2. PURPOSE AND NEED

The Purpose and Need statement, in this NEPA document, describes the deficiencies being addressed and provides solutions to the terminal needs under the Proposed Action. The statement documents the justification for the project and provides the basis for evaluating the effectiveness of alternatives.

2.1. PURPOSE

The purpose of the Proposed Action is to facilitate the accommodation of existing and 2035 forecast passenger demands into a new terminal building, including baggage handling, security, passenger comfort, and terminal administrative needs, while meeting the needs of the TSA, airlines, concessionaires, and passengers, all while providing a modern gateway for the surrounding Mercer County region. The Proposed Action will aim to address existing chronic and severe passenger terminal area congestion and lack of services due to significantly undersized facilities.

2.2. NEED

The existing main terminal building was constructed in 1975. An additional, modular inbound baggage claim facility was opened in two phases in 2013 and 2017. The physical condition of the older, main structure (heating, ventilation, and air conditioning (HVAC), plumbing, roofing, windows, finishes, etc.) is in various stages of aging and disrepair. The existing terminal building and other Airport facilities can be seen on the ALP, **Figure 3-3**. The existing terminal area, including the terminal buildings, access road, and parking areas, do not provide many of the basic passenger amenities and comforts expected by modern travelers. The existing terminal has numerous deficiencies, which have resulted in safety, security, efficiency, and comfort concerns. Terminal deficiencies include:

General Building Structure

- The existing terminal was constructed in 1975 and exceeds the FAA recommended minimum useful lifespan of 40 years (FAA Order 5100.38D, Change 1, February 26, 2019).
- The existing terminal building and baggage facility comprises approximately 28,000 SF, and an analysis of required space indicates a need of approximately 125,000 SF. (Note approximately 5,000 SF of Airport administrative and law enforcement space is located off Airport property due to undersized facility. Administrative functions housed in the off-site leased space include Airport administrative offices, security, and operations functions. These functions would normally be located in the terminal. For purposes of this EA, the 5,000 SF of leased off-site space is included in the existing 33,000 SF Terminal referenced throughout this document. The existing terminal was constructed in the 1970s to accommodate approximately 170 peak hour enplaned passengers (based on seating capacity) and currently services a minimum of 276 peak hour passengers based on schedule, as well as number and type of operations that have changed over the years due

to industry changes and passenger demands, therefore exceeding capacity and causing passenger congestion.
- The existing terminal does not comply to American Disabilities Act (ADA) standards.
- The existing terminal consists of two separate buildings, resulting in passenger confusion. The main terminal building accommodates departing passengers with ticketing, security, and a hold room. When a passenger enters the terminal, there are two sets of stairs going up to the restaurant/non-secure seating area. There is ticketing on the right, then bag drop at the rear of the lobby/foyer to the left (north). Passengers then return south to downstairs where they are screened by the TSA. The paths of travel for passengers can be difficult due to grade changes within the building and the site. There is no clean line of travel and no visuals to where the passenger would end up, be that the hold room or apron/plane.
- The baggage claim building to the north of the terminal building accommodates incoming baggage for passengers.

Items in Need of Replacement

- The existing terminal building HVAC is outdated and needs replacement, as it is unable to accommodate the dynamic nature of heating and cooling loads in the facility. It is unable to sense the changing conditions and thereby modify the operation of the HVAC equipment accordingly. Modern HVAC systems are designed to meet or exceed the requirements of the latest version of ASHRAE Standard 90.1 – *Energy Efficient Design of New Buildings except Low-Rise Residential Buildings*. The existing terminal was not designed to the current standards such as the 2015 State of New Jersey Building Code with 2015 addendums as well as the other relevant standards related to modern HVAC system design and installation.

Layout

- The existing terminal consists of additions that were added over time, resulting in an inefficient layout, flow of passengers, and passenger congestion. When Frontier began operations at the Airport in late 2012, hold room modifications moved baggage claim from the terminal to an outbuilding and expanded it later.
- The current hold room does not provide the necessary space required for the existing operations.

Passenger Traffic and Convenience

- The existing single terminal hold room seating capacity is inadequate for current passenger enplanements and causes repeated congestion issues during peak passenger usage. Undersized hold rooms create congestion at the TSA checkpoint and reconciliation area; provide an inability to move comfortably between the seating, concessions, or restrooms, and prevent the plane from loading efficiently.
- The recommended number of enplaned passengers to restroom square foot ratio is approximately 3.7 passengers to one square foot vs the current ratio of 8.6 passengers to one square foot. This is 2.3 times below the recommended ratio.
- The existing terminal building does not have sufficient space to house concessions for passenger convenience.

- The Airport currently uses four aircraft parking positions. Passengers are required to leave the terminal through one of two doors and walk outside to aircraft via the apron hardstand. The recommended configuration is for a passenger boarding bridge to serve each aircraft parking position to minimize air conditioning/heating in the aircraft during boarding and provide passengers with protection from the weather (FAA AC 150/5360-13, July 13, 2018). Passenger boarding bridges also increase passenger safety, especially during winter operations when icy conditions can increase the potential for accidental falls during ground boarding under existing conditions.
- Four passenger boarding bridges (PBBs) would provide improved passenger convenience and safety and replace the existing outdoor boarding hardstands.
- Ground service equipment storage would be provided on the remaining apron area.

TSA

- The existing terminal was constructed prior to implementation of current TSA requirements, and as such, the TSA checkpoint does not meet standards.
- New security requirements recommend approximately 3,460 square feet for two screening lanes (Airport Cooperative Research Program (ACRP)Report 25, *Airport Passenger Terminal Planning and Design,* 2010*)*
- The current configuration has 1,720 square feet for two screening lanes.
- The existing terminal security measures, including surveillance systems, are inadequate.
- The existing TSA office space within the terminal only accommodates a fraction of the required TSA office space and does not accommodate a break room or full and separate secondary passenger screening room. Currently, screening operations occur at the bottom of the terminal stairs next to the secure hold room. Offices, a break room, and secondary screening rooms would be included in the design for the new terminal.

Access Road and Parking

- Existing terminal access roadway and parking has inefficient wayfinding and existing passenger parking capacity is inadequate for passenger forecast demand. Analysis conducted in the Master Plan Update identified a need for a total of approximately 2,900 parking spaces to meet future demand. See Chapter 3 for a detailed discussion of parking demand.

Additional supporting information of the existing terminal and deficiencies noted above can be found in Appendix B. Photographs of the existing terminal follow:

Photo 1: Baggage claim facility airside entrance line (Date: April 2016)

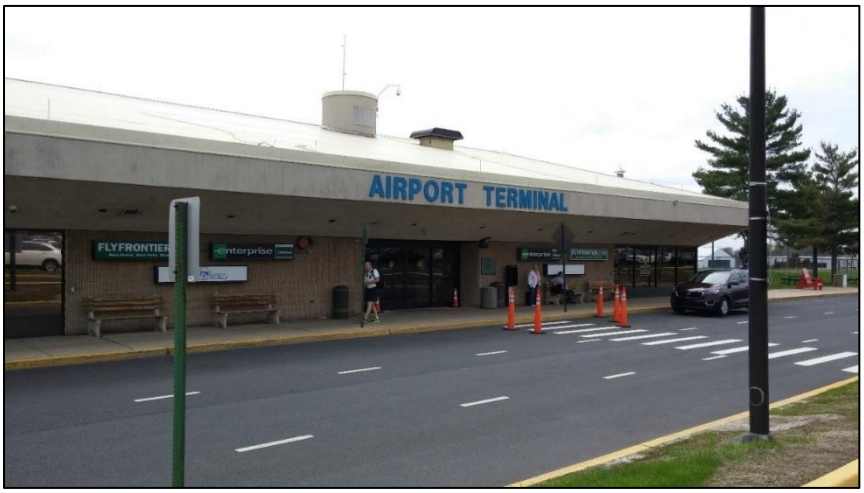
Photo 2: Baggage claim facility (Date: April 2016)

Photo 3: Terminal passenger security area (Date: April 2016)

Photo 4: Terminal apron with aircraft boarding ramp (Date: April 2016)

Photo 5: View of terminal building from apron (Date: April 2015)

Photo 6: View of terminal building from parking area (Date: April 2015)



The number and type of aircraft operations are a function of market demand as well as airfield capacity and the capacity of the individual runways that are available for simultaneous use for take-offs and landings. The airfield capacity is governed by the size and length of the runways, the wind direction, the configuration of the airfield, size and speed of the aircraft, flight paths and approved approach and departures procedures, and the ability of the air traffic control tower to coordinate approaches and departures. Additionally, TTN's runways are intersecting which does not allow for simultaneous use of the runways as one operation needs to clear the intersection before another operation can begin. The physical constraints, property layout, and other factors make significant changes to the runway layout infeasible at TTN.

At TTN, the size and length of the runways are fixed due physical constraints (roads and a railroad) which make runway extensions impractical. Additionally, the use of Engineered Material Arresting Systems (EMAS) at the ends of each runway to minimize the ability for aircraft to over-run the end of the runway further limits the possibility of runway extension(s). In fact, EMAS was installed at the runway ends to achieve an equivalent level of safety based in part on the inability of TTN to reasonably achieve fully graded Runway Safety Areas in accordance with FAA standards due to the presence of surrounding road and railways.

The need to improve the level of service within the terminal is related to the number of enplanements or passengers departing from the airport. The recent increases in passenger enplanements at TTN are the result of demand within TTN's service area for low-cost airline fares as explained in the AMPU. In 2017, Frontier Airlines, a low-cost carrier (LCC) servicing TTN, upgraded from the smaller Airbus A319 aircraft, which seats 156-162 passengers, to a larger and more cost-efficient Airbus A320 aircraft, which can seat up to 186 passengers. This increase in passenger capacity per operation allowed Frontier to accommodate growing passenger demand without adding operations. Similarly, the terminal capacity needs to increase to accommodate the existing and forecast passenger enplanements in order to provide an improved level of service in terms of space available to accommodate passengers within the building itself. The existing terminal can accommodate the unconstrained forecast, but at a very poor Level of Service.

Terminal Capacity is the ability of the terminal to accommodate the throughput of passengers and the ability of passengers to move through the terminal between the ticketing counter and landside of a terminal through security and to the gates and airside of a terminal. Insufficient terminal capacity can lead to an undesirable Level of Service for airport passengers. The Terminal Capacity is governed and impacted by numerous factors that include the number of aircraft gates; the number of aircraft parked simultaneously at gates; forecast and scheduled aircraft arrivals and departures; delays at the airport; sizes of aircraft; staffing of the ticketing, baggage, gates, and security checkpoint; and number of both usable and staffed lanes within the security checkpoint, number of baggage drop positions at the ticketing counter, length of the baggage claim display devices, and number of ticketing counter positions. The number of enplanements coupled with the desire to meet a minimum Level of Service C (LOS C) for terminal planning set the sizing and layout of the replacement terminal. Planning and design for LOS C within the terminal is further described in this chapter and Chapter 3 Alternatives Analysis.

Increases in the number of enplanements is the primary driver for the number of operations of air carrier flights and the size and level of service for a terminal. Operations at TTN have increased in the category of itinerant and local operations, including the Airport's flight school, but air carrier

operations are less than forecast through 2020. Increases in enplaned passengers have occurred despite the congestion of the existing terminal building, further eroding the current level of service the TTN Terminal Building can afford passengers. The growth in enplanements despite the existing terminal conditions demonstrates the strength of the market and the value proposition offered by TTN. Improvements to the passenger experience by increasing the average Level of Service from a current LOS F with overcrowded and minimal passenger amenities to LOS C with industry average space allocations and passenger amenities will address the terminal deficiencies in operations, function, layout, and passenger wayfinding and would enhance the experience of passengers already utilizing TTN and those that would do so in the future. Left unaddressed, the terminal would continue to experience chronic and worsening congestion and operational difficulties associated with passenger overcrowding in addition to increase maintenance and operations costs associated with maintaining an older facility operational into the future. Further discussion of Level of Service is included in Paragraph 2.2.1.

The existing functional areas and future needs of the terminal, including the deficiencies for each area are provided in Chapter 3 and Appendix B. The AMPU included a preliminary programming level analysis of the terminal size requirements utilizing the following guides:

- FAA Advisory Curricular (AC) 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*
- FAA AC 150/5360-9, *Planning and Design of Airport Terminal Facilities at Non-Hub Locations*
- TSA *Checkpoint Design Guide (CDG)*
- ACRP Report 25, *Airport Passenger Terminal Planning and Design*

That analysis determined that an approximately 115,000-125,000 SF terminal was needed. Since the AMPU, Mercer County has undertaken a more detailed analysis to determine the terminal needs. The analysis resulted in a required terminal size of 125,070 SF, with most of the increase attributable to providing additional space for baggage handling, concessions, and general circulation. There is an overall existing deficiency of approximately 92,000 SF. This would provide Level of Service (LOS) C, (see Section 2.2.1 for LOS definitions), which is intended to strike a balance between competing constraints of the adjacent areas, peak hour use, passenger experience, and cost. Supporting documentation for the proposed terminal sizing is provided in Table 2-1 below and Appendix B.

2.2.1. Terminal Programming and Facility Sizing

General

ACRP Report 25: *Airport Passenger Terminal Planning and Design* serves as one of the principal means by which the Airport industry can develop innovative near-term solutions to meet demands placed on it. The ACRP is part of the Transportation Research Board (TRB) and is funded by the National Academies of Sciences, Engineering, and Medicine and the FAA. ACRP Report 25, published in 2010 provides guidance in planning and developing airport passenger terminals and assists users in analyzing common issues related to airport terminal planning and design.

In addition to ACRP Report 25, publications and concepts developed by Airport Authorities Coordinating Council (AACC), now Airports Council International (ACI), and International Air Transport Association (IATA) have been published as part of AACC/IATA's *Guidelines for Airport Capacity/Demand Management*, second edition 1990, and third edition 1996.

As part of the evaluation of the existing terminal at TTN, the function of the spaces with the terminal were evaluated relative to the ACRP Report 25, the AACC/IATA's *Guidelines for Airport Capacity/Demand Management*, and the FAA's Advisory Circular AC 150/5360-13A, *Airport Terminal Planning*, 7/13/18.

Level of Service Definition and Standard

Within ACRP Report 25, the Level of Service, LOS, is used by planners and airport operators to describe, either qualitatively or quantitatively, the service provided to airport travelers at various points within the airport terminal building. It often relates to the degree of congestion or crowding experienced by travelers at the processors within a building that include the ticketing counter/area, the security checkpoint, the hold room/gate, and the baggage claim within the terminal building. It may also be a measure of the amount of waiting or processing time, or the length of the queues or lines encountered by such travelers at these locations within a terminal.

Terminal planning defines the Level of Service categories as:

A Excellent LOS; condition of free flow; no delays; excellent level of comfort.

B High LOS; condition of stable flow; very few delays; high level of comfort.

C Good LOS; condition of stable flow; acceptable brief delays; good level of comfort.

D Adequate LOS; condition of unstable flow; acceptable delays for short periods of time; adequate level of comfort.

E Inadequate LOS; condition of unstable flow; unacceptable delays; inadequate level of comfort.

F Unacceptable LOS; condition of cross flows; system breakdown and unacceptable delays; unacceptable level of comfort.

The existing terminal operates at a LOS F, which is based upon both quantitative and qualitative analysis of the functions and operations within the building, comparisons with other airport terminals, and standards/recommendations for terminal programming and space planning.

The proposed terminal is planned for a minimum Level of Service C within each area of the facility. LOS C is typically used as a design objective with terminal planning because it denotes good service at a reasonable cost. For terminal planning, the challenges are to determine the occupancy of various processors during the peaks and establish acceptable waiting times and queuing lengths for those processors.

For the various areas within the Terminal, the following table identifies the LOS standards.

Table 2-1: Level of Service Standards

Level of Service										
TERMINAL AREA	A		B		C		D		E	
Check-in Queue Area	19.4FT²	1.8M²	17.2FT²	1.6M²	15.1FT²	1.4M²	12.9FT²	1.2M²	10.8FT²	1.0M²
Wait/Circulate	29.0FT²	2.7M²	24.8F²	2.3M²	20.5FT²	1.9M²	16.1FT²	1.5M²	10.8FT²	1.0M²
Hold Room	15.0FT²	1.4M²	12.9FT²	1.2M²	10.8FT²	1.0M²	8.6FT²	0.8M²	6.5FT²	0.6M²
Baggage Claim	21.5FT²	2.0M²	19.4FT²	1.8M²	17.2FT²	1.6M²	15.1FT²	1.4M²	12.9FT²	1.2M²
Government Inspection Services	15.1FT²	1.4M²	12.9FT²	1.2M²	10.8FT²	1.0M²	8.6FT²	0.8M²	6.5FT²	0.6M²

Source: *Guidelines for Air Capacity/Demand Management*, Third Edition, ACI/IATA, 1996

LOS F is interpreted as Terminal Area less than LOS E.

Guidelines for Airport Capacity/Demand Management identifies that LOS C is typically recommended as a design objective for the design hour. The design hour is the number of passengers in the peak hour of an average day in the peak month and are also referred to as peak hour passengers as noted in ACRP Report 25 – Airport Passenger Terminal Planning and Design. The design hour is used because it denotes good service at a reasonable cost. For the planning of this terminal, LOS C was the basis of design for sizing the terminal appropriately for passenger peaks and acceptable waiting times for processors. The processors for a terminal building are anywhere a process takes place involving passenger movement or queuing and these include the airline check-in counter and baggage drop, TSA security checkpoint, hold rooms and passenger boarding bridge processing, and baggage claim. Flexibility while using the LOS guidelines in planning and design allows for the optimization of terminal sizing for the forecasted enplanements and passenger use. The added benefit of flexibility in sizing of queuing for the airline ticket counters and baggage drop, TSA security checkpoint, hold rooms and passenger boarding bridge processing, and baggage claim is that they allow for extensions of waiting and queuing lines during times of heavy demand and peaks during the day. The flexibility in sizing of queuing for these functions also provides additional area for the spreading out of passengers over a longer distance to provide social distancing during, and after, the COVID-19 pandemic, and in anticipation that social distancing will become more acceptable and common practice moving forward, or for social distancing for a future global pandemic.

As noted previously, the basis for design for the Replacement Terminal and of all of the separate sections of the building is LOS C. The major areas include the processors and connecting or adjacent spaces which are the ticketing lobby, TSA checkpoint and queuing, passenger gates and hold rooms, concessions and restrooms, baggage claim, and circulation spaces. As the design for the building progressed from planning into Concept Design and Schematic Design, the building limits (footprint/exterior walls) and each of the various major components of the building are designed. As the shape of the building is then sized to meet both the function for the various spaces, and any budgetary constraints, the interior spaces continue to be coordinated with stakeholders. As the coordination of the interior spaces within the building continues to be

progressed in design, the major areas noted above each push and pull the interior limits they share with other adjacent areas, whether they are walls, separations, changes in architectural finishes, or changes in use between those areas. During this part of the design, the exterior building limits and shape are final, however, the interior configuration may change somewhat. The design progression may result in changes to the interior space layout and areas that may result in a LOS higher than LOS C, however, no spaces are intentionally designed for a LOS better than C. Note that when referenced as LOS C based on the ACRP 25 Report, LOS C values are minimums and the place to begin the design. The consequence to the design is that the terminal would always be larger than the minimum standards due to the inclusion of circulation space, structural and mechanical space, and the space that is developed and added based on the habits of travelers within modern terminals.

Trenton Mercer Airport Replacement Terminal Facility Requirements

The facility requirements, including space planning and programming for the replacement terminal, were identified during the Master Plan for TTN. The standards within ACRP Report 25: *Airport Passenger Terminal Planning and Design* are the basis for the minimum sizes of spaces within the terminal. Terminal layouts were modified as the design progressed to facilitate circulation of passengers, separation and/or distinction between processors or movements within the building, and to maintain LOS C in the areas of the TSA checkpoint, circulation spaces, concessions, gate hold rooms, baggage claim, and meeter/greeter areas in the public lobby. The space allocations are further refined to reflect the needs of the passengers typically using the Airport. For example, airports with more leisure travelers tend to have larger baggage handling space requirements due to larger volume of checked bags and bulky recreational equipment when compared to typical business travelers. Those airports also tend have more families and require more space during queuing, more access and use of concessions and amenities including restrooms. TTN is an airport that has more leisure travelers than business travelers, more families traveling together, and thus the space is optimized for the needs of those users. It is common knowledge that Frontier, as the only carrier at TTN, is an LCC carrier that targets leisure and family travel.

The existing terminal and replacement terminal planning are identified in **Table 2-2**[1] below. A column is also added for areas where the Terminal Planning Spreadsheet from the ACRP Report 25, where values were able to be calculated. Additionally, notations are added in the "Proposed Terminal Program Notes" column referencing appropriate space programming at similar sized/function/classification airports designed in the last 10 years by the architect of the proposed terminal. Similar airports include the following: Roanoke-Blacksburg Regional Airport (Virginia), Newport News/Williamsburg International Airport (Virginia), Meadows Field Airport (Bakersfield, California), Helena Regional Airport (Montana), Missoula International Airport (Montana), and Billings Logan International Airport (Montana).

- Annual Enplanements – 476,507 (Forecast Year 2035)
- Peak Hour Enplaned – 490

[1] *Source: Urban Engineers*

Table 2-2: Terminal Planning

Program Area	Existing Terminal	ACRP 25 Program	ACRP 25 Calculation	Proposed Terminal Program	Proposed Terminal Program Notes
Ticketing					
Counter Positions (#)	6	14	40% of use by pax for counter and kiosks	14	
Counter Length (lf)	32	45	Existing counter lf	70	5 lf/position – counter and half shared scale
Counter Area (sf)	500	675	Based on 15 ft counter depth	700	10 sf/position – counter depth and standing depth to baggage belt
Check In/Queuing Area (sf)	700	345	sf based on positions and existing counter length	2,450	35 sf/counter length
Airline Offices (sf)	2,750	2,250	50 sf/counter length	2,950	30 sf/counter length
Baggage Makeup (sf)	100	-	Baggage Makeup is for back of house/cart circulation	6,900	100 sf/counter length
Airline Operations (sf)	0	-	-	2,010	30 sf/counter length
Hold Rooms					
Gates (#)	4	4		4	
Hold Room Waiting (sf)	3,420	4,300 sf per gate / 17,200 sf - 4 gates	Calculation based upon input for 180 seat aircraft with high utilization, high seating percentage, large number of families/ children. Corresponding Narrowbody standard (145 seats) is 4,180 sf/gate and 757 standard (185 seats) is 5,460 sf/gate	2,825 sf per gate / 11,300 sf – 4 gates	2 – A320 180 seat Aircraft = 6,320 sf 2 – RJ 70-90 seat Aircraft = 2,720 sf Increase by factor of 1.25 to add space for high number of families/children
Baggage Claim					

Program Area	Existing Terminal	ACRP 25 Program	ACRP 25 Calculation	Proposed Terminal Program	Proposed Terminal Program Notes
Claim Lobby Frontage (lf)	85	244 (Demand) 130 (Aircraft)	Based on peak hour arrivals and percentage of passengers checking bags	340	2 – 170 lf bag claims
Claim Lobby Area (sf)	2,895			8,500	25 sf per claim lf
Baggage Drop Off (sf)	2,400			10,125	20% above 25 sf per claim lf
Rental Cars					
Agencies (number)	1	-	-	3	3 families of rental car companies (6 individual rental car companies)
Counter Frontage (lf)	18	-	-	60	20 lf per family
Counter Area (sf)	180	-	-	600	10 sf per lf
Queuing Area (sf)	80	-	-	600	Same area as counter
Office/Storage (sf)	0	-	-	720	12 lf depth per family
Concessions					
Food/Gifts (sf)	2,950	-	-	7,475	15 sf per passenger based on airport experience/similar airports*
Public Restrooms					
Public Restrooms (sf)	1,300	-	-	3,900	8 sf per passenger based on airport experience/similar airports*
Public Lobby Seating					
Meeter/Greeter Waiting (sf)	1,550	-	-	8,650	15 sf per passenger for seating and 3 sf per passenger for waiting based on airport experience/similar airports *
Security					
Screening Lanes	2	-	-	3	Based on TSA Standards

Program Area	Existing Terminal	ACRP 25 Program	ACRP 25 Calculation	Proposed Terminal Program	Proposed Terminal Program Notes
Passenger Screening (sf)	1,720	4,200	Based on lanes and typical screening lanes spacing	5,175	Based on TSA Standards
Security Queuing (sf)	630	1,200	Based on lanes and typical screening lanes spacing	900	Based on TSA Standards
TSA Office Support (sf)	300	-	-	2,000	Based on TSA Standards
Baggage Screening (sf)	600	3,380	Based on design hour bag load at 1.5 bags and 60% passenger checking baggage	3,450	Based on TSA Standards
Administration					
Office/Operations (sf)	4,000 (offsite)	-	-	5,425	Need based
Law Enforcement (Sheriff) (sf)	960 (offsite)	-	-	890	Need based
Emergency Medical Svcs. (sf)	0	-	-	150	Need based
Circulation/Structural/Support					
Circulation (sf)	6,645	9,900	Concourse circulation only based on length of concourse and wingspan	9,900	Circulation for comfort level.
Mechanical/Electrical (sf)	-	-	Between 10% and 12% as a guide but based on actual demand for utility space within the terminal	18,730	Mechanical, electrical, and support equipment based on sizes of spaces and mechanical or electrical load of the terminal
Structural (sf)	-	-	-	11,500	Structural columns, column covers, walls, chases, etc. based on sizes of spaces, spans of structures, room sizes.

* Similar airports include small or non-hub commercial service airports with less than 6 gates and constructed in the last 15 years.

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The resulting terminal design shown in Table 2-2 identifies areas that have square footages above or below the ACRP Report 25 LOS C minimums. Design throughout the planning and programming of the terminal, started with the ACRP LOS C minimums and was increased or decreased based on numerous competing factors evaluated and adjusted as the design progressed. These include the layout of the spaces and passenger path of travel and wayfinding; back of house hallways and passages; building code and egress requirements; adjacencies of areas within the terminal by function and use; the sizes and method of heating and cooling the terminal and associated equipment rooms for mechanical equipment and ducts; sizes and layouts of electrical systems to serve the terminal, baggage, and mechanical systems; layout of efficiency of the structural framing and structural systems within the building and the sizes of columns, floors, spans between columns, etc.; exterior cladding and exterior finish systems; functional baggage system layouts for delivering baggage to a standard TSA baggage check system, outbound baggage systems for delivery of bags to the aircraft by tug/cart, inbound baggage systems for delivery of incoming baggage from aircraft to the terminal by tug/cart, baggage claim devices, and associated baggage conveyors to connect all of the functions noted; functional and required TSA security checkpoint standards; and other reasons.

- Ticketing Counter Length - 45 ft ACRP vs 70 ft Planning
  The counter length was increased above minimums to account for the sizes of weight scales, and the size of the workstation layout - computer, cabinet, monitor, case work, etc.
- Ticketing Counter Area – 675 sf ACRP vs 700 sf Planning
  The area between the ticketing position and the baggage drop belt behind the ticketing counter is increased from minimums to align with the adjacent wall locations for the exterior wall and stair/elevator/restroom core on either end of the ticketing counter and the structure/columns along the wall behind the baggage belt.
- Check-in/Queueing Area – 345 sf ACRP vs 2,450 sf Planning
  The area for queueing at the ticketing counter is directly related to the length and therefore has been increased based on that length. While airports move more toward automated ticketing kiosks or mobile options, the area for ticketing is needed based on design hour/peak hour passenger traffic.
- Airline Offices – 2,250 sf ACRP vs 2,950 sf Planning
  The area of airline offices is directly related to the length of the counter. The length is determined by equipment size and structural framing for the terminal. Since the office space is needed adjacent to the counter, the space occupies the same width of area behind the counters based on the adjacent wall locations for the exterior wall and stair/elevator core on either end of the office space and the structure/columns along the wall behind the baggage belt and behind the offices.
- Baggage Makeup – Undefined in ACRP vs 6,900 sf Planning
  The area of baggage makeup is for tug/cart circulation, outbound baggage displays for tug/cart pickup and transfer to aircraft. ACRP does not identify this function as it is unique to each airport and impacted by availability of space, automation and systems, baggage conveyors and security screening equipment, electrical and mechanical needs of the

baggage equipment and makeup areas, TSA requirements, types of operations, aircraft sizes, etc.

- Airline Operations – Undefined in ACRP vs 2,010 sf Planning
  The area of airline operations is used for coordinating ground operations while aircraft are at the terminal. This includes coordinating baggage transfers, cleaning, septic, catering, fueling, and ground power/air. Space is for offices, equipment, and supplies. ACRP does not identify this function as it is unique to each airport and impacted by availability of space, requirements, types of operations, aircraft sizes, etc.
- Hold Room Waiting – 17,200 sf ACRP vs 11,300 sf Planning
  Hold room was not sized for 4 full A-320 aircraft which are the typical aircraft used at TTN. While high utilization is likely on the flights at TTN (based on current utilization and ultra-low-cost model by current air carrier), two full A-320 and two full large regional jets were modelled with a factor to increase sizes to account for delays, multiple design hour/peak hour operations that are on previous and current schedules (and anticipated for future schedules).
- Baggage Claim Lobby Frontage – 244 lf ACRP vs 340 lf Planning
  The sizes of the claim devices in ACRP are based on the demand or aircraft size. The size of the display devices is based on structural framing, available equipment sizes for the display devices (sloped plate, power conveyor, etc.).
- Claim Lobby Area – Undefined in ACRP vs 8,500 sf Planning
  The area of baggage claim waiting area is based upon a comfort level around claim devices that account for waiting at claim devices, baggage, and ability to move within the space after passengers retrieve baggage. The open area of the public lobby and the structural framing/size of the building including the mechanical and electrical equipment/rooms impact the availability of space for the claim lobby. This function is unique to each airport and impacted by availability of space, requirements, types of operations, aircraft sizes, location of claim devices, structure, etc.
- Baggage Drop Off – Undefined in ACRP vs 8,500 sf Planning
  Similar to baggage makeup, this area includes space for tug/cart circulation, inbound baggage displays for tug/cart transfer of baggage from aircraft to conveyors that lead to the claim devices. ACRP does not identify this function as it is unique to each airport and impacted by availability of space, automation and systems, baggage conveyors and security screening equipment, electrical and mechanical needs of the baggage equipment and makeup areas, types of operations, aircraft sizes, etc.
- Rental Cars – Undefined in ACRP vs 1,920 sf Planning (combined)
  Rental car operations are an amenity provided within the terminal for passengers. Sizes are based upon experience with typical layouts at small hub/non-hub airports. Similar to other spaces within the terminal, ACRP does not identify this function as it is unique to each airport and impacted by the number of operators, space availability within the terminal, and if the airport sees the need to provide this amenity to its passengers.
- Concessions – Undefined in ACRP vs 7,475 sf Planning
  Concessions for food and gifts are provided as an amenity both pre-security and post security within the terminal for passengers. Sizes are based upon experience with typical

layouts at small hub/non-hub airports. Similar to other spaces within the terminal, ACRP does not identify this function as it is unique to each airport and impacted by the design hour/peak hour passengers, availability of space, traveler profile, and passenger comfort.

- Meeter/Greeter Waiting – Undefined in ACRP vs 8,650 sf Planning
  Meeter/greeter waiting areas is a generalized area within the public space of a terminal where arriving passengers pass from the secure side of the terminal back toward the baggage claim and landside transportation. Size is based upon availability and flexibility, structural layout, and adjacent uses. ACRP does not identify this function as it is unique to each airport and impacted by the number of passengers, parking availability adjacent to the terminal, passenger profile, and if the airport sees the need to provide this amenity to its passengers.
- Security – 8,780 sf ACRP vs 11,525 sf Planning (combined)
  The difference between the ACRP areas and the planning/design area is due to the TSA standards for security checkpoints. The standards are updated regularly and are based upon TSA equipment, staffing, operations, and functions at the airport.
- Administration – Undefined in ACRP vs 6,465 sf Planning (combined)
  The location of Airport operations and administration staff, law enforcement, and emergency medical services within the terminal is standard for most small and non-hub airports. This places the administration and operations staff at the location where they are needed in lieu of remote operations. ACRP does not identify this function as it is unique to each airport and impacted by the availability of space and the priority of these functions being located within the terminal.
- Circulation – 9,900 sf ACRP vs 9,900 sf Planning
  The ACRP is based on the length of the gate areas. There is no difference in the planning and design spaces for the terminal.
- Mechanical/Electrical – Undefined in ACRP vs 18,730 sf Planning
  The mechanical and electrical spaces include mechanical and mechanical support rooms; equipment rooms; electrical rooms; communications rooms; mechanical ducts and distribution or return ducts for heating and cooling; duct banks and wiring for electrical and communications distribution; electrical, mechanical and communications closets, etc. ACRP discusses the various components and notes terminal planning should account for between 10% and 12%, however, it also notes that “many terminals are outside this range”, and electrical, telecommunications, and other building systems have “increased the demand for utility space in many terminals”. Additionally, the terminal is incorporating centralized ground power and mechanical systems to produce and distribute preconditioned air to the aircraft, further increasing the size of mechanical systems and their rooms and spaces within the terminal footprint. The ACRP is based on the length of the gate areas. There is no difference in the planning and design spaces for the terminal.
- Structural – Undefined in ACRP vs 11,500 sf Planning
  Structural and architectural components are not covered in the overall square footage and are included in this number which includes structural columns and column covers; architectural finishes; seismic bracing; shear walls; closing off spaces, corners, and

unusable spaces; utilize common column/bay spacing or other regular sized components for both cost and constructability.

As the current Schematic Design progresses into Design Development and Construction Document Design, refinement of the areas would occur as part of the design process. The LOS C minimum is used as the starting point and is based upon the design hour/peak hour passenger operations. During other times of the day, the experienced LOS may be significantly higher as there would be less passengers using the terminal. The LOS is only reviewed if significant changes to the functions, operations, or spaces such as a new TSA standard for security checkpoints is issued and require review to identify what impacts any changes have on adjacent spaces.

2.3. SUMMARY

As described in Chapter 1, TTN has been an important economic engine for the region prior to the COVID-19 pandemic and is anticipated to continue to be economically important following the pandemic based on the recovery discussed in Chapter 1. Enplanements have increased by nearly 200 percent due to LCC airline service, which started in 2012. The existing terminal operates at a LOS F and experiences chronic congestion, provides poor circulation, has poor passenger amenities, and is significantly undersized for the current level of enplanements. The main terminal building is 45 years old, and systems are old, outdated, and do not meet the current standards. Additionally, the building was constructed when TTN had less than 55,000 annual enplanements compared to the existing demand of over 350,000 annual enplanements and before additional security requirements as a result of 9/11. Without the critical infrastructure in place, it is difficult for TTN to accommodate existing or forecast demand while providing an acceptable level of service.

The purpose of the Proposed Action is to address the needs identified at TTN, which include accommodating existing and most current FAA approved forecast demand at the desired LOS C, addressing identified deficiencies, improving passenger flow, and alleviating passenger congestion. Upon completion, the Proposed Action would achieve the stated goals and serve to position TTN to meet the existing and forecast needs of the Trenton region. By following the process outlined in FAA Order 5050.4B and Order 1050.1F, it is anticipated that the facility would continue to develop without compromising the integrity of the surrounding environment.