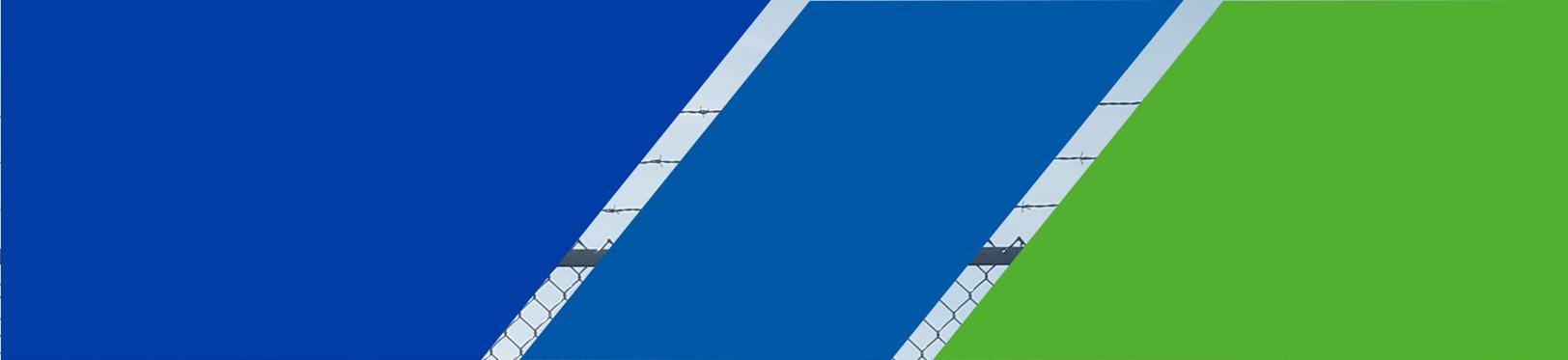




Appendix: E

PGAL Tweed Airport New Haven East Terminal Development



TWEED
NEW HAVEN
AIRPORT

Tweed Airport New Haven East Passenger Terminal Development

1. Introduction

The proposed East Terminal project at Tweed New Haven Airport (HVN) is planned as a replacement project of the aging and constrained passenger terminal facilities that exist today on the west side of the airport. The proposed 40-acre site for the project is located on the south-west zone of the airport where decommissioned Runway 14-32 is located. In conjunction with other major HVN projects identified in the latest master plan, the proposed new HVN East Terminal seeks to provide new passenger terminal, landside access, and airfield facilities for accommodating the projected passenger growth.

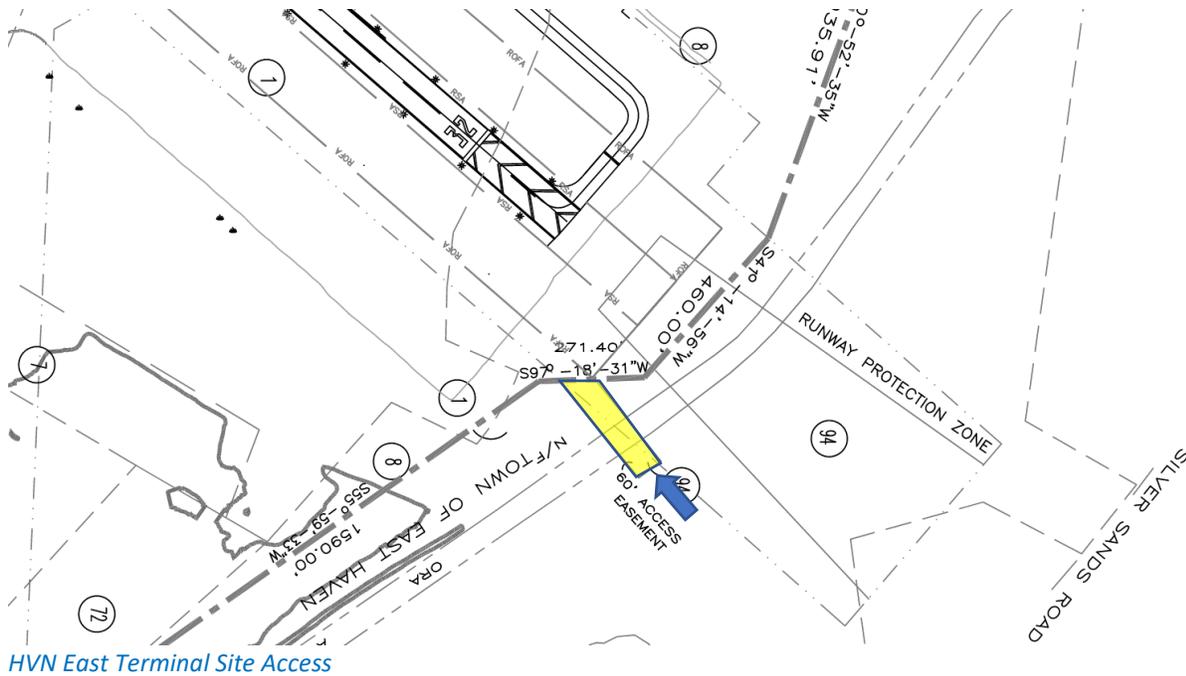


Aerial View of HVN East Terminal Project Site

The basis for exploring design alternatives to arrive to a preferred design solution begins with an analysis of facility requirements based on the projected passenger growth; available sites to develop at the airport; and, the local and regional environmental considerations.

2. Site Access

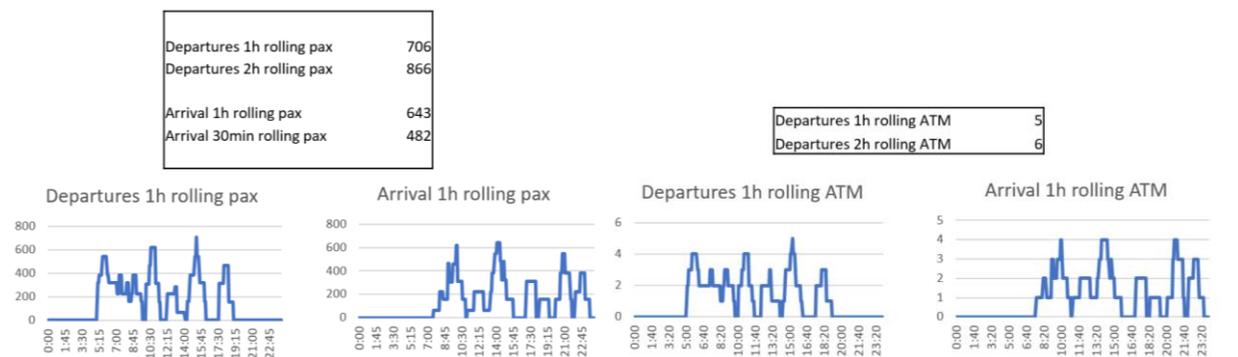
Access to the new HVN East Terminal site is planned thru the 60-foot-wide easement granted by the city on the southwest of the project site from Uriah Street. This access would traverse inland wetlands to the developed site.



3. Facility Requirements

Initial terminal programmatic requirements based on the provided Design Day Flight Schedule (DDFS) information and other profiling considers a new HVN East Terminal resulted in the need to process +1,000,000 annual enplaned passengers and accommodate a projected passenger growth of between 2-3% thereafter thru the term of the lease agreement between the operator and the aviation authority.

To clarify, the DDFS used to determine the new East terminal requirements is exclusively intended to be used for this analysis – i.e., differs from the noise assumptions, among others – and follows the recommendation of IATA and ACRP. The proposed DDFS defined intends to capture the 90% percentile of the traffic to guarantee an acceptable Level of Service (LOS), which is a similar approach as assuming the average busy day in the peak month. This is based on



DDFS Forecast Rolling 1hour pax / ATM, Source: Avports

Information from the provided DDFS is extracted to generate facility requirements and test initial programmatic assumptions for the project. An expected Level of Service (LOS) requirement for each of

the various operational processes is determined across utilizing benchmarks from IATA Airport Development Reference Manual (ADRM). An LOS of Optimum, which prescribes a balance of appropriate space requirements and maximum waiting times, is the chosen factor to determine the sizing of the various project functional areas such as roadways, parking, curbside pick-up and drop-off, passenger check-in areas, security checkpoints, holdroom lounges, baggage screening and reclaim, and other operational support elements.

a. Landside Access Requirements

The new HVN East Terminal requires access from the off-airport municipal roadway system Initially, and until a formal traffic analysis is undertaken, a 2-lane bidirectional roadway is assumed to satisfy the projected vehicle traffic demand based on trip generation between assumed modal types. This access roadway will serve short-term parking, long-term parking, rental car lots, deliveries, and the passenger terminal arrivals and departures curbside. A recirculating loop or traffic circle provides the ability for vehicles to gain access to other landside parking areas without the need to exit the airport.

b. Parking

The new HVN East Terminal requires short- and long-term parking for private vehicles and staging and return areas for rental cars and for-hire vehicles. Based on the modal splits provided in combination with group size and trip length, parking requirements can be ascertained.

- Parking: 25%*
- TNC/Taxi: 15%*
- Rental Car: 15%*
- Staff: 5%*
- Average Group size: 1.8 pax*
- Average Bags per pax (check-in): 0.7 bags/pax*
- Average trip length per pax: 4.5 days*

Vehicular Planning Information, Source: Avports

It is projected that at minimum, 4,000 parking spaces are required to serve the HVN East Terminal. This parking requirement is distributed between short-term, long-term, car rental, taxi, and staff parking.

DAILY DEPARTURES DEMAND				DAILY ARRIVALS DEMAND			
3,552	Departing Pax	Trip Length	4.5 days	3,399	Departing Pax	Trip Length	4.5 days
1.8	Group size			1.8	Group size		
530.8	25% Parking (long term)			509.6	25% Parking (long term)		
318.5	15% Taxi			305.8	15% Taxi		
318.5	15% Car Rental			305.8	15% Car Rental		
849.3	40% Private Vehicle			815.3	40% Private Vehicle		
150.0	5% Staff			150.0	5% Staff		
2,123.3	100% Daily Departing Vehicle Movements			2,038.3	95% Daily Arriving Vehicle Movements		
1,167.8	60% of Daily Departing Vehicle Movements entering Parking			1,121.1	60% of Daily Arriving Vehicle Movements exiting Parking		
4,017.8	14 day average parking requirement (entering / exiting balance)						

Vehicular Parking Demand, Source: PGAL

c. Curbside

Arrivals and departures curbside requirements are calculated by first identifying the peak rolling passenger hours and distributing the passenger demand into planned group size to calculate number of vehicle movements.

DEPARTURES		
706	Departures 1HR Rolling Pax	14:40-15:40
1.8	Group size	
98.1	25% Parking	(lane 3, 4)
58.8	15% Taxi	(Lane 1, 2)
58.8	15% Car Rental	(Lane 3, 4)
176.5	45% Private Vehicle	(Lane 1, 2)
392.2	1HR Rolling Departures Vehicle Movements (all lanes)	
235.3	60% of Vehicle Movements using Curbside Parking during 1HR Rolling Peak Hour	

ARRIVALS		
643	Departures 1HR Rolling Pax	13:45-14:45
1.8	Group size	
89.3	25% Parking	(lane 3, 4)
53.6	15% Taxi	(Lane 1, 2)
53.6	15% Car Rental	(Lane 3, 4)
160.8	45% Private Vehicle	(Lane 1, 2)
357.2	1HR Rolling Departures Vehicle Movements (all lanes)	
214.3	60% of Vehicle Movements using Curbside Parking during 1HR Rolling Peak Hour	

Vehicular Movements, Source: Avports, PGAL

Once the demand for vehicle movements has been identified, curbside roadway lengths are determined to meet adequate level of service and capacity ratio targets. The total curbside length requirement is subsequently split between multiple lanes to maintain curbside parking closer to the new terminal building. Pass-through lanes are provided to access curbside parking. Based on the analysis, it is viewed that 2 lanes are sufficient to accommodate the demand.

DEPARTURES									
Modal Type	Peak Hour Vehicle Demand	Peak 15 Minute (vehicles)	Vehicle Dwell Time (Min)	Multiple Stop Factor	Peak 15 Demand (minutes)	Vehicle Length (ft)	Peak 15 Min. Demand (ft * Min)	Peak 15 Min. Demand (ft)	
Private	176.5	44.1	3.0	1.0	132.4	25.0	3,309.4	220.6	
Taxi	58.8	14.7	2.0	1.0	29.4	25.0	735.4	49.0	
Shuttle	0.0	0.0	2.0	1.0	0.0	50.0	0.0	0.0	
Bus	0.0	0.0	2.0	1.0	0.0	50.0	0.0	0.0	
Other	0.0	0.0	2.0	1.0	0.0	30.0	0.0	0.0	
Total	235.3	58.8					Total Required	269.7	
					Total LF Provided Lane 1	350	80%	280	
					Total LF Provided Lane 2	350	50%	175	
					*4-lane curbside roadway with parking on interior 2 lanes of 350 lft each				
							Total Provided (lf)	700*	
							Utilization Factor (lf)	455	
							Capacity Ratio	0.593	
							LoS	C	

ARRIVALS									
Modal Type	Peak Hour Vehicle Demand	Peak 15 Minute (vehicles)	Vehicle Dwell Time (Min)	Multiple Stop Factor	Peak 15 Demand (minutes)	Vehicle Length (ft)	Peak 15 Min. Demand (ft x Min)	Peak 15 Min. Demand (ft)	
Private	160.8	40.2	3.0	1.0	120.6	25.0	3,014.1	200.9	
Taxi	53.6	13.4	2.0	1.0	26.8	25.0	669.8	44.7	
Shuttle	0.0	0.0	2.0	1.0	0.0	50.0	0.0	0.0	
Bus	0.0	0.0	2.0	1.0	0.0	50.0	0.0	0.0	
Other	0.0	0.0	2.0	1.0	0.0	30.0	0.0	0.0	
Total	214.3	53.6					Total Required	245.6	
					Total LF Provided Lane 1	350	80%	280	
					Total LF Provided Lane 2	350	50%	175	
					*4-lane curbside roadway with double parking on interior 2 lanes of 350 lft each				
							Total Provided (lf)	700*	
							Utilization Factor (lf)	455	
							Capacity Ratio	0.540	
							LoS	C	

Curbside Length, Source: PGAL

d. Airside

The new HVN East Terminal requires accommodation of ADG III aircraft. As such, the number of aircraft gates and remain over-night (RON) parking positions can be planned to serve the demand indicated on the provided DDFS. It assumes 25 daily departures with an average seat utilization of 85%. 8 aircraft parking stands is the minimum requirement to support the 8 aircraft Remaining Over Night (RON) and is split into 6 terminal positions and 2 RON positions on the new terminal's airside apron. A new ADG III taxilane provides access to and from the new airside apron to the existing taxiway system. The gate will have PC Air, GPU, and potable water cabinets to service the aircraft. Vehicle Service Roads provide access to ramp support areas and the aircraft.

DDFS Aircraft Parking Stand Requirement. Source: Avports

e. Terminal Building

Based on the provided DDFS which identifies the rolling peak hour demand and based on the LOS Optimum, the terminal building facility requirements can be identified. LOS Optimum metrics are applied using space and maximum wait time guidelines for the desired LOS for planning of the check-in, security control, gate holdrooms, baggage reclaim, and public arrival hall components of the terminal. Other terminal building facility requirements are specified by the Lessee such as commercial, office, and support spaces. Restroom facilities are sized based on building codes and industry best practices. Support facilities such as for building systems are planned to accommodate the functional program.

f. Terminal Space Programming

Interviews with key stakeholders give an understanding of operational requirements that are not specified by the overall facility requirements exercise. A building space program has been generated to further refine the operational intent of the facility and to determine functional sizes of major elements. Using this information yields the ability to calculate a projected terminal building footprint, parking lot sizes, airside apron area configurations, and other elements that enable a “test-fit” on the major planning components on the project site.

SITE TOTAL (Exterior Space + Open under Terminal)					1,477,141	SF	R+P+E
BUILDING TOTAL (Interior Space Elevated)					79,128	SF	L+S+A+O
R Roadways, Landside Access, & Curbside					Total	195,120	SF
#	Space	Department	Location	Qty	Area Unit	Total	Unit
P Parking					Total	778,821	SF
#	Space	Department	Location	Qty	Area Unit	Total	Unit
E EXTERIOR APRON, SITE, OTHER					Total Area	503,200	SF
#	Space	Department	Location	Qty	Area Unit	Total	Unit
L Pre-Security					Total Area	28,881	SF
#	Space	Department	Location	Qty	Area Unit	Total	Unit
A Airside Post-Security					Total Area	28,300	SF
#	Space	Department	Location	Qty	Area Unit	Total	Unit
O OPS RAMP LEVEL (INTERIOR)					Total Area	5,340	SF
#	Space	Department	Location	Qty	Area Unit	Total	Unit

Terminal Space Program. Source: PGAL

g. Summary of Facility Requirements

Roadways	2 lane bi-directional roadway and recirculation loop
Parking	4,000 parking spaces
Curbside	
Departures	2 lanes 350 linear feet each
Arrivals	2 lanes 350 linear feet each
Terminal	
Ticketing	20 check-in Counters, 9 self-serve kiosks
BHS Screening	2 EDS machines
SSCP	5 Screening Lanes
Holdroom	(6) 2,300sf departure lounges
Claim	(2) 150 linear feet
Commercial	12,000sf

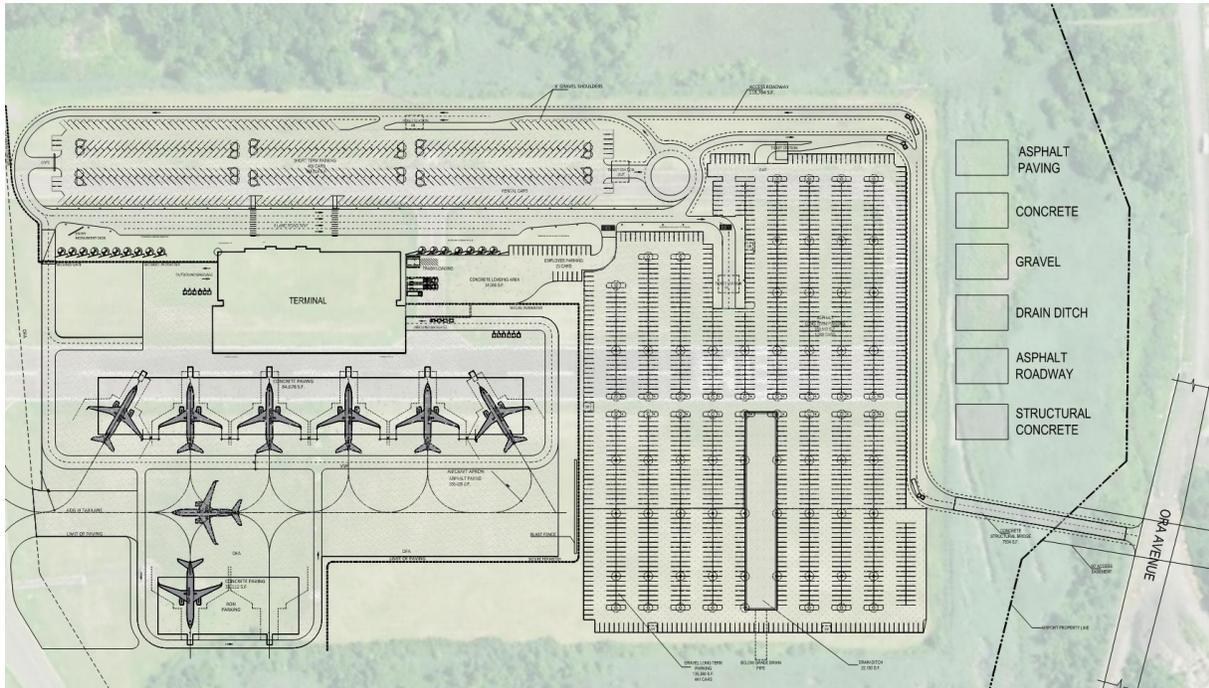
Office Ramp Support	8,000sf 5,000 sf
Gates	4 ADG III
Terminal Stands	6 ADG III
Hardstands	2 ADG III
Taxilane	ADG III

4. Concept Planning

Utilizing the facility requirements and space program defined above, options for the project site configuration have been explored. Multiple iterations of potential site distribution concepts have been studied including options to mitigate flooding concerns within this project site. Major facility components are arranged on the site to balance operational and practical targets, including mitigating noise exposure to the neighborhood located towards the north by configuring the layout as proposed. Landside parking is located adjacent to the off-airport roadway system and airside parking is located adjacent to the taxiway system. The optimum solution for the new terminal building is oriented north to south which allows for access roadways, arriving and departing curbsides and aircraft parking stands on either side of the building. Appropriations for storm water quality and retention are identified for compliance with the local authority having jurisdiction.

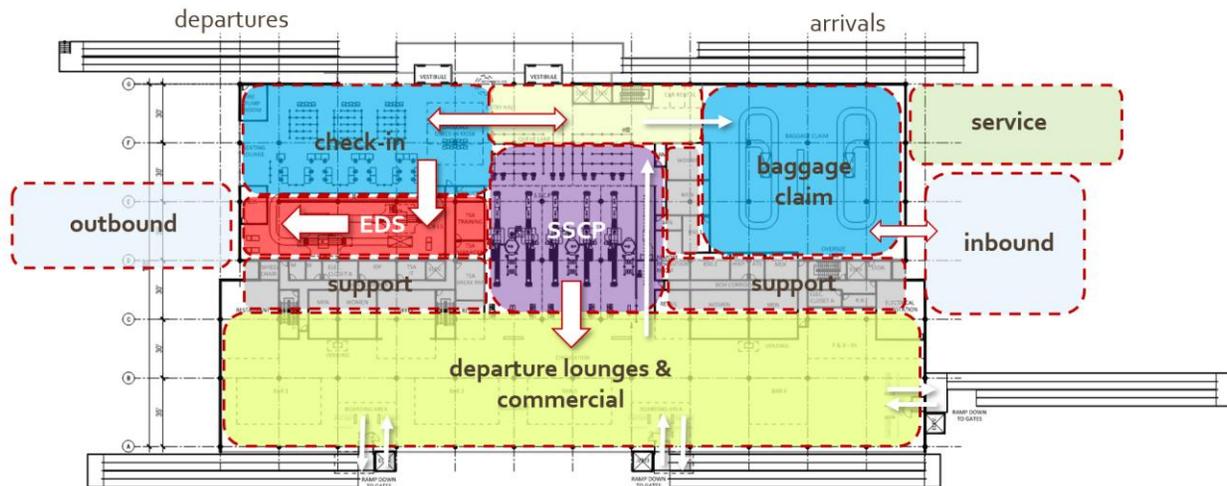


HVN East Terminal Site Distribution Diagram of Functional Elements. Source: PGAL



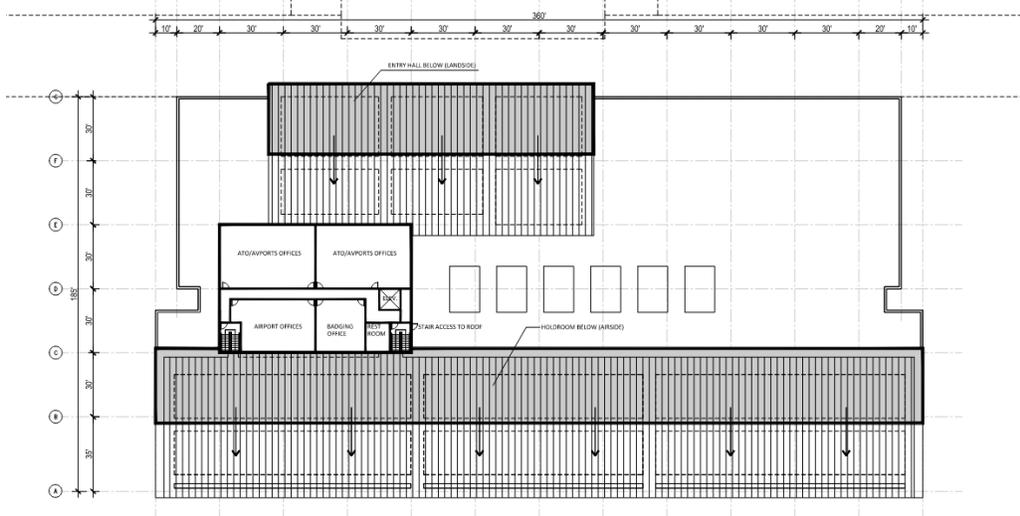
HVN East Terminal Site Planning Preferred Option. Source: PGAL

For the new terminal building, the facility requirements and building space program results in a proposed design of a +/-80,000sf elevated 1-story plus mezzanine terminal with 4 gates serviced by arrivals / departures curbsides. A common check-in hall with ticketing; public and staff restrooms; retail food/beverage concessions; outbound BHS system with EDS and bag makeup; airline ticket offices; TSA SSCP; departure holdrooms w/ automated boarding; airside operations offices; equipment storage; rental car and other amenity kiosks; landside loading / trash dock; and other elements are contained therein.



HVN East Terminal Building Functional Diagram. Source: PGAL

Building systems assumed for the new passenger terminal include but are not limited to: Outbound / inbound BHS; BMS; LED daylight harvesting / dimming; access control, CCTV, FIDS, RIDS; public Wi-Fi; paging; wayfinding and regulatory signage; solar panel array and battery storage system; rainwater harvesting and reuse; HVAC DX w air handlers; a standby / emergency power generators; and lightning protection.



HVN East Terminal Mezzanine Level Floor Plan. Source: PGAL



HVN East Terminal Mezzanine Conceptual Rendering. Source: PGAL