Chapter 5. Airport Regional Value Methodology

5.1. Introduction

The traditional approach of identifying an airport's contribution to its state aviation system describes only a portion of its value to its community and larger region. An airport provides services to aircraft and their users as well as access to the larger transportation and emergency service networks. Additionally, the types of demand that a facility accommodates may increase the significance of certain characteristics and infrastructure relative to another nearby airport. These factors can be difficult to quantify and/or compare.

To acknowledge these confines, the Airport Regional Value (ARV) metric was developed to provide a methodology for assessing specific characteristics that affect an airport's attractiveness and ability to support demand in a region. ARV establishes a series of attributes common to all facilities and assigns a value for each variable based on typical needs for similar facilities. This specific guidance helps each facility to effectively perform its role at the federal, state, regional, and/or local levels, which enhances the statewide aviation system. ARV accomplishes this by providing a benchmarking tool that can be adapted for the different roles that airport facilities play within a state and a better understanding of future projects that would benefit an airport in serving its function in the system. Specific factors that influenced development of an ARV process to evaluate Nevada's aviation system included:

- Comparison Equivalencies – comparing the significance of each airport within the context of their role in the system
- Community Relevance – demonstrating the airport's value to the community as it relates to the existing and future operation and development
- Investment Relevance – evaluating capital investment and decision-making tools (such as return on investment, cost-benefit analysis, though these are not calculated in the Nevada Airport and Heliport System Plan [NAHSP]) as a value-added impact
- Existing Property/Facility Value – identifying the value of existing property and facilities as a depreciated asset, insurance coverages, and estimating replacement costs
- Economic Impacts – incorporating traditional economic impact characteristics into a broader perspective for identifying the value of the airport to the community such as employment, payroll, and local commerce generated by airport tenants.

5.2. ARV Methodology

ARV comprises several components or variables as described in the subsequent **Section 5.3**, each of which contribute to the overall representation of an aviation facility. Value Rating Variables (VRVs) are the foundation for the ARV and allow a facility to be quantitatively compared against a specific set of objectives or other benchmarks, allowing for the differences between the NAHSP airport roles. In the end, each aviation facility in the NAHSP will be provided a Report Card that outlines the total VRV score including the basis for how each factor was rated, and recommended action items to improve the ARV score, thus enhancing the airport's ability to fulfill its function in the statewide system. It should be noted that ARV was completed for only the airports within the NPIAS. **Section 5.5** outlines how non-NPIAS airports were evaluated for the NAHSP.

5.2.1. Value Rating Variables (VRVs)

VRVs provide an index for comparison against an established set of criteria. These values are scored based on a scale that may represent best case/worst case conditions or other situations. The VRVs serve to quantify a facility's assets and opportunities and generally follow the context of a classic Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. Elements of the SWOT analysis include:

- Strengths – assets such as facilities and services that are in place and internally controlled
- Weaknesses – assets perceived as deficient but can be improved
- Opportunities – advantages that are not controllable yet contribute to benefit the facility
- Threats – uncontrollable disadvantages that inhibit the ability to provide services

The VRVs are broadly categorized as an asset value (strength or weakness) or as an opportunity value (opportunity or threat) which allows for a quick assessment of each facility's particular set of circumstances. Detailed components of the various assets and opportunities are organized to fall within one of seven major focus areas to represent key features that can be used to evaluate each characteristic and to provide a format that allows an assessment of the sensitivity of values against specific conditions and comparison with other peer facilities. The VRV categories are aligned to various focus areas including:

- Regional Significance (VRS) – the importance that a facility has within its area and community given other nearby aviation facilities and its ability to serve expected aviation demand through its infrastructure and services
- Airport Facilities (VAF) – the type and condition of a facility's pavements, buildings, services, and equipment for navigation and weather reporting
- Airport Protection (VAP) – the safety areas and airspace around a facility that identify existing and potential for new penetrations, obstructions, and restrictions that could impact the safety of aircraft operations
- Airport Access (VAA) – the ability for users to travel to and from a given facility using several types of roadways and local transportation methods, as well as the proximity of the closest downtown area
- Airport Expandability (VAE) – the ability for a facility to expand given its existing aviation and non-aviation uses
- Community Commitment (VCC) – the extent that a facility receives political, financial, and social support from its governing authority and community

It is important to note that these VRVs are not requirements or mandates but serve as a mechanism to assess how specific airports that are part of the Nevada Department of Transportation (NDOT) system are contributing to the national and state air transportation system and for identifying the potential for enhancing their functionality and usage. While facility sponsors should consider the VRVs when planning for future development, specific needs should be evaluated within the context of each airport's master plan or ALP update to develop plans for maintaining and improving their existing and anticipated future requirements.

5.2.2. ARV Scoring

As noted previously, the VRVs were developed primarily based on factors that are either identified as a controllable asset of the airport or as an opportunity within an airport's environment. To apply VRVs while accounting for a facility's unique needs depending on its role within the state aviation system, as identified in **Chapter 3**, different types of scoring methodologies were developed. The primary metrics for rating each VRV were established by a set of objectives by airport role including the infrastructure, facilities, and services

required to optimally support the type and volume of aviation activity typified by that role. In some cases, the scoring was tied to the expectations for varying levels of service based on the NAHSP role identified within **Chapter 3**.

Scoring for VRVs are based on four methods:

- Scale – based on the degree to which the recommended condition is met, this scoring methodology gives 5 points for meeting the best-case criteria down to 0 points where conditions are wholly deficient.
- Binary – based on whether an airport meets the objective set for its specific airport role and accounts for conditions that do not provide significantly greater value if the objective is exceeded.
- Binary Hybrid– modified binary score where points are given for having satisfied partial components of the objective.
- Additive – points are assigned for each item the airport provides from a list of components, so the objective is fulfilled. These items benefit an airport if present, but their absence is not detrimental to the overall airport service role.

Each VRV factor has a maximum score of 5 points. An airport that meets or exceeds an objective is assumed to be fulfilling its established role within the NAHSP system and the maximum of 5 points allotted. However, in cases where deficiencies or other factors are identified, points less than the maximum are assigned and opportunities to improve the condition may be recommended. In some cases, it may be a sign for an airport to change its role within the state classification system.

Each of the specific VRVs is defined and discussed in the context of how each airport is assessed in **Sections 5.3.1** through **5.3.6**.

To determine the final ARV score, the airport's points from the various VRVs are summed. Among the six objectives there are a total of 40 VRVs and at 5 points each, a total of 200 maximum points.[1] Collectively, the VRVs provide a cumulative score that allows a snapshot of individual airport performance and also provides a means to compare to peer airports in the NAHSP system. As part of the NAHSP, a Report Card is developed for each NPIAS airport that outlines the score for each factor.

Table 5-1 presents a summary of score system of the VRVs.

[1] There are two bonus points available for runway surface type of concrete.

Table 5-1: Summary of VRVs

VRV	Value Rating Variable Categories	No. of Factors	Max Score
V_{RS}	Regional Significance	9	45
V_{AF}	Airport Facilities	11	55
V_{AP}	Airport Protection	5	25
V_{AA}	Airport Access	4	20
V_{AE}	Airport Expandability	4	20
V_{CC}	Community Commitment	7	35
ARV	**Total ARV Score**	40	**200**

Sources: Kimley-Horn, Quadrex 2021

5.3. Individual Value Rating Variables (VRV)

The VRVs of the six VRV categories that comprise the ARV, the objectives that comprise the variables, and basis for the scoring of each are described below.

5.3.1. Regional Significance (V_{RS})

Airports have a regional significance and serve areas beyond their sponsoring community's immediate political boundary. As a regional resource, the airport can be considered as the "on- and off-ramps" to the national air transportation system. A loss of the airport's ability to serve this function not only deprives the region of access, but also reduces the overall service level of the national, state, and regional systems. The community should think of the airport as a resource worthy of protection and value its ongoing activity and consider allowing for expansion of the airport. The Regional Significance (V_{RS}) factor can be estimated at a system level using geographic coverage to determine the airport's utility as a resource for users while acknowledging the proximity of alternative airports. Nine specific variables were chosen to identify the regional significance of an airport.

5.3.1.1. Airport Ownership

Airport ownership conveys a sense of the long-term viability of the airport. Publicly owned airports included in the FAA's National Plan of Integrated Airport Systems (NPIAS) generally receive federal funding for eligible infrastructure improvements. Airports that accept FAA funding also agree to abide by grant assurances requiring the airport sponsor to maintain the airport for a minimum of 20 years. Privately owned airports, whether available for public use but have never accepted federal grant funding or only for private use, do not have such restrictions and could be sold and/or closed without notice. Airports that are under contract or leased for public use accessibility are dependent on the terms of their agreement. The Airport Ownership VRV has a scaled score: public (5), private (3), or contract/leased, whether publicly or privately owned (3).

5.3.1.2. Airport Use

Airports accommodate a variety of uses, starting with providing the community access to national air transportation. Aviation users may be attracted to an airport for a wide range of reasons from available facilities to strategic location or onsite services. Some potential uses and related users may include:

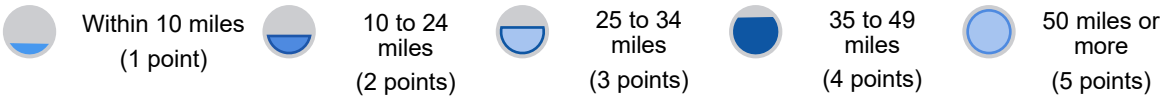
- Emergency Medical Services (EMS) – helicopter or fixed-wing medical transportation
- Aerial Firefighting – air tanker staging, refueling, and retardant loading
- Federal/State/Local Law Enforcement and Other Agencies – transport, monitoring, or enforcement
- Tourism – aerial tours of scenic locations
- Gliders – towing, landing, and aircraft storage
- Skydiving – flights and drop zones
- Special Events – seasonal venues and other attractions

The Airport Use VRV is an additive score with 1 point for each specific use up to a maximum of 5 points.

5.3.1.3. Nearest Airport

Airports generally enjoy a monopoly as the only air transportation facility serving the community, though this can vary depending on the location of other airports in the region or vicinity. The Nearest Airport VRV is assigned a scaled score based on the driving distance from an airport to the nearest airport included in the NPIAS, as shown in **Figure 5-1**.

Figure 5-1: Nearest Airport VRV Scoring Methodology



Sources: Kimley-Horn, Quadrex 2021

5.3.1.4. Longest Runway

Runway length is a principal indicator of an airport's ability to serve various sized aircrafts. The runway length needed at an airport depends on its current or future role and the type of aircraft that are currently or are anticipated to use the airport on a regular basis. Runway length by itself does not provide the complete picture but offers a way to understand what aircraft types are able to operate at the airport. For regional and general airports the runway length was evaluated on whether it can accommodate 100% or 95% of small aircraft fleets. To evaluate this, the existing airport elevation and maximum annual temperature experienced were graphed using Figure 2-1 in AC 150/5325-4B where the minimum runway length was determined. If the airport met this criterion or exceeded it, then the runway length is considered sufficient to accommodate the small aircrafts of 10 passenger seats or less.

The Longest Runway VRV is a binary metric based on an airport's role, and an airport whose longest runway meets or exceeds the objective runway length noted in **Table 5-2** receives 5 points. Airports that do not meet the objective lengths are given no points for the Longest Runway VRV. Since this variable is controllable, an identified deficiency may lead to runway improvement recommendations to properly accommodate existing or projected airport traffic.

Table 5-2: Longest Runway VRV

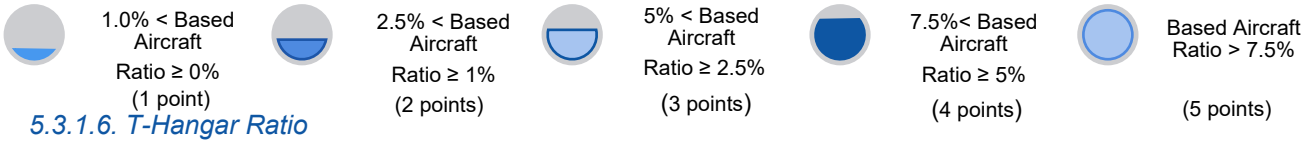
Airport Role	Runway Length
Primary	Future Runway Length from Airport Plans
National	Future Runway Length from Airport Plans
Regional	To accommodate 100 percent of small aircraft fleet
General	To accommodate 95 percent of small aircraft fleet
Access	Maintain Existing
Backcountry	>3,000 Feet
Special Event	>3,000 Feet / As Appropriate

Sources: Kimley-Horn, Quadrex 2021

5.3.1.5. Based Aircraft Ratio

Most airports have aircraft that are operated and stored on the property long-term; these are considered based aircraft. An airport's number of based aircraft can be compared to total based aircraft in the state to determine its share of the market. The Based Aircraft Ratio VRV is a scaled score indexed based on the market share percentages to the following ranges shown in **Figure 5-2**.

Figure 5-2: Based Aircraft Ratio VRV Scoring Methodology



5.3.1.6. T-Hangar Ratio

Sources: Kimley-Horn, Quadrex 2021

The availability of T-hangars represents a portion of the airport's capacity in accommodating the long-term storage of aircraft based in the vicinity. While the number of vacancies or those on a waiting list may be more direct and immediate measures of unmet demand, the T-hangar ratio provides a broader view of an airport sponsor's ability and/or willingness to serve the based aircraft market. The availability of T-hangars is controllable, in that additional hangar development could come directly from the sponsor or through a public-private partnership where the private sector provides the funding for site preparation and hangar construction and the sponsor offers a ground lease.

The T-hangar ratio divides the number of based aircraft by the total number of T-hangars with the assumption that a higher ratio is an indication of a market well-served while a lower ratio may infer a deficiency and that aircraft storage needs are being met at another airport. T-hangars operated privately were included in the total number of units. The T-hangar Ratio VRV is a binary score based on an airport's NAHSP role and is 5 points if the objectives listed in **Table 5-3** are met, and 0 points if not.

Airports with no based aircraft and no T-hangars are considered to have met the demand. As Primary airports primarily serve aircraft not typically housed in T-hangars, airports within this role were given a score of 5. Additionally, if an airport cannot meet the objective with T-hangars alone, the availability and use of conventional hangars should be reviewed. In cases where conventional hangars are currently utilized for long-term based aircraft storage, the conventional hangars should be factored into the hangar ratio calculation to better determine if available hangar facilities are meeting demand.

Table 5-3: T- Hangar Ratio VRV

Airport Role	T-Hangar Ratio
Primary	> 0.90
National	0.70 – 0.80
Regional	0.60 – 0.70
General	0.50 – 0.60
Access	> 0.25
Backcountry	> 0.25
Special Event	None

Sources: Kimley-Horn, Quadrex 2021

5.3.1.7. Fuel Availability

The availability of aircraft fuel is a vital service for aircraft operators both for those based at the airport and for visitors. Jets, turboprops, and turbine-powered helicopters require Jet A fuel while aircraft powered by reciprocating (piston) engines use 100 octane low lead aviation gasoline (100LL or "AvGas"). Some airports may have one or more fixed-base operators (FBO) that offer attended full-service fueling for both Jet A and/or AvGas. Others may not have an FBO but offer a self-service fuel facility that includes a 24-hour credit card transaction kiosk, usually just for AvGas. For larger airports in the NAHSP system, full-service (FS) Jet A and AvGas in addition to self-service (SS) AvGas are required to achieve the recommended fuel services objective. Smaller airports are only required to have some form of fuel available. Since this variable is controllable, it may serve to encourage airport sponsors to provide or attract fuel services if deficient based on the level and type of demand at the airport.

The Fuel Availability VRV has a binary hybrid score based on the airport's role as shown in **Table 5-4**. If the objectives of the airport role are met**,** it would receive 5 points; if it has at least one type of fuel, it would receive 3 points; and if no fuel is available, the airport receives 0 points. The availability of self-service fuel assumes that that the facility has an unattended credit card reader.

Table 5-4: Fuel Availability VRV

Airport Role	Fuel Availability	Fuel Service
Primary	Jet A & 100LL	Full Service and Self Service with Credit Card Reader
National	Jet A & 100LL	Full Service and Self Service with Credit Card Reader
Regional	Jet A & 100LL	Full Service and Self Service with Credit Card Reader
General	Jet A or 100LL	Self Service with Credit Card Reader
Access	Jet A or 100LL	Self Service with Credit Card Reader
Backcountry	No Fuel Service	
Special Event	As Appropriate	

Sources: Kimley-Horn, Quadrex 2021

5.3.1.8. Aircraft Maintenance

Like fuel, the availability of aircraft maintenance services can strengthen an airport's attractiveness to based and transient aircraft operators. Services can include major or minor maintenance and repair of aircraft structures and engines. These can be offered by the same FBO that provides aircraft fueling, although shops that specialize in aircraft maintenance are becoming more common.

Like the Fuel Availability VRV, the accessibility of aircraft maintenance is somewhat controllable by the sponsor, who can recruit shops to locate at an airport. The presence of aircraft maintenance is identified in the FAA 5010 facilities database. As an element of the VRVs for the Regional Significance, Aircraft Maintenance is a binary score shown in **Table 5-5**, based on the role of the airport. For larger airports, 5 points are given for the presence of major maintenance services for either aircraft airframes or powerplants while at smaller airports, 5 points are given for the presence of minor maintenance in either category. No points are given for airports that do not have any aircraft maintenance capabilities on-airport.

Table 5-5: Aircraft Maintenance VRV

Airport Role	Aircraft Maintenance
Primary	Major
National	Major
Regional	Minor
General	Minor
Access	None
Backcountry	None
Special Event	None

Sources: Kimley-Horn, Quadrex 2021

5.3.1.9. Instrument Approach

The ability to use an airport during inclement weather conditions is facilitated by the availability of an instrument approach procedure. Historically, these procedures were developed using on-airport or nearby navigation aids or specialized ground-based equipment which was expensive to install and maintain. The advent of instrument approach procedures using satellite-based global positioning system (GPS) has allowed new procedures to be developed inexpensively for most airports. While the weather in Nevada is characterized as sunny or partially sunny 65 to 80 percent of the time, the availability of an instrument procedure provides the flexibility for users to operate into an airport during inclement weather conditions.

The Instrument Approach VRV is a binary hybrid score of 5 points for an airport that meets its role-based objectives for its most precise approach type and lowest objectives, shown in **Table 5-6**. Note that the class and objectives shown were not used in evaluating the instrument approach itself. If an airport does not meet the criteria, one point is removed for each level below the objective that should be met.

Table 5-6: Instrument Approach VRV

Role	Class	Approach Type	Additional Considerations*
Primary	C	Precision	200'- 300' AGL / ½ mile
National	D	LPV	200'- 300' AGL / ½ mile
Regional	D/E	Non-Precision/VNAV	300'- 350' / ¾ mile
General	E	Non-Precision/LNAV	400'+ / 1 mile
Access	G	Visual	Clear of clouds / 1+ mile
Backcountry/Special Event	G	Visual	Clear of clouds / 1+ mile
*Note: Localizer Precision with Vertical Guidance (LPV) Lateral Navigation/Vertical Navigation (LNAV/VNAV); *Not scored as part of ARV and just for additional consideration*			

Sources: Kimley-Horn, Quadrex 2021

5.3.1.10. Summary – Regional Significance VRVs (V_{RS})

The V_{RS} category provides a quantitative illustration of how an airport serves its community, users, and the national/state air transportation system. **Table 5-7** summarizes this VRV with a maximum score of 45 points.

Table 5-7: Summary – Regional Significance VRVs (V_{RS})

VRV Code	Variable	VRV Basis	VRV Score
RAO	Airport Ownership	Scale	5
RAU	Airport Use	Additive	5
RNA	Nearest Airport	Scale	5
RLR	Longest Runway	Binary	5
RBA	Based Aircraft Ratio	Scale	5
RTH	T-Hangar Ratio	Binary	5
RFA	Fuel Availability	Binary Hybrid	5
RAM	Aircraft Maintenance	Binary	5
RIA	Instrument Approach	Binary Hybrid	5
Total Maximum V_{RS}			**45**

Sources: Kimley-Horn, Quadrex 2021

5.3.2. Airport Facilities Value (V_{AF})

Similar to the Regional Significance Value (V_{RS}), the Airport Facilities Value (V_{AF}) can be used to compare the availability of resources that allow an airport to accommodate the range of aircraft relevant to its service role. Larger airports may have assets such as airfield pavement that support business aviation activity (i.e., primarily jets) while others may just provide basic facilities and services. All the various VRVs comprising the Airport Facilities Value can be controlled by the sponsor primarily by development as a capital improvement project. In many cases, these projects may be eligible for federal funding at NPIAS airports.

5.3.2.1. Airport ARC Category

In FAA Advisory Circular (AC) 150/5300-13A – *Airport Design*, the Airport Reference Code (ARC) is defined as an airport's highest Runway Design Code (RDC) less the visibility component, as discussed in Chapter 2. The combination of the Aircraft Approach Category (AAC) and Airplane Design Group (ADG) comprise the ARC, which is usually identified on the airport layout plan (ALP). The Airport ARC Category VRV serves to identify an airport's recommended airfield design standards compared to the most demanding aircraft currently using or expected to use the airfield. The ARC VRV depends on an airport's role and receives a binary score of 5 points if the airport meets the FAA's recommended ARC and 0 points if an airport does not meet the ARC. Roles and their recommended ARCs are shown in **Table 5-8**.

Table 5-8: Airport ARC Category VRV

Role	ARC
Primary	C-II
National	C-II
Regional	B-II
General	B-II
Access	B-I
Backcountry	A-I
Special Event	As Appropriate
Note: For instances in which ARC classified as small, partial points are awarded.	

Sources: Kimley-Horn, Quadrex 2021

5.3.2.2. FAA Design Standards

While the Airport ARC Category VRV provides the basis for the airfield design criteria, the FAA Design Standards VRV evaluates whether the existing characteristics of specific airfield components (e.g., runway or taxiway widths, separations, runway protection zones, etc.) meet the recommended design standards. These design standards are based on the typical characteristics of the airport's respective aircraft design group in FAA AC150/5300-13A.

The Design Standards VRV is a binary hybrid score with 5 points given to airports that meet all the standards. For any airfield component identified that does not meet the standards, 3 points are awarded if the deficiency has been recognized by a proposed project to address the issue. Otherwise, no points are given if a deficiency is not noted for subsequent action. The significance of this VRV is to identify the need for projects to help airports meet the design standards to accommodate users.

5.3.2.3. Runway Surface Type/Condition

The Runway Surface Type/Condition VRV is a considerable factor in identifying whether the surface type and condition of the runway can continue to serve its aircraft demands. The runway surface and condition of the pavement are based on observations during airport inspections and published as part of the FAA's Airport Master Record (Form 5010). Additionally, a select few airports within the NPIAS undergo further pavement inspections that might confirm the existing pavement condition; this information was utilized in the evaluation of the airports based on their role. The condition levels range from Excellent (E) to Failed (L), as discussed in more detail in **Chapter 2**. These conditions provide critical information on the remaining longevity of the pavement. Unpaved runways may have an engineered surface (graded, gravel, etc.) but based on traffic levels, may be reaching the point where runway paving should be considered.

This valuable information can assist in identifying where a reconstruction or rehabilitation project should be planned to preserve the integrity of the runway pavement. Per the airport's NAHSP role, most airports are given 5 points if the runway is paved. Exceptions include Access and Backcountry airports, which are not expected to have paved runways. The Runway Surface Type/Condition VRV is a binary hybrid score based on the airport's role in either meeting the objectives (5 points), meets one of the objectives for the airport's role (3 points), or not meeting (0 points) the objectives shown in **Table 5-9**.

Table 5-9: Runway Surface Type/Condition VRV

Role	Runway Surface	Runway Condition
Primary	Paved	Excellent, PCI > 86
National	Paved	Excellent, PCI > 86
Regional	Paved	Good, PCI >71
General	Paved	Good, PCI >71
Access	Non-Paved**	Fair, PCI > 56
Backcountry	Non-Paved**	Fair, PCI > 56
Special Event	As Appropriate	Fair, PCI >56
*Notes: **Non-Paved runway surfaces exclude the PCI*		

Sources: Kimley-Horn, Quadrex 2021

5.3.2.4. Runway Lighting

The Runway Lighting VRV is another element among the airport facility objectives and identifies the ability to use the airfield at night or during low visibility weather. The Runway Lighting VRV score is binary with 5 points awarded based on the following objectives in **Table 5-10**. A score of 5 points for the Runway Lighting VRV indicates that the airport has the minimum level of airfield lighting appropriate for its role, otherwise no points are allocated, which serves to identify the need for airfield lighting improvements.

Table 5-10: Runway Lighting VRV

Role	Runway Lighting	Remarks
Primary	MIRL	HIRL desired
National	MIRL	HIRL desired
Regional	MIRL	
General	LIRL	
Access	Reflectors	LIRL desired
Backcountry	None	
Special Event	As Appropriate	
Notes: HIRL – High intensity; MIRL – Medium intensity; LIRL – Low level		

Sources: Kimley-Horn, Quadrex 2021

5.3.2.5. Taxiway

The Taxiway VRV is based on existing taxiway facilities associated with the primary runway. A full-length parallel taxiway is preferable especially for busier airports since it provides the opportunity for accessing the runway for immediate departure and exiting the runway upon arrival. FAA considers a full parallel taxiway a fundamental component of the airfield. While partial parallel taxiways, turnarounds, and holding aprons provide some enhancement of runway capacity by providing access and egress opportunities when a full parallel taxiway is not available, it still falls short of the minimum criteria for NPIAS airports.

The Taxiway VRV is a binary score identifying if an airport meets the criteria appropriate for its role objectives per role listed in **Table 5-11**. A score of 5 points identifies that the airport has sufficient airfield to serve the air traffic, while 0 points for the Taxiway VRV identifies the need for taxiway improvement projects to aid the capability of the runway to meet air traffic demand.

Table 5-11: Taxiway VRV

Role	Taxiway Type
Primary	Full Parallel to all Runways
National	Full Parallel to all Runways
Regional	Full Parallel to Primary Runway
General	Partial Parallel to Primary Runway
Access	Turnarounds
Backcountry	Turnarounds or Holding pads
Special Event	As Appropriate

Sources: Kimley-Horn, Quadrex 2021

5.3.2.6. Visual Aids

Visual Aids VRV is based on the existing visual aid systems that provide information and guidance or assistance to pilots when utilizing the airport. The visual aids considered and evaluated included Runway End Identifier Lights (REILs), Visual Approach Slope Indicator or Precision Approach Path Indicator (VASI/PAPI), Approach Light Systems (ALS), Rotating Beacon, and Lighted Wind Cone/Wind Cone. Each form of visual aids has different performance requirements in whether it provides lighting guidance, wind indicator, or assistance with air traffic. These various instruments are crucial infrastructure to each airport in serving the air traffic demand.

The Visual Aids VRV is a binary hybrid score in which an airport has all the objective visual aids or more than listed in **Table 5-12** receive 5 points. If an airport does not meet the criteria, one point is removed for each visual aid objective deficiency.

Table 5-12: Visual Aids VRV

Role	Visual Aids Objective
Primary	Rotating Beacon, Lighted Wind Cone, PAPI/VASIs, and ALS/REILs
National	Rotating Beacon, Lighted Wind Cone, PAPI/VASIs, and ALS/REILs
Regional	Rotating Beacon, Wind Cone, REILs, and PAPI/VASIs
General	Rotating Beacon and Wind Cone
Access/Backcountry	Wind Cone
Special Event	As Appropriate

Sources: Kimley-Horn, Quadrex 2021

5.3.2.7. Weather Reporting

The Weather Reporting VRV identifies the availability of a weather reporting system at an airport. The objective for this metric is measured by the presence of an Automated Surface Observing System (ASOS) which is owned and operated by the federal government (FAA or National Weather Service) or an Automated Weather Observing System (AWOS) which is owned and operated by the airport sponsor. For AWOS systems, there may be distinctions as to whether the unit is an AWOS I, II, or III, which indicates the presence of various sensors that report weather conditions beyond basic weather information. Examples of observations include the altimeter setting, wind direction and velocity, and temperature/dew point information.

An ASOS or AWOS is the objective for all airports except for the Access category, which may have an automated UNICOM or other reporting system. Backcountry airports have no criteria for weather reporting. In addition to weather reporting, an additional criterion for Primary airports is the presence of an Air Traffic Control Tower (ATCT). For evaluating the airport's Weather Reporting VRV, scoring is based upon a binary score (5 points) for meeting the objectives listed in **Table 5-13**.

Table 5-13: Weather Reporting VRV

Role	Weather Reporting
Primary	ATCT, AWOS/ASOS
National	AWOS/ASOS
Regional	AWOS/ASOS
General	AWOS/ASOS

Role	Weather Reporting
Access	UNICOM
Backcountry	None
Special Event	As Appropriate

Sources: Kimley-Horn, Quadrex 2021

5.3.2.8. GA Terminal

At a minimum, an airport's terminal facility provides basic shelter and amenities for users. Besides a public lobby, amenities can include public restrooms, lounge areas, a conference room, and a snack/beverage vending area. Areas designated specifically for pilots will usually include a weather briefing room and in some cases, private lounge/rest area. At commercial service airports, the GA facilities may be co-located or adjoined with commercial passenger services. At larger GA airports, a dedicated terminal will house basic facilities, amenities, an FBO counter, office/operations areas, airport management offices, and even fully equipped workout rooms for pilots, among other spaces.

The GA Terminal VRV assesses the current facilities at an airport and identifies the need to plan and develop improvements to provide basic features to serve the airport's users. The GA Terminal VRV is scored as a binary metric based on the following role of the airport and features shown in **Table 5-14**. If the airport has a GA Terminal and meets or surpasses the recommended features, it receives 5 points. An airport receives no points if it does not meet the criteria based on the airport role.

Table 5-14: GA Terminal VRV

Role	GA Terminal	Features
Primary	Yes*	Public Restrooms/Conference Room/Pilots Lounge
National	Yes	Public Restrooms/Conference Room/Pilots Lounge
Regional	Yes	Public Restrooms/Conference Room/Pilots Lounge
General	No	Public Restrooms
Access	No	Public Restrooms Desired
Backcountry	No	Public Restrooms Desired
Special Event	No	Public Restrooms Desired
*Note: * Features may be combined with Commercial Terminal*		

Sources: Kimley-Horn, Quadrex 2021

5.3.2.9. Utilities

The Utilities VRV is based on an evaluation of an airport's existing basic services for utilities such as electrical, water (or well), and sanitary sewer (or septic) systems. These utilities are necessary to support the airfield (e.g., lighting, visual aids, etc.) as well as for fire protection and the facilities in the GA terminal.

This metric is based on the airport's role and is scored as a binary hybrid, with 5 points given for meeting all of the objectives, 3 points for meeting 50 percent of the objectives, and 1 point for meeting at least one objective for utilities services. **Table 5-15** presents the utilities objectives based on each airport role.

Table 5-15: Utilities VRV

Role	Electric	Water	Sewer (or Septic)
Primary	Yes	Yes	Yes
National	Yes	Yes	Yes
Regional	Yes	Yes	Yes
General	Yes	Yes	No
Access	Yes	Yes	No
Backcountry	Yes	Yes	No
Special Event	Yes	Yes	No

Sources: Kimley-Horn, Quadrex 2021

The Utilities VRV is an indication of an airport's capacity to support and protect the recommended existing facilities in addition to the potential development of new aeronautical and non-aeronautical businesses and other activities.

5.3.2.10. Security/Wildlife Fencing

Fencing around the airfield is recommended for discouraging unauthorized access by people or vehicles and inhibiting wildlife access. While fencing is required for commercial service airports certified under 14 CFR Part 139, the funding eligibility of full perimeter fencing at general aviation airports must be justified based on specific needs. This can include a recommendation from a wildlife hazard management plan or other needs based on prevailing conditions such as an urban setting.

The significance of the Security/Wildlife Fencing VRV is to identify the ability to protect the airport from runway incursion accidents, collisions with wildlife, theft, vandalism, and other unauthorized or unwanted access. This VRV is evaluated by binary scoring, in which the airports meeting the objective for their role receive 5 points as outlined in **Table 5-16**. If the objectives are not met, the airport receives no points.

Table 5-16: Security/Wildlife Fencing VRV

Role	Security Fencing	Wildlife Fencing
Primary	Full	Full
National	Full	Full
Regional	Full	Full
General	Partial	Partial
Access	None	None
Backcountry	None	None
Special Event	None	None

Sources: Kimley-Horn, Quadrex 2021

5.3.2.11. Communications Connectivity

Communications Connectivity as a VRV is meant to measure the airport's existing communications infrastructure to provide users with access to basic telephone access, cellular, and internet services. Public phone access is defined as widespread availability in the terminals of both larger and small airports. The ability to make phone calls for emergency services, ground transportation, or to obtain online weather briefings and filing of flight plans are just a few of the common yet important communication needs.

The Communications Connectivity VRV is a binary hybrid score based on the airport's role meeting the objectives listed in **Table 5-17.** Scores per role are given based on meeting all objectives (5 points), meeting 50 percent of the objectives (3 points), and meeting at least one objective (1 point).

Table 5-17: Communications Connectivity VRV

Role	Public Phone	Cellular (Data/4G)	Free Wi-Fi in Terminal
Primary	Yes	Yes	Yes
National	Yes	Yes	Yes
Regional	Yes	Yes	Yes
General	Yes	Yes	No
Access	Yes*	Yes*	No
Backcountry	None	None	None
Special Event	None	None	None
**For Access, a public phone or cellular is acceptable.*			

Sources: Kimley-Horn, Quadrex 2021

5.3.2.12. Summary – Airport Facilities VRVs (V_{AF})

Table 5-18 presents a summary of the value rating variables that comprise the Airport Facilities VRV component of the ARV. The maximum score for the V_{AF} is 55 points for the Airport Facilities evaluated.

Table 5-18: Summary – Airport Facilities VRVs (V_{AF})

VRV Code	Variable	VRV Basis	VRV Score
FAR	Runway ARC Category	Binary	5
FDS	FAA Design Standards	Binary Hybrid	5
FRS/FRC	Runway Surface Type/Condition	Binary Hybrid	5
FRL	Runway Lighting	Binary	5
FTW	Taxiways	Binary	5
FVA	Visual Aids	Binary Hybrid	5
FWR	Weather Reporting	Binary	5
FTM	GA Terminal	Binary	5
FUT	Utilities	Binary Hybrid	5
FSF	Security/Wildlife Fencing	Binary	5
FCC	Communications Connectivity	Binary Hybrid	5
Total V_{AF}			**55**

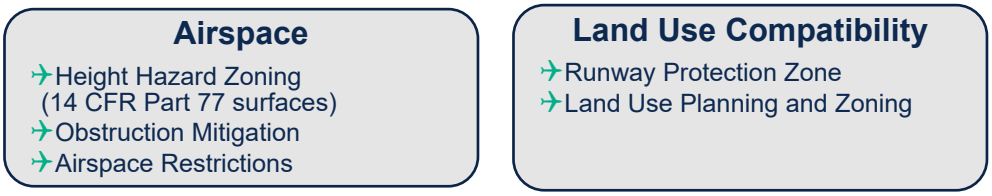
Sources: Kimley-Horn, Quadrex 2021

5.3.3. Airport Protection Value (V_{AP})

Airports need protection from encroachment of their airspace and to have compatible land uses surrounding the airport to maintain its ability to serve its users. The failure to protect the navigable airspace around an airport from new development such as buildings, radio towers, and wind turbines along the runway's approach and departure flight paths can lead to interference with the safe and efficient utility of the runway(s). Additionally, if land use compatibility is not protected, new residential development can create the need to implement aircraft noise abatement procedures and other measures which can also interfere with the usability of the airport. The Airport Protection Value (V_{AP}) VRV category is designed to assess each system airport's current ability to prevent the encroachment of obstructions or incompatible land use.

The variables used as value rating factors for assessing airport protection measures include the following as shown in **Figure 5-3**.

Figure 5-3: Airport Protection Measures Variables



Sources: Kimley-Horn, Quadrex 2021

5.3.3.1. Height Hazard Zoning

Height hazard zoning is often an effective tool for preventing development of vertical structures that could degrade the usability of navigable airspace around the airport. Navigable airspace is identified in 14 CFR Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace* which includes the definitions and dimensions of various areas around the airport that should be protected. The federal government does not have enforcement powers to prevent any development that would encroach into navigable airspace but through grant assurances and other measures, FAA relies on the airport sponsor's governance and the cooperation of neighboring political subdivisions to protect the airport's airspace. Often, this is accomplished through the enactment of height hazard zoning that provides specific requirements for the notification of the intent to develop a structure near the airport, evaluation of potential airspace impacts, and due process for the approval, disapproval, appeal, and enforcement actions.

All system airports that are included in the FAA's NPIAS report, and really all airports regardless of inclusion, should have some form of height hazard zoning or other effective measure for airspace protection to at least comply with FAA Airport Improvement Program (AIP) Grant Assurance 20, *Hazard Removal and Mitigation.* As a VRV element, Height Hazard Zoning is a binary metric with a score of 5 points for having some form of control over preventing obstruction hazards to navigable airspace. If no zoning is in place, the airport receives no points.

5.3.3.2. Obstruction Mitigation

Existing obstructions that penetrate the protected areas outlined in 14 CFR Part 77 are identified by the requirement to be marked and lighted. Sometimes, obstructions located along the flight path require that the runway threshold be displaced to assure that approaching aircraft maintain a safe altitude above the obstruction. Other less permanent obstructions such as trees, vegetation, antennas, or other structures could be mitigated but may require dealing with property interests beyond the immediate control of the sponsor.

The criteria for determining the need to displace or relocate a runway threshold somewhere other than the physical end of usable runway pavement is found in FAA AC 150/5300-13B, *Airport Design*. The Obstruction Mitigation variable identifies the diminished capacity in the full landing distance available (LDA) of the primary runway because of approach path obstruction mitigation. As such, it also serves to recognize opportunities to mitigate non-permanent controlling obstructions and reduce or eliminate the threshold displacement.

The VRV is a binary score based on the airport's role and the presence of existing displaced thresholds resulting from the proximity of objects that penetrate the minimum obstacle clearance surface (OCS)[2]. This binary score metric is based on airports meeting or exceeding the objective OCS per airport role listed in **Table 5-19**. An airport that meets or exceeds the OCS receives 5 points. If the OCS does not meet the minimum, the airport receives no points.

Table 5-19: Obstruction Mitigation VRV

Role	Objective Obstacle Clearance Surface (OCS)
Primary	≥20:1
National	≥20:1
Regional	18:1 to 20:1
General	15:1 to 18:1
Access	≤15:1
Backcountry	≤15:1
Special Event	≤15:1

Sources: Kimley-Horn, Quadrex 2021

[2] The OCS slope extends from physical end of runway pavement outwards.

5.3.3.3. Airspace Restrictions

Airspace restrictions above or otherwise in the vicinity of the airport can diminish its utility. Restrictions can result from overlying the Class B, C, or D airspace of other nearby airports or from overlying designated Warning or Alert Areas or Military Operating Areas (MOAs). The Airspace Restrictions VRV serves to identify any of these types of areas in proximity of the airport. While the existence of an airspace restriction may not be controllable in most cases, identifying the limitations imposed by the restriction clarifies the complexity that users face when approaching or departing the airport. The Airspace Restrictions VRV is a 5-point scaled metric per **Table 5-20** based on the existence of an airspace restriction overhead and/or in vicinity of the airport.

Table 5-20: Airspace Restrictions Objective and Scoring

Airspace Restriction	Overhead?	or	Adjacent?	Distance	VRV Score
No	N/A				5
Yes	Yes		Yes	> 5 miles	3
Yes	Yes		Yes	< 5 miles	1

Sources: Kimley-Horn, Quadrex 2021

The Airspace Restrictions VRV acknowledges that the airspace of each system airport may have constraints that limit its utility and capacity compared to other peer airports. While the designation of airspace is not controllable by the airport sponsor, this variable provides a basis for considering the alteration or adjustment of the restrictions to enhance the efficiency of the airport.

5.3.3.4. Runway Protection Zone

Airports have Runway Protection Zones (RPZs) which are two-dimensional trapezoidal areas that extend beyond the end of each runway. These protection zones are based on the airport's runway design standard criteria in FAA AC 150/5300-13A per the respective Runway Design Code. RPZs correspond to the dimensions of the three-dimensional runway approach zone identified in 14 CFR Part 77 but serve a different purpose. Rather than protecting the airspace from obstacles that would interfere with the use of the runway, RPZs generally identify the boundaries of specific areas that should be protected to "enhance the safety and protection of people and property on the ground." The RPZ should not have any facilities that would accommodate the congregation of people or property. The FAA recommends the sponsor have a controlling interest in the property of the RPZ that allows the relocation of facilities and/or prevents encroachment of such incompatible uses.

The Runway Protection Zone VRV identifies whether the sponsor owns or has controlling interests (e.g., clear zone easement, etc.) in the RPZ property. This VRV, shown in **Table 5-21** is a scaled score based on if the sponsor owns or controls the property and whether that is full, partial, or no control.

Table 5-21: Runway Protection Zone Scoring

Control of RPZ	VRV Score	Remarks
Full	5	Has full control of the RPZ areas
Partial	3	Partial control with plans for full control
None	1	No ownership of the RPZ areas

Sources: Kimley-Horn, Quadrex 2021

The Runway Protection Zone VRV metric demonstrates the sponsor's need to have full control of development within the RPZ. It also acknowledges that the need to relocate existing incompatibilities is a priority for meeting the FAA design standards.

5.3.3.5. Land Use Compatibility

Other land uses around the airport should be protected from encroachment by new residential areas and similar types of developments that are considered incompatible with airport operation. This is especially important for undeveloped land along the runway approach and departure paths. Like height hazard zoning, land use compatibility planning serves to safeguard future aviation development. The sponsor should have the ability to exercise control over proposed new development that would be unsuitable or otherwise sensitive to existing and future aircraft operations.

The Land Use Compatibility VRV serves to identify the need for a sponsor to take action to prevent future non-compatible uses from occurring near the airport, especially along the approaches to the runway. It also recognizes whether the sponsor has considered or may need to consider measures to control development in areas where incompatibilities may occur if unchecked. As shown in the scaled score in **Figure 5-4,** the Land Use Compatibility VRV is based on the distances to any incompatibilities within three miles of the runway end.

Figure 5-4: Land Use Compatibility VRV Scoring Methodology

Sources: Kimley-Horn, Quadrex 2021

5.3.3.6. Summary – Airport Protection VRVs (V_{AP})

Table 5-22 presents a summary of the VRVs that comprise the Airport Protection category component of the ARV. The maximum score for the V_{AP} is 25 points.

Table 5-22: Summary – Airport Protection VRVs (V_{AP})

VRV Code	Variable	VRV Basis	VRV Score
PHZ	Height Hazard Zoning	Binary	5
POM	Obstruction Mitigation	Scaled	5
PAR	Airspace Restrictions	Binary Hybrid	5
PPZ	Runway Protection Zone	Binary Hybrid	5
PLU	Land Use Compatibility	Scaled	5
Total V_{AP}			**25**

Sources: Kimley-Horn, Quadrex 2021

5.3.4. Airport Access Value (V_{AA})

Another factor that should be considered when assessing the value of the airport to the community and to those who use the airport is ground access and ground transportation. The Airport Access V_{RV} is measured primarily by the proximity of the airport to the central business district, the quality and capacity of the road network, and the availability of ground transportation that provides "last mile" capabilities for visitors.

5.3.4.1. Community Access

The Community Access VRV is determined by the distance between the airport and central business district (CBD) of the community it serves. This metric is a scaled score based on the mileage of the most traveled route from the CBD to the airport per **Table 5-23**. The closer the airport is to a CBD, the higher the score the airport receives.

Table 5-23: Community Access Scoring

Distance Between Airport & CBD	VRV Score
< 2 miles	5
≥ 2 miles but < 5 miles	4
≥ 5 miles but < 10 miles	3
≥ 10 miles but < 20 miles	2
≥ 20 miles	1

Sources: Kimley-Horn, Quadrex 2021

While the distance between the airport and the CBD is not controllable, the Community Access VRV offers a sense of the relative ease or difficulty of providing ground access and ground transportation.

5.3.4.2. Regional Access

The Regional Access VRV considers airport access as a function of its connection with the national, state, regional, and local network of highways, streets, and roads. Regional access is measured by the distance to the interchange of the closest principal arterial highway (e.g., Interstate or US Highway interchange). Airports with a short distance to a major highway may have the advantage of greater mobility and accessibility to and

from major population centers compared to those with longer distances. The Regional Access VRV is a scaled metric similar to the Community Access VRV and is scored as depicted in **Table 5-24**.

Table 5-24: Regional Access Scoring

Distance Between Airport & Major Highway	VRV Score
< 5 miles	5
≥ 5 miles but < 10 miles	4
≥ 10 miles but < 15 miles	3
≥ 15 miles but < 20 miles	2
≥ 20 miles	1

Sources: Kimley-Horn, Quadrex 2021

While not always controllable by the airport sponsor, the Regional Access VRV quantifies the connectivity of the system airport to the national and state system of highways, which helps to identify the need and opportunity for improving the mobility and access of users.

5.3.4.3. Local Access

The capacity of the road connecting the community to the airport is another metric in assessing the quality of an airport's accessibility. While most all airports need nothing more than a paved two-lane road as a connection, some system airports may be in more populated areas that are busy enough to require additional features such as a dedicated turning lane, signalization, signage, etc. The Federal Highway Administration (FHWA) classifies roads based on their function. These include:

- Major Arterials – provide service between major urbanized areas with high travel speeds and limited access and offer substantial statewide or interstate mobility and access. Principal major arterials are classified as an interstate, freeway, or expressway, while other major arterials can be identified as a federal or designated state highway.
- Minor Arterials – provide service for trips of moderate length and offer connectivity to the higher arterial system. In urban settings, they interconnect with the higher arterial roads and provide intra-community access and mobility. In rural settings, they provide a connection between developed areas and other arterials and are typically designed to provide higher overall travel speeds with less interference from intersections and other access points.
- Major Collectors – in urban settings, they connect local and minor collector roads leading from populated areas to arterial roads. In rural settings, they provide intra-county mobility in areas not serviced by arterial roads.
- Minor Collectors – provide access and traffic circulation from lower density residential neighborhoods and commercial/industrial areas to major collectors and arterials. In rural settings, they serve to collect traffic from local roads and connect specific developed areas.
- Local Roads – provide direct access between adjacent developed areas, often through residential areas, but are not designed to support through traffic. In rural settings, they provide access over short distances to specific destinations.

Local Access VRV provides an assessment of the connecting roadway as a measure of existing facilities and the capacity to handle traffic. The Local Access VRV is a binary score based on the airport's role and meeting or surpassing the access road objectives (5 points) as shown in **Table 5-25**. Those airports with an access road directly leading to an interstate or other major highway surpass the objectives for each role and receive 5 points as well.

Table 5-25: Local Access Objectives by Role

Role	Access Road	Turn Lane[1]	Signalization
Primary	Arterial (Major)	Yes	Yes*
National	Arterial (Minor)	Yes	Yes*
Regional	Collector (Major)	No	No
General	Collector (Minor)	No	No
Access	Local	No	No
Backcountry	N/A	No	No
Special Event	N/A	No	No

Notes: Turn Lane & Signalization provided additional information but were not used to evaluate the access road type criteria. Interstates or Highways listed as Access Road supersede Arterial (Major)

Sources: NDOT, Kimley-Horn, Quadrex 2021

5.3.4.4. Ground Transportation

The Ground Transportation VRV assesses the availability of ground transportation services as another airport access measure. This VRV represents the “last mile” characteristics of the airport’s utility to its users. Historically, the last mile concept has been used in transportation planning, telecommunications, and supply-chain/logistics industries to describe the issues associated with completing the last leg of the journey. In the context of airports, the last mile challenge is how a traveler can reach their ultimate destination after arriving at or trying to return to the airport.

At most commercial service airports, where regular scheduled passenger air service is the norm, there are several modes of transportation available to provide the means for travelers to reach their destination. However, activity at general aviation airports is intermittent and the volume of travelers may not support regular ground transportation services. In many cases, the decision to offer ground transportation services at an airport is outside the sponsor’s control. However, there may be options available to provide a supportive business environment to encourage such services as needed.

The Ground Transportation VRV is based on the system airport's role and availability of specific ground transportation services shown in **Table 5-26**. The VRV is a binary hybrid score from which all the listed services are met (5 points), 50 percent of the services are present (3 points), and at least one service is present (1 point) based on the role of the airports.

Table 5-26: Ground Transportation Objectives by Role

Role	Mode of Transportation
Primary	Courtesy Car, Bus, Taxi/Ride Share, Rental Car
National	Rental Car or Courtesy Car, Bus, Taxi or Ride Share
Regional	Rental Car or Courtesy Car, Bus, Taxi or Ride Share
General	Rental Car or Courtesy Car, Taxi/Ride Share
Access	Rental Car or Courtesy Car, Taxi/Ride Share
Backcountry	Rental Car or Courtesy Car, Taxi/Ride Share
Special Event	As Appropriate

Sources: Kimley-Horn, Quadrex 2021

5.3.4.5. Summary – Airport Access VRVs (V_{AA})

Table 5-27 presents a summary of the VRVs that comprise the Airport Access VRV component of the ARV. The maximum score for the V_{AA} is 20 points.

Table 5-27: Summary – Airport Access VRVs (V_{AA})

VRV Code	Variable	VRV Basis	VRV Scoring
ACA	Community Access	Scaled	5
ALA	Local Access	Binary Hybrid	5
ARA	Regional Access	Scaled	5
AGT	Ground Transportation	Binary Hybrid	5
Total V_{AA}			**20**

Sources: Kimley-Horn, Quadrex 2021

5.3.5. Airport Expandability Value (V_{AE})

The expansion capability of an airport is another significant factor in estimating the current and future worth of the airport to the community. The primary consideration with the Airport Expandability VRV is identifying the availability of vacant property that can used to develop additional airfield and other types of facilities. For this analysis, the terms used to differentiate amongst the various airport property uses include:

- Airfield – Runways, Taxiways, RPZs and associated object free areas
- Aeronautical – Aprons, FBOs, Hangars
- Non-Aeronautical – Uses that do not have a direct relationship with aviation

This analysis focuses on whether there is adequate property to provide the opportunity to expand airfield facilities, without specific data on whether that is needed to support increased activity. This factor also considers the availability of property for non-aeronautical uses, which represents the potential for generating additional revenues to support the airport's operational and capital development expenses.

5.3.5.1. Total Acreage/Based Aircraft Ratio

The Total Acreage/Based Aircraft Ratio VRV serves to identify the airport's ability to support the airfield, aprons, hangars, and terminal facilities necessary to accommodate current aviation activity as well as the overall potential for the continued development of the airport. This VRV is measured by dividing the total area of airport property in terms of acres by the number of based aircraft. A higher ratio suggests that that there may be an abundance of property available to meet current and future aviation needs and to support aeronautical and non-aeronautical uses compared to a lower ratio.

This metric is based on a generic relationship derived between different characteristics of various airport types. The acreage per based aircraft typically increases as the airport role is increased and vice versa. This is primarily due to the average number of based aircraft declining at a greater rate than the size of the airport (measured in acreage). The Total Acreage per Based Aircraft metric is a scaled VRV based on the system airport's average ratio shown in **Table 5-28**, which compares the total airport acreage to number of based aircraft. This VRV is meant to identify the relationship between the property available to accommodate aviation activity in total acreage compared to the number of based aircraft. In cases where there is no based airport at an airport, the NAHSP assumed one based aircraft was present.

Table 5-28: Total Acreage/Based Aircraft Ratio Scoring

Ratio	VRV Score
> 5.0	5
3.0 to 4.9	4
1.0 to 2.9	3
0.5 to 0.9	2
< 0.5	1

Sources: Kimley-Horn, Quadrex 2021

5.3.5.2. Airfield and Aeronautical Property

The primary concern with the use of an airport's property is the ability to accommodate the facilities necessary to directly support aviation activity. The Airfield and Aeronautical Property VRV is designed to assess the amount of property dedicated for an airport's airfield (i.e., runways, taxiways, RPZs, etc.), as well as approximate the area needed to support aeronautical activity including aircraft parking, storage, fueling, and FBO facilities. The area set aside for the airfield is derived from a formula that references the RDC to identify the specific design criteria for each airfield component and runway. This data is used to estimate the total amount of property needed to fully accommodate the airfield.

The formula used for determining each of the airfield area requirements for a single runway is included in **Table 5-29**.

Table 5-29: Airfield Property Calculation

Airfield Property	Area
Runway Surface Area	(RW Length + 400') x Primary Surface Width (Runway Width)
Taxiway Surface Area	RW Length x TW Object Free Area (OFA)
Runway Protection Zone (RPZ) Surface Area	[RPZ Length x Width (Inner) + (RPZ Length +200') x .05 x Width (Outer)] x 2
Total Aviation Use Area	**Sum of Above + a 20% margin**
Notes: Utilize Runway Design Code of airport to determine this area values, refer to AC 150/5300 – 13B Appendix 7 Runway Design Standards Matrix	

Sources: Kimley-Horn, Quadrex 2021

Property designated for aeronautical uses focuses on:

- Circulation of aircraft on the ground (taxi lanes, etc.)
- Aprons and tie-downs for parking
- Aircraft storage (hangars and T-hangars)
- Full-service and self-service fueling
- FBO terminal (including the lobby, restrooms, waiting lounges, and vehicle parking)

To estimate the area needed for specific facilities, the Airfield and Aeronautical Property VRV first uses a general factor of 0.25 acres (11,000 square feet) per based aircraft to yield the gross area needed to support general uses for aeronautical activity. In ideal situations, the dedicated area for the airfield and aeronautical uses should represent only a fraction of the total available airport property in order to allow for property that can be used for non-aeronautical tenants that can provide additional revenues. For situations in which no based aircraft was recorded or if the total airport property was less than four acres, the airfield property was calculated based on the various segments of the airport property listed in **Table 5-29**.

The metric used for the Airfield and Aeronautical Property VRV is a scaled score based on the percentage of total airport property per **Table 5-30**. The implication of a low Airfield and Aeronautical Property VRV score is that the system may be less able to accommodate future growth.

Table 5-30: Airfield and Aeronautical Property VRV

Airfield and Aeronautical Property vs Total Airport Property	VRV Score
< 50%	5
≥ 50% but < 60%	4
≥ 60% but < 70%	3
≥ 70% but < 80%	2
≥ 80% average	1

Sources: Kimley-Horn, Quadrex 2021

5.3.5.3. Surplus Property

The Surplus Property VRV provides a general assessment of the amount of an airport's excess property after meeting its estimated aviation needs. Future aeronautical and non-aeronautical development is a function of the remaining property available after the airfield and aeronautical needs have been met. Surplus property can and should be used for additional aeronautical facilities (e.g., hangars) as demand grows.

More importantly, non-aeronautical activities on airport property are often important sources of revenue for an airport to support its operating expenses and other financial needs. This is especially important for smaller airports where aeronautical revenue is limited.

The Surplus Property VRV is a scaled scoring metric shown in **Table 5-31** and is based on the remaining airport property that can be marketed to non-aeronautical interests.

Table 5-31: Surplus Property VRV

Surplus Property	VRV Score
> 150 acres	5
≤ 150 acres but > 100 acres	4
≤ 100 acres but > 50 acres	3
≤ 50 acres but > 25 acres	2
≤ 25 acres	1
Note: Available or in use for non-aeronautical purposes	

Sources: Kimley-Horn, Quadrex 2021

5.3.5.4. Airfield Expandability

The ability to provide additional or expanded facilities to support growing levels of aircraft traffic (or larger aircraft) can be measured by the amount of available surplus property. However, the amount of existing airport property available for extending the primary runway may be limited by the current property line or physical boundaries such as roads, railroads, or other features.

The Airfield Expandability VRV is a scaled score metric, shown in **Table 5-32** that identifies the cumulative length of available property beyond the ends of the system airport's primary runway.

Table 5-32: Airfield Expandability VRV

Airfield Expandability *	VRV Score
> 1,000'	5
≤ 1,000' but > 750'	4
≤ 750' but > 500'	3
≤ 500' but > 250'	2
≤ 250'	1
Note: Cumulative length available for extending primary runway	

Sources: Kimley-Horn, Quadrex 2021

The Airfield Expandability factor should not be interpreted as a recommendation or endorsement for extending a system airport's runway. It is simply used to demonstrate the potential capability for providing additional runway length. For airports that do not currently have the property to provide expandability for the runway, there may be opportunities to purchase additional property if the need can be justified through more detailed studies.

5.3.5.5. Summary – Airport Expandability VRVs (V_{AE})

Table 5-33 presents a summary of the VRVs that comprise the Airport Expandability category component of the ARV. The maximum score for the V_{AE} is 20 points.

Table 5-33: Airport Expandability VRVs (V_{AE})

VRV Code	Variable	VRV Basis	VRV Scoring
EAR	Total Acreage Ratio	Scaled	5
EAP	Airfield and Aeronautical Property	Scaled	5
ESP	Surplus Property	Scaled	5
EAE	Airfield Expandability	Scaled	5
Total V_{AE}			**20**

Sources: Kimley-Horn, Quadrex 2021

5.3.6. Community Commitment Value (V_{CC})

The level of community commitment to the airport is one of the most important factors for assessing the perception of the existing and potentially future value of the airport. The Community Commitment Value (V_{CC}) seeks to identify the level of support for an airport. Political support can be measured indirectly by the financial resources that have been provided for the operation and development of the airport. Public airports are operated as an enterprise activity and it is important to assess the level of support that an airport's governance provides. In some cases, financial support in the form of subsidies or loans from the community's general fund may be necessary to supplement an airport's operating revenues when they are insufficient to cover its operating expenses and/or capital development costs. And while the value of goodwill may appear to be intangible, it can be assessed on the basis of the public presence of the airport by supporting events that can bring the public to actually come out and visit. These and other factors identified to establish a value that represents the community's commitment are included in this section.

5.3.6.1. Last Airport Layout Plan (ALP) Update

The ALP demonstrates the ultimate vision for how an airport will be developed. It illustrates the location and size of existing facilities in addition to proposed improvements. For airports in the NPIAS, the FAA requires the sponsor to maintain a current ALP and any proposed future development to be depicted on an airport's approved ALP for it to be eligible for federal funding assistance. FAA recommends that the ALP be updated every 5 to 7 years to maintain its currency and relevancy. Airports outside of the NPIAS may have airport diagrams listing the present facilities; however, it is not equivalent to an ALP.

The Last ALP Update VRV assesses the community's development strategy for the airport and is measured as a binary score of 5 points based on the airport's role and length of time since the last ALP update. If the airport does not meet the objectives listed in **Table 5-34**, it does not receive any points.

Table 5-34: Last ALP Update VRV

Role	Last ALP Update[3]
Primary	< 3 years
National	< 5 years
Regional	< 5 years
General	< 10 years and after 2013
Access	< 10 years and after 2013
Backcountry	< 10 years and after 2013
Special Event	As appropriate

Sources: Kimley-Horn, Quadrex 2021

The ALP is a vital component for determining the eligibility of projects for funding under the FAA AIP. The Last ALP Update VRV provides notice if there is a need to encourage system airports to update their ALPs to assure that the FAA's ever-changing design standards and other criteria are identified and to illustrate the extent of potential development projects. For non-NPIAS airports, the depiction of existing facilities should be kept current as needed.

5.3.6.2. Airport Management

The community's commitment towards providing day-to-day stewardship of the airport is measured through the Airport Management VRV. The commitment of personnel to manage the airport's day-to-day affairs is an important measure of the community's support. It demonstrates a certain minimum level of proactiveness to ensure that the safety, security, and efficiency of the airport is being maintained. For example, the designation of an airport manager to oversee airport activities, provide administration of airport operations, and tend to other airport needs could be evidence of the support by the community.

The Airport Management VRV is a binary metric, scored based on meeting the level of personnel assigned to an airport (5 points) recommended for its role, as shown in **Table 5-35**. If the airport does not meet the objective, no points are awarded.

Table 5-35: Airport Management VRV

Role	Airport Management
Primary	Full-time
National	Full-time
Regional	Full-time
General	Part-time or Staff/FBO
Access	Staff
Backcountry	Staff
Special Event	As Appropriate

Sources: Kimley-Horn, Quadrex 2021

5.3.6.3. Historical Capital Improvement Investment

Capital improvements include projects that were designed and constructed to develop the airport as well as subsequent projects to expand existing facilities. The Historical Capital Improvement Investment VRV is a measure of the amount of the federal, state, and local investment for airport development projects over the last five years. Capital improvements demonstrate a community's past interest in funding airport development. It also establishes the value of these investments as a financial asset on the community's balance sheet.

This VRV is a binary hybrid scored metric, shown in **Table 5-36**, that identifies the level of funded development based on the system airport's role. Points are given based on the airport's role: if the full criteria are met the airport receives 5 points; if past airport funding meets 50 percent of criteria it receives 3 points; and if the airport has had at least some form of funding it receives 1 point.

Table 5-36: Historical Capital Improvement Investment VRV

Role	Capital Improvements
Primary	> $20 million
National	> 5.0 million
Regional	> $1.0 million
General	> $1.0 million
Access	> $500,000
Backcountry	No Funding
Special Event	No Funding

Sources: Kimley-Horn, Quadrex 2021

5.3.6.4. Airport Capital Improvement Program (ACIP)

The ACIP identifies projects proposed for development within the next five to six years. Like an ALP, the FAA requires projects to be listed in the ACIP to establish eligibility for federal AIP funding. The ACIP VRV provides a metric to assess if an airport has a current ACIP (i.e., updated within the past 5 years) and the total amount of anticipated funding in the current ACIP. Note that the funding total analyzed for the NAHSP is inclusive of the total combined federal, state, and local shares.

The presence of a current ACIP with future projects identified is a strong indication of the community's continued interest in the development of the airport. Access to federal funding for simply maintaining the functionality of existing facilities (e.g., overlays to rehabilitate for airfield pavement, etc.) requires that an airport's ACIP be kept current. Additionally, a current ACIP allows NPIAS airports to compete on a regional and national basis for a share of AIP funding that has been appropriated for airport development. The ACIP VRV encourages system airports to maintain a current ACIP to help maintain their airport facilities to meet their aviation demands.

The ACIP VRV has a binary hybrid score based on the objectives per the airport's role listed in **Table 5-37**. An airport receives 5 points if this criterion is met, 3 points if future airport funding meets 50 percent of criteria, 1 point if the airport has some form of funding, and 0 points if an airport has no funding allocated or projected for future capital improvements.

Table 5-37: ACIP VRV

Role	Future Capital Improvements
Primary	> $20 million
National	> $5.0 million
Regional	> $1.0 million
General	> $1.0 million
Access	> $500,000
Backcountry	No Funding
Special Event	No Funding

Sources: Kimley-Horn, Quadrex 2021

5.3.6.5. Economic Development Partnership

There are times when a community may not have the resources (financial or otherwise) to develop aeronautical and non-aeronautical facilities to provide much needed economic benefits (e.g., employment, payroll, goods, and services purchased locally, etc.). Partnering with private sector interests is a way to leverage limited resources to take advantage of opportunities to develop facilities that would bring those benefits to the community. The Economic Development Partnership VRV encourages the proactive strategy of developing a partnership with the local chamber of commerce and with other city or county entities, especially at airports where no such agreements currently exist. Its binary score is based on whether the airport has an established public/private partnership (5 points) or not (0 points).

5.3.6.6. Financial Sustainability

Operating revenues generated by aeronautical sources such as hangar rentals, fuel sales, and charges from non-aeronautical sources are used to offset an airport's operational expenses. When a deficit occurs, the airport sponsor may have the responsibility to subsidize the cost to operate, maintain, and improve the airport. In many cases, the need to dedicate funds to cover the sponsor's local share for a federally funded airport development project can be a sensitive issue for the community, particularly if the allocated public funds result in budget cuts elsewhere. However, it could also be portrayed as an opportunity to enhance the asset value of the airport (and the community's balance sheet) through a highly leveraged capital improvement project.

The Financial Sustainability VRV identifies the ability of airports to generate adequate revenue to cover their expenses. Business planning, economic studies, and other resources can be offered to help airports achieve financial sustainability. Ideally, operating revenues cover both operating and capital expenses, but for many airports it does not. The dependance on operational subsidies in which there is a need for financial support daily, can hinder the ability for the airport to be self-sufficient, in which case is considered a less viable financial aid. Ensuring that support and perception of the airport from a community standpoint is an asset

versus a liability. This VRV is a binary metric, shown in **Table 5-38**, that is scored based on an airport's role and the objective level of stand-alone sustainability for covering either operating and/or capital expenses (5 points). For those airports that do not meet the objectives, 0 points are given. It should be noted that for the NAHSP, receiving a federal or state grant counts as a capital improvement subsidy.

Table 5-38: Financial Sustainability VRV

Role	Objectives
Primary	Capital Improvement Subsidy
National	Capital Improvement Subsidy
Regional	Capital Improvement Subsidy
General	Capital Improvement Subsidy
Access	Capital Improvement & Operations Subsidy
Backcountry	Capital Improvement & Operations Subsidy
Special Event	As Appropriate

Sources: Kimley-Horn, Quadrex 2021

5.3.6.7. Goodwill

Goodwill is an influencing factor that defines the public's perception of an airport. This can be manifested as a community's awareness of an attitude toward the airport in general; as an example, being viewed as an asset as opposed to a liability (e.g., financial performance, noise, etc.). The Goodwill VRV seeks to quantify an airport's image within the community. An airport's goodwill can also be assessed by the existence of favorable media relation stories, editorials, and community outreach opportunities. Examples of building goodwill can include events like open houses, air shows, and guided tours for schools and organizations.

The Goodwill VRV is an additive score metric which examines certain aspects of how an airport is perceived in the community. Points are added for specific evidence of the proactive development of goodwill as listed in **Table 5-39**. There may be items other than those listed that can be considered goodwill, but the intent of the VRV is to encourage the proactive approach for improvement of the airport's favorable perception within the community.

Table 5-39: Goodwill VRV

Evidence of Goodwill	Points
Dedicated Website	2
Marketing and Advertising	1
Open House/Airshow	2
School Tours/Education Program	2
Positive media stories (Max 2)	1

Sources: Kimley-Horn, Quadrex 2021

5.3.6.8. Summary – Community Commitment VRVs (VCC)

Table 5-40 presents a summary of the value rating variables that comprise the Community Commitment VRV component of the ARV. The maximum score for the V_{CC} is 30 points.

Table 5-40: Summary – Community Commitment VRVs (V_{CC})

VRV Code	Variable	VRV Basis	VRV Scoring
CAU	Last ALP Update	Binary	5
CAM	Airport Management	Binary Hybrid	5
CCI	Historical Capital Improvement Investment	Binary Hybrid	5
CAC	ACIP	Binary Hybrid	5
CEP	Economic Development Partnership	Binary	5
CFS	Financial Sustainability	Binary	5
CGW	Goodwill	Additive	5
Total V_{CC}			**35**

Sources: Kimley-Horn, Quadrex 2021

5.4. Airport Regional Value Summary

The ARV helps to identify and quantify the influence of the airport separate from the traditional economic impact approach while also incorporating an evaluation of an airport's assets and its opportunities as a catalyst for economic activity in the region. The ARV also recognizes the efforts that an airport's community has engaged in to protect that investment as well as other attributes that demonstrate an airport's uniqueness, which can affect an airport's influence on the regional economic environment. The ARV can be used by airports in the discussion of economic impact and opportunity, asset values, and support for airport needs and development.

5.5. Non-NPIAS Airports Evaluation

For non-NPIAS airports within the NAHSP, a modified evaluation was utilized to assess how well airports are meeting the expectations of their NAHSP role based on a set of facility and service objectives (FSOs). Similar to ARV, the FSOs provide guidelines to help airports optimally support the type of aviation activities that typically occur at their facilities. Airports that meet the specific FSOs established for their classification are best equipped to fulfill the aviation market needs of their communities and regions and support their function in the statewide system. FSOs differ from VRVs because FSOs only relate to physical infrastructure that is available on an airport, and therefore don't consider such factors as roadway access, airport location, community development partnerships, and so forth. Focusing specifically on on-airport facilities and services allows an airport representative to identify what improvements may need to occur in order for that airport to better perform its role within the system, or what an airport needs to achieve in order to be placed in a more demanding role.

Unlike ARV, a score was not tied to the individual variables and only determined if the airport meets or does not meet the objective. The FSOs by NAHSP role for non-NPIAS facilities are displayed in **Table 5-41**.

Table 5-41: Non-NPIAS Facilities and Service Objectives (FSO) by NAHSP Role

Variable	Airport Objective			
	General	Access	Backcountry	Special Event
Longest Runway	To accommodate 95 percent of small aircraft fleet	Maintain Existing, at least 3,000 Feet	>3,000 Feet	>3,000 Feet or As Appropriate
T-Hangar Ratio (THR)	0.50 - 0.60	> 0.25	> 0.25	None
Fuel Availability	Jet-A or 100LL, Self Service with Credit Card Reader	Jet A or 100LL, Self Service with Credit Card Reader	None	As Appropriate
Instrument Approach	Non-precision	Visual	Visual	Visual
FAA Design Standards	Meet FAA Design Standards	Meet FAA Design Standards	Meet FAA Design Standards	Meet FAA Design Standards
Runway Surface Type/Condition	Paved and Good, PCI >71	Non-Paved and Fair, PCI > 56	Non-Paved and Fair, PCI > 56	As Appropriate and Fair, PCI > 56
Runway Lighting	LIRL	Reflectors, LIRL Desired	None	As Appropriate
Taxiways	Partial Parallel to Primary Runway	Turn Arounds	Turn Arounds or Hold Pads	As Appropriate
Visual Aids	Rotating Beacon and Wind Cone	Wind Cone	Wind Cone	As Appropriate
Weather Reporting	AWOS/ASOS	Automated Unicom	None	As Appropriate
GA Terminal	Public Restrooms	Public Restrooms Desired	Public Restrooms Desired	Public Restrooms Desired
Utilities	Electricity and Water Available	Electricity and Water Available	Electricity and Water Available	Electricity and Water Available
Security/Wildlife Fencing	Partial	None	None	None
Communications Connectivity	Public Phone and Cellular (Data/4G)	Public Phone or Cellular	None	None

Variable	Airport Objective			
	General	Access	Backcountry	Special Event
Ground Transportation Services	Rental or Courtesy Car and Taxi/Ride Share	Rental or Courtesy Car and Taxi/Ride Share	Rental or Courtesy Car and Taxi/Ride Share Desired	As Appropriate
Last ALP Update	< 10 years and After 2013	< 10 years and After 2013 or Airport Diagram	< 10 years and After 2013 or Airport Diagram	As Appropriate

Source: Kimley-Horn, 2021