Florida Agri-Business Development Final Project

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Elizabethtown College

Contents:

LEED Charrette Summary and Development Approach

This section of the paper is meant to give a clear understanding of the overall design ideas, the sustainability goals, and how the project will fit both the agricultural history of the land and the modern vision the developers have for future events, rentals, and farm use.

Architecturally, I based my designs on the barndominium the developers provided and on the modern style shown in the example video. Since I had a clear understanding of what that building looked like and the style the developers wanted, I used those two examples to guide the rest of the project and keep the same vernacular across all the buildings: simple forms, open spaces, concrete floors, white walls, floor-to-ceiling windows, and black accents. I also added wood doors and cabinets to connect the modern buildings back to the farm feel of the property.

This project also has room for academic collaboration. Elizabethtown College students could help with things like sustainability research, studying the land, or refining later design phases. Since the University of Florida is close by and already working with the vineyard, these students and professors could support the farming research, vineyard growth, and monitoring of the protected natural areas.

To support renewable energy goals, there are multiple good locations on the property for photovoltaics. The cottages, the barndominium, the greenhouse/dining room, and the horse barn all have large roof surfaces that could easily hold solar panels without affecting the architectural style. These buildings get plenty of direct sunlight because they are in the open fields, making them efficient spots for energy generation. In addition to the rooftops, a solar-panel canopy over the main parking lot would be another strong option. This would provide clean energy while also giving shade to vehicles and improving the guest experience.

Site Plan Overview

The project site consists of roughly 50 acres in Anthony, Florida, located in Marion County about 15–20 minutes north of Ocala. It spans four connected parcels which all fall under A-1 Agricultural zoning. The property sits in a mostly rural area surrounded by farmland, with Jumbolair Aviation Estates about 8 minutes away and the University of Florida roughly 38 minutes north.

The developers vision is to maintain the site's agricultural identity while expanding it into a multi-use farm and event space. Since about two-thirds of the land is already cleared, those open areas will be used for features like the vineyard, cottages, horse rink, gardens, parking areas, and event spaces. The remaining one-third of the land contains mature trees, which made it easy to designate forest conservation zones and wildlife management

areas. The entire project is meant to be completed in phases, starting with the 2,500 square-foot barndominium and the airstream, and later expanding into amenities for weddings, small conferences, summer camps, and short-term rentals.

For the overall layout of the site, I tried to balance the agricultural purpose of the property while still protecting the natural features that are already there. To reduce unnecessary pavement, I designed a shared parking lot for the farmers market and the petting zoo, which keeps that side of the property more open. The main entrance includes a large parking lot sized for events, weddings, and general visitors. This area also acts as the start and end point of the hiking trail. Since the trail crosses the main road in three places, I added crosswalks and planned for pedestrian signals to keep hikers safe.

Any building expected to generate larger amounts of waste, like the barndominium, greenhouse/dining room, and farmers market, includes a designated dumpster area with enough space for garbage trucks to pull in and turn around. The barndominium sits near the pool and hot tub, and I added a short path between them along with a tall privacy fence around the pool. This keeps the area quiet and separate from the rest of the surrounding property.

The hiking trail loops through both the open fields and the wooded parts of the land. Along the trail, I spaced five exercise nodes and added several benches so guests can rest or enjoy the scenery. I also routed the trail through the Japanese garden so hikers get a more scenic experience. There is another trail access point near the yoga tent, where I placed a small parking area for convenience. The cottages are placed along the trail with enough spacing to give each one privacy, but they're still close enough together to make maintenance and utilities manageable.

The horse barn, pasture, and horse rink are grouped together in the bottom-right portion of the site so the horses can move easily between grazing and exercise areas. Just below this, I placed the vineyard to take advantage of the wide open fields. A central barn sits between the vineyard and horse areas to store equipment and reduce travel distances for daily farm operations. Near the vineyard, I included two gardens that supply crops for the farm-to-table program in the greenhouse/dining room. A gravel loop road connects all of these agricultural features and makes it easy to deliver crops directly to the greenhouse kitchen. Across the road, the airstream is tucked into a quieter part of the property to create a more private guest experience.

Figure 1. Full Site Plan

Figure 2. Enlarged Site Plan (Right Side)

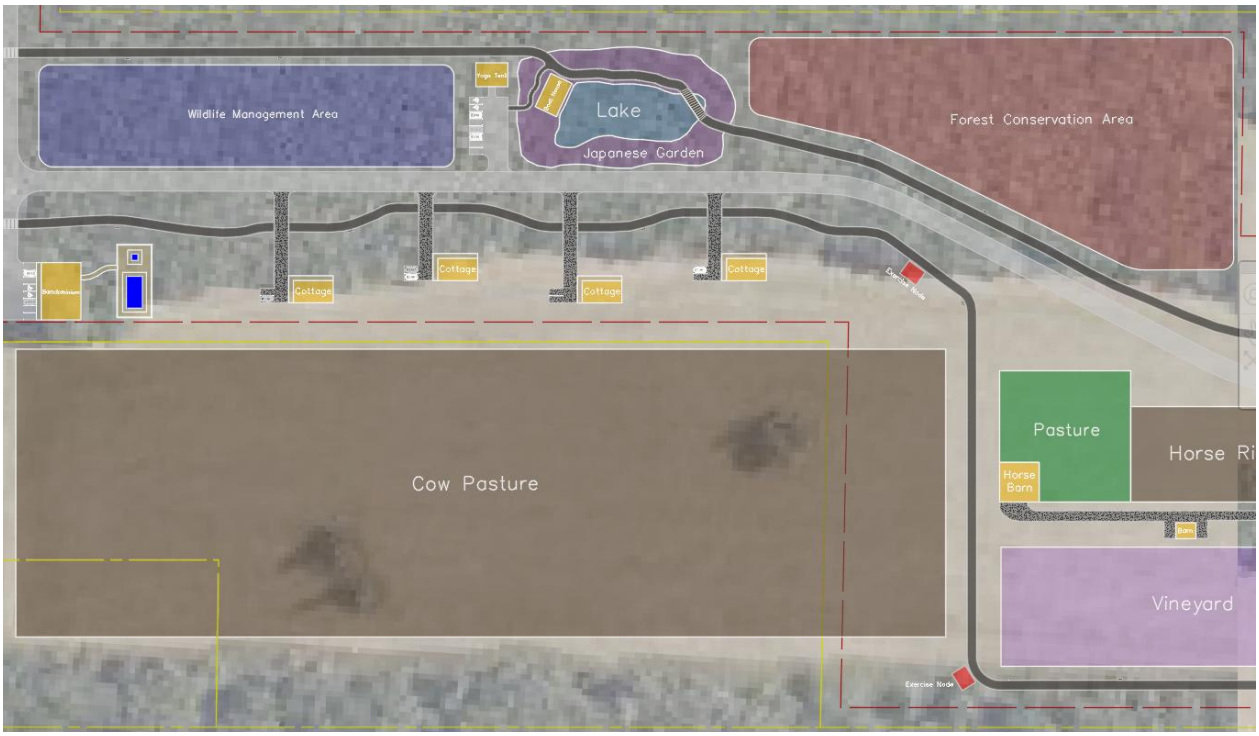

Figure 3. Enlarged Site Plan (Middle)

Figure 4. Enlarged Site Plan (Left Side)

Excavation Estimate

Based on the size of the site and all the features being added, the koi pond ends up being the biggest source of excavation on the property. Using its dimensions, I estimated about 2,333 cubic yards of cut just from the pond alone, plus another 148 cubic yards from the in-ground pool. The rest of the cut comes from leveling the building pads, parking lots, roads, the horse rink, and the agricultural areas. Once I added up those cut volumes, the total excavation for the entire site came out to roughly 10,970 cubic yards. To figure out the fill, I looked at how much soil would actually be reused for building pads, roads, and general grading. After applying reasonable reuse percentages, I estimated that the site only needs around 1,900 cubic yards of compacted fill. That means there will be a net surplus of about 9,060 cubic yards of soil that will most likely need to be hauled off-site unless it can be used on-site for shaping the landscape, building up low spots, or improving trail grading. These numbers are just a rough estimate but give a good idea of how much cut and fill there will be.

Heavy Equipment Needed:

- Excavator
- Bulldozer
- Backhoe
- Dump trucks
- Motor grader
- Skid steer

Geotechnical Information

Load Bearing Capacity of the Soil:

For the load bearing capacity of the site, the 2023 Florida Residential Building Code provides standard values that can be used when a geotechnical investigation hasn't been completed. The code explains that typical bearing capacities depend on the type and condition of the soil, but site-specific testing is recommended for more accurate results [1]. Based on the geological information for this area, the site is underlain by thin or bare limestone, which generally provides solid support but may contain voids or weak zones caused by gradual weathering [2]. Because of this, soil stabilization methods such as compaction or grouting may be needed to strengthen the foundation materials. Overall, the limestone at the site should be able to support most structures, but since there could be weak spots, it would be a good idea to use conservative design values or get a geotechnical report to make sure the foundation is safe and reliable.

Sinkholes:

According to the ArcGIS geotechnical map, the development site is located in Area 1, which is described as having bare or thinly covered limestone. In this area, sinkholes are not very common, and when they do form, they're usually shallow, wide, and develop slowly. The main type found here are solution sinkholes, which happen when water gradually dissolves the limestone underground. Within about a two-mile radius of the site, there have been five recorded sinkholes since 1948, with dates in 2001, 2002, 2007, 2017, and 2018. On average, these sinkholes were about 4 feet wide and 7 feet deep, showing that while sinkholes can occur in the area, they tend to be smaller and form gradually, so the overall risk to development seems fairly low [3].

Septic:

For the septic drain field, the soil and subsurface conditions play a major role in how effectively wastewater can filter through the ground. The Florida Department of Environmental Protection states that a proper site evaluation should include information on soil texture, permeability, depth to the water table, and distance to bedrock [4]. Since the development site is located in an area with thin or bare limestone, it's important to check for shallow groundwater and rock close to the surface, as these conditions can limit how well the soil absorbs wastewater. The soil must provide enough unsaturated depth beneath the drain field to allow proper filtration and prevent contamination of groundwater. Because the area has limestone and a history of some sinkhole activity, it would be smart to conduct a detailed soil evaluation to confirm that the site is suitable for a standard drain field or if an alternative system would be better for long-term performance.

Flooding Potential:

Based on the FEMA flood map for Marion County (Figure 5), the project site is not located within a designated FEMA Flood Zone A, which means it is not identified as a high-risk flood area. Most of the surrounding mapped floodplains are to the east and northeast of the property, where larger wetlands and low-lying wooded areas are present [5]. Even though the site itself sits outside of these high-risk zones, it is still important to consider localized drainage and heavy-rainfall events, especially in Florida, where flat terrain and intense storms can create temporary ponding. For this project, the flooding and stormwater requirements would follow the guidelines from the Florida DEP, the Southwest Florida Water Management District, and Marion County's floodplain program. They cover what's needed for retention, grading, and runoff control. Even though the site isn't in an official flood zone, the design still needs to focus on managing normal stormwater, keeping water directed away from structures, and preventing any changes to the land from affecting nearby properties.

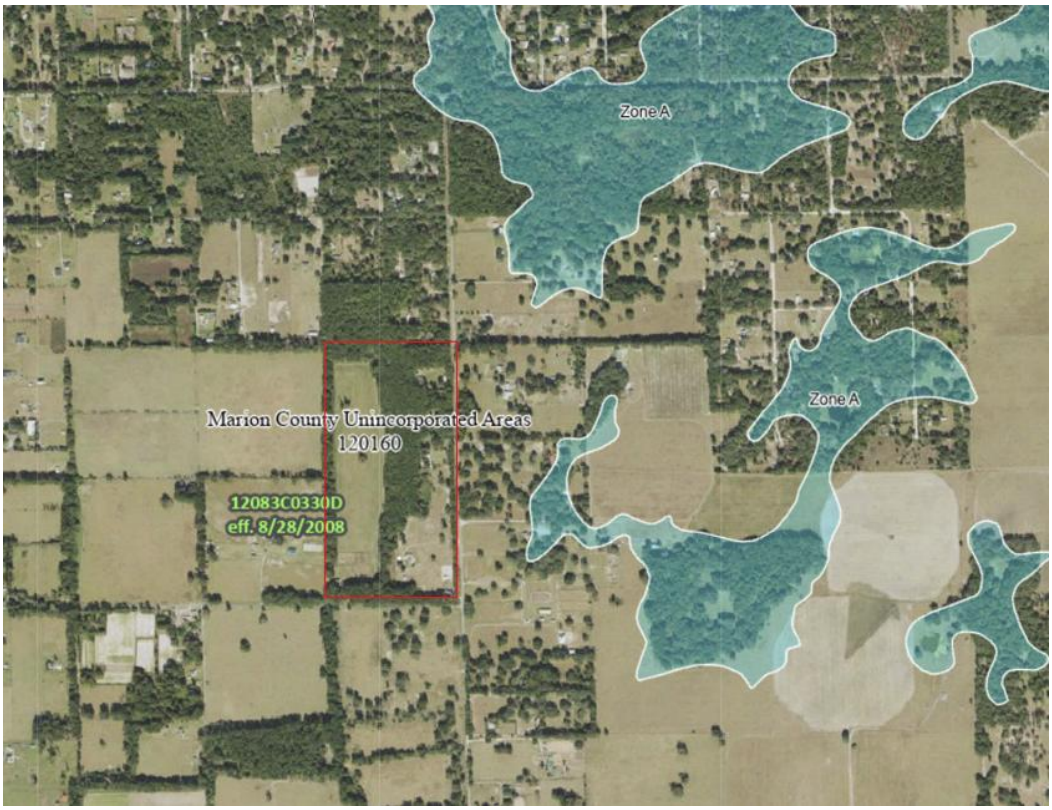

Figure 5. FEMA Flood Map for Marion County

In addition, according to the NHC's Potential Storm Surge Flooding maps (Figure 6), the development site is not located within any coastal or storm-surge hazard zones associated with hurricane flooding [6]. Since the property is well inland and not identified within a coastal zone, it is not considered at risk for hurricane-driven storm-surge flooding. While hurricanes can still bring heavy rainfall and strong winds, the site is not mapped as being at risk to coastal surge impacts.

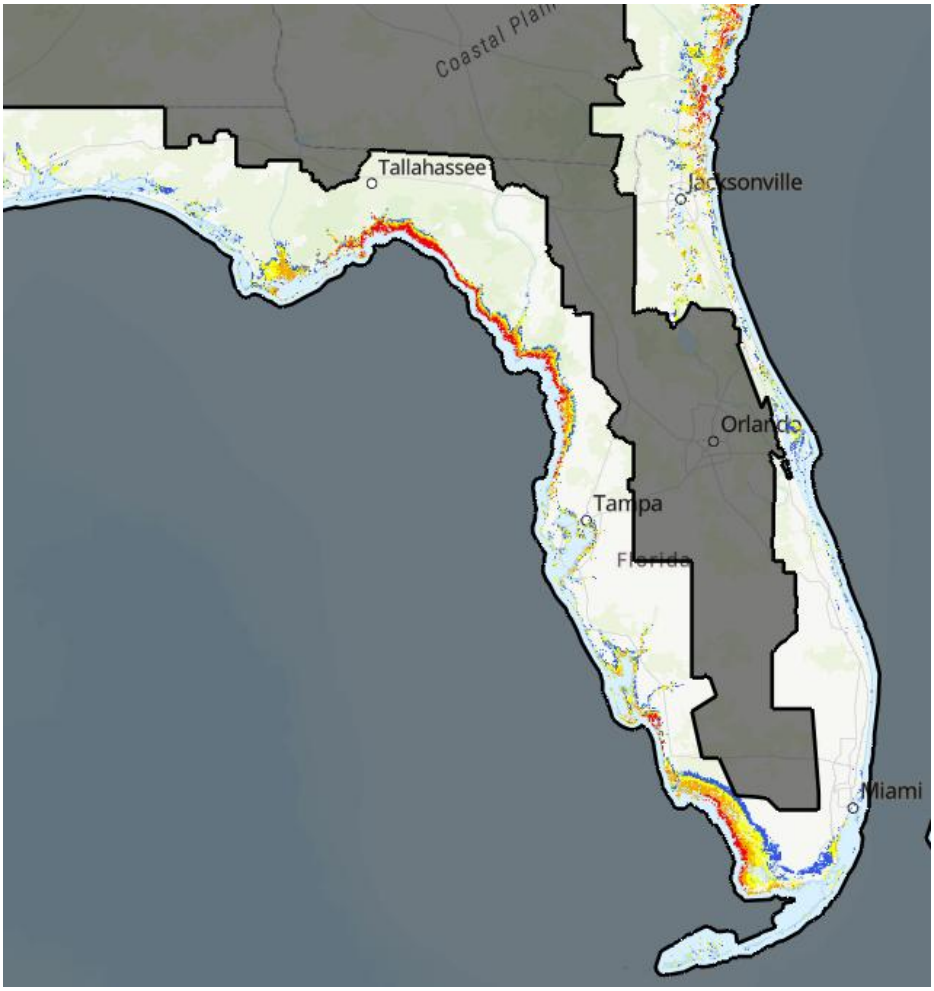

Figure 6. Potential Storm Surge Flooding Map

Zoning

For this site, all four parcels fall under the A-1 Agricultural zoning district, which is designed to keep agriculture as the primary land use while still allowing homes, barns, greenhouses, nurseries, and other farm-related structures. This zoning category is flexible for rural properties, and it aligns well with the goals of this project since most of the proposed buildings and activities relate directly to farming, horses, small animals, and supporting farm operations. The A-1 standards also helped guide many of the layout decisions so that everything stays within the zoning rules.

The development standards for A-1 zoning include a maximum density of one dwelling unit per ten acres and a minimum lot size of ten acres. Since the entire property is roughly 50 acres, the barndominium and four cottages remain well within the allowable density. Setbacks are another major requirement, with 25 feet needed on the front, sides, and rear of all main structures. Since most of the buildings were placed in the open fields and away

from property edges, the site naturally satisfies these setback requirements. The height limit of 50 feet was also easy to meet, as none of the buildings come close to exceeding that limit.

The list of permitted uses under A-1 is broad and covers everything from general farming and livestock to nurseries, greenhouses, poultry, horses, and even guest cottages for agricultural workers. All of the proposed uses on this site, including the horse barn, greenhouse/dining room, and farmers market, fit comfortably within the allowable categories [7].

Comprehensive Plans

State of Florida Comprehensive Plan (Figure 7):

The Florida State Comprehensive Plan guides the state's long-term growth by promoting the health, safety, and welfare of its residents while protecting natural, cultural, and economic resources. It emphasizes supporting children, families, and the elderly, providing affordable housing and healthcare, and ensuring public safety. The plan prioritizes sustainable use of water, coastal, and natural resources, clean air, energy efficiency, and proper waste management. It encourages responsible land use, urban revitalization, efficient public facilities, transportation planning, and economic development, including agriculture and tourism. Overall, it focuses on intergovernmental coordination, citizen participation, and balanced policies that support growth, environmental protection, and quality of life [8].

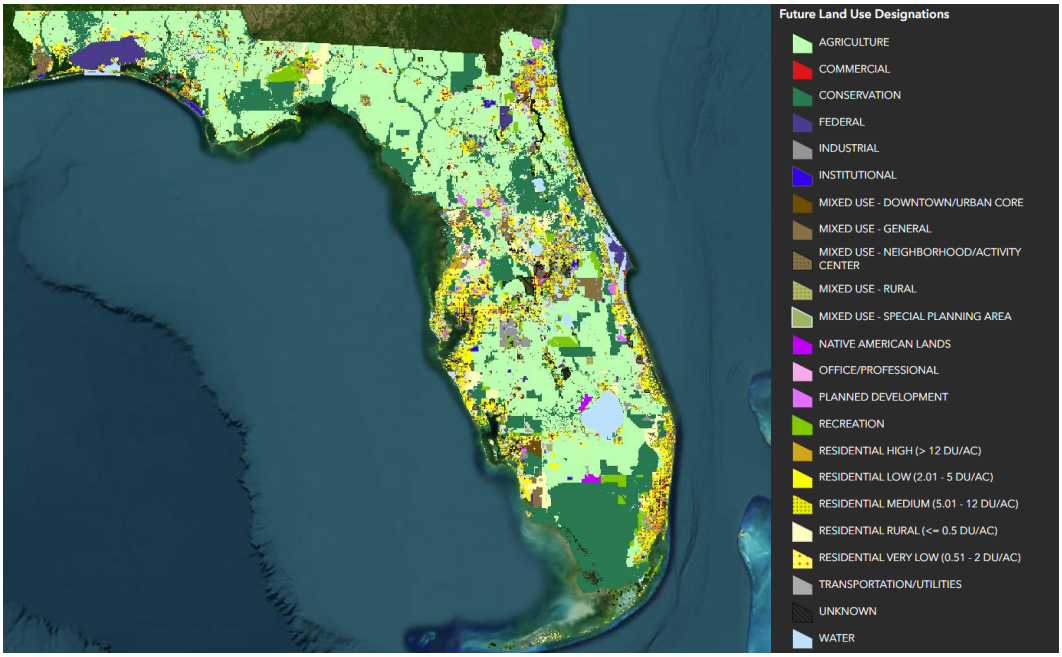

Figure 7. State of Florida Comprehensive Plan Map

Marion County Comprehensive Plan (Figure 8):

The Marion County Comprehensive Plan is designed to guide sustainable growth while protecting natural, agricultural, and cultural resources. It emphasizes supporting agriculture, conserving open space, and maintaining the character of residential neighborhoods, while allowing for mixed-use development and economic growth. The plan directs new development to areas where infrastructure can efficiently support it and uses overlay zones to protect unique areas. Strategies include protecting farmland in rural areas, encouraging development in urban areas through transferable development credits, and implementing long-term public infrastructure planning. Overall, the plan aims to balance growth with resource protection and quality of life for residents [9].

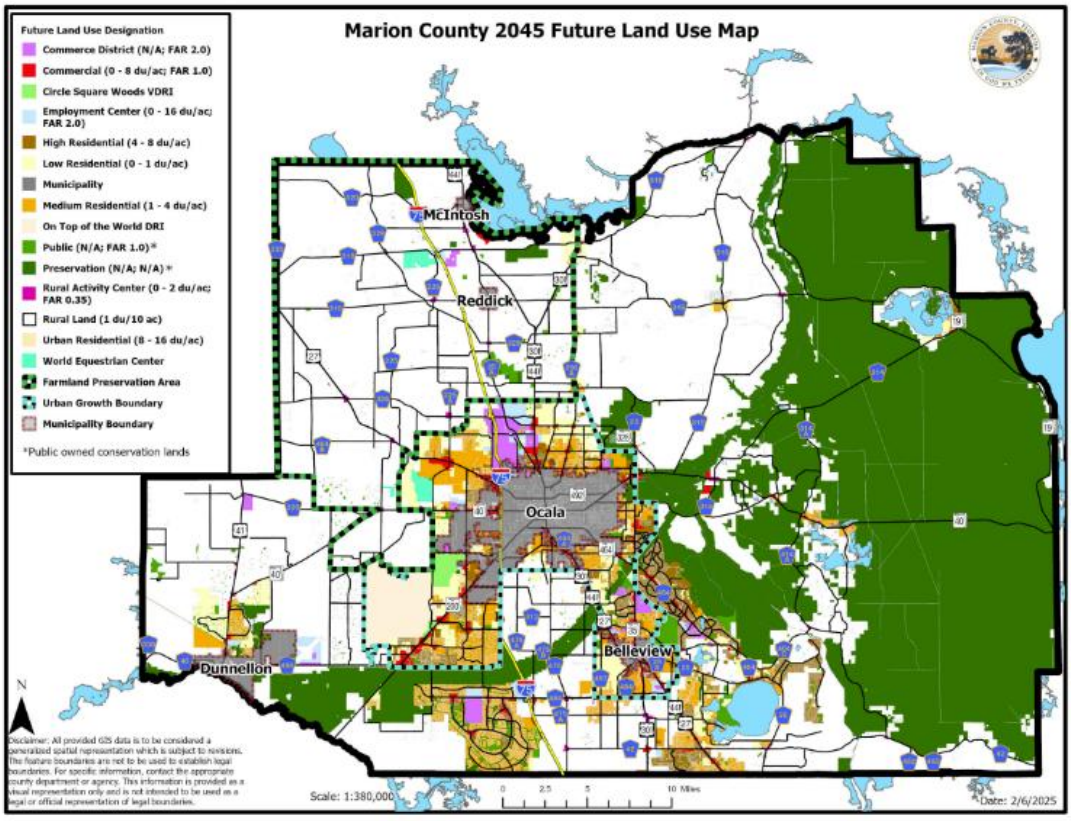

Figure 8. Marion County Comprehensive Plan Map

Ocala City Comprehensive Plan (Figure 9):

The Ocala City Comprehensive Plan focuses on making the city a great place to live, work, and play by following the Ocala 2035 Vision. The plan encourages public participation and community involvement in neighborhood planning, and it prioritizes capital improvement projects that support the Vision. It also emphasizes protecting the city's natural and cultural resources, improving pedestrian safety, and creating attractive gateway areas. The

city supports mixed-use development close to neighborhoods and transit, with incentives for infill and redevelopment. For future land use, the High Intensity/Central Core is meant for dense, walkable areas with a mix of residential, commercial, office, and public uses, encouraging multi-modal transportation, small building setbacks, and sustainable design features [10].

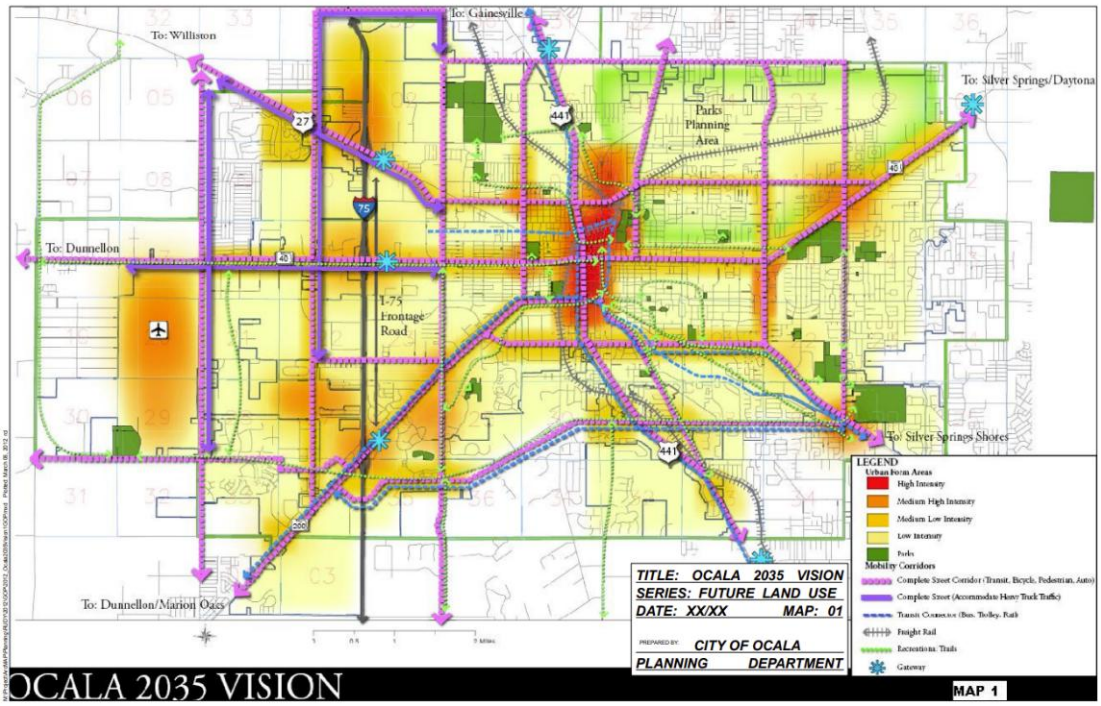

Figure 9. Ocala City Comprehensive Plan Map

Demographics

Marion County Demographics (Figure 10):

Marion County has been growing fast, with an estimated 445,472 people living there in 2025, which is about a 34% increase since 2010. The county is still fairly spread out, but its population growth has picked up recently, rising about 3.9% just in the past year. Most residents identify as White (around 72%), followed by about 13% who identify as Black or African American, with smaller portions identifying as Asian, multiracial, or other groups. Economically, the median household income is roughly $58,500, and around 14–15% of the population lives below the poverty line [11].

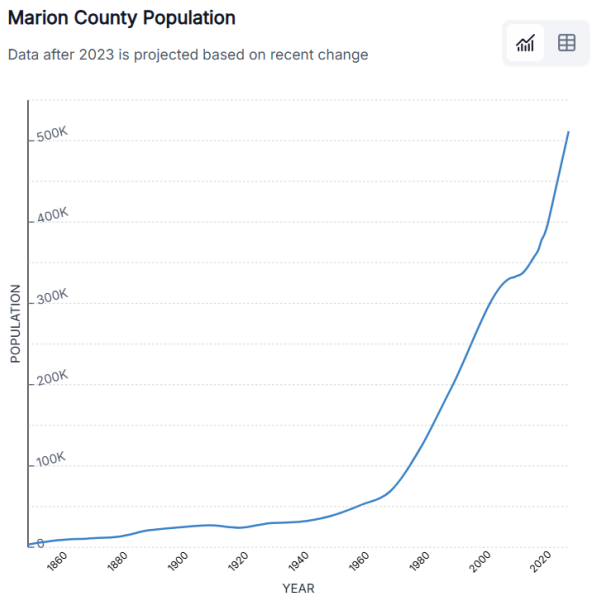

Figure 10. Marion County Population Graph

Ocala City Demographics (Figure 11):

Ocala has been growing steadily, with an estimated 71,842 people living there in 2025, which is about a 12.5% increase since 2020. The city is moderately diverse, with about 63.9% of residents identifying as White and around 19.8% identifying as Black or African American, along with smaller portions of the population identifying as Asian, multiracial, or other groups. The average household income is roughly $77,100, and about 18.2% of the population lives below the poverty line [12].

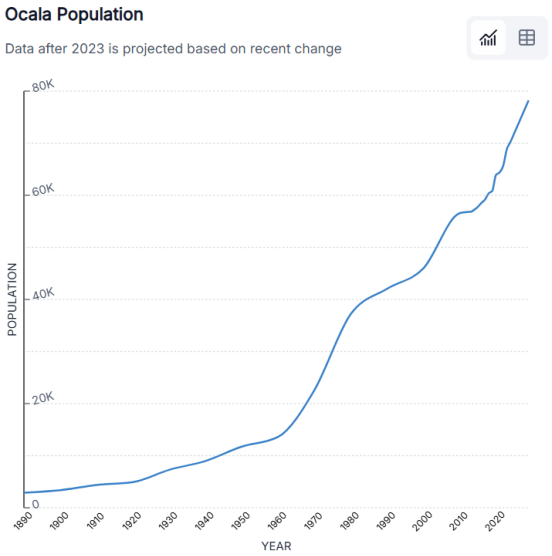

Figure 11. Ocala City Population Graph

References

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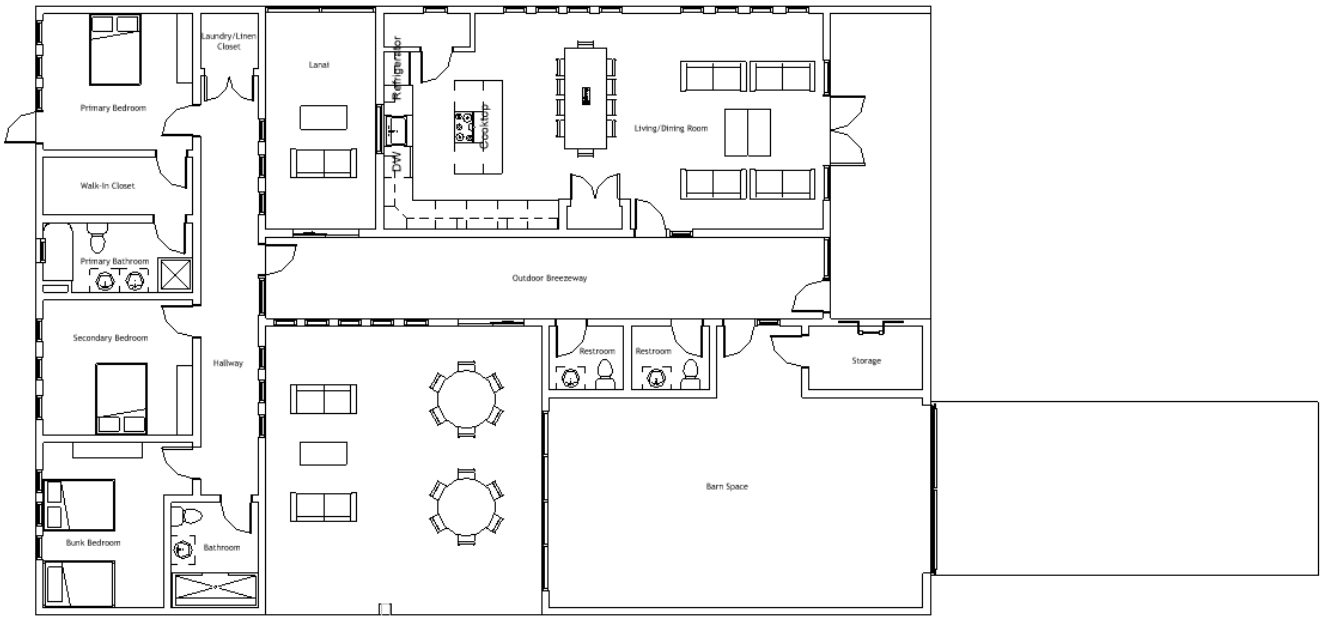
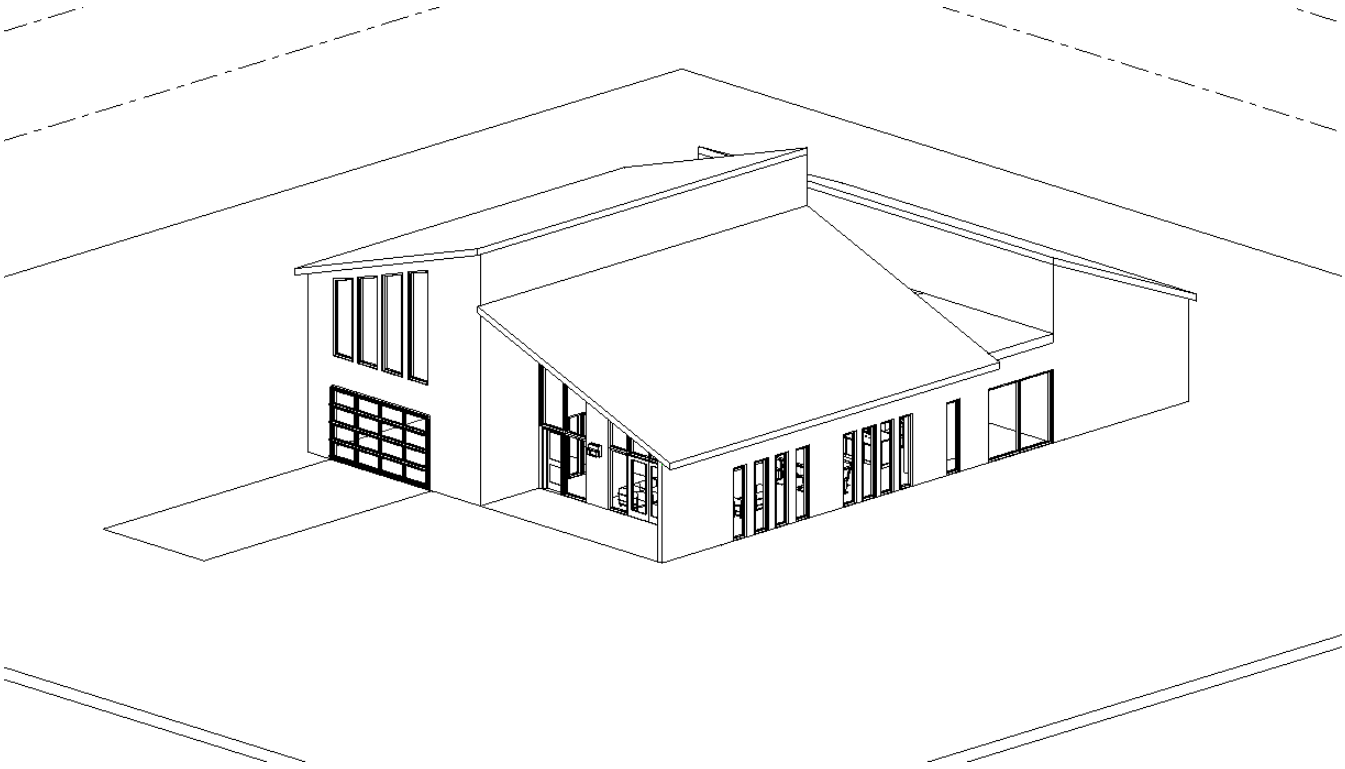
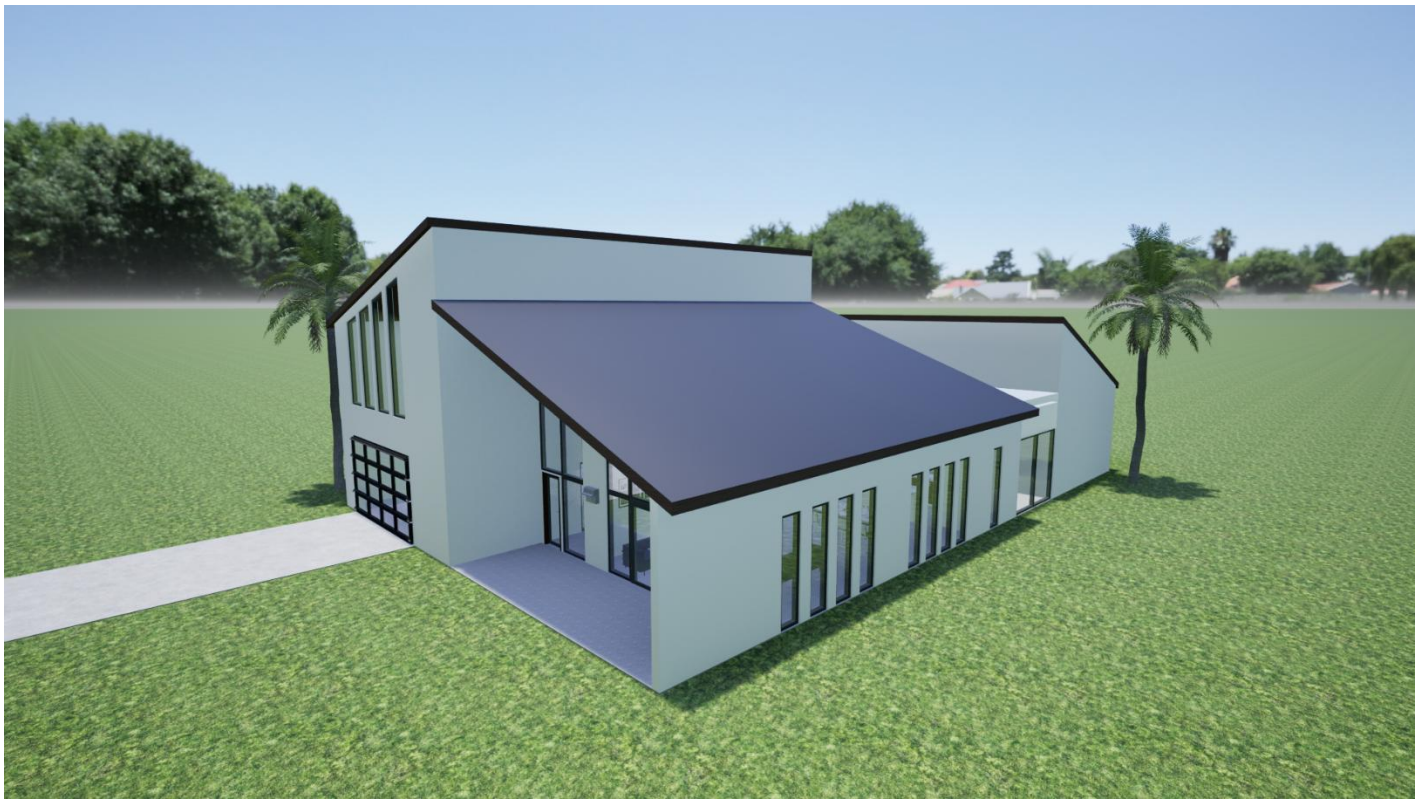
[12] “Ocala, Florida Population 2024,” *Worldpopulationreview.com*, 2024. https://worldpopulationreview.com/us-cities/florida/Ocala

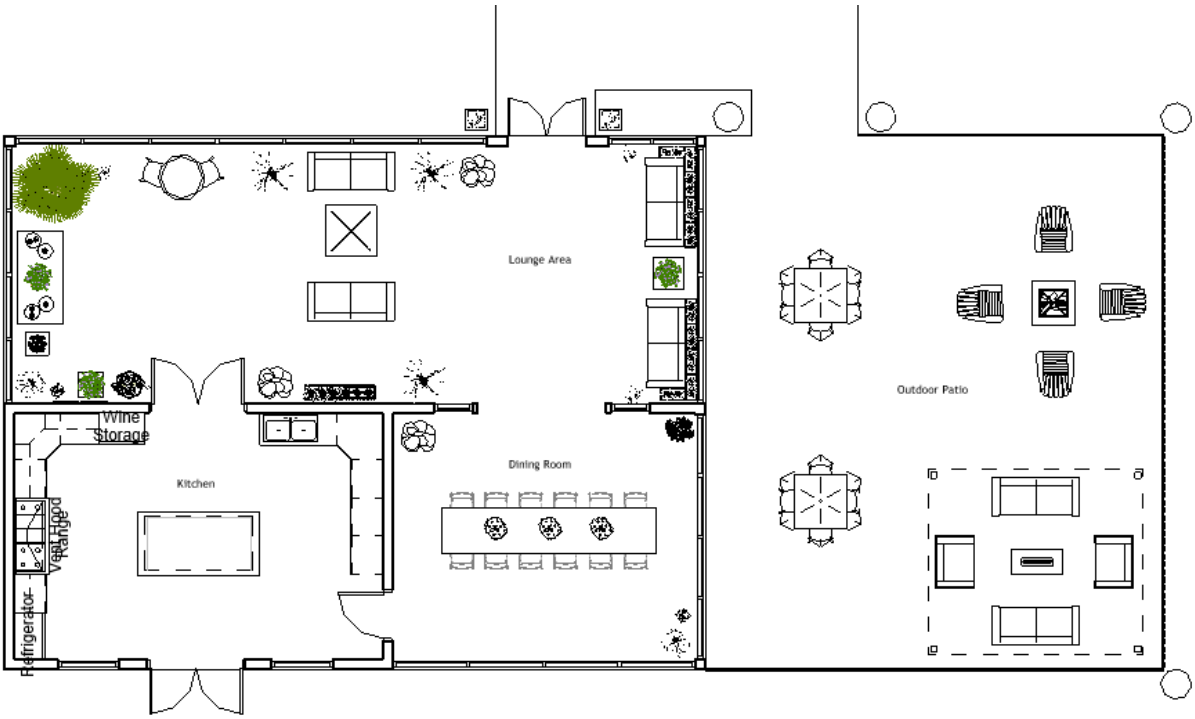
Barndominium

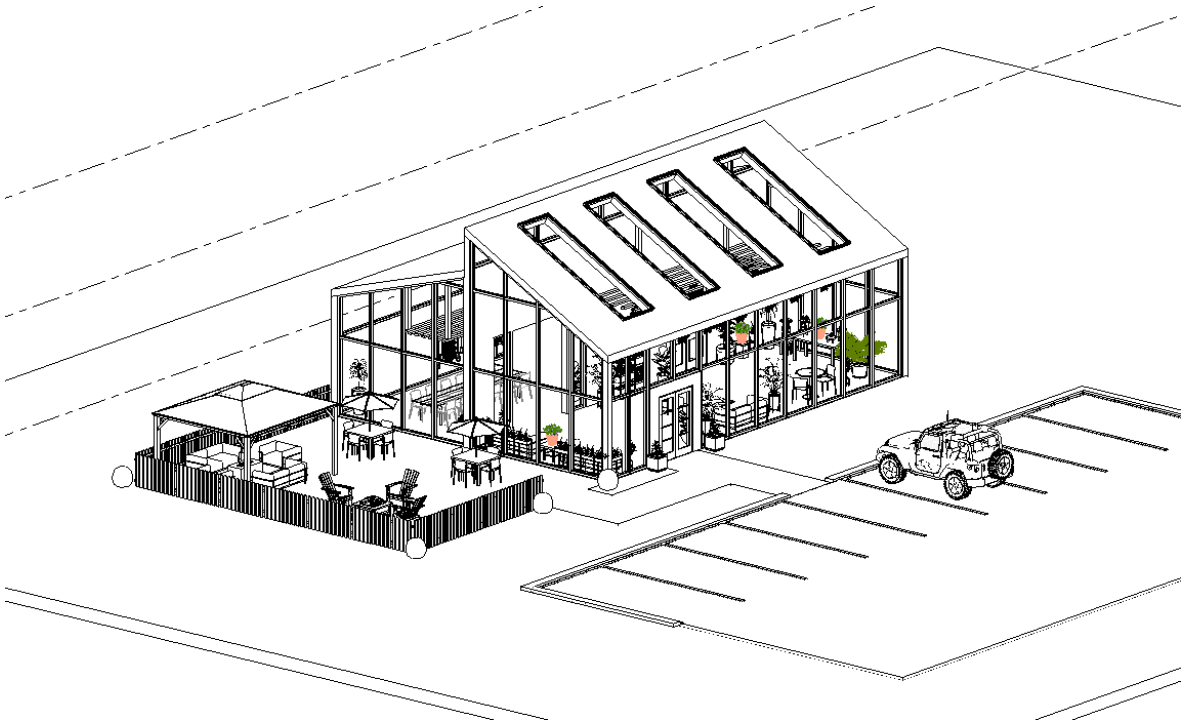


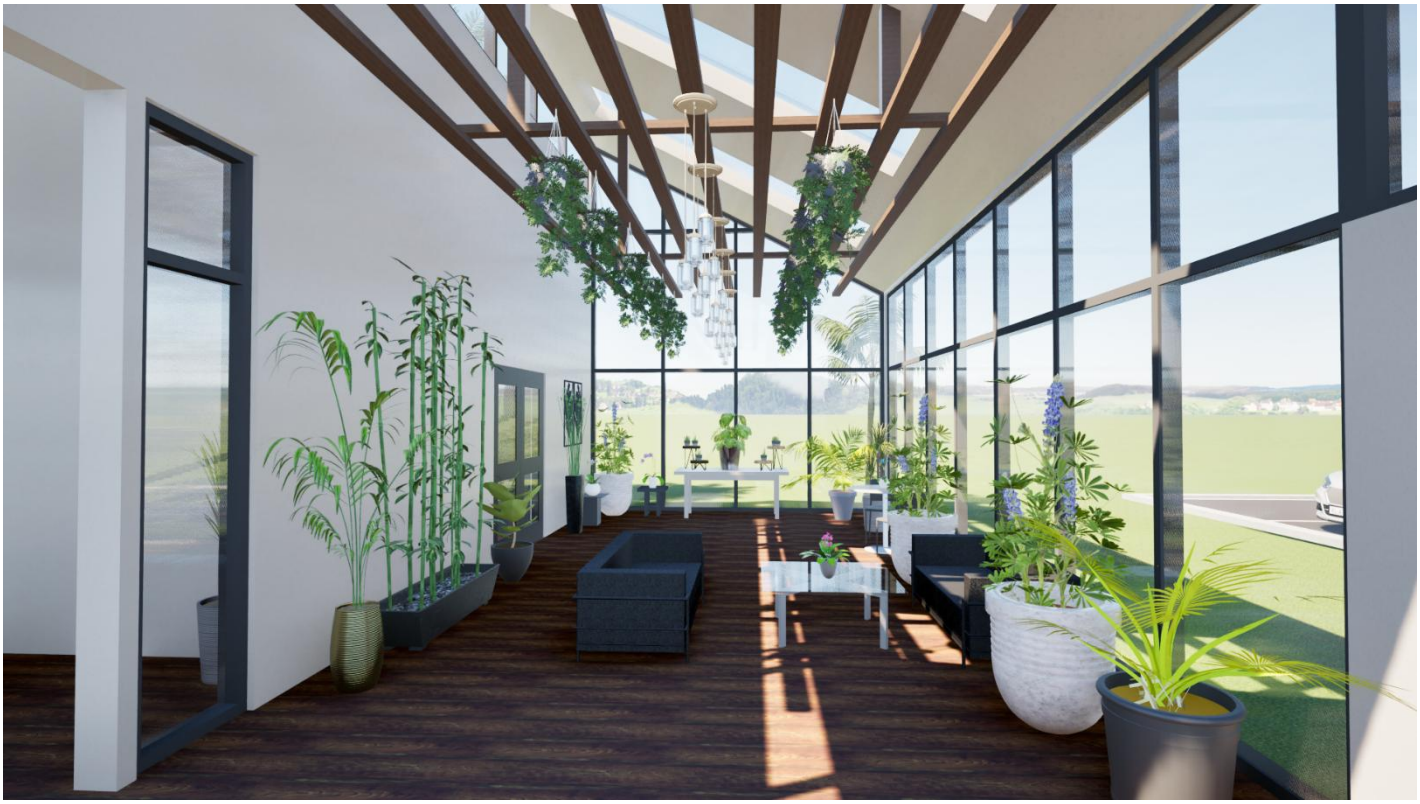




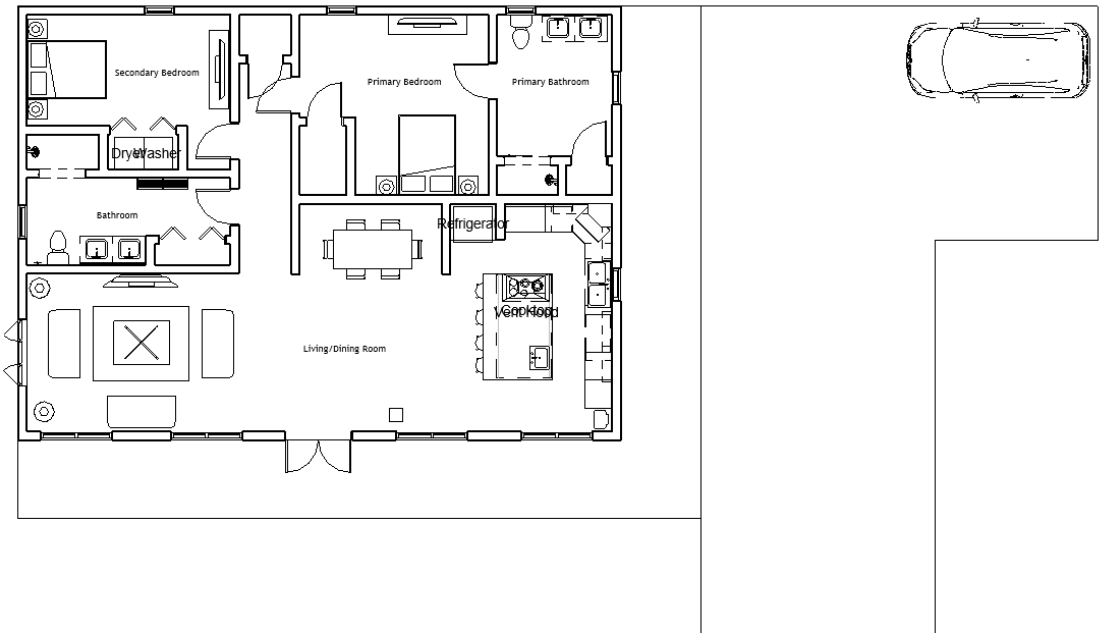
Greenhouse/Dining Room

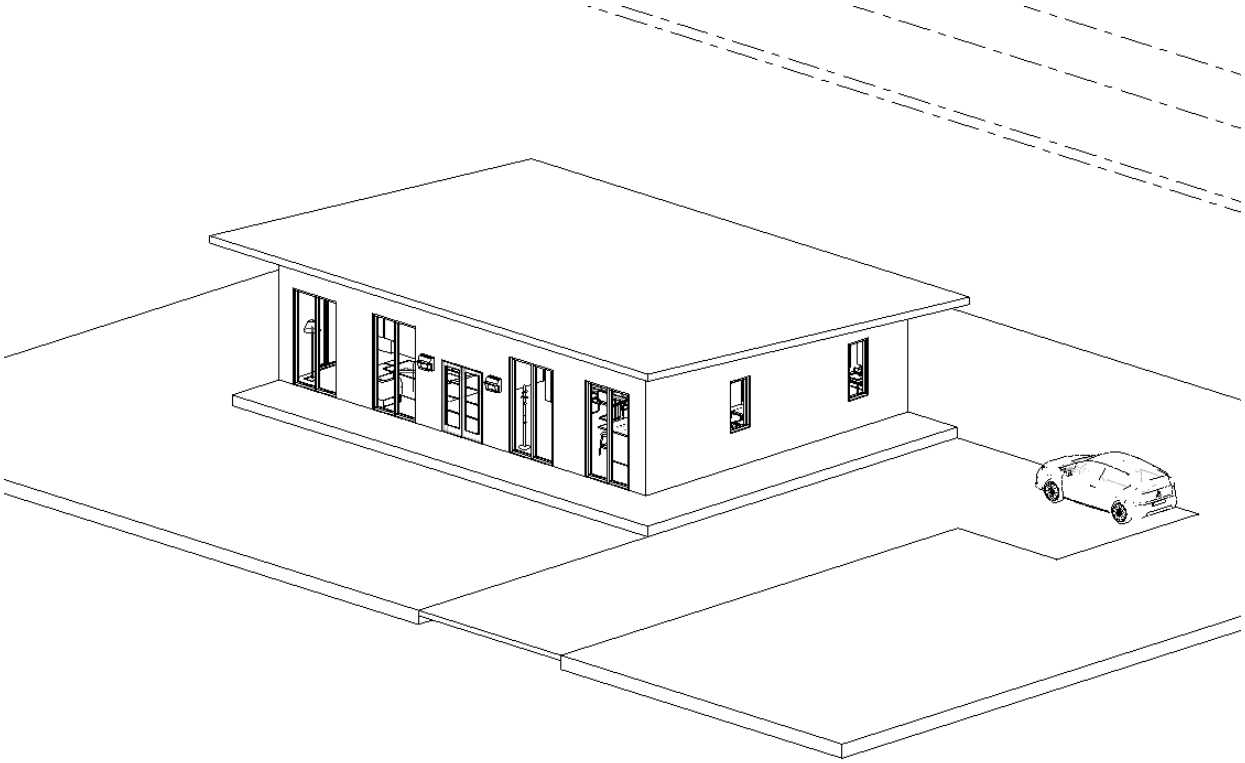






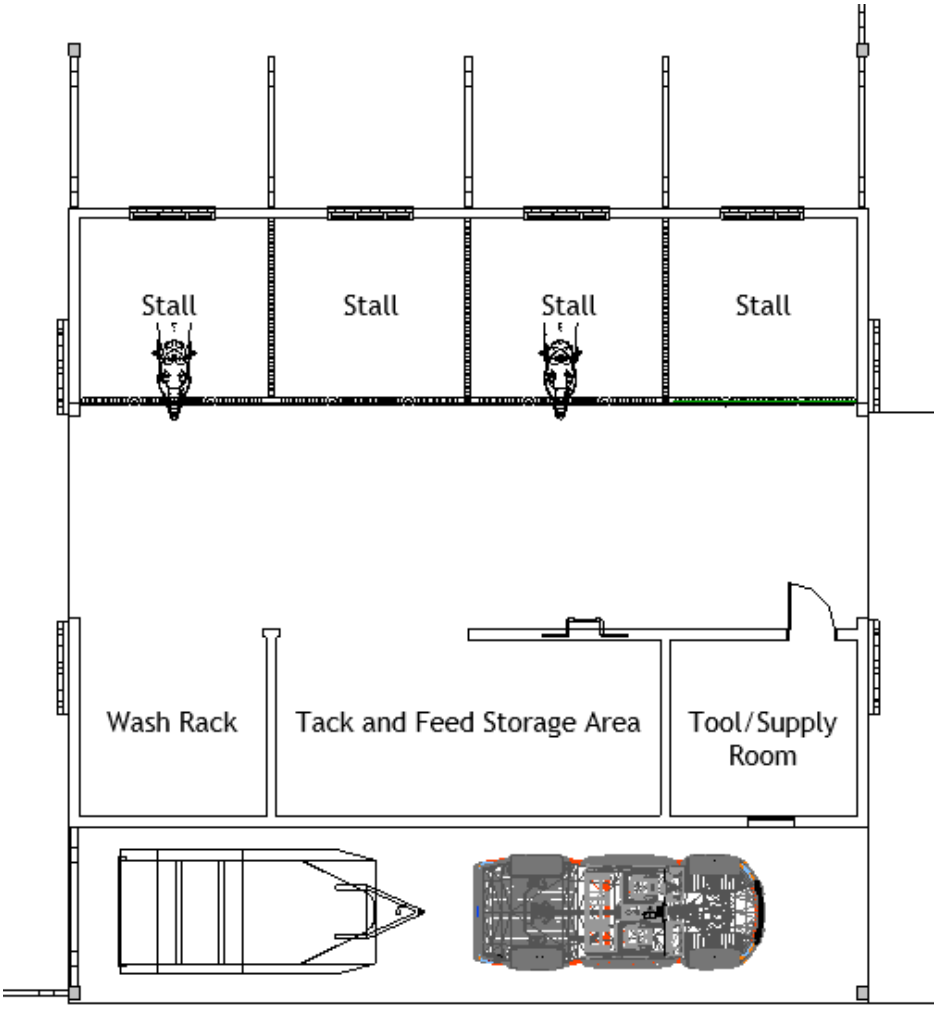
Cottage


Secondary Bedroom
Primary Bedroom
Primary Bathroom
Dryer
Washer
Bathroom
Refrigerator
Cooktop
Living/Dining Room




TRAVEL

Horse Barn


Stall
Stall
Stall
Stall
Wash Rack
Tack and Feed Storage Area
Tool/Supply Room

Japanese Garden