC staff
- Developed an accepted methodology for **"the merging of 16 local comprehensive plans and existing land uses."**
- **Key tool** for inter-local and regional planning



Google Earth visualization tool



Sample land use conversion table for Virginia Beach

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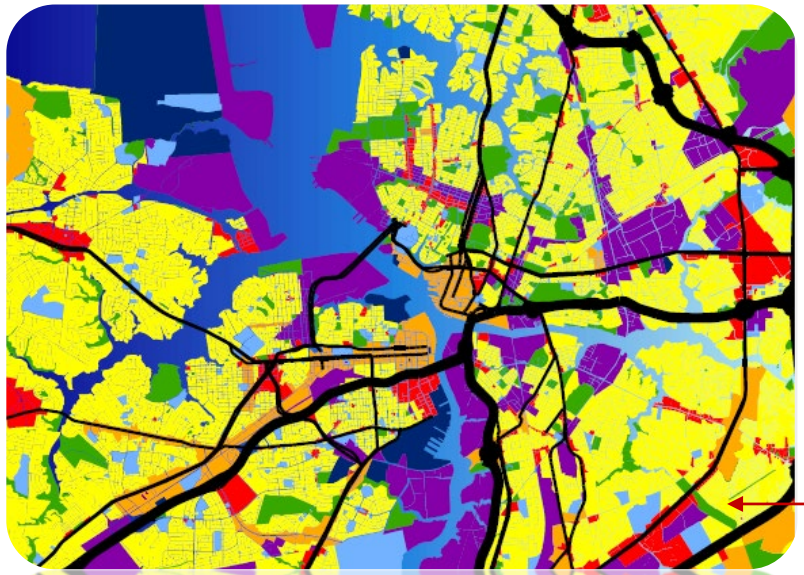
HRTPO Regional Land Use Map

How it works:

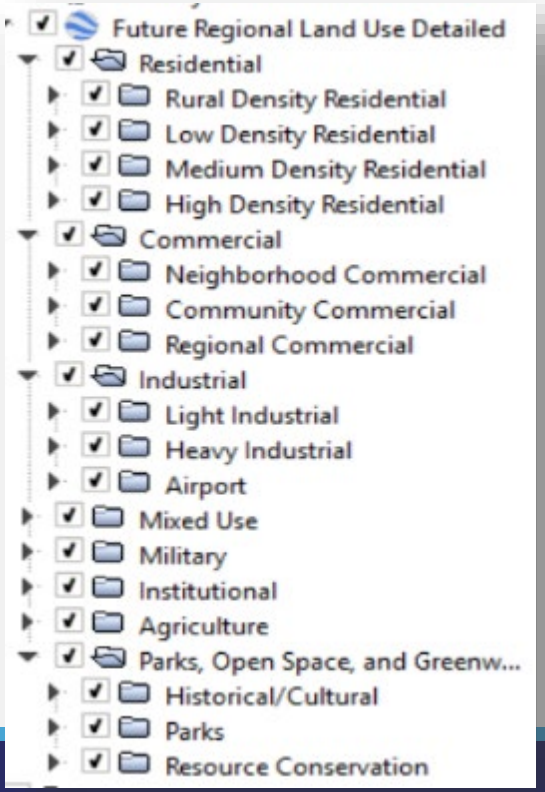
- Uses the same basic land use categories for both **Existing** and **Future** land uses
- Uses the regional **parcel** dataset
- **Does not have any data** associated with each category (e.g. population, employment, density, etc.)



Sample Future Land Use

Basic Categories

Detailed Categories



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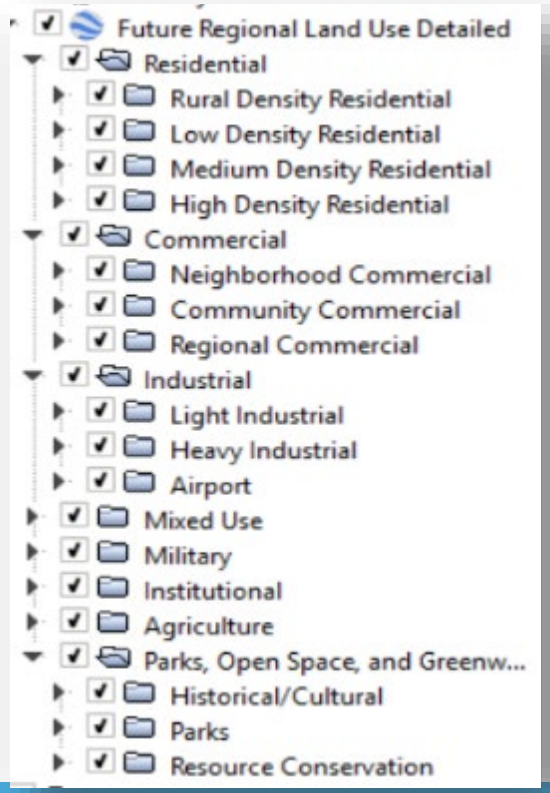
Building Place Types

1. Profile existing and future land use types in the region to develop a unified set of Place Types that describe regional development patterns



Create a set of quantifiable Place Types based on the regional Land Use Categories

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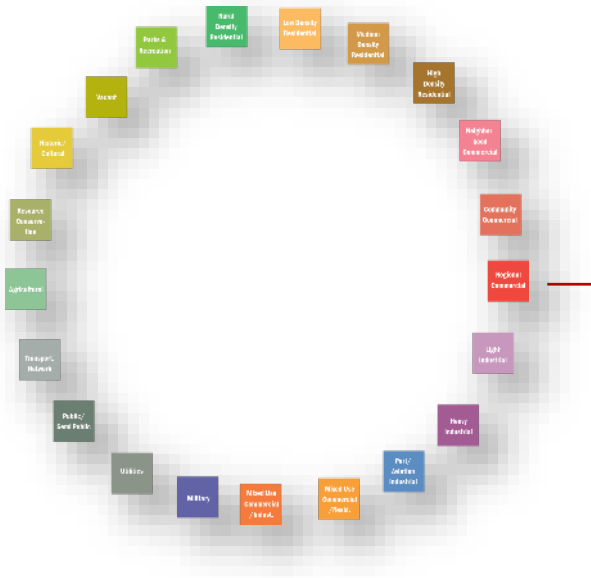
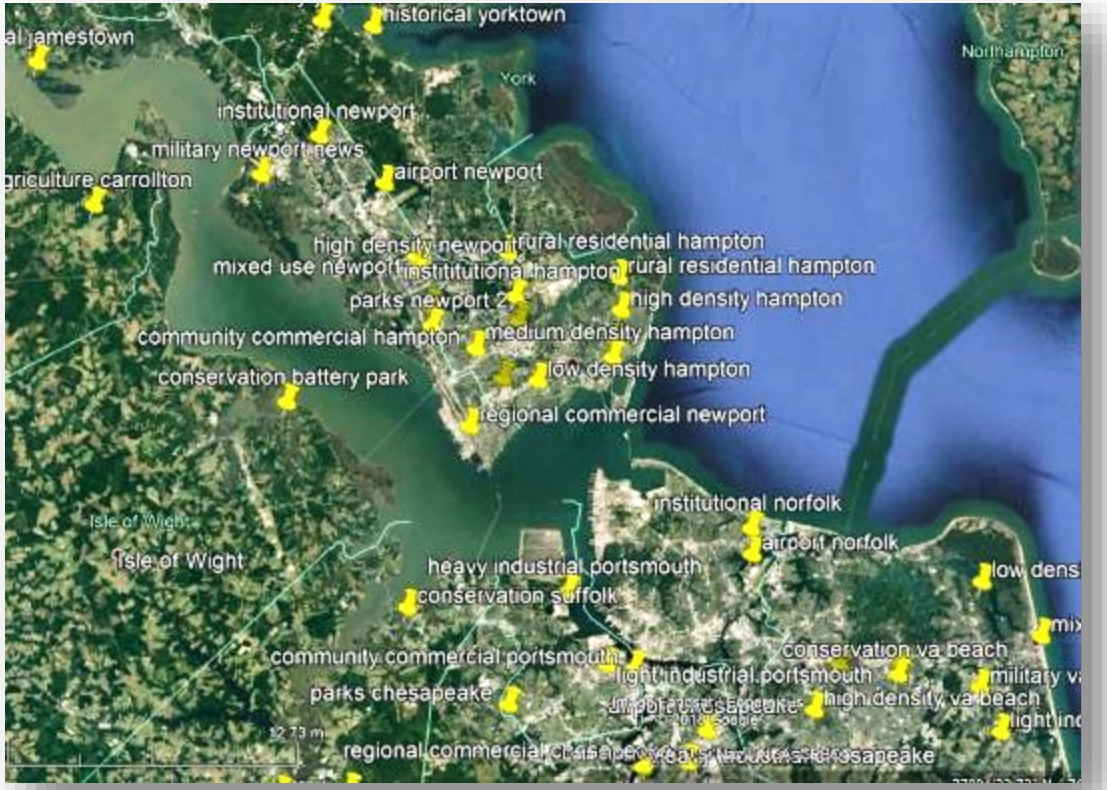
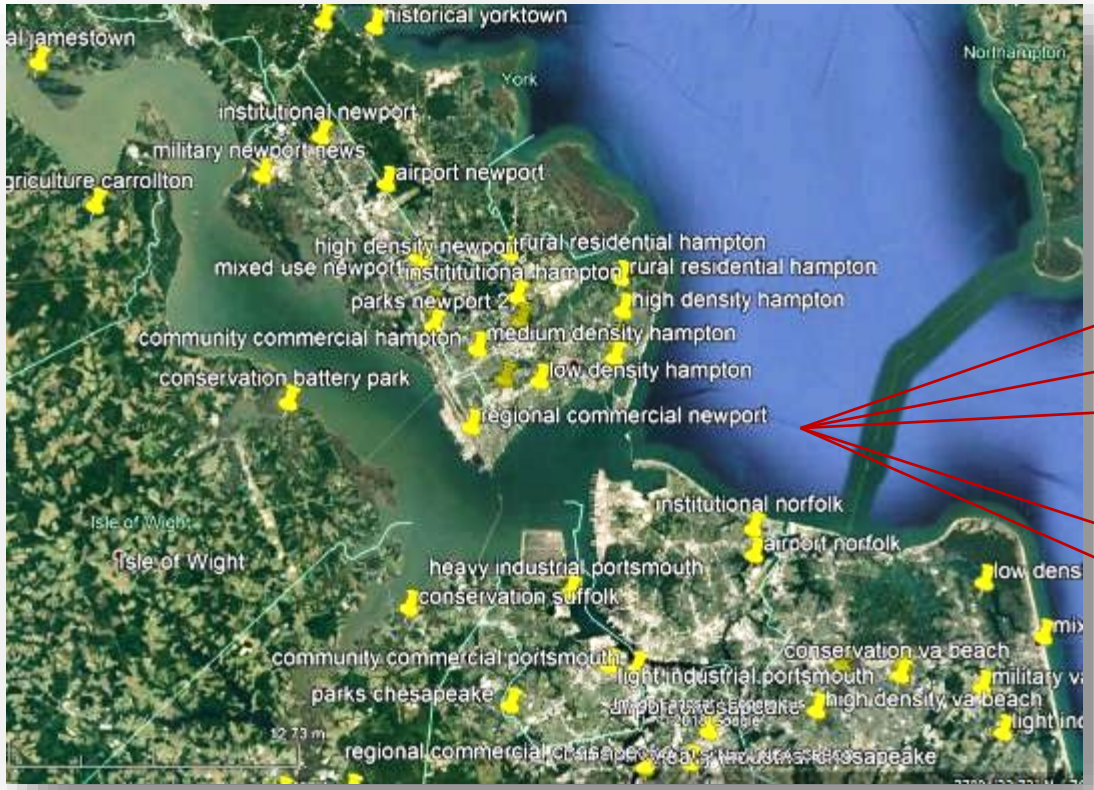
Building Place Types

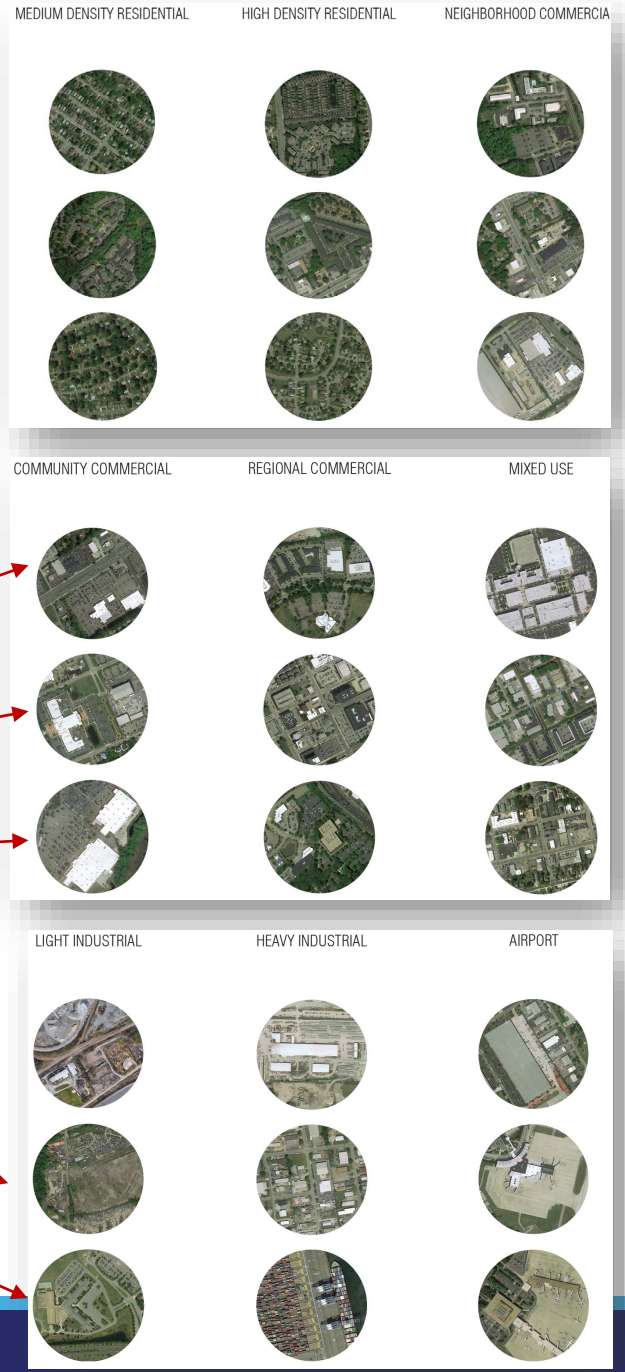


Profile each Land Use using sample locations in the Region



Building Place Types





For each Land Use, sample multiple locations

Use ¼ mile diameter sample areas for each location

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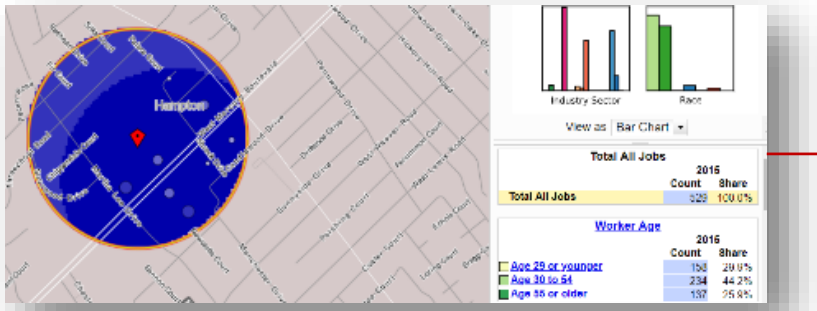
Building Place Types



Community Commercial

Average = **4.9 jobs/acre**

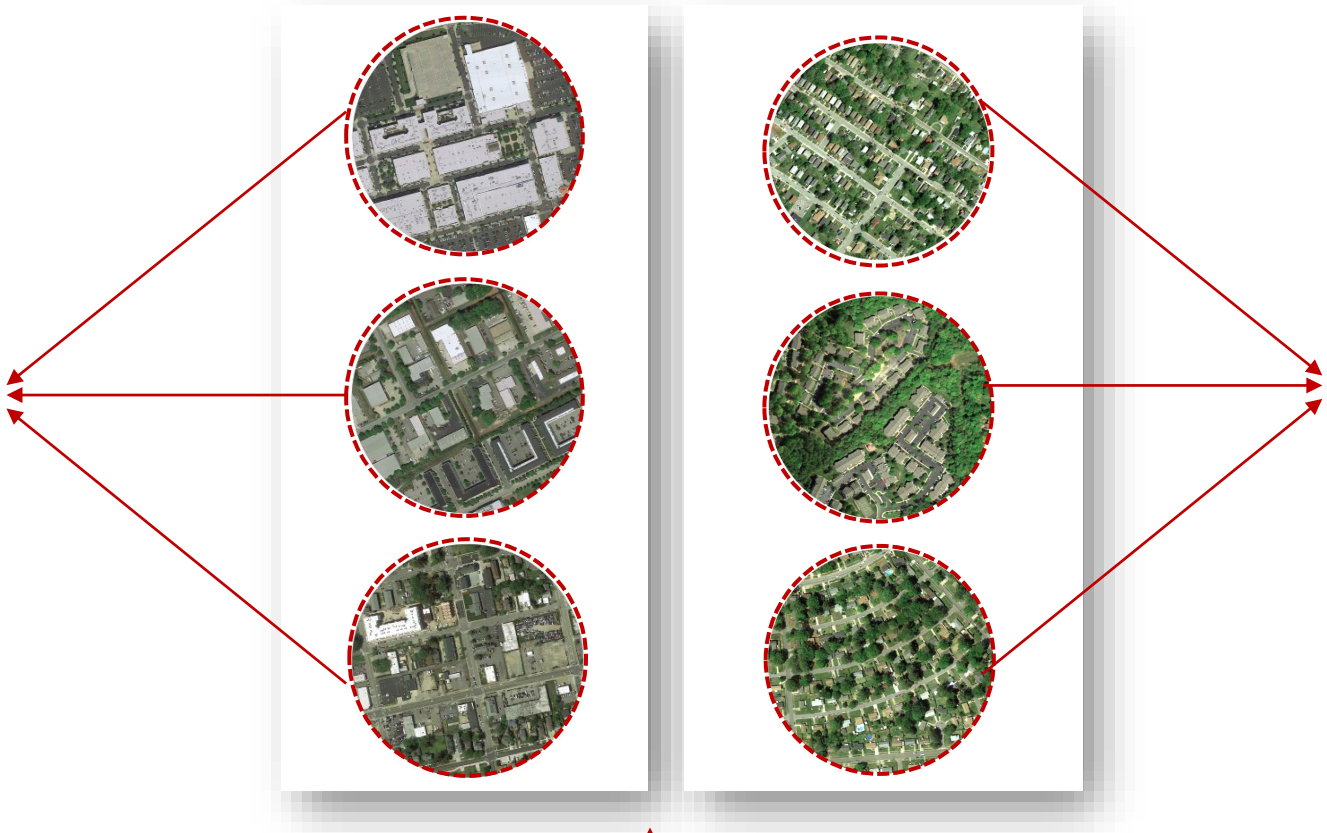
Utilize U.S. Census data to calculate **actual population and employment in each sampled Land Use**

Average the jobs and population in each sampled area to come up with a **Typical Density/Intensity for each Place Type**

Building Place Types

Mixed Use Commercial /Indust.

Average = **12.7 jobs/acre + 19.2 people/acre**

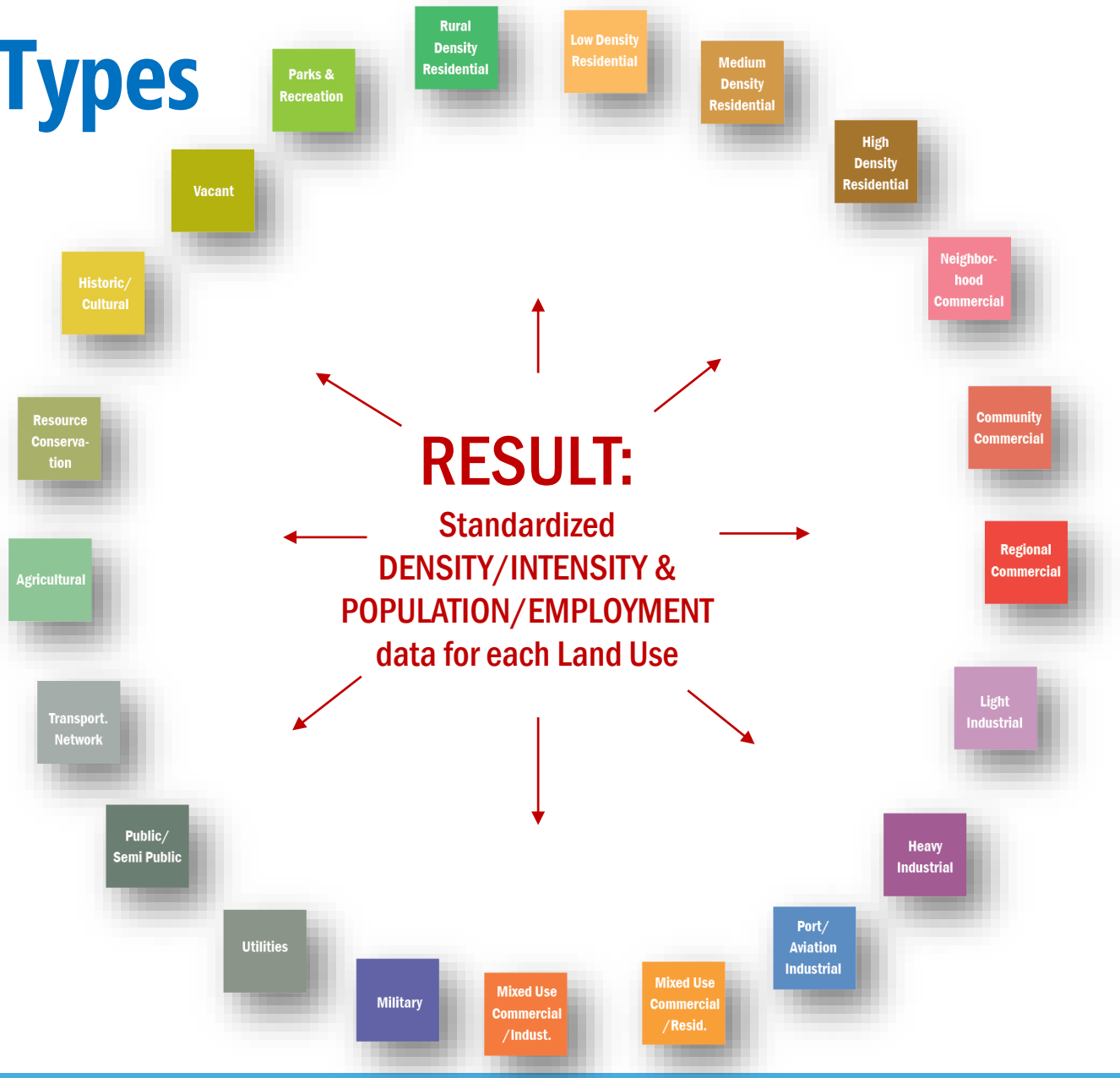


Medium Density Residential

Average = **17.3 people/acre**

Same process for Residential and Mixed Use

Building Place Types



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“Virtual Present”

Task 4.1d: Build “Virtual Present” Map of the Region

Task 4.1f: Calibrate “Virtual Present” to TAZ control totals

Task Summaries:

1. allocating the Place types onto the GIS base map of the region to match the existing pattern of development and land uses on the ground today
2. output to a GIS map of the Region that converts the existing land uses to Place types, with resulting data derived from the Place types about land use, environmental features, accessibility and transportation characteristics
3. modify the Place type allocation in the Virtual Present so that the population and industry employment totals match the 2015 controls in each TAZ according to the Travel Demand Model

Allocating Place Types

TAZ **834** in Portsmouth

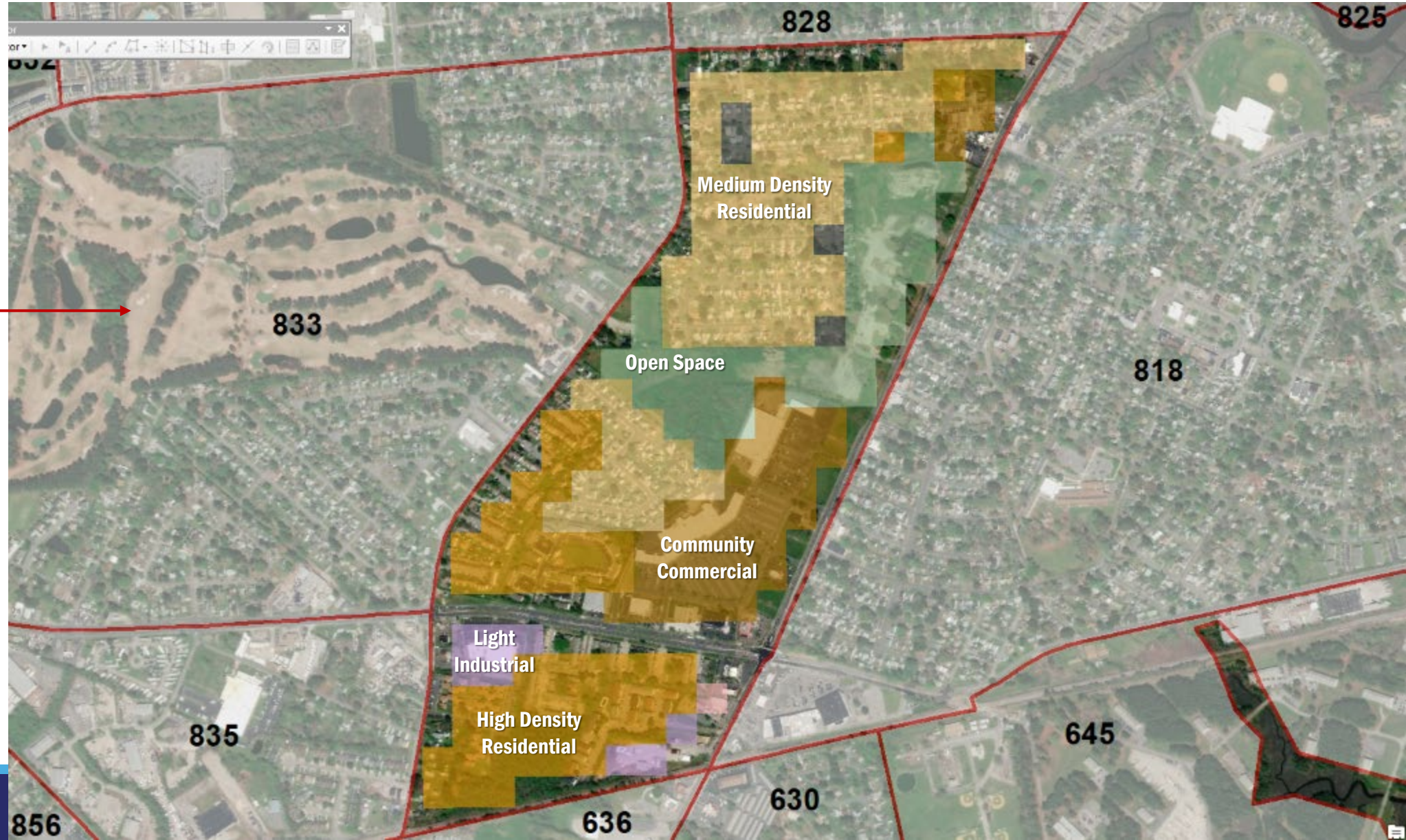
CONTROL TOTALS:
Emp. = **426 jobs**
Pop. = **2,362 people**

Allocating Place Types

Applying 1-Acre **Place Type Grid** onto TAZ →

Allocating Place Types

Applying **Existing Land Uses** (from Regional Map) onto Place Type Grid →

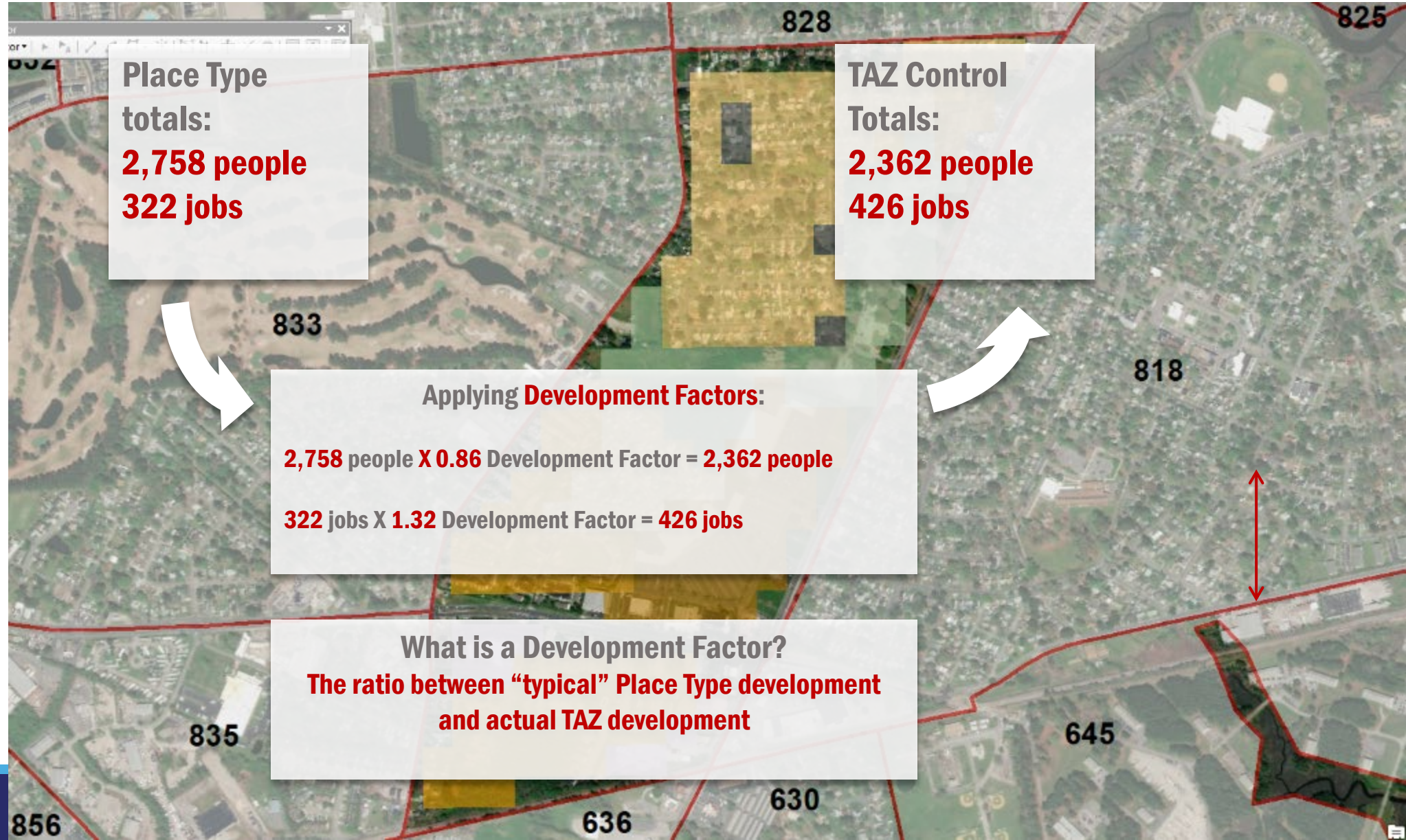


Allocating Place Types

Applying **Jobs & Population** totals for each Place Type

Allocating Place Types

Reconciling Place Type allocation with TAZ Control Totals



Place Type totals:
2,758 people
322 jobs

TAZ Control Totals:
2,362 people
426 jobs

Applying **Development Factors**:

2,758 people **X 0.86** Development Factor = **2,362 people**

322 jobs X **1.32** Development Factor = **426 jobs**

What is a Development Factor?

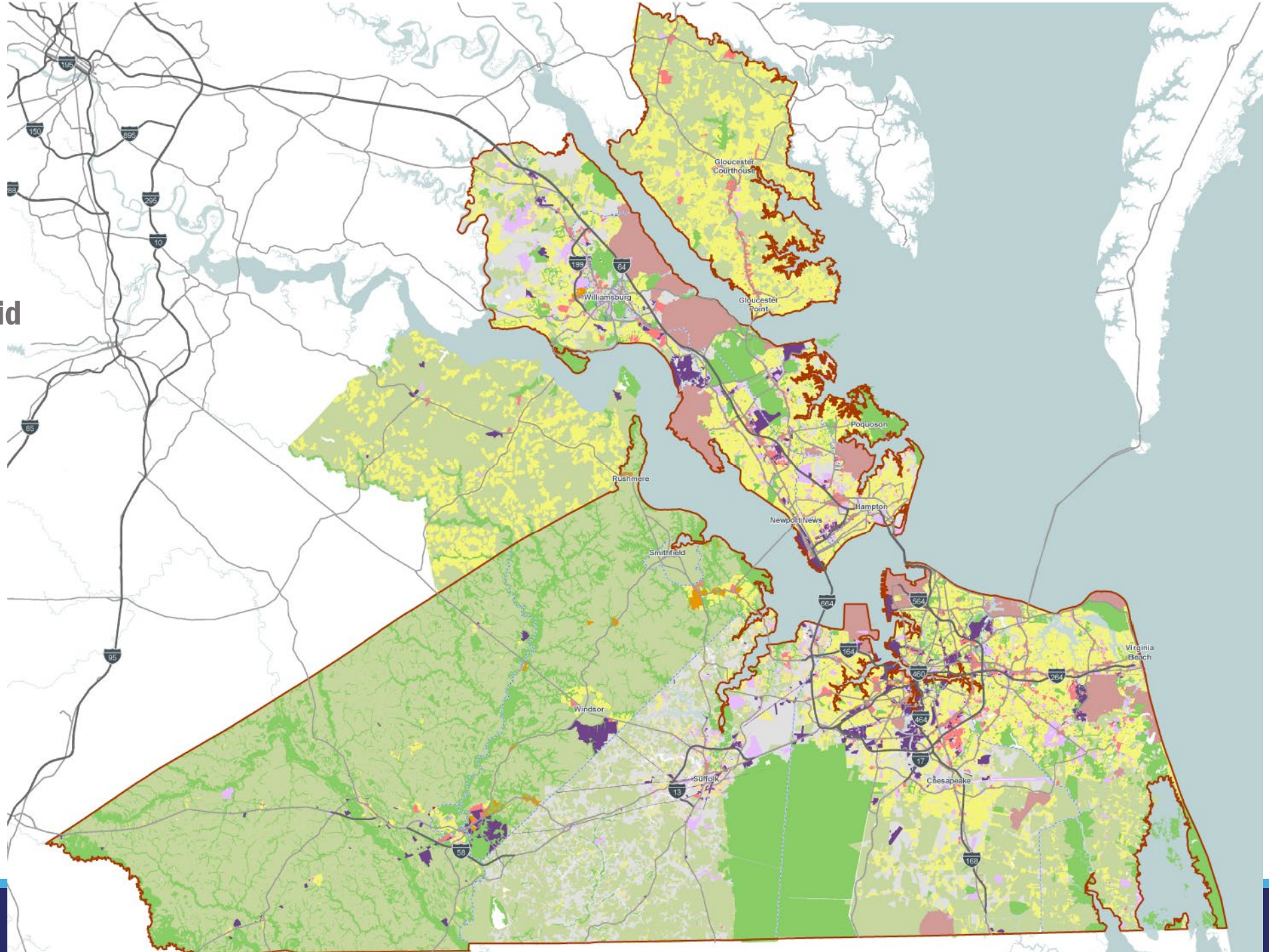
The ratio between "typical" Place Type development and actual TAZ development

Next Steps

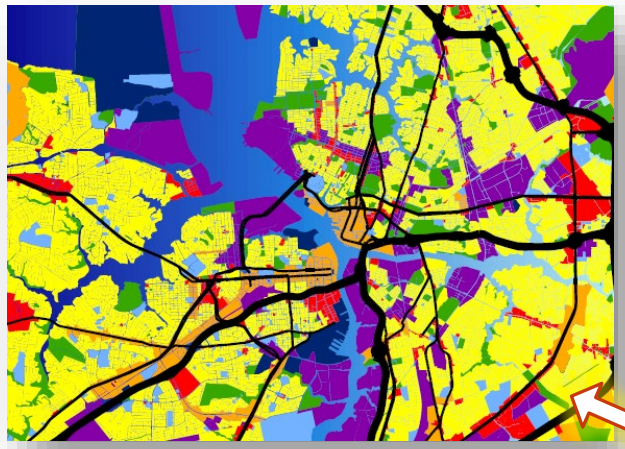
1. Apply the quantified grid of Place Types to the existing Land Uses for the Region

2. Apply Development Factors to reconcile each TAZ control total

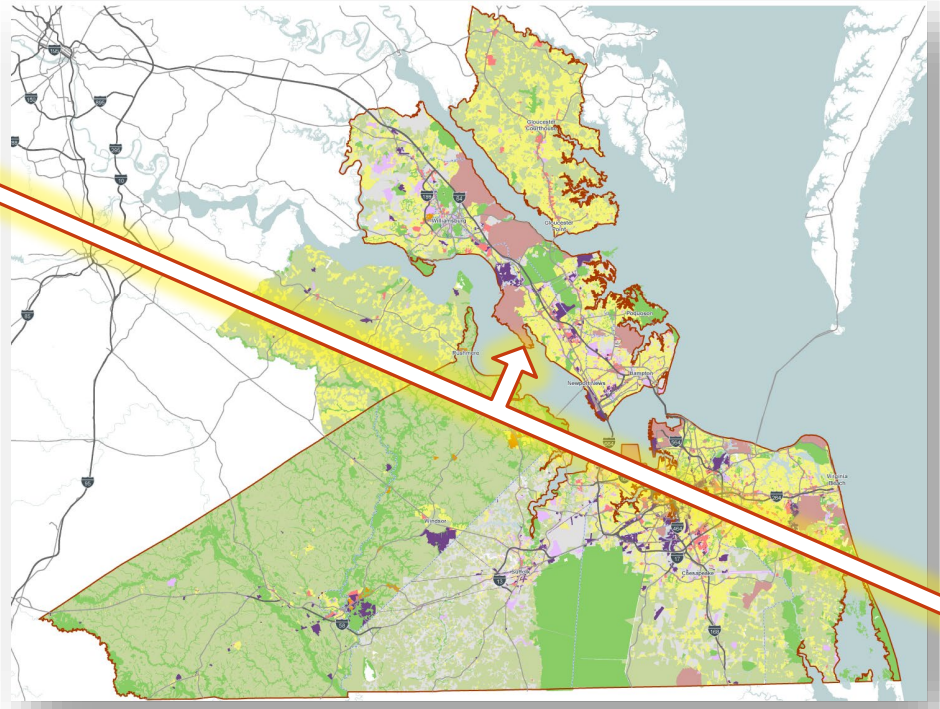
3. Yields a 2015 “Virtual Present” map of the Region

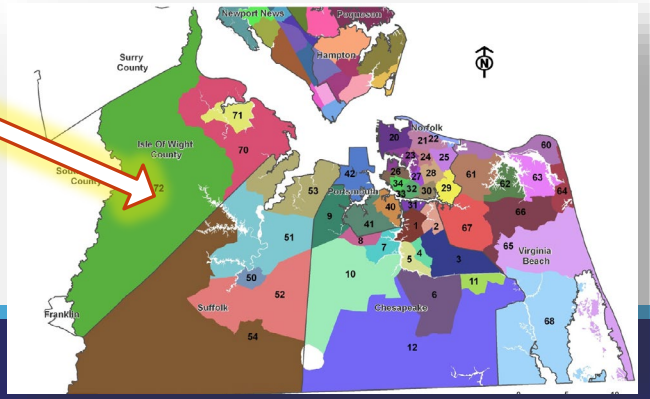


The Result:



A Regional dataset that **matches up the Regional Land Use Map with the TAZ Control Totals**





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HRTPO REGIONAL CONNECTORS STUDY

TASK 4.1 UPDATE – ECONOMIC COMPONENTS OF BUILDING THE BASE DATA, MODELS, AND SCENARIOS

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Economic Objectives – Task 4.1

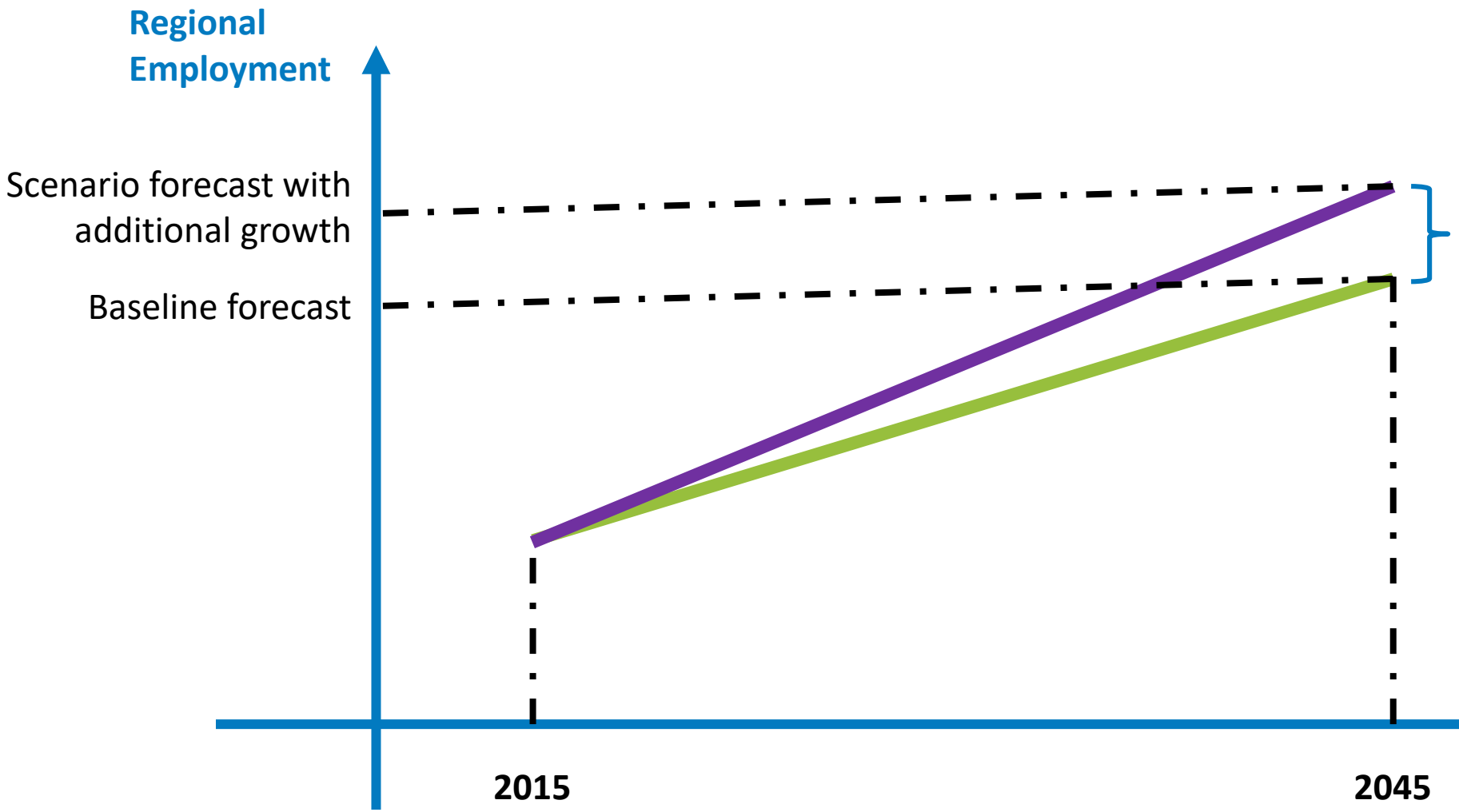
Research to support later development of economic "drivers" for use in scenario planning:

1. Understand TPO's current and forecast future economic conditions – *establishes baseline conditions from which alternative scenarios will pivot*
2. Identify economic risks & opportunities that may affect spatial and industry patterns of long term regional growth – *start identifying building blocks of potential alternative scenarios*

Principles guiding economic research

- TPO's 2045 growth forecasts to be regarded as conservative baseline – alternative future scenarios will involve plausible additional growth
- Propose to hold incremental growth constant across 3 alternative scenarios and to focus on the implications of different visions of economic futures
- Alternative scenarios should investigate the balance between military activity and economic diversification in the region
- Alternative economic futures should be sufficiently different so as to result in different spatial patterns and types of development, with associated implications for travel patterns and modal reliance

Alternative Economic Futures

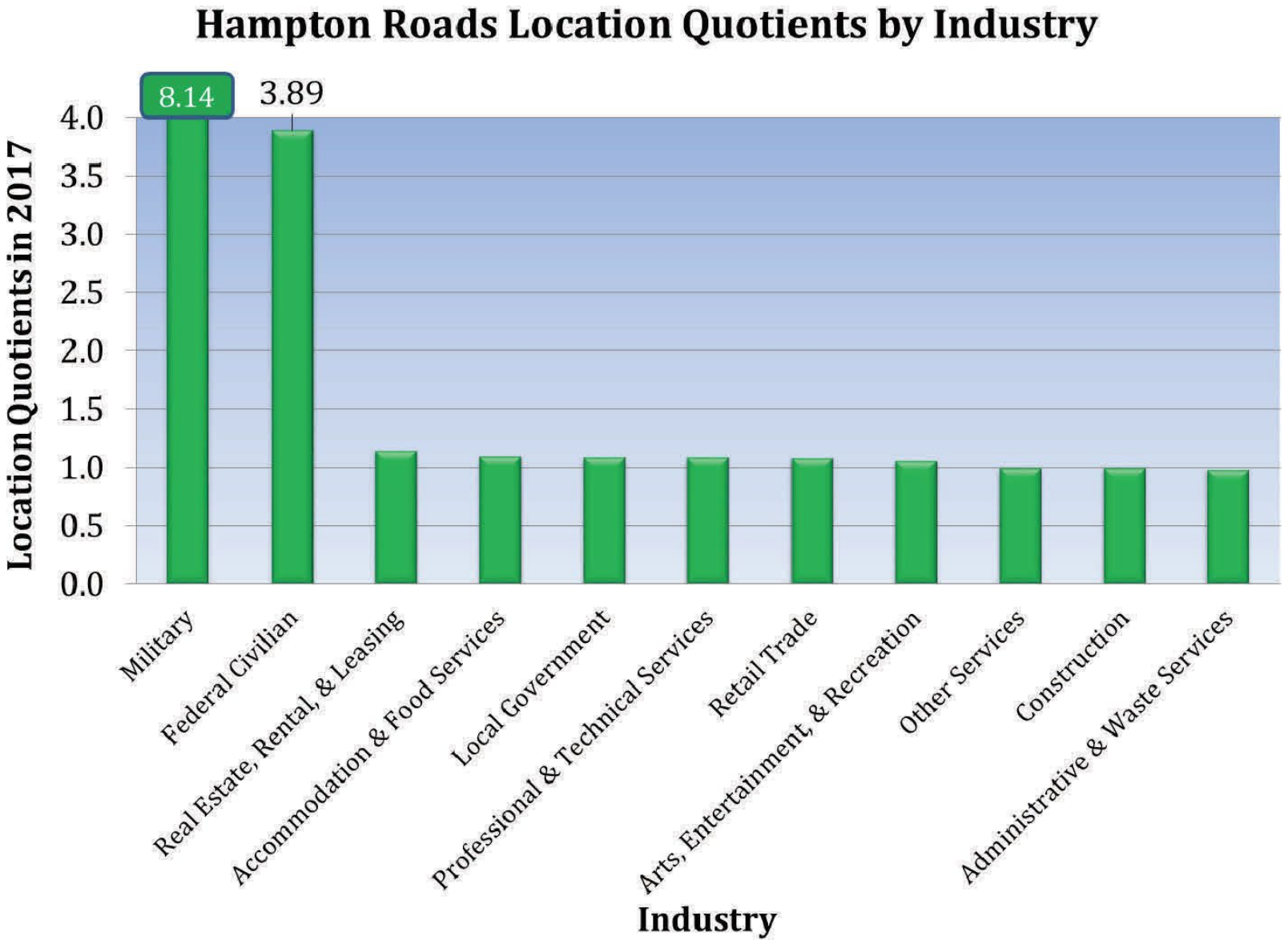


Key questions:

- How much additional growth is plausible?
- What might the composition of that growth be?

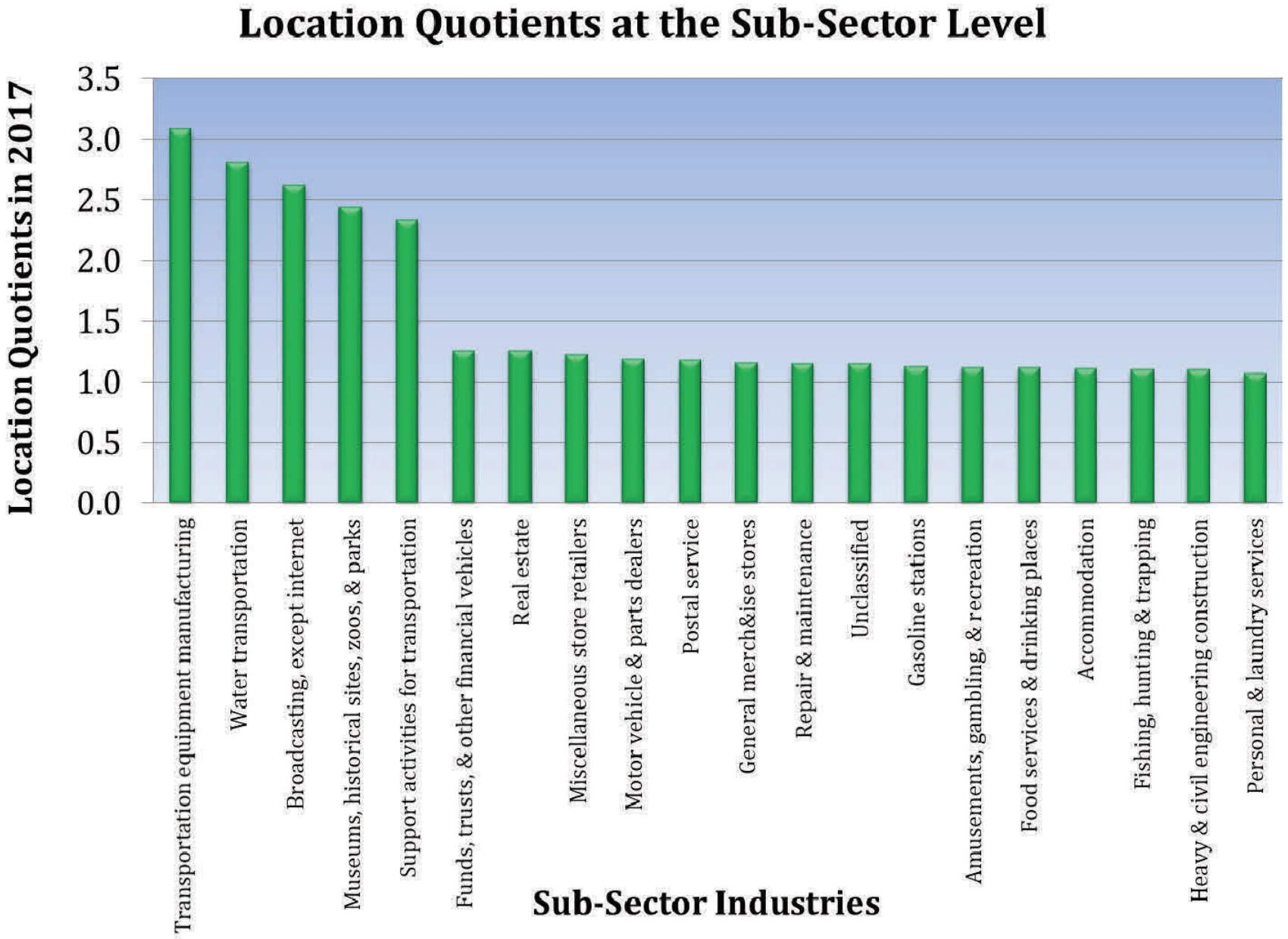
1. Understand TPO's current and forecast future economic conditions

Current Industry Clusters



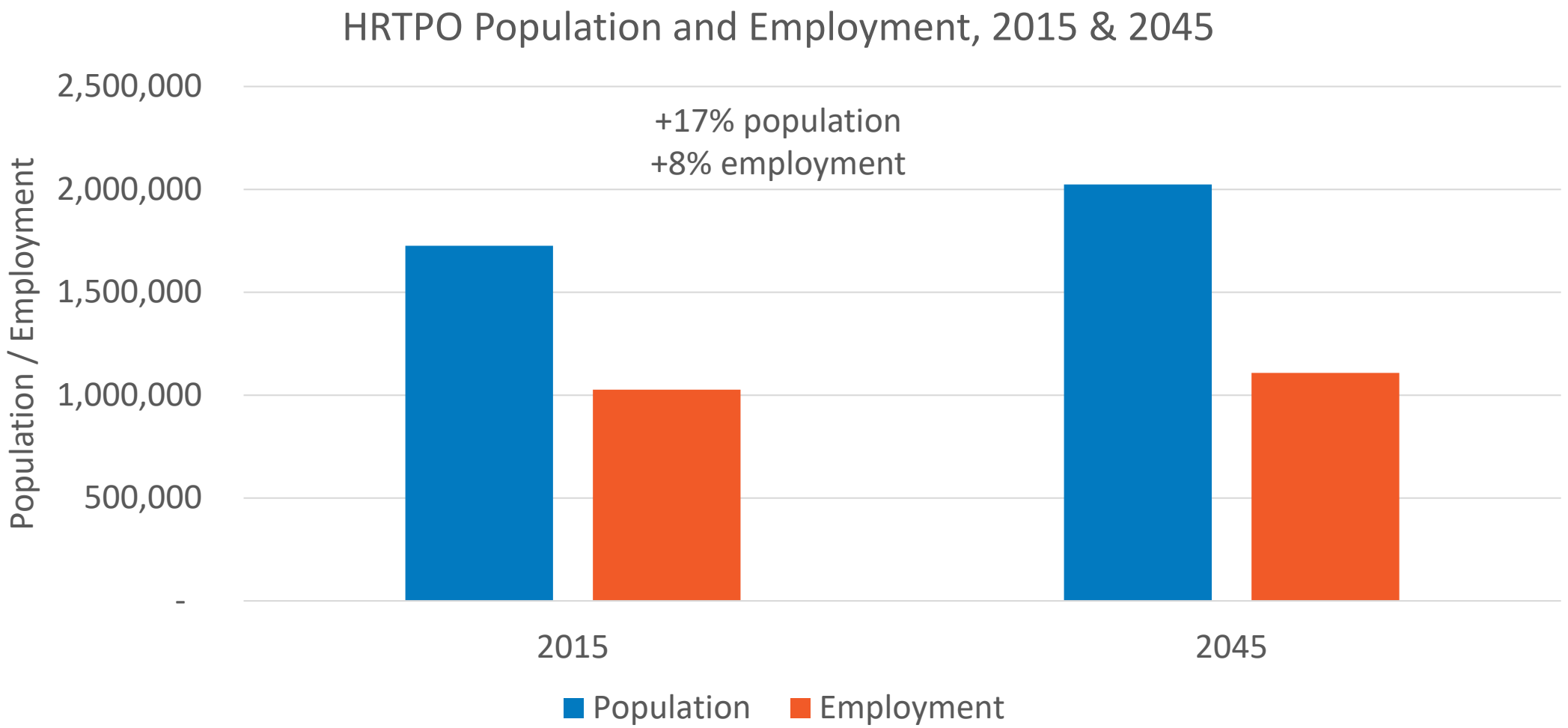
Source: Bureau of Labor Statistics, HRPDC Regional Benchmarking Study

Current Industry Clusters

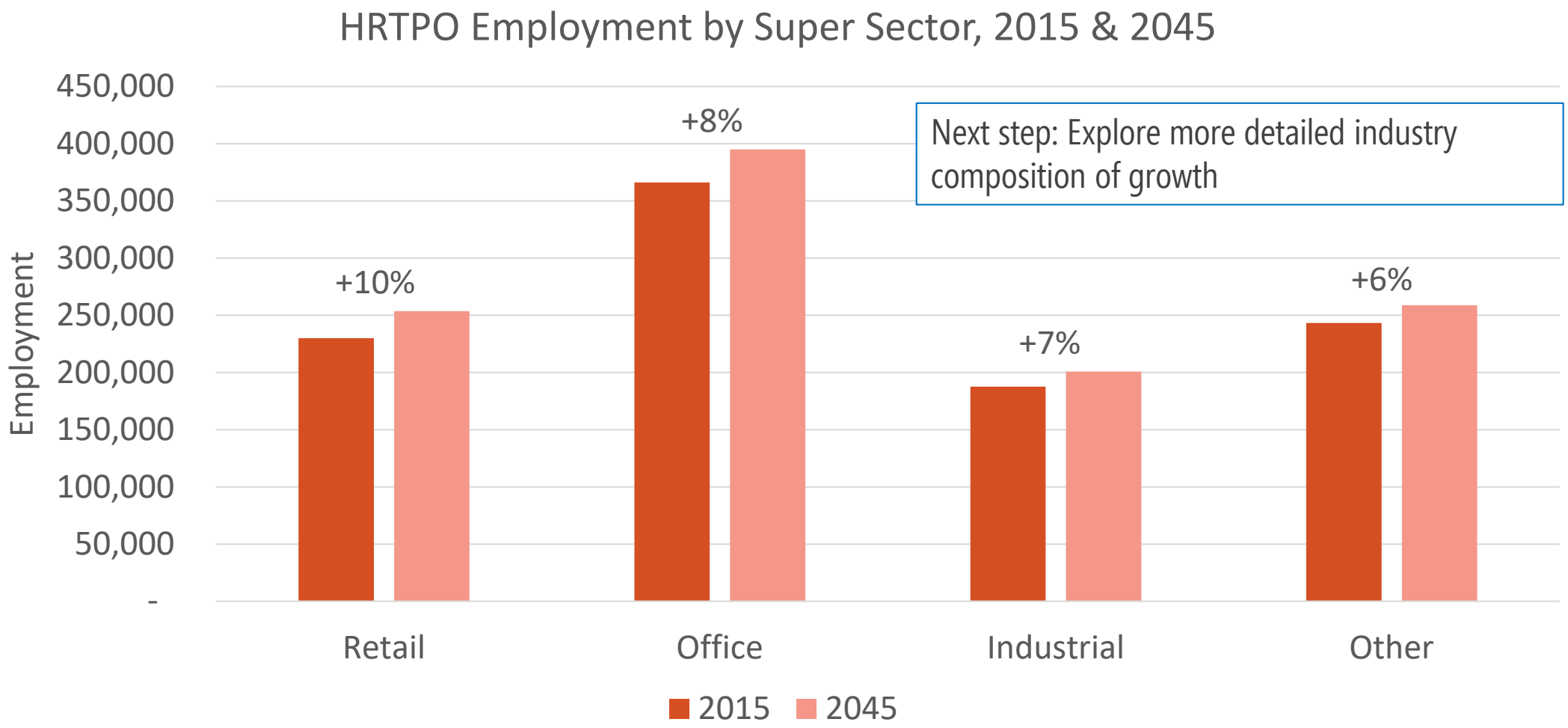


Source: Bureau of Labor Statistics, HRPDC Regional Benchmarking Study

2015 to 2045 TPO Forecast Summary



2015 to 2045 Industry Composition



Forecast Methodology

- Two forecasts: Southside and Peninsula
- Population & employment generated using REMI model
  - Regional control totals constrain localities (top-down process)
- Population growth driven by
  - Employment growth (in-migration for jobs)
  - Natural change (births & deaths)
- Other variables generated using bottom-up process
  - Review of comprehensive plans & development patterns
  - Woods & Poole provided household forecasts
  - Workers & vehicles based on past trends

2. Identify economic risks & opportunities that may affect patterns of long term regional growth

Sources of Information

- Industry composition
  - HREDA Go-to-Market Strategy (2019)
  - HRPDC Regional Economic Development Strategy (2015)
  - HRPDC Regional Benchmarking Study (2018)
  - Old Dominion University State of the Region Report (2015)

Industrial Patterns – Risks

- Jobs lost since Great Recession
  - *50,000 civilian jobs lost, 30,000 recovered; a further 20,000 military jobs lost*
- Growth in gross product weaker than similarly-sized metros
  - *Annualized growth of 0.5% in 2014-2017*
- Region remains highly reliant on military/civilian DoD employment
  - *25% of regional employment in 2013, and shrinking*
- Income and wages lags behind U.S.
  - *Regional per capita incomes $3,000 lower than U.S. average; income from wage and salaries has decrease since 2011 even as incomes rise due to increases in personal transfers/government benefits*

Industrial Patterns – Opportunities

Regional Economic Development Strategy:

- Grow and maintain three pillars of the regional economy
  - Federal
  - Port/maritime
  - Tourism/arts & culture
- Nurture new opportunities (i.e., diversifying the economy)

Industrial Patterns – Opportunities

- **Go-to-Market Strategy, Target Business Sectors**
  - **Shared services:** provision of high value internal support functions to corporate operations for U.S. clients, including finance and human resources
  - **Software development and IT:** Development of software applications, support and consulting services for U.S. and international markets
  - **Transportation technology:** Specialized manufacture, assembly, and repair for regional maritime transport equipment market; transfer of shipbuilding capabilities to production of railcars, buses, trucks, sensors, etc.
  - **Distribution:** Regional distribution/logistics centers for Eastern U.S. market.
  - **Food and beverage processing:** Specialized food processing for domestic and international markets (meat, dairy, coffee, seafood)

Next Steps

- Investigate plausible additional growth
  - Go-to-Market Strategy growth goals
  - Alternative published forecasts
- More detailed investigation into:
  - Port of Virginia forecasts
  - Regional large economic development sites
- Understand demographic changes in baseline forecast (e.g. age cohorts, labor force participation)
- Begin characterizing potential economic drivers of scenarios

HRTPO REGIONAL CONNECTORS STUDY

TASK 4.2 UPDATE – DEFINING ALTERNATIVE FUTURE SCENARIOS

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Framework Scenario Development

- Steps to developing scenarios
  1. Establish the baseline scenario
  2. Identify the "storylines" for alternative scenarios
  3. Affirm the scenarios with Working Group and Steering Committee
  4. Define drivers within the major parameters:
     1. Demographic/location drivers
     2. Economic drivers
     3. Technology drivers
  5. Quantify the drivers for each alternative scenario
  6. Develop a narrative for each alternative scenario

Certain drivers are linked to others (e.g., retirees pair with healthcare industry)

Framework Scenario Matrix

		SCENARIOS			
DRIVER PARAMETERS AND TOOLS	**DRIVER EXAMPLES**	**BASELINE**	**SCENARIO 1**	**SCENARIO 2**	**SCENARIO 3**
DEMOGRAPHICS & LAND USE Land Use Allocation Model	Population; Locations of Growth; Generational Mix;	2045 SE Forecasts; Baseline Place Types;	Baseline Data (with scenario-based adjustments) Sea Level Rise Projection*	Baseline Data (with scenario-based adjustments) Sea Level Rise Projection*	Baseline Data (with scenario-based adjustments) Sea Level Rise Projection*
ECONOMICS TREDIS and vFREIGHT Models	Industry Diversification; Port Activities; Tourism	2045 SE Forecasts;	Baseline Data (with scenario-based adjustments)	Baseline Data (with scenario-based adjustments)	Baseline Data (with scenario-based adjustments)
TECHNOLOGY Travel Demand Model	CV/AV Implementation; Shared Mobility Costs and Usage	Baseline Assumptions	Scenario-based Assumptions	Scenario-based Assumptions	Scenario-based Assumptions

*Will not vary by scenario

Potential Scenario Economic Narratives – Illustrative Only

- Baseline Scenario: HRTPO 2045 forecast
- Scenario 1: The Defense Economy
  - Baseline plus growth in military/DoD employment
  - National consolidation of military facilities within Hampton Roads
  - Port of Virginia (Assumption 1)
  - Growth also occurs in defense-related industries (e.g., federal civilian, marine transportation)
- Scenario 2: Regional Industry Targets (Steering into existing strengths)
  - Static military/DoD employment
  - Growth in travel to the region
  - Port of Virginia (Assumption 2)
  - Baseline plus employment growth from significant economic diversification
  - Diversification occurs according to regional industry targets (e.g., shared services, tourism, marine transportation)
- Scenario 3: Something Completely Different - National Industry Targets
  - Static military/DoD employment
  - National consolidation of military facilities outside of Hampton Roads
  - Port of Virginia (Assumption 3)
  - Baseline plus employment growth from significant economic diversification
  - Diversification occurs according to national growth industry targets

Additional Driver Assumptions for Discussion

Assuming the big economic shifts will drive growth, what other uncertain trends should be considered within the scenarios?

- Demographic and Land Use Drivers
  - Considering two types of millennials to differentiate – military and tech sector (different preferences)
  - Would a high retiree scenario be of interest? What land use preferences would they have?
- Technology Assumptions
  - Will have a combination of levers built in to the model plus additional levers we define
  - Any specific concerns or must-haves?