November 2024

Capital Region International Airport Master Plan
Terminal Area Plan

Appendix X
Terminal Area Plan

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Prepared by RS&H, Inc. at the direction
of Capital Region Airport Authority

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1 Introduction

Capital Region Airport Authority (CRAA) leadership, Lansing Capital Region International Airport (LAN) staff, Federal Aviation Administration's Detroit Airports District Office (FAA-DET ADO) staff, Michigan Department of Transportation (MDOT), and the local community understand that the LAN commercial passenger terminal is aging and building maintenance costs over the long-term will only increase without strategic investment. Many elements of the terminal infrastructure/equipment are reaching the end of their useful life. Passenger amenities in the terminal are limited, modern comforts and conveniences are lacking or have been implemented in a piecemeal fashion, and the "curb appeal" of the building front is not aligned with community expectations for the airport serving its state capital. The CRAA, FAA, MDOT, and local leaders recognize that now is the time to make the necessary investments in the passenger terminal to address these issues.

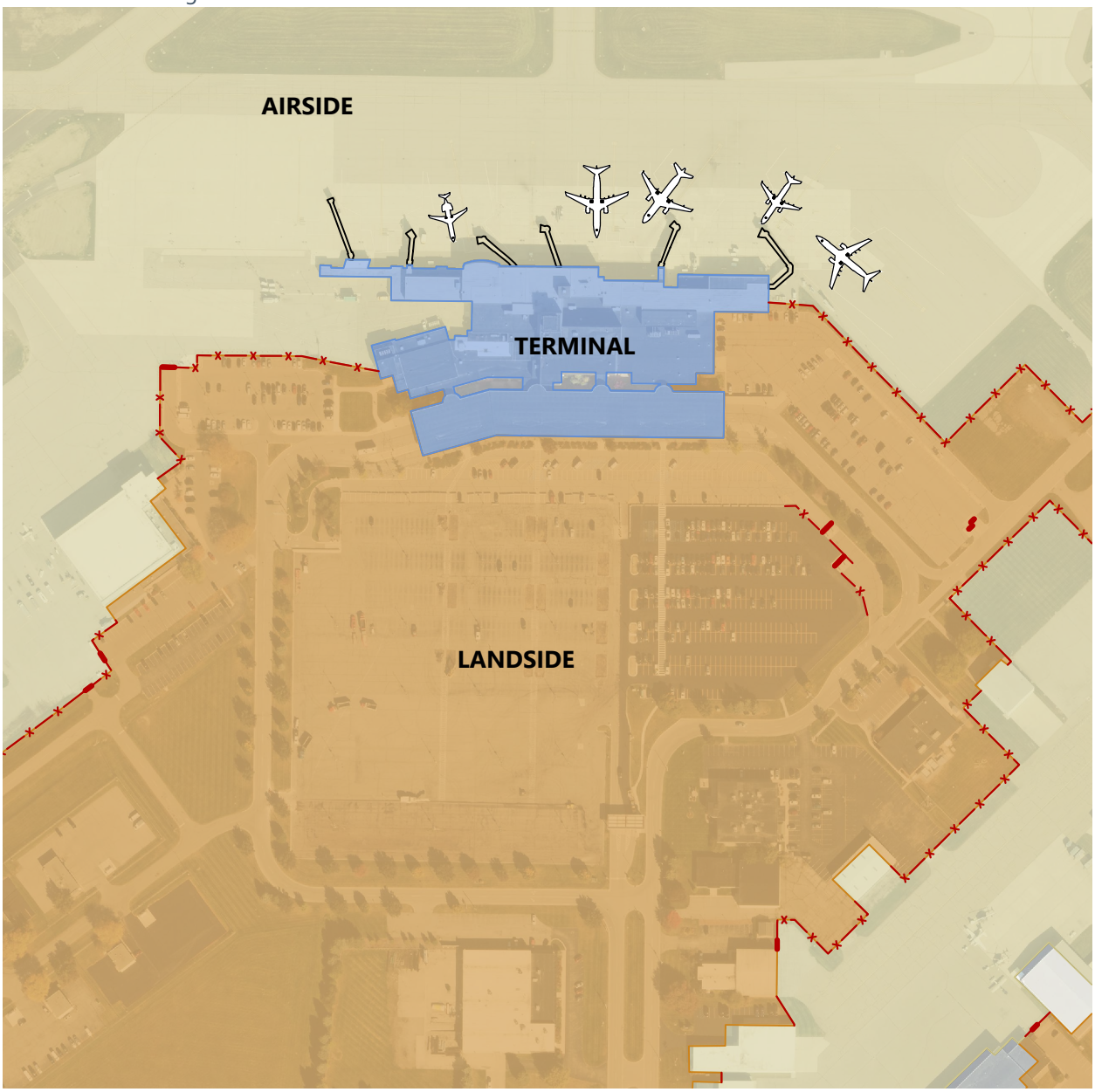
1.1 Existing Conditions

In 1959, the original portion of the existing passenger terminal opened and began serving the residents of Lansing and the greater Metropolitan Service Area (MSA) with a two level, single-concourse terminal facility, connected to administration offices and an Airport Traffic Control Tower (ATCT). The existing terminal facility has undergone several transformative expansions and renovations, with the most recent occurring in 2008. This section describes the current condition of the terminal area serving commercial passenger traffic.

The commercial passenger terminal area consists of both landside and airside areas, with the terminal facility bridging the gap between the two. These areas are designed to securely serve passengers using commercial airline services and are divided by the Air Operations Area (AOA) fence. The commercial passenger terminal area is illustrated in **Figure 1** and generally defined by the following terms:

- **Airside Area** – This area includes the commercial apron where passenger aircraft park and ground service equipment are staged.
- **Terminal Building** – This area includes the existing facility that serves airline passengers. Terminal spaces include a ticketing hall, car rental services, a security checkpoint, passenger holdrooms, concessions, baggage claim, airport administration offices, and support areas. The ATCT is also located within the terminal building and is owned by CRAA.
- **Landside Area** – This includes the roadway network, terminal facility access points, parking lots, and the terminal curb where passengers are dropped off and picked up.

Figure 1
Commercial Passenger Terminal Area



LEGEND
- Airside
- Terminal
- Landside
- AOA Fence
- AOA Gate

N

0' 150' 300'

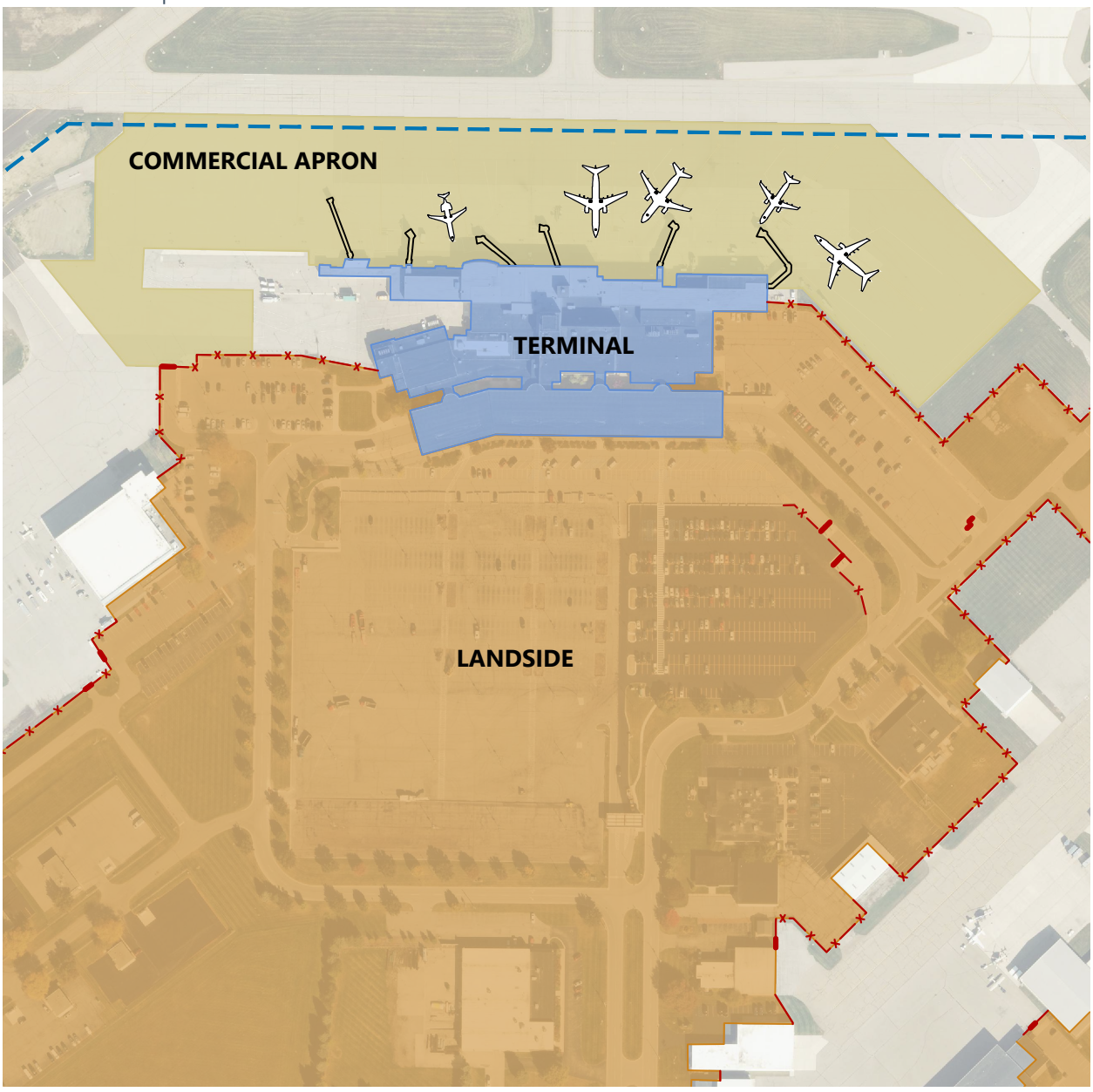
Source: RS&H, 2023

1.2 Airside Apron Condition

The commercial service apron, shown in **Figure 2**, is approximately 500,000 square feet and can accommodate up to eight mid-sized commercial passenger aircraft simultaneously.

Refer to **Chapter 1, Inventory of Existing Conditions** for more information about pavement condition of the terminal apron.

Figure 2
Airside Aircraft Apron Area



LEGEND
- Commercial Apron
- Terminal
- Landside
- AOA Fence
- AOA Gate
- 35' Building Restriction Line (BRL)

N

0' 150' 300'

Source: RS&H, 2023

1.3 Terminal Building Condition

The terminal building is configured with a linear concept and a parallel gate concourse. The first level contains a combination of landside and airside operations. The landside area accommodates the primary airline functions of ticketing, airline ticket offices, outbound/inbound baggage, and baggage claim. In addition, this area also contains space dedicated to rental car counters, concessions, public function areas, the security checkpoint, and utilities. The linear terminal building is organized so that departing passenger functions, such as ticketing, are in the eastern section, while arriving passenger functions, such as baggage claim, are in the western section. The two areas are connected by a central circulation lobby containing the security checkpoint facilities and a meet-and-greet lobby. This area also contains stairs, elevators, and escalators to the second level. The airside portion of the first level contains the inbound and outbound baggage facilities, a ground level holdroom for Gates 1-4, and the Federal Inspection Services (FIS) area for passengers and crew arriving from international locations.

The landside portion of the second floor consists of offices, conference rooms, storage space, and the Eaton RESA Aviation Career Institute. The airside portion consists of passenger holdrooms for bridge-loaded aircraft, a self-serve concessions space with beverages and food, a restaurant (with associated office and storage space), and FIS access from Gate 9. Adjacent to Gate 6 is an escalator and stair core which connects the upper level holdrooms with the first level holdroom for Gates 1-4. At the time of this assessment, all regularly scheduled airline service is conducted at Gates 5-9, while Gates 1-4 are used for sports charters or irregular operations.

The third level is entirely on the terminal non-secure side and consists of FAA office space and CRAA office space.

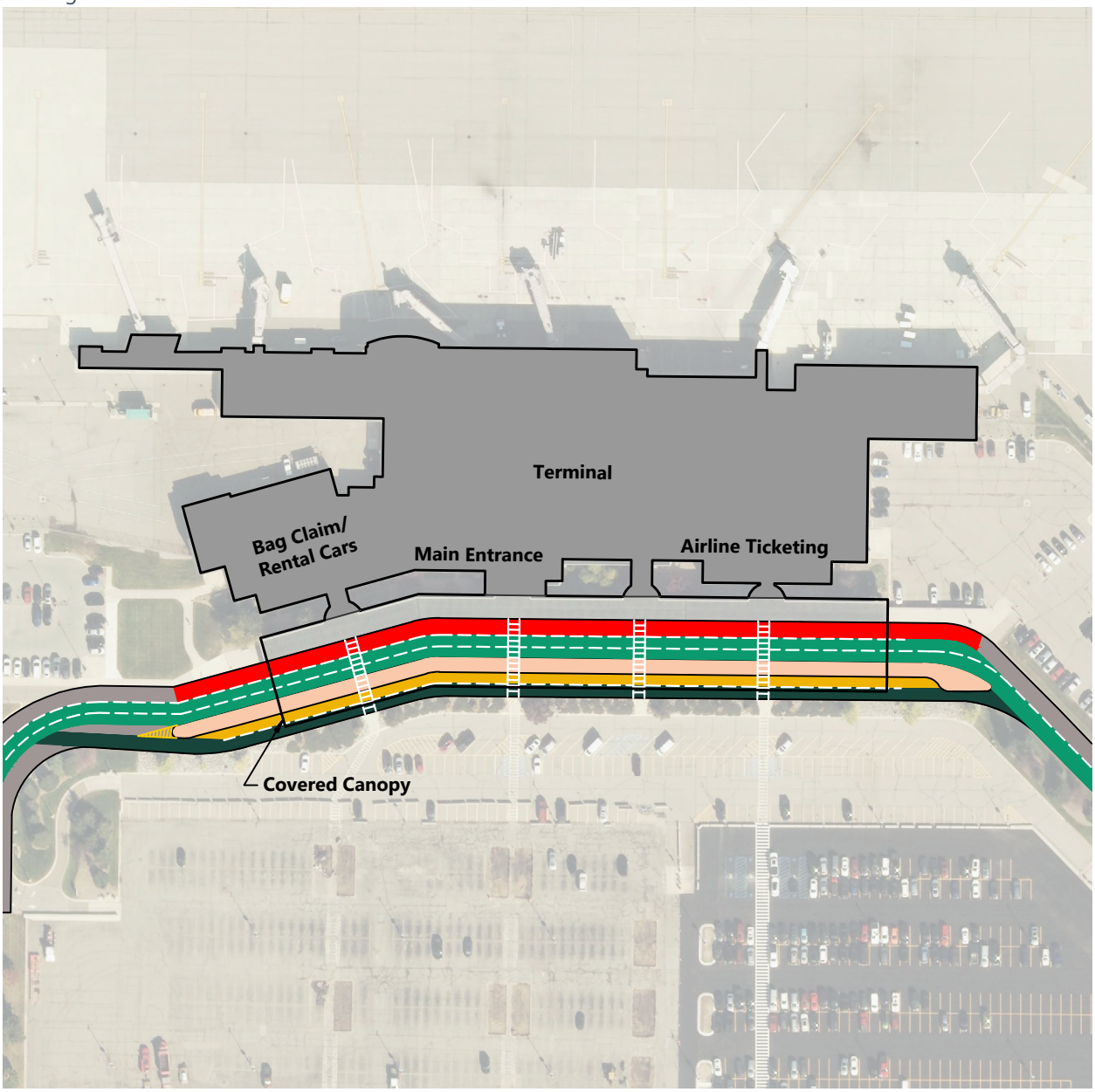
The fourth and fifth levels are allocated to the FAA for ATCT functions. The fourth level consists of offices and administrative space, while the fifth level is the tower cab. See **Appendix X, Terminal Facility Assessment** for a depiction of the terminal building layout.

As part of the Master Plan update, an inventory and building assessment of the existing terminal facility was conducted. The assessment identified many critical infrastructure systems beyond their expected useful life requiring replacement. It also indicated that based on the time of initial construction (1959 with expansions in 1979, 1994, 2002, and 2008), environmental hazards may exist within the infrastructure. Based on the findings within the terminal facility assessment, many of the existing facilities need repair and updating.

1.4 Landside Conditions

The current terminal building is primarily accessed by way of Capital City Boulevard with E/W Circle Drive serving as the terminal loop road. Public vehicle parking facilities for passengers are programmed into designated areas for long-term, short-term, employee, and rental car lots. These parking lots provide 1,781 spaces for customers, staff, and the public, which are broken out into 166 short-term, 1,328 long-term, 189 employee, and 98 rental car customer ready-return spaces (with an additional 324 rental vehicle storage spaces available in the service area, not included in customer parking space count). The terminal curbfront is split into two segments with passenger pickup/drop off immediately in front of building (inner curb) and commercial service pickup/dropoff on the outer curb. The terminal curbfront is covered by a concrete canopy which spans all traffic lanes up to, but not including, the commercial vehicle through lane. **Figure 3** shows the layout of the terminal curb roads. **Figure 4** depicts the terminal landside and vehicle movement areas within the terminal loop road. More detailed information about the landside configuration is available within **Appendix X, Regional Access – Existing Conditions Technical Memorandum**.

Figure 3
Passenger Terminal Curbfront



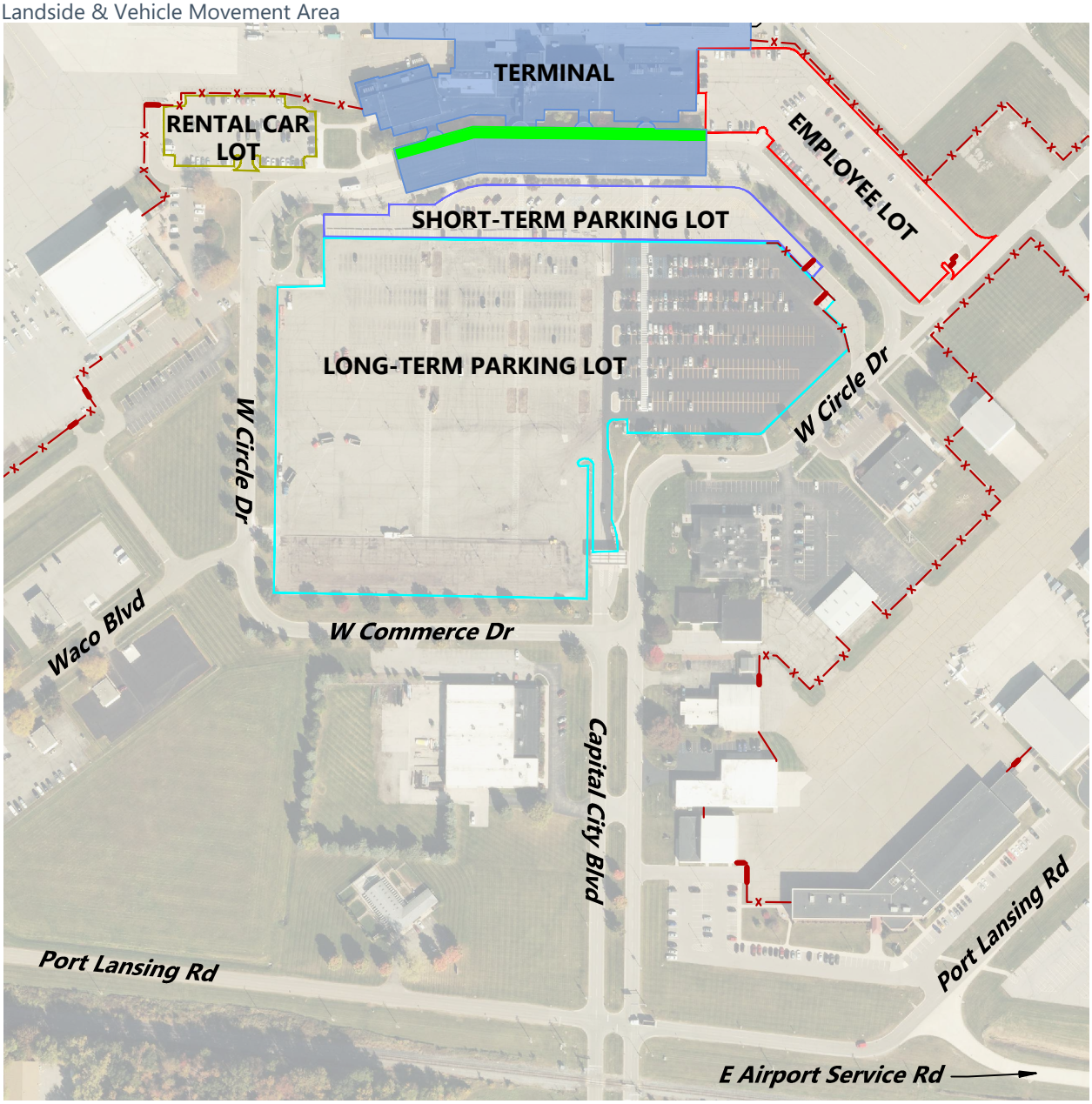
Passenger Curbside Dropoff/Pickup Lane
Passenger Vehicle Through Lanes
Commercial Vehicle Staging Lane
Commercial Vehicle Through Lane
Commercial Vehicle Curb
Crosswalk

N

0' 75' 150'

Source: RS&H, 2024

Figure 4
Landside & Vehicle Movement Area



Source: RS&H, 2023

2 Passenger Demand Forecast

To evaluate the existing passenger terminal facility against current and future activity, portions of the CRAA's aviation demand forecast, developed during the Master Plan analysis, will be used. The following section summarizes the passenger activity portions of the demand forecast to provide greater context in the evaluation of existing conditions at the terminal and outline the planning activity levels used to project the future terminal area needs (categorized by functional area in **Section 3.1**).

2.1 Design Activity Level

Determining the peak hour passenger demand is the traditional method for comparing terminal facility capacity with current and forecast demand. This is done by calculating the amount of enplaning and deplaning passengers processed through the terminal during the busiest hour of the busiest day of the forecast year. Peak hour demand helps identify terminal facility accommodations needed to provide the optimal level of service for passengers.

The Master Plan forecast establishes four passenger enplanement forecast scenarios based on the existing baseline year, 2023. Forecasted years include 5-, 10-, and 20-year increments, which present the three base case scenarios, 2028, 2033, and 2043 respectively, and an additional high-growth scenario for 2043. To determine the necessary future passenger terminal needs, the high-growth scenario for 2043 was chosen as a conservative approach to best determine site needs, constraints, and phasing strategies. **Table 1** describes each activity level and the aircraft associated with the peak hour passenger demand.

Table 1
Design Activity Level Summary

Scenario	Aircraft Type	Passenger Seats	Peak Enplaning Passengers	Peak Deplaning Passengers (Domestic)	Peak Deplaning Passengers (International)
Existing 2023	Boeing 737-800 Bombardier CRJ-700 Bombardier CRJ-900 Embraer 145	189 65 76 50	140	160	150
Base 2028	Boeing 737-800 Bombardier CRJ-700 Bombardier CRJ-900	189 65 76	440	560	260
Base 2033	Airbus A220-100 Boeing 737-800 Bombardier CRJ-700 Bombardier CRJ-900	109 189 65 76	450	560	260
Base 2043	Airbus A220-100 Boeing 737-800 Bombardier CRJ-700 Bombardier CRJ-900	109 189 65 76	460	570	270
High 2043	Airbus A220-100 Boeing 737-800 Bombardier CRJ-700 Bombardier CRJ-900	109 189 65 76	460	570	270

Source: RS&H, 2023

2.1.1 Peak Hour Design Levels

Forecasted airline schedules were analyzed to establish the peak hour passenger demand for calculating terminal facility needs. Peak hour enplaning passengers (PHEP) and peak hour deplaning passengers (PHDP) are used to determine the peak hour passenger demand at the terminal. For LAN, an additional PHDP metric was established for international arrivals, which both created demand values for the FIS, but also reduced the deplaning passenger count for the portions of the terminal exclusively serving domestic passengers.

The peak hour is determined by summing total passenger counts for complementary functions into 60-minute intervals using passenger reporting profiles. Once peak hour values are established, they are used to calculate the facility requirements for specific functions (ex. ticketing, security screening, and restrooms). PHEP represents the peak hour in which demand for the terminal's processing functions is the greatest. The high demand within the hour is associated with flights scheduled for departure, resulting in a surge of passengers arriving and

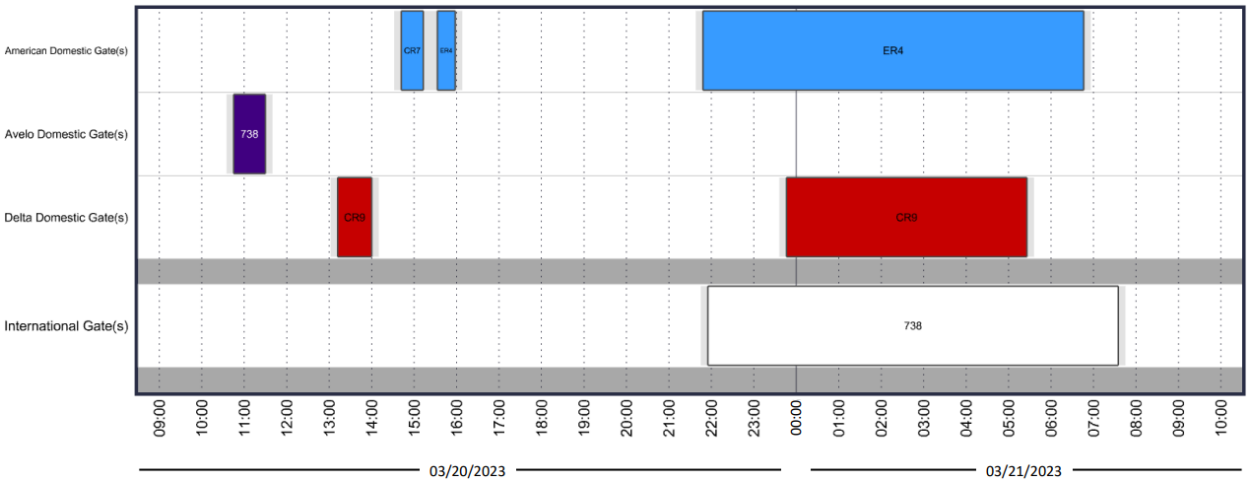
processing through the terminal. This passenger activity creates "pressure" on the terminal curb, ticket counters, screening functions, and holdrooms. The distribution of passengers for the PHEP in this study assumes passengers will begin arriving approximately 110 minutes prior to the flight departure time, with the bulk of the passengers arriving between 40 and 80 minutes before departure. PHDP represents the peak hour of arriving flights where passengers move through the terminal, adding "pressure" to restrooms, baggage claim, the terminal curb, and ground transportation facilities. Peak hour deplaning distributions are not as complex because of the short period required to unload an entire aircraft and the reduced length of time deplaning passengers (not connecting) spend in the terminal. The deplaning peak hour for domestic arrivals is the total number of passengers on each aircraft factored in the scenario, as all passengers are assumed to have exited the terminal within 30 minutes.

The following scenarios are each illustrated with a design day flight schedule and peak hour passenger distribution graph. The design day flight schedule separates each airline by color and indicates the length of time an aircraft would be utilizing a gate and how many gates will be needed simultaneously. The larger blocks in the early morning and late evening indicate an overnight aircraft. The peak hour passenger distribution graph demonstrates the time-of-day enplaning and deplaning passengers are inside the terminal building and when they overlap.

2.1.1.1 Existing 2023 Passenger Forecast

The Existing 2023 scenario was developed as a visualization and benchmark to compare to future planning activity levels. While LAN operates in a preferential airline/gate use arrangement, with Avelo at Gate 5, Delta at Gates 6 and 7, and American at Gate 8, **Figure 5** shows that each airline could, under modeled conditions, use one gate.

Figure 5
Design Day Flight Schedule – Existing 2023

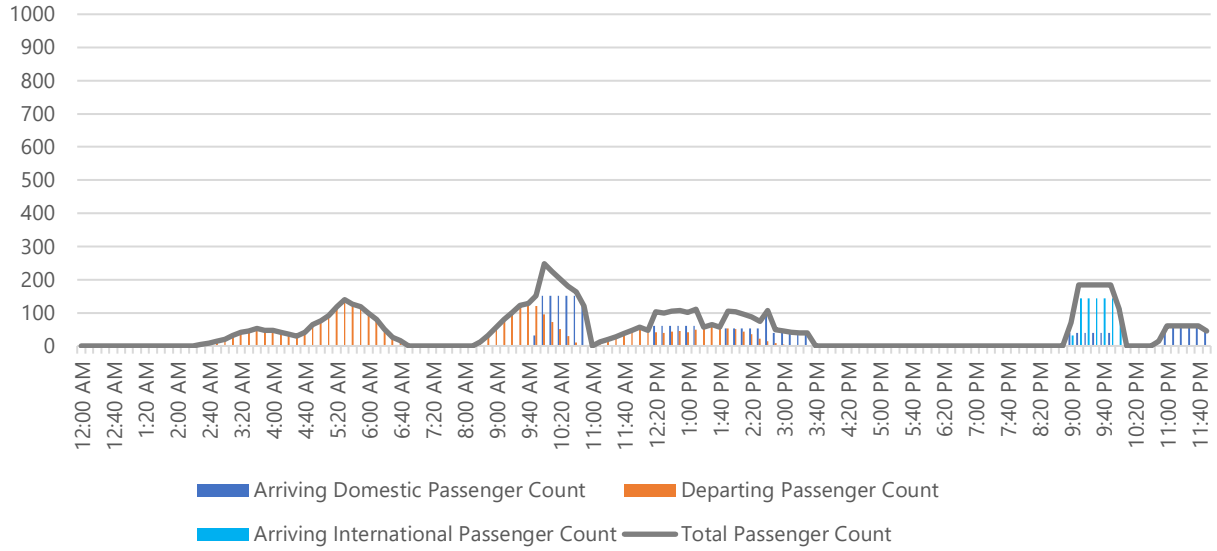


Note: Rolling 60-minute passenger counts.
Source: RS&H, 2023

This schedule yields a PHEP of 440, a PHDP (Domestic) of 560, and a PHDP (International) of 260.

Figure 6 shows the passenger distributions for the existing 2023 DDFS. As previously mentioned, the two flights do not overlap. This schedule yields a PHEP of 140, a PHDP (Domestic) of 160, and a PHDP (International) of 150.

Figure 6
Peak Hour Passenger Distribution – Existing 2023

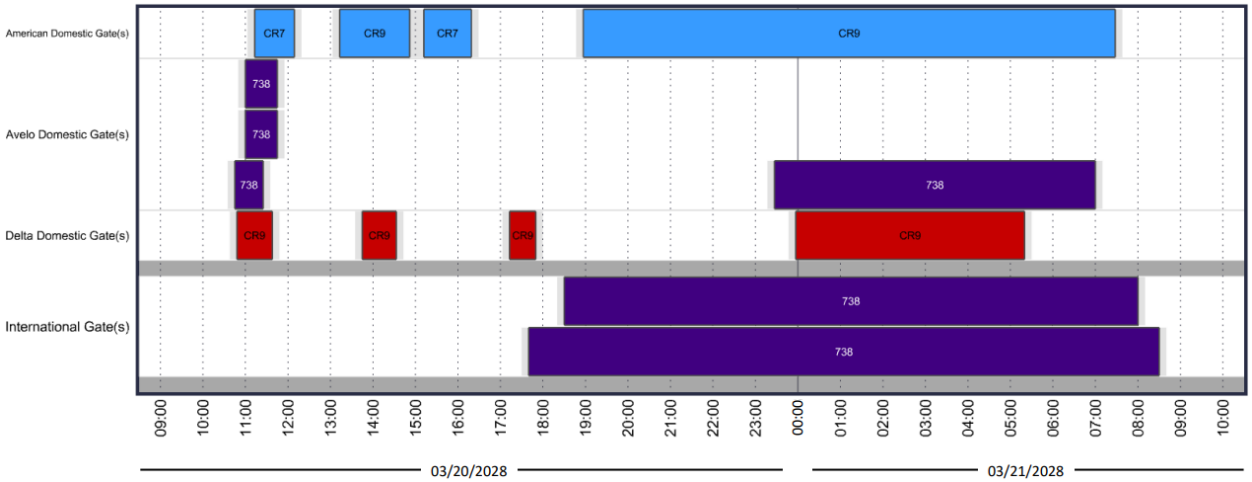


Note: Rolling 60-minute passenger counts.
Source: RS&H, 2023

2.1.1.2 Base 2028 Passenger Forecast

The Base 2028 scenario used for this study does not add any new airlines to the schedule, but adds an international departure operated by the incumbent ULCC, Avelo Airlines, totaling two international departures. Domestic capacity increases with multiple regional jets from both American Airlines and Delta Air Lines and adds notable expansion from Avelo to other domestic markets. Due to operational strategies, and typical leisure-market focus from ULCC's, Avelo's projected schedule involves the addition of close-to-simultaneous departures in the late morning, as shown in **Figure 7**. These flights, combined with the American and Delta flights around the same time will have a significant increase to the PHEP and PHDP's.

Figure 7
Design Day Flight Schedule – Base 2028

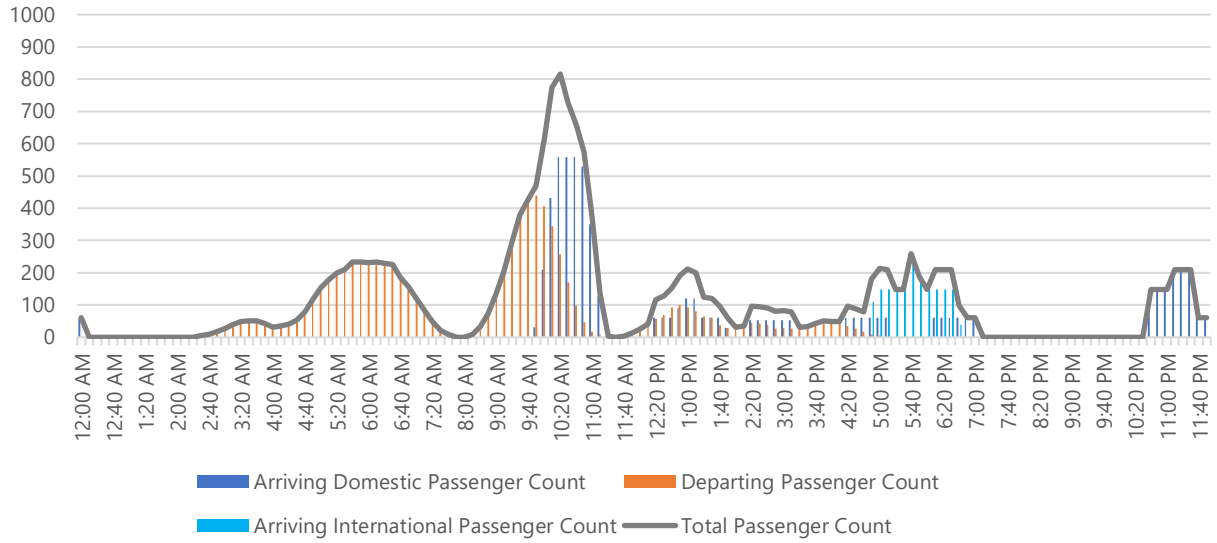


Source: RS&H, 2023

This schedule yields a PHEP of 440, a PHDP (Domestic) of 560, and a PHDP (International) of 260.

Figure 8 shows the passenger distributions for the Base 2028 DDFS. As previously mentioned, the late morning has five flights with respective operations very close to each other. This schedule yields a PHEP of 440, a PHDP (Domestic) of 560, and a PHDP (International) of 260.

Figure 8
Peak Hour Passenger Distribution – Base 2028

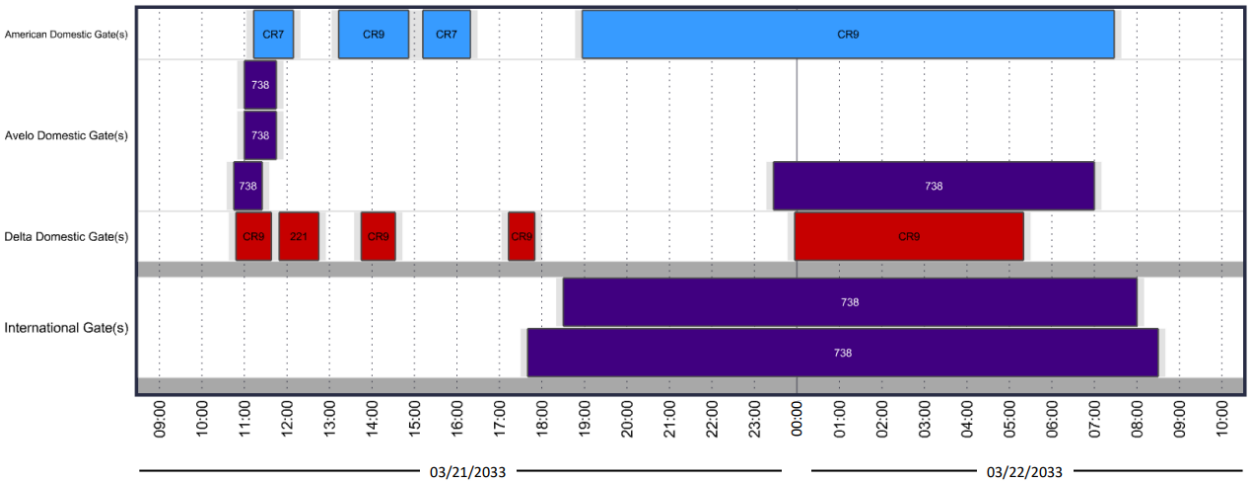


Note: Rolling 60-minute passenger counts.
Source: RS&H, 2023

2.1.1.3 Base 2033 Passenger Forecast

The Base 2033 flight schedule builds upon the Base 2028 schedule by adding a mainline Airbus A220-100 to Delta Air Lines' schedule, as shown in **Figure 9.** The timing of this additional flight, while not at the same time as the preceding group of five, will result in some departing passengers arriving at the airport and utilizing the various functions of the facility with the passengers on the previous flights.

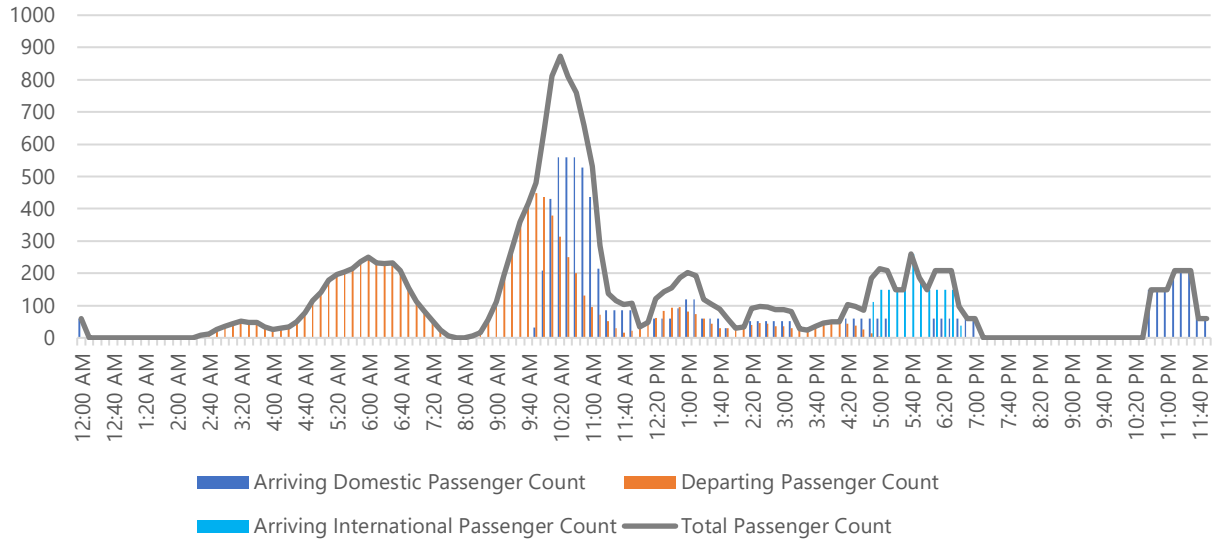
Figure 9
Design Day Flight Schedule – Base 2033



Source: RS&H, 2023

Figure 10 shows the passenger distributions throughout the design day and illustrates the peak values in the late morning. As mentioned previously, the additional Delta flight in the late morning offers a slight increase to the PHEP vs the 2028 values. This schedule yields a PHEP of 450, a PHDP (Domestic) of 560, and a PHDP (International) of 260.

Figure 10
Peak Hour Passenger Distribution – Base 2033

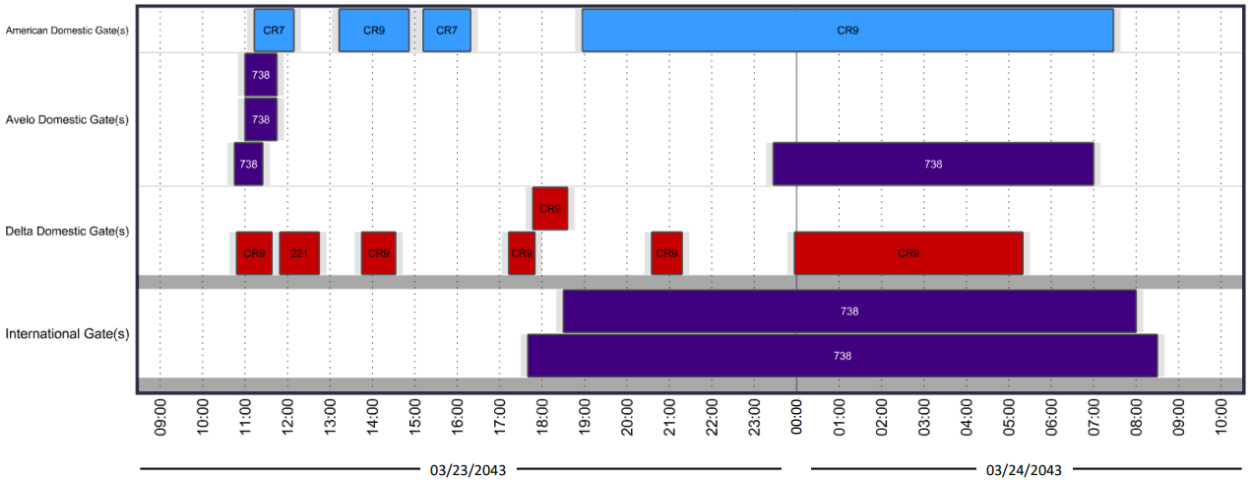


Note: Rolling 60-minute passenger counts.
Source: RS&H, 2023

2.1.1.4 Base 2043 Passenger Forecast

The Base 2043 flight schedule builds on the 2033 schedule and adds two Delta regional flights in the evening, which will result in the need for a second gate as two of the flights have a slight overlap, as shown in **Figure 11**. The rest of the schedule remains the same as the Base 2033 scenario.

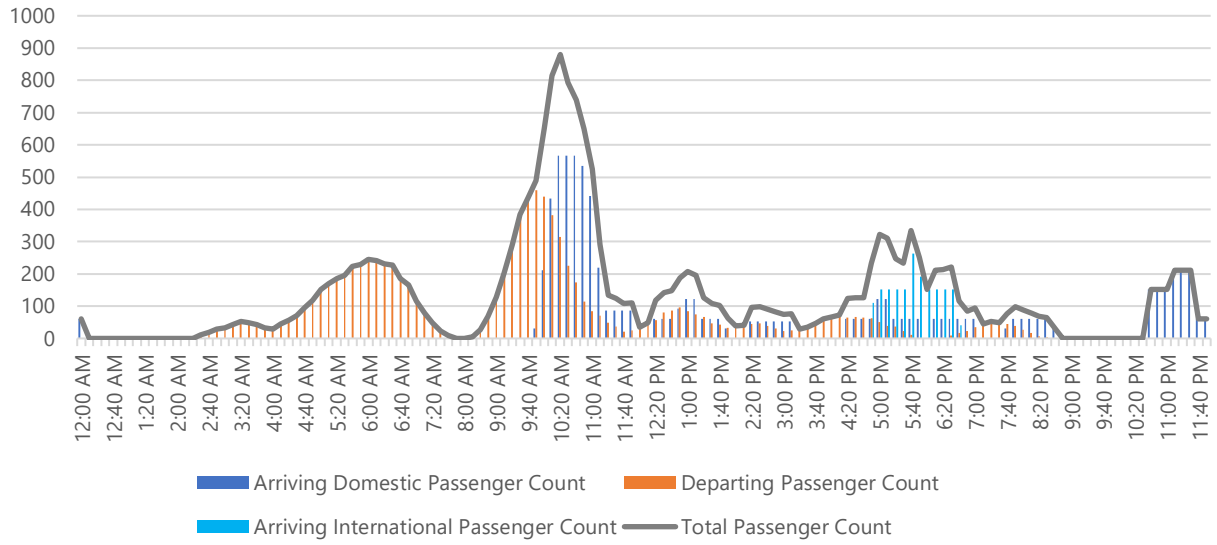
Figure 11
Design Day Flight Schedule – Base 2043



Source: RS&H, 2023

Figure 12 shows the passenger distributions for the Base 2043 DDFS. There are slight increases over the 2033 schedule, but the changes are minimal due to the schedule additions. This schedule yields a PHEP of 460, a PHDP (Domestic) of 570, and a PHDP (International) of 270.

Figure 12
Peak Hour Passenger Distribution – Base 2043

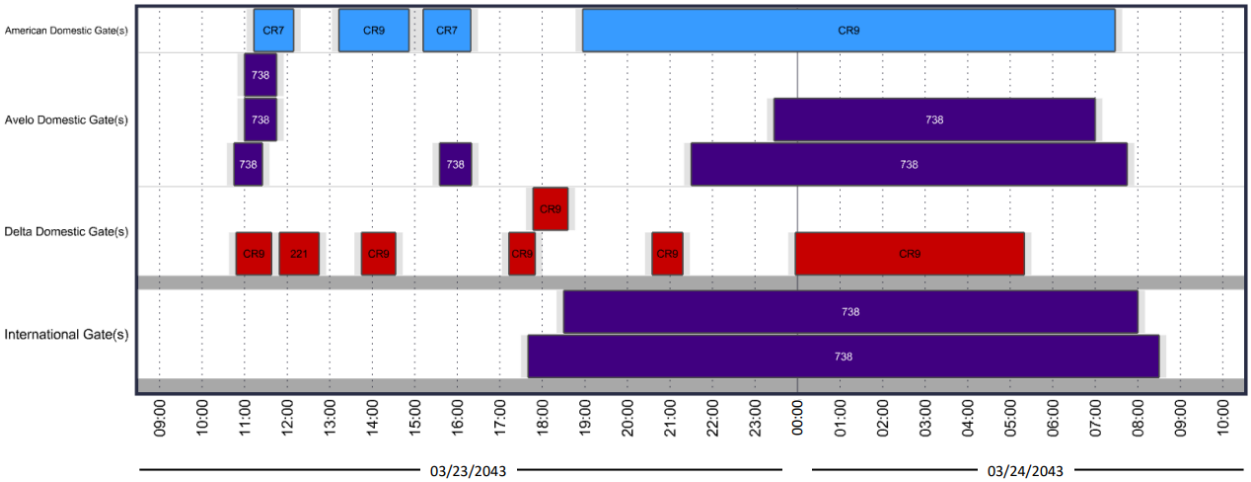


Note: Rolling 60-minute passenger counts.
Source: RS&H, 2023

2.1.1.5 High 2043 Passenger Forecast

The High 2043 flight schedule accounts for an increase in ULCC service by Avelo. The flight schedule, shown in **Figure 13,** shows two additional domestic flights, one mid-afternoon turn, and one late-night arrival. Even with the addition of an early morning departure, peak passenger loads still occur in the late morning due to the close-to-simultaneous flights.

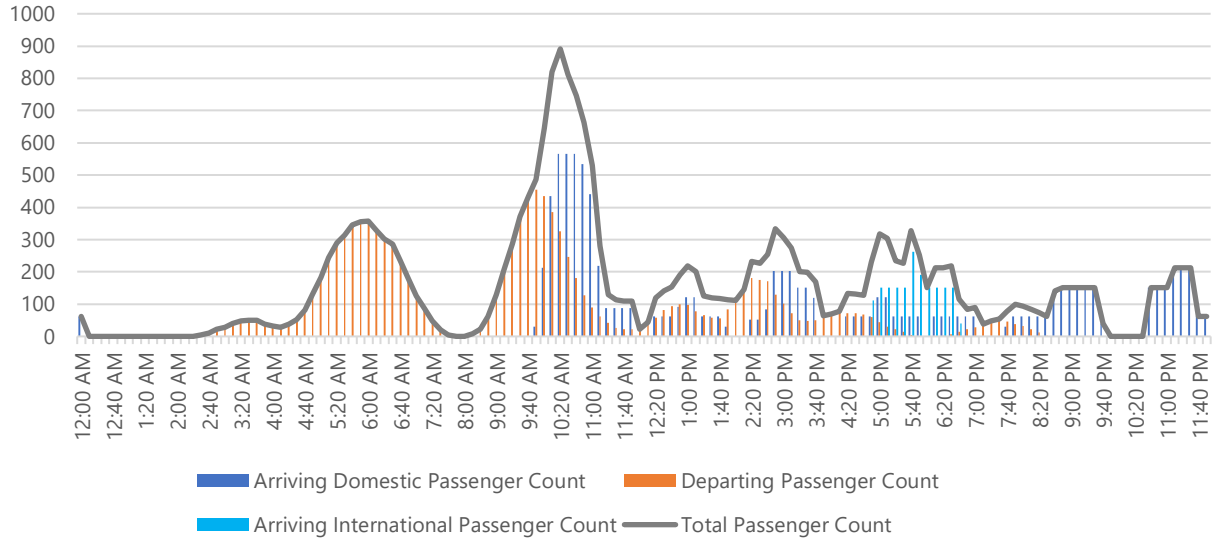
Figure 13
Design Day Flight Schedule – High 2043



Source: RS&H, 2023

Figure 14 shows the passenger distributions throughout the design day and illustrates the peak values in the late morning. This schedule yields a PHEP of 460, a PHDP (Domestic) of 570, and a PHDP (International) of 270.

Figure 14
Peak Hour Passenger Distribution – High 2043



Note: Rolling 60-minute passenger counts.
Source: RS&H, 2023

2.2 Forecast Summary

Four forecast scenarios from the overall Master Plan forecast were chosen for terminal planning purposes, and the design day flight schedules for those scenarios determined the peak-hour demand. **Table 2** summarizes each scenario's annual enplanement and peak hour enplanement and deplanement metrics.

Table 2
Passenger Enplanement/Deplanement Data

	Baseline Forecast				
ANNUAL AND PEAK-HOUR PASSENGERS	**Existing 2023**	**Base 2028**	**Base 2033**	**Base 2043**	**High 2043**
Annual Enplaned Passengers	101,400	231,000	245,900	303,800	360,200
Total Peak Hour Enplaned Passengers	140	440	450	460	460
Total Peak Hour Deplaned Passengers (Domestic)	160	560	560	570	570
Total Peak Hour Deplaned Passengers (International)	150	260	260	270	270
Total Combined Peak Hour Passengers	250	820	880	880	900
Total Passenger Boarding Bridges	3 (6)[1]	5	5	5	6

Note:
(1) LAN currently has 6 Passenger Boarding Bridges. Demand need is 3 based on schedule at time of analysis.
Source: RS&H, 2023

3 Terminal Area Programming Requirements

Industry guidelines were used to assess the existing capacity and future requirements for different functional areas in the terminal corresponding with proposed annual enplanement growth in the planning periods. To simplify each analysis, the terminal building was broken down into functional areas that delineate types of space by use. For the planning period, the projected enplanement/deplanement levels were used to determine the space required to accommodate operations.

The terminal building programmatic requirements were calculated based upon airport terminal planning best practices and recommended methodologies which can be credited to the following industry resources.

- *Airport Passenger Terminal Planning and Design* – Airport Cooperative Research Program Report 25, 2010, Volumes 1 and 2

- *IATA Airport Development Reference Manual*, 11th Edition, 2019
- *Checkpoint Design Guide*, Revision 6.1, Transportation Security Administration (TSA), 2016
- *TSA Planning Guidelines and Design Standards for Checked Baggage Inspection Systems*, Version 4.1, 2011
- FAA Advisory Circular 150/5360-13A, *Airport Terminal Planning*, July 2018
- FAA Advisory Circular 150/5360-14A, *Access to Airports by Individuals with Disabilities*, 2017

The programmatic requirements for this terminal building were determined based on the peak activity identified in the scenario analysis combined with planning parameters tailored to meet a desired level of service. Level of Service (LOS) is a qualitative and quantitative measure of passenger flows, level of delay, and level of passenger comfort. Two reputable industry sources have researched and developed rating systems that discuss methodologies and recommendations for determining LOS. These organizations are the International Air Transportation Association (IATA) and the Airport Cooperative Research Program (ACRP).

Table 3 shows the LOS ratings and attributes for each level. An "optimum" level of service is the benchmark for terminal planning because it offers a balance of cost efficiency while providing good LOS and comfort for passengers.

Table 3
Terminal Passenger Level of Service Standards

GRADE		LEVEL OF SERVICE	FLOW	DELAY	COMFORT LEVEL
A	Over-Design	Excellent	Free	None	Excellent
B		High	Stable	Few	High
C	Optimum	Good	Stable	Acceptably Brief	Good
D	Sub-Optimum	Adequate	Unstable	Acceptable for Short Periods	Adequate
E		Inadequate	Unstable	Unacceptable	Inadequate
F		Unacceptable	Cross Flows	System Breakdown	Unacceptable

Source: ACRP/IATA

All planning factors used in this study target an "optimum" level of service for each program area. To determine the programmatic area requirements, planning factors and industry best practices were applied according to the guidance outlined in the reference documents at the beginning of this section. It is important to note that some of the planning factors in those documents are better suited to large-hub airports. As such, professional experience and

judgement was exercised to adjust planning factors for use in this analysis when necessary to best fit the LAN operating environment. Recommended areas for each terminal programmatic function were the result of applying the adjusted factors and best practices.

3.1 Terminal Building Components

The conservative 2043 high-growth scenario was used to determine the size and area volumes for a passenger terminal that adequately supports airline operations at LAN. This allowed development of a full-size buildout that could be phased according to the base scenarios. The terminal sizing is based upon the standards required to provide an optimum level of service to passengers and includes correctly sized processing functions.

The terminal facility requirements in **Table 4** show all the program elements described in this chapter together into a total program area. The numbers shown in the table are rounded as specific areas may fluctuate prior to design and construction depending on numerous factors such as building code, operational efficiency and sustainability measures, and specific architectural and engineering factors, which could amount to a 10-15 percent difference. The terminal facility is categorized into different functional areas, as follows:

- **Airline Spaces:** The terminal areas used for ticketing/check-in, active and queuing spaces, and airline ticketing offices.
- **Airport Spaces:** The terminal areas used by the airport administration for offices, storage, and operations functions.
- **Baggage Services:** The areas of the terminal used to handle inbound and outbound baggage, including facilities necessary to perform baggage sorting, offloading, and retrieval.
- **Building Systems**: The areas of the terminal are reserved for mechanical, electrical, telecom, and other services that provide the utilities to operate the terminal.
- **Concessions:** The areas of the terminal that are leasable to third-party vendors, including food and beverage, retail, and banks/ATMs.
- **Federal Inspection Services (FIS):** The areas of the terminal controlled by Customs and Border Protection (CBP), and dedicated to passengers arriving on international flights, including primary and secondary inspection, baggage claim, agricultural checks, and detainment centers.
- **Ground Transportation:** The areas of the terminal used for car rental, taxi, bus, and ride-sharing counter space, queuing, and offices.
- **Holdrooms:** The areas of the terminal where passengers wait to board an aircraft, including airline customer service counters, boarding queues, and other amenities.
- **Public Spaces:** The areas of the terminal used by the public for circulation and associated functions, including waiting areas for meeters/greeters, ticketing circulation, and baggage claim retrieval.

- **Restrooms:** The areas of the terminal dedicated to restroom functions are located airside, landside, and in the FIS, including fixtures and stalls, janitor closets, and family rooms.
- **Transportation Security Administration (TSA):** The areas of the terminal operated by the TSA, including the security screening checkpoint (SSCP), offices, and baggage screening rooms.

Table 4
Terminal Building Program Requirements

TERMINAL FACILITIES COMPONENTS	Baseline Forecast					Surplus / (Deficiency)			
	Existing 2023	Base 2028	Base 2033	Base 2043	High 2043	Base 2028	Base 2033	Base 2043	High 2043
Airline Spaces	7,800	5,500	5,500	5,500	5,500	2,300	2,300	2,300	2,300
Airport Spaces	41,900	41,900	41,900	41,900	41,900	0	0	0	0
Baggage Services	25,800	25,400	26,000	26,200	29,100	500	(200)	(400)	(3,300)
Building Systems	22,100	5,500	5,600	5,700	6,200	16,600	16,500	16,400	16,000
Concessions	7,200	3,500	3,700	4,600	4,900	3,800	3,500	2,700	2,400
Customs and Border Protection (CBP)	17,900	20,600	20,600	20,700	21,300	(2,700)	(2,700)	(2,900)	(3,500)
Ground Transportation	1,400	2,100	2,300	2,800	3,300	(800)	(900)	(1,400)	(2,000)
Holdrooms/Gates	20,600	13,100	13,500	13,500	16,800	7,600	7,200	7,200	3,900
Public Spaces	30,900	13,000	13,200	13,900	15,800	18,000	17,800	17,000	15,100
Restrooms	5,400	4,400	4,800	4,800	5,000	1,100	700	700	400
Transportation Security Administration (TSA)	5,800	5,900	5,900	5,900	5,900	(100)	(100)	(100)	(100)
Total	**186,800**	**140,900**	**143,000**	**145,500**	**155,700**	**46,300**	**44,100**	**41,500**	**31,200**

Source: RS&H, 2023

It should be noted that circulation, which is included under 'Public Spaces,' is calculated as a percentage of the total airside or landside spaces. Thus, the airside and landside circulation surpluses are associated with the other specific program areas. The surplus/deficient spaces include:

- Oversized or Underutilized Areas:
  - Ticketing Hall
  - Holdrooms
  - Various Basement Spaces
- Undersized Areas:
  - Outbound Baggage Screening (TSA)
  - FIS Primary Inspection and Baggage Claim

Each description includes an explanation of those operational considerations that must be considered.

3.1.1 Airline Spaces

Airline Spaces include airline ticket counters, self-service kiosks, queue areas, and airline ticket offices. These areas are on the non-secure side where passengers check in, obtain boarding documentation, and check bags. At LAN, the airline spaces are oversized in all areas. The ticket counters, sized for numerous airlines to use simultaneously, are currently used by four airlines, one of which is seasonal. Airline Ticket Offices (ATO) are also provided for each airline. While four airlines currently serve the airport, the preferred plan should incorporate flexibility to easily expand airline spaces should additional airlines establish operations at the airport.

3.1.2 Airport Spaces

This section details the areas used by the Airport to operate LAN. These spaces include badging, conference rooms, offices, operations and security, and areas allocated for the FAA including the ATCT. Facility requirements for these areas are based on input from the airport authority, and their current space allocation is adequate for their needs.

3.1.3 Baggage Services

Outbound passengers with checked baggage proceed to the check-in counters, where their bags are tagged to their destination. Passengers are required to take their luggage across the lobby to a TSA baggage screening device and hand it off to an officer before proceeding to the security screening checkpoint. These devices are in the lobby since there is no climate-controlled area behind the ticket counters to securely house and operate baggage screening devices. Once the baggage is screened, they are placed on a conveyor belt and moved to the outbound baggage sorting area, where the bags are loaded on the appropriate carts and taken to the aircraft.

Inbound baggage is taken off the aircraft, placed on carts, and taken to the inbound baggage devices, consisting of two flat-plate conveyor belts connected to each baggage claim carousel. Baggage claim is the area in the terminal where arriving passengers retrieve their checked baggage. This area includes the two revolving flat-plate baggage claim devices and the area surrounding the device.

3.1.4 Building Systems

Mechanical systems consist of all the utility areas needed to allow the building to function correctly. These areas include electrical, plumbing, mechanical, telecom, support, and janitorial areas. The consensus is that many of the components are either beyond their useful life or are not code compliant and require upgrade or replacement. While more than adequate, the program space is divided into poorly located/sized rooms, some of which are undersized.

3.1.5 Concessions

Concessions planning is essential to the overall terminal program because of its impact on airport revenue and passenger convenience and satisfaction. Concessions programs are typically calculated based on annual enplanements and can be broken down into four categories: Food and Beverage, Convenience Retail, Specialty Retail, and Services. For this analysis, all concessions are grouped. Typically, airside concessions are a larger percentage of the program versus the landside due to the nature of passengers spending more time post-security.

At LAN, the concessions program is oversized in terms of square footage. The airside program consists of one large restaurant with sit-down and carry-out offerings, and a self-serve convenience area. The restaurant is between gates 7 and 8, providing a good location between the gates used by the dominant carriers at the airport. The location provides great airside views of the apron, taxiways, and runways. The self-serve area is between gates 5 and 6 and has an attached seating area with airside views. The landside portion of the terminal has one self-serve convenience area between the SSCP and baggage claim, with a seating area across the hallway.

Successful concessions programs spread the food and drink out in various parts of the facility. Newsstands and sundries are typically placed along the main circulation, while bars are becoming more intermingled in the holdrooms. Many airports utilize these types of holdroom bars as additional holdroom seating, where passengers often pick a seat and stay until boarding. Applying these types of concepts in the most visible areas of the concourse helps disperse the concession crowds. Optimizing use of space which cannot be used as holdrooms, particularly at vertical access areas, can increase visibility and allows each type of concession to have its own identity and give passengers a sense of space.

The future of passenger terminal concessions is leaning toward self-service, either through online pre-ordering, tablet ordering, or upscale vending machines. Many bars and restaurants interspersed throughout the holdrooms have tablet ordering where food comes from a central kitchen, which saves space in the passenger areas. There are airports throughout the world that are trialing automated concessions delivery systems, which consist of automated trolleys that deliver items to passengers anywhere in the terminal. These technologies are in their infancy and still developing.

Concessions bring in substantial revenue through food and drink sales at unique and casual settings. Passengers are inclined to spend for non-standard offerings, such as exotic cuisine, or 'pub-fare' branded by a celebrity chef. While these are good for passengers who come to the airport early to relax and enjoy the experience, there is also room for grab-and-go due to flights either not offering food or offering it at highly priced selections.

3.1.6 Customs and Border Protection (CBP)

The airport has a CBP FIS located on level 1, adjacent to the ticket counters, and attached to gate 9. Passengers arriving on an international flight deplane through the PBB (Passenger Boarding Bridge) and proceed down a ramp system to the primary inspection area. Once cleared, passengers proceed to a dedicated baggage claim carousel, and then are either cleared to exit, or are diverted to secondary inspection for further processing. The primary inspection and baggage claim areas of the FIS are undersized for the planning activity levels and will need additional officer podiums and enlarged baggage carousels. The waiting area around the carousel must be expanded to accommodate more passengers at the same time.

3.1.7 Ground Transportation

The ground transportation program in this analysis consists of rental car and shuttle services[1] located within the passenger terminal and associated queue space. This space is undersized and will need expansion for all planning periods.

3.1.8 Holdrooms

The holdroom is where passengers congregate on the sterile side of the terminal to wait and board their aircraft. These areas include seating space, a standing area, an airline boarding podium, a queue area, and circulation for enplaning and deplaning passengers. Sizing is determined based on the type of aircraft expected to use each gate and considers space required for airline staff podiums and associated support areas.

At LAN, the holdroom program is oversized for all planning periods. While aircraft sizes may increase, there is adequate room for additional seating; however, most holdrooms are

[1] No shuttle services operate at LAN at the time of this study, July 9, 2024.

associated with a single gate so the flexibility will reach a limit if aircraft sizes get significantly larger. While the future fleet projections do not forecast aircraft over 200-seats, it is now common to combine holdrooms to accommodate higher seat counts. New-build facilities can do this easily, while renovations of existing facilities would have to adjust the program layout.

3.1.9 Public Spaces

Public spaces in the terminal incorporate all circulation areas used by the public and airside-to-landside exit lanes. In a general sense, the landside circulation at LAN is oversized, as the lobby has grown due to various expansion projects throughout its history. While the total square footage of public circulation is above requirements, the issue is how the space is laid out. Currently, the landside circulation area remains heavily trafficked, but the ticketing area is divided by a series of structural columns that are the result of previous expansion efforts. The airside circulation is also oversized due to some redundant areas caused by a jagged circulation corridor connecting all the holdrooms. Overall, the terminal's program areas are vastly spread out, creating an expansive sprawling facility. This design creates multiple inefficiencies in circulation and public spaces.

3.1.10 Restrooms

The restrooms at LAN are appropriately sized according to airport planning guidelines; however, more locations need to be added per code requirements, with all ADA standards met. Current restrooms have added redundancies to accommodate peak-hour loads with a percentage of fixtures out-of-service for routine cleaning or maintenance. Additional provisions include family rooms, nursing rooms, restroom-related janitor closets, and other amenities specified by the airport.

3.1.11 Transportation Security Administration (TSA)

After completing the check-in process, passengers proceed to the Security Screening Checkpoint (SSCP). Security screening is regarded as a significant "pressure point" in terminal facility planning as it must serve all passengers and employees going from the landside (non-secure side) to the airside (secure side). The SSCP program for a terminal of this size consists of a standard template with either single or dual inspection lanes, queuing area where passengers line up for document check, and the composure area where passengers can recompose and/or rearrange their belongings before heading to the gates. TSA policy states that these lane configurations can be further enhanced for higher throughput rates by utilizing automated technology. These allowances are incorporated in current planning standards.

TSA is also responsible checked baggage screening. After an airline agent tags a checked bag, the passenger brings it to one of two baggage screening stations located in the ticket lobby.

The bag is screened for explosives and other hazardous items before it is sent to the baggage make-up area for transport to the aircraft.

At LAN, the SSCP is adequately sized with two screening lanes; each lane equipped with state-of-the art screening devices with higher passenger throughput. This means that each lane can accommodate more passengers per hour than standard devices. This helps alleviate bottlenecks at the checkpoint but ideally, from a customer service perspective, both lanes operate at the same time to avoid excessive queuing. Furthermore, upgrading and preserving space for additional TSA screening equipment should be included in the terminal design phase, as the current space does not allow for a third lane to be added because it would close off exit lanes and access to other airport functional spaces.

3.2 Airside Components

Airside components include aircraft aprons and aircraft gates. The gates should be within a short distance of the terminal building and provide ADA accessibility between the aircraft and the building. The analysis for total apron space began with the requirements necessary to provide seven aircraft gate positions large enough for the Boeing B737-900ER and Airbus A321neo aircraft (which are all Aircraft Design Group (ADG) III aircraft). While these aircraft are not specifically in the flight schedules, it is appropriate to plan for the most significant aircraft type for that ADG. Additionally, the CRAA has requested accommodation for an ADG-V (Airbus A330-300, Boeing 777-200, or similar) for charter flights which occur a few times a year. This could be accomplished through a Multi Aircraft Ramp System (MARS) arrangement which would use two ADG-III positions for one ADG-V, a commonly used system worldwide. While the primary focus of this study is the passenger terminal facility, the airside apron is more than adequate to accommodate the planning levels discussed earlier in this section (see **Figure 2**).

Any development that leaves the terminal airside building face in place would need to arrange aircraft parking at angles due to the tail height restrictions dictated by the Part 77 restrictions for Runway 10-28. Development that moves the terminal airside building face could provide more room on the apron for perpendicular parking due to the increased distance from the Part 77 tail height restriction lines.

3.3 Landside Components

Landside components of the passenger terminal include the terminal roadway loop, terminal curb, and vehicle parking areas. The sizing of the terminal curb and parking areas are based on various planning parameters and needs specific to a region's passenger characteristics. The terminal landside area and roadways must be sized appropriately to provide safe design, intuitive user access, an adequate level of service capacity, meet vehicle parking demand, and efficiently serve all terminal curb activity. Illustrated in **Figure 4** and analyzed within both

Appendix X, **Regional Access – Existing Conditions Technical Memorandum** and the Master Plan facility requirements (**Chapter 4**), landside components at LAN are generally considered adequate to meet existing and future passenger demand with specifically identified areas for potential improvements. For the terminal analysis, landside facilities are considered a trailing planning element, meaning landside preferences do not dictate appropriate terminal design solutions. However, as part of the terminal and landside design phase, the following items should be considered:

- Consideration of ramped curbs
- Traffic signals for crosswalks
- Ensure that parking and front drive are configured to allow traffic flow during an elevated threat level (300' setback)

3.4 Terminal Area Programming Summary

In summary, the terminal area at LAN is generally comprised of the passenger terminal building, the airside terminal apron, parking lots, and supporting terminal roadways. The existing airside apron, terminal roadways, and parking lots are sufficient to meet passenger demand, but the passenger terminal building presents significant challenges to meeting existing and future demand in a cost-effective manner. The existing passenger terminal building has sufficient aggregate space to accommodate the current passenger activity, however, the allocation of space is inadequate to meet existing and future needs. Furthermore, some key areas of the building's infrastructure and equipment have outlived their useful life, in some instances requiring near-term, if not immediate replacement.

Based on the current utilization and condition of the existing facilities, the commercial passenger terminal building requires significant renovations to enhance the safety and security of the facility for passengers now and in the future. It is recommended that LAN consider the construction of a new commercial passenger facility or renovation of the existing facility to provide the ideal LOS to current and future passengers. The above analysis determined that these components within the existing terminal facility are deficient in meeting these goals because of the facility layout and inefficient use of existing space. Based on the passenger demand and airline operation forecast, it is determined that a 155,700 square foot facility would be necessary to meet the anticipated high-growth demand scenario in 2043.

4 Terminal Area Alternatives

This section will discuss three conceptual alternatives for the new terminal program based on the passenger demand forecasts discussed earlier in this chapter. These forecasts determined that a 155,700 square-foot facility would be necessary to meet the long-term demand anticipated in 2043. The concepts shown in this section provide full build-out layouts that can be phased to best accommodate the planning activity levels.

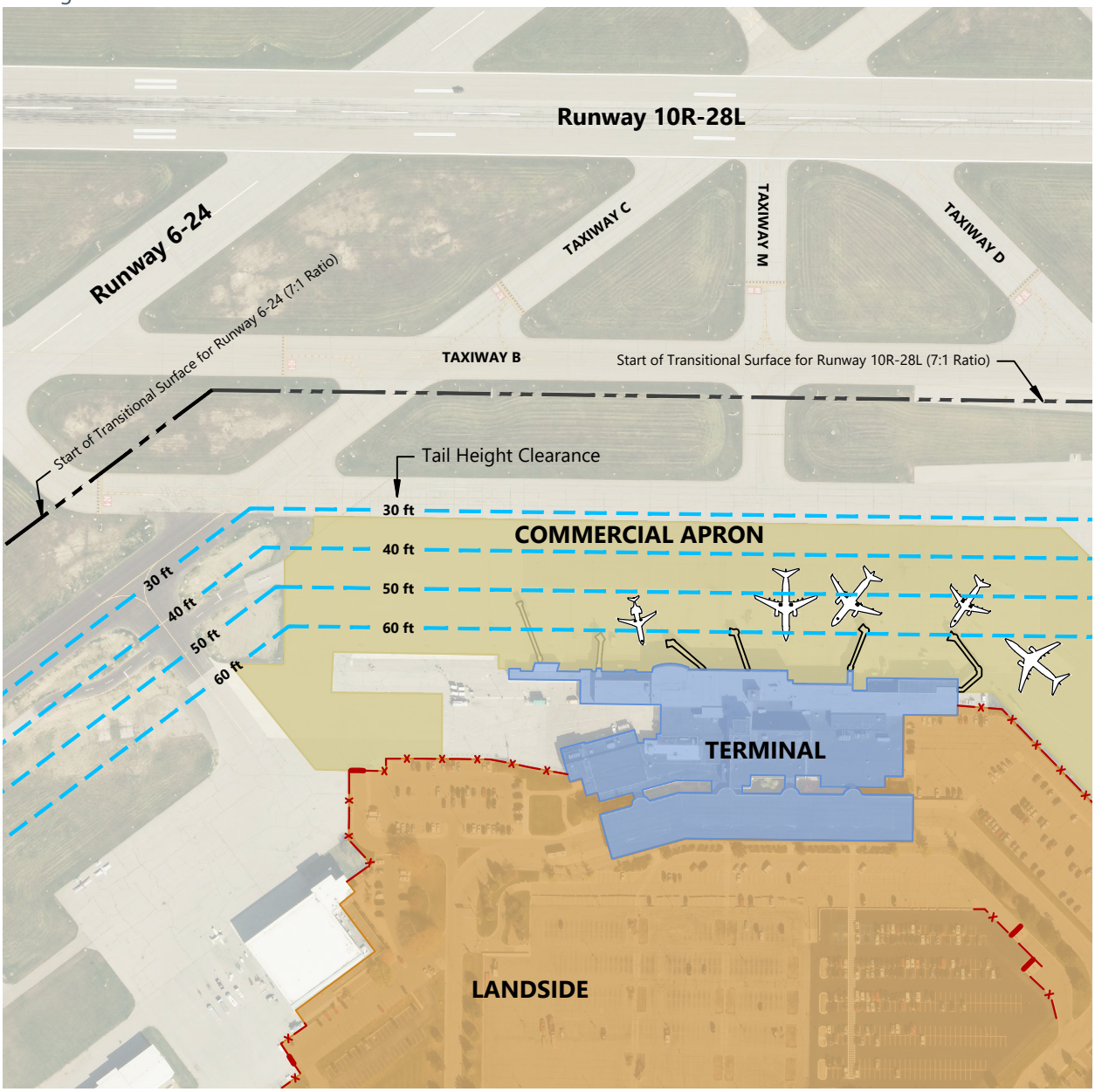
The three alternatives include a complete renovation of the existing facility, a hybrid renovation/new-construction concept, and a completely new-build option. The CRAA vision for development established within the new master plan identified the existing terminal area as the preferred location for the commercial terminal. All terminal alternatives will analyze terminal development within this context and subsequently analysis of existing infrastructure, safety areas, and geographic constraints can be defined.

4.1 Site Constraints

Though the site has an abundance of space, various constraints must be considered in the development of terminal area concepts. As shown in **Figure 15**, the existing site is constrained by airside access to the north, northwest and northeast, existing cargo facilities are situated to the east and there are runways and taxiway systems to the north and northwest of the terminal. It is important to ensure future terminal areas do not impact protected Part 77 surfaces like the transitional surface which extends perpendicular to the runway up and out at a seven foot to one foot slope.

An existing FAA ATCT and related FAA administrative functions are currently housed within the existing terminal facility. It is critical to retain operation of these FAA facilities during, and after, terminal improvements are performed. Terminal layouts are also limited due to the location of the tower. Sight lines from the tower to the airfield cannot be obstructed – limiting the potential to move the terminal layout further north. The tower must also remain in its current position, restricting options to shift the terminal facility west. These constraints have significant impacts on replacing the terminal facility.

Figure 15
Existing Site Constraints



LEGEND
- Commercial Apron
- Terminal
- Landside
- AOA Fence
- AOA Gate
- Part 77 Transitional Surface Start Point
- Tail Height Clearance

N

0' 150' 300'

Source: RS&H, 2023

4.1.1 Renovation Concept Site

The renovation concept is developed to make the best use of space within the existing terminal facility and includes enhancements to support future growth. In this regard, the site selections are minimal, as the existing facility provides the site. The FAA ATCT and related office spaces are not significantly impacted by this option. It would be difficult to reduce the overall size of the facility and maintain operational effectiveness during construction because of the building configuration.

4.1.2 Hybrid Concept Site

The hybrid concept makes use of the current administrative facility location and provides new-build replacements for other parts of the existing terminal facility that are demolished. New sections of the terminal will be developed as a state-of-the-art facility. Implementation of this concept can be phased over a short- or long-term timeline. The locations of the new-build portions are further discussed in **Section 4.2.3**. This option minimally impacts the operation of the ATCT.

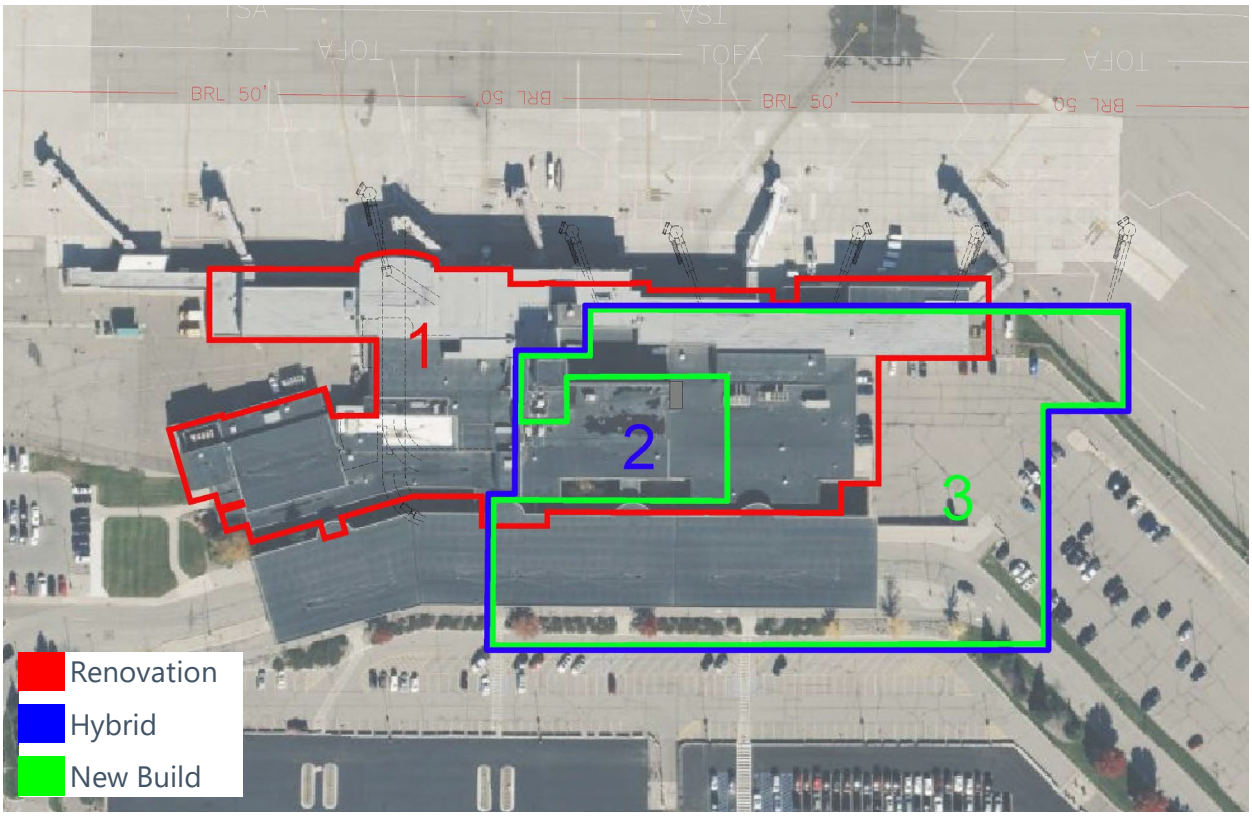
4.1.3 New-Build Concept Site

A new-build site provides a "clean slate" for developing a state-of-the-art facility. The placement of the terminal on each site would be determined by its ability to accommodate phased expansion. As construction progresses, passengers will still need to safely navigate the facility during a transition phase while old building sections are closed off and new areas are opened. Once completed, as passenger numbers grow, certain elements of the facility program become inadequately sized. This means choosing a site that can easily accommodate expansion, over a short- or long-term approach, it critical to addressing overall program needs. This option also has the greatest potential impact on the operation of the ATCT due to the remaining portions of the facility needing to be enclosed once the administrative building is removed.

As discussed in **Section 4.1**, FAA Part-77 transitional surfaces determine the safety distances and heights that affect ATCT visibility lines, Building Restriction Lines (BRL), and aircraft tail height limitations. Should a new-build facility be the preferred development option, careful consideration of these surfaces is required for terminal siting to maintain flexibility in accommodating a large variety of aircraft types including potential future impacts. This option provides an opportunity to move the vertical surfaces of the terminal further south, potentially allowing larger aircraft access to the ramp. The site location further affects the design of the facility, as ATCT sight lines and compliance with the defined BRLs and aircraft tail heights will determine the extents of the structure and placement of each aircraft parking position.

Figure 16 shows the three site options in relation to the existing facility. As shown in the exhibit, each configuration makes use of the existing landside access and infrastructure. Further evaluation of each option is provided in this section.

Figure 16
Building Option Configurations



Source: RS&H, 2023

4.1.3.1 Site 1

This site is the location of the existing terminal, and while difficult to construct and maintain operations, it makes use of the existing landside infrastructure remarkably close to how it is currently used. Additionally, most of the apron infrastructure would remain. Careful consideration should be taken to assess whether it would be costly to reuse the existing facility should this site be preferred.

4.1.3.2 Site 2

This site builds a new facility to the east of the existing terminal, along the curb roadways. This configuration requires changes to the existing administrative/staff parking lots and realigning the access drive and short-term parking areas. While phasing the project would be less complex than site 1, the location is in an alleyway between terminal landside/airside areas and would

require additional apron construction to streamline access. Expansion opportunities exist long-term in the location of the original passenger terminal.

4.1.3.3 Site 3

This site builds a new facility in the current short-term parking lot in front of the existing terminal, with further development opportunities on the site of the existing facility. The size of the proposed facility would require a limited portion of the short-term parking area to be repurposed for the new terminal footprint, however, there is an oversupply of long-term parking area available to convert to a short-term parking program. The curbside access portion of the roadway would have to be realigned, but once completed, the new terminal would be able to expand east, south, and west. There would be more apron area for a variety of aircraft parking options, as well as an area for de-icing and Remain Over Nights (RONs).

4.1.3.4 New-Build Summary

With each of the proposed site options for a new facility, several additional tasks are needed to accommodate the new terminal site and allow the remaining FAA ATCT and CRAA offices to remain in operation. These tasks include partial demolition of the terminal facility to accommodate the new building, enclosing remaining portions of the existing building, rerouting building systems to accommodate the partial demolition, reworking airfield pavement areas, and rerouting site utilities.

4.2 Preliminary Program Concepts

Three terminal development options are discussed in this section: 1.) Renovation, 2.) Hybrid, and 3.) New-Build. The renovation concept elements use the existing facilities to the extent possible by updating parts of the building that are most deficient, repurposing parts of the facility that are in good condition, and strategically expanding areas needed to address future projections. The hybrid development option balances construction of new facilities with strategic renovation of existing terminal space. The new-build layout replaces existing facilities with a new terminal. While all options shown yield more square footage than what is recommended in the facility requirements program (see **Table 4**), careful consideration is taken to balance demolition, construction, and reusing existing space to promote safe and efficient flow of passenger traffic. It is important to balance the cost of demolishing existing space with costs to renovate the same space to minimize overall improvement costs. **Table 5** shows the estimated total square footage for Options 1 through 3, as drawn in the following concepts beginning in **Section 4.2.2**.

Option 0 represents the 'no-build' scenario, which is important in assessing the costs of doing any work at all. Options 1 and 2 utilize parts of the existing facility, while Option 3 is a newly built facility with very little reused from the original passenger terminal.

Table 5
Terminal Alternatives Square Footage Summary

Terminal Alternative	Area (sf)
Option 1 – Renovation	229,409
Option 2 – Hybrid	213,687
Option 3 – New-Build	208,214

Source: RS&H, 2024

4.2.1 Option 0 – No-Build

The first option to consider is to leave the facility exactly as it is and focus solely on interior updates to infrastructure. The facility would undergo minimal renovation work to bring the facility up to date for critically needed investments based on the findings from the Facility Assessment. This option requires the least amount of capital expenditure but securing AIP funding could be more challenging as the eligibility of the proposed renovation work would need to be carefully considered.

4.2.2 Option 1 – Renovation Concept

Option 1, as shown in **Figure 17** and **Figure 18**, was developed as a full refurbishment and enhancement of the existing facility including replacement of the curbside canopy structure. The work in this option centers around updating interior components, and relocating several functions to make them more efficient, allowing for other functions to expand or reduce in size to accommodate program needs. With the intent of avoiding/minimizing any demolition or new construction, the terminal renovation concept optimizes use of the existing building envelope under a modern terminal layout programmed with the latest passenger and user amenities. One of the primary changes in this option is the relocation of the SSCP to a second floor above the area it currently occupies. This way, adequate space is provided for passengers to queue, recompose after screening, and proceed to the departures hall without changing levels or impacting airline ticketing. Additional work is conducted in the FIS, includes converting to 'bags-first' placing the baggage claim carousel before primary inspection, expanding the queuing area prior to primary screening, and improving vertical circulation by removing the existing ramps and replacing with an escalator and elevator. Any exterior improvements in this alternative will involve cladding or "smoothing out" odd setbacks and relics of multiple expansion projects over the building's life.

While this alternative can be phased to maintain airport terminal operations during redevelopment, it would likely also prove to be the most disruptive during certain phases of renovation where options are limited for provided temporary locations to provide continued service functionality (such as security screening). Performing renovation and construction within, and over, occupied areas of the building increases costs due to the need for accommodating

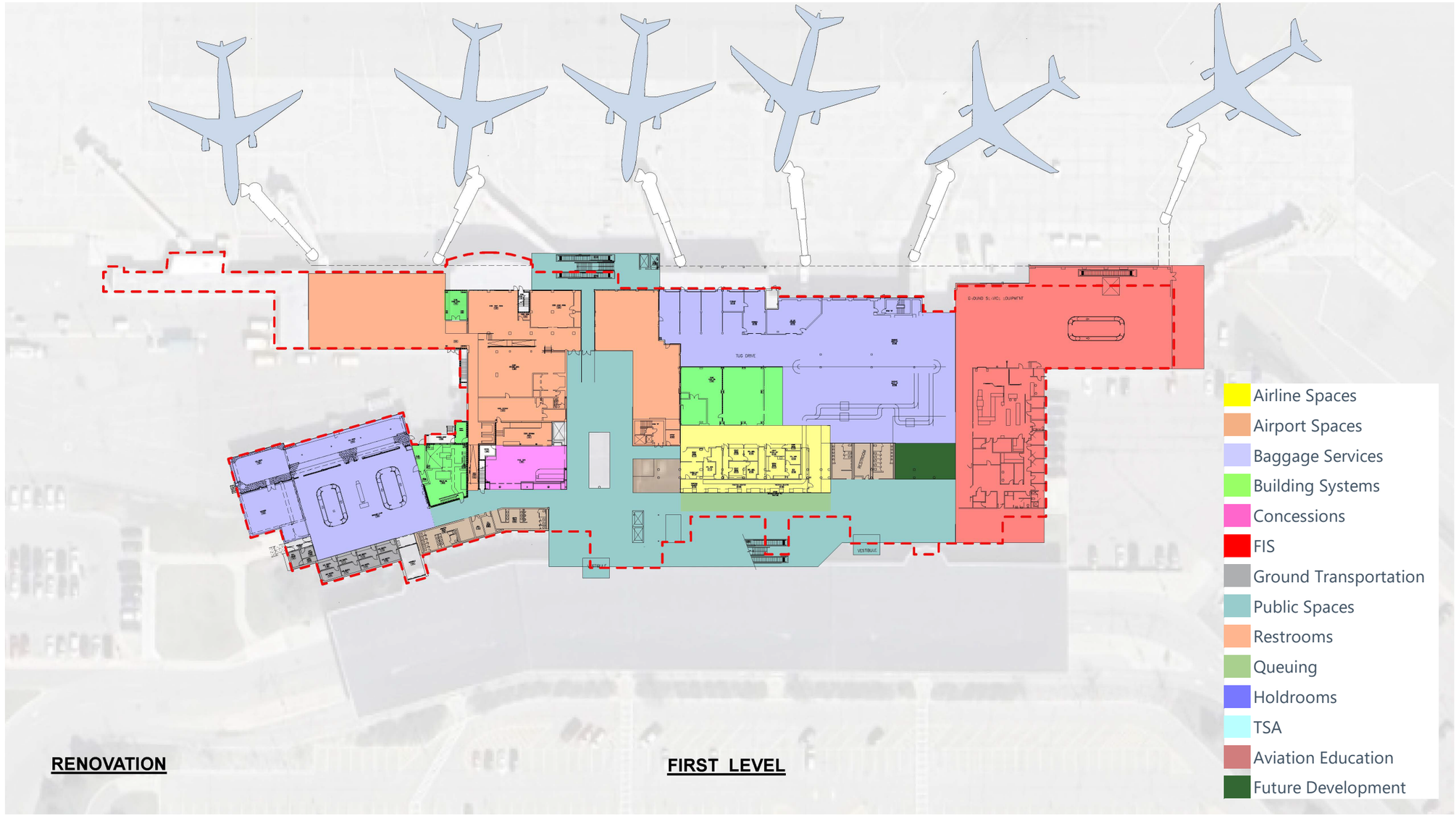
temporary facilities including overhead protection, catwalks, temporary heating/cooling plants, temporary walls, and other installations/safeguards for passenger movements.

4.2.2.1 Facility Layout

For the renovation option, the facility's overall footprint is left largely intact. The most notable modifications to this plan include the expansion of the gate level to accommodate a new modernized SSCP in the central portion of the facility and increasing the primary screening holding area of the FIS. The use of the aircraft ground loading level would no longer be needed and therefore removed. The following graphics show primary floor plans for the preferred renovation alternative. **Figure 17** is level one and **Figure 18** is level two. The SSCP's relocation to the second floor reduces the congestion in the center of the terminal and allows opportunity to repurpose that area.

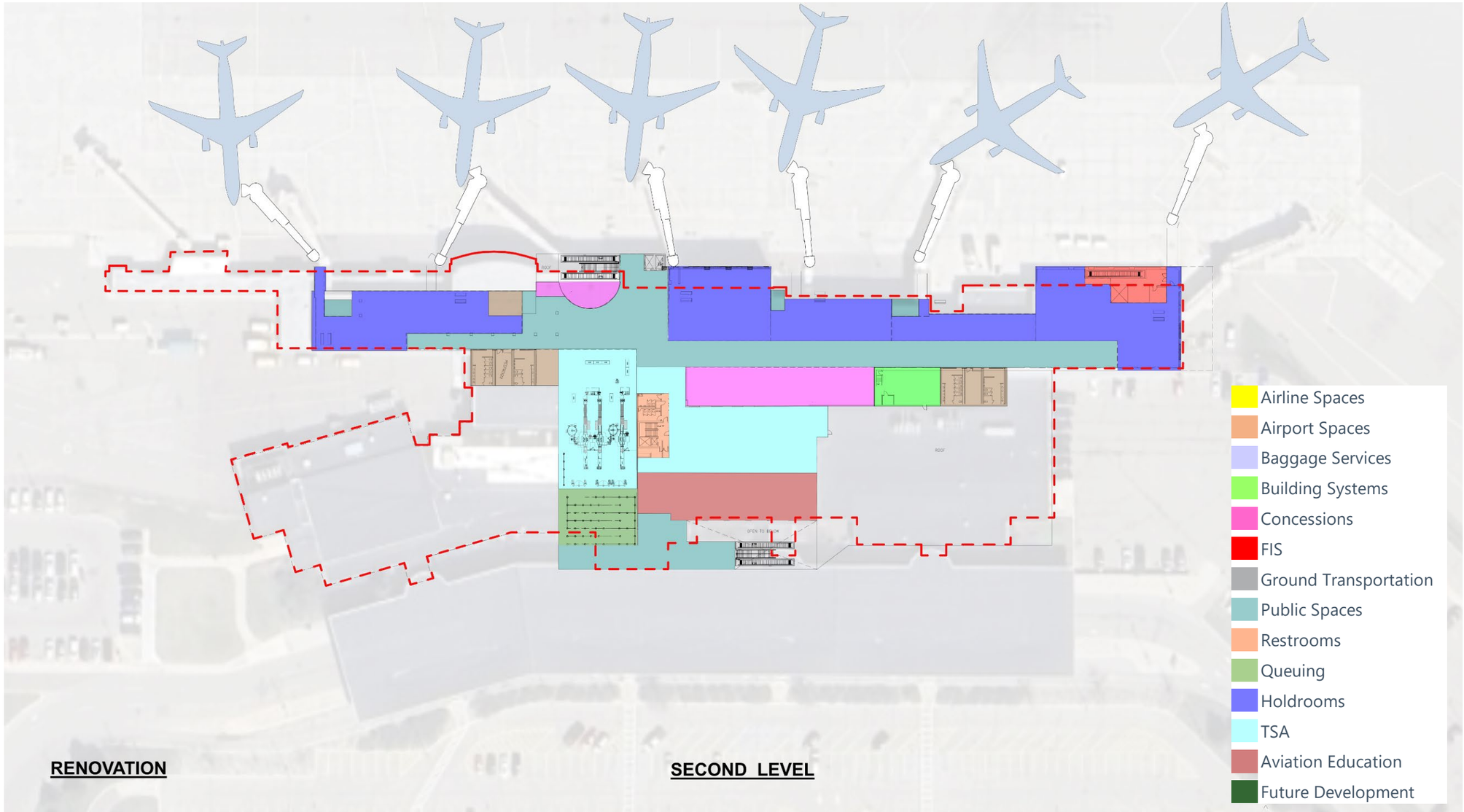
The level two floor plan shows the addition of the expanded SSCP over its ground level location. The space provided for the SSCP can accommodate the high-growth passenger forecast scenario and leaves potential for further expansion, aligning with the airport's vision. Additional changes to the second floor include expanded restrooms to better accommodate traffic generated from larger aircraft during peak hours, and a relocated concessions footprint near the center of the terminal to provide passengers with improved, unconstrained access to the concessions program. The secure-side exit lane will be parallel to the SSCP and bring passengers to the central lobby by way of a second story walkway parallel to the SSCP, with vertical circulation leading from this level to the existing baggage claim area. The existing vertical circulation elements, such as the escalators in the middle of the holdroom currently used for departing passengers clearing security, will be relocated to improve vertical access.

Figure 17
Preferred Renovation Option – Level One



Note: The space layouts for Levels 3 to 5 are not included as there are no interior alterations.
Source: RS&H, 2024

Figure 18
Preferred Renovation Option – Level Two



Note: The space layouts for Levels 3 to 5 are not included as there are no interior alterations.
Source: RS&H, 2024

Table 6
Renovation Option Square Footage

Legend Color	Description	Total Area (sf)
	1st Level	
	Airline Spaces	5,320
	Airport Spaces	20,586
	Baggage Services	29,547
	Building Systems	5,541
	Concessions	1,933
	FIS	22,410
	Ground Transportation	1,336
	Public Spaces	27,341
	Restrooms	4,142
	Future Development	1,218
	Queuing	1,753
	Subtotal	**121,127**
	2nd Level	
	Airport Spaces	1,163
	Building Systems	1,417
	Concessions	4,957
	FIS	1,449
	Holdrooms	20,311
	Public Spaces	17,372
	Restrooms	3,488
	TSA	12,576
	Aviation Education	4,865
	Queuing	2,476
	Subtotal	**70,074**
	3rd Level	
N/A	Airport Spaces	7,152
N/A	FAA	6,497
	Subtotal	**13,649**
	4th Level	
N/A	FAA	2,140
	Subtotal	**2,140**
	5th Level	
N/A	FAA	546
	Subtotal	**546**
	Canopy	
N/A	Canopy	21,873
	Subtotal	**21,873**

Legend Color	Description	Total Area (sf)
	All Levels & Canopy	
	Airline Spaces	5,320
	Airport Spaces	28,901
	Baggage Services	29,547
	Building Systems	6,958
	Concessions	6,890
	FIS	23,859
	Ground Transportation	1,336
	Public Spaces	44,713
	Restrooms	7,630
	Future Development	1,218
	Queuing	4,229
	Holdrooms	20,311
	TSA	12,576
	Aviation Education	4,865
N/A	FAA	9,183
N/A	Canopy	21,873
	Grand Total	**229,409**

Source: RS&H, 2024

4.2.3 Option 2 – Hybrid Concept

Option 2, as shown in **Figure 19** and **Figure 20**, known as the 'hybrid concept', blends demolition and new construction to remove the oldest, most deficient areas of the terminal and replaces them with modern components. The result is a largely new terminal layout programmed to meet current standards with the latest passenger and user amenities. With a higher degree of replacement than a pure renovation option, functional areas and passenger flow are greatly enhanced to support a high-quality user experience, improve overall aesthetics, and support opportunities for future growth. This option utilizes the space in front of the existing terminal, where the curb road and canopy are, to construct a new terminal facility further south. One key advantage to this option is the ability to continue operations in the existing terminal facility uninterrupted during construction. This option also relocates the current departures gate areas south, increasing the apron area to streamline the aircraft parking plan and, potentially, accommodate larger aircraft in the future.

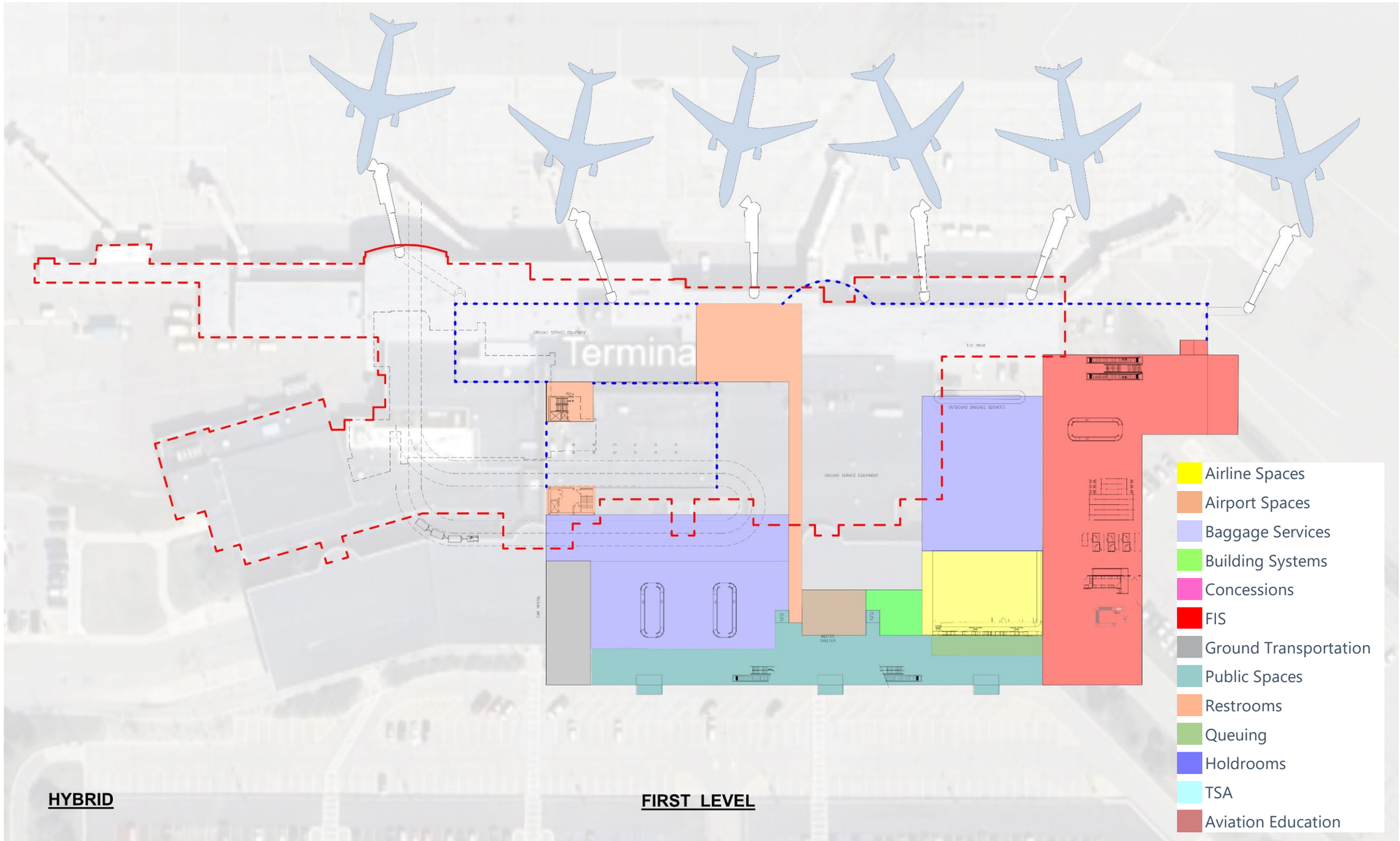
The size of this concept brings the total facility square footage closer to the appropriate size for accommodating current and forecast need. Reducing the overall square footage from the existing building, implementing modern utility systems/fixtures (such as lighting and plumbing), and using the newest exterior envelop materials would also reduce overall energy consumption, maintenance, and other operational costs.

4.2.3.1 Facility Layout

With the existing terminal serving as a longitudinal barrier between landside and airside facilities, Option 2 would construct a new terminal facility south of the existing building. The FAA's ATCT, currently in the central area of the existing facility, serves as a conceptual "anchor" – meaning all terminal functions would be configured to allow the ATCT to continue operations independent of terminal construction.

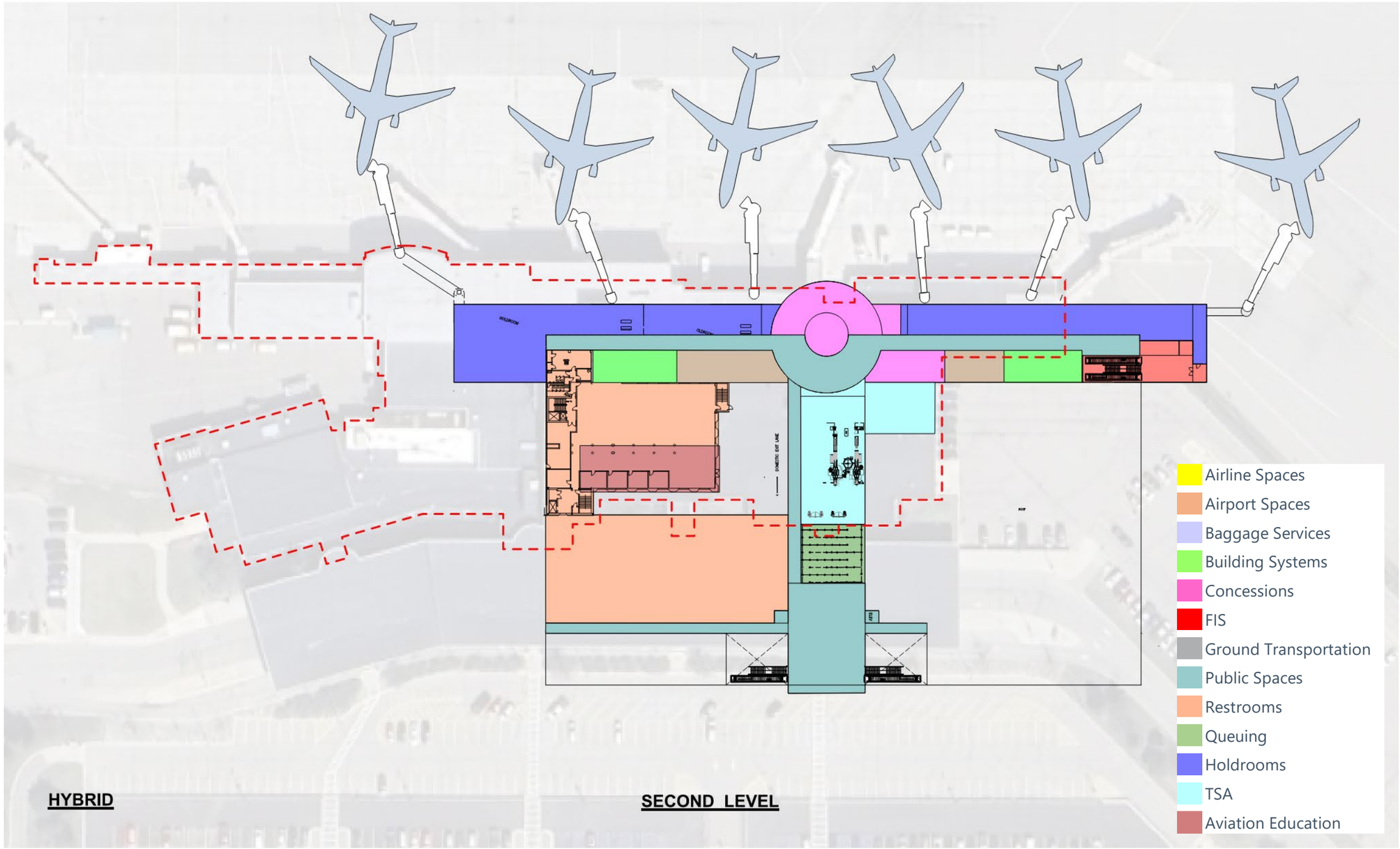
As project funding eligibility for federal assistance is often dependent on space that is both accessible to the public and non-revenue generating (or may be common use to airlines), this option allows federally eligible spaces to be funded and prioritized over other areas of the facility. This type of layout can also be phased over multiple years to sequence improvements as funding is available rather than trying to finance the entire project in a short period of time.

Figure 19
Hybrid – Level One



Note: The space layouts for Levels 3 to 5 are not included as there are no interior alterations.
Source: RS&H, 2023

Figure 20
Hybrid – Level Two



Note: The space layouts for Levels 3 to 5 are not included as there are no interior alterations.
Source: RS&H, 2023

Table 7
Hybrid Option Square Footage

Legend Color	Description	Total Area (sf)
1st Level		
	Airline Spaces	6,197
	Airport Spaces	12,114
	Baggage Services	30,928
	Building Systems	1,351
	FIS	24,877
	Ground Transportation	3,352
	Public Spaces	11,676
	Restrooms	1,770
	Queuing	1,237
	Subtotal	**93,502**
2nd Level		
	Airport Spaces	25,039
	Building Systems	2,911
	Concessions	4,927
	FIS	2,435
	Holdrooms	15,139
	Public Spaces	16,197
	Restrooms	3,177
	TSA	8,087
	Aviation Education	4,055
	Queuing	2,471
	Subtotal	**84,438**
3rd Level		
N/A	Airport Spaces	7,152
N/A	FAA	6,497
	Subtotal	**13,649**
4th Level		
N/A	FAA	2,140
	Subtotal	**2,140**
5th Level		
N/A	FAA	546
	Subtotal	**546**
Canopy		
N/A	Canopy	19,412
	Subtotal	**19,412**

Legend Color	Description	Total Area (sf)
All Levels & Canopy		
	Airline Spaces	6,197
	Airport Spaces	44,305
	Baggage Services	30,928
	Building Systems	4,262
	Concessions	4,927
	FIS	27,312
	Ground Transportation	3,352
	Public Spaces	27,873
	Restrooms	4,947
	Queuing	3,708
	Holdrooms	15,139
	TSA	8,087
	Aviation Education	4,055
N/A	FAA	9,183
N/A	Canopy	19,412
	Grand Total	**213,687**

Source: RS&H, 2024

4.2.4 Option 3 – New-Build Concept

Option 3, as shown in **Figure 21** and **Figure 22**, is a full new-build, providing a "clean slate" for developing state-of-the-art facilities that make the most efficient use of the program space, passenger access during construction, and maximizing airfield safety. The new terminal is built within the immediate area of the existing terminal, but construction can be phased to allow full terminal operations during construction. Old, deficient areas of the existing terminal are demolished once new terminal facilities meet operational needs. A new-build passenger terminal facility would incorporate modern infrastructure, including environmental sustainability, energy efficiencies, and improved airport access. The Leadership in Energy and Environmental Design (LEED) certification process outlines numerous standards that designers and operators can adopt to utilize modern design and engineering technologies to develop and maintain and efficient facility.

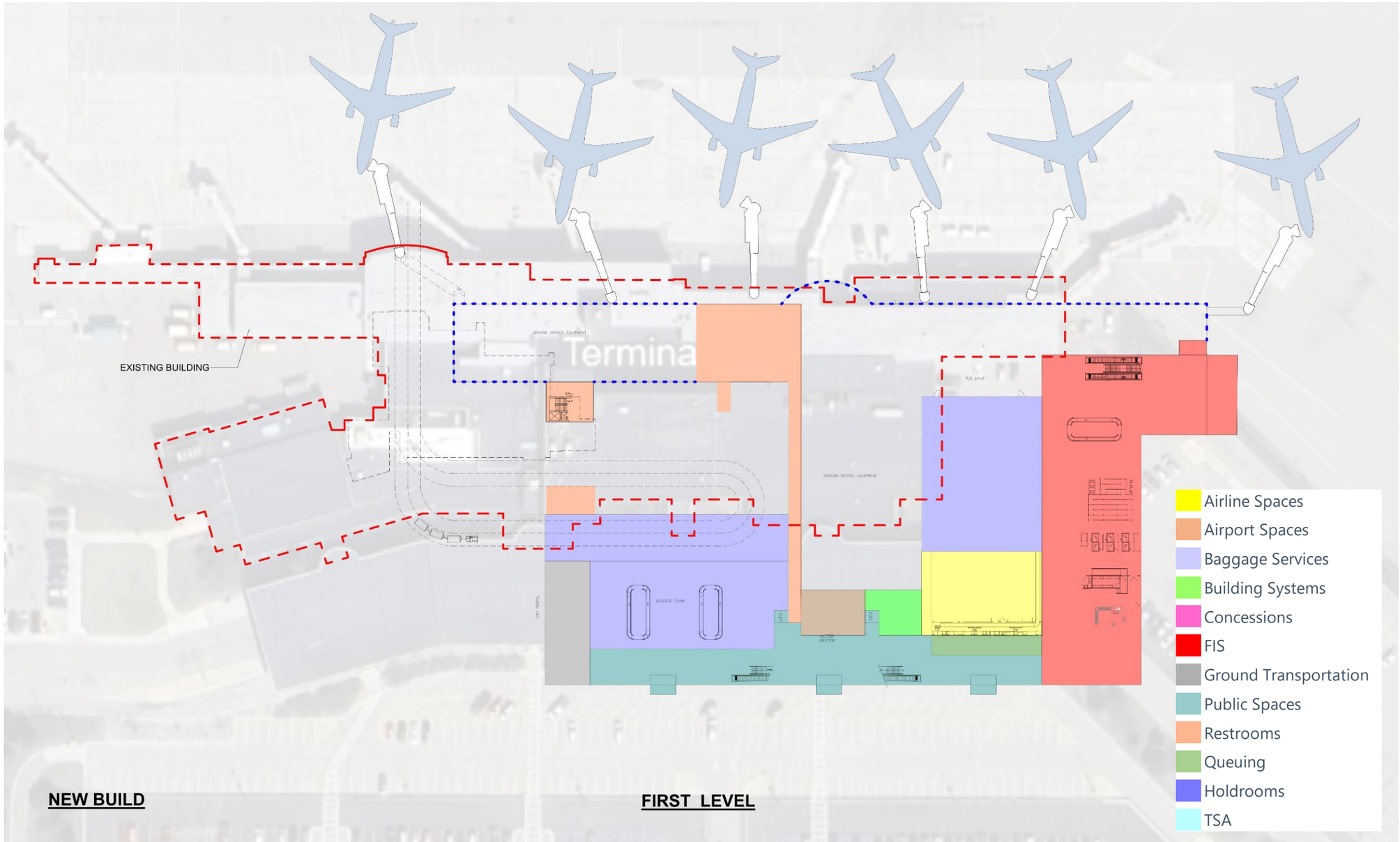
Option 3 focuses on the same objective as Option 2, to replace most of the existing terminal functions while preserving the existing, functional FAA Tower. This option also removes the current administrative building and relocates the offices into the new terminal facility.

4.2.4.1 Facility Layout

The consolidation of the terminal facility is focused on reducing the active footprint of public spaces to meet the needs outlined in the terminal facility requirements. This minimizes development costs, maximizes funding support and eligibility, and allows a high level of efficiency and security over the life of the new facility.

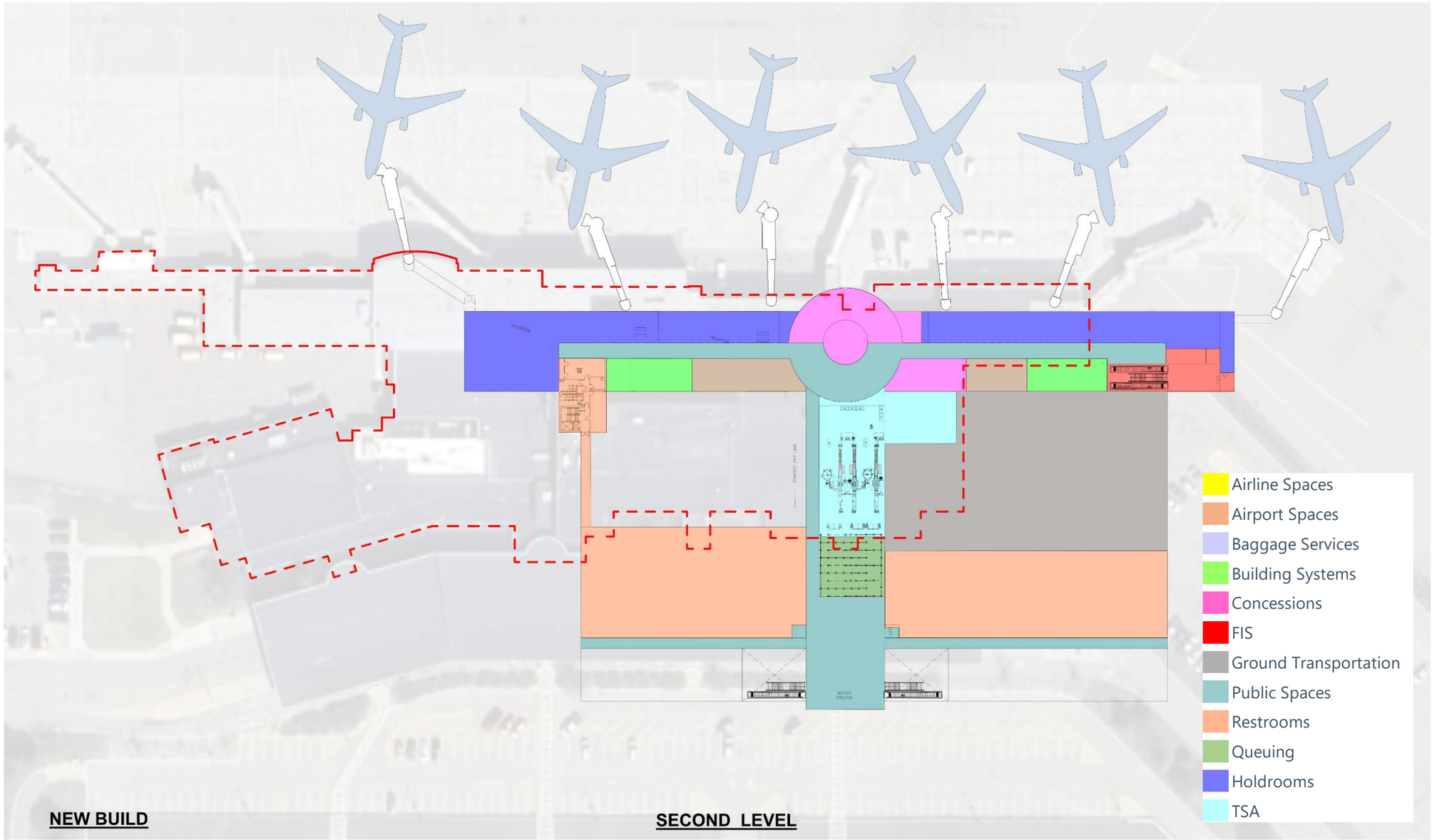
This layout (depicted in **Figure 21** and **Figure 22**) is similar to Option 2 in that it consolidates most of the existing spaces to meet program requirements. This option moves administrative functions into the terminal building, allowing the public easier access to the offices of the Airport Authority.

Figure 21
New-Build – Level One



Note: The space layouts for Levels 3 to 5 are not included as there are no interior alterations.
Source: RS&H, 2023

Figure 22
New-Build – Level Two



Note: The space layouts for Levels 3 to 5 are not included as there are no interior alterations.
Source: RS&H, 2023

Table 8
New Build Option Square Footage

Legend Color	Description	Total Area (sf)
1st Level		
	Airline Spaces	6,197
	Airport Spaces	11,103
	Baggage Services	30,928
	Building Systems	1,351
	FIS	24,877
	Ground Transportation	3,352
	Public Spaces	11,676
	Restrooms	1,770
	Queuing	1,237
	Subtotal	**92,491**
2nd Level		
	Airport Spaces	34,946
	Building Systems	2,911
	Concessions	4,927
	FIS	2,435
	Holdrooms	15,139
	Public Spaces	17,392
	Restrooms	3,177
	TSA	8,087
	Queuing	2,471
	Subtotal	**91,485**
3rd Level		
N/A	FAA	2,140
	Subtotal	**2,140**
4th Level		
N/A	FAA	2,140
	Subtotal	**2,140**
5th Level		
N/A	FAA	546
	Subtotal	**546**
Canopy		
N/A	Canopy	19,412
	Subtotal	**19,412**

Legend Color	Description	Total Area (sf)
All Levels & Canopy		
	Airline Spaces	6,197
	Airport Spaces	46,049
	Baggage Services	30,928
	Building Systems	4,262
	Concessions	4,927
	FIS	27,312
	Ground Transportation	3,352
	Public Spaces	29,068
	Restrooms	4,947
	Queuing	3,708
	Holdrooms	15,139
	TSA	8,087
N/A	FAA	4,826
N/A	Canopy	19,412
	Grand Total	**208,214**

Source: RS&H, 2024

4.3 Alternatives Evaluation

The three alternatives (Renovation, Hybrid, and New-Build) were evaluated by RS&H and CRAA staff based on established criteria ranging from ease of relocation of certain program elements, to cost and implementation efforts, to level of service and longevity. Evaluation also considered assessment of the degree of required construction, rough order-of-magnitude (ROM) costs associated with construction, and program locations for each option. Each option had varying advantages and disadvantages, and evaluation criteria were scored using a color-coded ranking system. **Table 9** shows the evaluation and ranking of key program elements. The evaluation demonstrates that all options are better than taking no action. After intense scrutiny and consideration of all factors, as well as feedback from focused local stakeholder representatives and the public, CRAA staff selected the Renovation option as the preferred path forward at this time. This preferred terminal Renovation alternative is analyzed further in the following sections.

Table 9
Alternatives Evaluation Criteria

	No-Build	Renovation	Hybrid	New-Build
Operational Efficiency				
FAA/ATCT Access				
CRAA Administration Access				
Non-Aeronautical Revenue				
Resolves Current Issues				
SSCP Queuing				
Screening Bags Facility				
FIS Passenger Experience				
Wayfinding				
Ticketing Hall Flow (Columns)				
Bag Claim Size				
Energy Efficiency				
Flexibility/Future Expansion Potential				
Apron/Ramp Accommodations and Flexibility				
Meets Long-Term Facility Needs (Enplanements)				
Customer Experience-Level of Service				
Constructability				
Ease/Timeliness of Implementation (Phasing)				
Airport Operational Impacts (Phasing)				
Cost to Implement (Project Costs)				
Life-Cycle Costs				
Environmental Impacts and Compliance				
Ranked Total	***60%***	***85%***	***93%***	***92%***

Color	*Value*	*Description*
	3	*Good (Meets Need)*
	2	*Fair*
	1	*Poor (Does Not Meet Need)*

Source: RS&H, 2023

4.4 Preferred Alternative

With the footprint of the existing terminal facility already surpassing the programmable space required per the aviation activity forecast, as well as being in the most desirable location for safe and secure transition between landside and airside operations, the CRAA prefers to renovate the existing facility bringing the building up to current building and FAA design requirements. The preferred terminal renovation concept, selected by the CRAA, was further refined as an implementable program with rough order-of-magnitude (ROM) cost estimates generated to establish a threshold by which future value engineering efforts could be improved to suit the proposed terminal facility vision, implementation, funding capacity, and future considerations of the CRAA.

4.5 Preliminary Cost Estimates

The LAN Terminal Alternative Estimate was based on sketches and square footage documentation prepared by RS&H. The estimate was reviewed by the planning team prior to submission to airport leadership to ensure that the estimated costs were consistent with the intended scope. In addition, cost drivers, mark-ups, and escalation were agreed on by the planning team.

The development of the quantities was provided by RS&H and electronically taken off from the drawings. The unit costs are based on a compilation of construction cost data consisting of information from recently bid projects, pricing from similar projects, and vendor quotes. Mark-ups are based on industry standards and construction escalation is based on Engineering News-Record's (ENR) city index for Detroit and averaged for the last 12 months.

Since the documents to prepare the estimate are planning level and conceptual, the following assumptions were made in the development of the estimate:

Building Structure

It is assumed that the new building portion of the terminal alternatives will be constructed on spread footings and the building structure will be steel. The new canopy will be architectural steel with a metal panel roof structure.

Building Facade

The new building portion of the terminal alternatives will be composed of 50 percent metal panel and 50 percent curtainwall. The portions of the terminal to remain will also have a new façade constructed with 50 percent metal panel and 50 percent curtain wall. Portions of the FAA tower will be re-cladded and allowances for this work is included in the estimate.

Building Interior
Pricing for the building interior is based on square footage of programmed space. The level of interior finishes varies from room to room to reflect the function of the space function and operation. Unit costs are developed for the expected level of finish for these areas.

Equipment
Six new jet bridges, an updated baggage handling system, and three new baggage carousels are included in all three terminal alternatives.

Fire Protection, Plumbing, Mechanical, Electrical and Technology (MEP+T)
The Terminal Assessment Report was used in the development of the MEP+T costs for the Renovated Terminal Alternative. The Hybrid and New Terminal Alternatives are based on all new MEP+T systems.

Sitework
Site work costs are based on a percentage of the building costs since the work is not yet defined. The Renovated Terminal Alternative is based on 3 percent of the building costs, and the Hybrid and New Terminal Alternatives are based on 6 percent of the building costs since the addition impacts are greater to the existing site with the Hybrid and New-Build terminal alternatives. Specific improvement items impacting these costs include removal of existing building sections and relevant foundations, backfill, and installation of new paved areas.

Any costs associated with relocation of access drives, parking, or other facilities impacting new construction are not included in these mark-ups. These associated costs will be addressed in the development of the landside costs if required.

Mark-ups
The estimate assumes a general contractor bid (or multi-prime bid) with a Construction Manager at Risk (CMR) providing oversite. An 8 percent mark-up is included for the general contractor's overhead and profit, and a 7 percent mark-up is included for the CMR's fee. The estimate assumes a design-bid-build procurement and includes a design fee of 12 percent and an inspection and material testing fee of 3 percent.

Furniture, Fixtures, and Equipment (FF+E) is included at 10 percent with a phasing cost of 7 percent for the Renovated terminal alternative and 5 percent for the Hybrid and New-Build terminal alternatives. It is also assumed phasing for the Renovated terminal alternative will increase overall costs due to building temporary structures to accommodate most of the renovated space being occupied by the traveling public or airport/airline staff during construction.

Contingency

When determining a conceptual project ROM cost, a 25 percent construction contingency is included to address project unknowns and to account for design evolution. This contingency percentage is expected to decrease once more detailed designs are performed.

A 10 percent construction contingency is included to address the potential for additional design tasks needed to determine improvements needed to support the building as well as any enabling types of projects needed to support construction.

Escalation

The estimate is based on 2023 pricing and is then escalated to 2028 which represents the mid-point of construction. 25 percent construction escalation is included which is 5 percent factor per year for five years. ENR's City Index for Detroit was used in the development of the escalation mark-up.

4.5.1 Cost Estimate Analysis

Rough order-of-magnitude cost estimates were developed for each terminal alternative and will be discussed in the following sections. Summary costs and unit price per square foot are for each terminal alternative are shown in **Table 10**.

Table 10
Preliminary Cost Estimate Summary

Terminal Option	Square Footage	Unit	Unit Price	Total Cost (2023 Dollars)	Escalation Cost (2028)	Total Cost (Rounded)
Renovation	229,409	SF	$1,005	$230,538,695	$45,259,062	$275,800,000
Hybrid	213,687	SF	$1,284	$274,475,440	$53,765,989	$328,300,000
New-Build	208,214	SF	$1,364	$283,991,849	$55,630,124	$339,700,000

Notes:

1 - Above costs are program costs and assume GC bid with CMR.
2 – 25% planning contingency is included.
3 – 10% construction contingency is included.
4 – Base costs are in 2023 dollars and excalated to 2028 based on an average escalation of 5% per year. If project is delayed beyond 2028, additional escalation costs are likely to occur.
5 – FF+E is noted in estimate.
6 – 12% engineering costs are included.
7 – See basis of estimate for additional clarifications.

Source: McGuinness Unlimited; RS&H, 2023

4.5.1.1 Renovation Option

Rough order-of-magnitude cost estimates were generated for the Renovation option (at conclusion of chapter). The estimates were broken into landside site work, terminal building renovation and construction, upgrades in security and information technology, and passenger boarding bridge equipment, along with the associated program engineering and construction fees. Impacts to existing airside facilities are assumed to be minimal per the program scope and thus are not included in these cost estimates. Landside site work includes the modifications to the existing terminal loop road, parking lot, associated curbs and gutters, as well as changes in landscaping, lighting, striping, installation of a curbside canopy, and other general construction items. The terminal building construction category includes the costs of reconfiguring a 197,347 square foot terminal with full fit-out.

All estimates' values were increased by a constant 5 percent escalation rate consistent with industry pricing trends up through calendar year 2028, the proposed last year of project construction at the time of this writing. The full, detailed cost estimate for the refined redevelopment option can be found at the conclusion of this report.

4.5.1.2 Hybrid Option

Rough order-of-magnitude cost estimates were generated for the Hybrid option (at conclusion of chapter). Estimates were broken into the same categories as the Renovation option, however, the landside site work, upgrades in mechanical, electrical and other infrastructure were based on an allowance that could increase/decrease at the time of design based on funding available. All costs include associated program engineering and construction fees. Impacts to existing airside facilities are assumed to be minimal per the program scope and thus are not included in these cost estimates. Detailed ROM cost estimates for the Hybrid alternative are provided at the conclusion of this report. All estimate values were increased by a constant 5 percent escalation rate consistent with industry pricing trends for calendar year 2028, the proposed last year of project construction at the time of this writing.

4.5.1.3 New-Build Option

Rough order-of-magnitude cost estimates were generated for the New-Build option (at conclusion of chapter). This alternative is similar to the Hybrid option, with the exception of the existing administration building being removed from the scope of work. Like the Hybrid option, the FAA tower facility remains in place and improvements are made to the exterior envelope systems. All estimate values were increased by a constant 5 percent escalation rate consistent with industry pricing trends for calendar year 2028, the proposed last year of project construction at the time of this writing.

4.6 Eligibility

The construction, repair, reconstruction, rehabilitation, renovation, and expansion of airport passenger terminals are eligible for grants from the Airport Improvement Program (AIP) and the Passenger Facility Charge program (PFC) of the Federal Aviation Administration (FAA). In Section 47102(28) of Title 49 United States Code, terminal development under AIP is defined as:

> *"(28) "terminal development" means—*
>
> *A. development of—*
>
> *i. an airport passenger terminal building, including terminal gates;*
>
> *ii. access roads servicing exclusively airport traffic that leads directly to or from an airport passenger terminal building; and*
>
> *iii. walkways that lead directly to or from an airport passenger terminal building; and*
>
> *B. the cost of a vehicle described in section 47119(a)(1)(B)."*

Under the law (in section 47119), work may be done in public use areas that are used for movement of passengers and their baggage. For large-hub, medium-hub, and small-hub airports, the areas are limited to nonrevenue producing areas. Also, for those airports, the grant must be paid through the airport's passenger entitlements. Roadways, walkways, and vehicles to go to and from the terminal including multimodal terminals, are also considered to be terminal development.

Non-hub primary airports have the same eligibility as the larger airports with the addition of revenue producing public-use areas. In addition, non-hub primary airports may be provided with up to $20 million in discretionary funds and funds from the Small Airport Fund.

With enplanements of 85,599 reported in the latest calculation for the year ending December 31, 2022, Capital Region International Airport is designated as a non-hub airport since it has enplanements less than 0.05 percent of National enplanements for all airports. As such, LAN can use the expanded eligibility and increased funding availability for non-hub primary airports.

Section 47119 contains those provisions for AIP eligibility. Additional PFC eligibility is included in Section 40117 applies to include "gates and related areas."

Traditionally, FAA has decided that certain facilities in a terminal building, although they may not be accessible to the public, may still be at least partially eligible because other eligible areas may not function without the use of those facilities. These areas are generally referred to as "prorated" areas since their use serves both eligible and ineligible areas of the terminal. Thus,

the FAA Order 5100.38D (and predecessor versions) has provided a method for using square footage for computation of eligible/ineligible portions as follows:

Table 11
AIP Eligibility Square Footage Computation Methods

Step	Action
1	Determine the square footage for each of the following categories: A. Eligible Areas B. Ineligible Areas C. Prorated Areas (areas that needed for utilities such as mechanical, electrical, or water) D. High Cost 100% Eligible Items (Examples: Passenger loading bridges, escalators, elevators) E. High Cost 100% Ineligible Items (Example: Large commissioned sculpture, ineligible build out costs)
2	Determine the eligible proration % as follows: Eligible Proration % = A / (A+B)
3	Determine the eligible cost as follows: Eligible Cost = [(Cost of A+B+C) * (Eligible Proration %)] + (Cost of D)

Source: FAA Order 5100.38D

4.6.1 Additional Funding

The Infrastructure Investment and Jobs Act, referred to as the Bipartisan Infrastructure Law (BIL) provides additional money for airport projects under an Airport Infrastructure Grant Program (AIG) as well as the Airport Terminal Program (ATP). ATP currently is slated to go for five years (FFY 2022-2026) with $1 billion per year.

Under the AIG portion of BIL, FAA provides an additional $3 billion per year for all airports, but the bulk of the money ($2.48 billion per year) is provided to primary airports. LAN is one of those airports. Early calculations indicate that there may be an estimated amount of $1.6 million approximately each year added to AIP entitlements for the airport.

Under the Airport Terminal portion, the Federal share for non-hub airports will be 95 percent of the eligible spaces of the terminal project. For the Airport Infrastructure portion, the Federal share of projects will be the same as the airport currently receives under AIP.

In the latest *Frequently Asked Questions* about the BIL programs, dated March 27, 2023, the FAA requires that an eligibility analysis be conducted for the new programs as follows:

> *"Q-U38: Are eligibility calculations required for terminal development grants using AIG Allocated or ATP funds?*
> *A: Yes. Eligibility calculations similar to those done under PFC will be required for AIG Allocated and ATP terminal grants."*

4.6.2 Eligibility Analysis

Table 12, **Table 13**, **Table 14**, and **Table 15** provide an initial estimated eligibility analysis for each concept, beginning with the No Action option for the existing facility. For further emphasis, the impact of work done as part of the project contains various levels of ineligible work based on interpretations of Federal law for the AIP and PFC programs under Title 49 of the United States Code Subchapter VII – Aviation Programs.

4.6.3 Methodology

An eligibility analysis identifies which spaces in the terminal are eligible for AIP and/or PFC funding. The three categories used to identify the spaces are: "eligible", "ineligible" and "prorated" (shown as "Y"," N" and "P"). The first two are "either/or" determinations based upon the concept of "nonrevenue and revenue producing; public use spaces for the movement of passengers and baggage in air commerce" (Identified for Non-hub Primary Airports under Section 47119 of Title 49, United States Code.) "Prorated" space is a determination that the function using the space serves both "eligible and ineligible" space. Generally, these facilities include such items as mechanical rooms and electrical rooms. Under longstanding FAA guidance, these prorated areas are computed for the entire facility regardless of the work being considered for a specific project. That percentage is then carried over for any prorated area included in the specific program.

Thus, the eligibility analysis provides a picture of the general methodology applied to LAN in general using the existing airport condition. The analysis also includes spaces that are not eligible for Federal funding programs meaning any work must be done by the airport without Federal involvement. In any event, if ineligible areas are included in a construction contract, the airport must be diligent in accounting for costs incurred and separate costs for ineligible spaces from reimbursement from FAA or PFC revenue. The accounting would be simpler if the airport had contracts for ineligible spaces separate from eligible and prorated eligible spaces.

At this stage of the planning, there is no specific design work accomplished. The square footage is expected to change during the design phase of any alternative, but this effort provides some broad analysis of the effect of each alternative to a practical planning-level degree for AIP or PFC participation. As design is undertaken, the eligibility analysis should be done at different

stages of design as eligible areas may have ineligible portions detected that need to be addressed in the final evaluation for the sake of accuracy. For example, a restaurant may be theoretically eligible, however, some areas like kitchens may not since FAA has determined that those areas in a restaurant are not "public use". In addition, future determination either through legislation or reevaluation of the areas is always possible.

Finally, it is important to note that these computations are only done by square footage. Actual cost eligibility for grant or PFC approval will be performed during project design as cost estimates are developed. Depending on the cost for each area, the percentage is expected to change when costs are established. Historically, when the cost element is added, the eligibility percentage may increase or decrease depending on the nature of work to be undertaken in the individual areas. The following tables show the planning-level analysis of AIP/PFC funding eligibility.

Table 12
Eligibility Program – Existing

Existing		AIP and Airport Terminal Program (ATP) Eligibility					PFC and Airport Infrastructure Program (AIG) Eligibility				
Description	Total Area	Eligibility	Eligible Area	Ineligible Area	Prorated Eligible Area	Prorated Ineligible Area	Eligibility	Eligible Area	Ineligible Area	Prorated Eligible Area	Prorated Ineligible Area
Airline Spaces	7,800	N		7,800			Y	7,800			
Airport Spaces	28,400	N		28,400			N		28,400		
Baggage Services	25,800	Y	25,800				Y	25,800			
Building Systems	22,200	P			15,570	6,630	P			16,621	5,579
Concessions	5,100	Y	5,100				Y	5,100			
Customs and Border Protection (CBP)	17,900	Y	17,900				Y	17,900			
Ground Transportation	1,400	Y	1,400				Y	1,400			
Public Spaces	33,000	Y	33,000				Y	33,000			
Restrooms	5,300	Y	5,300				Y	5,300			
Holdrooms	20,600	Y	20,600				Y	20,600			
Transportation Security Administration (TSA)	6,500	Y	6,500				Y	6,500			
Aviation Education	4,024	N		4,024			N		4,024		
Federal Aviation Administration (FAA)	9,000	N		9,000			N		9,000		
TOTAL	**187,024**		**115,600**	**49,224**	**15,570**	**6,630**		**123,400**	**41,424**	**16,621**	**5,579**
			AIP Prorated Eligible		**70.1%**			**PFC Prorated Eligible**		**74.9%**	

Source: Borsari Airport Consultants; RS&H 2023

Table 13
Eligibility Program – Renovation

Renovation Scenario		AIP and Airport Terminal Program (ATP) Eligibility					PFC and Airport Infrastructure Program (AIG) Eligibility				
Description	Total Area	Eligibility	Eligible Area	Ineligible Area	Prorated Eligible Area	Prorated Ineligible Area	Eligibility	Eligible Area	Ineligible Area	Prorated Eligible Area	Prorated Ineligible Area
FIRST LEVEL											
Airline Spaces	5,320	N		5,320			Y	5,320			
Airport Spaces	20,586	N		20,586			N		20,586		
Baggage Services	29,547	Y	29,547				Y	29,547			
Building Systems	5,541	P			4,525	1,016	P			4,664	877
Concessions	1,933	Y	1,933				Y	1,933			
Customs and Border Protection (CBP)	22,410	Y	22,410				Y	22,410			
Ground Transportation	1,336	Y	1,336				Y	1,336			
Public Spaces	27,341	Y	27,341				Y	27,341			
Restrooms	4,142	Y	4,142				Y	4,142			
Future Development	1,218	Y	1,218				Y	1,218			
Queuing	1,753	Y	1,753				Y	1,753			
Subtotal	**121,127**		**89,680**	**25,906**	**4,525**	**1,016**		**95,000**	**20,586**	**4,664**	**877**
SECOND LEVEL											
Airport Spaces	1,163	N		1,163			N		1,163		
Building Systems	1,417	P			1,157	260	P			1,193	224
Concessions	4,957	Y	4,957				Y	4,957			
Customs and Border Protection (CBP)	1,449	Y	1,449				Y	1,449			
Holdrooms	20,311	Y	20,311				Y	20,311			
Public Spaces	17,372	Y	17,372				Y	17,372			
Restrooms	3,488	Y	3,488				Y	3,488			
Transportation Security Administration (TSA)	12,576	Y	12,576				Y	12,576			
Aviation Education	4,865	N		4,865			N		4,865		
Queuing	2,476	Y	2,476				Y	2,476			
Subtotal	**70,074**		**62,629**	**6,028**	**1,157**	**260**		**62,629**	**6,028**	**1,193**	**224**
THIRD LEVEL											
Airport Spaces	7,152	N		7,152			N		7,152		
ADDITIONAL											
Canopy	21,873	Y	21,873				Y	21,873			
TOTAL	**220,226**		**174,182**	**39,086**	**5,683**	**1,275**		179,502	33,766	5,856	1,102
			AIP Prorated Eligible		**81.7%**			**PFC Prorated Eligible**		**84.2%**	

Source: Borsari Airport Consultants; RS&H 2023
Note: FAA spaces on levels 3 to 5 are not included as there are no interior alterations.

Table 14
Eligibility Program – Hybrid

Hybrid Scenario		AIP and Airport Terminal Program (ATP) Eligibility					PFC and Airport Infrastructure Program (AIG) Eligibility				
Description	Total Area	Eligibility	Eligible Area	Ineligible Area	Prorated Eligible Area	Prorated Ineligible Area	Eligibility	Eligible Area	Ineligible Area	Prorated Eligible Area	Prorated Ineligible Area
FIRST LEVEL											
Airline Spaces	6,197	N		6,197			Y	6,197			
Airport Spaces	12,114	N		12,114			N		12,114		
Baggage Services	30,928	Y	30,928				Y	30,928			
Building Systems	1,351	P			983	368	P			1,025	326
Customs and Border Protection (CBP)	24,877	Y	24,877				Y	24,877			
Ground Transportation	3,352	Y	3,352				Y	3,352			
Public Spaces	11,676	Y	11,676				Y	11,676			
Restrooms	1,770	Y	1,770				Y	1,770			
Queuing	1,237	Y	1,237				Y	1,237			
Subtotal	**93,502**		**73,840**	**18,311**	**983**	**368**		**80,037**	**12,114**	**1,025**	**326**
SECOND LEVEL											
Airport Spaces	25,039	N		25,039			N		25,039		
Building Systems	2,911	P			2,118	793	P			2,208	703
Concessions	4,927	Y	4,927				Y	4,927			
Customs and Border Protection (CBP)	2,435	Y	2,435				Y	2,435			
Holdrooms	15,139	Y	15,139				Y	15,139			
Public Spaces	16,197	Y	16,197				Y	16,197			
Restrooms	3,177	Y	3,177				Y	3,177			
Transportation Security Administration (TSA)	8,087	Y	8,087				Y	8,087			
Aviation Education	4,055	N		4,055			N		4,055		
Queuing	2,471	Y	2,471				Y	2,471			
Subtotal	**84,438**		**52,433**	**29,094**	**2,118**	**793**		**52,433**	**29,094**	**2,208**	**703**
THIRD LEVEL											
Airport Spaces	7,152	N		7,152			N		7,152		
ADDITIONAL											
Canopy	19,412	Y	19,412				Y	19,412			
TOTAL	**204,504**		**145,685**	**54,557**	**3,101**	**1,161**		**151,882**	**48,360**	**3,233**	**1,029**
			AIP Prorated Eligible		**72.8%**			**PFC Prorated Eligible**		**75.8%**	

Source: Borsari Airport Consultants; RS&H 2023
Note: FAA spaces on levels 3 to 5 are not included as there are no interior alterations.

Table 15
Eligibility Program – New Construction

New Construction Scenario		AIP and Airport Terminal Program (ATP) Eligibility					PFC and Airport Infrastructure Program (AIG) Eligibility				
Description	Total Area	Eligibility	Eligible Area	Ineligible Area	Prorated Eligible Area	Prorated Ineligible Area	Eligibility	Eligible Area	Ineligible Area	Prorated Eligible Area	Prorated Ineligible Area
FIRST LEVEL											
Airline Spaces	6,197	N		6,197			Y	6,197			
Airport Spaces	11,103	N		11,103			N		11,103		
Baggage Services	30,928	Y	30,928				Y	30,928			
Building Systems	1,351	P			997	354	P			1,039	312
Customs and Border Protection (CBP)	24,877	Y	24,877				Y	24,877			
Ground Transportation	3,352	Y	3,352				Y	3,352			
Public Spaces	11,676	Y	11,676				Y	11,676			
Restrooms	1,770	Y	1,770				Y	1,770			
Queuing	1,237	Y	1,237				Y	1,237			
Subtotal	**92,491**		**73,840**	**17,300**	**997**	**354**		**80,037**	**11,103**	**1,039**	**312**
SECOND LEVEL											
Airport Spaces	34,946	N		34,946			N		34,946		
Building Systems	2,911	P			2,147	764	P			2,238	673
Concessions	4,927	Y	4,927				Y	4,927			
Customs and Border Protection (CBP)	2,435	Y	2,435				Y	2,435			
Holdrooms	15,139	Y	15,139				Y	15,139			
Public Spaces	17,392	Y	17,392				Y	17,392			
Restrooms	3,177	Y	3,177				Y	3,177			
Transportation Security Administration (TSA)	8,087	Y	8,087				Y	8,087			
Queuing	2,471	Y	2,471				Y	2,471			
Subtotal	**91,485**		**53,628**	**34,946**	**2,147**	**764**		**53,628**	**34,946**	**2,238**	**673**
ADDITIONAL											
Canopy	19,412	Y	19,412				Y	19,412			
TOTAL	**203,388**		**146,880**	**52,246**	**3,144**	**1,118**		**153,077**	**46,049**	**3,276**	**986**
			AIP Prorated Eligible		**72.8%**			**PFC Prorated Eligible**		**77.6%**	

Source: Borsari Airport Consultants; RS&H 2023
Note: FAA spaces on levels 3 to 5 are not included as there are no interior alterations.

5 Implementation

There are multiple ways to implement large scale projects like the preferred terminal development project. At a master planning level, generalized high-level solutions are developed and used to determine a funding program over the planning period. After this high-level plan is completed, further implementation analysis will be completed as part of the conceptual design.

To implement the preferred terminal solution, program scheduling and funding must be examined to ensure capital outlays are in alignment with project phasing. As the program is anticipated to participate in the Airport Improvement Program and potentially available avenues of the Bipartisan Infrastructure Law, the project phasing will be incorporated into the Airport's Capital Improvement Program (ACIP). Program elements, delivery methods, and program financial planning are discussed in the following sections.

5.1 Environmental Overview (NEPA Documentation)

Regulatory elements that must be considered in advance of the preferred terminal development project include those related to environmental documentation requirements (described later in detail) and environmental permitting requirements. Environmental permitting must be considered for all aspects of both building and civil works. However, environmental permitting requirements associated with drainage, building construction, and public roadway construction need to be defined in the next phase of design and are, therefore, not discussed in this section.

The FAA Reauthorization Act of 2018 (Act) included provisions related to non-aeronautical development at airports. Section 163 of the Act takes two significant steps to limit FAA's authority over non-aeronautical development. First, the Act explicitly limits FAA's authority to "directly or indirectly regulate" non-aeronautical property transactions at an airport, except: (1) to ensure the safe and efficient operation of aircraft, or the safety of people and property on the ground; (2) to ensure the receipt of fair market value for the use or disposal of property; or (3) where the property was itself purchased with Airport Improvement program (AIP) grants or is subject to the Surplus Property Act. The Act also limits FAA's authority to review and approve Airport Layout Plan (ALP) amendments to only those amendments that "materially impact" safety and efficiency for aircraft operations, or that "adversely affect the value of prior Federal investments to a significant extent." FAA's position is that when an ALP amendment and FAA approval are required for non-aeronautical development (even on property which has been released from grant obligations) when combined with an aeronautical development project, the FAA retains approval authority over the entirety of the project, thereby triggering the need for environmental review.

When the FAA retains approval authority over a project, an airport must then demonstrate compliance with the National Environmental Policy Act (NEPA) and implementing regulations

issued by the Council on Environmental Quality (CEQ). NEPA documentation must be completed prior to construction for airport projects receiving federal funding or ALP approval.

There are three levels of NEPA documentation depending on the scope of a proposed project and the potential environmental impacts associated with a proposed project. These include categorical exclusion (CATEX), environmental assessment (EA), and environmental impact statement (EIS). FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures,* [2] lists actions that the FAA has found in the past to not normally have a significant effect on the environment. Proposed projects that fall within the list found in FAA Order 1050.1F and do not have an extraordinary circumstance[3] can be processed with a CATEX. For proposed projects that do not fall within the list specified as a CATEX in FAA Order 1050.1F, an EA must be prepared. At the completion of the EA, the FAA will issue a Finding of No Significant Impact (FONSI) or continue with an EIS. An EIS must be prepared if the environmental impacts associated with a proposed project are significant impacts that cannot be mitigated below the established significant threshold. At the completion of an EIS, the FAA will issue a Record of Decision (ROD).

FAA Order 1050.1F and FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*, require the evaluation of airport development projects in NEPA documents as they relate to specific environmental resource categories by assessing project impacts against identified thresholds at which the impacts are considered significant. NEPA documents must be prepared in compliance with CEQ regulations, both FAA Orders and applicable Executive Orders, as well as other applicable federal, state, and local requirements.

The terminal renovation project would require an ALP approval from the FAA and would also use federal funds for the project. Therefore, it is assumed that FAA would retain approval authority over the project and NEPA documentation would need to be completed. It is our recommendation that the appropriate level of NEPA documentation for this terminal renovation project is a CATEX under Paragraphs 5-6.4(h) and 5-6.4 (v) in FAA Order 1050.1F, which state:

> *h. "Federal financial assistance, licensing, or Airport Layout Plan (ALP) approval for construction or expansion of facilities—such as terminal passenger handling and parking facilities or cargo buildings, or facilities for non-aeronautical uses at existing airports and commercial space launch sites—that do not substantially expand those facilities (see the FAA's presumed to conform list (72 Federal Register 41565 (July 30, 2007))).*"
>
> *v. "Replacement or reconstruction of a terminal, structure, or facility with a new one of similar size and purpose, where location will be on the same site as the existing building or facility*."

[2] FAA, Order 1050.1F, *Environmental Impacts: Policies and Procedures*, Sections 5-6.1 through 5-6.6. July 16, 2015.
[3] FAA, Order 1050.1F, *Environmental Impacts: Policies and Procedures*, Sections 11-5(6). July 16, 2015.

Depending on the final scope of the project, the CATEX may also include Paragraphs 5-6.4(i) and 5-6.4(e), in FAA Order 1050.1F. Paragraph 5-6.4(i) states:

> *"Demolition and removal of FAA buildings and structures, or financial assistance for or approval of an Airport Layout Plan (ALP) for the demolition or removal of non-FAA owned, on-airport buildings and structures, provided no hazardous substances or contaminated equipment are present on the site of the existing facility. This CATEX does not apply to buildings and structures of historic, archaeological, or architectural significance as officially designated by Federal, state, tribal or local governments."*

Paragraph 5-6.4(e) in FAA Order 1050.1F states:

> *"Federal financial assistance, licensing, or Airport Layout Plan (ALP) approval for the following actions, provided the action would not result in significant erosion or sedimentation, and will not result in a significant noise increase over noise sensitive areas or result in significant impacts on air quality.*
>
> - *Construction, repair, reconstruction, resurfacing, extending, strengthening, or widening of a taxiway, apron, loading ramp, or runway safety area (RSA), including an RSA using Engineered Material Arresting System (EMAS); or*
> - *Reconstruction, resurfacing, extending, strengthening, or widening of an existing runway.*
>
> *This CATEX includes marking, grooving, fillets, and jet blast facilities associated with any of the above facilities."*

However, the CRAA will need to coordinate with the FAA Environmental Protection Specialist (EPS) at the Detroit ADO who will make the final determination which level of NEPA documentation is the most appropriate for the project, as well as the scope needed for that NEPA documentation.

Table 16 summarizes existing environmental conditions at or near LAN for each of the environmental impact categories listed in FAA Order 1050.1F, Exhibit 4-1. The purpose of this environmental overview is to identify environmental conditions that could potentially be affected by terminal development alternatives.

Table 16
Summary of Environmental Resource Categories

Environmental Resource	Description
Air Quality	LAN, located within Clinton County, Eaton County, and Ingham County, is in attainment for all National Ambient Air Quality Standards.[4]
Biological Resources (Including Fish, Wildlife, and Plants)	The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC)[5] identified the following Endangered Species Act (ESA) listed, proposed or candidate species for LAN: endangered Indiana bat (*Myotis sodalis*), endangered northern long-eared bat (*Myotis septentrionalis*), proposed endangered tricolored bat (*Perimyotis subflavus*), threatened eastern massasauga (*Sistrurus catenatus*), candidate monarch butterfly (*Danaus plexippus*), threatened eastern prairie fringed orchid (*Platanthera leucophaea*), and proposed experimental population for whooping crane (*Grus americana*). The IPaC did not identify any ESA designated critical habitats, and suitable habitat is not present within the proposed terminal development area. The IPaC identified the bald eagle (*Haliaeetus leucocephalus)* as a migratory non-Bird of Conservation Concern, and the black-billed cuckoo (*Coccyzus erythropthalmus*), bobolink (*Dolichonyx oryzivorus*), Canada warbler (*Cardellina canadensis*), chimney swift (*Chaetura pelagica*), golden-winged warbler (*Vermivora chrysoptera*), lesser yellow-legs (*Tringa flavipes*), long-eared owl (*Asio otus*), red-headed woodpecker (*Melanerpes erythrocephalus*), rusty blackbird (*Euphagus carolinus*), and wood thrush (*Hylocichla mustelina*) as migratory Birds of Conservation Concern. However, suitable habitat is not present for migratory birds within the proposed terminal development area.
Climate	Combustion of fossil fuels from aviation emissions, construction activities, and other airport operations are sources of greenhouse gases (GHGs) that contribute to climate change. However, the

[4] U.S. Environmental Protection Agency. Michigan Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. Retrieved February 2024 from https://www3.epa.gov/airquality/greenbook/anayo_mi.html
[5] U.S. Fish and Wildlife Service. IPaC Information for Planning and Consultation. Retrieved February 2024 from https://ipac.ecosphere.fws.gov/

	FAA 1050.1F Desk Reference on Climate[6] states there are currently no significance thresholds for aviation GHG emissions as aviation projects represent a small percentage of overall GHG emissions.
Coastal Resources	The proposed terminal development area, is not within a Coastal Zone[7] and there are no Coastal Barrier Resource System[8] segments within the area.
Department of Transportation Act, Section 4(f)	There are no wildlife or waterfowl refuge in the area of the proposed terminal development.[9] See Historical, Architectural, Archeological, and Cultural Resources for NRHP-eligible properties protected under Section 4(f)).
Land and Water Conservation Fund Act of 1965 6(f)	There are no Section 6(f) resources in the proposed terminal development area. The nearest 6(f) property is Dietrich Park, located approximately 1.6 miles southeast of LAN.[10]
Farmlands	According to the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey, the area around the proposed terminal development does not contain prime farmland, or farmland of statewide or local importance.[11]
Hazardous Materials, Solid Waste, and Pollution Prevention	The U.S. Environmental Protection Agency (EPA) NEPAssist tool[12] identified six (6) Resource Conservation Recovery Act (RCRA) hazardous waste generators in proximity to the proposed terminal development area at LAN: Lansing Community College Aviation, Martinaire Aviation LLC., Avflight Lansing, Capital Region Airport Authority, Continental Express[13], and the Lansing Jet Center[13]. A review of RCRA facility information did not identify

[6] Federal Aviation Administration. 1050.1F Desk Reference, Version 3 (October 2023). Retrieved February 2024 from https://www.faa.gov/media/71921

[7] State of Michigan. Coastal Zone Boundary Maps. Retrieved February 2024 from https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Programs/WRD/Coastal-Management/coastal-zone-maps.pdf?rev=5f849175a60742c8ab9106fa415970a5

[8] U.S. Fish and Wildlife Service. Coastal Barrier Resources System Map. Retrieved February 2024 from https://fwsprimary.wim.usgs.gov/cbrs-mapper-v2/

[9] U.S. Fish and Wildlife Service. National Wildlife Refuge System. Retrieved February 2024 from https://www.fws.gov/program/national-wildlife-refuge-system

[10] Land and Water Conservation Fund Coalition. Map of LWCF Programs. Retrieved February 2024 from https://lwcf.tplgis.org/mappast/

[11] U.S. Department of Agriculture. Natural Resources Conservation Service. 7 CFR Part 658 Farmland Protection Act. Retrieved February 2024 from https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

[12] U.S. Environmental Protection Agency. NEPAssist, Capital Region International, EPA Facilities. Retrieved February 2024 from https://nepassisttool.epa.gov/nepassist/nepamap.aspx

[13] Facility no longer exists.

	any hazardous materials releases or violations from these facilities. The NEPAssist tool did not identify any Brownfields sites, Superfund sites, Toxic Release Inventory sites, or hazardous waste sites at LAN. The Granger's Disposal Center of Lansing,[14] approximately 1.6 miles east of LAN, accepts construction solid waste and recycling. Hazardous waste generated would need to be disposed of at an appropriate licensed facility that handles such waste. No Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) superfund sites exist at the Airport. Solid waste from the Airport is transported to the Granger Disposal Center of Lansing. The Airport has National Pollutant Discharge Elimination System (NPDES), Stormwater Pollution Prevention Plan (SWPPP), and Spill Prevention, Control, and Countermeasure (SPCC) permits.
Historical, Architectural, Archeological, and Cultural Resources	According to the NRHP database,[15] there is one NRHP-listed property located at LAN, the 9622nd Army Air Corps Reserve Recovery Unit – Civil Air Patrol Quonset Huts. However, the building was removed from Airport property in 1995. The existing terminal is over 45 years in age and therefore, has the potential to be eligible as historic. A historic assessment of the existing terminal is recommended to determine if it is eligible for inclusion in the NRHP.
Land Use	The proposed terminal development area is located in DeWitt Chater Township, Clinton County, Michigan that has been annexed to the City of Lansing.[16] The proposed terminal development area is zoned as Airport and the development would be consistent with that zoning designation.
Natural Resources and Energy Supply	Construction for the proposed terminal development could temporarily increase the Airport's consumption of natural resources and energy. These resources include a variety of construction materials, fuel, oil, and water. The transport of construction materials and operation of heavy machinery may temporarily increase the airport's fossil fuel consumption. These

[14] Clinton County, Michigan. Curbside and Landfill Waste Disposal Options. Retrieved February 2024 from https://www.clinton-county.org/358/Trash-Disposal-Services

[15] U.S. Department of Interior, National Parks Service. National Register Database and Research. Retrieved February 2024 from https://www.nps.gov/subjects/nationalregister/database-research.htm

[16] U.S. Census Bureau. 2020 Census Tract Reference Map, Clinton County, Michigan 26037. Retrieved February 2024 from https://www2.census.gov/geo/maps/DC2020/PL20/st26_mi/censustract_maps/c26037_clinton/DC20CT_C26037.pdf

	resources are not rare or in short supply. Likewise, construction activities could marginally increase demands on water, electricity, and natural gas. However, it is assumed that these demands would be met by existing Airport infrastructure.
Noise and Compatible Land Use	Construction for the proposed terminal development would be phased so that there would be no effect to aircraft operations. Therefore, a noise contour analysis would not be required.
Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks	The proposed terminal development area is located within Census Tract 102.4, Block Group 1.[17] For this block group, the following information was obtained from U.S. Census Bureau 2020 Census: total estimated population is 2,299 people; approximately 8.4% of the population is unemployed;[18] approximately 2.0% of the population is below the poverty level;[19] approximately 13.2% of the population is considered a minority;[20] approximately 27.3% of the population is under the age of eighteen.[21] The nearest public school is Cumberland Elementary, approximately 0.9-mile south of LAN, which serves students in pre-kindergarten through third grade. The nearest children's health care facility is the Cristo Rey Family Health Clinic, approximately 2miles southeast of LAN. The proposed terminal development is not anticipated to affect socioeconomics, environmental justice, or children's health and safety.
Visual Effects (Including Light Emissions)	Various lighting features currently illuminate Airport facilities, such as the airfield (e.g., runways and taxiways), buildings, access roadways, automobile parking areas, and the apron area for the safe and secure movement of people and vehicles. Structures at the Airport include the existing terminal, hangars, maintenance buildings, etc. The proposed terminal development may include additional light emissions. However, the new terminal and light

[17] U.S. Census Bureau. 2020 Census Tract Outline Map, Clinton County, Michigan 26037. Retrieved February 2024 from https://www2.census.gov/plmap/pl_trt/st26_Michigan/c26037_Clinton/CT26037_001.pdf

[18] U.S. Census Bureau. 2022: ACS 5-Year Estimates Detailed Tables, Employment. Retrieved February 2024 from https://data.census.gov/table/ACSDT5Y2022.B23027?t=Employment&g=1500000US260370102041

[19] U.S. Census Bureau. 2022: ACS 5-Year Estimates Detailed Tables., Poverty Retrieved February 2024 from https://data.census.gov/table/ACSDT5Y2022.B17101?t=Income%20and%20Poverty&g=1500000US260370102041

[20] U.S. Census Bureau. 2020: DEC Redistricting Data (PL 94-171), Race. Retrieved February 2024 from https://data.census.gov/table?g=1500000US260370102041

[21] U.S. Census Bureau. 2022: ACS 5-Year Estimates Detailed Tables, Age. Retrieved February 2024 from https://data.census.gov/table?t=Age%20and%20Sex&g=1500000US260370102041

	installations would not substantially alter the visual or aesthetic character of LAN.
Water Resources (Including Wetlands, Floodplains, Surface Waters, Groundwater, and Wild and Scenic Rivers)	The National Wetlands Inventory[22] identified no wetlands within the proposed terminal development area. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel 26037C0313D,[23] the proposed terminal development area is outside the 100-year floodplain. The proposed terminal development area is not located over an EPA-designated Sole Source Aquifers (SSA). The nearest SSA is the St. Joseph SSA underlying South Bend, Indiana, over 100 miles southwest of LAN.[24] The proposed terminal development area is not in the vicinity of any Wild and Scenic Rivers. The nearest Wild and Scenic River segment is the Pere Marquette Wild and Scenic River, located over 95 miles northwest of LAN.[25]

5.2 Phasing

The phasing of design and construction focuses on terminal modernization completed in sections to minimize impacts to terminal operations and passenger movement. Phasing will define immediate improvements that address current facility needs as well as long-term improvements to meet forecast demand. Each concept will remove and replace the existing curbside canopy to enhance curbside views of the terminal.

The following figures illustrate conceptual phasing plans for the renovation, hybrid, and new-build terminal alternatives to demonstrate how the overall program could be potentially split over multiple phases/years to minimize impacts to airport operations as well as address financial constraints. Construction phases are described in the following sections.

5.2.1 Renovation Concept Phasing

Renovation of the existing building emphasizes maintaining terminal functions, sustaining, passenger movements, and mitigating any potential disruptions to airport revenues. As with

[22] U.S. Fish and Wildlife Service. National Wetlands Inventory Mapper. Retrieved February 2024 from https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/

[23] Federal Emergency Management Agency. National Flood Hazard Layer FIRMette. Retrieved February 2024 from https://msc.fema.gov/arcgis/rest/directories/arcgisjobs/nfhl_print/mscprintb_gpserver/j245d321284a346b0a51ab44fc9b43a3c/scratch/FIRMETTE_6381dd89-81f0-4038-bc5c-ac452d5a59f1.pdf

[24] U.S. Environmental Protection Agency. Map of Sole Source Aquifers. Retrieved February 2024 from https://www.epa.gov/dwssa/map-sole-source-aquifer-locations

[25] National Parks Service. Wild and Scenic Rivers ArcGIS Mapper. Retrieved February 2024 from https://nps.maps.arcgis.com/apps/View/index.html?appid=ff42a57d0aae43c49a88daee0e353142

most renovation projects, safety and security measures will need to be taken during construction such as temporary barricades, movement corridors, waiting areas, among others to allow passengers safe passage for navigating past construction areas while minimizing any potential negative passenger experience. The third-floor office space is not included as part of the renovation effort currently. **Figure 23** shows the Renovation Concept phasing.

5.2.1.1 Phase 1

Phase 1 Renovation improvements include enhancements to the public, non-secured areas of the terminal, focusing on expanding the current terminal lobby south and increasing the space for passenger movement which is currently constrained by building columns. The baggage claim and adjacent areas will be updated, and baggage carousels will be reconfigured to enhance airfield security and maximize use of the existing building footprint. Second level improvements will be limited to preparing preserved space for installing vertical circulation equipment in later phases.

5.2.1.2 Phase 2

Renovation Phase 2 will primarily focus on centralizing MEP systems within the current building. The existing ticketing counter will be temporarily moved to the east side of the lobby area, allowing the centralization of mechanical, electrical, and plumbing systems. Second floor enhancements will be limited to placement of electrical and mechanical systems to service the holdroom areas.

5.2.1.3 Phase 3

Renovation Phase 3 primarily focuses on construction of new ticketing counters in the lobby, reconfiguring in-line baggage screening to be placed in the "back-of-house" area, and relocating the security screening checkpoint to a newly constructed second floor. Additional modifications performed during this phase include expansion of ramp equipment storage areas, installation of new restrooms, and relocating TSA functions to the second floor of the existing administration building.

5.2.1.4 Phase 4

Renovation Phase 4 provides new vertical circulation for arriving passengers and modifications to circulation spaces on the first floor of the terminal. Demolition of the existing vertical circulation areas shall also be performed during this phase of development. Work may also include enhanced passenger service spaces such as an indoor service animal relief area (SARA).

5.2.1.5 Phase 5

Renovation Phase 5 relocates administrative staff to the first floor of the terminal facility. Demolition of the west half of the terminal concourse area and building out new administrative space and hold rooms may also be included in this portion of development.

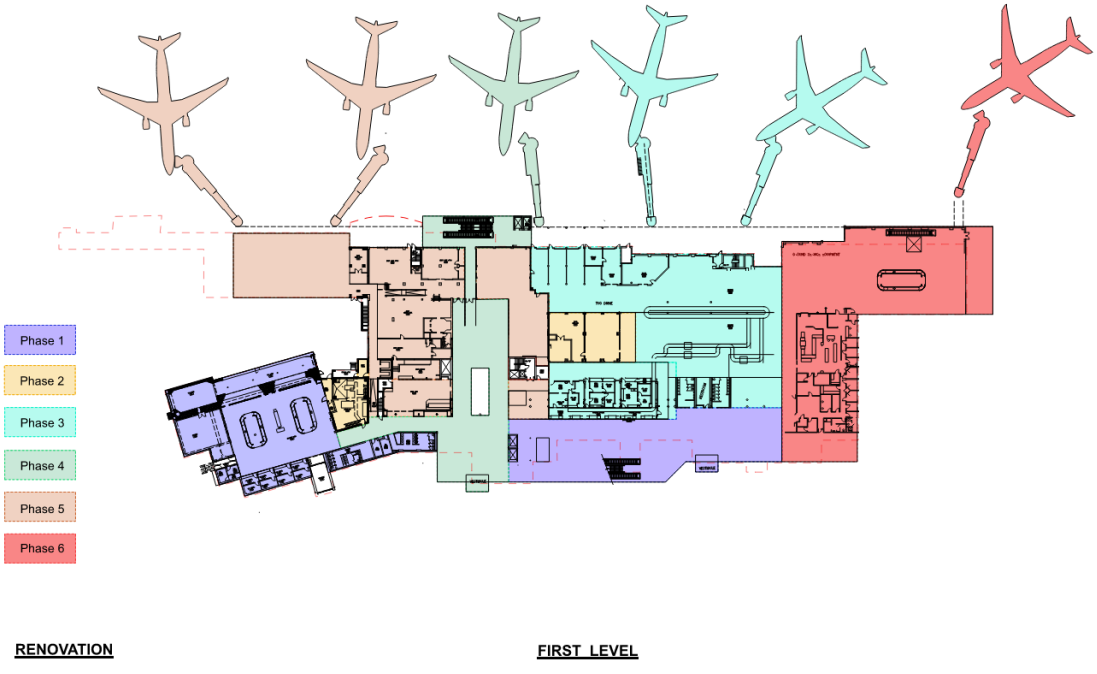
5.2.1.6 Phase 6

Renovation Phase 6 improvements focus on enhancing FIS operations These improvements include increased queuing capacity, a “bag first” configuration, and enhanced circulation from the gate level to the first floor.

5.2.1.7 Phase 7

Renovation Phase 7 addresses holdroom improvements to the west half of the terminal concourse. It will also include “shelling out” concession space for an assigned operator. Restrooms shall also be optimally placed to enhance passenger services.

Figure 23
Renovation Concept Phasing



Source: RS&H, 2023

5.2.2 Hybrid Concept Phasing

The phased approach for the Hybrid and the New-Build approach are similar. The main difference is the implementation/renovation of the existing administrative building. The Hybrid approach focuses on developing a new facility, allowing the existing building to remain in operation for as long as possible. **Figure 24** shows the Hybrid Concept phasing.

5.2.2.1 Phase 1

Hybrid Phase 1 constructs the main terminal facility including the lobby, ticketing, baggage claim and administrative functions south of the existing terminal, allowing the existing facility to remain in operation. During construction, passenger movements will remain in the existing facility. The curbside area will be relocated during this phase, creating a temporary reduction in passenger level of service by necessitating a longer walk into the existing building.

5.2.2.2 Phase 2

Hybrid Phase 2 relocates ticketing, baggage claim, and administrative functions from the existing facility into the new terminal building. Temporary measures to be provided include: 1. allowing passengers to access the existing screening area to gain access into the concourse area; and 2. temporary shelters and belts for inbound baggage into the baggage claim area. A new screening area will be built between the new and existing facilities. Access to all gate holding areas would remain operational with temporary barricades provided in the concourse's middle section. Temporary egress from the concourse to the baggage claim area would also be provided.

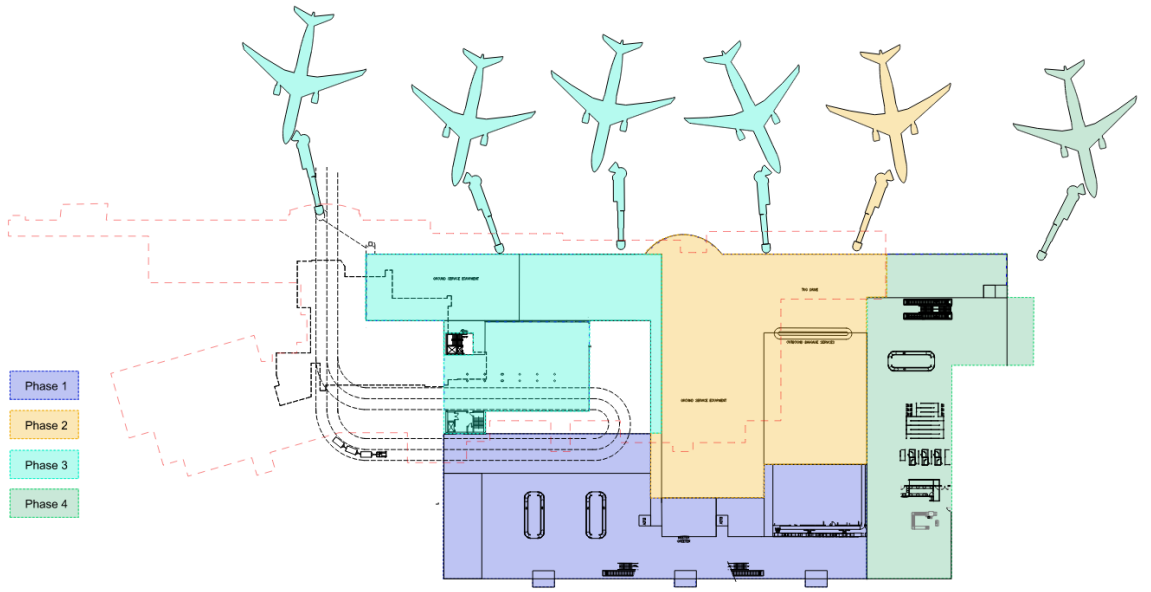
5.2.2.3 Phase 3

Hybrid Phase 3 relocates all security screening equipment and TSA offices from the first floor to the second floor. The exiting corridor from the secure side to the non-secure side is also relocated to the second floor of the new facility. Remaining administrative staff space is relocated into the new building and renovations are made to the second floor of the existing administration building. The third floor is not renovated under this alternative. The western half of the existing terminal facility is demolished, except the administrative building sections which remain to be renovated.

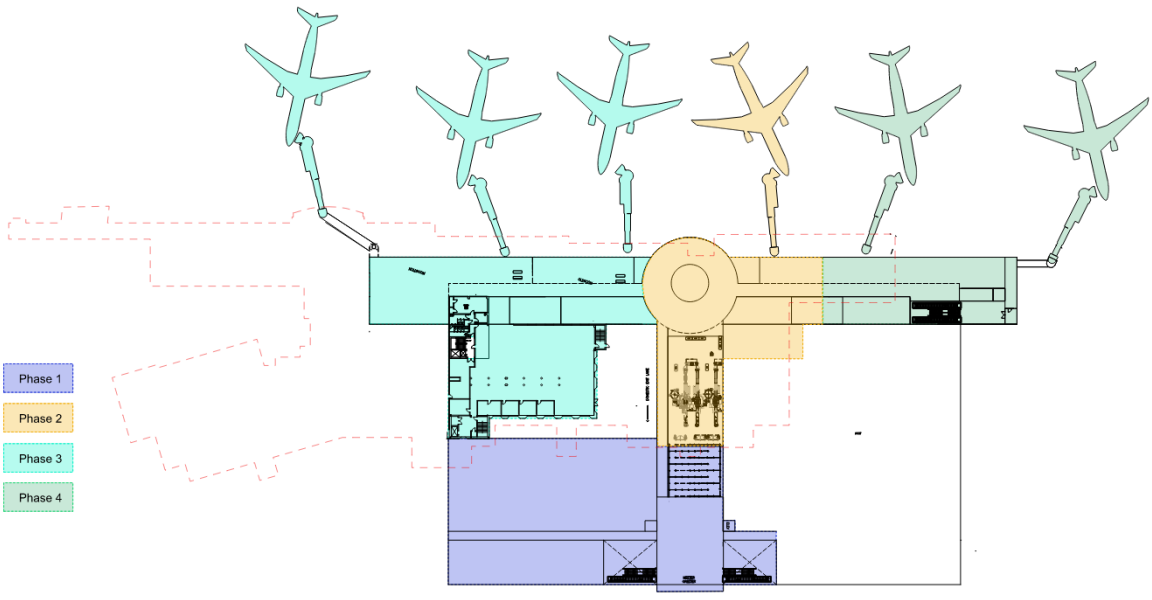
5.2.2.4 Phase 4

Hybrid Phase 4 builds out eastern holdrooms and construct a new FIS area. Any remaining portions of the existing building and infrastructure which is no longer needed are removed/demolished.

Figure 24
Hybrid Concept Phasing



HYBRID FIRST LEVEL



HYBRID SECOND LEVEL

Source: RS&H, 2023

5.2.3 New-Build Concept Phasing

The key difference between the phasing approach for the New-Build Concept and the Hybrid Concept is the demolition of the administrative building.

5.2.3.1 Phase 1

The New-Build Phase 1 description matches the Hybrid Phase 1 approach. Construct the main terminal facility including the lobby, ticketing, baggage claim, and administrative functions south of the existing terminal, allowing the existing facility to remain in operation during construction. While constructing the new terminal building, passenger movement will remain in the existing facility. The curbside area will be relocated during this phase, creating a temporary reduction in passenger level of service by necessitating a longer walk into the existing building.

5.2.3.2 Phase 2

The New-Build Phase 2 relocates ticketing, baggage claim, and administrative functions from the existing facility into the new terminal building. Temporary measures to be provided include: 1. allowing passengers to access the existing screening area to gain access into the concourse area; and 2. temporary shelters and belts for inbound baggage into the baggage claim area. A new screening area will be built between the new and existing facilities. Access to all gate holding areas would remain operational with temporary barricades provided in the concourse's middle section. Temporary egress from the concourse to the baggage claim area also provided.

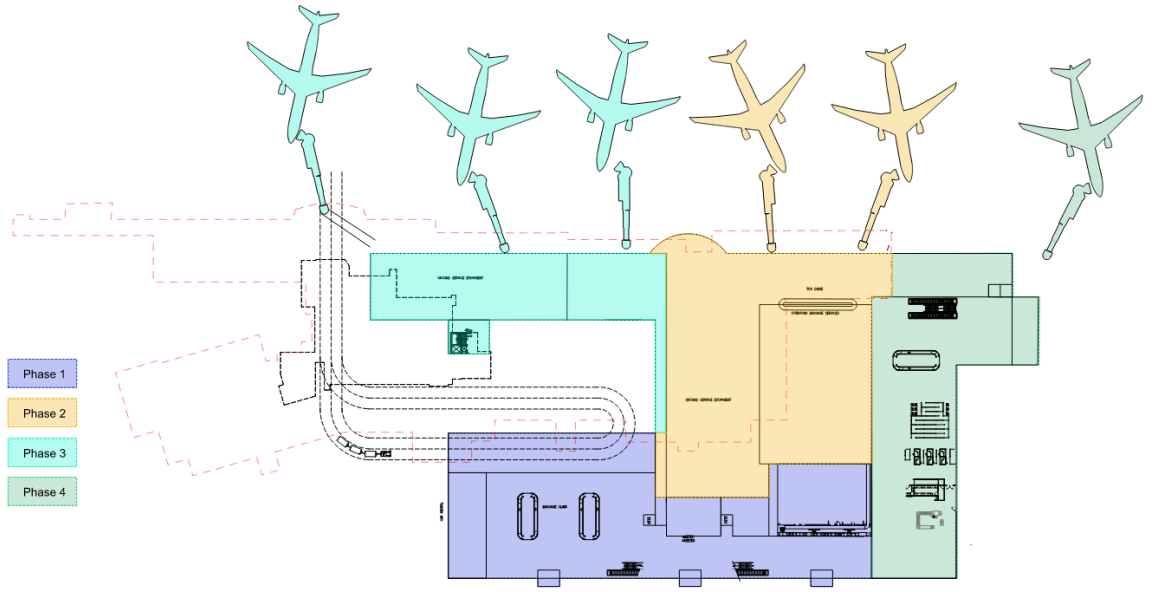
5.2.3.3 Phase 3

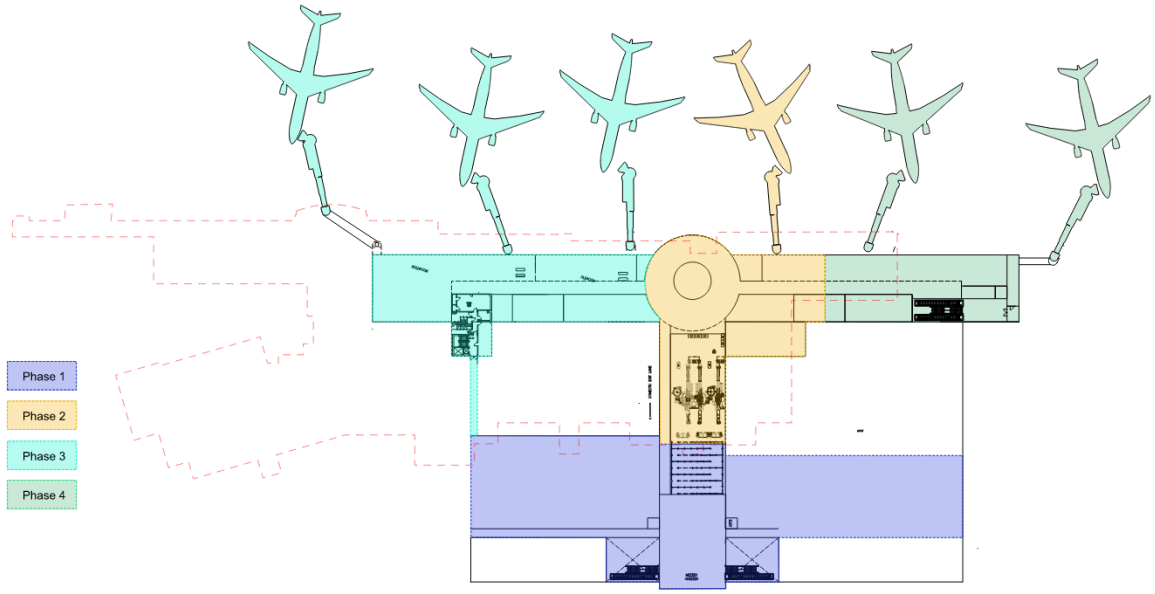
The New-Build Phase 3 relocates all security screening equipment and TSA offices from the first floor to the second floor. The exiting corridor from the secure side to the non-secure side is also relocated to the second floor of the new facility. The western half of the existing terminal and the existing administrative building to be demolished. The remaining portion of the FAA tower to be enclosed and any remaining portions of the tower section to be renovated.

5.2.3.4 Phase 4

New-Build Phase 4 builds out eastern holdrooms and construct a new FIS area. Any remaining portions of the existing building and infrastructure which is no longer needed are removed/demolished.

Figure 25
New-Build Concept Phasing





Source: RS&H, 2023

6 Conclusion

The LAN Terminal Area Plan considered forecast of passenger demand and identified the requirements of a terminal area facility to meet that demand. The CRAA has determined, based on their vision for the airport, the renovation and modernization of the existing facility provides the best case to support the airport operationally within a realistic financial timeline for both immediate and future needs. One benefit to this approach is that, under known constraints, it provides an immediate, practical, and implementable solution to improve passenger services for ticketing, baggage check, and queuing for the security screening checkpoint. Implementation of the Renovation Concept program can be spread over multiple phases and still provide the flexibility for air service expansion, creating a reduced time-to-market advantage for LAN when air service expands.

To address CRAA goals of flexible and sustainable development, opportunities exist to strategically phase terminal program renovation elements, while limiting impacts to daily operations and the overall passenger experience. Additionally, beginning Renovation Concept phases does not preclude the CRAA from later pivoting to the Hybrid or New-Build concepts. While a new facility would also satisfy the needs of the near-term base forecast scenario, renovating the existing space allows CRAA to remain in operation with minimal curbside impacts as well as avoiding disruption to FAA ATCT operations. The Renovation approach also allows the CRAA to focus on expanding service from existing carriers and attracting new carriers to the market in the CRAA's push to achieve the long-term high-growth forecast scenario. With the FAA's support for the LAN Terminal Area Plan and its preferred development alternative, the CRAA can continue down the path towards achieving its vision.

Refined Redevelopment Plan
Detailed Rough Order of Magnitude
Cost Estimate

Lansing Capital Region International Airport
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	Options	SF	Unit	Unit Price	Total 2023	Escalation - 2028		Total
1	Renovation of Existing Terminal Option	229409	SF	$1,005	$230,538,695	$45,259,062	**$**	**275,800,000**
2	Hybrid Terminal Option	213687	SF	$1,284	$274,475,440	$53,765,989	**$**	**328,300,000**
3	New Building Option	208214	SF	$1,364	$283,991,849	$55,630,124	**$**	**339,700,000**

Clarifications

1 *Above costs are program costs and assume GC bid with CMR.*
2 *Planning contingency is included - 25%.*
3 *Construction contingency is included -10%.*
4 *Base costs are in 2023 dollars and escalated to 2028 based on an average escalation of 5%/year. If project is delayed beyond 2028, additional escalation costs are likely to occur.*
5 *FF+E is noted in estimate.*
6 *Engineering Costs are included - 12%.*
7 *See basis of estimate for additional clarifications.*
8 *Estimate revised based on new sketches dated 7.19.2024*

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Work Breakdown		Renovation		Hybrid		New	
General Requirements		$5,064,837		$6,247,121		$6,463,716	
Demolition		$7,419,895		$10,206,345		$10,443,030	
Building Structure		$6,064,347		$18,539,482		$20,523,964	
Building Envelop		$12,884,540		$13,275,865		$15,940,205	
Interior Build Out (Finishes)		$14,282,930		$12,531,880		$12,317,980	
Equipment		$28,647,430		$29,600,320		$29,600,320	
Conveying Systems		$2,980,000		$2,440,000		$2,370,000	
Fire Suppression		$553,508		$1,038,642		$1,100,688	
Plumbing		$2,104,545		$2,053,365		$2,144,605	
HVAC		$9,416,456		$10,600,213		$10,247,744	
Electrical-Distribution, Lighting & Fire Alarm		$6,994,007		$10,071,428		$9,898,128	
Technology-Roughen & Equipment		$6,998,688		$6,411,075		$6,230,466	
Sitework		$2,950,390		$8,173,803		$8,457,199	
Subtotal		**$106,361,572**		**$131,189,538**		**$135,738,045**	
Design contingency	25%	$26,590,393		$32,797,385		$33,934,511	
Phasing	7%	$9,306,638	5%	$8,199,346	5%	$8,483,628	
Bond, Permit & Insurance	4%	$5,690,344		$6,887,451		$7,126,247	
LEED	0%	$0		$0		$0	
GC Overhead	8%	$11,835,916	6%	$10,744,423	6%	$11,116,946	
GC Profit	3%	$4,793,546		$5,694,544		$5,891,981	
Construction Contingency	10%	$16,457,841		$19,551,269		$20,229,136	
Total Construction Costs		**$181,036,249**		**$215,063,956**		**$222,520,494**	
Engineering Costs (Design)	12%	$19,749,409		$23,461,522		$24,274,963	
CMR / Program Manager Fee	7%	$11,520,489		$13,685,888		$14,160,395	inc precon services
Inspection (RE) & Material Testing	3%	$4,937,352		$5,865,381		$6,068,741	
Total of Construction Costs and Professional Fee		**$217,243,499**		**$258,076,747**		**$267,024,593**	
Owner Related Costs (FF+E, Power Consumption, IT, Other Consultants)	10%	$13,295,196		$16,398,692		$16,967,256	
Total Construction, Professional and Owner Costs		**$230,538,695**		**$274,475,440**		**$283,991,849**	
Escalation - 5 year implementation	25%	$45,259,062		$53,765,989		$55,630,124	
Total Program Costs	**2028**	**$275,800,000**		**$328,300,000**		**$339,700,000**	
SF		229409		213687		208214	
Cost/SF		$1,202		$1,536		$1,631	

Clarifications

Phasing % is greater for Renovation Option due to construction in an operating facility

GC overhead % is greater for Renovation Option due to construction in an operating facility

Lansing Capital Region International Airport
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Renovation of Existing Terminal Option

Item	Description	Quantity	Unit	Unit Price	Total	Comment
	General Requirements				**$ 5,064,837**	
	Based on 5% of direct construction costs	1	ls	5064837	$ 5,064,837	
	Demolition				**$ 7,419,895**	
	Building structure demolition	790,500	cf	4	$ 3,162,000	
	Demolition of finishes in areas to be renovated	172,927	sf	10	$ 1,729,270	
	Demolition of second floor for opening to below	2,796	sf	75	$ 209,700	
	Demo of existing building envelop for new additions	66,255	sf	20	$ 1,325,100	
	Demo of existing canopy	included with building demolition				
	Add for temporary wall/weather enclosure	66,255	sf	15	$ 993,825	
	Building Structure				**$ 6,064,347**	
	Foundations	34,609	sf	40	$ 1,384,360	
	Slab on grade	11,216	sf	8	$ 89,728	
	Concrete floor on metal deck-second floor	23,393	sf	15	$ 350,895	
	Structural steel/Joists	260	tons	6500	$ 1,687,189	
	Premium associated with constructing second floor over occupied first floor	23,393	sf	10	$ 233,930	temp shoring, protection
	Metal roof deck	26189	sf	5	$ 130,945	
	New canopy - foundations and structure	21,873	sf	100	$ 2,187,300	architectural steel
	Building Envelop				**$ 12,884,540**	
New Construction						
	New canopy roof	21,873	sf	100	$ 2,187,300	
	Curtain wall w/ sunshades	31,823	sf	150	$ 4,773,375	assume 50% of exterior
	Metal panel exterior	31,823	sf	100	$ 3,182,250	assume 50% of exterior
	EPDM roof	26189	sf	35	$ 916,615	
	New sliding doors	5	ea	25000	$ 125,000	
Renovation						
	Re-clad FAA tower	1	allow	100000	$ 100,000	
	EPDM roof (includes demo)	40000	sf	40	$ 1,600,000	portion of roof remains per assessment report
	Interior Build Out (Finishes)				**$ 14,282,930**	
Finishes		Finish costs include walls, flooring, ceilings, wall finishes and accessories. MEP costs are priced separately.				
	Restrooms	7630	sf	200	$ 1,526,000	
	Building system	6958	sf	20	$ 139,160	
	Airline and airport space, aviation education, FAA, TSA	60845	sf	40	$ 2,433,800	
	Concession, future development	8108	sf	20	$ 162,160	
	Baggage service	29547	sf	20	$ 590,940	
	Public space / Queuing	48942	sf	90	$ 4,404,780	
	FIS, Hold Rooms	44170	sf	50	$ 2,208,500	
	Ground transpiration	1336	sf	50	$ 66,800	
Other						
	Glass handrail at second floor open below	72	lf	350	$ 25,200	
	New ticket counter	200	lf	650	$ 130,000	
	Ground transpiration counters	150	lf	650	$ 97,500	
	New gate counters	9	ea	6000	$ 54,000	work station, printer, ticket scanner by airline
	Signage	229,409	sf	10	$ 2,294,090	inc FIDs
	Service Animal Relief Areas	1000	sf	150	$ 150,000	
	Equipment				**$ 28,647,430**	
	Demo existing jet bridges	5	ea	50000	$ 250,000	

	New jet bridge w/ foundations	5	ea	1170000	$	5,850,000	120' w/ PC air
	New conveyors / BHS system	29547	sf	690	$	20,387,430	
	Carousels	3	ea	720000	$	2,160,000	
	Conveying Systems				**$**	**2,980,000**	
	Elevators - 5 stop - replace existing	2	ea	350000	$	700,000	
	Elevators - 5 stop - new	4	ea	300000	$	1,200,000	
	Escalators - 2 floors	5	ea	200000	$	1,000,000	
	Stairs	2	ea	40000	$	80,000	2 floors
	Fire Suppression				**$**	**553,508**	
	New sprinkler systems for new construction	34,609	sf	6	$	207,654	
	Adjusted sprinkler system for renovated areas	172,927	sf	2	$	345,854	Mains to remain, adjust branch piping and heads for new wall layouts
	Plumbing				**$**	**2,104,545**	
	New storm drainage for new construction	34,609	sf	5	$	173,045	
	Add'l storm drainage for ponding on roof	40,000	sf	0.5	$	20,000	per Terminal Assessment Report
	Plumbing for renovated/new restrooms	7,630	sf	250	$	1,907,500	
	New gas meter - SMART meter	1	ea	4,000	$	4,000	
	HVAC				**$**	**9,416,456**	
Equipment							
	Primary HHW pumps - end suction centrifugal	2	ea	8000	$	16,000	per Terminal Assessment Report
	Secondary HHW pumps - end suction centrifugal	6	ea	7500	$	45,000	
	Replace chillers 1-4	567	tons	1,150	$	652,050	
	Replace 20 HP pump	2	ea	6,000	$	12,000	
	Replace 15 HP pump	4	ea	5,500	$	22,000	
	Replace AHU 1-15	133,855	cfm	9	$	1,137,768	
	Replace RTU-3	8	tons	5,000	$	37,500	
	Replace MAU 1-3	1,238	MBH	30	$	37,140	
	MDF Split	3	tons	12,000	$	36,000	
	Gate 2 Split	3	tons	12,000	$	30,000	
	New equipment to support new construction	34,609	sf	20	$	692,180	
Ductwork and Accessories							
	New ductwork	207,536	sf	8.4	$	1,743,302	
	New insulation	207,536	sf	1.2	$	249,043	
	New accessories	207,536	sf	0.5	$	103,768	
Piping and Insulation							
	HWS&R - Copper press	207,536	sf	2.25	$	466,956	
	HWS&R - Grooved steel	207,536	sf	1	$	207,536	
	Coil Connections at VAVs	207,536	sf	0.25	$	51,884	
	Pipe Insulation	207,536	sf	0.9	$	186,782	
Controls							
	New BAS	207,536	sf	15	$	3,113,040	assume all new
Miscellaneous							
	Test and Balance	207,536	sf	0.75	$	155,652	
	Rigging of equipment	1	ls	75000	$	75,000	
	Demolition	172,927	sf	2	$	345,854	
	Electrical-Distribution, Lighting & Fire Alarm				**$**	**6,994,007**	
Electrical Equipment and Distribution							
	Existing service capacity adequate for future loads						per Terminal Assessment Report
	Rework service entrance for dual feeders	1	ls	1500000	$	1,500,000	per Terminal Assessment Report
	New MDS and associated panels for new construction	34,609	sf	10	$	346,090	
	Panel feeders for above	34,609	sf	2	$	69,218	
	Replace all wiring devices and branch wiring	34,609	sf	6	$	207,654	
Motor Control							
	HVAC System and Miscellaneous Equipment Feeders and Connections.	207,536	sf	3	$	622,608	assume all new
Lighting							
	Lighting - terminal	207,536	sf	15	$	3,113,040	assume all new

	Lighting controls	207,536	sf	0.5	$ 103,768	assume all new
	Lighting - canopy	21,873	sf	10	$ 218,730	
Fire Alarm						
	New fire alarm system for new construction	34,609	sf	5	$ 173,045	
	Modification of existing fire alarm system for renovated areas	172,927	sf	1	$ 172,927	
Miscellaneous						
	Demolition	172,927	sf	2.5	$ 432,318	reno only
	Lightening protection	34,609	sf	1	$ 34,609	new construction
	Technology-Roughen & Equipment				**$ 6,998,688**	
	New rough-in for telecommunication	207,536	sf	8	$ 1,660,288	
	New access control	207,536	sf	6	$ 1,245,216	
	New PA system	207,536	sf	5	$ 1,037,680	
	New DAS system	207,536	sf	4	$ 830,144	
	New video management system	207,536	sf	10	$ 2,075,360	
	New telcom room	1	allow	150000	$ 150,000	
	Sitework				**$ 2,950,390**	
	Assume 3% of Building Costs	1	ls	2950390	$ 2,950,390	
Subtotal		**229409**	**sf**	**$ 464**	**$ 106,361,572**	

Lansing Capital Region International Airport
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RS&H

Hybrid Terminal Option

Item	Description	Quantity	Unit	Unit Price	Total	Comment
	General Requirements				**$ 6,247,121**	
	Based on 5% of direct construction costs	1	ls	6247121	$ 6,247,121	
	Demolition				**$ 10,206,345**	
	Building structure demolition	2,272,410	cf	4	$ 9,089,640	
	Demolition of finishes in areas to be renovated	31,752	sf	10	$ 317,520	
	Demo of existing building envelop for new additions	8,715	sf	20	$ 174,300	
	Demo basement	12,354	sf	40	$ 494,160	12' deep
	Demo of existing canopy	included with building demolition				
	Add for temporary wall/weather enclosure	8,715	sf	15	$ 130,725	
	Building Structure				**$ 18,539,482**	
	Foundations	162,523	sf	40	$ 6,500,920	
	Slab on grade	91,332	sf	8	$ 730,656	
	Concrete floor on metal deck-second floor	71,191	sf	15	$ 1,067,865	
	Structural steel/Joists	1219	tons	6500	$ 7,922,996	
	Metal roof deck	75169	sf	5	$ 375,845	
	New canopy - foundations and structure	19,412	sf	100	$ 1,941,200	architectural steel
	Building Envelop				**$ 13,275,865**	
New Construction						
	New canopy roof	19,412	sf	100	$ 1,941,200	
	Curtain wall w/ sunshades	33,915	sf	150	$ 5,087,250	assume 50% of exterior
	Metal panel exterior	33,915	sf	100	$ 3,391,500	assume 50% of exterior
	EPDM roof	75169	sf	35	$ 2,630,915	
	New sliding doors	5	ea	25000	$ 125,000	
Renovation						
	Re-clad FAA tower	1	allow	100000	$ 100,000	
	EPDM roof (includes demo)	assume existing roofing remains or will be demolished as part of terminal expansion				
	Interior Build Out (Finishes)				**$ 12,531,880**	
Finishes		Finish costs include walls, flooring, ceilings, wall finishes and accessories. MEP costs are priced separately.				
	Restrooms	4947	sf	200	$ 989,400	
	Building system	4262	sf	20	$ 85,240	
	Airline and airport space, aviation education, FAA, TSA	71827	sf	40	$ 2,873,080	
	Concession	4927	sf	20	$ 98,540	
	Baggage service	30928	sf	20	$ 618,560	
	Public space / Queuing	31581	sf	90	$ 2,842,290	
	FIS, Hold Rooms	42451	sf	50	$ 2,122,550	
	Ground transpiration	3352	sf	50	$ 167,600	
Other						
	Glass handrail at second floor open below	475	lf	350	$ 166,250	
	New ticket counter	200	lf	650	$ 130,000	
	Ground transpiration counters	150	lf	650	$ 97,500	
	New gate counters	9	ea	6000	$ 54,000	work station, printer, ticket scanner by airline
	Signage	213,687	sf	10	$ 2,136,870	inc FIDs
	Service Animal Relief Areas	1000	sf	150	$ 150,000	
	Equipment				**$ 29,600,320**	
	Demo existing jet bridges	5	ea	50000	$ 250,000	
	New jet bridge w/ foundations	5	ea	1170000	$ 5,850,000	120' w/ PC air
	New conveyors / BHS system	30928	sf	690	$ 21,340,320	
	Carousels	3	ea	720000	$ 2,160,000	

	Conveying Systems				**$**	**2,440,000**	
	Elevators - 5 stop - replace existing	2	ea	350000	$	700,000	
	Elevators - 5 stop - new	3	ea	300000	$	900,000	
	Escalators - 2 floors	3	ea	200000	$	600,000	
	Stairs	6	ea	40000	$	240,000	2 floors
	Fire Suppression				**$**	**1,038,642**	
	New sprinkler systems for new construction	162,523	sf	6	$	975,138	
	Adjusted sprinkler system for renovated areas	31,752	sf	2	$	63,504	Mains to remain, adjust branch piping and heads for new wall layouts
	Plumbing				**$**	**2,053,365**	
	New storm drainage for new construction	162,523	sf	5	$	812,615	
	Add'l storm drainage for ponding on roof	assume repairs as part of new construction					
	Plumbing for new restrooms	4,947	sf	250	$	1,236,750	
	New gas meter - SMART meter	1	ea	4,000	$	4,000	
	HVAC				**$**	**10,600,213**	
Equipment							
	New equipment through terminal	194,275	sf	20	$	3,885,500	
Ductwork and Accessories							
	New ductwork	194,275	sf	12	$	2,331,300	
	New insulation	194,275	sf	1.2	$	233,130	
	New accessories	194,275	sf	0.5	$	97,138	
Piping and Insulation							
	HWS&R - Copper press	194,275	sf	2.25	$	437,119	
	HWS&R - Grooved steel	194,275	sf	1	$	194,275	
	Coil Connections at VAVs	194,275	sf	0.25	$	48,569	
	Pipe Insulation	194,275	sf	0.9	$	174,848	
Controls							
	New BAS	194,275	sf	15	$	2,914,125	assume all new
Miscellaneous							
	Test and Balance	194,275	sf	0.75	$	145,706	
	Rigging of equipment	1	ls	75000	$	75,000	
	Demolition	31,752	sf	2	$	63,504	
	Electrical-Distribution, Lighting & Fire Alarm				**$**	**10,071,428**	
Electrical Equipment and Distribution							
	Rework service entrance for dual feeders (inc vault) and extending airfield lighting power	1	ls	1700000	$	1,700,000	per Terminal Assessment Report
	New MDS and associated panels	194,275	sf	10	$	1,942,750	
	Panel feeders for above	194,275	sf	2	$	388,550	
	Replace all wiring devices and branch wiring	194,275	sf	6	$	1,165,650	
Motor Control							
	HVAC System and Miscellaneous Equipment Feeders and Connections.	194,275	sf	3	$	582,825	assume all new
Lighting							
	Lighting - terminal	194,275	sf	15	$	2,914,125	assume all new
	Lighting controls	194,275	sf	0.5	$	97,138	assume all new
	Lighting - canopy	19,412	sf	10	$	194,120	
Fire Alarm							
	New fire alarm system for new construction	162,523	sf	5	$	812,615	
	Modification of existing fire alarm system for renovated areas	31,752	sf	1	$	31,752	
Miscellaneous							
	Demolition	31,752	sf	2.5	$	79,380	reno only
	Lightening protection	162,523	sf	1	$	162,523	new construction
	Technology-Roughen & Equipment				**$**	**6,411,075**	
	New rough-in for telecommunication	194,275	sf	8	$	1,554,200	
	New access control	194,275	sf	6	$	1,165,650	
	New PA system	194,275	sf	5	$	971,375	
	New DAS system	194,275	sf	4	$	777,100	
	New video management system	194,275	sf	10	$	1,942,750	

	Sitework				**$ 8,173,803**	
	Assume 7% of Building Costs	1	ls	8173803	$ 8,173,803	
Subtotal		**213687**	**sf**	**$ 614**	**$ 131,189,538**	

Lansing Capital Region International Airport
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RS&H

New Building Option

Item	Description	Quantity	Unit	Unit Price	Total	Comment
	General Requirements				**$ 6,463,716**	
	Based on 5% of direct construction costs	1	ls	6463716	$ 6,463,716	
	Demolition				**$ 10,443,030**	
	Building structure demolition	2,455,590	cf	4	$ 9,822,360	
	Demolition of finishes in areas to be renovated	8,031	sf	10	$ 80,310	
	Demo of existing building envelop for new additions	1,320	sf	20	$ 26,400	
	Demo basement	12,354	sf	40	$ 494,160	12' deep
	Demo of existing canopy	included with building demolition				
	Add for temporary wall/weather enclosure	1,320	sf	15	$ 19,800	
	Building Structure				**$ 20,523,964**	
	Foundations	180,771	sf	40	$ 7,230,840	
	Slab on grade	91,331	sf	8	$ 730,648	
	Concrete floor on metal deck-second floor	89,440	sf	15	$ 1,341,600	
	Structural steel/Joists	1356	tons	6500	$ 8,812,586	
	Metal roof deck	93418	sf	5	$ 467,090	
	New canopy - foundations and structure	19,412	sf	100	$ 1,941,200	architectural steel
	Building Envelop				**$ 15,940,205**	
New Construction						
	New canopy roof	19,412	sf	100	$ 1,941,200	
	Curtain wall w/ sunshades	41,618	sf	150	$ 6,242,625	assume 50% of exterior
	Metal panel exterior	41,618	sf	100	$ 4,161,750	assume 50% of exterior
	EPDM roof	93418	sf	35	$ 3,269,630	
	New sliding doors	5	ea	25000	$ 125,000	
Renovation						
	Re-clad FAA tower	1	allow	200000	$ 200,000	add'l sides w/ new option
	EPDM roof (includes demo)	assume existing roofing remains or will be demolished as part of terminal expansion				
	Interior Build Out (Finishes)				**$ 12,317,980**	
Finishes		Finish costs include walls, flooring, ceilings, wall finishes and accessories. MEP costs are priced separately.				
	Restrooms	4947	sf	200	$ 989,400	
	Building system	4262	sf	20	$ 85,240	
	Airline and airport space, aviation education, FAA, TSA	65159	sf	40	$ 2,606,360	
	Concession	4927	sf	20	$ 98,540	
	Baggage service	30928	sf	20	$ 618,560	
	Public space / Queuing	32776	sf	90	$ 2,949,840	
	FIS, Hold Rooms	42451	sf	50	$ 2,122,550	
	Ground transpiration	3352	sf	50	$ 167,600	
Other						
	Glass handrail at second floor open below	475	lf	350	$ 166,250	
	New ticket counter	200	lf	650	$ 130,000	
	Ground transpiration counters	150	lf	650	$ 97,500	
	New gate counters	9	ea	6000	$ 54,000	work station, printer, ticket scanner by airline
	Signage	208,214	sf	10	$ 2,082,140	inc FIDs
	Service Animal Relief Areas	1000	sf	150	$ 150,000	
	Equipment				**$ 29,600,320**	
	Demo existing jet bridges	5	ea	50000	$ 250,000	
	New jet bridge w/ foundations	5	ea	1170000	$ 5,850,000	120' w/ PC air
	New conveyors / BHS system	30928	sf	690	$ 21,340,320	
	Carousels	3	ea	720000	$ 2,160,000	

	Conveying Systems				**$**	**2,370,000**	
	Elevators - 5 stop - replace existing	1	ea	350000	$	350,000	
	Elevators - 5 stop - new	3	ea	300000	$	900,000	
	Escalators - 2 floors	4	ea	200000	$	800,000	
	Stairs	8	ea	40000	$	320,000	2 floors
	Fire Suppression				**$**	**1,100,688**	
	New sprinkler systems for new construction	180,771	sf	6	$	1,084,626	
	Adjusted sprinkler system for renovated areas	8,031	sf	2	$	16,062	Mains to remain, adjust branch piping and heads for new wall layouts
	Plumbing				**$**	**2,144,605**	
	New storm drainage for new construction	180,771	sf	5	$	903,855	
	Add'l storm drainage for ponding on roof	assume repairs as part of new construction					
	Plumbing for new restrooms	4947	sf	250	$	1,236,750	
	New gas meter - SMART meter	1	ea	4,000	$	4,000	
	HVAC				**$**	**10,247,744**	
Equipment							
	New equipment through terminal	188,802	sf	20	$	3,776,040	
Ductwork and Accessories							
	New ductwork	188,802	sf	12	$	2,265,624	
	New insulation	188,802	sf	1.2	$	226,562	
	New accessories	188,802	sf	0.5	$	94,401	
Piping and Insulation							
	HWS&R - Copper press	188,802	sf	2.25	$	424,805	
	HWS&R - Grooved steel	188,802	sf	1	$	188,802	
	Coil Connections at VAVs	188,802	sf	0.25	$	47,201	
	Pipe Insulation	188,802	sf	0.9	$	169,922	
Controls							
	New BAS	188,802	sf	15	$	2,832,030	assume all new
Miscellaneous							
	Test and Balance	188,802	sf	0.75	$	141,602	
	Rigging of equipment	1	ls	75000	$	75,000	
	Demolition	2,878	sf	2	$	5,756	
	Electrical-Distribution, Lighting & Fire Alarm				**$**	**9,898,128**	
Electrical Equipment and Distribution							
	Rework service entrance for dual feeders (inc vault) and extending airfield lighting power	1	ls	1700000	$	1,700,000	per Terminal Assessment Report
	New MDS and associated panels	188,802	sf	10	$	1,888,020	
	Panel feeders for above	188,802	sf	2	$	377,604	
	Replace all wiring devices and branch wiring	188,802	sf	6	$	1,132,812	
Motor Control							
	HVAC System and Miscellaneous Equipment Feeders and Connections.	188,802	sf	3	$	566,406	assume all new
Lighting							
	Lighting - terminal	188,802	sf	15	$	2,832,030	assume all new
	Lighting controls	188,802	sf	0.5	$	94,401	assume all new
	Lighting - canopy	19,412	sf	10	$	194,120	
Fire Alarm							
	New fire alarm system for new construction	180,771	sf	5	$	903,855	
	Modification of existing fire alarm system for renovated areas	8,031	sf	1	$	8,031	
Miscellaneous							
	Demolition	8,031	sf	2.5	$	20,078	reno only
	Lightening protection	180,771	sf	1	$	180,771	new construction
	Technology-Roughen & Equipment				**$**	**6,230,466**	
	New rough-in for telecommunication	188,802	sf	8	$	1,510,416	
	New access control	188,802	sf	6	$	1,132,812	
	New PA system	188,802	sf	5	$	944,010	
	New DAS system	188,802	sf	4	$	755,208	
	New video management system	188,802	sf	10	$	1,888,020	

	Sitework				**$ 8,457,199**	
	Assume 7% of Building Costs	1	ls	8457199	$ 8,457,199	
Subtotal		**208214**	**sf**	**$ 652**	**$ 135,738,045**	