Chapter 5

Testing the Direction

The future offers unlimited possibilities including both challenges and opportunities that will impact Anderson MPA residents. People may continue demanding walkable places and delay or forgo getting a driver's license, automobiles may become connected and driverless, core industries today may disappear tomorrow, the world may be hit with a global pandemic that halts travel, or population growth may slow. Scenario planning is an analytical tool that can better prepare us for what lies ahead by testing various future alternatives. More specifically, scenario planning looks at how projects, programs, and policies may react under various conditions. For example, developing vacant property in downtowns versus building subdivisions around major interchanges are two different yet possible ways that residential growth can take shape. Studying these two development approaches can provide valuable insight into transportation impacts and can then be used to inform zoning codes and development ordinances.

Scenario planning departs from traditional long-range planning techniques, which often

exclusively focus on projections based on current trends and leave little room to consider new possibilities or unexpected challenges. The vast uncertainty of what the future holds is being felt now more than ever. *2050 inMotion* includes minor updates to the first scenario planning component included as part of the *2045 inMotion* MTP planning process and establishes a baseline for future scenario planning efforts.

Developing Scenarios

The process of developing future scenarios is not a one-size-fits-all approach; instead, it is a scalable process that can create a better understanding of emerging issues or build consensus around policy changes or investment priorities[16]. All scenario planning processes include at least one trend scenario, often called a baseline scenario, for comparing other scenarios with different futures. The baseline scenario typically reflects current policies, plans, and community values and is compared directly with other scenarios. Comparisons between scenarios illustrates actions that can be taken to achieve a more desirable future or which actions are most desirable under different circumstances.

To further explain the scenario planning process, the graphic below provides FHWA's six-phase scenario planning framework, which was used to guide the *2050 inMotion* scenario planning effort.

The planning team and stakeholder committee chose to integrate scenario planning throughout the process and focused public involvement on step three, the visioning component. However, before visioning, the planning team worked with stakeholder committee members to identify the elements or hypothetical dials that can be turned for
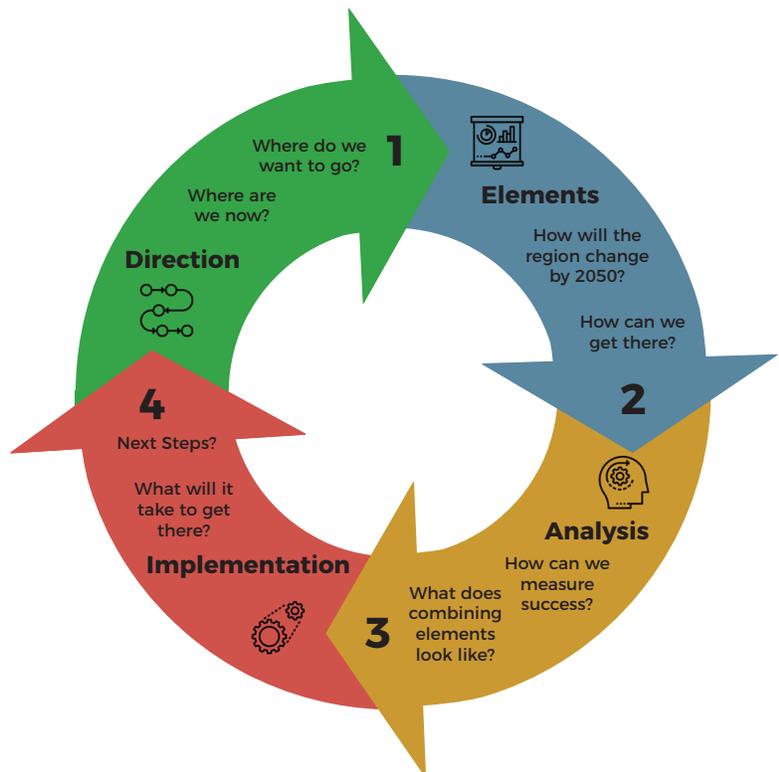
Figure 5.01: Testing the Direction, adapted from[17]

Figure 5.02: FHWA Scenario Framework[(16)]

The framework image contains the following vertical labels:
- Stakeholder Involvement
- Identify, Prepare, and Refine Analysis Tools
- Data Collection

1 *How should we get started?* — Process goals and objectives, engage with stakeholders — **Output:** Work Plan

2 *Where are we now?* — Analyze and identify regional trends in land use and transportation — **Output:** Transportation systems inventory, land suitability analysis, evaluation of trends

3 Who are we and where do we want to go? — Establish future goals informed by the key values of the region — **Output:** Set of working principles that document state, community, region, or study-area goals

4 *What could the future look like?* — Visualize alternative transportation and land use scenarios — **Output:** Identification of appropriate scenario analysis tool or refinement of travel demand model

5 *What impacts will scenarios have?* — Access scenario impacts and how they would perform — **Output:** Refined analysis tools or models, assessment of scenario impacts and performance measures

6 *How will we reach our desired future?* — Craft a comprehensive vision — **Output:** Comprehensive vision, action steps, performance measures, plan to moniter progress

creating a future scenario. Multiple changes must be analyzed simultaneously to develop distinct scenarios that simplify comparisons of results. After working with the public to establish a vision, individual elements were combined to create the final scenarios.

Identifying Elements

Scenario planning analyzes various elements that impact the study area like demographics, economics, politics, health, transportation, environmental trends, and land use. A trademark of scenario planning is identifying land development patterns as elements that could impact transportation networks, investments, and operations. Land development patterns

illustrate what future growth might look like on the ground[17]. While scenario planning can be implemented in many ways, the general method is:

- Using scenarios to compare interactions between multiple factors, such as transportation, land use, and economic development.

- Analyzing how different land use, demographic, or other types of scenarios could impact transportation networks.

- Identifying possible strategies that lead a state, community, region, or study area toward achieving elements of the preferred future.

- Engaging the public throughout the process.

Through the *2050 inMotion* process, the planning team and stakeholder committee developed scenarios by combining the following seven elements:

- Industry Concentrations
- Regional Investment Strategies
- Demographic Changes
- Technological Disruptions
- Behavioral Trends
- Population Projections
- Employment Projections
- Land Development Patterns

The Regional Overview discussed impacts of various industries and place types on the transportation system, as well as the impacts these industries have on regional mobility. Each industry type utilizes the transportation system differently and the overall industry

concentration can significantly shift investment priorities. Disrupting the Direction explains demographic and technological disruptions that will impact our future, informing scenario considerations for future technologies Connected and Autonomous Vehicles (CAVs). These disruptions can drastically change our direction. Regional investment strategies can help ease the burden of uncertain futures to overcome challenges that might arise, but the approach can vary. While population and employment projections dictate a region's amount of growth, development patterns determine where growth occurs.

Accounting for the elements listed above begins the process of testing the future direction. While each element represents a unique consideration, they are interconnected. Demographic changes like an aging population contribute to different behavioral trends, land development patterns, and so on. Combining these elements creates a framework to identify priorities, recommendations, and investments connecting where we are to where we want to be.

Population & Employment Projections

Projections for population and employment change are the result of demographic, socioeconomic, and land use models. Models generate expected population and employment levels which are further refined based on local expertise from real estate developers, planners, engineers, researchers, and elected officials. Each of these models use past trends to inform projections but are limited in accuracy when the projection is made further from current information. For *2050 inMotion*,

population and employment projections are estimated from 2015 to 2050 with an increasing range of possibilities the further the forecast year is from 2015.

To simplify analysis, projections can be split into analysis periods—set time frames in which disruptions or different assumptions can be made. Even though it is nearly impossible to predict exactly when something will happen, it's easier to predict that a disruption may occur within a certain timeframe. The

projections for *2050 inMotion* were split into four analysis periods:

- 2015 to 2020
- 2020 to 2030
- 2030 to 2040
- 2040 to 2050

Scenarios consider the range of growth options and the potential disruptions in each analysis period that can profoundly impact
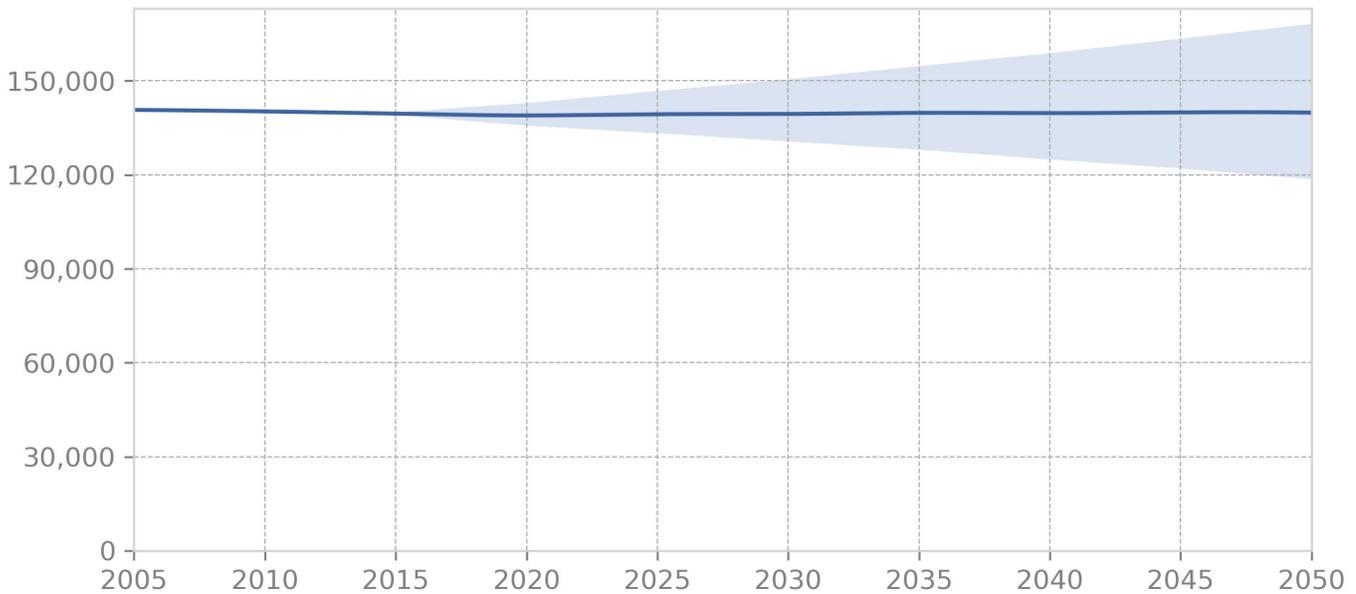
Figure 5.03: Population Projection Ranges
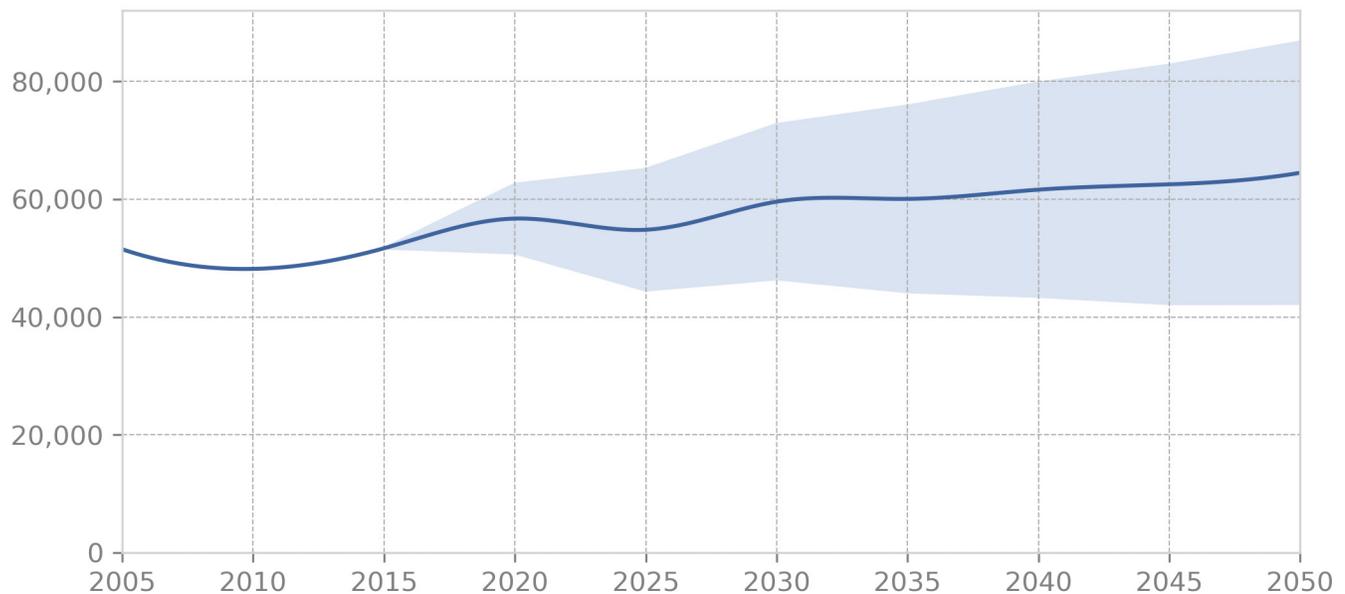
Figure 5.04: Employment Projection Ranges

future growth. In this way, scenarios can incorporate multiple growth rates while remaining in the overall range of possibilities. For example, a scenario could follow a medium growth rate from 2015 to 2030 and assume a catalytic project occurs between 2030 and 2040 to spur higher growth; conversely, an economic downturn could slow growth within any of the analysis periods.

Development Patterns

Development patterns define how available land is utilized for residential, employment, and other purposes based on demographic, economic, political, and geographical conditions. Three development patterns were considered: Roadway Corridor, Infill & Redevelopment, and Waterfront Corridor.

Roadway Corridor

Development could occur along interstates and major arterial corridors like I-69, US-36, SR-9, and SR-13. Roadway Corridor represents a future where development mainly occurs on greenfield, or previously undeveloped agricultural land, and is accessed by major roadways. Due to a lack of utility infrastructure, the cost of utility expansions should be considered by communities to ensure they can achieve economic longevity after development. Figures 5.05 and 5.06 show examples of the Roadway Corridor development pattern.

Infill & Redevelopment

Development is integrated into existing communities by building on vacant parcels in urban or suburban areas, and land uses are intensified resulting in increased densities.

Figure 5.05 Roadway Corridor Pattern

Figure 5.07 Infill Pattern

Figure 5.06 Roadway Corridor Pattern

Figure 5.08 Infill Pattern

These areas are already served by public infrastructure, such as transportation, water, wastewater, and other utilities. Ideally, this development pattern aims for better use of property so that it provides an economic return to the community. Figures 5.07 and 5.08 depict the Infill & Redevelopment development pattern.

Waterfront Corridor

Development is concentrated along the White River and adjacent creeks. Office and industrial development occur as a mix between corridor and infill locations. Figure 5.09 depicts the Waterfront Corridor development pattern.

Figure 5.09 Waterfront Pattern

Combining Elements

The seven scenario elements are combined to create distinct futures for analyzing the path that aligns most closely with the desired vision. As noted previously, the elements are interconnected and turning the knob of one may change another. It is important to understand these connections, how they evolve, and how they impact the transportation system.

The planning team began combining elements by noting which were most closely linked together and establishing predominant concerns of the stakeholder committee and

public. The stakeholder committee helped influence each scenario through meetings dedicated to scenario planning elements, methodology, and terminology. Focus groups informed the scenario planning process by reacting to initial tests and development patterns to further improve the scenarios. Consistent messages of preserving agricultural land, adapting to new technologies, investing in downtowns, and considering impacts of a catalytic project led to four initial considerations:

- A future based around the roadway corridor development pattern
- A future based around CAVs
- A future based around small business & infill development
- A future based around waterfront development

From these four considerations, each element was reviewed, and assumptions were made based on available research and expertise. For example, in a future based around CAVs and technology:

- The information industry sector would thrive.
- Development would largely occur around roadways but could also include redeveloping parking lots for a higher use.
- More people would be attracted to the MPA due to lower cost of living and increased flexibility for commuting to Indianapolis (i.e., working while driving and increase in telecommuting).

The planning team worked with the stakeholder committee to balance the shifting elements and generate the scenarios that were of greatest interest to the public. The seven elements

were combined to create three scenarios: Status Quo, Investing in Place, and Connected World.

Each scenario paints a different future for the region, and the names generally represent the combination of elements that define the scenario.

Final Scenarios

The final scenarios were created with a sketch planning tool that utilizes nationally available datasets such as census information to provide insight on the impacts of changing development patterns and densities. Scenarios were built, mapped, and analyzed. Each scenario was built from a "base scenario," a map of the MPA at present time containing information about population, employment, housing, and land use for every parcel and census block. The tool includes a library of representative building and place types that describe different land uses and their associated population, housing, and employment characteristics. Areas of the MPA can then be redefined into different place types that simulate changes in land uses, population numbers, and employment numbers according to modeled projections for each future time period.

Status Quo

Status Quo maintains a lot of the same assumptions that can be seen in the Anderson MPA now, so this scenario should be considered the baseline scenario. The growth projection is low to mimic current growth rates. The dominant industry is manufacturing and logistics to build upon the development that has taken place throughout the Anderson MPA along the I-69 corridor. To support manufacturing and logistics growth as well as transportation focused on personal automobile travel, Road Corridor is the primary development pattern. An aging population represents the predominant demographic change consistent with current conditions in the region and further contributes to the low growth rate.

Investing in Place

Investing in Place focuses on redevelopment in existing downtown areas. The growth projection is medium to simulate more growth from Indianapolis moving toward the Anderson MPA. The dominant industry is small business because redevelopment has led to entrepreneurs repurposing existing buildings. Revitalization has already started in Anderson and the Investing in Place scenario builds upon it. To support small business growth, Infill & Redevelopment is the primary development pattern. Finally, the transportation system is focused on walking, biking, and transit since destinations are closer in existing towns and cities.

Connected World

Connected World is the biggest change to our future region because of the impact of CAVs. CAVs prioritize roadway corridor development but also infill downtown parking lots that are no longer needed. The region sees greater population growth because it is well placed for an easy commute to Indianapolis. In Connected World, commuters can work on their way to work or choose to telecommute more regularly. The dominant industry also changes to technology as the local economy adapts between now and 2050. In addition, electrified CAVs result in emission reduction and shopping online leads to more small truck traffic.

Comparing Scenarios

Even though the sketch planning tool provides a high-level overview of scenarios, it does not represent localized conditions like Prometheus, the MCCOG Travel Demand Model (TDM) does. Moreover, it does not have the flexibility to consider all seven elements combined. Each scenario was compared using the sketch planning tool to identify which scenario(s) would be incorporated into Prometheus for additional analysis. Scenarios were evaluated using a variety of measures:

Land Consumption – Quantifies the land converted for development in future scenarios.

Energy Use – Estimates residential/commercial electricity and natural gas use for existing buildings and new growth as represented by future scenarios.

Water Use – Estimates the residential and commercial water use for existing buildings and new growth as represented by future scenarios.

Walk Accessibility – Measures proximity to amenities and accessibility to specific features

Table 5.01: Comparison of Final Scenarios			
	Status Quo	**Investing in Place**	**Connected World**
Growth	Low	Medium	High
Industry	Manufacturing & Logistics	Small Business	Tech
Development	Roadway Corridor	Infill & Redevelopment	Mix of Roadway Corridor and Infill & Redevelopment
Miscellaneous	Aging Population	Increase in walk/bike/ transit trips	· Telecommuting increases · Driverless cars (CAVs) · Increase in online shopping (small truck traffic increases) · Increase in shared mobility services (vehicle ownership decreases)

or opportunities by the available sidewalk network.

Transit Accessibility – Measures proximity to amenities and accessibility to specific features or opportunities by foot and transit.

Transportation – Is a high-level travel model that produces estimates of different transportation metrics for future scenarios.

Emissions – Estimates emissions associated with passenger vehicle transportation and building energy/water use.

Household Costs – Estimates annual household costs associated with passenger vehicle

transportation, residential energy use, and residential water use.

Risk– Measures the potential impacts of natural hazards and supports analyzing flood and fire risks across the US.

The following graphs compare the three scenarios and, where applicable, include the base scenario to illustrate changes from existing conditions. The base scenario describes the existing built environment, constituting a baseline assessment of land use, demographic characteristics, and other conditions to provide context for analysis scenario.
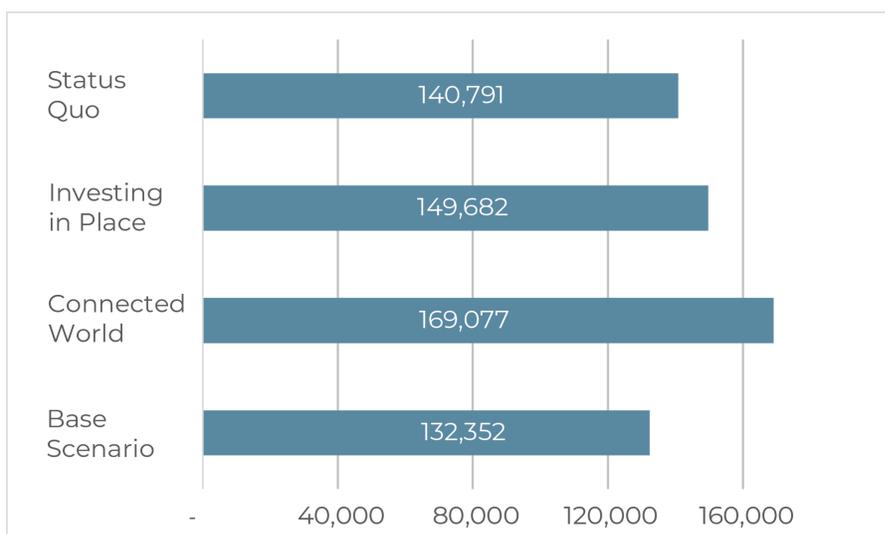

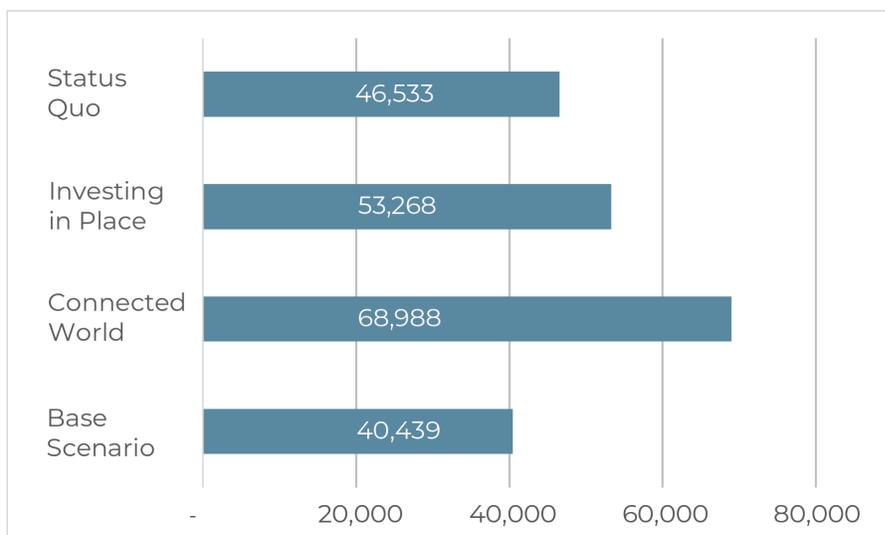**Figure 5.10:** Population in Each Scenario

Figure 5.11: Employment (jobs) in Each Scenario

As the only high growth scenario, Connected World has significantly more people and jobs than Investing in Place and Status Quo. Scenarios can be compared in various ways to get a more in-depth understanding of the underlying assumptions. Measures can generally be considered at three levels: total, rate per capita, and rate per additional person/job. Using per capita and per additional person/job rates eliminates some of the difference seen strictly due to the population and employment differences.

Land consumption is the ideal measure for illustrating the difference between total and rate comparison values. Connected World has the most land consumed total largely due to the high population and employment numbers, but also accounting for the Roadway Corridor development pattern that results in sprawling growth. Status Quo is only like Connected World in development pattern because both include Roadway Corridor development. This development pattern's impact is illustrated by land consumption since these two scenarios consume more agricultural land and more total land in general.

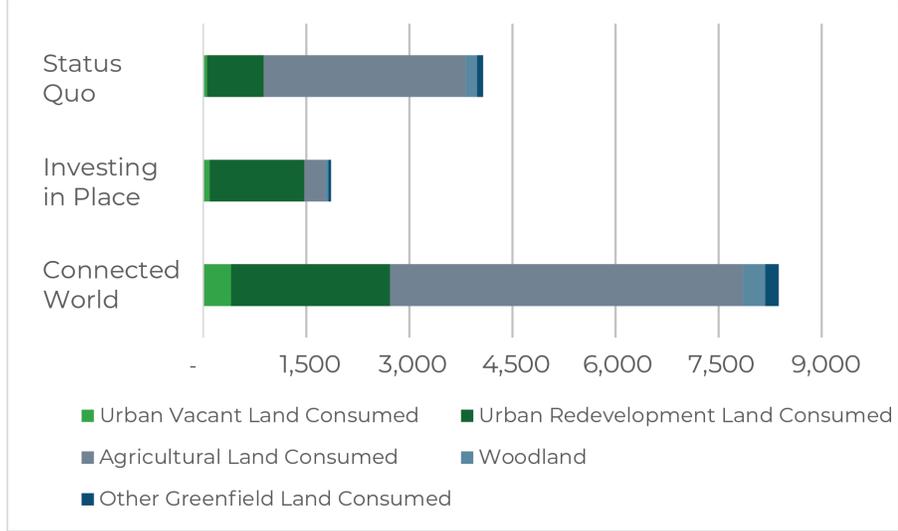**Figure 5.12:** Total Land Consumed (acres) in Each Scenario

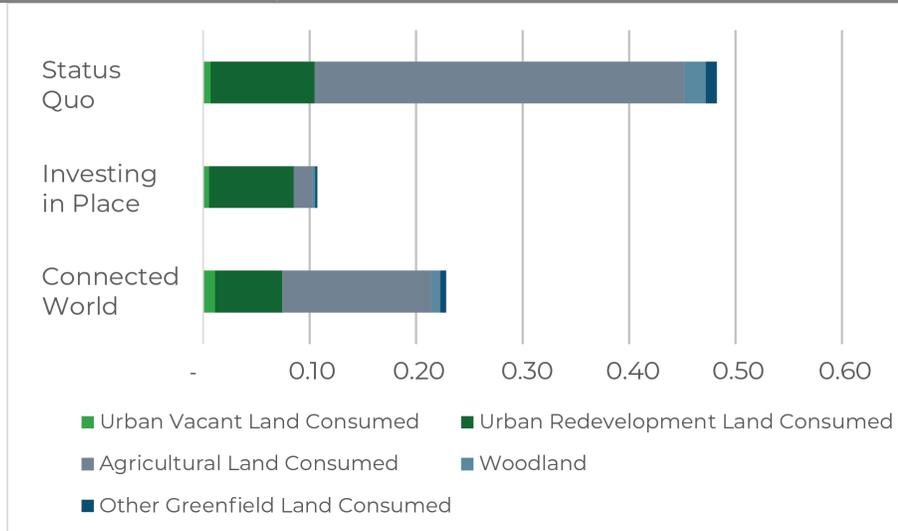**Figure 5.13:** Land Consumed per Additional Person in Each Scenario

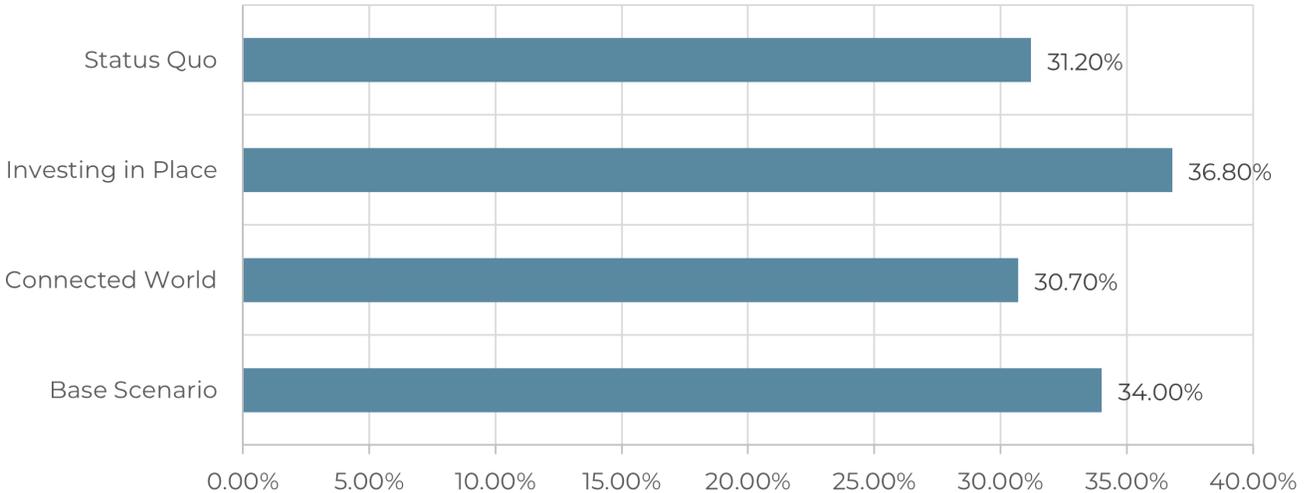**Figure 5.14** Percent of People within 15 min walk to a School

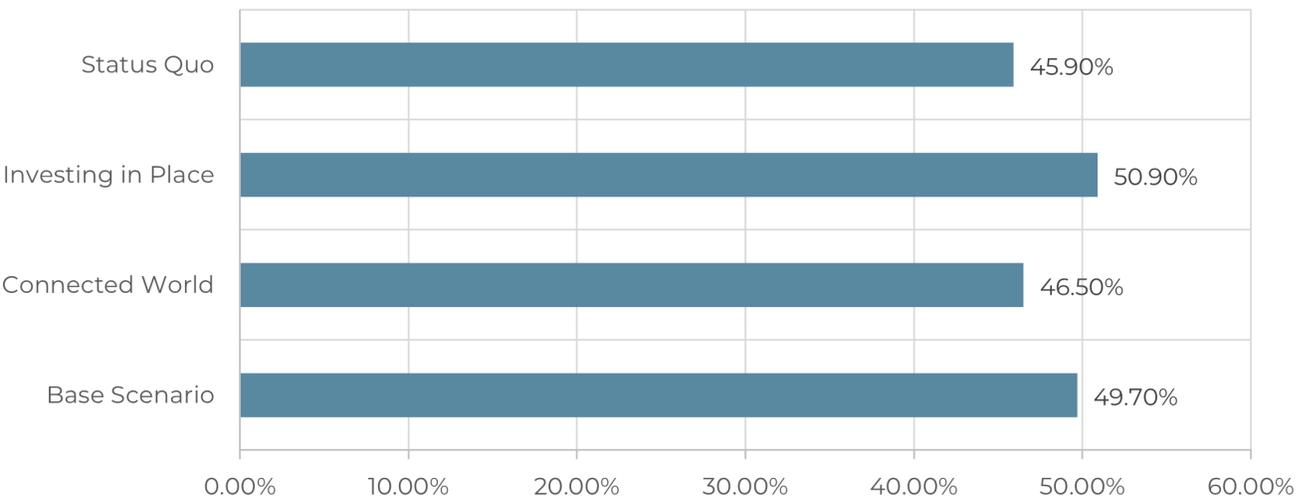| Scenario	Percent
Status Quo	31.20%
Investing in Place	36.80%
Connected World	30.70%
Base Scenario	34.00%

(x-axis: 0.00% to 40.00% in 5.00% increments)

Figure 5.15: Percent of People within 20 min Transit Trip to a School

Scenario	Percent
Status Quo	45.90%
Investing in Place	50.90%
Connected World	46.50%
Base Scenario	49.70%

(x-axis: 0.00% to 60.00% in 10.00% increments)

Investing in Place best represents public feedback on desired development patterns by utilizing existing assets, filling in vacant properties, and generally investing in the cores of cities and towns throughout the Anderson MPA. When compared to the increase in population, Status Quo consumes the most land per additional person at a rate nearly five times the rate of Investing in Place and more than double the rate of Connected World.

For both walk and transit accessibility, Investing in Place locates the greatest percentage of residents near parks, schools, hospitals, and transit stops because the development pattern is naturally adjacent to existing amenities.

It is also important to note that all scenarios result in lower access when compared to the Base Scenario, which is likely because of the amount of growth concentrated in the Southwest subregion.

The sketch planning tool application had its limitations: some baseline assumptions for place type amenities were not changed that, in hindsight, should have been. For example, since hospital access is already low in the Southwest subregion, adding more people there than locations with high access to hospitals reduces the total access. Future sketch planning efforts will attempt to overcome this limitation by actively identifying the threshold

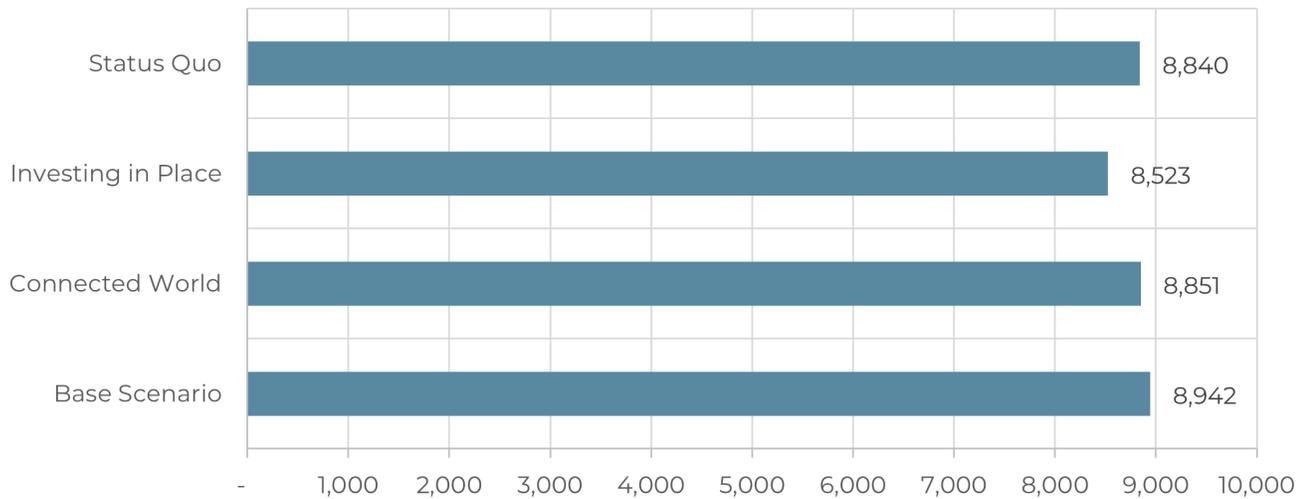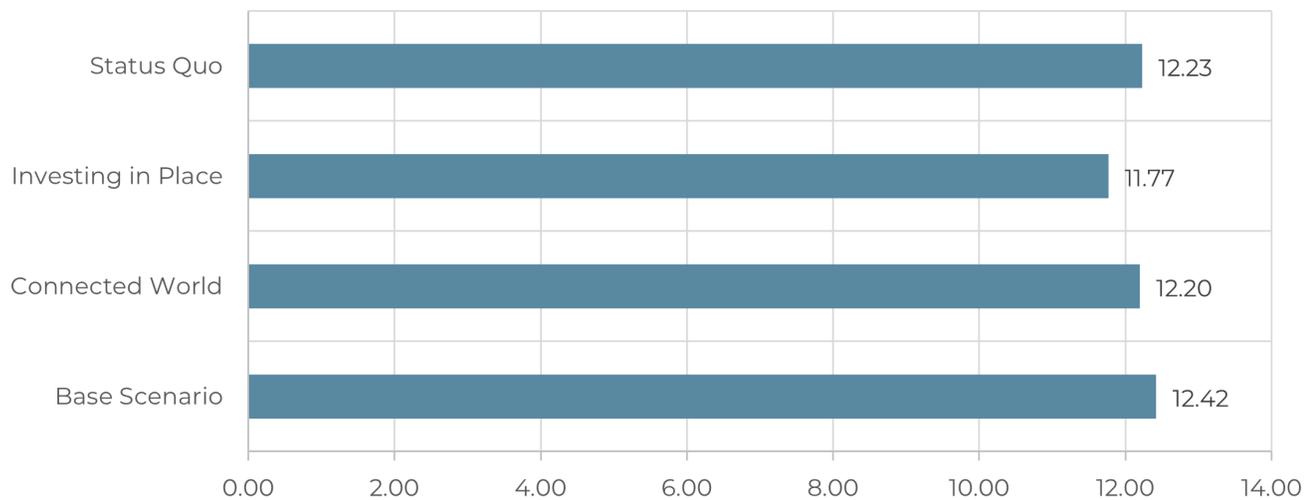**Figure 5.16:** Per Capita Annual Residential VMT (miles/year/person)

Scenario	VMT
Status Quo	8,840
Investing in Place	8,523
Connected World	8,851
Base Scenario	8,942

Figure 5.17: Passenger Vehicle Emissions per Household (metric ton/year)

Scenario	Emissions
Status Quo	12.23
Investing in Place	11.77
Connected World	12.20
Base Scenario	12.42

for when these specific amenities would be added then attempt to locate them based on underlying assumptions within each scenario.

As noted earlier, VMT is an important measure for understanding the amount of travel in our region. VMT directly illustrates the use of roadways. Investing in Place has the lowest VMT rate due to improved walk and transit access, and concentrated population and employment growth. Residents in this scenario are less likely to rely on the roadway network to travel, so they generate lower VMT rates.

Vehicle emissions can also be compared across scenarios. However, they follow the trend of VMT and further highlight the air quality benefits of the Investing in Place scenario compared to the other three. Furthermore, per household annual auto and utility costs illustrate the cost savings from Investing in Place.

Investing in Place aligns with the established direction and community desires the most as illustrated by nearly all measures. Public input highlighted the importance of utilizing existing assets; preserving agricultural land; encouraging walking, biking, and transit trips; and reducing emissions to improve air quality. Investing in Place further supports investing in community health and results in the lowest direct and indirect household costs according to the sketch planning outputs. However, the public also expressed great interest in new technologies and understanding their impacts to our transportation system. Both the public and local planning partners also note the amount and pattern of growth in the Connected World scenario more closely reflects the outgrowth of Indianapolis into the southwest subregion. Therefore, a combined scenario, Investing in Connected Places, was developed as the preferred scenario for analysis. The combination maintains Investing in Place assumptions for the north and central-east subregions, while using the higher growth and corridor growth pattern in the southwest subregion.