GSP INTERNATIONAL AIRPORT
ROGER MILLIKEN FIELD

GREENVILLE-SPARTANBURG INTERNATIONAL AIRPORT

TERMINAL AREA STUDY

FINAL
October 13, 2010

RS&H
IMPROVING YOUR WORLD

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Reynolds, Smith and Hills, Inc. (RS&H) has been tasked to assist the GSP Airport Commission with developing a Terminal Area Study which includes updating requirements for the GSP terminal based on the most current enplanements models (including a low fare carrier); requirements imposed by security measures; new airline operational models; technology upgrades; environmental awareness and anticipated developments in the aviation industry. This plan takes into consideration recommendations made by the 2003 Bechtel Master Plan; examines the implications of the new requirements and recommends a strategic implementation of a short and long range plan for the terminal area. The plan aims at full optimization of existing functional areas; replacement of non-functional areas and planned future growth within the limits of the existing terminal area.

This Terminal Area Study is both dynamic and strategic taking into consideration various possible scenarios relevant to the potential requirement for expansion and renovation of the airport's facility . The current state of the aviation industry requires a plan which emphasizes flexibility. It gives GSP airport the opportunity to adjust strategic areas over time while examining the loads implied by different forecast as well as adapting to new conditions as they arise. This plan aims at a proactive and logical approach to renovation and growth of the existing Greenville-Spartanburg International Airport (GSP).

Utilizing the Bechtel 2003 Master Plan as a springboard, the following general goals are established for the plan:

- Maintain Excellent Service Standards
    a. Safety
    b. Security
    c. Passenger Convenience
    d. Airline Operation Efficiency
- Expand Airline Service
    a. Low Cost Carriers
    b. International passenger operations
- Comply with TSA Requirements
    a. Baggage Security Screening
    b. Passenger Security Screening
- Network the Passenger Terminal for Intelligent Systems
    a. Self service ticketing (more recently - plan for self-service bag check-in)
    b. Explosive Detection Systems
    c. Provisions for passenger screening; displays and wireless internet access.
    d. Other systems
- Validate/Enhance Terminal Concessions Program
    a. Location
    b. Variety and Number of offerings.
- Resolve Highway Capacity Constraints at I-85 (Beyond our scope)
- Increase Capacity of Auto Parking Facilities
- Maintain a "Good Neighbor" Policy.
    a. Impact of GSP growth on the environment.
    b. Minimize energy utilization and optimize alternative energy sources.
- Investigate the Need for Land Acquisition (Outlined in previous Master Plan)

Significant changes have taken place in the aviation industry that must be taken into consideration when developing a strategic plan. These are:

- TSA issuance of the Planning Guidelines and Design Standards for Checked Baggage Inspection Systems (PGDS) in 2007 and subsequent issuance of version 3.0 in 11/27/2009. This document recommends equipment redundancies and avoidance of single points of failure, and new inline baggage screening systems to accommodate over five years of growth.
- Recommended Security Guidelines for Airport Design and Construction issued 5/2006.
- CBP Airport Technical Design Standards for Passenger Processing Facilities, issued 8/2006
- Proliferation of self-service ticketing; potential "counter-less" roaming agents; upcoming self-service baggage check-in.
- New security screening technology requirements impacting size of facilities i.e. full body scanners require a significant change in the overall width of passenger screening areas.
- Financial drivers towards increasing sources of revenue at airport facilities (i.e. concessions, business centers, spas, car-wash facilities, privately leased parking facilities,etc.)
- Continued emergence of successful low fare carriers.

RS&H conducted a Master Plan update study for the terminal, identified deficiencies and projected three different growth scenarios (Base Case-assuming no changes in number or type of carriers; Low Fare Carrier-assuming the addition of a major low fare carrier and Focus City-assuming GSP operating as a hub for the low fare carrier). Currently, GSP is preparing to welcome Southwest Airlines into their airport. The requirements for development of this Terminal Area Study, therefore, are based on the "Low Fare Carrier" model.

Several alternatives, including building a new "greenfield" terminal were analyzed based on factors which included passenger convenience, constructability, cost, and flexibility among others. This analysis concluded in a partial rebuild/remodel of the terminal which generally maintained the existing gates concourse area (projected to meet the needs of the airport up to the 2M enplanement level). Further linear expansion of the existing gates concourse area would have increased walking distances and incurred unwarranted additional costs.

- The study recommends a re-build of the central core area to one that will allow sufficient flexibility to meet the future requirements of the airport as follows:
- Relocation of the rental car areas to the parking garages
- Remodeling of the existing baggage claim area
- Remodeling of the existing gate concourse area
- Substantial increase in the number of concessions and a strategic location on the secure side of the terminal; increased passenger convenience by means of a reduction in changes in levels
- New, energy efficient central plant and a sustainable approach to all building components and systems

This report details the various parts of the study outlined above and illustrates Options for development; growth potential; projected phasing scenarios; costs and funding opportunities.

The joint RS&H, GSP International Airport, RBGB, and Unison staff recommendations, included herewith, are based on the lowest cost option which will meet all of the requirements of the most current Master Plan and will have the greatest potential for ease of expansion and incorporation of sustainable systems.

TERMINAL AREA STUDY INTRODUCTION

Greenville-Spartanburg International Airport (GSP) is a publicly owned and operated airport serving the Piedmont region of South Carolina. It is classified as a primary commercial service airport by the Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems (NPIAS). Currently the airport has scheduled passenger service by six airlines: Allegiant Air, American Eagle, Continental Airlines, Delta Air Lines, United Express, and US Airways. Additionally a seventh airline, Southwest Airlines, has announced upcoming service to Greenville-Spartanburg International Airport.

The Greenville-Spartanburg International Airport (GSP) serves the air transportation needs for Upstate South Carolina. It's location places it in an ideal position to fuel the economic engines for both the Greenville and Spartanburg areas while serving the growing industrial and business demands of these communities. The growth and improvement of the GSP International Airport will also result in generation of employment opportunities and local business participation. The Commission has maintained a long term strategy which has included tracking it's growth and updating it's master plan over the years.

- In 1991, a master plan study entitled the "Horizon Plan" was developed. This master plan proposed lengthening of the runway to 11,001 feet and adding five gates to the concourse building.
- In March, 1996, a study was completed which analyzed land use and acquisition for expansion of the runway and commercial land uses.
- In March 1997, the 1991 master plan was updated. This plan included revisions to growth strategies for the airfield, terminal, cargo, ground access,parking, land acquisition and noise mitigation.
- In December 2003, an update of the Airport Master Plan was completed. The 2003 update made recommendations for development and upgrades based on major changes in the aviation industry and updated growth forecasts. The recommendations included goals for the terminal and passenger areas to be developed at a later date and, as stated in the report: "be examined as part of conceptual studies performed by others"

BACKGROUND

Before embarking on a new terminal area capital improvement program, the Commission recognized that specialized terminal area planning was needed to properly determine the appropriate and fiscally prudent capital improvement program. Reynolds, Smith and Hills, Inc. (RSH) was tasked to assist the Commission with the growth and development of the passenger terminal area.

The Terminal Area Master Plan document analyzed the facility requirements of the commercial service passenger terminal to accommodate the projected aviation forecasts. The facility requirements were compared to the available terminal areas. Three separate forecasts were presented with triggers that will signal when major functional areas would need to be expanded.

In 2010, one of the three triggers was signaled. A new low fare carrier, Southwest Airlines, announced that it would introduce service at the airport in 2011. This study includes the potential capacity requirements for this growth increment.

This study will serve as an effective planning tool to guide future development of the terminal facilities at GSP.

SECTION 1: PROJECT AND SUSTAINABILITY GOALS

GOAL ESTABLISHMENT

PROJECT GOALS

In accordance with the goals and objectives of the Greenville-Spartanburg International Airport staff, RS&H investigated multiple approaches to properly size and situate the passenger terminal building in order to position it for gradual but logical expansion within the next thirty (30) to fifty (50) years. These initial investigations included improvements to the existing passenger terminal building that would allow it to accommodate the facility requirements as well as potentially relocating the existing functions to a new structure at an adjacent or "greenfield" site.

Among the considerations for this logical expansion were:

- The creation of a highly sustainable passenger terminal building in accordance with the latest sustainability and LEED guidelines.
- Improved potential for a new signage and way-finding system. The airport currently lacks adequate signage and way finding making it difficult for passengers to orient themselves within the terminal building.
- Improved use of "branding" in the concessions for the terminal building.
- Improved passenger experience for disabled/handicapped passengers as well as passengers traveling with strollers. Logical location for vertical circulation elements such as elevators and elimination of unnecessary level changes as well as possibilities for lining up crosswalks, curb-cuts at terminal and parking garage entrances were taken into consideration. The most significant goal in improving both way finding and accessibility was the logical transition from the ticketing areas and claim areas to the gate areas without the need for an intermediate level change.
- Improved general interior appearance and lighting levels consistently throughout the terminal building. Methods to eliminate the dark, dated appearance were examined and incorporated.
- Potential for upgrades to the building systems such as mechanical, electrical, phone, communications and access controls.
- Potential for upgrading of the Public Address system to integrate current acoustical and distribution technologies in order to improve the clarity of the broadcast as well as focus on specific areas as required.
- Develop a full-length canopy for use along the entire length of the terminal building curbfront.
- The potential for re-design of the customer service counter to a more appropriate and visible location.
- The potential for more effective expansion joint system to avoid failure of components in the storefront and flooring.
- The potential for maintaining and enhancing water features as well as improving water efficiency or separation from potable water.
- Potential for replacement of the existing neon lighting sign band feature on the ticketing and baggage claim areas of the terminal building to a less costly and more maintainable system.
- Potential for replacement of all gate kiosks as well as ticket counters.
- Potential for introduction of common-use technologies at all areas of the passenger terminal building. This includes common-use ticket counters, gate counters, departure lounges, and aircraft parking positions.
- Development of a secured delivery method for landside and airside concessions. This would include an area with the capacity for future screening of all concession goods.
- Potential for an integrated gate signage system at the gates and departure lounges. This may include a dynamic system to integrate with common-use technology.
- Potential for the connection of concourses A and B in order to eliminate the need to have multiple passenger screening checkpoints.

In addition to the planning and physical requirements of the passenger terminal area, the Commission has elected to embark upon a program to promote energy conservation, evaluate sustainable design solutions and examine short and long-term alternatives that will place the Commission at the leading edge of environmental stewardship.

Additionally, this study analyzes existing revenue generating operations, including retail, food,parking and car rental areas, in a tiered approach with physical design closely coordinated with a market and financial evaluation. The concessions analysis will assist the Commission in developing a new consumer marketplace that is both practical and responsive to the needs of the passenger.

1.1 SUSTAINABILITY INTRODUCTION

The Greenville-Spartanburg Airport (GSP) Commission has acknowledged that energy efficiency, environmental stewardship, water conservation and sustainable practice will form a key component of not only the building renovation but the general operation and maintenance activities of the buildings into the future. The GSP Commission understands the cost saving benefits, the operation and maintenance benefits and market advantages that accrue from high performance green building construction and operation.

The following goals are the result of team meetings with airport management staff, building users, design architects, engineers and green building consultant where sustainability objectives and needs were discussed at length. This list captures the core energy and environmental commitment of GSP management and the Commission and will serve as non-negotiable guiding principles for the renovation, design and construction activities anticipated over the next several years.

High performance green building design has introduced the concept of "integrated" design which implies that all members of the project team contribute to the creative design process. The collective input from all members leads to a much better performing "whole" building than has been typical. However, one result of this design phase approach is that new ideas, methods, concepts and solutions will almost certainly arise. Therefore, it is expected that new opportunities for sustainable optimization will occur as the detailed design process unfolds and these new ideas may not be specifically listed in this report.

1.2 OWNER'S PROJECT REQUIREMENTS

In order to have a "road map" for the project team to use as a guiding core principles for sustainability, it is advantageous to prepare an Owner's Project Requirements (OPR) document which lists and quantifies these goals. The process from which this document is formed includes a facilitated "OPR Interview" with all interested parties including GSP management and operations staff, Commission members, airline personnel, vendors and any other regular users of the facility. From this exercise, the key needs of the users, including energy and environmental goals, will be formally documented. Much of this information has already been developed through the course of the TAS activity, but a formal OPR will be prepared to document detailed design goals. The OPR is a living document that is changed and modified over the course of the project and ensures that sustainability goals are consistently applied across all disciplines. An OPR is essential for a project seeking LEED certification.

1.2.1 LEED CERTIFICATION

The buildings associated with the terminal renovation will most likely target certification under the United States Green building Councils (USGBC) Leadership in Energy and Environmental Design (LEED) building rating system. This may include the rating system specifically related to new construction and major renovation and may eventually include the long term operational rating system, LEED for Existing Buildings - Operations and Maintenance (LEED-EBOM).

The LEED rating system is a voluntary certification program that identifies key energy and environmental aspects of a project and awards points in each category. Depending on the number of points achieved, a project will be awarded a level of certification.

The LEED award levels and point distribution is as follows:

Certified: 40 – 49 points
Silver: 50 – 59 points
Gold: 60 – 79 points
Platinum: 80 – 110 points

It is understood that the design, construction, and future plans for operation will include high performance green building goals as a key, non-negotiable driver of building design and operation. However, the project team is encouraged to focus primarily on achieving a green building that optimizes energy efficiency and environmental performance rather than focus directly on completing a LEED Scorecard. This approach maximizes the building performance while optimizing costs and feasibility of sustainability goals. When the focus is primarily on a scorecard completion, then the creative inputs to a project can be compromised. With this approach, the LEED scorecard will fill in automatically and becomes the proof of a good design, not the purpose.

1.2.2 ASHRAE 90.1-2007: MINIMUM TARGET ENERGY CODE

The minimum energy code to be used for the design and construction of this project shall be the ASHRAE Standard 90.1-2007 Energy Standard for Buildings Except Low-Rise Residential Buildings. This standard is the minimum reference standard for all LEED projects. This standard exceeds the current State of South Carolina minimum State energy standard.

1.2.3 ASHRAE STANDARD 189.1: HIGH PERFORMANCE GREEN BUILDING STANDARD

ASHRAE Standard 189.1-2009 Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings is a recently released (January 2010) standard which is not yet adopted by any government authority but does represent a new high level of building performance criteria in code mandatory language. This standard achieves a 30% energy reduction over ASHRAE Standard 90.1-2007 for most commercial building types. The project team shall target meeting the requirements of this standard in an attempt to be an early adopter of current energy strategies. Many of the mandatory, prescriptive and performance based criteria of this standard are aligned with the requirements of the LEED rating system and with many of the key sustainability targets of the project.

1.3 ENERGY EFFICIENCY GOALS

Building energy consumption is the combination of several factors including the building envelope performance, glass selection, orientation, HVAC system selection, lighting system and process and plug load characteristics. There are no single design elements that lead to energy efficiency but rather the combination of elements that work together to maximize performance. That is why building energy performance is best achieved through a "whole building" analysis rather than a single, line item, analysis.

The following key energy efficiency goals have been identified:

- Achieve 70%** less energy use than the minimum reference energy standard
- Incorporate daylight design and controls for at least 75% of regularly occupied spaces
- Use high efficiency HVAC systems including
    - Variable speed drive technology
    - Dedicated outdoor air systems utilizing demand control ventilation
    - Energy recovery ventilator
- Use solar thermal water heating where applicable
- Consider adsorption chiller technology combined with parabolic mirror solar collector
- Consider geothermal heat pump systems for heating and cooling
- Use high efficiency natural gas / fuel oil boilers

** This goal is probably not yet achievable but all attempts to maximize the goal are encouraged.

1.3.1 RENEWABLE ENERGY SYSTEMS – SOLAR READY

The design of the building will include infrastructure to facilitate the deployment of renewable energy systems in the future. The requirements of this goal will include making available roof space with proper solar orientation (flat or south facing) and include anticipated empty conduit runs, access ways, and program locations for future wiring and devices such as inverters, meters and panels.

1.3.2 WATER EFFICIENCY GOALS

Water availability in this region is a critical issue and is expected to be a critical policy issue into the foreseeable future. Local water rate increases have already been advertised to be approximately 5% per year over a minimum seven (7) year period. The GSP Commission has acknowledged this reality and the project team shall place a key focus on reducing potable water use consumption. The following key water efficiency goals have been identified:

- Potable water used only for drinking, cooking and personal hygiene (hand washing, showers, etc)
- Non-potable water uses met by on-site reclaimed water (rainwater, greywater, and condensate)
- Process water use reduction strategies (cooling tower make up, fire dept practice, car washing, etc.)
- Potable water use reduction strategies (low flow fixtures, automatic devices, etc.)
- Irrigation reduction strategies (smart controllers, native and adaptive plants, etc.)

1.4 INDOOR ENVIRONMENTAL QUALITY (IEQ) GOALS

The design and construction of this facility will incorporate aggressive steps to maximize the indoor environmental quality of the building. Many of the requirements in this area are achieved through specification of products and materials that do not off gas volatile chemicals into the occupied spaces or adding requirements for the general contractor to institute construction phase IAQ measures (such as good housekeeping). However, many of the requirements are based on design practices that improve air supply to the spaces and optimize lighting system performance and controls.

Strategies and actions to improve IAQ in the following key areas include:

- Mechanical design to improve IAQ
    - Outside air measurement
    - Temperature and humidity control
- Lighting control optimization
- Construction phase practices to minimize indoor pollutants

- Low VOC products (sealants, adhesives, carpet, paint, composite agrifiber products, furniture, etc)
- Superior building air filtration devices (MERV 13 filters minimum)
- Walk off systems to reduce introduction of dirt into the space
- Daylighting of regularly occupied spaces
- Views to the outside of regularly occupied spaces

1.4.1 MATERIAL AND PRODUCTS

It is evident that development in environmental stewardship awareness, and thus, demand, has had a transforming effect on the building products industry. Many leading manufacturers have assessed and re-formulated their products and internal operations to reduce the negative environmental impacts of their products. As a result, the design and construction community now has a host of cost efficient, well performing products with impressive environmental characteristics available for use in buildings.

Attempt to have 100% of building products under specification sections 2-10 including furniture meet one, both or a combination of the following criteria:

- Harvested, extracted, recovered, and manufactured locally (500 mile radius of site)
- Made of recycled content
- Be salvaged or reused products
- Be manufactured of "rapidly renewable" resources
- Forest Stewardship Council (FSC) certified wood

NOTE: This goal is probably not yet achievable but all attempts to maximize the goal are encouraged.

1.4.2 LIGHTING SYSTEMS

Interior lighting goals:

- Incorporate daylight design and controls for at least 75% of regularly occupied spaces
- Achieve a lighting power density (LPD) of at least 10% less than the reference energy standard
- Use manual on / auto off sensors for lighting control (vacancy sensors)

Exterior lighting goals:

- Meet the requirements of the International Dark Sky Association (IDSA) "Dark Sky" initiative
- Ensure that no external lights burn during daylight hours
- Use solar powered street lights wherever feasible
- Investigate feasibility of solar powered wayfinding light system

1.4.3 APPLIANCES

All qualifying appliances and equipment purchases shall have the Energy Star label. Appliances that do not carry the Energy Star label are exempt from this requirement.

1.5 RECYCLING

Successful recycling operations within an airport environment require dedicated programming infrastructure. The project team shall include provision to facilitate recycling by identifying waste materials to be recycled, reviewing waste streams throughout the building, and allocating appropriate space in the public and back of house areas.

1.6 COMMISSIONING OF BUILDING ENERGY USING SYSTEMS

Provide third party verification that building system performance meets with the design intent. It is preferred that the commissioning Authority (CxA) be hired directly by the owner or architect. Commissioning of building energy systems is an important aspect of building design and construction to ensure that systems operate as intended.

The CxA shall be engaged into the project at the early design development stage and will be involved in preparation of the Owners Project Requirements and will conduct design reviews to ensure operability and maintainability of installed systems. The CxA shall prepare a final commissioning report and ensure that operator training is completed by the general contractor.

The following systems shall be commissioned:

- HVAC systems including IAQ measures and control
- Building envelope systems to confirm thermal and moisture integrity
- Lighting and shading controls
- Irrigation system
- Plumbing system
- Service water heating system
- Renewable energy system
- Energy and water measurement device operation

1.6.1 PLANS FOR OPERATION

To ensure efficient performance of the building after construction, the project team shall work closely with the operations staff to develop and implement various plans for the ongoing operation and maintenance of key building systems. These plans will be tailored to match the capabilities of the O&M and management staff, will be specific to the requirements of GSP and will provide measurable data for reporting and tracking the environmental performance of the building.

Specific plans for operation shall be developed in the following areas:

- High Performance Building Operation
    - Site
    - Water Use
    - Energy Use
- Indoor Air Quality management
- Green Cleaning
- Equipment Maintenance

- Service life plan
- Transportation management

1.6.2 CONSUMPTION MEASUREMENT

The project team is committed to the installation of measurement devices for tracking and monitoiring energy and water use in the building. The following systems will include measurement devices that allow for remote reading of data output and provide data logging capacity to allow for tracking and assessing of energy and water use.

- Total electricity use
- Total gas use
- Total water use
- Lighting
- HVAC
- People moving
- Process energy loads (i.e. baggage handling, screening)
- Process water use (over 1,000 gallons per day)
- Irrigation water use
- Reclaimed water use

PHYSICAL PLANT/BUILDING OPERATIONS AND MAINTENANCE

PHYSICAL PLANT REPLACEMENT

1.7 ELECTRICAL

1.7.1 NORMAL POWER DISTRIBUTION AND GROUNDING SYSTEM

The proposed system consists of two utility owned transformers sized to provide redundant power to double ended switchgear with a tie breaker. This arrangement allows for one or both transformers to feed the entire terminal building. Options are being developed with Duke Energy on availability, cost and routing of alternative circuit #2411 from Pelham Retail Substation. The existing feed from the garage to the terminal ticketing area will be removed and all of the power distribution equipment in the 1962 terminal building will be replaced in new electric closets. The existing electrical closets and panelboards in the concourses will be reviewed on a case by case basis for code compliance.

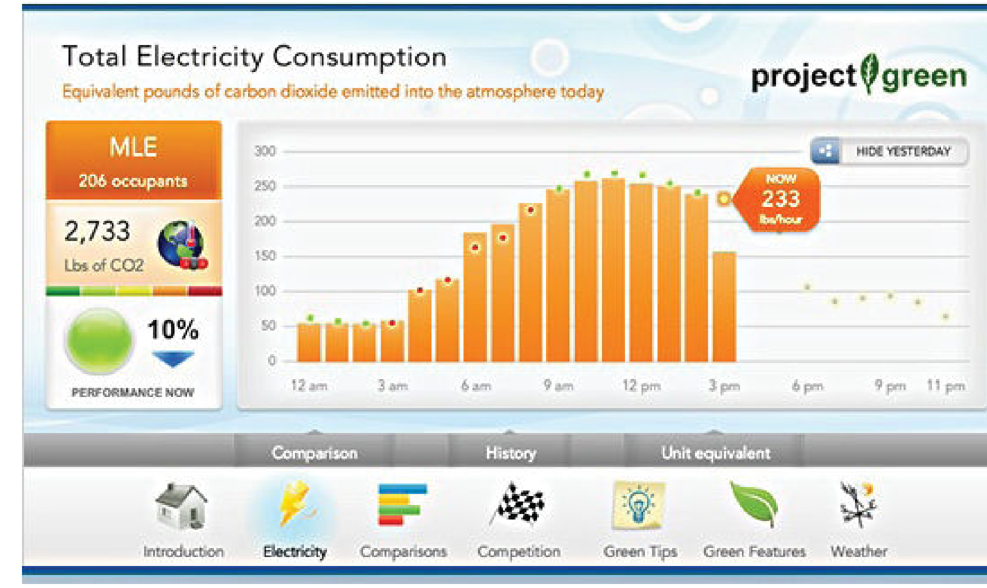
The utility transformers will require an outdoor space similar to the existing transformer vault and the new double ended switchgear will require a centrally located room. New electric closets will be required on each floor in addition to the existing closets in the concourses. The new double ended switchgear and utility transformers will be installed in a permanent central location and brought online to phase existing loads into service before demolition of the existing utility transformers and switchboard.

A new grounding counterpoise and lightning protection system will be installed in the central core construction area and tied into the existing systems at the concourses.

Conduits for future provisions that are part of the master plan will be installed under the terminal area renovations, including concourse B expansion and future photovoltaic installations.

The new distribution system will be designed in a way to allow metering of the various building loads such as HVAC, concessions, operational loads, people moving equipment, lighting, convenience power and passenger boarding bridges. Educational displays will be installed in a public area to exhibit the energy efficient systems used at GSP and real time energy usage and savings of the airport.

The final configuration will consist of the two existing parking garages having independent utility feeds and the terminal with a central electric plant for new power distribution, metering, grounding and lightning protection in the core and terminal areas and tie ins to existing distribution in the areas that are to remain or have minor renovations.

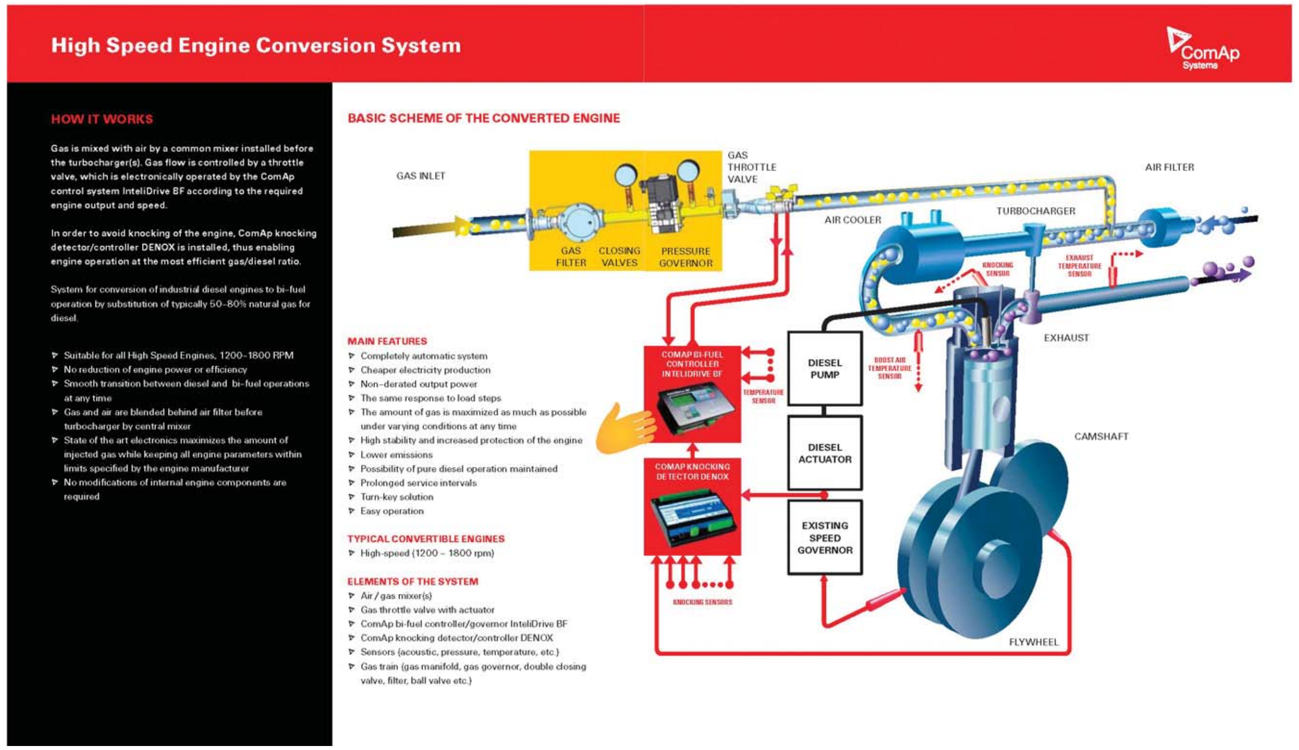


1.7.2 EMERGENCY POWER DISTRIBUTION SYSTEM

The proposed system shall provide a level of redundancy to the proposed building that passengers would not be inconvenienced during a power outage event.

Bi-fuel and alternative fuel generators utilizing natural gas with clean burn technology will be investigated for non-required emergency loads. Diesel fuel generators designed to Tier 4 Interim emissions regulations, which exhaust nearly 80% less pollutants than Tier 1 generators from years 1996-2001, will be investigated for the required emergency loads such as life safety that require start up within 10 seconds. Automatic transfer switches, installed upstream from the service entrance switchgear, will provide the backup power and have a control sequence to open the tie breaker of the switchgear to run each end of the double ended switchgear from an independent generator. Load shedding will be required to ensure overloading of the generators does not occur. Options for the emergency generator plant will continue to be developed with Duke Energy, which has customer programs for peak shaving and on-site power generation.

Each generator can be remotely located in a weather protected and sound attenuated outdoor enclosure that is out of sight and sound from the public. The automatic transfer switches will be part of the switchgear line up. The diesel fuel tank can be mounted to the underside of the generators or underground in an area accessible by fuel truck and natural gas line. The generators will be brought on line in conjunction with the new utility service entrance switchgear, prior to taking the existing generator out of service.



The following indicates the proposed minimum electrical loads to be connected to the standby emergency generator system:

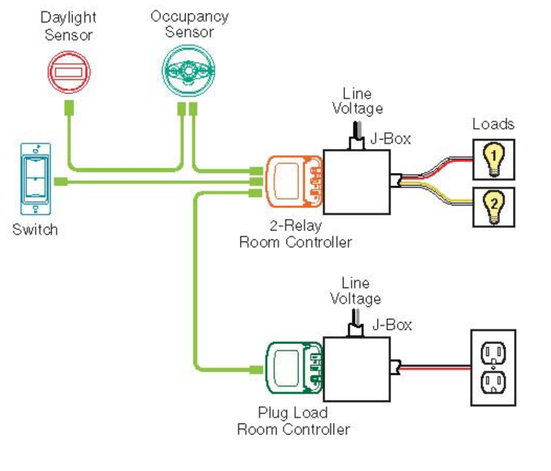
1. Emergency Lighting
    a. Selected light fixtures for egress lighting
    b. Selected light fixture in public areas which will also act as security lighting
    c. Exit signs
    d. All fixtures in security, electrical, mechanical, stairwells, generator and telephone rooms
2. Life Safety and Other Systems
    a. Fire alarm
    b. Public address
    c. Telephone
    d. Security
    e. Generator auxiliary systems
    f. Building automation
    g. Multi-User flight information system
3. People moving equipment
    a. Elevators and elevator lights
    b Escalators
    c. Elevator machine room
4. Terminal Operations
    a. Selected Passenger Boarding Bridges without preconditioned air system and 400Hz/28Vdc power supply
    b. Heating, ventilation and a level of cooling in public areas
    c. Explosive detection system and associated conveyor systems
    d. Selected baggage claim devices
    e. Other miscellaneous loads important for terminal operation as defined by GSP

1.7.4 FIRE ALARM SYSTEM

The proposed system shall be state of the art and consist of a central fire alarm control panel, located in the airport operations center, with voice annunciation and graphical user interface as well as new initiation and notification addressable devices throughout the campus. The proposed system shall be brought on line prior to replacement of existing devices. Upon the installation of the new FACP, all existing wiring and notification and initiation devices shall be replaced.

1.7.5 LIGHTING AND LIGHTING CONTROLS

1. Interior Lighting
    a. Lamp sources such as induction and LED will be evaluated to reduce maintenance, lighting power density and lumen degradation and maximize color rendering index
    b. Direct and indirect sources will be used to maintain a good visual comfort level
    c. Consistent color temperatures will be used
2. Exterior Lighting
    a. Existing high pressure sodium lamps sources will be phased out for a cooler color temperature for a cleaner, more uniform feel.
3. Lighting Controls
    a. A state of the art digital system which can interface with the building management system to utilize occupancy detection in spaces not only for lighting but for plug loads and thermostat settings.
    b. The non-public spaces will have an enhanced bi-level control strategy that takes advantage of daylighting, occupancy detection and manual on/off bi-level switching.
    c. The public spaces will be completely automated and shut fixtures on normal power circuits off during daylight and off hours.



All lighting will be calculated using lighting design software to ensure minimum foot-candle levels and uniformity ratios meet the recommended practices of the Illuminating Engineering Society of North America.

Refer to the energy efficiency, daylighting and lighting systems description under the Sustainability Goals and Energy and Sustainability Standards sections of the report for additional lighting information.

1.7.6 COMMUNICATIONS

The expanded facility will be provided with premise distribution system to accommodate voice and data communication needs. A centrally located main communications room will be provided for head end equipment for telephone, network, CATV, etc. with satellite communication rooms for distribution. The existing fiber and copper backbones will be used to the extent possible. A new integrated, redundant network – to include UPS, switches, firewall, etc. – will be capable of seamless expansion as required in the future. The system will include fiber optic and copper cables from the main communications room to the satellite rooms, as well as cabling to the communication outlets.

The new system will be designed to allow common use of the communication infrastructure as well as to allow implementation of common use terminal concept.

1.7.7 SECURITY (ACCESS CONTROLS AND CCTV)

New access controls and CCTV cameras will be added as required in the central core renovation areas and existing will be re-used where feasible. The new devices will integrate with the security project that is underway. The Airport Operations Center (AOC) and head end equipment will be relocated to a new space. Equipment room for head end equipment and security console will be similar in size as the existing AOC.

1.7.8 MULTI-USER FLIGHT INFORMATION SYSTEM (MUFIDS)

New head end equipment and software, monitors and cabling will be provided for the MUFIDS system. Components of the MUFIDS system are as follows:

1. Flight information displays at various locations throughout the terminal facility
2. Baggage information displays in the baggage claim areas
3. Internet interface to provide access to flight information via the airport's website
4. Integrated voice response system to allow access to the flight information via telephone
5. Capabilities for visual paging for the hearing impaired

1.7.9 PUBLIC ADDRESS SYSTEM

A new state of the art public address system will be provided in the central core area with the following features:

1. Ability for zone paging as well as call paging facility
2. Computerized system to allow recording of the paging messages and queue messages based on the time or designated priority
3. Compensation for ambient noise
4. Pre-recorded announcements for flight boarding
5. Ability for announcements in different languages
6. New speakers throughout the terminal facility

1.8 MECHANICAL SYSTEMS BASIS OF DESIGN ANALYSIS

1.8.1 GENERAL DESCRIPTION

The intent of this section is to document the proposed basis of design for the additions and modifications to the mechanical systems associated with the GSP International Airport Terminal. The review of these criteria by the GSP staff is welcomed. The information developed and presented in this section represents the interpretations of the project goals and the application of these goals by Reynolds, Smith and Hills, Inc. staff into an analysis which is meant as a basis for refining the implementation of the facility with respect to the mechanical systems. The proposed mechanical systems for this new facility with heating, cooling and ventilation systems in compliance with current codes and standards while simultaneously representing reliable and energy efficient systems which meet the airport staffs goals for sustainable and efficient systems.

1.8.2 DESIGN CRITERIA

The proposed mechanical systems will be designed to meet the requirements of the local, state and national code requirements along with criteria specified by the program scoping documents. The below standards represent minimums and it is expected that in many cases, especially with regard to energy efficiency and sustainable practices, the design will be held to higher standards.

Applicable Building Codes and Standards:

South Carolina Building Code, 2006 Edition

International Plumbing Code, 2006 Edition

International Mechanical Code, 2006 Edition

International Energy Conservation Code , 2006 Edition

ASHARE 90.1-2004: Energy standard for buildings except low riser residential buildings

SMACNA HVAC Duct Construction Standards, Metal and Flexible, 1995 Edition.

NFPA 90A: 2003

NFPA 101: 2003

ASHRAE Handbooks: 2007-2010

ASHRAE 62-2004 Ventilation Standards

ASHRAE 15-2001: Safety Code for Mechanical Refrigeration

1.8.3 ENVIRONMENTAL DESIGN CRITERIA:

As a basis for calculation of the cooling and heating requirements, the outdoor design temperatures for the facility are based on the climatic conditions specific to Greenville, South Carolina as reported in the 2009 ASHRAE Fundamentals Handbook. The indoor design conditions are based on comfort guidelines published by ASHRAE. The referenced values are as follows:

Outdoor Design Temperatures:

Summer (0.4 % values): 93.7 °F db/74.2 °F wb
Winter (99.6% values): 19.5 °F db

The various interior areas of the facility are to be conditioned as indicated below:

INTERIOR DESIGN CONDITIONS

	Summer		Winter
Spatial Area Type	DB, o F	% RH	DB, o F
Public Areas	72	50	70
Administrative Areas	72	50	70
Office Areas	72	50	70
TSA Office Areas	72	50	70
Car Rental Offices	72	50	70
Conference and Meeting Rooms	72	50	70
Toilet Rooms	78	50	70
IT Data and Telephone Room	78	50	68
Break Room	72	50	70
Baggage Claim Areas	72	50	70
Airline Ticketing Lobby Areas	72	50	70
Departure Lounge Areas	72	50	70
Electrical Rooms	NA	NA	55
Baggage Makeup Areas	NA	NA	55
AHU Rooms	80	95	55
Mechanical Equipment Rooms	NA	NA	55
Electrical Switchgear Room	78	50	55

When modeling the loads associated with the occupants in mechanically conditioned areas have been considered as 500 Btuh, equally split into sensible and latent components of 250 Btuh each.

The lighting loads will be based on an actual fixture layouts with heat gain of approximately 2.0 watts per square foot for all occupied spaces, which are air-conditioned. The lighting loads for spaces, which are to be ventilated only, are expected to be no more than 1.5 watts per square foot. In all cases, the lighting power densities will not exceed values proscribed by the standards indicated above.

Miscellaneous loads will be spread over their associated air conditioning unit zones based on the actual location of the surveyed loading and final space layout plans.

Outdoor and Exhaust Air Ventilation

Ventilation systems should be designed to provide the minimum outdoor airflow rates in accordance with IMC-2006 table 403.3 as presented below:

Spatial Area Type	Rate
Public Areas	0.05 CFM/sq. ft.
Administrative Areas	20 CFM/Person
Office Areas	20 CFM/Person
TSA Office Areas	20 CFM/Person
Car Rental Offices	20 CFM/Person
Conference and Meeting Rooms	20 CFM/Person
Toilet Rooms	75 CFM/water closet or urinal.
IT Data and Telephone Room	NA
Break Room	N/A
Departure Lounge Areas	15 CFM/Person
Electrical Rooms	NA
Baggage Claim Areas	15 CFM/Person
Airline Ticketing Lobby Areas	15 CFM/Person
AHU Rooms	NA
Ventilated Only Electrical Rooms	10 ACH
Ventilated Mechanical Rooms	10 ACH

The above ventilation rates reflect the minimum requirements associated with the prescribed method of compliance with current ventilation standards. In specific instances, these rates are increased to address the outdoor air balance and building pressurization requirements. Unoccupied electrical rooms and communication rooms that are fully conditioned, per their equipment requirements, will not be ventilated.

OCCUPANCIES FOR VARIOUS SPACE TYPES

Spatial Area Type	Rate (People/ 1000 sf)
Public Areas	7
Administrative Areas	7
Office Areas	7
TSA Office Areas	7
Car Rental Offices	7
Conference and Meeting Rooms	50
Toilet Rooms	10
IT Data and Telephone Room	2
Break Room	20
Departure Lounge Areas	100
Electrical Rooms	2
Baggage Claim Areas	50
Airline Ticketing Lobby Areas	50

The occupancy levels listed on the previous page represent the maximum expected number of people in a given space type at any one time. These values will be varied via scheduling provisions when performing the load and ventilation analysis.

1.8.4. ENERGY CODE EVALUATION

Based on the final configuration of the facility the energy code requirements for this type of facility as defined by International Energy Conservation Code 2006 and ASHRAE Standard 90.1 – 2007 Energy Standard in accordance with South Carolina Building Code 2006 will be utilized as a guideline to determine the allowable thermal parameters for the facility. All new HVAC equipment will be selected and specified with considerations given to the compliance with referenced standards.

The following thermal performance criteria was taken from Table 5.5-3 for Climate Zone 3 (South Carolina) and should serve as a minimum performance basis for selecting exterior envelope components such as: glazing for window and skylights and insulation for walls, floors and roof decks. As indicated by Section 9, emphasis has been placed on energy efficiency and sustainable building practices. The merits of providing elements that exceed the minimums below will be analyzed as the design progresses.

Element Description	Maximum Values	
Window Glazing	U = 0.6	SHGC = 0.25
Skylight Glazing	U = 0.69	SHGC = 0.39
Walls, Mass	U = 0.123	
Edge of Floor Slabs	U = 0.20	
Roof	U = 0.048	
Exterior Doors	U = 0.70	

Where the U – values are represented in Btuh/h•ft 2 •°F.

The high expected percentage of exterior envelope glazing to wall and roof area will require the use of high thermal performance specifications for all window glazing in the facility to satisfy the thermal criteria. If there is addition of enclosed skylight areas, these skylight assemblies will require more stringent thermal performance as indicated above. Other aspects of ASHRAE Standard 90.1 - 2007, such as HVAC equipment, insulation and controls will be selected with considerations given to the referenced energy standards requirements.

1.8.5 HVAC SYSTEM DESCRIPTIONS

Primary Systems:

Currently there are three distinct viable options to provide heating, ventilation and air conditioning under consideration. The first option is to provide replacement equipment for what is currently installed and in need of replacement. For this option, the new equipment would be the most efficient available of its kind. The second option would provide chilled water using an adsorption chiller. The third option is to provide a ground-source heat pump system that will accomplish heating and cooling using the ground as both a heat source and a heat sink.

Of the three options, the ground source heat pump option is proposed based on superior efficiency, ease of maintenance and life cycle cost. As the iterative design process continues, a formal life cycle cost analysis will be performed to ensure the optimal system that best attains the project goals is the one that is selected.

Air Handling and Air Supply Terminal Devices:

Curbside Entry Vestibules:

Air curtains, located above the doors, are utilized during the heating season to enhance the vestibules thermal performance. Above-ceiling mounted units will supply conditioned air during the heating and cooling seasons to temper and slightly pressurize the vestibules.

ATO Spaces and Car Rental:

Air handling units will be used to zone office spaces and supply conditioned air through the main duct system to supply air outlet devices located in the sidewalls and ceilings.

Ticket Lobby and Bag Claim:

Air handling units located in the utility "spine" will serve the ticket lobby and bag claim areas. The spine will allow for ease of access to the units for maintenance purposes.

Dining, Meeting & Bar Areas:

An independent AHU serving concession dining areas shall supply conditioned air through the main duct system to supply air outlet devices.

Inbound Baggage Make-up Areas and Tug Drive:

The air in these spaces are monitored for carbon monoxide (CO) and nitrogen dioxide (NO2) levels to activate the exhaust systems. During periods of low CO, the exhaust systems operate at reduced airflow levels to reduce energy requirements. During periods of high tug activity, the CO and / or NO2 levels will increase and the system will react to the increased levels by energizing additional exhaust systems and modulating the outdoor air return air dampers to allow for increased outdoor air flow.

Toilets and Janitor Closets:

A single air handling unit will serve a gang of toilets and janitor closet to meet cooling and heating requirements. Air from adjacent spaces will be transferred to restrooms to meet exhaust requirements.

Concourse and Hold Room Areas:

Concourse and hold room area zoning will be retained. Existing constant volume air handling units will be replaced with heat pump units. Ventilation air will be supplied to these units from dedicated outdoor air units utilizing energy recovery wheels and located in accordance with NFPA 415 and ASHRAE 62.1-20007.

HVAC Equipment Rooms

Main Mechanical Room

The main mechanical room house pumps associated with the ground source heat pump system. This room will provide space to header the piping to and from the Earth Heat Exchanger (EHX) field. Since this room contains AFD's associated with the pumps, it should be provided with dedicated constant volume heat pump units which provide for heating and cooling of this space.

Electrical and Communication Rooms:

Since these rooms house sensitive electronics and transformers, constant air volume heat pump units should be utilized to supply conditioned air to these rooms. Thermostatically operated ventilation fans should be provided for these spaces to provide redundant temperature control.

Building Automation System for Environmental Control (BAS):

The proposed design shall provide an open protocol web based direct digital control system suitable for automatic control of the various non-HVAC equipment items and all HVAC equipment items. It is the intent of this BAS to be based on the LON open protocol standard as developed by the Echelon Corporation. This BAS architecture approach will provide the GSP facility with a system which is non-proprietary at the equipment controller level, thereby allowing the use of "generic" LON controllers as manufactured by a variety of controls manufacturers offering LON certified controllers such as Johnson Controls, T.A.C., Trane Company, and Invensys. The system shall be configured with distributed logic controllers for stand-alone operation without need for communication with the PC based BAS front end. The PC based front end shall be providing as the human interface device for modifications to the system set points and operating sequences and schedules. The system shall also incorporate hand-held interface devices for mobile access in addition to web based access via generic internet web browsers such as Internet Explorer via standard web connectivity including wireless. Additional information on the features of the BAS are included in this section in the Energy and Sustainability Standards portion.

1.8.6 PLUMBING SYSTEMS

General Description

The intent of this section is to provide information and options regarding the replacement of the existing plumbing systems with more efficient plumbing systems associated with the Greenville-Spartanburg International Airport (GSP) Project. The review of these criteria by the GSP staff is requested and welcomed. The intent of the recommended plumbing systems is to provide the facility with high quality and reliable plumbing systems with aesthetic fixtures and utilizing high efficiency equipment in compliance with codes and standards. Plumbing equipment and systems will be selected and designed to meet the airport staff's goals for plumbing systems requiring minimal frequencies of maintenance and trouble-free, automatic operation.

Plumbing Codes and Standards

The proposed plumbing systems shall be designed to meet the requirements of the local, state and national code requirements as part of the program development.

Applicable Building Codes and Standards:

- ICC International Building Code, 2006 Edition
- ICC International Plumbing Code, 2006 Edition
- ICC International Fuel Gas Code, 2006 Edition
- NFPA 54/ANSI Z2223.1-1999 National Fuel Gas Code: 1996
- ADA/ANSIO A117.1 Americans With Disabilities Act 1998
- ASPE Data Books, American Society of Plumbing Engineers Plumbing Systems Design Manuals
- Local code requirements of the Authority Having Jurisdiction including variances

Plumbing Design Criteria

1. Terminal group, family, airport staff and TSA staff restrooms
2. Terminal concession including full service kitchen, restaurant and lounge
3. Janitorial service closets with mop basins or service sinks
4. Water features with lighting, filtration and pumping equipment
5. Break room sinks
6. HVAC central heating hot water and chilled water system
7. HVAC air handling equipment rooms
8. Exterior non-freeze wall service hydrants
9. Car wash water recycling system for rental car agencies
10. Four primary irrigation systems

Plumbing Systems

1. Domestic (potable) cold water distribution
2. Domestic (potable) hot water heating, distribution and recirculation
3. Primary storm drainage for all roof areas connected to rain harvesting system with overflow connections to conventional site storm drainage system.
4. Secondary (emergency) storm drainage for all roof areas
5. Snow/ice melting systems for primary and secondary roof drains and gutters
6. Sanitary, waste and vent
7. Greasy waste and grease interceptor
8. Natural gas distribution including meter and pressure regulators
9. HVAC makeup water connections
10. Non-potable water piping system for toilets and urinals with system bypass valves for connection to domestic (potable) cold water system.
11. Non-potable water piping system for irrigation, car wash and water features with system bypass valves for connection to domestic (potable) cold water system.

Solar Water Heating System

A solar domestic hot water is proposed to replace the existing domestic hot water system including piping and materials. The proposed system is estimated to incorporate thirty (30) collectors (complete with tubes, basic rack and manifold), thirty (30) hi-angle racks for flat roof mounting, six (6) APS pump stations with controller (1 pump for every 5 collectors), six (6) x-tank expansion tanks for glycol and one (1) 55 gallon drum of hi-temp glycol transfer fluid used to serve hot water to the renovated terminal building bathrooms and concessions area. This system will connect thirty collectors in series using a storage capacity of 1,500 gallons to provide maximum efficiency. Heat exchanger tanks or shell and tube heat exchangers will "pre heat" the cold to the primary heat source.

According to Apricus and the United States Department of Energy it is estimated that this system could potentially save between 50%-80% in water heating energy costs annually. It is estimated that this solar water heating system based on annual savings and credits would pay for itself in two years.

Rainwater Harvesting System

After performing an analysis of rainwater statistics, a rainwater harvesting system is proposed. Based on historic rainfall data (average over past 33 years) an estimated 4 million gallons of rainwater per year may be available for re-use. Of the 4 million gallons, 1.7 million gallons of water could be used to serve the toilets and urinals, with 2.3 million gallons of water available for the irrigation system, HVAC make-up water, rental car agency car wash and the water features. Condensation drainage from the HVAC systems should be connected to the rainwater harvesting system.

The underground storage system is recommended to be polypropylene modules that are snapped together at the building site and stacked vertically and connected horizontally to create a storage space of unlimited size and shape. Drainage cells above the tank are designed to capture surface water from lawn areas, porous pavers or gravel. The system can also support non-porous parking areas. The pit area can be lined with a non-porous to contain the water for harvesting or a porous liner to recharge local groundwater. The required storage area for this system will be approximately 200,000 gallons and will take up approximately 4,000 square feet and can be located underground in a centralized location. The harvested water will need to be disinfected, color-dyed and re-distributed by a triplex pump system. The system is recommended to be monitored by the building automation system which will provide a real time analysis of total water usage and savings. It is estimated that this rainwater harvesting system based on annual savings would pay for itself in ten years.

All plumbing systems should be centralized and include capacity and extensions for minor future expansions of the terminal building, as is practical.

Plumbing Fixtures, Drains and Appurtenances

Plumbing fixtures are recommended to be high quality, commercial grade with aesthetic fittings. Fixtures and appurtenances complying with the Americans with Disabilities Act should be provided where required. The ultra low flow fixtures listed below could potentially provide up to a 30%-40% in water usage savings annually. General descriptions of the plumbing fixtures are as follows:

- Water closets for group restrooms should be china, wall mounted with back spud; concealed electrically powered, sensor operated flush valve; adjustable closet carrier; white, open front, solid plastic, white seat. Fixture color: white. Water closets for other restrooms will be as indicated above except with exposed, solar-powered sensor operated flush valve. All toilets will be 1.28 gallons per flush.
- Urinals for group restrooms should be vitreous china, wall mounted with back spud; concealed, electrically powered, sensor operated flush valve; adjustable urinal carrier. Urinals for other restrooms should be as indicated above except with the exposed, solar-powered sensor operated flush valve. All urinals will be 0.125 gallons per flush.
- Lavatory countertops and lavatory fixtures for group restrooms are recommended to be Corian solid polymer fabricated unless otherwise required by owner or agency. Colors of countertops and lavatory fixtures can vary to reflect the architectural color schemes and textures. Group restroom lavatories will have solar powered sensor operated faucet and soap dispensers supplied from ASSE 1017 mixing valve. Lavatories for other restrooms should be vitreous china, wall mounted drilled for concealed arm carrier and provided with floor mounted lavatory compliant with ASSE 1017. All lavatories will be provided with heavy-duty, chrome plated, threaded supply valves and chrome plated cast brass trap. Accessible lavatories should be provided with factory insulated traps and supply valves. All lavatory faucets will have 0.5 gallons per minute aerators.
- Floor drains are recommended for group restrooms. Floor drains should have stainless steel strainers with deep sealing, cast iron traps and trap primer taps. Each restroom floor drain trap seal should be maintained via automatic electronic trap seal primers. Mechanical equipment room drains should be provided with an extended rim stainless steel strainer.
- Single and dual level electric water coolers will be provided at group restroom and various locations. Select water coolers which reduce water usage by approximately 40% or more and provide an energy savings of up to 50%. Recycled content stainless steel should be considered.
- Mop basins fixture and trim for janitor service closets should be terrazzo basin with service faucet, 3-mop hanger station, hose and hose clamp and stainless steel strainer.
- Concession area sanitary floor sinks should have stainless steel bodies and 12” square grates and 8” depth for sanitary food service applications.
- Roof drains should be cast iron bodies with under deck clamps and aluminum domes. Secondary (emergency) roof drains should have adjustable internal dams of external dams to allow drainage only up failure of primary storm drainage system.

Water Feature and Equipment

The site has a total of four (4) water features that use potable water. The water features are located at the garden adjacent to the restaurant, the fountain inside the terminal, the large water fountain between parking garages and the waterfall feature. These water features will be served with water from the rainwater harvesting system.

1.8.7. FIRE SUPPRESSION SYSTEMS

New Construction and Renovation:

Under the covered mall provisions (passenger transportation terminals) of the building code, the building will be fully protected with an automatic sprinkler system and hose connections (manual standpipe system) located at the main entrances/exits and in the stair enclosures. The system will be a wet-pipe system in heated spaces and a dry-pipe system in unheated and exterior spaces including the areas below the concourses. Sprinkler protection will be provided in all areas of the new and existing building. The sprinkler system will be provided in accordance with NFPA 13 and state and local requirements.

The available water supply will have to be verified through fire hydrant flow tests. If the residual pressure is not adequate for the sprinkler protection, a fire pump will be required.

PHYSICAL PLANT/BUILDING OPERATIONS AND MAINTENANCE

1.9 PHYSICAL PLANT RE-USE

1.9.1 ELECTRICAL

The existing capital electrical equipment such as switchboards, distribution panelboards and generators will be evaluated on a case by case basis to determine if replacement in place and kind is required. Additional power for the baggage handling system will be required from the utility company and generator system. A dedicated space will be required for the new electrical equipment. The resultant power distribution system will not be a centralized system with redundancy, but a pieced together system from different eras that is sprawled throughout the buildings with very limited capacity for growth.

The head end equipment and remote devices for fire alarm, communications, MUFIDS and public address systems will have to be upgraded as described under the replacement options. The existing airport operations center, CCTV and access control system will remain in place. Additional devices will be added to the existing system on an as needed basis.

The lighting fixtures and lighting controls will be replaced in kind with sources as described under the “replacement” section. The amount of available daylight and existing light fixture arrangement and mounting will limit the level of energy efficiency when compared to the replacement options. The owner’s project requirement document will require modifications for less aggressive energy goals from the lighting system.

1.9.2 MECHANICAL

Under the "re-use" scenario the design intent is to replace the existing mechanical equipment in-kind with the highest efficiency models available in the market in an effort to strive to meet the project requirements. The two (2) boilers and (2) chillers would be replaced with more efficient versions. Large constant volume air handlers would be replaced with variable volume units that would be able to modulate airflow and save fan energy during off-peak conditions. A modern building automation system as described in this report will be provided. Demand controlled ventilation and the other energy-saving control schemes will also be provided as under the replacement options.

The "re-use" option retains the same mechanical central plant and equipment rooms. These spaces were originally created for a centralized approach to air handling units. Ground Source Heat Pump systems are based on a decentralized approach to air handling, as such, the existing facility does not lend itself to this system type. Adequate access and space to maintain equipment located in the original Terminal mechanical room may remain an issue under this configuration option.

1.9.3 PLUMBING

The basic concept for Plumbing design will remain the same under Option 2. However, with less of the terminal being renovated, there may be reduced opportunity to take advantage of sustainable practices such as rain harvesting.

1.9.4 FIRE PROTECTION

The requirement to provide a fire suppression system in accordance with NFPA and state and local codes will be the same for replacement or re-use.

IMPLEMENTATION OF SUSTAINABILITY GOALS

1.10 HIGH PERFORMANCE GREEN BUILDING AT GSP - INTRODUCTION

The Greenville Spartanburg Airport (GSP) Commission has mandated that high performance green building measures be incorporated into all aspects of refurbishment and new construction projects currently under consideration on the campus. This sustainability initiative will consider all areas of building operations such as ongoing maintenance activity, administrative actions and public awareness.

As such, the Terminal Area Study (TAS) activities have integrated energy efficiency, environmental stewardship, water conservation, resource protection, and sustainability into all aspects of the project development. Sustainability for this project is not considered an additive option but is instead a guiding principle that is integral to the decision making process and is spread across all disciplines. This section is intended to provide a summary of the high performance building goals targeted for this project and highlight the various options available for consideration. However, throughout the TAS, there is further reference to sustainable considerations related to each section.

Producing a high performance building is a process that involves critical analysis of energy and environmental measures in order to determine both feasibility, practicality and return on investment. Sustainability measures, goals and strategies for this project have been sufficiently researched and analyzed to ensure that the measures are relevant and pertinent to this project. Some measures, however, will be formalized during the detailed design stage of the project development and will require analysis and simulation tools to optimize the final solutions.

The project team, in conjunction with GSP, has established achievable sustainability goals for the TAS with targets that will challenge design teams.

Energy and environmental goals have been established in the following key areas:

1. Develop an Owners Project Requirements document
2. Establish ASHRAE 90.1-2007 as the base energy standard for the project
3. Meet ASHRAE Standard 189.1 - Standard for the Design of High Performance Green Buildings
4. Energy efficiency
5. Renewable energy system deployment strategies
6. Water efficiency
7. Indoor environmental quality (IEQ)
8. Material and product selection
9. Lighting system design including daylighting and control
10. High performance appliance and equipment selection
11. Recycling infrastructure
12. Commissioning of building energy using systems
13. Plans for operation
14. Energy and water consumption measurement

The broad-spectrum environmental targets established by the project team include a 70% reduction in energy consumption (based on ASHRAE Standard 90.1-2007), potable water use only for drinking, cooking and personal hygiene, materials that are locally sourced and/or have high recycled content, daylighting for 75% of regularly occupied spaces, enhanced indoor environmental quality, Energy Star appliances and infrastructure in place to measure energy and water use within the building.

It is a strong possibility that the renovated terminal building work will strive to achieve recognition under the United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) rating system for Building design and Construction. However, the project team approach is to first

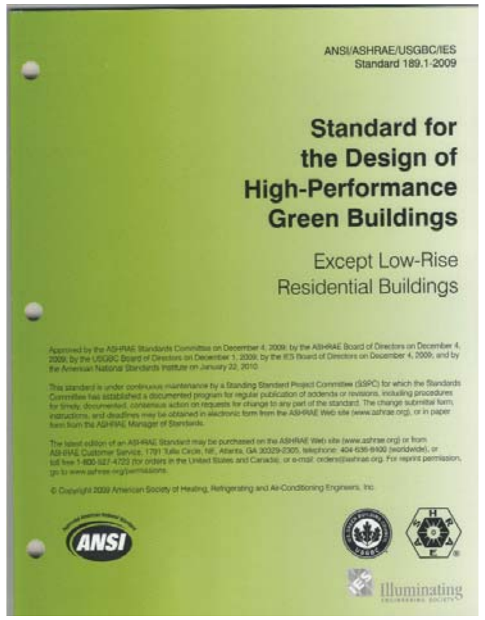
produce a high performance building that optimizes sustainability with the needs of the owner and building users. LEED certification is the proof of a good design.

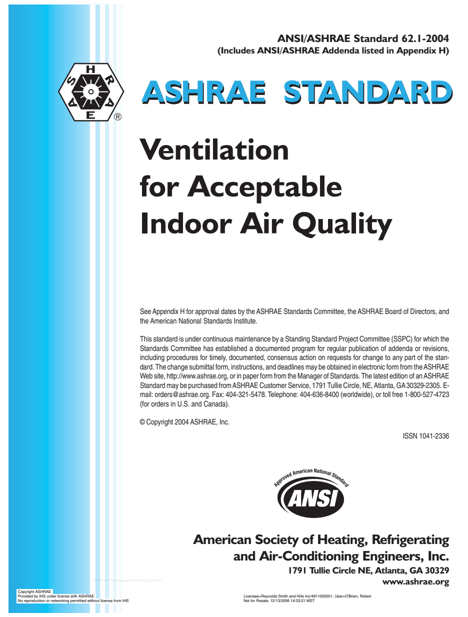
Many high performance building goals will only be fully developed during the course of detailed design development. The following sections describe the approach, challenges, and application strategies for incorporating specific high performance green building measures into the design development and construction process.

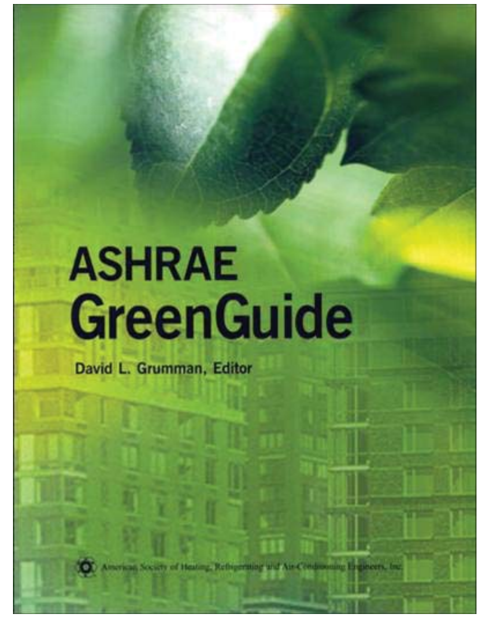
1.10.1 STANDARDS

ASHRAE Standard 90.1-2007

ASHRAE Standard 90.1-2007 Energy Standard for Buildings Except Low-Rise Residential Buildings shall be the minimum reference standard used for this project. Although this is not the current state energy standard for South Carolina, it is the minimum reference standard for the LEED rating system and is the current federal reference standard. The requirements are similar to the previous version (ASHRAE 90.1-2004) which is a reference standard in the state.







ASHRAE Standard 189.1

ASHRAE Standard 189.1-2009 Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings is a recently approved and released standard that represents the most current developments in high performance building design and construction. The project team intends to attempt the requirements of this standard in order to adopt the most current energy efficiency strategies. This ANSI approved standard captures, in mandatory code language, the key areas of building design and development including site sustainability, water and energy efficiency, indoor environmental quality, the buildings impact on atmosphere, materials and resources, construction phase quality management and ongoing plans for operation of the completed building. Meeting the requirements of this standard will set GSP apart as an "early adopter" of the most current high performance green building procedures.

1.10.2 ENERGY EFFICIENCY

Energy efficiency as a goal encompasses many diverse elements and furthermore requires creative application of available strategies. To successfully meet the 70% energy reduction goal for this project, it is critical that numerous energy efficiency strategies be integrated into the total design. There is no single strategy that meets this requirement.

The following strategies have been identified as critical to achieving the goals of this project.

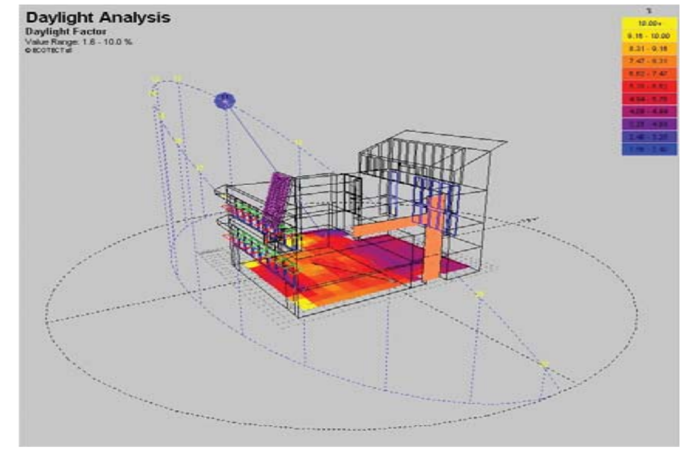
Process Loads

A process load is loosely considered an energy use that is not directly associated with human comfort such as machinery, refrigerated storage spaces, or operating room lighting, for example. In an airport, there are significant process loads that constitute a large percentage of the gross energy use of the building - 50% or more in many cases. Current energy analysis protocol includes process loads as part of the overall building energy use. Therefore, reductions in process energy use have a critical impact on the energy reduction goal. Baggage handling, baggage screening and transport systems are high energy consumers in an airport.

However, as the equipment and manufacturing sectors also start to address energy use and environmental stewardship, there are many innovative and creative solutions to past ways emerging. From an energy analysis standpoint, it is possible to capture energy savings from an energy efficient process when compared to the "business as usual" process equipment. For instance, modern conveyor systems may introduce variable speed drives and timed operation to reduce energy consumption. Much of this equipment is currently available, off the shelf, and with proven performance.

The project team shall research and include energy efficient process equipment as needed to suit the final layout of the airport. Much of this work will include detailed discussions and negotiations with the equipment manufacturers. One key industry benefit of this approach is having a role in changing a market and spurring research and development in industry.

1.10.3 DAYLIGHTING



Daylighting is the use of natural ambient daylight to provide illumination in order to offset the use of electric lighting. Key design considerations include orientation and shading of windows, area of windows, mitigation of glare and direct beam sun, reflectivity of interior surfaces, window physical properties and lighting control to maximize the saving potential. Lighting energy use represents 30% to 40% of energy use in terminal buildings and reduction in this energy using sector is critical to meeting project energy goals.

Building size and orientation constraints at GSP present a design challenge to meet this goal. The orientation of the buildings and the space needs are fixed quantities with little opportunity for adjustment. The west to northwest orientated building surfaces (those that face the runway) are most challenging as the afternoon setting sun tends to have direct beam sun at low angles from the horizon. Furthermore, large building areas with internal distances (over 40 to 60 feet from exterior walls) also pose a design challenge. However, creative shading design, internal shading devices and toplighting strategies can mitigate the negative effects of these issues. Space use design can be further developed to place non-regularly occupied spaces toward interior zones. These spaces include rest rooms, storage rooms, MEP spaces, corridors, stairwells, etc.

Lighting Systems

Lighting system power requirements are addressed in the reference energy standards in terms of "lighting power density" and is in units of Watts per square foot (W/sf). This is a term that describes power requirements for various spaces and is not a measure luminance levels. The lighting system for this project shall be designed to achieve an LPD of at least 10% lower than the levels indicated in ASHRAE 90.1-2007.

Additionally, the project lighting system shall utilize automatic control where applicable. Automatic control shall include manual on – automatic off occupancy sensors, daylight control, and time clock control where applicable.

Solar Powered Wayfinding

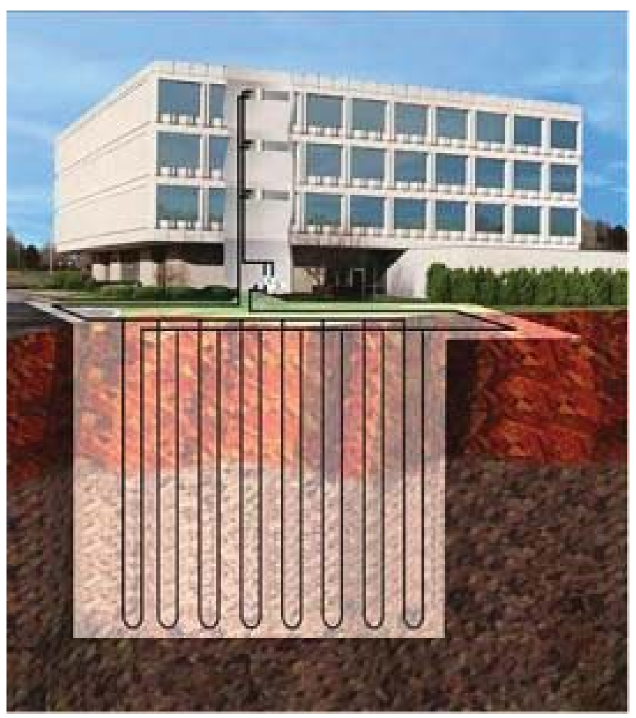
Airport lighting systems, interior and exterior, have specific lighting requirements to provide directional and wayfinding signage for the passengers and airport visitors. These lights typically burn at all times and one strategy under consideration is the deployment of solar power systems to power these specific systems. The system under consideration includes solar PV panels and a battery back-up arrangement sized to meet the load, and to provide sufficient battery power to operate the lights overnight. The lighting system will comprise LED fixtures with extremely low power needs and a complete grid connected back up connection for times when solar becomes temporarily unavailable. Low wattage LED light fixtures should not be associated with low light output.

1.10.4 HIGH EFFICIENCY HVAC SYSTEMS

HVAC system design for the new renovation at GSP presents another strong opportunity for energy savings. Currently, two high performance systems are under consideration: ground source heat pump and chilled water system with an adsorption chiller that utilizes hot water as the driving mechanism, and with high efficiency boiler for heating. Aside from these two systems, a more traditional system will also be evaluated. The traditional system will be very similar to what is currently in place with regard to central plant equipment, but will utilize high efficiency equipment currently available.

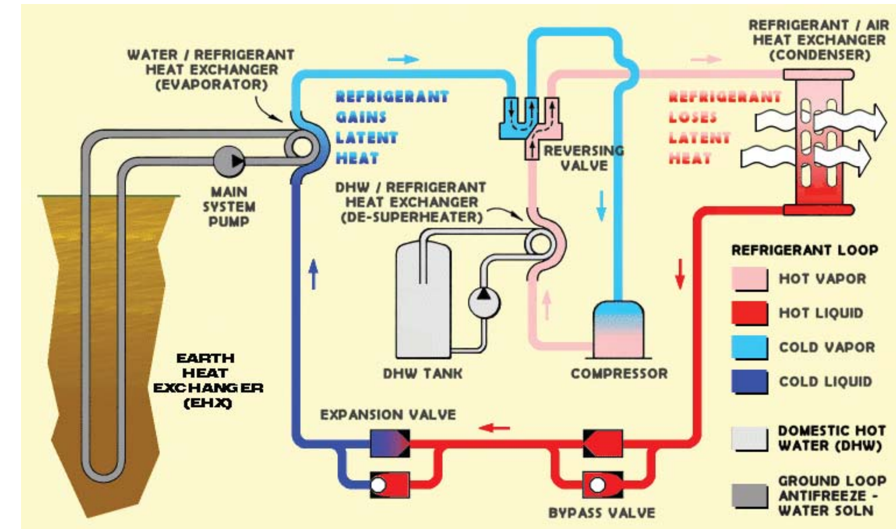
Ground Source Heat Pump

Ground source heat pump systems (GSHP) are one of the most efficient HVAC systems available today. There are a number of different varieties of this system type, but this study focuses on the ground-coupled heat pump system with vertical boreholes serving as both the heat source and sink. With some of the highest efficiency ratings, long life, no outdoor equipment and generally superior quality construction, these systems lend themselves very well to maximizing HVAC system performance. The cost of a GSHP system is often close to twice the cost of code minimum, contractor grade systems but much closer in cost to traditional high efficiency systems. However, when a high performance building uses heat load reduction strategies (i.e. daylighting and improved building envelope) the HVAC size requirements are lower which often helps bring costs to within budget targets. The key cost difference between GSHP and traditional systems is a first cost and involves the drilling of bore fields known as an earth heat exchanger (EHX). Subsequent equipment replacement is similar in cost to traditional systems as the EHX does not need to be replaced. GSHP systems are ubiquitous and have been installed worldwide for over 40 years.



GSHP systems consist of a reversible heat pump unit that is linked to the EHX via a refrigerant to water heat exchanger. The EHX is an array of boreholes, typically 6 inch diameter and between 200 and 350 feet in depth. Inserted in these bore holes is a pipe loop that circulates water or a glycol-water solution at a temperature that, depending on the season, will be either higher or lower than the surrounding ground temperature. In the region Greenville Spartanburg International Airport is located, the ground temperature below 30 feet remains approximately 62 °F year-round. The difference in temperatures between the earth and fluid in the pipe results in heat transfer. During cooling season when the water loop temperature entering the EHX is higher than the surrounding earth, heat is rejected to the soil. During the winter when heating is required, the loop water temperature entering the EHX is lower than the surrounding ground temperature and heat is transferred to the loop fluid.

Heat pump units are used to group building spaces into similar thermal zones and supply heated or cooled air to the spaces based on the space temperature and space temperature setpoint. During cooling, heat is transferred to the EHX from the heat pump while it is delivering cooled air to the space as part of the refrigerant cycle. During heating, heat is transferred from the EHX to the heat pump where the reverse refrigerant cycle is used to warm air delivered to the space.



Long-term affects of the annual energy balance of the EHX must be considered when design a GSHP system. In cooling dominated regions, such as where GSP is located, more heat is rejected to the earth than is removed from it, resulting in a gradual rise in ground temperature from 2 °F to 10 °F over time until a new equilibrium is reached. A proper design will account for the temperature change to ensure adequate capacity exists throughout the life of the GSHP system. It is often advantageous to employ a hybrid system where there is an energy imbalance with regard to the EHX. A cooling tower or drycooler can be added to a cooling dominated GSHP system to bring a closer balance to the heat being rejected to and recovered from the EHX. Such a hybrid system can have the added advantage of reducing the number of bore holes required, thereby reducing first cost.

An further benefit of a GSHP system is that a desuperheater can be provided with a number of heat pump units for the purpose of making hot water. Rather than rejecting heat to the EHX during periods of cooling, the waste heat is used by the desuperheater to create hot water. The desuperheater can only make hot water when the heat pump is cooling and so is meant to augment, rather than replace, other means to produce hot water.

The challenge with the airport, as is the case with most GSHP installations, is allocating appropriate space for the EHX. A rule of thumb is that the EHX area is generally equal to the building floor area to be conditioned. For the airport, it appears the optimal location for the borehole field is in the large turf grass area adjacent and to the northwest gate apron tarmac. In order to gather the borehole loops into a header, it will be necessary to trench across the tarmac. Furthermore, during the course of well drilling, logistical procedures will be in place to maintain aircraft operations.

Additionally, it is highly recommended that a soil conductivity test is performed in order to determine the thermal properties of the soil. The results of this test enable the designers to select the optimal well depth, quantity and spacing before drilling starts. This exercise is especially important where large GSHP systems are to be installed.

Adsorption Chiller

An option currently being considered for this project is the installation of an adsorption chiller for air conditioning needs. An adsorption chiller produces chilled water through a molecular interaction of solids and vapor, uses no carbon based refrigerant, can use waste heat streams or solar thermal systems for the heat source and have been shown to operate at up to 99% less energy consumption than traditional chillers.

The key benefit of these chillers is that the driving force for the process is hot water (not electricity) and since the operating temperature range can be as low as 130 deg F, the systems lend themselves easily to the use of solar thermal systems as the primary source of hot water. Although these systems are successfully installed around the globe, studies have shown these systems are not numerous in the region, although there are examples in Charlotte, NC (see below) and the U.S. Department of State Bureau of Overseas Building Operations has recently approved such a chiller for a new U.S. embassy.

In 2005, the Frito-Lay plant in Charlotte, NC, installed an adsorption chiller when 150 tons of cooling was needed in the processing area to offset the 150 tons of a mechanical unit and save on electricity cost. The Charlotte plant utilized an existing hot water loop heated to 194F with waste heat from a cooking process to power the adsorption chiller. After 30,000 hours, the downtime due to mechanical issues with this unit was zero (0) as well as zero (0) repair parts. According to Frito-Lay the observed electrical savings have been $27,000 per year.

A key reason this type of system is under consideration for this project is a combination of superior energy efficiency and the knowledge that the operations and maintenance staff at GSP have advanced technical abilities.

Additional HVAC System Considerations

Regardless of the system selected, several fundamental design related strategies will be included that have been shown to improve energy efficiency for HVAC systems. Included as part of the design for this project will be the use of technologies such as variable speed drives for motors, modulation of ventilation air to match occupancy, on-site energy recovery units, use of premium efficiency motors, zoning of systems, economizers, and high efficiency equipment selections. In addition the design strategies, an advanced building automation system (BAS) will be provided to implement various control strategies, provide monitoring and storing of data for trending purposes. The BAS will allow for the monitoring and data acquisition systems such as gas and water consumption, process loads and others identified in the "Consumption Measurement" section later in this chapter.

Solar Thermal Water Heating

The GSP terminal building is a good candidate for the deployment of solar thermal water heating for a variety of applications. The basic principle for solar thermal water heating systems is using the heat energy of the sun to heat a fluid. Typical system components include solar collectors, storage tanks, distribution systems, pumps and controls. Solar thermal systems are very well established and proven technologies with millions of installations globally. For GSP, the application of this technology is being considered in three (3) key areas:

1. Domestic water heating
2. Kitchen / cooking application
3. Adsorption chiller (if selected)

Domestic water heating is a common use for solar thermal although the distances between hot water usage points at GSP may lead this application to be impractical with regard to distribution piping and associated heat losses. However, the layout of the final design may prove to be practical for the installation of a solar thermal system. Kitchens and cooking facilities are often high users of hot water primarily for dishwashing. With a constant and known hot water demand it appears that the restaurant may be a good candidate for solar heated water. A preliminary estimate utilizing thirty (30) collectors could potentially save between 50%-80% in water heating energy costs annually. Refer to the HVAC system section (above) for the potential of solar thermal to be used for the HVAC system.

1.10.5 WATER EFFICIENCY

Water efficiency is an important environmental and economic concern in the region and the project team is exploring numerous ways in which water efficiency can be optimized for this project. A key goal for the project team is to institute systems and technologies to ensure that potable water is used only for drinking, cooking and personal hygiene (hand washing, showers, etc). It has been reported that the local water authority is planning to raise water costs an average of 5% per year for the next 10 years. Water conservation will and has become an important issue within the region.

The primary uses of potable water on the GSP campus are as follows:

1. Public restrooms
2. Irrigation
3. Restaurant / food service
4. Water feature (fountain and waterfall)
5. Fire / Rescue practice
6. Rental agency car wash

The following items are key considerations to improve water use efficiency and meet the environmental goals for this project:

On-Site Water Reclamation

A fundamental design element for this project will include the installation of infrastructure that captures onsite water that would normally be directed to drain. The potential sources of reclaimed water are rainwater, and HVAC system condensate collection. Targeted uses of reclaimed water on this project are for toilet flushing, water feature make-up, cooling tower make up (if installed), and potentially fire protection use and irrigation.

Rainwater harvest potential on this site has great potential with the specific challenge for GSP being the routing of the harvested streams and the location of underground (or aboveground) water storage vessels. Additionally, a rain harvest "balance" shall be calculated during design development to target actual location and size of the system components. However, preliminary analysis indicates that a rainharvest system, of some configuration, could be utilized to a great extent. Based on historic rainfall data (average over past 33 years) an estimated 4 million gallons of rainwater per year may be available for re-use. Of the 4 million gallons, 1.7 million gallons of water could be used to serve the toilets and urinals, with 2.3 million gallons of water available for other purposes.

HVAC system condensate generation is high in this region at approximately 12.6 gallons of water per year per cfm of outdoor air. Condensate water is mostly generated during times of low rainfall. The project team will include provision for the capture, collection and reuse of HVAC system condensate.

Water Reduction Strategies

Building Water Use Reduction

The system design for this project will include measures for reducing water usage where possible. Plumbing fixtures used throughout the project will be low-flow and, where applicable, on automatic control primarily for flushing and lavatory flow. The following minimum flow rates will be established for plumbing fixtures:

Water closets:	1.28 gallons per flush (gpf), solar-powered sensor operated flush valve
Urinals:	0.125 gallons per flush (gpf), solar-powered sensor operated flush valve
Public lavatory:	0.50 gallon per minute (gpm), solar-powered sensor operated faucet

Commercial Food Service Operations

Restaurants and food preparation areas shall include the following equipment parameters where applicable:

1. Use high efficiency pre-rinse spray valves rated at 1.3 gpm or less
2. Use Energy Star rated dishwashers
3. Use boilerless / connectionless food steamers rated at 2.0 gal/hour or less
4. Use combination ovens rated at 10 gal/hour or less
5. Use air cooled ice machines
6. Use hands free foot operated faucet controllers in food preparation areas

Special Water features

The water fountain and other water features on the campus shall be supplied by on-site reclaimed non-potable water for make up water needs.

Irrigation Water Reduction Strategies

GSP currently has an extensive irrigation system that is made up of several zones and is on simple time clock control. In the event that the irrigation system is modified, it is recommended that several high performance irrigation strategies be considered. As noted above, there may be opportunity to supplement some or all of the current potable water used for irrigation with collected rainwater. The installation of "smart" irrigation controllers, hydrozoning of irrigation areas and plant selection are means for reducing water irrigation need regardless of the source. Additional water conservation measures are noted below:

1. Hydrozone automatic irrigation systems to water plant materials with different water requirements
2. Do not spray irrigation water on non vegetative surfaces
3. Do not spray irrigation water within 3 feet of any building.
4. Install "smart" irrigation controllers that utilize evapotranspiration and weather data
5. Reduce turfgrass areas to no more than 40% of the total landscape area
6. Limit potable water use to 1/3 of the total landscapes area

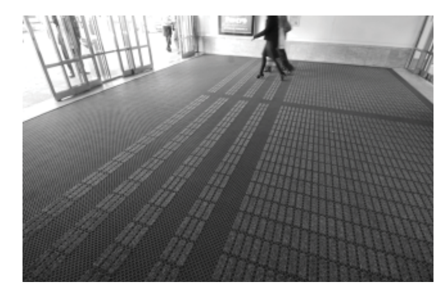
Renewable Energy Systems – Solar Ready

The deployment of renewable energy systems on buildings is dependent on adequate infrastructure, roof availability, orientation, and program space for accommodating the equipment. Most existing buildings are not appropriate for renewable system installation due to physical limitations of the building form. Therefore, the project team shall have the foresight to include useable space on the building to easily accommodate renewable energy systems into the future.

At a minimum, the area to be available will be sized to accommodate a renewable energy system that has a minimum rating of 3.7 Watts/ft2 multiplied by the total roof area. The design shall include space for access, pathways, conduits and program space for electrical equipment associated with renewable energy systems. For the GSP renovation project, the anticipated renewable energy systems will be solar PV and solar thermal.

1.10.6 INDOOR ENVIRONMENTAL QUALITY (IAQ)

Building IAQ components



Building IAQ is a fundamental component of high performance green buildings and contributes to the general health and well being of the occupants. The primary IAQ strategies to be used on this project are listed below:

1. Comply with the ventilation rate requirements of ASHRAE Standard 62.1-2007: Ventilation for Acceptable Indoor Air Quality using the Ventilation Rate Procedure
2. If feasible, add 30% more outdoor air to the minimum OA rates prescribed by ASHRAE 62.1. This strategy

impacts indoor air quality but may also impact building energy use and is not always feasible for this climate and building type.

3. Monitor all outdoor air flows to ensure that adequate outdoor air is being supplied to the spaces. Install a flow meter with alarm capabilities to alert maintenance staff when outdoor air flow rates are at a +/- 10% deviation from minimum flow rates.
4. Ensure that all outdoor air supplied to the building is filtered with a minimum MERV 13 filter rating or higher
5. Prohibit the use of tobacco products inside the building and designate smoking areas 25 ft minimum from building openings or fresh air intakes.
6. At all major entrances, provide entry system walk off mats with the following surface characteristics and minimum length requirements
    a. Scraper surface (3 foot)
    b. Absorption surface (3 foot)
    c. Finishing surface (4 foot)
7. HVAC design shall comply with ASHRAE Standard 55 (thermal comfort). The designer shall prepare the appropriate documentation per Section 6 of the standard.
8. Acoustical control for the building envelope including wall and roof assemblies shall have a composite STC rating of 50 or greater. Windows in the building envelope shall have an STC rating of 30 or greater.

Material IAQ Characteristics

The project design shall reduce or eliminate the introduction of volatile organic compounds (VOCs) into the building during construction. Acceptable VOC levels for products shall be as established by the LEED Rating system for the following products:

1. Adhesives and sealants
2. Paints and coatings
3. Floor covering materials
4. Composite wood and agrifiber products
5. Office and furniture systems
6. Ceiling and Wall systems

Indoor Air Quality Construction Phase Management

The introduction of indoor pollutants during construction activities can have long term detrimental effects on indoor air quality and plans will be in place to ensure construction practices prevent adverse IAQ development. The following construction phase activities will be in force during construction:

1. Permanent HVAC systems shall not be operated during construction except for start-up, testing, balancing and commissioning.
2. All HVAC materials shall be stored and protected from moisture and shall remain clean
3. Prior to occupancy, the contractor shall perform a building flush out or conduct an indoor air quality test. The activities shall be planned in advance and documented.
4. All materials stored on site shall be protected from moisture damage.
5. Limit construction vehicle idling

1.10.7 MATERIALS AND PRODUCTS

Construction Waste Management

The contract documents shall specify that a detailed construction waste management plan (CWM) is developed, implemented and documented by the general contractor with the goal of diverting as much waste as possible from landfill. Total waste shall be measured (typically by weight) and the amount of waste diverted from landfill will be further subdivided from the total. Diverted from landfill implies material that will be recycled or reused. Material destined for incineration is not considered diverted from landfill. Also, vegetative debris, dirt and any contaminated products are not included in the calculations.

The contractor shall develop a CWM plan that describes in detail the logistics of the operation and describes the measuring and reporting plans. The target quantity for this activity is a minimum of 75% of construction waste diverted from landfill.

Refrigerants

The Montreal Protocol mandates that the chlorinated refrigerants (CFC and HCFC) shall be phased out by the year 2030. These refrigerants have significant ozone depleting and global warming potentials. In order to adopt the requirements of this Protocol, and to use the next generation of HVAC equipment, the project team shall eliminate the use of these products. Refrigerant selection shall be limited to HFCs, such as R-134a or R-410a, or will use more natural refrigerants such as ammonia. Additionally, the amount, or charge, of refrigerant use will be limited through equipment selection, length of piping runs, and load reduction strategies.

Ongoing operation and maintenance plans will include regularly scheduled maintenance activities to ensure proper operation of systems and include measures that minimize the potential for refrigerant leaks.

Storage and Collection of Recyclables

A part of the GSP sustainability initiatives includes expanding the recycling program within the airport buildings. This will include both the administrative as well as the public areas of the campus. In order to facilitate this initiative, the project team shall include program space into the public and non-public areas of the building that makes recycling an easy to implement activity. The program will include an assessment of materials available for recycling, and a determination of the minimum space necessary to accomplish the program.

Material Properties

The design of this project shall include product selection that maximizes the following characteristics for those products contained in specification sections 2 – 10. The project specifications will include detailed product requirements and instructions for the contractor to source and submit products that include one or more of the following aspects:

- Harvested, extracted, recovered, and manufactured locally (500 mile radius of site)
- Made with a high percentage of recycled content
- Be salvaged or reused products
- Be manufactured of “rapidly renewable” resources (cork, bamboo, linoleum)
- All wood products shall be certified by the Forest Stewardship Council (FSC)

All building products have the potential to meet these targets however it is the primary building products that contribute the most to achieving this goal. Therefore, products such as concrete, steel, flooring, ceiling, and wall materials will be specifically targeted to optimize the desired qualities. The contractor shall maintain a log of all materials and material properties including cost in order to properly document this activity. The contractor shall prepare monthly reports in order to track the quality and progress of this work.

1.10.8 COMMISSIONING OF ENERGY USING SYSTEMS

Commissioning (Cx) is the formal, third party verification that the energy using systems of a building are performing as designed. Cx is primarily a quality control exercise and, when started at an early stage, can provide operational and energy benefits for the life of the building. For the GSP airport renovation, the Cx activity will be as defined both by the LEED Rating System Fundamental and Enhanced Cx requirements and also by the Cx requirements laid out in ASHRAE Standard 189.1.

Commissioning is a process that includes early development of the Owners Project requirements in order to identify and list specific project goals and ensure these goals are maintained throughout the design and construction process. It includes the review of design documents to ensure that the systems can be easily accessed and operated throughout the life of the building and once construction begins, the Cx process systematically checks and tests that the installation and operational aspects of the equipment is in accordance with the design documents. Following construction, the Commissioning Authority (CxA) prepares a final report that lists functional instructions for all of the equipment and systems, lists any outstanding issues to be resolved, oversees the training of operations staff, and includes a visit within 18 months after completion to review the operation status of the commissioned systems.

It is expected that the following systems shall be commissioned and it is recommended that the CxA be hired directly by the project owner (GSP):

- HVAC systems including IAQ measures and control functions
- Building envelope systems to confirm thermal and moisture integrity
- Lighting and shading controls including daylighting system
- Irrigation system
- Plumbing system
- Service water heating system
- Renewable energy systems (PV and solar thermal)
- On-site reclaimed water system
- Energy and water measurement device operation

1.10.9 PLANS FOR OPERATION

As noted by ASHRAE, “High-performance green buildings begin with appropriate planning, design, and construction. Strong performance over the lifetime of the building is only realized, however, when the systems are continuously monitored and improved and the whole building is maintained in a sustainable manner.” In order to facilitate the ongoing efficient operation of the project, a series of operational and maintenance documents shall be prepared that spell out the anticipated plans and procedures to be prepared by project team members working closely with facilities staff.

The Plans for Operation shall include the following sections:

- High Performance Building Operation
    - o Site Sustainability
    - o Water Use Efficiency
    - o Energy Efficiency
- Indoor Air Quality Management
    - o Outdoor airflow measurement and verification
    - o Green Cleaning Plan
- Equipment Maintenance
- Service Life Plan (building envelope replacement strategy)
- Transportation Management Plan

1.10.10 CONSUMPTION MEASUREMENT

Benchmarking, tracking, and reporting of building performance are becoming hallmarks of the modern green building. Buildings of the not too distant future will be required, through public pressure, to have the ability to report their performance in a fashion similar to a food label. Many jurisdictions today require building performance disclosure as a condition of sale. Furthermore, it is essential that building performance be known in order that energy related problems can be identified and corrective measures taken. Without the ability to measure, it is difficult to know or observe discrepancies and it is one of the only ways to measure improvements over time.

There are several building rating measures on the market today for benchmarking building performance including the Energy Star Portfolio Manager and ASHRAE's Building Energy Quotient program (currently in pilot phase). The project team shall design appropriate consumption measurement capacity into the building. By knowing early in the project that specific energy using systems require measurement allows for these devices to be installed in the most cost effective manner.

The following systems will include consumption measurement devices:

- Total electricity use
- Total gas use
- Total water use
- Lighting
- HVAC
- People moving
- Process energy loads (i.e. baggage handling, screening)
- Process water use (over 1,000 gallons per day)
- Irrigation water use
- Reclaimed water use

The consumption measurement devices shall be capable of automatically communicating with the building automation system (BAS). The BAS shall be capable of electronically storing the data for a minimum of 36 months and be capable of producing hourly, daily, monthly and annual reports.

SECTION 2: EXISTING INVENTORY ANALYSIS

2.1 EXISTING TERMINAL AREA

This “Terminal Area Study” encompasses the existing Greenville-Spartanburg Airport commercial service passenger terminal building including gates; departure lounges; terminal airside operational areas serving the aircraft gates; airport and airline operational areas; baggage handling; deliveries; equipment locations, circulation, and servicing; airline and airport offices; passenger security screening; storage areas; passenger amenities; concessions; mechanical, electrical, hvac, fire proection and communication as well as other necessary services and utilities; passenger drop off and pick up curbs; commercial curbs; rental cars offices, counters and provisions; parking areas and structures; access roadways; landscaped and “visual relief” areas and other areas pertinent to the function of the commercial service passenger terminal building.

These functions are contained within an acre area bounded on the North by terminal access roadway North of the North surface parking area; on the South by the Southern edge of the surface parking area; to the East by the terminal loop road; and to the West by the Easternmost edge of the aircraft parking apron

This study addresses the necessary improvements to optimize functionality, flexibility and operations for the projected traffic utilizing the terminal and ease of expansion for future projected growth up to the maximum capacity of both the aircraft gates and terminal area functions.

Ancillary buildings within the aforementioned area are not part of this study unless relocation or reconfiguration are required to achieve the improvement goals of the passenger terminal functions.

Existing facilities data for the terminal area were assembled from a variety of sources, including material on file at the airport, previous architectural/engineering record drawings, as well as on-site physical inventories.

Characteristics of the Area

To gain a full understanding of the airport’s characteristics, it is important to first understand its regional context. Characteristics that are of primary importance to this Terminal Area Study include the region’s size and population, and Greenville-Spartanburg International Airport’s (GSP) competing commercial service airports.

Geographic Setting

The Combined Statistical Area (CSA) of Greenville-Spartanburg International Airport (GSP) consists primarily of the cities Greenville, Spartanburg, and Anderson. The CSA is an 8-county region of northwestern South Carolina commonly referred to as “the Upstate”. The CSA has an estimated population of 1,203,795. The cities of Greenville and Spartanburg are located approximately halfway between Atlanta, Georgia and Charlotte, North Carolina along Interstate 85. The metropolitan areas of Greenville and Spartanburg also include portions of Interstates 185, 385 and I26.

The airport is located North of Interstate 85, approximately 5 miles South of Greer, 12 miles East of Greenville, and 16 miles West of Spartanburg. The airport property straddles the Greenville-Spartanburg county line with the terminal area residing entirely within Spartanburg County.

Competing Airports include:

Atlanta Hartsfield International Airport , Atlanta, Georgia. Approximately 2.45 hours drive.
Columbia Metropolitan Airport, Columbia, South Carolina. Approximately 1.75 hours drive.
Charlotte-Douglas International Airport, Charlotte, North Carolina. Approximately 1.5 hours drive.
Asheville Regional Airport, Asheville, North Carolina. Approximately 1.1 hour drive.

Footnote: MapQuest Road Atlas, 2008 Edition, FAA Hub Identification, 2008

Local Ground Access

Local ground access to the airport is provided primarily by Aviation Parkway with a direct connection from Interstate 85. Secondary access to the terminal area is available through GSP Drive with connection to SC Highway 14 to the South and Stevens Road with connection to Brockman McClimon Road to the North.

The primary, and most commonly used entrance to the airport terminal area, is from Aviation Parkway. Aviation Parkway has a dedicated interchange with Interstate 85 and is a four-lane divided highway that runs directly to the terminal area.

Aircraft Parking Apron

The aircraft parking area for the terminal building is composed of nine gates at Concourse A and four gates at Concourse B. All 13 gates are equipped with passenger boarding bridges (PBB) of various ages. Concourse A and B are separated by an airside landscaping feature (garden) described below. The apron is composed of standard 25 square foot concrete sections and has a 1 percent slope away from the building running 150 feet to a linear drainage structure along the length of concourses A and B.

2.2 EXISTING FACILITIES DATA

EXISTING BUILDINGS AND ARCHITECTURAL SYSTEMS

The GSP airport buildings under consideration for this study were substantially constructed in 1962 and have undergone various expansions and renovations in 1988, 1999, 2000, and 2001. Most of the original building components are still in place including the HVAC and electrical distribution system.

The following buildings comprise the extent of the scope of this terminal area study:

Terminal Area Buildings/Facilities

The passenger terminal area contains several structures providing support functions to the terminal building. These structures include the FAA Air Traffic Control Tower, Airport Rescue and Fire Fighting facility (ARFF), and two five-level parking structures.

The FAA Air Traffic Control Tower is a multi-story structure located directly north of the passenger terminal building. It houses standard FAA airport airspace and ground movement functions.

The ARFF facility is a single-story structure with 6 drive-through apparatus parking positions. The parking positions are housed in 3 stacked bays in the center of the structure with ancillary functions housed on either end of the facility.

The two parking structures are nearly identical in layout. Each is 5 stories in height with the lower-most level partially below grade. The parking structures are located directly across from the passenger terminal building curbfront. No covered walkways are available to access the parking structures from the passenger terminal building.

Landscaping and Water Terminal Area Features

Additional features located in the immediate vicinity of the passenger terminal area include the Airside Garden, the Central Lawn and Fountain, and the Entryway Waterfall.

The Airside Garden is located directly between concourses A and B on the aircraft apron. The Garden location is original to the 1962 terminal building, but was heavily renovated in 1989. The garden is currently on the non-secure side of the terminal.

The Central Lawn and Fountain is located directly in front of the passenger terminal building’s ticketing lobby between the two parking structures. The Central Lawn is predominantly flat, surrounded by vehicular roadway infrastructure, and outlined by very large trees. The Central Lawn’s primary feature is a large, round reflecting pool with a large water fountain.

The Entryway Waterfall is located on the primary approach road prior to arrival to the passenger terminal area. The Entryway Waterfall is designed to emulate Reedy Falls in downtown Greenville as well other local waterfall features.

Terminal Building

The passenger terminal building at the Greenville-Spartanburg International Airport was initially constructed in 1962 and has been expanded multiple times since then. The terminal and concourse are long and linear, with limited separation between airside and landside.

While the entire length of the facility is covered, not all areas are enclosed. The enclosed areas comprise approximately 215,158 square feet of building area. The length of concourses A and B is 1,865 feet. Concourse A has 9 gates and concourse B has 4 gates. All 13 gates are equipped with Passenger Boarding Bridges (PBB).

Building	Area (Square Feet)
Terminal	215,158 s.f. enclosed, conditioned space
Including: Central Plant and Mechanical Electrical and Plumbing rooms Connector Concourse A Concourse B Customs and Border Protection Facility Airport Offices	
Fire/Crash/Rescue building	7,800 s.f.
Parking Garage A	100,000 s.f. (per floor, 5 floors)
Parking Garage B	100,000 s.f. (per floor, 5 floors)

Buildings not included in the study:

- South Cargo area
- ATC/FAA Tower
- Fuel refueling facility
- General aviation complex
- Maintenance shop

2.3 BUILDING ENVELOPE

The building envelope has experienced structural deterioration, as well as, functional and technological obsolescence due to its age and the era of its construction. The primary construction materials are reinforced concrete, steel, and glass. The structural elements are largely exposed and contribute to the "rational" aesthetic of the terminal building. The Airport recently finished a complete roofing replacement projectc onsisting of the demolition and total replacement of the roofing insulation and membrane system. This project not only remedied many of the water/air infiltration issues that had occurred in the past, but with the inclusion of a "cool roof" membrane should deliver future savings in terms of energy use through reduction of the "heat island" effect.

The new roof scope resolved drainage issues relating to deflection of existing roof structure, however, did not resolve the underling structural deflection issue.

The initial investigation of the building envelope revealed some pressing issues:

- Breaches in the integrity of the building envelope occurring in and around the intersections of expansion joints and window wall systems.
- The low level of interior day lighting triggers a higher energy consumption due to required new fixtures.
- The existing curtain wall system is single pane and does not provide the optimum level of insulation for maximum energy conservation.
- The existing roof structural "T's" do not have the currently required safety factors for pre-stressed roof members and have experienced a substantial amount of "creep"(sagging) over the years. While this does not constitute a threat of failure as it stands at the moment, it does preclude the application of additional ceiling-suspended loads such as signage, ductwork, acoustical ceilings, ceiling-suspended monitors, etc.
- The existing roof structural "T's" also extend beyond the building wall to the exterior overhang without a thermal break or barrier. This allows for greater heat loads to enter the building during the summer and losses during the winter.
- Other building envelope systems including doors, joints, wall systems, etc. do not have the higher insulation values of the more modern systems.
- Miscellaneous additions of roofs and canopies are not consistent with the architecture of the terminal building.
- Conveyors and motors exposed to the elements, even when there is a small cover above tend to deteriorate more rapidly and require more maintenance.
- Portions of the building below the public gate level may require work in order to upgrade electrical and mechanical systems in addition to ensuring a complete thermal envelope for the public areas.

2.4 STRUCTURAL SYSTEMS

Structural Design Criteria

Applicable Building Codes

- International Building Code, 2006 Edition with Amendments
- ACI 318 Building Code Requirements for Reinforced Concrete
- AISC Manual of Steel Construction – Thirteenth Edition
- ASCE 7-05 Minimum Design Loads for Buildings and Other Structures

Structural Design Requirements

Design Live Loads:	
Public Areas	100 psf
Offices	50 psf
Corridors and Stairs	100 psf
Mechanical Equipment Areas	150 psf
Roof	20 psf
Design Wind Loads:	
Basic Wind Speed	90 mph
Exposure Category	'C'
Importance Factor	1.15
Design Snow Loads:	
Ground Snow Load	10 psf

Exposure Factor	0.9
Importance Factor	1.10
Design Earthquake Loads:	
Spectral Response Acceleration at short periods (SDS)	0.35
Spectral Response Acceleration at 1-sec. period (SD1)	0.11
Material Strengths:	
Cast-In-Place Concrete	f'c = 4,000 psi
Reinforcing Steel (ASTM A615)	fy = 60 ksi
Structural Steel Wide Flange Shapes (ASTM A992)	fy = 50 ksi
Structural Steel Tubes (ASTM A500, Gr. B)	fy = 46 ksi
Structural Steel Pipes (ASTM A53, Type S)	fy = 35 ksi
Structural Steel Angles and Plates (ASTM A36)	fy = 36 ksi

Basis of Structural Investigation

The information given in this structural systems portion of this terminal area study is based on a schematic-level review of existing systems and their capacity for expansion. For this schematic report, no extensive structural calculations were made and no earthquake or wind analysis was performed. These structural operations will be done during later phases of the project.

Existing Structural Systems

The main foundation system for the existing terminal is predominantly concrete piles. The current ticketing lobby was the original terminal structure built in 1962. This original construction consisted of a roof structure with cast-in-place concrete girders with prestressed concrete tee beams and cast-in-place concrete columns. Additions and modifications over the years consisted of both concrete and steel construction.

Existing Ticketing Roof Structure

Excessive deflection is noted at the exposed prestressed concrete roof tees of the current ticketing lobby. Sagging of the roof structure was noted many years ago when water began ponding on the roof. It is our understanding that this was the result of underestimating cable losses in the early days of prestress concrete design. The issue was addressed by the addition of tapered insulation board up to 17.5 inches thick at midpoint of the roof to provide positive drainage of rainwater. Preliminary calculations show that the existing roof structure has adequate capacity to safely carry all anticipated current loading; however, adding more load to the existing structure is not recommended. Future modifications to the terminal will be somewhat limited by the sagging roof such as the addition of a suspended ceiling or heavy piping would need to be avoided without structural enhancement of the system.

Proposed Structural Systems

The new terminal expansion project is anticipated to use steel framing to reduce foundation requirements and provide maximum flexibility. Based on proposed schematic floor plans, modification to the existing structure will be necessary. The development of the floor plans shall consider impacts to the existing structure and minimize impacts to existing structural systems.

Foundation Recommendations

Based on the previous geotechnical report information, deep foundations are expected for the proposed terminal expansion. The actual foundation system will be decided based upon the findings of the geotechnical engineer's soil report.

Framing Recommendations

A steel-framed structural system minimizes new foundation costs and provides flexibility for future modifications. Floor framing will be a composite steel beam system consisting of steel beams with welded headed studs supporting a steel deck and concrete floor slab. New roof framing will be steel beams and joists supported by new steel columns. The recommended lateral systems for the terminal expansion are moment and braced frames, which will be strategically located for the structural system.

2.5 CAPITAL EQUIPMENT ANALYSIS

2.5.1 EXISTING SYSTEMS OVERVIEW

The mechanical systems of GSP International Airport Roger Milliken Field were surveyed from October 3-5, 2009. Mechanical spaces were found to be extremely well-kept and a proactive maintenance routine and extremely knowledgeable staff in place. The Maintenance staff has done an excellent job of maintaining the mechanical systems and have actively resolved issues and made enhancements to increase operational efficiency of existing equipment. One example was the modification of the cooling tower controls and piping to allow the towers to operate with a single chiller, greatly improving system performance and reducing power consumption.

Mechanical systems surveyed varied in age, but the majority date to the 1988 Terminal Expansion project. During the survey, a few pieces of mechanical equipment were found still in operation that date to the original 1962 terminal construction. Original systems remain in place in large part due to the fact that as the Airport Terminal has grown, the mechanical rooms in which the systems are housed have become practically inaccessible for the purpose of equipment removal and replacement. The exceptional maintenance and repair routine carried out by the staff is another large contributor to keeping these systems operational. Although still working, the original systems are in need of replacement.

Based on the 2007 ASHRAE Handbook – HVAC Applications Table 4 of Chapter 36, the equipment installed during the 1988 expansion is at or nearing the end of its expected service life. Although these systems are in good condition and have been very well maintained over the years, evidence for the need to consider replacement have started to appear: air handling unit fan motors have failed, existing pneumatic controls do not offer the same level of information for control as a modern digital automation system, the existing chiller control panel was found to be in need of an upgrade so that it would remain supported by the manufacturer. A more detailed account of the existing equipment, its condition and expected service life follows.

2.5.2 EXISTING EQUIPMENT CONDITION SURVEY

Primary Systems (Central Plant) Equipment

Chillers

There are two existing Trane model CVHE-50F-AA-2R nominal 575 ton chillers located in the central mechanical room. The chillers were installed as part of the 1988 Terminal Expansion project. The chillers were converted to operate using R123 as the refrigerant and subsequently derated to 515 tons each. In addition to the refrigerant change-out, the control panels will need to be replaced in the near-term future as the existing panels will become obsolete and no longer supported by the manufacturer. A chiller can be expected to have a similar service life as a boiler and the existing chillers are nearing that threshold.

Boilers

Two Burnham boilers are used to satisfy the building's heating demand and are located in the boiler room adjacent to the central mechanical room. The boilers are dual-fired, such that they may operate on either natural gas or fuel-oil based on utility rates. Based on Table 4 referenced above, a boiler may be expected to have a 25 year service life. The existing boilers are in good shape, but nearing the end of expected service life.

Cooling Towers

Two Baltimore Aircoil Company coiling towers are located on the roof between the concourses. The cooling towers were installed along with the chillers as part of the 1988 Terminal Expansion project. Cooling towers can be expected to have a service life of at least 20 years. As with other equipment, these cooling towers have been well maintained and are in good condition. The fill material that acts as the evaporative surface was observed to be cracked in some locations and should be evaluated for replacement in the next few years.

Pumps

The pumps in place that serve the hot water and chilled water system appear to be in good condition and have received regular maintenance, but are at or near their 20 year expected service life. The pumps that send chilled and hot water to the various air handling units throughout the terminal are variable volume. The Variable Frequency Drives (VFD) that modulate the volume of water pumped are the same age as the pumps and should also be replaced.

Secondary Systems Equipment

Air Handlers

Based on as-built documents, there are 33 existing air handling units serving various areas of the terminal building. Most of these units date to the 1988 Terminal Expansion. Although ASHRAE Table 4 doesn't list Air Handling Units (AHU) per se, the main components comprising an AHU (fans, motors, coils, actuators) have expected service lives ranging from 18 to 25 years and are at or near the end of the expected service life.

The majority of existing air handling units are constant volume type. These units supply the same amount of air to the spaces they serve, regardless of the heating or cooling load in that space. The air handling unit fan is turned on when the unit is scheduled to be in occupied mode, and turned off during unoccupied mode. The temperature of the supply air is changed to match the heating or cooling load of the space by modulating a two-way valve on the heating or cooling coil. Many of the AHU's are multizone units that can supply air at different temperatures for each of the zones. By providing a constant volume of airflow at all times, this style of AHU does not take advantage of potential savings during periods of non-peak loads when a lesser amount of air could be used to satisfy the space temperature setpoint, thereby saving fan energy.

There are three air handling units that date to the original terminal construction and still use steam heating coils. They are located in the terminal building basement mechanical room that is congested with equipment and makes maintenance of these units problematic. Access to this mechanical room is via a personnel stairwell. Means to bring large objects into or remove them from this space is extremely difficult, at best, due to the limited access to this space. During the field survey it was relayed by GSP maintenance staff that an estimate for removal and replacement of the AHU steam coils was requested, but the contractor declined to provide a quote based on the difficulty of the proposed work.

The northern portion of the Administrative Office area is served by a Trane multizone unit that was installed approximately in 1999. This unit is in good shape. It is not on the main hot water/ chilled water loop and is provided with chilled water by an independent chiller located on the roof above.

Supply of outside, or ventilation, air to the air handling unit is currently not being measured. For the air handling units serving the concourses, ventilation air is being introduced at the apron level. NFPA 415 Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways requires these air intakes to be located a minimum of 10 feet above grade level to prevent the entrainment of heavier than air gasses, such as those from jet fuel. Further, the close proximity of air intakes to aircraft operations has caused an adverse affect on indoor air quality at times.

Heat Exchangers

A small number of heat exchangers exist to create heated water from the steam generated by the boilers. The heat exchangers are in fair condition, though Maintenance indicated a service issue exists with HX-1.

Ductwork

Overall, ductwork appears to be in good shape. Based on ASHRAE Table 4, ductwork can be expected to have a service life of 30 years. During the survey it was indicated that the ductwork had been recently cleaned. It is expected that ductwork in the concourses can be reused.

Piping

From the exterior, the existing piping appeared to be in fair to good shape. However, piping typically wears from the inside out and would require more than a visual inspection to determine the true condition of the piping network. Although piping can be expected to last upwards of 40 years, changes to the building configuration and heating and cooling loads may necessitate replacement of existing piping to accommodate areas requiring increased hot or chilled water flow.

Fans

Fans can be expected to have a service life of 15 to 20 years. The existing fans are not only at or near the end of their service life, but changes to ventilation codes and standards since the fans were installed will likely require that the fans be replaced to meet current standards.

Misc. packaged equipment

A small direct expansion (DX) split system heat pump is located in and serves the southern portion of the Administrative offices. This system dates to the early 1980's and is operational. It has been properly serviced and maintained, but is beyond its expected service life of 15 years.

Two ductless split systems were installed to serve the new Airline Operations Center. These units are in excellent condition and can remain or possibly be reused.

2.5.3 PLUMBING ANALYSIS

Terminal Building

The terminal ticketing level and gate level public restroom plumbing fixtures were replaced in 2008. The new plumbing fixtures and flushometers are not marked indicating the flow rates of the fixture and flushometer, though it is assumed the water closet fixtures and flushometers are rated at 1.6 gpf and urinal fixtures and flushometers are rated at 1.0 gpf. The lavatory faucets are assumed to provide a 0.5 gpm flow rate. Ultra-low-flush (ULF) fixtures with solar powered sensor flushometers and faucets may be considered to increase overall water efficiency. ADA compliant urinals are not provided.

The cold water, hot water and hot water recirculation, storm drainage, waste, sanitary and vent piping systems are located below the gate level (ceiling of terminal ticket level and central plant level). Remote fixtures may be served by small storage water heater(s) or instantaneous heaters.

Secure area Restaurant / bar concession areas are provided at the North and South gate areas. The North restaurant / bar is served by a grease interceptor discharging into a sump with duplex sump pumps in a mechanical room at the apron level.

The main restaurant and bar (before passenger screening checkpoint) are located on the main apron level at the center of the building. The bar is South of the main corridor and the restaurant is located North of the main entrance corridor (at center of the building). The systems and equipment are generally well maintained and functioning properly with respect to the age of the equipment and piping. Roof drains and gutter and downspout systems serve the passenger boarding gates and finger areas. Wall hydrants are installed at some of the passenger boarding gates.

Parking Garages

The parking garages are provided with cold water piping and hose utility hydrants located at each level to wash down the garage floor areas, etc. Each garage water supply includes a main shut-off valve in a valve box outside of the garage to isolate and service the water system.

Water Fountain Feature

The water supply for the fountain between the parking garages is provided with a backflow preventer and water meter. The irrigation system's control valves are in various locations and are housed in meter or valve boxes for access.

Gas Distribution and Metering

The terminal building gas main service entrance including metering, pressure regulators and pressure relief valve is located at the Southeast corner of the central plant area. This services the entire terminal excluding the main restaurant, Fire Crash and Rescue building and generator. The main restaurant has a separate gas meter adjacent to the main meter.

Water Meters and Water Distribution

The terminal water supply is provided from a loop of the municipal water supply that is installed around the airport. There are two water services with water meters and service piping connected to the airport compound loop. One water service entrance is on the West side of the airport and the other water service entrance is on the East side of the airport. The airport compound loop bisects the airfield and is routed around the terminal and other buildings to provide domestic water and fire protection water for the airport including the terminal building.

Another water meter for the main restaurant hot water system is located in the central plant. This serves as a sub-meter so that the owner can monitor hot water usage of the main restaurant.

Central Plant / Domestic Water Heaters

Airport terminal building domestic hot water system is provided with two gas fired water heaters combined with site-fabricated steam heat exchangers, tanks and pumps, providing dual energy source for the domestic hot water supply. The alternate steam energy source is utilized in the winter, when the steam is available, to reduce operational costs. The system includes hot water recirculation to maintain the temperature of the distribution piping. This system could be replaced with two factory dual energy source water heaters and digital mixing valve with integral recirculation pump to provide higher efficiencies and complete system operation data and system control through the building automation system. The water heating equipment has been well maintained, however, the equipment beyond its expected service life of 15 -20 years.

Fire Suppression Systems

The existing Airline Operations center and terminal building has limited automatic fire suppression system.

2.5.4 ELECTRICAL

Normal Power Distribution System

The existing power distribution system is fed by 24kV electric services to the utility company's (Duke Energy) transformers with 480/277 volt 3-phase 4-wire secondary service distributed throughout the terminal. All of the existing airport's facilities are all fed off circuit #2406 from the Pelham Retail Substation, which is loaded at approximately half capacity. The 24kV circuit runs overhead between Aviation Pkwy and GSP Dr, then underground near the southeast corner of Parking Garage A. The circuit continues underground along the south side of the garage and turns between the terminal and Concourse A to terminate in the central plant. The areas of the terminal building that were part of the 1988 expansion are fed by two utility transformers in the central plant, located centrally in a room below the apron level. One utility transformer serves only mechanical HVAC loads (750 kVA to a motor control center). The other serves the majority of the terminal building (2500 kVA utility transformer to a 3400/4000A switchboard). The power is distributed from the central plant throughout the airport's facilities at 480/277 volts and 208/120 volts.

The north end of the ticketing level, including the airline ticketing area, is served by original power distribution equipment from 1962 out of a basement mechanical room. The south end of the ticketing level, that houses the rental car counters and baggage claim, is served by a 1200A distribution panel fed from the 2000A switchboard in Parking Garage A, installed in 1988. Parking Garage A is served by a 750 kVA utility transformer and Parking Garage B is served by a 500 kVA utility transformer.

In summary, the existing power distribution system, which includes switchboards, motor control centers, panel boards, circuit breakers, wiring and transformers, range in age from 22-48 years old. Although the move to a central plant was built in 1988, many areas of the terminal are still served from remote buildings, creating a piece work power distribution system. In addition, the airport is served from a single feed from the utility company, creating a single point of failure for the electrical system. GSP is vulnerable to storms, car accidents and other utility outages that occur downstream from Pelham Retail Substation. Ideally the airport would be served by dual feeds with independent routing for a redundant system that is not susceptible to a single point of failure.

Additional information regarding the power system and load information is under Appendix 1 – GSP Energy & Water analysis Report. Refer to Appendix 2 for a site utility map.

Emergency Power Distribution System

There is a level of emergency power for life safety and other emergency loads provided by generator sets for approximately 45% of the existing demand load. The emergency power systems allow for life safety loads and general airport functionality without air conditioning in the event of a utility power outage. The central plant houses a generator set, 500 kW 480/277V circa 1988, which feeds the majority of the terminal building. Parking Garage A has an 80 kW generator set for emergency and life safety loads. Parking Garage B has a 150 kW generator set for emergency, life safety loads and site lighting as well as spare capacity for future Parking Garage C. All of the existing generators run on diesel fuel oil and are from an era prior to strict emissions regulation.

Fire Alarm System

The existing fire alarm system consists of a main fire alarm control panel, located in the fire crash rescue (F/C/R) building and a second remote annunciator panel in airport operations center, located on the south end of the ticketing level. The system manufacturer is Simplex Grinnell and was installed in 1988 and AOC panel in 2010. The system consists of several Simplex 4020 sub panels located throughout the campus, including garages. The sub panels feed fire alarm notification (horn/strobes) and initiating (smoke/heat detectors) devices throughout the terminal. There are many cases where proper coverage of fire detection and notification devices does not meet code. The layout of the individual devices in each building area will require further review upon any renovation projects.

The current system only has a horn sound off at a fire alarm event and does not have voice notification type devices capable of voice annunciation to notify passengers and employees and to provide them with direction on what to do and where to go.

Lighting and Lighting Controls

In general, the existing interior and exterior lighting and controls are dated to 1988. The lamps from this era are not as efficient with energy consumption, rated for fewer hours and do not provide the quality of color rendering index as today's lamps. There is a variety of light sources such as T12 fluorescent, T8 fluorescent, incandescent, halogen, metal halide, high pressure sodium and compact fluorescent which make for inconsistent light coloring throughout the terminal. The light levels in the many of the interior terminal areas are adequate when daylight is present but underlit at night. The garage and site lighting have acceptable average light levels but poor uniformity with high max/min ratios.

Almost all of the interior light fixtures are controlled by manual switching or are not controlled at all. The existing lighting controls do not meet the requirements of current energy codes. The exterior fixtures are controlled by photocell with the exception of some of the fixtures on emergency circuits which run at all times.

Refer to Appendix 1 for a detailed description of the existing lighting systems and Appendix B of Appendix 1 for a space by space description of the existing lighting and lighting controls.

As part of the energy audit, guidance documents were provided for recommended lamp, light fixture and control upgrades in areas that will not be part of the Terminal Area Study upgrades. These upgrades are currently underway, including photocells installed in the concourses for on/off control during day lit conditions. GSP's maintenance staff has been working with Duke Energy for lighting incentives. Refer to Appendix 3 for the Lighting and Controls Phase 1 Energy Upgrades Guidance Documents.

The parking garage lighting was of particular interest because of the quantity of light fixtures and constant operation. Many light fixtures and control options were considered, including the installation of LED and induction light fixtures as mock up. A summary of the parking garage lighting study was developed and is attached as Appendix 4.

NOTE: Data sheets included under Appendix 3 and 4 are for technical reference only and do not imply a single approved manufacturer or distributor.

Communications and Data Network

GSP has considerable fiber optic cabling infrastructure which provide fiber connectivity to the passenger boarding areas, commission building, fire crash rescue, maintenance building and Stevens Aviations as well as the fuel farm facility.

During 2010, the security upgrade project provided a high end robust network for security and CCTV use. GSP also upgraded GSP administrative network to provide a good quality network. The network is expanded to FedEx and north FIS areas using wireless mesh network. As such GSP has a high quality network to allow expansion to support additional applications such as shared tenant services to airlines and other tenats.

Most of fibers are connected to the central NTE com room located behind the ATO space in baggage make up area.

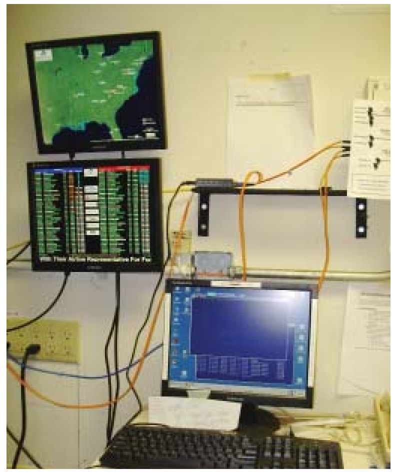
The proposed upgrade to the terminal facility will require relocation of all communication assets to a new central communication room before the existing NTE room could be demolished. A detailed phasing plan will be required to allow change over without losing the existing access controls, CCTV and GSP network.

Security (Access Controls and CCTV)

The security system for the airport property began an upgrade project in July 2009. Projected completion date is September 2010. This upgrade included CCTV cameras, access control, and installation of a standalone security network to coordinate all functions. In addition, a new operations center was built and outfitted near police operations at the south end of the ticketing level. The new system provides the airport with state of the art surveillance at a console built for two people. There is capability to record events, provide user control of cameras and access controls for doors and communicate with the appropriate persons. The system was designed to accommodate future expansions and will be adequate for the foreseeable future; keeping in mind that typical technology turnover is in the 5-10 year range.

Multi-User Flight Information System (MUFIDS)

The existing FIDS system is from 1989. The software was custom built and has limited expansion capabilities. The hub is located in a room on the north bridge/connector. The system is bound by location, analog and physical space in the room. A new network based flight information system is recommended for the proposed terminal upgrades. An evaluation should be made to use a subscription based MUFIDS or a GSP owned system with appropriate subscriptions to update arrival information. The other option is to interface the system with airline host system at GSP as such the FIDS monitors will be as accurate as the airline system information. The interface option may add some initial capital cost, however, the yearly operational cost will be limited.



Public Address System

The existing public address was installed in 1988. The system is considered outdated, does not have expansion capability and parts are obsolete. The head end equipment is located in a room adjacent to the FIDS system on the north bridge/connector. A network based digital PA system should be considered for the proposed terminal upgrade project. The new system allows distributed PA amplifier locations with IP microphone system. The system will be equipped by ambient noise detectors in the ticketing and baggage claim area to adjust the speaker output based on the ambient noise level.

The system will allow buffering of the message so that no one has to wait for the current message to be completed. The message will be played after the current message is complete, unless a high priority message arrives before the next message is in sequence to play.

The system can be interfaced with MUFIDS to allow initiation of prerecorded aircraft boarding messages. The recorded messages could be played in number of popular languages.

2.5.5 CODE AND STANDARDS RELATED ISSUES

The following is a list of Mechanical, Electrical and Plumbing items that need to be addressed in the event of a renovation to the terminal in order to meet current codes:

- Location of outside air intakes for the concourse air handling units do not meet NFPA 415 and would need to be relocated to a minimum 10 feet above the apron and 50 feet away from fueling operations.
- Many interior and exterior areas do not meet the IESNA's recommended practices for light levels and lighting uniformity.
- Existing lighting controls upgrade to meet current energy conservation code
- Existing fire alarm system does not meet International Building Code (voice capabilities)
- Mechanical equipment being replaced with required to meet or exceed current minimum efficiency requirements
- Fire Suppression system installed throughout terminal per NFPA 13 and state and local requirements

CONCLUSION

The existing mechanical/plumbing systems are at or past their expected life, which, at the very least, will require a capital equipment replacement project for the central plant in the near future. If only a capital equipment replacement project is undertaken, the airport will face many challenges with the existing physical size constraints, equipment down time and like equipment will be installed. A new central plant, with new location, allows for construction and installation of all new equipment prior to decommissioning the old equipment and does not require similar systems to be installed. With a new central plant, multiple system types (ground source heat pumps, water-cooled chiller and boiler, etc.) can be evaluated to determine the optimum solution.

The existing electrical systems are outdated, lack redundancy and have been installed in stages over the years as demand has increased. The lighting systems include HID fixtures in the high ceiling areas. The output of these fixtures has declined and a combination of aging building finishes and lower output make the areas relatively dark at night time.

In all cases, the existing equipment for all MEP systems as well as specialty systems, such as motors for baggage handling, require a high level of maintenance and cost to keep the systems operating.

SECTION 3: AVIATION FORECASTS

This chapter presents the enplaned passenger and gate requirement forecast for the Greenville-Spartanburg International Airport. The objective of the forecast is to identify the long-term trends for the types and levels of aviation activity that could trigger the need for expansion. The forecast will be used for evaluating the terminal facilities at the Airport.

Historically, the Airport has seen annual enplaned passengers grow from 79,917 in 1963 to 712,156 in 2008. Over this almost 50-year period, the number of annual passengers grew by over 600,000. The average annual growth rate has been 5.0 percent or an average of approximately 14,000 additional passengers per year. It took less than 6 years for passengers to double from 1963 to 1969. In the 10 years from 1969 to 1979, passengers doubled again, but it took approximately 15 more years for passenger volumes to again double. Since about 1990, passenger volumes have seen relatively steep annual change. The all-time peak year was 2005 with 904,282 enplanements;fueled by the short-lived airline, Independence Air. However, the U.S. economic recession, coupled with the demise of Independence Air in early 2006 and other factors will likely cause 2009 enplaned passengers to total approximately 617,000 or a roughly 13 percent drop from 2008.

The Airport believes these totals have been limited largely by two factors:

- The relative proximity of the Airport to the airline hubs of Atlanta and Charlotte
- The lack of a low fare carrier at the airport

The rapid increase in passengers during the brief period of service by the low fare carrier, Indepedence Air, demonstrated the market potential of the Airport, if competitive fairs are available.

The past introduction of leisure destination flights by Allegiant Air and other carriers has increased passenger volume suggesting that much higher levels of passengers are possible if a low fare carrier was available to stimulate travel. Further, the Airport has substantial "leakage" of passengers to alternative facilities. Therefore, this forecast will provide several scenarios of potential passenger activity representing both the trends of historical traffic and the opportunities for substantial increases.

3.1 THE REGIONAL BASE FOR AVIATION ACTIVITY

This section will identify the geographic area served by the Airport and that region's characteristics that influence aviation demand. It is recognized that air passengers can come into the region from outside and local residents can utilize other airports; however, this regional analysis provides a basis for identifying and understanding the greater Greenville-Spartanburg-Anderson area and its ability to support aviation activity.

3.1.1 IDENTIFICATION OF THE AIR TRADE AREA AND COUNTY POPULATION

The prime geographic region served by an airport is referred to as an Air Trade Area. For the purposes of this study, the Greenville-Spartanburg-Anderson, South Carolina Combined Statistical Area (CSA) will be defined as the Air Trade Area because it represents the region surrounding the Airport and the source of the majority of existing passengers. Note that the CSA definition utilized in this report is the November 20, 2008 revision from the U.S. Office of Management and Budget.

The CSA consists of eight counties, all of which are in South Carolina, as shown in Figure 3-1. The estimated population in 2008 was 1,241,618. The names of the CSA counties and the 2008 Census Bureau estimate of population are shown in Table 3-1.

FIGURE 3-1
GREENVILLE-SPARTANBURG-ANDERSON CSA

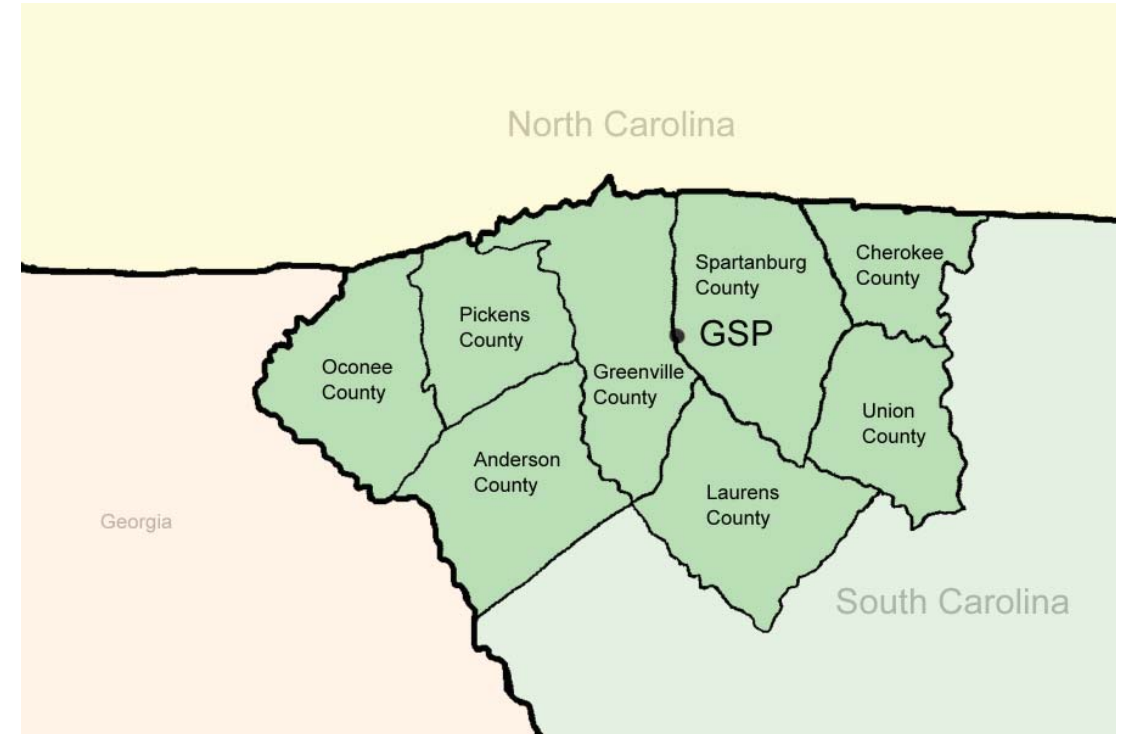


TABLE 3-1
COUNTY IDENTIFICATION AND POPULATION OF THE CSA

County	2008 Population	Share
Anderson	182,825	14.7%
Cherokee	54,394	4.4%
Greenville	438,119	35.3%
Laurens	69,681	5.6%
Oconee	71,274	5.8%
Pickens	116,915	9.4%
Spartanburg	280,738	22.6%
Union	27,672	2.2%
Total	1,241,618	100.0%

Source: July 1, 2008 Census Bureau estimate

Note that Greenville County contains over a third of the Air Trade Area's population and that together Greenville, Spartanburg, and Anderson counties represent over 70 percent of the region's population.

3.1.2 REGIONAL DEMOGRAPHIC AND ECONOMIC INFORMATION

This section will identify the key demographic characteristics of the Air Trade Area and per capita income. In addition, certain large regional employers will be identified. For comparison, the Air Trade Area's population and per capita income will be presented with information for the entire United States, the Southeast portion of the United States, the state of South Carolina, and the CSA.

Population Growth

The rate of population growth in the CSA has historically been similar to the Southeast United States and South Carolina at 1.4 percent, 1.5 percent, and 1.4 percent respectively. Compared to the total country's 1.1 percent historical growth rate, the CSA has grown slightly faster. However, as projected by Woods and Poole Economics, regional population growth is expected to slow to a 0.7 percent annual average rate over the next 30 years versus slightly higher rates for the U.S., Southeast, and the state. The historical and projected comparison of CSA growth to these other geographic areas is shown in Table 3-2.

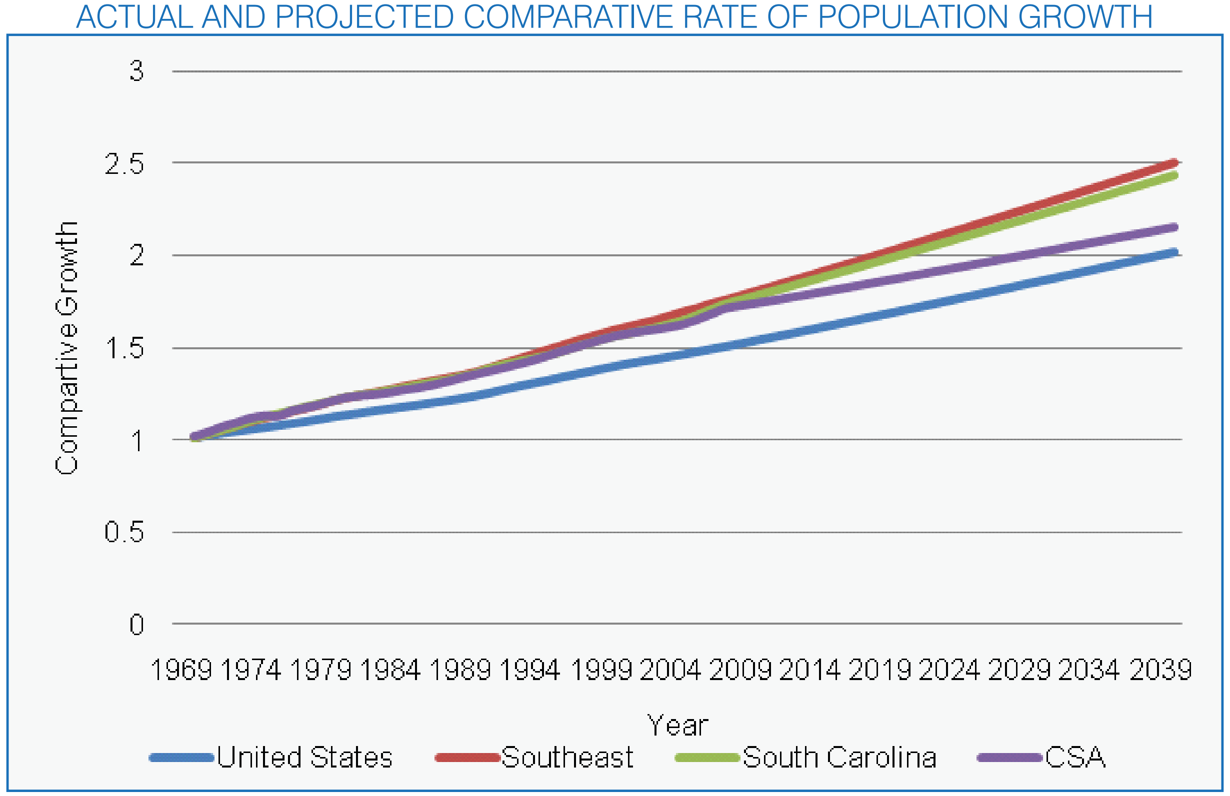
TABLE 3-2
HISTORICAL AND PROJECTED POPULATION GROWTH

Area	1969-2008	2009-2040
United States	1.1%	0.9%
Southeast	1.5%	1.1%
South Carolina	1.4%	1.1%
CSA	1.4%	0.7%

Source: Woods and Poole Economics

Assuming that the base year of data (1969) is valued at one, the comparison of local, state, regional, and national population growth rates is shown on the following chart. The chart indicates that historical actual growth rate of the Southeast, state, and CSA were similar to each other and higher than the national growth rate. Projections for the future by Woods and Poole Economics suggest that the rate of CSA population growth is slowing slightly versus the historical average. These historical and projected population statistics are shown in Figure 3-2.

FIGURE 3-2
ACTUAL AND PROJECTED COMPARATIVE RATE OF POPULATION GROWTH



Source: Woods and Poole Economics

Per Capita Personal Income

Per Capita Personal Income (PCPI) in the CSA has historically been less than the United States average and that trend is expected to continue. In 1969, the CSA, state, and the Southeast had similar PCPIs in the $12,000 to $13,000 range versus the national average of $16,465. By 2008, the comparison between the four areas remained similar. For the future, the Southeast, South Carolina, and CSA are expected to remain with lower PCPIs versus the national average. Note that all these amounts are provided in constant year 2004 dollars as presented in Table 3-3.

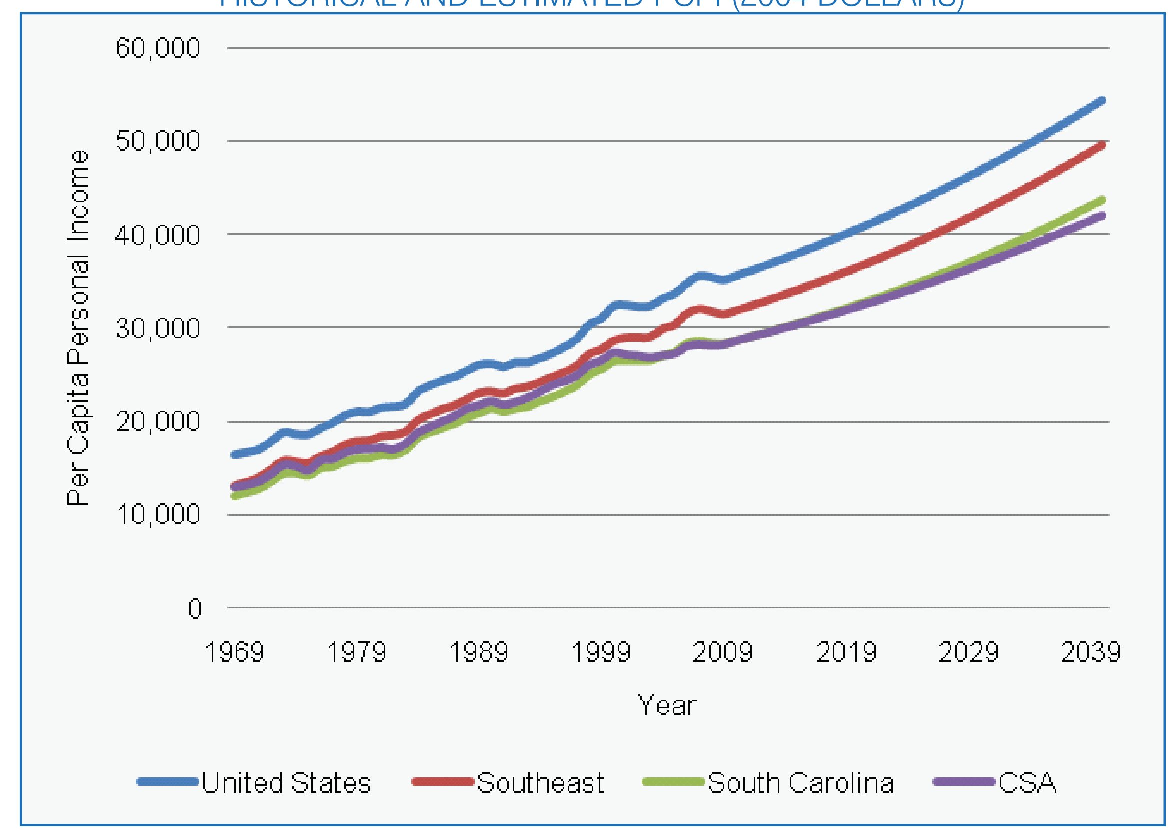
TABLE 3-3
COMPARISON OF PER CAPITA PERSONAL INCOME

Area	1969	2008	2040
United States	16,465	35,438	54,378
Southeast	13,180	31,846	49,699
South Carolina	12,072	28,422	43,725
CSA	12,853	28,137	42,092

Source: Woods and Poole Economics, Inc.

The graphic differences between constant dollar PCPI amounts are shown in Figure 3-3.

FIGURE 3-3
HISTORICAL AND ESTIMATED PCPI (2004 DOLLARS)



Source: Woods and Poole Economics, Inc.

Major Employers and Other Economic Indicators

As in any community, the major employers in the Air Trade Area include a large number of governments, schools, hospitals, and retail establishments. The state of South Carolina is the largest single regional employer. The largest non-manufacturing employers in the CSA are listed in Table 3-4.

TABLE 3-4
FIVE LARGEST NON-MANUFACTURING EMPLOYERS IN THE CSA

Rank	Employer	Number of Employees
1	State of South Carolina	8,400
2	Clemson University	8,000
3	Greenville Hospital	7,800
4	Greenville County Schools	7,200
5	Spartanburg Regional Medical	4,600

Source: South Carolina Council of Governments

Much more significant for regional employment is the fact that BMW located their sole U.S. manufacturing facility in the region after conducting a nationwide search for the ideal site. BMW indicates their plant represents a $3.7 billion investment. Other automotive-related firms have located in the region to supply BMW and other customers. Other major industrial employers in the region include IBM, Fuji Film, and General Electric Power Systems. Michelin Tire has four manufacturing plants and their U.S. research and development facility located in the region. The largest manufacturing firms in the CSA are presented in Table 3-5.

TABLE 3-5
FIVE LARGEST MANUFACTURING EMPLOYERS IN THE CSA

Rank	Employer	Number of Employees
1	Michelin Tire (4 locations)	6,140
2	BMW Manufacturing	4,410
3	Cryovac Division (2 locations)	2,850
4	General Electric	2,600
5	Electrolux	1,500

Source: South Carolina Council of Governments

The South Carolina Department of Commerce cites surveys' showing the region is one of the most attractive in the United States for locating new manufacturing plants. They indicate the region has available labor, a history of non-union workers, excellent transportation, available land, and various government incentives for new employers. As noted, European firms seem to be especially attracted to invest in the region.

Nineteen college and technical schools are listed by the regional economic development organization as being located in the CSA. The most known nationally are Clemson University with approximately 17,500 students and Bob Jones University with approximately 5,000. Furman University with approximately 2,700 students is noted for its liberal arts programs.

3.2 HISTORICAL PASSENGER ACTIVITY

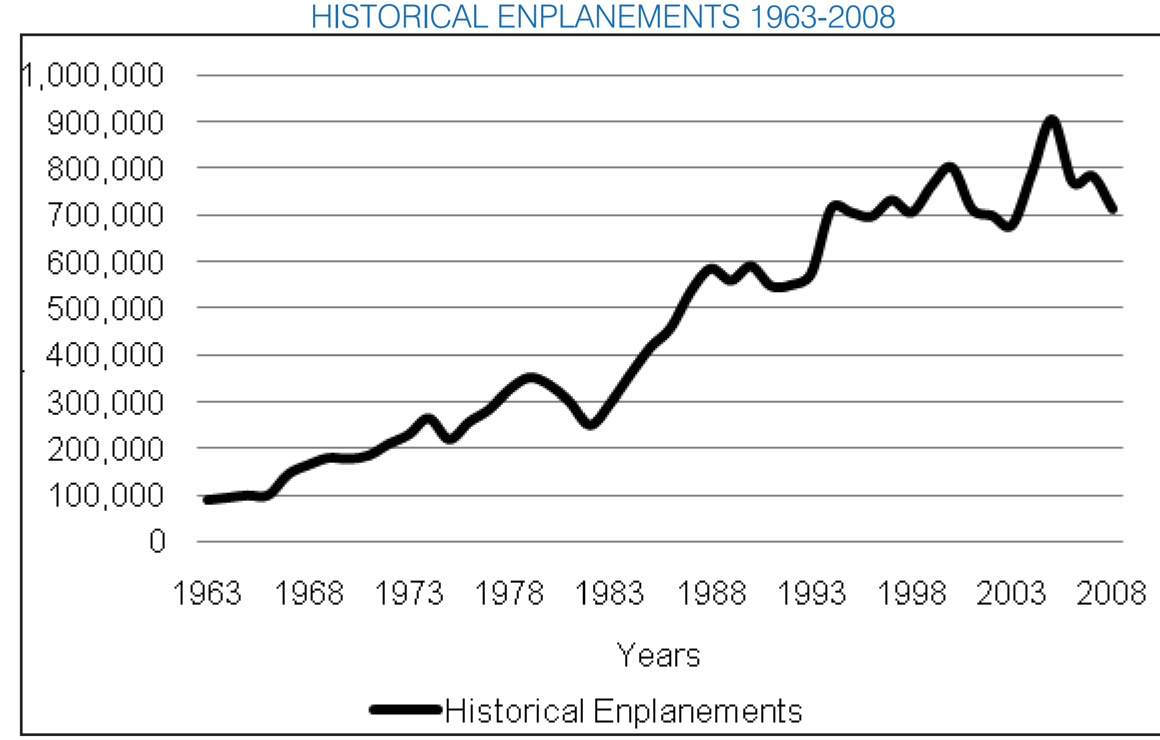
This section will identify the historical air traffic activity at the Airport. As presented in the introduction, the number of enplaned passengers has increased from under 100,000 in the 1960s to over 700,000 for almost every year of the last 15. The recent historical record (since 1995) has been more erratic as airlines have frequently introduced and withdrawn service.

3.2.1 ANNUAL PASSENGER ACTIVITY

A graph of almost 50 years of enplaned passengers (1963-2008) shows a long-term record of increase as presented in Figure 3-4.

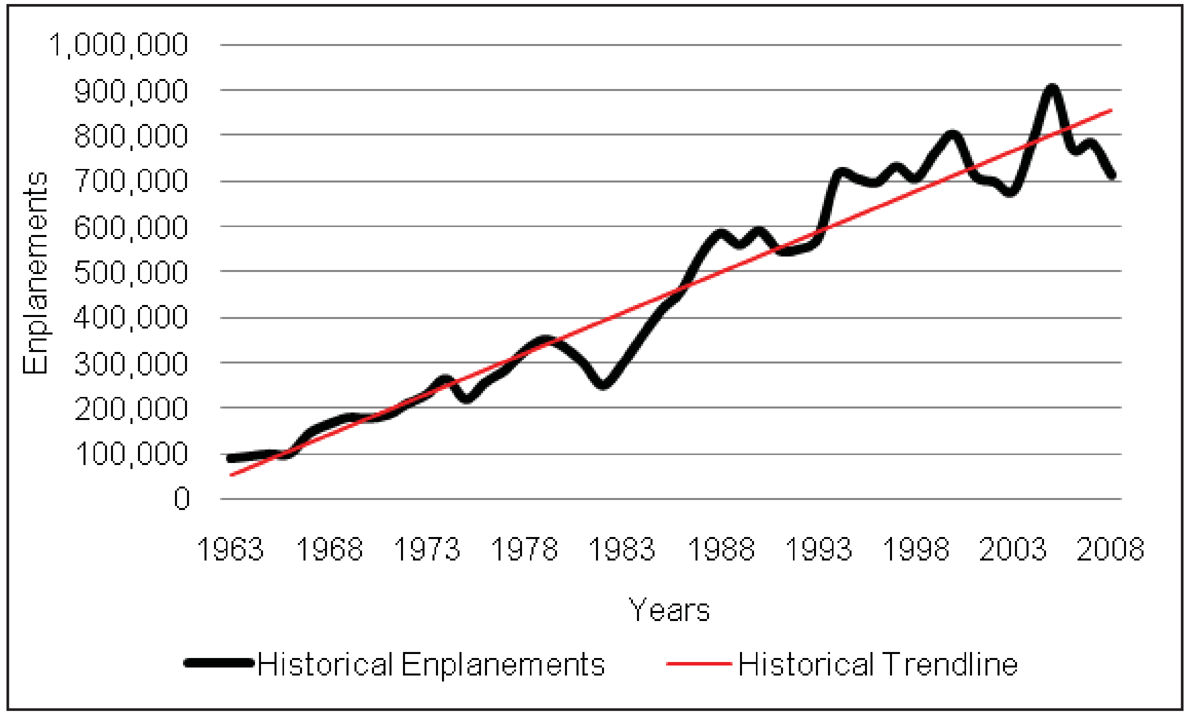
Placing a linear trend line on the graph of 46 years of historical data presents an interesting pattern of activity. From 1963 to 1979, the trend line follows a steady increase in enplaned passengers. From 1979 to about 1995, the same rate of increase continues, but with more variation among the years. After 1995, the number of annual passengers has shown much higher variation as indicated in Figure 3-5. Over the entire period, the trend line indicates a 5.0 percent average annual growth rate, but this average is caused by high growth in the early years and much slower growth in later years.

FIGURE 3-4
HISTORICAL ENPLANEMENTS 1963-2008



Source: Airport

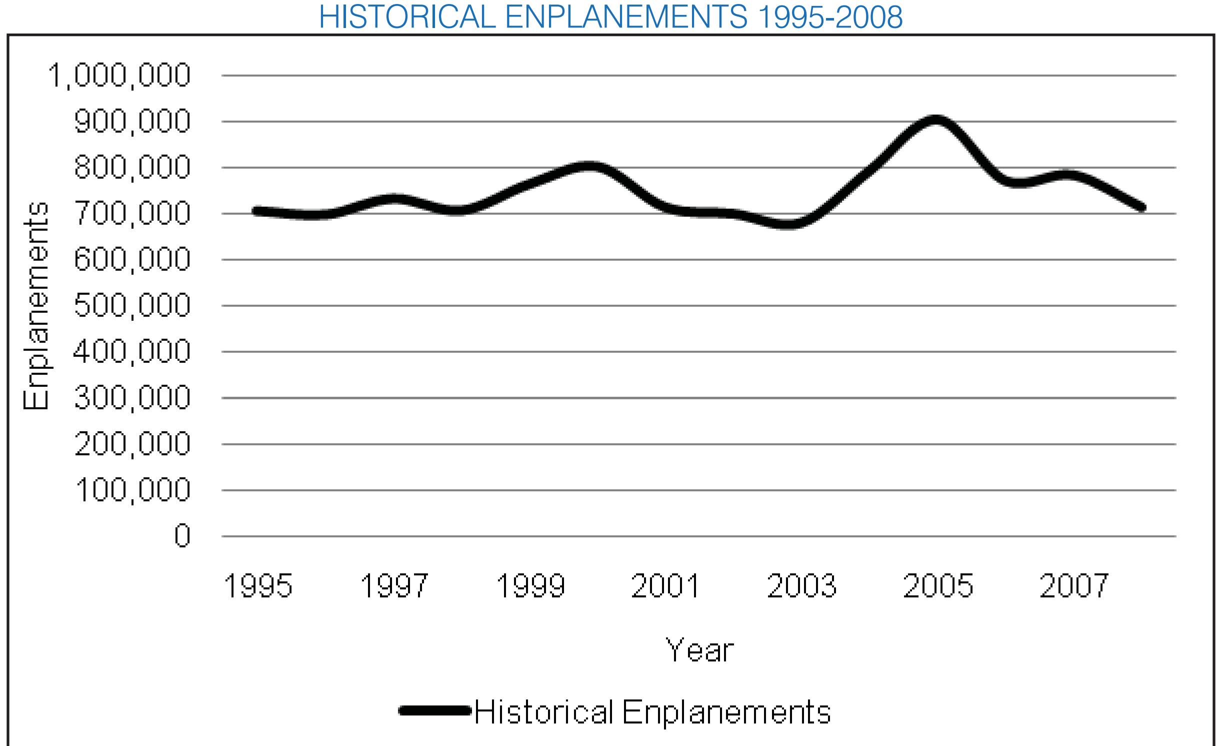
FIGURE 3-5
HISTORICAL ENPLANEMENTS 1963-2008 WITH TREND LINE



Source: Airport

The graph of the enplaned passengers from 1995 to 2008 presents a significantly different picture of traffic. In this period, passenger volumes have flattened-out and if the estimated 620,000 passengers of 2009 were shown, no long-term growth would be indicated. The last 14 years of passenger enplanements are shown in Figure 3-6.

FIGURE 3-6
HISTORICAL ENPLANEMENTS 1995-2008



Source: Airport

The last 10 years of historical enplaned passenger statistics indicate two years of greater than 10 percent increases and two of greater than 10 percent decreases. The last 10 years of historical enplanements with annual percent change are shown in Table 3-6.

TABLE 3-6
TEN YEARS OF HISTORICAL ENPLANEMENTS

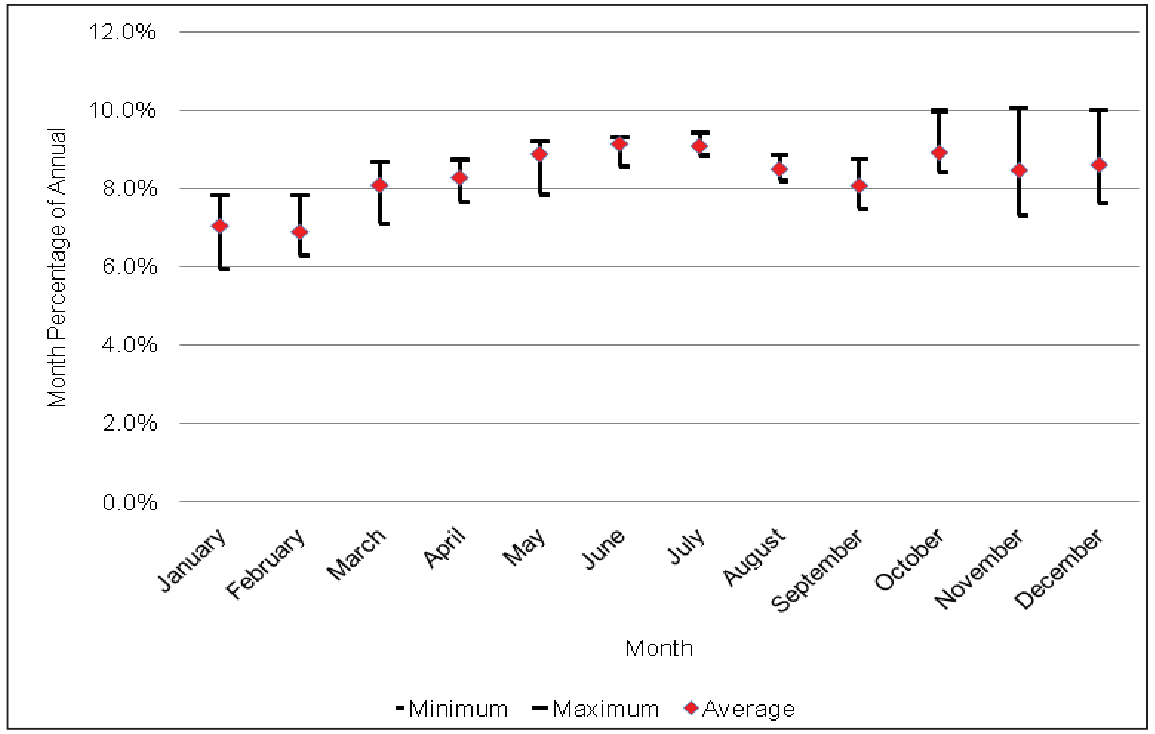
Year	Enplaned Passengers	Annual Change
1999	762,575	
2000	801,609	5.1%
2001	712,310	-11.1%
2002	698,092	-2.0%
2003	678,216	-2.8%
2004	791,370	16.7%
2005	904,282	14.3%
2006	769,839	-14.9%
2007	782,675	1.7%
2008	712,156	-9.0%

Source: Airport

3.2.2 MONTHLY AND OTHER SEASONAL TRENDS

The passenger traffic at the Airport is relatively stable for each month. This similar monthly activity is typically the sign of a business-type market, rather than a leisure destination. In the 2006 through 2009 year to date period, February initially appears to be the lowest traffic month of the year. However, allowing for the fewer days in that month, January and February are the slowest months for travel. For most airports, January and February are typically the slowest months. The highest travel months for the Airport are generally the early summer (May, June, and July). The year to date statistics for 2009 show a stronger seasonality with January and February being the lowest traffic months and July being a peak; it is assumed that the economic recession caused this higher peaking in 2009. Note that the Airport's airline flight schedule does not vary significantly during the year; rather, the load factors change. The average monthly passenger traffic for the past four years appears in Figure 3-7.

FIGURE 3-7
MONTHLY PASSENGER TRAFFIC 2006 TO YEAR-TO-DATE 2009



Source: Airport

3.2.3 AIRLINES PROVIDING SERVICE AND GATE ASSIGNMENTS

Six airlines provide regularly scheduled service to the Airport. These are Allegiant, American Eagle, Continental Express, Delta Connection, United Express, and US Airways Express. With the exception of Allegiant, all airline service to the airport is provided by one of the "legacy" airlines, specifically by one or more of their regional commuter affiliates. These legacy carriers are the traditional major airlines who serve most airports by means of subsidiary or affiliate carrier.

There are 13 designated boarding gates at the Airport. Their current distribution is shown in Table 3-7 by carrier.

TABLE 3-7
ASSIGNMENT OF PASSENGER TERMINAL GATES

Carrier	Gate Identification	Number of Gates for Carrier
Concourse A		
US Airways	A1 & A2	2
American	A3	1
Continental	A6	1
United	A5	1
Allegiant	A7	1
Vacant	A4, A8 & A9	3
Concourse B		
Delta	B2, B3, & B4	3
vacant	B1	1
Total		13

Source: Airport

3.2.4 FLIGHT SCHEDULE

Each of the legacy airlines serving the Airport flies to one or more of their respective hubs. Allegiant serves a variety of vacation destinations in Florida. The December 2009 cities served non-stop by carrier are shown in Table 3-8.

TABLE 3-8
NON-STOP DESTINATIONS FROM THE AIRPORT

Carrier	Non-Stop Destination
American	Dallas/Ft. Worth (DFW)
Continental	Cleveland (CLE), Houston (IAH), New York (EWR)
Delta	Atlanta (ATL), Cincinnati (CIN), Detroit (DET), New York (LGA)
United	Chicago (ORD), Washington D.C. (IAD)
US Airways	Charlotte (CLT), Philadelphia (PHL), Washington, D.C.(DCA)
Allegiant	Ft. Lauderdale (FLL), Orlando)SFB), Punta Gorda (PGD), St. Petersburg (PIE)

Source: Airport, December 2009 schedule

3.3 SIGNIFICANT FACTORS INFLUENCING PASSENGER AIR SERVICE

This section will identify the most significant factors expected to influence regional aviation demand. Competition among airports and airlines results in a situation where regional passengers have multiple choices for travel.

3.3.1 LOCATION AND OTHER CHARACTERISTICS OF REGIONAL AIRPORTS

Within relatively easy driving distance of the Greenville-Spartanburg-Anderson CSA are a number of other commercial service airports. In fact, the Airport is located between two of the largest airline hub airports in the United States. Atlanta is the home of the nation's largest airline hub for Delta Air Lines; in addition, Air Tran also has their national hub there. Charlotte is the largest hub for US Airways. Other airports such as Columbia Metropolitan and Asheville Regional are reasonably close in distance, but neither is believed to be a serious competitor in the face of the extensive air service available in Atlanta and Charlotte. Key information on the four closest competing airport cities is provided in Table 3-9.

TABLE 3-9
INFORMATION ON SURROUNDING REGIONAL AIRPORTS

City	Highway Miles	Driving Time	Highway	FAA Hub Size	2008 Rank
Charlotte	69	1:26	Interstate 85	Large	13
Columbia	92	1:45	Interstate 26	Small	111
Asheville	63	1:05	Interstate 26	None	157
Atlanta	173	2:45	Interstate 85	Large	1

Source: MapQuest Road Atlas, 2008 edition; FAA hub identification, 2008.

Each of these cities are linked to the Air Trade Area by interstate highways that make driving relatively easy. However, congestion on highways in and around Atlanta can hinder access at peak times.

3.3.2 DOMESTIC AIRLINE COMPETITION AMONG REGIONAL AIRPORTS

This section will identify the two key competitive airports and discuss leakage of air passengers. Current competitive information about the Atlanta and Charlotte airports is provided as follows:

- Atlanta – Atlanta is the largest airport in the world in passenger volume. Almost 90 million total passengers were recorded in 2008. Some 16 scheduled passenger airlines serve Atlanta and three charter carriers have regular flights. These carriers serve approximately 150 non-stop destinations with approximately 1,300 daily domestic departures. The airport has 182 passenger gates and extensive international air service.
- Charlotte – FAA records indicate that Charlotte is the thirteenth largest in passenger volume and eighth in aircraft operations. Nine scheduled passenger carriers are identified by the airport as proving passenger service on 620 daily domestic departures. Non-stop service to 128 destinations is reported from 91 gates. The airport reports international service to 26 cities, but some of these flights are seasonal.

The 2008 South Carolina Airports System Plan estimated that between 28 and 48 percent of Greenville-Spartanburg-Anderson area passengers use alternative airports. Most of the passenger leakage is split evenly between Atlanta and Charlotte; however, a few passengers also use the Columbia and Asheville airports. The Airport's own study of passenger leakage indicated that up to 59 percent of Air Trade Area passengers choose flights out of Atlanta or Charlotte.

3.3.3 SPECIFIC SOUTHWEST AIRLINES SERVICE ISSUES

Southwest Airlines has become the largest U.S. airline based upon domestic passenger volume. This carrier has also been adding service and has generally remained profitable, while other airlines have shown losses.

In their efforts to grow, Southwest has focused upon high volume markets. This has led to Southwest now serving 45 of the largest 50 markets in the United States. The only top 50 markets not served are Atlanta, Cincinnati, Charlotte, Memphis, and Richmond. The largest 50 U.S. markets based upon Metropolitan Statistical Area population and whether or not they are served by Southwest are shown in Table 3-10.

TABLE 3-10
TOP 50 MSA MARKETS INDICATING SOUTHWEST SERVICE

Rank	MSA Name	2008 Population	Southwest Airport
1	New York City	19,003,798	La Guardia, Long Island
2	Los Angeles	12,872,808	Los Angeles, Burbank, Orange County
3	Chicago	9,569,624	Midway
4	Dallas	6,300,006	Love Field
5	Philadelphia	5,838,471	Philadelphia
6	Houston	5,728,143	Hobby
7	Miami	5,414,772	Ft. Lauderdale, West Palm Beach
8	Atlanta	5,376,285	--
9	Washington D.C.	5,358,130	Dulles
10	Boston	4,522,858	Boston Logan
11	Detroit	4,425,110	Detroit Metro
12	Phoenix	4,281,899	Phoenix
13	San Francisco	4,274,531	San Francisco, Oakland
14	Ontario	4,115,871	Ontario
15	Seattle	3,344,813	Seattle
16	Minneapolis	3,229,878	Minneapolis
17	San Diego	3,001,072	San Diego
18	St. Louis	2,816,710	St. Louis
19	Tampa	2,733,761	Tampa
20	Baltimore	2,667,117	Baltimore
21	Denver	2,506,626	Denver
22	Pittsburgh	2,351,192	Pittsburgh
23	Portland	2,207,462	Portland
24	Cincinnati	2,155,137	--
25	Sacramento	2,109,832	Sacramento
26	Cleveland	2,088,291	Cleveland
27	Orlando	2,054,574	Orlando
28	San Antonio	2,031,445	San Antonio
29	Kansas City	2,002,047	Kansas City
30	Las Vegas	1,865,746	Las Vegas
31	San Jose	1,819,198	San Jose
32	Columbus	1,773,120	Columbus
33	Indianapolis	1,715,459	Indianapolis
34	Charlotte	1,701,799	--
35	Norfolk	1,658,292	Norfolk
36	Austin	1,652,602	Austin
37	Providence	1,596,611	Providence
38	Nashville	1,550,733	Nashville
39	Milwaukee	1,549,308	Milwaukee
40	Jacksonville	1,313,228	Jacksonville
41	Memphis	1,285,732	--
42	Louisville	1,244,696	Louisville
43	Richmond	1,225,626	--
44	Oklahoma City	1,206,142	Oklahoma City
45	Hartford	1,190,512	Hartford
46	New Orleans	1,134,029	New Orleans
47	Buffalo	1,124,309	Buffalo
48	Birmingham	1,117,608	Birmingham
49	Salt Lake City	1,115,692	Salt Lake City
50	Raleigh-Durham	1,088,765	Raleigh-Durham

With both Atlanta and Charlotte being large metropolitan areas not served by Southwest, it is believed that introduction of future service is likely to be targeted by that airline at the northern Georgia, western South Carolina, western North Carolina area. Further, this analysis focused on the standard U.S. Census Metropolitan Statistic Area definition of population centers. If the broader Combined Statistical Area definition was utilized, the greater Greenville, Spartanburg, and Anderson area would have sufficient number of residents to qualify as one of the largest 50 U.S. population centers and, therefore, qualify for Southwest service on its own.

3.3.4 AIRPORT EFFORTS TO IMPROVE AIR SERVICE

The Airport has been aggressive in efforts to increase and improve air service to the northwestern South Carolina region. These efforts continue and the potential for greatly improved air service is recognized in the forecast scenarios.

3.4 PASSENGER FORECAST

This section will present the enplaned passenger forecast. This forecast will be based upon three scenarios of future traffic. The forecast will be used for terminal facility planning purposes.

3.4.1 PRESENTATION OF AIR SERVICE SCENARIOS

The Airport expects to break from the recent historical trend of relatively stable passenger traffic and significantly increase passenger levels as a low fare airline introduces service. Therefore, this section will develop three airline traffic scenarios that will provide alternatives of passenger traffic growth based upon the stated assumptions. Each of the cases is focused only on commercial passenger service and is identified below.

Case 1 – Existing Service Continuation – This base case assumes that the major "traditional" carriers (AA, CO, DL, UA, US, or similar hub-type carriers) continue serving the Airport and their traffic grows in line with local and industry trends. In addition, service by one or more leisure destination carriers such as Allegiant or Direct Air continues. This leisure destination service is not necessarily daily, but once or twice per week to a variety of locations. Further, such leisure destination service may be somewhat seasonal because it is to beach, gambling, or other resort destinations and it includes potential service to international destinations in the Caribbean or Mexico. That is, there is no significant change in the type of carriers serving the Greenville-Spartanburg International Airport and many local passengers still utilize other regional airports such as Atlanta and Charlotte. Note that passenger leakage estimates for the Airport's service area have ranged from 28 to 59 percent and this case assumes such leakage continues.

Case 2 – Introduction of Scheduled Low Fare Carrier Service – In this case, a major low fare carrier (for planning purposes, this carrier is presumed to be Southwest Airlines) introduces scheduled service to the Airport. At the same time, Atlanta and/or Charlotte and/or other regional airports may also see growth or introduction of low fare airlines, so that the Airport becomes a new spoke in the low fare carrier's network. In addition, the existing major carrier and leisure destination charter service continues at the Airport. That is, the Airport has a major one-time stimulus for growth of passengers with the introduction of a low fare carrier. Once the low fare carrier introduces service, passenger traffic growth continues at an accelerated pace versus the base case forecast above as the low fare carrier continues to add flights.

Case 3 – Development of Low Fare Carrier Focus City – In this case, the Airport becomes a focus city of the low cost carrier with much more extensive low fare carrier service attracting a much higher percentage of the local traffic, as well as travelers from a larger area of North Carolina, South Carolina, and Georgia. In this scenario, major carrier service also continues and grows, but the leisure destination carrier(s) discontinue service or become a minor part of traffic levels. In this case, there is a one-time major jump in passengers as the low-fare carrier introduces service and a continuing much higher than national average increasing rate of passenger growth as more low fare flights are introduced.

In addition, the FAA Terminal Area Forecast (TAF) will be presented for comparison. The FAA prepares an annual projection of passenger and aircraft operations traffic for all U.S. airports. This forecast is calculated based upon each airport's historical activity and national averages for change in passengers. This analysis updates the TAF by utilizing its long-term growth rate, but starting with the estimated 2009 passenger estimate. Further, the TAF forecast ends at 2025, so it is extended in time. In this manner, all the forecasts start and end at the same point. While the FAA typically insists its forecasts be used for planning, in reality, the TAF is a backwards-looking analysis, usually prepared without examination of the local aviation demand situation.

3.4.2 COMPARATIVE NATIONAL AND INTERNATIONAL FORECASTS

Local air traffic is impacted by the condition of national and international economies, as well as airline behavior. This section will provide various external forecasts to provide perspective on the Airport's projections.

The FAA predicted in March 2009 that domestic enplanements will growth approximately 2.0 percent annually from 2008 to 2025. During the same period, international traffic to and from the U.S. is projected to grow 3.9 percent resulting in a total growth of U.S. air carrier enplanements of 2.2 percent in the period. Three aircraft manufactures also made traffic projections in 2009. These forecasts are usually more aggressive than the FAA's. The aircraft manufactures include a worldwide forecast that includes the relatively fast-growing markets of China and the Middle East, as well as slower-growing markets like the U.S. and Europe. These four forecasts are shown in Table 3-11.

TABLE 3-11
COMPARATIVE AVERAGE ANNUAL RATE OF GROWTH FORECASTS

Source	Period	Domestic	International	Worldwide
Federal Aviation Administration	2008-2025	2.0%	3.9%	0.0%
Boeing Company	2008-2028	2.5%	0.0%	4.9%
Airbus Industries	2009-2028	2.0%	0.0%	4.7%
Embraer	2008-2027	2.7%	0.0%	4.9%

Source: Respective organizations

Note that the forecasts are not directly comparable in that they may forecast slightly different types of activity, use different periods, or include other assumptions. Rather, none of these forecasts project domestic activity growing faster than 2.7 percent over the long-term and most see worldwide traffic growing almost 5.0 percent annually versus the relative slow growth of the "mature" U.S. market.

3.4.3 DEVELOPMENT OF THE PASSENGER FORECAST

Three forecast scenarios will be used in this section to project passenger enplanements for terminal planning purposes. They represent concepts of: 1) business as usual, 2) attract a new low fare carrier, and 3) 'aggressive' growth of passengers. Such scenario building is necessary because the Airport has broken its trend of steady growth and reached a plateau. Further, it is clear that the major legacy carriers are static or in decline, while the U.S. passenger growth is mostly coming from new, low fare carriers. Therefore, without a low fare carrier, the Airport's traffic may continue to languish. In fact, recent national statistics indicate that low fare carriers now represent 30 percent of passenger enplanements. Finally, Southwest Airlines currently serves neither South Carolina nor Georgia and they cannot leave such major markets without representation for many years in the future.*

*NOTE: In the summer of 2010, Southwest Airlines announced that it will begin service out of GSP International Airport in 2011. The planning scenario for passenger enplanements will indicate a sharp increase and clearly fall within the Case 2 "Low Fare Carrier" category in the aviation forecast section of this document.

TABLE 3-12
DETAILED PASSENGER FORECAST TABLE

Case 1 - Base

	2010						2015						2020						2025						2030						2040						2050					
	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate
Allegiant	1.3	M80	150	85%	60,000	1	1.5	M80	150	85%	70,000	1	1.4	73G	175	85%	76,000	1	1.6	73G	175	85%	87,000	1	2	73G	175	85%	109,000	1	3	73G	175	85%	163,000	1	4	73G	175	85%	217,000	1
American	4	ERJ	50	70%	51,000	1	5	ERJ	50	70%	64,000	1	4	E70	70	70%	72,000	1	4.5	E70	70	70%	80,000	1	5	E70	70	70%	89,000	1	7	E70	70	70%	125,000	1	9	E70	70	70%	161,000	1
Continental	6.6	ERJ	50	70%	84,000	2	7	ERJ	50	70%	89,000	2	6	E70	70	70%	107,000	2	7	E70	70	70%	125,000	2	8	E70	70	70%	143,000	2	9	E70	70	70%	161,000	2	10	E70	70	70%	179,000	2
Delta	16	CR2	50	70%	204,000	3	13	CR7	70	70%	233,000	3	15	CR7	70	70%	268,000	3	15	CR9	80	70%	307,000	3	16	CR9	80	70%	327,000	3	20	CR9	80	70%	409,000	4	25.8	CR9	80	70%	526,000	4
United	6	CR2	50	70%	77,000	1	7	CR2	50	70%	89,000	1	6	CR7	70	70%	107,000	1	6.5	CR7	70	70%	116,000	1	7	CR9	80	70%	143,000	1	8	CR9	80	70%	164,000	1	9	CR9	80	70%	184,000	1
US Airways	11	CR2	50	70%	141,000	2	12	CR2	50	70%	153,000	2	8.4	DH4	75	70%	161,000	2	9.3	DH4	75	70%	178,000	2	10.5	DH4	75	70%	201,000	3	14.5	DH4	75	70%	278,000	3	21	DH4	75	70%	402,000	4
	44.9				617,000	10	45.5				698,000	10	43.9				791,000	10	43.9				893,000	10	48.5				1,012,000	11	61.5				1,300,000	12	78.8				1,669,000	13
Five year period growth rate											2.5%						2.5%						2.5%						2.5%						2.5%						2.5%	
Forty year period growth rate																																									2.5%	

Case 2 - New Low Fare Service

	2010						2015						2020						2025						2030						2040						2050					
	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate
Allegiant	1.3	M80	150	85%	60,000	1	1.5	M80	150	85%	70,000	1	1.4	73G	175	85%	76,000	1	1.6	73G	175	85%	87,000	1	2	73G	175	85%	109,000	1	3	73G	175	85%	163,000	1	4	73G	175	85%	217,000	1
American	4	ERJ	50	70%	51,000	1	5	ERJ	50	70%	64,000	1	4	E70	70	70%	72,000	1	4.5	E70	70	70%	80,000	1	5	E70	70	70%	89,000	1	7	E70	70	70%	125,000	1	9	E70	70	70%	161,000	1
Continental	6.6	ERJ	50	70%	84,000	2	7	ERJ	50	70%	89,000	2	6	E70	70	70%	107,000	2	7	E70	70	70%	125,000	2	8	E70	70	70%	143,000	2	9	E70	70	70%	161,000	2	10	E70	70	70%	179,000	2
Delta	16	CR1	50	70%	204,000	3	13	CR7	70	70%	233,000	3	15	CR7	70	70%	268,000	3	15	CR9	80	70%	307,000	3	16	CR9	80	70%	327,000	3	20	CR9	80	70%	409,000	4	25.8	CR9	80	70%	526,000	4
United	6	CR2	50	70%	77,000	1	7	CR2	50	70%	89,000	1	6	CR7	70	70%	107,000	1	6.5	CR7	70	70%	116,000	1	7	CR9	80	70%	143,000	1	8	CR9	80	70%	164,000	1	9	CR9	80	70%	184,000	1
US Airways	11	CR2	50	70%	141,000	2	12	CR2	50	70%	153,000	2	8.4	DH4	75	70%	161,000	2	9.3	DH4	75	70%	178,000	2	10.5	DH4	75	70%	201,000	3	14.5	DH4	75	70%	278,000	3	21	DH4	75	70%	402,000	4
Southwest	0				0	0	8	73G	150	75%	329,000	2	10	73G	150	75%	411,000	2	12	73G	150	75%	493,000	3	14	73G	150	75%	575,000	2	18	73G	150	75%	737,000	4	23	73G	150	75%	947,000	5
	44.9				617,000	10	53.5				1,027,000	12	50.8				1,202,000	12	55.9				1,386,000	13	62.5				1,587,000	13	79.5				2,037,000	16	101.8				2,616,000	18
Five year period growth rate											10.7%						3.2%						2.9%						2.7%						2.5%						2.5%	
Forty year period growth rate																																									3.7%	

Case 3 - Low Fare Carrier Focus City

	2010						2015						2020						2025						2030						2040						2050					
	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate	Daily Fts.	Equip.	Seats	Load	Eps	Gate
Allegiant	1.3	M80	150	85%	60,000	1	1	M80	150	85%	47,000	1	0.5	73G	175	85%	27,000	1	0	73G	175	85%	-	0	0	73G	175	85%	-	0	0	73G	175	85%	-	0	0	73G	175	85%	-	0
American	4	ERJ	50	70%	51,000	1	5	ERJ	50	70%	64,000	1	4	E70	70	70%	72,000	1	4.5	E70	70	70%	80,000	1	5	E70	70	70%	89,000	1	7	E70	70	70%	125,000	1	9	E70	70	70%	161,000	1
Continental	6.6	ERJ	50	70%	84,000	2	7	ERJ	50	70%	89,000	2	6	E70	70	70%	107,000	2	7	E70	70	70%	125,000	2	8	E70	70	70%	143,000	2	9	E70	70	70%	161,000	2	10	E70	70	70%	179,000	2
Delta	16	CR1	50	70%	204,000	3	13	CR7	70	70%	233,000	3	15	CR7	70	70%	268,000	3	15	CR9	80	70%	307,000	3	16	CR9	80	70%	327,000	3	20	CR9	80	70%	409,000	4	25.8	CR9	80	70%	526,000	4
United	6	CR2	50	70%	77,000	1	7	CR2	50	70%	89,000	1	6	CR7	70	70%	107,000	1	6.5	CR7	70	70%	116,000	1	7	CR9	80	70%	143,000	1	8	CR9	80	70%	164,000	1	9	CR9	80	70%	184,000	1
US Airways	11	CR2	50	70%	141,000	2	12	CR2	50	70%	153,000	2	8.4	DH4	75	70%	161,000	2	9.3	DH4	75	70%	178,000	2	10.5	DH4	75	70%	201,000	3	14.5	DH4	75	70%	278,000	3	21	DH4	75	70%	402,000	4
Southwest	0				0	0	10	73G	150	75%	411,000	2	14	73G	150	75%	575,000	3	18	73G	150	75%	739,000	4	22	73G	150	75%	903,000	4	29	73G	150	75%	1,183,000	6	37	73G	150	75%	1,528,000	8
	49.9				617,000	10	55				1,086,000	12	53.9				1,317,000	13	60.3				1,545,000	13	68.5				1,806,000	14	87.3				2,320,000	17	112.0				2,980,000	20
Five-year period growth rate											12.0%						3.9%						3.2%						3.2%						2.5%						2.5%	
Forty-year period growth rate																																									4.0%	

The forecast scenarios for the Airport were developed based upon each carrier's daily schedule, which will be presented in a later section. However, the basis of each forecast is as follows.

Case 1 - Base Case Existing Service Continuation – In this case, the same six carriers current operating continue to serve the Airport and passenger traffic grows at an average annual rate of 2.5 percent. This 2.5 percent growth rate is higher than the FAA's TAF forecast rate of 1.9 percent and the same as that projected by Boeing for domestic traffic.

Case 2 – Introduction of Scheduled Low Fare Carrier Service – In this case, a new, low fare carrier introduces eight flights per day by 2015. These flights are on 150 passenger aircraft such as Boeing 737-700 or Airbus A-320. Note that the typical start-up service by Southwest Airlines to a new city is eight flights per day. The existing carriers at the Airport continue the same schedule as shown in the base case forecast scenario above, so the new low fare service is additive to the base case. Over the remaining forecast period, the low fare carrier continues to add flights at an average of two additional daily flights every five years.

Case 3 – Development of Low Fare Carrier Focus City – The low fare carrier in this scenario introduces ten flights a day by 2015 and grows service by four new daily flights every five years. The existing carriers continue with the same schedule as previously projected; however, the leisure destination carrier withdraws service by 2025.

The Airport passenger forecasts were developed based upon the three scenarios, as well as consideration of carriers, destinations, aircraft, and gates. That is, the existing flight schedule was changed over time reflecting growth of markets, change of aircraft, and other factors. This bottom-up forecast by year, airline, aircraft type, load factor, gate usage, and enplaned passengers is shown in Table 3-12.

The growth rate by scenario is presented in Table 3-13 and the projected passenger enplanements are presented in Table 3-14.

TABLE 3-13
PERCENTAGE GROWTH FORECAST BY SCENARIO

Scenario	Case	2010	2015	2020	2025	2030	2040	2050
2009 TAF [1]		1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%
Base Case	1	0.0%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Low Fare Carrier	2	0.0%	10.7%	3.2%	2.9%	2.7%	2.5%	2.5%
Focus City	3	0.0%	12.0%	3.9%	3.2%	3.2%	2.5%	2.5%

[1] FAA TAF growth rate, but starting with 2009 estimate

TABLE 3-14
PASSENGER GROWTH FORECAST BY ENPLANEMENTS

Scenario	Case	2010	2015	2020	2025	2030	2040	2050
2009 TAF [1]		617,000	678,000	745,000	818,000	898,000	1,154,000	1,483,000
Base Case	1	617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Low Fare Carrier	2	617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Focus City	3	617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000

[1] FAA TAF growth rate, but starting with 2009 estimate

The three forecast cases and the 2009 FAA TAF forecast are presented in Figure 3-7.

Each of the four forecasts are discussed below.

FAA TAF - The FAA TAF forecast, as modified to begin at the estimated 2009 enplanement level, presents a growth level of 1.9 percent throughout the 20-year planning period. By 2030, total enplanements reach approximately 900,000, which match the peak year of 2005.

Case 1 – The base case grows passengers at 2.5 percent through the planning period resulting in just over 1.0 million passengers in 2030.

Case 2 – With a low fare carrier introducing service, passenger jump to over 1.0 million by 2015. Future growth results in approximately 1.6 million passengers in 2030.

Case 3 – With a low fare carrier focus city, passengers jump slightly faster in the early years and reach approximately 1.8 million by 2030 or roughly three times today's level.

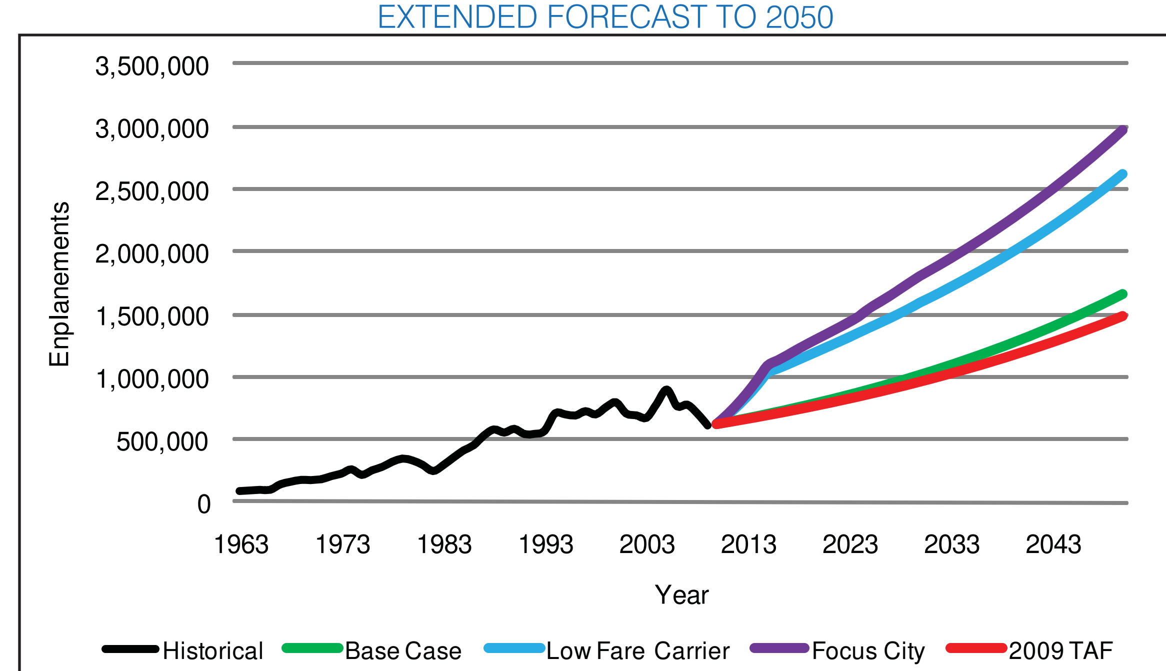
The significant change among the three cases is the level of low fare service at the Airport. From no low fare service today, to approximately 50 percent by 2030, the percentage of low fare service in 2030 by case is shown in Table 3-15.

TABLE 3-15
SHARE OF LOW FARE CARRIER SERVICE AT THE AIRPORT IN 2030

Scenario	Case
Base Case	0%
Low Fare Carrier	36%
Focus City	50%

The growth rates as shown in Table 3-13 result in the projections shown in Figure 3-8. The lowest growth rate scenario of the FAA TAF reaches almost 1.5 million passengers in 2050 and the highest reaches approximately 3.0 million passengers.

FIGURE 3-8
EXTENDED FORECAST TO 2050

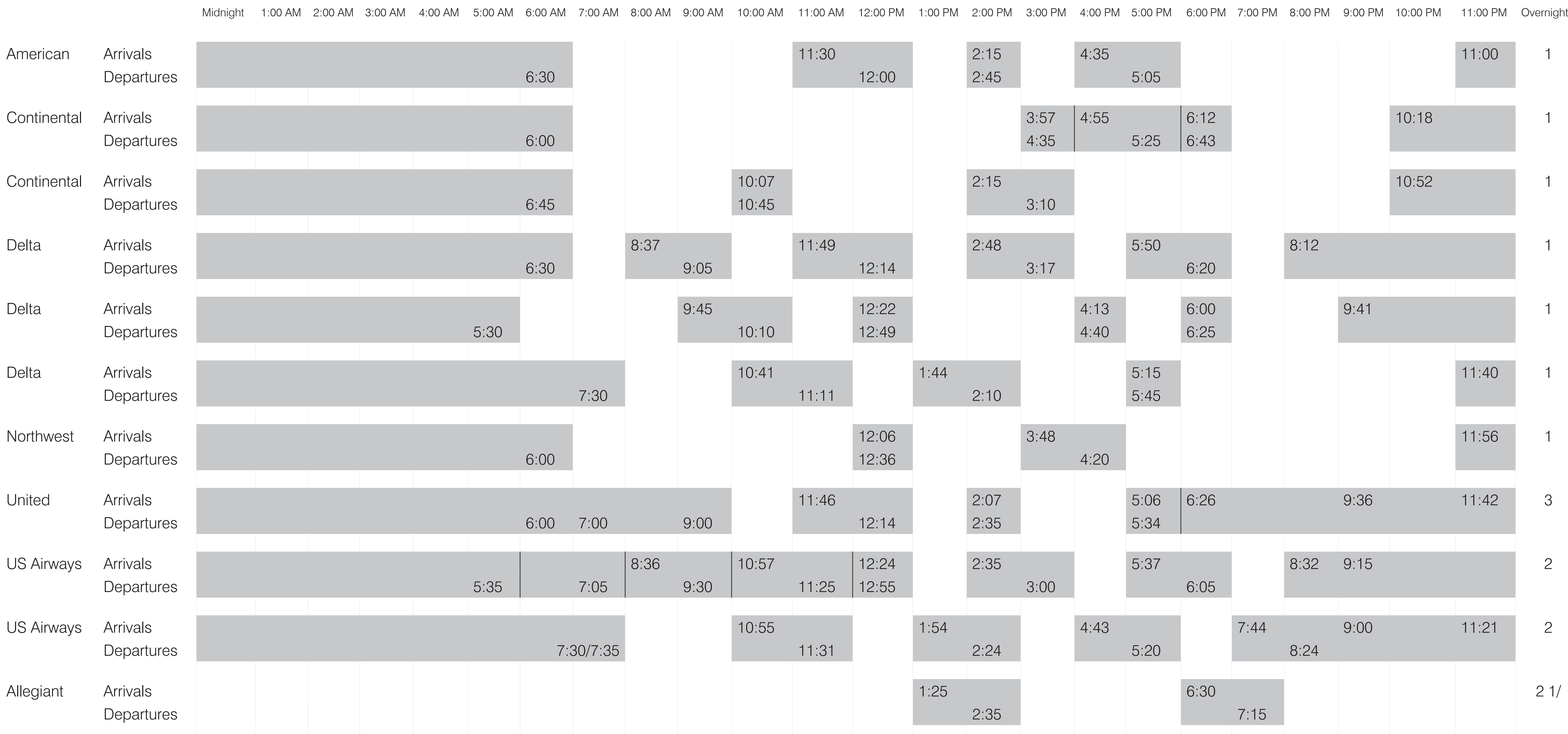


3.5 DESIGN DAY/DESIGN HOUR

Airport facilities are not typically designed to accommodate their annual activity; rather, they are designed to accommodate a busy or peak period. For purposes of forecasting activity demands and facility needs, the absolute peak hour of activity is not used. Rather, an average peak over a month period is used resulting in facilities that are sized in a fiscally conservative manner. This section of the Terminal Area Master Plan forecast will identify and calculate that peak period activity for commercial passengers and aircraft gate usage.

The peak activity at any airport is often constrained by the number of gates. Further, the number of airlines and their number of destinations, as well as their number of station employees, limit any airline's ability to schedule and handle too many aircraft at the same time. Therefore, this peak period gate analysis will be built from the bottom-up, based upon the existing airline schedule. The current gate usage and overnight aircraft, as derived from the December 2009 actual flight schedule, are presented in Figure 3-9.

FIGURE 3-9
DECEMBER 2009 AIRLINE SCHEDULE BY GATE



By Hour Aircraft	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM
Arrivals	0	0	0	2	1	4	3	3	3	5	2	4	4	4	1	2	4	2	5
Departures	2	6	5	0	3	2	3	6	0	5	3	3	5	4	1	1	0	0	0

The peak period most commonly used in airport planning is the design day and/or design hour. These periods are not the absolute peak usage that an airport will ever see, but rather represent the much busier than normal period – usually the 85th percentile of activity, or the Peak Hour of the Average Day of the Peak Month. Because this Airport's annual traffic is relatively stable and the daily peaks occur during the morning departures, evening arrivals, and an arrival/departure bank at mid-day, a peak gate usage analysis has been developed. The peak arriving or departing hour, based upon the maximum use of the leased gates and growth of the existing schedule, is shown in Table 3-16.

TABLE 3-16
PROJECTED PEAK HOUR FLIGHTS AND PASSENGERS

Case 1 - Base Case

	2015					2030					2050				
	Flights	Equip	Seats	Load Factor	Passengers	Flights	Equip	Seats	Load Factor	Passengers	Flights	Equip	Seats	Load Factor	Passengers
Allegiant[1]	0	M80	150	100%	0	0	73G	175	100%	0	0	73G	175	100%	0
American	1	ERJ	50	100%	50	1	E70	70	100%	70	1	E70	70	100%	70
Continental	2	ERJ	50	100%	100	2	E70	70	100%	140	2	E70	70	100%	140
Delta	3	CR7	70	100%	210	3	CR9	80	100%	240	4	CR9	80	100%	320
United	1	CR2	50	100%	50	1	CR9	80	100%	80	1	CR9	80	100%	80
US Airways	2	CR2	50	100%	100	3	DH4	75	100%	255	4	DH4	75	100%	300
Maximum Hour	9				510	10				755	12				910

Case - 2 New Low Fare Service

	2015					2030					2050				
	Flights	Equip	Seats	Load Factor	Passengers	Flights	Equip	Seats	Load Factor	Passengers	Flights	Equip	Seats	Load Factor	Passengers
Allegiant[1]	0	M80	150	100%	0	0	73G	175	100%	0	0	73G	175	100%	0
American	1	ERJ	50	100%	50	1	E70	70	100%	70	1	E70	70	100%	70
Continental	2	ERJ	50	100%	100	2	E70	70	100%	140	2	E70	70	100%	140
Delta	3	CR7	70	100%	210	3	CR9	80	100%	240	4	CR9	80	100%	320
United	1	CR2	50	100%	50	1	CR9	80	100%	80	1	CR9	80	100%	80
US Airways	2	CR2	50	100%	100	3	DH4	75	100%	225	4	DH4	75	100%	300
Southwest	2	73G	150	100%	300	2	73G	150	100%	300	5	73G	150	100%	750
Maximum Hour	11				810	12				1,055	17				1,660

Case 3 - Low Fare Carrier Focus City

	2015					2030					2050				
	Flights	Equip	Seats	Load Factor	Passengers	Flights	Equip	Seats	Load Factor	Passengers	Flights	Equip	Seats	Load Factor	Passengers
Allegiant[1]	0	M80	150	100%	0	0	73G	175	100%	0	0	73G	175	100%	0
American	1	ERJ	50	100%	50	1	E70	70	100%	70	1	E70	70	100%	70
Continental	2	ERJ	50	100%	100	2	E70	70	100%	140	2	E70	70	100%	140
Delta	3	CR7	70	100%	210	3	CR9	80	100%	240	4	CR9	80	100%	320
United	1	CR2	50	100%	50	1	CR9	80	100%	80	1	CR9	80	100%	80
US Airways	2	CR2	50	100%	100	3	DH4	75	100%	225	4	DH4	75	100%	300
Southwest	2	73G	150	100%	300	3	73G	150	100%	450	7	73G	150	100%	1,050
Maximum Hour	11				810	13				1,205	19				1,960

[1]Alligiant flights typically do not occur in the peak hour

The current airline schedule was analyzed to identify the peak hours for scheduled aircraft arrivals and departures. This analysis included the two multiple day per week Allegiant flights, but excluded their once per week operations. Based on the current airline schedule, the maximum number of scheduled aircraft arriving in any single hour is five. These aircraft arrivals occur twice per day between 2 pm and 3 pm in the afternoon and between 11 pm and midnight. For departing flights, the peak hours are between 6 am and 7 am and between noon and 1 pm. In each case, six aircraft depart. These current peak hour aircraft arrivals and departures were previously shown on Figure 3-9.

For the future, maximum major carrier gate usage is assumed for departing flights and related passenger enplanements based on the by carrier gate projection. The exception is Allegiant who has no peak hour flights projected because they do not typically operate at the early morning, late evening, or other peaks of the major carriers. Full aircraft are assumed based on a typical busy day schedule such as Monday morning or Friday evening. The deplaning passenger schedule has typically been less peaked than the enplaning passenger schedule. Therefore, 85 percent of the peak enplaned passenger forecast is projected for the deplaned passenger peak based upon the current ratio (5 to 6) of maximum hour arriving versus departing flights. The maximum number of gates utilized and the peak hour passengers for the 2010, 2020, 2030, and 2050 periods are presented in Table 3-17. Note that based upon the current schedule and that of most airports, the peak hour for enplaned passengers is likely to be the early morning departure hour and for the deplaning passengers the late evening arrival window.

TABLE 3-17
GATE REQUIREMENT AND PEAK HOUR PASSENGER PROJECTION

	Gates	Enplanements	Deplanements
Base Case			
2010	10	450	383
2020	10	640	544
2030	11	755	642
2040	12	855	727
2050	13	910	774
Low Fare Carrier			
2010	10	450	383
2020	12	940	799
2030	13	1,055	897
2040	16	1,435	1,220
2050	18	1,660	1,411
Focus City			
2010	10	450	383
2020	13	1,090	927
2030	14	1,205	1,024
2040	17	1,585	1,347
2050	20	1,960	1,666

3.6 FORECAST CONCLUSION

This section provides a summary of the forecast scenarios developed. Information developed in this chapter will be used in the remainder of the Terminal Area Study to assess the capacity of the Airport's existing facilities and provide planning guidance for proposed facility expansion.

The Air Service Area for the Greenville-Spartanburg International Airport or approximately the Greenville-Spartanburg-Anderson Combined Statistical Area (CSA) has experienced steady if modest population, economic, and employment growth from 1969 to the present. The population of the CSA is expected to grow at a slower rate than the state of South Carolina, the Southeast portion of the United States, and the United States. The growth in PCPI for the Southeast United States, South Carolina, and the CSA are expected to remain in a similar range to each other. However all three will trail the growth in PCPI of the United States. Employment is expected to keep pace with the other comparable areas throughout the forecast period.

In 1963, the Airport saw 79,917 enplanements. Within six years, in 1969, the number of enplanements had doubled. The enplanements doubled again by 1979, and doubled yet again by 1994. Since about 1990, passenger volumes have seen relatively steep annual change. The all-time peak year was 2005 with 904,282 enplanements. This was fueled somewhat by the low-fare carrier, Independence Air, which began service to the Airport in 2004. However, Independence Air ceased all operations in January of 2006. Another low cost carrier, Allegiant Air, began service to the Airport in 2006 and still operates from the Airport today. However, Allegiant does not offer the same frequency or destinations as Allegiant caters primarily to the leisure market. The interest shown by low cost carrier entrants to the Greenville-Spartanburg market could positively influence passenger enplanements to the market.

The Greenville-Spartanburg International Airport is geographically located between the two key competitive airports: Hartsfield-Jackson Atlanta International and Charlotte Douglas International. It is estimated that between 28 and 48 percent of the Greenville-Spartanburg-Anderson area passengers use these alternative airports to Greenville-Spartanburg International. Southwest Airlines does not have a presence at either of the alternative airports. However, if Southwest were to begin service to the Greenville-Spartanburg International Airport, it is likely that some if not all of the leakage to the alternative airports would be attracted back to the Airport.

Three forecast scenarios for commercial passenger aviation activity were developed for the Airport as follows:

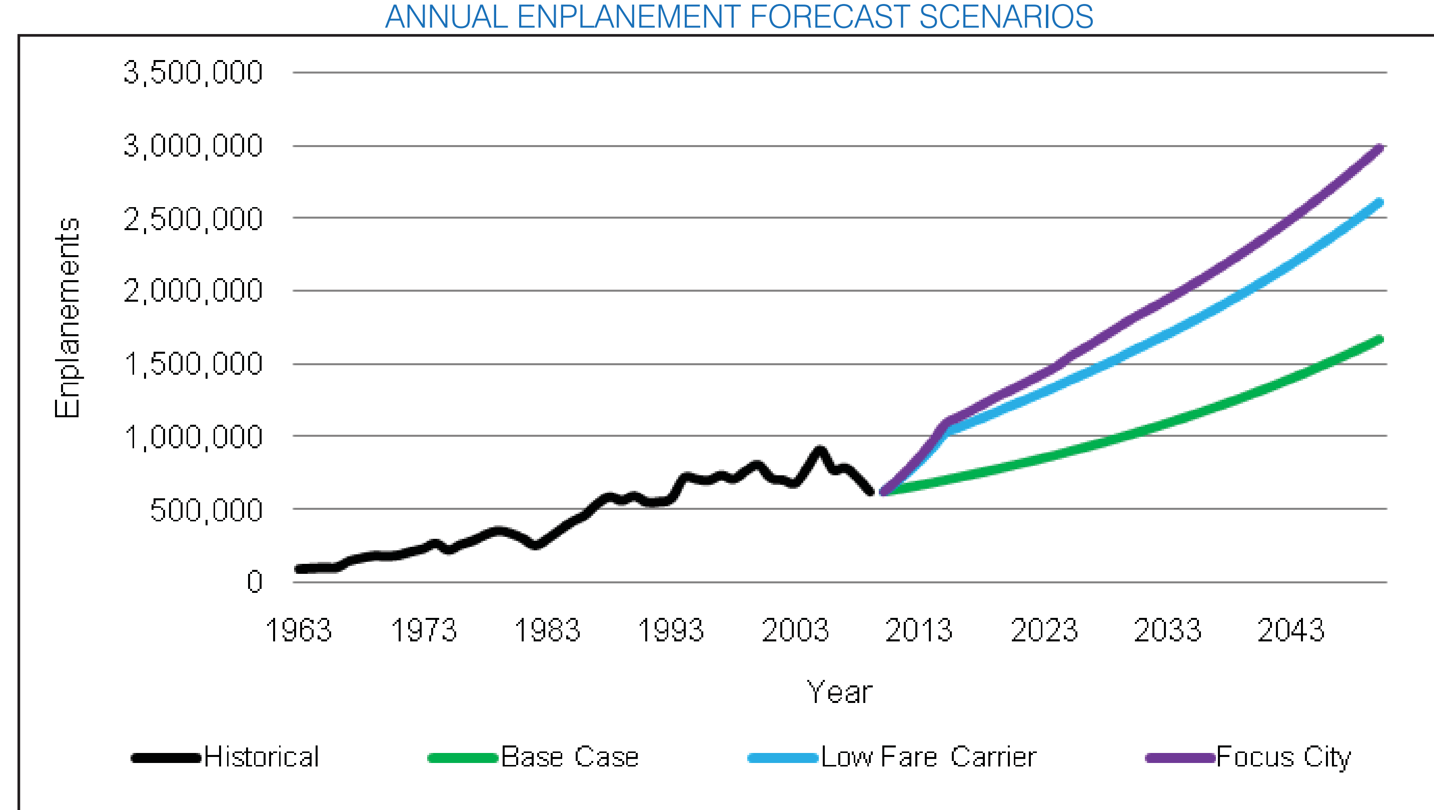
- Base Case: The existing or similar type airlines continue to serve the Airport at an average annual growth rate in enplanements of 2.5 percent.
- Low Fare Carrier: A new low fare carrier introduces service at the Airport using 150-seat aircraft. The air carrier begins service with eight daily flights and adds two additional daily flights every five years. The existing airlines continue as indicated in the Base Case forecast.
- Focus City: The low fare carrier introduces ten flights a day by the year 2015 and grows service by four new flights every five years. The existing airlines continue with the same schedule as indicated in the Base Case scenario. However, the existing leisure destination carrier withdraws service by 2025.

The results of these forecasts are presented in Table 3-18. Figure 3-10 shows the historical annual enplanements at the Airport as well as the growth in annual enplanements for each of the forecast scenarios.

TABLE 3-18
SUMMARY OF AVIATION FORECAST SCENARIOS

	2010	2015	2020	2025	2030	2040	2050
Base Case							
Annual Enplanements	617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Peak Hour Enplanements	450	510	640	670	755	855	910
Peak Hour Deplanements	383	434	544	570	642	727	774
Gates	10	10	10	10	11	12	13
Low Fare Carrier							
Annual Enplanements	617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Peak Hour Enplanements	450	810	940	970	1,055	1,435	1,660
Peak Hour Deplanements	383	689	799	825	897	1,220	1,411
Gates	10	12	12	13	13	16	18
Focus City							
Annual Enplanements	617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Peak Hour Enplanements	450	810	1,090	1,120	1,205	1,585	1,960
Peak Hour Deplanements	383	689	927	952	1,024	1,347	1,666
Gates	10	12	13	13	14	17	20

FIGURE 3-10
ANNUAL ENPLANEMENT FORECAST SCENARIOS



SECTION 4: FACILITY REQUIREMENTS

4.1 FACILITY REQUIREMENTS INTRODUCTION

Facility requirements for a commercial service passenger terminal comprise the space each functional area of the terminal would require. The aviation activity forecasts are the basis for the facility requirements. Each of the following areas is assessed:

- Overall terminal size
- Number of gates
- Check-in area
- Passenger security screening
- Baggage security screening
- Departure lounges
- U.S. Customs and Border Protection
- Concessions
- Baggage-claim and baggage input
- Public areas
- Airline operating areas
- Curb lengths

The facility requirements for each area are compared with the amount of space currently provided in the existing terminal. In many areas, the required number of processing units is also calculated. Processing units include such items as ticketing desks, security-screening checkpoints, or baggage-claim devices.

It is unknown which scenario presented in the last chapter might occur and the timing of additional facility requirements is uncertain. Therefore, this chapter identifies triggers for each functional area. Triggers are strategic activity levels that indicate that additional facilities are needed. Additional facilities are then based on demand rather than a point in time.

4.1.1 FORECASTS OF AVIATION ACTIVITY

The previous chapter presented three scenarios that could potentially occur at the Airport. A forecast of aviation activity was developed for each scenario. The three scenarios are as follows:

- Base Case: The existing or similar type airlines continue to serve the Airport at an average annual growth rate in enplanements of 2.5 percent.
- Low Fare Carrier: A new low fare carrier introduces service at the Airport using 150-seat aircraft. The air carrier begins service with eight daily flights and adds two additional daily flights every five years. The existing airlines continue as indicated in the Base Case forecast.
- Focus City: The low fare carrier introduces ten flights a day by the year 2015 and grows service by four new flights every five years. The existing airlines continue with the same schedule as indicated in the Base Case scenario. However, the existing leisure destination carrier withdraws service by 2025.

4.1.2 PEAK-HOUR ENPLANEMENTS

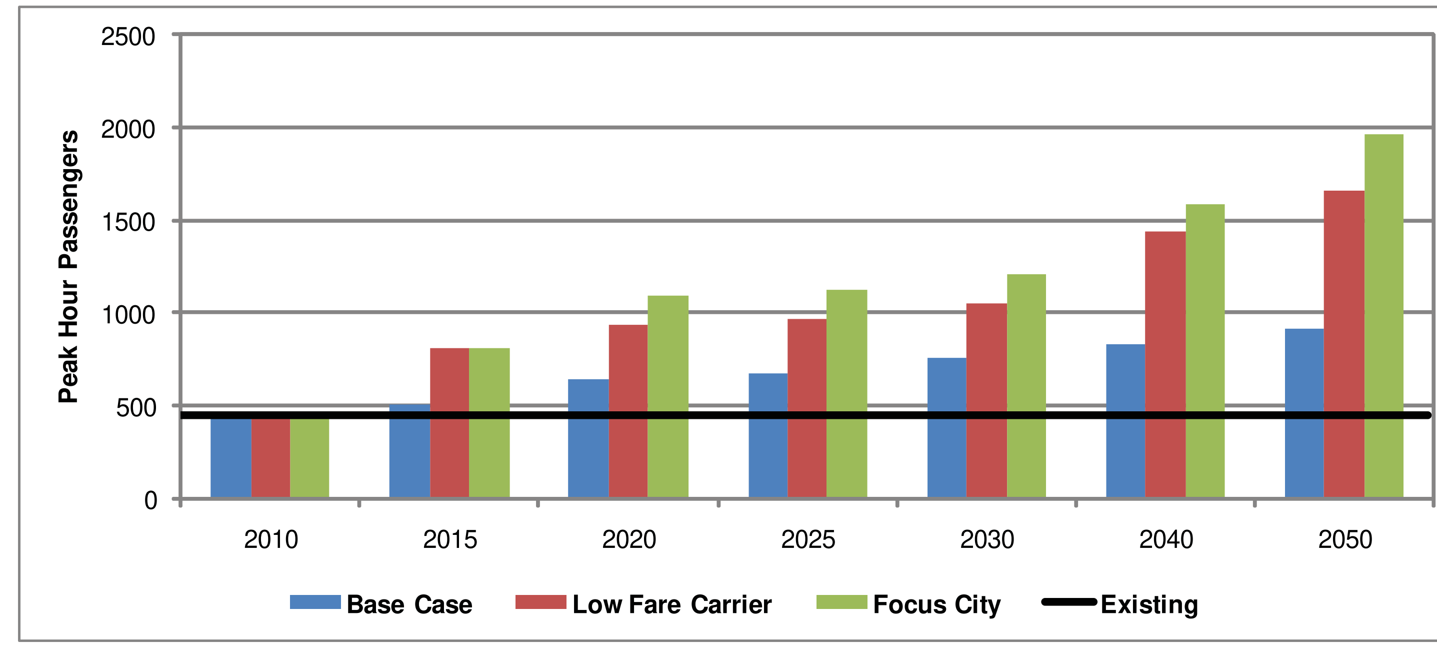
The aviation activity forecasts are presented for a number of activities including:

- Annual enplanements
- Annual operations
- Peak-hour enplanements
- Peak-hour operations

All of the forecast activities are used to some degree in the development of the facility requirements. However, the peak-hour enplanements are used most often. The peak-hour enplanements are the passengers boarding aircraft during the peak-hour of an average day of the peak month of the year.

The peak-hour enplanements do not represent the absolute busiest hour of an airport during a typical year. Sizing a passenger terminal to accommodate the absolutely busiest period of the year would result in the terminal standing relatively empty most of the time. It is acceptable for the terminal to be crowded during certain periods. Figure 4-1 shows the forecast of peak-hour enplanements.

FIGURE 4-1
PEAK-HOUR ENPLANEMENTS FORECAST



	2010	2015	2020	2025	2030	2040	2050
Base Case							
Annual Enplaned Passengers	617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Peak Hour Enplanements	450	510	640	670	755	835	910
Low Fare Carrier							
Annual Enplaned Passengers	617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Peak Hour Enplanements	450	810	940	970	1,055	1,435	1,660
Focus City							
Annual Enplaned Passengers	617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Peak Hour Enplanements	450	810	1,090	1,120	1,205	1,585	1,960

4.1.3 QUANTITATIVE ANALYSIS

The facility requirements presented in this section are quantitative. The qualitative analysis is presented in Section 1. The facility requirements address how much area or how many processing units will be required. They are based on calculations performed using industry practices and standards. The facility requirements are compared with the existing facility only in terms of the amount of area that may be required, or the number of processing units.

The qualitative analysis of the existing terminal and each functional area is also important. Issues analyzed should include:

- Are the existing facilities and processing units located correctly within the terminal?
- Are particular functional areas in proper adjacency with other functional areas?
- Is the area showing its age with excessive wear and tear?
- Does the area have proper lighting and acoustics?

The qualitative analysis is as essential as the quantitative analysis and will be presented in a later chapter of this report.

4.1.4 INDUSTRY STANDARDS

The facility requirements analysis has been performed using many industry standards. These include, but are not limited to, the following:

- Airport Development Reference Manual, International Air Transport Association (IATA)
- FAA Advisory Circular 150/5360-13, Planning and Design Guidelines for Airport Terminal Facilities, FAA
- FAA Advisory Circular 150/5360-9, Planning and Design of Airport Terminals Facilities at Non-Hub Locations, FAA
- Recommended Security Guidelines for Airport Planning, Design and Construction, Transportation Security Administration
- Measuring Airport Landside Capacity, Transportation Research Board
- Airport Technical Design Standards Passenger Processing Facilities, U.S. Customs and Border Protection

4.1.5 AIRPORT SPECIFIC ASSUMPTIONS

The forecasts of aviation activity and the industry standards and models are but two elements upon which the facility requirements are calculated. The third element is the numerous processing rates and percentages of participation that are specific to a particular airport. Without the third element, the facility requirements become very generic.

Small samples of the Greenville-Spartanburg International Airport processing rates and percentages of participation were observed and compared to national averages. Based on these observations, assumptions were made on how the percentages and processing rates might change over the 40-year forecast period. These assumptions were reviewed with the Airport staff and, in some cases, modified.

As each functional area of the terminal is discussed in this chapter, specific assumptions are also presented. Appendix A contains a full list of all assumptions as well as the detailed development of the facility requirements.

In addition, all airports have methods of operations that are unique, which vary from overall industry standards. This results in some areas of the terminal exceeding or falling short of standard calculations by a significant amount. Where this occurs at GSP it will be noted.

4.1.6 AVIATION DEMAND TRIGGERS

Three forecasts of aviation activity were presented in the previous chapter based on three specific scenarios. The results present a wide range of annual passenger enplanements as the planning period develops. However, there is no definition of when or whether these scenarios may occur. The facility requirements result in an equally wide array of options. The aviation demand triggers indicate that when a particular level of aviation activity occurs, the Airport will need to provide a specific number or amount of additional facilities. The triggers are not tied to a particular year; they are tied to aviation activity. Triggers are presented for each major functional area as it is presented and a summary table is presented at the end of the chapter.

If a trigger indicates that a facility will require expansion when a certain passenger enplanement level is reached, the Airport should not wait until that level is reached to begin addressing the matter. Triggers should be monitored on a periodic basis to determine trends in specific aviation activity. If it appears likely that a particular level will be reached within two years, consideration should be given to beginning the project immediately.

Typically, it can take at least two years to complete the planning, environmental processing (where required), design, and construction of larger projects. When planning, designing, and constructing a project, it is important not to design to the target activity trigger. Rather, an activity level that is five years or so beyond the aviation activity trigger should be used. This will ensure that the new facility is not at capacity the day it opens, but has at least five years or more before additional expansions may be needed. Depending on the capital requirements of any specific capacity enhancement and the cost of further enhancements, capacity targets beyond the ten years of growth are sometimes prudent.

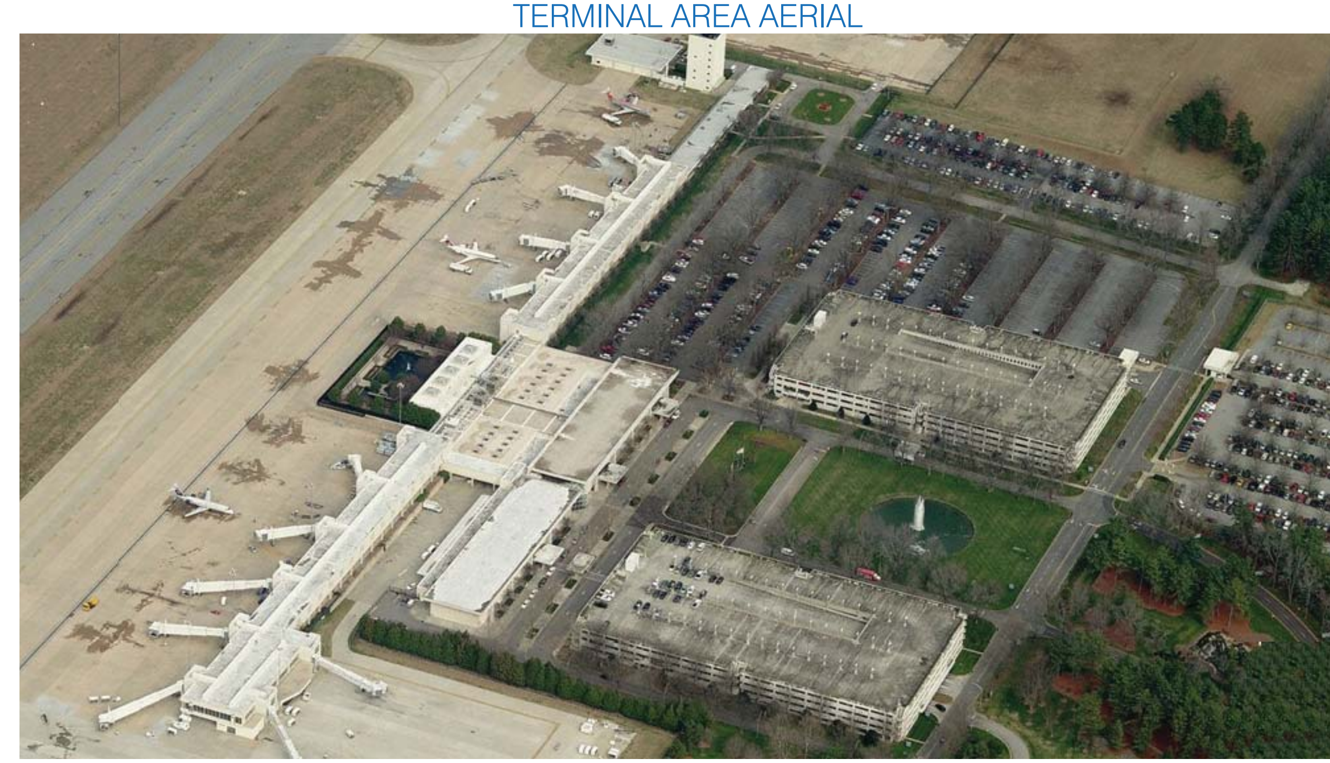
4.2 OVERALL TERMINAL SIZE

The existing commercial service passenger terminal at Greenville-Spartanburg International Airport has three units on three levels. The "landside" unit houses check-in, baggage claim, waiting and seating, baggage service offices, rental car counters, offices for airlines and rental cars companies, and other amenities. The "airside" unit contains passenger-security screening, a restaurant, snack bars, departure lounges, and other amenities. A "Connector" unit links the landside and airside units and contains elevators and escalators, restrooms, and retail concessions.

4.2.1 EXISTING OVERALL TERMINAL FACILITIES

The existing commercial service passenger terminal was constructed in 1962 and has been expanded once since then. The terminal and concourse are long and linear as can be seen in Figure 4-2.

FIGURE 4-2
TERMINAL AREA AERIAL



While the entire length of the facility is covered, not all areas are enclosed. The enclosed areas comprise approximately 215,000 square feet of building area. Table 4-1 is an inventory of the various existing terminal areas.

TABLE 4-1 EXISTING TERMINAL AREAS

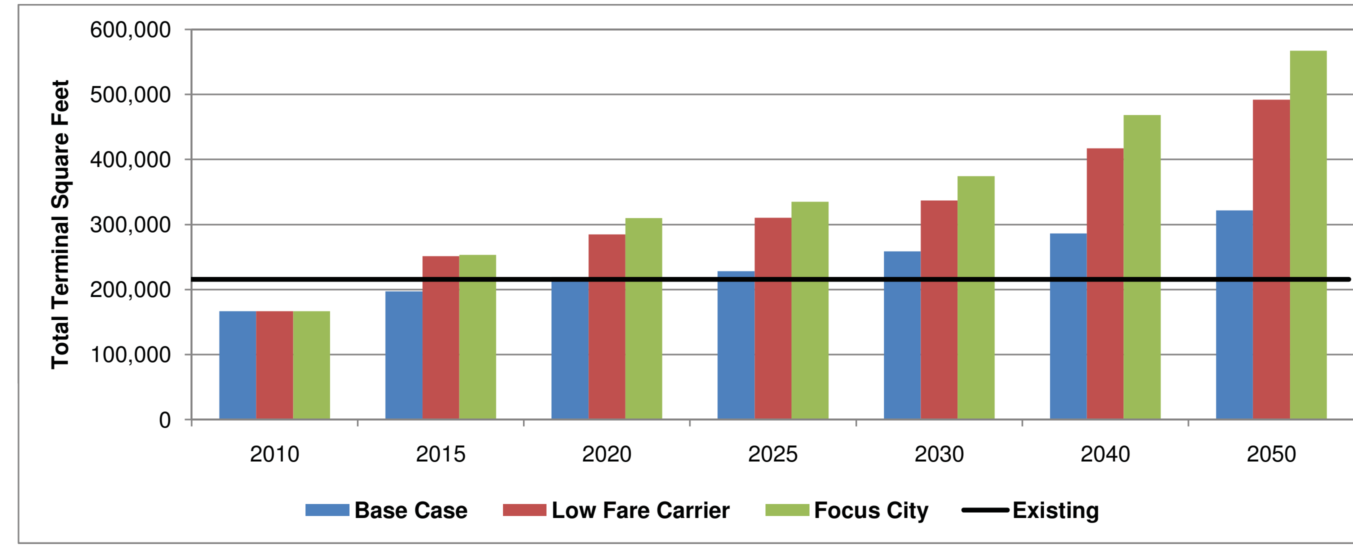
	TERMINAL FUNCTIONAL AREAS SUMMARY	EXISTING
Airline Functional Areas (SF)	Check-in counters and kiosks	1,936
	Check-in queue	1,891
	Airline ticket offices	4,951
	Baggage make-up	9,000
	Departure lounges	33,094
	Inbound baggage input	4,152
	Baggage claim lobby	8,491
	Baggage service offices	895
	Subtotal Airline Functional Areas	64,410
Security Areas (SF)	Passenger Screening	2,674
	Passenger Screening queue	1,735
	In-line EDS baggage screening	0
	TSA offices and support	1,346
	Subtotal Security	5,755
Terminal Concess. (SF)	Food / Beverage / Retail	16,953
	Rental car counters and offices	2,184
	Rental car customer queue	1,126
	Subtotal Terminal Concessions	20,263
Public Areas (SF)	Non-secure public restrooms	1,207
	Secure public restrooms	2,706
	Terminal Conference Rooms	1,276
	Waiting and seating	3,990
	Public circulation including lobby and entrance	52,448
	Subtotal Public Areas	61,627
Non-Public Areas (SF)	Airport operations	1,174
	Airport Police	1,289
	Maintenance, storage and janitorial	907
	Circulation	924
	Mechanical/ Electrical	27,842
	Subtotal Non-Public Areas	32,136
	SUBTOTAL PROJECT AREA (NET)	184,191
	NET TO GROSS FACTOR	6,080
	SUBTOTAL PROJECT AREA (GROSS)	190,271
Terminal Ancillary Areas (SF)	Airline Operations	12,932
	Airport Administrative Offices	4,267
	Customs and Border Protection	7,688
	Subtotal Security	24,887
	TOTAL BUILDING AREA	215,158

4.2.2 *TOTAL TERMINAL FACILITY REQUIREMENTS*

Facility requirements have been calculated for each of the major terminal functional areas. Figure 4-3 shows the total square foot area of the terminal required for each period for each of the forecasts, based on a macro-level evaluation of space.

FIGURE 4-3

TOTAL TERMINAL FACILITY REQUIREMENTS



	Existing	2010	2015	2020	2025	2030	2040	2050
	215,158							
Base Case								
Annual Enplaned Passengers		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Total Terminal Building in Square Feet		166,520	197,190	219,330	228,120	258,980	286,540	321,690
Low Fare Carrier								
Annual Enplaned Passengers		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Total Terminal Building in Square Feet		166,520	251,420	284,950	310,490	336,880	417,390	491,840
Focus City								
Annual Enplaned Passengers		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Total Terminal Building in Square Feet		166,520	253,470	310,110	334,980	374,280	468,350	567,330

From a macro-level, the existing terminal would be able to accommodate the aviation demand beyond 2015 only in the Base Case forecast. It would be able to accommodate the demands of the Base Case forecast through the year 2020. However, as discussed further in this section, specific parts of the terminal are undersized and, therefore, restrict the overall throughput capacity of the terminal.

With the demands of the Low Fare Carrier and Focus City forecasts, the terminal would require additional area prior to 2015. By the year 2030, the Low Fare Carrier forecast demand would require about 120,000 additional square feet to the existing terminal. The Focus City forecast would require an additional approximately 38,000 square feet to the Low Fare Carrier forecast in the same period.

4.3 NUMBER OF GATES

Gates are one key measure of an airport's capacity. However, gates are further defined by:

- The size aircraft they can accommodate
- The presence of a passenger-boarding bridge and its characteristics
- The capacity of the departure lounge(s) adjacent to the gate
- Access to a customs inspection facility
- Other facility specific factors

Specific airline factors also affect the number of gates. These include the types of airlines that use the gates and whether or not the gates are used exclusively by one airline. The type of airline use determines if a gate may stand idle a large portion of the day, or whether the airlines or the airport operate out of each gate on an almost continuous basis. Different airlines operate gates differently by utilizing a gate from two to ten times per day.

4.3.1 EXISTING NUMBER OF GATES

The commercial service passenger terminal currently has 13 gates and each is equipped with a passenger-boarding bridge. Figure 4-4 illustrates the apron area at two of the existing gates equipped with a passenger-boarding bridges.

FIGURE 4-4
EXISTING GATES

4.3.2 ASSUMPTIONS ON NUMBER OF GATES

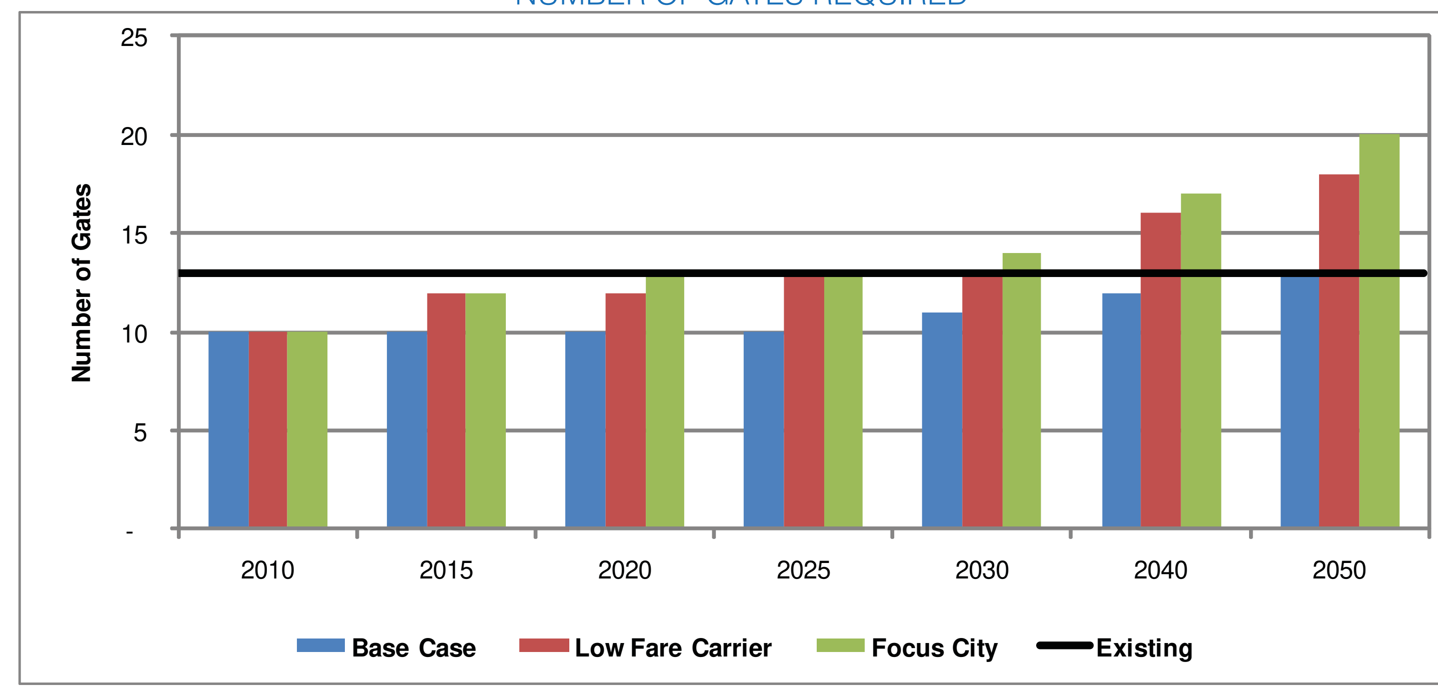
Only two assumptions were made in the development of the facility requirements for the number of gates. they are:

- In the Base Case forecast, there are six airlines operating from the Airport. In the Low Fare Carrier and Focus City forecasts, there are seven airlines operating at the Airport except in 2010.
- The number and size of the gates were determined as part of the Aviation Demand Forecasts and are shown in Table 2-12 and Table 2-17 of the previous section.

4.3.3 REQUIRED NUMBER OF GATES

The 13 existing gates are forecast to be sufficient throughout the planning period for the Base Case forecast. However, the Low Fare Carrier forecast projects an additional five gates by the year 2050. Figure 4-5 shows that by the year 2050, the Focus City forecast would require seven additional gates beyond the current 13 gates.

FIGURE 4-5
NUMBER OF GATES REQUIRED



	Existing	2010	2015	2020	2025	2030	2040	2050
	13							
Base Case								
Annual Enplaned Passengers		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Number of Gates		10	10	10	10	11	12	13
Low Fare Carrier								
Annual Enplaned Passengers		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Number of Gates		10	12	12	13	13	16	18
Focus City								
Annual Enplaned Passengers		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Number of Gates		10	12	13	13	14	17	20

4.3.4 NUMBER OF GATES TRIGGERS

A number of factors determine the number of gates that may be required. These may include:

- The size of aircraft serving the gates
- The number of times per day that a gate is utilized
- The assignment of gates to airlines on an exclusive use basis

Table 4-2 shows a range of peak hour departing flights for each level of number of gates. The number of daily flights can range from approximately 35 to 40 for an 11-gate terminal and between 90 and 95 flights for a 20-gate terminal.

TABLE 4-2
NUMBER OF GATES TRIGGERS

Triggering Event	Facility Requirement
Peak Hour Departing Flights	Number of Gates
8-9	10
9-10	11
10-11	12
11-12	13
12-13	14
12-14	15
13-15	16
14-16	17
15-17	18
16-18	19
16-19	20

Note: These numbers do not show the gate utilization that would be typical for Southwest Airlines, which has a higher rate of flights per gate.

4.4 CHECK-IN AREA

For purposes of this study, the check-in area of the terminal has been divided into two inter-related areas. The first area consists of:

- The check-in desks and kiosks
- The area in which the check-in agent is standing
- The take-away baggage belt
- The area in front of the check-in desks and kiosks for the passenger to stand while being processed

The second area is that of the check-in queue. This is the area in which the passenger waits for access to a check-in desk or kiosk.

This study analyzed two methodologies of operating the check-in area. The first would operate the check-in counters and kiosks on a common-use basis where any airline could operate out of any check-in counter or kiosk. This would reduce the number of check-in desks and kiosks as all of them would be available during peak periods.

The second methodology would operate the facility as it is currently on an exclusive-use basis. The airlines would operate check-in desks and kiosks assigned exclusively to each airline. Desks and kiosks of an airline that may not have a flight during the peak period could not be used by other airlines and would stand idle. This increases the total number of check-in desks and kiosks.

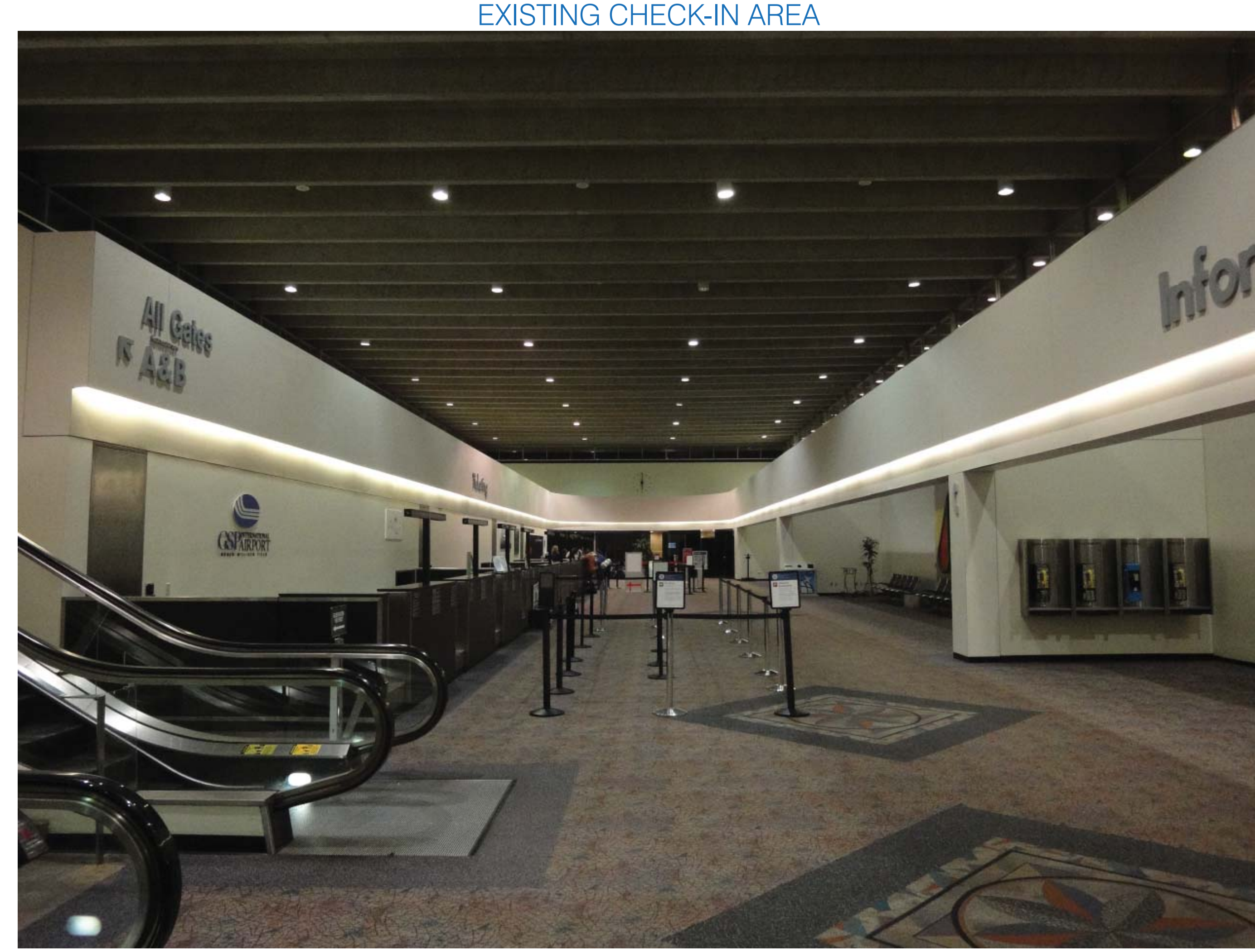
The results of the exclusive-use analysis are reported in this report, because the check-in facilities are currently operated this way at the Airport. In addition, even with the exclusive-use methodology, there would be sufficient existing capacity through the year 2030. Appendix 6 contains the results of the common-use check-in facilities along with the remainder of the detailed facility requirements.

4.4.1 EXISTING CHECK-IN FACILITIES

The existing check-in counter/kiosks area measures approximately 1,936 square feet. The existing check-in queue area measures approximately 1,891 square feet. The total for both areas is approximately 3,827 square feet.

Figure 4-6 shows both the check-in counter/kiosk and the check-in queue area. The area from the left-hand wall to the stanchions represents the check-in desks and kiosks area. The area within the stanchions represents the check-in queue area. The area between the stanchions and the wall on the right represents a combination of circulation, waiting, and concession areas. This report covers these areas later.

FIGURE 4-6
EXISTING CHECK-IN AREA



4.4.2 CHECK-IN ASSUMPTIONS

Several assumptions are made for the check-in area because the use of this area is in flux across the country. As the technology of self-serve check-in advances, it is likely that the average amount of time that a passenger spends checking in at an airport will continue to decrease. The introduction of check-in self-serve kiosks and the ability to print out boarding passes at home or office is just the beginning. Soon, the passenger will be allowed to drop off checked baggage at locations other than the check-in hall. This may not even occur at the Airport, but could happen downtown.

The less time the passenger spends in the check-in area, the less area will be required. It is uncertain when these advances may occur. Additionally, it is unknown how long it may take these advances to reach the majority of the airports. After conversations with the Administrative staff of the Airport, the following assumptions were adopted:

Common to Check-in Counters and Kiosks

- In the Base Case forecast, there are six airlines operating from the Airport. In the Low Fare Carrier and Focus City forecasts, there are seven airlines operating at the Airport except in year 2010.
- The depth of the check-in counters/kiosks includes the take-away baggage belt the agent operating area, the check-in counter/kiosk stations, and five feet in front of the counter for passenger standing and movement.
- Fifty percent of passengers use the check-in facilities at the Airport as opposed to checking in at home or elsewhere.

Check-in Counters

- The average processing time per passenger at a conventional check-in counter takes 150 seconds (2.5 minutes).
- The average width of a conventional check-in counter position with one half of one bag well in lineal feet is approximately four feet five inches.
- Of the passengers using the staffed Airport check-in facilities, the percentage that use the conventional check-in counters will decrease over the planning period as follows:
  - 2010 to 2015 – 50 percent
  - 2015 to 2020 – 40 percent
  - 2020 to 2025 – 30 percent
  - 2025 to 2030 – 20 percent
  - 2030 to 2050 – 5 percent

Kiosks

- The average processing time per passenger at a check-in kiosk is 90 seconds (1.5 minutes).
- The average width of a check-in kiosk station position with one half of one bag well in lineal feet is approximately four feet five inches.
- Of the passengers using the Airport check-in facilities, the percentage that use the kiosks will increase correspondingly over the planning period as follows:
  - 2010 to 2015– 50 percent
  - 2015 to 2020– 60 percent
  - 2020 to 2025– 70 percent
  - 2025 to 2030– 80 percent
  - 2030 to 2050– 95 percent

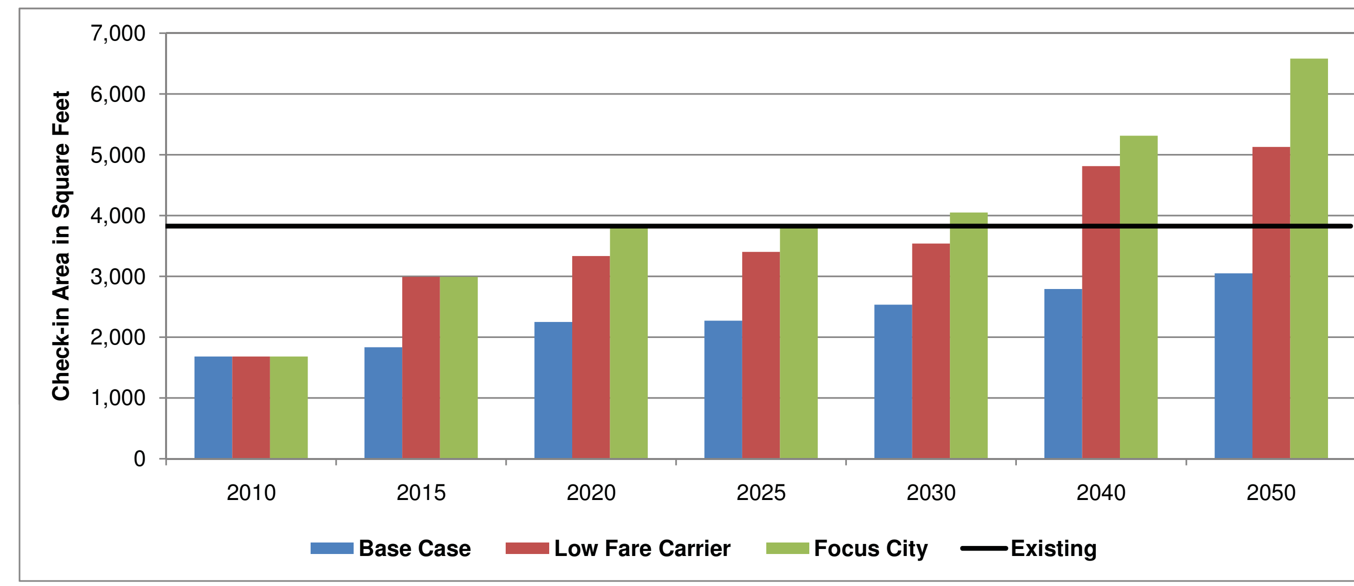
Check-in Queue

- The area per passenger in the check-in queue is 14 square feet. (IATA recommendation)
- The maximum acceptable queuing time in the check-in queue is ten minutes. (IATA recommendation)

4.4.3 CHECK-IN FACILITY REQUIREMENTS

The existing check-in counter and kiosk area currently has 1,936 square feet. This will be sufficient to meet the check-in requirements through the year 2050 for the Base Case, through 2030 for the Low Fare Carrier forecasts, and through the year 2025 for the Focus City forecast. The existing check-in queue area of 1,891 square feet would be able to meet demand through the year 2030 for the Low Fare Carrier forecast and through the year 2030 for the Focus City forecast. The Base Case forecast would not require additional queue area. Figure 4-7 shows the facility requirements of both the check-in counter/kiosk and the queuing areas combined.

FIGURE 4-7
CHECK-IN AREA FACILITY REQUIREMENTS



	Existing	2010	2015	2020	2025	2030	2040	2050
	3,827							
Base Case								
Annual Enplaned Passengers		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Square Feet of Check-in Area		1,680	1,830	2,250	2,270	2,530	2,790	3,050
Low Fare Carrier								
Annual Enplaned Passengers		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Square Feet of Check-in Area		1,680	2,990	3,330	3,400	3,540	4,810	5,130
Focus City								
Annual Enplaned Passengers		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Square Feet of Check-in Area		1,680	2,990	3,800	3,830	4,050	5,310	6,580

4.4.4 CHECK-IN TRIGGERS

The existing check-in counters and kiosks area of 1,936 square feet is large enough to handle the Base Case forecast demand through the year 2050. However, Table 4-3 shows that when the total peak-hour enplanements reaches 1,500 passengers, additional area will be required.

The existing check-in queue area of 1,891 square feet is large enough to handle up to approximately 1,090 peak-hour passengers. Table 4-3 shows various levels of potential peak-hour enplanments and the corresponding square foot area of queue required.

TABLE 4-3
CHECK-IN AREA AND QUEUE TRIGGERS

Triggering Event	Facility Requirement	
Peak-Hour Enplanements	Check-in Counter/ Kiosk Area	Check-in Queue Area
450	820	860
650	1,060	1,260
850	1,310	1,640
1,000	1,460	1,920
1,500	2,070	2,880
2,000	2,810	3,860

4.5 PASSENGER SECURITY SCREENING

Passenger security screening is an ever-evolving function of a passenger terminal. The existing terminal was designed and built before passenger security screening was envisioned. The original design did not provide any space for this function. Additions have been made to the terminal over the years and passenger security screening has been accommodated. However, the increased space for passenger security screening required after the terrorist attacks of September 11, 2001 has put a severe strain on the facility.

On Christmas Day of 2009, a terrorist attempted to blow up a flight entering the United States with explosives concealed beneath his clothing. Since then, there has been an increased call for additional passenger screening that can detect this type of threat. The Transportation Security Administration (TSA) is currently testing new equipment designed to scan the entire body revealing explosives and other contraband. However, because this full-body scan also results in a relatively graphic image of the passenger, there is wide concern from religious and civil liberty groups that the full-body scanners would be too intrusive. Should a passenger decline to go through the full-body-scanner, the TSA is considering allowing the passenger to be very thoroughly hand searched. They call this procedure an "enhanced pat-down search". The full-body scan and the "enhanced pat-down search" have been included in the assessmet of the passenger security-screening facilities in addition to the procedures in effect during the majority of 2009.

4.5.1 EXISTING PASSENGER SECURITY-SCREENING FACILITIES

The existing passenger security-screening facilities consist of two checkpoints, one for each concourse. Each is currently housed in an area originally designed to be a circulation lobby where passengers could traverse between the connector level and the upper level concourses. Each checkpoint is accessible by elevator, escalator, and hall.

Together, the two passenger security-screening areas measure approximately 4,409 square feet. The facilities calculated for this portion of the terminal include:

- The area in which the TSA security equipment and personnel are located
- The queue prior to the security equipment
- The area immediately after the security-screening equipment where passengers can reassemble themselves
- The deplaning corridor through which arriving passengers pass from the secure side of the terminal to the non-secure side

This area does not include the offices and training areas for the TSA personnel.

4.5.2 PASSENGER SECURITY-SCREENING ASSUMPTIONS

Several assumptions were made in determining the facility requirements for the passenger security-screening area. These assumptions were based on the following facts:

1. The TSA is still testing the full-body scanners.
2. There are currently 40 full-body scanners located at 19 airports across the United States.
3. TSA will deploy an additional 150 scanners in 2010.
4. The TSA has the funding for an additional 300 scanners in their 2010 budget.
5. TSA has proposed funding for an additional 500 scanners for the 2011 budget.

By the end of 2011, this could potentially result in 950 scanners deployed across the United States. With over 550 airports in the United States with scheduled flights, it is unlikely that full-body scanners would screen 100 percent of the passengers at an airport the size of Greenville-Spartanburg within the next six years or until the year 2015.

However, it is assumed that a more enhanced screening will be mandated before then. Until sufficient full-body scanners can be manufactured and distributed, it is assumed that the passengers would undergo an "enhanced pat-down search". It is further assumed that even when sufficient scanners are deployed, that a certain percentage of the population will be unable or unwilling to be screened using the full-body scanner. The following specific assumptions have also been made:

Processing and QueueTimes

- The processing time per passenger to go through the security processing typical at U.S. airports in 2009 is anticipated to decrease over the planning period as follows:
    - 2010 to 2015 – 30 seconds per passenger
    - 2015 to 2020 – 25 seconds per passenger
    - 2020 to 2025 – 20 seconds per passenger
    - 2025 to 2050 – 18 seconds per passenger (TSA goal)
- The average additional processing time per passenger for a full-body scan would be 30 seconds.
- The average additional processing time per passenger for an enhanced pat-down search would be 180 seconds (3 minutes).
- The maximum queue time at the 2009 TSA passenger security-screening layout will be 10 minutes (TSA goal).
- The maximum queue time at the full-body scanners will be 10 minutes.
- The maximum queue time at the enhanced pat-down search will be 10 minutes

Square Foot Areas

- The average square foot area per security-screening position is approximately 830 square feet. This is the average size of a 2009 TSA Standard Layout for three or more positions.
- The average square foot area for a full-body scanner is approximately 90 square feet.
- The average square foot area needed for an enhanced pat-down search is approximately 40 square feet.
- The square foot area per passenger in the passenger security-screening queue is nine square feet (TSA standard).

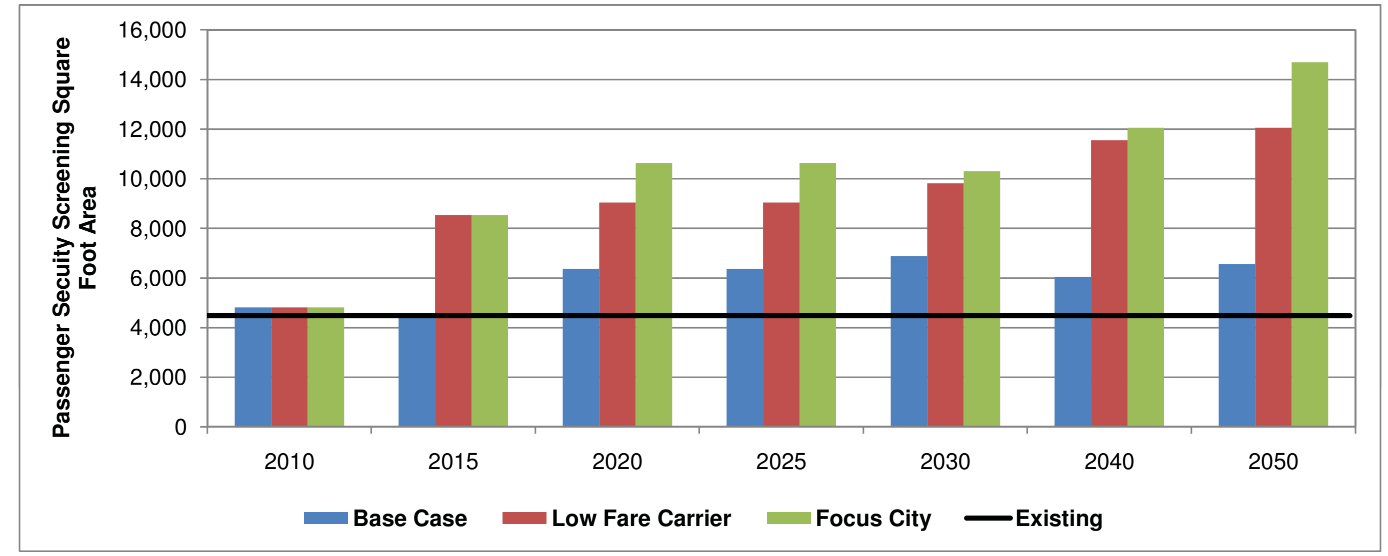
General

- The percentage of passengers who will go through the full-body scanner in addition to the typical 2009 TSA passenger security-screening layout will increase over the planning period as follows:
  - 2010 – 0 percent
  - 2015 to 2050 – 25 percent
- The percentage of passengers who will go through the enhanced pat-down search in addition to the typical 2009 TSA passenger security-screening layout will also vary over the planning period as follows:
  - 2010 – 0 percent
  - 2015 to 2050 – 2 percent
- All of the passenger security-screening positions are in one location and no duplication or redundancy is required due to more than one location. If multiple checkpoints are required, additional space would be required to accommodate peaks at each checkpoint.

4.5.3 PASSENGER SECURITY-SCREENING FACILITY REQUIREMENTS

Based on the above assumptions and the current TSA requirements, it was calculated that approximately 4,820 square feet are currently needed for passenger-security screening. Compared to the 4,409 square feet available today, split into two separate check-points. The area is 93 percent of what it needs to be. Figure 4-7 shows that the situation further deteriorates with each of the forecast scenarios. By the year 2030, an additional 2,471 square feet will be require for the Base Case forecast, 5,401 for the Low Fare Carrier forecast, and 5,901 for the Focus City forecast.

FIGURE 4-8
PASSENGER SECURITY-SCREENING FACILITY REQUIREMENTS



	2010	2015	2020	2025	2030	2040	2050
Annual Enplaned Passengers							
Base Case	617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Low Fare Carrier	617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Focus City	617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Number of 2009 passenger security-screening check point position(s)							
Base Case	3	4	5	5	6	6	7
Low Fare Carrier	3	6	7	7	8	11	12
Focus City	3	6	8	8	9	12	15
Number of full-body scanners							
Base Case	1	2	2	2	2	2	2
Low Fare Carrier	1	2	2	2	3	4	4
Focus City	1	2	3	3	3	4	5
Number of enhanced pat-down search areas							
Base Case	1	1	1	1	1	1	1
Low Fare Carrier	1	1	1	1	2	2	2
Focus City	1	1	2	2	2	2	3
Total square foot area for passenger screening checkpoint (Existing 4,409 sq. ft.)							
Base Case	4,820	4,520	6,380	6,380	6,880	6,050	6,550
Low Fare Carrier	4,820	8,540	9,040	9,040	9,810	11,560	12,060
Focus City	4,820	8,540	10,640	10,640	10,310	12,060	14,700

4.5.4 PASSENGER SECURITY-SCREENING TRIGGERS

TSA requirements and the number of peak-hour enplaning passengers determine the size of the passenger security-screening checkpoint. The facility is currently undersized for the peak-hour passengers of today, which number is approximately 450 passengers. The peak-hour passenger numbers and the average processing times determine the number of security-screening positions. As the number of peak-hour passengers rises, so will the number of security-screening positions.

Table 4-4 shows the required number of security-screening positions of the type found in U.S. airports in 2009 for several levels of peak-hour enplaning passengers. The table ends with the level of 2,000 peak-hour enplaned passengers. This level was chosen as it is close to the number of enplaning passengers forecast during the peak hour in the Focus City forecast for the year 2050. This is the highest peak-hour enplaned passenger level reached in any of the forecasts. Table 4-5 shows the required number of full-body scanners for each of the peak-hour passenger levels. This assumes that 25 percent of the passengers pass through the full-body scanner. Table 4-6 shows the number of enhanced pat-down search positions required, assuming that approximately 2 percent of the passengers would submit to this procedure rather than the full-body scan.

TABLE 4-4
NUMBER OF 2009 SECURITY-SCREENING POSITIONS TRIGGERS

Triggering Event	Facility Requirement
Peak-Hour Enplanements	Number of 2009 Security-Screening Positions
450	3
650	5
850	6
1,000	8
1,500	11
2,000	15

Note: Assumes 100 percent screening

TABLE 4-5
NUMBER OF FULL-BODY SCANNING DEVICES TRIGGERS

Triggering Event	Facility Requirement
Peak-Hour Enplanements	Number of Full-Body Scanning Devices
450	1
650	2
850	2
1,000	3
1,500	4
2,000	5

Note: Assumes 25 percent screening

TABLE 4-6
NUMBER OF ENHANCED PAT-DOWN SEARCH POSITIONS

Triggering Event	Facility Requirements
Peak-Hour Enplanements	Number of Enhanced Pat-Down Positions
450	1
650	1
850	1
1,000	2
1,500	2
2,000	3

Note: Assumes 2 percent screening

The appropriate square foot area can be determined by multiplying the number of required security-screening positions and/or scanners by the appropriate square foot area for each. This is currently 830 square feet for a 2009 security-screening position, 90 square feet for a full-body scanner position, and 40 square feet per enhanced pat-down search area. Additional area must also be included for the queue before each screening procedure. Appendix 6 contains these details.

The summary of these facilities assumes that 100 percent of the passengers would be processed through the 2009 type of U.S. airport security screening. Beginning in 2015, passengers would also undergo an additional level of enhanced screening through either the full-body scanner, the enhanced pat-down search, or a combination of the two. The process may not transpire exactly in this manner, but this section and Appendix 6 give enough information to be able to determine other combinations of these elements.

4.6 BAGGAGE SECURITY SCREENING

Similar to the passenger security-screening facilities, the baggage screening facilities were not envisioned when the terminal was designed and built. In fact, the mandate for baggage screening did not come until late 2001, after the terrorist attacks, when congress determined that 100 percent of checked baggage must be screened for explosives.

4.6.1 EXISTING BAGGAGE SECURITY-SCREENING FACILITIES

The terminal was not designed nor built to accommodate baggage security screening. Therefore, space had to be found to accommodate the new function. Today, the TSA baggage area is located in the former baggage make-up area as shown in Figure 4-9. Although, TSA occupies approximately 3,900 square feet of space in the airlines baggage make-up area for manually screening checked bags, since there is no dedicated baggage screening room. For the purpose of this study, the existing baggage screening area is assumed to be zero square feet. All of its actual area is counted as baggage make-up.

FIGURE 4-9
EXISTING CHECKED-BAGGAGE SCREENING AREA

Nine years after Congress mandated that all checked baggage would be security screened; all baggage at the Airport is screened using Explosive Trace Detection (ETD) technology. This methodology requires that TSA wipe sensitive swabs across baggage and other items and then scan the swab for trace amounts of explosive materials. In addition, in late 2009, the TSA mandated that their agents must physically open 100 percent of the baggage at airports employing such technology. This is a highly labor intensive operation and requires an average of approximately 80 seconds per bag to process.

4.6.2 CHECKED-BAGGAGE SECURITY-SCREENING ASSUMPTIONS

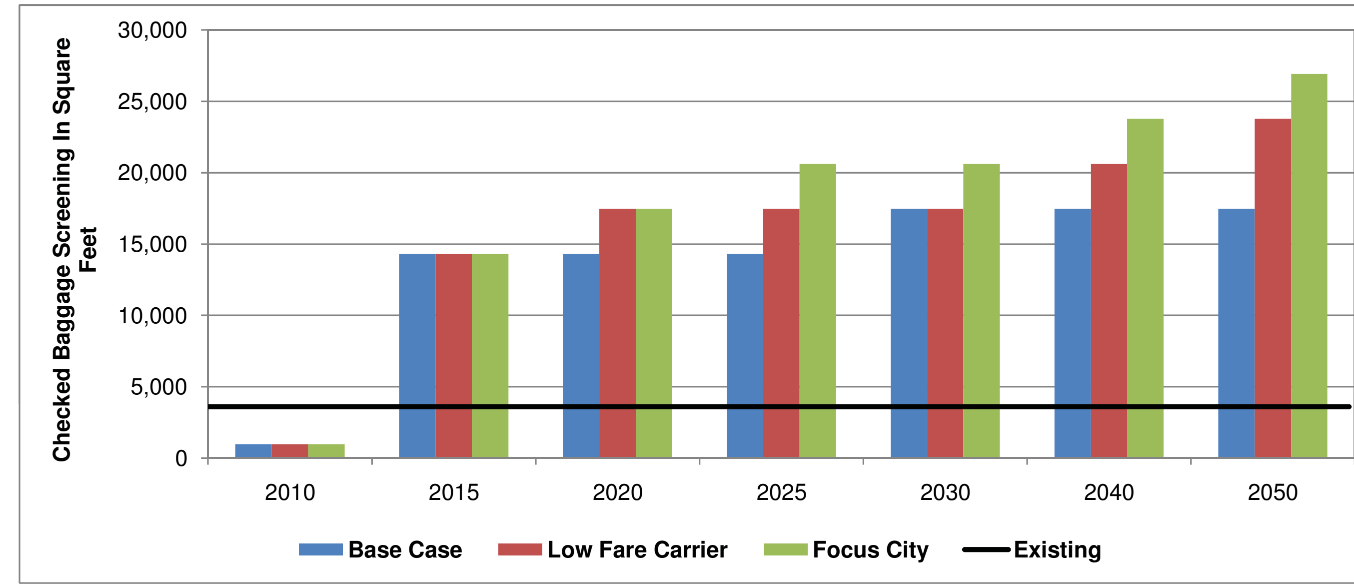
Several assumptions were made in calculating the facility requirements for the checked-baggage security-screening. The primary assumption is that with future terminal modifications, the current ETD methodology would be replaced with Explosive Detection System (EDS) technology. EDS electronically scans the checked baggage for explosives. It is assumed that the EDS would be initially installed without the auxiliary baggage conveyors, but that five years later the EDS machines would be installed "in-line" to the baggage-handling system. Specific assumptions are as follows:

- The percentage of passengers checking bags is 50 percent.
- The average number of bags per passenger checking bags is 1.3.
- The percentage of baggage being primary screened with ETD technology will vary over the planning period as follows:
    - 2010 – 100 percent
    - 2015 to 2050 – 0 percent
- The percentage of baggage being primary screened with in-line EDS technology will also vary over the planning period as follows:
    - 2010 - 0 percent
    - 2015 to 2050 – 100 percent
- The average processing rate of baggage screened with the ETD technology including the opening of 100 percent of the baggage is 45 bags per hour.
- The average processing rate of baggage screened with in-line EDS technology is 225 bags per hour.

4.6.3 CHECKED-BAGGAGE SECURITY-SCREENING FACILITY REQUIREMENTS

Based on the above assumptions, the existing baggage screening space that occupies approximately 3,900 square feet of baggage make-up space will be insufficient to comply with federal security mandates by 2015 for all scenarios.

FIGURE 4-10
CHECKED-BAGGAGE SECURITY-SCREENING FACILITY REQUIREMENTS



	2010	2015	2020	2025	2030	2040	2050
Annual Enplaned Passengers							
Base Case	617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Low Fare Carrier	617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Focus City	617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Number of ETD primary screening positions							
Base Case	8	0	0	0	0	0	0
Low Fare Carrier	8	0	0	0	0	0	0
Focus City	8	0	0	0	0	0	0
Number of in-line EDS primary screening positions							
Base Case	0	2	2	2	3	3	3
Low Fare Carrier	0	2	3	3	3	4	5
Focus City	0	2	3	4	4	5	6
Total baggage screening square foot area (Existing 3,888 sq. ft.)							
Base Case	960	14,310	14,310	14,310	17,460	17,460	17,460
Low Fare Carrier	960	14,310	17,460	17,460	17,460	20,610	23,770
Focus City	960	14,310	17,460	20,610	20,610	23,770	26,920

4.6.4 CHECKED-BAGGAGE SECURITY-SCREENING TRIGGERS

The number of checked-baggage screening positions is dependent upon the number of peak-hour outbound checked bags and the methodology used to check the bags. Table 4-7 shows the number of security-screening stations required for various levels of peak-hour outbound checked bags.

TABLE 4-7
OUTBOUND CHECKED-BAGGAGE SCREENING TRIGGERS

Triggering Event		Facility Requirement
Number of Peak-Hour Outbound Checked Bags	ETD Primary Stations	In-Line EDS Primary Stations
225	5	1
450	10	2
675	15	3
900	20	4
1,125	25	5
1,350	30	6

The area required for the checked-baggage security-screening is determined by multiplying the number of stations by the square foot area of the type of screening position used. The average square foot area for an ETD station is 120 square feet. For a stand-alone EDS machine, it is approximately 65 square feet. For an in-line EDS system, it is approximately 2,400 square feet, but as the number of machine rises, there is an economy that is realized with joint use of the baggage belts. Additionally, while the in-line EDS system requires more area, it processes more bags per hour, reducing the number of machines required to process the same number of bags. The in-line EDS system would also greatly reduce number of personnel required to screen checked bags.

4.7 DEPARTURE LOUNGES

The departure lounges are located on the highest passenger level of the existing terminal. They occupy two concourses. Four airlines currently occupy Concourse A and one airline, Delta, occupies Concourse B.

4.7.1 EXISTING DEPARTURE LOUNGE TOTAL AREA

Of the two concourses, Concourse A has nine departure lounges and approximately 21,900 square feet of holding area and Concourse B has four departure lounges and approximately 11,200 square feet of holding area. Together, there is approximately 33,100 square feet of departure lounge space exclusive of concourse circulation restrooms and concession space. All of the departure lounges are of an open style where the passengers can sit in areas not specifically assigned to the airline or flight they might be using, as shown in Figure 4-11.

FIGURE 4-11
EXISTING DEPARTURE LOUNGES

Two of the departure lounges in Concourse A and one of the departure lounges in Concourse B are currently unassigned to airlines The two concourses are not directly accessible to each other. A passenger would have to travel outside of security and then back through security to travel from one concourse to another.

4.7.2 DEPARTURE LOUNGE ASSUMPTIONS

The size of the largest aircraft that uses a gate determines the size of the corresponding departure lounge. The following specific assumptions were made in sizing the departure lounges:

- The square foot area per passenger in the departure lounges is 15 square feet. (IATA recommendation)
- Not all departure lounges/gates are occupied during the peak hour.
- The mix of aircraft serving the Airport and the number of seats that these aircraft represent will vary over the planning period and with the aviation activity forecast as seen in Table 4-8.

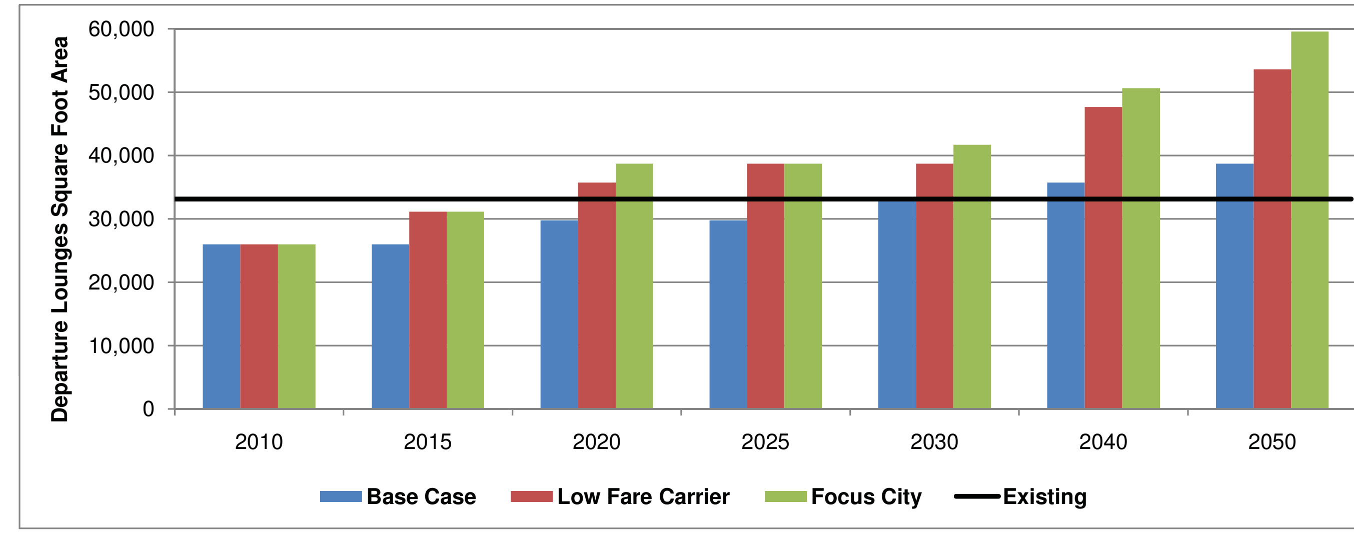
TABLE 4-8
SEATS IN THE AIRCRAFT MIX

	2010	2015	2020	2025	2030	2040	2050
Base Case							
Aircraft with 20-50 seats	97.1%	68.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Aircraft with 51-80 seats	0.0%	28.6%	96.6%	62.2%	48.5%	49.6%	50.8%
Aircraft with 81-110 seats	0.0%	0.0%	0.0%	34.2%	47.4%	45.5%	44.1%
Aircraft with 131-160 seats	2.9 %	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Aircraft with 161-180 seats	0.0%	0.0%	3.4%	3.6%	4.1%	4.9%	5.1%
Low Fare Carrier							
Aircraft with 20-50 seats	97.1%	57.9%	0.0%	0.0%	0.0%	0.0%	0.0%
Aircraft with 51-80 seats	0.0%	24.3%	77.6%	48.8%	37.6%	38.4%	39.3%
Aircraft with 81-110 seats	0.0%	0.0%	0.0%	26.8%	36.8%	35.2%	34.1%
Aircraft with 131-160 seats	2.9%	17.8%	19.7%	21.5%	22.4%	22.6%	22.7%
Aircraft with 161-180 seats	0.0%	0.0%	2.8%	2.9%	3.2%	3.8%	3.9%
Focus City							
Aircraft with 20-50 seats	97.1%	56.4%	0.0%	0.0%	0.0%	0.0%	0.0%
Aircraft with 51-80 seats	0.0%	23.6%	73.1%	45.3%	34.3%	34.9%	35.7%
Aircraft with 81-110 seats	0.0%	0.0%	0.0%	24.9%	33.6%	32.1%	31.0%
Aircraft with 131-160 seats	2.9%	20.0%	26.0%	29.9%	32.1%	33.0%	33.2%
Aircraft with 161-180 seats	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%

4.7.3 DEPARTURE LOUNGE FACILITY REQUIREMENTS

The existing 39,490 square feet of departure lounge space is forecast to be able to accommodate all of the forecasts through the year 2050.

FIGURE 4-12
DEPARTURE LOUNGES SQUARE FOOT AREA REQUIREMENTS



	Existing	2010	2015	2020	2025	2030	2040	2050
	33,094							
Base Case								
Annual Enplaned Passengers		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Square Feet of Departure Lounges		25,950	25,950	29,780	29,780	32,780	35,730	38,710
Low Fare Carrier								
Annual Enplaned Passengers		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Square Feet of Departure Lounges		25,950	31,140	35,730	38,710	38,710	47,640	53,600
Focus City								
Annual Enplaned Passengers		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Square Feet of Departure Lounges		25,950	31,140	38,710	38,710	41,690	50,620	59,550

4.7.4 DEPARTURE LOUNGE SIZE TRIGGERS

The largest aircraft that a gate is designed to accommodate determines the area of the corresponding departure lounge. Aircraft do not typically occupy all of the gates during the peak hour and the departure lounge does not duplicate all of the seats in an aircraft. Aircraft typically do not fly entirely full, nor do all passengers wait in the departure lounge. Taking these factors into consideration results in the square foot area requirements for departure lounges based on the number of peak-hour aircraft seats on departing aircraft shown in Table 4-9.

TABLE 4-9
SIZE OF DEPARTURE LOUNGE TRIGGERS

Triggering Event		Facility Requirement
Peak-Hour Passengers	Number of Gates	Total Square Foot Area of All Departure Lounges
450	10	25,950
650	10	29,780
850	12	35,730
1,000	13	38,710
1,500	16	47,640
2,000	20	59,550

4.8 U.S. CUSTOMS AND BORDER PROTECTION FACILITIES

On March 1, 2003, the three largest Federal Inspection Service (FIS) agencies were consolidated to form the U.S. Customs and Border Protection (CBP). It is the role of the CBP to manage, secure, and control the borders of the United States.

The three agencies that were consolidated were the U.S. Customs, Immigration, and Agriculture operations. As the CBP, the work of these agencies continues at airports that operate as points of entry into the United States. Selected airports also host the Public Health Service (PHS) and the Fish and Wildlife Service (FWS). At larger airports, an investigative agency of the Department of Homeland Security (DHS), Immigration and Customs Enforcement (ICE) may also be represented.

4.8.1 EXISTING CBP FACILITIES

The existing CBP facilities at the Greenville-Spartanburg International Airport are located on the apron level of Concourse A. The CBP currently has approximately 7,688 square feet in this facility.

Currently, the Airport does not receive any scheduled commercial international flights. The international commercial flights that it does receive are typically charter flights.

4.8.2 CBP ASSUMPTIONS

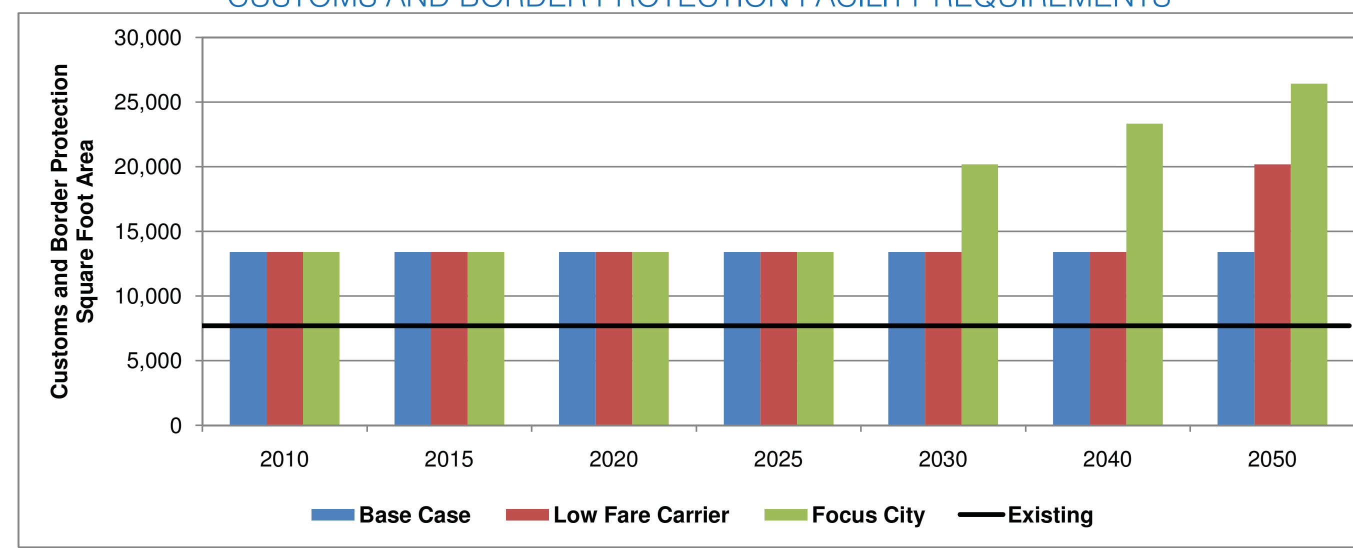
As the existing CBP facilities are not used on a consistent basis, the following assumptions were made:

- The existing facilities would not be replaced/moved or enlarged until regularly scheduled commercial international flights come to the Airport.
- The smallest commercial service facility for which CBP publishes a facility program is for 200 passengers per peak hour, approximately the size of a Boeing 757-200 aircraft.
- If the Airport were to replace the existing CBP facilities, it would be with a facility that would accommodate at least 200 peak-hour passengers.
- Allegiant is expected to enter the Caribbean market within the next five years.
- With the introduction of a low fare carrier to the Airport, international traffic in addition to that of Allegiant could follow.
- If a low fare carrier enters the market, the international deplanements will reach 400 peak-hour passengers by the year 2050,
- If the Airport becomes a focus city for a low fare carrier, the peak-hour international deplaning passengers will reach 400 by the year 2030 and 600 by the year 2050.

4.8.3 CBP FACILITY REQUIREMENTS

Based on the assumptions, the following facility requirements were calculated, as shown in Figure 4-13. In order to accommodate a peak-hour deplanement of approximately 200 passengers, about 13,410 square feet would be required. A facility able to accommodate approximately 400 peak-hour passengers would require about 20,190 square feet, and a facility for 600 peak-hour passengers would need about 26,420 square feet of area. Square footage requirements indicated are as prescribed by CBP Standards.

FIGURE 4-13
CUSTOMS AND BORDER PROTECTION FACILITY REQUIREMENTS



	Existing	2010	2015	2020	2025	2030	2040	2050
	7,688							
Base Case								
Annual Enplaned Passengers		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Square Feet of CBP		13,410	13,410	13,410	13,410	13,410	13,410	13,410
Low Fare Carrier								
Annual Enplaned Passengers		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Square Feet of CBP		13,410	13,410	13,410	13,410	13,410	13,410	20,190
Focus City								
Annual Enplaned Passengers		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Square Feet of CBP		13,410	13,410	13,410	13,410	20,190	23,330	26,420

4.8.4 *CBP TRIGGERS*

The increasing numbers of peak-hour deplaning international passengers become the triggers for additional CBP facilities. As the number of regularly scheduled deplaning international passengers increases, the CBP recognizes the corresponding square foot facility requirements indicated in Table 4-10.

TABLE 4-10
CUSTOMS AND BORDER PROTECTION TRIGGERS

Triggering Event	Facility Requirement
Peak-Hour Deplaning International Passengers	Customs and Border Protection Square Foot Area
200	13,410
400	20,190
600	26,420

4.9 CONCESSIONS

Concessions are those passenger terminal functions that are not strictly necessary to getting passengers onto and off aircraft. Concessions are amenities. They make the experience of travel more pleasant. Typical airport terminal concessions might include a gift and news shop, a restaurant or snack bar, and rental car facilities. However, concessions also include such items as Automated Teller Machines (ATMs), advertising, telephones, amusement arcades, and vending machines. At larger airports, it can include hairdressers, shoeshine stands, massage facilities, and nail salons. To reduce the number of concessions at an airport would severely reduce the desirability of the airport to the traveler.

Concessions also produce revenue for the Airport and to eliminate or severely reduce the concessions at an airport would severely cut into the revenue of the airport. Alternatively, when there are more concessions than passenger processing areas of the terminal, it can become difficult for the passenger to find their way through the concessions to security, the departure lounges, or baggage claim. A balance between the concessions and the terminal functions must be kept.

4.9.1 *EXISTING CONCESSIONS*

The Airport currently has one large restaurant, a snack bar, a food take-away counter, and a bar on the non-secure side of the terminal. Figure 4-14 is a picture of the large restaurant.

FIGURE 4-14
EXISTING LANDSIDE RESTAURANT

Figure 4-15 shows an existing food preparation area, which is supported by a commercial kitchen and food storage on the level below. The snack bar can be seen at the left side of the Figure 4-15. The right side of Figure 3 15 shows a pass through to the servers of the large restaurant.

FIGURE 4-15
EXISTING FOOD PREPARATION AREA

In addition, there is a small snack bar on each of the two concourses, as well as a vending area and a bar prior to security. Together, the existing square foot area for the food and beverage operations at the Airport total approximately 14,700 square feet.

There is one gift and news store on the non-secure side of the terminal. This store supports a gift and news kiosk on each concourse. Together, with a storage area, these facilities total approximately 2,250 square feet.

"Other concessions" consist of such items as advertising, ATMs, taxi desks, and motel/hotel boards. The area for these functions are incidental and are included in other spaces.

The rental car counters, the offices located behind them, and the queue area in front of the counters are located adjacent to the baggage-claim area. This is traditional in airport layouts, although increasingly these functions are located in closely located parking garages. Together, these rental car facilities currently occupy approximately 3,310 square feet in the terminal. Figure 4-16 shows the rental car counters and an area for queuing.

FIGURE 4-16
EXISTING RENTAL CAR COUNTERS

4.9.2 CONCESSION ASSUMPTIONS

The following basic assumptions were made in developing the facility requirements for the terminal concessions:

- The percentage of passengers using the restaurant is currently 15 percent. It is assumed that this will increase to an average of 20 percent once future terminal modifications are complete.
- Each person in the restaurant occupies an average of 35 square feet in the seating and service areas, not including kitchen, storage and other support facilities.
- There are five rental car companies currently at the Airport with two of the rental car companies co-branding and sharing facilities. It is assumed that this will continue throughout the planning period.

4.9.3 CONCESSION TRIGGERS

The terminal concessions, exclusive of the rental car facilities will require additional facilities within the forecast period. The triggers for the expansion of these facilities will be addressed in the separate concessions study that is a part of this study.

The existing square foot area of the rental car terminal facilities is more than the demand throughout the planning period for the entire forecast. No triggers for additional capacity requirements are needed. Even if an additional rental car company were to come to the terminal, the existing rental car area would be enough to accommodate that company with only minor adjustments to the layout of the existing spaces.

4.9.4 EXISTING RETAIL PROGRAM

By examining the Airport's existing retail program, we gain a better understanding of not only sales and revenue performance, but also the adequacy of existing space. In addition, through a review of the types of products and services offered and the locations of these facilities, we are better able to identify opportunities for expanding or enhancing service and revenue productivity.

To accomplish this, current facility layouts, merchandise mix, historical enplanements, facility characteristics, and historical sales and revenue statistics are analyzed. There are several performance indicators that may be examined as part of a retail program analysis, but two of the most useful, which are discussed in this overview, are sales per square foot and sales per enplaned passenger.

In general, a high level of *sales per square foot* is desirable, indicating an efficient use of space. However, when sales per square foot climb significantly above the industry average for a merchandise category, it may be an indication that the retail facility is undersized. In this case, additional retail space may be warranted in order to reduce congestion, serve more customers and ultimately increase sales and customer satisfaction. Conversely, low sales per square foot may be indicative of oversized facilities or a number of other deficiencies, including problems related to store design, merchandise mix, customer service, visibility or location. However, note lower sales per square foot may also be simply a result of overall airport size. For example, a branded specialty coffee kiosk has a minimum square footage irrespective of the number of passengers it serves.

Sales per enplaned passenger reflect the extent to which passengers choose to take advantage of concession opportunities and is often referred to as a "capture rate." A high level of sales per enplanement is always a positive indicator of retail performance. However, sales per enplanement must be analyzed in conjunction with sales per square foot to assess the efficiency of a retail facility. For example, high sales per enplanement and low sales per square foot may suggest that the retail facility is oversized, resulting in an inefficient use of space (subject to the minimum size for any particular type of concession). Conversely, low sales per enplanement and high sales per square foot may suggest an undersized facility that may be unable to adequately serve customers due to its small size, resulting in a lower capture rate.

4.9.5 CONCESSIONS PROGRAM OVERVIEW

Currently, the concessions program at GSP consists of a full-service restaurant (Windows), generic bar and a Hudson newsstand. Each of these facilities is pre-security. Post-security, each concourse includes a Hudson "news wall", which displays a limited variety of news papers and periodicals, as well as beverage coolers and some pre-packaged snacks and candies, and a small snack stand and bar operated by the food and beverage concessionaire.

The landside news and gift shop is the primary retail outlet at GSP, offering passengers and visitors a variety of newspapers, magazines, sundry items, and local souvenirs. Gross retail sales at GSP totaled approximately $1,420,331 in 2008, or $1.99 per enplaned passenger.

The landside dining area provides passengers and visitors a full-service restaurant in an atrium setting. Airside snack shops offer passengers a variety of grab and go options including sandwiches, pizza, hot pretzels, cold cereal, and pastries. Beverage options at the snack shops include soda, juice, milk, coffee, beer, wine, and mixed drinks. Gross sales for the food and beverage program at GSP totaled approximately $2,247,248 in 2008, or $3.16 per enplaned passenger.

Food and beverage space at GSP totals 10,159 square feet, excluding storage and support space. When compared with 2008 enplanements, Greenville averages $221 in food and beverages sales per square foot. Retail space at the Airport totals 1,747 square feet, leading to retail sales of $814 per square foot in 2008.

4.9.6 COMPARATIVE AIRPORT ANALYSIS

This section provides an analysis of selected airport concession programs as a comparison to GSP's retail program performance. Airports in this review were chosen because they are a similar size to GSP – specifically annual enplanement levels between 500,000 and 1.2 million. Except as noted, all data are for 2008 as reported in the 2009 Airport Revenue News Fact Book.

TABLE-4-11
COMPARATIVE CONCESSION SALES - 2008

Airport		2008 Enplanements	Ratio of Pre- to Post- Security (Concession Space)	Food and Beverage				News/Gift			
				Sales	S.F.	Sales/EP	Sales/S.F.	Sales	S.F.	Sales/EP	Sales/S.F.
LEX	Blue Grass Airport (2007 data)	527,231		$1,443,814	11,026	$2.74	$131	$1,554,247	6,588	$2.95	$236
ACY	Atlantic City Int'l	547,459	60/40	2,276,719	4,633	4.16	$491	1,087,419	1,481	1.99	$734
FAT	Fresno Yosemite	627,343	79/21	2,493,599	11,514	3.97	$217	1,685,991	3,497	2.69	$482
MSN	Dane County Regional	739,729	24/76	2,763,738	7,547	3.74	$366	2,294,445	4,017	3.10	$571
SRQ	Sarasota/ Bradenton Int'l	755,162	60/40	3,036,723	13,881	4.02	$219	2,303,773	7,687	3.05	$300
ICT	Wichita Mid-Continent	805,286		2,787,328	7,455	3.46	$374	1,568,300	1,438	1.95	$1,091
TYS	McGhee Tyson	863,294	30/70	2,457,035	3,277	2.85	$750	2,712,080	3,591	3.14	$755
GRR	Gerald R. Ford Int'l	907,160	80/20	3,041,464	9,680	3.35	$314	1,307,908	1,113	1.44	$1,175
SFB	Orlando Sanford	914,449		4,911,689	N/A	5.37	N/A	1,756,341	N/A	1.92	N/A
SAV	Savannah/Hilton Head Int'l	988,929	41/59	4,864,940	15,821	4.92	$307	3,406,425	6,485	3.44	$525
GSO	Piedmont Triad Int'l	1,109,100	34/66	3,602,566	12,432	3.25	$290	3,100,680	6,690	2.80	$463
CHS	Charleston International	1,170,821	50/50	3,140,433	11,143	2.68	$282	2,379,069	2,348	2.03	$1,013
	Weighted Average					$3.70	$294			$2.53	$521
GSP	Greenville-Spartanburg Int'l	712,156		$2,247,248	10,159	$3.16	$221	$1,420,331	1,747	$1.99	$814

Sources:

1. 2009 Airport Revenue News Fact Book (except LEX, which is 2007 data from the 2008 Airport Revenue News Fact Book).
2. GSP data supplied by the Airport and the Terminal Area Planning Study draft.

As seen in Table 4-11, food and beverage sales per enplanement for Greenville-Spartanburg equaled $3.16 per enplaned passenger. This is below the weighted average of $3.70 for the 12 comparative airports. Total concession space at GSP equals approximately 11,900 square feet, with the majority of this space dedicated to food and beverage. This is a comparably sized program to peer airports.

Similar to GSP, the retail programs of many airports with less than 1.2 million enplanements consist primarily of news and gift concessions with only a few airports offering specific specialty retail concessions. Consequently, airports of this size typically have low retail sales per enplanement.

Greenville reports retail sales per enplanement for 2008 at $1.99 per enplaned passenger. This is also below the weighted average of the comparable airports, which was $2.53 per enplaned passenger in 2008.

4.9.7 RECOMMENDED SPACE REQUIREMENTS

One of the more important elements in the evaluation and planning of an airport retail program is determining the appropriate amount of space to be allocated for food and beverage and news, gift, and specialty concessions. Space requirements are developed through an iterative process, beginning with a preliminary quantitative analysis of space requirements, which is then refined as other elements of the concession program are incorporated.

The quantitative measures used in this section provide an objective starting point from which to estimate future space demands, as well as evaluate the adequacy of current retail space. The calculated maximum space requirements represent the ideal case, ignoring any physical or financial constraints. If there were no other considerations or limitations, passenger traffic could support the amount of space described below. The recommended size and configuration of retail space is continually refined and ultimately determined by a combination of factors, including the location and configuration of stores, passenger flow, passenger demographics, and the amount of space available given the physical constraints of the facility. A Space Utilization Factor is developed for each concession category (food and beverage and news, gift & specialty) and the methodology used to develop these factors is discussed in detail later in this section.

4.9.8 SPACE UTILIZATION FACTOR (SUF) ANALYSIS

The Space Utilization Factor methodology was developed by Unison to evaluate the amount of retail space required at an airport to meet current and future passenger demand. This methodology has been used by Unison in its concessions program planning engagements for more than 10 years. The Space Utilization Factor (SUF) represents the number of square feet of retail space required per thousand annual enplaned passengers. The SUF factor is comprised of several components representing passenger, facility and retail operating characteristics that serve as space "drivers" – those characteristics that influence the amount of concessions space that is needed to optimize customer satisfaction, concessionaire financial viability and revenues to the airport. A ranking is applied to each component of the major characteristics according to its contribution in allocating an airport's concession space. Each characteristic is ranked from 0.1 (requiring less space) to 0.6 (requiring more space) for both the food and beverage and retail categories.

Passenger Characteristics focus on factors descriptive of the passenger base, including leisure versus business travelers, origination & destination passengers versus connecting passengers, the degree of passenger peaking, and area residents versus visitors. These characteristics have a significant affect on buying behavior and consequently on the amount of retail space required.

Facility Characteristics focus on the physical characteristics of GSP, such as whether concession locations are scattered throughout terminals or centrally located, if they are highly visible and accessible to dense passenger traffic, if they are located pre- or post-security, and if the retail locations are close to boarding gates. These characteristics affect program sizing because when retail locations are clustered in highly visible and accessible locations, they are more likely to serve a greater number of customers and thus require additional space. Those locations that are out of passenger sight or access will naturally attract less traffic.

Retail Characteristics include those factors that are specific to each retail category. For example, for food and beverage concessions, if the program includes a full-service restaurant, more space will be required than if it includes only snack bars scattered throughout the terminals. This is because restaurants require more space for seating and kitchens. All of these characteristics are discussed in detail below.

Once each characteristic is ranked, individual rankings are totaled for each retail category. An additional adjustment factor is applied to the calculated SUF for news, gifts and specialty retail to take into account generally overall lower consumer demand for retail merchandise, higher passenger exposure requirements for specialty retail in order to maintain financial viability, and no need for seating. At airports the size of GSP, an adjustment factor of 35% is used to account for the relatively small customer base that reduces the financial viability of retail (specialty retail in particular), which in turn, reduces space requirements.

The SUF represents the amount of retail space required in a particular category per thousand enplaned passengers. The higher the SUF, the greater the amount of space required. In order to arrive at an estimate of space requirements, the SUF is multiplied by the total number of enplaned passengers and divided by one thousand. It should be noted that although the SUF analysis is an extremely important factor in determining space requirements, it is a starting point in our space planning for a concessions program. Additional factors such as merchandise mix, design concepts, space requirements of individual concepts and facility constraints are also considered in developing and finalizing the overall program space.

4.9.9 RATIONALE FOR SUF CHARACTERISTIC RANKINGS

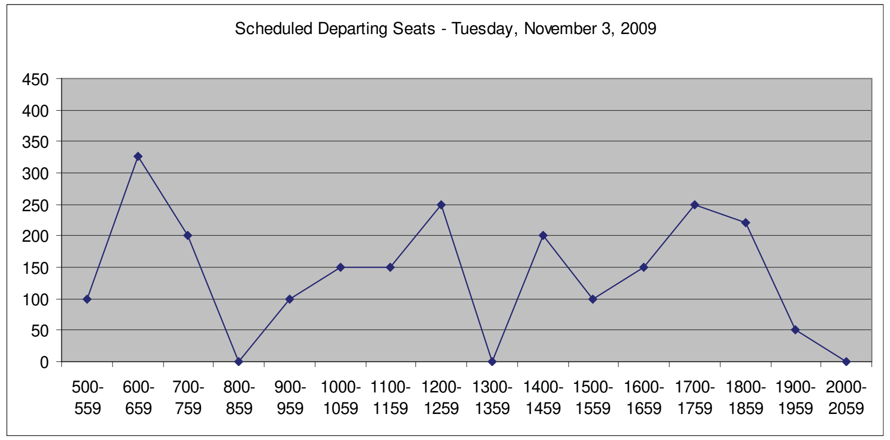
The Space Utilization Factor analysis includes the ranking of characteristics grouped into the following categories: Passenger Characteristics, Facility Characteristics, Food & Beverage Characteristics and Retail Characteristics. The rationale for the rankings of each characteristic are discussed below. These ranking are specific to the characteristics of GSP and its passenger market, and to the future concessions program.

SUF Analysis – Passenger Characteristics

Passenger characteristics have a significant impact on buying behavior and consequently on the amount of retail space required. The key characteristics taken into account in the estimation of space requirements are as follows:

- *Connecting/O&D.* Passengers who begin or end their trip at an airport – O&D passengers – typically have longer dwell times than passengers who are only connecting to another flight. GSP has an extremely high O&D passenger base, suggesting a high SUF of 0.6.
- *Travel Purpose.* The higher the percentage of leisure travelers versus business travelers, the higher the SUF ranking and the greater the amount of space needed for concessions. This is attributed to the difference in buying characteristics between leisure and business travelers. As discussed earlier, leisure travelers tend to arrive earlier at the airport, purchase more on impulse, and spend more money on gifts and souvenirs. According to passenger survey results, approximately 40% of all passengers at GSP are traveling for business, and 60% are traveling for leisure purposes. This led to an SUF ranking of 0.4 for this characteristic.
- *Resident v. Visitor.* Visitors are more likely than residents to spend money on souvenirs and gifts, as well as arrive earlier at the Airport due to unfamiliarity with the Airport. According to the 2009 Economic Impact Analysis, 63% of passengers are local residents split between residents and visitors at GSP, resulting in an SUF ranking of 0.2.
- *Income.* It is important to look at passenger income when determining passenger spending power, as passengers with higher household incomes are generally able to spend more money on concessions at the Airport. Based on survey data at GSP, 59% of respondents report annual household incomes of over $75,000. This distribution led to a moderate SUF ranking of 0.4 for this characteristic.
- *Short Duration Flights / Long Duration Flights.* Passengers who will be traveling longer distances may be more likely to make purchases at an airport than those who are traveling on commuter or regional flights. Passengers who will be making connections at other airports also may be less likely to purchase at the originating airport than those who will be flying directly to their final destination. At GSP, the majority of passengers are traveling on shorter trips to major hub airports. Therefore, this factor received a lower ranking of 0.2.
- *Passenger Peaking.* Passenger peaking refers to periods during which a greater than average number of departures are scheduled within a short period of time. A high level of passenger peaking generally necessitates more retail space to accommodate the higher volume of passengers using retail space during these periods. With the exception of an early morning peak, the Airport has fairly steady passenger traffic throughout the majority of the day (Figure 4-17). This resulted in an SUF ranking of 0.3.

FIGURE 4-17



SUF Analysis – Facility Characteristics

The physical characteristics of GSP have a significant affect on the number of passengers exposed to concessions and consequently on the amount of space required for concessions in order to satisfy passenger demand. Pertinent facility characteristics and the corresponding SUF rankings are discussed below:

- *Accessibility and Visibility.* Those retail spaces that are the most accessible and visible require the most space. This is because highly visible spaces are more likely to attract passengers, whereas retail spaces that are hidden or in low-traffic areas will need less floor space. An undersized retail space will lead to long lines and frustrated passengers. The proposed layout at GSP places concessions within the direct flow of passenger traffic which increases both the accessibility and visibility of these outlets, therefore these SUF factors received high rankings of 0.4.
- *Clustered or Scattered Location.* Store location is critical to attract passengers and promote spending. Concessions that are clustered in central areas attract more passengers than do scattered facilities. Clustered stores that provide a "critical mass" of retail area create distinct and inviting retail environments. Clustering increases the passenger's propensity to shop because there is a higher likelihood of finding a necessity or impulse item to purchase from the variety of options available. The proposed program places concession facilities in a centralized area visible to all passengers; therefore, this factor received a higher SUF ranking of 0.4.
- *Pre/Post Security Screening.* Passengers generally prefer concessions located airside (after security screening) over those located landside (before security screening). Research has shown that passengers spend less time at landside concessions than airside concessions. This pattern is attributed to greater passenger anxiety concerning the time it will take to pass through security and locate the proper gate. Once passengers complete ticketing, baggage checking and security, they tend to be more relaxed and are more willing to browse, eat and shop. The proposed terminal configuration moves a large percentage of concessions beyond the security checkpoint. Therefore, this factor received a higher SUF ranking of 0.5.
- *Terminal Configuration.* The layout of the terminal has an impact on the amount of exposure that passengers have to concession facilities. Terminal configurations that require longer walking distances generally require more scattered retail space than terminal configurations with shorter walking distances. GSP has a linear configuration, although the two concourses are in opposite directions of the security checkpoint. For these reasons, this factor received a moderate SUF ranking of 0.3.

In addition to passenger and facility characteristics, there are characteristics specific to each concession category – food & beverage and retail (news, gift, and specialty).

SUF Analysis – Food and Beverage Characteristics

- *Style of Food Service.* The style of food service at airports typically ranges from on-the-go (or "walk-away") food concepts to sit down table service restaurants. Sit-down restaurants generally require more space to accommodate kitchen/prep areas, seating areas and to accommodate the longer dwell time at sit down venues. Unison anticipates that the food & beverage program will continue to feature a seating area for casual dining; therefore, this characteristic earned an SUF ranking of 0.4.
- *Degree of National/Regional Brand Recognition.* National or regional brands attract passengers based on their familiarity with a particular concept and instill confidence that they can expect consistent quality and value, thus increasing the need for retail space. Unison recommends that the future program include national or locally recognized brands, particularly in food and beverage, and specialty retail. In anticipation of a branded food and beverage program, this characteristic was assigned an SUF ranking of 0.4.

SUF Analysis – Retail Characteristics

- *Merchandise & Store Concepts.* Retail programs with a variety of specialty retail shops generate greater customer satisfaction and sales performance than those programs with only combined news and gift shops. However, smaller airports do not have the passenger base to financially support a wide variety of specialty shops. This is the preferred scenario for GSP; therefore, this factor received a low SUF ranking of 0.1.
- *Degree of National/ Regional Brand Recognition.* Brand name recognition of national retailers provides passengers with confidence and assurance that they are purchasing quality products at reasonable prices. However, for newsstands this recognition is less important. At first the retail program at GSP will be primarily News & Gifts, but as the program grows specialty retail comes into play, which is why this factor received an SUF ranking of 0.3.

The SUF analysis for GSP indicates a basic space requirement for food and beverage space (excluding "back of house" support and storage) of 4.0 square feet per 1,000 enplaning passengers. For news gifts and retail, the utilization factor is 2.9 square feet per 1,000 enplanements. The individual SUF rankings described above for each concessions category are shown in tables 4-12 and 4-13.

TABLE 4-12
DEVELOPED SPACE UTILIZATION FACTOR - FOOD AND BEVERAGE

Lower Range of Values Requires Less Space		Upper Range of Values Requires More Space	GSP
Lower Range	Middle Range	Upper Range	SUF Ranking
0.1 0.2 0.3	0.4	0.5 0.6	
Passenger Characteristics			
Connecting Passenger		Originating Passenger	0.6
Pleasure/ Personal Traveler		Business Traveler	0.4
Local Resident		Visitor	0.2
Household Incomes <$75,000	⟷	Household Incomes >$75,000	0.4
Short Duration Flights		Long Duration Flights	0.2
Low Degree of Passenger Peaking		High Degree of Passenger Peaking	0.3
Facility Characteristics			
Difficult Access to Facilites		Easy Access to Facilities	0.4
Poor Visibility	⟷	Facilities are Highly Visible	0.4
Limited or No Clustering/Central Zone		Facilities are Clustered	0.4
Landside Locations		Concessions is Located Airside	0.5
Linear or Single Terminal Configuration		Multiple Concourses or Terminals	0.3

TABLE 4-12 (CONTINUED)

Food Service Characteristics			
Fast Food Service	⟷	Sit-Down Food & Beverage Service	0.4
Non-Brand Name Eateries		Nat'l/Regional Brand Recognition	0.4
SUF for Food and Beverage			4.9

TABLE 4-13
DEVELOPED SPACE UTILIZATION FACTOR - RETAIL

Lower Range of Values Requires Less Space		Upper Range of Values Requires More Space	GSP
Lower Range	Middle Range	Upper Range	SUF Ranking
0.1 0.2 0.3	0.4	0.5 0.6	
Passenger Characteristics			
Connecting Passenger		Originating Passenger	0.6
Pleasure/ Personal Traveler		Business Traveler	0.4
Local Resident		Visitor	0.2
Household Incomes <$75,000	⟷	Household Incomes >$75,000	0.4
Short Duration Flights		Long Duration Flights	0.2
Low Degree of Passenger Peaking		High Degree of Passenger Peaking	0.3
Facility Characteristics			
Difficult Access to Facilites		Easy Access to Facilities	0.4
Poor Visibility	⟷	Facilities are Highly Visible	0.4
Limited or No Clustering/Central Zone		Facilities are Clustered	0.4
Landside Locations		Concessions is Located Airside	0.5
Linear or Single Terminal Configuration		Multiple Concourses or Terminals	0.3
Retail Characteristics			
Traditional Airport Products/Services	⟷	Specialty Shops/Services	0.1
Non-Brand Name Shops/Merchandise		Nat'l/Regional Brand Recognition	0.3
SUBTOTAL			4.5
Retail Adjustment Factor (1)			35%
SUF for News, Gift and Specialty Retail			2.9

(1) Based on comparative airports, retail programs are approximately 35% smaller than food & beverage programs. Thus we used 35% as a discount factor in determining space requirements for the retail program.

4.9.10 SUMMARY OF SPACE REQUIREMENTS

In order to ensure that the concession program is adequately sized to serve future passenger demand, space requirements were examined in consideration of projected enplanement levels for years 2015, 2020, 2025, 2030, 2040 and 2050. Since space requirements are driven by passenger traffic, a separate space requirement table was created for each proposed scenario of future traffic (Base Case scenario, Low Fare Carrier scenario, and Focus City scenario).

As shown on Table 4-14, under the Base Case scenario approximately 3,420 square feet of food and beverage space and approximately 2,042 square feet of retail space will be needed in 2015. Approximately 1,912 square feet of storage and office space is needed to support these operations. Total concession space requirements for planning year 2015 equal 7,374 square feet. With projected enplanements increasing each year, the amount of space required to meet passenger demand will increase as well. By year 2030, under this scenario GSP will need approximately 4,959 square feet of food and beverage space, 2,960 square feet of retail space and 2,772 square feet of storage and support space. At year 2040, under this scenario, GSP will need 6,370 square feet of food and beverage space, 3,803 square feet of retail space and 3, 560 square feet for storage and support.

TABLE 4-14
CONCESSION SPACE REQUIREMENTS
BASE CASE

Retail Category	Developed SUF[1]	Current Program	Concession Space Requirements 2015	2020	2025	2030	2040	2050
Food and Beverage	4.9	10,177	3,420	3,876	4,376	4,959	6,370	8,178
News, Gift, and Specialty	2.9	1,416	2,042	2,314	2,612	2,960	3,803	4,882
Subtotal Concessions Space[2]		11,593	5,462	6,190	6,988	7,919	10,173	13,060
Storage/Support Space[3]		5,360	1,912	2,166	2,446	2,772	3,560	4,570
TOTAL AREA REQUIREMENT		**16,953**	**7,374**	**8,356**	**9,434**	**10,691**	**13,733**	**17,630**
Projected Enplanements[4]		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000

Notes (These notes apply to Tables 4-14, 4-15, and 4-16):
1. Developed SUF is the amount of food and beverage and retail square footage required per 1,000 enplaned passengers. Estimated by Unison.
2. Space requirements calculated baed on total annual enplanements (SUF X Projected Enplanements/1000).
3. Projected space requirements for storage and support space is estimated to be 35% of food and beverage and retail space, subject to a minimum of 1,200 square feet.
4. Projected Enplanements from this report.

As shown on Table 4-15, under the Low Fare Carrier scenario approximately 5,032 square feet of food and beverage space and approximately 3,004 square feet of retail space will be needed in 2015. Approximately 2,813 square feet of storage and office space is needed to support these operations. Total concession space requirements for planning year 2015 equal 10,849 square feet. By year 2030, under this scenario, GSP will need approximately 7,776 square feet of food and beverage space, 4,462 square feet of retail space and 4,347 square feet of storage and support space. At year 2040, under this scenario, GSP will need 9,982 square feet of food and beverage spaces, 5,958 square feet of retail space, and 5,579 square feet for storage and support.

TABLE 4-15
CONCESSION SPACE REQUIREMENTS
LOW FARE CARRIER

Retail Category	Developed SUF[1]	Current Program	Concession Space Requirements 2015	2020	2025	2030	2040	2050
Food and Beverage	4.9	10,177	5,032	5,890	6,791	7,776	9,982	12,818
News, Gift, and Specialty	2.9	1,416	3,004	3,516	4,054	4,462	5,958	7,652
Subtotal Concessions Space[2]		11,593	8,036	9,406	10,845	12,418	15,940	20,470
Storage/Support Space[3]		5,360	2,813	3,292	3,796	4,347	5,579	7,165
TOTAL AREA REQUIREMENT		**16,953**	**10,849**	**12,698**	**14,641**	**16,765**	**21,519**	**27,635**
Projected Enplanements[4]		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000

As shown on Table 4-16, under the Focus City scenario approximately 5,321 square feet of food and beverage space and approximately 3,177 square feet of retail space will be needed in 2015. Approximately 2,974 square feet of storage and office space is needed to support these operations. Total concession space requirements for planning year 2015 equal 11,472 square feet. By year 2030, under this scenario GSP will need approximately 8,850 square feet of food and beverage space, 5,280 square feet of retail space and 4,946 square feet of storage and support space. At year 2040, under this scenario, GSP will need 11,368 square feet of food and beverage space, 6,786 square feet of retail space and 6,354 square feet for storage and support.

TABLE 4-16
CONCESSION SPACE REQUIREMENTS
FOCUS CITY

Retail Category	Developed SUF[1]	Current Program	Concession Space Requirements 2015	2020	2025	2030	2040	2050
Food and Beverage	4.9	10,177	5,321	6,453	7,571	8,850	11,368	14,602
News, Gift, and Specialty	2.9	1,416	3,177	3,852	4,519	5,280	6,786	8,717
Subtotal Concessions Space[2]		11,593	8,498	10,305	12,090	14,130	18,154	23,319
Storage/Support Space[3]		5,360	2,974	3,607	4,231	4,946	6,354	8,162
TOTAL AREA REQUIREMENT		**16,953**	**11,472**	**13,912**	**16,321**	**19,076**	**24,508**	**31,481**
Projected Enplanements[4]		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000

It is important to note that several assumptions in developing space needs, particularly with respect to the location of concession space within the terminal. It is assumed that the principal concession spaces would be airside, highly visible, easily accessible, and within the direct flow of passenger traffic. By doing so, the most optimal concessions program may be developed. If the retail program is relegated to secondary space within the terminal, where visibility and access may be hampered, the amount of required space will likely be reduced, the variety of the program will be diminished and the overall success of the program will be severely hampered.

The need to place concessions airside is particularly important. In light of stricter security measures in recent years, passengers have tended to get through security prior to visiting concessions. Further, with the restriction of carrying liquids through the security checkpoint, passengers are more likely to wait until they are airside to purchase their beverages. Moreover, as shown in the Comparative Airport Analysis above, airports with a majority of the program post-security tended to have higher news and gift sales.

Finally, as noted above, the SUF analysis serves as a guideline for space planning recommendations. Other factors that are considered include the availability of space in the terminal, minimum and/or maximum sizes for individual concepts and locations, the number of individual concession locations and overall business potential. In some cases, these considerations may lead to relatively large deviations from the findings of the SUF analysis.

4.9.11 CONCESSION PROGRAM RECOMMENDED LAYOUT

Based on this analysis, it is recommended that the primary concession space at GSP be located immediately after the security checkpoint for maximum exposure to departing passengers. This space should include some quick-serve food and beverage restaurants (perhaps with a common seating area) serving all day parts, as well as a specialty coffee outlet. In addition, a casual dining restaurant with full bar is appropriate. This primary concessions area will also include a news and gift retailer, offering a wide variety of newspapers, magazines, sundry items, and local souvenirs. At terminal capacity, local or nationally branded specialty retailing is needed and would be viable for the concessionaire.

As a convenience to passengers, smaller news & gift and café/bar outlets should be located near the ends of the terminal concourses. These will offer passengers a limited selection of food, snacks, beverages, and reading material nearer their departure gates. The café/bar outlets should serve all day parts, with a selection of grab-and-go foods, as well as a variety of alcoholic and non-alcoholic beverages. The news & gift locations should offer a selection of magazines, newspapers, travel and sundry items, and packaged snacks and candy. In addition, the location of these concessions will be advantageous in the case of any future extensions of the terminal building.

Typically, minimal concessions space is needed pre-security and generally serves as an amenity for visitors (meeter/greeters and well-wishers, as well as employees). This concession should provide a limited variety of pre-packaged sandwiches and snacks, bottled non-alcoholic beverages, and freshly brewed coffee. In addition, some newsstand items would be appropriate, particularly at terminal capacity.

Recommended space allocations and locations for these facilities are shown on Table 4-17. Additional space is required for storage/support of these facilities.

TABLE 4-17
PRELIMINARY CONCESSION LAYOUT AND MERCHANDISING PLANS
TWO-MILLION ANNUAL ENPLANED PASSENGERS

	Location	Tentative Use	Area (sq. ft.)
Food Service	Pre-Security	Snacks/Coffee	200
	Post-Security Central Core	Casual Dining/Bar	4,000
		Quick Service/Common Seating	3,000
		Specialty Coffee Kiosk	200
	North Concourse	Cafe/Bar	1,200
	South Concourse	Cafe/Bar	1,200
Retail	Pre-Security	Newsstand	100
	Post-Security Central Core	News & Gifts	1,450
		Specialty Retail	2,600
	North Concourse	Newsstand	850
	South Concourse	Newsstand	850

4.9.12 PROPOSED MERCHANDISING CONCEPTS

The following pages describe retail merchandising and food & beverage concepts for the Airport. The list is not intended to be exhaustive, but a sample of the concepts that may be offered under the new retail program.

Retail Concept: NEWSSTAND (Pre-security)

Merchandising Plan: This pre-security newsstand should provide an unmistakable impression that the space is a newsstand. The selling space should be dedicated to magazines, newspapers, and a limited selection of books. In addition, the store should offer a selection of sundries, and health and beauty aids.

Retail Concept: NEWS AND GIFTS (Post-Security/Central Core)

Size of Space:

Merchandising Plan: A news and gift format in the terminal would offer a wide variety of items, including newspapers, magazines, periodicals, books, stationary, greeting cards, and postcards. The following merchandise categories would also be offered for sale: health and beauty items; non-prescription drugs; pre-packaged snacks, candy and chewing gum; chilled bottled water and soft drinks; Greenville-Spartanburg souvenirs (perhaps including a small assortment of Michelin memorabilia); apparel; travel accessories; and assorted gifts and toys. The newspapers offered would include a selection of local and national newspapers. In addition, the magazine section in this store would include a wide assortment of titles to appeal to a vast number of interests and hobbies.

Retail Concept: SPECIALTY RETAIL (Post-Security/Central Core)

Merchandising Plan: At the point that specialty retail is a viable option for the terminal, both local and nationally branded concessionaires should be considered. A wide variety of options are viable for the specialty retail location at GSP, including, but not limited to:

- Electronics: A store offering electronics and related merchandise including, but not limited to portable electronic equipment such as CD, DVD, MP3 and digital media players and viewers; cameras and video recorders; cellular telephones; portable digital assistants; game toys; recorded music and video; software; and accessories.
- Specialty Candy/Chocolate: A store offering specialty candy and chocolate. Consumers would be able to choose from both gift baskets/boxes as well as individual pieces. In addition, the operator can consider incorporating a self-serve format where candy/chocolate is sold by weight. Samples of the various products could be offered to customers to allow them to try the product.
- Small Leather Goods/Accessories: The operator of this store would offer various types of luggage such as garment bags, tote bags for computers and sports equipment, carry-on pieces, and suitcases for kids. The majority of luggage would have wheels for ease of use and convenience. Leather goods may also be offered including items such as briefcases, purses, wallets, and belts. Due to the size of some of the products, the operator should provide shipping services as well.
- Sunglasses: A sunglass store is a very popular concept in airports today. This store would offer a wide selection of designer sunglasses (e.g. Ray-Ban, Vuarnet, Révo, Bollé, Oakley, Laura Biagiotti, Serengeti, Suncloud, etc.) in numerous styles. The merchandise mix would include the latest styles in fashion and specialty sports sunglasses.
- Golf Shop: A golf shop would be appropriate for the Airport to address the popularity of the sport and the numerous golf courses in the local area. The merchandise would include men's and women's golf apparel. Traditionally, golf apparel was only used for the sport; however, today's golf apparel has become a popular style for casual wear by both golfers and non-golfers alike. Specifically, apparel items offered by this operator would include brand-name shirts, shoes, slacks, sweaters, and jackets. The merchandise mix could also include an assortment of accessories and golf related gifts such as gloves, visors, towels, golf balls, etc.

In order to maximize the potential of GSP's specialty retail space, it may be appropriate to combine two of the above concepts to exist side-by-side. This would lead to a more limited product assortment offered by each concept, however the added variety would be appreciated by passengers.

Retail Concept: NEWSSTAND (Post-Security/North and South Concourses)

Merchandising Plan: These two newsstands should provide an unmistakable impression that the space is a newsstand. The majority of selling space should be dedicated to magazines, newspapers, and books. The remaining selling space may include sundries, snacks, bottled beverages, and a small selection of Greenville-Spartanburg/South Carolina souvenirs.

Food and Beverage Concept: SNACKS/COFFEE (Pre-Security)

Merchandising Plan: This pre-security location would provide freshly-brewed coffee and specialty coffee and tea drinks, including but not limited to, espresso, lattes, cappuccinos, and iced coffee beverages. Freshly baked or prepared pastries, salads, and sandwiches should also be offered. Other related products, such as snacks, packaged candy, and other non-alcoholic beverages should be offered here as well.

Food and Beverage Concept: COFFEE KIOSK (Post-Security/Central Core)

Merchandising Plan: This coffee kiosk would provide freshly-brewed coffee, including but not limited to, espresso, lattes, cappuccinos, and iced coffee beverages. The kiosk would also offer related products such as fresh pastries, and other non-alcoholic beverages. The layout of the kiosk should be open and airy, so as to not block the passengers' view out the windows.

Food and Beverage Concept: QUICK SERVE CONCEPTS (Post-Security/Central Core)

Merchandising Plan: Quick-service food and beverage options are essential to any airport concession program due to the time constraints that departing passengers face. There are a variety of concepts that could be included as part of the food and beverage offerings at the Airport. Each of these concepts would require freshly prepared foods for all day-parts. In addition, the foods should be prepared with the freshest ingredients whether it be fruits, vegetables, meats, or breads.

There are a variety of concepts that could be included as part of the food & beverage offerings. We recommend that individual operations should consist of regional/local cuisine or nationally branded concepts. Potential food concepts include:

- Hamburgers
- Deli sandwiches/salads
- Pizza
- Barbeque
- Mexican
- Chicken
- Ethnic – Greek, Chinese, Thai
- Sausages/hotdogs

An open seating area in the post-security concessions cove should be configured as food court common seating.

Food and Beverage Concept: CASUAL DINING/BAR (Post-Security/Central Core)

Merchandising Plan: To address those passengers who have a lot of time before their departing flight, a casual sit-down restaurant would enhance the dining experience at the Airport. The overall dining experience at the Airport would be characterized by a variety of food and beverage (alcoholic and non-alcoholic) offerings, ambiance, and excellent customer service. This facility could be operated by a well-known local operator or a national operator such as TGI Fridays or Chili's.

An open seating area in the post-security concessions cove should be assigned to the casual dining/bar operator as table seating.

Food and Beverage Concept: CAFÉ/BAR (Post-Security/North and South Concourses)

Merchandising Plan: These two locations are intended for a café/bar concept that offers a limited variety of alcoholic and non-alcoholic beverages (which may include gourmet coffee and teas) and a selection of light menu items that could include sandwiches, salads or grilled items. The menus should serve all day parts and offer pre-packaged items to go.

4.9.13 INCORPORATION OF LOCAL OPERATORS AND CONCEPTS

Local food and beverage operators tend to perform very well in the airport environment. These concepts offer local residents a familiar name and menu, and provide out-of-town visitors a chance to experience regional cuisine. During Unison's research of the Greenville-Spartanburg area, local concepts were identified that could potentially translate well into the concession program at GSP. This preliminary list of potential local concepts was created based on their regional food and beverage offerings, as well as their connection to the Greenville-Spartanburg community. Adaptations of any potential concept would need to be made to fit the needs of the traveling public; specifically, all day parts would need to be served at airport locations.

A few concepts that could offer a local element to the concessions program include:

- The Green Room Restaurant & Bar (full-service restaurant and bar)
  - 116 N. Main Street (opened in 2009)
  - Diverse menu serves all day parts
- Soby's on the Side (grab-and-go)
  - 22 East Court Street
  - Takeout meals for breakfast and lunch (fresh ground coffees, deli sandwiches, etc.)
  - Very strong Greenville connection (a part of Table 301 restaurant group)
- Sassafras Southern Bistro (full-service restaurant and bar)
  - 103 North Main Street
  - Traditional low country Southern fare – dinner menu only
- Southern Fried Green Tomatoes (full-service restaurant)
  - 1175 Woods Crossing Road (founded in Greenville in 2003)
  - Lunch and dinner menu of home cooked meats and vegetables

At the point that specialty retail is a viable option for the terminal, both local and nationally branded concessionaires should be considered. The Mast General Store should be considered a strong local prospect. Their broad assortment of merchandise lends itself to providing an airport location a profitable offering for travelers. Gourmet foods such as honey, syrup, butters, and jellies could be purchased at the post-security location, without requiring passengers to carry these liquids through the security checkpoint. A bulk candy selection, old-fashioned toys, and a limited selection of apparel could be offered for functional value as well as souvenir items.

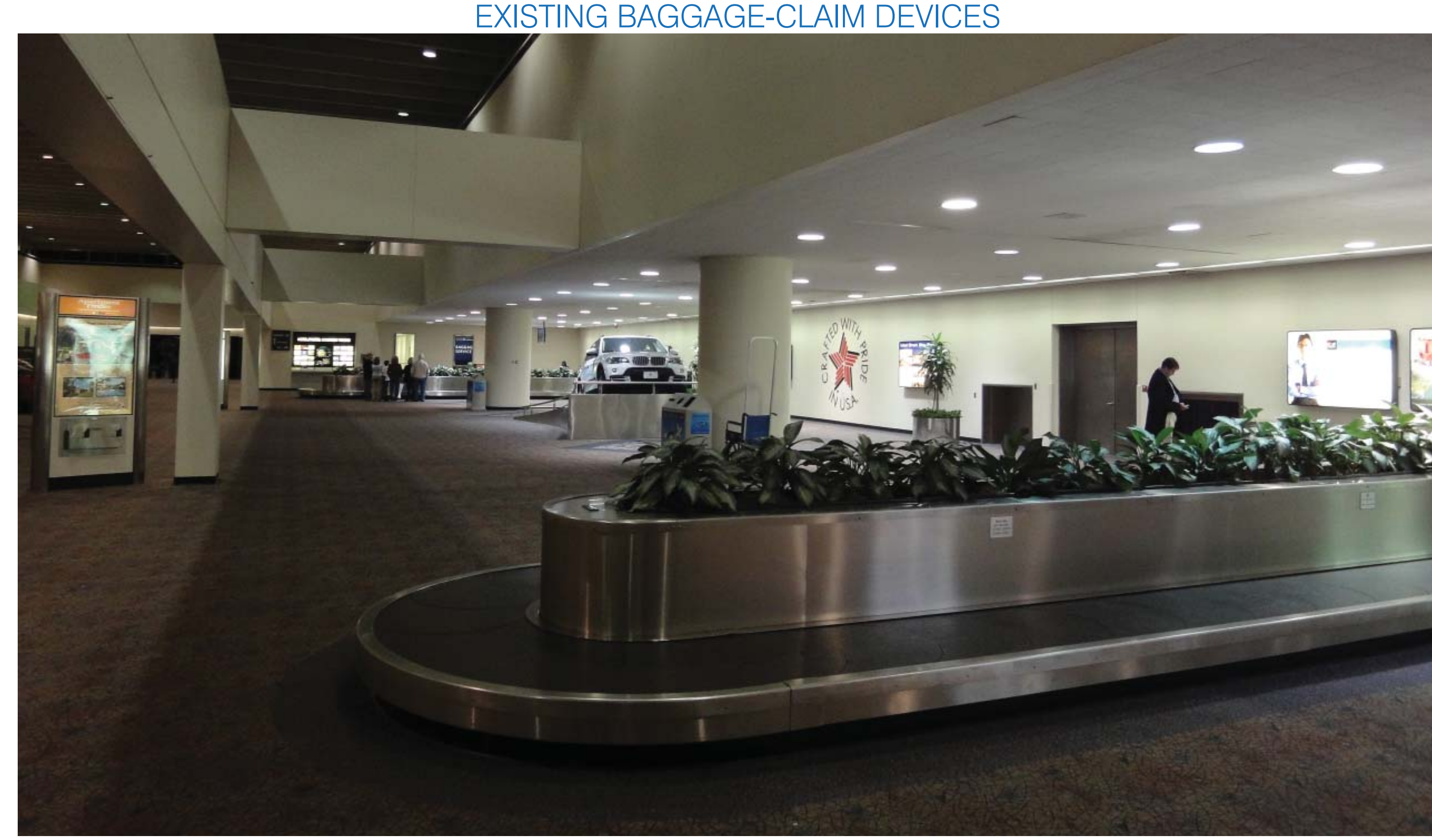
4.10 BAGGAGE CLAIM AND BAGGAGE INPUT

The baggage-claim facilities consist of the baggage-claim devices, as well as the area in which passengers and their meeter/greeters wait for the baggage to be delivered. Typically, this area would include limited seating and baggage trolley racks. The baggage input area is that area in which the airline off-loads the baggage carts and places the inbound baggage onto the baggage-claim conveyor.

4.10.1 EXISTING BAGGAGE-CLAIM AND BAGGAGE INPUT FACILITIES

The baggage-claim area of the Greenville-Spartanburg International Airport contains two flat-plate baggage-claim devices. Each device has a passenger presentation length of approximately 125 lineal feet. The presentation length, or frontage, is the length that is available to the passenger to retrieve baggage. There is sufficient area around each of the two baggage-claim devices to accommodate passengers, their meeter/greeters, and the passenger's baggage. In addition, there is enough room in the baggage claim hall to accommodate a third baggage-claim device in the future. The area of the existing baggage-claim hall measures approximately 8,491 square feet. Figure 4-18 shows the existing baggage-claim area.

FIGURE 4-18
EXISTING BAGGAGE-CLAIM DEVICES



The non-public side of the baggage-claim area is the baggage input area. This is the area where airline personnel place baggage onto the conveyor prior to its traveling through the wall to be claimed by the passenger. This area is important because it must have enough room for the baggage tugs with the baggage carts towed behind to be able to maneuver. The baggage input length of conveyor should be long enough to park at least three baggage carts along the length. There needs to be enough room for the baggage carts to park, the airline personnel to stand safely while off-loading the baggage onto the conveyor, and enough room for another baggage tug with carts in tow to pass beyond the parked baggage tug and carts. Essentially, the area for each narrow-body baggage-claim input area should measure approximately 53 feet in length and 30 feet in depth.

The existing baggage input area at the Airport measures approximately 20 feet wide by 200 feet long, or approximately 4,160 square feet. This is sufficient space and generally of the proper proportions to accommodate the traffic for all of the Base Case forecast. However as shown in Figure 4-19, only the baggage conveyor and the airline personnel work area are covered by an awning. Additional space will be needed to accommodate the Low Fare Carrier and the Focus City forecasts when a fourth baggage claim device is added.

FIGURE 4-19
EXISTING BAGGAGE INPUT AREA

4.10.2 ASSUMPTIONS

The following assumptions were made before beginning the calculations for the facility requirements:

- All flights will be served by narrow-body aircraft.
- Each flight will remain on a baggage-claim device an average of 20 minutes.
- Fifty percent of the arriving passengers will have checked baggage.
- On average, each passenger checking bags checks 1.3 bags.
- The average number of meeter/greeters per passenger is 0.8.
- Each passenger and their respective meeter/greeters will remain in the baggage-claim area an average of 15 minutes.
- Each baggage-claim device will be of the slope-plate design.
- Each baggage-claim device has a presentation length of approximately 134 lineal feet.
- Each bag on the baggage-claim belt occupies approximately 1.2 lineal feet.
- The average minimum square foot area per person in the baggage-claim area is 18 square feet including baggage and baggage trolley, where applicable.
- The number of seats on the largest aircraft serving the Airport will vary over the planning period and with the aviation activity forecast, as shown in Table 4-18.

TABLE 4-18
NUMBER OF SEATS ON LARGEST AIRCRAFT SERVING AIRPORT

	2010	2015	2020	2025	2030	2040	2050
Base Case							
Annual Enplanements	617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Number of seats on largest aircraft	150	150	175	175	175	175	175
Low Fare Carrier							
Annual Enplanements	617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Number of seats on largest aircraft	150	150	175	175	175	175	175
Focus City							
Annual Enplanements	617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Number of seats on largest aircraft	150	150	175	175	175	175	175

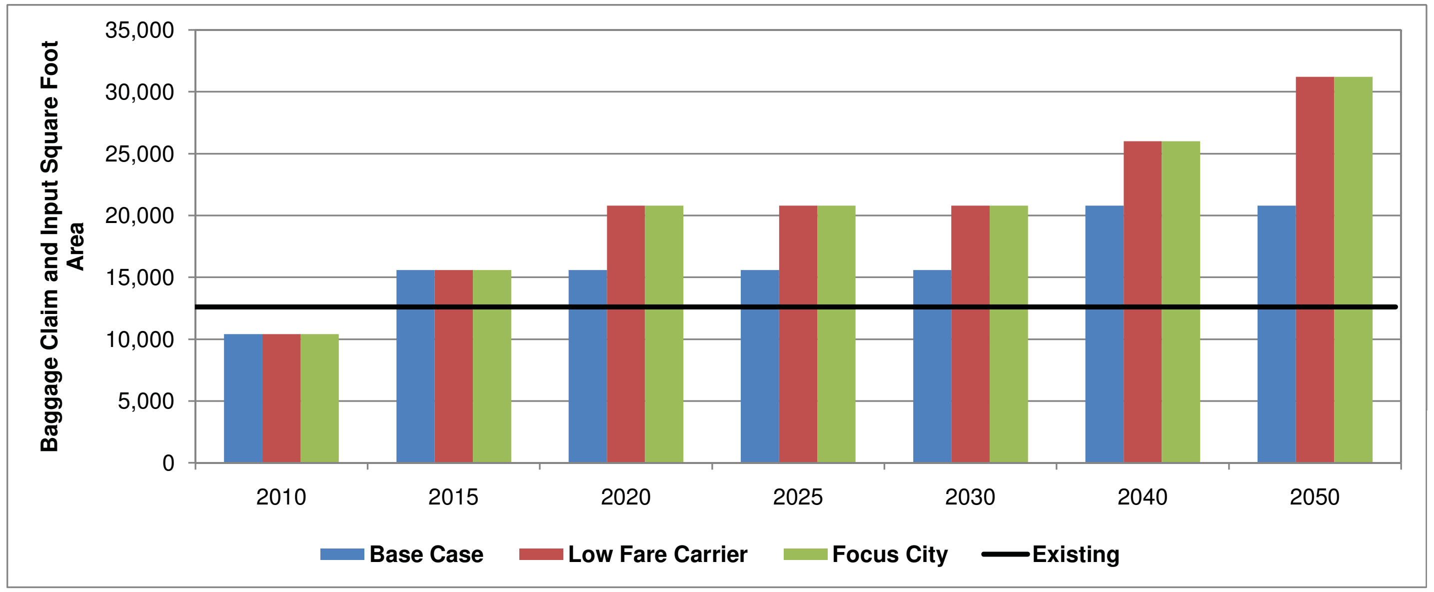
4.10.3 BAGGAGE-CLAIM AND BAGGAGE INPUT FACILITY REQUIREMENTS

The facility requirements for baggage-claim devices indicate that the two existing devices should be sufficient until the year 2015.

All three forecast scenarios require a third baggage-claim device by 2015. The Low Fare Carrier and Focus City forecasts indicate a need for a fourth device by 2020, a fifth by 2040 and a sixth by 2050.

Because there is already enough space between the existing two baggage-claim devices, additional baggage-claim area would not be needed until a fourth baggage-claim device is required.

FIGURE 4-20
BAGGAGE-CLAIM AND BAGGAGE INPUT FACILITY REQUIREMENTS



	Existing	2010	2015	2020	2025	2030	2040	2050
Annual Enplaned Passengers								
Base Case		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Low Fare Carrier		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Focus City		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Number of slope-plate baggage-claim devices	2 (Flat-Plate Devices)							
Base Case		2	3	3	3	3	4	4
Low Fare Carrier		2	3	4	4	4	5	6
Focus City		2	3	4	4	4	5	6
Total area of baggage-claim area	8,491							
Base Case		7,200	10,800	10,800	10,800	10,800	14,400	14,400
Low Fare Carrier		7,200	10,800	14,400	14,400	14,400	18,000	21,600
Focus City		7,200	10,800	14,400	14,400	14,400	18,000	21,600
Total area of inbound baggage input	4,152							
Base Case		3,200	4,800	4,800	4,800	4,800	6,400	6,400
Low Fare Carrier		3,200	4,800	6,400	6,400	6,400	8,000	8,000
Focus City		3,200	4,800	6,400	6,400	6,400	8,000	9,600
Total baggage claim and baggage input	12,643							
Base Case		10,400	15,600	15,600	15,600	15,600	20,800	20,800
Low Fare Carrier		10,400	15,600	20,800	20,800	20,800	26,000	31,200
Focus City		10,400	15,600	20,800	20,800	20,800	26,000	31,200

4.10.4 BAGGAGE-CLAIM AND BAGGAGE INPUT TRIGGERS

The trigger for the number of baggage-claim devices is the number of bags arriving in the peak hour. The facility requirements are based on the assumptions that fifty percent of the arriving passengers will have checked baggage and that on average each passenger checking baggage will only have checked one bag. This situation may not always remain. The number of peak-hour arriving bags is linked to the number of baggage-claim devices and the corresponding required square foot area as shown in Table 4-19. These numbers are based on a presentation length per baggage-claim device of 125 lineal feet and the assumption that each narrow-body aircraft occupies the baggage-claim device for an average of 20 minutes.

TABLE 4-19
BAGGAGE-CLAIM AND BAGGAGE INPUT TRIGGERS

Triggering Event		Facility Requirements	
Peak-Hour Number of Inbound Bags	Number of Slope-Plate Baggage-Claim Devices	Baggage-Claim Total Square Foot Area	Baggage Input Square Foot Area
335	1	3,600	1,600
670	2	7,200	3,200
1,005	3	10,800	4,800
1,340	4	14,400	6,400
1,675	5	18,000	8,000
2,010	6	21,600	9,600

Baggage claim frontage of 120 feet per device. Flat-plate devices yield 33% less capacity.

4.11 PUBLIC AREAS

While all areas that a passenger can typically enter in an airport passenger terminal are considered public, the areas considered in this section are those that are not assigned to airlines, concessions, or security functions. They typically include such areas as the public restrooms, waiting and seating areas outside of the departure lounges, public art displays, children's play areas, airport administration offices, conference rooms, and the general circulation within the public areas of the terminal.

4.11.1 EXISTING PUBLIC AREAS

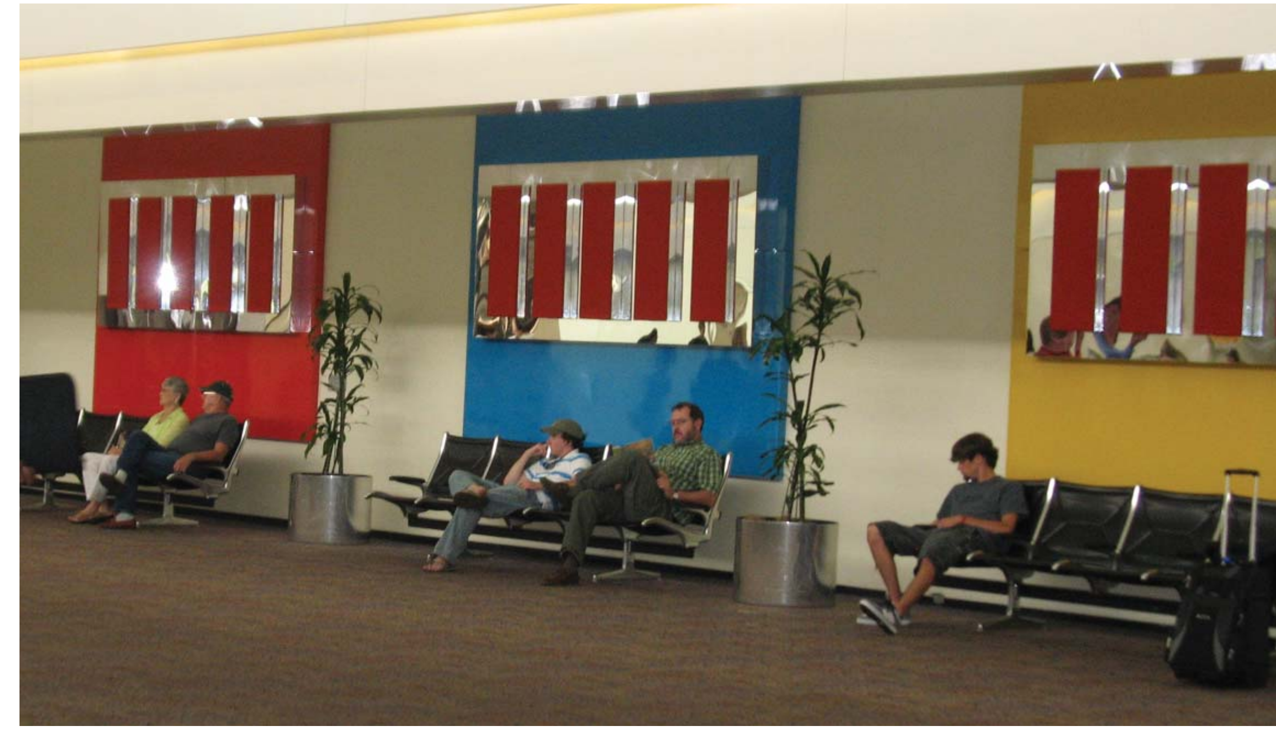
Within the existing Airport terminal, the areas that have been included in this category are the restrooms, the waiting and seating areas outside of the departure lounges, the information booth, the conference rooms, and the fountain/sculpture area in the terminal lobby (as shown in Figure 4-21), and the general public circulation areas. Together, these areas occupy approximately 61,600 square feet of area in the existing passenger terminal. This does not include the administrative offices, which have been calculated separately.

FIGURE 4-21
EXISTING FOCAL POINT OF THE TERMINAL LOBBY

The restrooms within the terminal are further broken down between those located on the landside, or prior to security, and those that are located on airside, or after security. The landside/non-secure restrooms occupy approximately 1,200 square feet, and the airside/secure restrooms occupy approximately 2,700 square feet.

The public waiting and seating areas exclusive of the departure lounges are scattered throughout the non-secure side of the terminal. Most notably, they are located adjacent to the check-in area and the baggage-claim area, as shown in Figure 4-22. In addition, there is seating area located in the area immediately prior to entering the large restaurant. The total square foot area of the entire existing terminal waiting areas exclusive of departure lounges is approximately 3,990 square feet.

FIGURE 4-22
ONE OF SEVERAL TERMINAL WAITING AREAS



Miscellaneous public areas include the terminal conference rooms, and the information booth area in the main lobby. This report groups these together largely because the airport does not typically lease these areas out to an airline or another party. The total square foot area for these functions is approximately 1,280 square feet.

The general public circulation spaces include not only corridors, but escalators and elevators, as well. The total square foot area of all of the public general circulation spaces is approximately 52,450 square feet.

4.11.2 PUBLIC AREA ASSUMPTIONS

The assumptions made in determining the facility requirements for the restrooms are as follows:

- Fifty percent of the peak 10-minute enplaning passengers use the airside restrooms.
- Twenty-five percent of the peak 10-minute enplaning passengers use the landside restrooms.
- Twenty percent of the peak 10-minute deplaning passengers use the landside restrooms.
- Five percent of the peak 10-minute deplaning passengers use the airside restrooms.
- Twenty-five percent of the peak-hour well-wishers use the landside restrooms.
- Thirty percent of the peak-hour meeter/greeters use the landside restrooms.
- The ratio of men to women restroom users is 50/50.
- The average time it takes men to use a restroom is 1.5 minutes.
- The average time that it takes women to use a restroom is 3 minutes.
- The average square foot area per restroom fixture is 100 square feet.

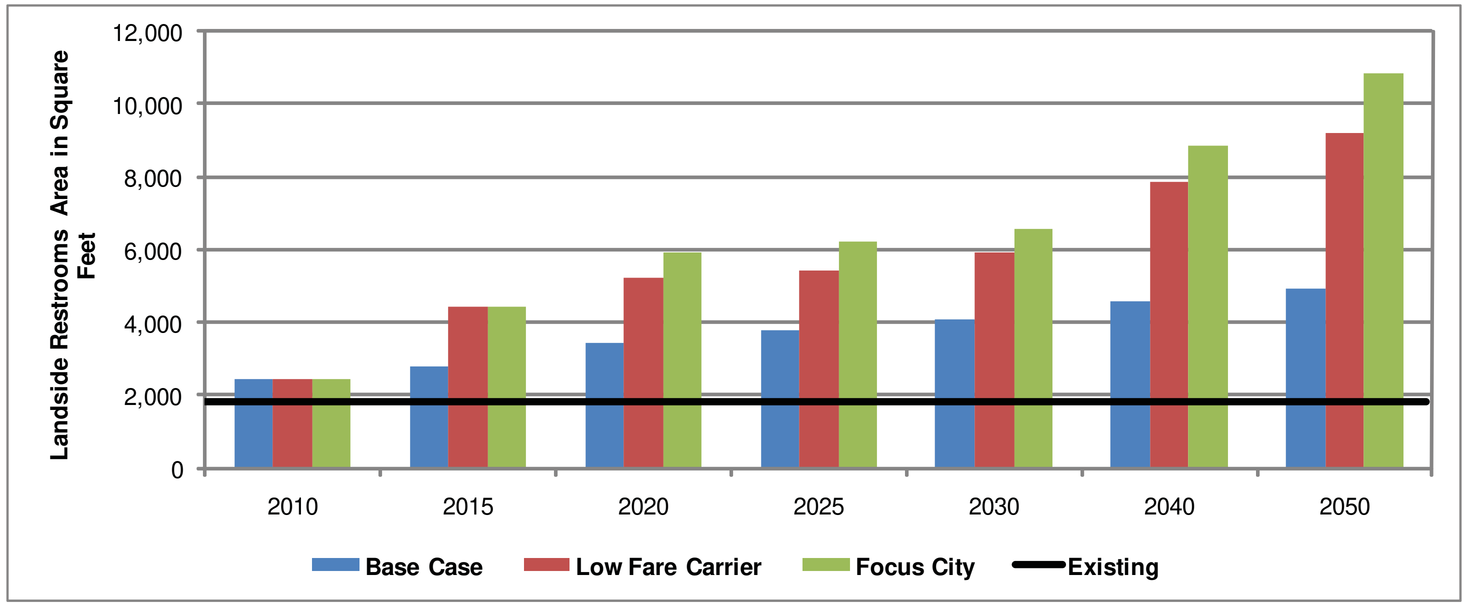
One assumption was made with respect to waiting and seating: the average area per waiting person is 15 square feet. This is an IATA recommendation.

4.11.3 FACILITY REQUIREMENTS FOR THE PUBLIC AREAS

Landside Restrooms

It was determined that the landside restrooms are currently undersized by approximately 620 square feet. In the Base Case forecast, a total of 4,100 square feet of landside restrooms would be required in the year 2030 and the Focus City forecast could require as many as 6,560 square feet in the same period, as shown in Figure 4-23.

FIGURE 4-23
LANDSIDE RESTROOMS FACILITY REQUIREMENTS



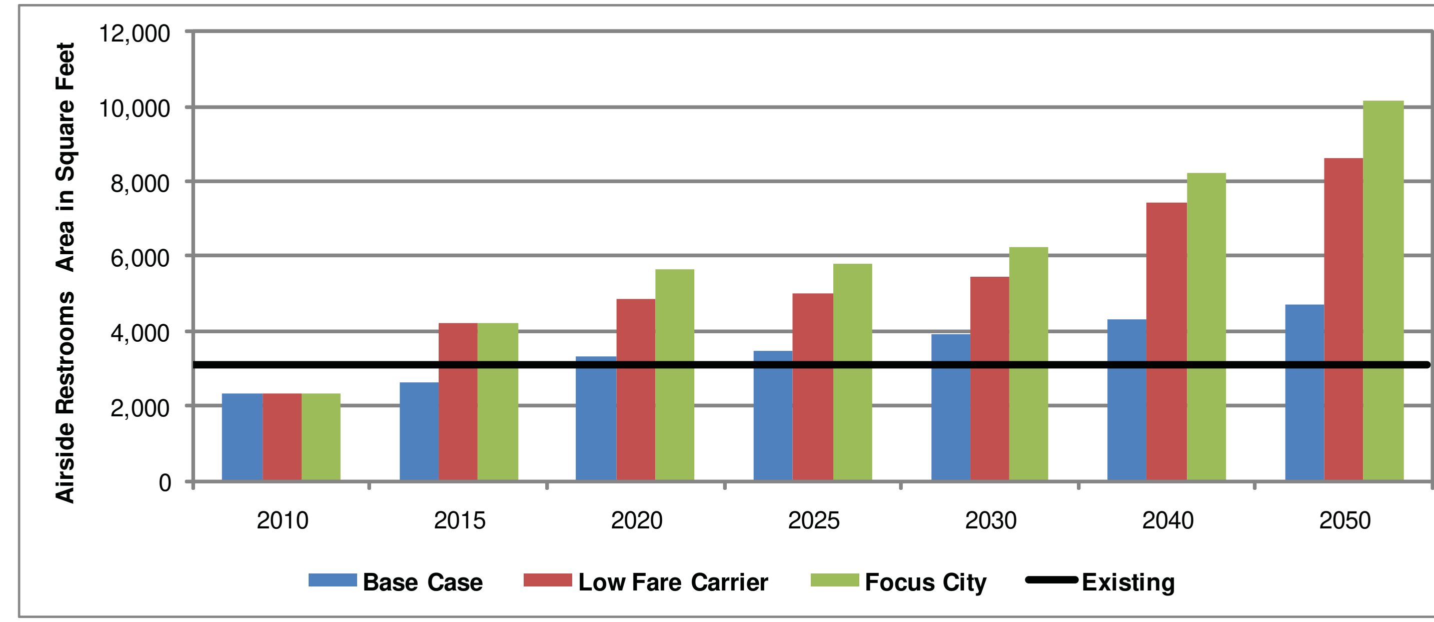
	Existing	2010	2015	2020	2025	2030	2040	2050
	1,207							
Base Case								
Annual Enplaned Passengers		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Square Feet of Landside Restrooms		2,500	2,800	3,400	3,800	4,100	4,600	4,900
Low Fare Carrier								
Annual Enplaned Passengers		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Square Feet of Landside Restrooms		2,500	4,400	5,200	5,400	5,900	7,900	9,200
Focus City								
Annual Enplaned Passengers		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Square Feet of Landside Restrooms		2,500	4,400	5,900	6,200	6,600	8,900	10,800

Airside Restrooms

The existing airside restrooms have enough capacity to be able to accommodate the demand through the year 2015 with the Base Case forecast. However, by the year 2030, an additional approximately 790 square feet of airside restroom area will be required.

An additional 1,100 square feet of airside restroom capacity will be needed prior to the year 2015 for both the Low Fare Carrier and the Focus City forecasts. By the year 2030, the Low Fare Carrier forecast will require a total of 5,460 square feet of airside restroom area and the Focus City forecast will require a total of 6,240 square feet for the same period, as shown in Figure 4-24.

FIGURE 4-24
AIRSIDE RESTROOM FACILITY REQUIREMENTS



	Existing	2010	2015	2020	2025	2030	2040	2050
	2,706							
Base Case								
Annual Enplaned Passengers		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Square Feet of Airside Restrooms		2,300	2,600	3,300	3,500	3,900	4,300	4,700
Low Fare Carrier								
Annual Enplaned Passengers		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Square Feet of Airside Restrooms		2,300	4,200	4,900	5,000	5,500	7,400	8,600
Focus City								
Annual Enplaned Passengers		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Square Feet of Airside Restrooms		2,300	4,200	5,600	5,800	6,200	8,200	10,200

Waiting and Seating

The public waiting and seating areas are calculated as a function of the annual enplaned passengers. By applying the appropriate factor, it has been determined the existing waiting and seating areas are undersized for the traffic of today. The Base Case forecast will need an additional 7,230 square feet by the year 2030 and the Low Fare Carrier and Focus City forecasts will need an additional 12,130 and 14,630 square feet above the existing respectively in the same periods as shown in Table 4-20.

TABLE 4-20
WAITING AND SEATING FACILITY REQUIREMENTS

	Existing	2010	2015	2020	2025	2030	2040	2050
	3,990							
Base Case								
Annual Enplaned Passengers		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Square Feet of Waiting and Seating		7,740	8,740	10,940	11,440	12,840	14,140	15,340
Low Fare Carrier								
Annual Enplaned Passengers		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Square Feet of Waiting and Seating		7,740	13,740	15,840	16,340	17,740	20,040	27,740
Focus City								
Annual Enplaned Passengers		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Square Feet of Waiting and Seating		7,740	13,740	18,340	18,840	20,240	26,540	32,640

4.11.4 TRIGGERS FOR PUBLIC AREAS

The trigger for the size of restrooms is the number of persons that use them. For the airside restrooms, the number of enplaning and deplaning passengers is the trigger. For the landside restrooms, not only the passengers, but also their well-wishers and meeter/greeters must be included. These have been taken into consideration in developing the triggers for both restroom locations. The results are shown in Table 4-21.

TABLE 4-21
RESTROOM TRIGGERS

Triggering Event	Facility Requirements	
Peak-Hour Enplaning and Deplaning Passengers Each	Square Foot Area of Airside Restrooms	Square Foot Area of Landside Restrooms
380	2,000	2,300
450	2,400	2,600
650	3,400	3,900
850	4,500	5,100
1,000	5,300	5,900
1,500	7,920	9,020
2,000	10,600	12,000

The trigger for the total area of waiting and seating in an airport terminal is typically a function of the number of annual enplanements as shown in Table 4-22.

TABLE 4-22
WAITING AND SEATING TRIGGERS

Triggering Event	Facility Requirement
Annual Enplaned Passengers	Total Square Foot Area of Waiting and Seating
615,000	7,700
700,000	8,800
800,000	10,900
900,000	11,600
1,000,000	12,800
1,500,000	18,500
2,000,000	24,000
3,000,000	33,000

4.12 AIRLINE OPERATIONAL AREAS

The airline operational areas include the airline ticket offices traditionally found behind the check-in counters; the airline operational areas directly associated with the apron such as the pilot rooms, storage, and personnel break areas; as well as the baggage make-up areas; baggage service offices; and the baggage-claim input areas. As the baggage-claim input area has been previously addressed, this section will address the remaining airline operational areas.

4.12.1 EXISTING AIRLINE OPERATIONAL AREAS

The existing terminal has a total of approximately 4,050 square feet of airline office and break room space located directly behind and in the general area of the check-in area. There is also a total of approximately 19,000 square feet of airline operational areas in the terminal for airline offices, storage, locker rooms, and break rooms. The baggage make-up area consists of approximately 5,100 square feet and approximately 720 square feet of baggage service offices are located near the baggage-claim area. These areas are distributed between the six airlines currently operating scheduled flights to and from Greenville-Spartanburg International Airport and total approximately 28,870 square feet.

4.12.2 AIRLINE OPERATIONAL AREA ASSUMPTIONS

In developing the facility requirements for the airline operating areas at the Airport, the following assumptions were used:

- The airline ticket offices are approximately 20 feet in depth.
- The peak-hour commercial aircraft departures across the planning period are forecast as shown in Table 4-23.

TABLE 4-23
PEAK-HOUR COMMERCIAL AIRCRAFT DEPARTURES

	2010	2015	2020	2025	2030	2040	2050
Base Case							
Annual Enplanements	617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Peak Hour Departures	9	9	9	9	10	11	12
Low Fare Carrier							
Annual Enplanements	617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Peak Hour Departures	9	11	11	12	12	15	17
Focus City							
Annual Enplanements	617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Peak Hour Departures	9	11	12	12	13	16	19

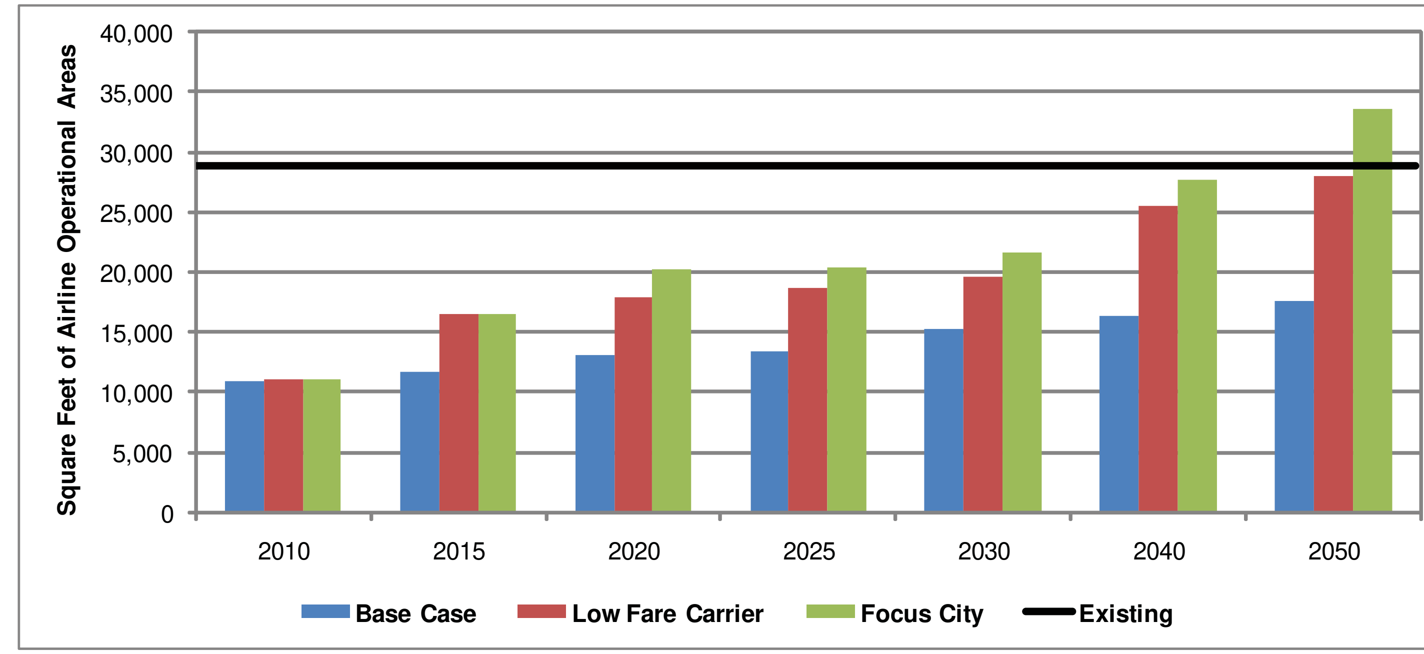
- In the Base Case forecast, there are six airlines operating from the Airport. In the Low Fare Carrier and Focus City forecasts, there are seven airlines operating at the Airport over the entire planning period.
- Fifty percent of the peak-hour enplaning passengers check baggage.
- Of the passengers checking baggage, the average number of bags per passenger is one.

4.12.3 AIRLINE OPERATIONAL AREA FACILITY REQUIREMENTS

Based on industry-accepted standards of facility requirements for airline operating spaces, there is sufficient space to accommodate the facility requirements based on each of the forecasts through the year 2030. However, by the year 2050, the Focus City forecast would require additional area for the airline operating areas, as seen in Figure 4-25.

However, airline operations areas, particularly those on the ramp, vary greatly from airport to airport. There may be reasons that so much additional area is currently being used by the airlines at the Airport.

FIGURE 4-25
AIRLINE OPERATIONAL AREA FACILITY REQUIREMENTS



	Existing	2010	2015	2020	2025	2030	2040	2050
	19,024							
Base Case								
Annual Enplaned Passengers		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Airline Operations		4,500	4,500	4,500	4,500	5,000	5,500	6,00
Low Fare Carrier								
Annual Enplaned Passengers		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Airline Operations		4,500	5,500	5,500	6,000	6,000	7,500	8,500
Focus City								
Annual Enplaned Passengers		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Airline Operations		4,500	5,500	6,000	6,000	6,500	8,000	9,500

4.12.4 AIRLINE OPERATIONAL AREA TRIGGERS

Using the industry standards and the stated assumptions, Table 4-24 shows the triggers of enplaning passengers to the square foot area of airline ticket offices that would typically be required. Table 4-25 shows the triggering peak-hour bags departing the Airport and Table 4-26 shows the peak-hour commercial aircraft operations that would require the corresponding square foot area of airline operational areas. Table 4-27 indicates the square foot area requirements for the total area of baggage service offices based upon the number of airlines operating at the Airport.

TABLE 4-24
AIRLINE TICKET OFFICE TRIGGERS

Triggering Event	Facility Requirements
Peak-Hour Enplaning Passengers	Total Square Foot Area of Airline Ticket Offices
380	900
450	1,100
650	1,600
850	2,000
1,000	2,400
1,500	3,600
2,000	4,800

TABLE 4-25
BAGGAGE MAKE-UP TRIGGERS

Triggering Event	Facility Requirements
Peak-Hour Outbound Bags	Square Foot Area
190	3,800
225	4,500
325	6,500
425	8,500
500	10,000
750	15,000
1,000	20,000

TABLE 4-26
AIRLINE (APRON AREA) OPERATIONS AREA TRIGGERS

Triggering Event	Facility Requirements
Peak-Hour Operations	Square Foot Area of Airline Apron Operations
18	4,500
22	5,500
26	6,500
30	7,500
34	8,500
38	9,500

TABLE 4-27
BAGGAGE SERVICE OFFICES TRIGGERS

Triggering Event	Facility Requirements in Square Feet
Number of Airlines	Baggage Service Offices
5	700
6	840
7	980
8	1,120

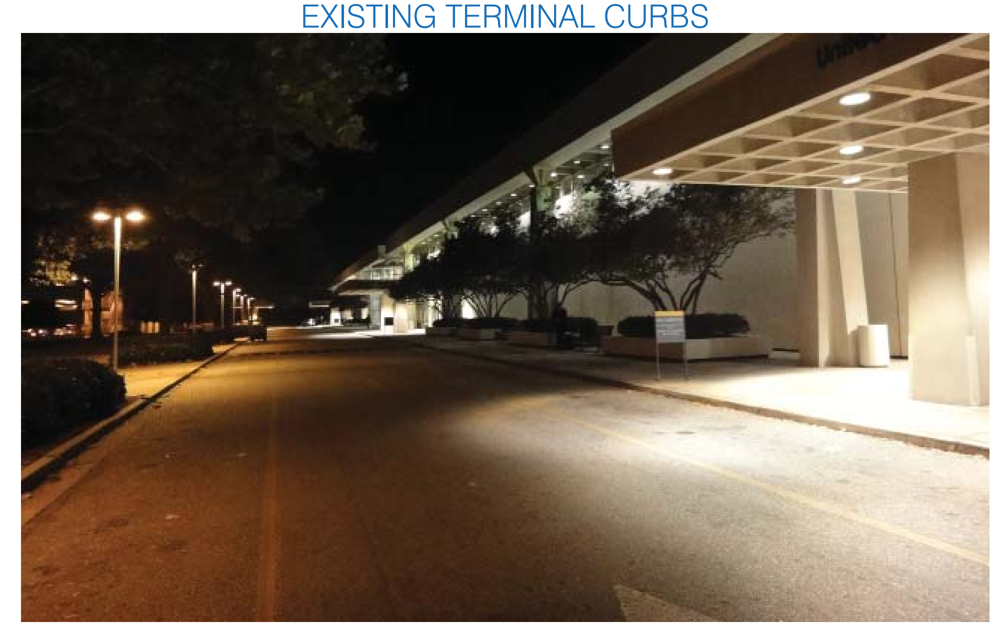
4.13 CURB LENGTHS

Typically, airports that are the size of Greenville-Spartanburg International have a long, one-level curb that runs the length of the terminal façade. The vehicle traffic in front of the curb runs in one direction, with the first section of curb typically being the departing passenger curb. The curb becomes the arriving passenger curb further along. As the peak hours for enplaning and deplaning passengers are typically different, there is generally no hard point where the departing passenger curb meets the arriving passenger curb. It can move depending on which cycle is peaking.

4.13.1 EXISTING TERMINAL CURBS

The Greenville-Spartanburg International Airport has a long curb along the full face of the terminal building. Passengers, their well-wishers, and meeter/greeters, as well as commercial vehicles such a taxis and shuttle busses use the terminal curb. Currently, the vehicles are allowed to park at the curb if the driver remains with the vehicle. In front of the terminal curb, there is one lane for parking, one through lane, and an additional parking lane against a wide island that runs the length of the terminal, as shown in Figure 4-26.

FIGURE 4-26
EXISTING TERMINAL CURBS



On the outside of the island is another lane for attended parking, and two one-directional through lanes. These lanes travel in the same direction as the lanes directly in front of the terminal. The parking lane directly in front of the terminal and both of the parking lanes on either side of the island can be considered as terminal curb.

These curbs have a total length of approximately 3,650 lineal feet. However, as traffic along the terminal curb increases, consideration should be given to converting the parking lane on the inner edge of the island into a through lane. While this would decrease the amount of attended parking directly in front of the terminal, it could relieve potential future roadway congestion

4.13.2 TERMINAL CURB ASSUMPTIONS

The following assumptions were made in calculating the facility requirements for the terminal curbs:

Private Vehicles

- Seventy-four percent of passengers access the Airport using a private vehicle.
- Twenty-five percent of the passengers using private vehicles access the departing passenger curb.
- Twenty–five percent of the passengers using private vehicles access the arriving passenger curb.
- There is an average of 2.3 people in a private car.
- Private vehicles dwell at the departing passenger curb an average of three minutes.
- Private vehicles dwell at the arriving passenger curb an average of four minutes.
- The average private vehicle occupies approximately 25 lineal feet of the curb.

Taxis

- Four percent of passengers access the Airport using a taxi.
- One hundred percent of the taxis access the departing passenger curb.
- One hundred percent of the taxis access the arriving passenger curb.
- There is an average of one person per taxi.
- The average dwell time of a taxi at the departing passenger curb is three minutes.
- The average dwell time of a taxi at the arriving passenger curb is three minutes.
- The average taxi occupies approximately 25 lineal feet of the curb.

Rental Cars

- Twenty percent of the passengers use rental cars.
- One percent of the rental cars access the departing passenger curb.
- One-half of one percent of the rental cars access the arriving passenger curb.
- There is an average of 1.2 persons per rental car.
- Rental cars dwell at the departing passenger curb an average of four minutes.
- Rental cars dwell at the arriving passenger curb an average of four minutes.
- The average rental car occupies approximately 25 lineal feet of the curb.

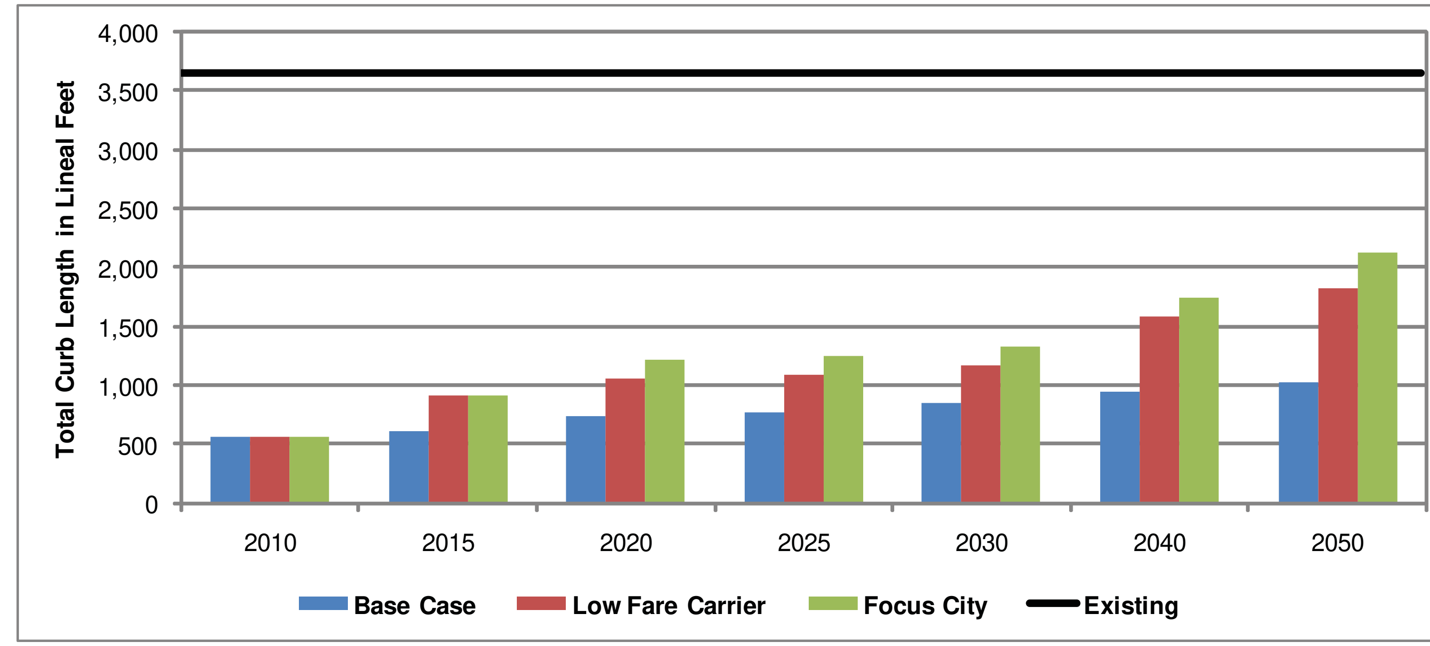
Courtesy Shuttles

- Two percent of the passengers access the Airport using courtesy shuttles.
- One hundred percent of the courtesy shuttles use the departing passenger curb.
- One hundred percent of the courtesy shuttles use the arriving passenger curb.
- There is an average of 1.3 passengers using each courtesy shuttle.
- The average dwell time of a courtesy shuttle at the departing passenger curb is three minutes.
- The average dwell time of a courtesy shuttle at the arriving passenger curb is two minutes.
- The average courtesy shuttle occupies approximately 35 lineal feet of curb.

4.13.3 TERMINAL CURB FACILITY REQUIREMENTS

Based on the above assumptions and utilizing industry standards, the existing terminal curbs should have sufficient capacity to accommodate each of the forecasts throughout the planning period. The enplaning curb, the deplaning curb and the total length can each be accommodated, as shown in Figure 4-27.

FIGURE 4-27
TOTAL CURB LENGTH FACILITY REQUIREMENTS



	Existing	2010	2015	2020	2025	2030	2040	2050
Annual Enplaned Passengers								
Base Case		617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Low Fare Carrier		617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Focus City		617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Enplaning Curb	1,280							
Base Case		212	231	273	283	315	345	374
Low Fare Carrier		212	336	385	397	429	574	659
Focus City		212	336	442	454	486	631	771
Deplaning Curb	2,370							
Base Case		345	382	463	483	541	596	647
Low Fare Carrier		345	579	667	687	745	1,004	1,157
Focus City		345	579	769	789	847	1,106	1,361
Total Curb	3,650							
Base Case		556	613	736	766	856	941	1,021
Low Fare Carrier		556	915	1,052	1,084	1,174	1,578	1,816
Focus City		556	915	1,211	1,243	1,333	1,737	2,132

4.13.4 TERMINAL CURB TRIGGERS

The existing terminal curb length is forecast to be sufficient to accommodate the facility requirements for each of the forecasts. However, the Airport may consider eliminating approximately a third of the available curb length to provide another thorough lane in front of the terminal. The triggers shown in Table 4-28 may be of assistance in determining if the Airport desires to modify the curbfront.

TABLE 4-28
TERMINAL CURB LENGTH TRIGGERS

Triggering Event	Facility Requirements in Lineal Feet	
Peak-Hour Enplanements Or Deplanements	Enplaning Curb	Deplaning Curb
380	190	344
450	210	400
650	275	550
850	350	711
1,000	410	830
1,500	560	1,230
2,000	790	1,640

4.14 TERMINAL FACILITY REQUIREMENTS SUMMARY

This chapter presents the facility requirements for the commercial service passenger terminal at Greenville-Spartanburg International Airport. These requirements are based on three factors:

- The previous chapter presented three scenario based aviation activity forecasts:
    - Base Case: The existing or similar type airlines continue to serve the Airport at an average annual growth rate in enplanements of 2.5 percent.
    - Low Fare Carrier: A new low fare carrier introduces service at the Airport using 150-seat aircraft. The air carrier begins service with eight daily flights and adds two additional daily flights every five years of the forecast period. The existing airlines continue as indicated in the Base Case forecast.
    - Focus City: The low fare carrier in this scenario introduces ten flights a day by the year 2015 and grows service by four new flights every five years. The existing airlines continue with the same schedule as indicated in the Base Case scenario; however, the existing leisure destination carrier withdraws service by 2025.
- Industry standards and practices
- Airport specific assumptions documented within this chapter.

The facility requirements as documented in this chapter are quantitative, not qualitative. Descriptions detail the amount of facilities that will be needed based on the aviation activity forecasts. They do not address the quality of the existing facilities or if they are in the correct location. However, quality considerations are important and will be addressed in a later chapter.

Because three forecasts of aviation activity were developed, three forecasts of facility requirements were also developed. However, it is uncertain when or if various scenarios will occur. This report presents strategic aviation activity triggers for each major terminal functional area. These triggers indicate when additional facilities are needed based on demand rather than a point in time. As a comparison, table 4-29 provides a summary of the facility requirements for each of the three forecast scenarios for the 20-year planning horizon.

After completing this facility requirements analysis and the terminal area study, Southwest Airlines announced its intention to begin service from Greenville-Spartanburg International Airport in early 2011. Southwest Airlines is a leading low fare carrier which validates the Low Fare Carrier scenario developed in this study.

TABLE 4-29
FACILITY REQUIREMENTS SUMMARY

	TERMINAL FUNCTIONAL AREAS SUMMARY	EXISTING	FORECAST SCENARIO		
			BASE CASE	LOW FARE	FOCUS CITY
Airline Functional Areas (SF)	Check-in counters and kiosks	1,936	1,060	1,480	1,690
	Check-in queue	1,891	1,470	2,060	2,360
	Airline ticket offices	4,951	1,400	2,000	2,300
	Baggage make-up	9,000	22,200	29,600	29,600
	Departure lounges	33,094	32,750	38,710	41,690
	Inbound baggage input	4,152	4,800	6,400	6,400
	Baggage claim lobby	8,491	10,800	14,400	14,400
	Baggage service offices	895	840	980	980
	Subtotal Airline Functional Areas	64,410	75,320	95,630	99,420
Security Areas (SF)	Passenger Screening	2,674	5,080	7,410	7,610
	Passenger Screening queue	1,735	1,800	2,400	2,700
	In-line EDS baggage screening	0	17,460	17,460	20,610
	TSA offices and support	1,346	3,300	4,500	5,000
	Subtotal Security	5,755	27,640	31,770	35,920
Terminal Concess. (SF)	Food / Beverage / Retail	16,953	10,690	16,770	19,080
	Rental car counters and offices	2,184	2,180	2,760	3,140
	Rental car customer queue	1,126	450	570	650
	Subtotal Terminal Concessions	20,263	13,320	20,100	22,870
Public Areas (SF)	Non-secure public restrooms	1,207	4,100	5,900	6,600
	Secure public restrooms	2,706	3,900	5,500	6,200
	Terminal Conference Rooms	1,276	1,300	1,560	1,690
	Waiting and seating	3,990	12,840	17,740	20,240
	Public circulation including lobby and entrance	52,448	46,000	62,700	69,600
	Subtotal Public Areas	61,627	68,140	93,400	104,330
Non-Public Areas (SF)	Airport operations	1,174	1,300	1,500	1,600
	Airport Police	1,289	2,200	3,100	3,600
	Maintenance, storage and janitorial	907	4,550	7,140	8,130
	Circulation	924	2,690	3,890	4,410
	Mechanical/ Electrical	27,842	29,010	40,340	44,880
	Subtotal Non-Public Areas	32,136	39,750	55,970	62,620
	SUBTOTAL PROJECT AREA (NET)	184,191	224,170	296,870	325,160
	NET TO GROSS FACTOR	6,080	7,400	9,800	10,730
	SUBTOTAL PROJECT AREA (GROSS)	190,271	231,570	306,670	335,890
Terminal Ancillary Areas (SF)	Airline Operations	12,932	5,000	6,000	6,500
	Airport Administrative Offices	4,267	9,000	10,800	11,700
	Customs and Border Protection	7,688	13,410	13,410	20,190
	Subtotal Security	24,887	27,410	30,210	38,390
	TOTAL BUILDING AREA	215,158	258,980	336,880	374,280

4.15 AIRPORT PUBLIC PARKING SUPPLY AND DEMAND

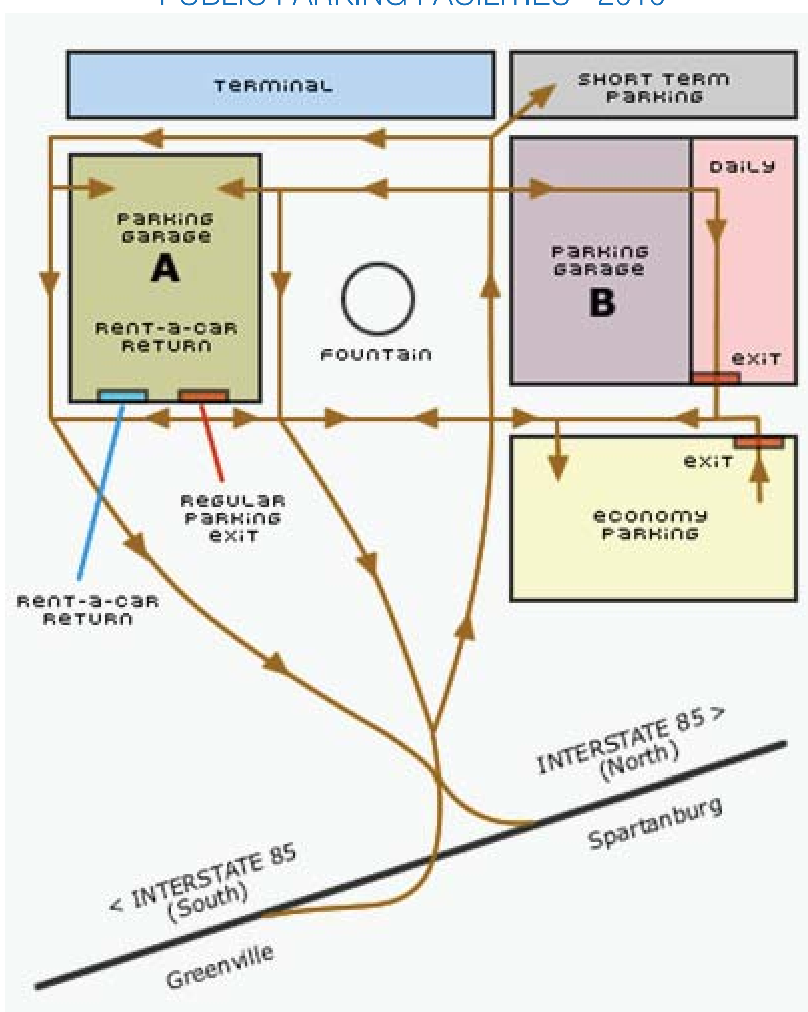
This chapter presents a description of the existing parking supply at GSP, an analysis of the historical public parking demand, and forecasts of parking demand and space requirements. The information presented in this section is intended to help guide the development of a terminal area development plan for GSP.

4.15.1 CURRENT AIRPORT PUBLIC PARKING SUPPLY

Airport Public Parking Facilities

There are 4,356 public parking spaces at GSP allocated among five different facilities. Short term parking is available in the Short Term Lot and long term parking is offered in the Daily Lot, Garage A and Garage B. The Economy Lot provides reduced rates for longer term parkers. The Short Term Lot has 232 spaces, Garage A has 1,368 spaces and Garage B has 1,529 spaces. 270 spaces in Garage A are assigned as rental car ready return spaces and are not available for public parking. The Daily Lot and the Economy Lot have 400 and 1,097 spaces, respectively. The Airport also has an Employee Lot located on-site with 214 parking spaces. The Airport's parking facilities are presented in Figure 4-28 and Figure 4-29.

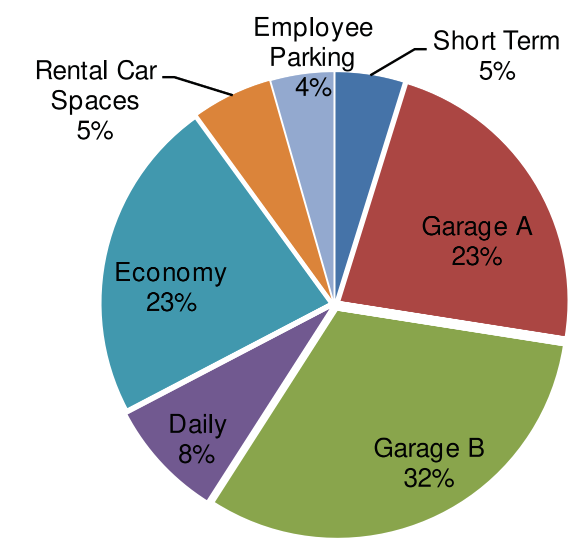
FIGURE 4-28
PUBLIC PARKING FACILITIES - 2010



Source: Airport official website

FIGURE 4-29
DISTRIBUTION OF PUBLIC PARKING SPACES BY FACILITY - 2010

Facility	Current Spaces Public Parking
Short Term	232
Garage A	1,098
Garage B	1,529
Daily	400
Economy	1,097
Total Public Spaces	4,356
Rental Car Spaces	270
Employee Parking	214
Total Non-Public Spaces	484
Total Parking Spaces	4,840



Parking Supply at GSP and Comparable Airports

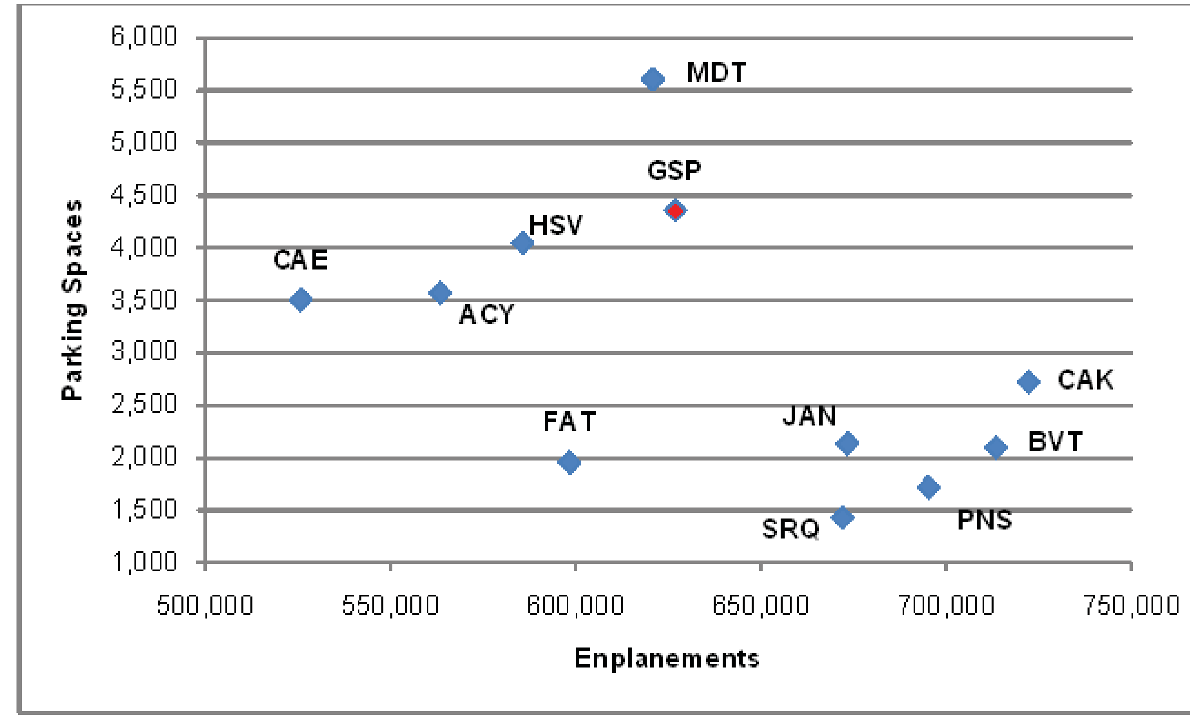
A survey was conducted of 10 airports of comparable size to GSP. The 10 airports selected had 2009 enplanements between 525,674 and 722,135. GSP had approximately 627,000 enplanements in 2009. The number of public parking spaces at the comparable airports ranged from 1,426 at Sarasota Bradenton to nearly 5,602 at Harrisburg. With 4,356 spaces, GSP's parking supply is larger than nine of the ten comparable airports. The findings of the survey are presented on Table 4-30 and Figure 4-30.

TABLE 4-30
PUBLIC PARKING SPACES AND ENPLANEMENTS AT GSP AND COMPARABLE AIRPORTS

Airport	Code	2009 Estimated Enplanements [1]	Public Parking Spaces [2]	
Greenville-Spartanburg International Airport	GSP	626,880	Short Term	232
			Garage	2,627
			Daily	400
			Long Term	1,097
				4,356
Columbia Metropolitan Airport	CAE	525,674	Garage	1,837
			Surface	1,668
				3,505
Atlantic City International Airport	ACY	563,460	Garage	1,100
			Short Term	168
			Economy	2,300 [3]
				3,568
Huntsville International Airport	HSV	585,574	Hourly	275
			Daily	2,400
			Economy	1,370
				4,045
Fresno Yosemite International Airport 4	FAT	598,275	Short Term	290
			Long Term	1,668
				1,958
Harrisburgh International Airport	MDT	620,760	Short Term	3,344
			Long Term	2,258
				5,602
Sarasota Bradenton International Airport	SRQ	671,989	Short Term	611
			Long Term	815
				1,426
Jackson-Evers International Airport	JAN	673,318	Garage	1,074
			Short Term	815
			Long Term	243
				2,132
Pensacola Gulf Coast Regional Airport	PNS	695,205	Garage	900 [5]
			Daily	820 [5]
				1,720
Burlington International Airport	BVT	713,454	Short Term	1,600 [5,6]
			Long Term	500
				2,100
Akron-Canton Airport	CAK	722,135	Short Term	270
			Long Term	1,482
			Economy	966
				2,718

Source: Parking space information obtained from respective airports.
[1] With the exception of GSP, passenger data from ACI-NA 2009 North American Airport Rankings: GSP data from Airport.
[2] Excludes valet and temporary waiting (cell phone) lots.
[3] Includes 980 overflow parking spaces.
[4] Parking space data from 2008 survey.
[5] Approximate.
[6] Currently under construction to add an additional 800 spaces.

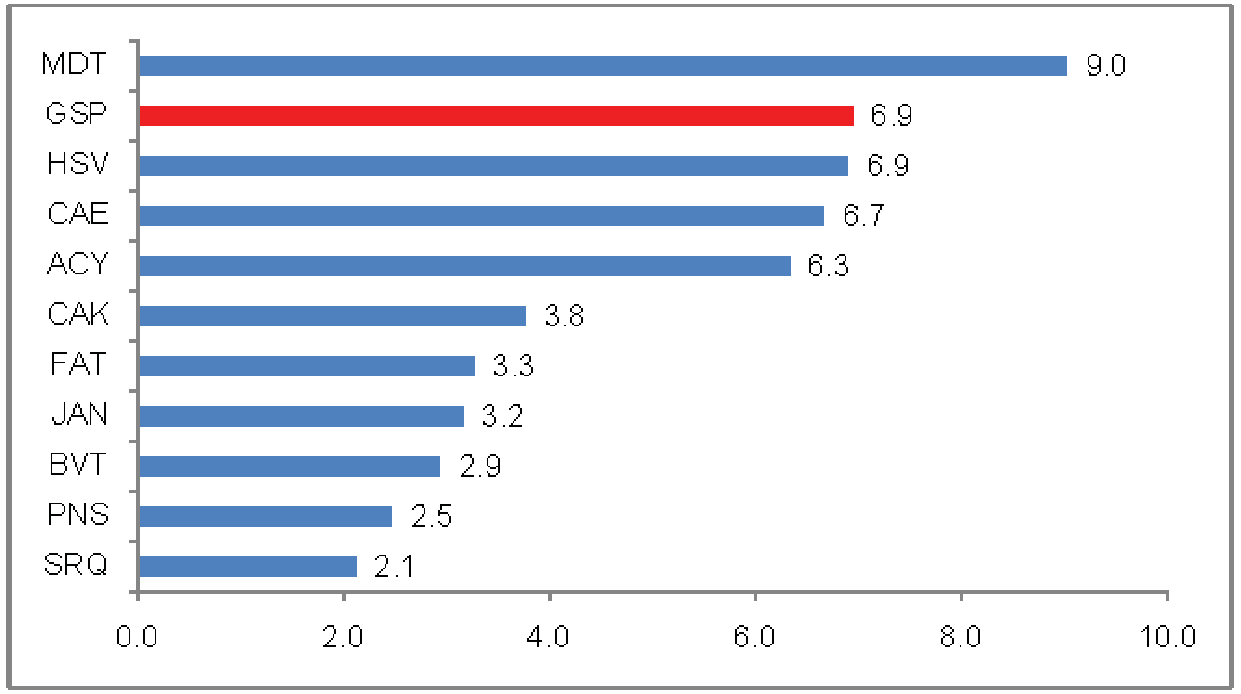
FIGURE 4-30
PUBLIC PARKING SPACES1 AND ENPLANEMENTS AT GSP AND COMP. AIRPORTS



Source: Parking spaces obtained from respective airports and enplanement data derived from ACI-NA 2009 North American Airport Rankings.
[1] Excludes valet and temporary waiting (cell phone) lots.

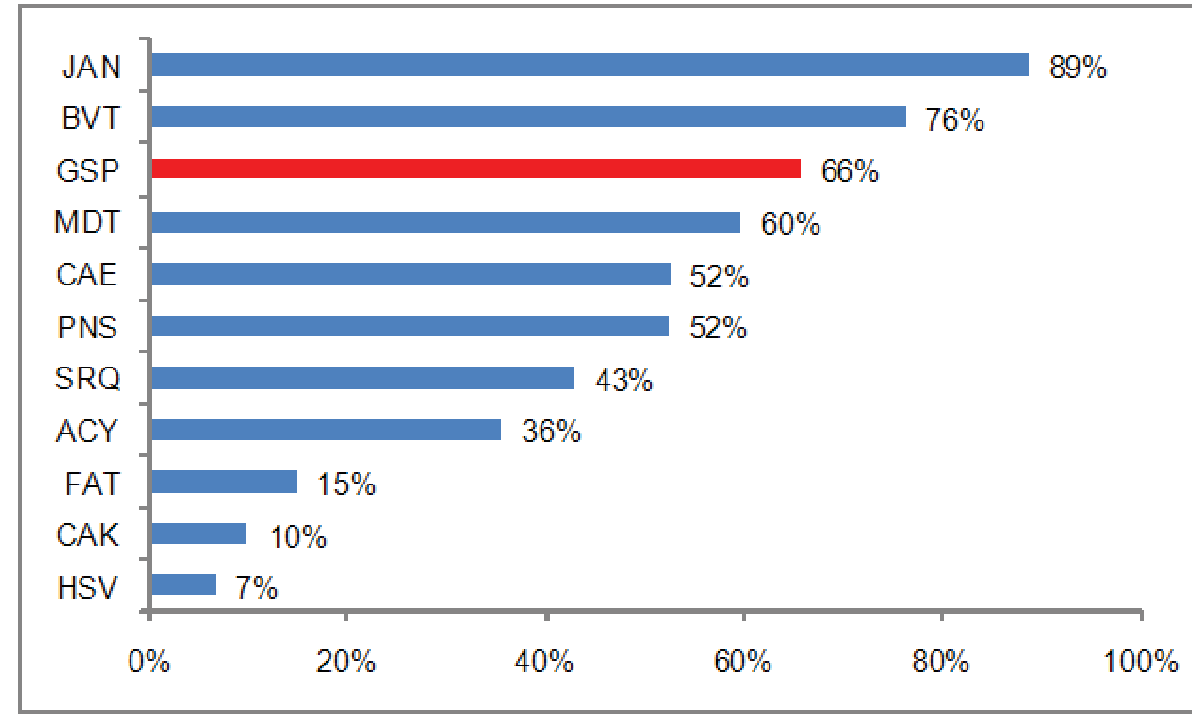
To compare the availability of public parking spaces while controlling for differences in passenger traffic, we calculated the number of public parking spaces per 1,000 enplanements (Figure 4-31). This statistic ranges from 2.1 at Sarasota Bradenton to 9.0 at Harrisburg. The average for all 11 airports is 4.9 spaces per 1,000 enplanements. Nine of the airports surveyed have fewer spaces per 1,000 enplanements than the Airport.

FIGURE 4-31
PUBLIC PARKING SPACES[1] PER 1,000 ENPLANEMENTS AT GSP AND COMPARABLE AIRPORTS



Source: Parking spaces obtained from respective airports and enplanement data derived from ACI-NA 2009 North American Airport Rankings.
[1] Excludes valet and temporary waiting (cell phone) lots.

FIGURE 4-32
PERCENTAGE OF PUBLIC PARKING SPACES[1] ALLOCATED TO SHORT TERM PARKING AT GSP AND COMPARABLE AIRPORTS



Source: Parking spaces obtained from respective airports.
[1] Excludes valet and temporary waiting (cell phone) lots.

Figure 4-32 shows the percentage of spaces allocated to short-term parking at the comparable airports. Huntsville has the lowest number of spaces allocated to short term parking at 7 percent. The highest percentage of short term parking spaces is 89 percent at Jackson-Evers.

Effective Parking Supply

In assessing the availability of parking spaces, it is important to make a distinction between actual and effective parking supply. The effective parking supply is less than the actual number of spaces after making allowances for various conditions that could render certain spaces unusable – for example, improperly parked vehicles and maintenance work – and to keep the time spent by customers searching for spaces within acceptable limits.

It is customary for an allowance of 10-15 percent to be allocated to such parking contingencies and for short-term/high traffic areas to be allocated a relatively higher allowance compared to other areas[1]. According to the 1995 GAS report, a parking system is considered to be operating at peak efficiency when occupancy is at 85% to 95% of capacity[2].

For the purpose of assessing the adequacy of the Airport's existing parking supply, two levels of service standards are defined: Level of Service A (LOS A) and Level of Service B (LOS B). One of the decisions to be made by Airport management is the level of service to be included when planning for parking supply taking into account both customary allowances and local conditions. The corresponding effective parking supply is calculated for each level of service.

Table 4-31 presents an assessment of effective parking supply[3] at two levels of service (LOS):

- LOS A. Effective parking supply is set at 85 percent of the actual number of short-term spaces and 90 percent of the long-term spaces. At LOS A, the effective Airport parking supply equals 3,909 spaces.
- LOS B. Effective parking supply is set at 95 percent of the actual number of short term spaces and 97 percent of the long term spaces. At LOS B, the effective Airport parking supply equals 4,221 spaces.

Footnotes:
[1] See, for example, Planners Press, "Parking Management Best Practices," 2006; TDM Encyclopedia, "Parking Evaluation," 2005; and Kay & Smith, *The Level of Service Approach* in "Parking Issues," March 2000.
[2] Graef, Anhalt, Schloemer & Associates, Inc., "Parking Expansion Plan," June 1995, pages 1-12 and 1-15.
[3] Graef, Anhalt, Schloemer & Associates, Inc., *Parking Expansion Plan for General Mitchell International Airport*, June 1995.

TABLE 4-31
EFFECTIVE PUBLIC PARKING SUPPLY - 2010

	Short Term	Garage A	Garage B	Daily	Economy	Total
Total public parking spaces	232	1,098	1,529	400	1,097	4,356
Effective public parking supply						
Level of Service A						
Efficiency factor[1]	85%	90%	90%	90%	90%	
Effective number of spaces	197	988	1,376	360	987	3,909
Level of Service B						
Efficiency factor1	95%	97%	97%	97%	97%	
Effective number of spaces	220	1,065	1,483	388	1,064	4,221

Source: Airport records
[1] See Graef, Anhalt, Schloemer & Associates, Inc., *Parking Expansion Plan for General Mitchell International Airport*, June 1995.

Rate Structure at GSP and Comparable Airports

Public parking rates in effect at GSP and at 10 comparable airports were examined in order to provide context for the Airport's rate structure (Table 4-32). Rates consist of pricing and duration components. The specific prices each airport charge are based on local market factors, thus they are not necessarily comparable between airports. Duration also can be affected by local airport factors, such as how strongly an airport may want to encourage long term parkers to use long term parking, which can be driven by the number of short term spaces available. The short term daily maximum rates are lowest at Burlington ($10.00) and long term daily maximum rates are lowest at Fresno Yosemite, Atlantic City, Columbia Metropolitan and Jackson Evers ($8.00). The three airports that offer economy parking each charge a daily maximum rate of $7.00. The highest short term daily maximum rates are found at Huntsville ($24.00) and the highest long term rates are at Sarasota Bradenton ($11.00). GSP's daily maximum rates for short term parking are 13 percent higher than the average short term rate of $13.50 while its daily maximum long term rate is 10 percent below the average rate of $9.00.

TABLE 4-32
PARKING RATES AT GSP AND COMPARABLE AIRPORTS - JUNE 2010

Airport	Code	Short Term / Hourly Rates	Daily / Long Term Rates	Economy Rates
Greenville-Spartanburg International Airport	GSP	Lot First 30 mins. - $1.00 Each addt'l 30 mins. - $1.00 Daily max. - $12.00	First hr. - $1.00 Each addt'l hr. - $1.00 Daily max. - $10.00 Garage First hr. - $1.00 Each addt'l hr. - $1.00 Daily max. - $10.00	First hr. - $1.00 Each addt'l hr. - $1.00 Daily max. - $7.00
Columbia Metropolitan Airport	CAE	First 20 mins. - Free 20-40 mins. - $3.00 Each addt'l 20 mins. - $1.00 Daily max. - $12.00	First 20 mins. - $1.00 Each addt'l 20 mins. - $1.00 Daily max. - $8.00	
Atlantic City International Airport	ACY	Garage - Per day - $12.00 Lot Each hr. - $1.00 Daily max. - $13.00	Per day - $8.00	
Huntsville International Airport	HSV	Each hr. - $1.00 Daily max. - $24.00	Each hr. - $1.00 Daily max. - $10.00	Each hr. - $1.00 Daily max. - $7.00
Fresno Yosemite International Airport 5	FAT	Every 20 mins. - $1.00 Daily max. - $12.00	Per day - $8.00	
Harrisburgh International Airport	MDT	Each hr. - $2.20 Daily max. - $20.00	Each hr. - $2.20 Daily max. - $8.50	
Sarasota Bradenton International Airport	SRQ	First 20 mins. - Free 21-40 mins. - $2.00 Each add't 20 mins. - $1.00 Daily max. - $13.00	First 20 min.s - Free 21-60 mins - $2.00 Each add't 20 mins. - $1.00 Daily max. - $11.00	
Jackson-Evers International Airport	JAN	Garage - Per day - $13.00 Lot - Per day - $11.00	Per day - $8.00	
Pensacola Gulf Coast Regional Airport	PNS	Each 30 mins. - $1.00 Daily max. - $10.50	Each 60 mins. - $2.00 Per day - $8.50	
Burlington International Airport	BVT	First 30 mins. - Free Next 30 mins. - $1.00 Each addt'l 60 mins. - $1.00 After 4 hrs. - $10.00 (daily max)	Per day - $10.00	
Akron-Canton Airport	CAK	First 30 mins. - $1.00 30 mins.-1 hr. - $2.00 1 hr.-1.5 hrs. - $3.00 1.5 hrs.-2 hrs. - $4.00 2 hrs.-2.5 hrs. - $5.00 2.5 hrs.-3 hrs. - $6.00 3 hrs.-3.5 hrs. - $7.00 3.5 hrs.-4 hrs. - $8.00 Daily max. - $13.00	First 30 mins. - $1.00 30 mins.-1 hr. - $2.00 1 hr.-1.5 hrs. - $3.00 1.5 hrs.-2 hrs. - $4.00 2 hrs.-2.5 hrs. - $5.00 2.5 hrs.-3 hrs. - $6.00 3 hrs.-3.5 hrs. - $7.00 Daily max. - $9.00	First 30 mins. - $1.00 30 mins.-1 hr. - $2.00 1 hr.-1.5 hrs. - $3.00 1.5 hrs.-2 hrs. - $4.00 2 hrs.-2.5 hrs. - $5.00 2.5 hrs.-3 hrs. - $6.00 Daily max. - $7.00

Source: Airport Websites

4.15.2 HISTORICAL PUBLIC PARKING DEMAND TRENDS

This section examines historical parking trends in terms of tickets issued, parking revenue, parking duration, and peak parking occupancy. Tickets issued and parking occupancy are two different representations of parking demand. Tickets issued measure the total number of vehicles entering a parking facility over a specified period and determine parking revenue. Parking occupancy measures the number of vehicles parked at a given time, and peak occupancy determines parking space requirements.

Tickets Issued

The following tables present data on tickets issued for the period 2005 through September 2009. Table 4-33 and Figure 4-33 provide a summary of annual trends, and Table 4-34 shows monthly data on tickets issued for all facilities combined. The key points are as follows:

- Table 4-33 shows that total tickets issued exits followed a pattern of large decreases and increases between 2005 and 2008. Tickets issued decreased by 12.5 percent in 2006, increased by almost 15 percent in 2007 and then decreased by 8.9 percent in 2008. Annual tickets issued were highest at nearly 481,000 in 2007 and lowest at approximately 419,000 in 2006. On average, tickets issued declined by 2.9 percent between 2005 and 2008. Through September 2009, total tickets issued suffered a large decline of 15.6 percent compared to the prior year.
- While there was a slight decline in total tickets issued, there was more variability among the different facilities. The Short Term Lot experienced the greatest rate of decline, an average of 11.6 percent during the four years analyzed. Garage A and the Daily Lot saw slight declines while tickets issued in Garage B and the Economy Lot grew by a small amount. All facilities had decreases in the first three quarters of 2009; however the greatest decreases occurred in the Economy Lot (Table 4-33).
- The allocation of tickets issued has changed since 2005. The Short Term Lot accounted for the largest share of tickets issued (32 percent) in 2005 and 2006 but declined to the second largest share (24 percent) in 2008. The largest share of exits belongs to Garage A with 29 percent. The Daily Lot maintains the smallest share of exits with 9 percent (Table 4-34).
- On a monthly basis, tickets issued in all facilities totaled as high as 49,022 in June 2007 and as low as 30,707 in November 2008. June is the peak month for total tickets issued in all facilities (Table 4-5).

TABLE 4-33
ANNUAL TICKETS ISSUED - 2005 – SEPTEMBER 2009

Year	Short Term	Garage A	Garage B	Daily	Economy	Total
2005	154,119	130,072	74,152	44,700	75,272	478,315
2006	128,723	120,378	75,319	34,920	59,386	418,726
2007	127,031	144,700	92,159	47,610	69,172	480,672
2008	106,398	127,443	82,759	40,169	80,891	437,660
Jan-Sept. 08	80,708	96,853	63,714	30,269	65,658	337,202
Jan-Sept. 09	72,156	80,883	54,652	28,948	48,040	284,679
Annual Share						
2005	32%	27%	16%	9%	16%	100%
2006	31%	29%	18%	8%	14%	100%
2007	26%	30%	19%	10%	14%	100%
2008	24%	29%	19%	9%	18%	100%
Jan-Sept. 08	24%	29%	19%	9%	19%	100%
Jan-Sept. 09	25%	28%	19%	10%	17%	100%
Average Annual Growth Rate						
2005-2008	-11.6%	-0.7%	3.7%	-3.5%	2.4%	-2.9%
Jan-Sept. 09	-10.6%	-16.5%	-14.2%	-4.4%	-26.8%	-15.6%

FIGURE 4-33
ANNUAL TICKETS ISSUED BY PARKING FACILITY
2005 – 2008

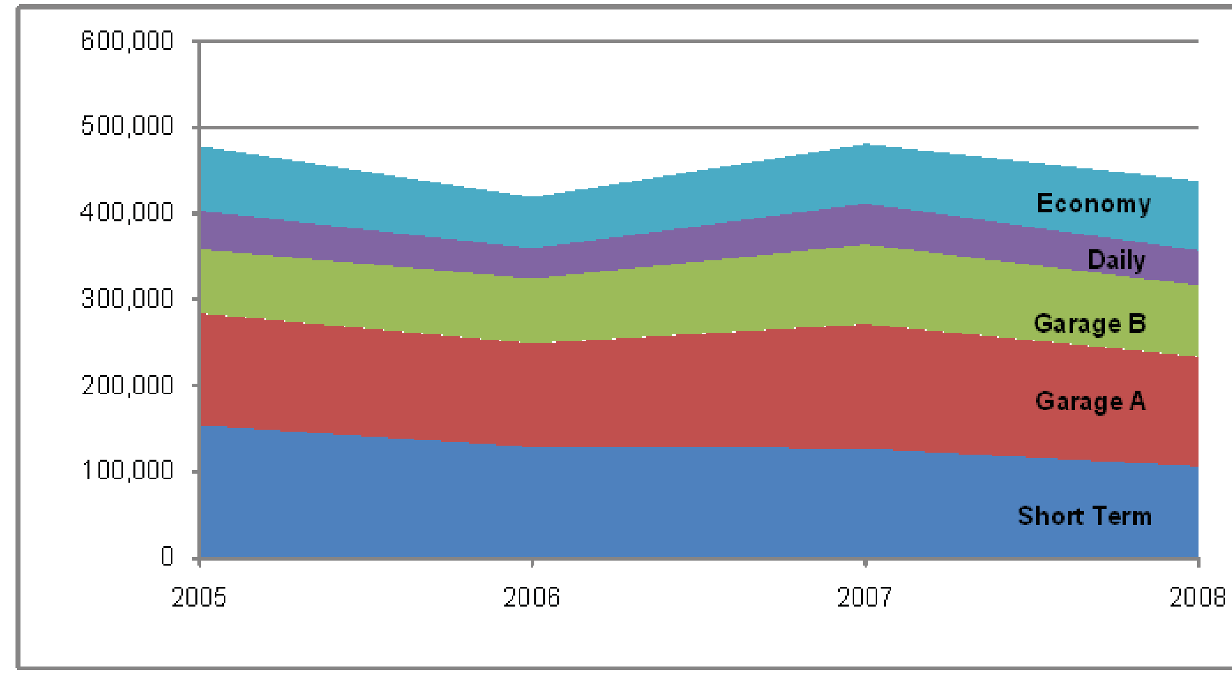


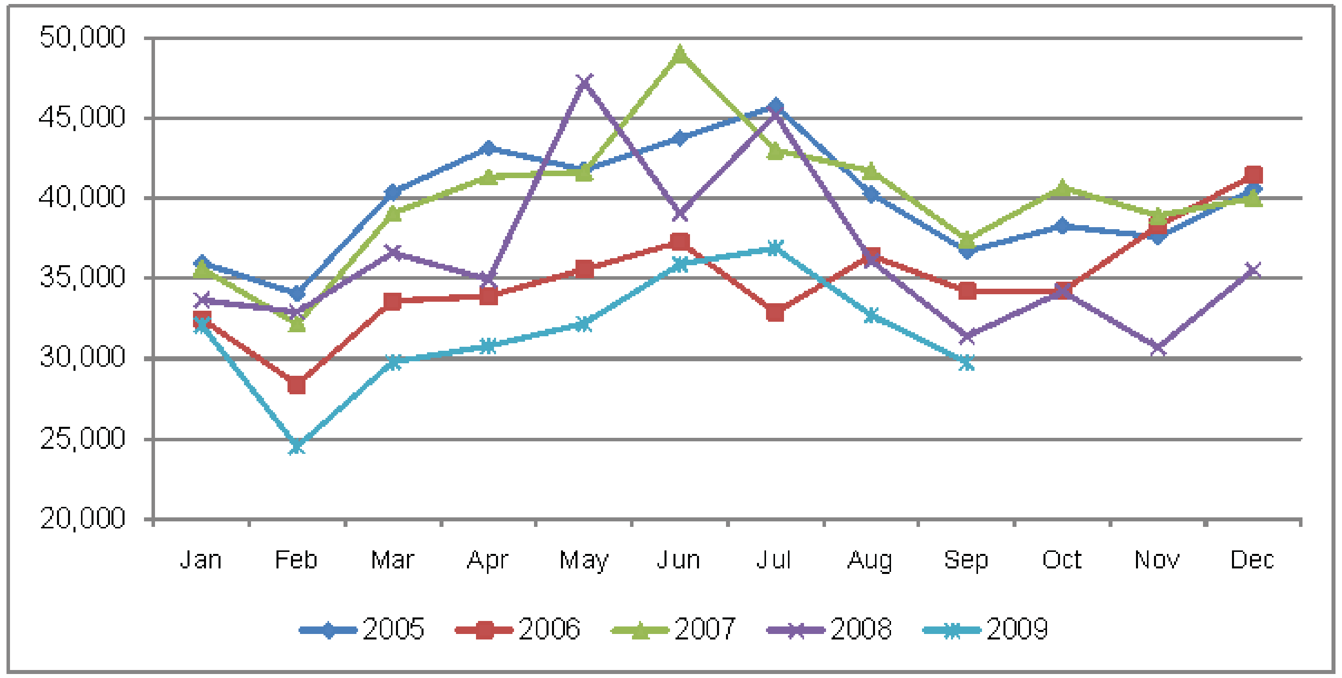
TABLE 4-34
MONTHLY TICKETS ISSUED – ALL FACILITIES
2005 – SEPTEMBER 2009

Month	2005	2006	2007	2008	2009
January	35,974	32,476	35,611	33,642	32,081
February	34,067	28,395	32,161	32,912	24,517
March	40,401	33,613	39,073	36,611	29,801
April	43,147	33,901	41,354	34,954	30,795
May	41,786	35,573	41,659	47,286	32,197
June	43,765	37,288	49,022	39,064	35,907
July	45,759	32,889	43,025	45,215	36,889
August	40,281	36,443	41,714	36,118	32,710
September	36,706	34,206	37,427	31,400	29,782
October	38,275	34,216	40,675	34,194	
November	37,582	38,269	38,932	30,707	
December	40,572	41,457	40,019	35,557	
Total	478,315	418,726	480,672	437,660	284,679
Annual Growth		-12.5%	14.8%	-8.9%	
Jan.-Sept. 2009					-15.6%
Monthly Average	39,860	34,894	40,056	36,472	31,631

Source: Airport Records

Figure 4-34 graphs the total tickets issued on a monthly basis to show seasonality. The graph indicates that tickets issued are highest in May, June and July and lowest in January, February and September.

FIGURE 4-34
MONTHLY TICKETS ISSUED
2005 – SEPTEMBER 2009



Source: Airport records.

Parking Revenue

Table 4-35 shows the current rates by parking facility, which have been in place since March 2006 when the daily maximum rates were raised by $1.00 in each facility except the Short Term Lot. The parking rates in the Short Term Lot were not changed at that time. Table 4-36 shows tickets issued, gross parking revenue, and average revenue per vehicle exit for all facilities for the period 2005 through September 2009.

The following trends are noteworthy:

- Total parking revenue in all facilities increased slightly in 2006 and then modestly in 2007 before decreasing by 8.3 percent in 2008. Parking revenue declined from $7.64 million in 2005 to $7.36 million in 2008 at an average annual rate of 1.3 percent. In the three quarters of 2009, tickets issued and parking revenue experienced declines of 15.6 percent and 20.2 percent, respectively.
- The parking rate increase in 2006 mitigated the decrease in tickets issued in 2006 as average revenue per ticket issued increased by 15.7 percent to $18.48. From 2005 to 2008, average revenue per ticket grew slightly, from $15.98 to $16.81 at an average annual rate of less than 2.0 percent. Through September 2009 the average rate per ticket was down 5.5 percent from the prior year.
- Adjusting for inflation, the average revenue per ticket issued decreased from $15.98 to $15.25 at an average rate of 1.6 percent. The inflation adjusted average rate declined by nearly 5.0 percent through the third quarter of 2009.

TABLE 4-35
ANNUAL VEHICLE EXITS, GROSS PARKING REVENUE, AND AVERAGE REVENUE PER VEHICLE EXIT – ALL FACILITIES
2005 – SEPTEMBER 2009

Year	Tickets Issued	Gross Parking Revenue	Avg. Revenue per Ticket Issued	
			Current $	Constant 2005 $
2005	478,315	$7,643,951	$15.98	$15.98
2006	418,726	$7,739,275	$18.48	$17.91
2007	480,672	$8,022,110	$16.69	$15.72
2008	437,660	$7,356,494	$16.81	$15.25
Jan-Sept. 08	337,202	$5,675,741	$16.83	$15.22
Jan-Sept. 09	284,679	$4,527,136	$15.90	$14.51
		Average Annual Growth Rate		
2005-2008	-2.9%	-1.3%	1.7%	-1.6%
Jan-Sept. 09	-15.6%	-20.2%	-5.5%	-4.6%

Source: Airport Records

The parking operator provided a sample of revenue data by facility for the first three months of 2010. This information is presented on Table 4-36.

TABLE 4-36
ANNUAL VEHICLE EXITS, GROSS PARKING REVENUE, AND AVERAGE REVENUE PER VEHICLE EXIT – ALL FACILITIES - 2005 – SEPTEMBER 2009

Parking Facility	Tickets Issued	Percentage of Tickets	Gross Parking Revenue	Percentage of Revenue	Avg. Rev. per Ticket Issued
Short Term	16,400	20.3%	$71,842	5.0%	$4.38
Garage A	25,116	31.1%	$522,800	36.5%	$20.82
Garage B	18,680	23.1%	$460,557	32.1%	$24.66
Daily	8,509	10.5%	$61,528	4.3%	$7.23
Economy	12,013	14.9%	$315,884	22.0%	$26.30
Total	80,718	100.0%	$1,432,610	100.0%	$17.75

Source: Airport Records

- The data shows that during the first quarter of 2010, the Short Term Lot represents of 20 percent of the tickets issued but only 5 percent of the total revenue. This is indicative of the higher turnover and lower average per ticket revenue that is seen in short term facilities.
- Garage A and Garage B combined account for 54.3 percent of the tickets issued and nearly 70 percent of the revenue. Garage A, which is closer to the terminal than Garage B, represents the larger share of tickets and revenue, but has lower average revenue per ticket.
- The Economy Lot has the highest average revenue per ticket followed by Garage B. The average revenue per ticket in the Economy Lot and Garage B was $26.30 and $24.66, respectively, during the first quarter of 2010.

Peak Parking Occupancy

The following measure of parking occupancy, when compared to available spaces, allow us to assess capacity utilization to be assessed:

- Monthly Peak - The highest occupancy recorded each month
- Annual Peak - The highest of the monthly peak occupancies, or the highest occupancy recorded in a year
- Average Peak - The average of the monthly peak occupancies

The parking management company takes an inventory of vehicles in each facility every morning between 12:00 a.m. and 8:00 a.m. Based on the daily inventory data for the years 2007-2009, peak overnight occupancy rates were determined based on total spaces in each facility and effective supply at LOS B and LOS A.

Overnight occupancy counts tend to understate occupancy during the day, especially in short term facilities. At the Airport's request, the parking operator conducted a two-week survey between May 12, 2010 and May 25, 2010 and counted the number of cars of each facility, on an hourly basis, between 8:00 a.m. and 12:00 a.m. Based on the results of the survey, we applied a factor of 114 percent to the Short Term, Garage A, Garage B and Daily facilities and a factor of 106 percent to the Economy Lot as a way of estimating peak daytime occupancy. The estimated daytime occupancy rates are presented on Tables 4-37 through 4-39.

Figures 4-35 through 4-40 present graphs comparing peak occupancy in each facility in each month from January 2007 through December 2009 with stated capacity and effective capacity at LOS B and LOS A. The following can be observed:

- Peak daytime parking occupancy in the Short Term Lot as declined each year from 67 percent in 2007 to 45 percent in 2009.
- Garage A maintained peak occupancy rates in excess of 100 percent in 2007 and 2008, but declined to 73 percent in 2009. The average peak as a percentage of the annual peak has remained relatively high during the three years analyzed. The annual peak daytime occupancy was highest at 104 percent of total spaces in 2008 and lowest at 73 percent of total spaces in 2009.
- In 2007 and 2008, Garage B had peak daytime occupancy rates that were much lower than the rates seen in Garage A. However, in 2009 the peak rate declined by only 5 percent to 55 percent, compared to the 31 percent decline to 73 percent that was experienced in Garage A. The average peak as a percentage of annual peak in Garage B has steadily remained near 85 percent.
- Peak overnight occupancy counts in the Daily Lot mirrored that of Garage A in 2007 and 2008 with peak daytime occupancy rates as a percentage of total spaces of 110 percent and 106 percent respectively. In 2009 the peak as a percentage of spaces decreased 45 percent. The Daily Lot is prone to spikes as demonstrated by the average peak as a percentage of annual peak. This ratio remained close to 50 percent in 2007 and 2008 but rose to 71 percent in 2009.
- The Economy Lot has had the highest occupancy rates of all of the facilities. The annual peak daytime occupancy was the highest at 126 percent of total spaces in 2007 and was 116 percent in 2008 and 2009.
- Combing occupancy in all facilities, the annual peak overnight occupancy has declined each year, moving from 76 percent to 54 percent in 2007. The average peak has moved in the opposite direction, increasing from 89 percent in 2007 to 93 percent in 2009.
- The graphs provide an easy way to visualize the information in the tables. When looking at the individual facilities, the graph shows instances when estimates of peak daytime occupancy in each month exceeded stated capacity. When looking at all the facilities combined (Figure 4-40), peak daytime occupancy remained well below combined capacity.

TABLE 4-37

ESTIMATED PEAK DAYTIME PARKING OCCUPANCY BY FACILITY - 2008

Month	2007					
	Short Term	Garage A	Garage B	Daily	Economy	Total[2]
Available Spaces						
Total Public Parking Spaces On-Airport	232	1,098	1,529	400	1,097	4,356
LOS B Effective Supply	220	1,065	1,483	388	1,064	4,221
LOS A Effective Supply	197	988	1,376	360	987	3,909
Estimated Peak Daytime Parking Occupancy [3]						
January	99	1,004	962	141	601	2,550
February	105	1,078	901	145	705	2,737
March	101	1,039	955	160	807	3,041
April	105	1,124	959	177	950	2,997
May	108	1,081	1,172	195	987	3,140
June	155	1,082	963	174	988	3,029
July	121	974	1,000	209	1,058	2,940
August	89	1,096	853	160	879	2,656
September	113	1,102	977	181	946	3,063
October	147	1,092	1,031	207	997	3,050
November	124	1,060	1,053	439	1,386	3,318
December	122	1,043	991	184	1,200	2,779
Annual Peak Daytime Parking Occupancy [4]	155	1,124	1,172	439	1,386	3,318
As a Percentage of Total Spaces	67%	102%	77%	110%	126%	76%
As a Percentage of LOS B Effective Supply	70%	106%	79%	113%	130%	79%
As a Percentage of LOS A Effective Supply	79%	114%	85%	122%	140%	85%
Average Peak Daytime Parking Occupancy [5,6]	116	1,065	985	198	959	2,942
As a Percentage of Annual Peak	75%	95%	84%	45%	69%	89%
As a Percentage of Total Spaces	50%	97%	64%	49%	87%	68%
As a Percentage of LOS B Effective Supply	53%	100%	66%	51%	90%	70%
As a Percentage of LOS A Effective Supply	59%	108%	72%	55%	97%	75%

1 Daytime peak estimated by applying a factor of 1.14 to the daytime occupancy for Short Term, Garage A, Garage B and Daily, and a factor of 1.06 to the Economy Lot.
2 Does not add. Total monthly peak is not equal to summation of monthly facilities peak.
3 Source: Airport records - overnight parking inventory data.
4 This refers to the highest parking occupancy recorded during the year.
5 Based on analysis of Airport parking records.
6 This represents the average of the highest parking occupancy recorded each month.
7 Bold numbers represent the peak month in the year.

TABLE 4-39
ESTIMATED PEAK DAYTIME PARKING OCCUPANCY BY FACILITY
2009

Month	2009					
	Short Term	Garage A	Garage B	Daily	Economy	Total[2]
Available Spaces						
Total Public Parking Spaces On-Airport	232	1,098	1,529	400	1,097	4,356
LOS B Effective Supply	220	1,065	1,483	388	1,064	4,221
LOS A Effective Supply	197	988	1,376	360	987	3,909
Estimated Peak Daytime Parking Occupancy [3]						
January	92	746	727	116	630	1,973
February	78	743	697	120	693	2,051
March	78	730	691	147	706	2,129
April	86	**755**	708	114	810	2,158
May	90	722	**684**	115	939	2,117
June	**84**	791	668	140	835	2,295
July	86	800	668	181	902	2,214
August	76	673	845	128	828	2,128
September	105	803	746	116	869	2,261
October	98	775	714	119	923	2,153
November	96	758	739	**117**	**1,276**	**2,356**
December	91	800	736	124	1,243	2,347
Annual Peak Daytime Parking Occupancy [4]	105	803	845	181	1,276	2,356
As a Percentage of Total Spaces	45%	73%	55%	45%	116%	54%
As a Percentage of LOS B Effective Supply	48%	75%	57%	47%	120%	56%
As a Percentage of LOS A Effective Supply	53%	81%	61%	50%	129%	60%
Average Peak Daytime Parking Occupancy [5,6]	88	758	718	128	888	2,182
As a Percentage of Annual Peak	84%	94%	85%	71%	70%	93%
As a Percentage of Total Spaces	38%	69%	47%	32%	81%	50%
As a Percentage of LOS B Effective Supply	40%	71%	48%	33%	83%	52%
As a Percentage of LOS A Effective Supply	45%	77%	52%	39%	90%	56%

1 Daytime peak estimated by applying a factor of 1.14 to the daytime occupancy for Short Term, Garage A, Garage B and Daily, and a factor of 1.06 to the Economy Lot.
2 Does not add. Total monthly peak is not equal to summation of monthly facilities peak.
3 Source: Airport records - overnight parking inventory data.
4 This refers to the highest parking occupancy recorded during the year.
5 Based on analysis of Airport parking records.
6 This represents the average of the highest parking occupancy recorded each month.
7 Bold numbers represent the peak month in the year.

FIGURE 4-35
ESTIMATED PEAK DAYTIME PARKING OCCUPANCY
AND AVAILABLE SPACES: SHORT TERM
2007 – 2009

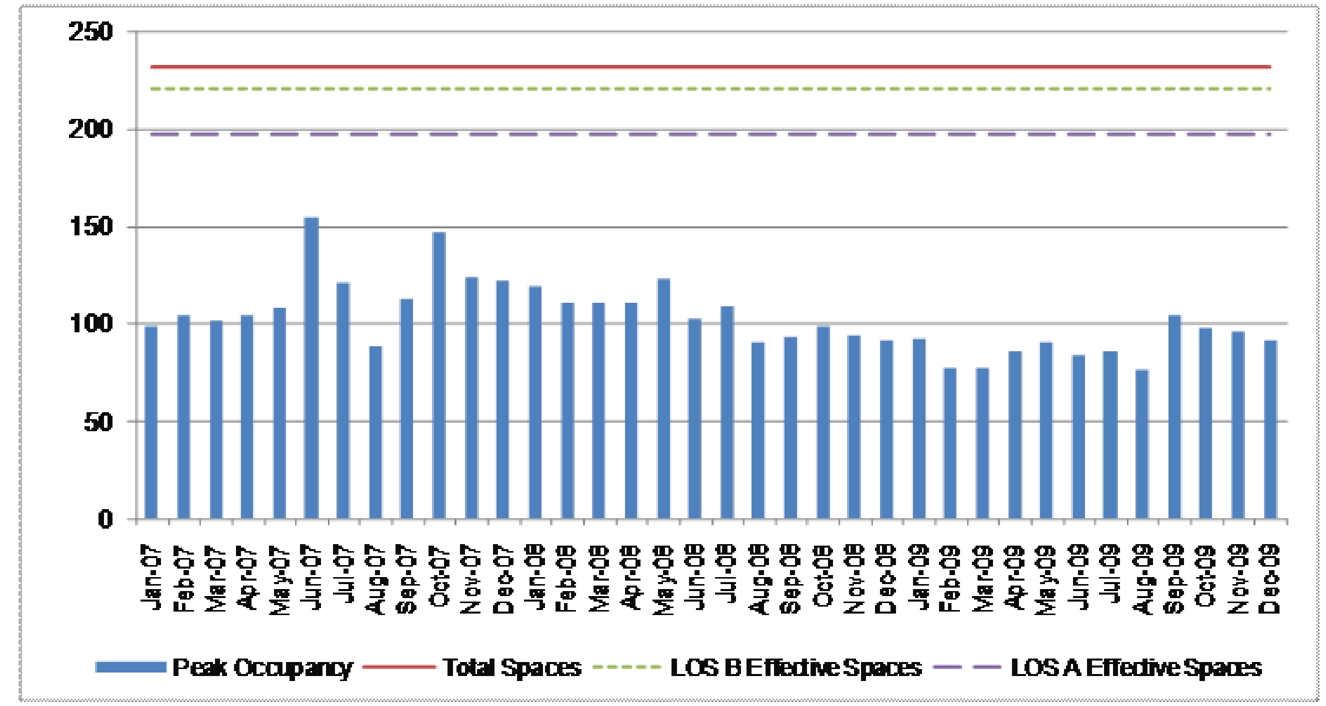


FIGURE 4-36
ESTIMATED PEAK DAYTIME PARKING OCCUPANCY AND AVAILABLE SPACES: GARAGE A
2007 – 2009

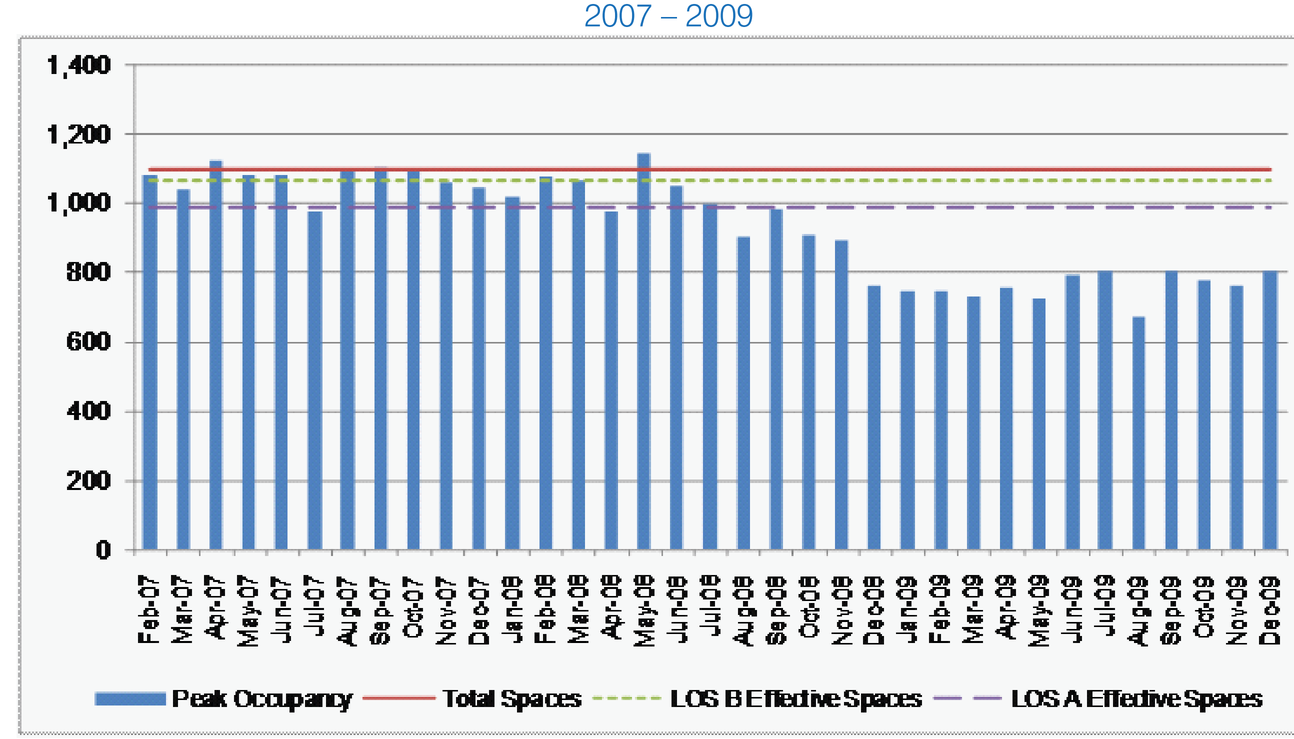


FIGURE 4-37
ESTIMATED PEAK DAYTIME PARKING OCCUPANCY AND AVAILABLE SPACES: GARAGE B
2007 – 2009

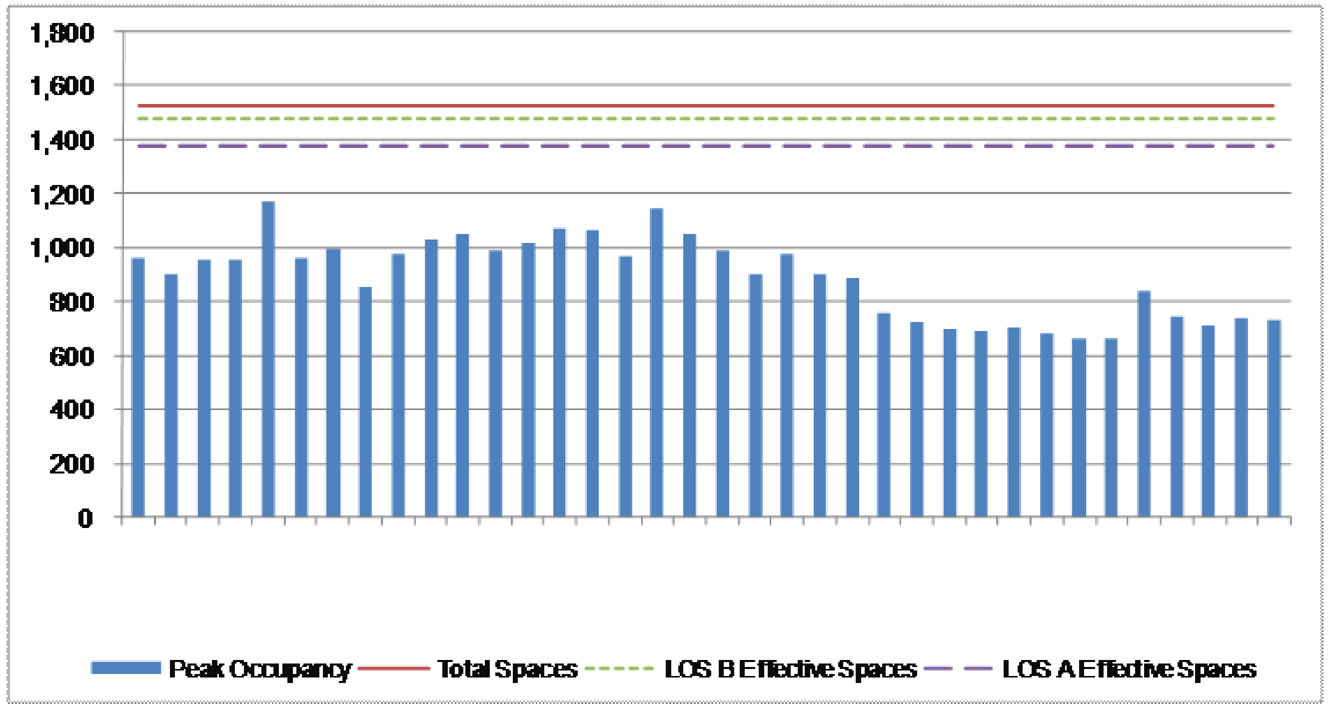


FIGURE 4-38
ESTIMATED PEAK DAYTIME PARKING OCCUPANCY AND AVAILABLE SPACES: DAILY
2007 – 2009

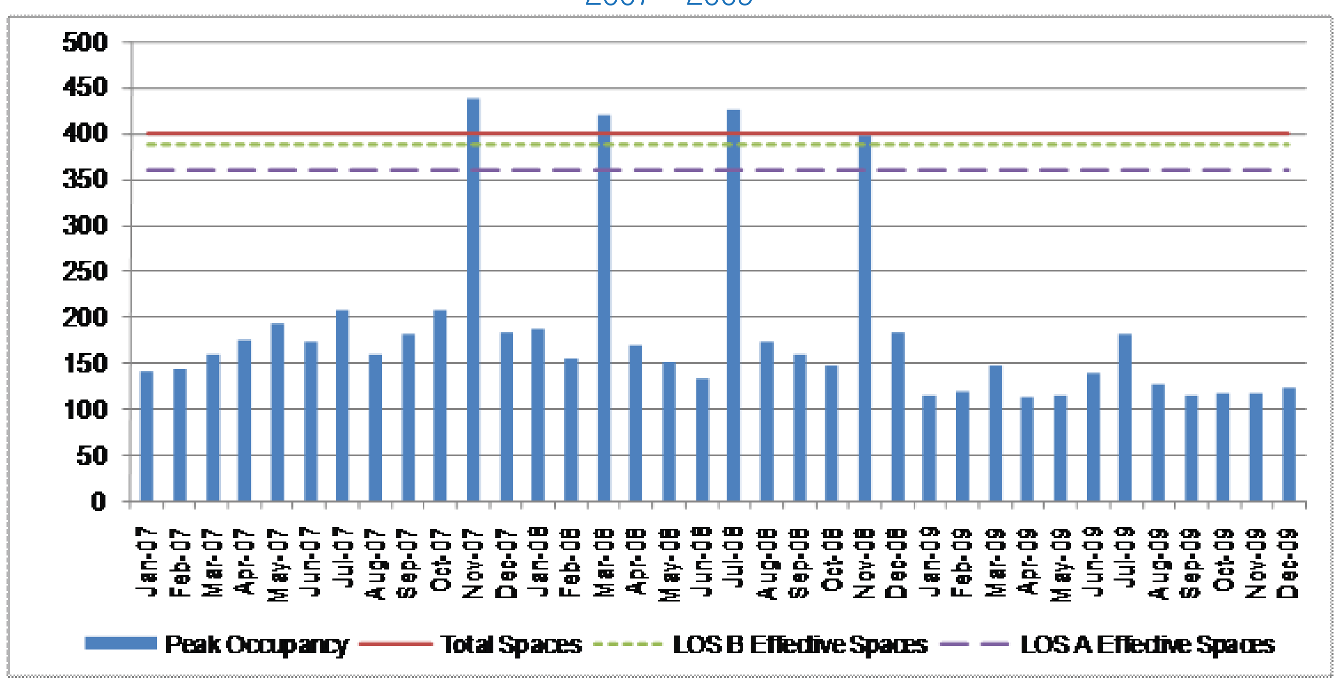


FIGURE 4-39
ESTIMATED PEAK DAYTIME PARKING OCCUPANCY AND AVAILABLE SPACES: ECONOMY
2007 – 2009

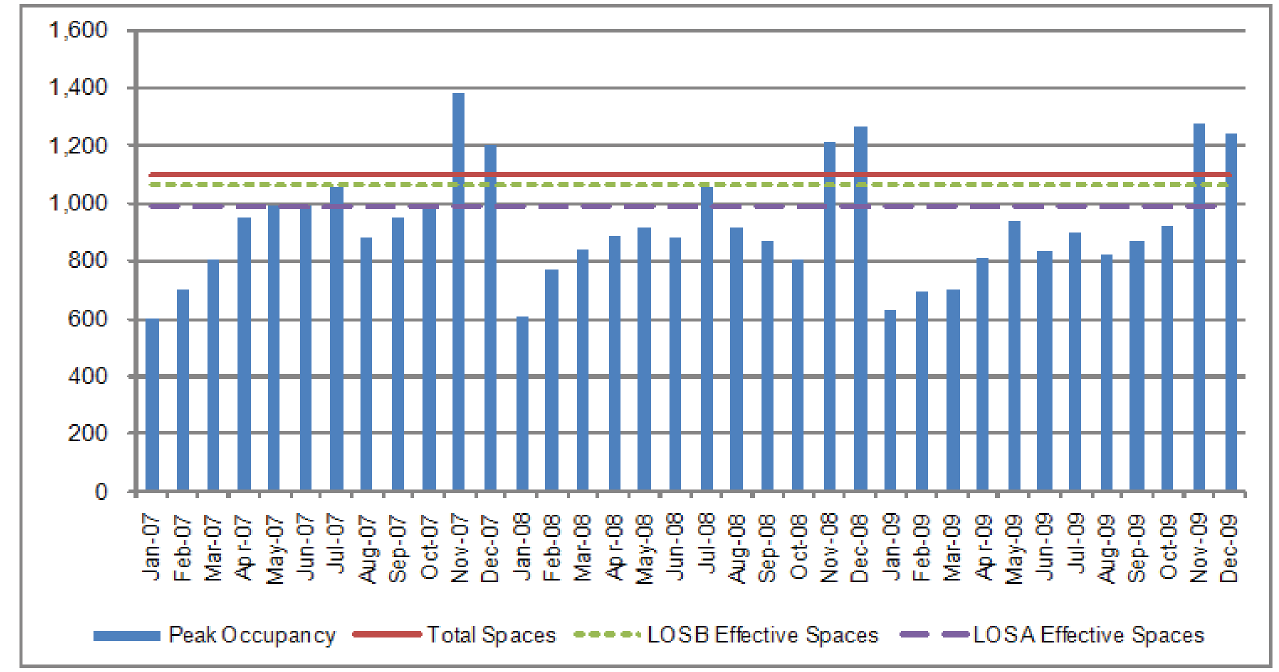
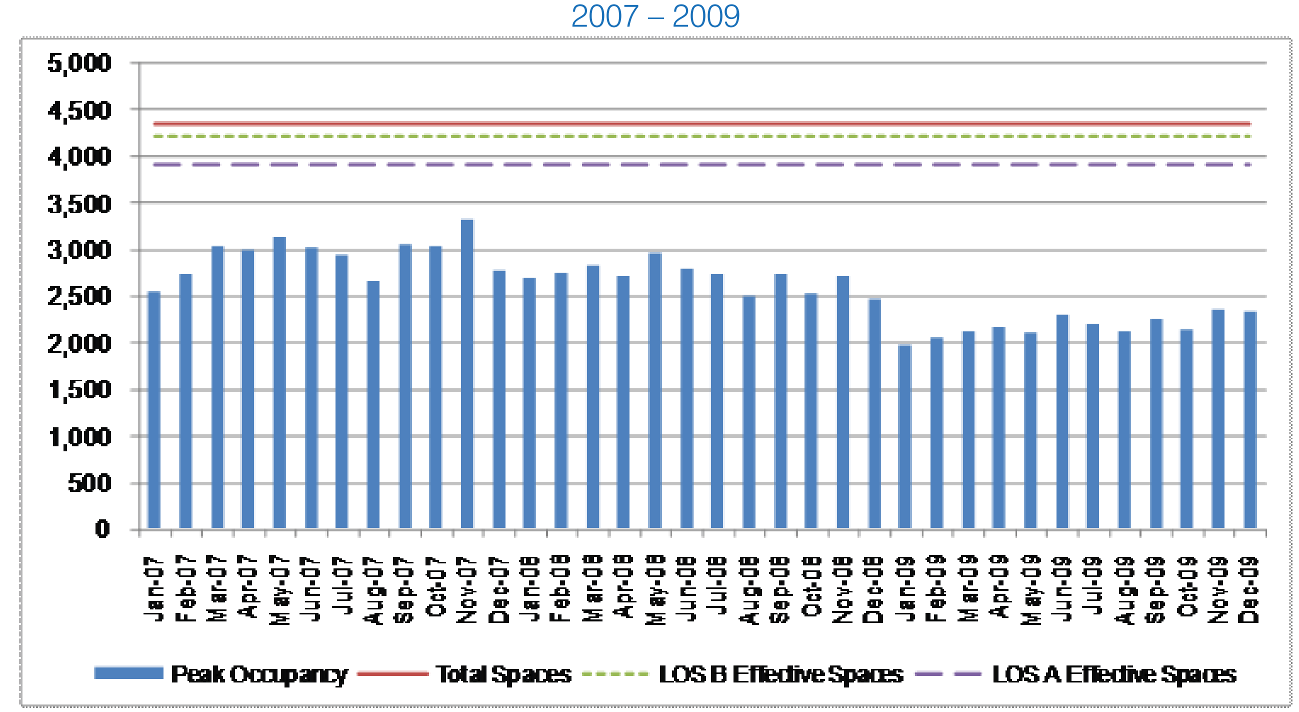


FIGURE 4-40
ESTIMATED PEAK DAYTIME PARKING OCCUPANCY
AND AVAILABLE SPACES: ALL FACILITIES
2007 – 2009



The above tables and graphs show a number of occasions when the peak occupancy was greater than the number of spaces in each facility. This situation occurs during peak when the customers park in open spaces in the facility that are not marked spaces for public parking. It can also occur when cars enter a full lot and drive around until they find a space or decide to leave.

The data for the Daily Lot and the Economy Lot in particular, show spikes in peak occupancy that coincide with holidays in November due to the heavy volume of passenger traffic during the Thanksgiving Holiday period.

Another way of assessing capacity utilization is by determining the number of days each year that parking occupancy exceeded capacity, calculated for different capacity specifications (actual, LOS B and LOS A) and different percentage utilization (100 percent, 90 percent, 80 percent, 70 percent, 60 percent and 50 percent). Tables 4-40 through 4-45 show the results for the Short Term Lot, Garage A, Garage B, Daily Lot, Economy Lot, and all facilities based on the daytime occupancy estimates. These tables show that the estimated daytime occupancy rarely hit 100 percent of capacity in any facility. The Short Term Lot was usually less than 50 percent occupied. Typically, Garage A was no more than 70 percent occupied while Garage B was less than 50 percent occupied. The Daily Lot was always less than 50 percent occupied and the Economy Lot was usually 60 percent occupied or less. Combining all facilities, parking occupancy was typically no more than 50 percent of stated capacity.

TABLE 4-40
GREENVILLE-SPARTANBURG INTERNATIONAL AIRPORT NUMBER OF DAYS THAT PARKING OCCUPANCY EXCEEDED SPECIFIED CAPACITY UTILIZATION – SHORT TERM
2005 – 2009

Occupancy Greater Than Specified Capacity		Number of Days Parking Occupancy Exceeded Specified Capacity Utilization		
		2007	2008	2009
Actual spaces	232	0	0	0
90%	209	0	0	0
80%	186	0	0	0
70%	162	0	0	0
60%	139	3	0	0
50%	116	13	2	0
LOS B spaces	220	0	0	0
90%	198	0	0	0
80%	176	0	0	0
70%	154	1	0	0
60%	132	4	0	0
50%	110	17	5	0
LOS A spaces	197	0	0	0
90%	177	0	0	0
80%	158	0	0	0
70%	138	3	0	0
60%	118	13	2	0
50%	99	41	27	1

Source: Airport Records

TABLE 4-41
GREENVILLE-SPARTANBURG INTERNATIONAL AIRPORT NUMBER OF DAYS THAT PARKING OCCUPANCY EXCEEDED SPECIFIED CAPACITY UTILIZATION – GARAGE A
2005 – 2009

Occupancy Greater Than Specified Capacity		Number of Days Parking Occupancy Exceeded Specified Capacity Utilization		
		2007	2008	2009
Actual spaces	1,098	2	1	0
90%	988	44	15	0
80%	878	104	56	0
70%	769	158	125	13
60%	659	205	180	77
50%	549	280	269	165
LOS B spaces	1,065	11	2	0
90%	959	51	21	0
80%	852	123	72	0
70%	746	169	140	18
60%	639	216	190	90
50%	533	289	292	177
LOS A spaces	988	44	15	0
90%	889	94	51	0
80%	791	152	113	7
70%	692	190	168	51
60%	593	249	220	134
50%	494	329	311	217

Source: Airport Records

TABLE 4-42
GREENVILLE-SPARTANBURG INTERNATIONAL AIRPORT NUMBER OF DAYS THAT PARKING OCCUPANCY EXCEEDED SPECIFIED CAPACITY UTILIZATION – GARAGE B
2005 – 2009

Occupancy Greater Than Specified Capacity		Number of Days Parking Occupancy Exceeded Specified Capacity Utilization		
		2007	2008	2009
Actual spaces	1,529	0	0	0
90%	1,376	0	0	0
80%	1,223	0	0	0
70%	1,070	1	0	0
60%	917	27	2	0
50%	765	103	59	1
LOS B spaces	1,483	0	0	0
90%	1,335	0	0	0
80%	1,187	0	0	0
70%	1,038	2	0	0
60%	890	40	6	0
50%	742	116	76	2
LOS A spaces	1,376	0	0	0
90%	1,238	0	0	0
80%	1,101	1	0	0
70%	963	11	0	0
60%	826	71	20	1
50%	688	145	105	13

Source: Airport Records

TABLE 4-43
NUMBER OF DAYS THAT PARKING OCCUPANCY EXCEEDED SPECIFIED CAPACITY UTILIZATION – DAILY
2005 – 2009

Occupancy Greater Than Specified Capacity		Number of Days Parking Occupancy Exceeded Specified Capacity Utilization		
		2007	2008	2009
Actual spaces	400	2	2	0
90%	360	2	3	0
80%	320	2	3	0
70%	280	2	3	0
60%	240	3	3	0
50%	200	6	5	0
LOS B spaces	388	2	3	0
90%	349	2	3	0
80%	310	2	3	0
70%	272	2	3	0
60%	233	3	4	0
50%	194	7	5	0
LOS A spaces	360	2	3	0
90%	324	2	3	0
80%	288	2	3	0
70%	252	2	3	0
60%	216	4	5	0
50%	180	12	7	1

Source: Airport Records

TABLE 4-44
NUMBER OF DAYS THAT PARKING OCCUPANCY EXCEEDED SPECIFIED CAPACITY UTILIZATION - ECONOMY
2005 – 2009

Occupancy Greater Than Specified Capacity		Number of Days Parking Occupancy Exceeded Specified Capacity Utilization		
		2007	2008	2009
Actual spaces	1,097	4	6	5
90%	987	9	10	7
80%	878	34	17	14
70%	768	103	68	36
60%	658	206	166	90
50%	549	291	272	177
LOS B spaces	1,064	5	6	5
90%	958	14	11	8
80%	851	53	26	15
70%	745	126	82	41
60%	638	218	182	104
50%	532	303	282	191
LOS A spaces	987	9	10	7
90%	889	28	13	13
80%	790	89	50	32
70%	691	173	132	73
60%	592	253	231	134
50%	494	329	306	236

Source: Airport Records

TABLE 4-45
NUMBER OF DAYS THAT PARKING OCCUPANCY EXCEEDED SPECIFIED CAPACITY UTILIZATION – ALL FACILITIES
2007 – 2009

Occupancy Greater Than Specified Capacity		Number of Days Parking Occupancy Exceeded Specified Capacity Utilization		
		2007	2008	2009
Actual spaces	4,356	0	0	0
90%	3,920	0	0	0
80%	3,485	0	0	0
70%	3,049	4	0	0
60%	2,614	79	29	0
50%	2,178	187	142	13
LOS B spaces	4,221	0	0	0
90%	3,799	0	0	0
80%	3,377	0	0	0
70%	2,954	20	1	0
60%	2,532	93	45	0
50%	2,110	202	155	27
LOS A spaces	3,909	0	0	0
90%	3,518	0	0	0
80%	3,127	2	0	0
70%	2,736	48	11	0
60%	2,345	142	94	2
50%	1,954	237	202	78

Source: Airport Records

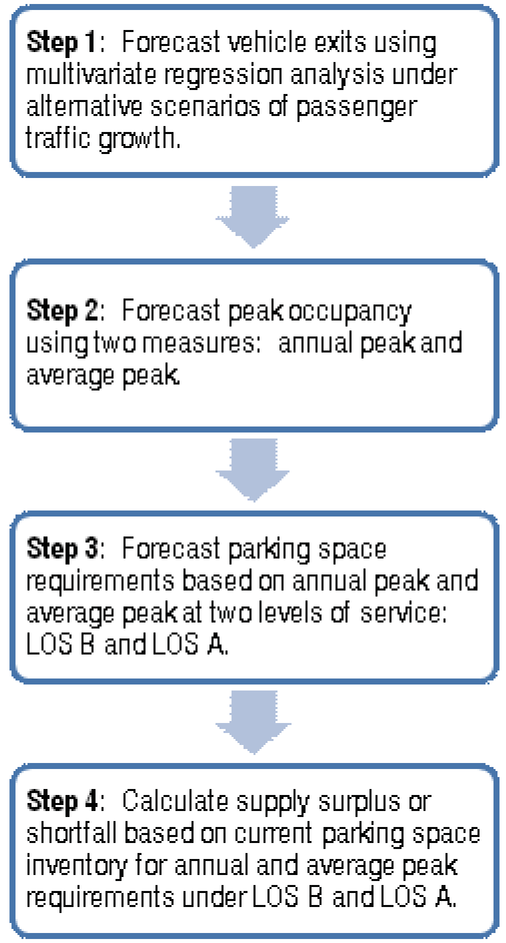
4.15.2 FORECAST PARKING DEMAND AND SUPPLY REQUIREMENTS

The objectives of this section are to develop forecasts of vehicle exits and translate these into corresponding forecasts of peak occupancy, to be used as basis for projecting space requirements. The annual forecasts of unconstrained demand are presented by facility and in aggregate from 2010 through 2040.

4.15.2.1 Forecasting Approach

Figure 4-14 outlines the steps in developing forecasts of parking demand and supply requirements.

FIGURE 4-41
STEPS IN FORECASTING PARKING DEMAND AND SUPPLY REQUIREMENTS



A multivariate regression model was developed to forecast monthly vehicle exits, which served as the basis for projecting peak occupancy. The peak occupancy space requirements are calculated, which include appropriate allowances to provide LOS B and LOS A, and determined any shortfall based on the existing number of spaces for airport public parking. This approach was adopted for the following reasons:

- Multivariate regression modeling allows the forecasts to be linked to key explanatory variables.
- The overall approach allows projections to be derived of revenues and peak occupancy directly from forecast vehicle exits.
- This approach allows two measures of peak occupancy to be calculated– the annual peak and the average peak – and link space requirements directly to peak occupancy projections.
- Finally, this approach allows explicit consideration of space allowances for different levels of service.

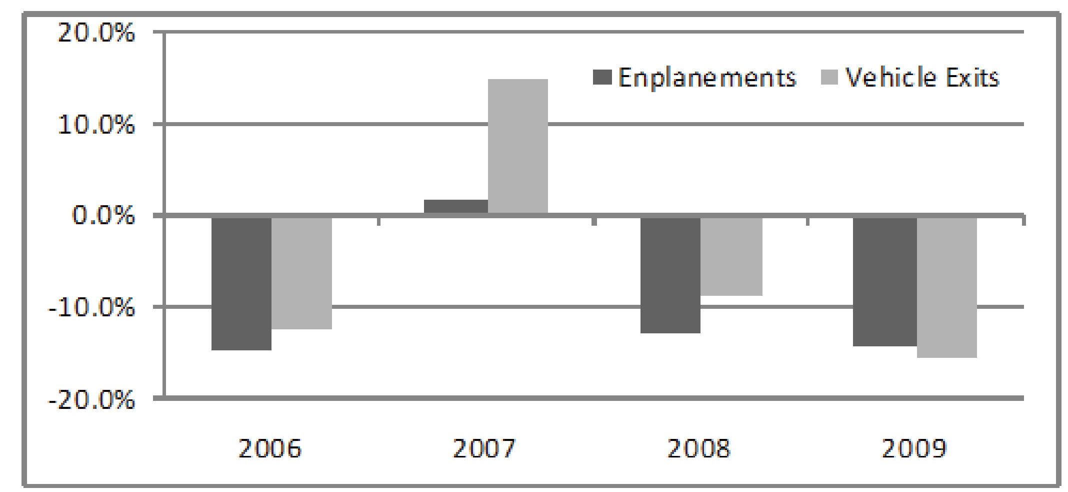
4.3.2 Forecast Vehicle Exits and Peak Occupancy

Forecast vehicle exits serve as the basis for projecting peak parking occupancy, which, in turn, is the basis for estimating parking space requirements. To forecast vehicle exits, we developed a multivariate regression model that relates historical monthly vehicle exits with the following key explanatory variables: (1) enplanements and (2) parking cost. We also tested model specifications including local per capita personal income, but the results showed that this variable was not statistically significant in explaining the historical trends in vehicle exits. A number of techniques are available for forecasting, with each one presenting certain advantages and disadvantages. We used multivariate regression analysis because it provides a systematic framework to incorporate multiple explanatory variables and produce alternative forecasts under different scenarios for enplanement growth. By design, regression analysis reduces subjective inputs and minimizes forecast errors.

The two key explanatory variables are described below:

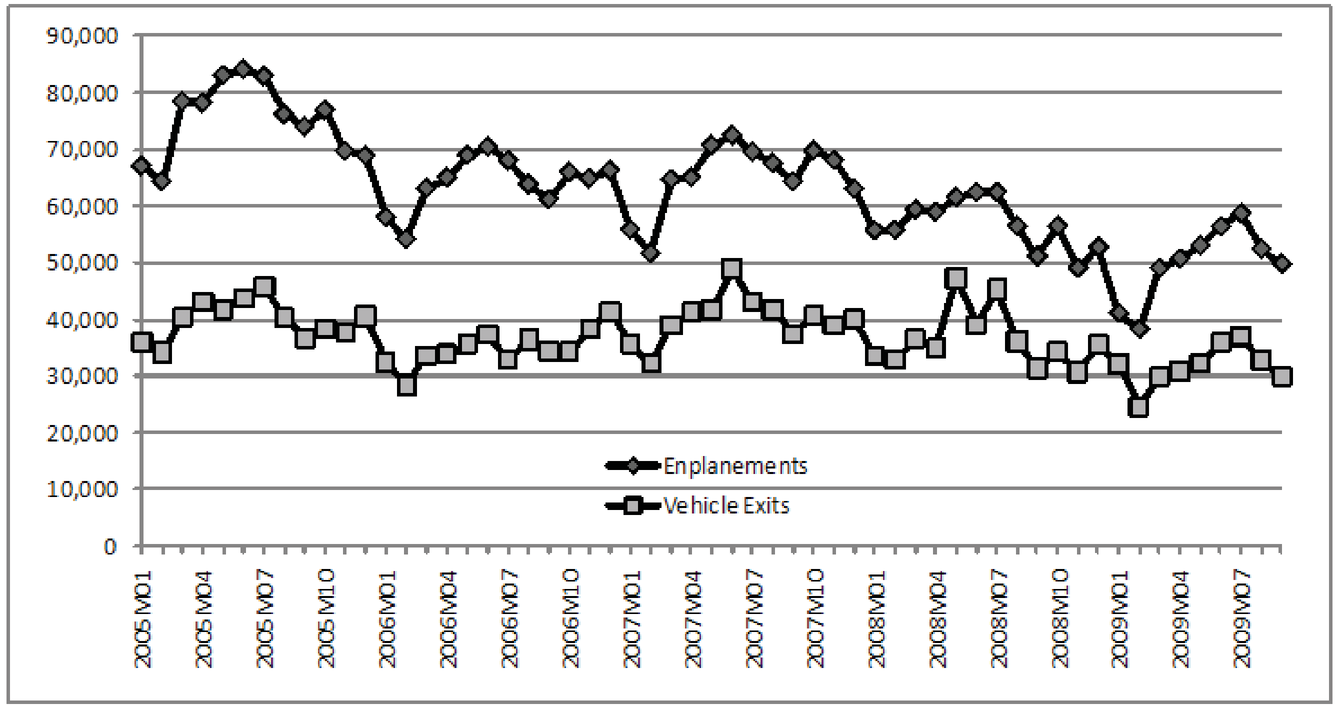
- Enplanements - The demand for parking at an airport is a derived demand; it is a consequence of passenger choice to use air service and to drive or be driven to the airport using a private vehicle. Airport passengers, particularly those that originate from the local area, as well as non-passengers who drop off and pick up airport passengers, represent the large majority, if not all, of public parking patrons at the airport. Figures 4-42 and 4-43 illustrate the correlation between enplanements and vehicle exits. While trends in vehicle exits generally follow trends in enplanements, vehicle exits show milder cyclical and seasonal fluctuations. Table 4-46 shows the following four forecasts of enplanements as developed in section 2.

FIGURE 4-42
ANNUAL GROWTH TRENDS IN ENPLANEMENTS AND VEHICLE EXITS
2006 - 2009



Source: Airport records; 2009 figures are estimates based on January-September data.

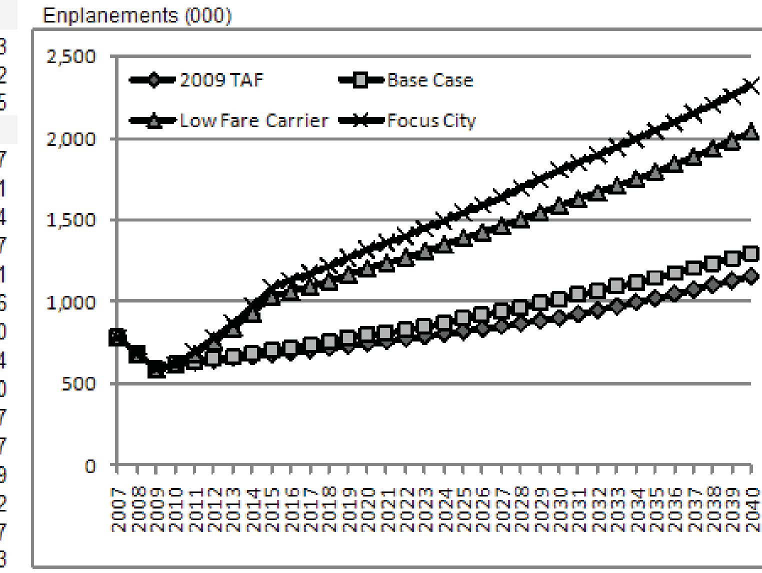
FIGURE 4-43
MONTHLY O&D ENPLANEMENTS AND VEHICLE EXITS
JANUARY 2005 - SEPTEMBER 2009



Source: Airport records.

TABLE 4-46
ENPLANEMENT FORECASTS
2007 - 2040

Year	Enplanements (000) Base Case	2009 TAF	Low Fare Carrier	Focus City
Historical				
2007	783	783	783	783
2008	682	682	682	682
2009E	585	585	585	585
Forecast				
2010	617	617	617	617
2011	632	629	683	691
2012	648	641	756	774
2013	664	653	837	867
2014	681	665	927	971
2015	698	678	1,027	1,086
2016	716	691	1,059	1,130
2017	733	704	1,092	1,174
2018	752	717	1,127	1,220
2019	771	731	1,163	1,267
2020	791	745	1,202	1,317
2021	810	759	1,235	1,359
2022	830	773	1,271	1,402
2023	851	788	1,308	1,447
2024	872	803	1,346	1,493
2025	893	818	1,386	1,545
2026	916	834	1,423	1,590
2027	939	850	1,461	1,641
2028	962	866	1,500	1,694
2029	986	882	1,541	1,748
2030	1,012	898	1,587	1,806
2031	1,036	922	1,623	1,850
2032	1,062	945	1,664	1,897
2033	1,089	969	1,706	1,945
2034	1,116	994	1,749	1,994
2035	1,144	1,019	1,793	2,045
2036	1,172	1,045	1,838	2,097
2037	1,202	1,072	1,885	2,150
2038	1,232	1,099	1,932	2,204
2039	1,263	1,127	1,981	2,260
2040	1,300	1,154	2,037	2,320
Avg. Annual Growth Rate				
2007-2009	-13.6%	-13.6%	-13.6%	-13.6%
2009-2010	5.5%	5.5%	5.5%	5.5%
2010-2040	2.5%	2.1%	4.1%	4.5%

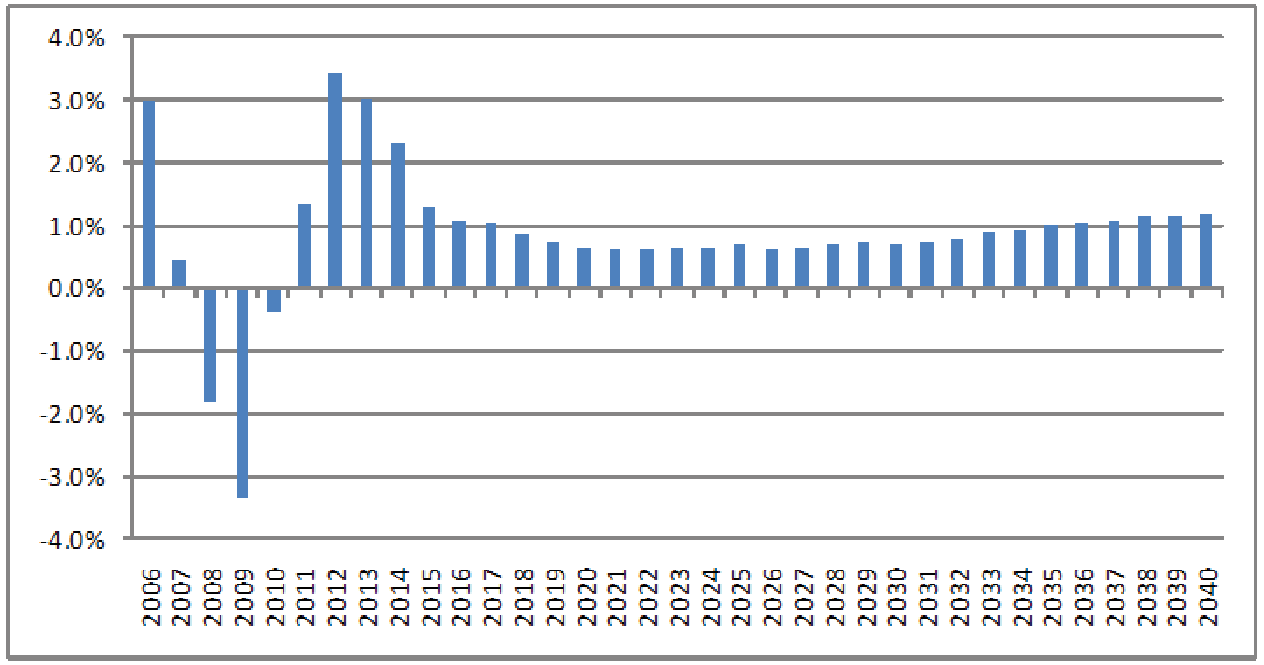


Sources: Airport records for historical data, 2005-2009; and RS&H, Inc. for the Terminal Area Study forecasts, 2010-2040

- Parking Cost- For any consumer goods or services, demand is inversely related to price. Holding all other factors constant, the demand for parking at the Airport will tend to decrease with a parking cost increase. Fewer passengers will choose to drive and park; and those who park will tend to park for shorter duration. The forecasts are based on the assumption that parking rates, on average, will increase with annual inflation.
- Income - Economic theory states that demand responds to changes in price, as discussed above, and to changes in income. Holding all other factors constant, an increase in income can increase demand for airport parking directly and indirectly. As income increases, more passengers will tend to choose to drive and park, and park for longer duration. As local income increases, more local residents will use air service, and local residents generate the demand for airport parking. The regression model used real per capita personal income

in the Greenville-Mauldin-Easley, SC Metropolitan Statistical Area (Greenville MSA) as an indicator of parking customers' income. Historical and forecast data were obtained from Moody's economy.com, an independent economic forecasting firm. Figure 4-44 shows the historical and projected annual growth rates in real per capita personal income. Like most of the metropolitan areas in the United States, the Greenville MSA has been affected by the recent U.S. economic recession, which began in December 2007, as shown by the declines in real per capita personal income in 2007-2009. The projected income growth trends in 2010 and the following years are consistent with expectations of an initially sluggish economic recovery.

FIGURE 4-44
REAL PER CAPITA PERSONAL INCOME IN THE GREENVILLE MSA
HISTORICAL AND FORECAST ANNUAL GROWTH RATES
2006 – 2040



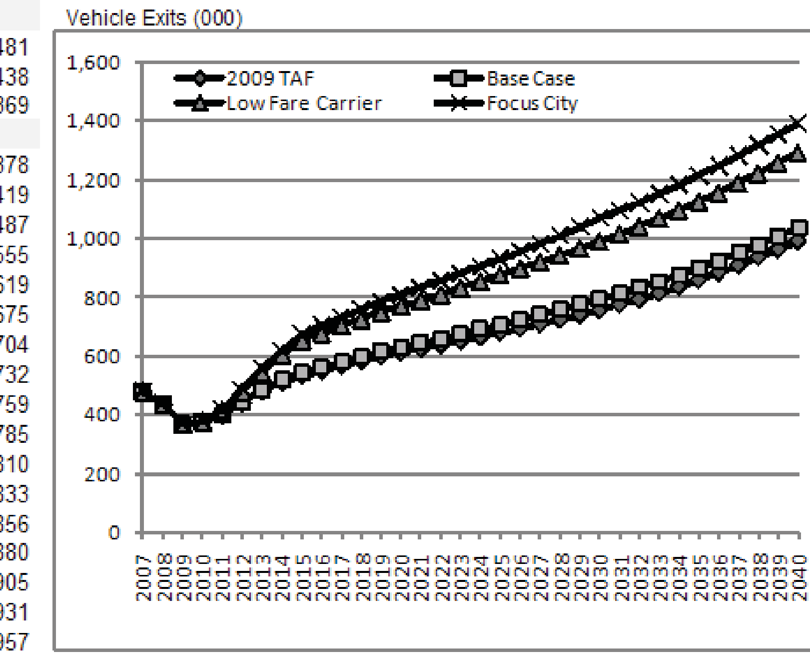
Source: Moody's economy.com

In addition to the above explanatory variables, the regression model also included variables to account for seasonal changes in parking demand. The model was estimated using ordinary least squares regression and yielded an Adjusted R-squared of 0.94. The key explanatory variables were highly statistically significant in explaining changes in monthly vehicle exits. The results confirm the hypothesized relationship between parking demand and the explanatory variables as follows: positive for enplanements, negative for parking cost, and positive for income.

The regression model was used to generate alternative forecasts of vehicle exits under the four scenarios of enplanement growth as shown in Table 4-47.

TABLE 4-47
UNCONSTRAINED FORECAST TOTAL VEHICLE EXITS - ALL FACILITIES
2007 – 2040

Year	Vehicle Exits (000) Base Case	2009 TAF	Low Fare Carrier	Focus City
Historical				
2007	481	481	481	481
2008	438	438	438	438
2009E	369	369	369	369
Forecast				
2010	378	378	378	378
2011	399	398	416	419
2012	444	441	481	487
2013	485	481	545	555
2014	519	514	604	619
2015	541	534	654	675
2016	560	552	679	704
2017	580	570	704	732
2018	597	585	727	759
2019	613	599	749	785
2020	628	613	770	810
2021	643	626	791	833
2022	658	639	811	856
2023	674	653	832	880
2024	690	666	854	905
2025	707	681	877	931
2026	723	695	899	957
2027	740	709	921	983
2028	758	725	944	1,011
2029	776	740	968	1,040
2030	795	756	992	1,069
2031	814	774	1,016	1,095
2032	834	793	1,042	1,122
2033	856	814	1,069	1,152
2034	878	836	1,097	1,182
2035	903	859	1,127	1,214
2036	928	883	1,158	1,247
2037	954	909	1,190	1,282
2038	981	935	1,223	1,317
2039	1,009	962	1,257	1,354
2040	1,038	990	1,293	1,392
Average Annual Growth Rate				
2007-2009	-12.3%	-12.3%	-12.3%	-12.3%
2009-2010	2.4%	2.4%	2.4%	2.4%
2010-2040	3.4%	3.3%	4.2%	4.4%



Sources: Airport records for historical data, 2007-2009; and Unison Consulting, Inc. for the forecast, 2010-2040

Peak parking occupancy determines space requirements. Based on forecast vehicle exits above, we developed forecasts of peak daytime parking occupancy measured in two ways:

- Annual peak. The annual peak is the highest occupancy that would ever occur in a year. Planning space requirements based on the annual peak is appropriate if the objective is to accommodate everyone wishing to park at the Airport at all times, and when there are no other parking options (such as overflow lots on-airport and off-airport parking) available to customers.
- Average peak. The average peak represents the average of the highest occupancy projected for each month in a

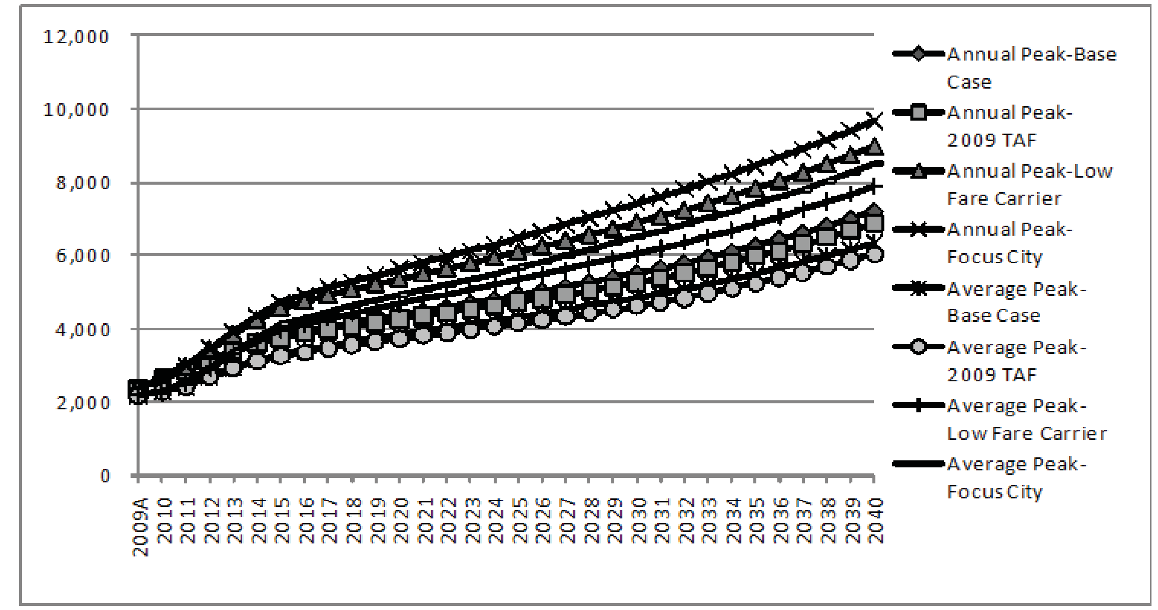
year. This means that there will be a few days when parking occupancy will exceed the average peak. If parking facilities were sized to accommodate the average peak, the Airport management should be prepared to provide overflow spaces or turn away potential customers during such days.

Peak occupancy forecasts based on the annual and average peak measures are shown in Table 4-48 and Figure 4-45.

TABLE 4-48
UNCONSTRAINED FORECAST PEAK OCCUPANCY – ALL FACILITIES 2008 – 2040

Year	Annual Peak				Average Peak				Ratio of Avg. Peak toAnnual Peak
	Base Case	2009 TAF	Low Fare Carrier	Focus City	Base Case	2009 TAF	Low Fare Carrier	Focus City	
2009A	2,356	2,356	2,356	2,356	2,182	2,182	2,182	2,182	0.93
2010	2,652	2,652	2,652	2,652	2,296	2,296	2,296	2,296	0.87
2011	2,839	2,830	2,961	2,980	2,422	2,415	2,529	2,546	0.85
2012	3,161	3,143	3,421	3,464	2,697	2,681	2,924	2,961	0.85
2013	3,429	3,401	3,845	3,916	2,950	2,926	3,313	3,376	0.86
2014	3,644	3,606	4,235	4,341	3,158	3,125	3,674	3,768	0.87
2015	3,780	3,731	4,568	4,716	3,292	3,249	3,981	4,110	0.87
2016	3,916	3,856	4,741	4,912	3,411	3,359	4,133	4,283	0.87
2017	4,047	3,976	4,911	5,107	3,531	3,468	4,285	4,457	0.87
2018	4,164	4,081	5,067	5,289	3,637	3,564	4,427	4,621	0.87
2019	4,270	4,174	5,215	5,465	3,734	3,650	4,560	4,778	0.87
2020	4,375	4,267	5,364	5,642	3,827	3,732	4,691	4,935	0.87
2021	4,476	4,354	5,501	5,797	3,918	3,812	4,814	5,073	0.88
2022	4,580	4,444	5,642	5,957	4,010	3,892	4,939	5,214	0.88
2023	4,690	4,540	5,791	6,126	4,107	3,976	5,070	5,362	0.88
2024	4,800	4,634	5,941	6,295	4,205	4,061	5,203	5,512	0.88
2025	4,916	4,735	6,099	6,474	4,308	4,149	5,342	5,670	0.88
2026	5,029	4,831	6,248	6,652	4,408	4,235	5,473	5,827	0.88
2027	5,146	4,931	6,402	6,836	4,511	4,323	5,609	5,988	0.88
2028	5,269	5,037	6,563	7,029	4,620	4,417	5,752	6,158	0.88
2029	5,393	5,142	6,727	7,225	4,731	4,512	5,897	6,333	0.88
2030	5,519	5,250	6,894	7,427	4,843	4,607	6,045	6,511	0.88
2031	5,652	5,377	7,062	7,609	4,959	4,719	6,192	6,670	0.88
2032	5,791	5,509	7,237	7,798	5,082	4,836	6,346	6,837	0.88
2033	5,944	5,656	7,428	8,003	5,216	4,965	6,513	7,016	0.88
2034	6,102	5,808	7,624	8,215	5,356	5,099	6,686	7,203	0.88
2035	6,269	5,969	7,831	8,436	5,503	5,241	6,868	7,398	0.88
2036	6,441	6,134	8,042	8,664	5,656	5,388	7,056	7,599	0.88
2037	6,623	6,309	8,266	8,903	5,816	5,543	7,253	7,810	0.88
2038	6,811	6,491	8,496	9,151	5,984	5,704	7,457	8,029	0.88
2039	7,003	6,676	8,731	9,403	6,154	5,868	7,665	8,252	0.88
2040	7,204	6,870	8,977	9,666	6,332	6,040	7,882	8,484	0.88

FIGURE 4-45
UNCONSTRAINED FORECAST PEAK OCCUPANCY – ALL FACILITIES 2009 – 2040



4.3.3 Forecast Parking Space Requirements and Surplus/(Shortfall)

Forecasts of peak daytime parking occupancy based on the annual peak and the average peak were then translated into forecasts of parking space requirements at LOS B and LOS A. Comparing forecast parking space requirements with existing and future spaces yields projections of capacity surplus or shortfall under LOS B and LOS A. The following tables and figures present projections of parking space requirements and capacity surplus (shortfall) based on the annual peak and the average peak at LOS B and LOS A:

- Projected parking space requirements and capacity surplus (shortfall) based on annual peak occupancy (Table 4-49). Under the Base Case, LOS B shortfalls begin to occur in 2019 and LOS A shortfalls begin to occur sooner, in 2016.
- LOS B space requirements based on annual peak occupancy compared with existing and future spaces (Figure 4-46).
- LOS A space requirements based on annual peak occupancy compared with existing and future spaces (Figure 4-47).
- Projected parking space requirements and capacity surplus (shortfall) based on average peak occupancy (Table 4-50). Under the Base Case, LOS B shortfalls begin to occur in 2025 and LOS A shortfalls begin to occur sooner, in 2021.
- LOS B space requirements based on average peak occupancy compared with existing and future spaces (Figure 4-48).
- LOS A space requirements based on average peak occupancy compared with existing and future spaces (Figure 4-49).

Projections are presented for all facilities combined to provide an overall picture of parking space requirements and capacity surplus (shortfall) on-airport. In practice, customers typically proceed to the next closest parking facility on-airport if they do not find a space in their first choice of a parking facility on-airport.

TABLE 4-49
REQUIRED SPACES AND SUPPLY SURPLUS (SHORTFALL) BASED ON ANNUAL PEAK OCCUPANCY
2010 - 2040

Year	Required Spaces Based on Annual Peak Occupancy								Surplus (Shortfall)							
	LOS B				LOS A				LOS B				LOS A			
	Base Case	2009 TAF	Low Fare Carrier	Focus City	Base Case	2009 TAF	Low Fare Carrier	Focus City	Base Case	2009 TAF	Low Fare Carrier	Focus City	Base Case	2009 TAF	Low Fare Carrier	Focus City
2010	2,737	2,737	2,737	2,737	2,956	2,956	2,956	2,956	1,619	1,619	1,619	1,619	1,400	1,400	1,400	1,400
2011	2,930	2,921	3,056	3,076	3,164	3,154	3,300	3,321	1,426	1,435	1,300	1,280	1,192	1,202	1,056	1,035
2012	3,263	3,244	3,531	3,575	3,523	3,503	3,812	3,860	1,093	1,112	825	781	833	853	544	496
2013	3,539	3,511	3,968	4,042	3,822	3,791	4,284	4,364	817	845	388	314	534	565	72	(8)
2014	3,761	3,722	4,370	4,480	4,061	4,018	4,719	4,838	595	634	(14)	(124)	295	338	(363)	(482)
2015	3,901	3,851	4,715	4,868	4,212	4,158	5,091	5,256	455	505	(359)	(512)	144	198	(735)	(900)
2016	4,041	3,980	4,893	5,070	4,364	4,297	5,283	5,474	315	376	(537)	(714)	(8)	59	(927)	(1,118)
2017	4,177	4,104	5,068	5,271	4,510	4,431	5,473	5,691	179	252	(712)	(915)	(154)	(75)	(1,117)	(1,335)
2018	4,297	4,212	5,230	5,459	4,640	4,548	5,647	5,895	59	144	(874)	(1,103)	(284)	(192)	(1,291)	(1,539)
2019	4,407	4,308	5,382	5,640	4,758	4,652	5,812	6,090	(51)	48	(1,026)	(1,284)	(402)	(296)	(1,456)	(1,734)
2020	4,515	4,404	5,536	5,823	4,876	4,755	5,977	6,288	(159)	(48)	(1,180)	(1,467)	(520)	(399)	(1,621)	(1,932)
2021	4,620	4,494	5,677	5,983	4,988	4,853	6,130	6,461	(264)	(138)	(1,321)	(1,627)	(632)	(497)	(1,774)	(2,105)
2022	4,727	4,587	5,823	6,148	5,104	4,953	6,288	6,639	(371)	(231)	(1,467)	(1,792)	(748)	(597)	(1,932)	(2,283)
2023	4,841	4,686	5,977	6,322	5,227	5,059	6,454	6,826	(485)	(330)	(1,621)	(1,966)	(871)	(703)	(2,098)	(2,470)
2024	4,953	4,783	6,131	6,497	5,349	5,164	6,620	7,015	(597)	(427)	(1,775)	(2,141)	(993)	(808)	(2,264)	(2,659)
2025	5,074	4,887	6,294	6,682	5,479	5,277	6,796	7,215	(718)	(531)	(1,938)	(2,326)	(1,123)	(921)	(2,440)	(2,859)
2026	5,190	4,986	6,448	6,865	5,604	5,384	6,962	7,413	(834)	(630)	(2,092)	(2,509)	(1,248)	(1,028)	(2,606)	(3,057)
2027	5,311	5,089	6,607	7,055	5,734	5,495	7,134	7,618	(955)	(733)	(2,251)	(2,699)	(1,378)	(1,139)	(2,778)	(3,262)
2028	5,438	5,198	6,774	7,254	5,871	5,613	7,314	7,833	(1,082)	(842)	(2,418)	(2,898)	(1,515)	(1,257)	(2,958)	(3,477)
2029	5,566	5,307	6,943	7,457	6,010	5,731	7,497	8,052	(1,210)	(951)	(2,587)	(3,101)	(1,654)	(1,375)	(3,141)	(3,696)
2030	5,696	5,418	7,115	7,665	6,151	5,851	7,683	8,277	(1,340)	(1,062)	(2,759)	(3,309)	(1,795)	(1,495)	(3,327)	(3,921)
2031	5,833	5,549	7,289	7,853	6,299	5,992	7,870	8,480	(1,477)	(1,193)	(2,933)	(3,497)	(1,943)	(1,636)	(3,514)	(4,124)
2032	5,976	5,686	7,469	8,048	6,453	6,140	8,065	8,691	(1,620)	(1,330)	(3,113)	(3,692)	(2,097)	(1,784)	(3,709)	(4,335)
2033	6,134	5,838	7,666	8,260	6,624	6,304	8,278	8,919	(1,778)	(1,482)	(3,310)	(3,904)	(2,268)	(1,948)	(3,922)	(4,563)
2034	6,298	5,994	7,869	8,478	6,800	6,473	8,496	9,155	(1,942)	(1,638)	(3,513)	(4,122)	(2,444)	(2,117)	(4,140)	(4,799)
2035	6,470	6,160	8,082	8,707	6,986	6,652	8,727	9,402	(2,114)	(1,804)	(3,726)	(4,351)	(2,630)	(2,296)	(4,371)	(5,046)
2036	6,647	6,331	8,300	8,942	7,178	6,836	8,962	9,655	(2,291)	(1,975)	(3,944)	(4,586)	(2,822)	(2,480)	(4,606)	(5,299)
2037	6,835	6,512	8,531	9,189	7,380	7,031	9,211	9,922	(2,479)	(2,156)	(4,175)	(4,833)	(3,024)	(2,675)	(4,855)	(5,566)
2038	7,030	6,699	8,769	9,444	7,590	7,234	9,468	10,198	(2,674)	(2,343)	(4,413)	(5,088)	(3,234)	(2,878)	(5,112)	(5,842)
2039	7,227	6,890	9,011	9,704	7,804	7,439	9,730	10,478	(2,871)	(2,534)	(4,655)	(5,348)	(3,448)	(3,083)	(5,374)	(6,122)
2040	7,435	7,090	9,265	9,976	8,028	7,656	10,004	10,772	(3,079)	(2,734)	(4,909)	(5,620)	(3,672)	(3,300)	(5,648)	(6,416)

FIGURE 4-46
REQUIRED SPACES BASED ON ANNUAL PEAK OCCUPANCY - LOS B
2010 - 2040

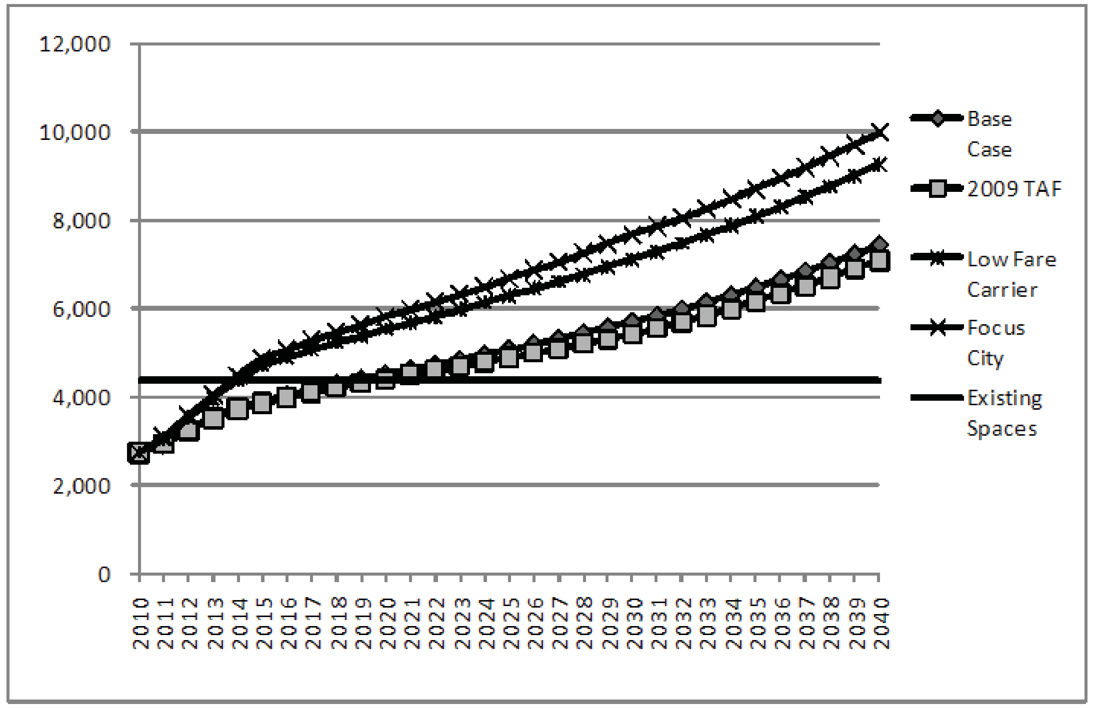


FIGURE 4-47
REQUIRED SPACES BASED ON ANNUAL PEAK OCCUPANCY - LOS A
2010 - 2040

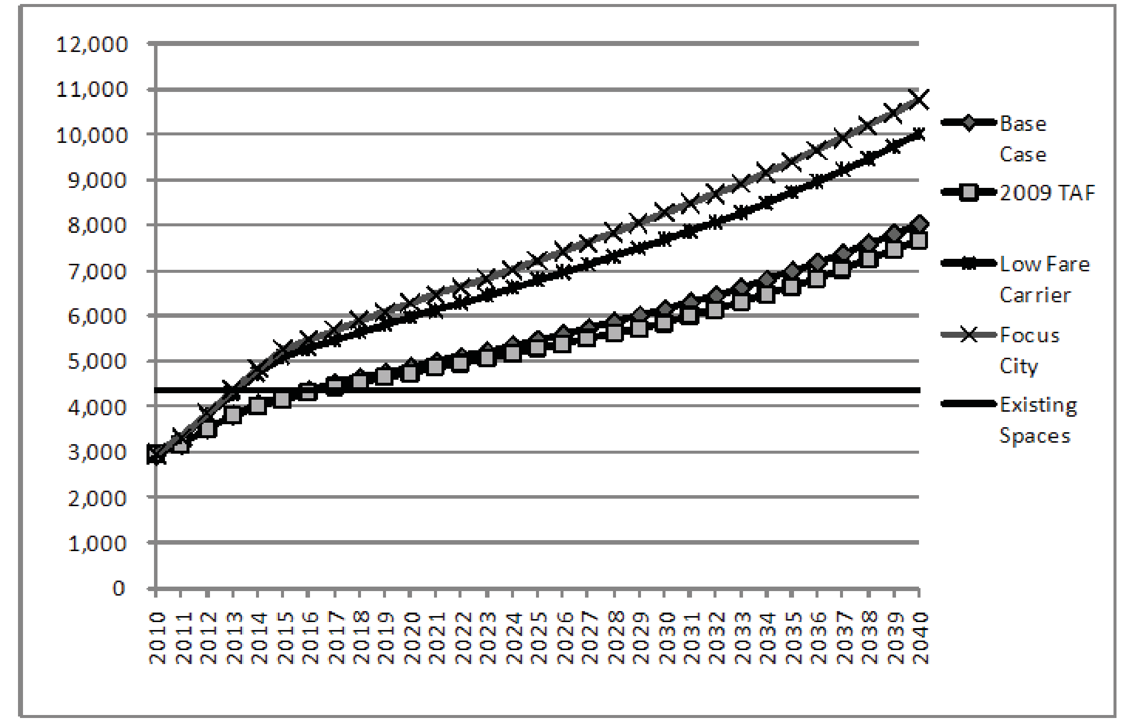


TABLE 4-50
REQUIRED SPACES AND SUPPLY SURPLUS (SHORTFALL) BASED ON AVERAGE PEAK OCCUPANCY
2010 - 2040

Year	Required Spaces Based on Average Peak Occupancy								Surplus (Shortfall)							
	LOS B				LOS A				LOS B				LOS A			
	Base Case	2009 TAF	Low Fare Carrier	Focus City	Base Case	2009 TAF	Low Fare Carrier	Focus City	Base Case	2009 TAF	Low Fare Carrier	Focus City	Base Case	2009 TAF	Low Fare Carrier	Focus City
2010	2,370	2,370	2,370	2,370	2,559	2,559	2,559	2,559	1,986	1,986	1,986	1,986	1,797	1,797	1,797	1,797
2011	2,500	2,492	2,610	2,628	2,699	2,691	2,818	2,837	1,856	1,864	1,746	1,728	1,657	1,665	1,538	1,519
2012	2,783	2,767	3,018	3,056	3,006	2,988	3,259	3,300	1,573	1,589	1,338	1,300	1,350	1,368	1,097	1,056
2013	3,045	3,020	3,419	3,484	3,288	3,261	3,692	3,762	1,311	1,336	937	872	1,068	1,095	664	594
2014	3,259	3,225	3,792	3,889	3,519	3,483	4,094	4,199	1,097	1,131	564	467	837	873	262	157
2015	3,398	3,353	4,109	4,242	3,669	3,621	4,436	4,580	958	1,003	247	114	687	735	(80)	(224)
2016	3,520	3,467	4,266	4,420	3,801	3,743	4,606	4,773	836	889	90	(64)	555	613	(250)	(417)
2017	3,644	3,579	4,422	4,600	3,935	3,865	4,775	4,967	712	777	(66)	(244)	421	491	(419)	(611)
2018	3,754	3,678	4,569	4,769	4,053	3,972	4,933	5,150	602	678	(213)	(413)	303	384	(577)	(794)
2019	3,854	3,767	4,706	4,931	4,161	4,068	5,082	5,325	502	589	(350)	(575)	195	288	(726)	(969)
2020	3,950	3,852	4,841	5,093	4,265	4,159	5,228	5,500	406	504	(485)	(737)	91	197	(872)	(1,144)
2021	4,044	3,934	4,968	5,236	4,366	4,248	5,365	5,653	312	422	(612)	(880)	(10)	108	(1,009)	(1,297)
2022	4,139	4,017	5,097	5,381	4,469	4,337	5,504	5,811	217	339	(741)	(1,025)	(113)	19	(1,148)	(1,455)
2023	4,239	4,103	5,233	5,534	4,577	4,431	5,650	5,975	117	253	(877)	(1,178)	(221)	(75)	(1,294)	(1,619)
2024	4,340	4,191	5,370	5,689	4,686	4,526	5,798	6,143	16	165	(1,014)	(1,333)	(330)	(170)	(1,442)	(1,787)
2025	4,446	4,282	5,513	5,852	4,801	4,624	5,953	6,319	(90)	74	(1,157)	(1,496)	(445)	(268)	(1,597)	(1,963)
2026	4,549	4,371	5,648	6,014	4,912	4,720	6,099	6,494	(193)	(15)	(1,292)	(1,658)	(556)	(364)	(1,743)	(2,138)
2027	4,656	4,462	5,789	6,180	5,027	4,818	6,251	6,673	(300)	(106)	(1,433)	(1,824)	(671)	(462)	(1,895)	(2,317)
2028	4,768	4,559	5,936	6,355	5,149	4,922	6,410	6,863	(412)	(203)	(1,580)	(1,999)	(793)	(566)	(2,054)	(2,507)
2029	4,883	4,657	6,086	6,536	5,272	5,028	6,572	7,058	(527)	(301)	(1,730)	(2,180)	(916)	(672)	(2,216)	(2,702)
2030	4,998	4,755	6,239	6,720	5,397	5,134	6,737	7,256	(642)	(399)	(1,883)	(2,364)	(1,041)	(778)	(2,381)	(2,900)
2031	5,118	4,870	6,391	6,884	5,526	5,259	6,900	7,433	(762)	(514)	(2,035)	(2,528)	(1,170)	(903)	(2,544)	(3,077)
2032	5,245	4,991	6,549	7,056	5,663	5,389	7,072	7,619	(889)	(635)	(2,193)	(2,700)	(1,307)	(1,033)	(2,716)	(3,263)
2033	5,383	5,124	6,722	7,241	5,813	5,533	7,258	7,819	(1,027)	(768)	(2,366)	(2,885)	(1,457)	(1,177)	(2,902)	(3,463)
2034	5,528	5,262	6,900	7,434	5,969	5,682	7,451	8,027	(1,172)	(906)	(2,544)	(3,078)	(1,613)	(1,326)	(3,095)	(3,671)
2035	5,679	5,409	7,088	7,635	6,133	5,841	7,654	8,244	(1,323)	(1,053)	(2,732)	(3,279)	(1,777)	(1,485)	(3,298)	(3,888)
2036	5,837	5,561	7,282	7,843	6,303	6,004	7,863	8,468	(1,481)	(1,205)	(2,926)	(3,487)	(1,947)	(1,648)	(3,507)	(4,112)
2037	6,002	5,721	7,486	8,060	6,481	6,177	8,083	8,704	(1,646)	(1,365)	(3,130)	(3,704)	(2,125)	(1,821)	(3,727)	(4,348)
2038	6,176	5,887	7,696	8,286	6,669	6,357	8,310	8,948	(1,820)	(1,531)	(3,340)	(3,930)	(2,313)	(2,001)	(3,954)	(4,592)
2039	6,351	6,056	7,911	8,517	6,858	6,539	8,542	9,196	(1,995)	(1,700)	(3,555)	(4,161)	(2,502)	(2,183)	(4,186)	(4,840)
2040	6,535	6,234	8,135	8,756	7,056	6,731	8,784	9,455	(2,179)	(1,878)	(3,779)	(4,400)	(2,700)	(2,375)	(4,428)	(5,099)

FIGURE 4-48
REQUIRED SPACES BASED ON AVERAGE PEAK OCCUPANCY - LOS B
2010 – 2040

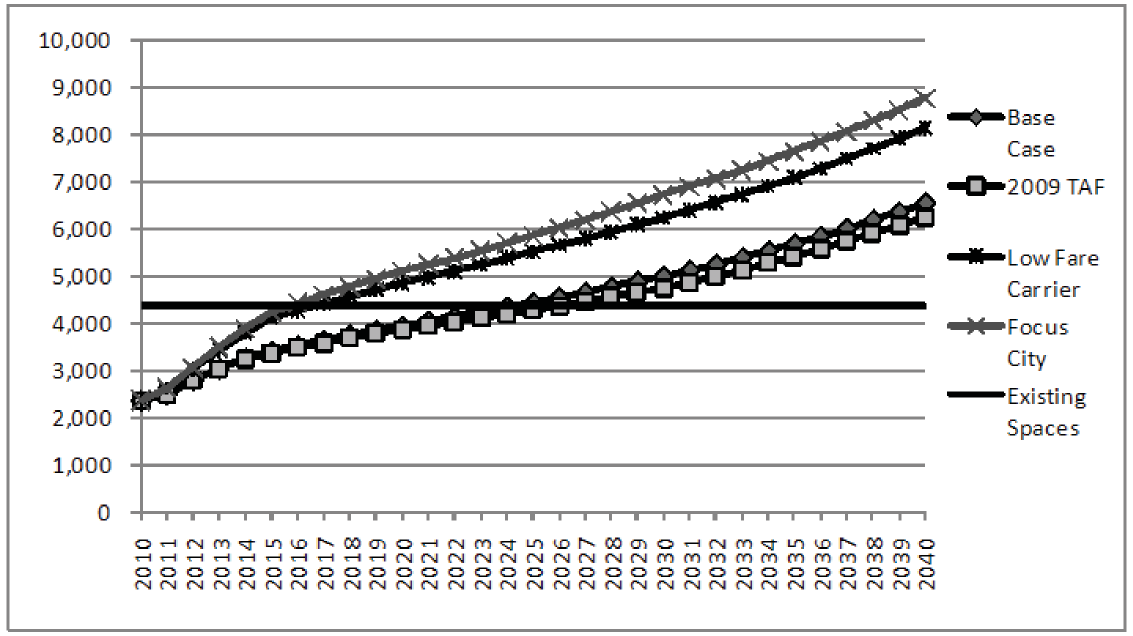
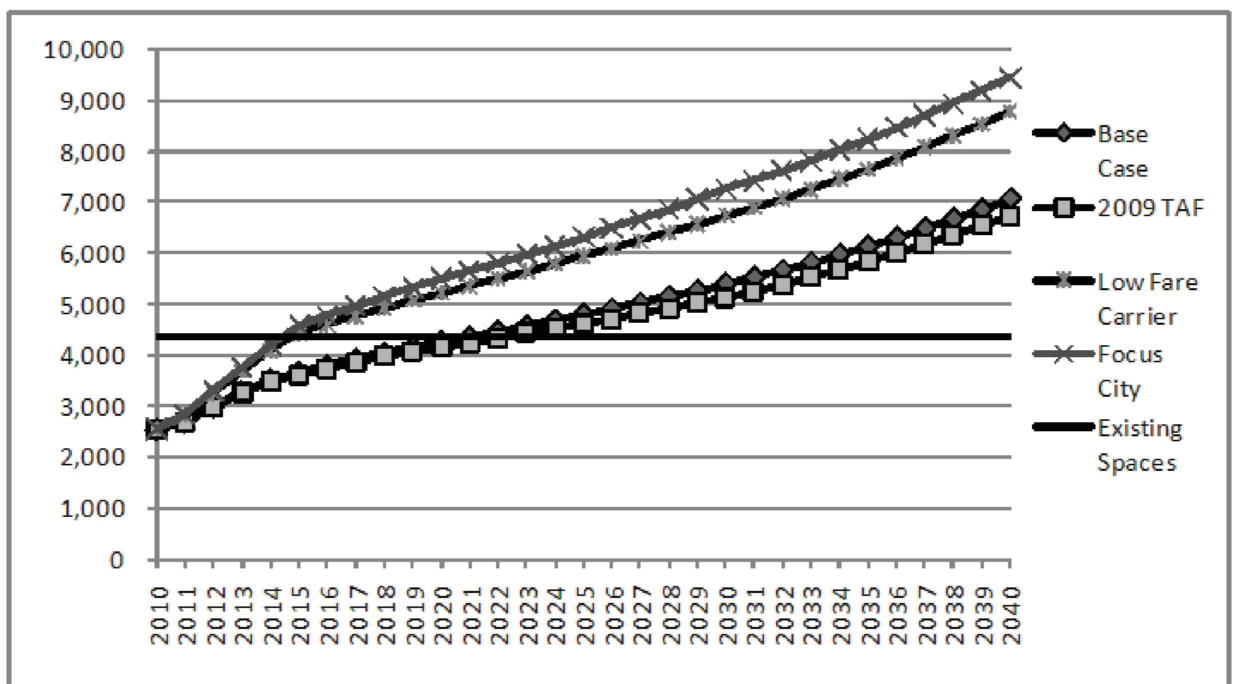


FIGURE 4-49
REQUIRED SPACES BASED ON AVERAGE PEAK OCCUPANCY - LOTS A 2010 – 2040



4.3.4 Forecast Risk and Uncertainty Factors

The forecasts of parking demand and space requirements were developed using the best available information. However, all forecasts are subject to certain limitations that should be kept in mind when interpreting the results and drawing any conclusions and recommendations. In this particular study, the following factors could introduce uncertainty and risk to the forecast results:

- No daytime occupancy data for the entire historical study period. Daytime occupancy was estimated based on data provided by the parking operator for a two-week sample period in 2010.
- Uncertainty about the future trends of explanatory variables. The analysis used the most recent available forecasts for key explanatory variables such as enplanements and local per capita personal income. Actual trends could deviate from forecast.
- Other factors that could affect airport parking demand. Other factors, not explicitly considered in the forecast model, could affect future airport parking demand. These include the availability and relative competitiveness of off-airport parking facilities, the composition of passengers and ground access mode split. A significant change in any of these factors could cause actual trends to deviate from forecast.

SECTION 5 - TERMINAL CONFIGURATION ANALYSIS

This section documents the multiple design approaches examined by the design team. The various options range from significant modifications/upgrades to the existing Passenger Terminal Building to the construction of a new facility at a "Greenfield" site.

All preliminary options are developed from the Program detailed in the Facility Requirements established in Section 3. The Options are arranged as follows:

OPTIONS A1, A2 AND A3.

These options examine the potential of modifying and expanding, on a limited basis, the existing Passenger Terminal Building within its current location. This approach examines the possibility of reusing as much of the existing Terminal Building infrastructure to the maximum extent possible while modifying/expanding select critical areas to provide better functionality.

OPTIONS A1, A2 AND A3 PROS AND CONS INCLUDE:

Pros:

1. Relatively lower initial construction cost
2. Require only limited site improvements 3) Greatly improved efficiency in reconstructed and new areas

Cons:

1. Limited initial improvements to the Terminal Building deficiencies
2. Require multiple years of construction
3. Have maximum disruption to passenger convenience and comfort
4. Limited or no new "Feel" after millions spent
5. Basic building core is still 50+ years old

OPTIONS B1, B2, B3, B4, AND B5.

These options examine the potential of providing a major reconfiguration to the existing landside portion of the Passenger Terminal Building while utilizing the Airside Concourses in their current configuration. Special focus was placed on reusing, as much as possible, the existing parking garage structures, existing surface parking lots, and existing roadways.

OPTIONS B1, B2, B3, B4, AND B5 PROS AND CONS INCLUDE:

Pros:

1. Moderate initial construction cost
2. Moderate site improvements required

Cons:

1. Moderate initial improvements to the Terminal Building deficiencies
2. Require multiple years of construction
3. Have moderate to minimal disruption to passenger convenience and comfort
4. Partial new "Feel" to Terminal Building

OPTIONS C1, C2, C3 AND C4.

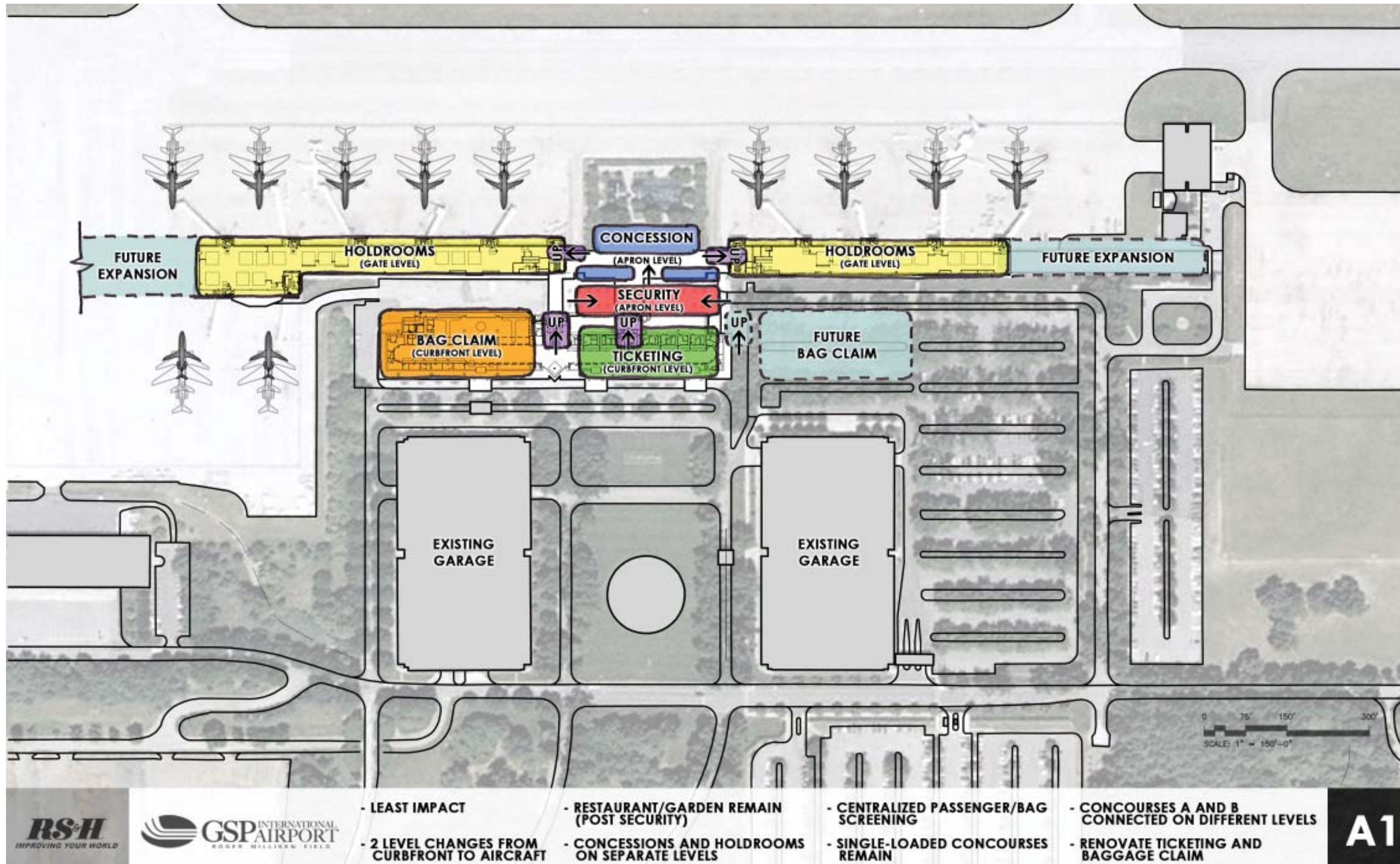
These options examine a wholesale replacement of the existing Passenger Terminal Building and relocation to a new "Greenfield" site. The Greenfield site options explore various configuration alternatives intended to develop a facility capable of accommodating the airport's needs through 2050 and beyond.

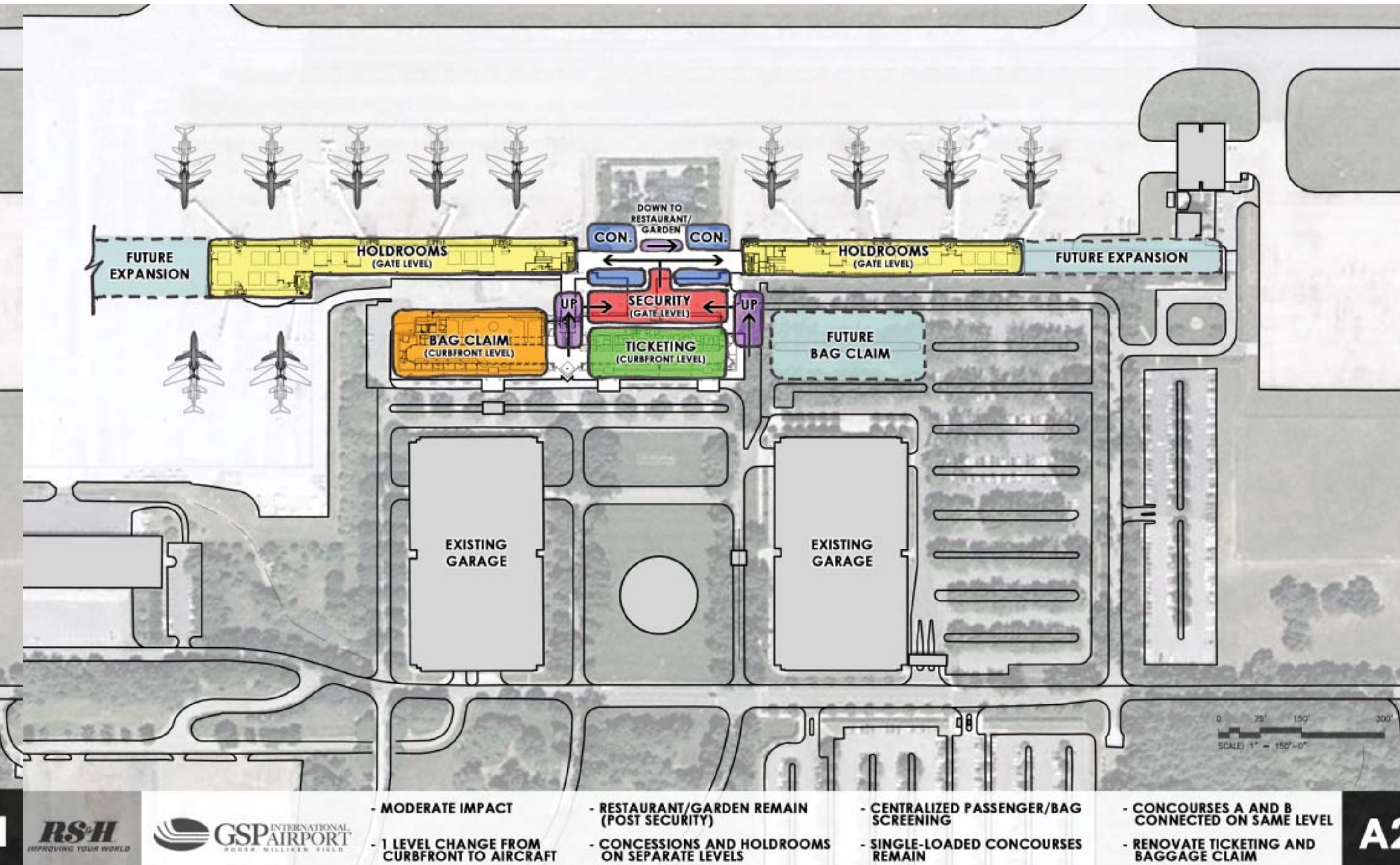
Pros:

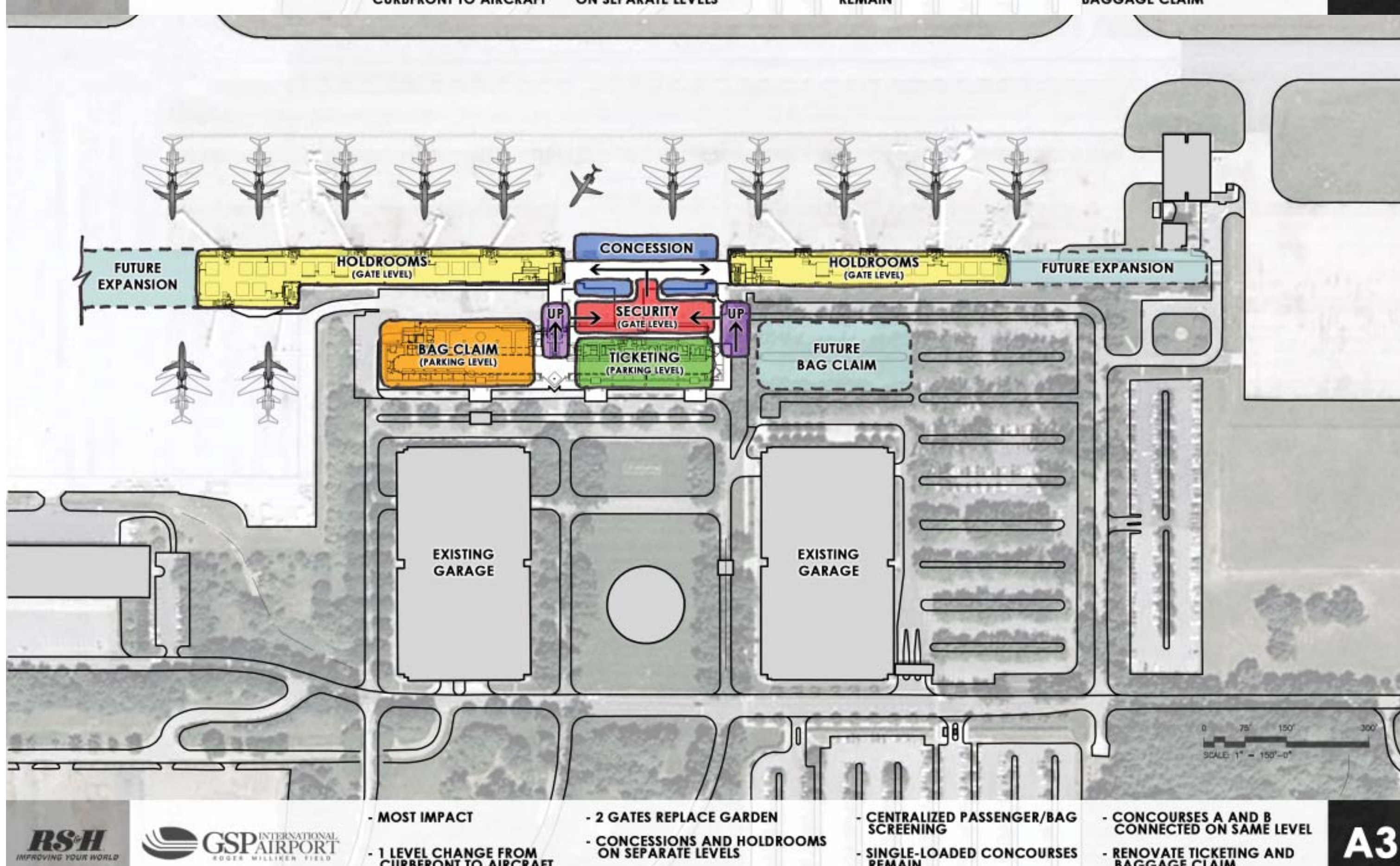
1. All new sustainable systems
2. Short implementation timeline
3. Maximize building efficiency
4. Ability to properly size all program components
5. Reduce operations and maintenance costs
6. Modern terminal design capable of reflecting the community image

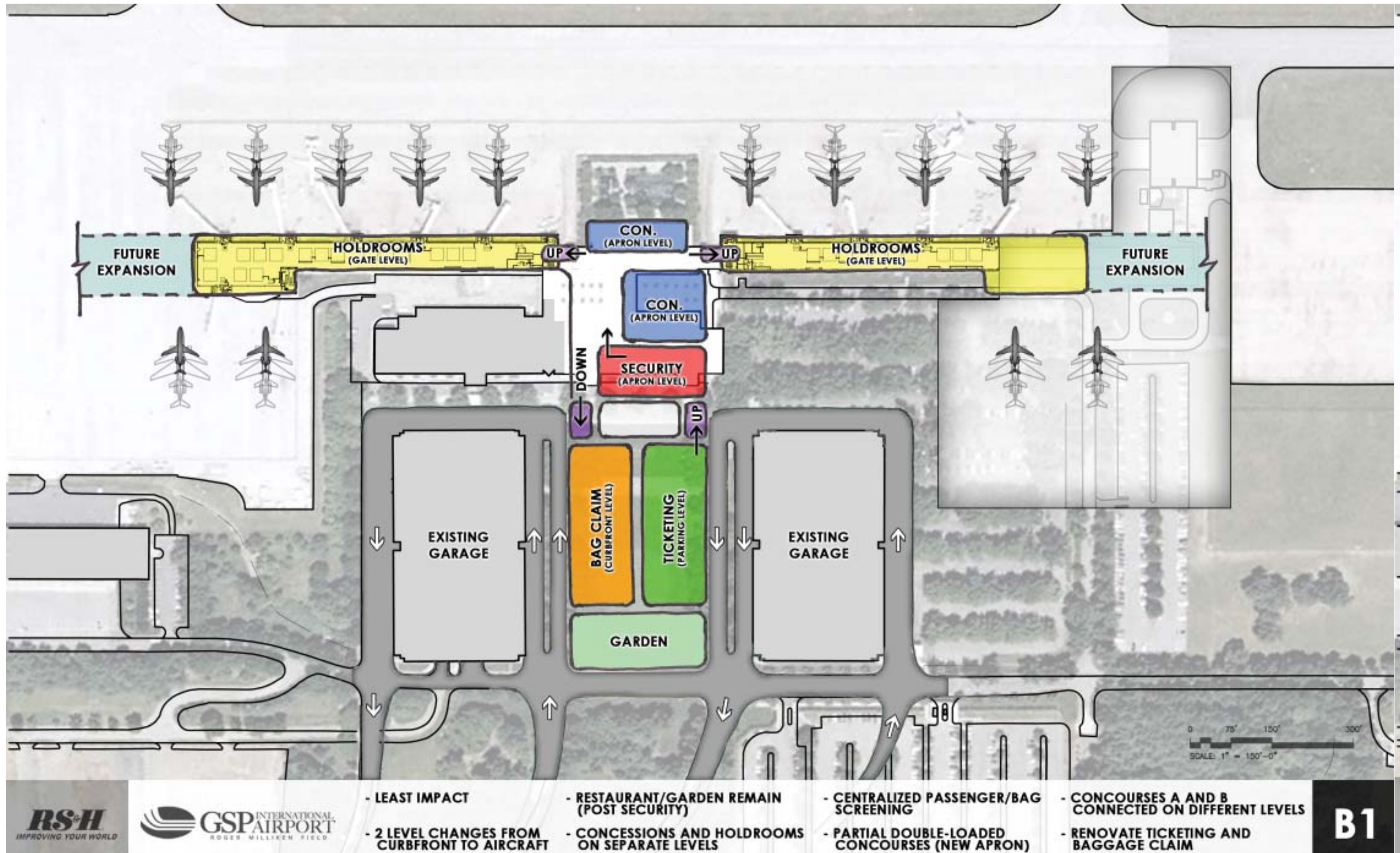
Cons:

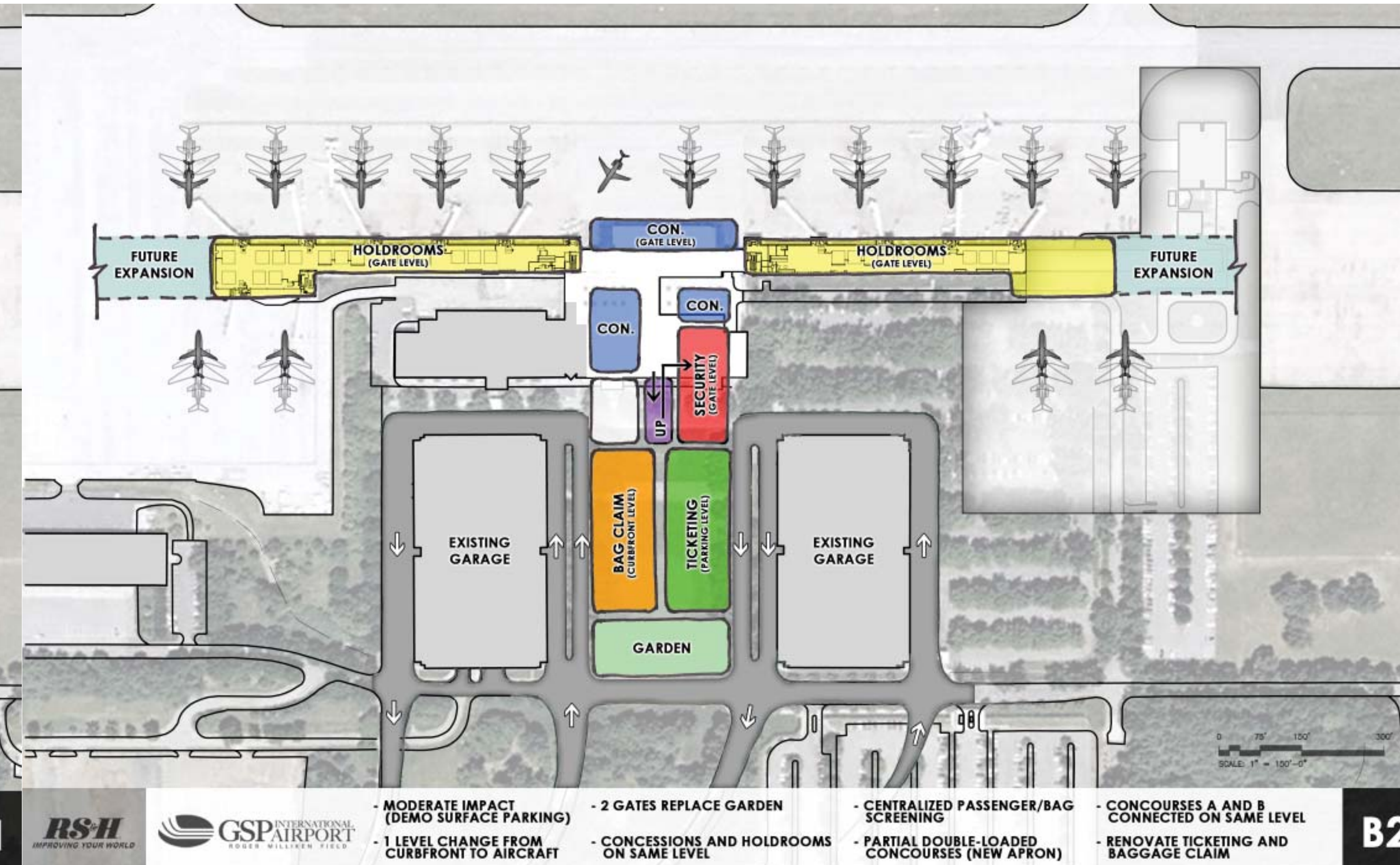
1. Greatest initial cost

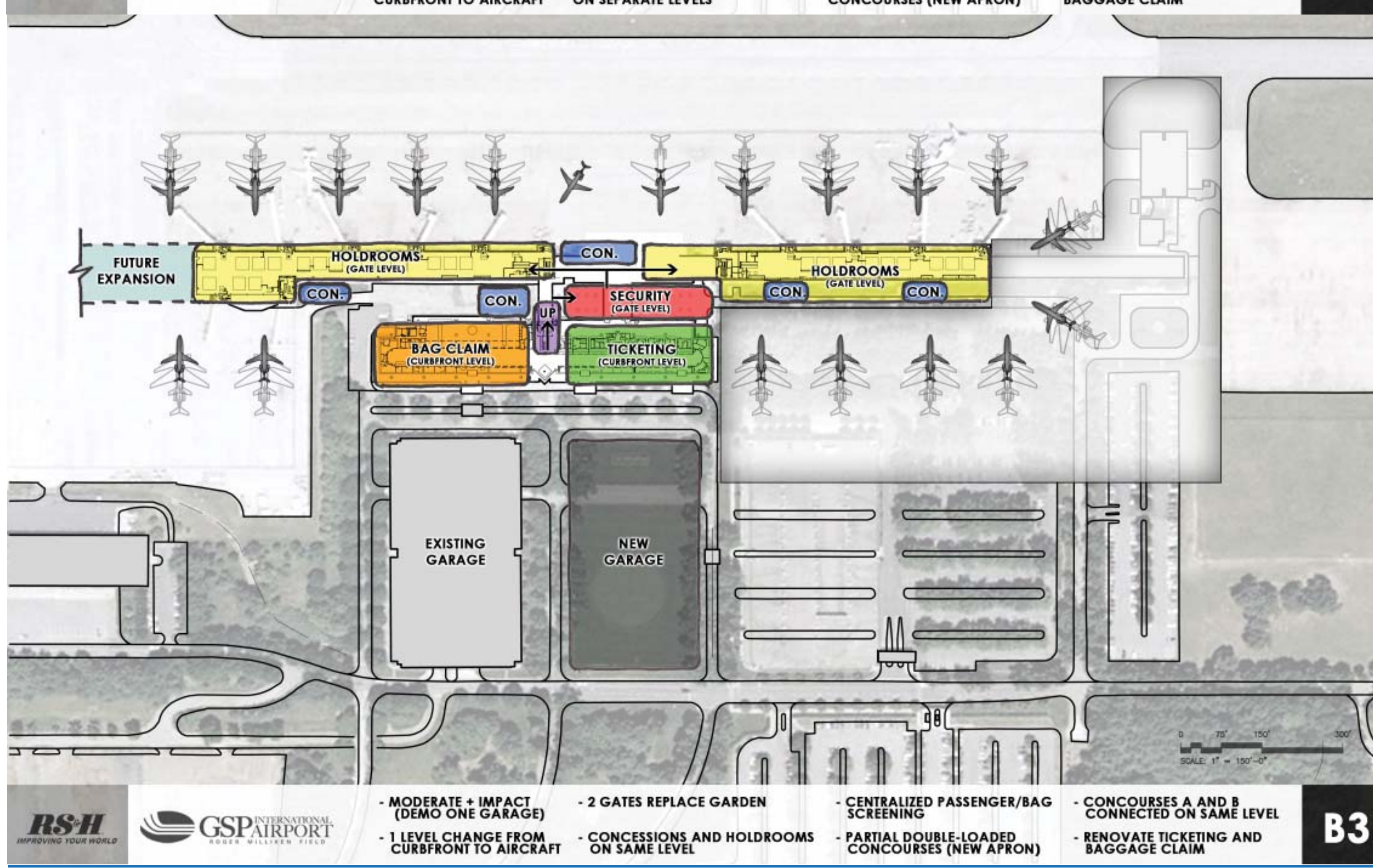

FUTURE EXPANSION
HOLDROOMS (GATE LEVEL)
CONCESSION (APRON LEVEL)
HOLDROOMS (GATE LEVEL)
FUTURE EXPANSION
SECURITY (APRON LEVEL)
UP
BAG CLAIM (CURBFRONT LEVEL)
TICKETING (CURBFRONT LEVEL)
FUTURE BAG CLAIM
EXISTING GARAGE
EXISTING GARAGE
RS&H IMPROVING YOUR WORLD
GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD
- LEAST IMPACT
- 2 LEVEL CHANGES FROM CURBFRONT TO AIRCRAFT
- RESTAURANT/GARDEN REMAIN (POST SECURITY)
- CONCESSIONS AND HOLDROOMS ON SEPARATE LEVELS
- CENTRALIZED PASSENGER/BAG SCREENING
- SINGLE-LOADED CONCOURSES REMAIN
- CONCOURSES A AND B CONNECTED ON DIFFERENT LEVELS
- RENOVATE TICKETING AND BAGGAGE CLAIM
A1

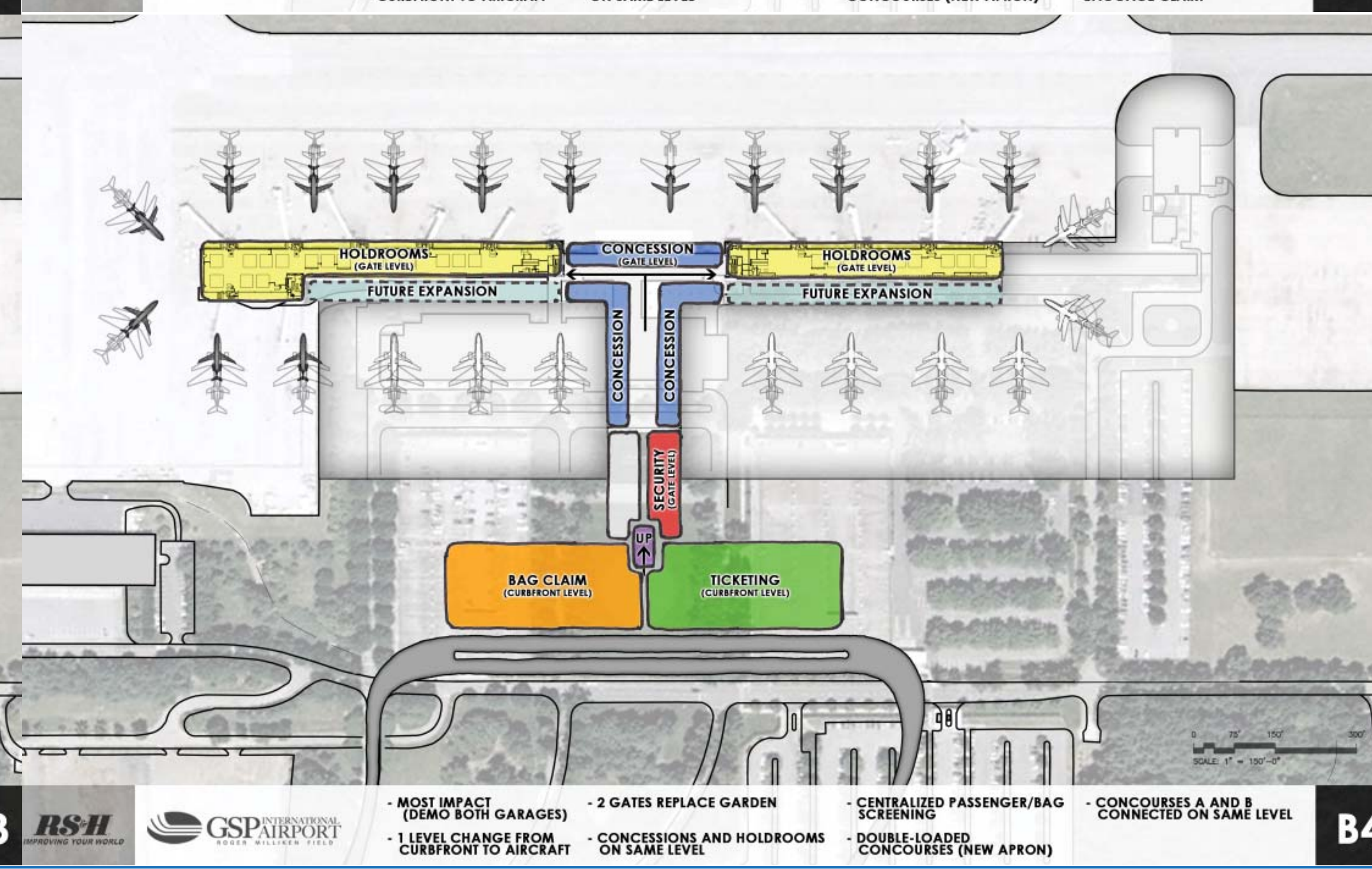

FUTURE EXPANSION
HOLDROOMS (GATE LEVEL)
CON.
DOWN TO RESTAURANT/ GARDEN
CON.
HOLDROOMS (GATE LEVEL)
FUTURE EXPANSION
SECURITY (GATE LEVEL)
UP
BAG CLAIM (CURBFRONT LEVEL)
TICKETING (CURBFRONT LEVEL)
FUTURE BAG CLAIM
EXISTING GARAGE
EXISTING GARAGE
RS&H IMPROVING YOUR WORLD
GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD
- MODERATE IMPACT
- 1 LEVEL CHANGE FROM CURBFRONT TO AIRCRAFT
- RESTAURANT/GARDEN REMAIN (POST SECURITY)
- CONCESSIONS AND HOLDROOMS ON SEPARATE LEVELS
- CENTRALIZED PASSENGER/BAG SCREENING
- SINGLE-LOADED CONCOURSES REMAIN
- CONCOURSES A AND B CONNECTED ON SAME LEVEL
- RENOVATE TICKETING AND BAGGAGE CLAIM
A2

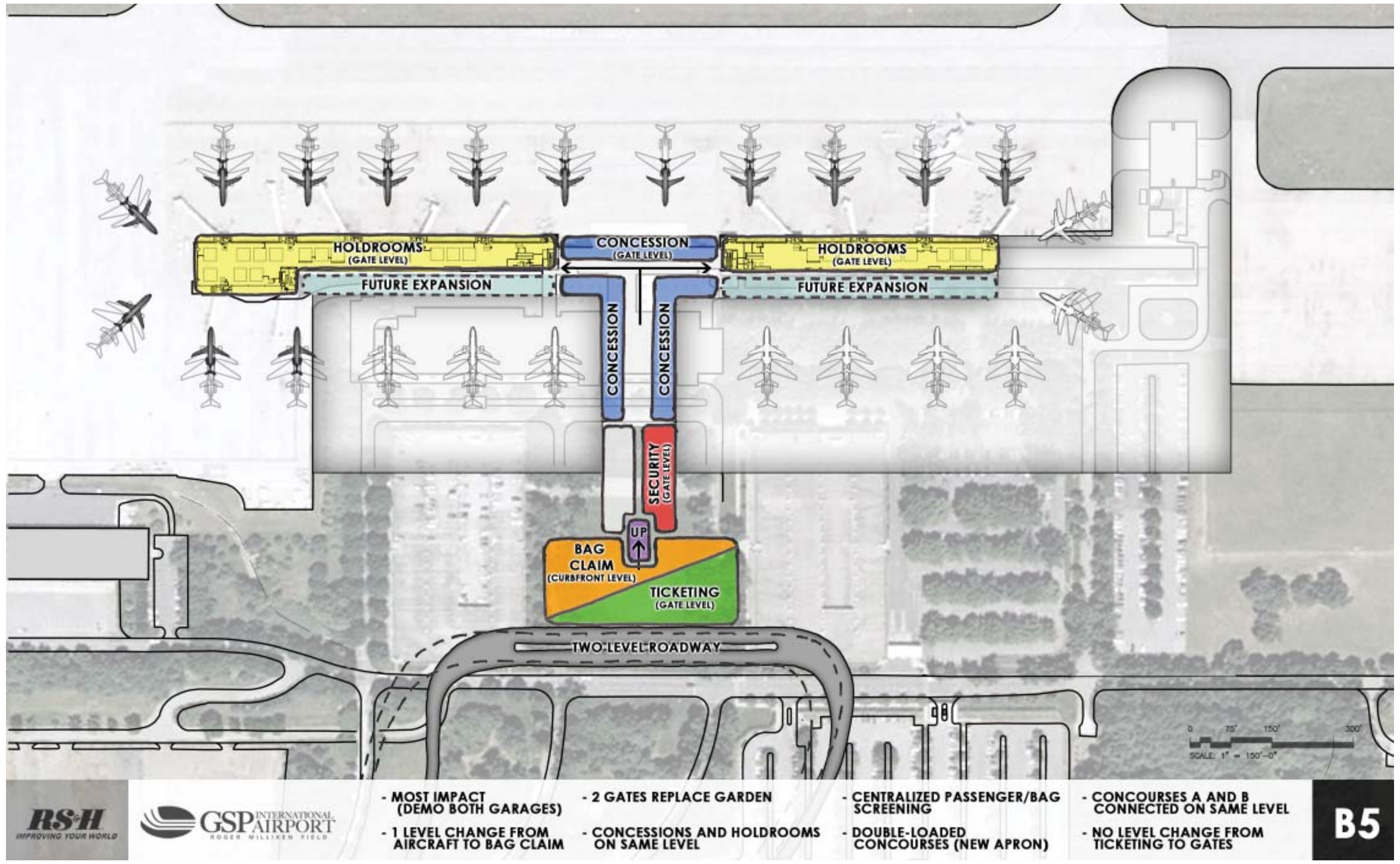

FUTURE EXPANSION
HOLDROOMS (GATE LEVEL)
CONCESSION
HOLDROOMS (GATE LEVEL)
FUTURE EXPANSION
SECURITY (GATE LEVEL)
UP
BAG CLAIM (PARKING LEVEL)
TICKETING (PARKING LEVEL)
FUTURE BAG CLAIM
EXISTING GARAGE
EXISTING GARAGE
RS&H IMPROVING YOUR WORLD
GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD
- MOST IMPACT
- 1 LEVEL CHANGE FROM CURBFRONT TO AIRCRAFT
- 2 GATES REPLACE GARDEN
- CONCESSIONS AND HOLDROOMS ON SEPARATE LEVELS
- CENTRALIZED PASSENGER/BAG SCREENING
- SINGLE-LOADED CONCOURSES REMAIN
- CONCOURSES A AND B CONNECTED ON SAME LEVEL
- RENOVATE TICKETING AND BAGGAGE CLAIM
A3

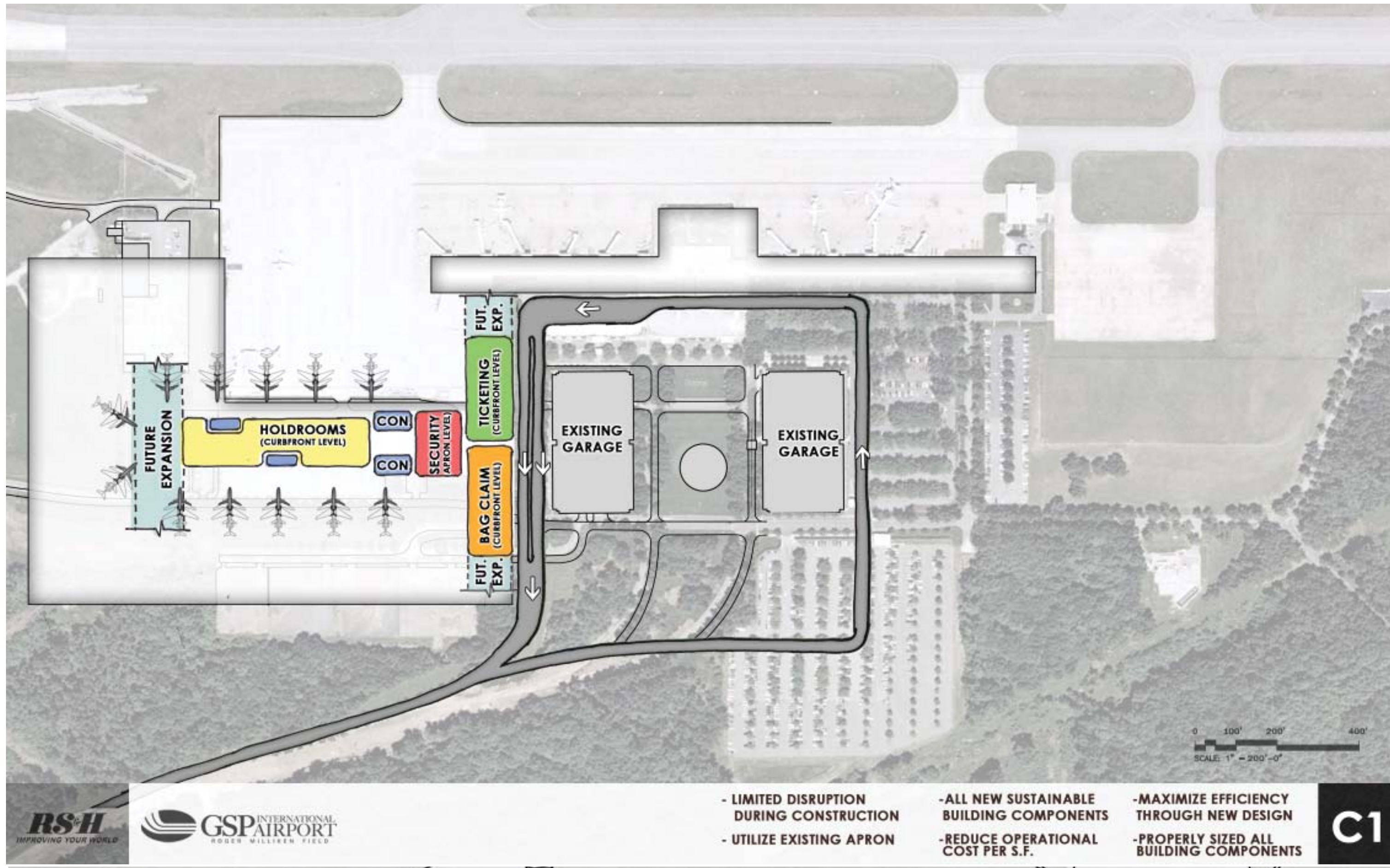

FUTURE EXPANSION
HOLDROOMS (GATE LEVEL)
CON. (APRON LEVEL)
UP
HOLDROOMS (GATE LEVEL)
FUTURE EXPANSION
CON. (APRON LEVEL)
SECURITY (APRON LEVEL)
DOWN
UP
EXISTING GARAGE
BAG CLAIM (CURBFRONT LEVEL)
TICKETING (PARKING LEVEL)
EXISTING GARAGE
GARDEN
SCALE: 1" = 150'-0"
RS&H IMPROVING YOUR WORLD
GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD
- LEAST IMPACT
- 2 LEVEL CHANGES FROM CURBFRONT TO AIRCRAFT
- RESTAURANT/GARDEN REMAIN (POST SECURITY)
- CONCESSIONS AND HOLDROOMS ON SEPARATE LEVELS
- CENTRALIZED PASSENGER/BAG SCREENING
- PARTIAL DOUBLE-LOADED CONCOURSES (NEW APRON)
- CONCOURSES A AND B CONNECTED ON DIFFERENT LEVELS
- RENOVATE TICKETING AND BAGGAGE CLAIM
B1

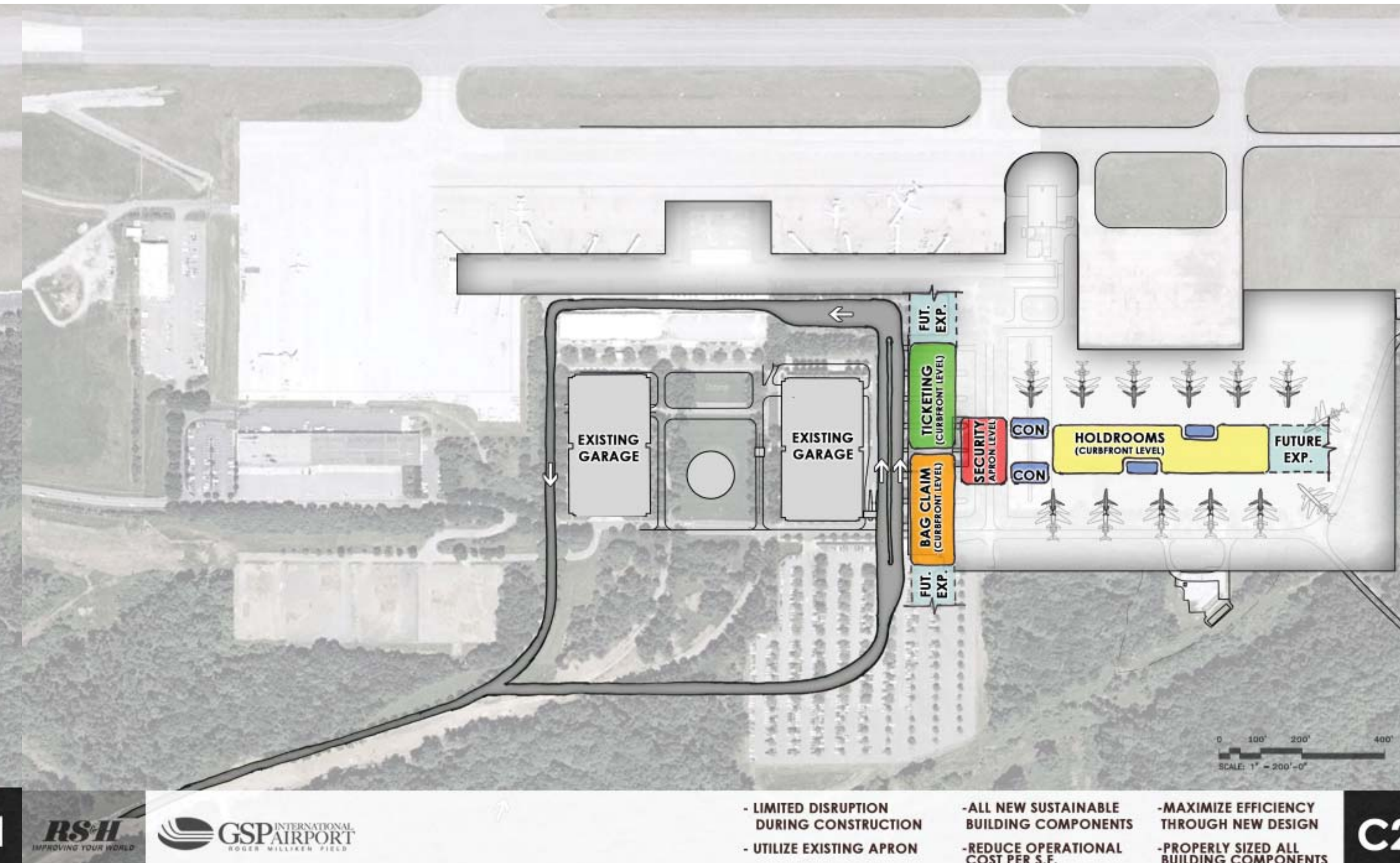

FUTURE EXPANSION
HOLDROOMS (GATE LEVEL)
CON. (GATE LEVEL)
HOLDROOMS (GATE LEVEL)
FUTURE EXPANSION
CON.
CON.
SECURITY (GATE LEVEL)
UP
EXISTING GARAGE
BAG CLAIM (CURBFRONT LEVEL)
TICKETING (PARKING LEVEL)
EXISTING GARAGE
GARDEN
SCALE: 1" = 150'-0"
RS&H IMPROVING YOUR WORLD
GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD
- MODERATE IMPACT (DEMO SURFACE PARKING)
- 1 LEVEL CHANGE FROM CURBFRONT TO AIRCRAFT
- 2 GATES REPLACE GARDEN
- CONCESSIONS AND HOLDROOMS ON SAME LEVEL
- CENTRALIZED PASSENGER/BAG SCREENING
- PARTIAL DOUBLE-LOADED CONCOURSES (NEW APRON)
- CONCOURSES A AND B CONNECTED ON SAME LEVEL
- RENOVATE TICKETING AND BAGGAGE CLAIM
B2

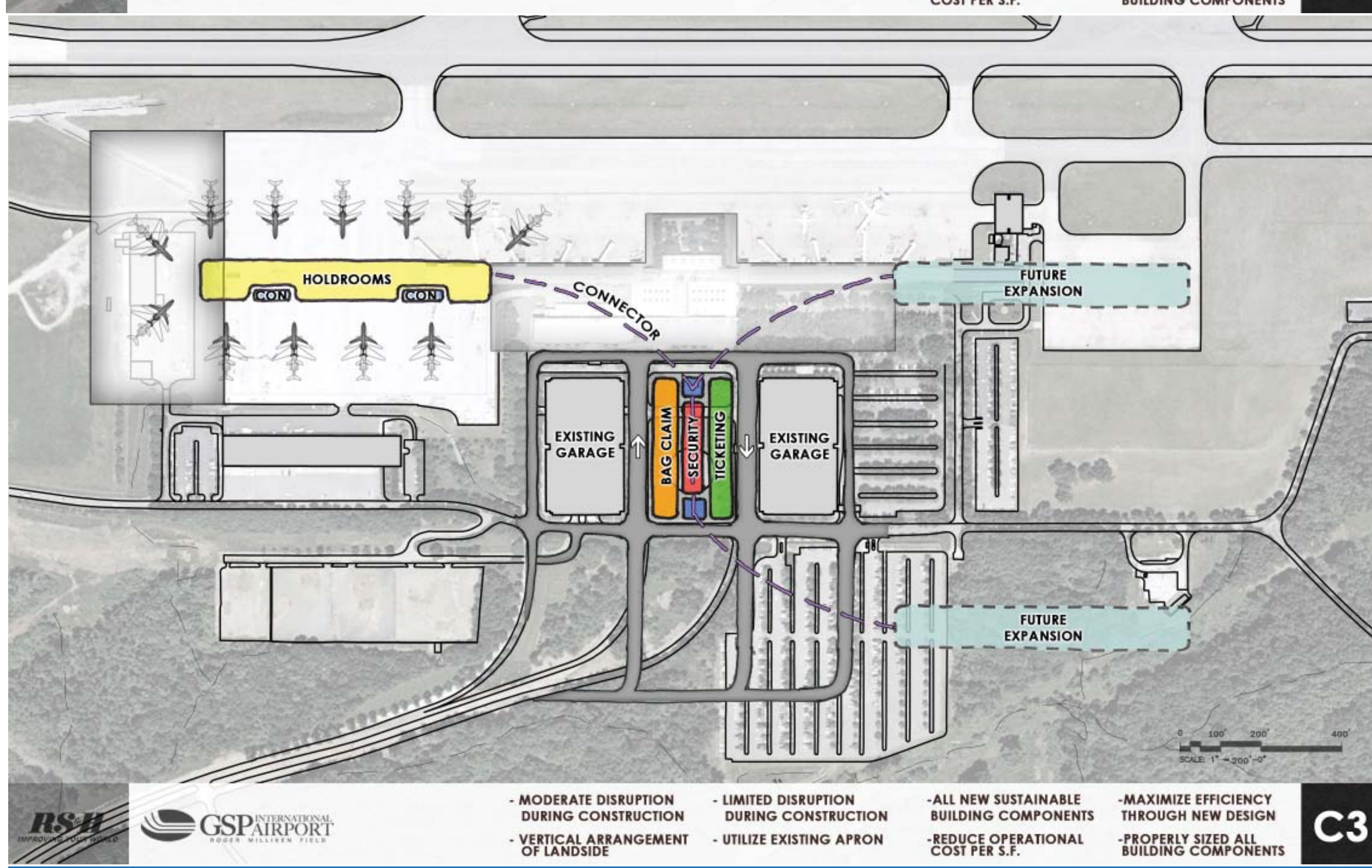

FUTURE EXPANSION
HOLDROOMS (GATE LEVEL)
CON.
CON.
HOLDROOMS (GATE LEVEL)
CON.
SECURITY (GATE LEVEL)
CON.
CON.
UP
BAG CLAIM (CURBFRONT LEVEL)
TICKETING (CURBFRONT LEVEL)
EXISTING GARAGE
NEW GARAGE
SCALE: 1" = 150'-0"
RS&H IMPROVING YOUR WORLD
GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD
- MODERATE + IMPACT (DEMO ONE GARAGE)
- 1 LEVEL CHANGE FROM CURBFRONT TO AIRCRAFT
- 2 GATES REPLACE GARDEN
- CONCESSIONS AND HOLDROOMS ON SAME LEVEL
- CENTRALIZED PASSENGER/BAG SCREENING
- PARTIAL DOUBLE-LOADED CONCOURSES (NEW APRON)
- CONCOURSES A AND B CONNECTED ON SAME LEVEL
- RENOVATE TICKETING AND BAGGAGE CLAIM
B3

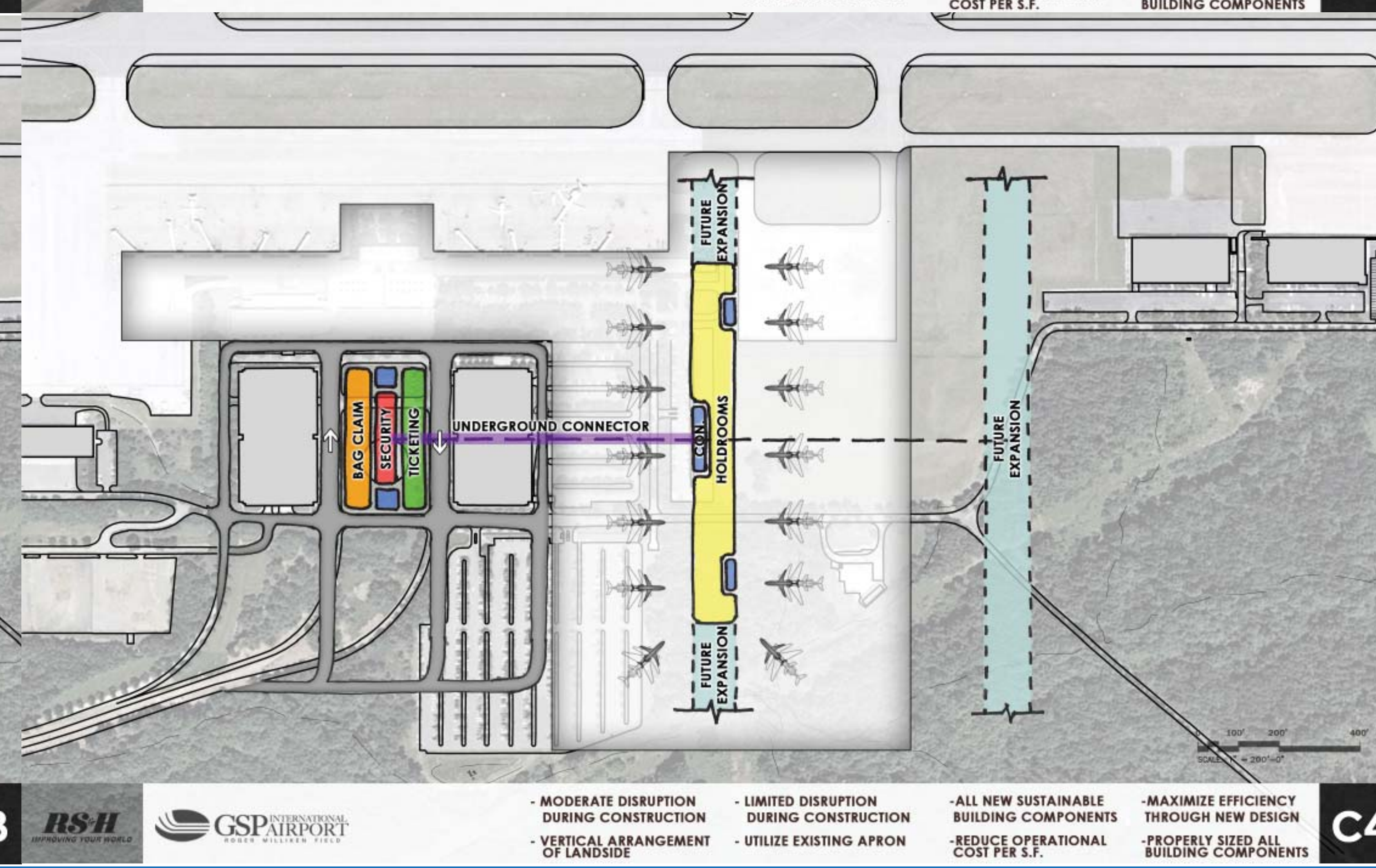

HOLDROOMS (GATE LEVEL)
CONCESSION (GATE LEVEL)
HOLDROOMS (GATE LEVEL)
FUTURE EXPANSION
FUTURE EXPANSION
CONCESSION
CONCESSION
SECURITY (GATE LEVEL)
UP
BAG CLAIM (CURBFRONT LEVEL)
TICKETING (CURBFRONT LEVEL)
SCALE: 1" = 150'-0"
RS&H IMPROVING YOUR WORLD
GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD
- MOST IMPACT (DEMO BOTH GARAGES)
- 1 LEVEL CHANGE FROM CURBFRONT TO AIRCRAFT
- 2 GATES REPLACE GARDEN
- CONCESSIONS AND HOLDROOMS ON SAME LEVEL
- CENTRALIZED PASSENGER/BAG SCREENING
- DOUBLE-LOADED CONCOURSES (NEW APRON)
- CONCOURSES A AND B CONNECTED ON SAME LEVEL
B4


HOLDROOMS
(GATE LEVEL)
CONCESSION
(GATE LEVEL)
HOLDROOMS
(GATE LEVEL)
FUTURE EXPANSION
FUTURE EXPANSION
CONCESSION
CONCESSION
SECURITY
(GATE LEVEL)
UP
BAG CLAIM
(CURBFRONT LEVEL)
TICKETING
(GATE LEVEL)
TWO-LEVEL ROADWAY
SCALE: 1" = 150'-0"
RS&H
IMPROVING YOUR WORLD
GSP INTERNATIONAL AIRPORT
ROGER MILLIKEN FIELD
- MOST IMPACT (DEMO BOTH GARAGES)
- 1 LEVEL CHANGE FROM AIRCRAFT TO BAG CLAIM
- 2 GATES REPLACE GARDEN
- CONCESSIONS AND HOLDROOMS ON SAME LEVEL
- CENTRALIZED PASSENGER/BAG SCREENING
- DOUBLE-LOADED CONCOURSES (NEW APRON)
- CONCOURSES A AND B CONNECTED ON SAME LEVEL
- NO LEVEL CHANGE FROM TICKETING TO GATES
B5


FUTURE EXPANSION
HOLDROOMS (CURBFRONT LEVEL)
CON
CON
SECURITY (APRON LEVEL)
FUT. EXP.
TICKETING (CURBFRONT LEVEL)
BAG CLAIM (CURBFRONT LEVEL)
FUT. EXP.
EXISTING GARAGE
EXISTING GARAGE
- LIMITED DISRUPTION DURING CONSTRUCTION
- UTILIZE EXISTING APRON
-ALL NEW SUSTAINABLE BUILDING COMPONENTS
-REDUCE OPERATIONAL COST PER S.F.
-MAXIMIZE EFFICIENCY THROUGH NEW DESIGN
-PROPERLY SIZED ALL BUILDING COMPONENTS
C1


EXISTING GARAGE
EXISTING GARAGE
FUT. EXP.
TICKETING (CURBFRONT LEVEL)
SECURITY (APRON LEVEL)
CON
CON
HOLDROOMS (CURBFRONT LEVEL)
FUTURE EXP.
BAG CLAIM (CURBFRONT LEVEL)
FUT. EXP.
- LIMITED DISRUPTION DURING CONSTRUCTION
- UTILIZE EXISTING APRON
-ALL NEW SUSTAINABLE BUILDING COMPONENTS
-REDUCE OPERATIONAL COST PER S.F.
-MAXIMIZE EFFICIENCY THROUGH NEW DESIGN
-PROPERLY SIZED ALL BUILDING COMPONENTS
C2


HOLDROOMS
CON
CON
CONNECTOR
FUTURE EXPANSION
EXISTING GARAGE
BAG CLAIM
SECURITY
TICKETING
EXISTING GARAGE
FUTURE EXPANSION
- MODERATE DISRUPTION DURING CONSTRUCTION
- VERTICAL ARRANGEMENT OF LANDSIDE
- LIMITED DISRUPTION DURING CONSTRUCTION
- UTILIZE EXISTING APRON
-ALL NEW SUSTAINABLE BUILDING COMPONENTS
-REDUCE OPERATIONAL COST PER S.F.
-MAXIMIZE EFFICIENCY THROUGH NEW DESIGN
-PROPERLY SIZED ALL BUILDING COMPONENTS
C3


FUTURE EXPANSION
BAG CLAIM
SECURITY
TICKETING
UNDERGROUND CONNECTOR
CON
HOLDROOMS
FUTURE EXPANSION
FUTURE EXPANSION
- MODERATE DISRUPTION DURING CONSTRUCTION
- VERTICAL ARRANGEMENT OF LANDSIDE
- LIMITED DISRUPTION DURING CONSTRUCTION
- UTILIZE EXISTING APRON
-ALL NEW SUSTAINABLE BUILDING COMPONENTS
-REDUCE OPERATIONAL COST PER S.F.
-MAXIMIZE EFFICIENCY THROUGH NEW DESIGN
-PROPERLY SIZED ALL BUILDING COMPONENTS
C4

CONCLUSION

CLIENT WORKSHOPS

A two-day workshop was held with representatives from Greenville-Spartanburg International Airport on March 22 and 23, 2010. The multiple variations on options A, B and C were presented and discussed in detail.

Option series A was preferred for apparent efficiency in cost and ability to reuse exsiting infrastructure to the maximum extent possible. The limitation to the overall useful lifespan of the reuse option would be the capacity of the airside components of the terminal building, namely the passenger holdrooms, without increasing overall areas or increasing the overall length of the concourses.

The following items were discussed during the presentation of the various potential options:

Option A2 was specifically selected by the airport's representatives as the sole option for further study and refinement. Generally Option A2 provides a development plan which maximizes the reuse of the existing airport facility while limiting new construction relative to Options B and C.

The terminal development will occur in a phased approach. The short term should further examine the renovation of the existing terminal building with the long-term goal of replacing or potentially relocating the terminal building complex to a new site. The trigger point for the various phased developments would be established in an update to the terminal area forecast.

Reusing the existing terminal building area is contingent on the overall capacity of the existing airside components. Passenger lounge capacity should generally be maintained with only minimal expansion to allow B Concourse to ultimately mirror the A Concourse layout and capacity. The primary limiting factor established by the airport's representatives is to not increase overall passenger walking distances established by A Concourse.

The Sustainability/LEED Benefits between the various options was discussed at the conceptual level. Although dramatically different in scale and scope, all options presented were developed with a strong focus on providing entirely new energy and resource efficient systems or replacing existing systems to achieve the highest reduction in energy and resource consumption possible.

SECTION 6: TWO MILLION ANNUAL ENPLANED PASSENGERS (MAEP)

6.1 TWO MAEP RATIONALE

After review of the Facility Requirements based on the three forecast scenarios, the Staff of the Greenville-Spartanburg International Airport met with the consultant. It was determined that:

- The existing concourse are in good condition and continue to serve the Airport with only minor renovations
- A five-gate expansion to Concourse B would increase the gate capacity to 18 gates, which depending on aircraft sizes could serve the Airport to approximately two MAEP.

It was determined that the Airport wished to:

- Retain as much as possible of the existing terminal structure
- Remain within the general existing terminal area
- Retain as much of the existing concourse/gates /departure lounge area as possible

As a result of this discussion, it was determined that a second Facility Requirements Analysis would be produced for a Planning Activity Level of Two Million Annual Enplaned Passengers (MAEP). Within the previous facility requirements, two MAEP would be reached in the following years for each forecast scenario:

- Base Case 2058
- Low Fare Carrier 2040
- Focus CIty 2034

This portion of the Facility Requirements section specifically discusses the Two MAEP Facility Requirements.

Unless otherwise noted, the square foot areas given have been calculated using the same assumptions as presented previously in Section 2. Only the number of passengers being processed has been changed unless otherwise noted. For purposes of this report, the peak hour number of enplaning passengers has been calculated at approximately 1,410. Details on the facility requirements for two million annual enplaned passengers can be found in Section 7.

6.1.1 TWO MAEP OVERALL TERMINAL SIZE

The existing terminal building currently has approximately 215,000 square feet of enclosed space. It is anticipated that with the Two MAEP, approximately 413,350 square feet of terminal area, including Customs and Border Protection will be required as shown in Table 6-1. This is an increase of approximately ninety percent over the square foot area of the terminal today, which is reasonable given a 125 percent increase in passengers.

TABLE 6-1

SUMMARY OF EXISTING AND FUTURE TERMINAL REQUIREMENTS FOR TWO MAEP

	TERMINAL FUNCTIONAL AREAS SUMMARY	EXISTING	2 MEP
Airline Functional Areas (SF)	Check-in counters and kiosks	1,936	2,560
	Check-in queue	1,891	2,860
	Airline ticket offices	4,951	3,400
	Baggage make-up	9,000	29,600
	Departure lounges	33,094	47,640
	Inbound baggage input	4,152	8,000
	Baggage claim lobby	8,491	18,000
	Baggage service offices	895	980
	Subtotal Airline Functional Areas	64,410	113,040
Security Areas (SF)	Passenger Screening	2,674	8,260
	Passenger Screening queue	1,735	3,300
	In-line EDS baggage screening	0	20,610
	TSA offices and support	1,346	6,100
	Subtotal Security	5,755	38,270
Terminal Concess. (SF)	Food / Beverage / Retail	16,953	21,130
	Rental car counters and offices	2,184	3,480
	Rental car customer queue	1,126	720
	Subtotal Terminal Concessions	20,263	25,330
Public Areas (SF)	Non-secure public restrooms	1,207	7,900
	Secure public restrooms	2,706	7,400
	Terminal Conference Rooms	1,276	1,950
	Waiting and seating	3,990	24,040
	Public circulation including lobby and entrance	52,448	77,200
	Subtotal Public Areas	61,627	118,490
Non-Public Areas (SF)	Airport operations	1,174	1,900
	Airport Police	1,289	4,300
	Maintenance, storage and janitorial	907	9,000
	Circulation	924	5,040
	Mechanical/ Electrical	27,842	51,590
	Subtotal Non-Public Areas	32,136	71,830
	SUBTOTAL PROJECT AREA (NET)	184,191	366,960
	NET TO GROSS FACTOR	6,080	12,110
	SUBTOTAL PROJECT AREA (GROSS)	190,271	379,070
Terminal Ancillary Areas (SF)	Airline Operations	12,932	7,500
	Airport Administrative Offices	4,267	13,500
	Customs and Border Protection	7,688	13,410
	Subtotal Security	24,887	34,410
	TOTAL BUILDING AREA	215,158	413,480

6.1.2 TWO MAEP NUMBER OF GATES

With Two million MAEP, a minimum of 16 gates would be required as opposed to the 10 gates in operation today. This equates to the aviation activity forecast of 127 daily commercial operations and 30 commercial operations in the peak hour.

6.1.3 TWO MAEP CHECK-IN AREA

The assumptions for the Two MAEP check-in facility have changed somewhat from those previously shown. With the Two MAEP facility requirements, it is assumed that of those passengers checking in at the Airport, 40 percent of the passengers would check-in using the conventional check-in counters, and 60 percent would check-in using the kiosks. In each of the previous projections, it was assumed that 50 percent would use the conventional check-in counters and 50 percent would use the kiosks in 2010. However, by the year 2050, it was assumed that of those checking in at the Airport, five percent would use the check-in counters and 95 percent would use the kiosks.

For exclusive use check-in areas, these assumptions result in a requirement for 2,560 square feet of area for the conventional check-in counters and kiosks as compared to the 1,936 square feet available today for the check-in function. The check-in queue would require 2,860 square feet of area with the Two MAEP, compared to the 1,891 square feet of check-in queue available in the terminal today. Combined, this equates to approximately forty percent more space than exists today.

6.1.4 TWO MAEP PASSENGER SECURITY SCREENING

For the Two MAEP, it was assumed that it would take 20 seconds per passenger for the traditional passenger security screening in operation at airports in 2009. Previously, a time of 30 seconds per passenger was used in 2010 and 18 seconds was used for the processing rate in 2050.

With the above assumptions, it was calculated that approximately 16,038 square feet of space would be required for this function alone as compared with the 4,409 square feet available today. This is a 260 percent increase from the area available today.

In addition, the full-body scanner and area for the complete body pat-down searches will add to the traditional security area.

6.1.5 TWO MAEP BAGGAGE SECURITY

In the previous calculations for security screening of checked baggage, it was assumed that 100 percent of the baggage would be checked with ETD detection in 2010 and that this would decrease to nothing in 2050. In the reverse, it was assumed that none of the baggage would be screened using an in-line EDS screening process in 2010, but that 100 percent of the baggage would be so screened in 2050. For the Two MAEP facility requirements, it was assumed that 100 percent of the baggage would be primary screened using the in-line EDS system.

These assumptions resulted in a need for 20,610 square feet of area needed for baggage security screening with Two MAEP. Today, approximately 4,390 square feet of the terminals baggage make-up space has been converted for baggage screening.

6.1.6 TWO MAEP DEPARTURE LOUNGES

With each of the aviation forecasts, a different mix of aircraft was also assumed to carry the projected number of passengers. With the Two MAEP, the aircraft fleet mix was projected as shown in Table 6-2. This would result in 16 gates and the corresponding departure lounges. An 85 percent load factor of the design aircraft dictates the holdroom capacity per gate.

TABLE 6-2
PROJECTED HOLDROOM CAPACITY FOR TWO MAEP

Number of Gates	Holdroom Size
10	22,130
12	26,550
14	35,440
16	40,500
18	45,560
20	50,630

The 16 departure lounges that would be able to accommodate the respective aircraft sizes would equate to approximately 43,030 square feet of departure lounge required with the Two MAEP. Today, there is approximately 33,094 square feet of departure lounges in the terminal.

6.1.7 TWO MAEP U.S. CUSTOMS AND BORDER PATROL

The U.S. Customs and Border Patrol facility currently has about 7,688 square feet within the area that is dedicated to this function. While this area is currently under utilized at the Airport, this could change in the future. The previous calculations were based on 200, 400 and 600 peak-hour international deplaning passengers. For the purposes of the Two MAEP, it was assumed that approximately 200 peak-hour international passengers would use the facility. This equates to a requirement of approximately 13,410 square feet for this function.

6.1.8 TWO MAEP CONCESSIONS

The concessions exclusive of the rental cars would need approximately 21,128 square feet to accommodate Two MAEP. Of this, a little over 9,800 square feet would be for food and beverage facilities, 5,850 square feet would be for news, gifts, and sundries, and 5,480 square feet would be for storage, kitchens, and other areas that directly support these concessions. The Airport today has approximately 16,953 square feet dedicated to concessions exclusive of the rental cars.

The rental car counters, offices, and queue area make up approximately 3,310 square feet of the terminal today. It is projected that with the Two MAEP, approximately 4,200 square feet of space would be required. However, this space does not necessarily need to be in the terminal. These functions could be placed into one or more of the parking garages.

6.1.9 TWO MAEP BAGGAGE CLAIM AND BAGGAGE INPUT

It is assumed in previous calculations, that the largest aircraft serving the Airport would be a 150-seat aircraft in 2010 and a 180-seat aircraft in 2050. For the Two MAEP, it is assumed that the largest aircraft serving the Airport would be a 175-seat aircraft.

The Two MAEP calculations result in a requirement of five slope-plate baggage claim devices with a total baggage claim frontage of approximately 670 lineal feet. Today, the Airport has two flat-plate baggage claim devices with a total of approximately 250 lineal feet of frontage.

With the Two MAEP, the square foot area of the baggage input area would need to have approximately 8,000 square feet. Today, the Airport has approximately 4,150 square feet dedicated to the baggage in-put area.

6.1.10 TWO MAEP PUBLIC AREAS

The Airport terminal currently has approximately 61,630 square feet of public areas, which includes the non-secure and non-secure public restrooms, waiting and seating, public circulation spaces within the terminal and the administrative offices and conference rooms. With the Two MAEP, approximately 118,490 square feet would be required for these same functions. Airport administration offices are not included in this calculation.

Of the current 61,630 square feet, 3,910 square feet is for public restrooms. The 118,490 square feet of public area in the Two MAEP forecast calls for 15,300 square feet for public restrooms and 24,000 square feet of waiting and seating areas exclusive of the departure lounges. The existing terminal currently has 4,000 square feet of waiting and seating space exclusive of the departure lounges.

6.1.11 TWO MAEP AIRLINE AREAS

The existing terminal has a total of approximately 4,950 square feet of airline office and break room spaces, 9,000 square feet of baggage make-up area, of which approximately half has been taken by TSA for manually screening checked bags, and 895 square feet for baggage service offices. In addition, another 13,000 square feet of airline operational spaces on the apron level, and 840 square feet of baggage service offices. Together, these spaces total approximately 26,960 square feet of airline operations areas.

The Two MAEP calls for 3,400 square feet of airline office and break room spaces, 29,600 square feet of baggage make-up areas, 980 square feet of baggage service office, and another 7,500 square feet of airline operational area on the apron level. This adds up to approximately 41,480 square feet of total airline operations areas.

6.1.12 TWO MAEP CURB LENGTHS

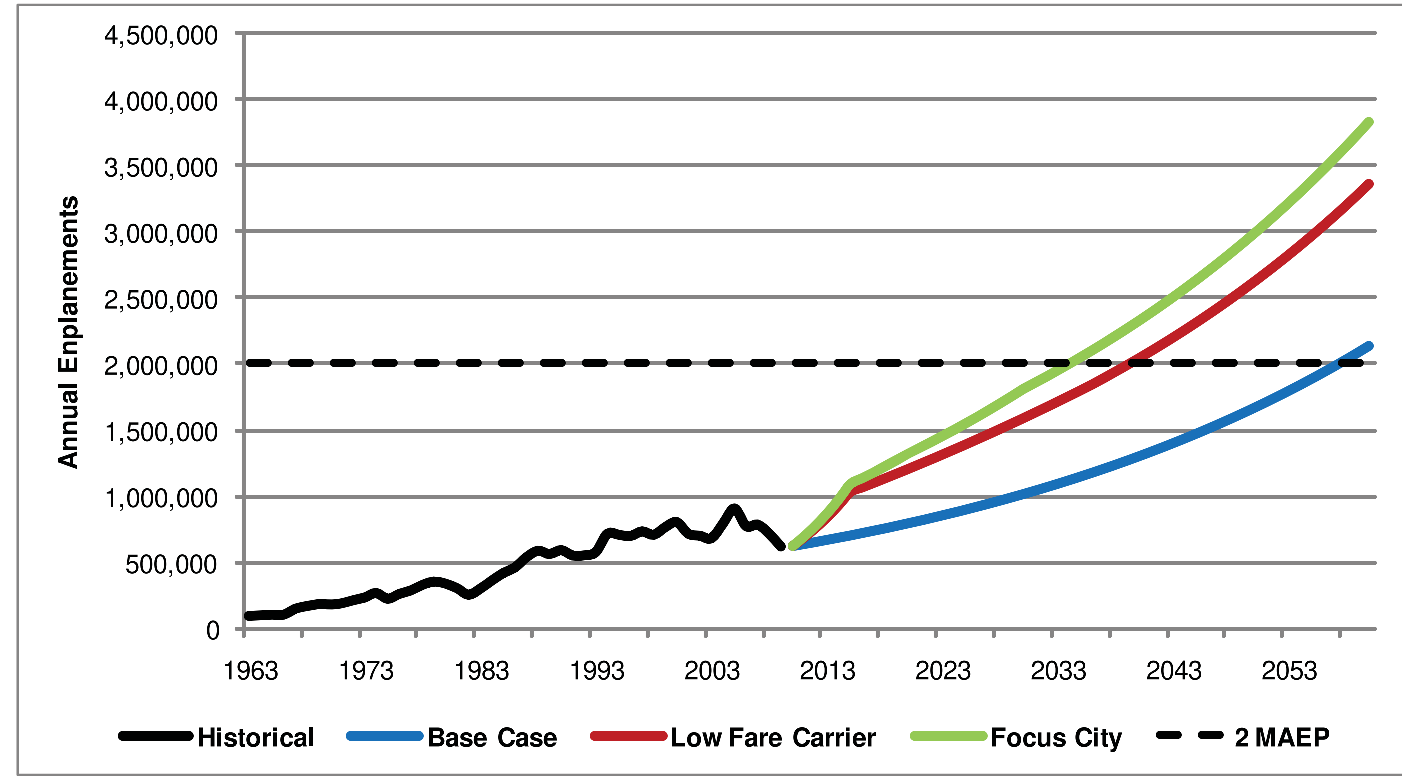
The existing enplaning curb length is approximately 1,280 lineal feet. The Two MAEP calculations project that a departing passenger curb length of approximately 575 lineal feet will be required. The current arriving passenger curb has approximately 2,368 lineal feet of deplaning curb while the Two MAEP projects that 1,000 lineal feet will be required. The total existing terminal curb length measures approximately 3,650 lineal feet although half of the curb parking is on the drivers side of the car, opposite of the preferred arrangement. The Two MAEP projections call for approximately 1,575 lineal feet of curb length. Consideration should be given to eliminating the curb parking aisles on this opposite side and increase the number of through lanes.

6.2 SUMMARY

Initially, three forecasts of facility requirements were developed to correspond to the three forecasts of aviation activity.

After discussions with the Greenville-Spartanburg International Airport, a fourth analysis of Facility Requirements for a Planning Activity Level of Two MAEP was developed. All of the previous assumptions were retained except as otherwise noted. Only the number of passengers being processed changed. The result is a total required terminal area of approximately 413,350 square feet.

FIGURE 6-1



SECTION 7: TERMINAL CONCEPTUAL LAYOUTS

TERMINAL SITE LAYOUT

7.1 APPROACH ROADS

Approach roads which provide ground access to GSP are I-85, SC14 and SC101. Interstate 85 parallels the Southeast airport boundary. The main access route for all airport commercial and general aviation traffic is I-85. I-85 has been improved to provide the separated on and off-ramp traffic as recommended in the GSP 2003 Master Plan Update. The off ramp merges directly into the extension of the Terminal Loop Road as well as into the short-term parking access road. Proper signage will assist in early separation of these two traffic components.

7.1.2 VEHICULAR FLOW ANALYSIS

The GSP Internal Road System

The internal road system serving the GSP airport terminal are:

1) The Terminal Loop Road which provides access to the terminal curbs, short-term and long-term parking, re-circulation within, and exit from the terminal area.

2) The short-term parking system which provides access into the parking structures, circulation between them, and and exits to the collection plazas and from parking revenue tickets dispensers.

3) The long-term parking system which will include the two existing surface parking lots with access to and from GSP Drive.

4) GSP Drive, running East of the Parking system also connects other airport activities to one another and to the terminal loop road5) The short-term parking access road provides direct access into the GSP short–term parking system, including rental cars, the option to enter the long term parking lots and exit back to I-85 without mixing with terminal arrivals and departures functions. The terminal loop road still allows entrance into the South short-term parking structure immediately after the terminal curbs.

It is recommended that the terminal loop road be configured to allow expansion of the roadway system to serve the expansion to the terminal to the North and allow sufficient space for the construction of a third parking structure in the future.

7.1.3 PRIVATE AND COMMERCIAL GROUND ACCESS TO TERMINAL

Private Vehicles Curb Roadway

The configuration of the terminal curb roadway consists of a private vehicle area with a double-wide pickup/drop off lane closest to the terminal curb; a maneuvering lane for vehicles pulling into or out of the pick- up and drop-off lanes .

- North Arrivals: After pick-up at the North Arrivals area, vehicles may enter the through lane and exit through the terminal loop road or exit early through the short-term access road system thus reducing the through traffic at the terminal curb section of the airport loop road.
- Departures: Vehicles dropping off passengers at the departures curb may continue through to the terminal loop road or enter the South short-term parking.
- South Arrivals: After pick-up at the South terminal curb, vehicles may continue through on the Terminal Loop Road to exit the airport or turn North to wait at the Cell-Phone lot , located North of the North surface long term parking lot.

7.1.4 COMMERCIAL VEHICLES

Commercial vehicles such as hotel shuttles, tour buses or limos pick-up and drop-off at the center Island-curb area. It is recommended that shaded, well signed shelters with seating be provided for passengers in these areas. Upon further development of terminal concepts, a commercial vehicle lounge area may be provided as a central pavilion on the lawn area closest to the terminal and between the short-term parking garages. This alternative would have to be evaluated further taking into consideration traffic flow; passenger convenience; aesthetic and activity generation factors however, it will facilitate the creation of a a dedicated lane for departures only which would quickly by-pass the arrivals traffic at the North baggage claim area curb.

A maneuvering lane is also provided for commercial vehicles as well as a through lane for faster moving traffic to access to shuttle stops further South or to exit to the Terminal Loop Road.

7.1.5 CURB FRONTAGE

Curb frontage remains the same until the ultimate build-out for 2M enplanements. The final plan adds 167 l.f. of curb frontage to the current 3650 l.f. for a total of 3817 l.f. Direct curb access to the terminal will increase from 933 l.f.to 1100 l.f. Total curb frontage will adequately meet the requirements for the 2m enplanements.

7.1.6 PARKING

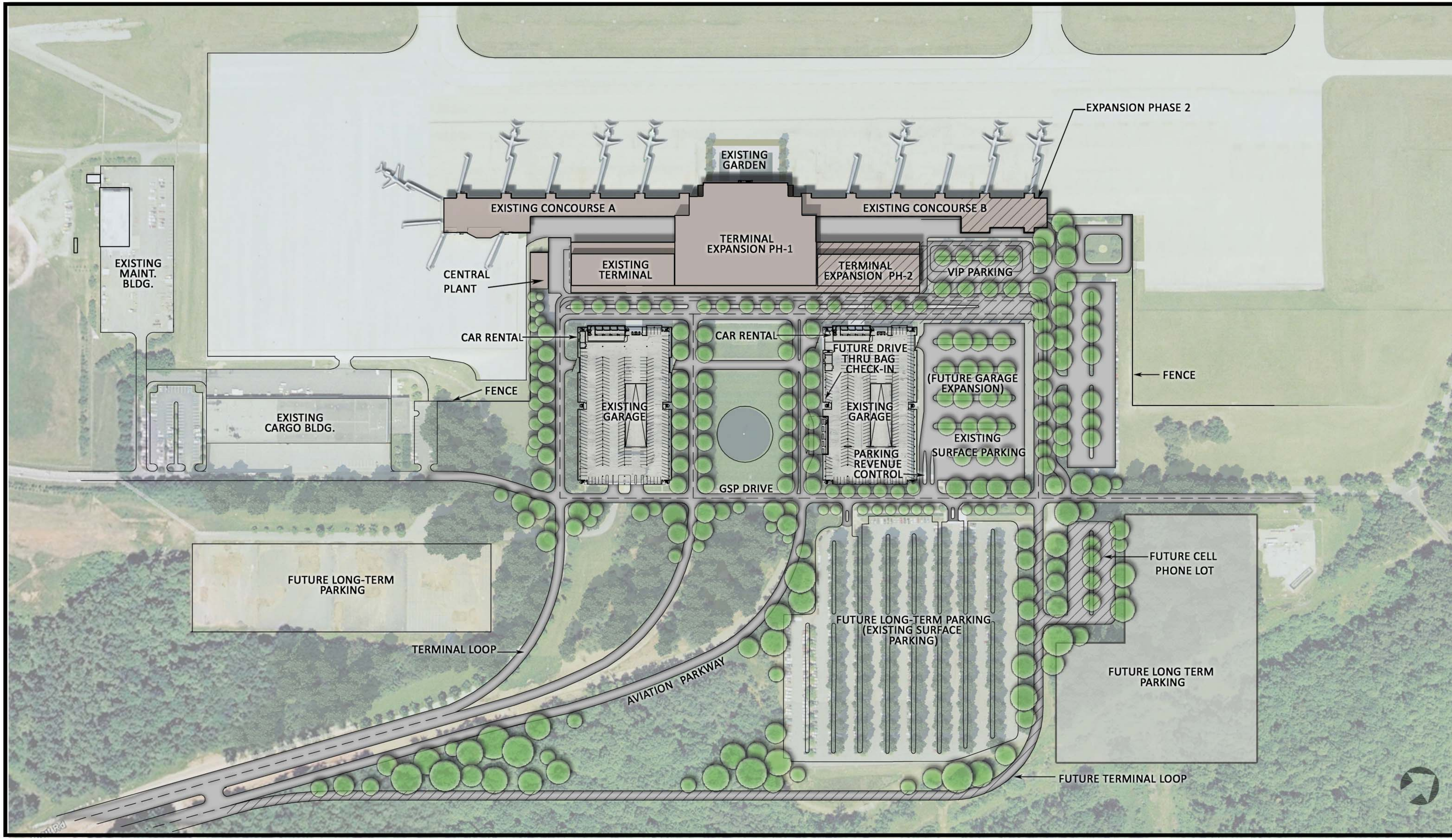
The parking supply and demand study indicates that parking current supply is adequate to supply peak daytime demands. With Southwest Airlines scheduled to begin service at GSP, the parking demand will exceed supply by 2015. This study recommends that GSP begin the planning process for a second North garage and explore two scenarios: 1) Convert the existing parking garages to rental car and short term parking; build a new long term parking garage; turn the surface lots into economy parking. 2) Convert the South garage to rental car and short term parking; convert the North garage into long term parking; build a new economy parking garage and retain the surface parking as remote economy parking.

7.1.7 CAR RENTAL AREAS

Four car rental offices and counters are indicated to be built out, within a common enclosure, at the South Parking garage second level. These will replace the offices which currently exist within the baggage claim area and will also include a common queuing area, restrooms and climate control. Rental cars are currently parked at the South parking garage. The car rental center will have direct access from the parking garage vertical circulation core and across the drive from the car rental area. Upon completion of the new North baggage claim area, a second car rental center, with another four car rental offices and counters will be built at the North garage.

7.1.8 SERVICE AND DELIVERIES

Service and deliveries will access either the concessions storage loading dock or the airport storage via the drives located behind the baggage claim area. Provisions for security screening, should that be required can be accommodated at that location or at the airside gate. Option one will have access to a secure service elevator to transport goods to a secure, back-of-house corridor for deliveries on the landside of the concourse. Deliveries to the airside concessions will cross the concourse circulation unless a separate service elevator is provided for that purpose. For cost purposes, access and service elevators are currently located on one side only. Due to space constraints, Option 2 requires that the deliveries be carried from the service access on the North side of the terminal to the service elevator on the South (a travel distance of approx. 368') to access the concessions on the second level of the terminal.


EXPANSION PHASE 2
EXISTING GARDEN
EXISTING CONCOURSE A
EXISTING CONCOURSE B
TERMINAL EXPANSION PH-1
EXISTING TERMINAL
TERMINAL EXPANSION PH-2
VIP PARKING
EXISTING MAINT. BLDG.
CENTRAL PLANT
CAR RENTAL
CAR RENTAL
FUTURE DRIVE THRU BAG CHECK-IN
(FUTURE GARAGE EXPANSION)
FENCE
FENCE
EXISTING GARAGE
EXISTING GARAGE
EXISTING CARGO BLDG.
EXISTING SURFACE PARKING
PARKING REVENUE CONTROL
GSP DRIVE
FUTURE CELL PHONE LOT
FUTURE LONG-TERM PARKING
FUTURE LONG-TERM PARKING (EXISTING SURFACE PARKING)
TERMINAL LOOP
AVIATION PARKWAY
FUTURE LONG TERM PARKING
FUTURE TERMINAL LOOP
0
250'
500'

SITE PLAN

7.2 OPTION ONE - OBJECTIVE APPROACH

Option one aims to refresh the core of the airport, by rebuilding it to current standards and requirements in order to fully meet the current functional requirements and provide ease of expansion for the future.

Section 4 of this report outlines areas where the current departures building module, central plant, and baggage handling areas are physically and functionally deficient in meeting the needs of a modern airport terminal. The existing departures area, central core, and connectors functioned adequately and were aesthetically acceptable for previous terminal needs. However, considerable limitations exist to meet the current requirements and future terminal growth initiatives. Some of these limitations are:

- A roof structure which does not have the structural capacity to bear the load of a suspended ceiling, curbside conveyors, or new mechanical systems.
- The restricted circulation space within the baggage handling areas and lack of space to expand baggage screening functions.
- The potential congestion generated by increased baggage operations, as well as concessions back of house functions (deliveries, screening, storage etc.).
- The multiple changes of level and its impact on passenger convenience.
- The changes of level from apron to the baggage handling areas.
- The limited space available for revenue generating concessions.
- The limited life and inefficiency of the airport's physical central plant.
- The absence of newer, better insulated and sustainable materials as well as more efficient, sustainable equipment.

These are serious indicators that in order to meet the stated needs of the GSP master plan such as maintaining excellent service standards; expanding airline service; complying with TSA requirements; providing a network of "intelligent systems" (CUTE, MUFIDS, MUBIDS, EDS, wireless, etc.); enhancing the concessions program and maintaining a "good neighbor" policy (environmentally), a new central core area that can accommodate the future needs of the terminal is worthy of consideration.

7.2.1 1A, 1B, 1C SIMILARITIES

Options One A, B & C are similar in that they all re-build the central core to meet the above-stated needs. Generally, Option One retains the existing baggage claim wing of the terminal (newer construction) and relocates the rental car counters and offices to the parking garages. The space is available to provide better restrooms, meeter-greeter, and waiting areas for passengers. The space will be remodeled to meet higher standards of durability, accessibility, and sustainability. The landside wall will, for the most part, be replaced by a glass wall with a low solar heat gain coefficient (SHGC) and proper solar shading. The remaining walls will be insulated to ensure a more efficient thermal envelope with a generous amount of daylighting.

What is now the Departures Hall and the spaces behind them, as well as the connector between Concourses A and B will be re-built to contain better circulation and queuing spaces , new ticket counters and self service units, state of the art technology, sustainable mechanical, electrical and plumbing systems, alternative energy components and preparation for future alternative energy systems, space for expansion of passenger and baggage screening systems, baggage make-up areas, and inbound baggage areas.

A gate level floor has been added in the central area to connect the two existing concourses and contains passenger screening and concessions functions. Escalators and elevators take passengers a full two stories into the screening areas at gate level. The second level restaurant will move to the third level, thus in closer proximity to secure passengers and with a birds-eye view of the garden, as well as secure circulation to access and enjoy the beautiful airside garden.

Materials used will be local, energy efficient and of high recycled content. Circulation will take passengers directly to the gate level from the ticketing level, thus enhancing passenger convenience. Ample concessions areas will be provided as well as room for expansion of such and provisions for deliveries and storage. In general, all of the Option One alternatives will result in meeting the goals stated in the GSP master plan as well as generating revenue and local employment.

The entire airside concourse interior will be remodeled with more sustainable materials and more efficient HVAC, lighting, electrical and communications systems. Concessions will also be added in close proximity to the end gates, as well as narrow, fast food or newsstand concessions towards the center of both concourses.

Depending on the growth of international enplanements at GSP, the existing Customs and Border Protection (CBP) will be expanded.

7.2.2 1A, 1B, 1C DIFFERENCES

This study presents three different alternatives for Option One (1A, IB & IC). Each alternative is outlined within the following sub tabs.

7.3 OPTION 1A

This option takes a conventional approach to ticketing and baggage claim. Ticket counters remain linear and baggage claim devices remain flat plate devices. It also creates a tall, brightly lit volume at the entrance to the terminal building where FIDS, small concessions and seating areas can be located.

7.3.1 TICKETING

This plan indicates a linear ticketing configuration with self-service ticketing units both along the line of the ticket counter (as a conversion of a standard GSP CUTE ticketing counter to be developed in the future) and two free-standing groupings for passengers not checking bags. A wall- to- ticket counter distance of 100' allows for ample circulation and queuing in front of the counter. Airline ticketing office (ATO) spaces are compliant with the Master Plan area requirements and space is provided for future employee screening (should it be required by TSA). Two elevator/stair cores for airline staff as well as two public elevator/escalator cores are in close adjacency to ticketing line on both ends.

The baggage make-up area is directly behind the ATO area. The area has the capacity to house three bag make-up carousel devices which can be additive as the airport growth may demand. There are delivery and storage functions flanking the make-up area on both North and South. Deliveries will occur from areas formerly dedicated to baggage make up. Inbound baggage will continue to occur directly as cart-to-claim device with the claim devices being flat plate devices. There are indications that further security will be required along the claim area airside wall. This option can easily adjust to those requirements if and when they occur.

Opportunities for landside concessions exist adjacent to the meeter-greeter lobby at baggage claim as well as adjacent to the vertical circulation elements on the ticketing side.

7.3.2 APRON

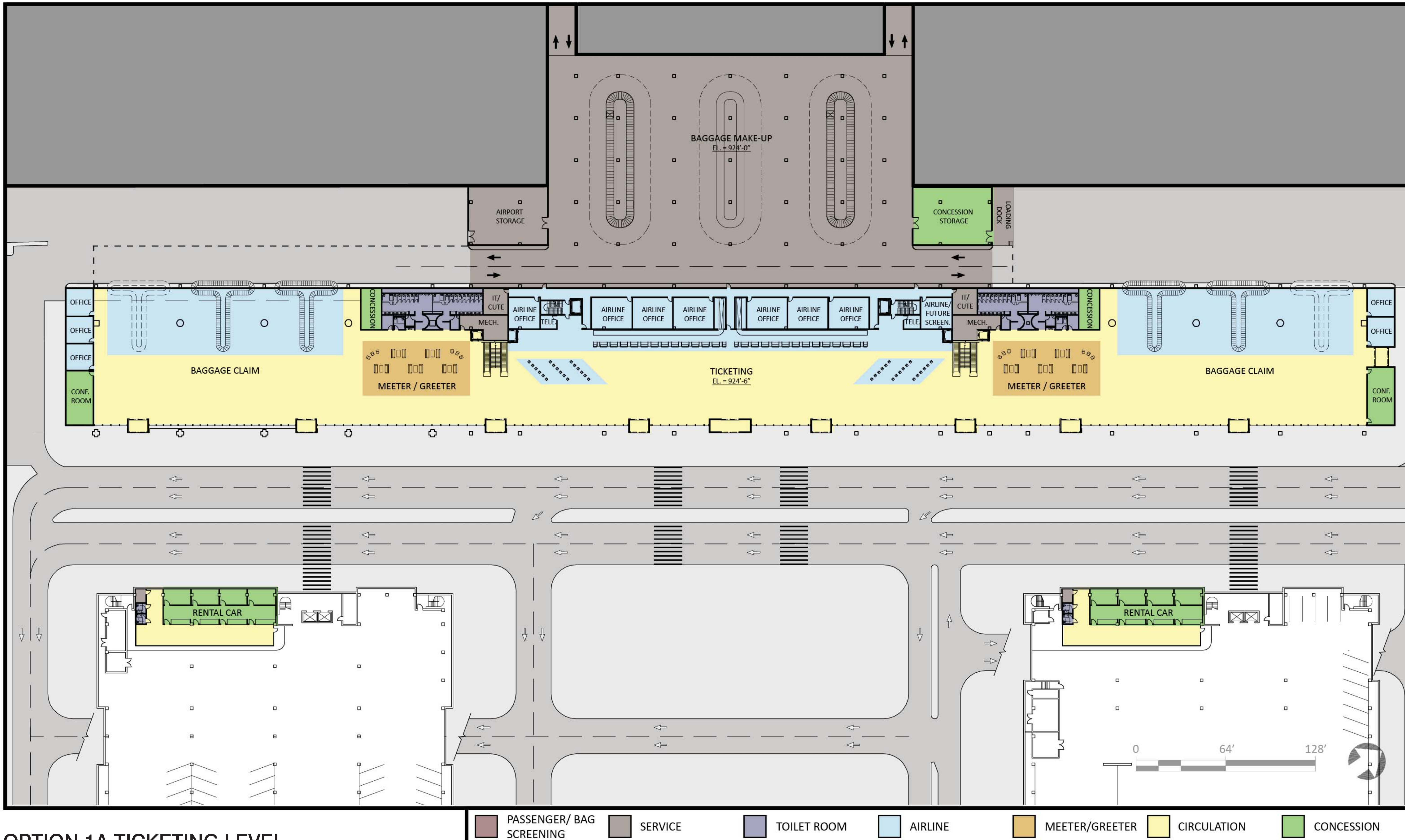
The 1A apron area indicates a central baggage screening area containing four (4) EDS machines; ETD area and related control and service functions. The space is surrounded by large mechanical spaces which will serve to house the replacement for the mechanical and other equipment currently housed in the this central area of the terminal. The proposal to utilize a "geothermal" system for HVAC will be studied during the design phase and may reduce the need for much of the space, making it available for airport storage functions, operations and expansion of the baggage screening areas. Access to baggage make up and claim remains at a lower level and reached by ramps from the apron. A utility "spine" has been added at a mezzanine level above the ticketing area. Mechanical and other equipment may be serviced entirely from within this "spine" and will be able to serve different zones without crossing public areas.

7.3.3 GATE

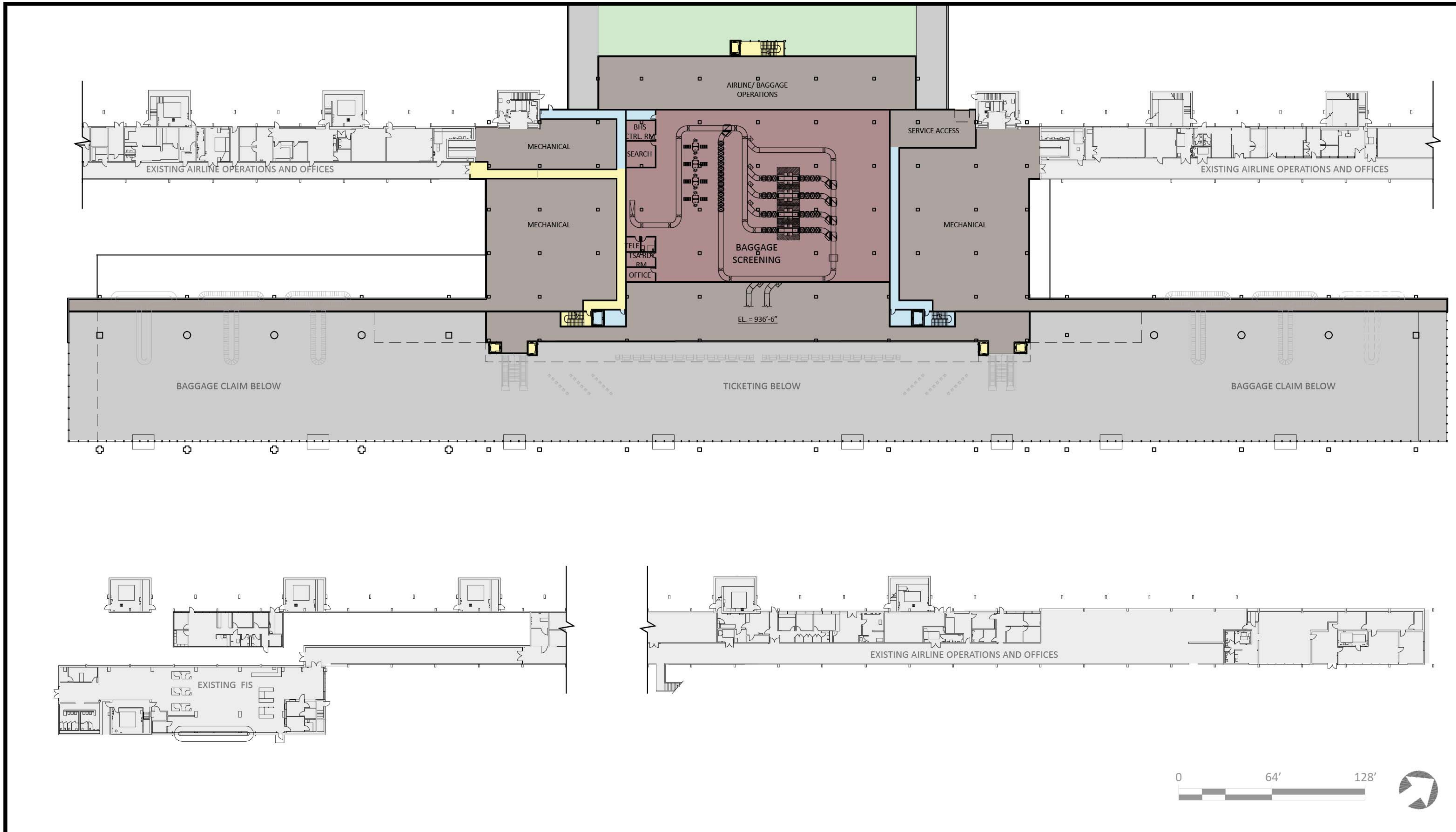
Passengers move from ticketing to a third level passenger screening via two sets of two story escalators and elevators. They will be directed to a linear queuing area on the east side of the TSA screening area.

The TSA screening area is configured to meet the full facility requirements and has built-in space to either expand or compress together with office and storage functions directly adjacent to it. The central core area has a generous amount of new concession space to capture the passengers as they clear the security checkpoint. Two sets of restrooms have been included in the third floor central core area. Concession deliveries occur via two service elevators and secure corridors on North and South.

Once the central connection between Concourses A and B is re-built, the space formerly utilized for TSA passenger screening will be re-claimed by the adjacent departure lounges. The new restaurant will have a bird's eye view of the garden area and will be access the garden through its own stair and elevator. The stair and elevators will remain enclosed and secure until they reach the enclosed garden area below.

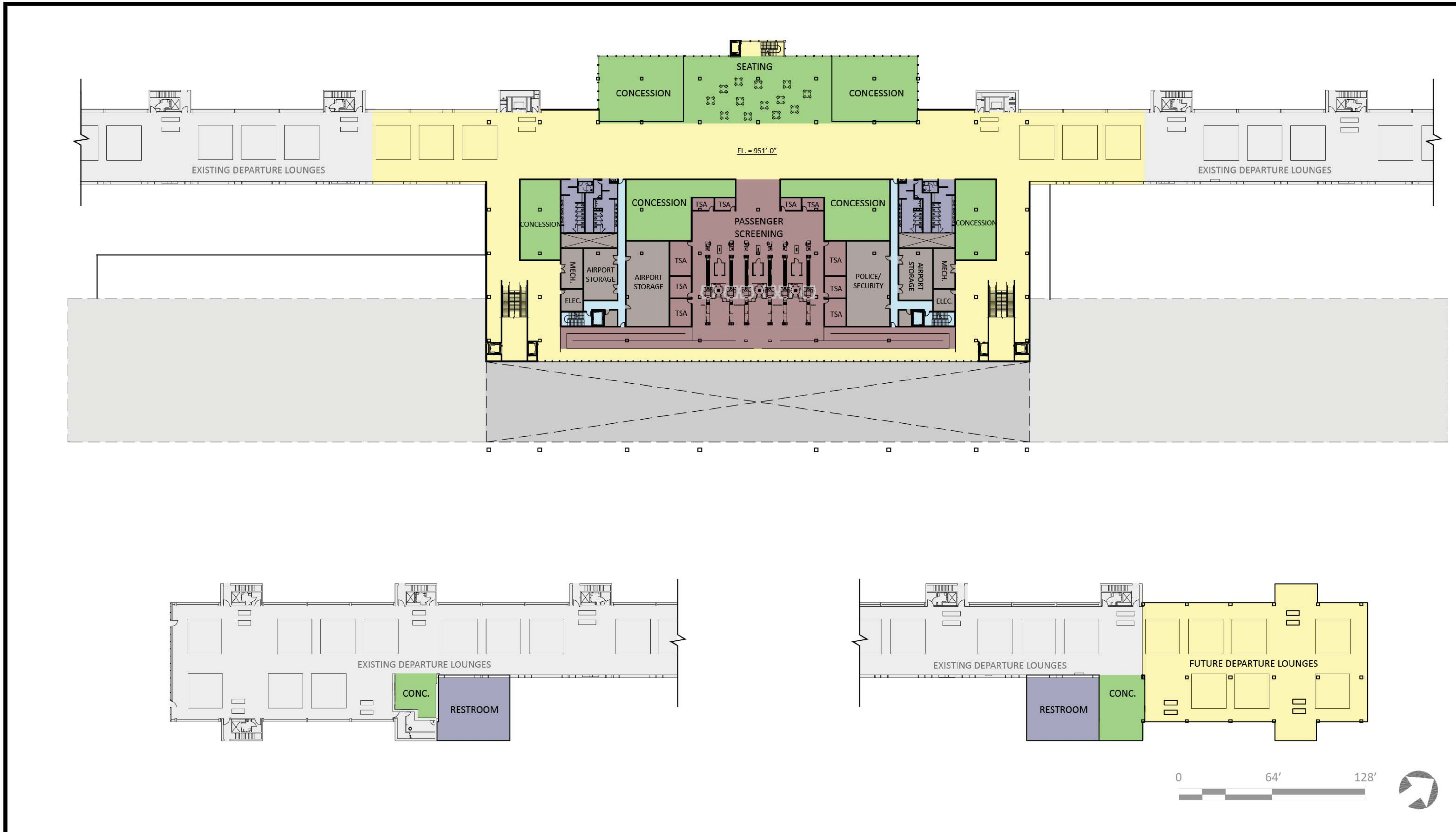


OPTION 1A TICKETING LEVEL



OPTION 1A APRON LEVEL

PASSENGER/ BAG SCREENING	SERVICE	TOILET ROOM	AIRLINE	MEETER/GREETER	CIRCULATION	CONCESSION

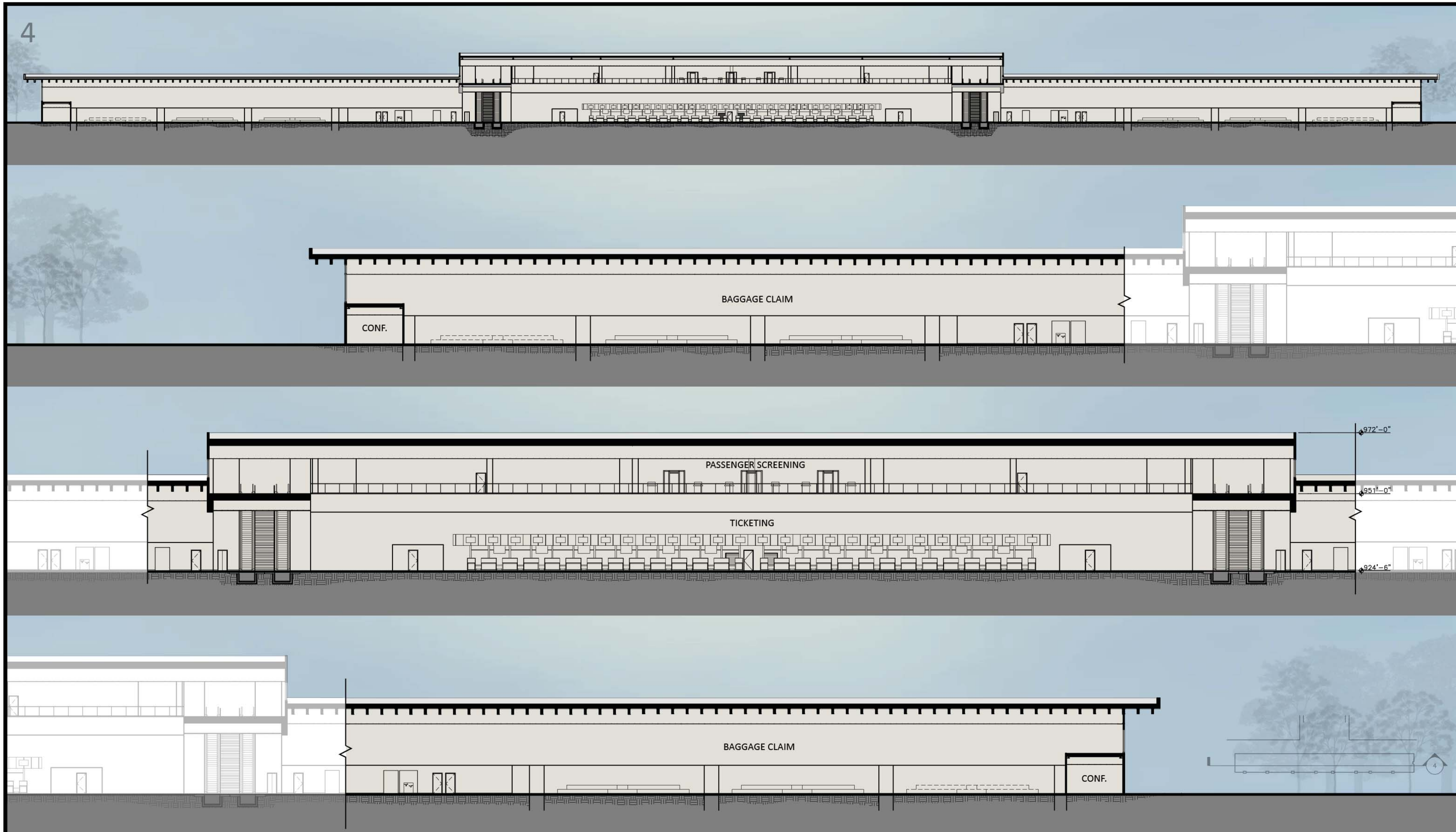


OPTION 1A GATE LEVEL

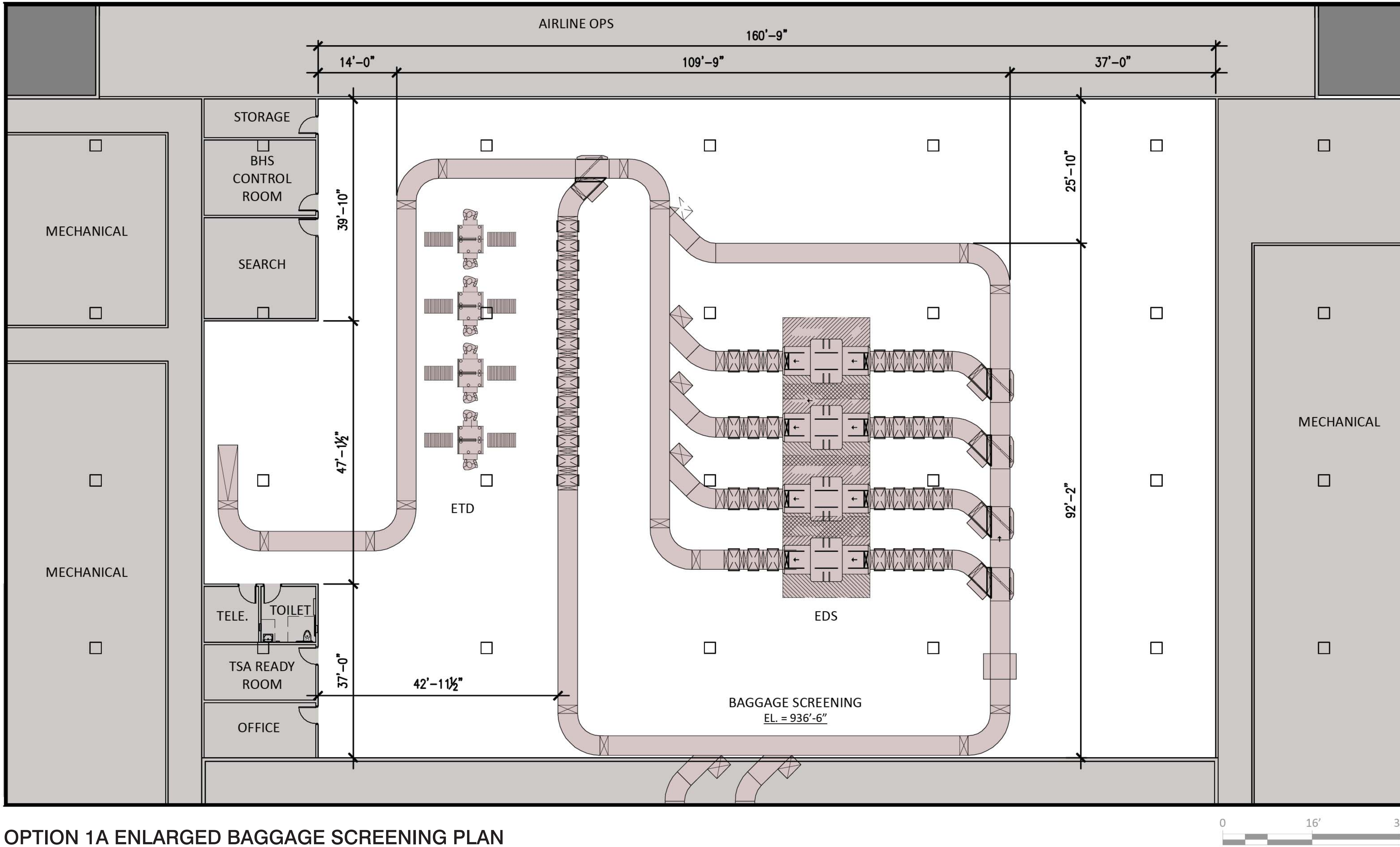
PASSENGER/ BAG SCREENING	SERVICE	TOILET ROOM	AIRLINE	MEETER/GREETER	CIRCULATION	CONCESSION

OPTION 1A SECTIONS

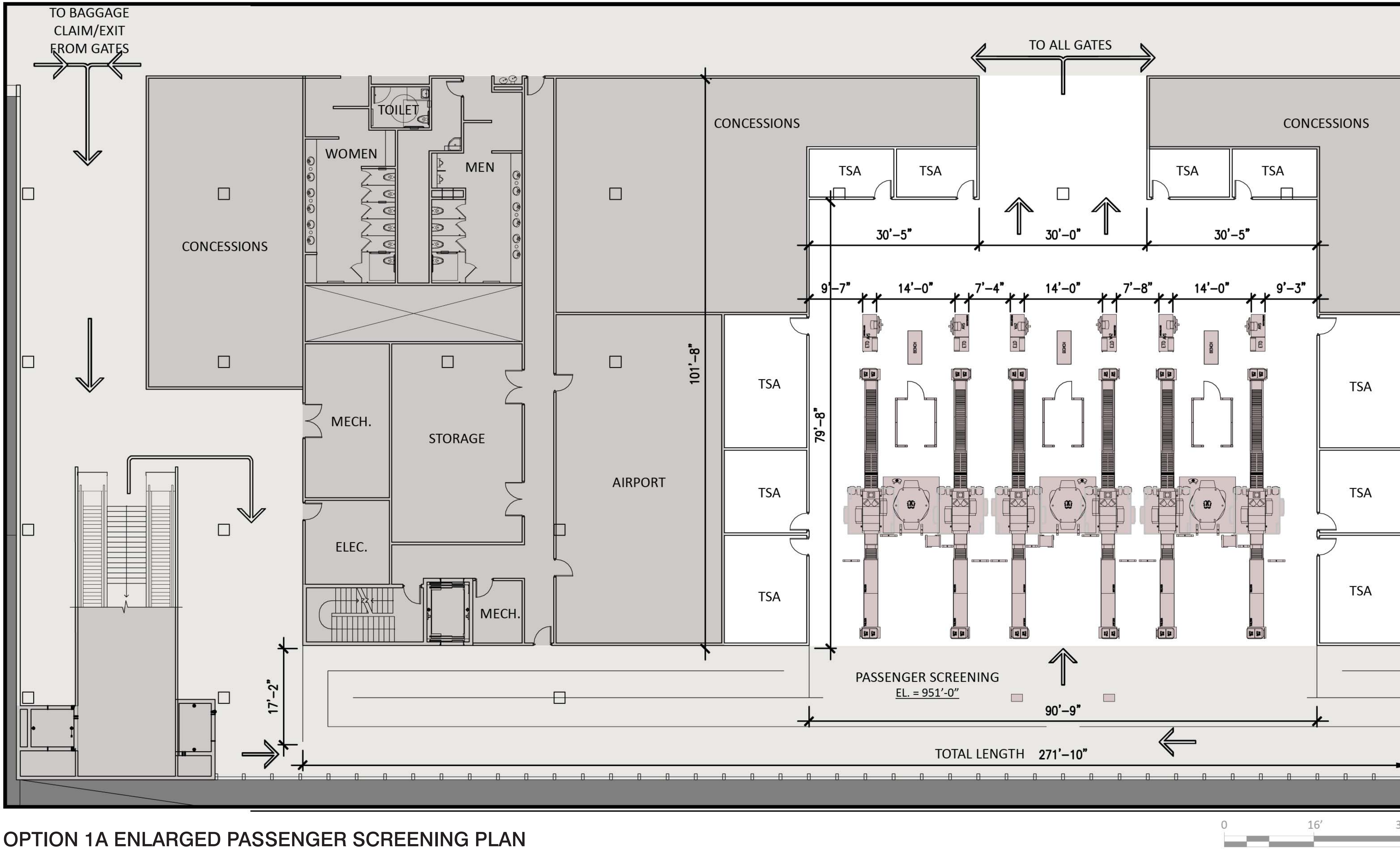
OPTION 1A SECTIONS



OPTION 1A SECTIONS



OPTION 1A ENLARGED BAGGAGE SCREENING PLAN



OPTION 1A ENLARGED PASSENGER SCREENING PLAN

PROGRAM COMPARISON

	TERMINAL FUNCTIONAL AREAS SUMMARY	EXISTING	2 MEP	OPTION 1A
Airline Functional Areas (SF)	Check-in counters and kiosks	1,936	2,560	5,204
	Check-in queue	1,891	2,860	4,010
	Airline ticket offices	4,951	3,400	5,258
	Baggage make-up	9,000	29,600	30,231
	Departure lounges	33,094	47,640	48,720
	Inbound baggage input	4,152	8,000	9,916
	Baggage claim lobby	8,491	18,000	24,216
	Baggage service offices	895	980	1,528
	Subtotal Airline Functional Areas	64,410	113,040	129,083
Security Areas (SF)	Passenger Screening	2,674	8,260	8,080
	Passenger Screening queue	1,735	3,300	5,390
	In-line EDS baggage screening	0	20,610	18,970
	TSA offices and support	1,346	6,100	3,586
	Subtotal Security	5,755	38,270	36,026
Terminal Concess. (SF)	Food / Beverage / Retail	16,953	21,130	15,138
	Rental car counters and offices	2,184	3,480	5,498
	Rental car customer queue	1,126	720	2,006
	Subtotal Terminal Concessions	20,263	25,330	22,642
Public Areas (SF)	Non-secure public restrooms	1,207	7,900	3,536
	Secure public restrooms	2,706	7,400	7,374
	Terminal Conference Rooms	1,276	1,950	3,366
	Waiting and seating	3,990	24,040	19,125
	Public circulation including lobby and entrance	52,448	77,200	86,845
	Subtotal Public Areas	61,627	118,490	120,246
Non-Public Areas (SF)	Airport operations	1,174	1,900	2,837
	Airport Police	1,289	4,300	1,735
	Maintenance, storage and janitorial	907	9,000	6,238
	Circulation	924	5,040	10,714
	Mechanical/ Electrical	27,842	51,590	44,924
	Subtotal Non-Public Areas	32,136	71,830	66,448
	SUBTOTAL PROJECT AREA (NET)	184,191	366,960	374,445
	NET TO GROSS FACTOR	6,080	12,110	12,360
	SUBTOTAL PROJECT AREA (GROSS)	190,271	379,070	386,805
Terminal Ancillary Areas (SF)	Airline Operations	12,932	7,500	12,932
	Airport Administrative Offices	4,267	13,500	4,267
	Customs and Border Protection	7,688	13,410	7,688
	Subtotal Security	24,887	34,410	24,887
	TOTAL BUILDING AREA	215,158	413,480	411,692

7.4 OPTION 1B

This option employs more new technology and aims at improved passenger flow.

7.4.1 TICKETING

The ticketing area in Option 1B aims at a improving the passenger flow by creating ticket counter “islands” and take-away conveyors which cross the back corridor under the floor so that ticketed passengers can flow directly up one of two escalator/elevator areas to the passenger security screening area at the gate level. The primary terminal circulation and down escalators remain towards the front of the building. Passengers queue in a N-S direction and a circulation corridor is created between the queues with self service ticketing and self service bag check-in towards the front of the corridor. At this point, a passenger will either get a boarding pass and check a bag or be directed to an agent at the counter.

The wall-to-counter distance allows for both terminal circulation and self-service queues. Queuing space for ticket agents is constrained by traffic along the adjacent circulation corridor and that of the adjacent ticketing island.

A small wall-type fast food concession is located adjacent to the “up” escalators on both ends.

Airline ticketing offices are compliant with the Master Plan area requirements and space is provided for future TSA employee screening, should it be required. A stair/elevator core is provided at the entrance to the ATO space on either end. A service elevator is provided at the North vertical circulation core for concessions supply distribution to a secure corridor at the gate level.

The carousel claim devices at the baggage claim areas are fed from flat take-away belts located behind the ATO spaces within the baggage screening area. The TSA baggage screening area is sufficient to meet the projected TSA Checked Baggage Inspection System (CBIS) for the maximum enplanements based on current criteria.

A large airport storage area is located adjacent to the screening area and the service access drive. This storage area could compress and become functional TSA baggage screening area should there be a change in criteria which would require more space for that function. The drive also allows service equipment to enter the area for servicing.

A meeter-greeter lobby is located at the base of the escalators adjacent to both baggage claim areas. A concession area is located adjacent to each baggage claim area.

7.4.2 APRON

This option places the baggage make-up area level with the aircraft apron for ease of tug circulation and efficient operations. It attempts to maximize the open area surrounding the baggage make-up space for enhanced air quality and provides sufficient space to grow into the presentation area required in the Master Plan.

The space is flanked by a mechanical room to serve the gate concourses and a baggage handling system (BHS) control room as well as connection from the CBP area by stair and elevator to the main ticketing floor to connect to ground transportation.

A utility “spine” has been added at a mezzanine level above the ticketing area. Mechanical and other equipment may be serviced entirely from within this “spine” and will be able to serve different zones without crossing public areas.

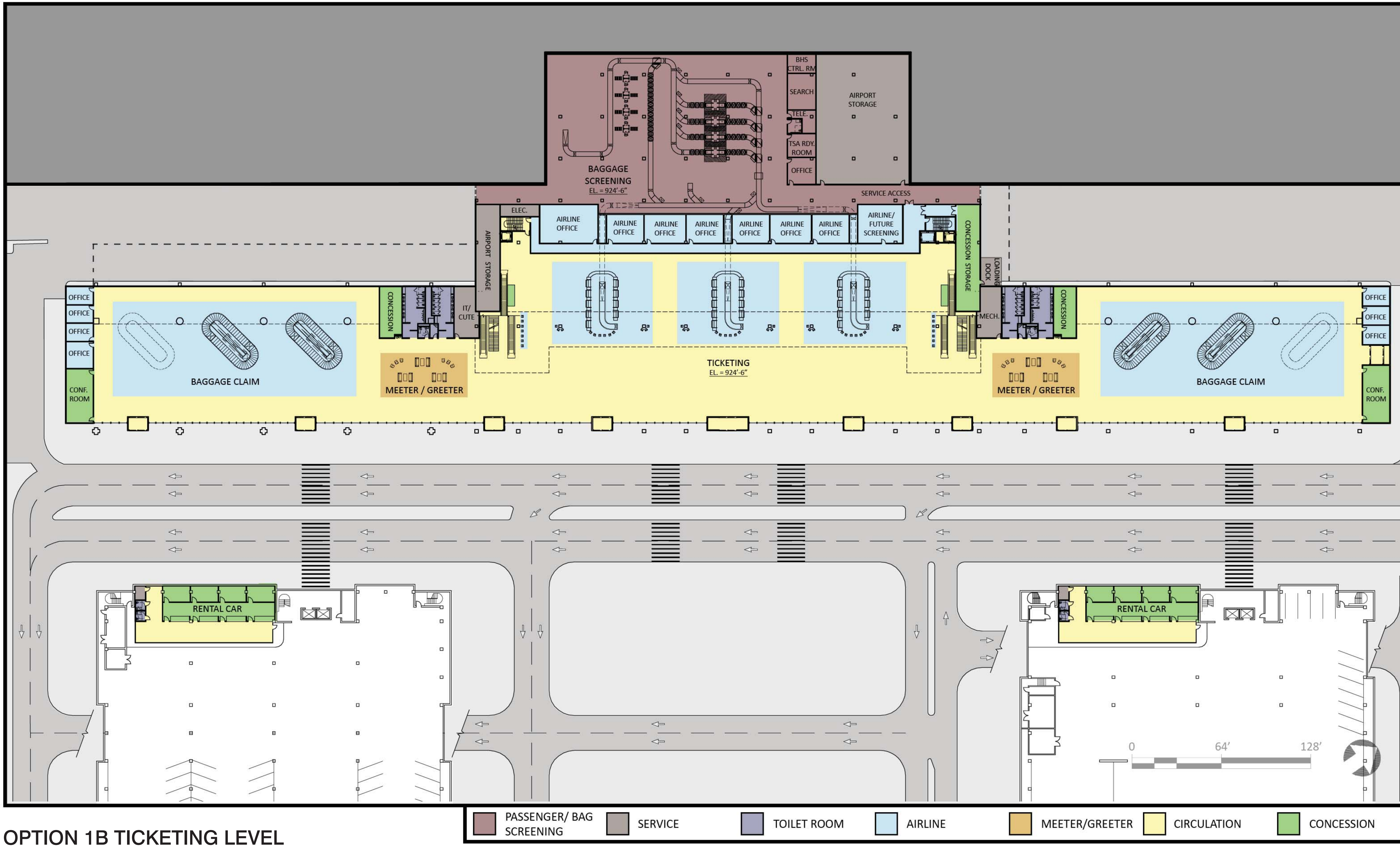
7.4.3 GATE

Passengers move from ticketing to a third level passenger screening via two sets of two story escalators and elevators. They will be directed to a linear queuing area on the east side of the TSA screening area.

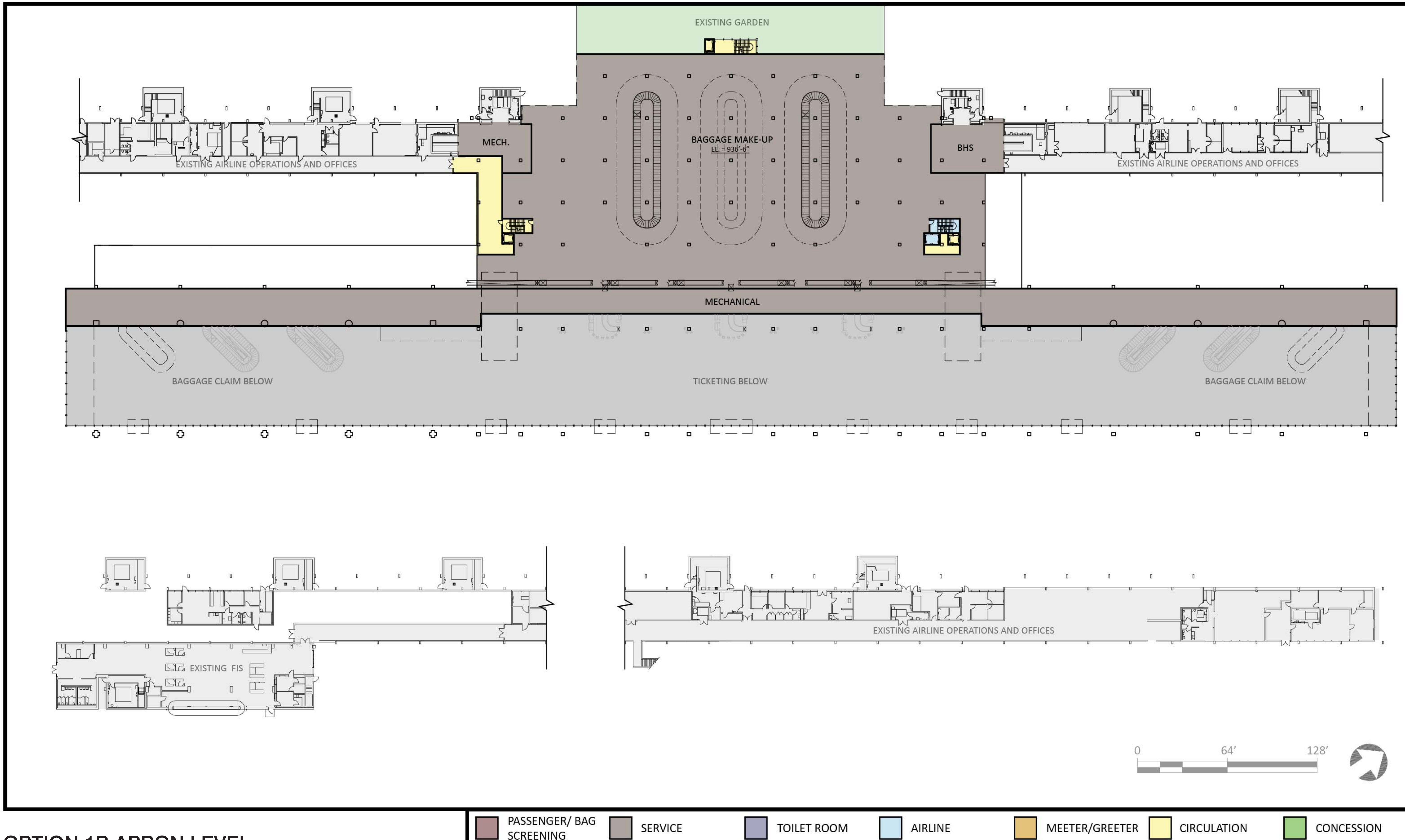
The TSA screening area is configured to meet the full facility requirements and has built-in space to either expand or contract together with office and storage functions directly adjacent to it. The central core area has a generous amount of new concession space to capture the passengers as they clear the security checkpoint. Two sets of restrooms have been included in the third floor central core area. Concession deliveries occur via two service elevators and secure corridors on North and South.

The TSA screening area is configured to meet the full facility requirements and has built-in space to either expand or compress together with office and storage functions directly adjacent to it. The central core area has a generous amount of new concession space to capture the passengers as they clear the security checkpoint. Two sets of restrooms have been included in the third floor central core area. Concession deliveries occur via two service elevators and secure corridors on North and South.

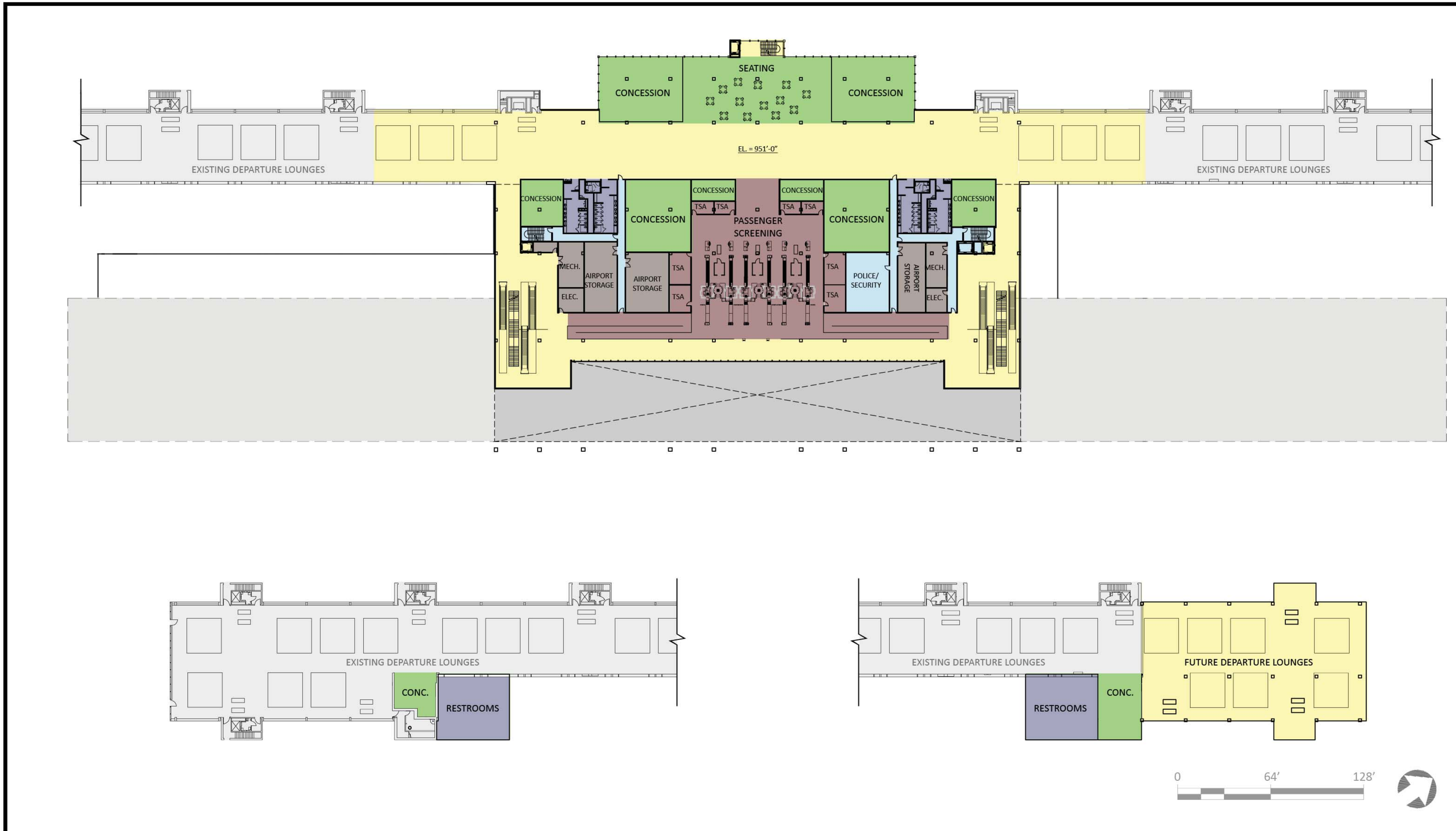
Once the central connection between Concourses A and B is re-built, the space formerly utilized for TSA passenger screening will be re-claimed by the adjacent departure lounges. The new restaurant will have a bird’s eye view of the garden area and will be access the garden through its own stair and elevator. The stair and elevators will remain enclosed and secure until they reach the enclosed garden area below.



OPTION 1B TICKETING LEVEL

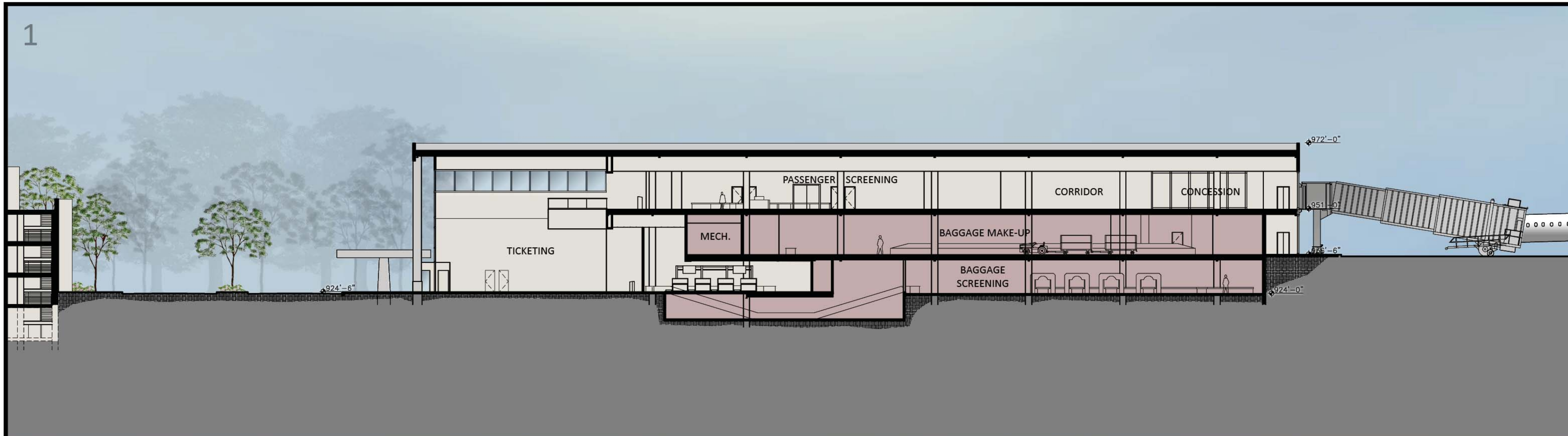


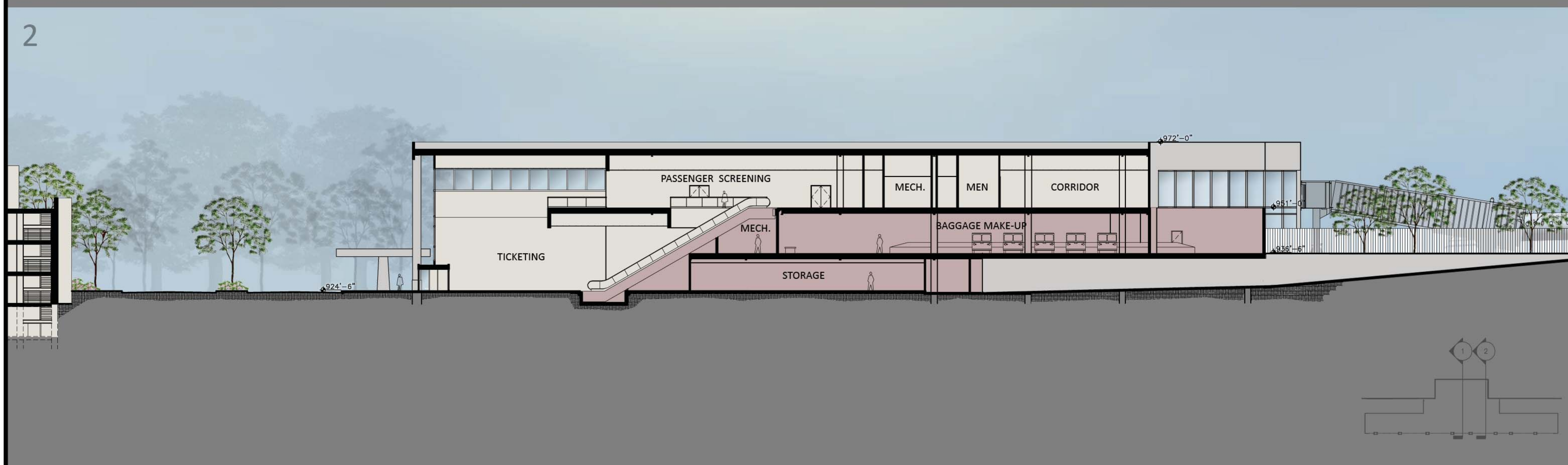
OPTION 1B APRON LEVEL



PASSENGER/ BAG SCREENING	SERVICE	TOILET ROOM	AIRLINE	MEETER/GREETER	CIRCULATION	CONCESSION

OPTION 1B GATE LEVEL



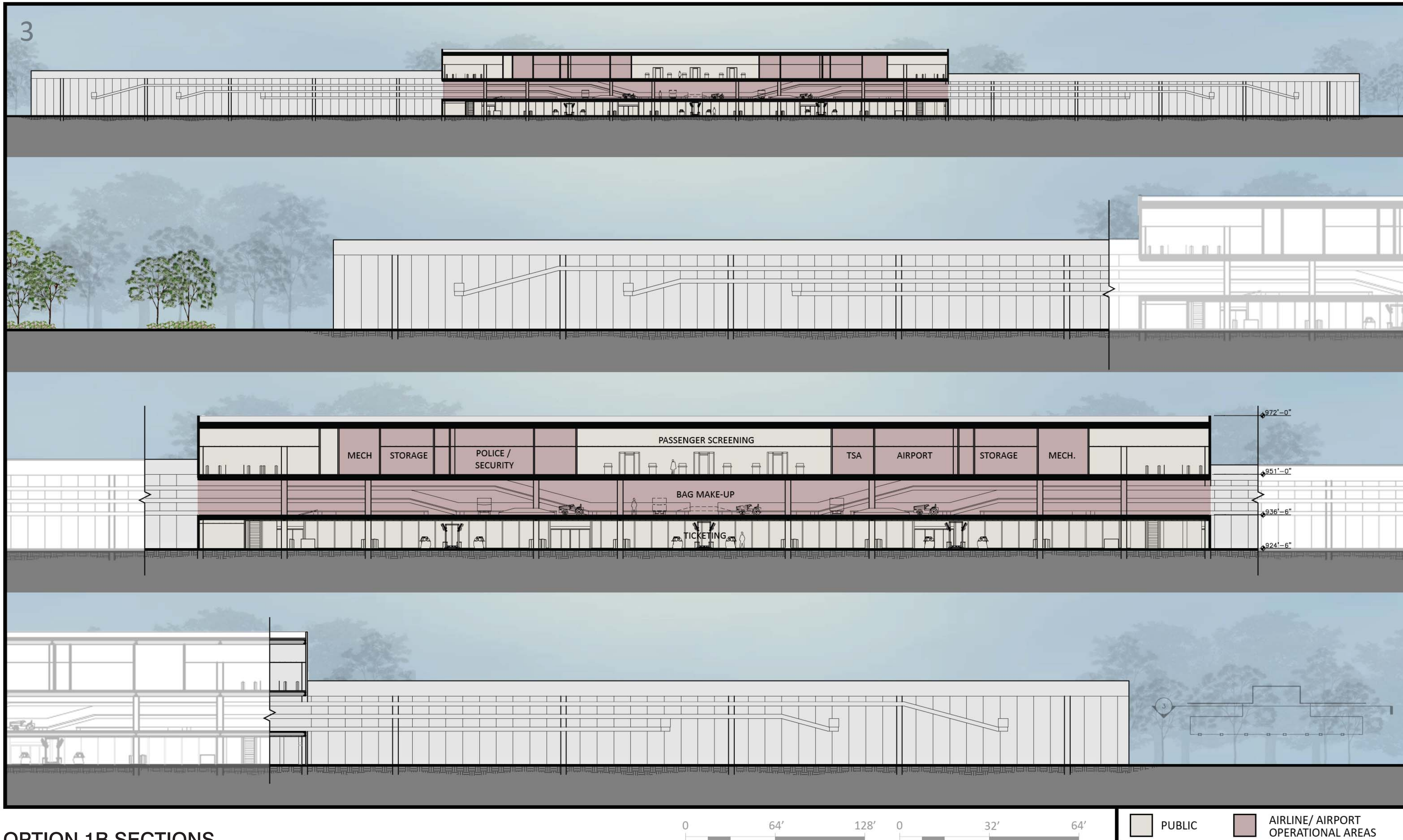


OPTION 1B SECTIONS

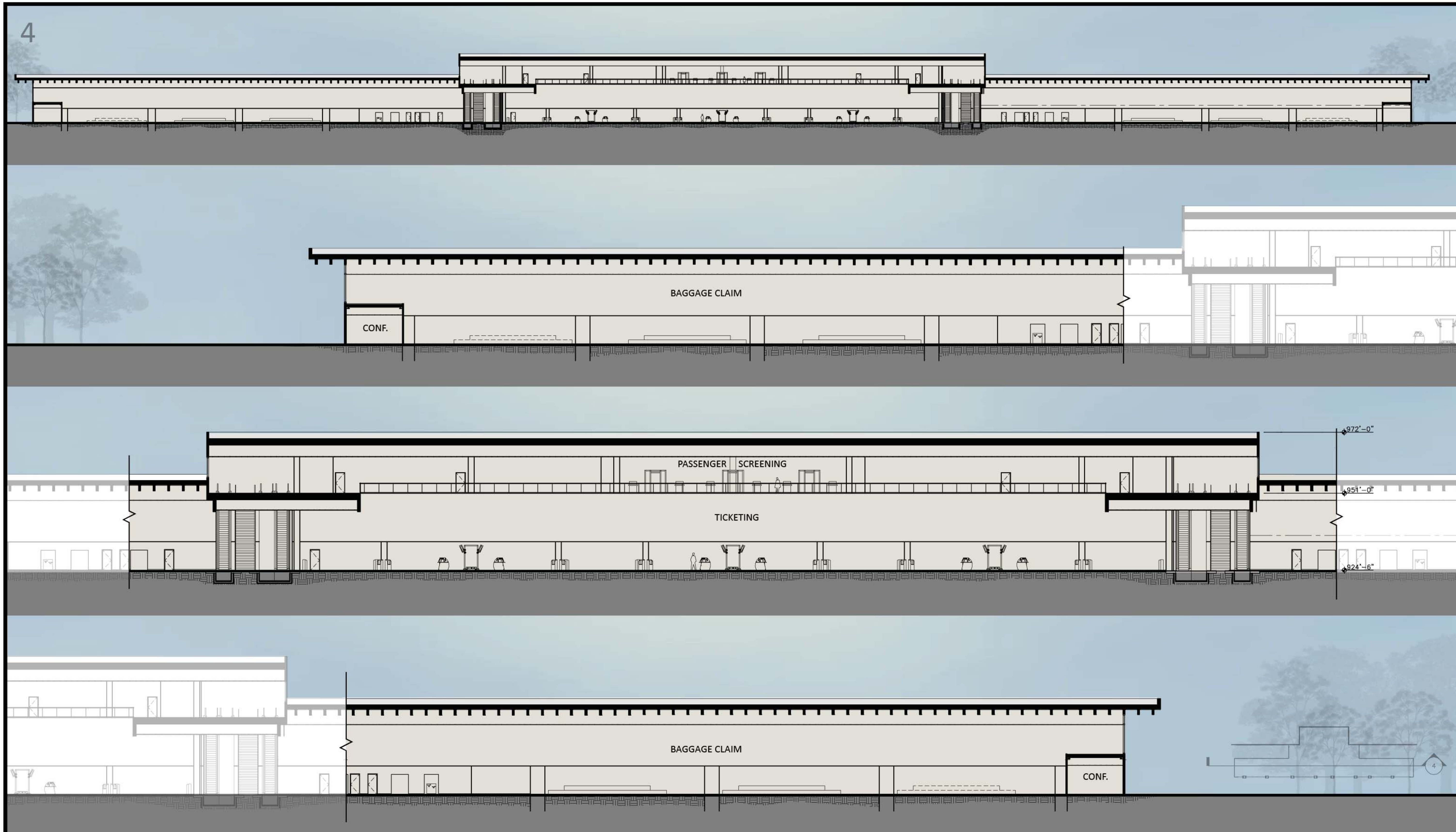
0 32' 64'

PUBLIC

AIRLINE/ AIRPORT OPERATIONAL AREAS



OPTION 1B SECTIONS



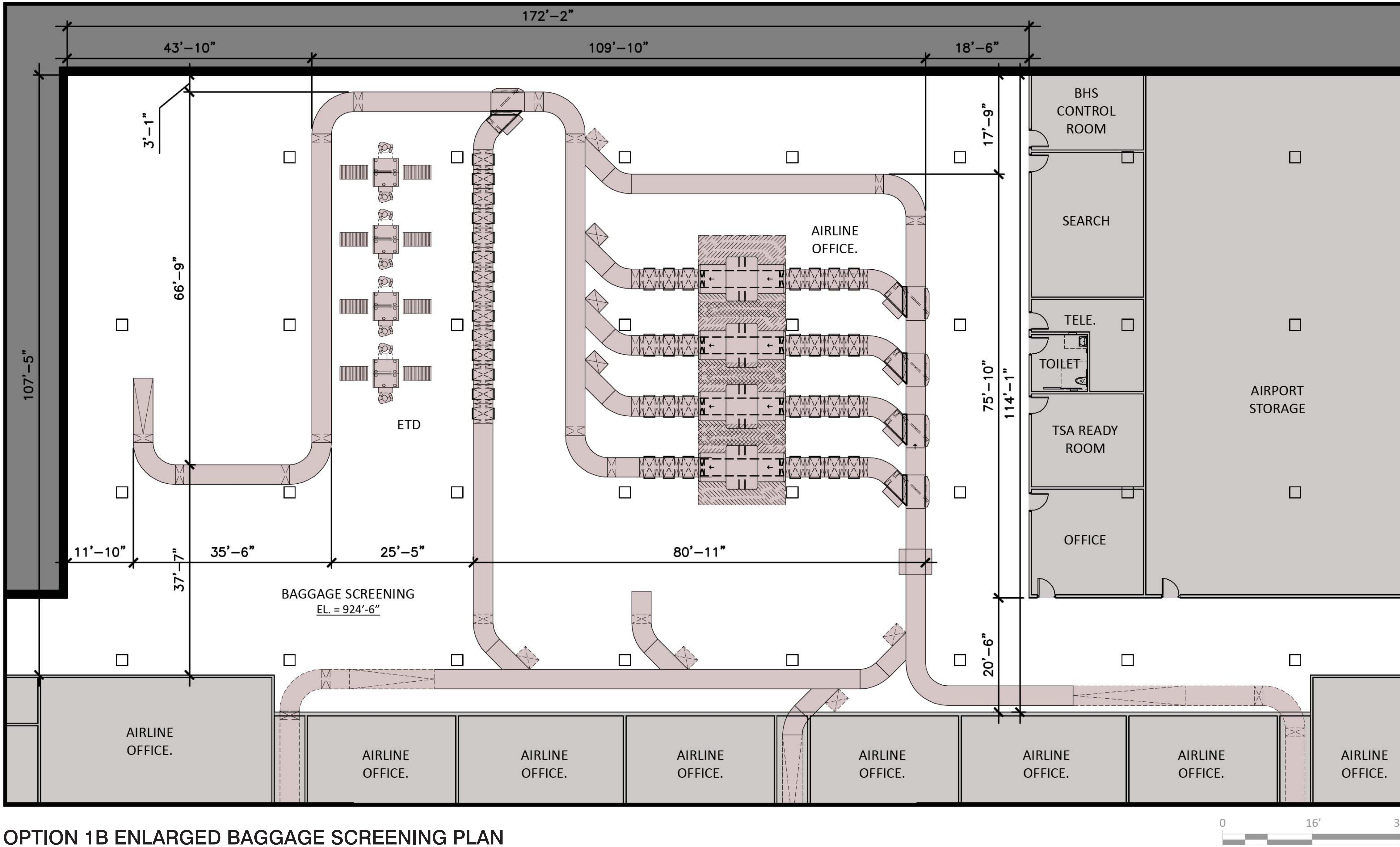
OPTION 1B SECTIONS

0 64' 128'

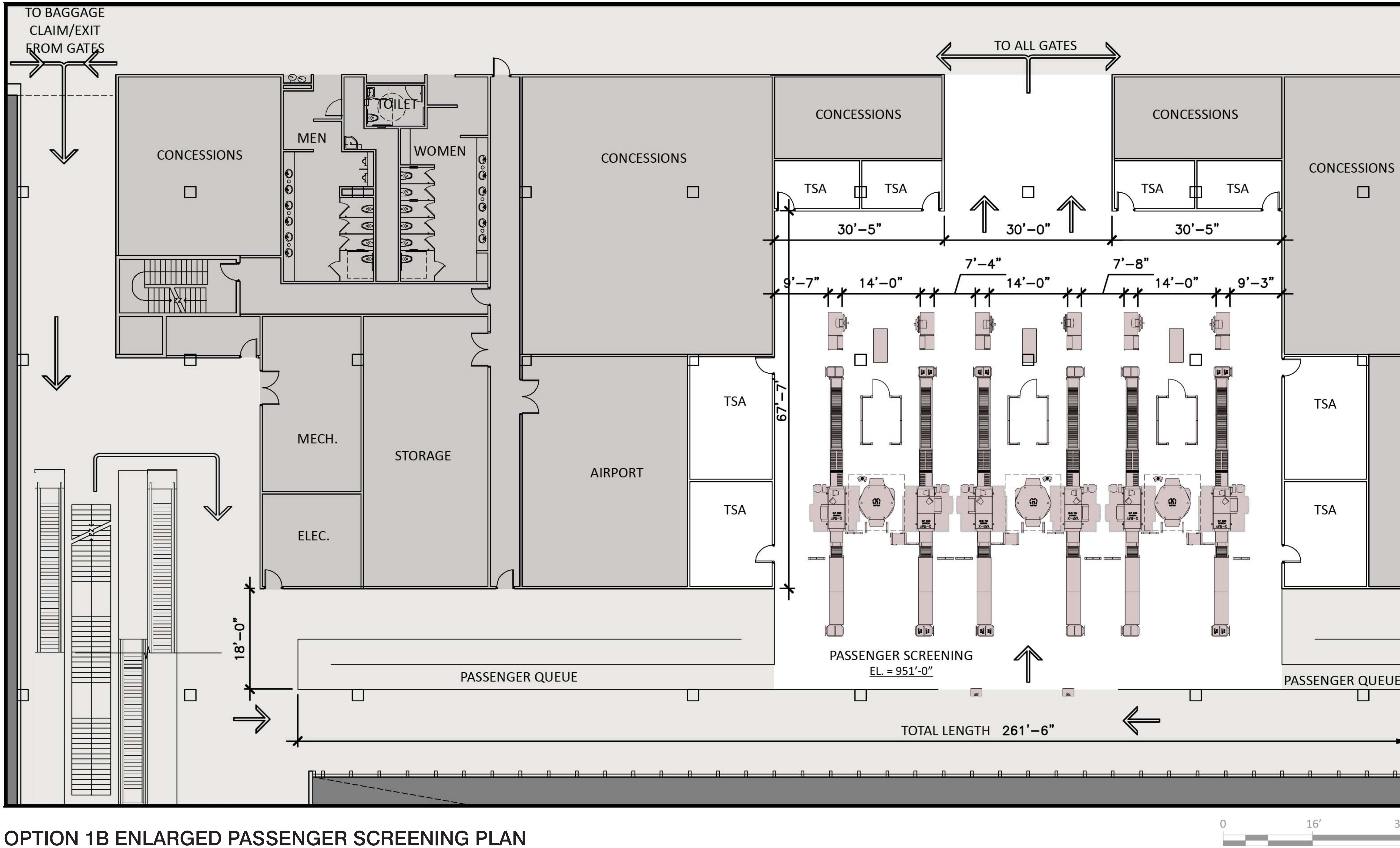
0 32' 64'

PUBLIC

AIRLINE/ AIRPORT OPERATIONAL AREAS



OPTION 1B ENLARGED BAGGAGE SCREENING PLAN



OPTION 1B ENLARGED PASSENGER SCREENING PLAN

PROGRAM COMPARISON

	TERMINAL FUNCTIONAL AREAS SUMMARY	EXISTING	2 MEP	OPTION 1B
Airline Functional Areas (SF)	Check-in counters and kiosks	1,936	2,560	7,228
	Check-in queue	1,891	2,860	11,772
	Airline ticket offices	4,951	3,400	5,806
	Baggage make-up	9,000	29,600	31,325
	Departure lounges	33,094	47,640	48,720
	Inbound baggage input	4,152	8,000	8,514
	Baggage claim lobby	8,491	18,000	27,797
	Baggage service offices	895	980	1,528
	Subtotal Airline Functional Areas	64,410	113,040	142,690
Security Areas (SF)	Passenger Screening	2,674	8,260	7,381
	Passenger Screening queue	1,735	3,300	7,811
	In-line EDS baggage screening	0	20,610	19,458
	TSA offices and support	1,346	6,100	3,101
	Subtotal Security	5,755	38,270	37,751
Terminal Concess. (SF)	Food / Beverage / Retail	16,953	21,130	15,294
	Rental car counters and offices	2,184	3,480	5,498
	Rental car customer queue	1,126	720	2,006
	Subtotal Terminal Concessions	20,263	25,330	22,798
Public Areas (SF)	Non-secure public restrooms	1,207	7,900	2,682
	Secure public restrooms	2,706	7,400	7,251
	Terminal Conference Rooms	1,276	1,950	840
	Waiting and seating	3,990	24,040	16,452
	Public circulation including lobby and entrance	52,448	77,200	81,593
	Subtotal Public Areas	61,627	118,490	108,818
Non-Public Areas (SF)	Airport operations	1,174	1,900	1,913
	Airport Police	1,289	4,300	2,968
	Maintenance, storage and janitorial	907	9,000	10,799
	Circulation	924	5,040	12,779
	Mechanical/ Electrical	27,842	51,590	47,385
	Subtotal Non-Public Areas	32,136	71,830	75,844
	SUBTOTAL PROJECT AREA (NET)	184,191	366,960	387,901
	NET TO GROSS FACTOR	6,080	12,110	12,800
	SUBTOTAL PROJECT AREA (GROSS)	190,271	379,070	400,701
Terminal Ancillary Areas (SF)	Airline Operations	12,932	7,500	12,932
	Airport Administrative Offices	4,267	13,500	4,267
	Customs and Border Protection	7,688	13,410	7,688
	Subtotal Security	24,887	34,410	24,887
	TOTAL BUILDING AREA	215,158	413,480	425,588

7.5 OPTION 1C

This option aims at a reduction in construction cost by overlapping the passenger screening level into the open three story space resulting in more efficient utilization of space and resulting in reduced construction cost.

It is similar to Option 1A with a slightly compressed footprint and ascending two story escalators accessing the passenger screening level directly from the front wall of the terminal. Other functions remain essentially the same.

During the design process, desirable features of Option 1B may be added, however additional conveyance systems such as escalators and conveyors will add construction cost.

7.5.1 TICKETING

This plan indicates a linear ticketing configuration with self-service ticketing units both along the line of the ticket counter (as a conversion of a standard GSP CUTE ticketing counter to be developed in the future) and two free-standing groupings for passengers not checking bags. A wall- to- ticket counter distance of 100' allows for ample circulation and queuing in front of the counter. Airline ticketing office (ATO) spaces are compliant with the Master Plan area requirements and space is provided for future employee screening (should it be required by TSA). Two elevator/stair cores for airline staff as well as two public elevator/escalator cores are in close adjacency to the ticketing line on both ends. Ascending escalators and elevators are located in close proximity to the landside exterior wall and flank the main entrance.

The baggage make-up area is directly behind the ATO area. The area has the capacity to house three bag make-up carousel devices which can be additive as the airport growth may demand. There are delivery and storage functions flanking the make-up area on both North and South. Deliveries will occur from areas formerly dedicated to baggage make up. Inbound baggage will continue to occur directly as cart-to-claim device with the claim devices being flat plate devices. There are indications that further security will be required along the claim area airside wall. This option can easily adjust to those requirements if and when they occur.

Opportunities for landside concessions exist adjacent to the meeter-greeter lobby at baggage claim as well as adjacent to the vertical circulation elements on the ticketing side.

7.5.2 APRON

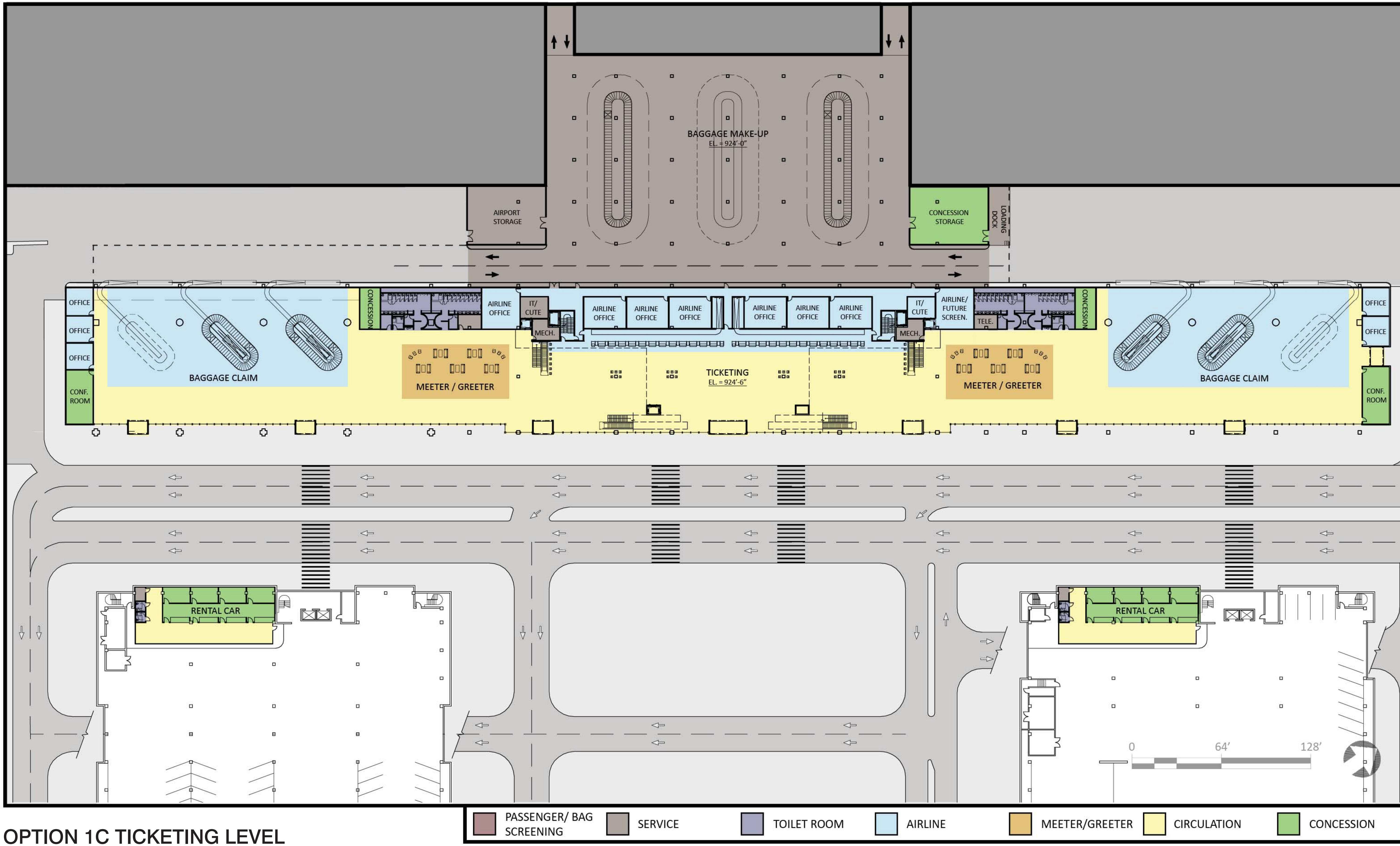
The 1C apron area indicates a central baggage screening area containing four (4) EDS machines, ETD area, and related control and service functions. The space is surrounded by large mechanical spaces which will serve to house the replacement for the mechanical and other equipment currently housed in the this central area of the terminal. The proposal to utilize a "geothermal" system for HVAC will be studied during the design phase and may reduce the need for much of the space, making it available for airport storage functions, operations and expansion of the baggage screening areas. Access to baggage make up and claim remains at a lower level and reached by ramps from the apron. A utility "spine" has been added at a mezzanine level above the ticketing area. Mechanical and other equipment may be serviced entirely from within this "spine" and will be able to serve different zones without crossing public areas.

7.5.3 GATE

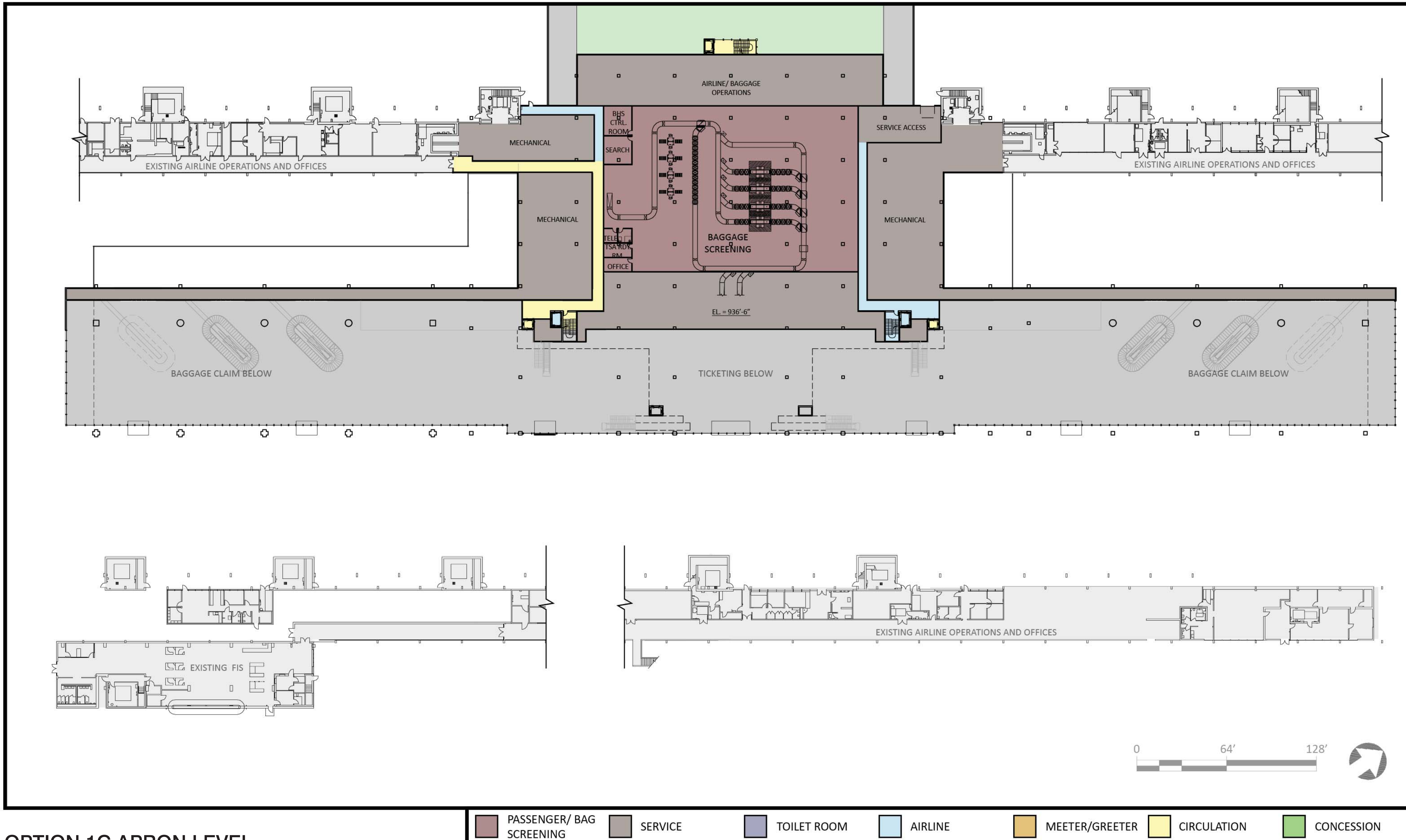
Passengers move from ticketing to a third level passenger screening via two sets of two story escalators and elevators. They will be directed to a linear queuing area on the east side of the TSA screening area.

The TSA screening area is configured to meet the full facility requirements and has built-in space to either expand or compress together with office and storage functions directly adjacent to it. The central core area has a generous amount of new concession space to capture the passengers as they clear the security checkpoint. Two sets of restrooms have been included in the third floor central core area. Concession deliveries occur via two service elevators and secure corridors on North and South.

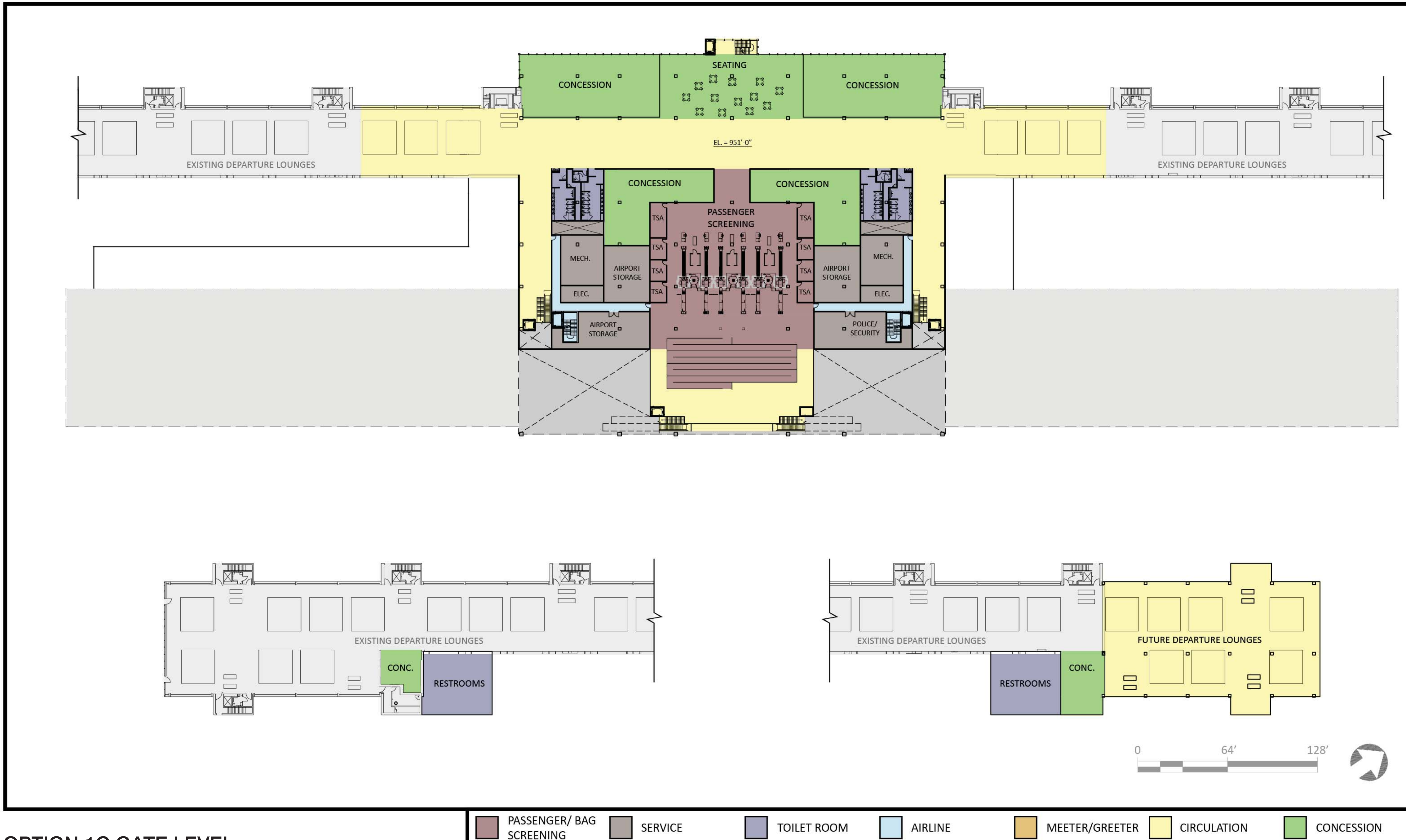
Once the central connection between Concourses A and B is constructed, the space formerly utilized for circulation from TSA passenger screening will be re-claimed at the gate level with adjacent departure lounges. The new restaurant will have a bird's eye view of the garden area and access the garden through its own stair and elevator. The stair and elevators will remain enclosed and secure until they reach the enclosed garden area below. Descending escalators and elevators are located in line with the exit corridor adjacent to the screening area.



OPTION 1C TICKETING LEVEL



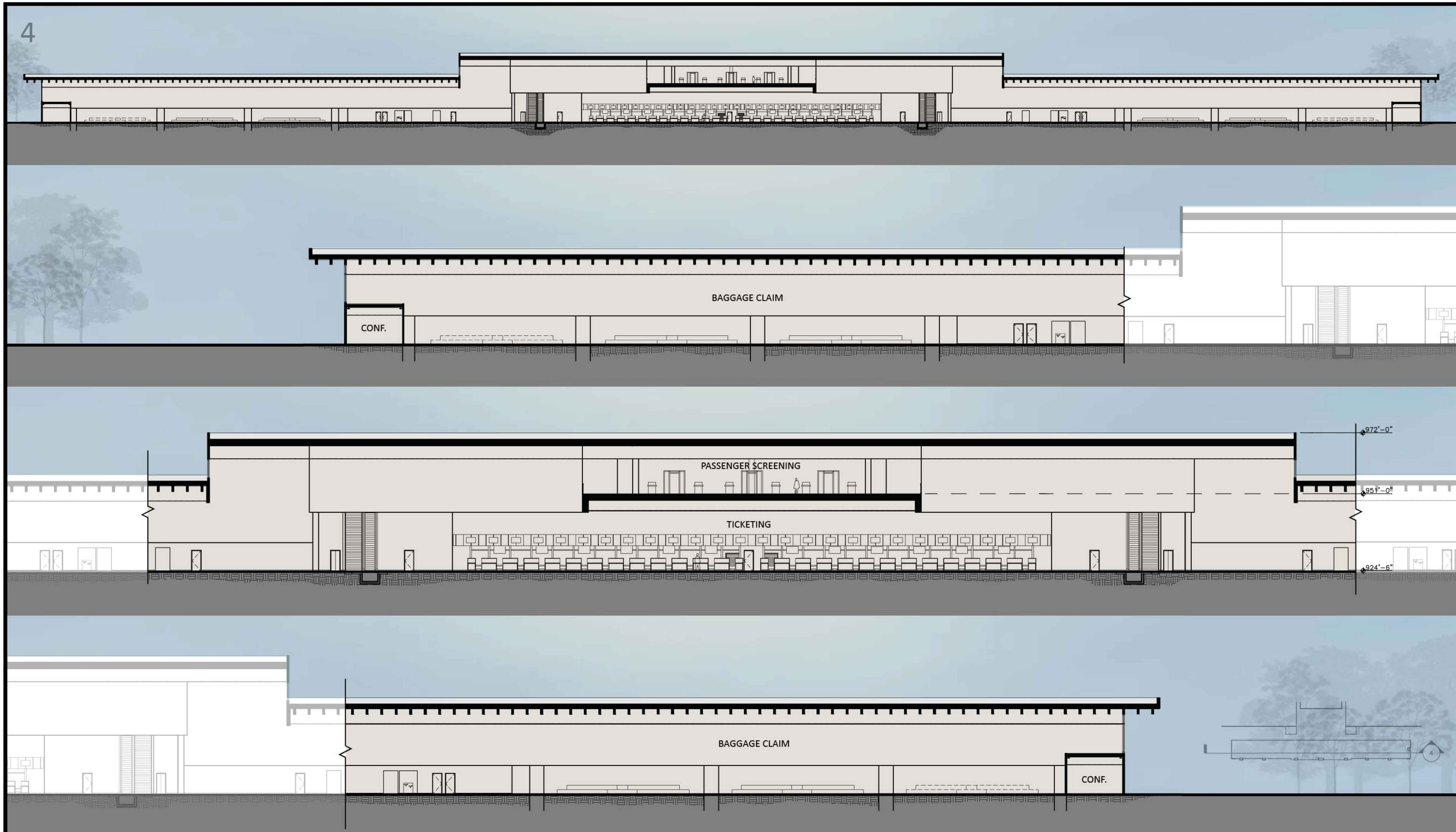
OPTION 1C APRON LEVEL



OPTION 1C GATE LEVEL

OPTION 1C SECTIONS

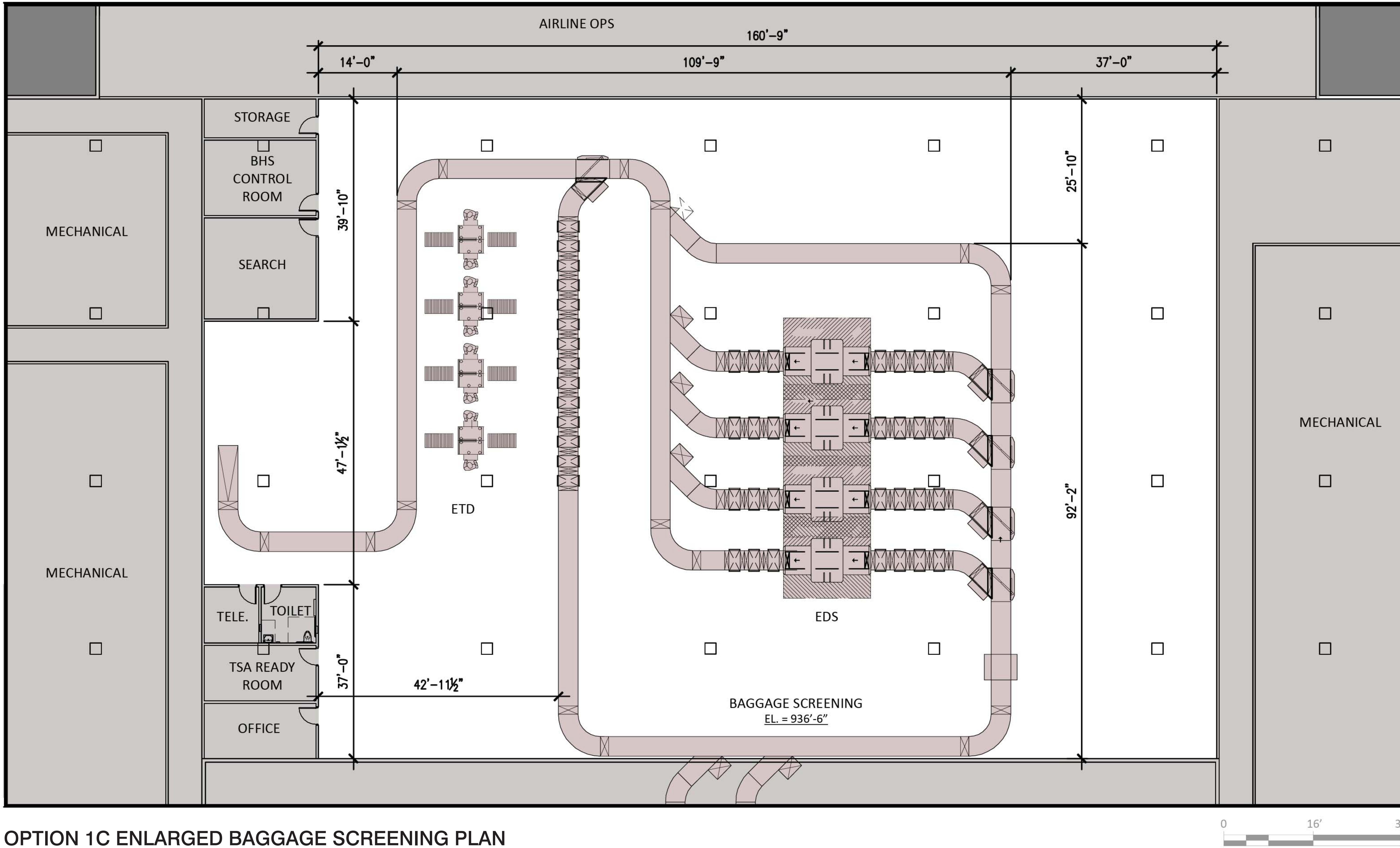

3
MECHANICAL
STORAGE
TSA
PASSENGER SCREENING
TSA
STORAGE
MECHANICAL
972'-0"
MECHANICAL
BAGGAGE
SCREENING
TLT
TELE
MECHANICAL
951'-0"
936'-6"
BAGGAGE
MAKE-UP
924'-6"
0
64'
128'
0
32'
64'
PUBLIC
AIRLINE/ AIRPORT OPERATIONAL AREAS



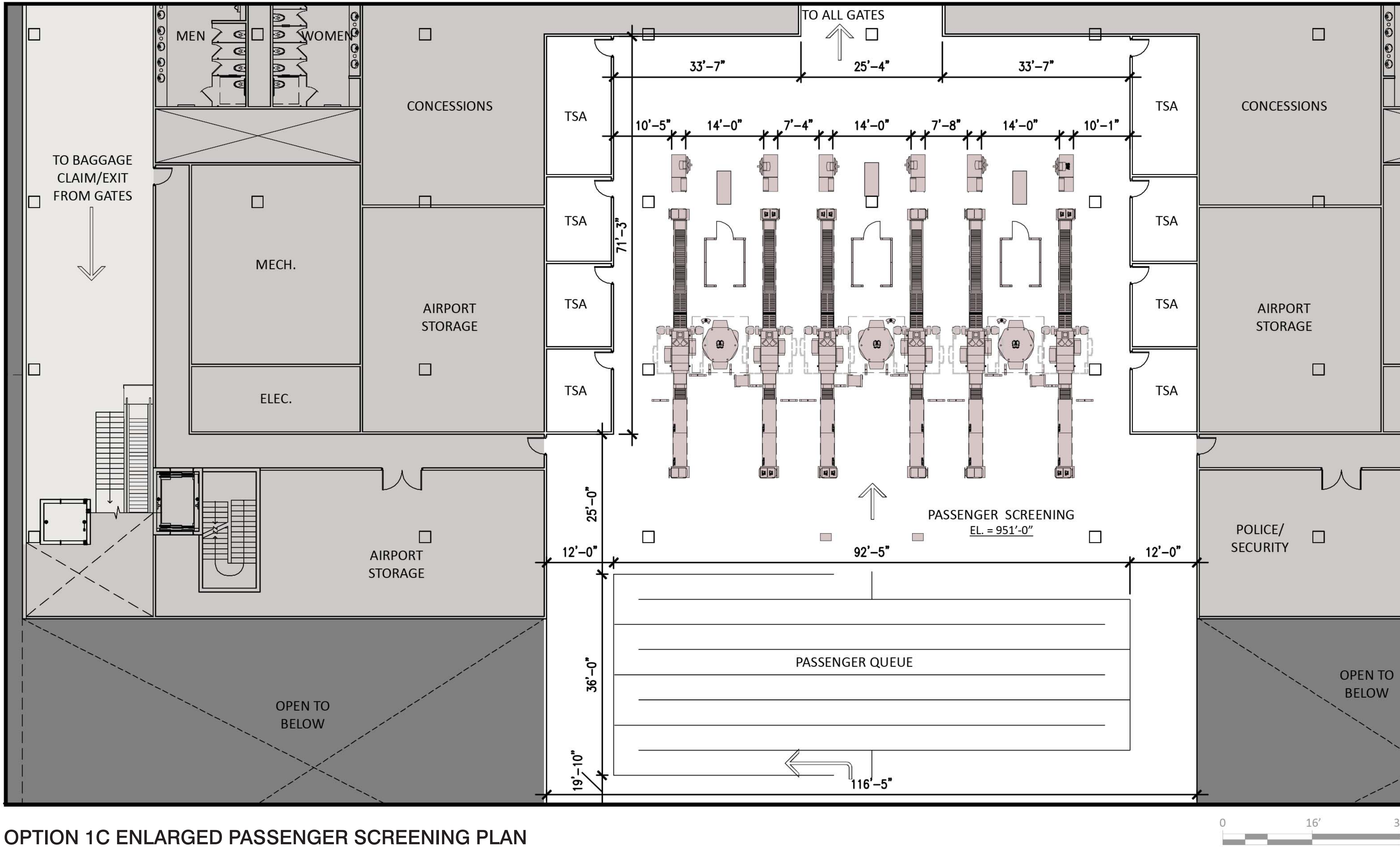
0 64' 128'
0 32' 64'

PUBLIC
AIRLINE/ AIRPORT OPERATIONAL AREAS

OPTION 1C SECTIONS



OPTION 1C ENLARGED BAGGAGE SCREENING PLAN



OPTION 1C ENLARGED PASSENGER SCREENING PLAN

PROGRAM COMPARISON

	TERMINAL FUNCTIONAL AREAS SUMMARY	EXISTING	2 MEP	OPTION 1C
Airline Functional Areas (SF)	Check-in counters and kiosks	1,936	2,560	4,416
	Check-in queue	1,891	2,860	3,309
	Airline ticket offices	4,951	3,400	6,026
	Baggage make-up	9,000	29,600	30,231
	Departure lounges	33,094	47,640	48,720
	Inbound baggage input	4,152	8,000	9,916
	Baggage claim lobby	8,491	18,000	25,216
	Baggage service offices	895	980	1,528
	Subtotal Airline Functional Areas	64,410	113,040	129,362
Security Areas (SF)	Passenger Screening	2,674	8,260	7,960
	Passenger Screening queue	1,735	3,300	3,328
	In-line EDS baggage screening	0	20,610	18,970
	TSA offices and support	1,346	6,100	2,984
	Subtotal Security	5,755	38,270	33,242
Terminal Concess. (SF)	Food / Beverage / Retail	16,953	21,130	16,966
	Rental car counters and offices	2,184	3,480	5,498
	Rental car customer queue	1,126	720	2,006
	Subtotal Terminal Concessions	20,263	25,330	24,470
Public Areas (SF)	Non-secure public restrooms	1,207	7,900	3,536
	Secure public restrooms	2,706	7,400	7,250
	Terminal Conference Rooms	1,276	1,950	3,366
	Waiting and seating	3,990	24,040	19,769
	Public circulation including lobby and entrance	52,448	77,200	71,868
	Subtotal Public Areas	61,627	118,490	105,789
Non-Public Areas (SF)	Airport operations	1,174	1,900	2,837
	Airport Police	1,289	4,300	1,496
	Maintenance, storage and janitorial	907	9,000	7,204
	Circulation	924	5,040	20,890
	Mechanical/ Electrical	27,842	51,590	45,737
	Subtotal Non-Public Areas	32,136	71,830	78,164
	SUBTOTAL PROJECT AREA (NET)	184,191	366,960	371,027
	NET TO GROSS FACTOR	6,080	12,110	12,240
	SUBTOTAL PROJECT AREA (GROSS)	190,271	379,070	383,267
Terminal Ancillary Areas (SF)	Airline Operations	12,932	7,500	12,932
	Airport Administrative Offices	4,267	13,500	4,267
	Customs and Border Protection	7,688	13,410	7,688
	Subtotal Security	24,887	34,410	24,887
	TOTAL BUILDING AREA	215,158	413,480	408,154

7.6 OPTION 2

This option aims at exploring the question of whether a "no expansion" option can provide the necessary functions in the proper areas to serve the current needs of the GSP terminal and provide logical, orderly and economical future expansion.

7.6.1 TICKETING

The ticketing area is linear and has been moved west to align with that of Option 1, the airline ticket offices (ATO) has also been moved back into the area now dedicated to baggage screening.

In order to optimize the functioning of the baggage claim area, the rental cars will be located at the South parking garage. Circulation between ticketing and baggage claim will be interrupted by the South meeter-greeter lobby and, most likely will create a choke point at the first baggage claim device during peak operations.

The existing Mechanical/Electrical basement will remain, as will existing communications rooms. All public areas as well as restrooms will be remodeled and brought up to current ADA and sustainable standards.

The outside, landside wall of the terminal will be replaced with a glass curtain wall of low solar heat gain coefficient (SHGC). Shading will be limited to late morning to early afternoon. Some low sun may penetrate close to the baggage claim area and ticketing areas in the early morning.

The ticketing area ceiling will remain exposed as the existing structure will not accept the imposition of added live loads of a ceiling or hanging of additional equipment, signs, lighting or other loads. An added ceiling will result in a lower ceiling area in the main entrance area which would block the rear clearstory window and need to be supported on columns within the ticketing lobby area.

The vertical circulation core between the ticketing and baggage claim area will remain. The north circulation core will be removed in order to provide for better functionality of the ticketing and airline ticketing office areas.

The TSA baggage screening area will need to operate to full TSA requirements within a very constrained area of less than 60'. This will allow a maximum of two (2) Explosive Detection Screening (EDS) machines in addition to an Explosive Trace Detection (ETD) area. This area will comply with TSA Checked Bag Inspection System guidelines currently assuming no growth but has little space to expand within the existing space. Conveyors from the ticketing areas and main screening circulation lines will cross within an area of less than 12' in ceiling height. Maintaining the second floor at the existing elevation will dictate a lowering of the TSA baggage screening area to allow sufficient space for the crossing baggage envelopes as well as cable trays and other utilities which may need to cross this space. There will be a raised open corridor area to access mechanical functions leading into this space and a ramp down from the apron level for servicing of the equipment. Ramps from apron to the baggage handling areas will remain.

Baggage make-up and inbound baggage areas will remain within the area between the landside terminal and the airside gates to allow for expansion to the North and for access to service ramps and concession loading dock to the North. Baggage make-up may be relocated to the space directly adjacent to ticketing however, this will additional conveyor distances and an additional area expansion which would negate the intent of this option.

The baggage make-up area occurs as a single loaded series of piers which would sort from the main line from the baggage screening area. The piers are placed against the retaining wall in order to allow for perpendicular loading of carts as well as parallel and still maintain enough space for tug circulation and loading of inbound bags. This results in a reduction in presentation area for baggage make-up. Turning radii for tugs carrying carts for larger aircraft is also constrained.

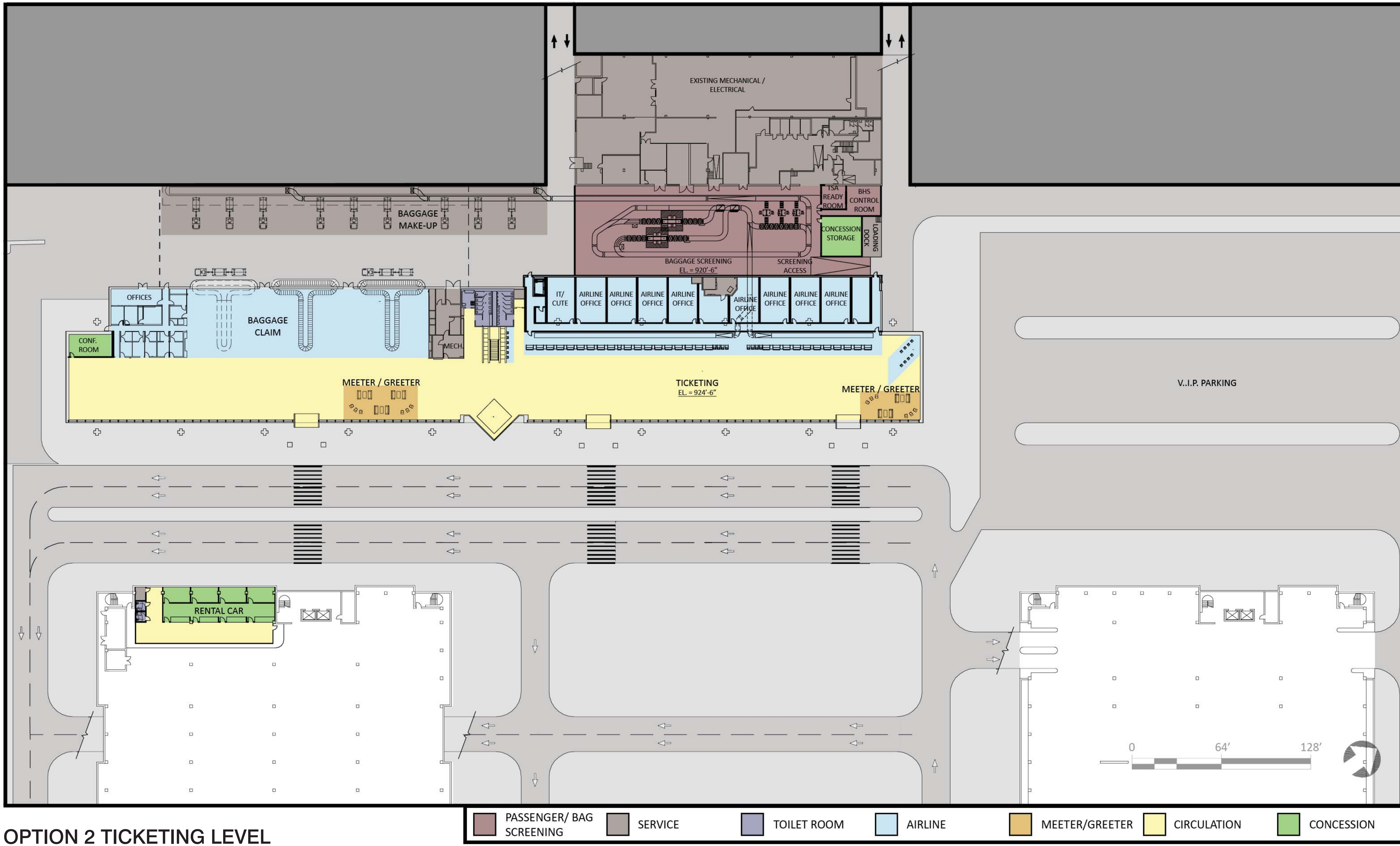
7.6.2 APRON

The apron level space will grow into the central area and will house the new passenger screening checkpoint. This will be oriented North-South to better utilize the narrow space between escalator landing and escalators to the gate concourse. The space will be fully compliant for current use and up to approx.1M enplanements and will have little room for expansion in this configuration. The existing restaurant could remain in its present configuration but only one concession can be added at this level although a few smaller, wall type concessions could occur. The location of these concessions, although past security, would not be as attractive to the traveling public as a concession which is closer to the departure gate. A small mechanical spine will be needed at this level as any new HVAC would have to be wall-supplied due to deficiencies in the existing structure.

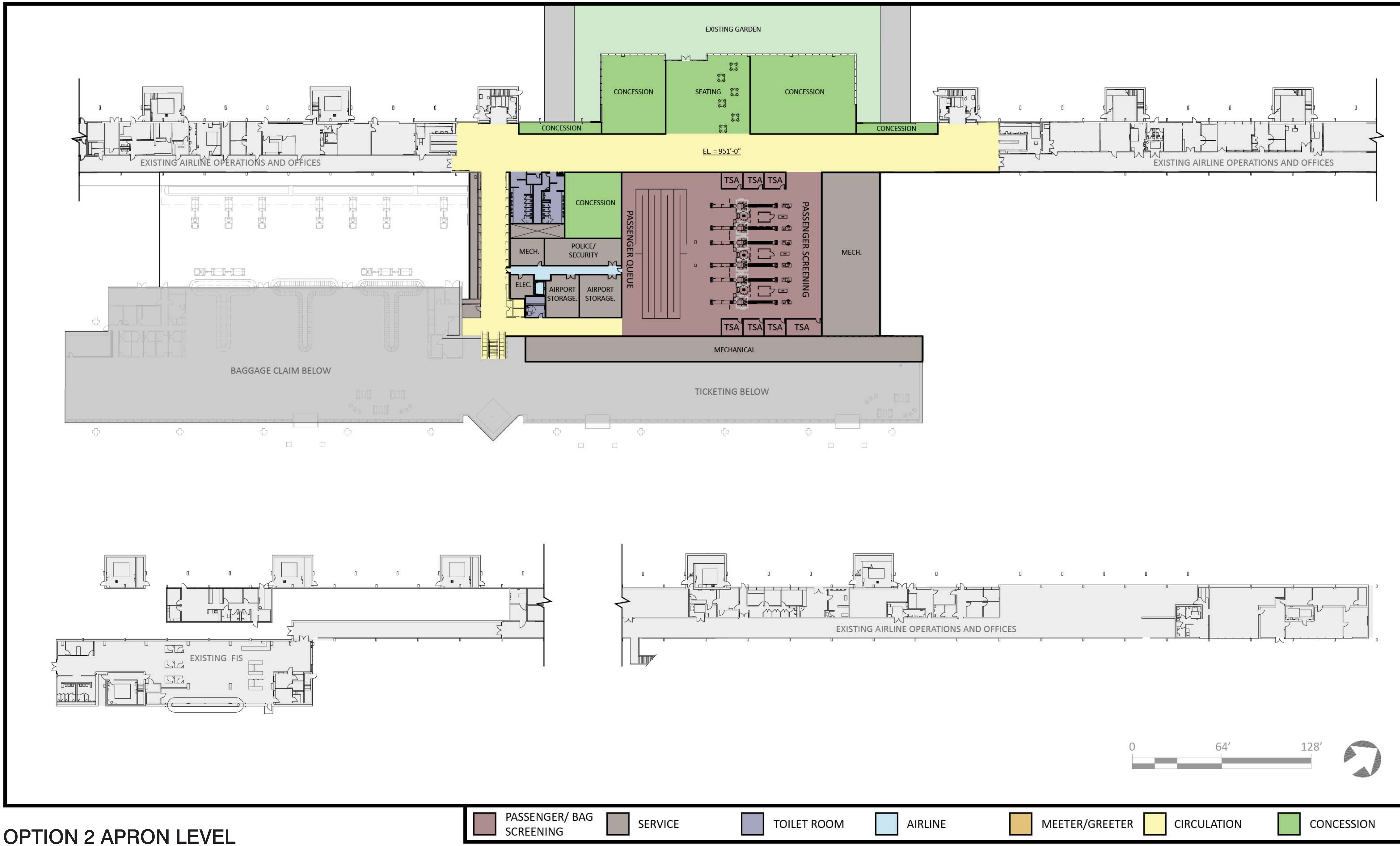
7.6.3 GATE

The gate level will remain essentially the same in layout. Walls and roof will be insulated for a better thermal envelope and finishes will be replaced with new. Existing restrooms will remain and will be remodeled with energy efficient fixtures and new finishes. The space currently utilized by escalators from the apron level will not be reclaimed as gate space and space for new concessions is severely limited. Departure lounge space can be added in the future at the North end with a longer walking distance.

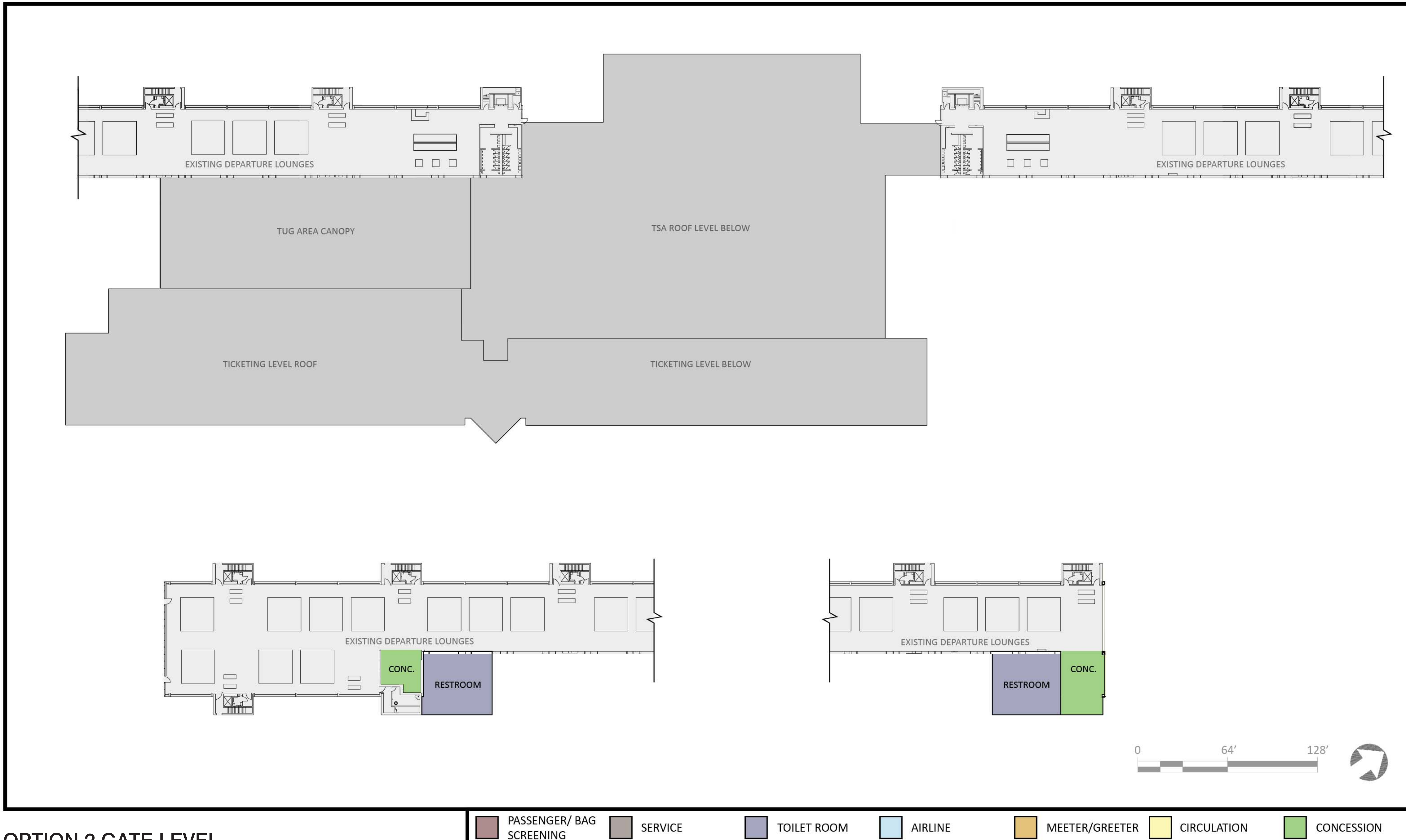
This option will be unable to properly expand to 2M enplanements due to the fact that the space added in the option 1 alternatives on the gate level will not be available without major demolition and new construction. Additionally, this option falls short of meeting the requirements of the Bechtel 2003 Master Plan. The option lacks five major components of modern airport terminals and no space to add these in the proper locations: 1) An abundance of revenue-generating spaces (concessions ,clubs, offices, business centers, etc.) ;2) Ease of passenger circulation and minimization of vertical transitions; 3) Baggage handling areas capable of growth ,ease of tug traffic, tug parking, signage and efficient sortation; 4) Baggage screening areas with flexibility to expand as the security needs demand; 4) Passenger screening areas with flexibility to expand as the security needs demand; 5) Flexibility to accommodate remote functions such as people movers and drive through ticketing and new technology such as large FIDS banks, interactive hotel and information boards as well dynamic signage.



OPTION 2 TICKETING LEVEL

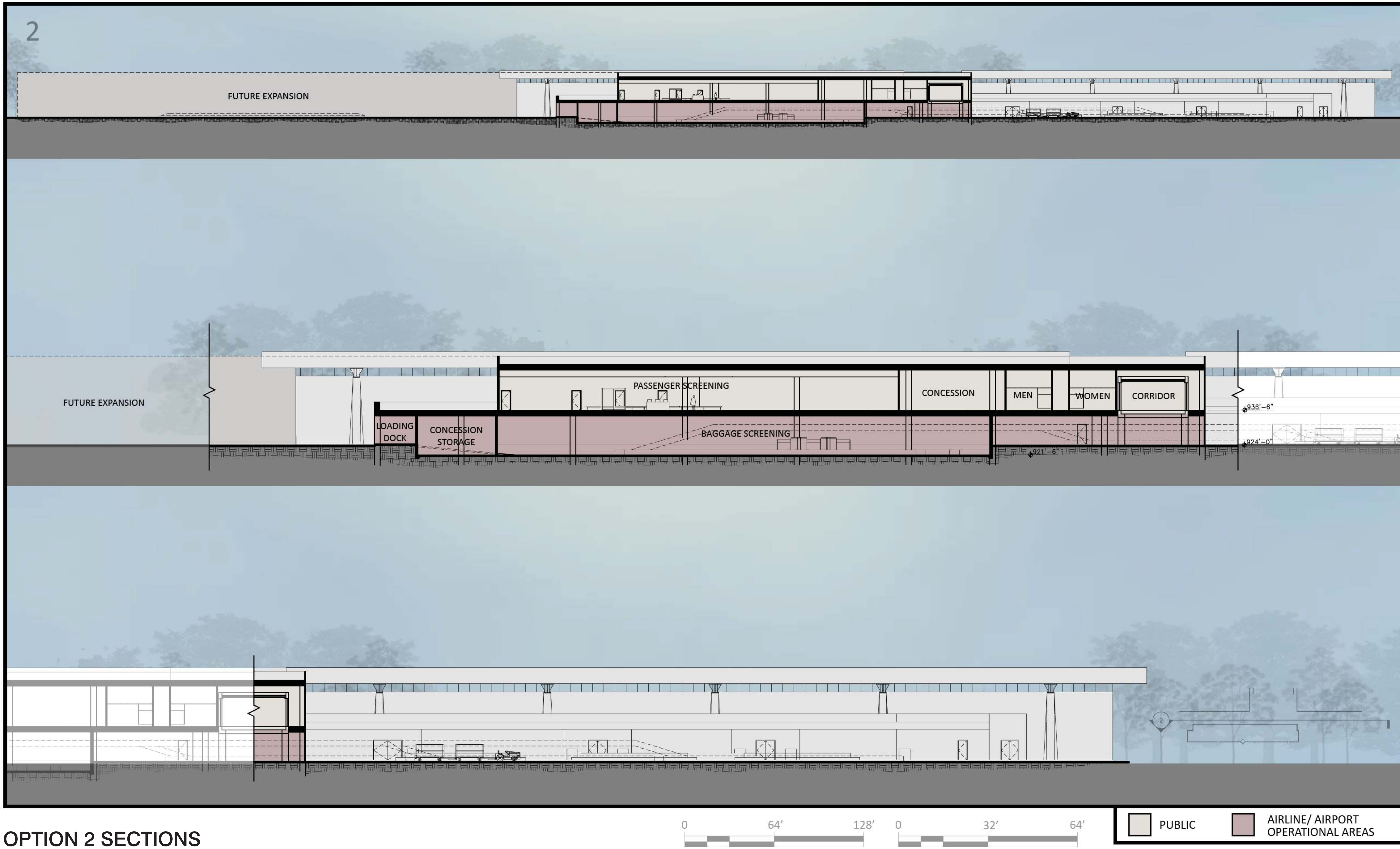


OPTION 2 APRON LEVEL

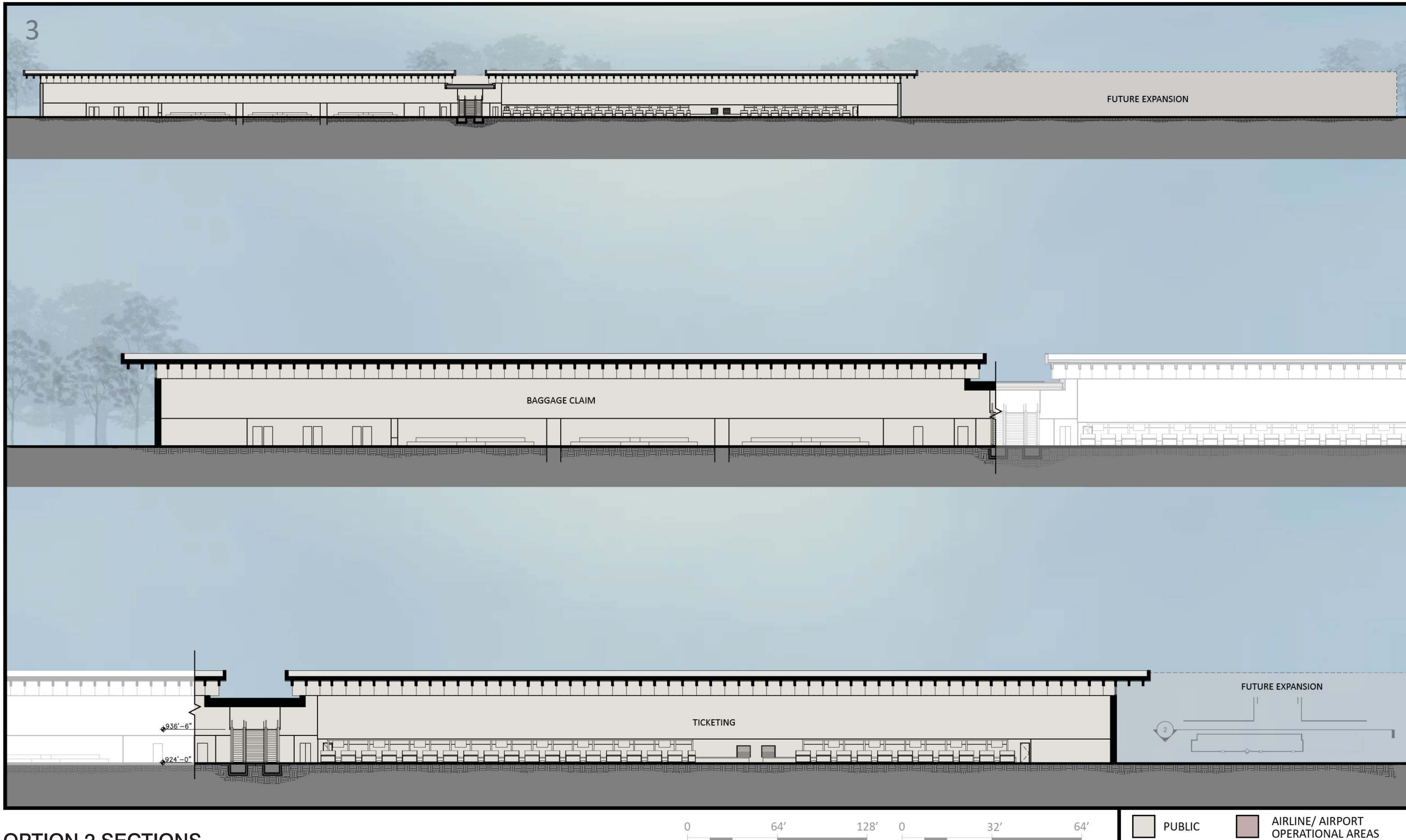


OPTION 2 GATE LEVEL

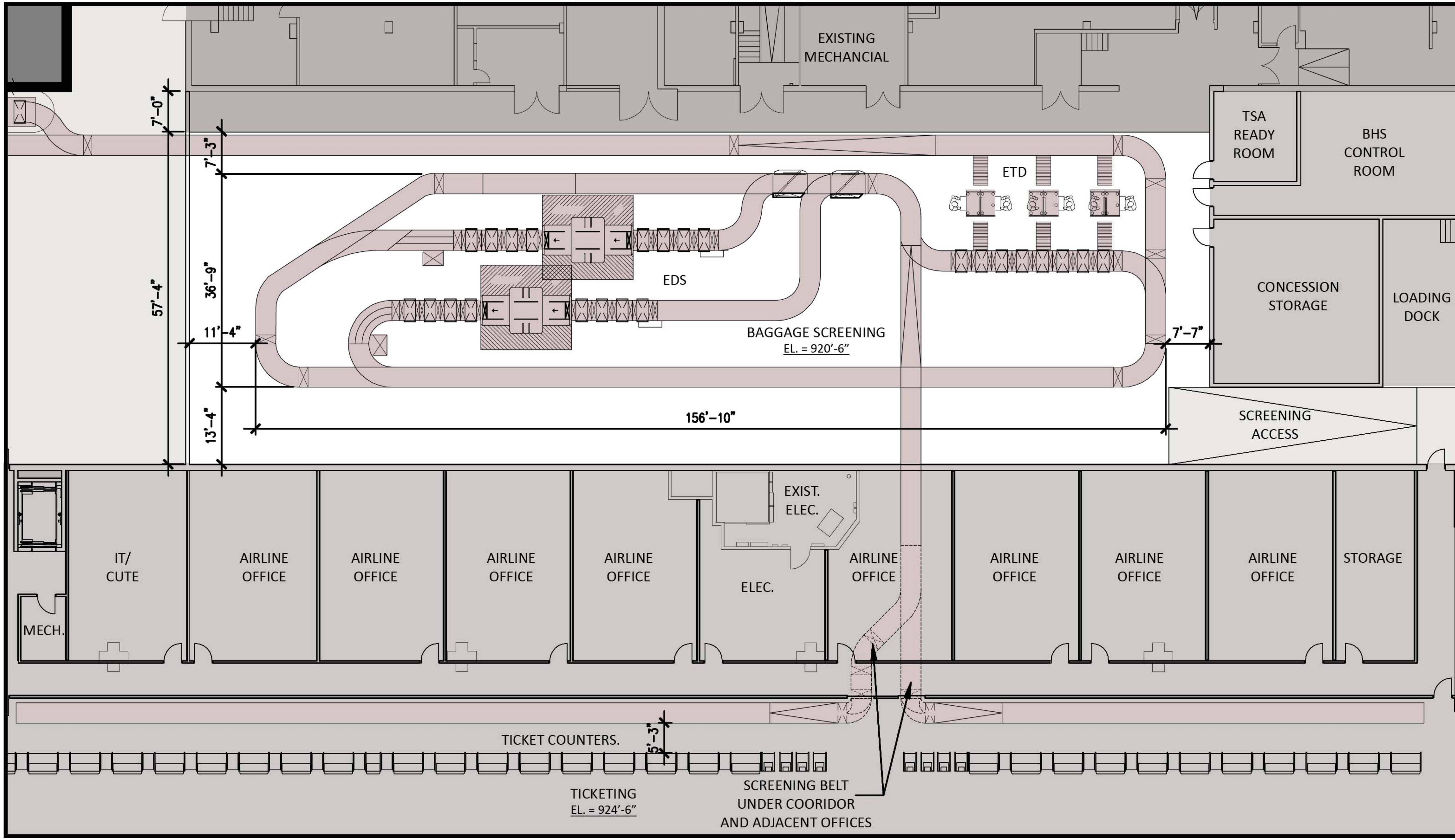
OPTION 2 SECTION



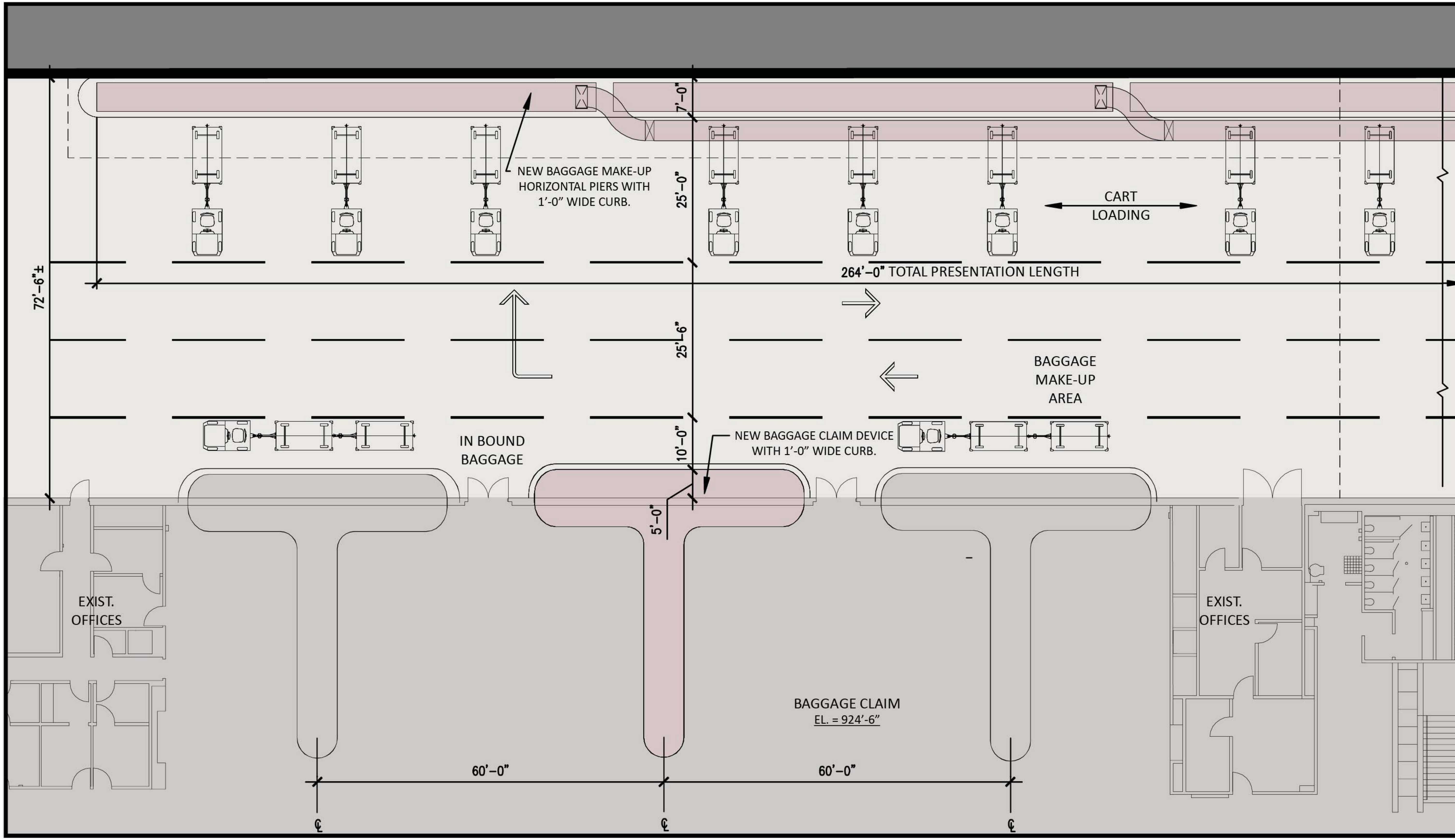
OPTION 2 SECTIONS



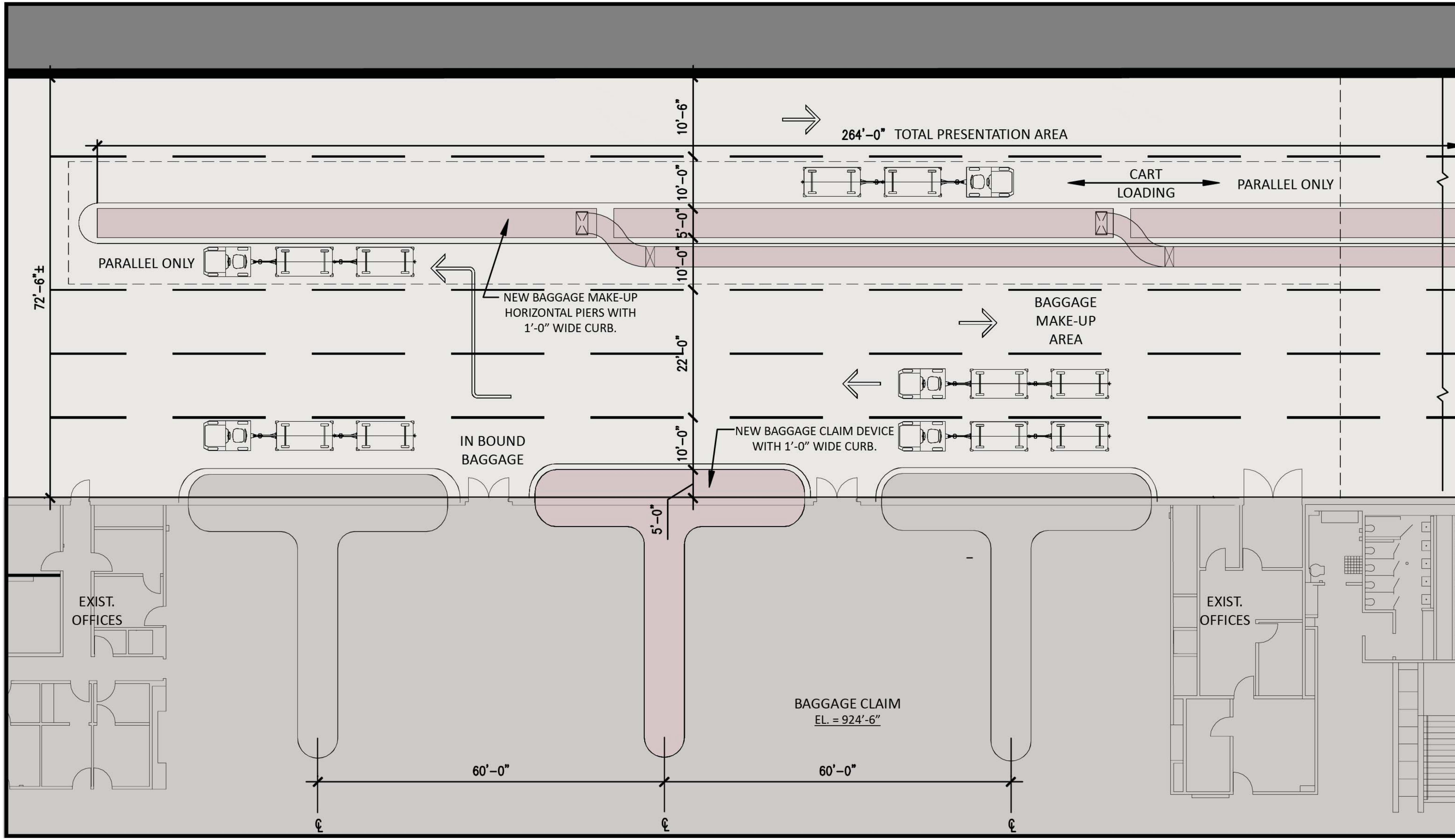
OPTION 2 SECTIONS



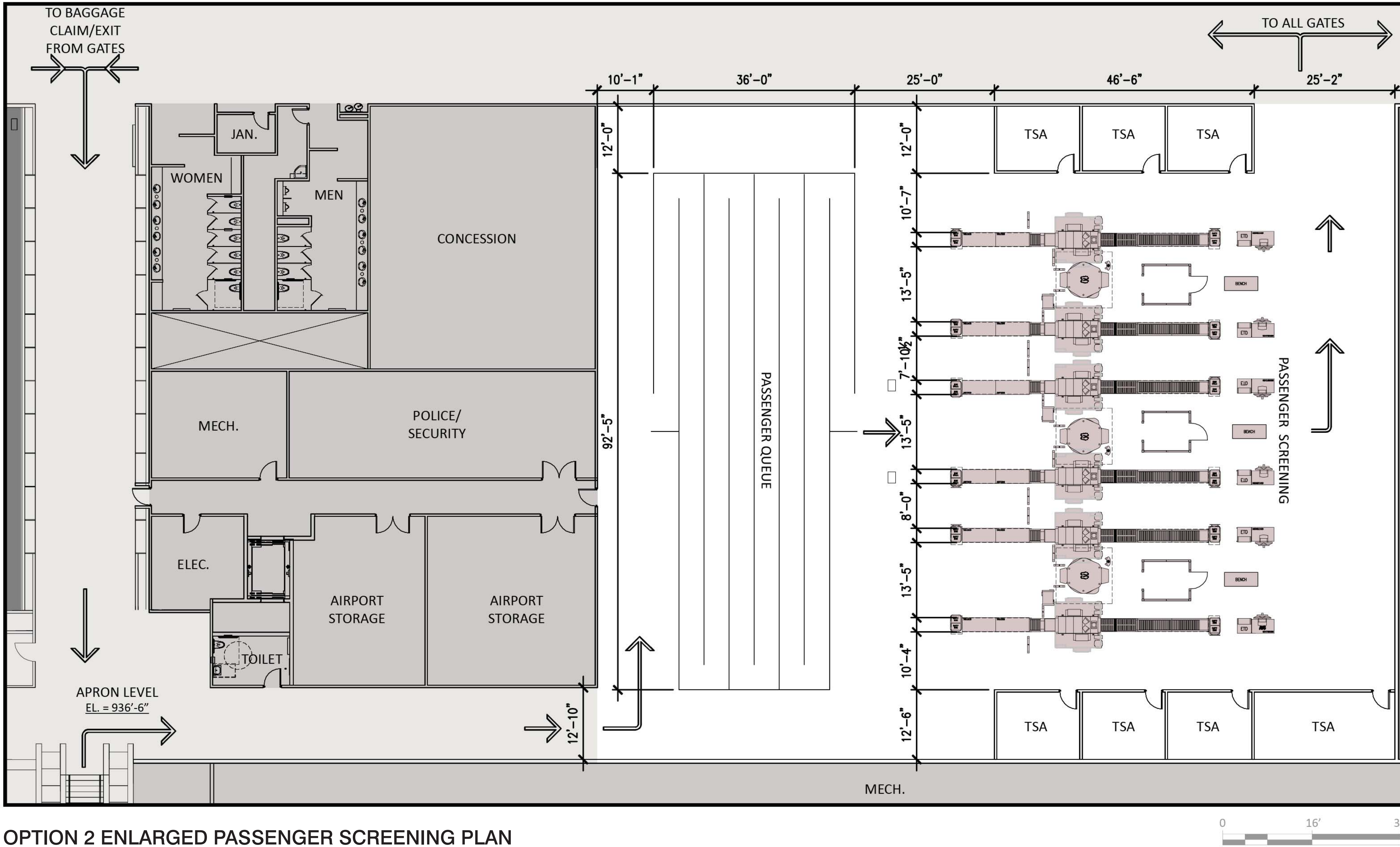
OPTION 2 ENLARGED BAGGAGE SCREENING PLAN



OPTION 2 ENLARGED BAGGAGE MAKE UP ALTERNATE 1



OPTION 2 ENLARGED BAGGAGE MAKE UP ALTERNATE 2



OPTION 2 ENLARGED PASSENGER SCREENING PLAN

PROGRAM COMPARISON

	TERMINAL FUNCTIONAL AREAS SUMMARY	EXISTING	2 MEP	OPTION 2
Airline Functional Areas (SF)	Check-in counters and kiosks	1,936	2,560	5,148
	Check-in queue	1,891	2,860	3,890
	Airline ticket offices	4,951	3,400	5,624
	Baggage make-up	9,000	29,600	8,513
	Departure lounges	33,094	47,640	33,094
	Inbound baggage input	4,152	8,000	5,138
	Baggage claim lobby	8,491	18,000	10,255
	Baggage service offices	895	980	1,242
	Subtotal Airline Functional Areas	64,410	113,040	72,904
Security Areas (SF)	Passenger Screening	2,674	8,260	5,974
	Passenger Screening queue	1,735	3,300	6,939
	In-line EDS baggage screening	0	20,610	11,352
	TSA offices and support	1,346	6,100	2,941
	Subtotal Security	5,755	38,270	27,206
Terminal Concess. (SF)	Food / Beverage / Retail	16,953	21,130	9,665
	Rental car counters and offices	2,184	3,480	5,498
	Rental car customer queue	1,126	720	2,006
	Subtotal Terminal Concessions	20,263	25,330	17,169
Public Areas (SF)	Non-secure public restrooms	1,207	7,900	823
	Secure public restrooms	2,706	7,400	5,972
	Terminal Conference Rooms	1,276	1,950	1,341
	Waiting and seating	3,990	24,040	11,936
	Public circulation including lobby and entrance	52,448	77,200	53,226
	Subtotal Public Areas	61,627	118,490	73,298
Non-Public Areas (SF)	Airport operations	1,174	1,900	1,884
	Airport Police	1,289	4,300	1,045
	Maintenance, storage and janitorial	907	9,000	2,838
	Circulation	924	5,040	2,950
	Mechanical/ Electrical	27,842	51,590	40,380
	Subtotal Non-Public Areas	32,136	71,830	49,097
	SUBTOTAL PROJECT AREA (NET)	184,191	366,960	239,674
	NET TO GROSS FACTOR	6,080	12,110	7,910
	SUBTOTAL PROJECT AREA (GROSS)	190,271	379,070	247,584
Terminal Ancillary Areas (SF)	Airline Operations	12,932	7,500	12,932
	Airport Administrative Offices	4,267	13,500	4,267
	Customs and Border Protection	7,688	13,410	7,688
	Subtotal Security	24,887	34,410	24,887
	TOTAL BUILDING AREA	215,158	413,480	272,471

PROGRAM COMPARISON

	TERMINAL FUNCTIONAL AREAS SUMMARY	EXISTING	2 MEP	OPTION			
				1A	1B	1C	2
Airline Functional Areas (SF)	Check-in counters and kiosks	1,936	2,560	5,204	7,228	4,416	5,148
	Check-in queue	1,891	2,860	4,010	11,772	3,309	3,890
	Airline ticket offices	4,951	3,400	5,258	5,806	6,026	5,624
	Baggage make-up	9,000	29,600	30,231	31,325	30,231	8,513
	Departure lounges	33,094	47,640	48,720	48,720	48,720	33,094
	Inbound baggage input	4,152	8,000	9,916	8,514	9,916	5,138
	Baggage claim lobby	8,491	18,000	24,216	27,797	25,216	10,255
	Baggage service offices	895	980	1,528	1,528	1,528	1,242
	Subtotal Airline Functional Areas	64,410	113,040	129,083	142,690	129,362	72,904
Security Areas (SF)	Passenger Screening	2,674	8,260	8,080	7,381	7,960	5,974
	Passenger Screening queue	1,735	3,300	5,390	7,811	3,328	6,939
	In-line EDS baggage screening	0	20,610	18,970	19,458	18,970	11,352
	TSA offices and support	1,346	6,100	3,586	3,101	2,984	2,941
	Subtotal Security	5,755	38,270	36,026	37,751	33,242	27,206
Terminal Concess. (SF)	Food / Beverage / Retail	16,953	21,130	15,138	15,294	16,966	9,665
	Rental car counters and offices	2,184	3,480	5,498	5,498	5,498	5,498
	Rental car customer queue	1,126	720	2,006	2,006	2,006	2,006
	Subtotal Terminal Concessions	20,263	25,330	22,642	22,798	24,470	17,169
Public Areas (SF)	Non-secure public restrooms	1,207	7,900	3,536	2,682	3,536	823
	Secure public restrooms	2,706	7,400	7,374	7,251	7,250	5,972
	Terminal Conference Rooms	1,276	1,950	3,366	840	3,366	1,341
	Waiting and seating	3,990	24,040	19,125	16,452	19,769	11,936
	Public circulation including lobby and entrance	52,448	77,200	86,845	81,593	71,868	53,226
	Subtotal Public Areas	61,627	118,490	120,246	108,818	105,789	73,298
Non-Public Areas (SF)	Airport operations	1,174	1,900	2,837	1,913	2,837	1,884
	Airport Police	1,289	4,300	1,735	2,968	1,496	1,045
	Maintenance, storage and janitorial	907	9,000	6,238	10,799	7,204	2,838
	Circulation	924	5,040	10,714	12,779	20,890	2,950
	Mechanical/ Electrical	27,842	51,590	44,924	47,385	45,737	40,380
	Subtotal Non-Public Areas	32,136	71,830	66,448	75,844	78,164	49,097
	SUBTOTAL PROJECT AREA (NET)	184,191	366,960	374,445	387,901	371,027	239,674
	NET TO GROSS FACTOR	6,080	12,110	12,360	12,800	12,240	7,910
	SUBTOTAL PROJECT AREA (GROSS)	190,271	379,070	386,805	400,701	383,267	247,584
Terminal Ancillary Areas (SF)	Airline Operations	12,932	7,500	12,932	12,932	12,932	12,932
	Airport Administrative Offices	4,267	13,500	4,267	4,267	4,267	4,267
	Customs and Border Protection	7,688	13,410	7,688	7,688	7,688	7,688
	Subtotal Security	24,887	34,410	24,887	24,887	24,887	24,887
	TOTAL BUILDING AREA	215,158	413,480	411,692	425,588	408,154	272,471

DESIGN MATRIX

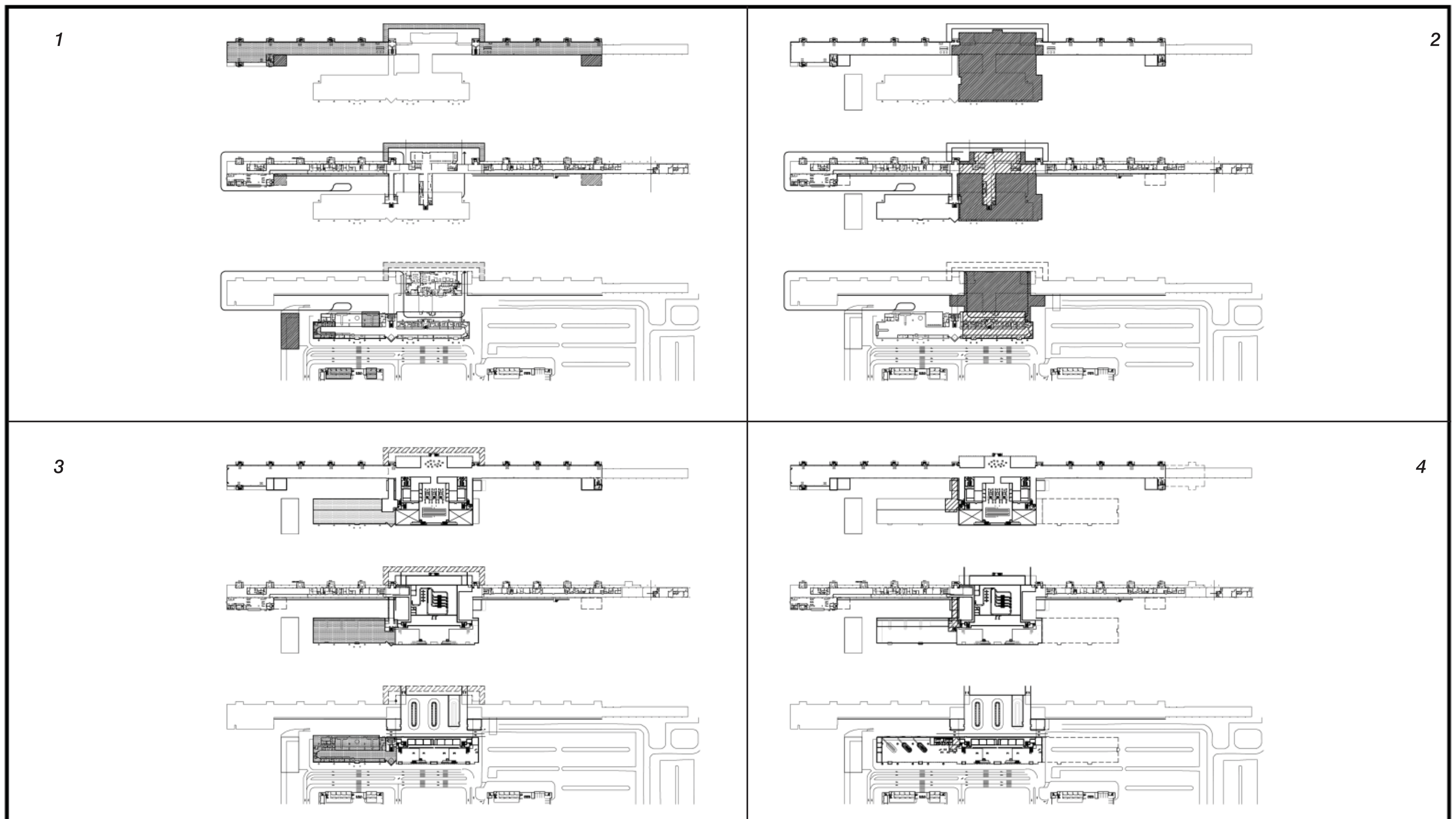
	Option 1A	Option 1B	Option 1C	Option 2
Sustainability				
Sustainability Integration	●	●	●	●
Ease of Future Sustainability Upgrades	●	●	●	◒
Building Program				
Meet 2 Million Enplanement Plan	●	●	●	❍
Efficient Circulation	◒	●	●	❍
Tug Travel Distance	◒	❍	◒	◒
Concessions Location	●	●	●	❍
Baggage Screening	●	◒	●	◒
Ease of Constructability	◒	❍	●	●
Infrastructure				
Expandability	●	●	●	◒
Flexibility	●	❍	◒	◒
Costs - First Cost	◒	❍	◒	●
Costs - Estimated Life Cycle	●	◒	●	❍
Passenger Experience				
Improvement in Passenger Experience	◒	◒	●	◒
Improvement in Passenger Flow	◒	❍	●	❍
Appearance	●	●	●	❍
Concessions Sightlines/Exposure	●	●	●	❍
Vertical Transitions	●	●	●	❍
Intuitive Wayfinding (Circulation)	❍	❍	●	◒
Views from Landside/Airside	●	●	●	❍
Analysis Total	15	12.5	17.5	6.5

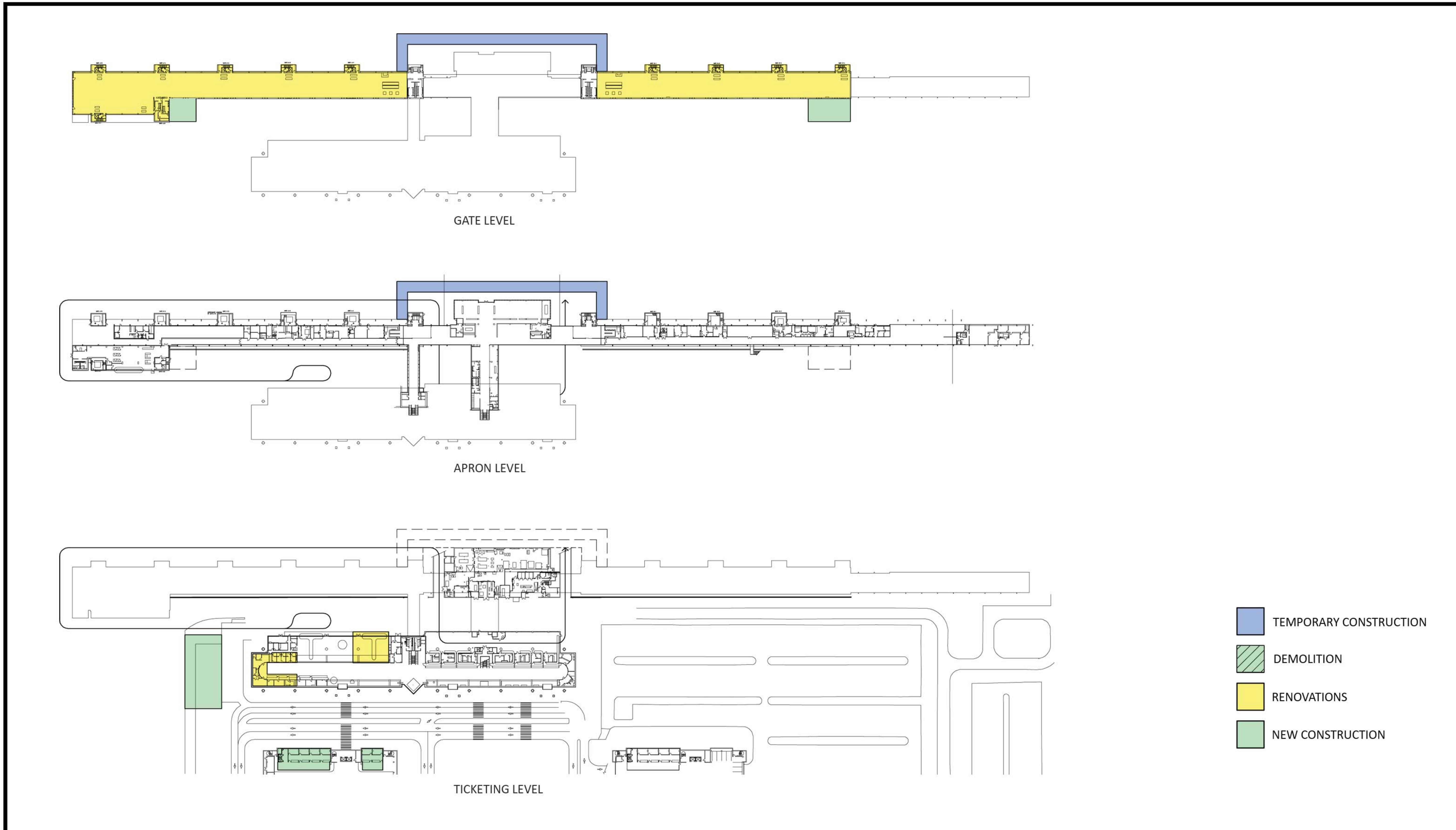
SECTION 8: CONCEPTUAL CONSTRUCTION PHASING

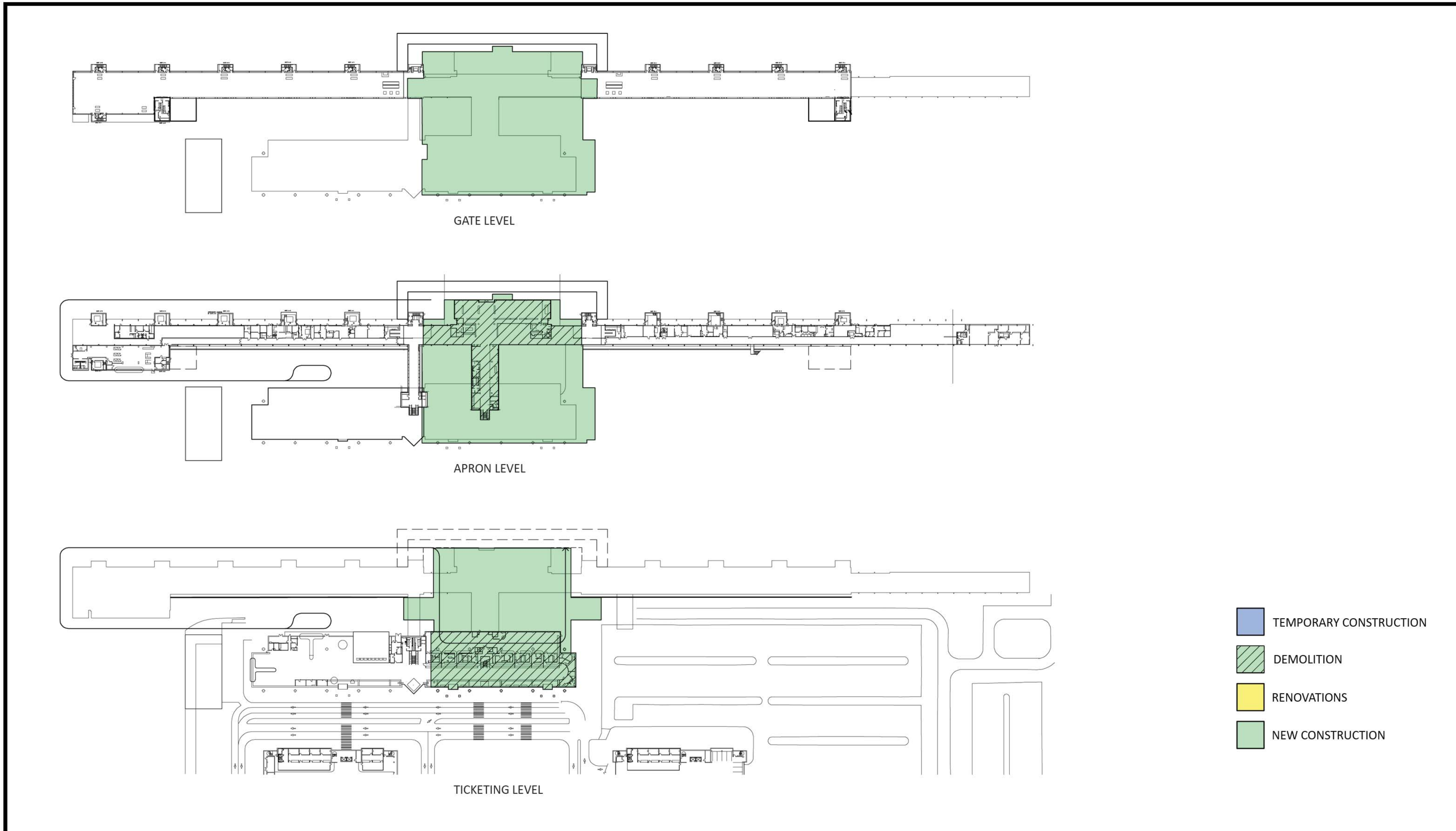
INTRODUCTION

The construction phasing of the various proposed was examined in detail to determine various approaches to the development of the project. The options presented in the following pages combine the design options 1A, 1B and 1C into a "general" approach which can be interchanged between the various options and preferred option 1C. Design option 2 was examined in the separate construction sequence option 2. The construction phasing options examined several components in the determination of the approach. These include: Impact on Passenger Flow; Impact on Passenger Convenience and Comfort; Impact on Airport Operations; Impact on Airline Operations; Relative Costs, Number of Steps, or Sequences, required to complete the work; and amount of temporary infrastructure required to complete the work.

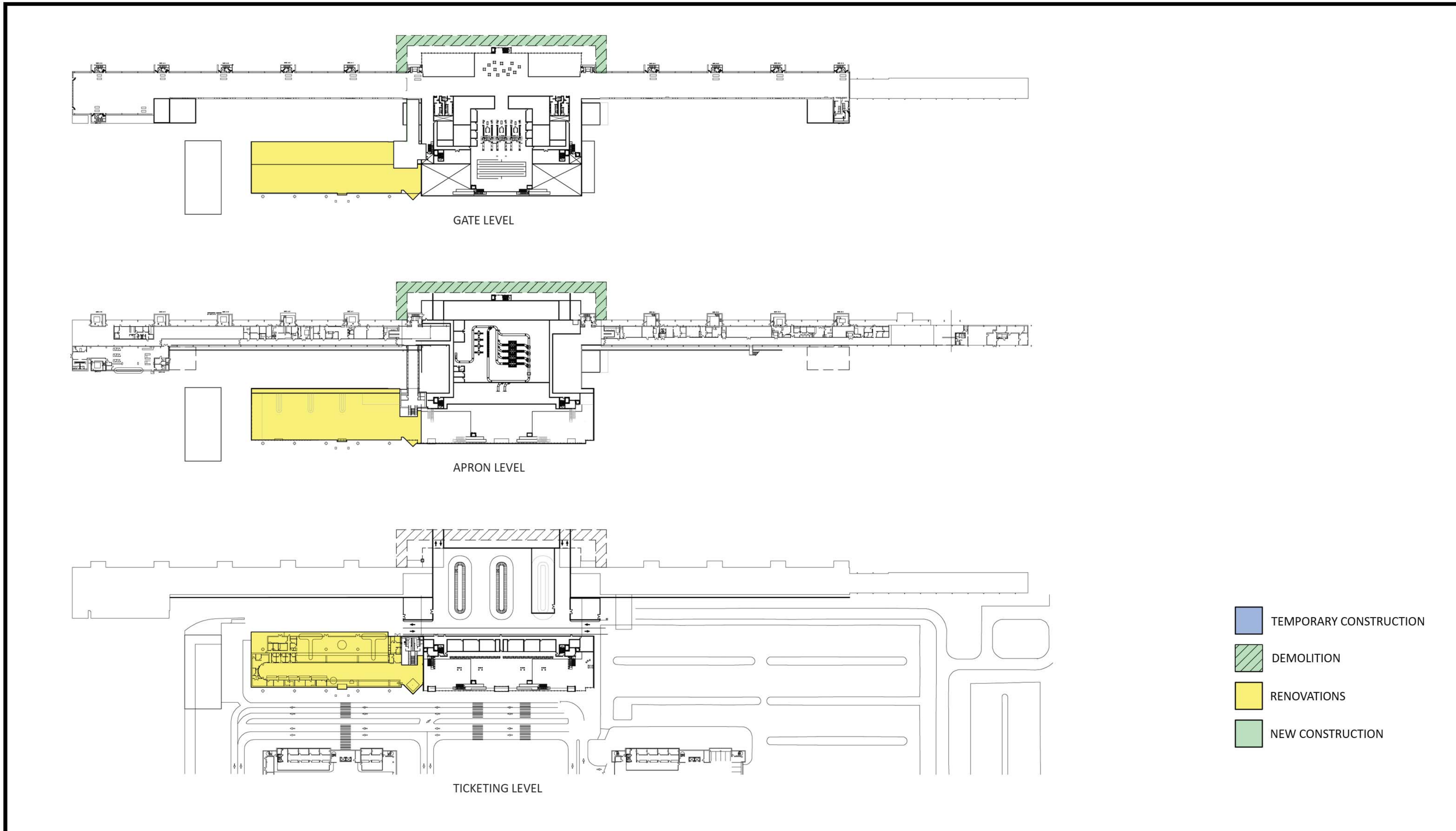
CONSTRUCTION SEQUENCING - I - OVERVIEW

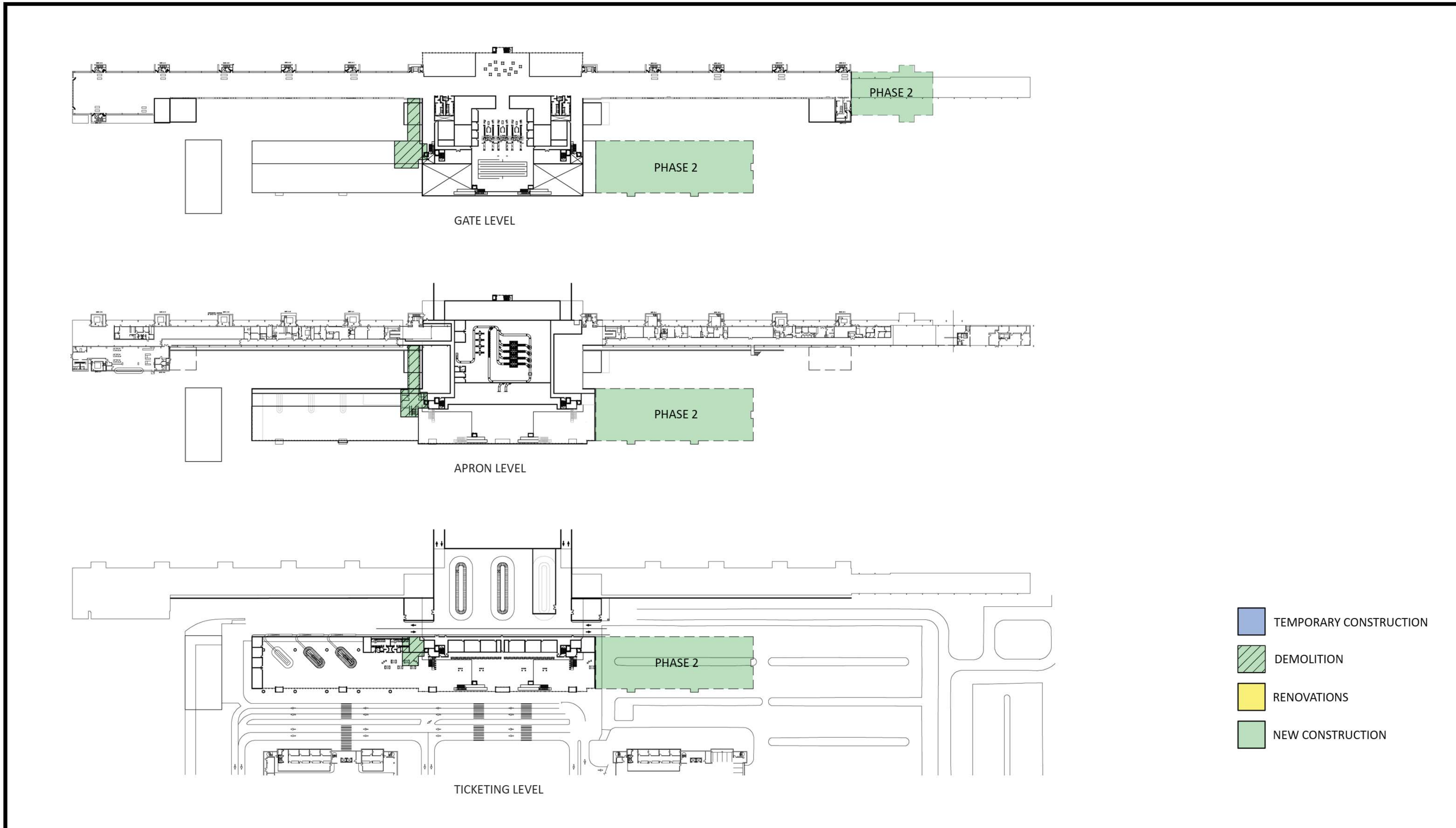



GATE LEVEL
APRON LEVEL
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

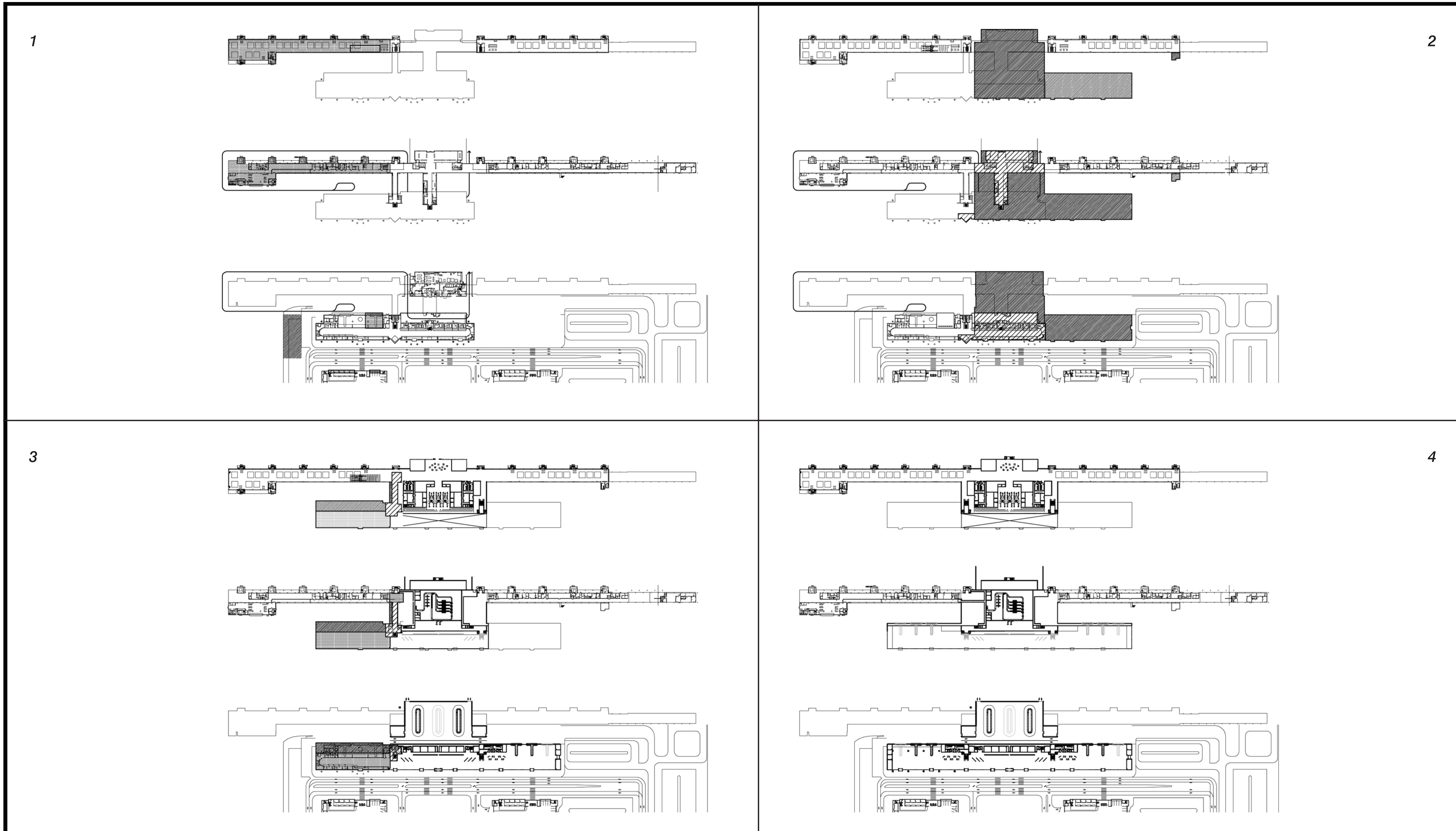


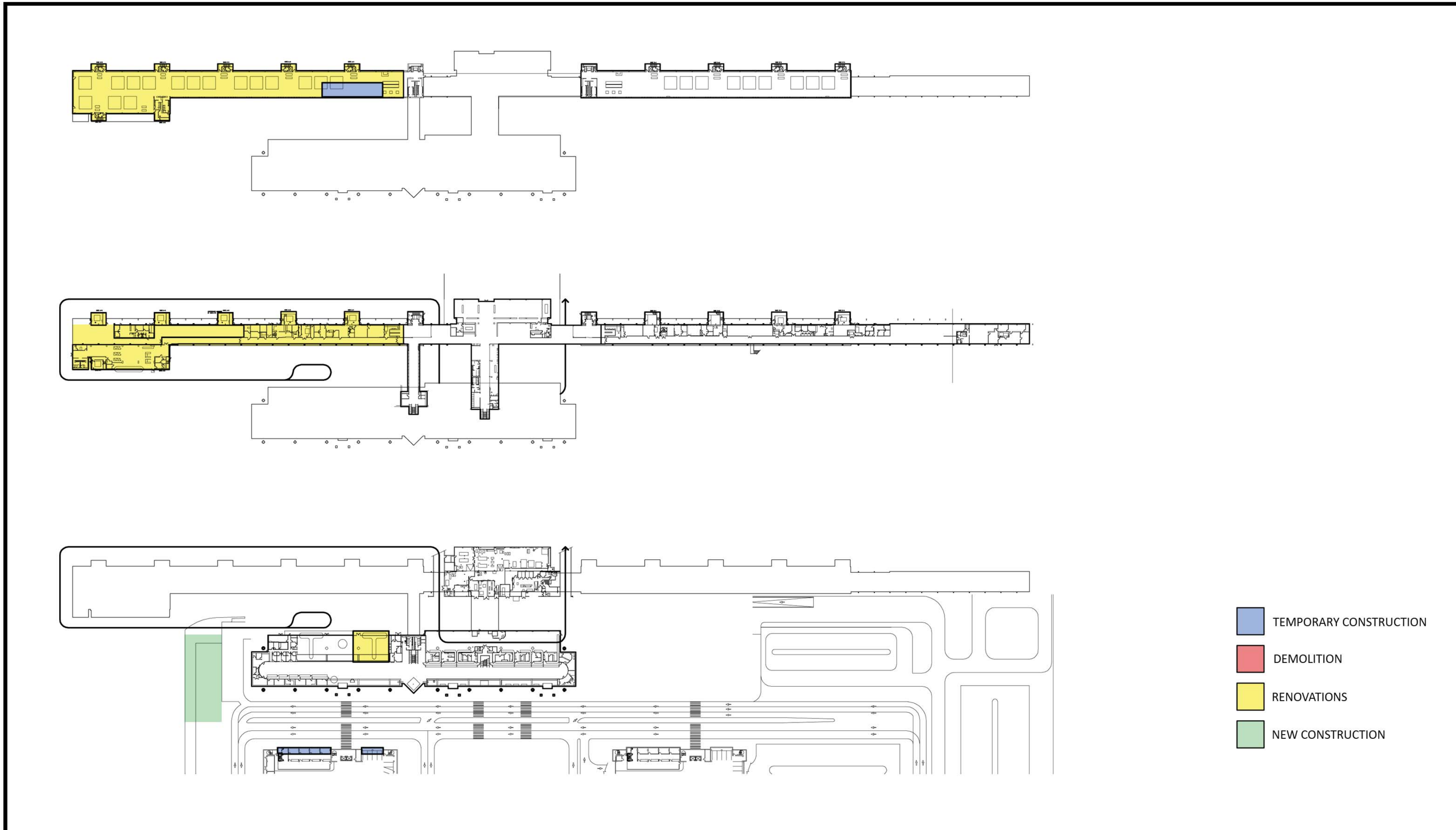
GATE LEVEL
APRON LEVEL
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

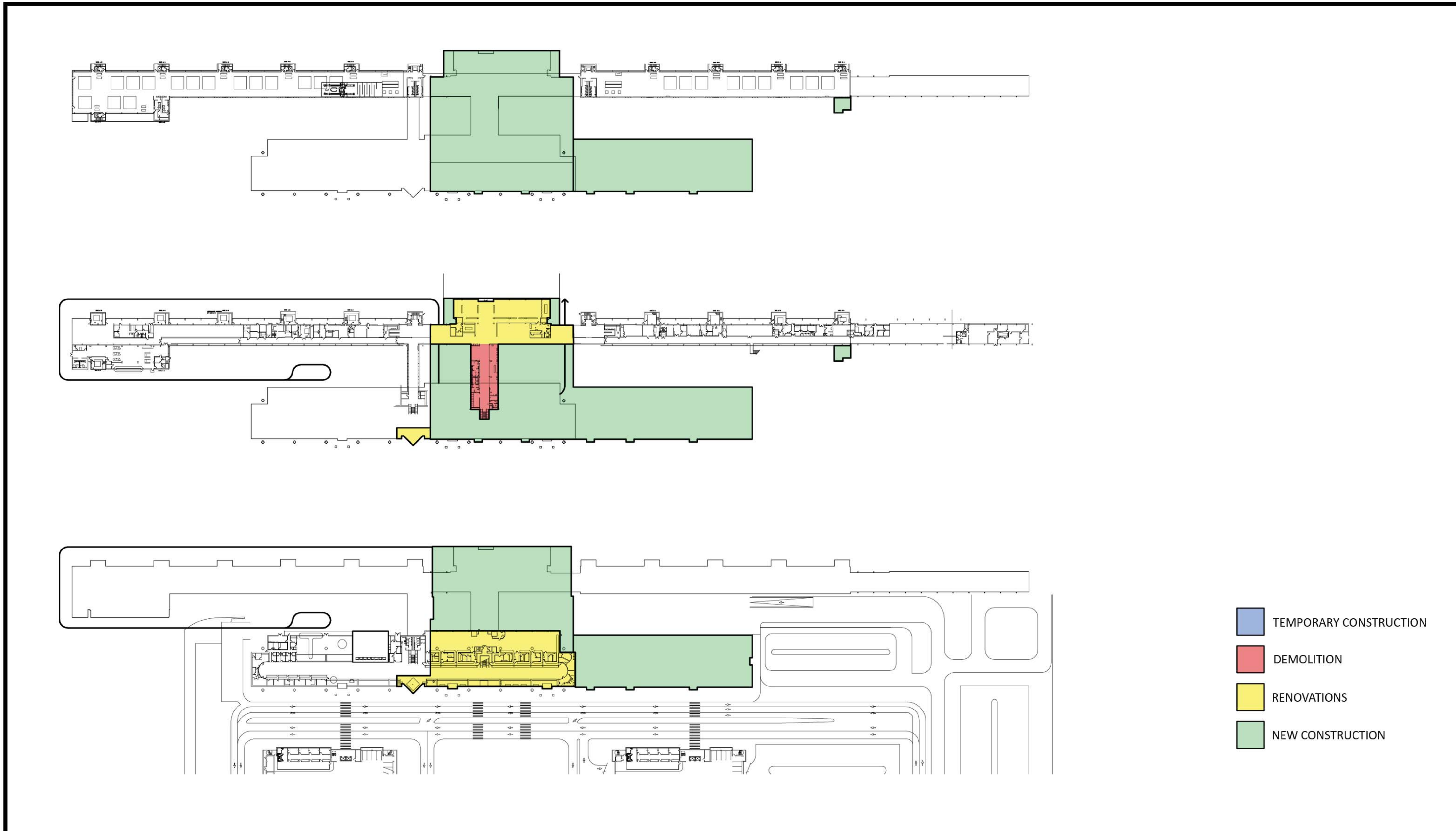

GATE LEVEL
APRON LEVEL
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

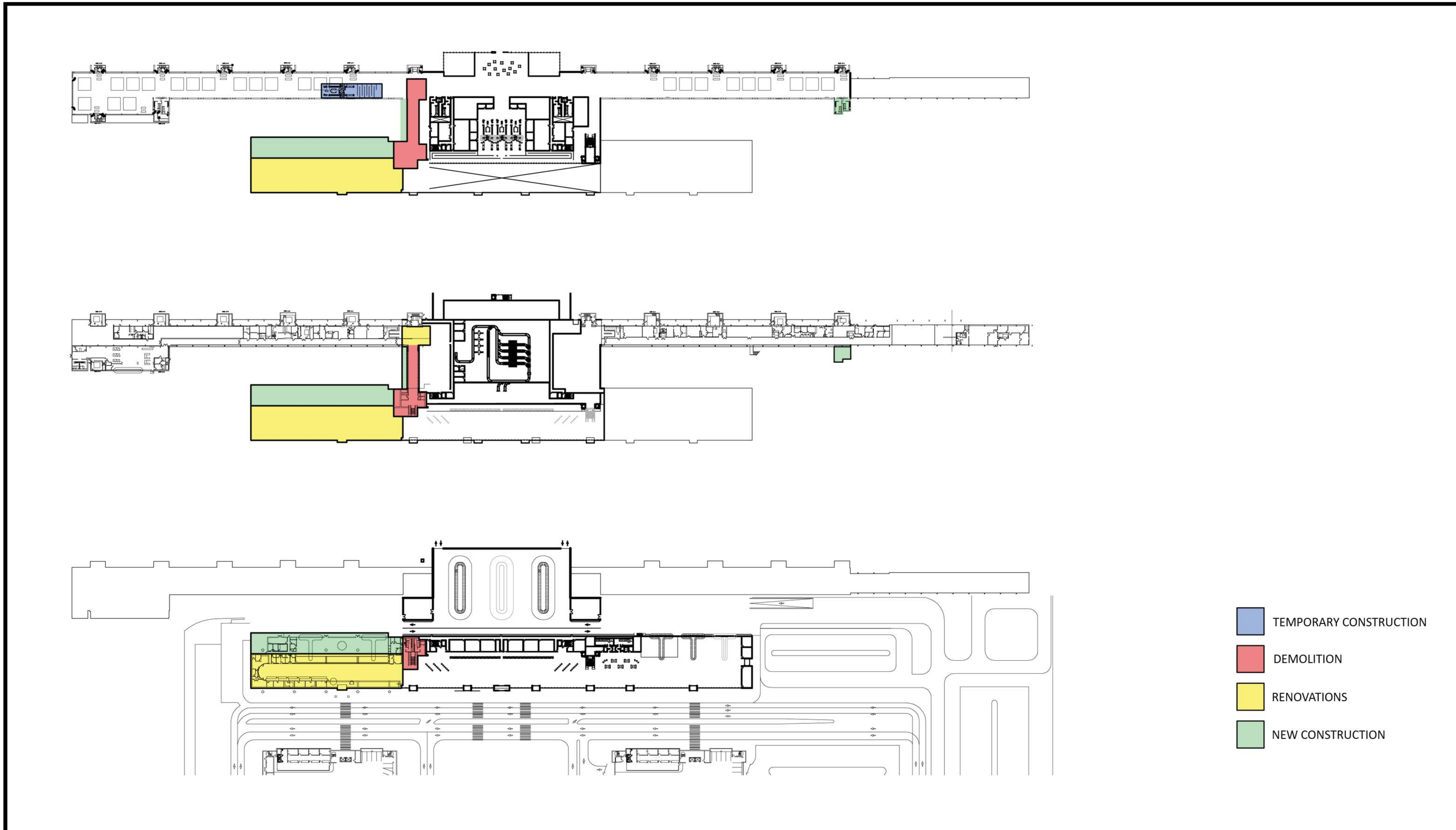


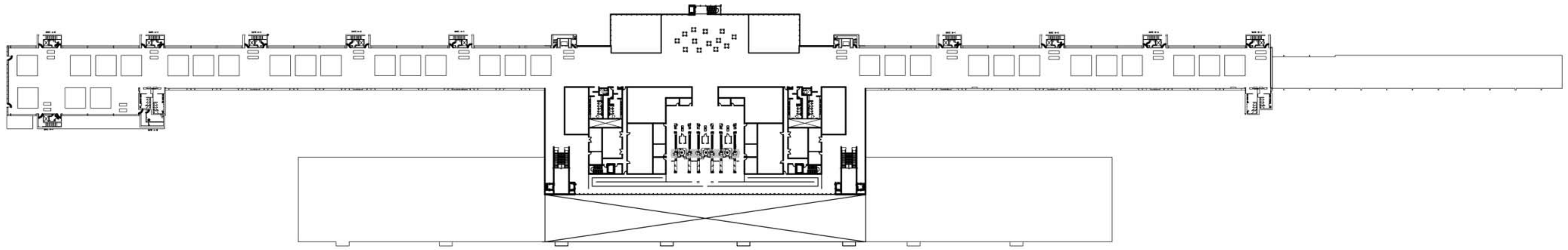
PHASE 2
PHASE 2
GATE LEVEL
PHASE 2
APRON LEVEL
PHASE 2
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION


1
2
3
4

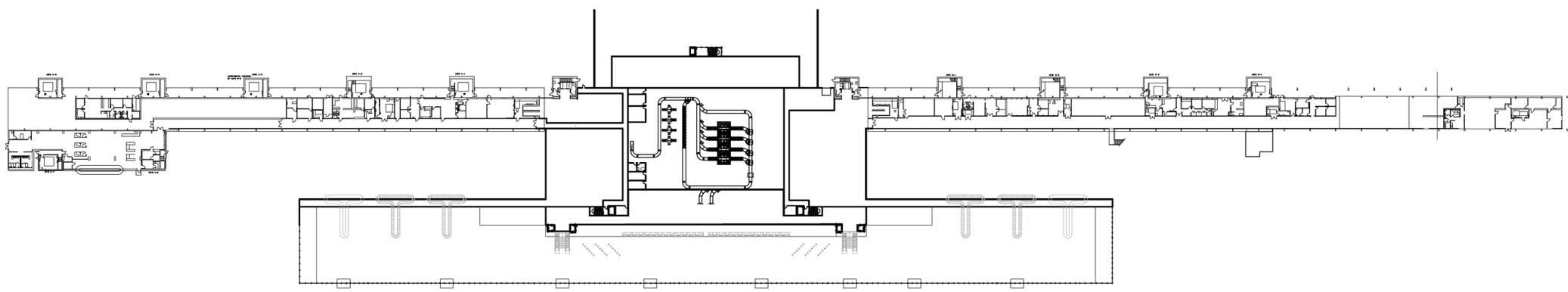

TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION


TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

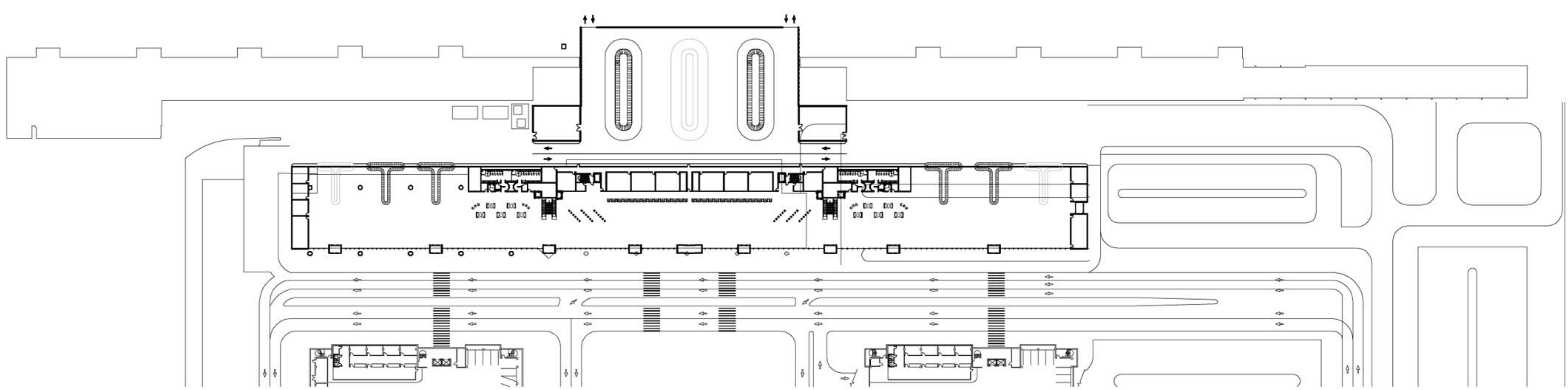

TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION



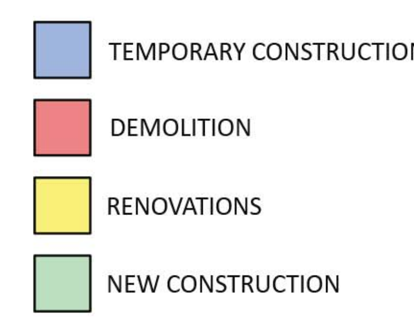
GATE LEVEL

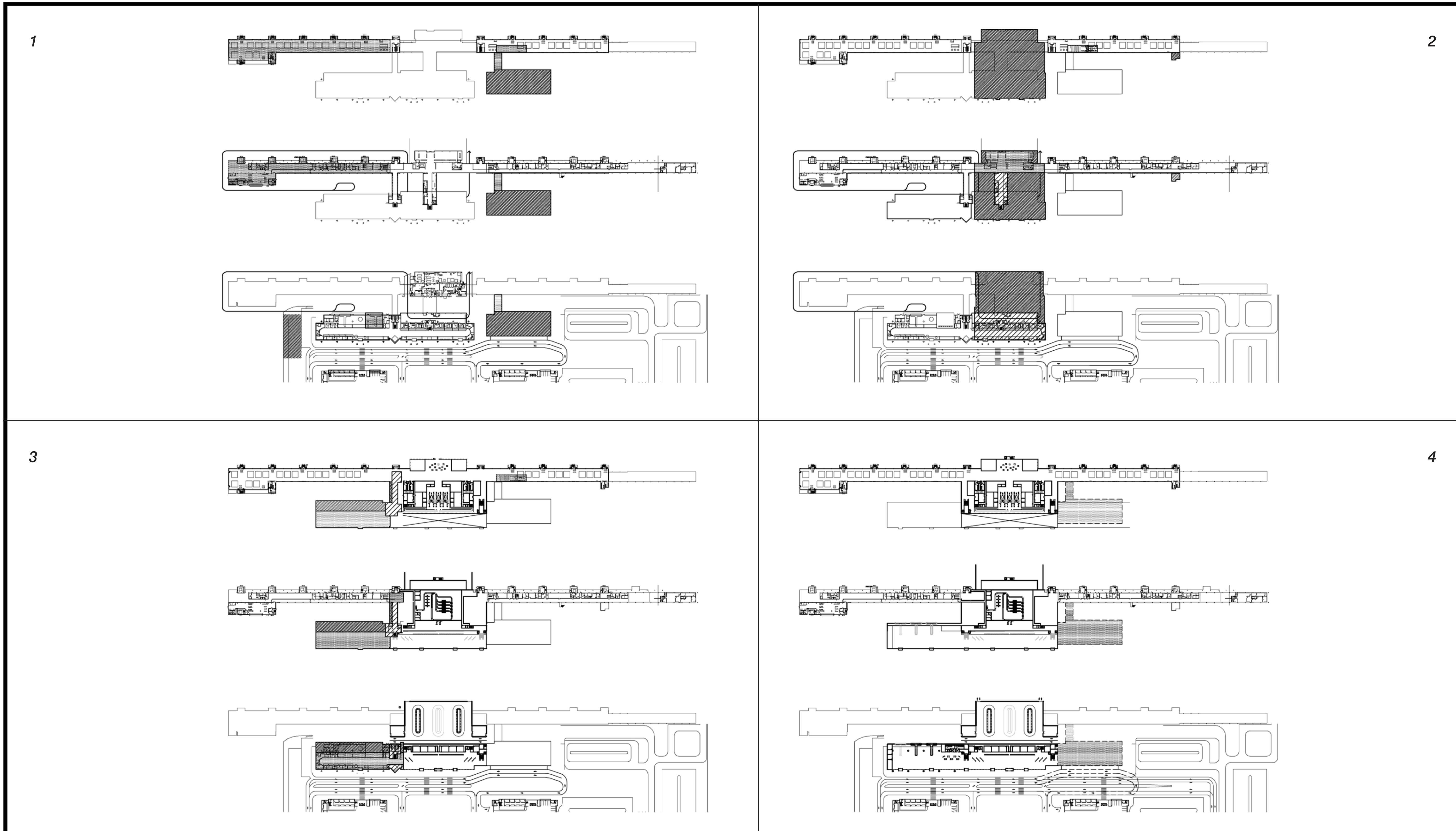


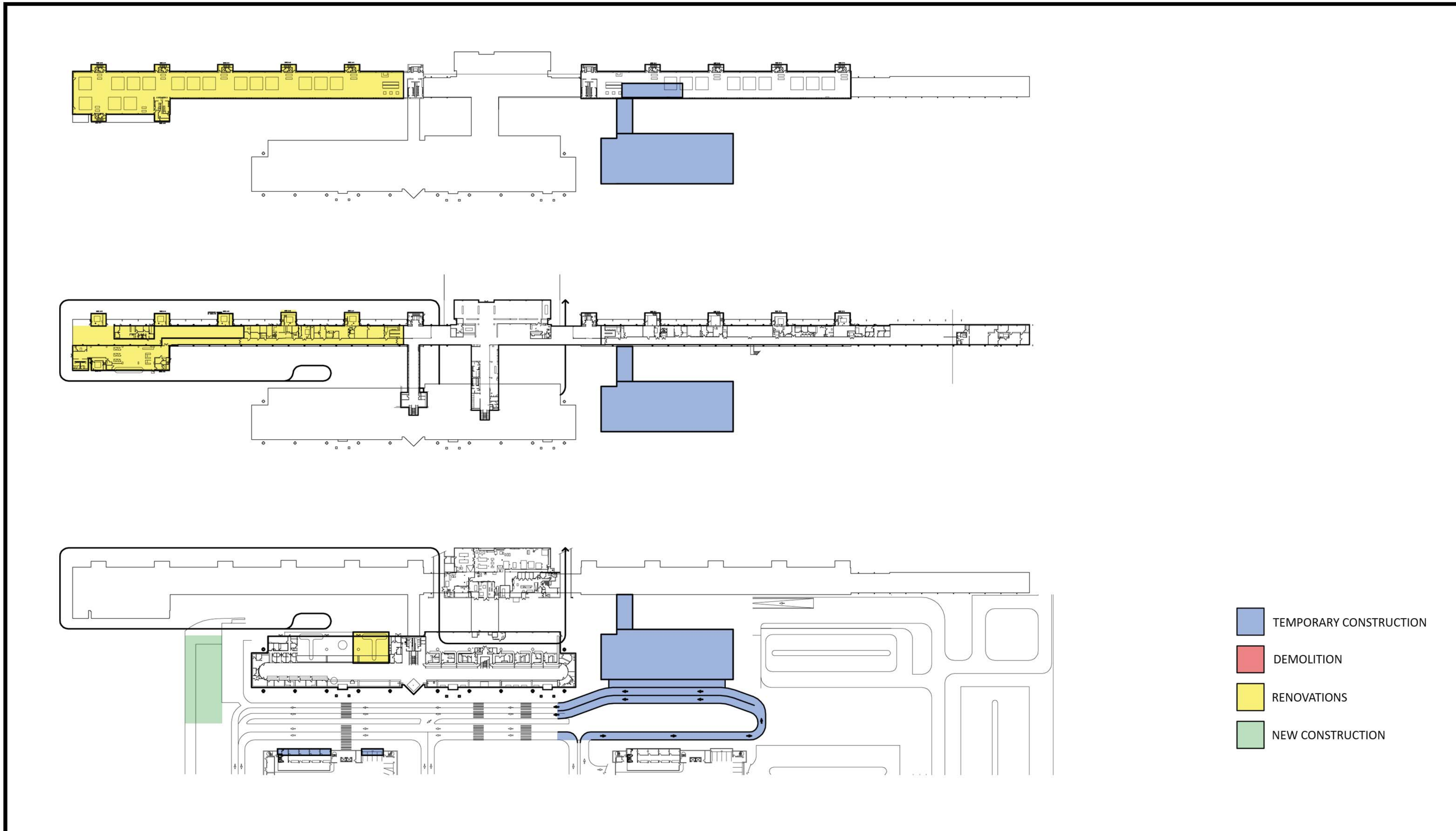
APRON LEVEL

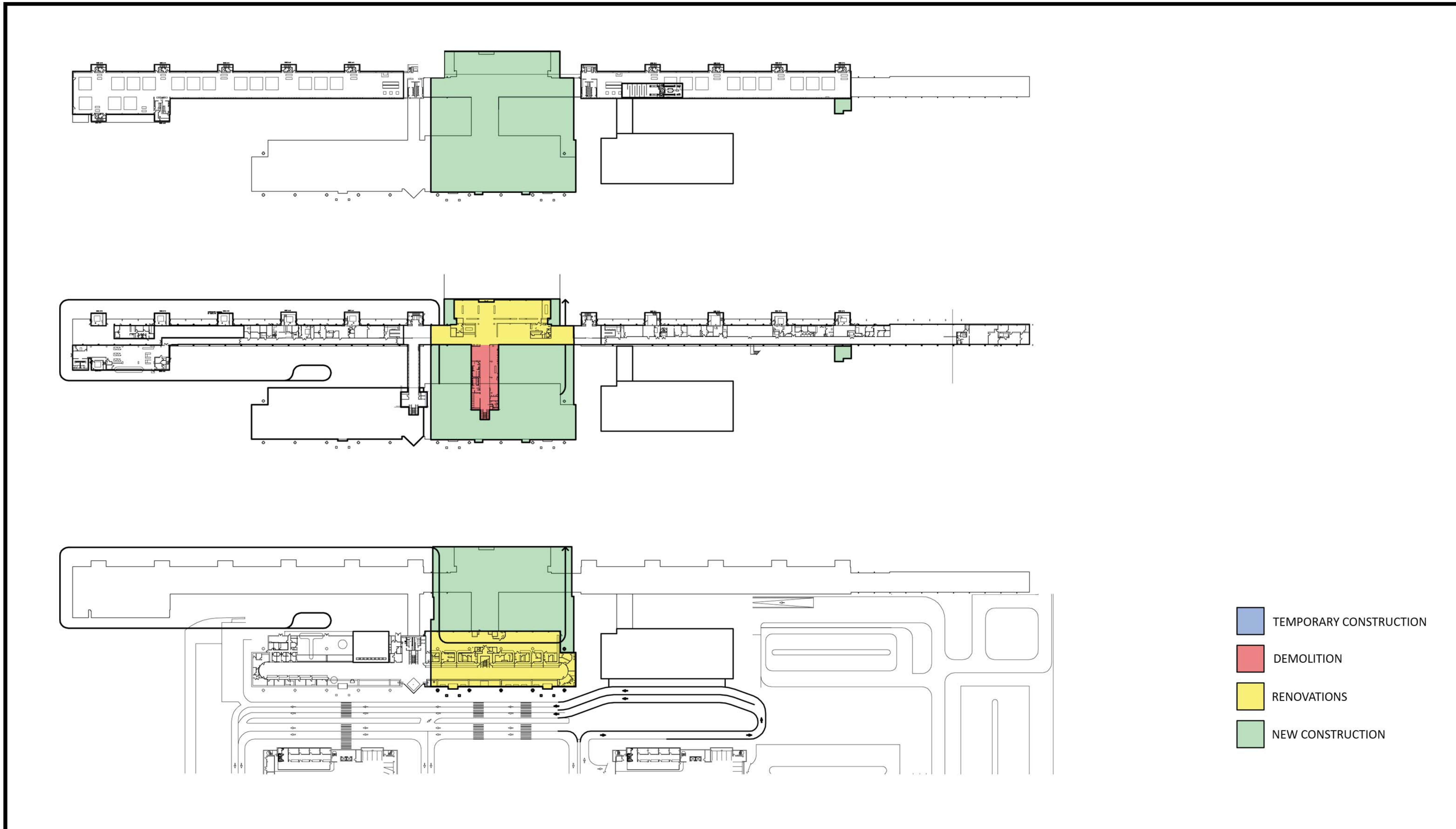


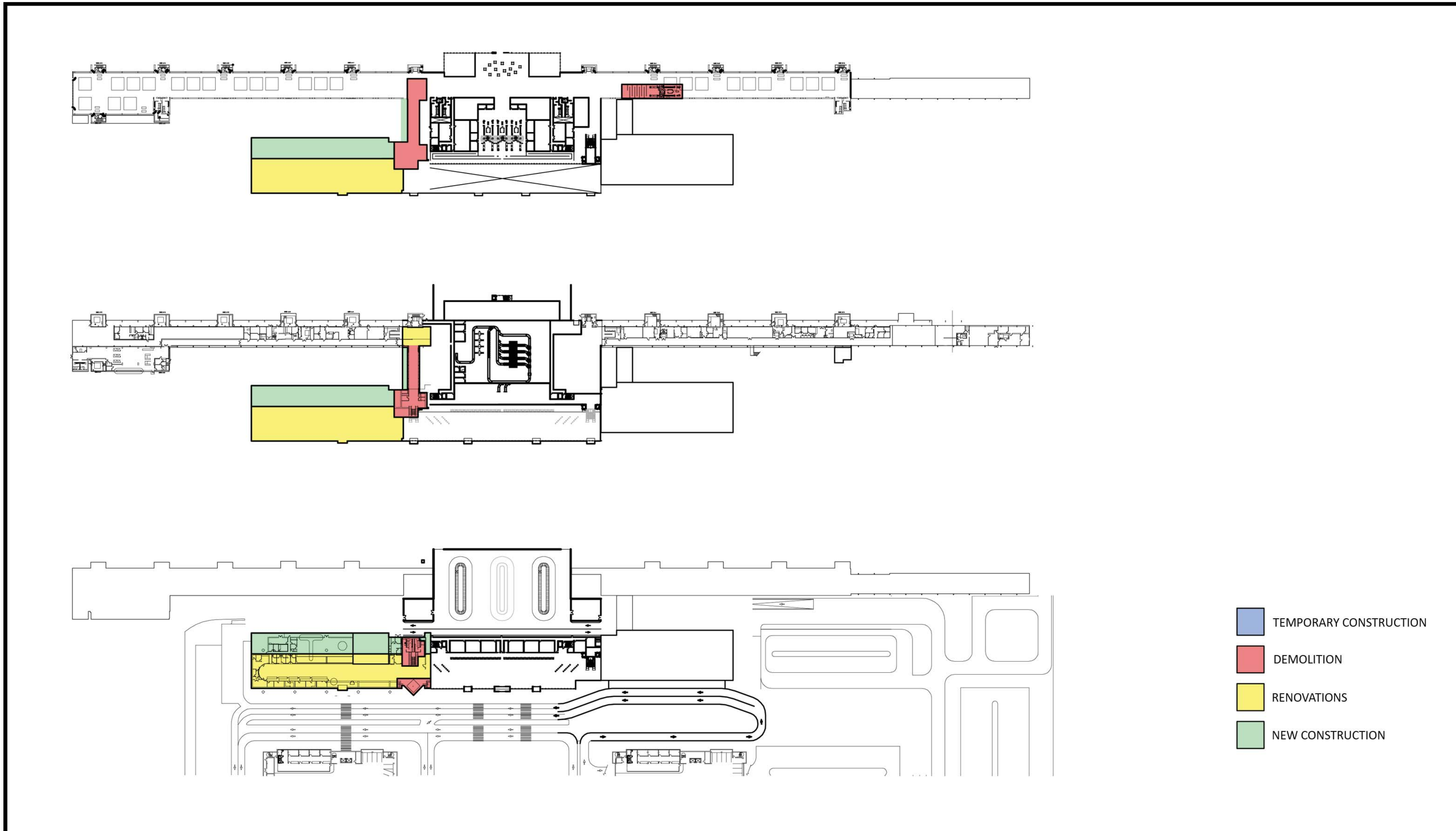
TICKETING LEVEL

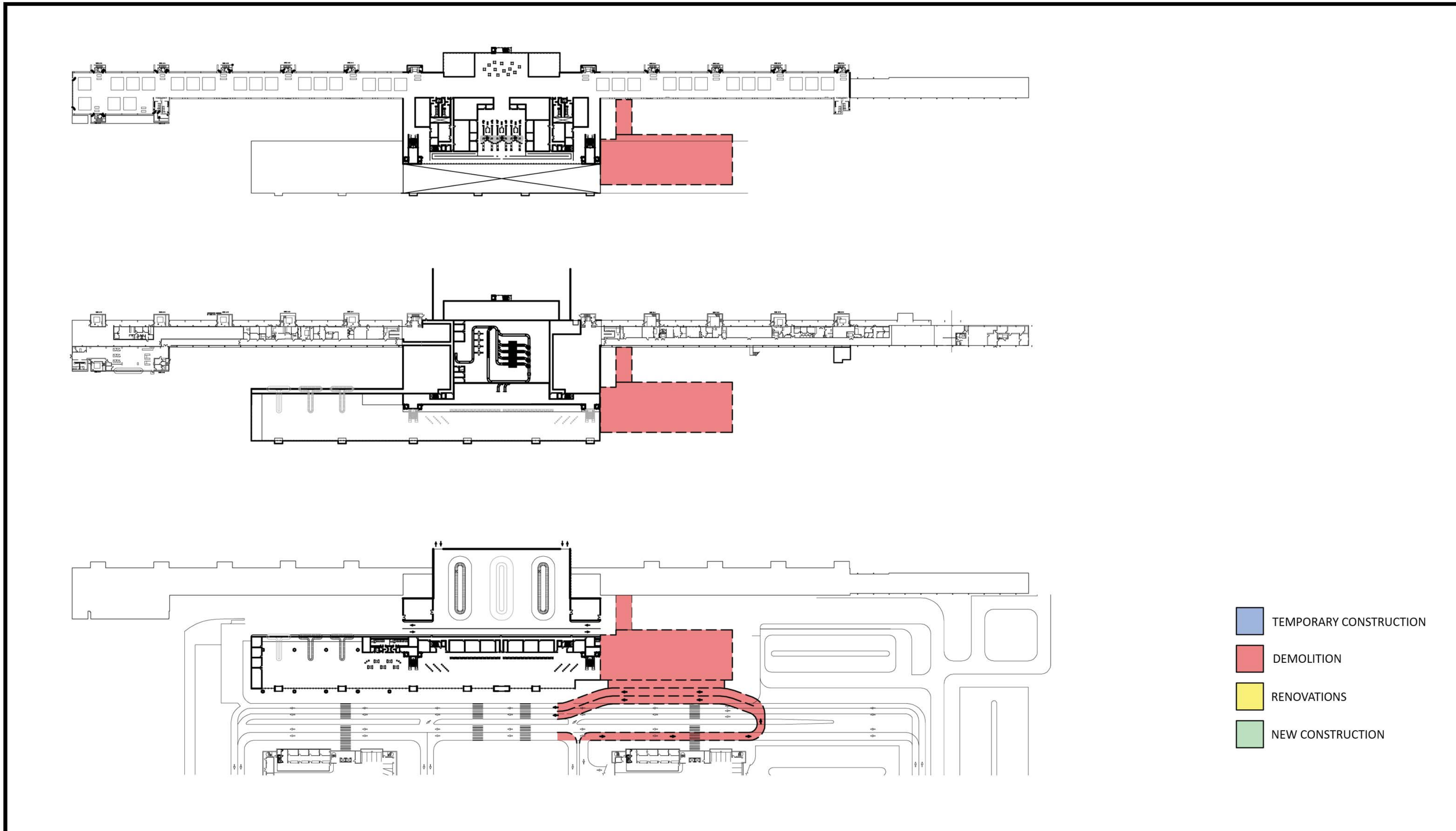



1
2
3
4

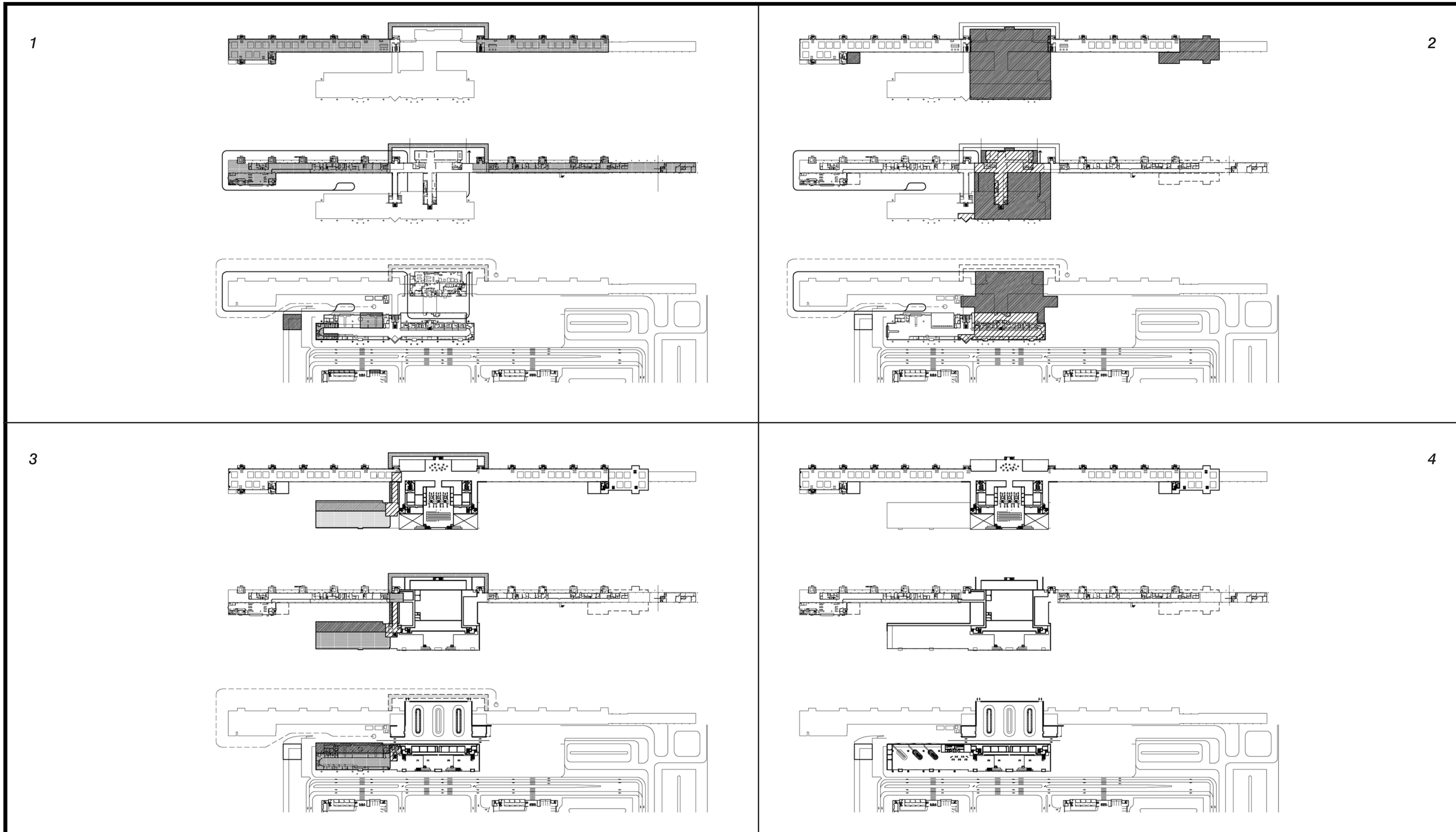

TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

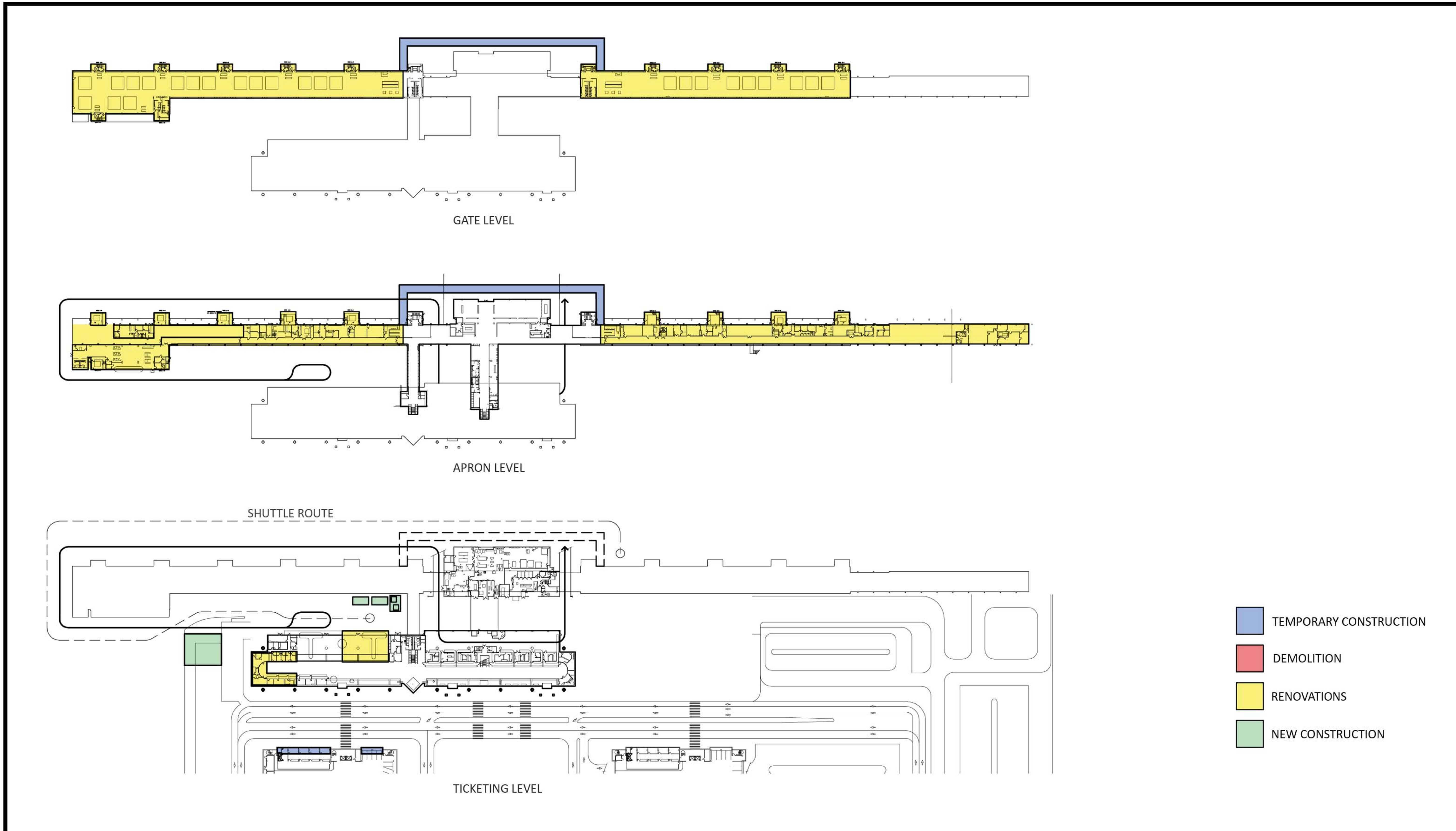

TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

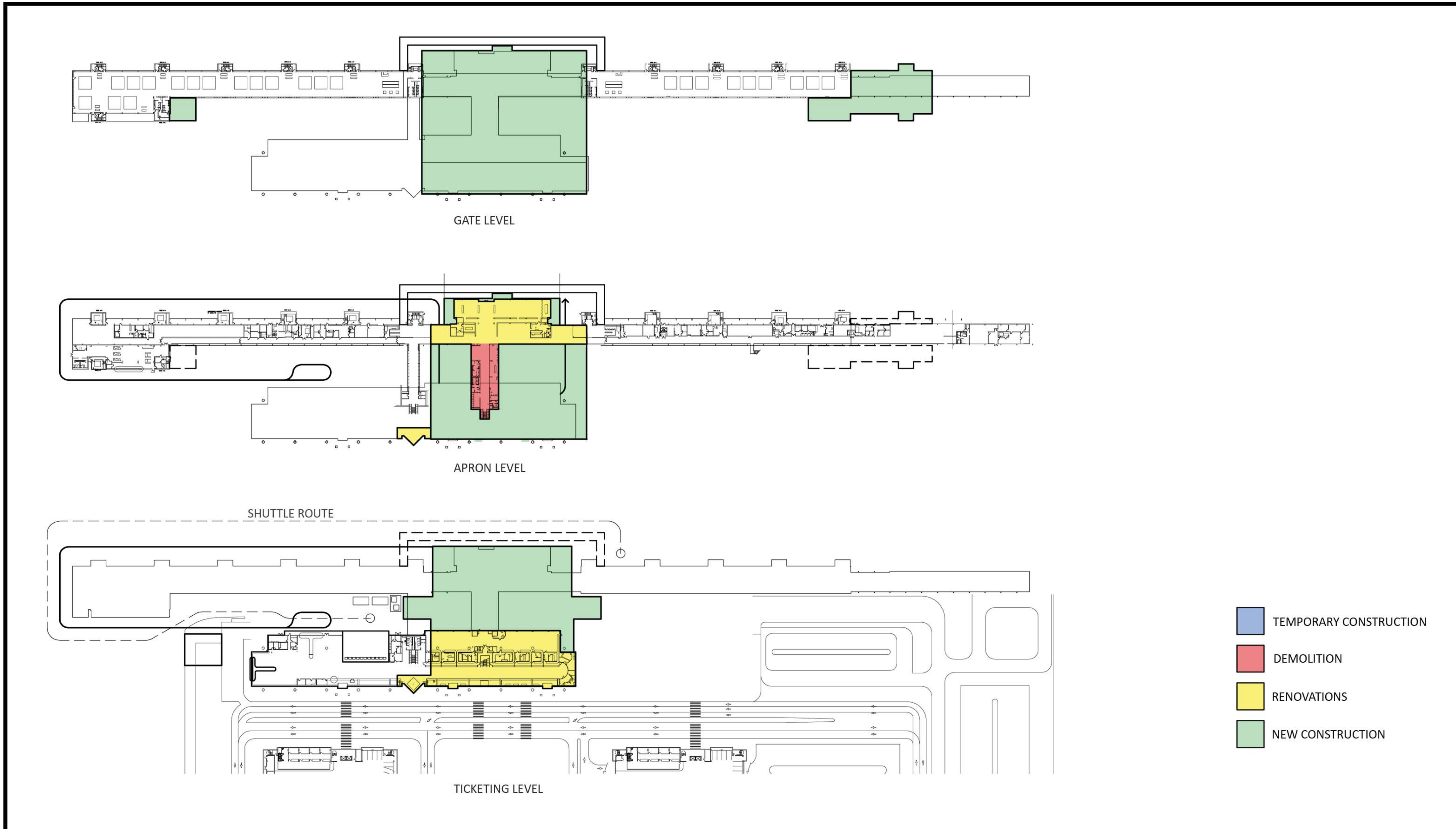

TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

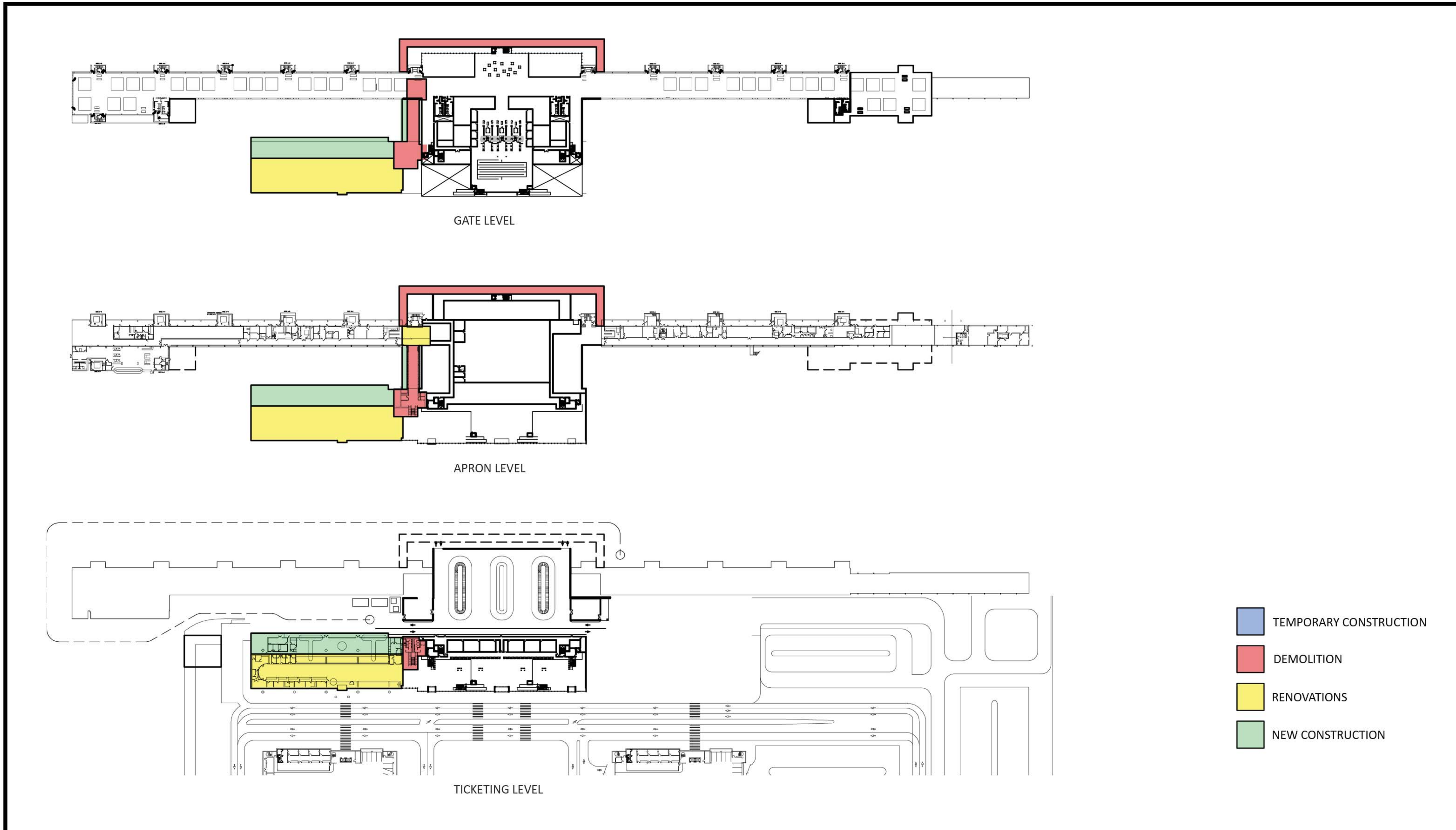


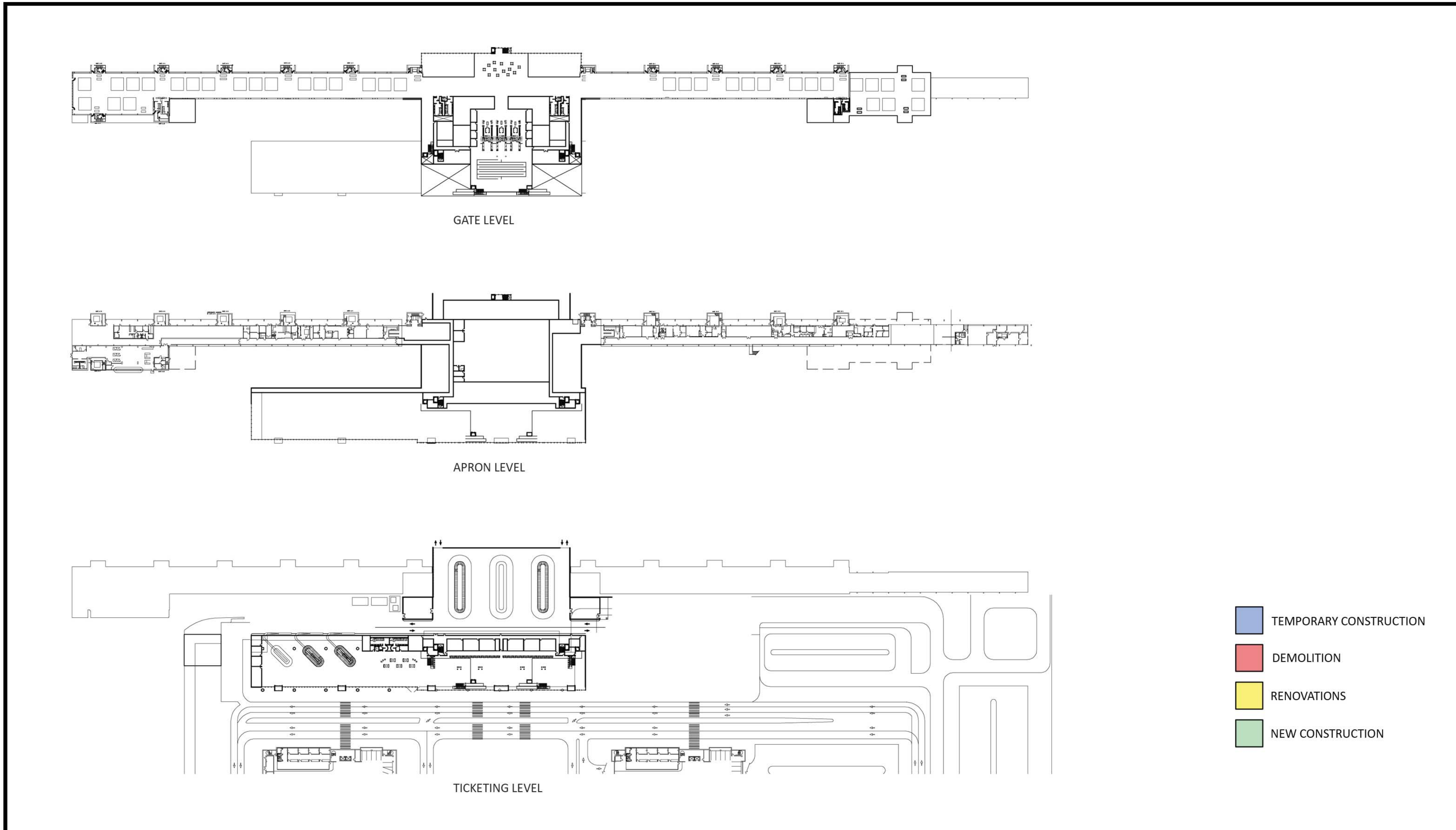
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

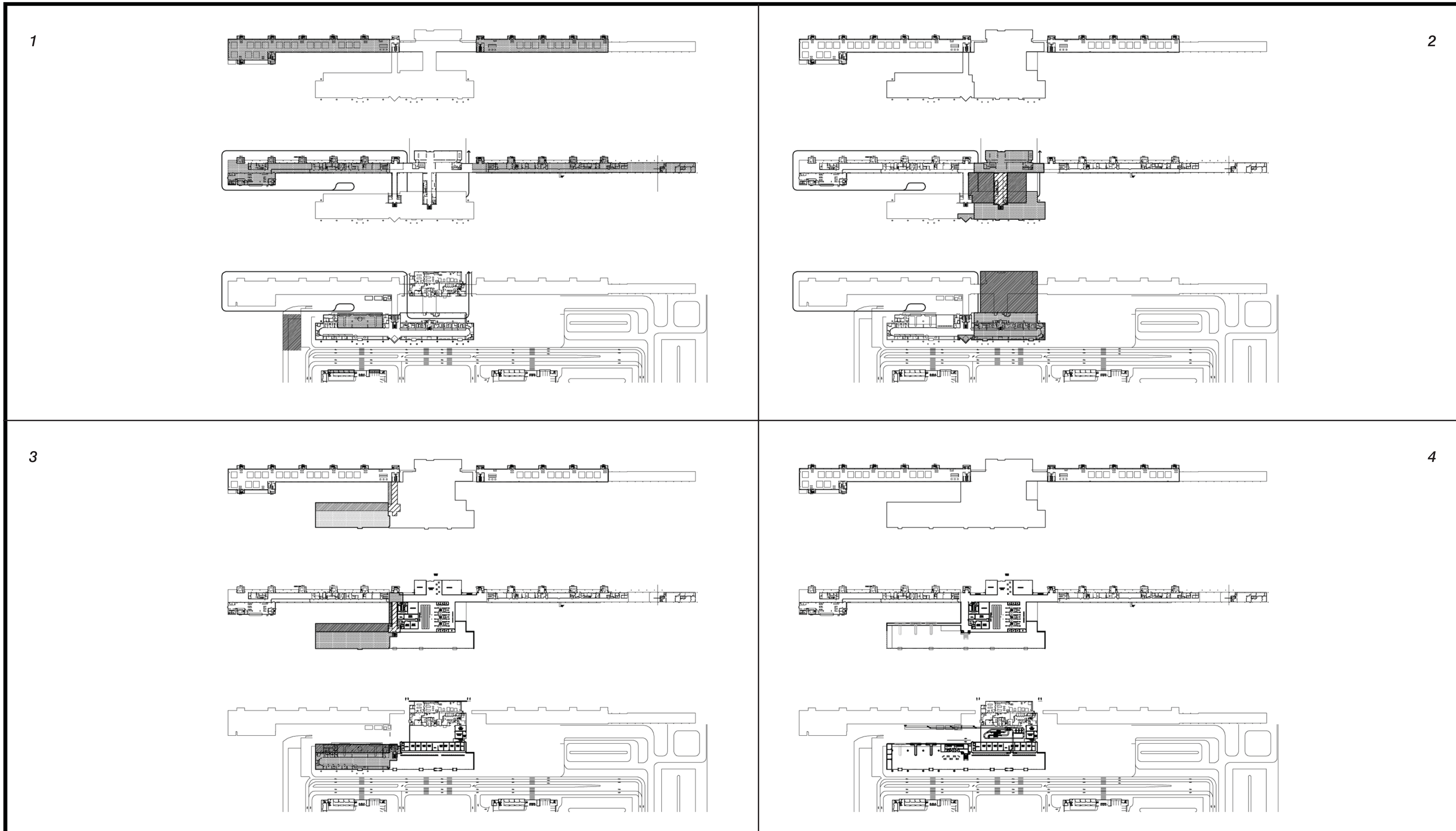

1
2
3
4

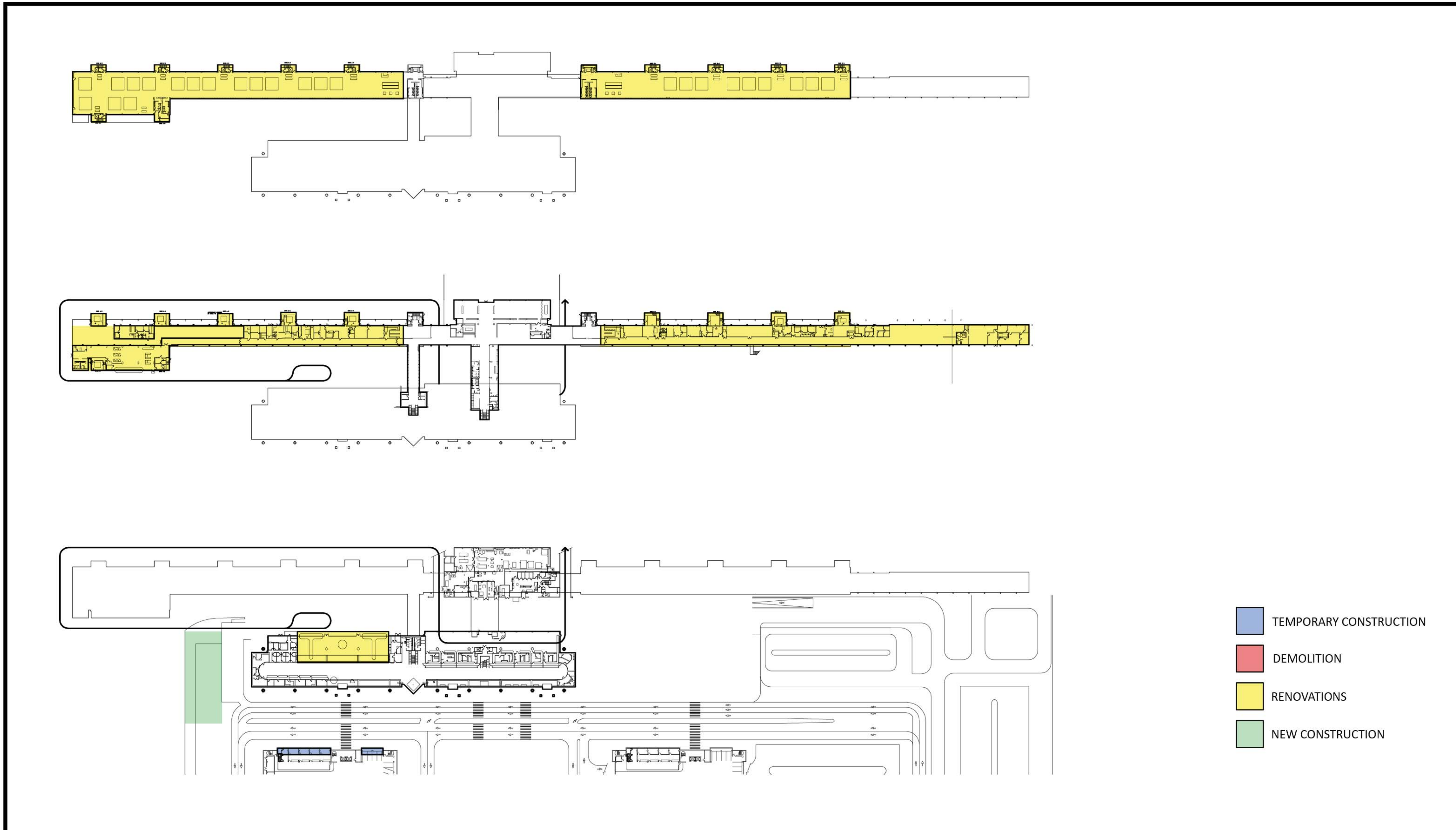

GATE LEVEL
APRON LEVEL
SHUTTLE ROUTE
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

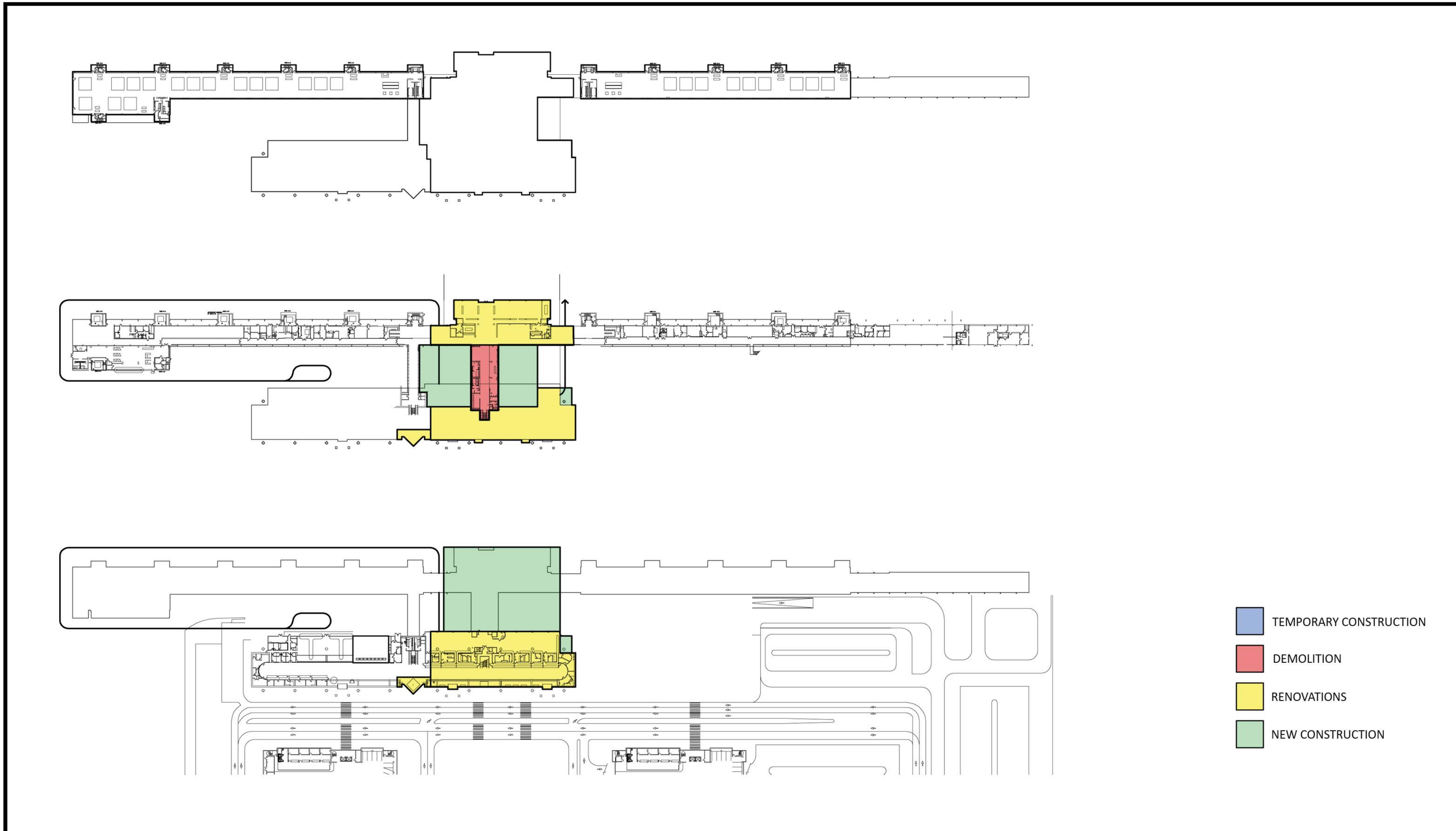

GATE LEVEL
APRON LEVEL
SHUTTLE ROUTE
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

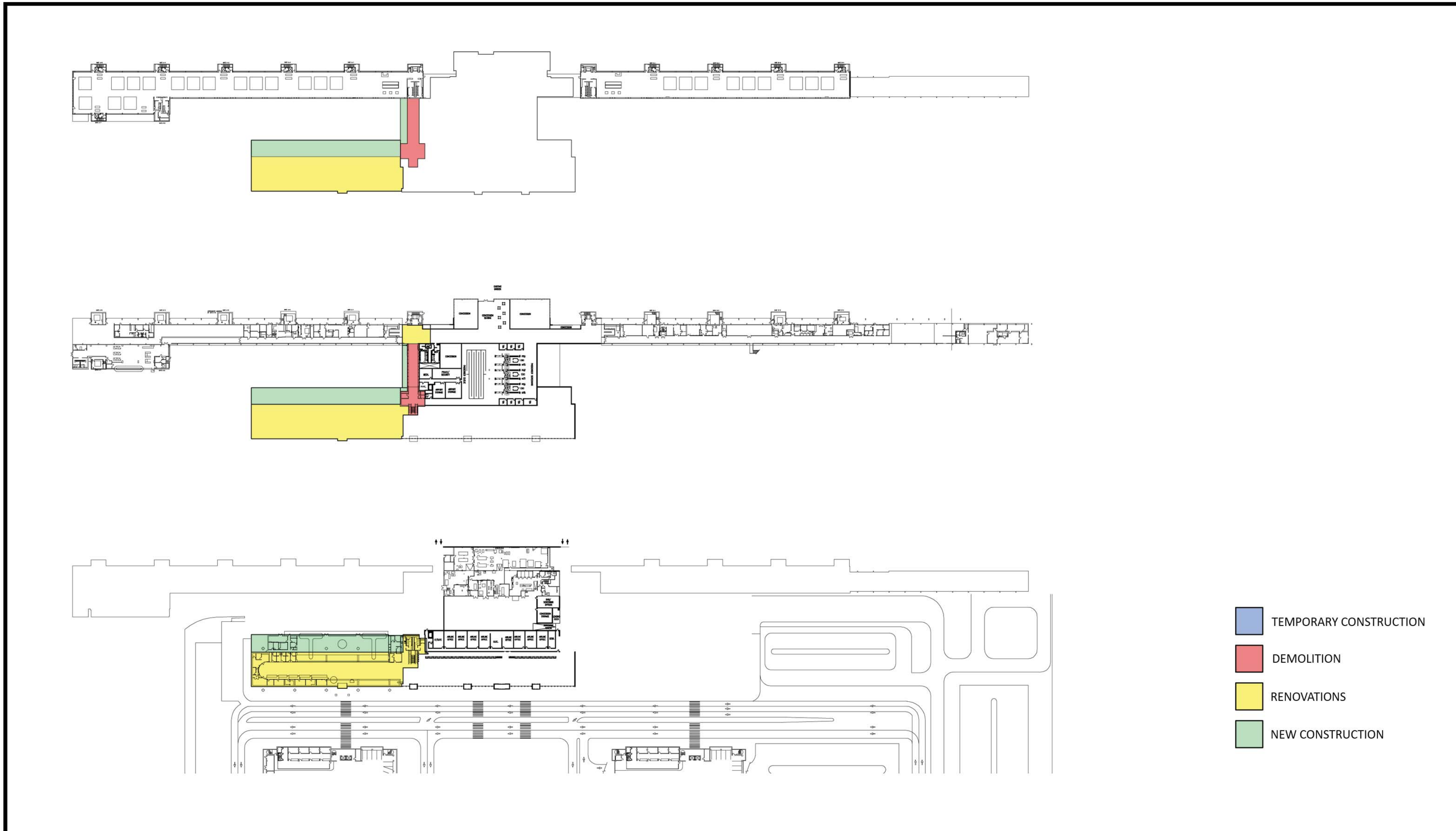

GATE LEVEL
APRON LEVEL
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

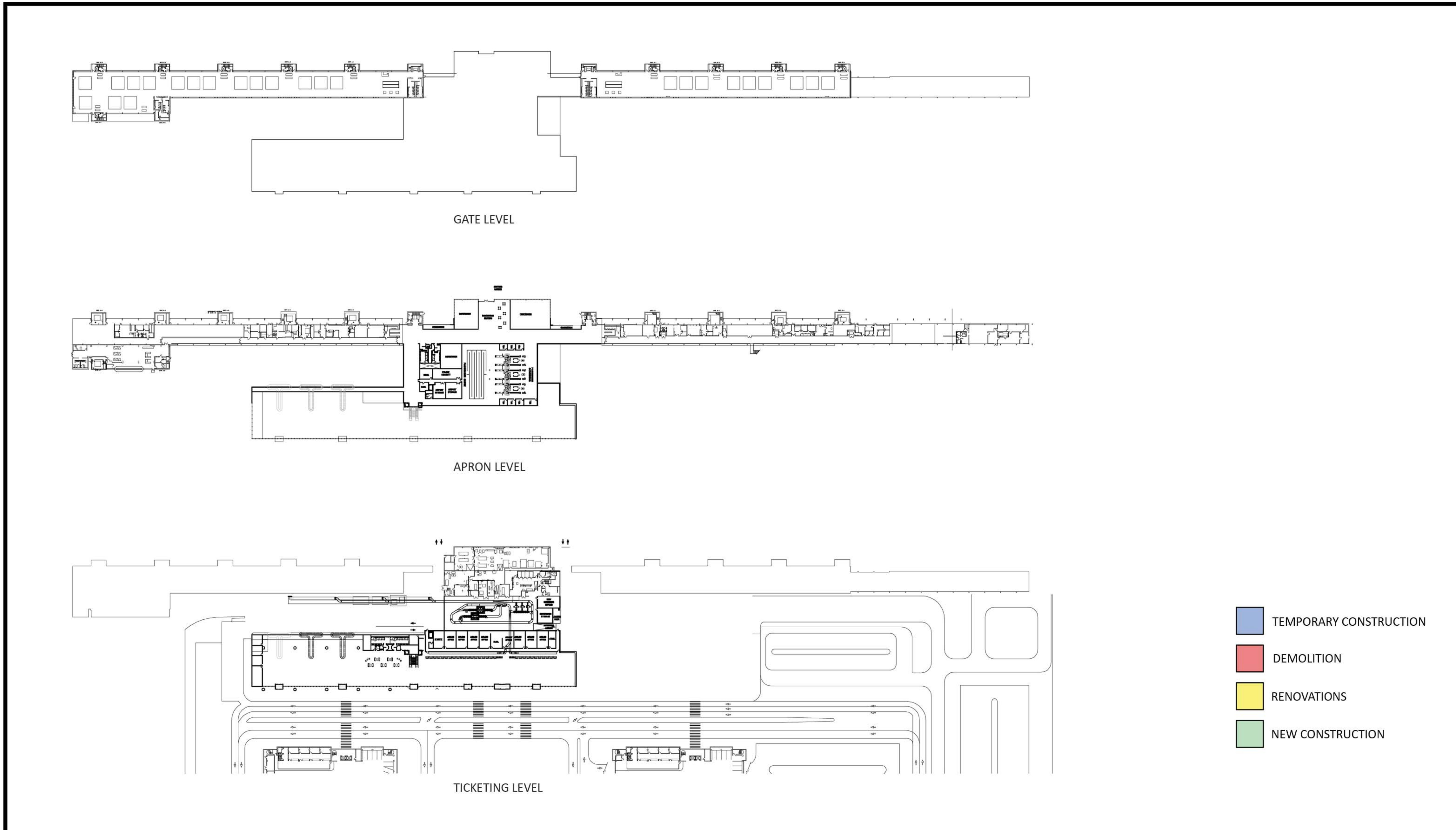

GATE LEVEL
APRON LEVEL
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION


1
2
3
4


TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION


TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION


TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION


GATE LEVEL
APRON LEVEL
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

SECTION 9: IMPLEMENTATION

9.1 INTRODUCTION

On July 12, 2010, the RS&H, Unison and RBGB team presented the GSP Terminal Area Study to the Commission. The team presented the goals of the study as they pertain to projected enplanements within a period of 20-30 yrs. upon arrival of a low fare carrier; achievement of a highly sustainable airport building and impacts of new technology; future aviation trends; parking capacity and concessions revenue potential. It also included the analysis of Options 1A, 1B, 1C and 2, as indicated in this document and how each option rated in meeting the aforementioned goals as well as building performance, natural wayfinding and passenger experience.

Option 1C rated best in best value as well as meeting the established goals of the project. Option 1C was the joint recommendation by GSP staff and RS&H/Unison/RBGB consultants and received the approval of the Commission.

This section of the report outlines the Terminal Area Study-level recommended approach to the implementation of Option 1C.

9.2 CONSTRUCTABILITY

Construction of Option 1C involves the complexity of the replacement of the central core of the terminal building. This central core contains the centralized mechanical, electrical and communications systems for the airport as well as ticketing, baggage make-up and baggage screening functions. This area also connects Concourse A and B. It also involves a substantial amount of renovation work within the existing terminal areas, which is often difficult to accomplish due to existing structure, maintenance of operations and unforeseeable conditions within the older sections of the terminal.

A logical, sequential development in the replacement of the systems and functions described above is necessary in order to maintain operations and passenger satisfaction as well as connecting the concourses for full utilization of the existing gates.

Various construction sequencing alternatives were explored and one alternative was selected as the one best capable of accomplishing the goals of the project with the minimum amount of disruption to existing operations. As the project develops, this sequence will be refined to take into consideration the priorities of GSP International Airport, their stakeholders and passengers. It will also address any existing conditions not evident at this time.

9.21 Construction Sequencing

The following sequence of construction is currently recommended.

1. Relocation of the Rental Car areas to the South Parking Garage.

2. Construction of the new Central Plant.

In order to maintain ticketing, ATO's and baggage make up operational during construction, the functions located in the "outbound" portion of the existing facility must be relocated to the existing baggage claim wing. The baggage claim wing does not, in its current configuration allow for this relocation, however once the rental car operation is relocated to the parking garage, and the North claim device relocated to the central area, space becomes available to relocate the ticketing functions to the baggage claim wing. It may also be necessary to make some temporary external provisions for coverage of inbound bag delivery and baggage make-up and screening.

The Central Plant portion of the terminal which is located behind the service drive between concourses A and B will also need to be demolished and reconstructed in the new project, thus the new central plant must be built and operational before the existing facilities are demolished.

Given the above, the first two pieces of construction which must occur are:

These two projects have been labeled "enabling projects" as they will make way for the new construction to occur.

Sequenced renovation within the concourse areas can occur concurrently with the enabling projects, thus limiting the impact on the existing facility.

3. Temporary Facilities

The third part of the project will be to construct the temporary facilities within the baggage make-up area and the corridor to connect the two concourses.

The temporary corridor is envisioned as a pre-fabricated tunnel (constructed off site). Minimal construction will occur along the perimeter of the restaurant to support the corridor which could be hoisted into place at hours of low passenger volume and finished from the inside.

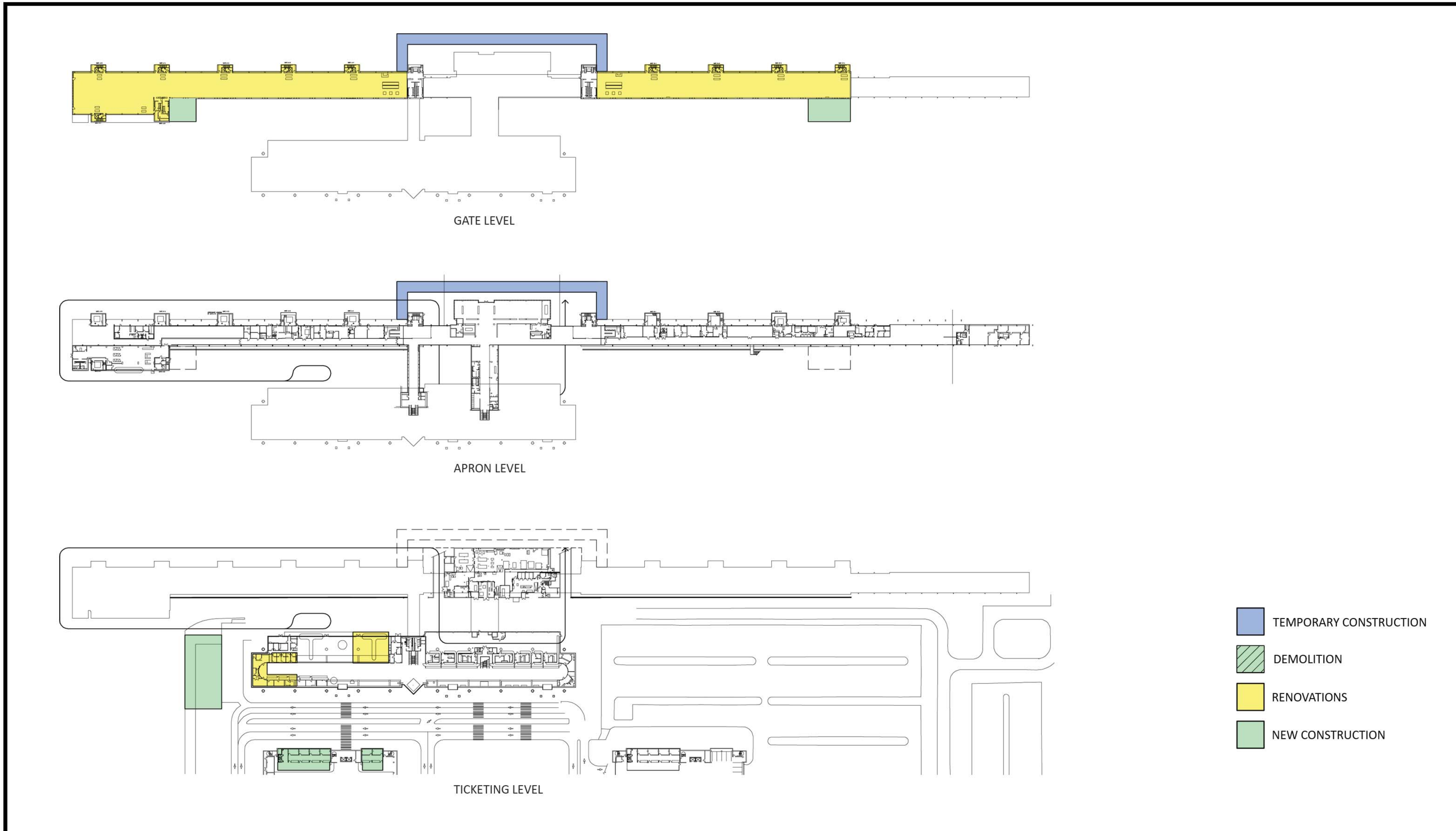
Construction access will be from the North side of the site.

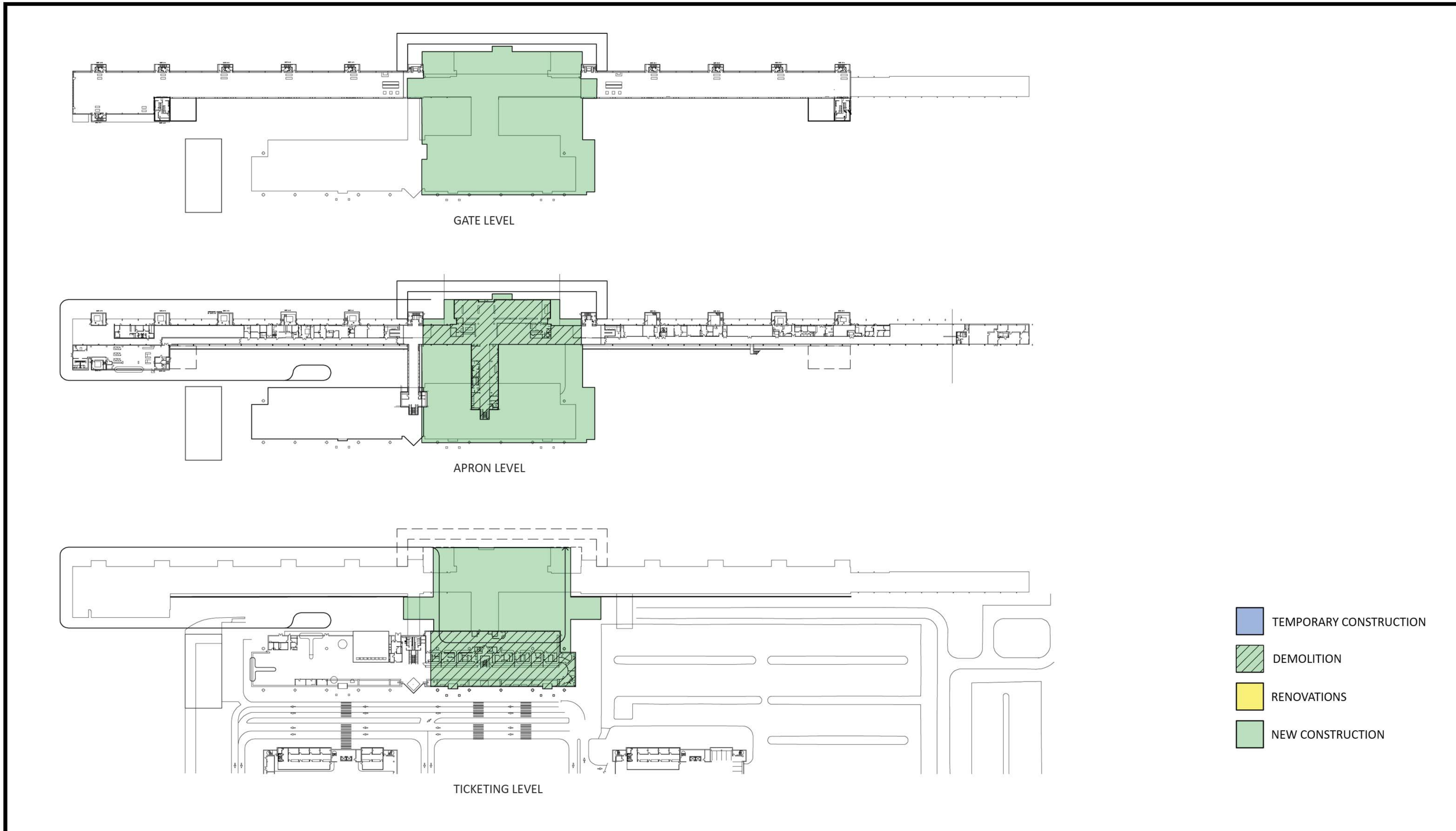
4. Demolition and New Construction

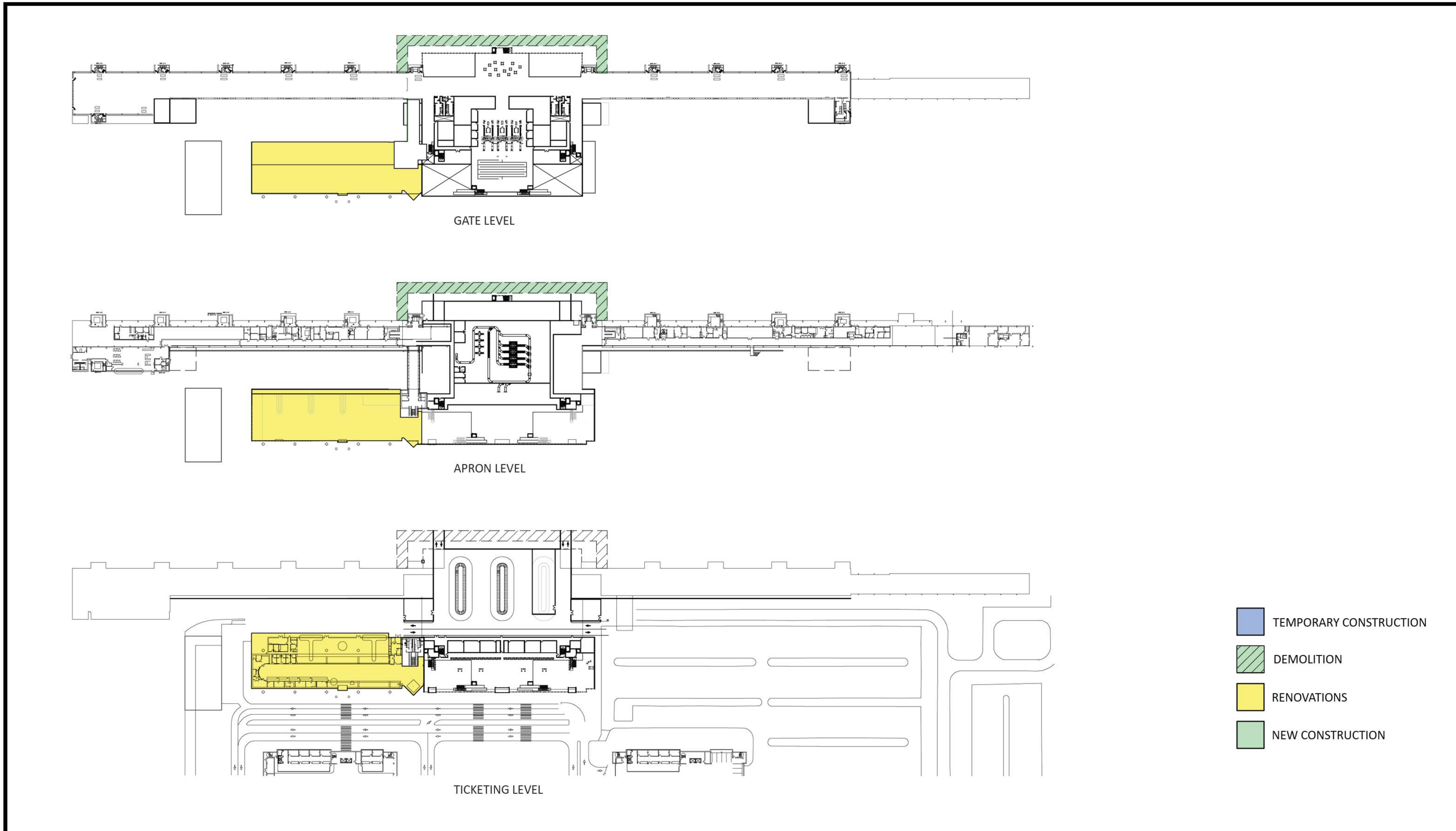
Once the temporary facilities are in place, demolition of the central core and new construction can begin.

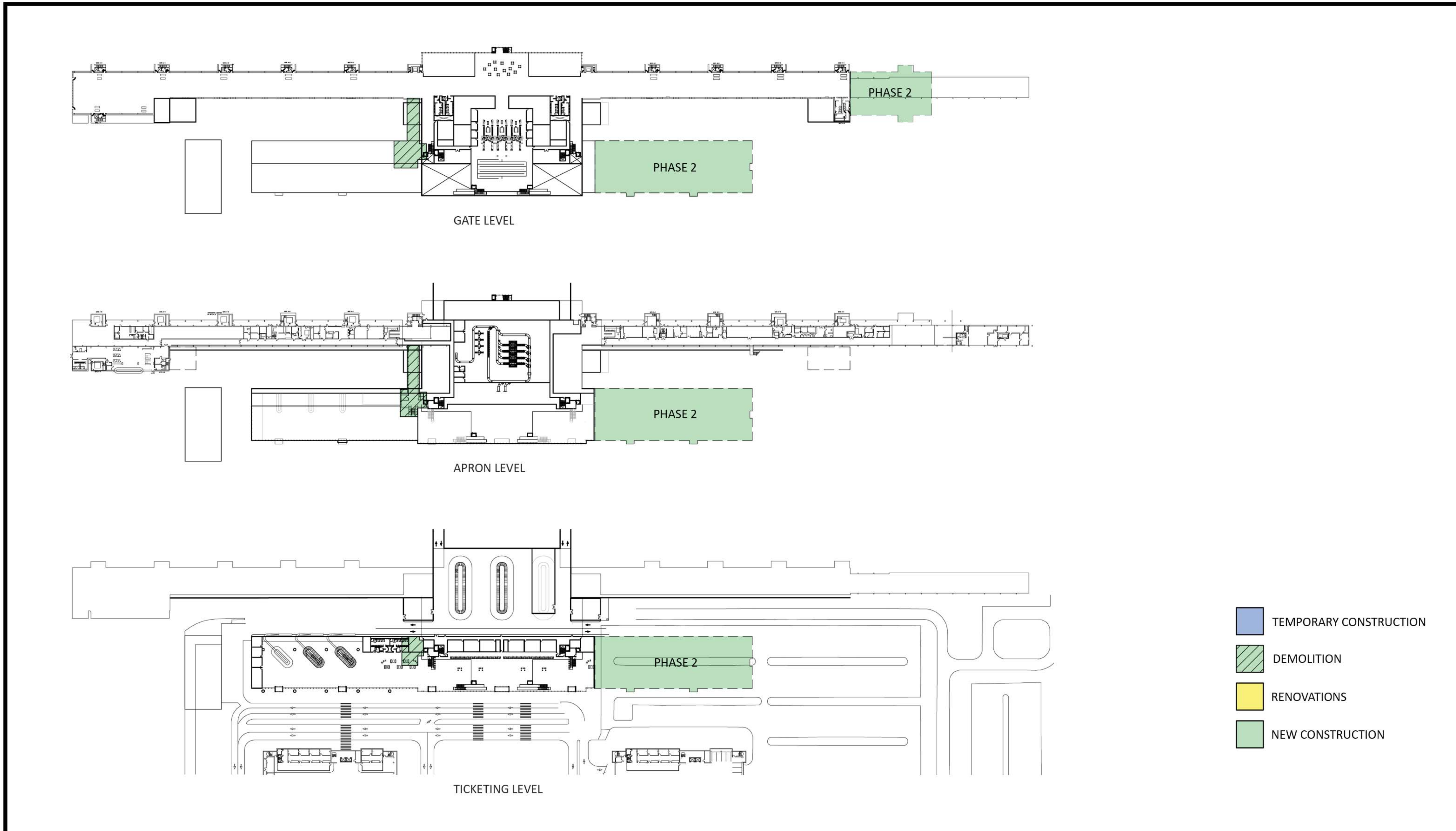
5. Renovation of the Existing Baggage Claim Wing

Sequential renovation of the existing baggage claim wing can occur once the new facilities are in place. This would include the removal of temporary facilities and the addition of a new baggage claim device, the replacement of existing devices and the conveyors associated with them. In addition to the above, finishes will be replaced to match the finishes in the newly constructed central core.


GATE LEVEL
APRON LEVEL
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION


GATE LEVEL
APRON LEVEL
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

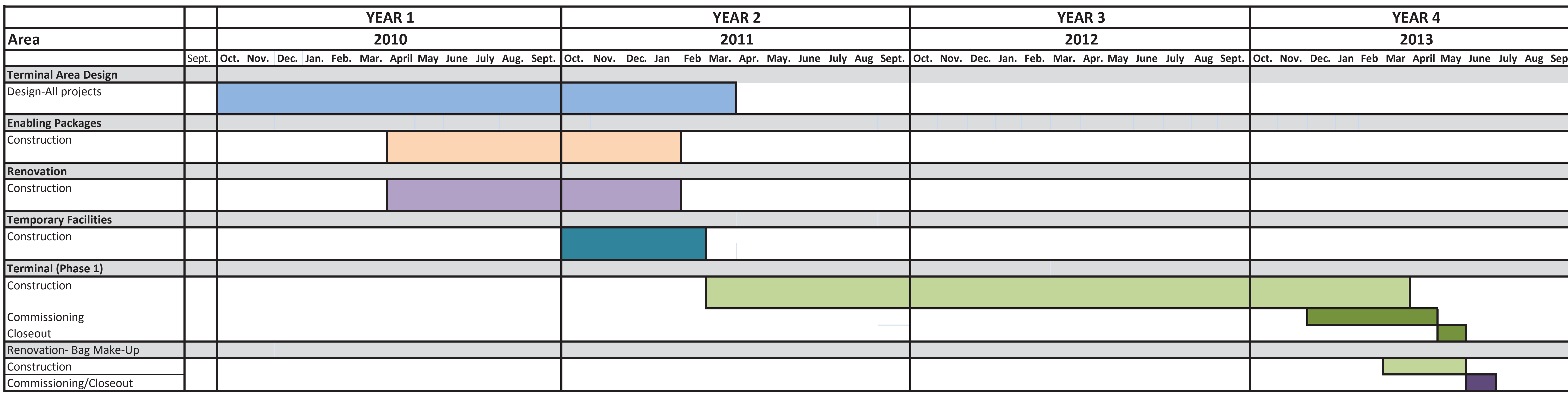

GATE LEVEL
APRON LEVEL
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION


PHASE 2
PHASE 2
GATE LEVEL
PHASE 2
APRON LEVEL
PHASE 2
TICKETING LEVEL
TEMPORARY CONSTRUCTION
DEMOLITION
RENOVATIONS
NEW CONSTRUCTION

9.3 SCHEDULE

The overall schedule for design and construction is anticipated to take approximately 45 months.

GREENVILLE SPARTANBURG
RENOV./EXPANSION
PRELIMINARY SCHEDULE



9.4 ESTIMATED CONSTRUCTION COST

9.4.1 CONSTRUCTION COSTS

A conceptual estimate of construction cost has been prepared. This estimate is based on cost per S.F. of similar projects completed recently and on data obtained from national data bases such as Means Cost Data.

Different costs per S.F. were assigned to different types of construction based on their level of complexity. The costs range from $100/s.f. to $375/s.f.

Factors were added for elements of the design which quantities and costs are unknown at the moment. These are: Sustainability- four percent; Site Development- two percent; Phasing/Temporary Construction- five percent; and Escalation to July 2012 at 3 percent per year.

The project is divided into Phase 1 and Phase 2 due to the fact that the airport will not immediately need all of the facilities required in the "2 Million Enplanement" scenario. The estimate includes a column labeled "2012 Complete Build Out" which indicates what the cost will be to build all of the facilities required for the 2 million enplanements at this time; a cost for only Phase 1 (what's needed now); a cost for "Phase 2" which is escalated to start in 20 yrs.; and a total for "Total Phased Construction" which includes both Phase 1 (built now) and Phase 2 (built 20 yrs. from now).

The joint consultant/staff recommendation is to build only Phase 1 at this time for a total estimated cost of $86,463,707. This results in approximately $264/s.f. of construction.

9.4.2 PROJECT COSTS

Estimated Fees for a project of this size and complexity, including enabling packages and renovation were added to the construction cost estimate to arrive at a total estimated project cost of $98,403,707.

9.4.3 OTHER ESTIMATES

Estimates for other options presented are also included in this section for comparative purposes.

9.4.4 PROJECT FUNDING

Included in this section is a graphic indicating Phase 1 areas eligible for AIP funding, PFC funding and TSA funding. Also included, is a chart indicating the s.f. areas and the percentages of funding eligibility for AIP. A similar chart is included for TSA funding eligibility.

9.5 TOTAL ANTICIPATED FUNDING AND CASH FLOW

The cost of the project was spread out over a period of four years based on the currently proposed construction sequencing for the entire project. Based on the anticipated funding, costs, funding and sponsor share of costs were indicated in the cash flow diagram included in this section.

9.6 RECOMMENDED DELIVERY METHOD

The current preferred delivery method for the expansion and renovation project described in this document as "Option 1C" is Construction Management at Risk (CM at Risk) with a Guaranteed Maximum Price (GMP). This delivery method involves the construction manager in the design team for a "pre-construction" period and allows for agreement on scope of work, cost and schedule followed by an early GMP. It allows for a "teaming" relationship among consultant, construction manager and owner and yields the benefits of early construction costing and value engineering. This method can be effective in controlling cost and schedule .

9.7 TECHNICAL DISCIPLINES

The goals established for the design and construction of the GSP International Airport project require the involvement of a number of engineering and specialty consultants.

It is important that RBGB (the sustainability consultant for the project) remain involved in every aspect of the development of the project in order to reach a unified sustainable solution from the onset which will permeate every area of the project. Additionally, the following disciplines of work and aviation specialties will play a role in the design of the terminal:

- Surveying
- Geotechnical Engineering
- Civil Engineering
- Structural Engineering
- Life Safety Analysis
- Mechanical
- Plumbing
- Fire Protection
- Electrical
- Communications
- Baggage Systems
- Wayfinding and Signage
- Acoustical Systems
- Interior Design

RS&H, as a full service firm, encompasses most of these services in-house. Some services will be provided by sub-consultants because of need for specialization or as a measure for the utilization of local and other consultants.

9.8 CONCLUSION

The development of this project will continue already having established solid goals and a logical approach to the project. Although changes may, and probably will, occur as the project is fully designed and constructed, the joint decision making during the pre-construction phase will assist in keeping changes to a minimum.

The aforementioned implementation parameters cover the essential elements to be addressed during the design and construction of this project.

CONSTRUCTION COST ESTIMATE FOR OPTION 1A

				Construction Category							Construction Phases			
				Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	2012 Complete Buildout	2012 Phase 1 Construction	* 2030 Phase 2 Construction	Total Phased Construction
				$100	$125	$150	$175	$250	$275	$375				
LEVEL											2 Million Enplanements	PHASE 1	PHASE 2	TOTAL PHASED
TICKETING	Ticketing (Demo & New 3 Levels)	44,863	SF							$16,823,625	$16,823,625	$16,823,625		$16,823,625
	Baggage Claim (Exist. Renov.) Ph 1	19,484	SF				$3,409,700				$3,409,700	$3,409,700		$3,409,700
	Car Rental Areas (Garage A) Ph 1	3,992	SF		$499,000						$499,000	$499,000		$499,000
	Baggage Makeup (New)	51,151	SF			$7,672,650					$7,672,650	$7,672,650		$7,672,650
	Inbound Baggage Canopy Ph 1	4,958	SF	$495,800							$495,800	$495,800		$495,800
	Subtotal Ticketing Level - Phase 1	124,448	SF	$495,800	$499,000	$7,672,650	$3,409,700	$0	$0	$16,823,625	$28,900,775	$28,900,775		$28,900,775
	Baggage Claim (New) Ph 2	27,922	SF						$7,678,550		$7,678,550		$13,053,535	$13,053,535
	Car Rental Areas (Garage B) Ph 2	3,992	SF		$499,000						$499,000		$848,300	$848,300
	Inbound Baggage Canopy Ph 2	4,958	SF	$495,800							$495,800		$842,860	$842,860
	Subtotal Ticketing Level - Phase 2	36,872	SF	$495,800	$499,000	$0	$0	$0	$7,678,550	$0	$8,673,350		$14,744,695	$14,744,695
	Total Ticketing Level - Phase 1 & 2	161,320	SF	$991,600	$998,000	$7,672,650	$3,409,700	$0	$7,678,550	$16,823,625	$37,574,125	$28,900,775	$14,744,695	$43,645,470
APRON	Baggage Screening and Mechanical - Phase 1	67,593	SF				$11,828,775				$11,828,775	$11,828,775		$11,828,775
	Mechanical - Phase 2	2,808	SF	$280,800							$280,800	$280,800		$280,800
	Total Apron Level - Phase 1 & 2	70,401	SF	$280,800	$0	$0	$11,828,775	$0	$0	$0	$12,109,575	$12,109,575	$0	$12,109,575
GATE	Passenger Screening (New)	68,747	SF					$17,186,750			$17,186,750	$17,186,750		$17,186,750
	Holdrooms (North/South Renovation)	66,249	SF				$11,593,575				$11,593,575	$11,593,575		$11,593,575
	Concessions	1,315	SF	$385,965				$328,750			$714,715	$714,715		$714,715
	Toilet Rooms	4,540	SF							$1,702,500	$1,702,500	$1,702,500		$1,702,500
	Subtotal Gate Level - Phase 1	140,851	SF	$385,965	$0	$0	$11,593,575	$17,515,500	$0	$1,702,500	$31,197,540	$31,197,540		$31,197,540
	Holdroom (North Expansion) Ph 2	13,393	SF							$5,022,375	$5,022,375		$8,538,038	$8,538,038
	Subtotal Gate Level - Phase 2	13,393	SF	$0	$0	$0	$0	$0	$0	$5,022,375	$5,022,375	$0	$8,538,038	$8,538,038
	Total Gate Level - Phase 1 & 2	154,244	SF	$385,965	$0	$0	$11,593,575	$17,515,500	$0	$6,724,875	$36,219,915	$31,197,540	$8,538,038	$39,735,578
	Subtotal Terminal - Phase 1	332,892		881,765	499,000	7,672,650	26,832,050	17,515,500	0	18,526,125	71,927,090	71,927,090		71,927,090
	Subtotal Terminal - Phase 2	53,073		776,600	499,000	0	0	0	7,678,550	5,022,375	13,976,525		13,976,525	13976525
	Total Terminal Construction	385,965	SF	$1,658,365	$998,000	$7,672,650	$26,832,050	$17,515,500	$7,678,550	$23,548,500	$85,903,615	$71,927,090	$13,976,525	$85,903,615
OTHER THAN TERMINAL	Central Plant Building **	10,000	SF	$1,000,000							$1,000,000	$1,000,000		$1,000,000
	Curbside Canopy Ph 1	19,539	SF	$1,953,900							$1,953,900	$1,953,900		$1,953,900
	Curbside Canopy Ph 2	12,537	SF	$1,253,700							$1,253,700		$2,131,290	$2,131,290
	Road (New) Ph 2	32,000	SF	$3,200,000							$3,200,000		$5,440,000	$5,440,000
	Subtotal Other Than Terminal			$7,407,600	$0	$0	$0	$0	$0	$0	$7,407,600	$2,953,900	$7,571,290	$10,525,190
	Total Terminal and Other			$9,451,930	$998,000	$7,672,650	$38,425,625	$35,031,000	$7,678,550	$30,273,375	$93,311,215	$74,880,990	$21,547,815	$96,428,805
CONSTRUCTION SOFT COSTS	Sustanability Factor	4%									$3,732,449	$2,995,240	$861,913	$3,857,152
	Site Development	2%									$1,866,224	$1,497,620	$430,956	$1,928,576
	Phasing / Temporary Construction	5%									$4,665,561	$3,744,050	$1,077,391	$4,821,440
	Escalation to July 2012 (3% per yr.)	6%									$5,598,673	$4,492,859	$1,292,869	$5,785,728
	Subtotal Construction Soft costs										$15,862,907	$12,729,768	$3,663,129	$16,392,897
	Total Construction Cost Estimate										$ 109,174,122	$ 87,610,758	$ 25,210,944	$ 112,821,702
										Cost Per Square Foot	$283	$263	$475	$292
FEES	Design Fees										$9,716,000	$7,797,000	$2,243,000	$10,040,000
	Construction Administration (CA)										$4,148,000	$3,329,000	$958,000	$4,287,000
	Resident Project Representative (RPR)										$1,200,000	$960,000	$408,000	$1,368,000
	Subtotal Fees									Total Fees	$15,064,000	$12,086,000	$3,609,000	$15,695,000
	Total Project Cost										$ 124,238,122	$ 99,696,758	$ 28,819,944	$ 128,516,702

* Escalation to 2030 + 70 % (3% per yr.)

**May reduce square footage areas from Terminal HVAC areas.

CONSTRUCTION COST ESTIMATE FOR OPTION 1B

				Construction Category							Construction Phases			
				Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	2012 Complete Buildout	2012 Phase 1 Construction	* 2030 Phase 2 Construction	Total Phased Construction
				$100	$125	$150	$175	$250	$275	$375				
LEVEL											2 Million Enplanements	PHASE 1	PHASE 2	TOTAL PHASED
TICKETING	Ticketing (Demo & New 3 Levels)	62,511	SF							$23,441,625	$23,441,625	$23,441,625		$23,441,625
	Baggage Claim (Exist. Renov.) Ph 1	19,916	SF				$3,485,300				$3,485,300	$3,485,300		$3,485,300
	Car Rental Areas (Garage A) Ph 1	3,992	SF		$499,000						$499,000	$499,000		$499,000
	Baggage Screening	31,898	SF				$5,582,150				$5,582,150	$5,582,150		$5,582,150
	Inbound Baggage Canopy Ph 1	4,958	SF	$495,800							$495,800	$495,800		$495,800
	Subtotal Ticketing Level - Phase 1	123,275	SF	$495,800	$499,000	$0	$9,067,450	$0	$0	$23,441,625	$33,503,875	$33,503,875		$33,503,875
	Baggage Claim (New) Ph 2	26,605	SF						$7,316,375		$7,316,375		$12,437,838	$12,437,838
	Car Rental Areas (Garage B) Ph 2	3,992	SF		$499,000						$499,000		$848,300	$848,300
	Inbound Baggage Canopy Ph 2	4,958	SF	$495,800							$495,800		$842,860	$842,860
	Subtotal Ticketing Level - Phase 2	35,555	SF	$495,800	$499,000	$0	$0	$0	$7,316,375	$0	$8,311,175		$14,128,998	$14,128,998
	Total Ticketing Level - Phase 1 & 2	158,830	SF	$991,600	$998,000	$0	$9,067,450	$0	$7,316,375	$23,441,625	$41,815,050	$33,503,875	$14,128,998	$47,632,873
APRON	Baggage Make-Up - Phase 1	78,562	SF			$11,784,300					$11,784,300	$11,784,300		$11,784,300
	Mechanical - Phase 2	8,122	SF	$812,200							$812,200	$812,200		$812,200
	Total Apron Level - Phase 1 & 2	86,684	SF	$812,200	$0	$11,784,300	$0	$0	$0	$0	$12,596,500	$12,596,500	$0	$12,596,500
GATE	Passenger Screening (New)	69,086	SF					$17,271,500			$17,271,500	$17,271,500		$17,271,500
	Holdrooms (North/South Renovation)	66,249	SF				$11,593,575				$11,593,575	$11,593,575		$11,593,575
	Concessions	1,315	SF	$400,097				$328,750			$728,847	$728,847		$728,847
	Toilet Rooms	4,540	SF							$1,702,500	$1,702,500	$1,702,500		$1,702,500
	Subtotal Gate Level - Phase 1	141,190	SF	$400,097	$0	$0	$11,593,575	$17,600,250	$0	$1,702,500	$31,296,422	$31,296,422		$31,296,422
	Holdroom (North Expansion) Ph 2	13,393	SF							$5,022,375	$5,022,375		$8,538,038	$8,538,038
	Subtotal Gate Level - Phase 2	13,393	SF	$0	$0	$0	$0	$0	$0	$5,022,375	$5,022,375	$0	$8,538,038	$8,538,038
	Total Gate Level - Phase 1 & 2	154,583	SF	$400,097	$0	$0	$11,593,575	$17,600,250	$0	$6,724,875	$36,318,797	$31,296,422	$8,538,038	$39,834,460
	Subtotal Terminal - Phase 1	343,027		895,897	499,000	11,784,300	20,661,025	17,600,250	0	25,144,125	76,584,597	76,584,597		76,584,597
	Subtotal Terminal - Phase 2	57,070		1,308,000	499,000	0	0	0	7,316,375	5,022,375	14,145,750		14,145,750	14145750
	Total Terminal Construction	400,097	SF	$2,203,897	$998,000	$11,784,300	$20,661,025	$17,600,250	$7,316,375	$30,166,500	$90,730,347	$76,584,597	$14,145,750	$90,730,347
OTHER THAN TERMINAL	Central Plant Building **	10,000	SF	$1,000,000							$1,000,000	$1,000,000		$1,000,000
	Curbside Canopy Ph 1	19,539	SF	$1,953,900							$1,953,900	$1,953,900		$1,953,900
	Curbside Canopy Ph 2	12,537	SF	$1,253,700							$1,253,700		$2,131,290	$2,131,290
	Road (New) Ph 2	32,000	SF	$3,200,000							$3,200,000		$5,440,000	$5,440,000
	Subtotal Other Than Terminal			$7,407,600	$0	$0	$0	$0	$0	$0	$7,407,600	$2,953,900	$7,571,290	$10,525,190
	Total Terminal and Other			$10,011,594	$998,000	$11,784,300	$32,254,600	$35,200,500	$7,316,375	$36,891,375	$98,137,947	$79,538,497	$21,717,040	$101,255,537
CONSTRUCTION SOFT COSTS	Sustainability Factor	4%									$3,925,518	$3,181,540	$868,682	$4,050,221
	Site Development	2%									$1,962,759	$1,590,770	$434,341	$2,025,111
	Phasing / Temporary Construction	5%									$4,906,897	$3,976,925	$1,085,852	$5,062,777
	Escalation to July 2012 (3% per yr.)	6%									$5,888,277	$4,772,310	$1,303,022	$6,075,332
	Subtotal Construction Soft costs										$16,683,451	$13,521,544	$3,691,897	$17,213,441
	Total Construction Cost										$114,821,398	$93,060,041	$25,408,937	$118,468,978
										Cost Per Square Foot	$287	$271	$445	$296
FEES	Design Fees										$10,219,000	$8,282,000	$2,261,000	$10,543,000
	Construction Administration (CA)										$3,729,000	$3,536,000	$965,000	$4,501,000
	Resident Project Representative (RPR)										$1,200,000	$960,000	$408,000	$1,368,000
	Subtotal Fees									Total Fees	$15,148,000	$12,778,000	$3,634,000	$16,412,000
	Total Project Cost										$129,969,398	$105,838,041	$29,042,937	$134,880,978

* Escalation to 2030 + 70 % (3% per yr.)
**May reduce square footage areas from Terminal HVAC areas.

CONSTRUCTION COST ESTIMATE FOR OPTION 1C

				Construction Category							Construction Phases			
				Unti Price	Unti Price	Unti Price	Unti Price	Unti Price	Unti Price	Unti Price	2012 Complete Buildout	2012 Phase 1 Construction	* 2030 Phase 2 Construction	Total Phased Construction
				$100	$125	$150	$175	$250	$275	$375				
LEVEL											2 Million Enplanements	PHASE 1	PHASE 2	TOTAL PHASED
TICKETING	Ticketing (Demo & New 3 Levels)	44,000	SF							$16,500,000	$16,500,000	$16,500,000		$16,500,000
	Baggage Claim (Exist. Renov.) Ph 1	19,439	SF				$3,401,825				$3,401,825	$3,401,825		$3,401,825
	Car Rental Areas (Garage A) Ph 1	3,992	SF		$499,000						$499,000	$499,000		$499,000
	Baggage Makeup (New)	51,199	SF			$7,679,850					$7,679,850	$7,679,850		$7,679,850
	Inbound Baggage Canopy Ph 1	4,958	SF	$495,800							$495,800	$495,800		$495,800
	Subtotal Ticketing Level - Phase 1	123,588	SF	$495,800	$499,000	$7,679,850	$3,401,825	$0	$0	$16,500,000	$28,576,475	$28,576,475		$28,576,475
	Baggage Claim (New) Ph 2	30,959	SF						$8,513,725		$8,513,725		$14,473,333	$14,473,333
	Car Rental Areas (Garage B) Ph 2	3,992	SF		$499,000						$499,000		$848,300	$848,300
	Inbound Baggage Canopy Ph 2	4,958	SF	$495,800							$495,800		$842,860	$842,860
	Subtotal Ticketing Level - Phase 2	39,909	SF	$495,800	$499,000	$0	$0	$0	$8,513,725	$0	$9,508,525		$16,164,493	$16,164,493
	Total Ticketing Level - Phase 1 & 2	163,497	SF	$991,600	$998,000	$7,679,850	$3,401,825	$0	$8,513,725	$16,500,000	$38,085,000	$28,576,475	$16,164,493	$44,740,968
APRON	Baggage Screening and Mechanical - Phase 1	62,605	SF				$10,955,875				$10,955,875	$10,955,875		$10,955,875
	Mechanical - Phase 2	2,808	SF	$280,800							$280,800	$280,800		$280,800
	Total Apron Level - Phase 1 & 2	65,413	SF	$280,800	$0	$0	$10,955,875	$0	$0	$0	$11,236,675	$11,236,675	$0	$11,236,675
GATE	Passenger Screening (New)	69,622	SF					$17,405,500			$17,405,500	$17,405,500		$17,405,500
	Holdrooms (North/South Renovation)	66,249	SF				$11,593,575				$11,593,575	$11,593,575		$11,593,575
	Concessions	1,315	SF	$384,029				$328,750			$712,779	$712,779		$712,779
	Toilet Rooms	4,540	SF							$1,702,500	$1,702,500	$1,702,500		$1,702,500
	Subtotal Gate Level - Phase 1	141,726	SF	$384,029	$0	$0	$11,593,575	$17,734,250	$0	$1,702,500	$31,414,354	$31,414,354		$31,414,354
	Holdroom (North Expansion) Ph 2	13,393	SF							$5,022,375	$5,022,375		$8,538,038	$8,538,038
	Subtotal Gate Level - Phase 2	13,393	SF	$0	$0	$0	$0	$0	$0	$5,022,375	$5,022,375	$0	$8,538,038	$8,538,038
	Total Gate Level - Phase 1 & 2	155,119	SF	$384,029	$0	$0	$11,593,575	$17,734,250	$0	$6,724,875	$36,436,729	$31,414,354	$8,538,038	$39,952,392
	Subtotal Terminal - Phase 1	327,919		879,829	499,000	7,679,850	25,951,275	17,734,250	0	18,202,500	70,946,704	70,946,704		70,946,704
	Subtotal Terminal - Phase 2	56,110		776,600	499,000	0	0	0	8,513,725	5,022,375	14,811,700		14,811,700	14811700
	Total Terminal Construction	384,029	SF	$1,656,429	$998,000	$7,679,850	$25,951,275	$17,734,250	$8,513,725	$23,224,875	$85,758,404	$70,946,704	$14,811,700	$85,758,404
OTHER THAN TERMINAL	Central Plant Building **	10,000	SF	$1,000,000							$1,000,000	$1,000,000		$1,000,000
	Curbside Canopy Ph 1	19,539	SF	$1,953,900							$1,953,900	$1,953,900		$1,953,900
	Curbside Canopy Ph 2	12,537	SF	$1,253,700							$1,253,700		$2,131,290	$2,131,290
	Road (New) Ph 2	32,000	SF	$3,200,000							$3,200,000		$5,440,000	$5,440,000
	Subtotal Other Than Terminal			$7,407,600	$0	$0	$0	$0	$0	$0	$7,407,600	$2,953,900	$7,571,290	$10,525,190
	Total Terminal and Other			$9,448,058	$998,000	$7,679,850	$37,544,850	$35,468,500	$8,513,725	$29,949,750	$93,166,004	$73,900,604	$22,382,990	$96,283,594
CONSTRUCTION SOFT COSTS	Sustanability Factor	4%									$3,726,640	$2,956,024	$895,320	$3,851,344
	Site Development	2%									$1,863,320	$1,478,012	$447,660	$1,925,672
	Phasing / Temporary Construction	5%									$4,658,300	$3,695,030	$1,119,150	$4,814,180
	Escalation to July 2012 (3% per yr.)	6%									$5,589,960	$4,434,036	$1,342,979	$5,777,016
	Subtotal Construction Soft costs										$15,838,221	$12,563,103	$3,805,108	$16,368,211
	Total Construction Cost										$109,004,225	$86,463,707	$26,188,098	$112,651,805
										Cost Per Square Foot	$284	$264	$467	$293
FEES	A/E Fees													
	Design Fees										$9,701,000	$7,695,000	$2,330,000	$10,025,000
	Construction Administration (CA)										$3,540,000	$3,285,000	$995,000	$4,280,000
	Resident Project Representative (RPR)										$1,200,000	$960,000	$408,000	$1,368,000
	Subtotal Fees									Total Fees	$14,441,000	$11,940,000	$3,733,000	$15,673,000
	Total Project Cost										$123,445,225	$98,403,707	$29,921,098	$128,324,805

* Escalation to 2030 + 70 % (3% per yr.)

**May reduce square footage areas from Terminal HVAC areas.

CONSTRUCTION COST ESTIMATE FOR OPTION 2

				Construction Category							
				Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	Unit Price	Total Construction
				$100	$125	$150	$175	$250	$275	$375	
LEVEL											900,000 Annual Enplanements
TICKETING/ BAG CLAIM	Ticketing (Demo & New 3 Levels)	32,274	SF						$8,875,350		$8,875,350
	Baggage Screening and Mechanical	34,768	SF					$8,692,000			$8,692,000
	Baggage Claim (Exist. Renov.)	25,467	SF				$4,456,725				$4,456,725
	Car Rental Areas (Garage A)	3,992	SF		$499,000						$499,000
	Baggage Makeup	16,704	SF	$1,670,400							$1,670,400
	Inbound Baggage Canopy	5,138	SF	$513,800							$513,800
	Subtotal Ticketing / Baggage Claim Level	118,343	SF	$2,184,200	$499,000	$0	$4,456,725	$8,692,000	$8,875,350	$0	$24,707,275
APRON	Passenger Screening	34,742	SF							$13,028,250	$13,028,250
	Concessions Renovations	22,392	SF						$6,157,800		$6,157,800
	Subtotal Apron Level	57,134	SF	$0	$0	$0	$0	$0	$6,157,800	$13,028,250	$19,186,050
GATE	Holdrooms (North/South Renovation)	66,249	SF				$11,593,575				$11,593,575
	Concessions	1,315	SF					$328,750			$328,750
	Toilet Rooms	4,540	SF							$1,702,500	$1,702,500
	Subtotal Gate Level	72,104	SF	$0	$0	$0	$11,593,575	$328,750	$0	$1,702,500	$13,624,825
	Total Terminal Construction	247,581	SF	$2,184,200	$499,000	$0	$16,050,300	$9,020,750	$15,033,150	$14,730,750	$57,518,150
OTHER											
	Curbside Canopy Ph 1	19,539	SF	$1,953,900							$1,953,900
	Subtotal Other			$1,953,900	$0	$0	$0	$0	$0	$0	$1,953,900
CONSTRUCTION SOFT COSTS	Sustanability Factor	4%									$78,156
	Site Development	2%									$39,078
	Phasing / Temporary Construction	5%									$97,695
	Escalation to July 2012 (3% per yr.)	6%									$117,234
	Subtotal Construction Soft costs										$332,163
	Total Construction Cost										$59,804,213
										Cost Per Square Foot	$242
FEES	A/E Fees										
	Design Fees										$5,322,000
	Construction Administration (CA)										$74,000
	Resident Project Representative (RPR)										$1,000,000
	Subtotal Fees									Total Fees	$6,396,000
	Total Project Cost										$66,200,213

ESTIMATE ASSUMPTIONS

The following estimate assumptions were made on all of the options listed; Option 1A, Option 1B, Option 1C and Option 2.

- Estimate based on average costs per square foot of medium size, quality finished complete terminal building. "Quality" finishes deemed as durable and attractive without being extravagant.
- Different areas assigned different costs per square cost depending on intensity of remodeling, renovation, equipment and constructability.
- Cost are calculated to the exterior wall and external surface of the roof of the building (excluding any exterior mounted fixtures or equipment) unless otherwise specified.
- Construction will be done during regular work hours except where airport operations do not allow.
- Costs do not include resolution of unforeseen utility conflicts or relocation of underground utilities.
- Most efficient contractor's schedule will be used.
- Existing traffic will be maintained to occupied buildings.
- Costs do not include asbestos abatement or cleanup of contamination.
- Concessions built as "shell" space to be finished by concessionaire.
- Costs exclude moving expenses and temporary buildouts for tenants.
- Temporary construction refers to construction necessary to maintain operations of the terminal building.
- Expansion of the layout indicated in Option 2 includes necessary renovation and reconstruction to allow existing areas to function for the added enplanements .
- Costs based on early studies and concept design and will fluctuate as design is developed.
- Cost estimates include baggage conveyance, baggage screening equipment, and baggage screening room fitout. The costs associated with these components may be reduced or entirely offset by direct grants or funding from TSA.

9.9 PROJECT FUNDING

Project funding scenarios have been analyzed and are summarized below. A phased construction scenario which addresses as a first phase a series of "enabling packages" of lesser cost and faster completion schedule than the main terminal core reconstruction would be advantageous in order to reduce the required out-of-pocket costs for the main terminal construction. Reimbursements from AIP and PFC's would replenish the expenditures within a 5-yr multi-year grant while construction of parts of the proposed plan progress.

Below are funding opportunities to be considered for this project:

Small hub airports generally have difficult choices to make when constructing or improving a terminal. Unlike the smaller airports in the nonhub category, AIP discretionary cannot be given for terminal development at small hub airports. Likewise, small hub airports cannot use AIP funding for revenue-producing areas of the terminal or nonrevenue-producing parking lots. So, a small hub is treated much the same as a large or medium hub airport but does not have the revenue-producing capabilities of its larger relatives.

Care should therefore be given to make sure that the project is scoped properly and that certain related parts are not unfairly treated as terminal development.

Areas to Explore: Some commonly constructed areas to review that could be considered not to be part of terminal development include:

1. Apron Construction. None of the apron work itself is terminal development and should be separated from the terminal project costs as it can be funded with discretionary funds.
2. Access Controls. Access controls are covered by section 47102 of the AIP law as being security equipment required by rule or regulation and can be funded with discretionary funds and seek a separate project for this part of the program.

Overall Eligibility for Funding: Terminal development at airports is defined by the FAA in its AIP handbook as follows—

"TERMINAL DEVELOPMENT. Typical eligible items include baggage claim delivery areas, automated baggage handling equipment (see Paragraph 602c for limitations), public-use corridors to boarding areas, central waiting rooms, restrooms, holding areas, and foyers and entryways, as well as passenger loading bridges and handicapped boarding assistance devices.

Normally FAA will also use a proration method to determine eligibility of areas that serve both eligible and ineligible areas. Generally a computation is made of the amount of space to the total space to determine a proration factor for the eligibility for things like roofs, utilities foundations etc. Only common use items like utilities should be subject to proration.

Structure of Funding: The request for funding can be submitted as separate projects under the program or as a list of projects. This list should be clearly annotated with the type of funding requested. Since the clear terminal work can only be funded with entitlements, the other projects such as the apron work (with terminal concourse demolition) and the access control project should be listed separately for discretionary funding.

Typical Scope of Small Hub Funding: Under the law, a small hub can finance a terminal with entitlements or Passenger Facility Charges (PFCs).

a. AIP Entitlements. With AIP being extended for short periods of time, the terminal project can only receive the amount of entitlements that are actually available to an airport. Using the example of the median level of a small hub airport at about 700,000 annual enplanements, an airport of this size receives about $3.7 million annually. That, plus any remaining entitlements from previous years, is the amount that a grant could be issued in 2010 (assuming that AIP is extended to September 30, 2010.) However, if AIP is extended for five years and the timing is correct, the airport could request a "multi-year" grant for 5 years of entitlements (or $18.5 million). The aprons and access control security work could be funded at any time using single grants of discretionary or funds from the small hub fund.

   Another approach permitted by law, but has some risk (albeit minor), is that an airport could finance the terminal construction and “pay itself back” using future entitlements. The risk is obvious even if unlikely—if AIP is not reauthorized or if there are no entitlements in the future, the airport would need to pay off debt without Federal support. An airport would need to coordinate with FAA about this approach for an analysis of the possibility of higher priority need in the future (something like a runway rehabilitation or other high priority project) as well as to assure that the terminal project meets all Federal requirements. The law permitting use of future entitlements requires that the project has met all Federal administrative and statutory requirements, such as DBE, Davis-Bacon, etc.

b. PFC. Another funding tool is the PFC revenue. An airport can be approved to collect and use a PFC to construct a tower. Using the same median size small hub airport as an example, the maximum that could be collected would be approximately $3.2 million per year. Many airports have financed large projects over many years (Denver, for example, was approved for a 30-year PFC for the construction of the new airport.) A common method would be for the issuance of bonds to produce a funding amount and then the use of PFCs to repay the bond, including bond costs (like interest, etc.)

A full financial analysis can be performed to determine the best financing approach using all of the tools (AIP, local funding, bond funding, PFCs, etc.) Just using the example above, the combination over the next five years using future entitlements and PFC’s could produce $34.5 million. Extending out the PFC amount for 10 years but keeping the entitlements at five years, would produce $48 million. If there is an increase in the PFC collection amount authorized by Congress in the AIP reauthorization to $6 per passenger (currently at $4.5), the 10 year PFC plus the five year entitlements would amount to $76 million. At a level of $6, shorter periods of entitlement use could be used or even eliminate the need for any pledging of entitlements depending on the cost of the terminal development. But an in-depth funding analysis based on the specific circumstances of the small hub should be undertaken.

Use of Discretionary Funding: As stated earlier, small hub airports cannot be provided with discretionary funding (including funds from the small hub fund). If this approach would be pursued, it would require special legislation either in the AIP reauthorization being debated or the next (or future) appropriations legislation. These two vehicles have different approaches but neither would be easy to attain. The reauthorization type of legislation is traditionally written more generally than appropriation language and would require some conditions that would limit its use to the individual airport to have any chance. The appropriation language is written more directly in that it generally names individual airport and the amount of funding. Both are considered “earmarks” which are not as popular in the current political climate. In any event, both approaches would need to use language such as “notwithstanding section 47119(b) of title 49, United States Code” in order to permit the use of discretionary funding. An additional reference to section 47110(d) could be added to permit the use of funding in revenue-producing areas.”

It should be noted that the higher the amount of discretionary funding the more remote the chances are for its passage.

TSA FUNDING (FROM TSA PLANNING GUIDELINES AND DESIGN STANDARDS BY CHECKED BAGGAGE INSPECTION SYSTEMS.) VERSION 3.0 11/27/2009

TSA. “TSA funding is subject to approval on a one-by-one basis and the eligibility and magnitude of their grants have not been entirely consistent. Generally, TSA will purchase the screening equipment to be utilized for both passengers and baggage. TSA will either purchase or fund the furnishings and equipment required for their functions, including movable partitions. If eligible, conveyance equipment dedicated solely to baggage screening functions could be reimbursed, as well as any additional costs incurred for changes in requirements or transportation/installation of equipment. The current TSA, Checked Baggage Inspection Systems guidelines indicate that :

- TSA supports basic interior wall construction only. Costs in excess of basic interior wall construction and finish are nonreimbursable.
- TSA supports basic interior wall finishes and buildout of interior spaces in bag inspection rooms. Costs in excess of basic finishes are nonreimbursable.
- Buildout of the interior space is defined to include:

  Installation of electrical and communications systems, including:

  – Circuit panels – Telephone or communication junctions

  – Transformers and other electrical components required to support TSA.
- Installation of any necessary heating or cooling systems to ensure that the environment in which EDS machines are located will support their operation.
- Sprinkler systems and alarms as required by code.
- Insulation and drywall associated specifically with the CBRA or OSR room.
- Provision for adequate lighting in the CBRA, OSR room, and CBIS area.
- Items may be negotiated by TSA as necessary to address the specific airport’s CBIS installation. These costs may include installation of a reinforced floor or added cost for installation of structural steel necessary to bolster flooring under the CBIS, CBRA, and/or OSR areas to meet structural load requirements.
- TSA supports costs associated with the demolition of existing spaces, modification or renovation of existing spaces, or fit out of newly constructed spaces necessary to support TSA operations. However, TSA will only consider those costs associated with areas necessary for its operation or directly supporting baggage screening operations (e.g., CBRA, OSR room, and CBIS area). (See Section F.3.1.2(a) regarding exterior walls and building shell.)
- TSA supports air conditioning of the OSR room, CBRA, and other areas that will be staffed by TSA field personnel. The exact extent of the heating, ventilation, and air conditioning (HVAC) cost that will be considered eligible for TSA reimbursement is assessed on a case-by-case d. TSA requires lighting, fixtures, switching, and appurtenances in CBIS areas, the CBRA, and the OSR room that meet current minimum National Electrical Code, International Building Code, and Occupational Safety and Health Administration requirements for lighting (lumen per square foot) for office space and to support associated computers,conditioning units, printers, and other ancillary equipment.
- If the following are allocable to the CBIS, OSR room, or CBRA, the following are allowable costs:

  - New power drops

  - Associated transformers

  - Electrical panels or subpanels

  - Communication and network wiring

  - Network and/or communications exchanges

  -Lighting and electrical costs in excess of basic fixtures are TSA nonreimbursable.
- TSA supports basic furnishings within the CBRA and OSR room only, including minimum requirements for work surfaces and lift assist devices, as referenced in the latest revision of the PGDS in effect at the time of OTA enactment. Such minimum requirements include, but may not be limited to, adjustable height work stations and non-powered gravity rollers.
- Costs in excess of basic furnishings are non-reimbursable.
- Closed Circuit Television (CCTV) at the following locations is reimbursable by TSA on a case-by-case basis:

  - The divert point going into the EDS shunt

  - The EDS entrance

  - The exit of the EDS

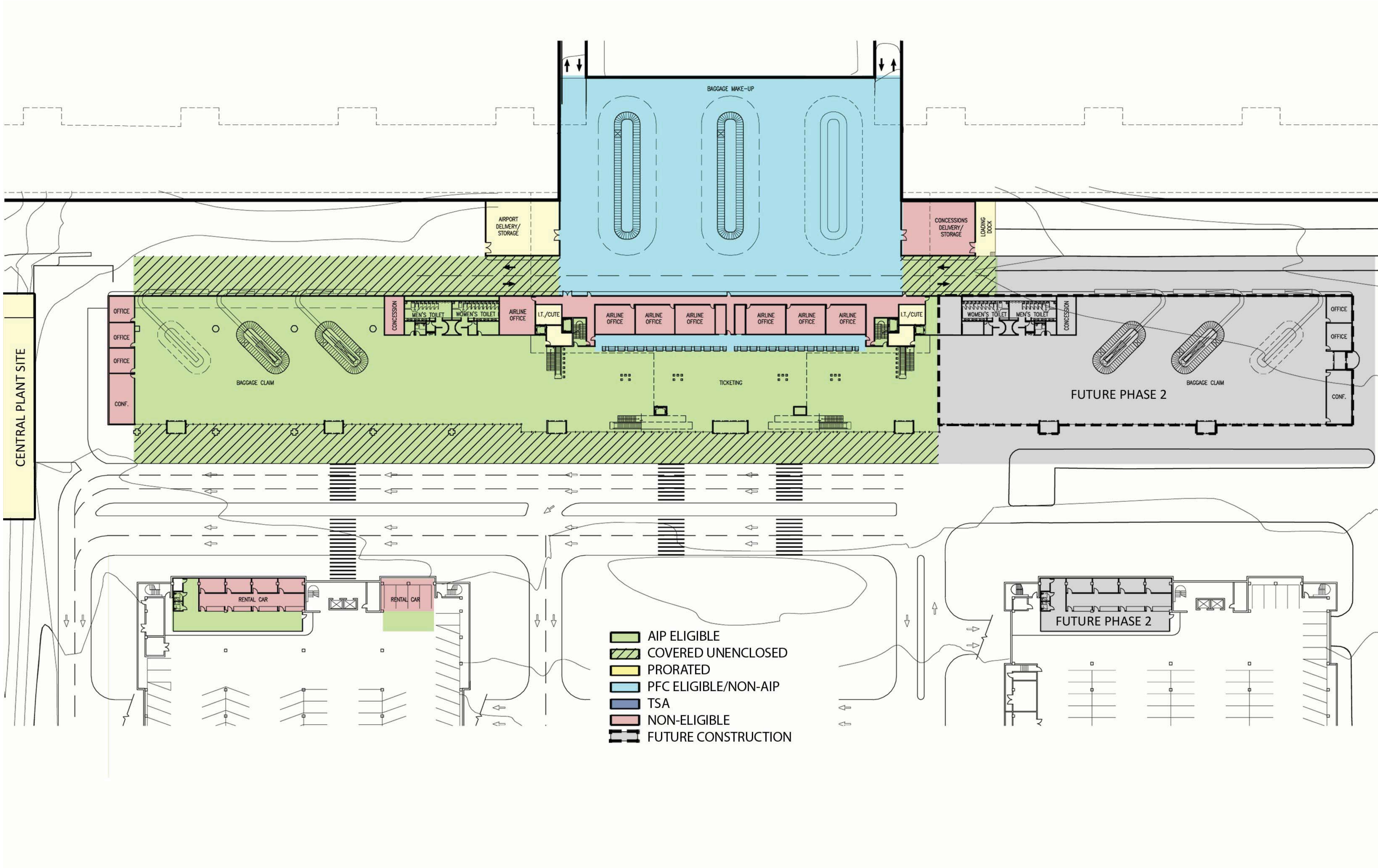
  - The machine clear bag divert point

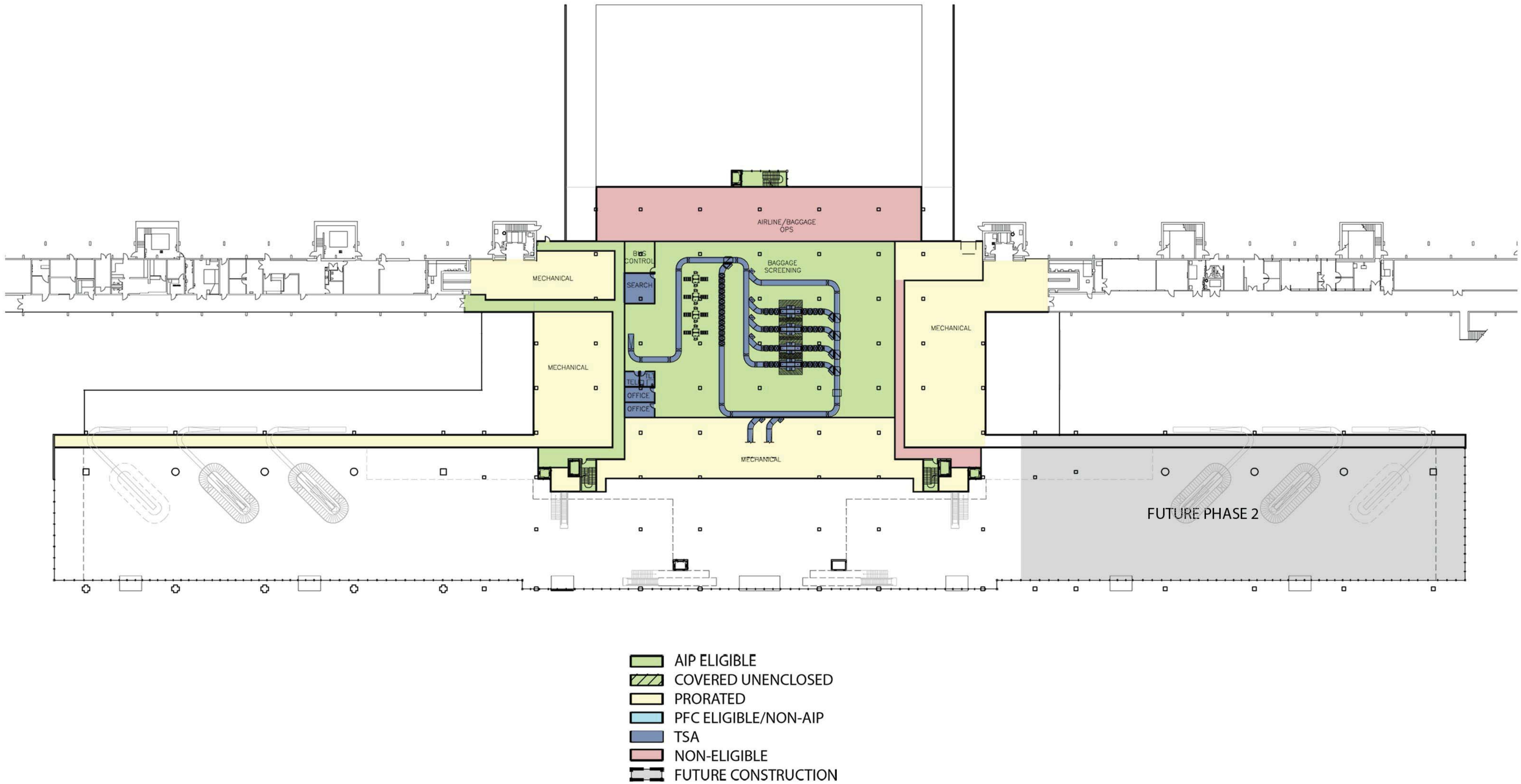
- The point where the OSR line merges into the mainline
- Last chance divert point in a security zone. Eligibility and the exact amount of reimbursement will be determined on a case-by-case basis.

- Sortation cost may be considered reimbursable for systems where bags from multiple ticket counter inputs are merged to be screened in a common matrix then delivered from the matrix and sorted back to the original delivery system.
- Remote baggage system graphics monitors for TSA use are a reimbursable cost.
- TSA will consider reimbursement of the costs for specific replacement and upgrade of the conveyor system necessary to support integration of the EDS machines on a case-by-case basis.

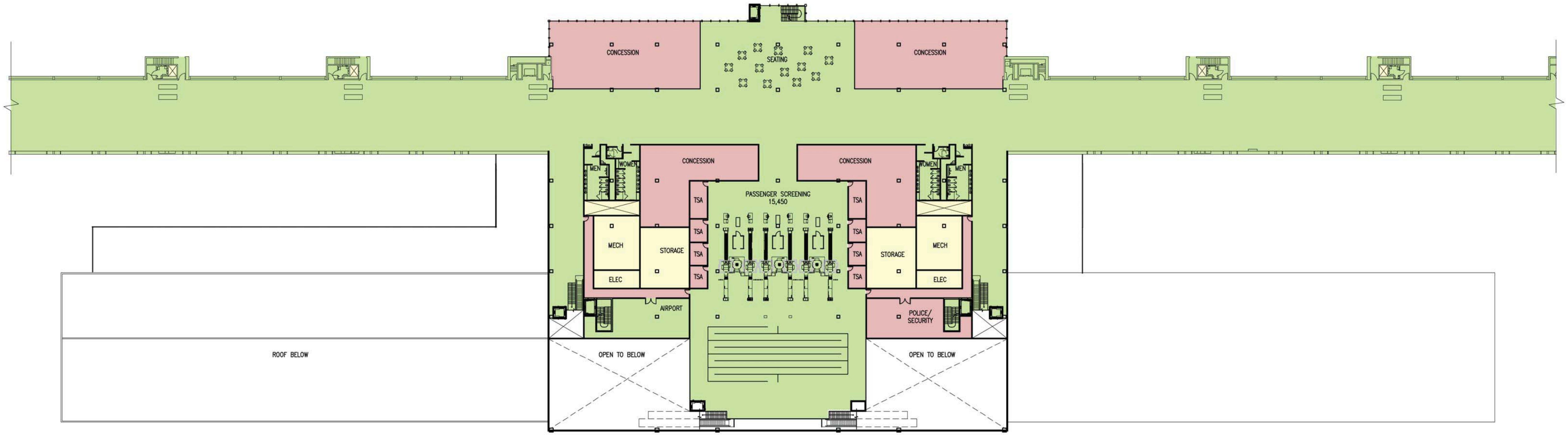
9.9.1 NONREIMBURSABLE COSTS

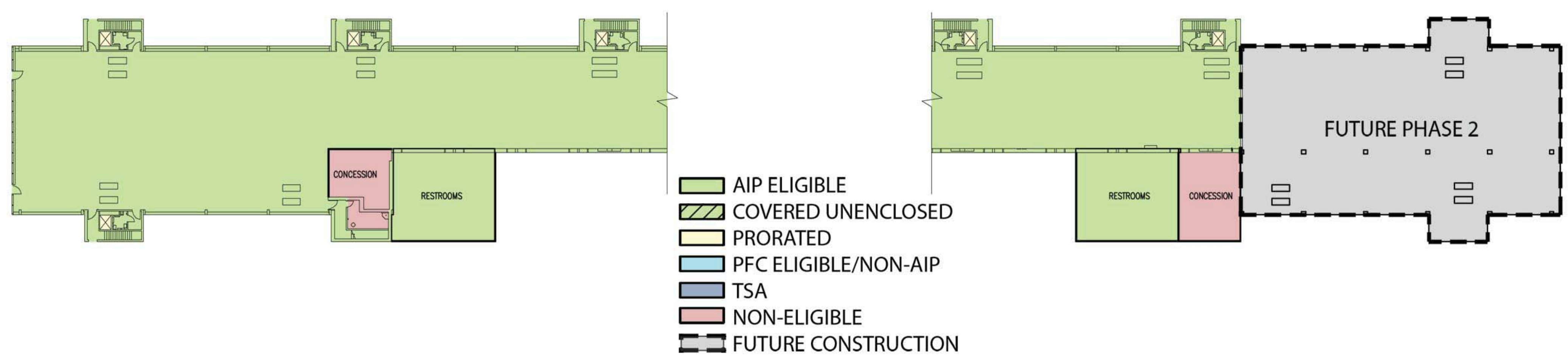
- TSA does not reimburse costs associated with the building shell or exterior enclosure.
- TSA does not reimburse the cost of construction of terminal expansions, whether necessary to support TSA operations or for other purposes.
- TSA does not reimburse construction costs for TSA-leased spaces.
- Costs for extended warranties and the procurement of extended warranties are not reimbursed by TSA.
- On-site technical support is considered part of the CBIS operating and maintenance (O&M) expense, which TSA does not reimburse. Therefore, on-site technical support is reimbursable by TSA only during startup and preparation for the Integrated Site Acceptance Test (ISAT).
- Spare parts are covered under the standard one-year warranty for all EDS equipment purchased by TSA; therefore.
- TSA does not require and does not reimburse the cost of any spare parts nor areas for storage of spare parts."


BAGGAGE MAKE-UP
AIRPORT DELIVERY/ STORAGE
CONCESSIONS DELIVERY/ STORAGE
LOADING DOCK
CENTRAL PLANT SITE
OFFICE
OFFICE
OFFICE
CONF.
CONCESSION
MEN'S TOILET
WOMEN'S TOILET
AIRLINE OFFICE
I.T./CUTE
AIRLINE OFFICE
AIRLINE OFFICE
AIRLINE OFFICE
AIRLINE OFFICE
AIRLINE OFFICE
AIRLINE OFFICE
I.T./CUTE
WOMEN'S TOILET
MEN'S TOILET
CONCESSION
OFFICE
OFFICE
CONF.
BAGGAGE CLAIM
TICKETING
BAGGAGE CLAIM
FUTURE PHASE 2
RENTAL CAR
RENTAL CAR
FUTURE PHASE 2
AIP ELIGIBLE
COVERED UNENCLOSED
PRORATED
PFC ELIGIBLE/NON-AIP
TSA
NON-ELIGIBLE
FUTURE CONSTRUCTION



AIRLINE/BAGGAGE OPS
BAGGAGE SCREENING
MECHANICAL
MECHANICAL
MECHANICAL
MECHANICAL
SEARCH
OFFICE
OFFICE
FUTURE PHASE 2
AIP ELIGIBLE
COVERED UNENCLOSED
PRORATED
PFC ELIGIBLE/NON-AIP
TSA
NON-ELIGIBLE
FUTURE CONSTRUCTION


CONCESSION
SEATING
CONCESSION
CONCESSION
CONCESSION
MEN
WOMEN
PASSENGER SCREENING
15,450
TSA
WOMEN
MEN
MECH
STORAGE
STORAGE
MECH
ELEC
ELEC
AIRPORT
POLICE/
SECURITY
ROOF BELOW
OPEN TO BELOW
OPEN TO BELOW


CONCESSION
RESTROOMS
RESTROOMS
CONCESSION
FUTURE PHASE 2
AIP ELIGIBLE
COVERED UNENCLOSED
PRORATED
PFC ELIGIBLE/NON-AIP
TSA
NON-ELIGIBLE
FUTURE CONSTRUCTION

TERMINAL AIP/PFC ELIGIBILITY ANALYSIS PHASE 1

AREA	NET SQ. FT.	GROSS SQ. FT.	AIP ELIGIBLE				PFC ELIGIBLE			
			AIP ELIGIBLE SQ.FT.	AIP INELIGIBLE SQ.FT.	AIP ELIGIBLE PRORATED SQ.FT.	AIP ELIGIBILITY (Y/N/P)	PFC ELIGIBLE SQ.FT.	PFC INELIGIBLE SQ.FT.	PFC ELIGIBLE PRORATED SQ.FT.	PFC ELIGIBILITY (Y/N/P)
Airline Functional Areas										
Ticketing Lobby	3,309	3,418	3,418			Y	3,418			Y
Ticket Counter *	4,416	4,562		4,562		N	4,562			Y
Airline Offices *	6,026	6,225		6,225		N	6,225			Y
Airport Ops/Storage *	2,837	2,931		2,931		N	2,931			Y
Departure Lounges	48,720	50,328	50,328			Y	50,328			Y
Baggage Make-up *	30,231	31,229		31,229		N	31,229			Y
Baggage Service Offices-Phase I *	741	765		765		N	765			Y
Baggage Make-up Carrosell (2 ea.)	1,764	1,822	1,822			Y	1,822			Y
Subtotal	**98,044**	**101,279**	**55,568**	**45,711**	**0**		**101,279**	**0**	**0**	
Circulation										
Lobby/Circulation	71,868	74,240	74,240			Y	74,240			Y
Passenger Waiting	19,769	20,421	20,421			Y	20,421			Y
Drop-off Canopy	19,539	20,184	20,184			Y	20,184			Y
Subtotal	**111,176**	**114,845**	**114,845**	**0**	**0**		**114,845**	**0**	**0**	
Rental Car Agencies										
Rental Car Offices	5,498	5,679		5,679		N		5,679		N
Rental Car Counter Queue	2,006	2,072	2,072			Y	2,072			Y
Subtotal	**7,504**	**7,752**	**2,072**	**5,679**	**0**		**2,072**	**5,679**	**0**	
Bag Claim										
Baggage Claim - Phase I	10,751	11,106	11,106			Y	11,106			Y
Inbound Baggage Input	4,958	5,122	5,122			Y	5,122			Y
Subtotal	**15,709**	**16,227**	**16,227**	**0**	**0**		**16,227**	**0**	**0**	
Non-Public Areas										
Mechanical / Electrical Rooms	35,737	36,916			27,065	P			31,634	P
Interior Circulation	20,890	21,579		21,579		N		21,579		N
Storage/Janitorial and Other	7,204	7,442			5,456	P			6,377	P
Central Plant	10,000	10,330			7,573	P			8,852	P
Subtotal	**73,831**	**76,267**	**0**	**21,579**	**40,094**		**0**	**21,579**	**46,862**	
Administrative Spaces										
Terminal Conference Rooms	3,336	3,446		3,446		N		3,446		N
Subtotal	**3,336**	**3,446**	**0**	**3,446**	**0**		**0**	**3,446**	**0**	
TSA										
TSA Screening Checkpoint	7,960	8,223	8,223			Y	8,223			Y
TSA Offices and Support	2,984	3,082		3,082		N		3,082		N
TSA In-line Bag Screening	18,970	19,596	19,596			Y	19,596			Y
TSA Queue	3,328	3,438	3,438			Y	3,438			Y
Subtotal	**33,242**	**34,339**	**31,257**	**3,082**	**0**		**31,257**	**3,082**	**0**	
Tenant/Concession Space										
Airport Police	1,496	1,545		1,545		N		1,545		N
Concessions	16,966	17,526		17,526		N		17,526		N
Subtotal	**18,462**	**19,071**	**0**	**19,071**	**0**		**0**	**19,071**	**0**	
Public Areas										
Men's and Women's Restrooms	10,786	11,142	11,142			Y	11,142			Y
Subtotal	**10,786**	**11,142**	**11,142**	**0**	**0**		**11,142**	**0**	**0**	
Passenger Departure Lounges										
Concourse - Ph I	38,430	39,698	39,698			Y	39,698			Y
Subtotal	38,430	39,698	**39,698**	**0**	**0**		**39,698**	**0**	**0**	
Total Space	**410,520**	**424,067**	**270,809**	**98,570**	**40,094**		**316,520**	**52,859**	**46,862**	

* PFC Eligible but Not AIP Eligible

** Gross square footage includes interior partitions, walls, shafts, and chases

*** Eligible sqare footage refers to gross square footage of Phase I

ADDITIONAL INFORMATION FROM THE AIP/PFC ELIGIBILITY ANALYSIS

Total AIP Eligble+Ineligibe (E+I) Space (Excludes prorated space)	369,379
Percentage of Eligible /(E + I) Space	73.3%
Percentage that Support Facilities were Prorated	73.3%
Total AIP Eligible and Eligible Prorated	310,904
Total PFC Eligble+Ineligibe (E+I) Space (Excludes prorated space)	369,379
Percentage of Eligible /(E + I) Space	85.7%
Percentage that Support Facilities were prorated	85.7%
Total PFC Eligible and Eligible Prorated	363,383

FUNDING SUMMARY

Funding Sources Summary - Phase I								
	Project Total $	AIP Eligible	AIP $	PFC Only Eligible	PFC $	TSA Eligible	TSA $	SPONSOR $
Terminal		73.3%	95%		100%		95%	
		$72,129,917	$68,523,421	$12,221,750	$12,221,750	$3,350,000	$3,182,500	$14,476,036
Total Cost	$98,403,707							
Total Contribution			$68,523,421		$12,221,750		$3,182,500	$14,476,036

PRELIMINARY CASH FLOW ANALYSIS

YEAR ONE

Cost		Funding	
85% Design Fees	$6,540,750.00	AIP (Entitl.)	$3,700,000.00
16% CA Fees	$525,600.00	PFC	$3,150,000.00
50% Central Plant*	$500,000.00	TSA	
86% Rental Car Area	$429,140.00		
40% Temp. Facilities**	$1,478,012.00		
16% Const. Rep.	$153,600.00		
Total	**$9,627,102.00**		**$6,850,000.00**

YEAR TWO

Cost		Funding	
15% Design Fees	$1,154,250.00	AIP (Entitl.)	$3,700,000.00
32% CA Fees	$1,051,200.00	PFC	$3,150,000.00
50% Central Plant*	$500,000.00	TSA	$855,000.00
14% Rental Car Area	$69,860.00		
60% Temp. Facilities**	$2,217,018.00		
20% Terminal Const.**	$16,253,935.40		
32% Const. Rep.	$307,200.00		
Total	**$21,553,463.40**		**$7,705,000.00**

YEAR THREE

Cost		Funding	
33%CA Fees	$1,084,050.00	AIP (Entitl.)	$3,700,000.00
55% Terminal Const.	$44,698,322.35	PFC	$3,150,000.00
33% Const. Rep.	$316,800.00	TSA	$855,000.00
Total	**$46,099,172.35**		**$7,705,000.00**

YEAR FOUR

Cost		Funding	
19% CA Fees	$624,150.00	AIP	$3,700,000.00
25% Terminal Const.	$20,317,419.25	PFC	$567,964.00
19% Const. Rep.	$182,400.00	TSA	$1,710,000.00
Total	**$21,123,969.25**		**$5,977,964.00**

Total Project Cost	**$98,403,707.00**
Total Project Grant Receipts (AIP Entitlements PFC's and TSA) estimated over 4 Years.	**$28,237,964.00**
Discretionary or other funding sources	**$30,165,743.00**
Sponsor	**$40,000,000.00**

* Note: Central Plant cost includes building cost and equipment cost. Equipment cost may vary depending on the type of system ultimately selected.
** Temporary facilities are assumed to be provided within the existing terminal baggage claim space for the purpose of this study.
*** Renovation Work concurrent with enabling packages.

Total project eligibility of $83,927,671 exceeds the AIP receipts based on yearly entitlement funding.

8/16/2010

SECTION 10: CONCLUSION

Analysis of the four (4) options presented in this plan conclude that retaining the existing core containing the ticketing area, vertical circulation, limited concessions, limited operational areas and multiple changes in level was not a desirable scenario in the strategic, long term potential analysis. Replacement of the core of the terminal area best met the requirements the most economical approach to full optimization of existing functional areas; replacement of non-functional areas and planned future growth within the confines of the existing terminal site in Option 1C. Further development during the design phase may result in the addition of some of the more desirable elements of the other options and in a streamlining of the overall footprint.

Within the scenario of an Option 1C development, the first phase of the implementation of this plan will consist of a series of "enabling" packages in order to replace the critical functions existing within the central core; allow more area to be utilized for full ticketing and baggage claim services as well as limited concessions within the existing baggage claim area; ensure proper movement of vehicular and pedestrian traffic; relocate vital underground utilities; and set in motion more efficient, sustainable systems to serve the new terminal.

During this time, procurement of a construction manager at risk, as the recommended delivery method; specialty consultants; testing, surveying, contract activities and the beginning of Schematic Design can occur.

With the Construction Manager at Risk and Design Consultants working together, work on the central core can begin. At this time, a portion of the construction (the enabling packages) will become available for AIP (and PFC funding, if desired) reimbursement.

It is estimated that, once temporary facilities are in place, construction would be completed within a period of approximately 24 months (2 yrs). At the end of the building and operational commissioning period, the Greenville-Spartanburg International Airport (GSP) will be ready to take on the challenges of a modern, fully functional, yet cost-effective airport terminal in a sustainable manner.

In its fully completed Phase I stage, GSP will, already, proudly display the image of the natural, unspoiled beauty of the Greenville-Spartanburg region.

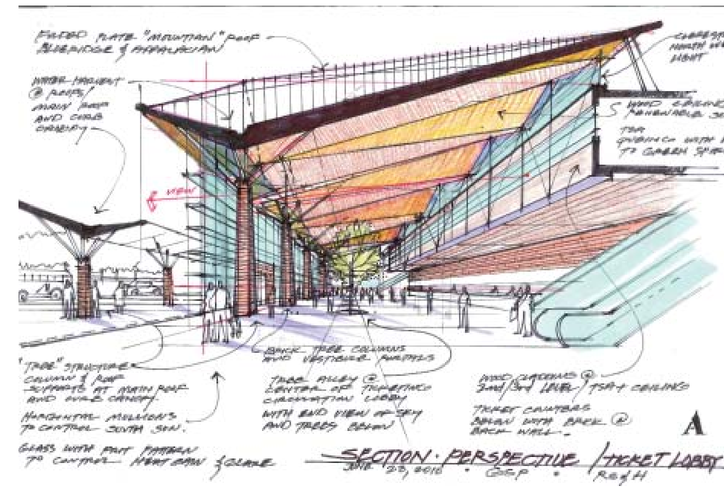
10.1 CHARACTER CONCEPTS

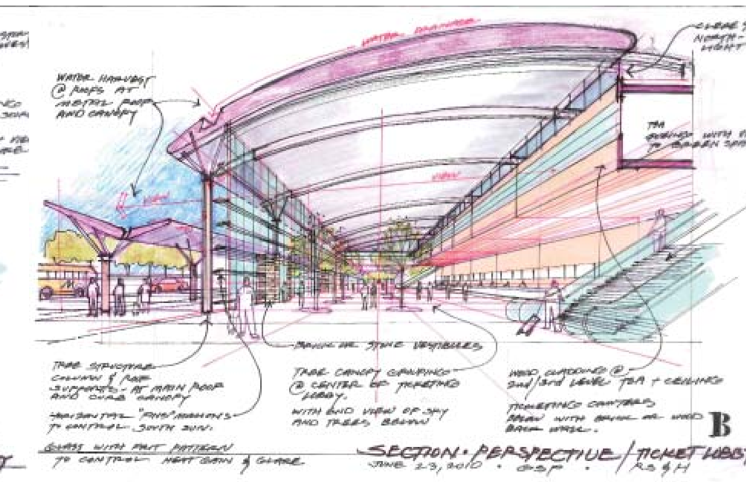
The potential design for the renovated terminal for Greenville-Spartanburg International Airport would provide a rational framework for the airport as it proceeds well into the 21st century. The architectural style, aesthetic would respond to functional requirements and support future growth, technological improvements and inevitable modifications over time. The architectural aesthetic would be developed to reflect the harmonious interaction between the built environment and the natural environment prevalent in the area.

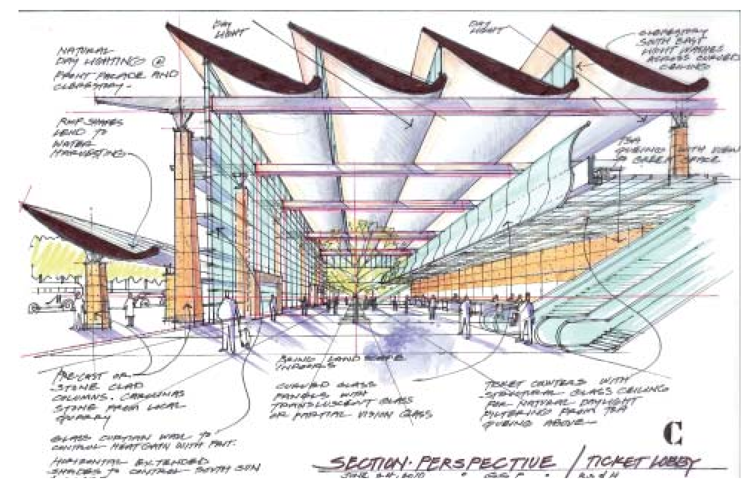
The following preliminary Design Goals have been established and would serve as criteria in the development of the terminal building "look and feel"

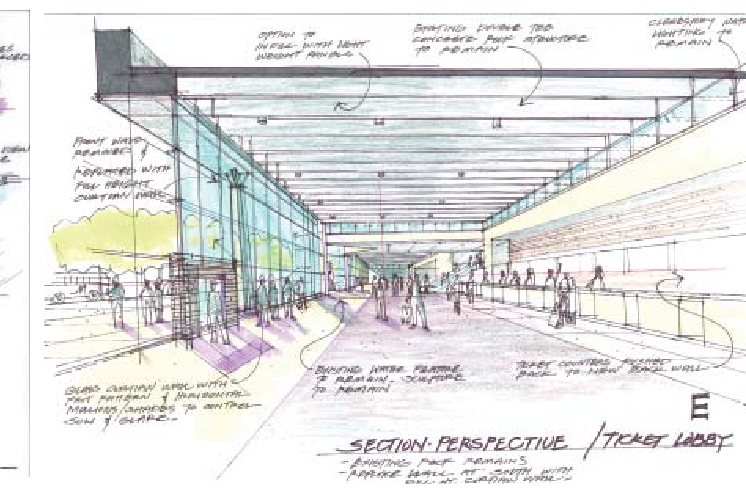
- The terminal will be a symbolic front door to the region.
- The terminal will incorporate sustainability and "green" practices in all components.
- The terminal will reflect the quality of the surrounding environment.
- The terminal may reflect Greenville-Spartanburg's mixture of architectural styles.
- The terminal will exemplify the area's quality of life.
- The terminal and terminal area will highlight natural features in the landscaping and choice of materials.
- The facility will display local business, industry, and natural environment.

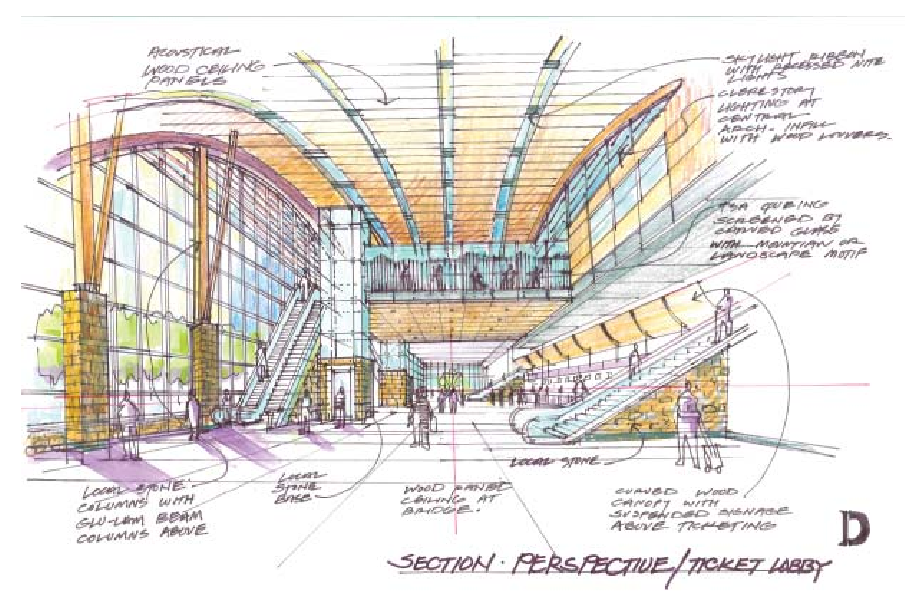
The five character sketches presented on this page reflect a preliminary "visioning" of the terminal building. These sketches are very preliminary. Upon commencement of the Design phase of the project a further evaluation and refinement of the Design Goals outlined above would result in a progression of the sketches.











APPENDIX 1

GSP ENERGY AND WATER ANALYSIS

Energy and Water Analysis

August 31, 2010

Table of Contents | Page

I INTRODUCTION

The following analysis was submitted to Greenville-Spartanburg International Airport (GSP) on January 25, 2010 to report findings from the ASHRAE Level 1 energy audit. A major component of this study involved the analysis of existing and future energy and water use in order to ensure that the airport goals of energy and environmental stewardship are met. The purpose of this report is to highlight the findings of the energy and water use audit of the existing buildings conducted in November and December of 2009.

Because this report preceded the official TAS findings, only the energy efficiency measures (EEMs) with a five (5) year or less simple payback are addressed.

For the energy audit stage of the Terminal Area Study, there were not a large number of EEMs to discuss. One reason for this is the excellent operations and maintenance procedures implemented on the airport campus. Although the existing equipment is nearing or past its normal life expectancy, it is in good operating condition and appears to be operating as originally intended. This statement is true for the mechanical, electrical and plumbing (MEP) aspects of the facility. Most facilities with equipment of this age do not operate at such high levels of performance. However, since the existing HVAC equipment is of an older vintage (20-30 years), it will require significant modification or change out. Also, energy efficiency performance has been dramatically improved, both in equipment efficiency and system design in the intervening years. Furthermore, the modernization of the building system components (envelope and MEP) will involve new load calculations, as well as compliance with current building and energy code requirements which have been upgraded since the original design. Most notably, the outdoor (fresh) air requirements, HVAC load analysis, plumbing fixture performance, and lighting power density requirements will be revisited during the design process.

Since this report does not have an extensive list of “repair” items to address, as is much too often the case with existing building energy studies, the report will begin to introduce higher level operations and maintenance (O&M) activities that can be considered and implemented in the interim. These principles will apply now and to any future modifications the airport may undergo. The airport management should consider this a confirmation that proper operational procedures are employed and that the capabilities of staff direct the recommendations of this report to a higher than normal level of performance. These higher level O&M practices are presented as suggestions can act as a mechanism for the airport management to start the process of high performance green building operation. Many of the O&M suggestions are directly linked to the steps necessary to establish a LEED for Existing Buildings Operations and Maintenance (LEED-EBOM) certification.

Objectives

The objectives of this energy and water audit are to identify and develop modifications that will reduce the energy use and/or costs of operating the airport buildings. This report shall identify EEMs that will give the owners and operators of the facility information needed to decide if any, some, or all of the recommended modifications should be implemented.

For this assessment, only those EEMs that have a simple payback of five years maximum are considered. Longer payback EEMs shall be targeted for future building projects.

The key elements of this audit include the following steps:

1. Collect and analyze historical energy use
2. Study the buildings and their operational characteristics
3. Identify potential modifications that will reduce the energy use or cost
4. Prepare a list of proposed EEMs
5. List and describe the findings of the analysis

Key energy and water using systems within the facility have been identified and it is within these key areas that this and future studies will focus. The following systems are the primary energy using components of the area buildings:

- Building envelope (walls, roof, windows, doors, etc)
- Lighting – interior
- Lighting – exterior and parking decks
- HVAC systems
- Domestic hot water
- Domestic water system
- Irrigation system
- Food preparation
- Conveying systems (people)
- Baggage handling
- Boarding bridges
- EDS equipment (security, x-ray, etc)
- Other process loads (i.e. computers, plug loads, etc.)

II DESCRIPTION OF EXISTING BUILDINGS AND SYSTEMS

The GSP airport buildings under consideration for this study were substantially constructed in 1962 and have undergone various expansions and renovations in 1988, 1999, 2000, and 2001. Most of the original building components are still in place including the HVAC and electrical distribution system.

The following buildings comprise the extent of the scope of this energy study. Refer to Appendix A for a detailed description of the various spaces within each building.

Buildings included in this study:

BUILDING	AREA (square feet)
• Terminal Central Plant and MEP rooms Connector Concourse A Concourse B Commission Offices	216,000 s.f.
• Fire / Crash / Rescue building	7,800 s.f.
• Parking Garage A	100,000 s.f. (per floor, 5 floors)
• Parking Garage B	100,000 s.f. (per floor, 5 floors)

Buildings not included in the study

- South Cargo area
- ATC / FAA Tower
- Fuel refueling facility
- General aviation complex
- Maintenance shop

Building Envelope

The building envelope appears to be in good condition relative to its age and the era of its construction. The primary construction materials are reinforced concrete, steel, and glass. The structural elements are largely exposed and contribute to the "rational" aesthetic of the terminal building. The Airport recently finished a complete roofing replacement project. This new roofing work consisted of the demolition and total replacement of the roofing insulation and membrane system. This project not only remedied many of the water/air infiltration issues that had occurred in the past, but with the inclusion of a "cool roof" membrane should deliver future savings in terms of energy use through reduction of the "heat island" effect.

The initial investigation of the building envelope revealed only a few pressing issues, chief of which is a series of breaches that occur in and around the intersections of expansion joints and window wall systems. Less urgent, another potential source of savings is the interior day-lighting levels. While the airside has the benefit of large floor to ceiling windows and is filled with light for most of the day, the landside interior is largely cut off from exterior natural light. The exceptions to this rule are the continuous clerestory window that runs the perimeter of the space, and the large glass cube that sits in the center of the exterior wall.

HVAC System

The existing HVAC system for the Fire / Crash / Rescue (FCR) building includes a gas fired hot water boiler for heating and this boiler serves the FCR building and half of the Commission building. For the FCR building, heating in the equipment bay is provided by hot water fan powered unit heaters mounted at high level. There is no cooling in the equipment bay. The offices and living quarters of the FCR are conditioned with a split system heat pump unit which includes a duct mounted hot water heating coil for supplemental heat.

The Commission building has two systems, one for the older and one for the newer halves. The newer portion is conditioned by an air handling unit with chilled water and hot water coils. Hot water is provided from the boiler in the FCR building and the chilled water is provided by a rooftop mounted air cooled chiller. The older part of the Commission office is supplied by a packaged heat pump unit located on the roof.

The Terminal, Concourses, Bridges, and Finger portions of the project are heated and cooled with central, constant volume air handling units with chilled water and hot water coils. Chilled water is provided by a pair on nominal 515 ton centrifugal chillers connected to two cooling towers. Hot water is generated by a steam boiler supplying three (3) steam heat exchangers. There are three (3) older air handling units located in the North Terminal Plant Room that continue to use steam coils for heating. The larger air handling units are multi-zone units with each zone on thermostatic control. However, there is not variable speed controls on the supply fans and when one zone damper reduces flow the excess flow is distributed to other zones. There is no bypass control. The existing air handling units have "hot deck / cold deck" arrangements meaning that during some periods, heating and cooling are provided simultaneously and mixed to achieve desired supply temperature.

The systems utilize simple outside air (OA) economizer control through the use of outside air temperature sensors and modulating OA dampers. At 55 deg F OA temperature, the chillers will shut down and the OA dampers open to a set position. When OA temperatures are extremely low, then the OA dampers close.

The secondary chilled water pumping system has been fitted with variable frequency drives (VFDs) and it was noted that the use of VFD technology could be utilized on many other fans and pumps. The maintenance staff has interlocked the cooling towers so that two towers can operate with one chiller (previously, one cooling tower was only linked to one chiller). The result has been a noticeable drop in the second chiller run time.

In addition to the central plant systems there are a few fan coil units and electric heaters located in various locations throughout the buildings. The control system for the HVAC system is primarily pneumatic. The condition of the equipment is excellent and is well maintained and operated correctly.

Electrical System

The existing power distribution system is fed by four underground electric services to utility owned transformers with 480/277 volt secondary service. The largest service is fed into a transformer room in the central plant where power is distributed throughout the concourses by a 4000 ampere rated service entrance switchboard, panelboards and step down transformers. The majority of electrical equipment was installed in 1988. The service to Parking Garage A serves a 2000 ampere rated service entrance switchboard, panelboards and step down transformers which feed loads throughout the terminal area. Much of this equipment is from the original building in 1962. The other two utility services feed Parking Garage B and the fountain. Generators for emergency power are located in both parking garages and the central plant, with ages ranging from 1985 to 1995.

The majority of light fixtures are original to when the building was constructed. The existing lamp sources consist of fluorescent, high pressure sodium, halogen (incandescent) and metal halide. Lighting controls for interior spaces are controlled via light switch, circuit breaker or left on at all times. Exterior light fixtures are typically controlled by photocell. Refer to Appendix B for a detailed space by space description of existing lighting and controls.

Plumbing System

The airport plumbing system consists primarily of public and private restrooms, small office area break rooms, and the restaurant / bar area facilities. It appears that many of the flow and flush fixture units are post 1992 and therefore comply with the current minimum flow rates established by the Energy Policy Act of 1992. Some fixtures installed more recently appear to be the low-flow type including water closets and lavatory aerators. However, some of the plumbing fixtures appear to be pre-1992 and are most likely high water consumers. The older units can use large amounts of potable water especially when these are in high traffic areas.

The restaurant has a large commercial water heater exclusively for the restaurant use and is maintained by airport maintenance staff. The restaurant water heating is provided through a steam heat exchanger for 6 months and reverts to an electric heater for the remaining 6 months that the steam boiler is shut down. Hot water for the restaurant does not seem to be on a sub-meter, especially during periods when the steam boiler is in operation. The restaurant system is on a recirculation loop with pump. Additional hot

water is provided by various electric water heaters distributed throughout the buildings. The airline crew spaces in the lower concourse areas (apron level) are each equipped with a small 10 gallon electric storage heaters located under counter in the break areas. The concourse restrooms are also provided with individual electric storage type water heaters (est. 120 gallon) each located adjacent to the end use.

The site has a total of four (4) water features that use potable water: The garden adjacent to the restaurant, the fountain inside the terminal, the large water fountain between parking garages and the waterfall feature.

City Water System

The city (potable) water use at GSP is approximately 32,000,000 gallons year which is approximately 86,000 gallons per day. The airport is fed by two main water lines, one, a 12" diameter line originating from the west side of the runway and the other, a 10" diameter main running along the road in front of the airport. Each water main is equipped with a dual meter system that has one meter as the primary and a second meter which is used when flow rate exceeds the primary meter capacity. There are a total of four (4) meters. The sewer discharge is also metered via a lift station with pump which is sub-metered and is used to determine the sewer charges. Unfortunately, there are no comparative water use rates reported by airports (gallons per passenger) to determine the relative scale of GSP water use. However, from comparison with other building data, the water use appears to be high.

The primary uses of water at the airport are:

Public restrooms (10 total)
Misc hose bibs, drinking fountains, etc
Restaurant
Irrigation
Fountain and waterfall make-up
Fire rescue
Rental agency car wash

An additional water meter is located near the FedEx facility but is not part of this study. In 2007, it was noted that the discharge meter at the pump station was registering more water discharge than was entering the site. An investigation revealed that rain water was infiltrating the line and the issue was quickly resolved. This is a god example of the benefits of regular monitoring of energy streams within a facility.

Irrigation system

The current irrigation system at GSP serves areas surrounding each of the two parking decks, the lawn area between the parking decks, the lawn area between the South Cargo area and the South Parking Deck and the landscape area surrounding the Commission offices. Each of the irrigation systems are independent and stand alone. The system consists of some drip irrigation heads but is primarily spray type. Each of the irrigation systems are independently controlled by timer control only and there is no other form of automated control such as rain sensor or weather interlinks. Each of the control points for the systems is mounted local to the area being served. To adjust the timer requires a technician to visit each controller separately. The water supplies to each irrigation system are independently piped. There is no separate water meter for the irrigation systems.

III UTILITY RATES

GSP pays low electricity rates. At $0.050 per kWh it is lower than the average for an area that already has lower than national average utility rates. The average price for commercial building electricity in this area according to the Department of Energy's Energy Information Administration (EIA) is $0.0881 per kWh and the average industrial rate is $0.0582 per kWh. GSP pays lower than the going industrial rate for this area.

GSP also pays relatively low gas rates. At an average of $0.67 per therm the cost is only slightly more than the average $0.63 per therm average of the City Gate cost also as reported by the Dept of Energy's Energy Information Administration (EIA). City Gate cost is the price for natural gas at the nearest pipeline distribution point and is generally considered the wholesale rate. Note that currently in this region (January 2010) gas process have increased dramatically due to demand.

Unfortunately, low utility rates are often seen as permission to allow energy waste to take place. Low utility costs also affect return on investment (ROI) and simple payback calculations. Interestingly, a recent Department of Energy study showed that even though the Southeast has low energy rates, the general electricity BILL is higher than those areas with double or more the energy tariffs. Therefore, it is critical as a corporate entity begins the process of sustainability and environmental stewardship to understand the wider costs and negative implications we face of inefficient energy use such as health issues, water depletion and air pollution.

The GSP airport buildings under consideration for this study are fed with four (4) electricity meters. The electricity meters located in the Parking Garages are billed to the parking garage vendor. However, Parking Garage A has a utility meter that serves both Parking Garage A and the South end of the Terminal building. A GSP owned and maintained electricity sub-meter is installed to measure the electricity used for the Terminal Building. The difference between the Terminal Building power consumption and Parking Garage A consumption is used to invoice the parking vendor.

An additional electric meter is located outdoors and adjacent to the main fountain and waterfall feature located between the parking garages. This meter is specifically for the pumps, motors and control system associated with these features.

The buildings under consideration for this study are supplied by three (3) main utility gas meters. The restaurant has an individual gas meter which appears to be used primarily for cooking as the gas consumption is relatively consistent throughout the year. The main

boiler is supplied through another meter and provides steam for heating and domestic hot water to the restaurant in the winter months only. The boiler is a dual fuel type and burns gas as the primary fuel but is also switched to fuel oil on occasion. In fact, it appears that the winter between 2008 and 2009 was a time of high fuel oil use. The third meter is located at the Fire / Crash / Rescue (F/C/R) building and measures gas use for the small hot water boiler in that area. This boiler also serves half of the heating needs for the Commission offices.

The following meters are located on the campus:

Electricity Meters

Account #	Location	Serves
0000159877	Main Switch Room	Terminal areas and Commission (except Terminal South)
1162803522	Parking Garage B	PGB and adjacent surface lot lights
0000804917	Outside near Fountain	Fountain and Waterfall
0000804918	Parking Garage A	PGA and Terminal South

Gas Meters

Account #	Location	Serves
153-2625-00	Near Central Plant entrance	Main Boiler
153-2575-00	At F/C/R building	F/C/R (and ½ Commission)
153-2650-00	Near Central Plant entrance	Restaurant

For the 12 month period from November 2008 to October 2009, the total energy cost for the GSP Airport buildings within this study were:

Electricity

Main meter	$450,160
Fountain	$ 32,114
Terminal South	$ 66,011
TOTAL	$548,285
Total kWh:	8,855,656 (annual)
Parking Garage A	$ 31,750
Parking Garage B	$ 41,770
TOTAL	$ 73,530
Total kWh:	1,832,640 (annual)

Gas

Main boiler	$36,667 **
Restaurant	$ 7,757

F/C/R	$ 7,444
TOTAL	$51,867
Total Therms:	35,214 (annual)

**Previous 12 month period was $175,953 indicating probable use of fuel oil instead of natural gas.

Total annual energy cost for this period is $592,700 dollars (excluding fuel oil fees, F/C/R, and parking garages) and with the area under consideration being 216,000 square feet the annual cost for energy at GSP using this figure is approximately $2.74 per square foot. However, since this excludes fuel oil costs for this period (it was the predominant heating source), and extrapolating the gas energy used in the previous winter, the more realistic energy cost value of $3.39 per square foot emerges with an annual operating cost of $731,986.

There are very little data available for comparison of airport performance however there are some studies that isolate electricity and fuel costs on a square foot basis. It appears that GSP is in the high range for comparable airports and based on typical industry rules of thumb. For instance, Atlanta Hartsfield-Jackson International Airport (ATL) has a reported annual energy use of 3.20 kWh/sf electricity and 2.07 Mbtu/sf gas; were GSP to operate at these levels the annual utility bills would be approximately 43% less. However, ATL has newer systems, and different equipment and circumstances, but the relative values can be used for comparative analysis.

The key point to consider moving forward is that GSP airport has older less efficient equipment that inherently will use more energy than modern replacements. However, the equipment is well maintained and is believed to be operating at its best efficiency. There are some opportunities to reduce energy costs and many of these are detailed in the report. There are, however, some energy efficiency strategies that will only become feasible once the Terminal Area Study is complete and there is an understanding of what shall remain and what shall be removed.

Refer to Appendix C for charts of electricity and gas use.

IV GENERAL RECOMMENDATIONS

HVAC SYSTEM

Current Operation Practice: The current operations and maintenance activity at the airport is excellent. The facilities maintenance manager and staff successfully utilize a planned maintenance program (MP2 by DataStream). The equipment appears to be in correct working order, is regularly checked and adjusted, and performs as intended. There are no major equipment failure issues to be reported and no major comfort complaints were reported.

System scheduling: The current HVAC system is configured to shut down every day at midnight and restart at 0400am. It is recommended that the operations staff experiment with optimizing these times as incremental delays or extensions of start/stop times can have a measurable effect on energy use. Also, some areas, such as the Terminal and Concourses, may benefit from an “optimal start” thermostat which has the capacity to remember occupancy profiles (and HVAC load requirements) and adjusts equipment start time to minimize run time. However, manually setting the time controllers can effectively achieve the same results.

Pump and fan motors: There is currently a program underway to replace failed system motors with premium efficiency motors and this practice should continue. The replacement of low efficiency motors can offer significant energy savings however there is not a “one size fits all” relationship. Some motor replacements have a 12 month or less payback while others can exceed eight years. The determining factor is motor run time, existing efficiency, age, and size. It is recommended that a detailed list of system motors (pumps, fans, etc.) be generated and list the motor efficiency, age and annual run time. With this information, motor manufacturers can identify the replacement options and indicate payback periods for individual motors.

Variable speed drives: The HVAC equipment pumps for chilled water, condenser water, heating water and fans for the air handling units and cooling tower are constant speed meaning these items operate at full load capacity regardless of the connected load. Any new or retrofitted system will include variable speed controllers and motors that modulate motor speed to suit actual conditions. The replacement of existing equipment with VFD equipment typically has impressive payback periods of less than five years and in some instances around two years depending on applied load, run time and variability over the calendar year. Typically this climate is suitable for VFDs since our transition seasons are moderate and there are often part-load conditions. It is recommended that the installation of VFDs be considered and obtain costing and payback information and target those systems where the VFD is feasible. This activity shall be performed in conjunction with the motor efficiency upgrades mentioned above as specific motor types are required for VFD operation.

HVAC System Re-Commissioning: Even though the existing HVAC system is well maintained, it was noted that a formal re-commissioning exercise has not been performed. It is recommended that the facilities staff retain a Commissioning Authority (CxA) to investigate and readjust the system set points to original conditions. This exercise is a good interim measure to ensure that all of the system set points are correct, that the fluid and air flow rates are established to intended values, that all of the control devices are operating within correct calibration. The process will also identify any system irregularities that need attention. Although the maintenance staff is capable of performing this activity, it is often less time consuming and more practical to hire an outside CxA for this activity.

ELECTRICAL SYSTEM

Lighting – Interior fixtures: The existing lighting system for this project is expansive and comprises many different fixture types, control methods and schedules. Generally, it was found that upgrades to the lighting system would be a recommended activity in most instances. The airport is undergoing an in-house lighting retrofit on an ad-hoc basis and it is suggested that this activity be prioritized and completed in a timely manner, possibly using the services of an outside contractor. Lighting retrofits are typically referred to as the "low hanging fruit" of energy efficiency measures due to the relatively short payback periods in 6 months to two years. Also, Duke Energy offers a lighting incentive program which provides a per fixture rebate for lighting retrofits. However, due to the complexity of the installed systems, it will be necessary to analyze each space for suitability of the retrofits and act accordingly. Attached to this document as Appendix B is a summary of the initial lighting investigation with specific suggestions for lighting upgrades.

Lighting – Interior control: In addition to a fixture upgrade, the use of occupancy sensors in many areas is recommended. Most of the lighting in GSP airport is manually operated. There are several non-public areas where lights remain on even when the space is unoccupied and this includes office space, storage rooms, MEP rooms, janitor closets, and conference rooms. The new modifications will certainly employ the use of occupancy sensors, photocells and timeclocks, and retrofitting now will give the maintenance staff good experience in the proper placement, adjustment and operation of these devices. It is essential that the installation of an occupancy sensor be matched to the needs of the space as they are not suitable for all applications. Duke Energy offers an incentive program for installation of lighting controls such as occupancy sensors.

Lighting – Incandescent: There are many places throughout the property where incandescent lamps are used in various applications. It is recommended that these lamps be replaced with suitable compact fluorescent (CFL) or LED type lamps as soon as possible. Keep in mind that the life of these lamps exceeds the five year threshold so they can be retained if any removal of fixtures forms part of the TAS results. Note that not all incandescent lamps are suitable for CFL/LED replacement especially those on outdoor motion sensors where immediate light is required.

EXIT lights: It is recommended that all EXIT lights be upgraded to LED type. Some EXIT lights have already been upgraded. LED EXIT lights typically operate at 90% less energy consumption than incandescent types and have up to eight years before lamp replacement.

Parking Deck Lighting: It is understood that a relighting proposal for the parking deck lighting systems are in place and that the firm providing the upgrade claims a significant energy savings opportunity. It is recommended that the proposal undergo an engineering review prior to agreement in order to determine the level of energy savings, the simple payback and if the retrofit meets with the requirements of the TAS. Refer to Appendix B for specific parking garage notes, recommendations and report review.

PLUMBING SYSTEM

Note: The main water supply into the GSP airport is metered and the discharge to the sanitary sewer system is also metered. Therefore, the exact quantity of discharge water for sewer charge purposes is known.

Small domestic water heaters: Located throughout the project are small 10 gallon water heaters which are used primarily in the airline line crew areas. It was noted during the walkthrough that some of these were leaking and it is recommended that these be inspected for leaks and repaired accordingly.

Pre 1992 Energy Policy Act Toilets and Lavatories: It is very likely that some of the public toilet areas (those that have not been renovated) contain plumbing fixtures that consume large quantities of potable water, either per flush or by flow rate (gallons per minute – gpm). In order to justify the replacement of these fixtures (based on the 5-year payback mandate) it is necessary to analyze the usage of the fixtures. It is recommended that an analysis of the older fixtures be completed to determine the feasibility of replacement.

Hot Water Temperature: Domestic hot water temperature is typically set for 120 deg F for hand washing and higher for commercial kitchen applications. In a few places, it was noted that the water temperature was hotter than normally encountered and may lead to scalding complaints if left unchecked. It is recommended that the hot water temperature be set to 100 deg F and determine if this temperature is acceptable to the building occupants (i.e. monitor complaints). Reducing the domestic hot water temperature can have measureable effect on energy use.

Restaurant Hot Water System: The restaurant is provided hot water during the cooling season when the main boiler is running via a steam to hot water heat exchanger with storage tanks. In the warmer periods, when the main boiler is shut down, hot water for the restaurant reverts to an electric system also with storage tanks. It appears that the restaurant hot water is not sub-metered when the boiler is providing the hot water and may not be sub-metered when the electric unit is operational (this item to be checked). As hot water is a significant part of the restaurant operating costs it is recommended that a hot water meter be installed to measure the amount of hot water used by the restaurant. This recommendation serves two purposes, one to capture potential costs of restaurant operation but to also introduce the maintenance operators to the metering device know as a BTU meter. This device, used by utility companies to measure solar hot water consumption, measures the hot water flow through a pipe in terms of energy (which is then converted to dollars). Installation of this device will give experience for the future installation of large scale solar water heating devices.

Sub-metering: A fundamental component of efficient operation involves the ability to record and monitor water usage. It is recommended that the major uses of water be monitored for consumption through the installation of water meters for selected usage categories. The categories include mains, domestic use, restaurant use, cooling tower make up, rental car wash units, F/C/R usage (including practice), and irrigation.

CITY WATER SYSTEM

High use: At 32,000,000 gallons of water consumed per year it is evident that water consumption can be reduced. It appears that the biggest use of clean potable drinking water is for non-potable consumption. The largest users appear to be the Fire./Crash/Rescue operation that uses city water to maintain equipment and practice, the irrigation system which extends the length of the entrance drive, and the car rental agencies cars washes which have water recycling systems installed but appear to be disconnected (in one instance). It is recommended that the F/C/R water consumption use patterns be monitored and develop ways for reusing water that is typically wasted and develop plans for reusing water on site (i.e. using fire practice water to fill an irrigation tank, or car wash tank).

Car Wash: Repair and return to service the car wash water recycling system for the rental car agencies.

IRRIGATION SYSTEM

General: At this time, the four (4) primary irrigation systems are controlled independently through individual timer clocks and these are operated manually. Furthermore, the irrigation system is typically spray type with very few drip irrigation heads and is not considered a "high performance" irrigation system. It is possible to achieve 30% to 50% water saving through the use of smart controllers and specialized spray heads and even more savings can be achieved with the use of native and adaptive plantings. The TAS will certainly introduce irrigation reduction strategies, such as the use of on-site water capture, so major renovations are not suggested at this time. However, it is recommended that the irrigation system be checked for correct operation including leaks, errant spray heads and detailed system control.

V OPERATION AND MAINTENANCE STRATEGIES

Current high performance green building concepts have matured to include ongoing building performance measurements, building benchmarking (comparing performance with similar facilities), and sustainable business practices. As the TAS will result in recommendations that include high performance green building design criteria, and considering that GSP is currently operated at a higher than average level of operational performance, it is concluded that GSP is an excellent candidate to begin the process of instituting high levels of green building methods and technologies into the operation and maintenance activities currently in place..

The list below highlights some of the key operational aspects that could be considered as the overall GSP campus undergoes long term planning and renovations over the next several years.

1. Building exterior and hardscape management
    a. Employ a management plan that reduces harmful chemical use, energy waste, water waste, air pollution, and chemical runoff during the maintenance of exterior areas such as hardscapes, building surfaces, and landscaped areas
2. Pest management
    a. Utilize environmentally safe pest management practices and methods
3. Alternative commuting programs for full and part time employees
    a. Institute a campus wide alternative commuting plan for employees who can include vanpools, carpools, and guaranteed rides home.
4. Monitoring of water use performance
    a. Install meters for key water using components of the building and begin a process of regular monitoring and reporting of water use.
5. Cooling tower water management
    a. Develop and manage a water management plan for cooling towers that addresses chemical use and possible the use of on-site generated water for cooling tower make up.
6. System level energy monitoring
    a. Install meters for key energy using components of the building and begin a process of regular monitoring and reporting of energy use.
7. Energy efficient operation planning
    a. Formally document building energy efficiency procedures, schedules and operation sequences so that regular maintenance activities include the regular assessment of practices to ensure that operation strategies are maintained.
8. Ongoing building commissioning plan
    a. Allow regularly scheduled re-commissioning of building systems to form part of standard preventative maintenance activities.
9. Emissions reduction reporting
    a. Develop a plan, using energy monitoring procedures, to track building emission levels and develop a means of regularly reporting this information.
10. Sustainable purchasing policy
    a. Develop an implement an internal policy for all airport users to employ a sustainable purchasing policy. Such items as paper, office supplies, office machines, construction products, couriers, and vehicles to name a few are candidates for inclusion in such a plan.

11. Solid waste management (i.e. recycling)
    a. In addition to enhancing the current recycling program on the campus, develop a policy for managing other solid waste streams (i.e. construction waste, airline waste, etc.) in a sustainable manner.
12. Green cleaning policy
    a. Develop a campus wide green cleaning policy that addresses high performance cleaning strategies including purchasing, custodial staff training, equipment and source control.
13. Indoor air quality management plan
    a. Establish procedures and regular checks to ensure that the indoor environmental quality is maintained at all times. These activities would include regular filter changes, outdoor air rate monitoring, mold inspections, equipment checks and other procedures specific to the building and systems at GSP.
14. Occupant comfort survey and monitoring
    a. Develop a means for getting occupant feedback on building comfort issues and develop a means for addressing these issues on an ongoing basis. Surveys are typically conducted on a two to five year frequency.

END

APPENDIX A – Facility Description

Note: MEP rooms, storage spaces, stairwells and other ancillary spaces not listed.

Terminal
1. Ticketing
2. Baggage claim
3. Public mall
4. Rental car counters / offices
5. Office space
6. Restrooms
7. Escalators
8. Vacant, leasable space
9. Baggage handling / screening

South Bridge
1. Advertising / display wall cases
2. Elevator
3. Conference room

North Bridge
1. Gift shop
2. Elevator
3. Restrooms
4. Vending area
5. Art display space

Security / Restaurant / Bar (center portion, apron level)
1. Passenger screening
2. Bar / lounge
3. Seating area
4. Restaurant
5. Elevator
6. Outdoor water garden

Concourse A (South) – Gate level
1. Passenger waiting / seating
2. Gate boarding
3. Concessionaire
4. Restrooms
5. Escalators

Concourse A (South) – Apron level
1. US Customs / Border Protection
2. Offices
3. Airline operations areas

4. Airfield support spaces
5. Open breezeway

Concourse B (North) – Gate level
1. Passenger waiting / seating
2. Gate boarding
3. Concessionaire
4. Restrooms
5. Escalators

Concourse B (North) – Apron level
1. Offices
2. Meeting rooms (2)
3. Airline operations areas
4. Airfield support spaces
5. Open breezeway

Commission Office
1. Open plan office
2. Enclosed office
3. Small conference room
4. Large conference room
5. Equipment
6. Break room
7. Restroom

Fire / Crash / Rescue
1. Equipment bay
2. Living quarters
3. MEP rooms
4. Storage

Parking Garage A (South)
1. Parking area
2. Rental car marshalling area and parking
3. Rental car office
4. Elevator

Parking Garage B (North)
1. Parking area
2. Elevator

APPENDIX B – Lighting System Field Notes

ENERGY AUDIT WALKTHROUGH FOR LIGHTING AND LIGHTING CONTROLS ON 11/04/09

- Exit signs, typical for majority:
  - (2) 6W T5 fluorescent lamps
  - (2) ballast per fixture which are obsolete
  - Recommendations: Replace fluorescent 12 watt signs with LED 3 watt signs. In areas where emergency power is not available provide self testing battery backup. A life safety walk through should be conducted to determine whether adequate number of exit signs are present.
- Back of house areas, mechanical rooms, baggage make up, catering, electrical rooms/closets, IT rooms/closets:
  - Typical light fixture is 1'x4' industrial strip or 1'x4' recessed strip with acrylic lens with (2) T12 fluorescent lamps and magnetic ballasts. Many of these areas had low light levels with flicker in the lamps. All of these areas were controlled by wall switches.
  - Recommendations: All of these fixtures should be retrofit with T8 fluorescent lamps and electronic ballasts. There are 32 watt T8 lamp and ballast combinations that run as low 28 watts and produce 3000 lumens per lamp. Compare this to the existing T12 lamp which runs at over 40 watts and produces approximately 2400 lumens. Although the staff was very good at keeping the lights turned off when not occupying the rooms, occupancy sensors would still be an energy saving solution in many areas. The updated lighting would provide a cleaner, brighter feel with up to 30% energy savings in the mentioned areas.
- Baggage conveyors and motors: Installed in approximately 1989. Manufacturer is no longer in business so parts are difficult to obtain.

Commission

- Typical light fixture is 2'x4' parabolic lens with (2) or (3) T8 lamps or 1'x4' acrylic lens with (2) T12 fluorescent lamps.
- Light levels were appropriate for office environment
- Lights were controlled by switches, with several areas having multiple switches for different light levels.
- Hours of operation are from 8am-5pm, Monday - Friday, with lights manually switched off during off hours.
- Recommendations: Occupancy sensors could be added in the bathroom, break room, server room and conference rooms. Daylighting could be utilized in areas open to windows. The mechanical and restrooms could use a T8 upgrade from T12s. Overall the lighting levels, controls and maintenance in Commission was acceptable.

Fire/Crash/Rescue (F/C/R)

- Typical light fixture in open garage areas is 1'x4' industrial strip with (2) T12 fluorescent lamps and 2'x4' acrylic lens with (4) T12 fluorescent lamps in office/lounge/training areas. Many of the T12 lamps flickered within the office/lounge areas.
- Light levels were appropriate for open garage area and low for office/lounge/training and exterior site areas. Daylight conditions provide abundant light levels in the garage but all fixtures were still operating.
- Lights were controlled by multiple switches. Exterior lights were controlled by photocell.
- Hours of operation are 24 hours per day, 7 days per week.
- Recommendations: All lamps should be updated from T12 to T8. Photocells or occupancy sensors could be used in the open garage areas. The additional lumens from a T8 lamp upgrade will provide better light levels in the training room.

North Lower Concourse (NLC) – Exterior Covered Walkway

- Typical light fixture in covered walkway is 120V lensed cylindrical downlight with (1) 15W self ballasted compact fluorescent lamp. The original design had 50W HPS lamps.
- Lights were off during daylight conditions. Nighttime conditions had very low light levels (approximately 2 foot-candle average), with every other light fixture on.
- Lights were controlled by photocell.
- Hours of operation are 24 hours per day, 7 days per week.
- Recommendations: Each light fixture should be on during nighttime conditions and the lens should be cleaned. Higher wattage compact fluorescent lamps should be considered. The lamps used for replacement of HPS provide approximately one quarter of the lumens as the HPS design.

NLC - GSP Operations

- Typical light fixture in office areas is 120V 2'x4' acrylic lens with (4) T8 fluorescent lamps.
- Light levels were much higher than required for office environment. Daylight was present.
- Lights were controlled by single or multiple switches.
- Hours of operation are from 4am to midnight.
- Recommendations: Each fixture should de-lamp (1) or (2) lamps. Occupancy sensors could be added.

NLC - Delta Operations

- Typical light fixture in office areas is 120V 1'x4' acrylic lens with (2) T12 fluorescent lamps.
- Light levels were acceptable for office environment. Daylight was present.
- Lights were controlled by single or multiple switches.
- Hours of operation are from 4am to midnight.

- Recommendations: All lamps should be updated from T12 to T8. Occupancy sensors could be added.

NLC - TSA Operations

- Typical light fixture in office areas is 120V 1'x4' acrylic lens with (2) T12 fluorescent lamps. Typical light fixture in training/computer workstation areas is 120V 2'x4' acrylic lens with (2) T12 fluorescent lamps.
- It was noted that tripping circuits is a common problem in this area due to circuit overload, especially when cleaning the area.
- Light levels were acceptable for training. Daylight was present.
- Lights were controlled by single switch.
- Hours of operation are from 4am to midnight.
- Recommendations: All lamps should be updated from T12 to T8. Occupancy sensors could be added. Dimming could be added for when computer training sessions are taking place.

NLC – Unoccupied offices

- Typical light fixture in office areas is 120V 1'x4' acrylic lens with (2) T8 fluorescent lamps or 2'x4' acrylic lens with (4) T8 fluorescent lamps.
- Light levels were much higher than required for office environment. Daylight was present.
- Lights were controlled by single or multiple switches.
- Hours of operation would be from 4am to midnight if occupied.
- Recommendations: Each 4-lamp fixture should de-lamp (1) or (2) lamps. Occupancy sensors could be added.
- Light fixtures in two bathrooms are uncontrolled, on 24/7.

NLC – Conference Room 1

- Typical light fixture is 120V 1'x4' acrylic lens with (2) T12 fluorescent lamps or downlight with 100W incandescent lamps.
- Light levels were low and two colors of light were present.
- Lights were controlled by switches and dimmers.
- Hours of operation are as required for training or conferences.
- Recommendations: All fluorescent lamps should be updated from T12 to T8.

NLC – Conference Room 2

- Typical light fixture is 120V 2'x4' parabolic lens with (4) T12 fluorescent lamps or downlight with 100W incandescent lamps.
- Light levels were low and two colors of light were present.
- Lights were controlled by switches and dimmers.
- Hours of operation are as required for training or conferences.
- Recommendations: All fluorescent lamps should be updated from T12 to T8.

Checkpoint B/Screening B

- Typical light fixture is pendant mounted 120V linear indirect with T8 fluorescent lamps (recently upgraded from T12 fluorescent).

- Nighttime light levels in the corridors were in the 20 foot-candle range. Daytime light levels were adequate with some daylight present. Screening light levels were slightly lower than adequate.
- Lights were controlled by circuit breakers.
- Hours of operation are from 4am to midnight. The lights operate on at all times.
- Recommendations: Timers could be added to shut down the circuits on normal power during off hours. Occupancy sensors could override the lights during off hours. Lights on emergency circuits would stay on at all times.

Bar and Kitchen

- Typical light fixture in bar/lounge area is small profile downlight with (1) 20W halogen MR16 lamp, each with 120VAC:12VDC transformer mounted in the plenum. Typical light fixtures in kitchen were surface mounted T15 fluorescent lamp under counter task fixtures, compact fluorescent lamps for grill and downlights with 75W incandescent lamps for general area lighting.
- Light levels in the kitchen were low during nighttime and daytime conditions, with levels in the 20 foot-candle range. Light levels in the bar/lounge area were very low during nighttime levels with levels ranging from 0.2 to 2 foot-candles. Daylight from the restaurant/atrium area was present in most areas.
- Lights were controlled by 20 year old lighting control system which no longer works and the manufacturer no longer exists. The system has normal and emergency power 480V inputs and 120V outputs for all lighting circuits. The system was designed to control the bar, lounge, kitchen and restaurant areas.
- Hours of operation are from 6:30am to 9pm. The lights operate on at all times.
- Recommendations: The MR16 lamps should be replaced with LED MR16 equivalent lamps which consume less than one third of the wattage and have a rated life 12 times of the halogen lamp. Currently, approximately 50 MR16 lamps have to be swapped out per month. The light output of the LED MR16 lamps could be increased for higher light levels throughout the area. The task lights should be replaced with T8 fluorescent lamps. The incandescent downlights should be replaced with higher output, lower wattage compact fluorescent lamps. The temperature of the color of all lamp sources should match. The lighting controls should be upgraded to a new system on a timeclock with user override during off hours.

Restaurant and Atrium

- Typical light fixture in restaurant and atrium areas are track mounted spot lights with 20W halogen MR16 lamps, track mounted flood lights with 150W halogen lamps, recessed wall wash downlights with 250W halogen lamps and surface mounted skylight up lights with 500W halogen lamps.
- Daytime light levels were very high in the restaurant and atrium areas due to the abundance of daylight. Nighttime light levels were very low with levels ranging from 3 to 8 foot-candles.
- Refer to bar and kitchen notes for lighting controls.
- Hours of operation are from 6:30am to 9pm. The lights operate on at all times due to an outdated (circa approx. 1988) lighting control system which transforms

480V to 120V for the lighting. The control system is from Strand Electric and Electro Controls, Inc. The maintenance staff indicated that the original manufacturer that provided the controls is no longer in business, replacement parts are obsolete and the system no longer works.
- Recommendations: The MR16 lamps should be replaced with LED lamps similar to the bar and kitchen areas. The light fixtures with halogen floodlights, downlights and up lights, should be replaced with more efficient light source such as HID or LED. The majority of wall wash downlights burn out at such a fast rate that it is not practical to keep them lamped. Therefore, all but four of the wall wash downlights, which highlight the atrium artwork, were operating at the time of the survey. The light output of many of the lights could be increased by using more efficient lamp sources while lowering the wattage consumption. Also, if such a high number of lamps were not burnt out there would be a much more comfortable level of light during nighttime conditions. Regarding the controls, photocells should be installed on each circuit to turn off the lights during daytime conditions and timers should be added to shut the lights off during non operating hours. The complexity of this area with emergency and normal power circuits and outdated control system may require further study with potential lighting control vendors before final recommendation.
- Without discussing the benefits of reduced maintenance and improvement of light levels, the running wattage for lighting in the atrium area is approximately 21kW, or 15kWh, consumed per month. At $0.06 per kWh, the atrium alone would see savings in the $7000-$8000/year range if the controls were updated to only run the lighting during dark operating hours. The savings would increase an additional $1500/year if the lamp wattage was cut in half by using efficient sources. These costs are assuming that all lights are operating on at all times. The current configuration has an annual utility cost of approximately $10,000. There is no reason this area should have a utility cost more than $1,500/year.

Checkpoint A/Screening A

- Same as Checkpoint B/Screening B with the exception of all light fixtures are 277V

North Bridge, Art Gallery and Vending

- Typical light fixture, controls and hours of operation in North Bridge is same as Checkpoint B/Screening B. Typical light fixtures in Art Gallery are track mounted 20W halogen MR16 lamps which run continuously. Typical light fixtures in Vending area are (4) lamp T8s with single switch.
- Recommendations: The MR16 lamps in the Art Gallery should be replaced with LED lamps. The vending area should be put on occupancy sensor and (1) or (2) lamps could be removed per fixture.

South Bridge

- Controls and hours of operation in South Bridge are same as North Bridge. Typical light fixture is 277V cove mounted with T8 fluorescent lamps for indirect up light of space.

- Light levels are adequate during daytime and nighttime conditions.
- Recommendations: None.

North Terminal – Open Ticketing Area

- Typical light fixture is 120V cylindrical downlight with 175W metal halide lamp. Typical cove/accent light fixture is 120V cathode tube.
- Light levels are adequate during daytime conditions. Light levels are very low during nighttime conditions, with levels in the 2-5 foot-candle range.
- Lights were controlled by circuit breakers.
- Hours of operation are from 4am to midnight. The lights operate on at all times.
- Recommendations: The HID fixtures should be replaced with an induction lamp with lower wattage, higher output and longer lamp life. The existing lamps are rated at 10,000 hours where induction lamps are rated at 100,000 hours and the lumens per watt is much higher. Under existing conditions, a lift has to be brought in on a monthly basis for lamp replacement. The cathode tube light should be replaced with LED source due to energy savings and maintenance. Both existing light sources were a concern for the maintenance staff. The lights should be controlled by timer to shut the light fixtures on normal circuits off during non operating hours. Another concern is life safety lighting. The metal halide source does not restrike in time to meet life safety lighting requirements.

South Terminal – Baggage Claim Area

- Typical light fixture in open area is 277V cylindrical downlight with 175W metal halide lamp. Typical light fixture in baggage area with dropped ceiling is 277V recessed downlight with 175W metal halide lamp and recessed linear wall slot fixture with T12 fluorescent lamp. Typical cove/accent light fixture is 120V cathode tube.
- Light levels are adequate during daytime conditions. Light levels are very low during nighttime conditions, with levels in the 2-5 foot-candle range in the open area and 12 foot-candles in the baggage area.
- Lights were controlled by circuit breakers.
- Hours of operation are from 4am to midnight. The lights operate on at all times.
- Recommendations: See the recommendations for North Terminal.

Terminal Office Areas

- Typical light fixture in office areas varied with downlights with compact fluorescent lamps, 1'x4' lensed troffers with T12 fluorescent lamps and downlights with incandescent lamps.
- Light levels are adequate in offices areas.
- Lights were controlled by switches.
- Hours of operation varied.
- Recommendations: Occupancy sensors should be added in most office areas because many of the lights were on while the space was unoccupied. Many of the lamps should be upgraded to more efficient sources.

Canopies

- Typical light fixture under canopy is 277V cylindrical downlight with 100W metal halide lamp.
- Light levels are adequate during nighttime conditions, with levels in the 40 foot-candle range.
- Lights were controlled by photocell.
- Hours of operation are nighttime conditions
- Recommendations: None.

Garden

- Typical light fixture in garden is flood light mounted in ground.
- Light levels are adequate during nighttime conditions.
- Lights were controlled by building management system.
- Hours of operation are nighttime conditions.
- Recommendations: None.

South Lower Concourse (SLC) – Exterior Covered Walkway

- Typical light fixture in covered walkway is 277V lensed cylindrical downlight with either (1) 15W self ballasted compact fluorescent lamp or 50W HPS lamps.
- Every other light was on during daylight conditions. Nighttime conditions had very low light levels (approximately 2 foot-candle average), with every other light fixture on.
- Lights were controlled by photocell but every other fixture was hard wired to operate on at all times.
- Hours of operation are 24 hours per day, 7 days per week.
- Recommendations: Each light fixture should be on during nighttime conditions and the lens should be cleaned. Higher wattage compact fluorescent lamps should be considered. The lamps used for replacement of HPS provide approximately one quarter of the lumens as the HPS design.

SLC – US Airways Operations

- Typical light fixture in office areas is 277V 1'x4' acrylic lens with (2) T12 fluorescent lamps.
- Light levels were acceptable for office environment. Daylight was present.
- Lights were controlled by single or multiple switches.
- Hours of operation are from 4am to midnight.
- Recommendations: All lamps should be updated from T12 to T8. Occupancy sensors could be added.

SLC – American Airlines Operations

- Same as US Airways Operations

SLC – Unoccupied offices

- Typical light fixture in office areas is 277V 1'x4' acrylic lens with (2) T8 fluorescent lamps.

- Light levels were adequate for office environment.
- Lights were controlled by single or multiple switches.
- Hours of operation would be from 4am to midnight if occupied.
- Recommendations: Occupancy sensors should be added.

SLC – South FIS

- Typical light fixture is 277V 2'x4' parabolic lens with (4) T12 fluorescent lamps.
- Light levels were acceptable for office environment.
- Lights were controlled by switches.
- Hours of operation are unknown.
- Recommendations: None.

Concourse A and Concourse B

- Typical light fixture is pendant mounted 277V linear indirect with T8 fluorescent lamps (recently upgraded from T12 fluorescent). There are also 150W halogen lamp decorative wall sconces.
- Nighttime light levels in the corridors were adequate in the 25 foot-candle range. Daytime light levels were adequate with some daylight present.
- Lights were controlled by light switches in the electrical closet.
- Hours of operation are from 4am to midnight. The lights operate on at all times.
- Recommendations: Timers could be added to shut down the circuits on normal power during off hours. Occupancy sensors could override the lights during off hours. Lights on emergency circuits would stay on at all times. Photocells could be added to the normal circuits to shut rows of lighting off during sunny daylight conditions. The wall sconces could be replaced with an energy efficient fixture.

Parking Garage A

- Typical light fixture in parking area is 277V parking garage fixture with (1) 100W HPS lamp and surface mounted fixture with (1) 35W HPS lamps in stairwells.
- Nighttime light levels in the parking area were low in many areas, with levels ranging from 1-15 foot-candles. Daytime light levels were adequate with some daylight present.
- Lights were controlled by circuit breakers.
- Hours of operation are 24 hours per day, 7 days per week. The lights operate on at all times.
- Recommendations: The circuits on emergency power include exit signs and the stairwell/walkway light fixtures, resulting in many lights left on during daytime conditions. The exit signs should be replaced and put on their own circuit. The stairwell/walkway fixtures should be put on photocell. Light levels in the garage should be examined and alternative quantity and type of light fixtures should be presented.

Parking Garage B

- Same characteristics as Parking Garage A.

- Recommendations: The circuits on emergency power were appropriate in this garage, resulting in stairwell/walkway fixtures only being on during nighttime conditions. Light levels in the garage should be examined and alternative quantity and type of light fixtures should be presented.

Site Lighting

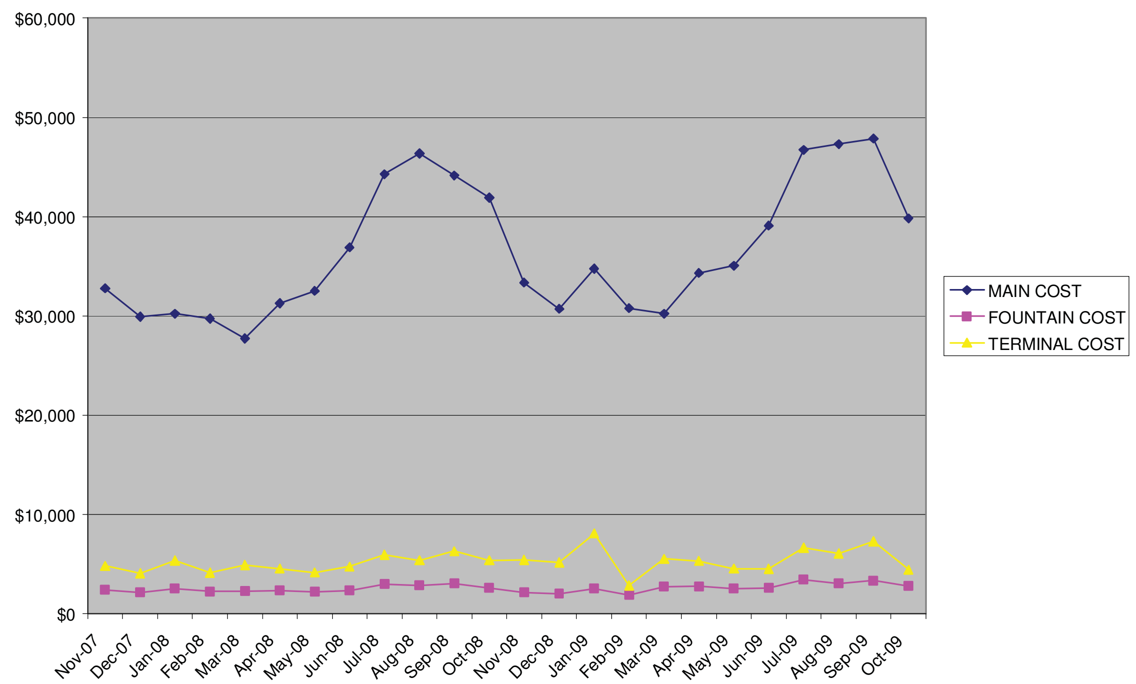
- Lighting levels from the terminal to the parking garage were slightly low. The areas under canopy had good light levels.
- Lighting levels at curbsides, between canopies, were very low, in the 0.5-2 foot-candle range. Lights could be added at the base of some of the trees, controlled by photocell, to enhance light levels.
- Exterior building/facade lighting was adequate.
- Surface parking lot lighting was from pole mounted shoebox fixtures with high pressure sodium lamp source. Light levels ranged from 1-2 foot-candles which was acceptable for the relatively low occupation in the surface lots during nighttime conditions.
- Recommendations: Overall lighting conditions were slightly low and the high pressure sodium lamp source gives an effect of dimly lit areas. Many areas curbside and in the garage had poor lighting uniformity ratios (from very bright in one area to very dark in another). One solution would be to move away from the HPS lamps source and use LED or induction lamps, which require much less maintenance, provides a more uniform light distribution and have lower energy consumption. Almost all exterior lighting was controlled by photocells. There may be opportunities to shut certain fixtures off during non operating hours via timeclock.

PARKING GARAGE REPORT REVIEW

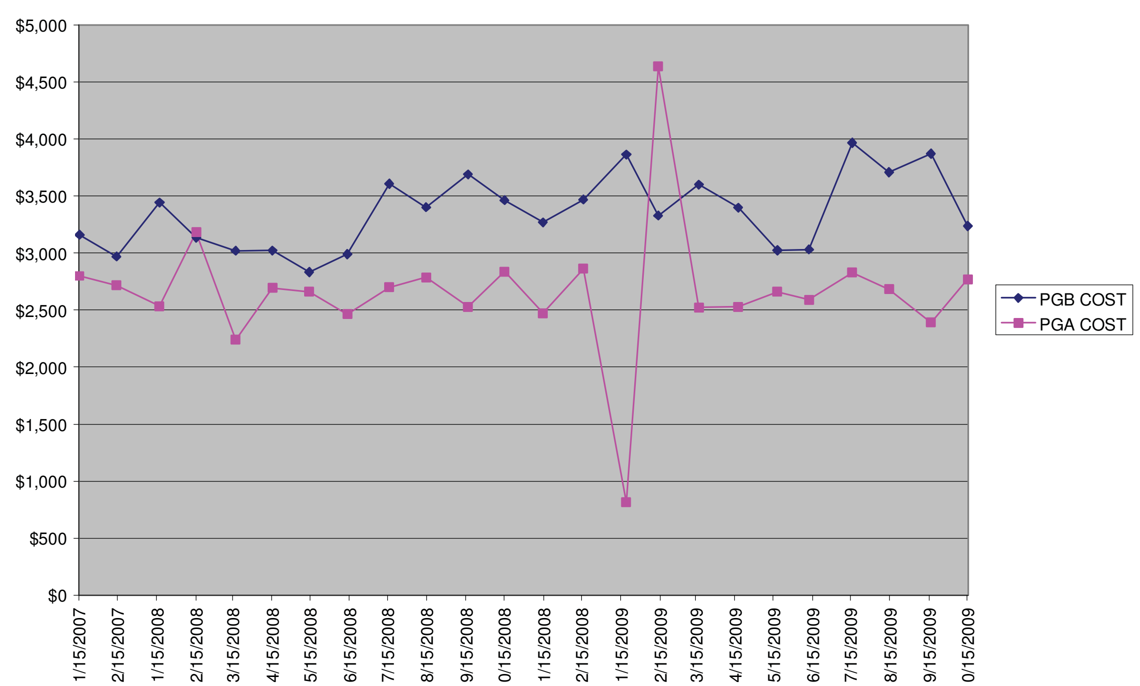
- The study recommends a one to one light fixture replacement of existing parking garage lowbay fixtures (with (1) 100W HPS lamp) with an enclosed industrial strip (with (2) 32W fluorescent T8s). A lighting calculation would have to be performed to confirm the proposed strips would provide an adequate amount of light. The lumen output of the fluorescent lamp source is less than the existing design but with reflectors, whiter light and better uniformity, the proposed fluorescent strips may be a viable solution in some instances. Because the overall existing light levels are low, additional light fixtures may be recommended.
- The report uses a blended electric rate of $0.0865/kWh for the payback analysis. This rate is significantly higher than what the airport is charged, which is typically $0.05-$0.06/kWh. The report also credits an EPAct Tax Deduction of $34,020. The airport will most likely not see this deduction because they are not a tax paying entity. The deduction may be able to be given to the contractor for some benefit to the airport off of the construction costs. The simple payback shown on the report is 2.8 years. With the above factors taken into consideration, the payback is closer to 4-4.5 years.
- Recommendations: Light fixture samples of fluorescent and LED sources could be installed for a mock up and the best solution for energy efficiency, light performance/uniformity and maintenance should be selected.

ELECTRICITY

GSP ELECTRICITY USE

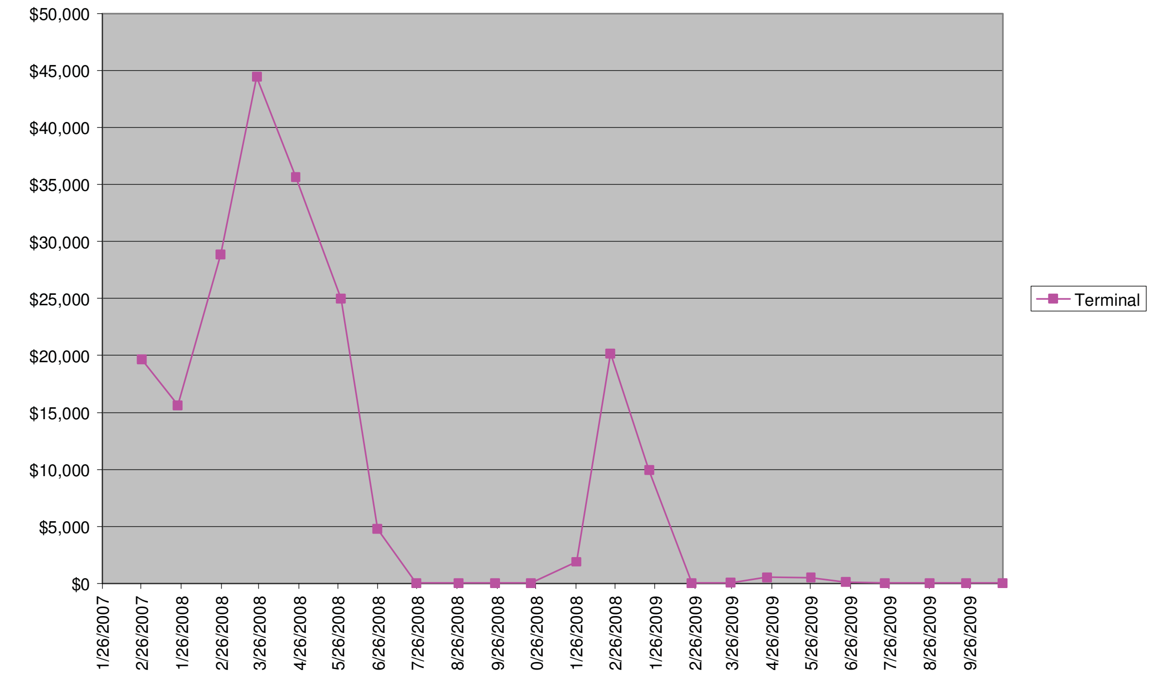


PGA and PGB ELECTRICITY USE

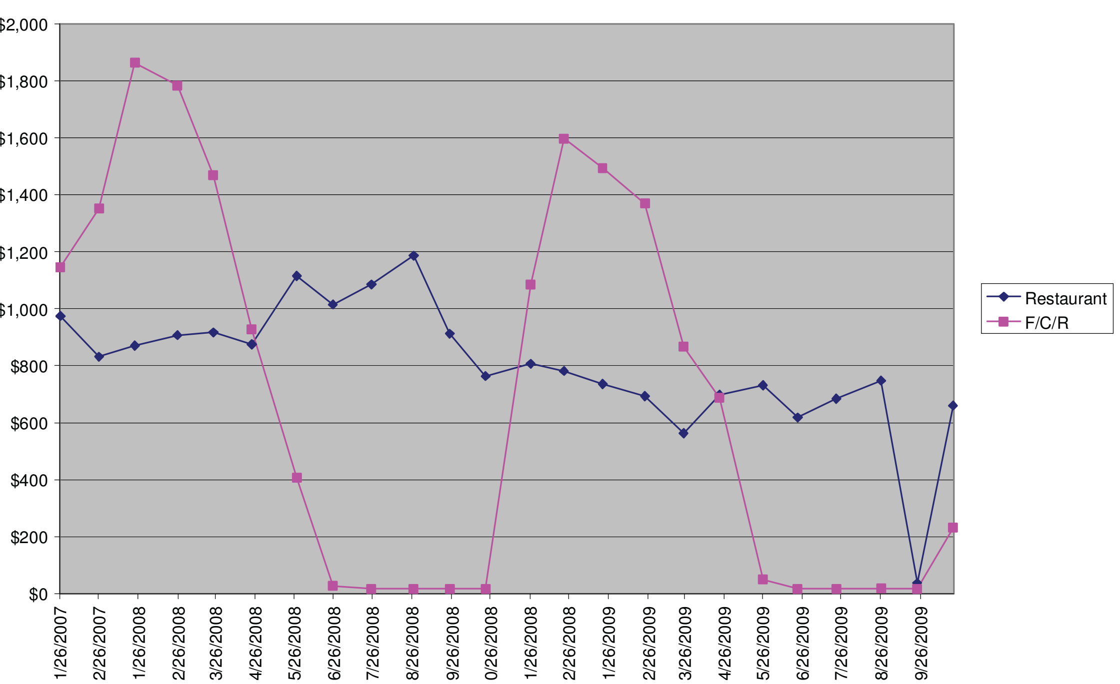


GAS

TERMINAL BOILER GAS CONSUMPTION

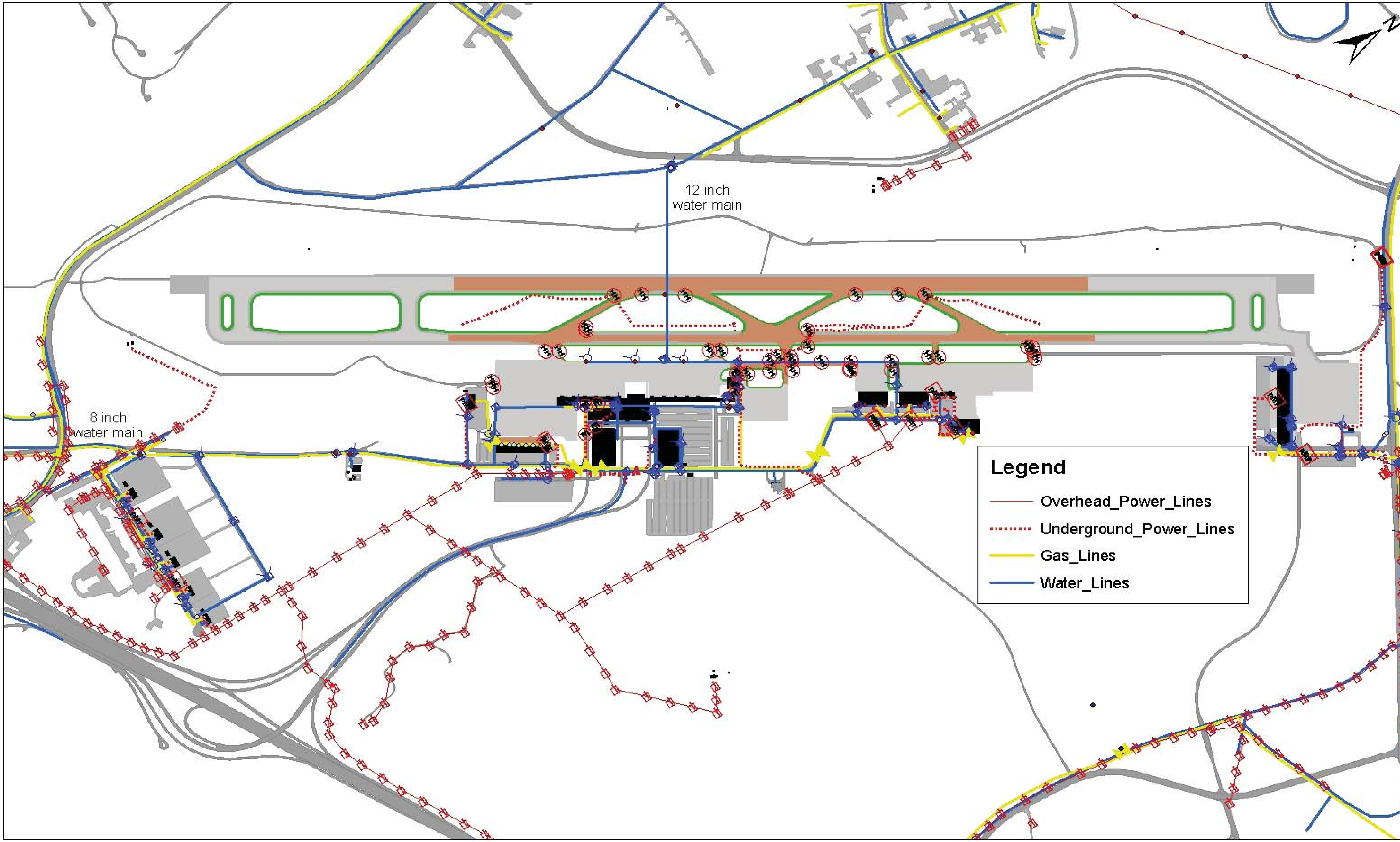


RESTAURANT & F/C/R/ GAS CONSUMPTION



APPENDIX 2

SITE UTILITIES MAP AND DUKE ENERGY MEETING MINUTES



EXISTING SITE UTILITIES MAP

MEETING NOTES

IMPROVING YOUR WORLD
Reynolds, Smith and Hills, Inc.

GSP Terminal Area Study AEP No. 203-8447.010

Date:	7/8/10	Meeting Date:	6/22/10
Meeting Place:	GSP Administration Building		
Participants:	Larry Holcombe (GSP) Chuck Mize (Duke Energy) Mahesh Adyharu (RS&H) Greg Smith (RS&H)		
Subject:	Utility power at GSP		

Following are the Minutes of this Meeting: *(Please review and advise of any changes)*

Items in *italics* represent action items.

1. The routing of the existing 24kV circuit (#2406) from Pelham Retail Substation was confirmed. The existing service has a demand load in the 3000-3500kVA range with capacity in the 6000-6500kVA range. *Duke Energy to confirm kVA capacity.*

2. The existing Pelham Retail Substation has 6 existing circuits. Circuit 2411 is fed from a separate transformer and may be a viable option as the alternative feed to the airport. The proposed routing down GSP drive has a section that needs confirmation of land use and there is a section of routing that would share the existing overhead lines. The secondary feed would provide a level of redundancy but not be a true alternative feed from a separate substation with independent routing. It was confirmed that there is not a viable option for a true alternative feed available within a reasonable radius of the airport. *Chuck to confirm feasibility and provide rough order of magnitude of cost to the airport for the 2411 feed.*

3. Mahesh asked if there would be any cost contribution requirements by GSP for the second feed. The feed would be paid for by an "extra facilities charge" to the airport which would be a five year payment plan for the cost of the new feed plus an indefinite monthly fee of 1.7% of the new feed's total cost.

4. Chuck confirmed that the largest transformer size they offer is 2500kVA and they prefer outdoor locations.

5. The Custom Lighting Incentives program from Duke Energy was discussed and the 1 year minimum payback restriction was noted.

6. The Power Share program from Duke Energy was discussed for running the generator at peak loads. *RS&H to investigate program and analyze cost benefits.*

7. The On-Site Generation program from Duke Energy was discussed for Duke to provide the design, install and maintenance of a 2MW emergency power generation system. *Chuck to provide rough order of magnitude for monthly cost.*

8. *Chuck to provide additional information and contact info for SEW Eurodrive for Airport Logistics*

Reynolds, Smith and Hills, Inc.
10748 Deerwood Park Blvd., South
Jacksonville, FL 32256-0597
Tel: (904) 256-2500 Fax: (904) 256-2501

By: Greg Smith
Direct Line: (904) 256-2167

APPENDIX 3

LIGHTING AND ENERGY UPGRADES GUIDANCE DOCUMENTS

GSP INTERNATIONAL AIRPORT

GREENVILLE-SPARTANBURG INTERNATIONAL AIRPORT

LIGHTING & CONTROLS
PHASE 1
ENERGY UPGRADES

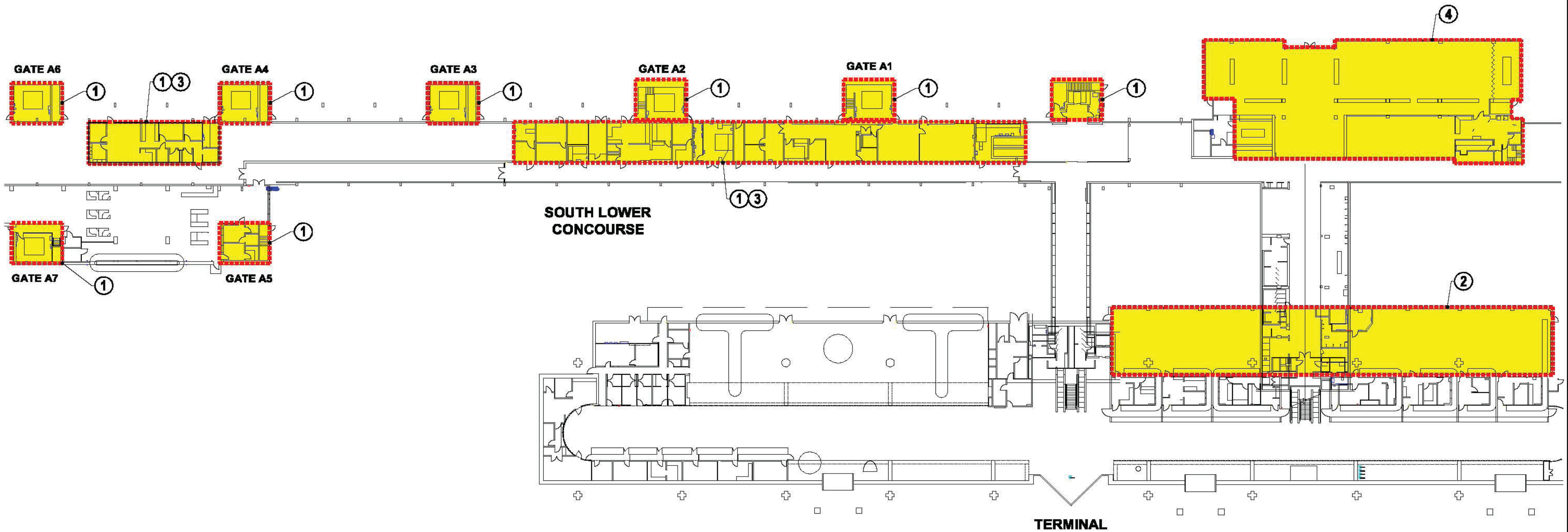
MARCH 22, 2010

GUIDANCE DOCUMENTS

PREPARED BY

RS&H®
IMPROVING YOUR WORLD

Reynolds, Smith and Hills, Inc.
8008 Corporate Center Drive
Suite 410
Charlotte, NC 28226
704-752-0610 FAX 704-541-3081
www.rsandh.com



ENERGY EFFICIENY MEASURES:

1. UPGRADE EXISTING LAMPS AND BALLASTS FROM T12 TO T8.
2. RETROFIT EXISTING FIXTURES WITH NEW REFLECTOR AND UPGRADE LAMPS AND BALLASTS FROM T12 TO T8. SEE APPENDIX ITEM 1.
3. INSTALL CEILING MOUNT OCCUPANCY SENSORS AND WALL SWITCH (LUTRON LRF2-OCR8-P-WH AND MRF2-6ANS-277). SEE APPENDIX ITEM 2.
4. PHASE OUT EXISTING HALOGEN MR16 LAMP SOURCES WITH LED MR16 (TOSHIBA LEL-MR4L-GU5F-B/US). SEE APPENDIX ITEM 3. INSTALL PHOTOCELL (SENSOR SWITCH CM-PC) AND POWER PACK (SENSOR SWITCH PP-20) FOR ON/OFF CONTROLS OF SKYLIGHT FIXTURES. SEE APPENDIX ITEM 4.
5. REPLACE EXISTING MOTION SENSORS WITH PHOTOCELL (SENSOR SWITCH CM-PC) AND POWER PACK (SENSOR SWITCH PP-20) FOR ON/OFF CONTROLS OF CIRCUITS CONCOURSE FIXTURES. SEE APPENDIX ITEM 4.

GENERAL NOTES:

1. COORDINATE ALL ENERGY EFFICIENCY MEASURES WITH ATTACHED APPENDIX ITEM 5 DUKE ENERGY INCENTIVES APPLICATION.

RS&H
IMPROVING YOUR WORLD

Reynolds, Smith and Hills, Inc.
8005 Corporate Center Drive
Suite 410
Charlotte, NC 28226
704-752-0610 FAX 704-541-3061
www.rsandh.com

GSP INTERNATIONAL AIRPORT

LIGHTING & CONTROLS PHASE 1 ENERGY UPGRADES

REVISIONS

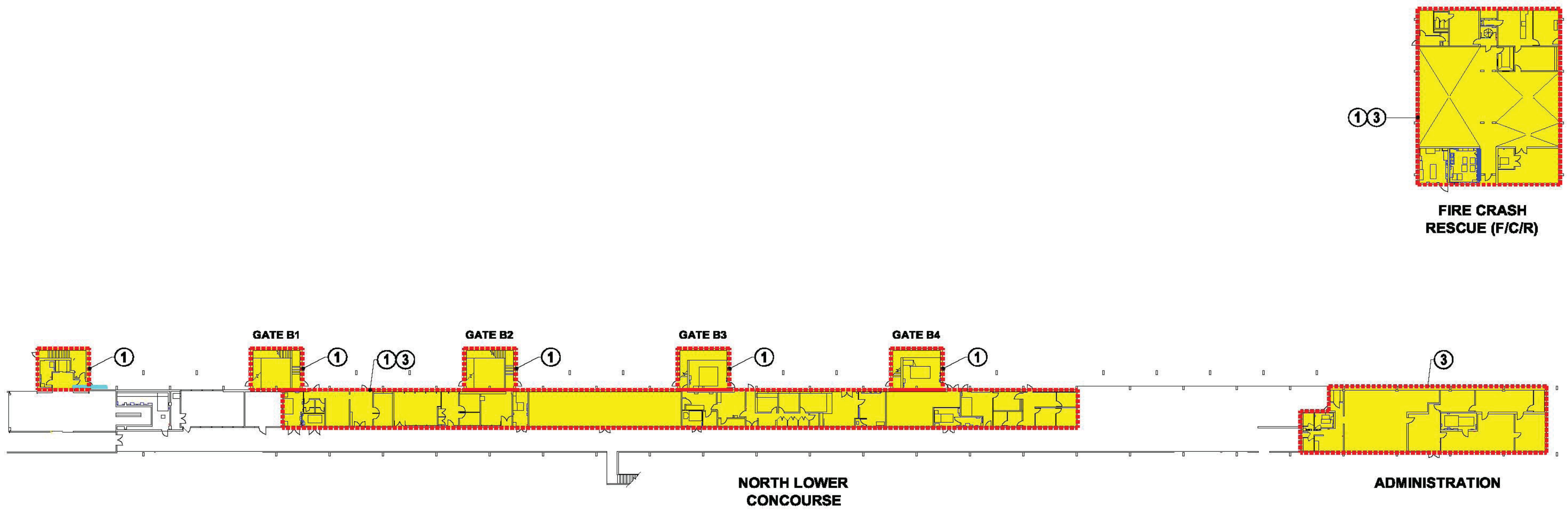
NO.	DESCRIPTION	DATE

DATE ISSUED: MARCH 22, 2010
SCALE: 1" = 60'
REVIEWED BY: MA
DESIGNED BY: GS
AEP PROJECT NUMBER
203-8447-010

SHEET TITLE
TERMINAL AND SOUTH LOWER CONCOURSE PLAN

SHEET NUMBER
E001

GUIDANCE DOCUMENTS



ENERGY EFFICIENY MEASURES:

1. UPGRADE EXISTING LAMPS AND BALLASTS FROM T12 TO T8.
2. RETROFIT EXISTING FIXTURES WITH NEW REFLECTOR AND UPGRADE LAMPS AND BALLASTS FROM T12 TO T8. SEE APPENDIX ITEM 1.
3. INSTALL CEILING MOUNT OCCUPANCY SENSORS AND WALL SWITCH (LUTRON LRF2-OCRB-P-WH AND MRF2-6ANS-277). SEE APPENDIX ITEM 2.
4. PHASE OUT EXISTING HALOGEN MR16 LAMP SOURCES WITH LED MR16 (TOSHIBA LEL-MR4L-GU5F-B/US). SEE APPENDIX ITEM 3. INSTALL PHOTOCELL (SENSOR SWITCH CM-PC) AND POWER PACK (SENSOR SWITCH PP-20) FOR ON/OFF CONTROLS OF SKYLIGHT FIXTURES. SEE APPENDIX ITEM 4.
5. REPLACE EXISTING MOTION SENSORS WITH PHOTOCELL (SENSOR SWITCH CM-PC) AND POWER PACK (SENSOR SWITCH PP-20) FOR ON/OFF CONTROLS OF CIRCUITS CONCOURSE FIXTURES. SEE APPENDIX ITEM 4.

GENERAL NOTES:

1. COORDINATE ALL ENERGY EFFICIENCY MEASURES WITH ATTACHED APPENDIX ITEM 5 DUKE ENERGY INCENTIVES APPLICATION.

RS&H
IMPROVING YOUR WORLD

Reynolds, Smith and Hills, Inc.
8008 Corporate Center Drive
Suite 410
Charlotte, NC 28226
704-752-0610 FAX 704-541-3061
www.rsandh.com

GSP INTERNATIONAL AIRPORT

LIGHTING & CONTROLS PHASE 1 ENERGY UPGRADES

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: MARCH 22, 2010

SCALE: 1" = 60'

REVIEWED BY: MA

DESIGNED BY: GS

AEP PROJECT NUMBER
203-8447-010

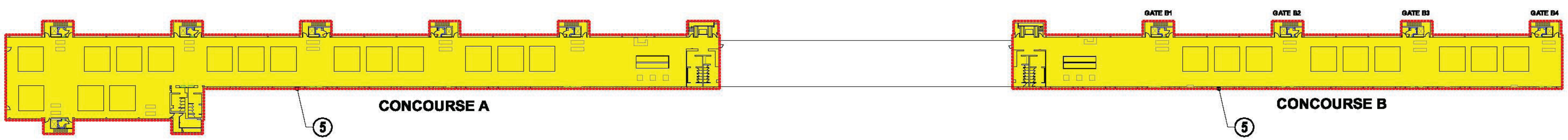
SHEET TITLE

F/C/R AND NORTH LOWER CONCOURSE PLAN

SHEET NUMBER

E002

GUIDANCE DOCUMENTS



ENERGY EFFICIENY MEASURES:

1. UPGRADE EXISTING LAMPS AND BALLASTS FROM T12 TO T8.
2. RETROFIT EXISTING FIXTURES WITH NEW REFLECTOR AND UPGRADE LAMPS AND BALLASTS FROM T12 TO T8. SEE APPENDIX ITEM 1.
3. INSTALL CEILING MOUNT OCCUPANCY SENSORS AND WALL SWITCH (LUTRON LRF2-OCRB-P-WH AND MRF2-6ANS-277). SEE APPENDIX ITEM 2.
4. PHASE OUT EXISTING HALOGEN MR16 LAMP SOURCES WITH LED MR16 (TOSHIBA LEL-MR4L-GU5F-B/US). SEE APPENDIX ITEM 3. INSTALL PHOTOCELL (SENSOR SWITCH CM-PC) AND POWER PACK (SENSOR SWITCH PP-20) FOR ON/OFF CONTROLS OF SKYLIGHT FIXTURES. SEE APPENDIX ITEM 4.
5. REPLACE EXISTING MOTION SENSORS WITH PHOTOCELL (SENSOR SWITCH CM-PC) AND POWER PACK (SENSOR SWITCH PP-20) FOR ON/OFF CONTROLS OF CIRCUITS CONCOURSE FIXTURES. SEE APPENDIX ITEM 4.

GENERAL NOTES:

1. COORDINATE ALL ENERGY EFFICIENCY MEASURES WITH ATTACHED APPENDIX ITEM 5 DUKE ENERGY INCENTIVES APPLICATION.

RS&H
IMPROVING YOUR WORLD

Reynolds, Smith and Hills, Inc.
8008 Corporate Center Drive
Suite 410
Charlotte, NC 28226
704-752-0610 FAX 704-541-3061
www.rsandh.com

GSP INTERNATIONAL AIRPORT

LIGHTING & CONTROLS PHASE 1 ENERGY UPGRADES

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: MARCH 22, 2010

SCALE: 1" = 100'

REVIEWED BY: MA

DESIGNED BY: GS

AEP PROJECT NUMBER

203-8447-010

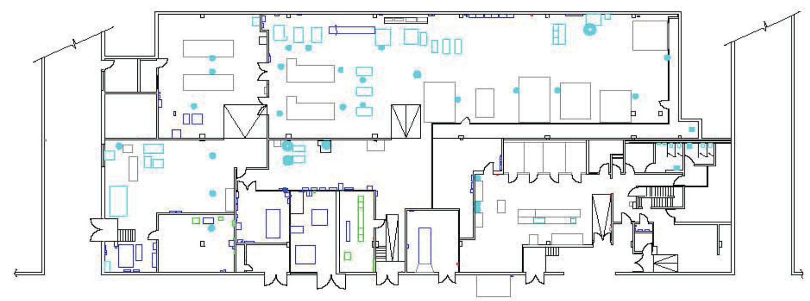
SHEET TITLE

CONCOURSE PLAN

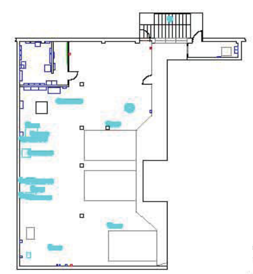
SHEET NUMBER

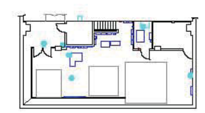
E003

GUIDANCE DOCUMENTS



① CENTRAL PLANT





① TERMINAL BASEMENT

ENERGY EFFICIENY MEASURES:

1. UPGRADE EXISTING LAMPS AND BALLASTS FROM T12 TO T8.
2. RETROFIT EXISTING FIXTURES WITH NEW REFLECTOR AND UPGRADE LAMPS AND BALLASTS FROM T12 TO T8. SEE APPENDIX ITEM 1.
3. INSTALL CEILING MOUNT OCCUPANCY SENSORS AND WALL SWITCH (LUTRON LRF2-OCRB-P-WH AND MRF2-6ANS-277). SEE APPENDIX ITEM 2.
4. PHASE OUT EXISTING HALOGEN MR16 LAMP SOURCES WITH LED MR16 (TOSHIBA LEL-MR4L-GU5F-B/US). SEE APPENDIX ITEM 3. INSTALL PHOTOCELL (SENSOR SWITCH CM-PC) AND POWER PACK (SENSOR SWITCH PP-20) FOR ON/OFF CONTROLS OF SKYLIGHT FIXTURES. SEE APPENDIX ITEM 4.
5. REPLACE EXISTING MOTION SENSORS WITH PHOTOCELL (SENSOR SWITCH CM-PC) AND POWER PACK (SENSOR SWITCH PP-20) FOR ON/OFF CONTROLS OF CIRCUITS CONCOURSE FIXTURES. SEE APPENDIX ITEM 4.

GENERAL NOTES:

1. COORDINATE ALL ENERGY EFFICIENCY MEASURES WITH ATTACHED APPENDIX ITEM 5 DUKE ENERGY INCENTIVES APPLICATION.

RS&H
IMPROVING YOUR WORLD

Reynolds, Smith and Hills, Inc.
8008 Corporate Center Drive
Suite 410
Charlotte, NC 28226
704-752-0610 FAX 704-541-3081
www.rsandh.com

GSP INTERNATIONAL AIRPORT

LIGHTING & CONTROLS PHASE 1 ENERGY UPGRADES

REVISIONS

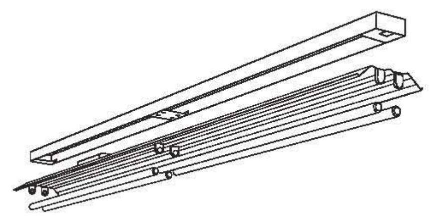
NO.	DESCRIPTION	DATE

DATE ISSUED: MARCH 22, 2010
SCALE: 1" = 60'
REVIEWED BY: MA
DESIGNED BY: GS
AEP PROJECT NUMBER
203-8447-010

SHEET TITLE
CENTRAL PLANT AND TERMINAL BASEMENT

SHEET NUMBER
E004

GUIDANCE DOCUMENTS



PROJECT INFORMATION	
Project Name	Type
Catalog No.	Date

FEATURES

- Retrofit package to upgrade existing 4' or 8' striplights or industrials to energy-efficient fixtures using the latest T8 or T5HO technology
- Kits are shipped completely pre-wired and install with simple hand tools
- Standard kits include: reflector, pre-wired ballast and sockets, safety cables, and optional bulk lamps
- Designed to fit most existing channel widths from 4" to 5⅜"
- Kit attaches to existing socket brackets to reduce waste
- Optional reflector materials available, 91% reflective gloss white or 95% reflective specular
- Includes dual safety cables for one person installation and secure attachment to existing channel
- Energy savings up to 50% compared to 2-lamp T12HO magnetic systems, while maintaining existing light levels

REFLECTORS
White reflectors have 91% total reflectance and are prepainted white aluminum. Specular aluminum reflectors have 95% total reflectance.

ELECTRICAL
Ballasts are energy efficient, thermally protected, automatic resetting, Class P, high power factor, sound rated A, electronic ballasts. Lamps are secured with rotary locking lamp sockets for ease of relamping and to reduce lamps disconnecting due to vibration or incidental contact. Ballast disconnect standard on all ballast supplied kits.

CERTIFICATION
UL 1598B Listed as luminaire conversion, retrofit.

ORDERING INFORMATION

EXAMPLE **RKSR8-232-GW-4EU**

RKSR ___ – ___ – ___ – ___ U – ___

MODEL
- **RKSR** Retrofit Kit Industrial Reflector Type

SIZE
- **4** 4'
- **8** 8'

NO. OF LAMPS IN CROSS SECTION
- **1** One
- **2** Two

LAMP TYPE
- **32** 4', T8: 32, 30, 28, 25 Watt
- **54** 4', T5HO: 54 or 51 Watt

REFLECTOR TYPE
- **GW** Gloss White, 91% Reflective
- **M4R** Enhanced Specular Aluminum, 95% Reflective

BALLAST
- **ELW** 1 or 2-Lamp, Electronic T8, Instant Start, 0.77 Ballast Factor
- **E** 1 or 2-Lamp, Electronic T8, Instant Start, 0.88 Ballast Factor
- **EHL** 1 or 2-Lamp, Electronic T8, Instant Start, 1.18 Ballast Factor
- **ESD** 1 or 2-Lamp, Electronic T8, Step Dimming, Programmed Start, 0.88 Ballast Factor
- **EP** 1 or 2-Lamp, Electronic T8, Programmed Start, 0.88 Ballast Factor or Electronic T5HO, 1.0 Ballast Factor
- **4ELW** 4-Lamp, Electronic T8, Instant Start, 0.77 Ballast Factor
- **4E** 4-Lamp, Electronic T8, Instant Start, 0.88 Ballast Factor
- **4EHL** 4-Lamp, Electronic T8, Instant Start, 1.18 Ballast Factor
- **4EP** 4-Lamp, Electronic T8, Programmed Start, 0.88 Ballast Factor or Electronic T5HO, 1.0 Ballast Factor
- **Blank** No Ballast Supplied (Please specify socket type under options)

VOLTAGE
- **U** 120V-277V

OPTIONS
(Required when no ballast is supplied)
- **IS8** Instant Start T8 Sockets
- **PS8** Programmed Start T8 Sockets
- **PS5** Programmed Start T5 Sockets

ACCESSORIES (ORDER SEPARATELY)
- **RKF32T8830** T8 32 Watt Lamps, FO830, 85CRI, 3000K, order in case quantity only (25)
- **RKF32T8835** T8 32 Watt Lamps, FO835, 85CRI, 3500K, order in case quantity only (25)
- **RKF32T8841** T8 32 Watt Lamps, FO841, 85CRI, 4100K, order in case quantity only (25)
- **RKF54T5835** T5HO 54 Watt Lamps, F5835, 85CRI, 3500K, order in case quantity only (40)
- **RKF54T5841** T5HO 54 Watt Lamps, F5841, 85CRI, 4100K, order in case quantity only (40)

Columbia LIGHTING

RKSR

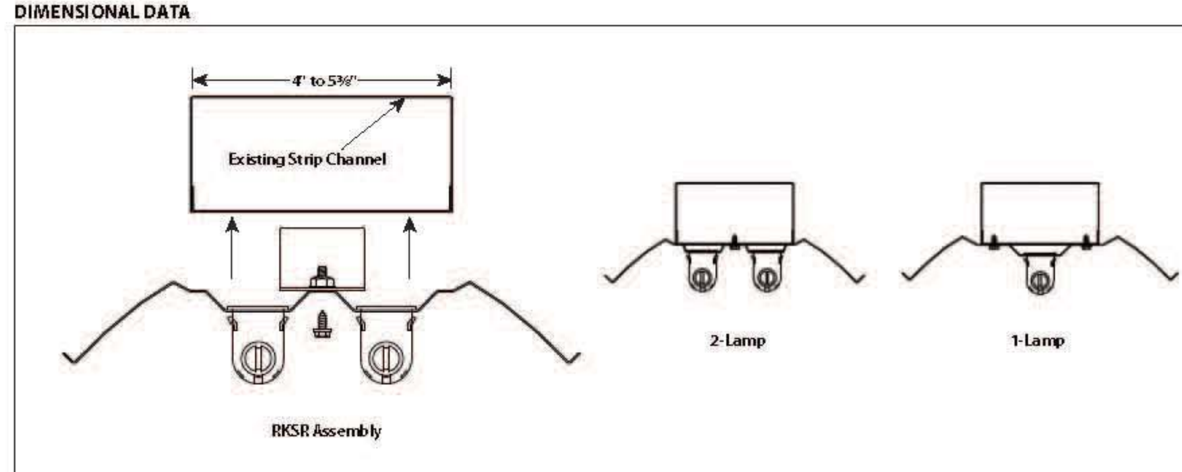
4', 8' Industrial Retrofit Kit / 1, 2-Lamp T8, T5HO

ENERGY AND OPTICAL PERFORMANCE DATA

8' Existing System									
Existing Lamp/Ballast System	Lamp Type	Quantity	Mean Lumens Per Lamp	Typical Fixture Efficiency	Ballast Factor	Delivered Lumens Per Fixture	Input Watts	Delivered Lumens Per Watt	Annual Cost*
1L96-T12 Mag	F96/T12/ES	1	4750	85.2%	0.88	3,561	76	47	$38.00
2L96-T12 Mag	F96/T12/ES	2	4750	85.2%	0.88	7,123	126	57	$63.00
1L96-T12HO Mag	F96/T12HO/ES	1	6950	85.2%	0.95	5,625	125	45	$62.50
2L96-T12HO Mag	F96/T12HO/ES	2	6950	85.2%	0.89	10,540	210	50	$105.00
8' Retrofit Options									
Proposed Lamp/Ballast System	Lamp Type	Quantity	Mean Lumens Per Lamp	Typical Fixture Efficiency	Ballast Factor	Delivered Lumens Per Fixture	Input Watts	Delivered Lumens Per Watt	Annual Cost*
2L32-T8 ELWU	F32T8/841	2	2800	91.8%	0.77	3,958	48	82	$24.00
4L32-T8 ELWU	F32T8/841	4	2800	91.8%	0.77	7,917	96	82	$48.00
2L32-T8 EU	F32T8/841	2	2800	91.8%	0.87	4,472	53	84	$26.50
4L32-T8 EU	F32T8/841	4	2800	91.8%	0.87	8,945	107	84	$53.50
2L32-T8 EHLU	F32T8/841	2	2800	91.8%	1.15	5,912	73	81	$36.50
4L32-T8 EHLU	F32T8/841	4	2800	91.8%	1.15	11,824	147	80	$73.50
2L54-T5HO EPU	F54/T5HO/841	2	4300	98.2%	1	8,445	117	72	$58.50
4L54-T5HO EPU	F54/T5HO/841	4	4300	98.2%	1	16,890	234	72	$117.00

*Based on $0.10/KWH and 5,000 operating hours per year

DIMENSIONAL DATA

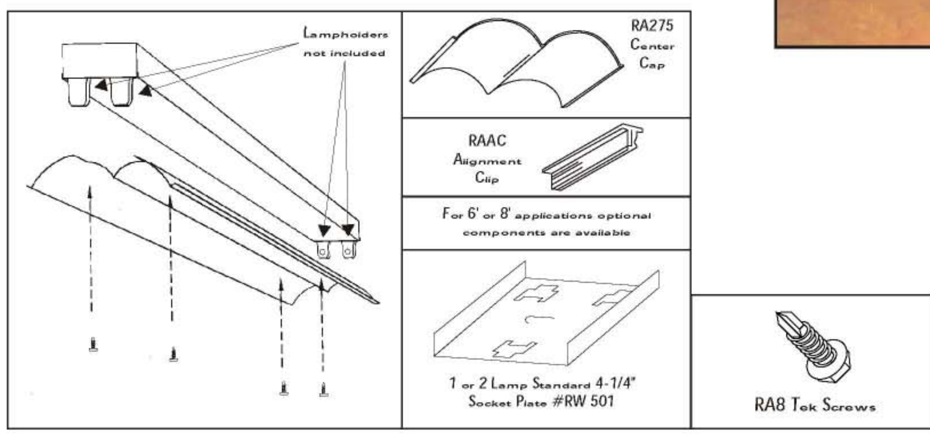


NOTE: All dimensions are in inches; dimensions and specifications are subject to change without notice. Please consult factory or check sample for verification.

A.L.P.
2000 SERIES REFLECTOR
For Quick, Simple Retrofit of 2 Lamp Strip Fixture

2000 Series Reflector Kit
2 Lamp Strip

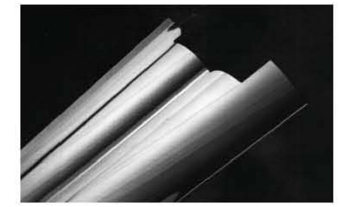
2000 Series Reflectors are for maximizing light output from typical 2 lamp fluorescent strip lighting fixtures. They can be used to convert from 8' to 4' lamps by using our optional socket plates. Anodized aluminum (RA) reflectors are manufactured with a minimum of 86% Total Reflectivity (T.R.). Optional finishes are also available. They are designed and manufactured in compliance with U.L. Standards for retrofit reflectors.



CATALOG NO.	DESCRIPTION	LENGTH
RA 2002	(1) RA 2002 2' Reflector (Anodized Aluminum), (4) RA8 TEK Screws	2'
RA 2003	(1) RA 2003 3' Reflector (Anodized Aluminum), (4) RA8 TEK Screws	3'
RA 2004	(1) RA 2004 4' Reflector (Anodized Aluminum), (4) RA8 TEK Screws	4'
RA 2006	(2) RA 2003 3' Reflector (Anodized Aluminum), (8) RA8 TEK Screws, (2) RAAC Alignment Clips, (1) RA 275 Center Cap	6'
RA 2008	(2) RA 2004 4' Reflector (Anodized Aluminum), (8) RA8 TEK Screws, (2) RAAC Alignment Clips, (1) RA 275 Center Cap	8'
ACCESSORIES		
RW 501	1 or 2 Lamp Standard 4-1/4" Wide Socket Plate & (2) TEK Screws (order 2 per fixture)	
RW 522	2 Double Lamp Center Socket Plate, (2) TEK Screws, 4-1/4" Wide (order 1 per 6' or 8' Fixture)	
RAAC	Clear Plastic Alignment Clip	
RA 275	Center Cap	

NOTE: FOR HIGHLY SPECULAR MIRO ALUMINUM (95% T.R.), DELETE PREFIX "RA" AND REPLACE WITH "RM" OR FOR WHITE ALUMINUM DELETE "RA" AND REPLACE WITH "RW".

For more information, or to place an order, contact Customer Service.



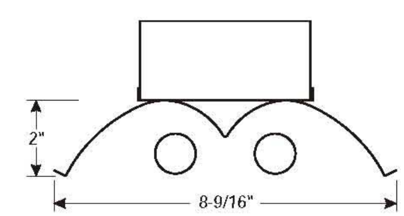
2000 Series Reflector

ZONAL CAVITY COEFFICIENTS OF UTILIZATION

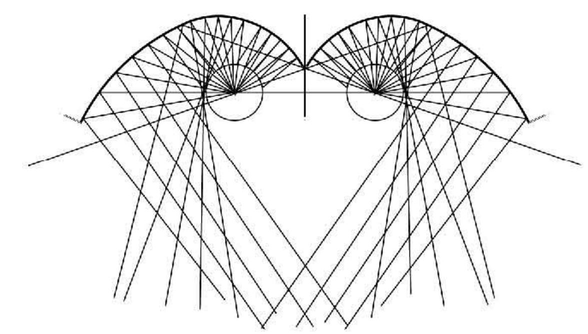
EFFECTIVE FLOOR CAVITY REFLECTANCE = .20																		
Ceiling	.80				.70				.50			.30			.10			.00
Wall / RCR	.70	.50	.30	.10	.70	.50	.30	.10	.50	.30	.10	.50	.30	.10	.50	.30	.10	.00
0	.93	.93	.93	.93	.91	.91	.91	.91	.87	.87	.87	.84	.84	.84	.80	.80	.80	.78
1	.86	.83	.80	.77	.84	.81	.79	.76	.78	.76	.74	.75	.73	.72	.72	.71	.69	.68
2	.79	.74	.69	.65	.77	.72	.68	.64	.69	.66	.62	.67	.64	.61	.65	.62	.60	.58
3	.73	.66	.60	.55	.71	.64	.59	.55	.62	.57	.54	.60	.56	.53	.58	.55	.52	.50
4	.67	.59	.52	.47	.66	.58	.52	.47	.56	.50	.46	.54	.49	.46	.52	.48	.45	.44
5	.62	.52	.45	.41	.60	.51	.45	.40	.50	.44	.40	.48	.43	.39	.47	.42	.39	.37
6	.57	.47	.40	.35	.55	.46	.40	35	.45	.39	.35	.44	.39	.35	.42	.38	.34	.33
7	.53	.42	.36	.31	.51	.42	.36	.31	.41	.35	.31	.39	.34	.31	.38	.34	.30	.29
8	.49	.38	.32	.27	.47	.38	.32	.27	.37	.31	.27	.36	.31	.27	.35	.30	.27	.25
9	.45	.34	.28	.24	.44	.34	.28	.24	.33	.28	.24	.32	.27	.24	.31	.27	.23	.22
10	.42	.31	.25	.21	.41	.31	.25	.21	.30	.25	.21	.29	.24	.21	.29	.24	.21	.20

Certified Test Report No. 7092.0

Ray Traces are directional patterns produced by the lumen output of the lamps striking and leaving the reflector surface.



2000 SERIES REFLECTOR



A.L.P.
LIGHTING COMPONENTS, INC.
CORPORATE HQ. CHICAGO, IL U.S.A.

Available from GoodMart
(877) 402-6100 • Fax: (347) 402-6100 • Buy online: www.GoodMart.com

Maestro Wireless® | simplicity. convenience. control.

commercial product offering

NEW

Use the Maestro Wireless family of products to build custom solutions for commercial spaces without spending a lot of time on the job.

- Lutron's reliable Clear Connect™ RF Technology is ideal for renovation as well as new construction.
- Easily install a **3-way dimmer or an occupancy sensor without pulling new wire**.
- Hassle-free set up of dimmer, switch, Pico™ wireless control, and occupancy sensor.
- Build custom solutions for any commercial space, including conference rooms, restrooms, hotel rooms, storage areas, corridors, and more.

Maestro Wireless dimmer and Pico wireless control

switch | lamp dimmer | mounted controller | car visor clip | table stand

Radio Powr Savr™ wireless occupancy/vacancy sensor

LUTRON.

save energy with Lutron™

Maestro Wireless® | ordering information

commercial product offering

Model number	Control Type	Maximum Capacity
Dimmers and switches		
MRF2-10D-120-	single-pole/multi-location **spec grade dimmer**	120 V, 1000 W incandescent/ halogen, magnetic low voltage
MRF2-6ND-120-	single-pole/multi-location **spec grade neutral wire dimmer**	120 V, 600 W incandescent/ halogen, magnetic low voltage
MA-R-	multi-location companion dimmer	120 V, provides multi-location dimming for additional locations
MRF2-8S-DV-	single-pole/multi-location **spec grade non-neutral switch**	120V/277V, 8 A light, incandescent, halogen, MLV, ELV, non-dim fluorescent ballasts, does not require a neutral wire connection
MRF2-8ANS-120-	single-pole/multi-location **spec grade switch**	120 V, 8 A light or 5.8 A fan, incandescent, halogen, MLV, ELV, non-dim fluorescent ballasts, and general purpose fans
MA-AS-	multi-location companion switch	120 V, provides multi-location switching for up to nine additional locations
MRF2-6ANS-277-	single-pole/multi-location **spec grade switch**	277 V, 6 A light, MLV, ELV, non-dim fluorescent ballasts
MA-AS-277-	multi-location companion switch	277 V, provides multi-location switching for up to nine additional locations
MRF2-3LD-	plug-in lamp dimmer	300 W, inc./halogen for table or floor lamps
Pico™ wireless control and accessories		
MRF2-3BRL-L-	Pico wireless control – communicates wirelessly with up to 10 Maestro Wireless dimmers, lamp dimmers, and switches	
QSA-PED1-	table stand for Pico wireless control	
CW-__-	Claro® wallplate in 1-4 openings	
Radio Powr Savr™ wireless occupancy and vacancy sensor		
LRF2-OCRB-P-WH	occupancy and vacancy sensor – auto-on/auto-off or manual on/auto-off	
LRF2-VCRB-P-WH	vacancy sensor – manual on/auto-off only (complies with CA Title 24 requirements)	

Products available in the following colors:

sensors – white (WH) only

lamp dimmers & table stands (for Pico wireless control) – white (WH), black (BL)

Pico wireless controls:
gloss finish – white and gray (WG), white (WH), ivory (IV), almond (AL), light almond (LA), gray (GR), brown (BR), black (BL)

dimmers, switches and Claro wallplates:
gloss finish – white (WH), ivory (IV), almond (AL), light almond (LA), gray (GR), brown (BR), black (BL)

satin finish – hot (HT), merlot (MR), plum (PL), turquoise (TQ), sea glass (SG), taupe (TP), eggshell (ES), biscuit (BI), snow (SW), palladium (PD), midnight (MN), sienna (SI), terracotta (TC), greenbriar (GB), bluestone (BG), mocha stone (MS), goldstone (GS), desert stone (DS), stone (ST), limestone (LS)

LUTRON.
www.lutron.com/maestrowireless

Customer Service 1.888.LUTRON1
Technical Support Center 24/7 1.800.523.9466

save energy with Lutron™

sensorswitch

ON/OFF & AUTOMATIC DIMMING PHOTOCELL SENSOR - CEILING MOUNT, LOW VOLTAGE

TYPICAL APPLICATIONS
- Daylight Harvesting
- Combination On/Off Switching & Continuous Dimming of 0-10 VDC Dimmable Ballast

FEATURES
- Full On/Off Control of Lighting
- Automatically Dims/Brightens 0-10 VDC ballasts as daylight changes
- Works as Stand Alone Unit or with Occupancy Sensor System
- Capable of finding optimum set-point
- Digital Set-Point Control
- Programmable via simple push-button commands
- Outputs to Power Pack or Lighting Control System via SPDT Relay
- Dimming sinks up to 20 mA
- Green LED Activity Indicator
- 100 Hour Lamp Burn-in Timer Mode

AVAILABLE OPTIONS
- Dual Zone Control (-DZ)
- Low Temp/Hi Humidity (-LT)

SPECIFICATIONS
- Size: Circular, 4.55" Dia., 1.55" Deep (11.56 cm Dia., 3.94 cm Deep)
- Sensor Weight: 5 Ounces
- Sensor Color: White
- Mounting: Ceiling Tile Surface, Round Fixture or Junction Box
- Relative Humidity: 20 to 90% non-condensing
- Operating Temp: 14° to 160° F (-10° to 71° C)
- Storage Temp: -14° to 160° F (-26° to 71° C)
- 12 to 24 VAC/VDC Oper. Voltage
- UL, CUL, and Title 24 Compliant
- 5 Year Warranty
- Made in U.S.A.

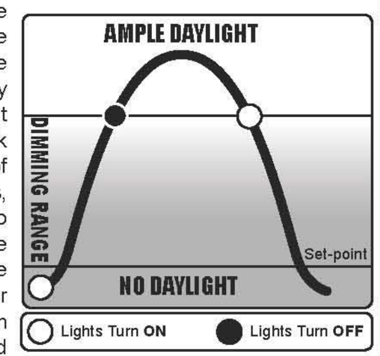
LOW TEMP/HI HUMIDITY(-LT)
- Conformally coated Circuit Board is corrosion resistant from moisture
- Operates down to -40° F(-40° C)

CM-PC-ADC

w/ Dual Zone Option!

The *CM-PC-ADC Series* combines the CM-PC On/Off Photocell sensor with the CM-ADC Automatic Dimming Control sensor to provide the industry's most intelligent control of lighting for daylight harvesting applications. Ideal for public spaces with windows like vestibules, corridors, or bathrooms; the sensors work by monitoring daylight conditions in a room, then controlling the lighting so as to insure that adequate lighting levels are maintained. The CM-PC-ADC can be used alone or as part of an occupancy sensor system The sensors are powered with 12 to 24 VAC/VDC and typically operate with a PP-20 or MP-20 Power Pack; enabling complete 20 Amp circuits to be controlled.

DAYLIGHT HARVESTING OPERATION
The sensor controls a 0-10 VDC dimmable ballast to achieve maximum daylight harvesting while maintaining a minimum light level referred to as the "set-point". When no daylight is available, the sensor allows the dimmable ballast to operate at its full bright level (10 VDC). As daylight increases and begins to contribute to the overall light level of the room, the Automatic Dimming Control (ADC) feature starts dimming the ballast proportionally. When sufficient daylight is present to maintain the set-point without any contribution from the lights, the sensor will switch off the ballast completely. The lights will remain off until the daylight level drops below the set-point. At this point, the lights will be turned on with the ballast set at its full dim level. As the daylight levels fall further, the ADC feature will again take control of the ballast; reducing the dim level (increasing the brightness) in order to achieve the necessary light level. At the point when all daylight contribution is gone, the ballast will be back at its full bright level. To make the series of adjustments unnoticeable to room occupants, a 10 to 20% safety factor is maintained to prevent the system from cycling when the light level is very near the set-point. There is also a 20 minute delay before the sensor switches the lights off to prevent the system from cycling on a cloudy day; and a 45 second delay before switching from "Off" to "On".



DUAL ZONE (-DZ) OPTION
Daylight contribution diminishes as the distance from the source (windows) increases. Therefore lights that are different distances from a window should not be controlled from the same photocell sensor output. With the Dual Zone (-DZ) option, the *CM-PC-ADC* has a second set of outputs that can control an additional zone of lighting. The option works by using a relative set-point for the second zone that is a selected percentage higher than the primary zone's set-point. The percentage is chosen via the digital push-button controls. The -DZ option is ideal for classrooms with individually controlled parallel rows of lights.

Model Numbering System: CM-PC-ADC-[DUAL ZONE]-[TEMP/HUMIDITY]

SERIES #	DESCRIPTION	DUAL ZONE	TEMP/HUMIDITY
CM-PC-ADC	On/Off Photocell & Automatic Dimming Photocell Sensor - Ceiling Mount, Low Voltage	Blank = Single Zone -DZ = Dual Zone	Blank = 14° to 160° F -LT = -40° to 160° F

T009-004

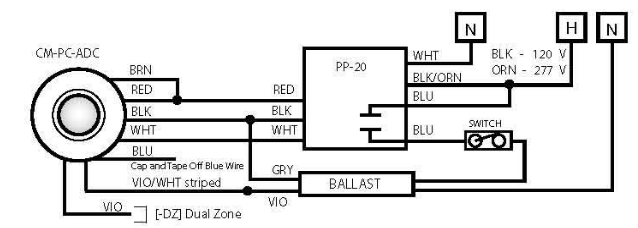
CM-PC-ADC

LIGHT LEVEL SET-POINT
The sensor functions by comparing the amount of daylight available with a defined acceptable lighting level. This threshold, called the "set-point", is utilized in all daylight harvesting lighting control decisions. The sensor can find its optimum set-point via the **Automatic Set-Point Programming** mode. In this mode, the sensor takes light readings at different dim settings and then sets the minimum light level to be the amount contributed by the artificial lights being controlled. It is assumed that the space is properly lit by design, however, if this is not the case the set-point may be easily adjusted to the occupant's preference. All modes and settings are entered digitally via a push button sequence. Once programmed, the exact value of the set-point (in foot candles) can be read out from the sensor via a series of LED flashes.

DIGITAL SET-POINT CONTROL
Each sensor contains a microcontroller that enables the user to engage the Automatic Set-Point Programming mode or to manually set / adjust the set-point. The manual process involves calculating and inputting the exact foot-candle value of the desired set-point into the sensor. It is important to note that the set-point is the light level required at the face of the sensor and that this value will be much different than the level required at a work surface. Typically, light levels at the ceiling are 3 to 5 times less than the work surface. For example, if 50 fc is desired at the work surface, the sensor should be set at 10 fc. For best results, measure the levels at both locations using a foot-candle meter before programming the set-point.To easily adjust the set-point after it has been initially programmed (via either the Automatic or Manual process) the *CM-ADC* has an ***Incremental control*** feature that steps the brightness setting (voltage) up or down 10% (1 VDC) and adjusts the set-point accordingly.

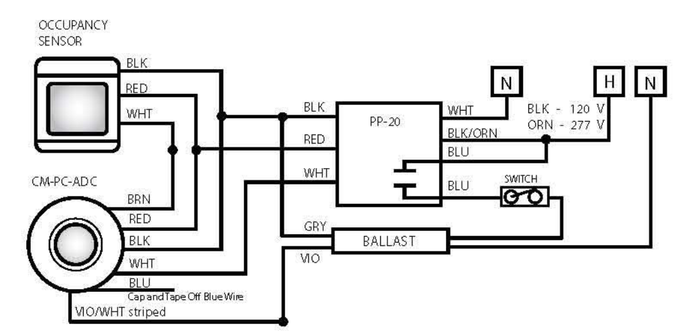
WIRING INSTRUCTIONS
Wire lead connections are Class II, 18 to 22 AWG.

STANDARD CM-PC-ADC
WHITE - Outputs high VAC/VDC (from Brown wire) when sensor calls for Lights "On" (eg. the room is Dark)
BLUE - Outputs high VAC/VDC (from Brown wire) when sensor calls for Lights "Off" (eg. adequate daylight is present)
RED - 12 to 24 VAC/VDC
BLACK - Common
BRN - Connect to Low Voltage Control input (Red wire on a Power Pack, White wire on an occupancy sensor)
VIOLET/WHITE striped - Connect to Violet wire from Zone 1's 0-10 VDC dimmable ballast. Also connect ballast Gray wire to sensor Black wire.



DUAL ZONE OPTION (-DZ)
BLUE wire will output high DC when sensor calls for Lights "On" for Zone 2.
SOLID VIOLET wire connects to Zone 2's 0-10 VDC dimmable ballast. Also connect Zone 2's ballast Gray wire to sensor Black wire. (Note: With the -DZ option the SPDT Relay is no longer present and the White wire will output only DC)

WIRING TOGETHER WITH OCCUPANCY SENSORS
Wire upstream occupancy sensor White wire to sensor Brown wire. When the space is unoccupied, the lights stay off regardless of daylight levels. However when occupied, the photocell sensor will control the lights according to daylight level and set-point.



sensorswitch

SENSOR SWITCH, INC.
900 Northrop Rd., Wallingford, CT 06492
(203) 265-2842 info@sensorswitch.com
www.sensorswitch.com

Revised 6/22/2006

TOSHIBA

E-CORE

Toshiba LED Lamp Products

MR16 GU10

MR16 GU5.3

A-19 Bulb

PAR30

PAR38

PAR20

TOSHIBA INTERNATIONAL CORPORATION
LED LIGHTING DEPARTMENT
13131 West Little York Road, Houston, Texas 77041
Tel 713/466-0277 Fax 713/896-5237
US 800/231-1412 Canada 800/872-2192 Mexico 01/800/527-1204

ledlighting@tic.toshiba.com
www.toshiba.com/lighting

TOSHIBA

E-CORE

E-Core LED Lamp Products

Toshiba proudly introduces high quality LED lamps with the following features:

- High Energy Efficiencies
- Long Life & High Reliability, Over 40,000 Hours
- High Color Rendering, Ra Over 80
- Dimmable (Except Mr16 Gu5.3)*1
- Three-Year Limited Warranty*2
- Mercury-Free
- Low UV/IR Radiation
- Conforms to UL Standards
- Lighting Data Available for all Models

Main Specifications:

** Preliminary Specifications 1/1/10*

Lamp Type	Model	Base	Voltage	Color	Wattage	Initial Lumen	Efficacy	Beam Angle	CRI	Dimmable	Rated Life	Dimension	
												MOL	Diameter
MR16 GU10	LEL-MR4L-GU1F-1/US	GU10	120 V ±10%	2,700 K	5.0 W	150 lm	30.0 lm/W	25°	≥ 80	Yes	40,000 Hrs.	2.165 (55 mm)	1.968 (50 mm)
	LEL-MR4WWGU1F-1/US			3,500 K	5.0 W	170 lm	34.0 lm/W	25°	≥ 80			2.165 (55 mm)	1.968 (50 mm)
	LEL-MR4W-GU1F-1/US			4,000 K	5.0 W	170 lm	34.0 lm/W	25°	≥ 80			2.165 (55 mm)	1.968 (50 mm)
MR16 GU5.3	LEL-MR4L-GU5F-B/US	GU5.3	12 V ±10%	2,700 K	4.5 W	170 lm	37.8 lm/W	25°	≥ 80	No	40,000 Hrs.	1.772 (45 mm)	1.968 (50 mm)
	LEL-MR4WWGU5F-B/US			3,500 K	4.5 W	190 lm	42.2 lm/W	25°	≥ 80			1.772 (45 mm)	1.968 (50 mm)
	LEL-MR4W-GU5F-B/US			4,000 K	4.5 W	190 lm	42.2 lm/W	25°	≥ 80			1.772 (45 mm)	1.968 (50 mm)
PAR20	LEL-PR8L-F1-2/US	E26	120 V ±10%	2,700 K	9.0 W	290 lm	32.2 lm/W	25°	≥ 80	Yes	40,000 Hrs.	3.582 (91 mm)	2.539 (64.5 mm)
	LEL-PR8WWF1-2/US			3,500 K	9.0 W	325 lm	36.1 lm/W	25°	≥ 80			3.582 (91 mm)	2.539 (64.5 mm)
	LEL-PR8W-F1-2/US			4,000 K	9.0 W	325 lm	36.1 lm/W	25°	≥ 80			3.582 (91 mm)	2.539 (64.5 mm)
PAR30 Short Neck	LEL-PR10L-F1-3/US	E26	120 V ±10%	2,700 K	10.5 W	360 lm	34.3 lm/W	25°	≥ 80	Yes	40,000 Hrs.	3.582 (91 mm)	3.819 (97 mm)
	LEL-PR10WWF1-3/US			3,500 K	10.5 W	410 lm	39.0 lm/W	25°	≥ 80			3.582 (91 mm)	3.819 (97 mm)
	LEL-PR10W-F1-3/US			4,000 K	10.5 W	410 lm	39.0 lm/W	25°	≥ 80			3.582 (91 mm)	3.819 (97 mm)
PAR38	LEL-PR11L-F1-4/US	E26	120 V ±10%	2,700 K	12.5 W	420 lm	33.6 lm/W	25°	≥ 80	Yes	40,000 Hrs.	5.354 (136 mm)	4.803 (122 mm)
	LEL-PR11WWF1-4/US			3,500 K	12.5 W	470 lm	37.6 lm/W	25°	≥ 80			5.354 (136 mm)	4.803 (122 mm)
	LEL-PR11W-F1-4/US			4,000 K	12.5 W	470 lm	37.6 lm/W	25°	≥ 80			5.354 (136 mm)	4.803 (122 mm)
A-19	LEL-AW6L-1/US	E26	120 V ±10%	2700 K	5.5 W	235 lm	42.7 lm/W	—	≥ 80	Yes	40,000 Hrs.	4.291 (109 mm)	2.362 (60 mm)
	LEL-AW6W-1/US			4000 K	5.5 W	265 lm	48.2 lm/W	—	≥ 80			4.291 (109 mm)	2.362 (60 mm)
A-19	LEL-AW8L-1/US	E26	120 V ±10%	2700 K	6.5 W	340 lm	52.3 lm/W	—	≥ 80	Yes	40,000 Hrs.	4.291 (109 mm)	2.362 (60 mm)
	LEL-AW8W-1/US			4000 K	6.5 W	380 lm	58.5 lm/W	—	≥ 80			4.291 (109 mm)	2.362 (60 mm)

Remarks:

*1 Flickering may occur with some dimmers when used toward their lower limit of brightness. Use the lamp within the recommended range to avoid flickering. Be sure to use dimming devices that are compatible with the lamp's power consumption.
*2 For further details please visit www.toshiba.com/lighting.

Note: Specifications are subject to change without notice. For details please contact the Toshiba International Corporation's LED Lighting Department.

TOSHIBA INTERNATIONAL CORPORATION
LED LIGHTING DEPARTMENT
13131 West Little York Road, Houston, Texas 77041
Tel 713/466-0277 Fax 713/896-5237
US 800/231-1412 Canada 800/872-2192 Mexico 01/800/527-1204
Copyright 1/2010

ledlighting@tic.toshiba.com
www.toshiba.com/lighting

South Carolina Lighting Incentive Application

Questions? Call 1-866-380-9580 or visit www.duke-energy.com.
Mail **original**, signed application and required documents to: Duke Energy • 431 Charmany Drive • Madison, WI 53719 or fax to 1-866-908-4921

Is this application: ☐ **NEW** (original) or ☐ **REVISED** (changes made to original application)

Building Type – Required (check one)		
☐ Data Centers	☐ Full Service Restaurant	☐ Office
☐ Education/K-12	☐ Healthcare	☐ Public Assembly/Church
☐ Education Other	☐ Industrial	☐ Public Order/Safety
☐ Elder Care/Nursing Home	☐ Lodging	☐ Religious Worship
☐ Food Sales/Grocery	☐ Retail (Non-mall)	☐ Service
☐ Fast Food Restaurant	☐ Retail (Mall)	☐ Warehouse
☐ Other:		

Customer Information					
Customer/Business		Contact			
Phone		**Account Number** (where equipment installed)*			
Street Address (Where incentive should be mailed)					
City		State		Zip Code	
Installation Street Address					
City		State		Zip Code	
E-mail Address					

**Failure to provide the account number associated with the location where the installation took place will result in rejection of the application.*

Vendor Information					
Vendor		Contact			
Phone		Fax			
Street Address					
City		State		Zip Code	
E-mail Address					

If Duke Energy has questions about this application, who should we contact? ☐ **Customer** ☐ **Vendor**

Payment Information		
Who should receive incentive payment?	☐ Customer	☐ Vendor (Customer must sign below)
I hereby authorize payment of incentive directly to the vendor:	Customer Signature (written signature)	
	Date	
Provide Tax ID Number for Payee	Customer Tax ID #	
	Vendor Tax ID #	

Terms and Conditions			
I have read and hereby agree to the Terms & Conditions and Program Requirements as stated in this form.			
Customer Signature (written signature)		Vendor Signature (written signature)	
Date		Date	
Title		Title	

Incentives are subject to change and may be discontinued at the sole discretion of Duke Energy. Equipment must be installed and operable to be eligible for incentives. As Federal Energy Policy Law changes, equipment efficiency requirements are subject to change.

NOTE: All Fixtures must be installed indoors, with the exception of Traffic and Pedestrian Signals.

Fixtures = Lamp + Ballasts Retrofit fixture replacement – 1:1 ratio (except where otherwise indicated)	Incentive per fixture	Qty	Total Existing Lamp Wattage	Total Installed Lamp Wattage	Annual Oper Hrs (minimum of 1800)	Equipment Cost (w/o labor)	Date Installed and Operable (mm/yy)	Total Incentive	
T8 with Electronic Ballast									
T8 8ft 2 lamp replacing T12 (retrofit only)	$7.00				Hrs.				
T8 8ft 1 lamp replacing T12 (retrofit only)	$5.00				Hrs.				
T8 4ft 4 lamp replacing T12 (retrofit only)	$11.00				Hrs.				
T8 4ft 3 lamp replacing T12 (retrofit only)	$9.00				Hrs.				
T8 4ft 2 lamp replacing T12 (retrofit only)	$4.00				Hrs.				
T8 4ft 1 lamp replacing T12 (retrofit only)	$3.00				Hrs.				
T8 3ft 4 lamp replacing T12 (retrofit only)	$10.00				Hrs.				
T8 3ft 3 lamp replacing T12 (retrofit only)	$6.50				Hrs.				
T8 3ft 2 lamp replacing T12 (retrofit only)	$4.00				Hrs.				
T8 3ft 1 lamp replacing T12 (retrofit only)	$3.00				Hrs.				
T8 2ft 4 lamp replacing T12 (retrofit only)	$6.00				Hrs.				
T8 2ft 3 lamp replacing T12 (retrofit only)	$4.20				Hrs.				
T8 2ft 2 lamp replacing T12 (retrofit only)	$4.00				Hrs.				
T8 2ft 1 lamp replacing T12 (retrofit only)	$3.00				Hrs.				
T8 HO 8ft 1 lamp replacing T12 (retrofit only)	$10.00				Hrs.				
T8 HO 8ft 2 lamp replacing T12 (retrofit only)	$14.00				Hrs.				
T8 HB 4ft 3L (retrofit only replacing 150-249W HID)	$30.00				Hrs.				
T8 HB 4ft 4L (retrofit only replacing 250-399W HID)	$40.00				Hrs.				
T8 HB 4ft 6L (retrofit only replacing 400-999W HID)	$50.00				Hrs.				
T8 HB 4ft 8L (retrofit only replacing 400-999W HID)	$40.00				Hrs.				
2 fixtures – T8 HB 4ft 8 Lamp (32W)*	$120.00				Hrs.				
T5 with Electronic Ballast									
T5 4ft 1 lamp replacing T12 (retrofit only)	$5.00				Hrs.				
T5 4ft 2 lamp replacing T12 (retrofit only)	$8.00				Hrs.				
T5 4ft 3 lamp replacing T12 (retrofit only)	$10.00				Hrs.				
T5 4ft 4 lamp replacing T12 (retrofit only)	$12.00				Hrs.				
T5 HO 4ft 1 lamp replacing T12 (retrofit only)	$6.00				Hrs.				
T5 HO 4ft 2 lamp replacing T12 (retrofit only)	$9.00				Hrs.				
T5 HO 4ft 3 lamp replacing T12 (retrofit only)	$11.00				Hrs.				
T5 HO 4ft 4 lamp replacing T12 (retrofit only)	$13.00				Hrs.				
T5 HO HB 2L (retrofit only replacing 150-249W HID)	$30.00				Hrs.				
T5 HO HB 3L (retrofit only replacing 250-399W HID)	$40.00				Hrs.				
T5 HO HB 4L (retrofit only replacing 400-999W HID)	$50.00				Hrs.				
T5 HO HB 6L (retrofit only replacing 400-999W HID)	$40.00				Hrs.				
T5 HO HB 8L (retrofit only replacing 750-999W HID)	$75.00				Hrs.				
2 fixtures – T5 HO HB 6 Lamp* (retrofit only)	$120.00				Hrs.				
* replacing 1,000W HID (2 for one replacement)									

Fixtures	Incentive per fixture	Qty	Total Existing Lamp Wattage	Total Installed Lamp Wattage	Annual Oper Hrs (minimum of 1800)	Equipment Cost (w/o labor)	Date Installed and Operable (mm/yy)	Total Incentive	
Compact Fluorescents (CFL									**Check One***
42W 8 lamp HB CFL	$50.00				Hrs.				☐R ☐NC ☐FE
CFL – Screw In (lamp only)	$1.50				Hrs.				☐R ☐NC ☐FE
CFL – Hardwired (Fixture and lamp)	$10.00				Hrs.				☐R ☐NC ☐FE
Metal Halide – Pulse Start									
320W Pulse Start Halide	$25.00				Hrs.				☐R ☐NC ☐FE
High Performance T8 Lighting Replace standard T8 systems with high performance T8 systems containing high lumen, long life F32T8 lamps (minimum > 3100 initial lumens, 24,000 hour rated life at 3 hour start) from CEE High Performance T8 qualified product list and either of the following: A low ballast factor electronic ballast (<.78 ballast factor), or approved ballast from the CEE High Performance T8 qualified product list. Both ballast and lamp must meet these guidelines to qualify for incentives. To view the CEE High Performance T8 qualified product list, go to: www. cee1.org.									
HPT8 4ft High Performance 1 lamp & ballast replacing standard T8 4ft 1 lamp	$4.00				Hrs.				
HPT8 4ft High Performance 2 lamp & ballast replacing standard T8 4ft 2 lamp	$6.00				Hrs.				
HPT8 4ft High Performance 3 lamp & ballast replacing standard T8 4ft 3 lamp	$6.20				Hrs.				
HPT8 4ft High Performance 4 lamp & ballast replacing standard T8 4ft 4 lamp	$12.00				Hrs.				
Low Watt High Performance T8 Lighting Replace standard T8 systems with 4' 25W, 28W, or 30W T8 U lamps and approved CEE ballast OR relamp existing T8 fixtures with low Watt T8 lamps 28W or less. In order to qualify for incentives ballasts must be from CEE approved list. To view the CEE High Performance T8 qualified product list, go to www.cee1.org. **NOTE:** Low Watt T8 compatibility varies; consult manufacturer's literature before specifying products.									
Low Watt High Performance T8 4ft 1 lamp of 28W or less & approved ballast replacing standard T8 4ft 1 lamp – 32W	$4.00				Hrs.				
Low Watt High Performance T8 4ft 2 lamp of 28W or less & approved ballast replacing standard T8 4ft 2 lamp – 32W	$6.00				Hrs.				
Low Watt High Performance T8 4ft 3 lamp of 28W or less & approved ballast replacing standard T8 4ft 3 lamp – 32W	$10.00				Hrs.				
Low Watt High Performance T8 4ft 4 lamp of 28W or less & approved ballast replacing standard T8 4ft 4 lamp – 32W	$12.00				Hrs.				
Relamp T8 fixtures with low Watt T8 lamps 28 watts or less	$.50/lamp				Hrs.				
T12 8ft and 4ft fixture replace by T8 High Performance Replace T12 and T12 HO 8' fixtures with High Performance T8 4ft lamps and ballast. Approved lamps and ballasts must be listed on the CEE High performance T8 qualified product list found on the web at www.cee1.org									
High Performance T8 4ft 2 lamp fixture replacing T12 8ft 1 lamp fixture	$10.00				Hrs.				
High Performance T8 4ft 4 lamp fixture replacing T12 8ft 2 lamp fixture	$15.00				Hrs.				
High Performance T8 4ft 2 lamp fixture replacing T12 High Output 8ft 1 lamp fixture	$20.00				Hrs.				
High Performance T8 4ft 4 lamp fixture replacing T12 High Output 8ft 2 lamp fixture	$25.00				Hrs.				
High Performance T8 4ft 1 lamp fixture replacing T12 4ft 1 lamp -same lumen output	$6.00				Hrs.				
High Performance T8 4ft 2 lamp fixture replacing T12 4ft 2 lamp -same lumen output	$8.00				Hrs.				
High Performance T8 4ft 3 lamp fixture replacing T12 4 ft 3 lamp -same lumen output	$12.00				Hrs.				
High Performance T8 4ft 4 lamp fixture replacing T12 4 ft 4 lamp -same lumen output	$16.00				Hrs.				
* R=Retrofit; NC=New Construction Project; FE=Replaced Failed Equipment									

Measure	Incentive	Qty	Annual Oper Hrs (minimum of 1800)	Equipment cost (w/o labor)	Date Installed and Operable (mm/yy)	Total Incentive	Check One *
Other Efficient Lighting Technologies							
21" Tubular Skylight/Light Tube	$75.00/fixture						☐R ☐NC ☐FE
LED Exit Signs (replacement fixture only)	$10.00/fixture						
LED Lighting In Reach-in Freezer or Cooler Case	$50.00/door						☐R ☐NC ☐FE
LED Case Lighting Sensor Controls	$10.00/sensor						
Occupancy Sensors							
Under 500 W connected to sensor	$20.00/sensor						☐R ☐NC ☐FE
Over 500 W connected to sensor	$40.00/sensor						☐R ☐NC ☐FE
Plug Load Occupancy Sensors	$25.00/station						☐R ☐NC ☐FE
List three (3) devices connected to plug load service:							
1.)							
2.)							
3.)							
LED Signals							
LED Auto Traffic Signals (retrofit only)	$12.50/lamp						
LED Pedestrian Signals (retrofit only)	$25.00/signal						
*R=Retrofit; NC=New Construction Project; FE=Replaced Failed Equipment							

Program Requirements

Equipment Eligibility

- All fluorescent fixtures utilize electronic ballast and T-8 lamps or T-5 lamps.
- Ballasts shall have a power factor greater than 90%.
- Ballasts, harmonic distortion shall not exceed 20%. For 8-foot fluorescent ballasts, the total harmonic distortion shall not exceed 30%.
- Lighting circuits should be installed with a neutral wire that has the same size conductor as the line load.
- All fixtures shall be installed indoors.
- All fixtures, lamps and ballasts, must be UL certified and meet all applicable codes and regulations.
- LED exit signs shall use 8 watts or less including the battery charger when active. They must meet State Fire Marshal codes and be UL rated.
- All fixtures must operate a minimum of 1,800 hours to be eligible.
- Incentives for pulse start metal halide fixtures are for 320w pulse start metal halide lamp/ballast combinations. In a retrofit application, the fixture must be hard-wired ballast retrofit or new fixture. Screw in retrofit lamps do not qualify. Pulse start lamp wattage must be lower than existing probe start lamp wattage.
- • Occupancy Sensors (under 500W) installed on or built into ***High Bay fixtures*** are eligible for incentives.
- Traffic and pedestrian signals using LED lights must replace conventional signals.
- Plug load occupancy sensors must control at least three devices in document station per controller limited to copiers, printers, faxes. Not computers and coffee machines.
- Tubular Skylight requires at least one light fixture per light tube that must be controlled by a "daylight" sensor.
- Eligible T8 and T5 High Bays must have specular/mirror like or white reflectors, high ballast factor ballasts, and fixture efficiency ***must*** be >90%. Manufacturers spec sheet is required and must indicate that it is a High Bay fixture. Must replace existing HID fixture to qualify. ***If your application is outside this scope, then pre-approval from Duke Energy is required.***
- Low watt T8 lamps should not be used in dimming applications unless the lamp and ballast manufacturers have approved a specific application for dimming or frequent switching. May demonstrate dim light, spiraling, pulsing and other undesirable behavior in cooler temperature rooms and while warming up. System performance varies based on lamp or ballast components.
- LED Lighting in Reach-in Freezer or Cooler Case: Must install a LED lighting system and replace (or in lieu of) a fluorescent lighting system for reach-in refrigerated display case.
- Fluorescent magnetic ballasts cannot be used to power the LED system. Existing fluorescent fixture end connectors and ballasts must be removed.
- LED lighting system must be a permanently installed luminaire. LED lamps that install into fluorescent lamp sockets are not eligible for incentives.
- Controls for LED Lighting in Reach-in Freezer or cooler Case: Must install occupancy sensors for LED lighting systems. End of aisle and individual case sensors qualify.
- All equipment must be **new** to be eligible for incentives. Used equipment is ***not*** eligible for incentives.

Incentive Eligibility

- Incentives are only available to customers on a Duke Energy South Carolina non-residential rate.
- Incentive will not be paid until eligible equipment has been installed, is available to operate, and verification has been completed by Duke Energy staff as noted in the Term & Conditions stated below.
- Duke Energy reserves the right to revise incentive levels and/or qualifying efficiency levels at anytime.
- Leased equipment is eligible for incentives providing the equipment meets the program requirements and the customer provides the required documentation noted on the Incentive Application Process page of this application.
- Customer may assign the incentive to the vendor who installed/supplied the equipment. The customer's signature is required in the appropriate places on this form to assign the incentive to the vendor. Customer agrees that such an action constitutes an irrevocable assignment of the incentive. This assigned incentive must reproduce the purchase price paid for the equipment by an equivalent amount.
- Any equipment which, either separately or as part of a project, has or will receive an incentive from any other Duke Energy program is ineligible.
- In no case will Duke Energy pay an incentive above the actual cost of the new equipment.
- Incentive recipient assumes all responsibilities for any tax consequences resulting from Duke Energy incentive payment.
- To qualify for Duke Energy incentives, applicant who provide their social security number as their federal tax identification number for tax purposes must sign and return the "Customer consent to release personal information" form ("Consent Form") along with the application. Incentive applications are processed by a 3rd party vendor. The 3rd party vendor is responsible for mailing the 1099 form at the end of the calendar year for tax filing. Duke Energy and the 3rd party vendor have signed confidentiality agreement to protect your personal information. If your social security number is your federal tax ID number and you elect not to sign the Consent Form, please do not send Duke Energy the application, as you will not be qualified to participate in the incentive program.

Terms and Conditions

I certify that this premise is served by Duke Energy (or an affiliate of Duke Energy), that the information provided herein is accurate and complete, and that I have purchased and installed the high efficiency equipment (indicated herein) for the business facility listed herein and not for resale. Attached is an itemized invoice for the indicated installed equipment. In understand that the proposed incentive payment from Duke Energy is subject to change based on verification and Duke Energy approval. I agree to Duke Energy verification of both the sales transaction and equipment installation which may include a site inspection from a Duke Energy representative or Duke Energy agent. I understand that I am not allowed to receive more than one incentive from Duke Energy on any piece of equipment. I also understand that my participation in the program may be taxable and that my company is solely responsible for paying all such taxes. I hereby agree to indemnify, hold harmless and release Duke Energy and it's affiliates from any actions or claims in regards to the installation, operation and disposal of equipment (and related materials) covered herein including liability from an incidental or consequential damages. Duke Energy does not endorse any particular manufacturer, product or system design within these programs; does not expressly or implicitly warrant the performance of installed equipment (Contact your contractor for details regarding equipment warranties), and is not liable for any damage caused by the installation of the equipment nor for any damage caused by the malfunction of the installed equipment.

Incentive Application Instructions

IMPORTANT NOTICE
Delays in processing incentive payments will occur if required documentation is not included with completed application(s).

1. Contact Duke Energy toll free at 866-380-9580 to confirm customer eligibility. Applications are available for download at www.duke-energy.com.
2. Review program and equipment requirements on the incentive application. (Page 6)
3. Purchase and install eligible energy-efficient equipment.
4. Complete and submit application within 60 days **after** equipment has been installed and is operational.
5. **The following items are required to verify projects. If they are not included, it will delay payment of incentive.**

   A. Itemized invoice for all equipment installed to include:
      a. Equipment cost
      b. Quantity per equipment type installed
      c. Model # for each equipment type
      d. Manufacturer's data sheet for each equipment model #.

   B. Make sure the account number provided on the cover page (customer information section) is associated with the location where the equipment was installed. If the account # does not match the address where the equipment was installed, the application will be rejected as ineligible.

   C. Provide required tax ID# for payee.

   D. Customer must sign and date the application after reviewing the Terms and Conditions. If customer wishes to **assign payment of the incentive directly to the vendor**, the customer should circle the appropriate payee in the Payment Information section of the application and sign their name to authorize payment.
6. Duke Energy may require site verification of projects that have been self-installed, prior to payment of incentive.
7. Fax the complete, signed application with all required documents to 1-866-908-4921 or mail to the following address:

   Duke Energy
   Smart $aver™ Incentive Program
   431 Charmany Drive
   Madison, WI 53719
8. A percentage of equipment installations will be site verified for quality assurance purposes. Once selected, a Duke Energy representative will contact the customer to arrange for the inspection. All incentive payments related to the project will be withheld until site verification is complete. There is no charge to the customer for these inspections.

Smart $aver™ Incentive Program
Requirements for Vendor Participation 2009

Program Overview

- Duke Energy offers it's eligible non-residential customers the opportunity to increase profitability through energy cost savings and contribute to a cleaner environment by participating in our Smart $aver™ Incentive Program.
- Under the Duke Energy Smart $aver™ Incentive Program, Vendor is defined as any third party who:
  – Promotes the sale and installation of the high efficiency equipment for the customer. The Vendor will ensure that the eligible equipment is installed and operating before submitting the application or assisting the customer in completing the application.
  – Is responsible for the product sale only and is not required to ensure installation of the eligible equipment.
- All license requirements, if any, are solely the Vendor's responsibility. Participating Vendors include equipment contractors, equipment Vendors, equipment manufacturers and distributors, energy service companies, etc. The typical Vendor role is to contact/solicit eligible customers building new or retrofitting existing facilities and encourage the installation of the energy-efficient equipment offered in Duke Energy's program.
- Incentives are paid directly to customers unless the customer assigns the incentive to the Vendor. The assigned incentive must reduce the purchase price paid for the equipment by an equivalent amount. Incentives are taxable to the entity who receives the rebate check. Rebates greater than $600 will be reported to the IRS unless documentation of tax exempt status is provided.
- Vendors can sign up to be on Duke Energy's Web site as a participating Vendor and be added to Duke Energy's e-mail distribution by faxing the Vendor Participation Agreement (VPA) to **1-866-908-4921** or mail to the following address:

  Duke Energy
  Smart $aver™ Incentive Program
  431 Charmany Drive
  Madison, WI 53719

Guidelines for Vendor Activities

- Vendors shall sign and return the attached VPA to Duke Energy prior to soliciting customer participation or when submitting an application. Rebate payments will not be released to a Vendor unless a signed VPA is on file.

Vendors shall not misrepresent the nature of their role in the program. In particular, Vendors shall not state or imply to customers, or any persons, that the Vendor is employed by or working on Duke energy's behalf.

- Vendors may not represent to customers that Duke Energy endorses their specific products or services. Duke Energy does not endorse specific products, services, or companies – only energy-efficient technologies.
- Vendors may advise customers of their option to have Duke Energy make their rebate check(s) payable to the Vendor if the customer's rebate amount is being deducted from the total sale price in advance. The customer must complete and sign the Payment Release Authorization section of the Smart $aver™ Incentive Program Application.
- Vendors may use the words "Duke Energy's Smart $aver™ Incentive Program" in promotional materials or advertisements. Vendors may use the name Duke Energy in a text format to describe the Smart $aver™ Incentive Program, but are not permitted to use Duke Energy's logos.
- For Vendors who properly install the qualifying equipment, the equipment shall be installed and operating prior to an application being submitted. A percentage of each Vendor's installations will be subject to inspection by Duke Energy for verifying that the equipment is installed and operating. Vendors demonstrating high failure rates (based on a statistically significant sample) will have 100% of subsequent jobs inspected or may have their participation in the Smart $aver™ Incentive Program revoked by Duke Energy in it's sole discretion.
- Vendors shall provide customers with applicable equipment warranty information for all measures installed. Vendors shall provide the required documentation for customers to apply for the rebate (invoices with model numbers and quantities, specification sheets for installed equipment, etc.) and assist customers in filling out the application.
- Vendors shall comply with all applicable local, state, and federal laws and codes when performing installation and related functions.
- Duke Energy reserves the right to revoke a Vendor's participation in Smart $aver™ Incentive Program if, in Duke Energy's sole judgment, the Vendor fails to comply with the program's guidelines and requirements.
- Smart $aver™ Incentive Program offerings may be modified or terminated without prior notice. Check Duke Energy's Web site for current program status.

For more information, call **1-866.380.9580** or visit **www.duke-energy.com.**

2009 Smart Saver™ Incentive Program

Technology	Responsible for sales and **not** installs*	Responsible for sales **and** Installation*	**Technology**	Responsible for sales and **not** installs*	Responsible for sales **and** Installation*
Lighting	☐	☐	Thermal Storage	☐	☐
Heating Ventilation & Cooling	☐	☐	Pumps/Motors/VFD's	☐	☐
Food Service	☐	☐	Chillers	☐	☐
Water Heating	☐	☐	Refrigeration	☐	☐
Process Equipment (air compressors, injection molding, etc.)	☐	☐			

* Check all that apply

Vendors who wish to be listed as a Smart $aver™ Incentive Program participating Vendor shall complete this form. A signed copy of this form must be on file at Duke Energy in order for the Vendor to receive incentive payments. Fax form to **1-866-908-4921** or mail to:

Duke Energy
Smart $aver™ Incentive Program
431 Charmany Drive
Madison, WI 53719

I have read and understand the Smart $aver™ Incentive Program Requirements for Vendor Participation, and I agree to comply with all requirements set forth therein. By signing this agreement, I agree to provide my customers with information and documentation that is true and accurate to the best of my knowledge. I hereby represent and warrant that the Tax ID and Vendor Tax Status provided below are true and accurate. I agree that any confidential information concerning my customer, including but not limited to Duke Energy service account information, will be used for the sole purpose of facilitating the customer's participation in the Smart $aver™ Incentive Program. Further, I understand that I am responsible for making sure everyone working for me understands the requirements prior to soliciting customer participation.

Vendor Federal Tax ID Number	

To qualify for Duke Energy incentives, applicants who provide their social security number as their federal tax identification number for tax purposes must sign and return the "Customer consent to release personal information" form ("Consent Form") along with the application. Incentive applications are processed by a third-party vendor. The third-party vendor is responsible for mailing the 1099 form at the end of the calendar year for tax filing. Duke Energy and the third-party vendor have signed confidentiality agreement to protect your personal information. If your social security number is your federal tax ID number and you elect not to sign the Consent Form, please do not send Duke Energy the application, as you will not be qualified to participate in the incentive program.

Vendor Tax Status	☐ Corporation	☐ Individual/Sole Proprietor	☐ Partnership	☐ Other

Contact me via	☐ Phone	☐ E-Mail	☐ Mail	

Company Name	
Mailing Address	
City, State, Zip	
Phone/Fax	
Primary E-mail Address	
Secondary E-mail Address	
Vendor Signature	
Title	
Print Name	
Date	

For more information, call 1-866-380-9580 or visit www.duke-energy.com.

APPENDIX 4

PARKING GARAGE LIGHTING STUDY

GSP Parking Garage Lighting:

GSP asked RS&H to explore state of the art lighting and control options for Parking Garages A and B that would maximize energy efficiency and improve the quality of light for a sustainable and safe environment. RS&H performed lighting calculations of several light fixtures and lamp types and obtained several mock up fixtures.

Light Level Requirements:

IESNA Lighting Handbook, Figure 22-22 states the Recommended Maintained Illuminance for Parking Garages to be 1 foot-candle (fc) at the parking surface for typical conditions, although an average value up to 5 fc may be calculated to address security concerns. Ramps (2 fc day/1 fc night), stairwells (2 fc) and entrance areas (50 fc day/1 fc night) have specific requirements. The Maximum/Minimum Horizontal Uniformity Ratio for all spaces is 10:1.

For a typical airport parking garage, RS&H's practice is to design a target level of 3 average fc at the parking surface with a uniformity ratio less than 10:1.

Existing Parking Garages A & B Lighting:

- There are approximately (1000) 100 watt (120 input watts) high pressure sodium with sealed glass lens fixtures for lighting levels 1-4.
- The roof lighting is provided by approximately (100) poles with 2-head 100 watt (120 input watts) high pressure sodium light fixtures.
- The stairwells and lobbies have approximately (150) 35 watt high pressure sodium light fixtures.
- The total electricity cost for the garages is approximately $80,000 per year.

Existing Lighting Summary:

- Average light levels are adequate (3 fc avg) but not uniform (Max/Min greater than 30:1)
- Lack of lighting control
- Yellow light color does not provide quality color rendering
- Annual maintenance average of 67 lamp and 3 ballast replacements for a cost of $1032.50

Lighting Options Explored:

The following options were reviewed and found not to be economically viable solutions:

1) Fluorescent strip lights as proposed in the ABM Energy Services Report do not have the lumen output to improve the light levels.
2) Two LED fixtures were provided by Hubbell Lighting and mocked up. The fixture has low energy consumption and good light color quality but glare was present from the LED modules. The cost of the fixtures did not offer a reasonable payback period.
3) Metal Halide lamp sources have lumen depreciation over short period, do not improve the energy costs and do not have practical controlling options.

4) Induction Type Light Fixture:
   - An induction lamp type fixture was installed at Greenville Memorial Hospital (GMH) and viewed by members of GSP, RS&H and the engineering staff at GMH. All parties were impressed by the light output, color and distribution of the induction fixture. A sample induction lamp type fixture has been installed by GSP for a mock up. Refer to attached cut sheet of I.L.P. Induction Fixture. Two sample fixtures from Devine Lighting were mocked up. Refer to attached cut sheet of Devine Lighting Induction Fixture.
   - The rated life of the induction lamp is 100,000 hours at 70% lumen output. The light distribution and color quality was at an acceptable level and better than the metal halide. The lumen output and uniformity of the 80 watt induction lamp would be an improvement of the existing light fixtures. The induction lamps can be controlled by dimming or bi-level switching. The energy consumption per fixture will present approximately 20-25% savings.
   - The installed cost of the fixture is in the range of $500/fixture. If the approximately (1000) existing fixtures were to be replaced, the cost would be in the $500,000 range. The annual energy savings would be in the $20,000/year range. Although this is the best option of the mocked up fixtures, there is not enough of energy saved to justify the upfront cost of replacing the existing fixtures. The unspent $500,000 can be used in more effective ways for larger energy savings.

Recommendation:

Start a group re-lamping program for the existing high pressure sodium fixtures where the lamps are replaced every other year to minimize lumen depreciation, which will help address the lighting uniformity concers.

Other Recommendations:

1) Install Photocell on stairwell lighting and roof top emergency circuits in Parking Garage A to turn off stairwell and roof deck lights during daylit conditions while keeping the exit signs on. In instances where exit signs are upstream of the stairwell lighting, remove the existing exit sign from the circuit and install self powered Tritium Exit Sign with 10 year rating.
2) Install on/off photocell control for the last row of light fixtures at the east and west ends of the garage on levels 1-4. Light levels during daylit conditions were at acceptable levels when the lights were shut off.
3) Install spot type fixtures on the underside of the third floor deck on Parking Garage A to light the entrance and sidewalk of the garage.
4) Install new light fixtures with direct/indirect components in stairwells and elevator lobbies of garage to improve light color and overall light levels on ceiling, wall and floor surfaces.
5) Coordinate the custom incentives program with Duke Energy for rebates.

Conclusion:

To implement all recommendations, it is suggested that a project of this size perform an in depth cost analysis and design documents or price requests be developed for a competitive bid out to a contractor to take advantage of the improved lighting levels and energy savings in a timely manner.

Additional samples will be installed and final decisions will be made based on GSP's objectives.

CATALOG NUMBER	
PROJECT NAME	TYPE
VOLTAGE	LAMPS

Induction Parking Deluxe Garage Fixture

SPECIFICATIONS

- Heavy duty round die cast aluminum housing.
- Textured architectural bronze powder coat finish over a chromate conversion coating.
- 2 piece aluminum reflector.
- Upper reflector removal for illuminating ceiling.
- Clear prismatic polycarbonate refractor with hinged clear polycarbonate drop lens and gasket.
- Easy hang bracket fits 4" electric box.
- 5000K induction lamp included.
- Approved for wet locations.

APPLICATIONS

- Parking garages
- Freezers
- Outdoor areas

100,000 hour rated life
10 Year Warranty

ORDERING GUIDE:

DGL - 80 - 2 - XX

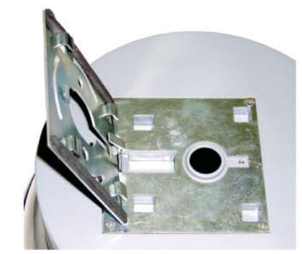
SERIES	LAMP	BALLAST CONFIG	OPTIONS
☐ DGL - GARAGE LIGHTER	☐ 40W LAMP	☐ 1 - 120V	☐ BLD - BI LEVEL DIM
	☐ 65W LAMP	☐ 2 - 277V	☐ DIM - 0-10V DIMMING SYSTEW
	☐ 80W LAMP		☐ XXXXK - SPECIAL LAMP COLOR
	☐ 100W LAMP		☐ SDT - 480/347 STEP DOWN TRANSFORMER
	☐ 120W LAMP		

Induction Lighting Products and the ILP logo are the trademark of Industrial Lighting Products, Inc.

INDUSTRIAL LIGHTING PRODUCTS, INC. 407-478-3759 PH 407-478-3760 FAX WWW.ILP-INC.COM

CATALOG NUMBER	
PROJECT NAME	TYPE
VOLTAGE	LAMPS

Induction Parking Deluxe Garage Fixture



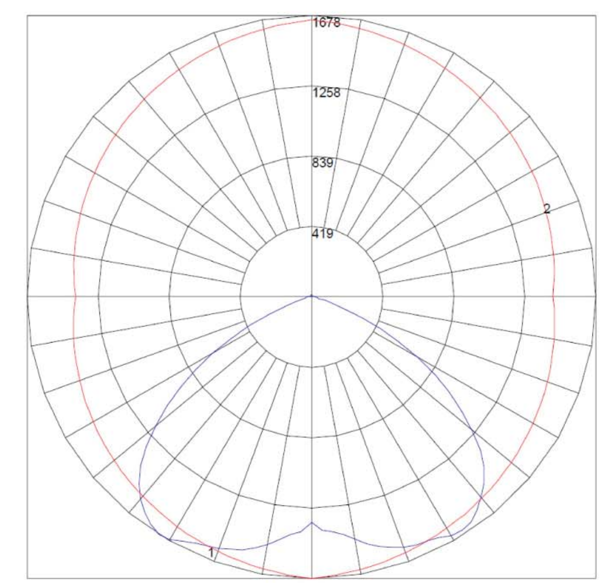
Easy hang bracket

Up light reflector removed

FLUX DISTRIBUTION

	Lumens	Percent Of Lamp
Downward Street Side	2273.8	35.5
Downward House Side	2232.2	34.9
Downward Total	4506.0	70.4
Upward Street Side	22.9	0.4
Upward House Side	26.1	0.4
Upward Total	49.0	0.8
Total Flux	4555.0	71.2

IES Classification	Type II
Longitudinal Classification	Very Short
Cutoff Classification	Cutoff
Total Rated Lamp Lumens	6400
Maximum Candela	1677.5
Maximum Candela Angle	270H 32.5V
Maximum Candela At 90 Degrees Vertical	27.5 (0.43% Lamp Lms)
Maximum Candela At 80 Degrees Vertical	37.4 (0.58% Lamp Lms)
Downward Total Efficiency	70.4%



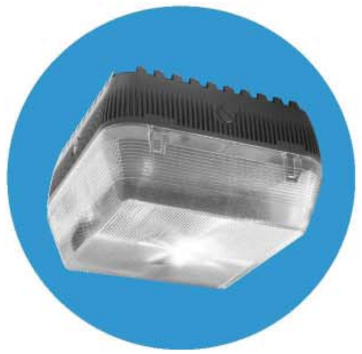
Maximum Candela = 1677.5 Located At Horizontal Angle = 270, Vertical Angle = 32.5
1 - Vertical Plane Through Horizontal Angles (270 - 90) (Through Max. Cd.)
2 - Horizontal Cone Through Vertical Angle (32.5) (Through Max. Cd.)

Induction Lighting Products and the ILP logo are the trademark of Industrial Lighting Products, Inc.

INDUSTRIAL LIGHTING PRODUCTS, INC. 407-478-3759 PH 407-478-3760 FAX WWW.ILP-INC.COM

CEILING

GFO/GFP SERIES



Features

- Rugged cast aluminum housing with 3/4" wiring hubs and versatile mounting capabilities. Surface mount over recessed boxes, Quick Mount wet location box, Adjustable trunnion mount, pendent mount and semi recessed concrete pour or drywall mount.
- Compact 10" sq. GFO40 or 14" sq. GFO/GFP80.
- Polycarbonate refractors. "O" units are opal, "P" units are prismatic, optional OP10 lens softens the prismatic square light distribution. Stainless steel screw closure with aircraft cable lens retainer.
- Reflector is high gloss white to maximize the lamp lumens into the refractor
- Wattages range from 26 watt fluorescent to 175MH. See ordering information.
- Standard finishes include dark bronze, black, white and platinum.
- Units are designed for use in wet locations.

Ordering Information

Example: GFP80 - 175MH - 277 - SAL - RC

Series	Watts/ Source	Volts	Finish	Mount
GFP80	175MH	277	SAL	RC

Series

GFO40	GFO40 Series
GFO80	GFO80 Series
GFP80	GFP80 Series

Wattage/Source

GFO40	
70HPS	Medium Base
70MH	Medium Base
2PLC13	G24q-1 Base
PLC26	G24q-3 Base
GFO80/GFP80	
100HPS	Medium Base
150HPS	Medium Base
100MH	Medium Base
150MH	Medium Base
175MH	Medium Base
2PLC26	G24d-3 Base
PLT42-ELB	GX24q-4 Base

Voltage[1]

120	120V
277	277V
MT	Multi-Tap (120/208/240/277V)
TT	Tri-Tap® (120, 277, 347V)
347	347V

Finish

DBZ	Dark Bronze
BLK	Black
WHT	White
SAL	Platinum

Mounting

RC	Semi-Recessed Concrete
RD	Semi-Recessed Drywall
TM	Trunnion Mount
QM	Quick Mount
PCB	Machined & Counter Balanced for 1/2" pendant, stem by others (not available for GFO40 Series)

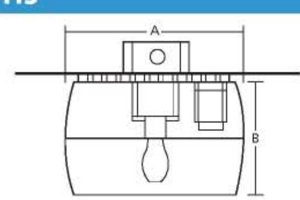
Options

C43	Cast Junction Box
TP	Tamper Proof
PC	Photocell
F	Fusing
OP10	White Translucent Lens (GFP80 & GFO80)
RTW90	Clear Lenticular Lens (GFO40 only)
EMQ	Emergency Quartz Relay

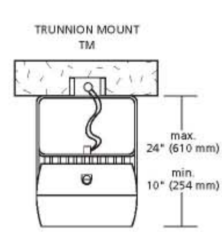
1 50 Hz 220/240V available.

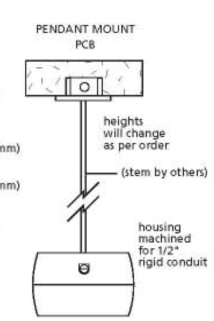
DEVINE DESIGN™

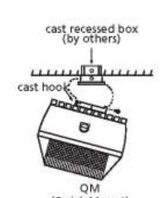
Dimensions



	A	B
GFO40	10" 254 mm	7" 178 mm
GFO80	14 1/4" 362 mm	8 1/2" 216 mm
GFP80	14 1/4" 362 mm	8 1/2" 216 mm



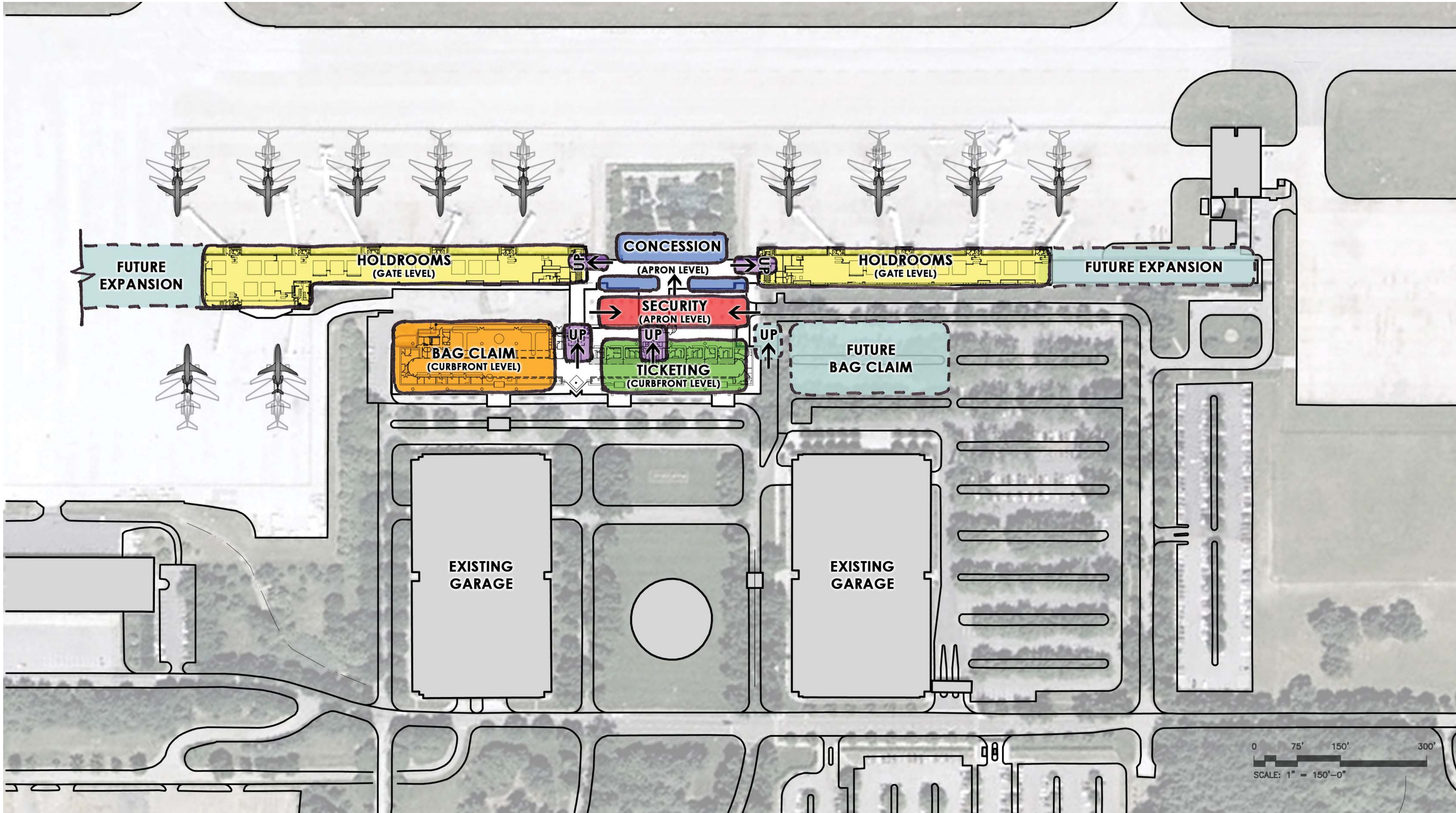




HUBBELL® Hubbell Lighting

APPENDIX 5

INITIAL CONCEPT DEVELOPMENT

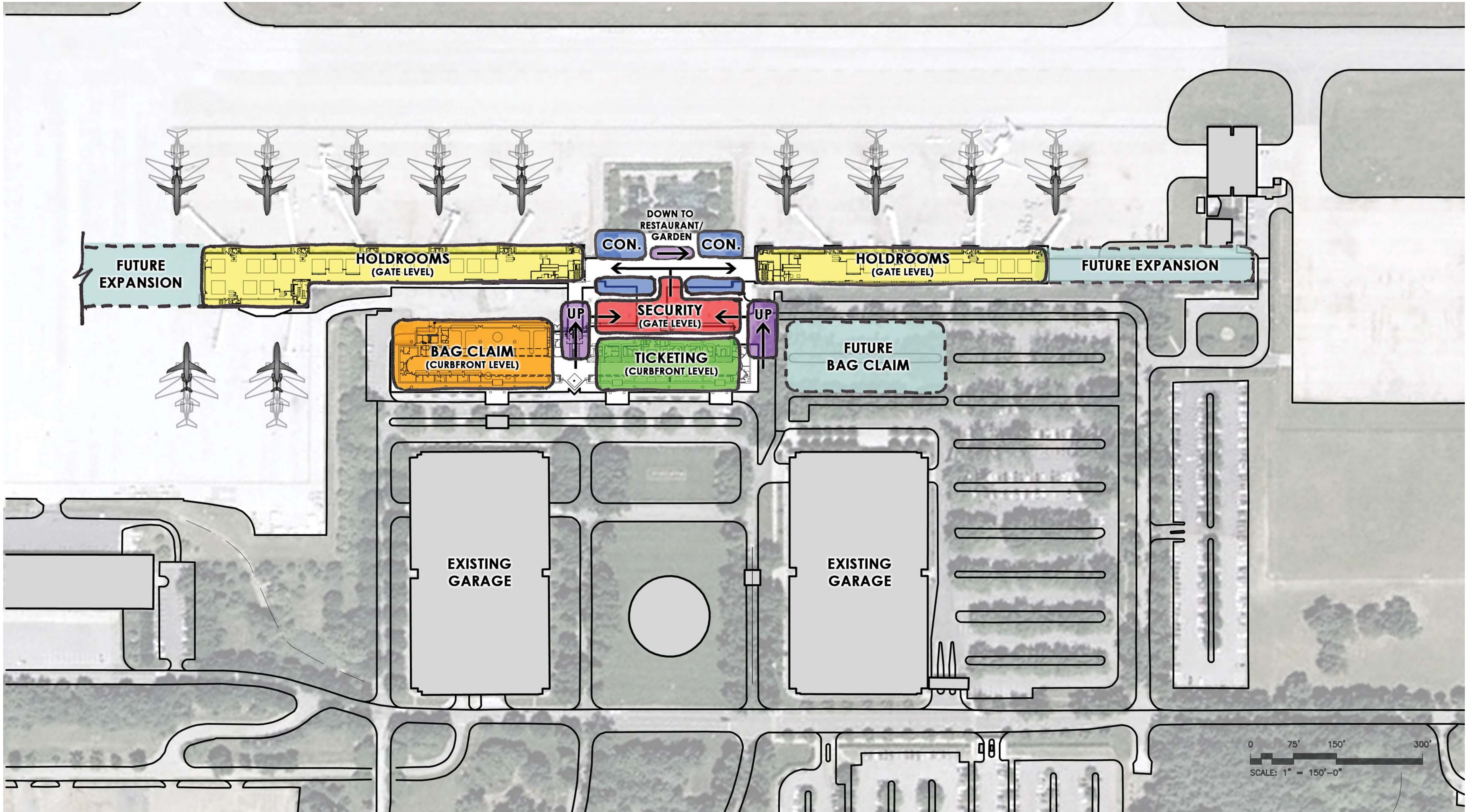


RS&H IMPROVING YOUR WORLD

GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD

- LEAST IMPACT
- 2 LEVEL CHANGES FROM CURBFRONT TO AIRCRAFT
- RESTAURANT/GARDEN REMAIN (POST SECURITY)
- CONCESSIONS AND HOLDROOMS ON SEPARATE LEVELS
- CENTRALIZED PASSENGER/BAG SCREENING
- SINGLE-LOADED CONCOURSES REMAIN
- CONCOURSES A AND B CONNECTED ON DIFFERENT LEVELS
- RENOVATE TICKETING AND BAGGAGE CLAIM

A1

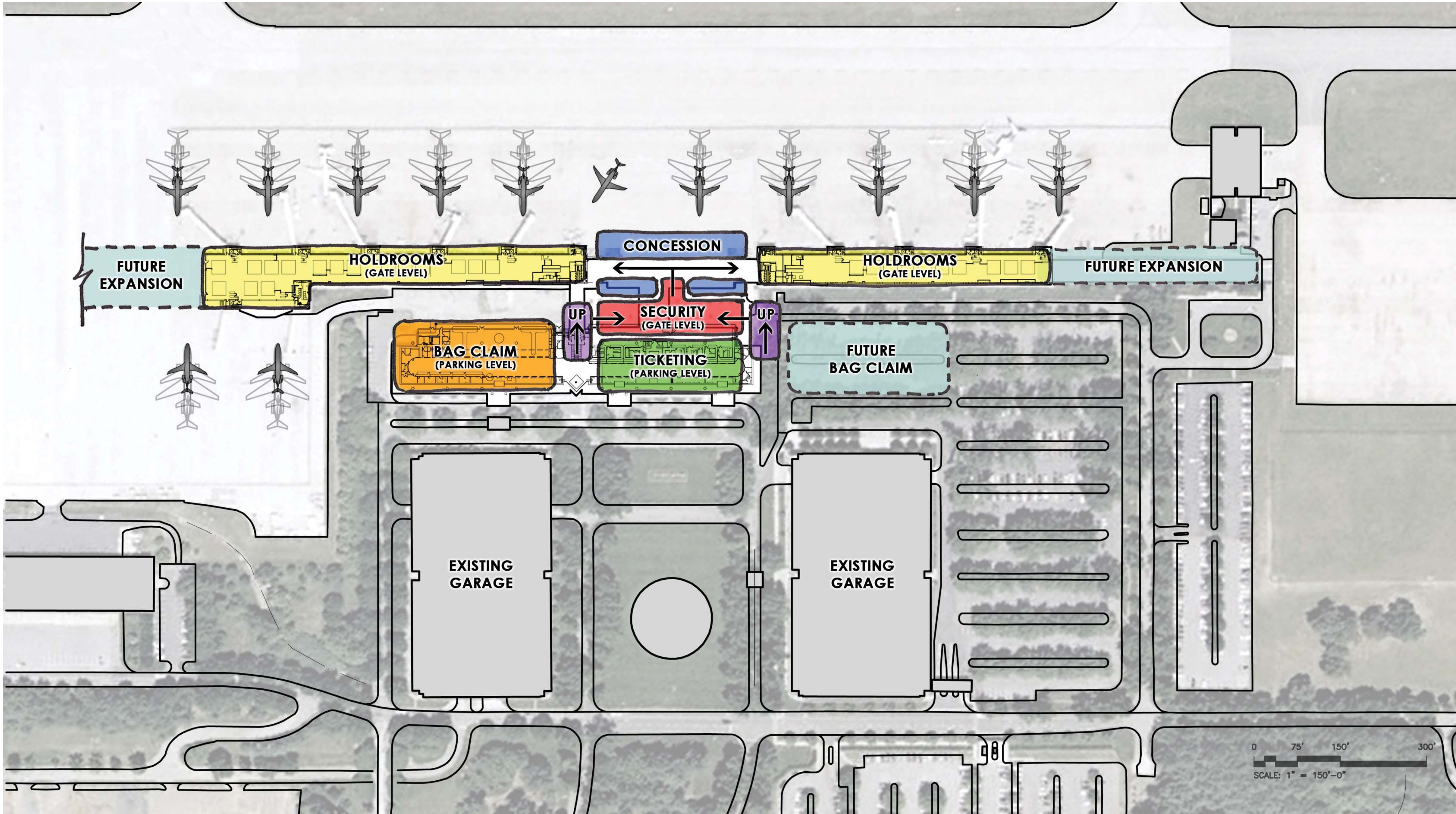


RS&H IMPROVING YOUR WORLD

GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD

- MODERATE IMPACT
- 1 LEVEL CHANGE FROM CURBFRONT TO AIRCRAFT
- RESTAURANT/GARDEN REMAIN (POST SECURITY)
- CONCESSIONS AND HOLDROOMS ON SEPARATE LEVELS
- CENTRALIZED PASSENGER/BAG SCREENING
- SINGLE-LOADED CONCOURSES REMAIN
- CONCOURSES A AND B CONNECTED ON SAME LEVEL
- RENOVATE TICKETING AND BAGGAGE CLAIM

A2

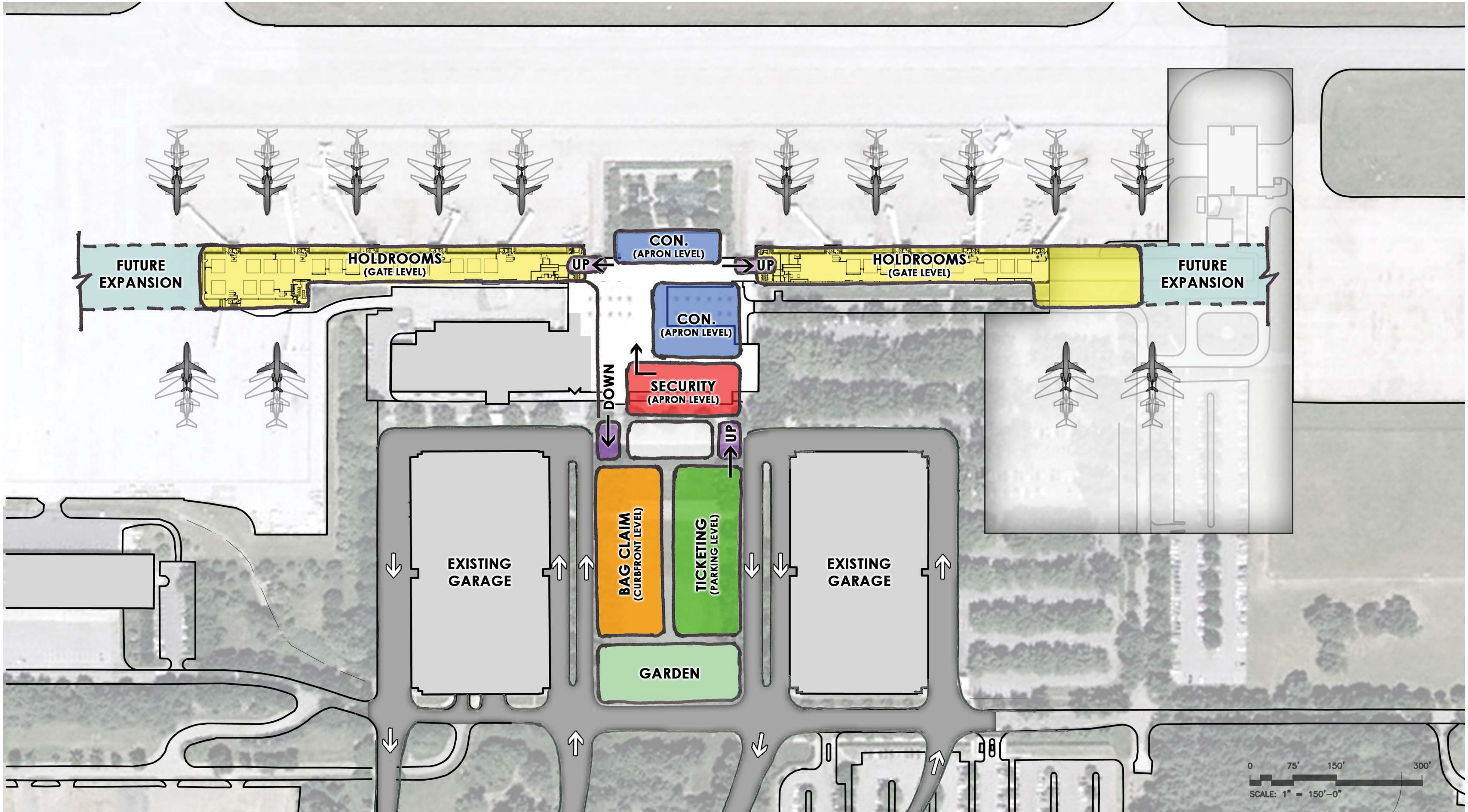


RS&H IMPROVING YOUR WORLD

GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD

- MOST IMPACT
- 1 LEVEL CHANGE FROM CURBFRONT TO AIRCRAFT
- 2 GATES REPLACE GARDEN
- CONCESSIONS AND HOLDROOMS ON SEPARATE LEVELS
- CENTRALIZED PASSENGER/BAG SCREENING
- SINGLE-LOADED CONCOURSES REMAIN
- CONCOURSES A AND B CONNECTED ON SAME LEVEL
- RENOVATE TICKETING AND BAGGAGE CLAIM

A3

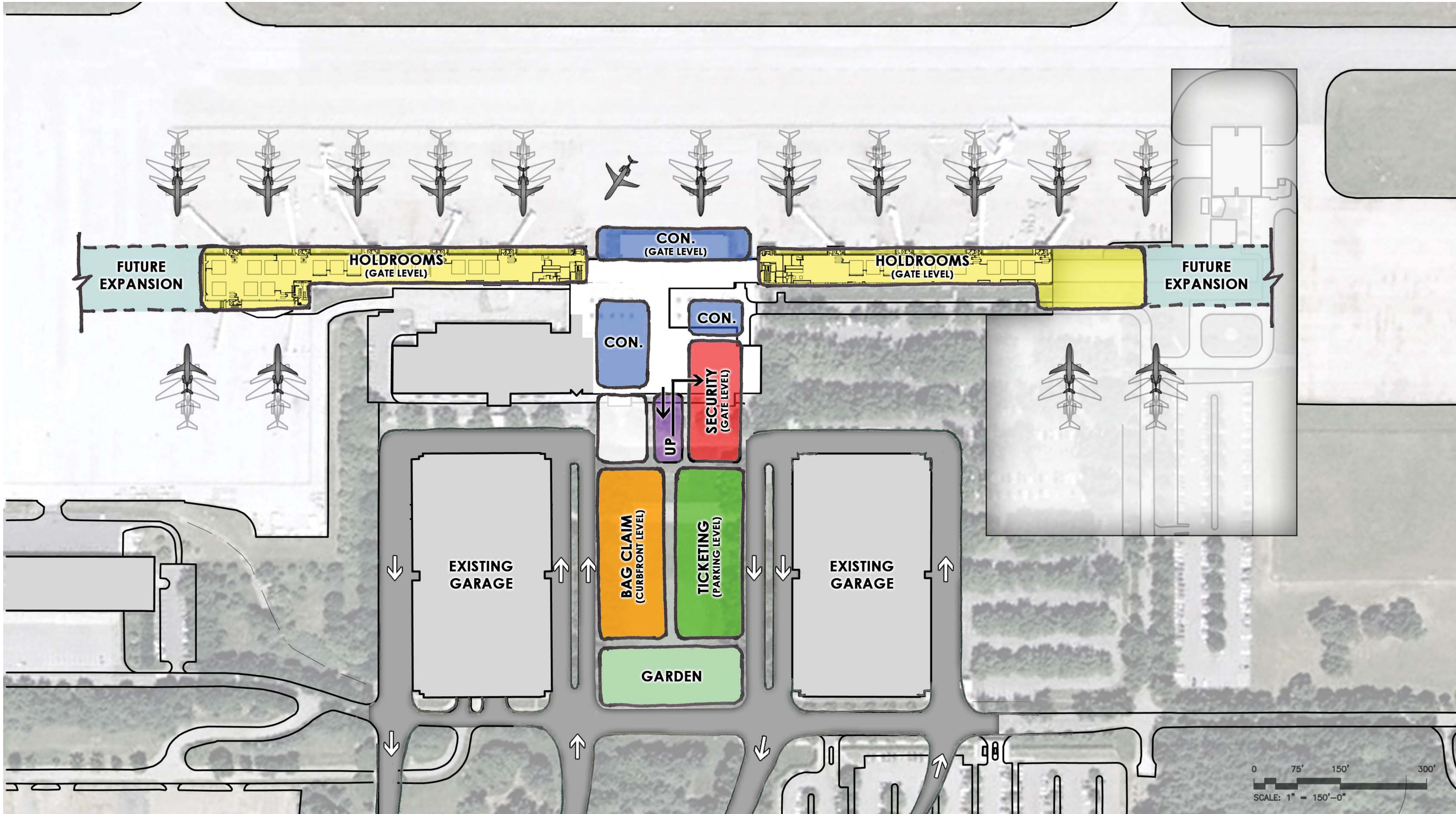


RS&H IMPROVING YOUR WORLD

GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD

- LEAST IMPACT
- 2 LEVEL CHANGES FROM CURBFRONT TO AIRCRAFT
- RESTAURANT/GARDEN REMAIN (POST SECURITY)
- CONCESSIONS AND HOLDROOMS ON SEPARATE LEVELS
- CENTRALIZED PASSENGER/BAG SCREENING
- PARTIAL DOUBLE-LOADED CONCOURSES (NEW APRON)
- CONCOURSES A AND B CONNECTED ON DIFFERENT LEVELS
- RENOVATE TICKETING AND BAGGAGE CLAIM

B1

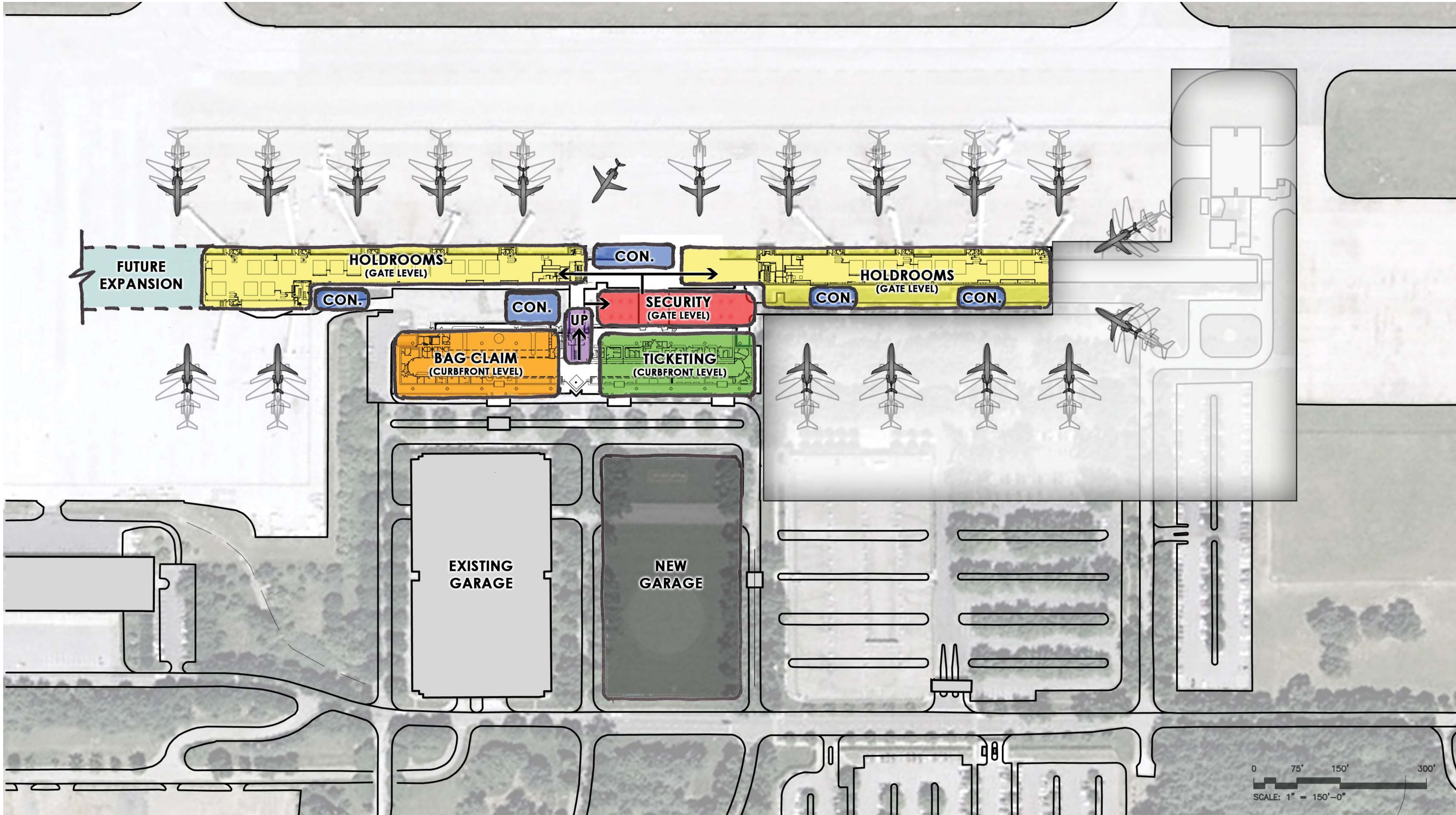


RS&H IMPROVING YOUR WORLD

GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD

- MODERATE IMPACT (DEMO SURFACE PARKING)
- 1 LEVEL CHANGE FROM CURBFRONT TO AIRCRAFT
- 2 GATES REPLACE GARDEN
- CONCESSIONS AND HOLDROOMS ON SAME LEVEL
- CENTRALIZED PASSENGER/BAG SCREENING
- PARTIAL DOUBLE-LOADED CONCOURSES (NEW APRON)
- CONCOURSES A AND B CONNECTED ON SAME LEVEL
- RENOVATE TICKETING AND BAGGAGE CLAIM

B2

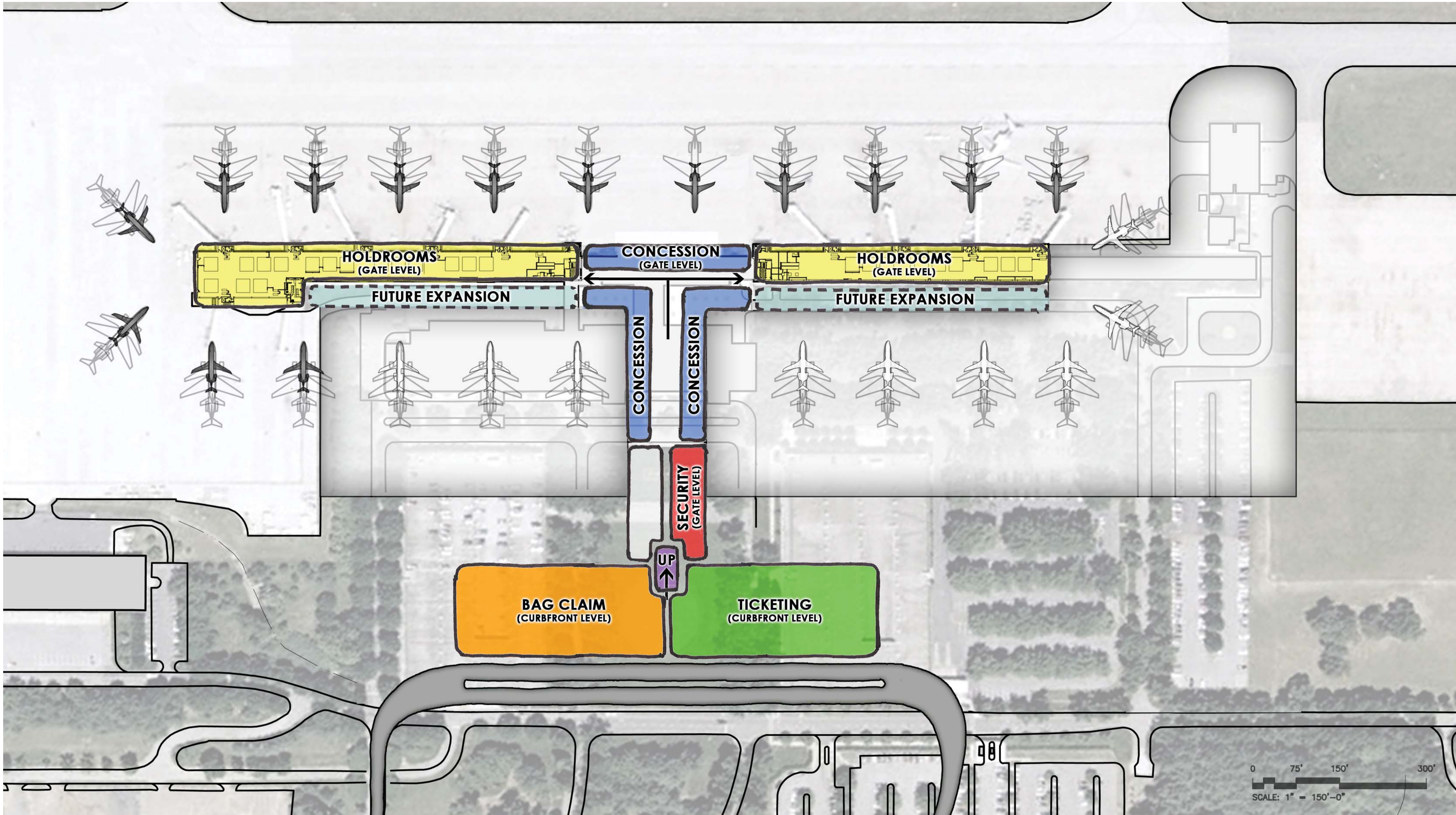


RS&H IMPROVING YOUR WORLD

GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD

- MODERATE + IMPACT (DEMO ONE GARAGE)
- 1 LEVEL CHANGE FROM CURBFRONT TO AIRCRAFT
- 2 GATES REPLACE GARDEN
- CONCESSIONS AND HOLDROOMS ON SAME LEVEL
- CENTRALIZED PASSENGER/BAG SCREENING
- PARTIAL DOUBLE-LOADED CONCOURSES (NEW APRON)
- CONCOURSES A AND B CONNECTED ON SAME LEVEL
- RENOVATE TICKETING AND BAGGAGE CLAIM

B3

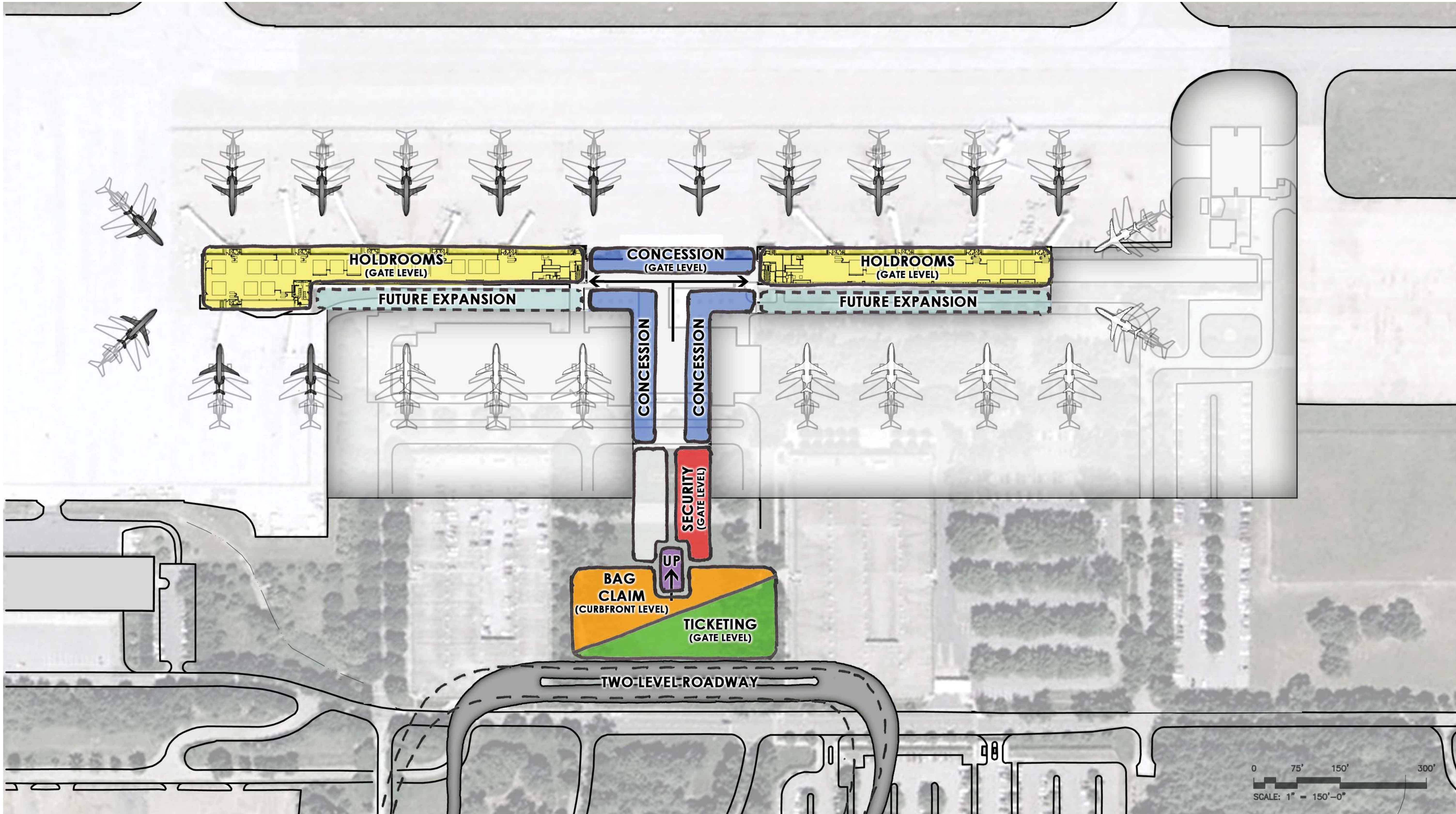


RS&H IMPROVING YOUR WORLD

GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD

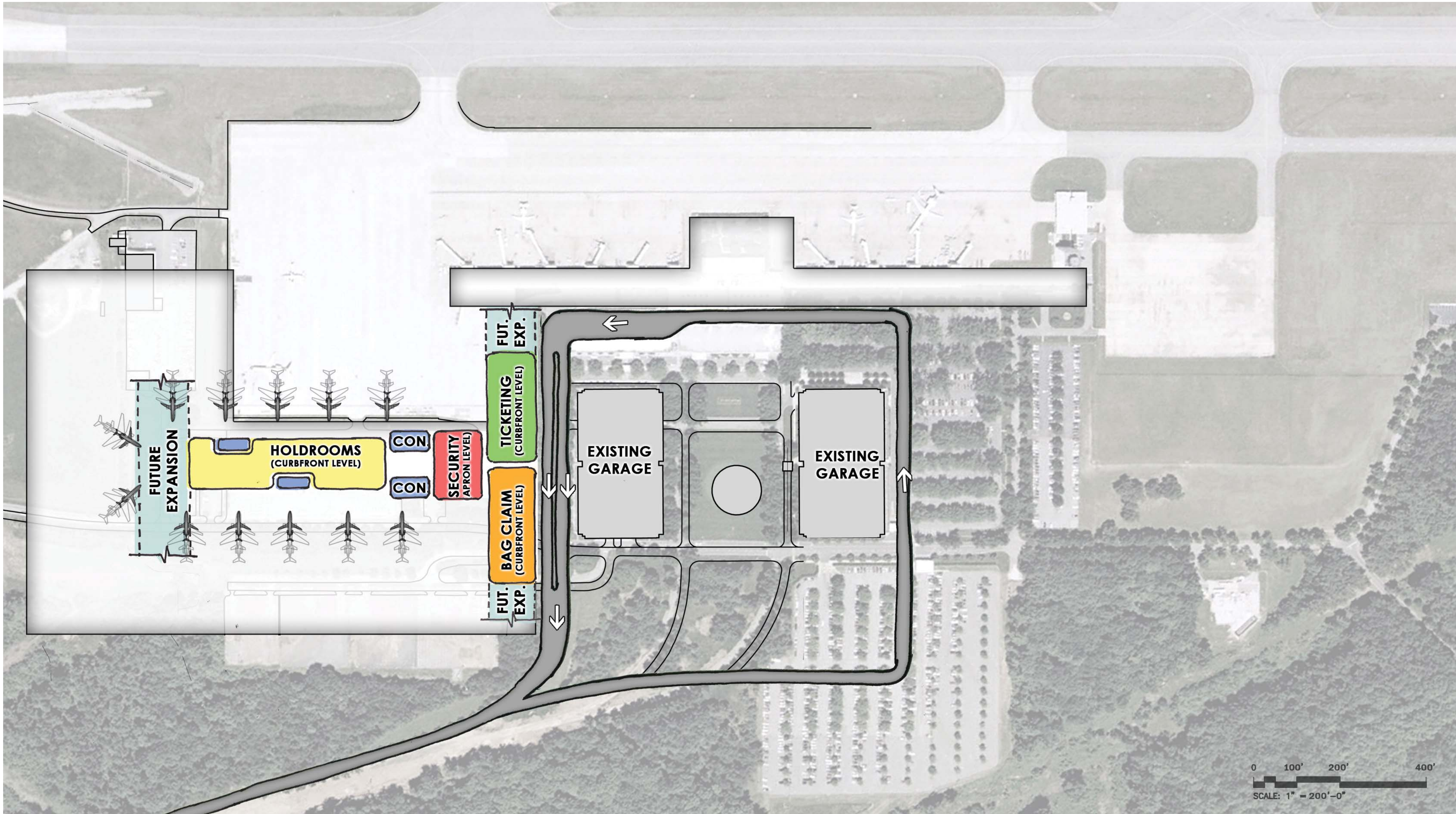
- MOST IMPACT (DEMO BOTH GARAGES)
- 1 LEVEL CHANGE FROM CURBFRONT TO AIRCRAFT
- 2 GATES REPLACE GARDEN
- CONCESSIONS AND HOLDROOMS ON SAME LEVEL
- CENTRALIZED PASSENGER/BAG SCREENING
- DOUBLE-LOADED CONCOURSES (NEW APRON)
- CONCOURSES A AND B CONNECTED ON SAME LEVEL

B4



- MOST IMPACT (DEMO BOTH GARAGES)
- 1 LEVEL CHANGE FROM AIRCRAFT TO BAG CLAIM
- 2 GATES REPLACE GARDEN
- CONCESSIONS AND HOLDROOMS ON SAME LEVEL
- CENTRALIZED PASSENGER/BAG SCREENING
- DOUBLE-LOADED CONCOURSES (NEW APRON)
- CONCOURSES A AND B CONNECTED ON SAME LEVEL
- NO LEVEL CHANGE FROM TICKETING TO GATES

B5



RS&H IMPROVING YOUR WORLD

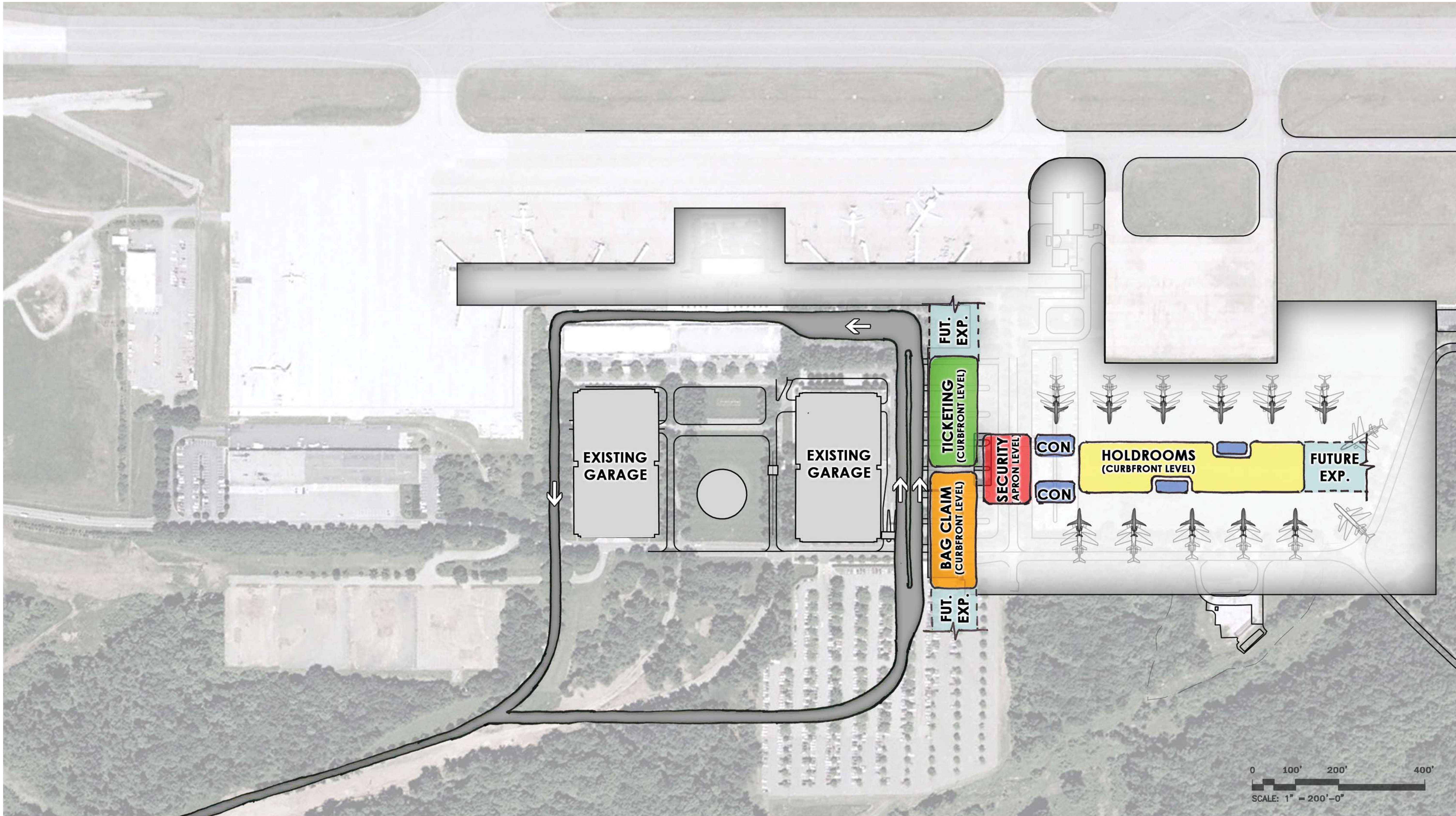
GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD

- LIMITED DISRUPTION DURING CONSTRUCTION
- UTILIZE EXISTING APRON

- ALL NEW SUSTAINABLE BUILDING COMPONENTS
- REDUCE OPERATIONAL COST PER S.F.

- MAXIMIZE EFFICIENCY THROUGH NEW DESIGN
- PROPERLY SIZED ALL BUILDING COMPONENTS

C1

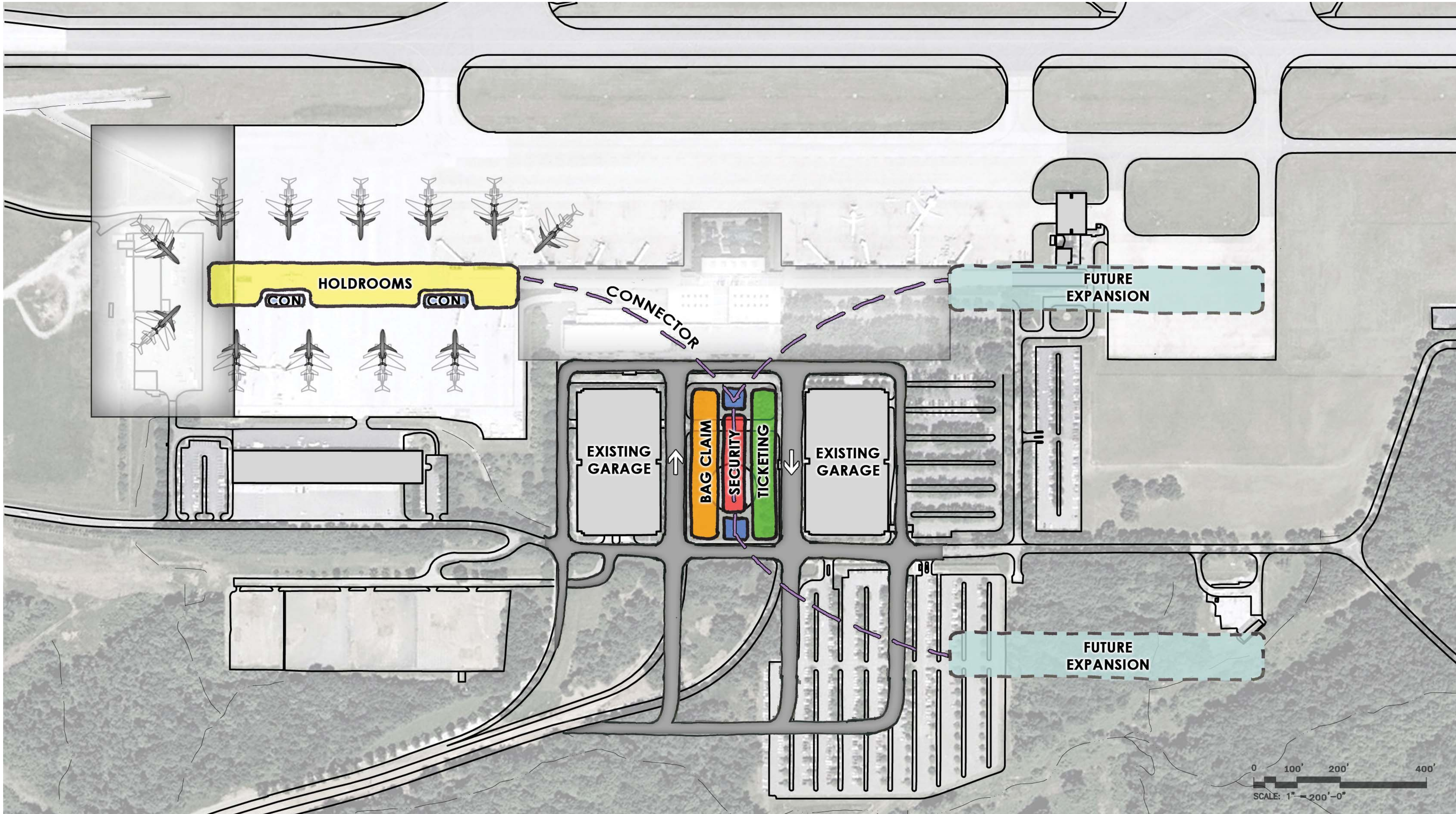


RS&H IMPROVING YOUR WORLD

GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD

- LIMITED DISRUPTION DURING CONSTRUCTION
- UTILIZE EXISTING APRON
- ALL NEW SUSTAINABLE BUILDING COMPONENTS
- REDUCE OPERATIONAL COST PER S.F.
- MAXIMIZE EFFICIENCY THROUGH NEW DESIGN
- PROPERLY SIZED ALL BUILDING COMPONENTS

C2

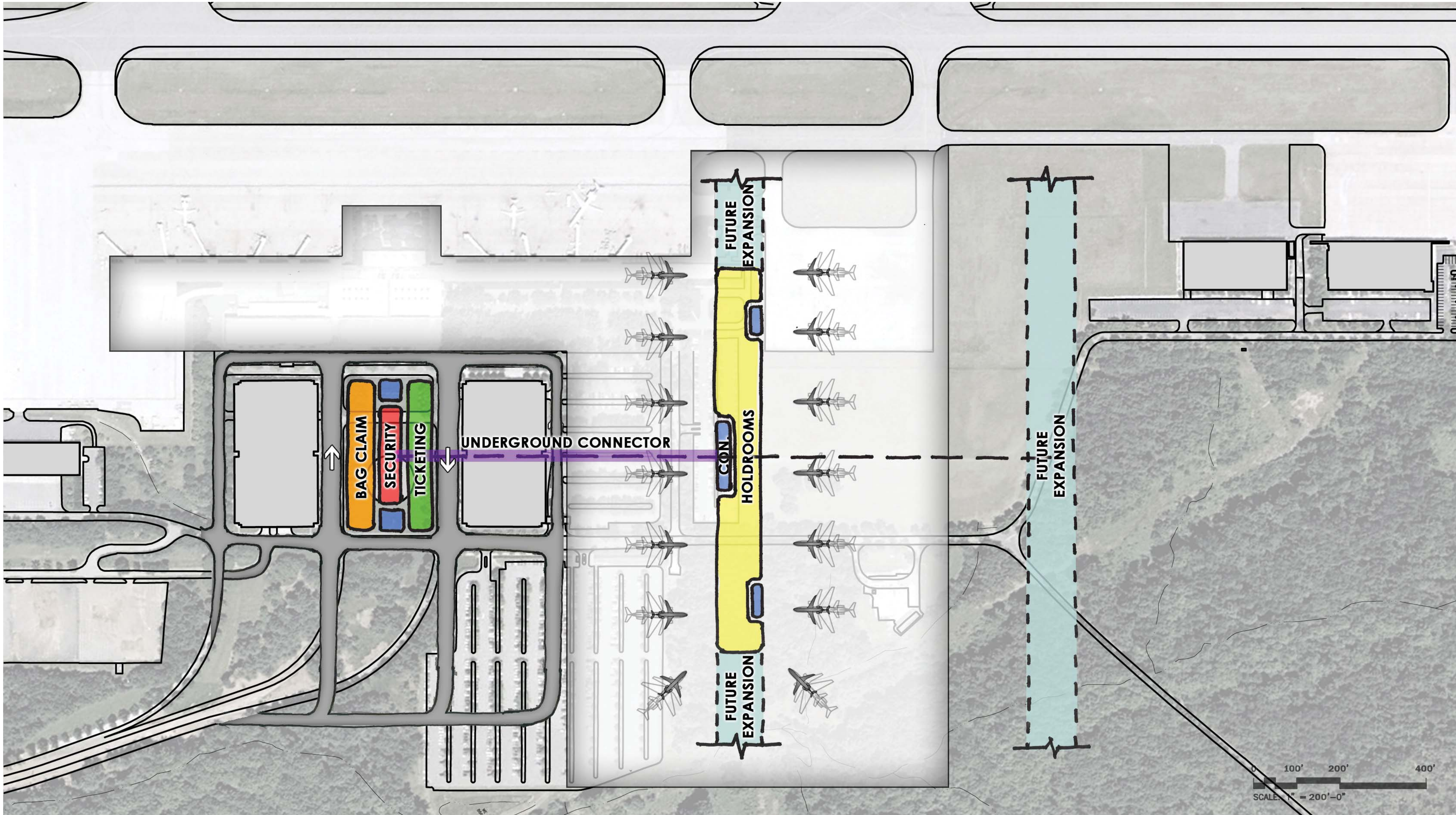


RS&H IMPROVING YOUR WORLD

GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD

- MODERATE DISRUPTION DURING CONSTRUCTION
- VERTICAL ARRANGEMENT OF LANDSIDE
- LIMITED DISRUPTION DURING CONSTRUCTION
- UTILIZE EXISTING APRON
- ALL NEW SUSTAINABLE BUILDING COMPONENTS
- REDUCE OPERATIONAL COST PER S.F.
- MAXIMIZE EFFICIENCY THROUGH NEW DESIGN
- PROPERLY SIZED ALL BUILDING COMPONENTS

C3



RS&H IMPROVING YOUR WORLD

GSP INTERNATIONAL AIRPORT ROGER MILLIKEN FIELD

- MODERATE DISRUPTION DURING CONSTRUCTION
- VERTICAL ARRANGEMENT OF LANDSIDE
- LIMITED DISRUPTION DURING CONSTRUCTION
- UTILIZE EXISTING APRON
- ALL NEW SUSTAINABLE BUILDING COMPONENTS
- REDUCE OPERATIONAL COST PER S.F.
- MAXIMIZE EFFICIENCY THROUGH NEW DESIGN
- PROPERLY SIZED ALL BUILDING COMPONENTS

C4

APPENDIX 6

DETAILED TERMINAL PROGRAM

APPENDIX 6
TABLE OF CONTENTS

Existing Terminal Functional Areas	Existing Square Foot Area
Airline	
Number of check-in counters	36
Number of check-in kiosks	20
Check-in counter and kiosk length in lineal feet	228
Number of departure lounges or holdrooms	13
Number of baggage claim devices (flat-plate)	2
Lineal feet of baggage claim frontage	250
Total square foot area of check-in counters and kiosks	1,936
Square foot area of check-in queue	1,891
Airline office square foot area	4,951
Baggage make-up square foot area	9,000
Total square foot area of holdrooms	33,094
Inbound baggage input square foot area	4,152
Baggage claim retrieval square foot area	8,491
Square feet of baggage service offices	895
Subtotal Square Feet of Airline Functional Areas	64,410
Security	
Number of security screening check point position(s)	4
Number of EDS machines	0
Total square foot area of security screening check point station(s)	2,674
Square foot area of security screening check point queue	1,735
Total square foot area of post security screening check point	0
Square foot area of checked baggage EDS screening	0
Total square foot area of deplaning corridor	0
TSA offices and support space in square feet	1,346
Subtotal Square Feet of Security	5,755
Terminal Amenities in Square Feet	
Food/Beverage/Retail	16,953
Rental car counters and offices	2,184
Rental car queue	1,126
Subtotal in Square Feet of Terminal Amenities	20,263
Public Areas in Square Feet	
Non-secure public restrooms	1,207
Secure public restrooms	2,706
Terminal Conference Rooms	1,276
Waiting and seating	3,990
Public circulation including lobby and entrance	52,448
Subtotal Public Areas in Square Feet	61,627

Existing Terminal Functional Areas	Existing Square Foot Area
Non-Public Areas in Square Feet	
Airport Operations	1,174
Airport Police	1,289
Maintenance, storage and janitorial	907
Circulation non-public	924
Mechanical/Electrical/conveyor chases	27,842
Subtotal Non-Public Areas in Square Feet	32,136
SUBTOTAL PROJECT AREA IN SQUARE FEET (NET)	**184,191**
Gross to Net Factor (Walls, structure, etc.)	6,080
SUBTOTAL PROJECT AREA SQUARE FEET (GROSS)	**190,271**
Non-Project Area (not in scope)	
Airline Operations	12,932
Airport Administration	4,267
Customs and Border Protection	7,688
Subtotal Non-Project Area	24,887
TOTAL TERMINAL BUILDING AREA IN SQUARE FEET	**215,158**

	Existing	2010	2015	2020	2025	2030	2040	2050
Annual Enplanements	617,000	617,000	698,000	791,000	893,000	1,012,00	1,300,00	1,669,00
Peak Hour Enplanements	450	450	510	640	670	755	855	910

BASE CASE SUMMARY		Projections						
Terminal Functional Areas	**Existing**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2050**
Airline								
Number of check-in counters - exclusive use	36	8	7	7	5	1	1	2
Number of check-in kiosks - exclusive use	20	5	6	9	11	15	16	18
Check-in counter and kiosk length in lineal feet - exclusive use	228	54	58	69	69	71	78	85
Number of departure lounges or holdrooms	13	10	10	10	10	11	12	13
Number of slope-plate baggage claim devices*	2	2	3	3	3	3	4	4
Lineal feet of baggage claim frontage	250	268	402	402	402	402	536	536
Total square foot area of exclusive use check-in counters and kiosks	1,936	820	880	1,040	1,030	1,060	1,170	1,280
Square foot area of check-in queue - exclusive use	1,891	860	950	1,210	1,240	1,470	1,620	1,770
Airline office square foot area	4,951	1,100	1,200	1,400	1,400	1,400	1,600	1,700
Baggage make-up square foot area	9,000	14,800	14,800	14,800	14,800	22,200	22,200	29,600
Total square foot area of departure lounges or holdrooms	33,094	25,950	25,950	29,780	29,780	32,750	35,730	38,710
Inbound baggage input square foot area	4,142	3,200	4,800	4,800	4,800	4,800	6,400	6,400
Baggage claim square foot area	8,491	7,200	10,800	10,800	10,800	10,800	14,400	14,400
Square feet of baggage service offices	895	840	840	840	840	840	840	840
Subtotal Square Feet of Airline Functional Areas	65,410	54,770	60,220	64,670	64,690	75,320	83,960	94,700
Security								
Number of 2009 TSA security screening check point position(s)	4	3	4	5	5	6	6	7
Number of full body scanners	0	1	2	2	2	2	2	2
Number of complete body pat down areas	0	1	1	1	1	1	1	1
Number of ETD primary screening positions	8	0	0	0	0	0	0	0
Number of in-line EDS primary screening positions	0	0	0	0	0	0	0	0
Total square foot area of 2009 TSA security station(s)	2,674	3,320	3,320	3,320	3,320	3,320	2,490	2,490
Square foot area of 2009 TSA security station(s) queue	1,735	900	1,200	1,500	1,500	1,800	1,800	2,100
Total square foot area of full body scanning position(s)	0	0	210	420	420	420	420	420
Total square foot area for full body scanning position(s) queue	0	0	45	90	90	90	90	90
Total square foot area of complete pat down areas	0	0	40	40	40	40	40	40
Total square foot area of complete pat down area queue	0	0	10	10	10	10	10	10
Total square foot area of post security screening check point	0	600	800	1,000	1,000	1,200	1,200	1,400

BASE CASE SUMMARY		Projections						
Terminal Functional Areas	**Existing**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2050**
Total square foot area of ETD primary baggage screening	0*	960	0	0	0	0	0	0
Total square foot area of EDS primary baggage screening	0	0	0	0	0	0	0	0
Total square foot area of in-line EDS baggage screening	0	0	14,310	14,310	14,310	17,460	17,460	17,460
TSA offices and support space in square feet	1,346	1,900	2,200	2,800	2,800	3,300	3,300	3,800
Subtotal Square Feet of Security	5,755	7,680	22,140	23,490	23,490	27,640	26,810	27,810
Terminal Concessions in Square Feet								
Food/beverage/retail	16,953	6,520	7,370	8,360	9,430	10,690	13,730	17,630
Rental car counters and offices	2,184	2,180	2,180	2,180	2,180	2,180	2,260	2,900
Rental car queue	1,126	450	450	450	450	450	470	600
Subtotal in Square Feet of Terminal Concessions	20,263	9,150	10,000	10,990	12,060	13,320	16,460	21,130
Public Areas in Square Feet								
Non-secure public restrooms	1,207	2,500	2,800	3,400	3,800	4,100	4,600	4,900
Secure public restrooms	2,706	2,300	2,600	3,300	3,500	3,900	4,300	4,700
Terminal conference rooms	1,276	1,170	1,170	1,170	1,170	1,300	1,430	1,560
Waiting and seating	3,990	7,740	8,740	10,940	11,440	12,840	14,140	15,340
Public circulation including lobby and entrance	52,448	26,900	31,000	37,100	40,500	46,000	51,900	58,900
Subtotal Public Areas in Square Feet	61,627	40,610	46,310	55,910	60,410	68,140	76,370	85,400
Non-Public Areas in Square Feet								
Airport Operations	1,174	1,100	1,100	1,100	1,100	1,300	1,400	1,500
Airport Police	1,289	1,300	1,500	1,900	2,000	2,200	2,500	2,700
Maintenance, storage and janitorial	907	2,780	3,140	3,560	4,020	4,550	5,850	7,510
Circulation	924	1,710	1,900	2,190	2,380	2,690	3,230	3,860
Mechanical/electrical/utility	27,842	16,920	19,400	23,330	25,500	29,010	32,920	37,560
Subtotal Non-Public Areas in Square Feet	32,136	23,810	27,040	32,080	35,000	39,750	45,900	53,130
SUBTOTAL PROJECT AREA (Net)	**184,191**	**136,020**	**165,710**	**187,140**	**195,650**	**224,170**	**249,500**	**282,170**
Net to Gross Factor	6,080	4,490	5,470	6,180	6,460	7,400	8,230	9,310
SUBTOTAL PROJECT AREA (Gross)	**190,271**	**140,510**	**171,180**	**193,320**	**202,110**	**231,570**	**257,730**	**291,480**

BASE CASE SUMMARY								
Square Feet Per Annual Enplaned Passenger	0.31	0.25	0.25	0.24	0.23	0.23	0.20	0.17
Square Feet Per Peak Hour Passenger	423	312	336	302	302	307	301	320
Terminal Ancillary Areas								
Airline operational square foot area	12,932	4,500	4,500	4,500	4,500	5,000	5,500	6,000
Airport Administrative Offices	4,267	8,100	8,100	8,100	8,100	9,000	9,900	10,800
Customs and Border Protection								
Sterile Corridor System		80	80	80	80	80	80	80
Primary Processing		2,940	2,940	2,940	2,940	2,940	2,940	2,940
Secondary Processing		3,810	3,810	3,810	3,810	3,810	3,810	3,810
CBP Administration		1,520	1,520	1,520	1,520	1,520	1,520	1,520
Preclearance Facilities		0	0	0	0	0	0	0
Circulation and Building Services		5,060	5,060	5,060	5,060	5,060	5,060	5,060
Subtotal Customs and Border Patrol in Square Feet	7,688	13,410	13,410	13,410	13,410	13,410	13,410	13,410
Subtotal Terminal Ancillary Areas	24,887	26,010	26,010	26,010	26,010	27,410	28,810	30,210
TOTAL BUILDING AREA	**215,158**	**166,520**	**197,190**	**219,330**	**228,120**	**258,980**	**286,540**	**321,690**

CBP = Customs and Border Protection

EDS = Explosives Detection System

PH = Peak Hour

TSA = Transportation Security Administration

* Existing baggage claim devices are flat-pleat devices

CBP = Customs and Border Protection

BASE CASE FORECAST	2010	2015	2020	2025	2030	2040	2050
Enplanements							
Annual Enplaned Passengers	617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Peak Month (9.1% of Annual)	56,147	63,518	71,981	81,263	92,092	118,300	151,879
Average Day (30 days)	1,872	2,117	2,399	2,709	3,070	3,943	5,063
Peak Hour Enplanements	450	510	640	670	755	835	910
Peak 20-minute Enplanements	225	255	320	335	378	418	455
Deplanements							
Annual Deplanements	610,830	691,020	783,090	884,070	1,001,880	1,287,000	1,652,310
Peak Hour Deplanements	383	434	544	570	642	710	774
Peak 20-minute Deplanements	255	289	363	380	428	473	516
Commercial Operations							
Annual	24,700	24,600	22,200	24,000	26,800	34,300	44,000
Average Day	75	75	67	73	81	104	134
Peak Hour	18	18	18	18	20	22	24
Gates	10	10	10	10	11	12	13
Average Passengers per Peak Hour Flight	50	57	71	74	76	76	76

DATA AND ASSUMPTIONS - BASE CASE	2010	2015	2020	2025	2030	2040	2050
Check-in							
Number of airlines operating at the airport	6	6	6	6	6	6	6
Average processing time per passenger at conventional check-in in seconds	150	150	150	150	150	150	150
Average processing time per passenger at kiosk check-in in seconds	90	90	90	90	90	90	90
Width per check-in counter including bag wells in lineal feet	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Width per kiosk including bag wells in lineal feet	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Depth per check-in counter or kiosk in lineal feet(1)	15	15	15	15	15	15	15
Maximum queuing time at check-in in minutes	10	10	10	10	10	10	10
Percentage of passengers using check-in	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of passengers using conventional check-in	50.0%	40.0%	30.0%	20.0%	5.0%	5.0%	5.0%
Percentage of passengers using kiosk check-in	50.0%	60.0%	70.0%	80.0%	95.0%	95.0%	95.0%
Square foot area per person in check-in queue	14	14	14	14	14	14	14
Passenger Security Screening							
Processing time per passenger at 2009 security in seconds	28	24	20	18	16	12	10
Additional processing time per passenger with full body scan in seconds	24	24	24	24	24	24	24
Additional processing time per passenger for full body pat-down	180	180	180	180	180	180	180
Square foot area per 2009 security station (2)	830	830	830	830	830	830	830
Square foot area per full body scanner	90	90	90	90	90	90	90
Square foot area of pat-down area	40	40	40	40	40	40	40
Percentage of passengers also full body scanned	0.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of passengers with complete pat down	0.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Maximum queue time in minutes at 2009 security (TSA Goal)	10	10	10	10	10	10	10
Maximum queue time in minutes at full body scan	2	2	2	2	2	2	2
Maximum queue time in minutes a complete pat-down	2	2	2	2	2	2	2
Square foot area per person in security queue (per TSA)	9	9	9	9	9	9	9
Baggage Security Screening							
Percentage of passengers checking bags	50%	50%	50%	50%	50%	50%	50%
Average number of checked bags per passenger checking baggage	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Percentage of bags primary screened with ETD	100%	0%	0%	0%	0%	0%	0%
Percentage of bags primary screened with EDS system	0%	0%	0%	0%	0%	0%	0%
Percentage of bags primary screened with in-line EDS system	0%	100%	100%	100%	100%	100%	100%
ETD processing rate of bags per hour including opening 100% of bags	45	45	45	45	45	45	45
In-line EDS processing rate in bags per hour	225	225	225	225	225	225	225
Departure Lounges or Holdrooms							
Square foot area per passenger in departure lounge	15	15	15	15	15	15	15
Percentage of 1-20 seat aircraft in aircraft mix	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Percentage of 21-50 seat aircraft in aircraft mix	97.1%	68.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Percentage of 51-80 seat aircraft in aircraft mix	0.0%	28.6%	96.6%	62.6%	48.5%	49.6%	50.8%
Percentage of 81-110 seat aircraft in aircraft mix	0.0%	0.0%	0.0%	34.2%	47.4%	45.5%	44.1%
Percentage of 111-130 seat aircraft in aircraft mix	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Percentage of 131-160 seat aircraft in aircraft mix	2.9%	3.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Percentage of 161-180 seat aircraft in the aircraft mix	0.0%	0.0%	3.4%	3.6%	4.1%	4.9%	5.1%
Baggage Claim							
Time in minutes each flight remains on baggage claim device (average)	20	20	20	20	20	20	20

DATA AND ASSUMPTIONS – BASE CASE	2010	2015	2020	2025	2030	2040	2050
Minutes average passenger with meeter/greeters remains in baggage claim	15	15	15	15	15	15	15
Number of seats on largest aircraft served	150	150	175	175	175	175	175
Square foot area per passenger in baggage claim area	18	18	18	18	18	18	18
Average number of meeter/greeters per passenger	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Assumed length of baggage claim per bag	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Restrooms							
Percentage of PH passengers in peak 10 minutes	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH enplaning pax using restrooms airside	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of PH enplaning pax using restrooms landside	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH deplaning passengers using restrooms landside	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of PH deplaning passengers using airside restrooms	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Percentage of PH well-wishers using landside restrooms	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH meeter/greeters using landside restrooms	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Percentage of men passengers	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of women passengers	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Time in minutes per use for men	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Time in minutes per use for women	3	3	3	3	3	3	3
Square foot area per fixture	100	100	100	100	100	100	100
Meeter/Greeter/Well-wishers							
Number of well wishers per passenger	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Number of meeter/greeters per passenger	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Restaurant							
Percentage of Daily passengers using Restaurant	15.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Square feet per person in Restaurant	35	35	35	35	35	35	35
Rental Cars							
Number of rental car companies at Airport	5	5	5	5	5	5	7
Terminal Curbs							
Percentage of passengers using a private auto	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%
Percentage of private autos at enplanement curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of private autos at deplaning curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Average number of persons per private auto	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Average dwell time for private auto at the enplaning curb in minutes	3	3	3	3	3	3	3
Average dwell time for a private auto at the deplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a private auto in feet	25	25	25	25	25	25	25
Percentage of passengers using a taxi	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Percentage of taxis at enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Percentage of taxis at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per taxi	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Average dwell time for a taxi at the enplanement curb in minutes	3	3	3	3	3	3	3
Average dwell time for a taxi at the deplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a taxi in feet	25	25	25	25	25	25	25
Percentage of passengers using a rental car	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of rental cars at the enplaning curb	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Percentage of rental cars at the deplaning curb	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Average number of persons per rental car	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Average dwell time for rental car at the enplaning curb in minutes	4	4	4	4	4	4	4

DATA AND ASSUMPTIONS – BASE CASE	2010	2015	2020	2025	2030	2040	2050
Average dwell time for rental car at the deplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a rental car in feet	25	25	25	25	25	25	25
Percentage of passengers using a courtesy shuttle	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Percentage of courtesy shuttles at the enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Percentage of courtesy shuttles at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per courtesy shuttle	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Average dwell time for a courtesy shuttle at the enplaning curb in minutes	3	3	3	3	3	3	3
Average dwell time of a courtesy shuttle at the deplaning curb in minutes	2	2	2	2	2	2	2
Average length at the curb of a courtesy shuttle in feet	35	35	35	35	35	35	35

(1) Includes take-away belt, area behind counter, counter and corridor in front of counter
(2) TSA 2009 Standards for Layout SAT.LWBI.3.2.a (near square foot average area per position for layouts with three or more positions)

PH = Peak Hour

pax = passengers
well-wishers = terminal visitors accompanying departing passengers
meeter/greeters = terminal visitors waiting for and greeting arriving passengers

	Projections						
CHECK-IN COUNTERS - BASE CASE	2010	2015	2020	2025	2030	2040	2050
Peak Hour Enplanements	450	510	640	670	755	835	910
Peak Hour Aircraft Departures	9	9	9	9	10	11	12
Percentage of 20-minute peak passengers	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Ratio of additional demand in off -peak hours	1	1	1	1	1	1	1
Percentage of enplaning passengers using check-in	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of enplaning passengers using conventional check-in	50.0%	40.0%	30.0%	20.0%	5.0%	5.0%	5.0%
Percentage of enplaning passengers using kiosk check-in	50.0%	60.0%	70.0%	80.0%	95.0%	95.0%	95.0%
Peak 20-minute passengers using conventional check-in - Common Use	56	51	48	34	9	10	11
Peak 20-minute passengers using kiosk check-in - Common Use	56	77	112	134	179	198	216
Maximum queuing time in minutes	10	10	10	10	10	10	10
Average processing time per passenger at check-in counter in seconds	150	150	150	150	150	150	150
Average processing time per passenger at check-in kiosk in seconds	90	90	90	90	90	90	90
Total number of airlines operating at airport	6	6	6	6	6	6	6
Length per check-in counter or kiosk including 1/2 bag well in lineal feet	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Depth per check-in counter or kiosk in lineal feet (1)	15	15	15	15	15	15	15
Conventional Check-in Counters - Common-Use							
Total number of check-in positions	8	7	7	5	1	1	2
Length of check-in counters in lineal feet	34	31	29	20	6	6	7
Total check-in counter square foot area	509	461	434	303	85	94	103
Check-in Kiosks - Common-Use							
Total number of check-in kiosks	5	6	9	11	15	16	18
Length in lineal feet of check-in kiosks	20	28	41	48	65	72	78
Total check-in kiosk square foot area	305	415	608	727	973	1,076	1,173
Conventional Check-in Counters - Exclusive Use							
Peak 20-minute passengers using conventional check-in	56	51	48	34	9	10	11
Total Number of Check-in Counter positions	8	7	7	5	1	1	2
Length in Lineal Feet	34	31	29	20	6	6	7
Total Check-in Counter square foot Area	510	461	434	303	85	94	103
Check-in Kiosks - Exclusive Use							
Peak 20-minute passengers using kiosks check-in	56	77	112	134	179	198	216
Total Number of kiosk positions	5	6	9	11	15	16	18
Length in lineal feet	20	28	41	48	65	72	78
Total Kiosk square foot area	305	415	608	727	973	1,076	1,173
Total square foot area of conventional and kiosk check-in positions - Common Use	810	880	1,040	1,030	1,060	1,170	1,280
Total square foot area of conventional and kiosk check-in positions - Exclusive Use	820	880	1,040	1,030	1,060	1,170	1,280

(1) Includes area behind counter, counter and corridor in front of counter

CHECK-IN QUEUE BASE CASE	Projections 2010	2015	2020	2025	2030	2040	2050
Peak Hour Enplanements	450	510	640	670	755	835	910
Number of airlines operating at the airport	6	6	6	6	6	6	6
Peak Hour Operations	18	18	18	18	20	22	24
Additional demand in off-peak hours	1	1	1	1	1	1	1
Percentage of passengers using check-in	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum queuing time in minutes	10	10	10	10	10	10	10
Average processing time in seconds per passenger at counter	150	150	150	150	150	150	150
Average processing time in seconds per passenger at kiosk	90	90	90	90	90	90	90
Square foot area per passenger in check-in queue	14	14	14	14	14	14	14
Common-Use							
Peak 20-minute passengers using conventional check-in	56	51	48	34	9	10	11
Number of check-in counters	8	7	7	5	1	1	2
Maximum number of passengers in counter queue	31	28	26	18	5	6	6
Square foot area of check-in counter queue	433	393	370	258	73	80	88
Peak 20-minute passengers using kiosk check-in	56	77	112	134	179	198	216
Number of kiosks	5	6	9	11	15	16	18
Maximum number of passengers in kiosk queue	31	42	62	74	99	109	119
Square foot area of kiosk queue	31	42	62	74	99	109	119
Total square foot area of check-in queues - Common Use	460	430	430	330	170	190	210
Exclusive-Use							
Peak 20-minute passengers conventional check-in	56	51	48	34	9	10	11
Number of check-in counters	8	7	7	5	1	1	2
Maximum number of passengers in counter queue	31	28	26	18	5	6	6
Square foot area of check-in counter queue	430	390	370	260	70	80	90
Peak 20-minute passengers using kiosk check-in	56	77	112	134	179	198	216
Number of kiosks	5	6	9	11	15	16	18
Maximum number of passengers in kiosk queue	31	40	60	70	100	110	120
Square foot area of kiosk queue	430	560	840	980	1,400	1,540	1,680
Total square foot area of check-in queues - Exclusive Use	860	950	1,210	1,240	1,470	1,620	1,770

BAGGAGE MAKE-UP - BASE CASE	Projections 2010	2015	2020	2025	2030	2040	2050
No. Equivelent aircraft Gates		5.0	5.0	5.0	6.2	7.4	7.9
Depart per Gate Peak 2-4 Hr Period		1.4	1.4	1.3	1.3	1.3	1.6
Staged Carts per Departure		2.0	2.0	2.0	2.0	2.5	2.5
Total Peak Staged Carts		14	14	13	16	24	32
Perpindicular Parked Carts (25%)		4	4	3	4	6	8
Parallel Parked Carts (75%)		11	11	10	12	18	24
Perpindicular Cart Frontage (8') LF		28	28	26	32	48	63
Parallel Cart Frontage (15') LF		158	158	146	181	271	356
Number of Airlines		6	7	7	7	7	7
Number of Carousels (144')		1.3	1.3	1.2	1.5	2.2	2.9
Effective Number of Carousels		2.0	2.0	2.0	2.0	3.0	3.0
Carousel Area , incl Staging SF		7,600	7,600	7,600	7,600	11,400	11,400
Carts Maneuvering / Circulation SF		7,200	7,200	7,200	7,200	10,800	10,800
Total Bag Make-Up Area SF		14,800	14,800	14,800	14,800	22,200	22,200

SECURITY - BASE CASE	2010	2015	2020	2025	2030	2040	2050
	Projections						
Security Screening Checkpoint							
Security Screening Checkpoint							
Peak Hour Enplanements	450	510	640	670	755	855	910
Peak 10-minute enplanements (.20)	90	102	128	134	151	171	182
Average processing rate (secs.)	28	24	20	18	16	12	10
Number of lanes needed	4	4	4	4	4	3	3
Space requirement per lane (SF)	830	830	830	830	830	830	830
Total square foot of lane space	3,320	3,320	3,320	3,320	3,320	2,490	2,490
2009 Security Screening Checkpoint Queue							
Maximum security screening checkpoint queue time in minutes	10	10	10	10	10	10	10
Maximum number passengers queuing	100	133	167	167	200	200	233
Square foot area per passenger in queue	9	9	9	9	9	9	9
Total square foot area of 2009 security queuing	900	1,200	1,500	1,500	1,800	1,800	2,100
Full Body Scan Screening							
Percentage of passengers also full body scanned	0.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Additional processing time per passenger with full body scan in seconds	24	24	24	24	24	24	24
Number of full body scanners required	0	1	2	2	2	2	2
Square foot area per full body scanner	90	90	90	90	90	90	90
Remote threat analysis screening in square feet	0	40	80	80	80	80	80
Staff support space square foot area	0	80	160	160	160	160	160
Additional required area for full body scanner(s)	0	210	420	420	420	420	420
Full Body Scan Queue							
Maximum queue time in minutes	2	2	2	2	2	2	2
Maximum number of passengers in queue	0	5	10	10	10	10	10
Square foot area per passenger in queue	9	9	9	9	9	9	9
Square foot area of full body scan queue	0	45	90	90	90	90	90
Complete Pat-Down Screening							
Percentage of passengers with complete pat down	0.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Additional processing time per passenger for full body pat-down	180	180	180	180	180	180	180
Number of full body pat-down areas	0	1	1	1	1	1	1
Square foot area of pat-down area	0	0	40	40	40	40	40
Additional area required for complete pat-down	0	40	40	40	40	40	40
Complete Pat Down Screening Queue							
Maximum queue time in minutes	2	2	2	2	2	2	2
Maximum number of passengers in queue	0	1	1	1	1	1	1
Square foot area per passenger in queue	9	9	9	9	9	9	9
Square foot area of complete pat-down queue	0	10	10	10	10	10	10
Post Security							
Square foot area post security	600	800	1,000	1,000	1,200	1,200	1,400

SECURITY - BASE CASE	2010	2015	2020	2025	2030	2040	2050
	Projections						
Deplaning Corridor							
Peak 20-minute deplaning passengers	255	289	363	380	428	473	516
Minimum width of deplaning corridor in lineal feet	6	6	6	6	6	6	6
Length of deplaning corridor in lineal feet	49	49	49	49	49	49	49
Square foot area of deplaning corridor	293	293	293	293	293	293	293
Total Square Foot Area of Security Screening Checkpoint	**4,283**	**5,917**	**7,502**	**7,502**	**8,832**	**8,832**	**10,162**
Checked Baggage Screening							
Peak hour enplanements	450	510	640	670	755	935	910
Percentage enplanement checking baggage	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Average checked bags per passenger checking bags	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Peak hour total checked bags	293	332	416	436	491	556	592
Area per ETD screening position	120	120	120	120	120	120	120
Percentage of bags primary screened with ETD	100%	0%	0%	0%	0%	0%	0%
ETD processing rate of bags per hour including opening 100% of bags	45	45	45	45	45	45	45
Number of ETD primary screening stations required	8	0	0	0	0	0	0
Total square foot area of primary ETD screening	960	0	0	0	0	0	0
In-Line Processing Rate		225	225	225	225	225	225
Actual EDS Stations		2	2	2	2	3	3
Area Per EDS Station SF		650	650	650	650	650	650
Total Area EDS Stations SF		1,300	1,300	1,300	1,300	1,950	1,950
Conveyor Control Room SF		800	800	800	800	1199	1199
Conveyor Storage and Maint. SF		130	130	130	130	195	195
Baggage Encoding Station SF		3,600	3,600	3,600	3,600	3,600	3,600
EDS Storage and Maint. SF		400	400	400	400	400	400
Threat Resolution Room SF		144	144	144	144	216	216
EDS Staff Support SF		300	300	300	300	450	450
Qty Secondary Screening Stations		4	4	4	4	6	6
Area per Secondary Screening Station	120	120	120	120	120	120	120
Total Area Secondary Screening SF		480	480	480	480	720	720
Total Area In-Line EDS System SF		7,154	7,154	7,154	7,154	8,730	8,730
Conveyor Space Factor SF		7,154	7,154	7,154	7,154	8,730	8,730
Total Area Bag Screening SF		**14,307**	**14,307**	**14,307**	**14,307**	**17,461**	**17,461**

DEPARTURE LOUNGES/HOLDROOMS - BASE CASE	Projections 2010	2015	2020	2025	2030	2040	2050
Annual Enplanements	617,000	698,000	791,000	893,000	1,012,000	1,300,000	1,669,000
Peak Hour Enplanements	450	510	640	670	755	855	910
No. of Gates	10	10	10	10	11	12	13
Largest Regular Aircraft (seats)	150	150	175	175	175	175	175
Percent PAX Accommodated / Gate	85%	85%	85%	85%	85%	85%	85%
Passengers Accommodated	127.5	127.5	148.75	148.75	148.75	148.75	148.75
Holdroom Seating Area	22,950	22,950	26,775	26,775	29,453	32,130	34,808
Deplaning Corridor	1,800	1,800	1,800	1,800	1,980	2,160	2,340
Airline Operational Space	1,200	1,200	1,200	1,200	1,320	1,440	1,560
Total Holdroom Area	25,950	25,950	29,780	29,780	32,750	35,730	38,710

BAGGAGE CLAIM - BASE CASE	Projections 2010	2015	2020	2025	2030	2040	2050
Seats on Largest Aircraft	150	150	175	175	175	175	175
Checked Bags per Aircraft	98	98	114	114	114	114	114
Ideal Frontage per Bag LF	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Claim Frontage per Aircraft LF	117	117	137	137	137	137	137
No. Peak Hour Arriving Aircraft	9	9	9	10	10	11	12
Avg. Minutes Occupying Carousel	20	20	20	20	20	20	20
Number Carousels	2	3	3	3	3	4	4
Sloped Plate Carousel Frontage LF	134	134	134	134	134	134	134
Area per Carousel incl Passengers SF	3,600	3,600	3,600	3,600	3,600	3,600	3,600
Total Bag Claim Area SF	**7,200**	**10,800**	**10,800**	**10,800**	**10,800**	**14,400**	**14,400**

Customs and Border Protection (CBP) Federal Inspection Services (FIS) Base Case	Projections 2010	2015	2020	2025	2030	2040	2050
Peak Hour International Deplaning Passengers	200	200	200	200	200	200	200
Peak Hour In-transit passengers							
Sterile Corridor System							
Number of gates	1	1	1	1	1	1	1
Square Feet of Outbound Interview Room	80	80	80	80	80	80	80
Number of VIP lounges	0	0	0	0	0	0	0
VIP lounges in square feet	0	0	0	0	0	0	0
Number of in-transit lounges	0	0	0	0	0	0	0
In-transit lounge area in square feet	0	0	0	0	0	0	0
In-transit lounge office in square feet	0	0	0	0	0	0	0
Additional In-transit lounge standards in square feet	0	0	0	0	0	0	0
Sterile Corridor Area in square feet	0	0	0	0	0	0	0
Subtotal Sterile Corridor System	80	80	80	80	80	80	80
Primary Processing							
Processing rate per passenger in minutes	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Number of positions required	3	3	3	3	3	3	3
Number of Piggy-back Counters	2	2	2	2	2	2	2
Area per Piggy-back Counter with circulation and queue in square feet	1,380	1,380	1,380	1,380	1,380	1,380	1,380
Total area of Piggy-back with circulation in square feet	2,300	2,300	2,300	2,300	2,300	2,300	2,300
Number of CBP Forms Counters	1	1	1	1	1	1	1
Area per CBP Forms Counter in square feet	24	24	24	24	24	24	24
Area of all CBP Forms Counters in square feet	24	24	24	24	24	24	24
Area per CBP Coordination Center in square feet	255	255	255	255	255	255	255
Number of CBP Coordination Centers required	1	1	1	1	1	1	1
Total area for CBP Coordination Centers in square feet	255	255	255	255	255	255	255
Area per Counter Terrorism Response Suite in square feet	475	476	477	478	479	480	481
Number of public restroom fixtures required (local codes may supersede)	2	2	2	2	2	2	2
Area required per fixture in square feet	180	180	180	180	180	180	180
Total restroom area required in square feet	360	360	360	360	360	360	360
Subtotal Primary Inspection	2,940	2,940	2,940	2,940	2,940	2,940	2,940
Secondary Processing							
Rover Coordination Center (for multi-level facilities only) in square feet	225	225	225	225	225	225	225
Area required per waiting passenger in square feet	25	25	25	25	25	25	25
Number of passengers queuing	10	10	10	10	10	10	10
Total area of passenger queue in square feet	250	250	250	250	250	250	250
Triage Podium (single and double) in square feet	180	180	180	180	180	180	180
Triage Podium (quad) in square feet	0	0	0	0	0	0	0
Number of referral passengers waiting	5	5	5	5	5	5	5
Area per passenger in square feet	25	25	25	25	25	25	25
Total referral passenger waiting area in square feet	125	125	125	125	125	125	125
Number of Secondary Baggage Exam podiums and baggage belts	0	0	0	0	0	0	0

Customs and Border Protection (CBP) Federal Inspection Services (FIS) Base Case	Projections 2010	2015	2020	2025	2030	2040	2050
Minimum processing area per position in square feet	756	756	756	756	756	756	756
Total area Secondary Baggage Exam and baggage belts in square feet	0	0	0	0	0	0	0
Number of Secondary Baggage X-ray Processing workstations	1	1	1	1	1	1	1
Minimum area per Secondary Baggage X-ray Processing Workstation in square feet	1,476	1,476	1,476	1,476	1,476	1,476	1,476
Total Area for Secondary Baggage X-ray Processing Workstations in square feet	1,476	1,476	1,476	1,476	1,476	1,476	1,476
Cashier's Office in square feet	0	0	0	0	0	0	0
Number of CBP Agricultural Laboratory and Disposal Rooms (varies by CBP)	1	1	1	1	1	1	1
Minimum area per Agricultural Laboratory and Disposal Room in square feet	150	150	150	150	150	150	150
Total minimum area of Agricultural Laboratories and Disposal Rooms in square feet	150	150	150	150	150	150	150
CBP/APHIS VS Bird Quarantine and Bird Hold Facilities (varies by CBP) in square feet							
Number of public restroom fixtures required (local codes may supersede)	2	2	2	2	2	2	2
Area required per fixture in square feet	180	180	180	180	180	180	180
Total restroom area required in square feet	360	360	360	360	360	360	360
Number of Interview Rooms	1	1	1	1	1	1	1
Area per Interview Room in square feet	80	80	80	80	80	80	80
Total area of all Interview Rooms in square feet	80	80	80	80	80	80	80
Number of Search Rooms	1	1	1	1	1	1	1
Area per Search Room in square feet	80	80	80	80	80	80	80
Total area of all Search Rooms in square feet	80	80	80	80	80	80	80
Area of Male Detention Room with toilet and fixtures in square feet	115	115	115	115	115	115	115
Area of Female Detention Room with toilet and fixtures in square feet	115	115	115	115	115	115	115
Area of Juvenile Detention Room with toilet and fixtures in square feet	115	115	115	115	115	115	115
Area of food preparation and storage in square feet	0	0	0	0	0	0	0
Expedited/Voluntary Removal Room Male (as required by CBP) in square feet	0	0	0	0	0	0	0
Expedited/Voluntary Removal Room Female (as required by CBP) in square feet	0	0	0	0	0	0	0
Subtotal Secondary Processing	3,271	3,271	3,271	3,271	3,271	3,271	3,271
Secondary Operations and Support							
Area of ADIT Room in square feet	110	110	110	110	110	110	110
Area of JABS/Identification Room in square feet	0	0	0	0	0	0	0
Area of Fraudulent Document Analysis Room in square feet	0	0	0	0	0	0	0
Area of Secondary Supervisor's Office in square feet	150	150	150	150	150	150	150
Prosecution Officer's Office In square feet	0	0	0	0	0	0	0
Number of detainee baggage storage rooms	1	1	1	1	1	1	1
Total area of detainee baggage storage rooms in square feet	50	50	50	50	50	50	50
Number of canine kennels (varies by CBP)							
Area per canine kennel in square feet	100	100	100	100	100	100	100

Customs and Border Protection (CBP) Federal Inspection Services (FIS) Base Case	Projections 2010	2015	2020	2025	2030	2040	2050
Total area of canine kennels in square feet	0	0	0	0	0	0	0
Canine unit secure aid storage in square feet	0	0	0	0	0	0	0
Canine unit general training aid storage in square feet	0	0	0	0	0	0	0
Canine unit general storage in square feet	50	50	50	50	50	50	50
Area for Passenger Service Representative in square feet	0	0	0	0	0	0	0
Number of agents offices: US ICE (ICE) (varies)							
Area per agent's office in square feet	150	150	150	150	150	150	150
Total area for ICE agent's office in square feet	0	0	0	0	0	0	0
Subtotal Secondary Operations and Support	360	360	360	360	360	360	360
Exit Podium							
Number of Single Exit Podiums	1	1	1	1	1	1	1
Exit Podium (single, single aisle) in square feet	180	180	180	180	180	180	180
Number of Double Exit Podiums	0	0	0	0	0	0	0
Exit Podium (double, double aisle) in square feet	0	0	0	0	0	0	0
Subtotal Exit Podiums	180	180	180	180	180	180	180
Subtotal Secondary Processing	3,811	3,811	3,811	3,811	3,811	3,811	3,811
CBP Administration							
CBP officer/staff area in square feet							
Port Director's office in square feet	225	225	225	225	225	225	225
Port Director's conference room in square feet	0	0	0	0	0	0	0
Port Director's secretary/reception area in square feet	0	0	0	0	0	0	0
Assistant Port Director's office in square feet	0	0	0	0	0	0	0
Chief Officer's office in square feet	175	175	175	175	175	175	175
Number of Supervisor's offices	1	1	1	1	1	1	1
Area per Supervisor's office in square feet	150	150	150	150	150	150	150
Total area of Supervisor's offices in square feet	150	150	150	150	150	150	150
Intelligence office in square feet	0	0	0	0	0	0	0
Number of general office workstations "C"	2	2	2	2	2	2	2
Area per general office workstation in square feet	64	64	64	64	64	64	64
Total area per general office workstation	128	128	128	128	128	128	128
Number of Anti-terrorism Contraband Enforcement Team modules "B"	-	-	-	-	-	-	-
Area per module "B" (4 @64 sf)in square feet	256	256	256	256	256	256	256
Anti-Terrorism Contraband Enforcement Team Office B in square feet	0	0	0	0	0	0	0
Number of Passenger Analysis Unit (PAU) offices	-	-	-	-	-	-	-
Area per PAU office (4 @ 64 sf) in square feet	256	256	256	256	256	256	256
Passenger Analysis Unit office (4 @ 64 sf) in square feet	0	0	0	0	0	0	0
Outbound Team office (4 @ 64 sf) in square feet	-	-	-	-	-	-	-
Canine Unit office (4 @ 64 sf) in square feet	-	-	-	-	-	-	-
Subtotal CBP Administration Officers/Staff Area	678	678	678	678	678	678	678
CBP Support Spaces							
Airport reception in square feet	0	0	0	0	0	0	0

Customs and Border Protection (CBP) Federal Inspection Services (FIS) Base Case	Projections 2010	2015	2020	2025	2030	2040	2050
Public Reception/Entrance & Clearance (E&C) Office (varies, See CBP) in square feet							
Airport Identification (I.D. Badging and secure file) room in square feet	0	0	0	0	0	0	0
Conference training room in square feet	0	0	0	0	0	0	0
Conference training equipment storage in square feet	0	0	0	0	0	0	0
Mail/copier/shredder room in square feet	0	0	0	0	0	0	0
Weapons storage room in square feet	0	0	0	0	0	0	0
Communications room (telephone and radio) in square feet	60	60	60	60	60	60	60
Computer room in square feet	80	80	80	80	80	80	80
General storage/file room in square feet	150	150	150	150	150	150	150
Secure storage room(s) in square feet	60	60	60	60	60	60	60
Break room in square feet	275	275	275	275	275	275	275
Number of officers	5	5	5	5	5	5	5
Male and female staff toilets/showers/lockers minimum (varies) in square feet	220	220	220	220	220	220	220
Union office in square feet	0	0	0	0	0	0	0
Physical training room (varies) in square feet							
US-PASS/NEXUS Enrollment Center and storage (as determined by CBP) in square feet							
Subtotal CBP Support Spaces	845	845	845	845	845	845	845
Subtotal CBP Administration	1,523	1,523	1,523	1,523	1,523	1,523	1,523
Preclearance Facilities							
CBP Coordination Center in square feet	475	475	475	475	475	475	475
Counter Terrorism Response Suite (per code) in square feet							
Rover Coordination Center (for multi-level facilities only) in square feet	225	225	225	225	225	225	225
Number of passenger referrals (confirm with CBP)	10	10	10	10	10	10	10
Area per passenger in secondary queue in square feet	25	25	25	25	25	25	25
Total area of secondary queue in square feet	250	250	250	250	250	250	250
Triage Podium (single and double) in square feet	180	180	180	180	180	180	180
Triage Podium (quad) in square feet	0	0	0	0	0	0	0
Number of Secondary Baggage Exam Podiums and baggage belts	1	1	1	1	1	1	1
Minimum processing area per position in square feet	1476	1476	1476	1476	1476	1476	1476
Total area Secondary Baggage Exam and baggage belts in square feet	1,476	1,476	1,476	1,476	1,476	1,476	1,476
Cashier's Office in square feet	0	0	0	0	0	0	0
Number of CBP Agricultural Laboratory and disposal rooms	1	1	1	1	1	1	1
Area of CBP Agricultural Laboratory and disposal rooms in square feet	150	150	150	150	150	150	150
Total area of CBP Agricultural Laboratory and disposal rooms in square feet	150	150	150	150	150	150	150
Number of Interview Rooms	1	1	1	1	1	1	1
Area per Interview Room in square feet	80	80	80	80	80	80	80
Total Area of Interview Rooms	80	80	80	80	80	80	80

Customs and Border Protection (CBP) Federal Inspection Services (FIS) Base Case	Projections 2010	2015	2020	2025	2030	2040	2050
Number of Search Rooms	1	1	1	1	1	1	1
Area per Search Room in square feet	80	80	80	80	80	80	80
Total Area of Search Rooms	80	80	80	80	80	80	80
ADIT Room in square feet	110	110	110	110	110	110	110
JABS/Identification Room in square feet	0	0	0	0	0	0	0
Fraudulent Document Analysis room in square feet	0	0	0	0	0	0	0
Secondary Supervisor's office in square feet	150	150	150	150	150	150	150
Prosecution Officer's office in square feet	0	0	0	0	0	0	0
Exit Podium (single, single aisle) in square feet	180	180	180	180	180	180	180
Number of Exit Podiums (double, double aisle)	0	0	0	0	0	0	0
Area per Exit Podium (double, double aisle) in square feet	315	315	315	315	315	315	315
Exit Podium (double, double aisle) in square feet	0	0	0	0	0	0	0
Chief Officer's office in square feet	175	175	175	175	175	175	175
Number of Supervisors' offices	1	1	1	1	1	1	1
Area per Supervisors' office in square feet	150	150	150	150	150	150	150
Total area of Supervisors' offices in square feet	150	150	150	150	150	150	150
Number of general offices space "C"	2	2	2	2	2	2	2
Area per office space "C" in square feet	64	64	64	64	64	64	64
Total area of general office space "C" in square feet	128	128	128	128	128	128	128
Conference/training room in square feet	0	0	0	0	0	0	0
Mail/copier/shredder room in square feet	0	0	0	0	0	0	0
Communications room (telephone and radio) in square feet	60	60	60	60	60	60	60
Computer room in square feet	80	80	80	80	80	80	80
General storage/file room in square feet	150	150	150	150	150	150	150
Secure storage rooms in square feet	60	60	60	60	60	60	60
Break room in square feet	275	275	275	275	275	275	275
Number of officers	5	5	5	5	5	5	5
Male and female staff toilets/showers/lockers in square feet	220	220	220	220	220	220	220
Number of Attorney Client Interview rooms (Canada Only) in square feet	0	0	0	0	0	0	0
Area per Attorney Client Interview rooms (Canada Only) in square feet	80	80	80	80	80	80	80
Attorney Client Interview room (Canada Only) in square feet	0	0	0	0	0	0	0
Number of public restroom fixtures required (local codes may supersede)	2	2	2	2	2	2	2
Area required per fixture in square feet	180	180	180	180	180	180	180
Total restroom area required in square feet	360	360	360	360	360	360	360
Subtotal Preclearance Facilities	0	0	0	0	0	0	0
Circulation and Building Services							
Circulation in square feet	2,757	2,757	2,757	2,757	2,757	2,757	2,757
Mechanical space in square feet	1,667	1,667	1,667	1,667	1,667	1,667	1,667
Building structure in square feet	639	639	639	639	639	639	639
Subtotal Circulation and Building Services	5,062	5,062	5,062	5,062	5,062	5,062	5,062
Total Area Air Carrier Facilities	12,738	12,738	12,738	12,738	12,738	12,738	12,738

Customs and Border Protection (CBP) Federal Inspection Services (FIS) Base Case	Projections 2010	2015	2020	2025	2030	2040	2050
Minimum number of parking spaces for official vehicles	2	2	2	2	2	2	2
Minimum number of parking spaces for employee vehicles	11	11	11	11	11	11	11

Customs and Border Protection (CBP) Federal Inspection Services (FIS) Base Case	Projections 2010	2015	2020	2025	2030	2040	2050

ADIT = Alien Documentation Identification and Telecommunication
APHIS = Animal and Plant Health Inspection Service
AQI = Agricultural Quarantine Inspection
CBP = Customs and Border Protection
FIS = Federal Inspection Services
GAF = General Aviation Facilities
ICE = Immigration and Customs Enforcement
JABS = Joint Agency Booking System (now referred to as the CBP Coordination Center
PAU = Passenger Analysis Unit
PASS/NEXUS = a joint venture between the Canada Border Services (CBSA) and the CBP, it is designed to expedite the border clearance process for low risk, pre-approved travelers into Canada and the U.S.
VIP = Very Important Persons
VS = Veterinary Services

RESTROOMS - BASE CASE	2010	2015	2020	2025	2030	2040	2050
	Projections						
Peak Hour Enplaning Passengers	450	510	640	670	755	835	910
Peak Hour Deplaning Passengers	383	434	544	570	642	710	774
Number of well-wishers per passenger	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Number of meeter/greeters per passengers	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Percentage of men passengers and visitors	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of women passengers and visitors	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Minutes per restroom use for men	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minutes per restroom use for women	3	3	3	3	3	3	3
Airside Restrooms							
Percentage of PH enplaning passengers in peak 10 minutes	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH enplaning pax using airside restrooms	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of PH deplaning passengers using airside restrooms	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Number of fixtures for men	5	5	7	7	8	9	10
Number of fixtures for women	9	11	13	14	16	17	19
Number of restrooms	3	3	4	4	5	5	6
Square foot area per fixture	100	100	100	100	100	100	100
Total airside toilet square foot area for men	482	546	685	717	808	894	974
Total airside toilet square foot area for women	939	1,065	1,336	1,399	1,576	1,743	1,900
Family room square foot area	568	644	808	846	954	1,055	1,149
Janitorial square foot area	341	387	485	508	572	633	690
Total airside restrooms	2,330	2,641	3,314	3,470	3,910	4,324	4,713
Landside Restrooms							
Percentage of PH Enplaning passengers using landside restrooms	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH Deplaning passengers using landside restrooms	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of passengers in peak 10 minutes	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH well-wishers using landside restrooms	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH meeter/greeters using landside restrooms	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Number of fixtures required for men	5	6	7	8	8	9	10
Number of fixtures required for women	10	11	14	15	17	19	20
Number of restrooms	3	3	4	5	5	6	6
Square foot area per fixture	100	100	100	100	100	100	100
Total landside toilet square foot area for men	500	600	700	800	800	900	1,000
Total landside toilet square foot area for women	1,000	1,100	1,400	1,500	1,700	1,900	2,000
Family room square foot area	600	680	840	920	1,000	1,120	1,200
Janitorial square foot area	360	408	504	552	600	672	720
Total landside restrooms	2,460	2,788	3,444	3,772	4,100	4,592	4,920

RESTROOMS – BASE CASE	2010	2015	2020	2025	2030	2040	2050
	Projections						
Total Restrooms							
Total airside restroom square foot area	2,330	2,641	3,314	3,470	3,910	4,324	4,713
Total landside restroom square foot area	2,460	2,788	3,444	3,772	4,100	4,592	4,920
Total restroom square foot area	4,790	5,429	6,758	7,242	8,010	8,916	9,633

PH = Peak Hour
well-wishers = terminal visitors accompanying departing passengers
meeter/greeters = terminal visitors waiting for and greeting arriving passengers

FOOD & BEVERAGE - BASE CASE	Projections 2010	2015	2020	2025	2030	2040	2050
Peak Hour Passengers	450	510	640	670	755	835	910
Percentage of Persons Using Restaurant	15%	20%	20%	20%	20%	20%	20%
Number of Peak Hour Passengers in Restaurant	68	102	128	134	151	167	182
Number of Well-wishers per Passenger	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Number of Employees using Restaurant in Peak Hour	4	7	8	9	10	11	12
Total Peak Hour Persons in Restaurant	92	139	175	183	206	228	248
Square Feet per Person in Restaurant	35	35	35	35	35	35	35
Square Feet Required for Restaurant	3,225	4,873	6,115	6,402	7,214	7,978	8,695
Square Feet Required for the Bar	967	1,462	1,835	1,921	2,164	2,394	2,609
Number of Restaurant/Bar Locations	3	3	3	3	3	3	3
Square Feet Required for Support & Storage Space	2,515	3,801	4,770	4,993	5,627	6,223	6,782
Total Area for Food and Beverage	6,708	10,136	12,720	13,316	15,005	16,595	18,086

CURBS - BASE CASE	Projections 2010	2015	2020	2025	2030	2040	2050
Enplanement Curb							
Peak 20-minute Enplanements	225	255	320	335	378	418	455
Number of well wishers per passenger	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Number of peak 20-minute passengers and well-wishers	293	332	416	436	491	543	592
Percentage of passengers using a private auto	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%
Percentage of private autos at enplanement curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Average number of persons per private auto	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Number of private autos at the curb in the peak 20-minutes	24	27	33	35	39	44	48
Average dwell time for private auto at the enplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a private auto in feet	25	25	25	25	25	25	25
Total length of curb required for private autos in the peak 20-minutes	88	100	125	131	148	164	178
Percentage of passengers using a taxi	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Percentage of taxis at enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per taxi	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Number of taxis at the enplaning curb in the peak 20-minutes	12	13	17	17	20	22	24
Average dwell time for a taxi at the enplanement curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a taxi in feet	25	25	25	25	25	25	25
Total length of curb required for taxis in the peak 20-minutes	44	50	62	65	74	81	89
Percentage of passengers using a rental car	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of rental cars at the enplaning curb	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Average number of persons per rental car	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Number of rental cars at the enplaning curb in the peak 20-minutes	0.5	0.6	0.7	0.7	0.8	0.9	1.0
Average dwell time for rental car at the enplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a rental car in feet	25	25	25	25	25	25	25
Total length of curb required for rental cars in the peak 20-minutes	25	25	25	25	25	25	25
Percentage of passengers using a courtesy shuttle	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Percentage of courtesy shuttles at the enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per courtesy shuttle	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Number of courtesy shuttles at the curb during the peak 20-minutes	5	5	6	7	8	8	9
Average dwell time for a courtesy shuttle at the enplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a courtesy shuttle in feet	35	35	35	35	35	35	35
Total length of curb requires for courtesy shuttles in the peak 20-minutes	35	35	35	35	40	44	48

CURBS - BASE CASE	Projections 2010	2015	2020	2025	2030	2040	2050
Number of courtesy shuttles at the curb during the peak 20-minutes	5	5	6	7	8	8	9
Average dwell time for a courtesy shuttle at the enplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a courtesy shuttle in feet	35	35	35	35	35	35	35
Total length of curb requires for courtesy shuttles in the peak 20-minutes	35	35	35	35	40	44	48
Additional demand on off-peak hours	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Total length of the enplanement curb	211	231	273	283	315	345	374
Deplaning Curb							
Peak 20-minute Deplanements	255	289	363	380	428	473	516
Number of meeter/greeters per passenger	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Number of peak 20-minute passengers and meeter/greeters	459	520	653	684	770	852	929
Percentage of passengers using a private auto	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%
Percentage of private autos at deplaning curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Average number of persons per private auto	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Average number of private autos at the curb in the peak 20-minutes	37	42	53	55	62	69	75
Average dwell time for a private auto at the deplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a private auto in feet	25	25	25	25	25	25	25
Total length of curb required for private autos in the peak 20-minutes in feet	185	209	263	275	310	343	373
Percentage of passengers using a taxi	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Percentage of taxis at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per taxi	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Average number of taxis at the deplaning curb in the peak 20-minutes	18	21	26	27	31	34	37
Average dwell time for a taxi at the deplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a taxi in feet	25	25	25	25	25	25	25
Total length of curb required for taxis at the deplaning curb in feet	69	78	98	103	116	128	139
Percentage of passengers using a rental car	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of rental cars at the deplaning curb	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Average number of persons per rental car	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Average number of rental cars at the curb in the peak 20-minutes	0.4	0.4	0.5	0.6	0.6	0.7	0.8
Average dwell time for rental car at the deplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a rental car in feet	25	25	25	25	25	25	25
Total curb length in feet required for rental cars in the peak 20-minutes	25	25	25	25	25	25	25

CURBS - BASE CASE	Projections 2010	2015	2020	2025	2030	2040	2050
Percentage of passengers using a courtesy shuttle	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Percentage of courtesy shuttles at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per courtesy shuttle	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Average number of courtesy shuttles at the curb in the peak 20-minutes	7	8	10	11	12	13	14
Average dwell time of a courtesy shuttle at the deplaning curb in minutes	2	2	2	2	2	2	2
Average length at the curb of a courtesy shuttle in feet	35	35	35	35	35	35	35
Total curb length required in feet for courtesy shuttles in peak 20-minutes	35	35	35	37	41	46	50
Additional demand in off-peak hours	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Total length of deplaning curb	345	382	463	483	541	596	647
Total Base Case Curb Length	556	613	736	766	856	941	1,020

	Existing	2010	2015	2020	2025	2030	2040	2050
Annual Enplanements	617,000	617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Peak Hour Enplanements	450	450	810	940	970	1,055	1,435	1,660

LOW FARE CARRIER SUMMARY		**Projections**						
Terminal Functional Areas	**Existing**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2050**
Airline								
Number of check-in counters - exclusive use	36	8	11	10	7	2	2	3
Number of check-in kiosks - exclusive use	20	5	10	14	16	21	28	33
Check-in counter and kiosk length in lineal feet - exclusive use	228	54	93	102	99	99	134	155
Number of departure lounges or holdrooms	13	10	12	12	13	13	16	18
Number of slope-plate baggage claim devices*	2	2	3	4	4	4	5	6
Lineal feet of baggage claim frontage	250	268	402	536	536	536	670	804
Total square foot area of exclusive use check-in counters and kiosks	1,936	820	1,390	1,530	1,490	1,480	2,010	2,330
Square foot area of check-in queue - exclusive use	1,891	860	1,600	1,800	1,910	2,060	2,800	2,800
Airline office square foot area	4,951	1,100	1,900	2,000	2,000	2,000	2,700	3,100
Baggage make-up square foot area	9,000	14,800	14,800	14,800	22,200	29,600	29,600	37,000
Total square foot area of departure lounges or holdrooms	33,094	25,950	31,140	35,730	38,710	38,710	47,640	53,600
Inbound baggage input square foot area	4,152	3,200	4,800	6,400	6,400	6,400	8,000	9,600
Baggage claim retrieval square foot area	8,491	7,200	10,800	14,400	14,400	14,400	18,000	21,600
Square feet of baggage service offices	895	840	980	980	980	980	980	980
Subtotal Square Feet of Airline Functional Areas	64,410	54,770	67,410	77,640	88,090	95,630	111,730	131,010
Security								
Number of 2009 TSA security screening check point position(s)	4	3	6	7	7	8	11	12
Number of full body scanners	0	1	2	2	2	3	4	4
Number of complete body pat down areas	0	1	1	1	1	2	2	2
Number of ETD primary screening positions	8	0	0	0	0	0	0	0
Number of EDS primary screening positions	0	0	0	0	0	0	0	0
Number of in-line EDS primary screening positions	0	0	2	3	3	3	4	5
Total square foot area of 2009 TSA security station(s)	2,674	3,320	4,980	4,980	4,980	4,980	4,980	4,980
Square foot area of 2009 TSA security station(s) queue	1,735	900	1,800	2,100	2,100	2,400	3,300	3,600
Total square foot area of full body scanning position(s)	0	0	420	420	420	600	810	810
Total square foot area for full body scanning position(s) queue	0	0	90	90	90	135	180	180
Total square foot area of complete pat down areas	0	0	40	40	40	80	80	80
Total square foot area of complete pat down area queue	0	0	10	10	10	10	10	10
Total square foot area of post security screening check point	0	600	1,200	1,400	1,400	1,600	2,200	2,400
Total square foot area of ETD primary baggage screening	0	960	0	0	0	0	0	0

LOW FARE CARRIER SUMMARY Terminal Functional Areas			**Projections**					
	Existing	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2050**
Total square foot area of EDS primary baggage screening	0	0	0	0	0	0	0	0
Total square foot area of in-line EDS primary baggage screening	0	0	14,310	17,460	17,460	17,460	20,610	23,770
TSA offices and support space in square feet	1,346	1,900	3,300	3,800	3,800	4,500	6,100	6,500
Subtotal Square Feet of Security	5,755	7,680	26,150	30,300	30,300	31,770	38,270	42,330
Terminal Concessions in Square Feet								
Food/beverage/retail	16,953	6,520	10,850	12,700	14,640	16,770	21,520	27,640
Rental car counters and offices	2,184	2,180	2,180	2,180	2,410	2,760	3,540	4,550
Rental car queue	1,126	450	450	450	500	570	730	940
Subtotal in Square Feet of Terminal Concessions	20,263	9,150	13,480	15,330	17,550	20,100	25,790	33,130
Public Areas in Square Feet								
Non-secure public restrooms	1,207	2,500	4,400	5,200	5,400	5,900	7,900	9,200
Secure public restrooms	2,706	2,300	4,200	4,900	5,000	5,500	7,400	8,600
Terminal conference rooms	1,276	1,170	1,430	1,430	1,560	1,560	1,950	2,210
Waiting and seating	3,990	7,740	13,740	15,840	16,340	17,740	24,040	27,740
Public circulation including lobby and entrance	52,448	26,900	44,900	51,500	56,600	62,700	81,000	93,700
Subtotal Public Areas in Square Feet	61,627	40,610	68,670	78,870	84,900	93,400	122,290	141,450
Non-Public Areas in Square Feet								
Airport Operations	1,174	1,100	1,400	1,400	1,500	1,500	1,900	2,100
Airport Police	1,289	1,300	2,400	2,800	2,900	3,100	4,300	4,900
Maintenance, storage and janitorial	907	2,780	4,620	5,410	6,240	7,140	9,170	11,770
Circulation	924	1,710	2,790	3,190	3,530	3,890	5,090	6,190
Mechanical/electrical/utility	27,842	16,920	28,580	33,020	36,320	40,340	52,210	60,660
Subtotal Non-Public Areas in Square Feet	32,136	23,810	39,790	45,820	50,490	55,970	72,670	85,620
SUBTOTAL PROJECT AREA (Net)	**184,191**	**136,020**	**215,500**	**247,960**	**271,330**	**296,870**	**370,750**	**433,540**
Net to Gross Factor	6,080	4,490	7,110	8,180	8,950	9,800	12,230	14,310
SUBTOTAL PROJECT AREA (Gross)	**190,271**	**140,510**	**222,610**	**256,140**	**280,280**	**306,670**	**382,980**	**447,850**
Square Feet Per Annual Enplaned Passenger	0.31	0.23	0.22	0.21	0.20	0.19	0.19	0.17
Square Feet Per Peak Hour Passenger	423	312	275	272	289	291	267	270
Terminal Ancillary Areas								
Airline operational square foot area	**12,932**	4,500	5,500	5,500	6,000	6,000	7,500	8,500
Airport Administrative Offices	**4,267**	8,100	9,900	9,900	10,800	10,800	13,500	15,300
Customs and Border Protection								
Sterile Corridor System		80	80	80	80	80	80	80
Primary Processing		2,940	2,940	2,940	2,940	2,940	2,940	6,160
Secondary Processing		3,810	3,810	3,810	3,810	3,810	3,810	4,550
CBP Administration		1,520	1,520	1,520	1,520	1,520	1,520	1,780
Preclearance Facilities		0	0	0	0	0	0	0

LOW FARE CARRIER SUMMARY
Terminal Functional Areas

	Existing	Projections 2010	2015	2020	2025	2030	2040	2050
Circulation and Building Services		5,060	5,060	5,060	5,060	5,060	5,060	7,620
Subtotal Customs and Border Patrol in Square Feet	7,688	13,410	13,410	13,410	13,410	13,410	13,410	20,190
Subtotal Terminal Ancillary Areas	24,887	26,010	28,810	28,810	30,210	30,210	34,410	43,990
TOTAL BUILDING AREA	**215,158**	**166,520**	**251,420**	**284,950**	**310,490**	**336,880**	**417,390**	**491,840**

CBP = Customs and Border Protection

EDS = Explosives Detection System

PH = Peak Hour
TSA = Transportation Security Administration
* Two existing flat-plate baggage claim devices
devices

LOW FARE CARRIER FORECAST	2010	2015	2020	2025	2030	2040	2050
Enplanements							
Annual Enplaned Passengers	617,000	1,027,000	1,202,000	1,386,000	1,587,000	2,037,000	2,616,000
Peak Month (9.1% of Annual)	56,147	93,457	109,382	126,126	144,417	185,367	238,056
Average Day (30 days)	1,872	3,115	3,646	4,204	4,814	6,179	7,935
Peak Hour Enplanements	450	810	940	970	1,055	1,435	1,660
Peak 20-minute Enplanements	225	405	470	485	528	718	830
Deplanments							
Annual Deplanements	610,830	1,016,730	1,189,980	1,372,140	1,571,130	2,016,630	2,589,840
Peak Hour Deplanements	383	689	799	825	897	1,220	1,411
Peak 20-minute Deplanements	255	459	533	550	598	814	941
Commercial Operations							
Annual	24,700	27,900	28,100	34,300	36,100	42,600	53,600
Average Day	75	85	85	104	110	129	163
Peak Hour	18	22	22	24	24	30	34
Gates	10	12	12	13	13	16	18
Average Passengers per Peak Hour Flight	50	74	85	81	88	96	98

DATA AND ASSUMPTIONS - LOW FARE CARRIER	2010	2015	2020	2025	2030	2040	2050
Check-in							
Number of airlines operating at the airport	6	7	7	7	7	7	7
Average processing time per passenger at conventional check-in in seconds	150	150	150	150	150	150	150
Average processing time per passenger at kiosk check-in in seconds	90	90	90	90	90	90	90
Width per check-in counter including bag wells in lineal feet	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Width per kiosk including bag wells in lineal feet	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Depth per check-in counter or kiosk in lineal feet(1)	15	15	15	15	15	15	15
Maximum queuing time at check-in in minutes	10	10	10	10	10	10	10
Percentage of passengers using check-in	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of passengers using conventional check-in	50.0%	40.0%	30.0%	20.0%	5.0%	5.0%	5.0%
Percentage of passengers using kiosk check-in	50.0%	60.0%	70.0%	80.0%	95.0%	95.0%	95.0%
Square foot area per person in check-in queue	14	14	14	14	14	14	14
Passenger Security Screening							
Processing time per passenger at 2009 security in seconds	28	24	20	18	16	12	10
Additional processing time per passenger with full body scan in seconds	24	24	24	24	24	24	24
Additional processing time per passenger for full body pat-down	180	180	180	180	180	180	180
Square foot area per 2009 security station (2)	830	830	830	830	830	830	830
Square foot area per full body scanner	90	90	90	90	90	90	90
Square foot area of pat-down area	40	40	40	40	40	40	40
Percentage of passengers also full body scanned	0.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of passengers with complete pat down	0.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Maximum queue time in minutes at 2009 security (TSA Goal)	10	10	10	10	10	10	10
Maximum queue time in minutes at full body scan	2	2	2	2	2	2	2
Maximum queue time in minutes a complete pat-down	2	2	2	2	2	2	2
Square foot area per person in security queue (per TSA)	9	9	9	9	9	9	9
Baggage Security Screening							
Percentage of passengers checking bags	50%	50%	50%	50%	50%	50%	50%
Average number of checked bags per passenger checking baggage	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Percentage of bags primary screened with ETD	100%	0%	0%	0%	0%	0%	0%
Percentage of bags primary screened with in-line EDS system	0%	100%	100%	100%	100%	100%	100%
ETD processing rate of bags per hour including opening 100% of bags	45	45	45	45	45	45	45
EDS processing rate of bags per hour	60	60	60	60	60	60	60
In-line EDS processing rate in bags per hour	120	120	120	120	120	120	120
Departure Lounges or Holdrooms							
Square foot area per passenger in departure lounge	15	15	15	15	15	15	15
Percentage of 1-20 seat aircraft in aircraft mix	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Percentage of 21-50 seat aircraft in aircraft mix	97.1%	57.9%	0.0%	0.0%	0.0%	0.0%	0.0%
Percentage of 51-80 seat aircraft in aircraft mix	0.0%	24.3%	77.6%	48.8%	37.6%	38.4%	39.3%
Percentage of 81-110 seat aircraft in aircraft mix	0.0%	0.0%	0.0%	26.8%	36.8%	35.2%	34.1%
Percentage of 111-130 seat aircraft in aircraft mix	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Percentage of 131-160 seat aircraft in aircraft mix	2.9%	17.8%	19.7%	21.5%	22.4%	22.6%	22.7%
Percentage of 161-180 seat aircraft in the aircraft mix	0.0%	0.0%	2.8%	2.9%	3.2%	3.8%	3.9%
Baggage Claim							
Time in minutes each flight remains on baggage claim device (average)	20	20	20	20	20	20	20
Minutes average passenger with meeter/greeters remains in baggage claim	15	15	15	15	15	15	15

DATA AND ASSUMPTIONS - LOW FARE CARRIER	2010	2015	2020	2025	2030	2040	2050
Number of seats on largest aircraft served	150	150	175	175	175	175	175
Square foot area per passenger in baggage claim area	18	18	18	18	18	18	18
Average number of meeter/greeters per passenger	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Assumed length of baggage claim per bag	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Restrooms							
Percentage of PH passengers in peak 10 minutes	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH enplaning pax using restrooms airside	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of PH enplaning pax using restrooms landside	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH deplaning passengers using restrooms landside	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of PH deplaning passengers using airside restrooms	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Percentage of PH well-wishers using landside restrooms	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH meeter/greeters using landside restrooms	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Percentage of men passengers	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of women passengers	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Time in minutes per use for men	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Time in minutes per use for women	3	3	3	3	3	3	3
Square foot area per fixture	100	100	100	100	100	100	100
Meeter/Greeter/Well-wishers							
Number of well wishers per passenger	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Number of meeter/greeters per passenger	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Restaurant							
Percentage of Daily passengers using Restaurant	15.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Square feet per person in Restaurant	35	35	35	35	35	35	35
Rental Cars							
Number of rental car companies at Airport	5	5	5	6	6	8	10
Terminal Curbs							
Percentage of passengers using a private auto	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%
Percentage of private autos at enplanement curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of private autos at deplaning curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Average number of persons per private auto	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Average dwell time for private auto at the enplaning curb in minutes	3	3	3	3	3	3	3
Average dwell time for a private auto at the deplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a private auto in feet	25	25	25	25	25	25	25
Percentage of passengers using a taxi	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Percentage of taxis at enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Percentage of taxis at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per taxi	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Average dwell time for a taxi at the enplanement curb in minutes	3	3	3	3	3	3	3
Average dwell time for a taxi at the deplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a taxi in feet	25	25	25	25	25	25	25
Percentage of passengers using a rental car	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of rental cars at the enplaning curb	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Percentage of rental cars at the deplaning curb	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Average number of persons per rental car	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Average dwell time for rental car at the enplaning curb in minutes	4	4	4	4	4	4	4
Average dwell time for rental car at the deplaning curb in minutes	4	4	4	4	4	5	6
Average length at the curb of a rental car in feet	25	25	25	25	25	25	25
Percentage of passengers using a courtesy shuttle	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

DATA AND ASSUMPTIONS - LOW FARE CARRIER	2010	2015	2020	2025	2030	2040	2050
Percentage of courtesy shuttles at the enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Percentage of courtesy shuttles at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per courtesy shuttle	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Average dwell time for a courtesy shuttle at the enplaning curb in minutes	3	3	3	3	3	3	3
Average dwell time of a courtesy shuttle at the deplaning curb in minutes	2	2	2	2	2	2	2
Average length at the curb of a courtesy shuttle in feet	35	35	35	35	35	35	35

(1) Includes take-away belt, area behind counter, counter and corridor in front of counter

(2) TSA 2009 Standards for Layout SAT.LWBI.3.2.a (near square foot average area per position for layouts with three or more positions)

PH = Peak Hour

pax = passengers

well-wishers = terminal visitors accompanying departing passengers

meeter/greeters = terminal visitors waiting for and greeting arriving passengers

	Projections						
CHECK-IN COUNTERS - LOW FARE CARRIER	2010	2015	2020	2025	2030	2040	2050
Peak Hour Enplanements	450	810	940	970	1,055	1,435	1,660
Peak Hour Aircraft Departures	9	11	11	12	12	15	17
Percentage of 20-minute peak passengers	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Ratio of additional demand in off -peak hours	1	1	1	1	1	1	1
Percentage of enplaning passengers using check-in	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of enplaning passengers using conventional check-in	50.0%	40.0%	30.0%	20.0%	5.0%	5.0%	5.0%
Percentage of enplaning passengers using kiosk check-in	50.0%	60.0%	70.0%	80.0%	95.0%	95.0%	95.0%
Peak 20-minute passengers using conventional check-in - Common Use	56	81	71	49	13	18	21
Peak 20-minute passengers using kiosk check-in - Common Use	56	122	165	194	251	341	394
Maximum queuing time in minutes	10	10	10	10	10	10	10
Average processing time per passenger at check-in counter in seconds	150	150	150	150	150	150	150
Average processing time per passenger at check-in kiosk in seconds	90	90	90	90	90	90	90
Total number of airlines operating at airport	6	7	7	7	7	7	7
Length per check-in counter or kiosk including 1/2 bag well in lineal feet	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Depth per check-in counter or kiosk in lineal feet (1)	15	15	15	15	15	15	15
Conventional Check-in Counters - Common-Use							
Total number of check-in positions	8	11	10	7	2	2	3
Length of check-in counters in lineal feet	34	49	43	29	8	11	13
Total check-in counter square foot area	510	733	638	439	119	162	188
Check-in Kiosks - Common-Use							
Total number of check-in kiosks	5	10	14	16	21	28	33
Length in lineal feet of check-in kiosks	20	44	60	70	91	123	143
Total check-in kiosk square foot area	306	659	893	1,053	1,360	1,849	2,139
Conventional Check-in Counters - Exclusive Use							
Peak 20-minute passengers using conventional check-in	56	81	71	49	13	18	21
Total Number of Check-in Counter positions	8	11	10	7	2	2	3
Length in Lineal Feet	34	49	43	29	8	11	13
Total Check-in Counter square foot Area	510	733	638	439	119	162	188
Check-in Kiosks - Exclusive Use							
Peak 20-minute passengers using kiosks check-in	56	122	165	194	251	341	394
Total Number of kiosk positions	5	10	14	16	21	28	33
Length in lineal feet	20	44	60	70	91	123	143
Total Kiosk square foot area	306	659	893	1,053	1,360	1,849	2,139
Total square foot area of conventional and kiosk check-in positions - Common Use	820	1,390	1,530	1,490	1,480	2,010	2,330
Total square foot area of conventional and kiosk check-in positions - Exclusive Use	820	1,390	1,530	1,490	1,480	2,010	2,330

(1) Includes area behind counter, counter and corridor in front of counter

CHECK-IN QUEUE - LOW FARE CARRIER	Projections 2010	2015	2020	2025	2030	2040	2050
Peak Hour Enplanements	450	810	940	970	1,055	1,435	1,660
Number of airlines operating at the airport	6	7	7	7	7	7	7
Peak Hour Operations	18	22	22	24	24	30	34
Additional demand in off-peak hours	1	1	1	1	1	1	1
Percentage of passengers using check-in	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum queuing time in minutes	10	10	10	10	10	10	10
Average processing time in seconds per passenger at counter	150	150	150	150	150	150	150
Average processing time in seconds per passenger at kiosk	90	90	90	90	90	90	90
Square foot area per passenger in check-in queue	14	14	14	14	14	14	14
Common-Use							
Peak 20-minute passengers using conventional check-in	56	81	71	49	13	18	18
Number of check-in counters	8	11	10	7	2	2	2
Maximum number of passengers in counter queue	31	45	39	27	7	10	10
Square foot area of check-in counter queue	433	624	543	373	102	138	138
Peak 20-minute passengers using kiosk check-in	56	122	165	194	251	341	341
Number of kiosks	5	10	14	16	21	28	28
Maximum number of passengers in kiosk queue	31	67	90	107	138	187	187
Square foot area of kiosk queue	31	67	90	107	138	187	187
Total square foot area of check-in queues - Common Use	460	690	630	480	240	330	330
Exclusive-Use							
Peak 20-minute passengers conventional check-in	56	81	71	49	13	18	18
Number of check-in counters	8	11	10	7	2	2	2
Maximum number of passengers in counter queue	31	45	39	27	7	10	10
Square foot area of check-in counter queue	430	620	540	370	100	140	140
Peak 20-minute passengers using kiosk check-in	56	122	165	194	251	341	341
Number of kiosks	5	10	14	16	21	28	28
Maximum number of passengers in kiosk queue	31	70	90	110	140	190	190
Square foot area of kiosk queue	430	980	1,260	1,540	1,960	2,660	2,660
Total square foot area of check-in queues - Exclusive Use	860	1,600	1,800	1,910	2,060	2,800	2,800

BAGGAGE MAKE-UP - LOW FARE CARRIER	Projections 2010	2015	2020	2025	2030	2040	2050
No. Equivelent aircraft Gates	5.0	6.8	7.2	8.1	9.2	11.5	12.8
Depart per Gate Peak 2-4 Hr Period	1.4	1.3	1.3	1.5	1.5	1.5	1.6
Staged Carts per Departure	2.0	2.0	2.0	2.0	2.5	2.5	2.5
Total Peak Staged Carts	14	18	19	24	35	43	51
Perpindicular Parked Carts (25%)	4	4	5	6	9	11	13
Parallel Parked Carts (75%)	11	13	14	18	26	32	38
Perpindicular Cart Frontage (8') LF	28	35	37	49	69	86	102
Parallel Cart Frontage (15') LF	158	199	211	273	388	485	576
Number of Airlines	6	7	7	7	7	7	7
Number of Carousels (144')	1.3	1.6	1.7	2.2	3.2	4.0	4.7
Effective Number of Carousels	2.0	2.0	2.0	3.0	4.0	4.0	5.0
Area per Carousel, incl Staging SF	7,600	7,600	7,600	11,400	15,200	15,200	19,000
Carts Maneuvering / Circulation SF	7,200	7,200	7,200	10,800	14,400	14,400	18,000
Total Bag Make-Up Area SF	14,800	14,800	14,800	22,200	29,600	29,600	37,000

SECURITY - LOW FARE CARRIER	2010	2015	2020	2025	2030	2040	2050
				Projections			
Security Screening Checkpoint							
Peak Hour Enplanements	450	810	940	970	1,055	1,435	1,660
Peak 10-minute enplanements (.20)	90	162	188	194	211	287	332
Average processing rate (secs.)	28	24	20	18	16	12	10
Number of lanes needed	4	6	6	6	6	6	6
Space requirement per lane (SF)	830	830	830	830	830	830	830
Total square foot of lane space	3,320	4,980	4,980	4,980	4,980	4,980	4,980
2009 Security Screening Checkpoint Queue							
Maximum security screening checkpoint queue time in minutes	10	10	10	10	10	10	10
Maximum number passengers queuing	100	200	233	233	267	367	400
Square foot area per passenger in queue	9	9	9	9	9	9	9
Total square foot area of 2009 security queuing	900	1,800	2,100	2,100	2,400	3,300	3,600
Full Body Scan Screening							
Percentage of passengers also full body scanned	0.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Additional processing time per passenger with full body scan in seconds	24	24	24	24	24	24	24
Number of full body scanners required	0	2	2	2	3	4	4
Square foot area per full body scanner	90	90	90	90	90	90	90
Remote threat analysis screening in square feet	0	80	80	80	110	150	150
Staff support space square foot area	0	160	160	160	220	300	300
Additional required area for full body scanner(s)	0	420	420	420	600	810	810
Full Body Scan Queue							
Maximum queue time in minutes	2	2	2	2	2	2	2
Maximum number of passengers in queue	0	10	10	10	15	20	20
Square foot area per passenger in queue	9	9	9	9	9	9	9
Square foot area of full body scan queue	0	90	90	90	135	180	180
Complete Pat-Down Screening							
Percentage of passengers with complete pat down	0.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Additional processing time per passenger for full body pat-down	180	180	180	180	180	180	180
Number of full body pat-down areas	0	1	1	1	2	2	2
Square foot area of pat-down area	40	40	40	40	40	40	40
Additional area required for complete pat-down	0	40	40	40	80	80	80
Complete Pat Down Screening Queue							
Maximum queue time in minutes	2	2	2	2	2	2	2
Maximum number of passengers in queue	0	1	1	1	1	1	1
Square foot area per passenger in queue	9	9	9	9	9	9	9
Square foot area of complete pat-down queue	0	9	9	9	9	9	9
Post Security							
Square foot area post security	600	1,200	1,400	1,400	1,600	2,200	2,400

SECURITY - LOW FARE CARRIER	2010	2015	2020	2025	2030	2040	2050
				Projections			
Deplaneing Corridor							
Peak 20-minute deplaning passengers	255	459	533	550	598	814	941
Minimum width of deplaning corridor in lineal feet	6	6	6	6	6	7	7
Length of deplaning corridor in lineal feet	49	49	49	49	49	49	49
Square foot area of deplaning corridor	293	293	293	293	293	321	349
Total Square Foot Area of Security Screening Checkpoint	4,283	8,832	10,162	10,162	11,757	16,030	17,388
Checked Baggage Screening							
Peak hour enplanements	450	810	940	970	1,055	1,435	1,660
% Enpl. Checking Bags	50%	50%	50%	50%	50%	50%	50%
Avg Bags Per Enpl Checking Bags	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Total Peak Hour Checked Bags	293	527	611	631	686	933	1,079
Area per ETD screening position	120	120	120	120	120	120	120
Percentage of bags primary screened with ETD	100%	0%	0%	0%	0%	0%	0%
ETD processing rate of bags per hour including opening 100% of bags	45	45	45	45	45	45	45
Number of ETD primary screening stations required	8	0	0	0	0	0	0
Total square foot area of primary ETD screening	960	0	0	0	0	0	0
Percentage of bags primary screened with in-line EDS system	0%	100%	100%	100%	100%	100%	100%
In-Line Processing Rate	225	225	225	225	225	225	225
Qty In-Line EDS Stations	1.3	2.3	2.7	2.8	3.0	4.1	4.8
Actual EDS Stations	2	2	3	3	3	4	5
Area Per EDS Station SF	650	650	650	650	650	650	650
Total Area EDS Stations SF	1,300	1,300	1,950	1,950	1,950	2,600	3,250
Conveyor Control Room SF	800	800	1199	1199	1199	1599	1999
Conveyor Storage and Maint. SF	130	130	195	195	195	260	325
Baggage Encoding Station SF	3,600	3,600	3,600	3,600	3,600	3,600	3,600
EDS Storage and Maint. SF	400	400	400	400	400	400	400
Threat Resolution Room SF	144	144	216	216	216	288	360
EDS Staff Support SF	300	300	450	450	450	600	750
Qty Secondary Screening Stations	4	4	6	6	6	8	10
Area per Secondary Screening Station	120	120	120	120	120	120	120

DEPARTURE LOUNGES/HOLDROOMS - LOW FARE CARRIER	Projections						
	2010	2015	2020	2025	2030	2040	2050
Peak Hour Enplanements	450	810	940	970	1,055	1,435	1,660
No. of Gates	10	12	12	13	13	16	18
Largest Regular Aircraft (seats)	150	150	175	175	175	175	175
Percent PAX Accommodated / Gate	85%	85%	85%	85%	85%	85%	85%
Passengers Accommodated	127.5	127.5	148.75	148.75	148.75	148.75	148.75
Holdroom Seating Area	22,950	27,540	32,130	34,808	34,808	42,840	48,195
Deplaning Corridor	1,800	2,160	2,160	2,340	2,340	2,880	3,240
Airline Operational Space	1,200	1,440	1,440	1,560	1,560	1,920	2,160
Total Holdroom Area	25,950	31,140	35,730	38,710	38,710	47,640	53,600

BAGGAGE CLAIM - LOW FARE CARRIER	Projections						
	2010	2015	2020	2025	2030	2040	2050
Seats on Largest Aircraft	150	150	175	175	175	175	175
Checked Bags per Aircraft	98	98	114	114	114	114	114
Ideal Frontage per Bag LF	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Claim Frontage per Aircraft LF	117	117	137	137	137	137	137
No. Peak Hour Arriving Aircraft	9	11	11	12	12	15	17
Avg. Minutes Occupying Carousel	20	20	20	20	20	20	20
Number Carousels	2	3	4	4	4	5	6
Sloped Plate Carousel Frontage LF	134	134	134	134	134	134	134
Area per Carousel incl Passengers SF	3,600	3,600	3,600	3,600	3,600	3,600	3,600
Total Bag Claim Area SF	7,200	10,800	14,400	14,400	14,400	18,000	21,600

Customs and Border Protection (CBP) Federal Inspection Services (FIS)	Projections						
Low Fare Carrier	2010	2015	2020	2025	2030	2040	2050
Peak Hour International Deplaning Passengers	200	200	200	200	200	200	400
Peak Hour In-transit passengers							
Sterile Corridor System							
Number of gates	1	1	1	1	1	1	1
Square Feet of Outbound Interview Room	80	80	80	80	80	80	80
Number of VIP lounges	0	0	0	0	0	0	0
VIP lounges in square feet	0	0	0	0	0	0	0
Number of in-transit lounges	0	0	0	0	0	0	0
In-transit lounge area in square feet	0	0	0	0	0	0	0
In-transit lounge office in square feet	0	0	0	0	0	0	0
Additional In-transit lounge standards in square feet	0	0	0	0	0	0	0
Sterile Corridor Area in square feet	0	0	0	0	0	0	0
Subtotal Sterile Corridor System	80	80	80	80	80	80	80
Primary Processing							
Processing rate per passenger in minutes	1	1	1	1	1	1	1
Number of positions required	3	3	3	3	3	3	7
Number of Piggy-back Counters	2	2	2	2	2	2	4
Area per Piggy-back Counter with circulation and queue in square feet	1,380	1,380	1,380	1,380	1,380	1,380	1,380
Total area of Piggy-back with circulation in square feet	2,300	2,300	2,300	2,300	2,300	2,300	5,520
Number of CBP Forms Counters	1	1	1	1	1	1	1
Area per CBP Forms Counter in square feet	24	24	24	24	24	24	24
Area of all CBP Forms Counters in square feet	24	24	24	24	24	24	24
Area per CBP Coordination Center in square feet	255	255	255	255	255	255	255
Number of CBP Coordination Centers required	1	1	1	1	1	1	1
Total area for CBP Coordination Centers in square feet	255	255	255	255	255	255	255
Area per Counter Terrorism Response Suite in square feet	475	475	475	475	475	475	475
Number of public restroom fixtures required (local codes may supersede)	2	2	2	2	2	2	2
Area required per fixture in square feet	180	180	180	180	180	180	180
Total restroom area required in square feet	360	360	360	360	360	360	360
Subtotal Primary Inspection	2,940	2,940	2,940	2,940	2,940	2,940	6,160
Secondary Processing							
Rover Coordination Center (for multi-level facilities only) in square feet	225	225	225	225	225	225	225
Area required per waiting passenger in square feet	25	25	25	25	25	25	25
Number of passengers queuing	10	10	10	10	10	10	20
Total area of passenger queue in square feet	250	250	250	250	250	250	500
Triage Podium (single and double) in square feet	180	180	180	180	180	180	180
Triage Podium (quad) in square feet	0	0	0	0	0	0	0
Number of referral passengers waiting	5	5	5	5	5	5	10
Area per passenger in square feet	25	25	25	25	25	25	25
Total referral passenger waiting area in square feet	125	125	125	125	125	125	250
Number of Secondary Baggage Exam podiums and baggage belts	0	0	0	0	0	0	0

Customs and Border Protection (CBP) Federal Inspection Services (FIS)	Projections						
Low Fare Carrier	2010	2015	2020	2025	2030	2040	2050
Minimum processing area per position in square feet	756	756	756	756	756	756	756
Total area Secondary Baggage Exam and baggage belts in square feet	0	0	0	0	0	0	0
Number of Secondary Baggage X-ray Processing workstations	1	1	1	1	1	1	1
Minimum area per Secondary Baggage X-ray Processing Workstation in square feet	1,476	1,476	1,476	1,476	1,476	1,476	1,476
Total Area for Secondary Baggage X-ray Processing Workstations in square feet	1,476	1,476	1,476	1,476	1,476	1,476	1,476
Cashier's Office in square feet	0	0	0	0	0	0	0
Number of CBP Agricultural Laboratory and Disposal Rooms (varies by CBP)	1	1	1	1	1	1	1
Minimum area per Agricultural Laboratory and Disposal Room in square feet	150	150	150	150	150	150	150
Total minimum area of Agricultural Laboratories and Disposal Rooms in square feet	150	150	150	150	150	150	150
CBP/APHIS VS Bird Quarantine and Bird Hold Facilities (varies by CBP) in square feet							
Number of public restroom fixtures required (local codes may supersede)	2	2	2	2	2	2	4
Area required per fixture in square feet	180	180	180	180	180	180	180
Total restroom area required in square feet	360	360	360	360	360	360	720
Number of Interview Rooms	1	1	1	1	1	1	1
Area per Interview Room in square feet	80	80	80	80	80	80	80
Total area of all Interview Rooms in square feet	80	80	80	80	80	80	80
Number of Search Rooms	1	1	1	1	1	1	1
Area per Search Room in square feet	80	80	80	80	80	80	80
Total area of all Search Rooms in square feet	80	80	80	80	80	80	80
Area of Male Detention Room with toilet and fixtures in square feet	115	115	115	115	115	115	115
Area of Female Detention Room with toilet and fixtures in square feet	115	115	115	115	115	115	115
Area of Juvenile Detention Room with toilet and fixtures in square feet	115	115	115	115	115	115	115
Area of food preparation and storage in square feet	0	0	0	0	0	0	0
Expedited/Voluntary Removal Room Male (as required by CBP) in square feet	0	0	0	0	0	0	0
Expedited/Voluntary Removal Room Female (as required by CBP) in square feet	0	0	0	0	0	0	0
Subtotal Secondary Processing	3,271	3,271	3,271	3,271	3,271	3,271	4,006
Secondary Operations and Support							
Area of ADIT Room in square feet	110	110	110	110	110	110	110
Area of JABS/Identification Room in square feet	0	0	0	0	0	0	0
Area of Fraudulent Document Analysis Room in square feet	0	0	0	0	0	0	0
Area of Secondary Supervisor's Office in square feet	150	150	150	150	150	150	150
Prosecution Officer's Office In square feet	0	0	0	0	0	0	0
Number of detainee baggage storage rooms	1	1	1	1	1	1	1
Total area of detainee baggage storage rooms in square feet	50	50	50	50	50	50	50
Number of canine kennels (varies by CBP)							
Area per canine kennel in square feet	100	100	100	100	100	100	100
Total area of canine kennels in square feet	0	0	0	0	0	0	0

Customs and Border Protection (CBP) Federal Inspection Services (FIS)	Projections						
Low Fare Carrier	2010	2015	2020	2025	2030	2040	2050
Canine unit secure aid storage in square feet	0	0	0	0	0	0	0
Canine unit general training aid storage in square feet	0	0	0	0	0	0	0
Canine unit general storage in square feet	50	50	50	50	50	50	50
Area for Passenger Service Representative in square feet	0	0	0	0	0	0	0
Number of agents offices: US ICE (ICE) (varies)							
Area per agent's office in square feet	150	150	150	150	150	150	150
Total area for ICE agent's office in square feet	0	0	0	0	0	0	0
Subtotal Secondary Operations and Support	360	360	360	360	360	360	360
Exit Podium							
Number of Single Exit Podiums	1	1	1	1	1	1	1
Exit Podium (single, single aisle) in square feet	180	180	180	180	180	180	180
Number of Double Exit Podiums	0	0	0	0	0	0	0
Exit Podium (double, double aisle) in square feet	0	0	0	0	0	0	0
Subtotal Exit Podiums	180	180	180	180	180	180	180
Subtotal Secondary Processing	3,811	3,811	3,811	3,811	3,811	3,811	4,546
CBP Administration							
CBP officer/staff area in square feet							
Port Director's office in square feet	225	225	225	225	225	225	225
Port Director's conference room in square feet	0	0	0	0	0	0	0
Port Director's secretary/reception area in square feet	0	0	0	0	0	0	0
Assistant Port Director's office in square feet	0	0	0	0	0	0	0
Chief Officer's office in square feet	175	175	175	175	175	175	175
Number of Supervisor's offices	1	1	1	1	1	1	1
Area per Supervisor's office in square feet	150	150	150	150	150	150	150
Total area of Supervisor's offices in square feet	150	150	150	150	150	150	150
Intelligence office in square feet	0	0	0	0	0	0	0
Number of general office workstations "C"	2	2	2	2	2	2	4
Area per general office workstation in square feet	64	64	64	64	64	64	64
Total area per general office workstation	128	128	128	128	128	128	256
Number of Anti-terrorism Contraband Enforcement Team modules "B"	-	-	-	-	-	-	-
Area per module "B" (4 @64 sf)in square feet	256	256	256	256	256	256	256
Anti-Terrorism Contraband Enforcement Team Office B in square feet	0	0	0	0	0	0	0
Number of Passenger Analysis Unit (PAU) offices	-	-	-	-	-	-	-
Area per PAU office (4 @ 64 sf) in square feet	256	256	256	256	256	256	256
Passenger Analysis Unit office (4 @ 64 sf) in square feet	0	0	0	0	0	0	0
Outbound Team office (4 @ 64 sf) in square feet	-	-	-	-	-	-	-
Canine Unit office (4 @ 64 sf) in square feet	-	-	-	-	-	-	-
Subtotal CBP Administration Officers/Staff Area	678	678	678	678	678	678	806
CBP Support Spaces							
Airport reception in squar efeet	0	0	0	0	0	0	0
Public Reception/Entrance & Clearance (E&C) Office (varies, See CBP) in square feet							
Airport Identification (I.D. Badging and secure file) room in square feet	0	0	0	0	0	0	0
Conference training room in square feet	0	0	0	0	0	0	0

Customs and Border Protection (CBP) Federal Inspection Services (FIS)	Projections						
Low Fare Carrier	2010	2015	2020	2025	2030	2040	2050
Mail/copier/shredder room in square feet	0	0	0	0	0	0	0
Weapons storage room in square feet	0	0	0	0	0	0	0
Communications room (telephone and radio) in square feet	60	60	60	60	60	60	60
Computer room in square feet	80	80	80	80	80	80	80
General storage/file room in square feet	150	150	150	150	150	150	150
Secure storage room(s) in square feet	60	60	60	60	60	60	60
Break room in square feet	275	275	275	275	275	275	275
Number of officers	5	5	5	5	5	5	10
Male and female staff toilets/showers/lockers minimum (varies) in square feet	220	220	220	220	220	220	350
Union office in square feet	0	0	0	0	0	0	0
Physical training room (varies) in square feet							
US-PASS/NEXUS Enrollment Center and storage (as determined by CBP) in square feet							
Subtotal CBP Support Spaces	845	845	845	845	845	845	975
Subtotal CBP Administration	1,523	1,523	1,523	1,523	1,523	1,523	1,781
Preclearance Facilities							
CBP Coordination Center in square feet	475	475	475	475	475	475	475
Counter Terrorism Response Suite (per code) in square feet							
Rover Coordination Center (for multi-level facilities only) in square feet	225	225	225	225	225	225	225
Number of passenger referrals (confirm with CBP)	10	10	10	10	10	10	20
Area per passenger in secondary queue in square feet	25	25	25	25	25	25	25
Total area of secondary queue in square feet	250	250	250	250	250	250	500
Triage Podium (single and double) in square feet	180	180	180	180	180	180	180
Triage Podium (quad) in square feet	0	0	0	0	0	0	0
Number of Secondary Baggage Exam Podiums and baggage belts	1	1	1	1	1	1	1
Minimum processing area per position in square feet	1476	1476	1476	1476	1476	1476	1476
Total area Secondary Baggage Exam and baggage belts in square feet	1,476	1,476	1,476	1,476	1,476	1,476	1,476
Cashier's Office in square feet	0	0	0	0	0	0	0
Number of CBP Agricultural Laboratory and disposal rooms	1	1	1	1	1	1	1
Area of CBP Agricultural Laboratory and disposal rooms in square feet	150	150	150	150	150	150	150
Total area of CBP Agricultural Laboratory and disposal rooms in square feet	150	150	150	150	150	150	150
Number of Interview Rooms	1	1	1	1	1	1	1
Area per Interview Room in square feet	80	80	80	80	80	80	80
Total Area of Interview Rooms	80	80	80	80	80	80	80
Number of Search Rooms	1	1	1	1	1	1	1
Area per Search Room in square feet	80	80	80	80	80	80	80
Total Area of Search Rooms	80	80	80	80	80	80	80
ADIT Room in square feet	110	110	110	110	110	110	110
JABS/Identification Room in square feet	0	0	0	0	0	0	0
Fraudulent Document Analysis room in square feet	0	0	0	0	0	0	0
Secondary Supervisor's office in square feet	150	150	150	150	150	150	150

Customs and Border Protection (CBP) Federal Inspection Services (FIS)	Projections						
Low Fare Carrier	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2050**
Prosecution Officer's office in square feet	0	0	0	0	0	0	0
Exit Podium (single, single aisle) in square feet	180	180	180	180	180	180	180
Number of Exit Podiums (double, double aisle)	0	0	0	0	0	0	0
Area per Exit Podium (double, double aisle) in square feet	315	315	315	315	315	315	315
Exit Podium (double, double aisle) in square feet	0	0	0	0	0	0	0
Chief Officer's office in square feet	175	175	175	175	175	175	175
Number of Supervisors' offices	1	1	1	1	1	1	1
Area per Supervisors' office in square feet	150	150	150	150	150	150	150
Total area of Supervisors' offices in square feet	150	150	150	150	150	150	150
Number of general offices space "C"	2	2	2	2	2	2	2
Area per office space "C" in square feet	64	64	64	64	64	64	64
Total area of general office space "C" in square feet	128	128	128	128	128	128	128
Conference/training room in square feet	0	0	0	0	0	0	0
Mail/copier/shredder room in square feet	0	0	0	0	0	0	0
Communications room (telephone and radio) in square feet	60	60	60	60	60	60	60
Computer room in square feet	80	80	80	80	80	80	80
General storage/file room in square feet	150	150	150	150	150	150	150
Secure storage rooms in square feet	60	60	60	60	60	60	60
Break room in square feet	275	275	275	275	275	275	275
Number of officers	5	5	5	5	5	5	10
Male and female staff toilets/showers/lockers in square feet	220	220	220	220	220	220	350
Number of Attorney Client Interview rooms (Canada Only) in square feet	0	0	0	0	0	0	0
Area per Attorney Client Interview rooms (Canada Only) in square feet	80	80	80	80	80	80	80
Attorney Client Interview room (Canada Only) in square feet	0	0	0	0	0	0	0
Number of public restroom fixtures required (local codes may supersede)	2	2	2	2	2	2	2
Area required per fixture in square feet	180	180	180	180	180	180	180
Total restroom area required in square feet	360	360	360	360	360	360	360
Subtotal Preclearance Facilities	0	0	0	0	0	0	0
Circulation and Building Services							
Circulation in square feet	2,757	2,757	2,757	2,757	2,757	2,757	4,147
Mechanical space in square feet	1,667	1,667	1,667	1,667	1,667	1,667	2,507
Building structure in square feet	639	639	639	639	639	639	961
Subtotal Circulation and Building Services	5,062	5,062	5,062	5,062	5,062	5,062	7,615
Total Area Air Carrier Facilities	12,738	12,738	12,738	12,738	12,738	12,738	19,376
Minimum number of parking spaces for official vehicles	2	2	2	2	2	2	2
Minimum number of parking spaces for employee vehicles	11	11	11	11	11	11	18

RESTROOMS - LOW FARE CARRIER	2010	2015	2020	2025	2030	2040	2050
	Projections						
Peak Hour Enplaning Passengers	450	810	940	970	1,055	1,435	1,660
Peak Hour Deplaning Passengers	383	689	799	825	897	1,220	1,411
Number of well-wishers per passenger	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Number of meeter/greeters per passengers	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Percentage of men passengers and visitors	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of women passengers and visitors	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Minutes per restroom use for men	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minutes per restroom use for women	3	3	3	3	3	3	3
Airside Restrooms							
Percentage of PH enplaning passengers in peak 10 minutes	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH enplaning pax using airside restrooms	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of PH deplaning passengers using airside restrooms	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Number of fixtures for men	5	9	10	10	11	15	18
Number of fixtures for women	9	17	20	20	22	30	35
Number of restrooms	3	5	6	6	7	9	10
Square foot area per fixture	100	100	100	100	100	100	100
Total airside toilet square foot area for men	482	867	1,006	1,038	1,129	1,536	1,777
Total airside toilet square foot area for women	939	1,691	1,962	2,025	2,202	2,996	3,465
Family room square foot area	568	1,023	1,187	1,225	1,333	1,813	2,097
Janitorial square foot area	341	614	712	735	800	1,088	1,258
Total airside restrooms	2,330	4,195	4,868	5,023	5,464	7,432	8,597
Landside Restrooms							
Percentage of PH Enplaning passengers using landside restrooms	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH Deplaning passengers using landside restrooms	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of passengers in peak 10 minutes	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH well-wishers using landside restrooms	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH meeter/greeters using landside restrooms	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Number of fixtures required for men	5	9	11	11	12	16	19
Number of fixtures required for women	10	18	21	22	24	32	37
Number of restrooms	3	5	6	7	7	10	11
Square foot area per fixture	100	100	100	100	100	100	100
Total landside toilet square foot area for men	500	900	1,100	1,100	1,200	1,600	1,900
Total landside toilet square foot area for women	1,000	1,800	2,100	2,200	2,400	3,200	3,700
Family room square foot area	600	1,080	1,280	1,320	1,440	1,920	2,240
Janitorial square foot area	360	648	768	792	864	1,152	1,344
Total landside restrooms	2,460	4,428	5,248	5,412	5,904	7,872	9,184
Total Restrooms							
Total airside restroom square foot area	2,330	4,195	4,868	5,023	5,464	7,432	8,597

RESTROOMS - LOW FARE CARRIER	2010	2015	2020	2025	2030	2040	2050
	Projections						
Total landside restroom square foot area	2,460	4,428	5,248	5,412	5,904	7,872	9,184
Total restroom square foot area	4,790	8,623	10,116	10,435	11,368	15,304	17,781

PH = Peak Hour
well-wishers = terminal visitors accompanying departing passengers
meeter/greeters = terminal visitors waiting for and greeting arriving passengers

FOOD & BEVERAGE - LOW FARE CARRIER	2010	2015	2020	2025	2030	2040	2050
	Projections						
Peak Hour Passengers	450	810	940	970	1,055	1,435	1,660
Percentage of Persons Using Restaurant	15%	20%	20%	20%	20%	20%	20%
Number of Peak Hour Passengers in Restaurant	68	162	188	194	211	287	332
Number of Well-wishers per Passenger	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Number of Employees using Restaurant in Peak Hour	4	11	12	13	14	19	22
Total Peak Hour Persons in Restaurant	92	221	257	265	288	392	453
Square Feet per Person in Restaurant	35	35	35	35	35	35	35
Square Feet Required for Restaurant	3,225	7,740	8,982	9,268	10,081	13,711	15,861
Square Feet Required for the Bar	967	2,322	2,695	2,781	3,024	4,113	4,758
Number of Restaurant/Bar Locations	3	3	3	3	3	3	3
Square Feet Required for Support & Storage Space	2,515	6,037	7,006	7,229	7,863	10,695	12,372
Total Area for Food and Beverage	6,708	16,098	18,682	19,278	20,967	28,520	32,992

CURBS - LOW FARE CARRIER	2010	2015	2020	2025	2030	2040	2050
	Projections						
Enplanement Curb							
Peak 20-minute Enplanements	225	405	470	485	528	718	830
Number of well wishers per passenger	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Number of peak 20-minute passengers and well-wishers	293	527	611	631	686	933	1079
Percentage of passengers using a private auto	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%
Percentage of private autos at enplanement curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Average number of persons per private auto	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Number of private autos at the curb in the peak 20-minutes	24	42	49	51	55	75	87
Average dwell time for private auto at the enplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a private auto in feet	25	25	25	25	25	25	25
Total length of curb required for private autos in the peak 20-minutes	88	159	184	190	207	281	325
Percentage of passengers using a taxi	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Percentage of taxis at enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per taxi	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Number of taxis at the enplaning curb in the peak 20-minutes	12	21	24	25	27	37	43
Average dwell time for a taxi at the enplanement curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a taxi in feet	25	25	25	25	25	25	25
Total length of curb required for taxis in the peak 20-minutes	44	79	92	95	103	140	162
Percentage of passengers using a rental car	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of rental cars at the enplaning curb	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Average number of persons per rental car	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Number of rental cars at the enplaning curb in the peak 20-minutes	0.5	0.9	1.0	1.1	1.1	1.6	1.8
Average dwell time for rental car at the enplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a rental car in feet	25	25	25	25	25	25	25
Total length of curb required for rental cars in the peak 20-minutes	25	25	25	25	25	25	25
Percentage of passengers using a courtesy shuttle	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Percentage of courtesy shuttles at the enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per courtesy shuttle	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Number of courtesy shuttles at the curb during the peak 20-minutes	5	8	9	10	11	14	17
Average dwell time for a courtesy shuttle at the enplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a courtesy shuttle in feet	35	35	35	35	35	35	35
Total length of curb requires for courtesy shuttles in the peak 20-minutes	35	43	49	51	55	75	87
Additional demand on off-peak hours	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Total length of the enplanement curb	211	336	385	397	429	574	659

CURBS - LOW FARE CARRIER	Projections 2010	2015	2020	2025	2030	2040	2050
Deplaning Curb							
Peak 20-minute Deplanements	255	459	533	550	598	814	941
Number of meeter/greeters per passenger	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Number of peak 20-minute passengers and meeter/greeters	459	827	959	990	1,077	1,464	1,694
Percentage of passengers using a private auto	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%
Percentage of private autos at deplaning curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Average number of persons per private auto	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Average number of private autos at the curb in the peak 20-minutes	37	66	77	80	87	118	136
Average dwell time for a private auto at the deplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a private auto in feet	25	25	25	25	25	25	25
Total length of curb required for private autos in the peak 20-minutes in feet	185	332	386	398	433	589	681
Percentage of passengers using a taxi	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Percentage of taxis at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per taxi	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Average number of taxis at the deplaning curb in the peak 20-minutes	18	33	38	40	43	59	68
Average dwell time for a taxi at the deplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a taxi in feet	25	25	25	25	25	25	25
Total length of curb required for taxis at the deplaning curb in feet	69	124	144	148	161	220	254
Percentage of passengers using a rental car	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of rental cars at the deplaning curb	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Average number of persons per rental car	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Average number of rental cars at the curb in the peak 20-minutes	0.4	0.7	0.8	0.8	0.9	1.2	1.4
Average dwell time for rental car at the deplaning curb in minutes	4	4	4	4	4	5	6
Average length at the curb of a rental car in feet	25	25	25	25	25	25	25
Total curb length in feet required for rental cars in the peak 20-minutes	25	25	25	25	25	25	25
Percentage of passengers using a courtesy shuttle	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Percentage of courtesy shuttles at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per courtesy shuttle	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Average number of courtesy shuttles at the curb in the peak 20-minutes	7	13	15	15	17	23	26
Average dwell time of a courtesy shuttle at the deplaning curb in minutes	2	2	2	2	2	2	2
Average length at the curb of a courtesy shuttle in feet	35	35	35	35	35	35	35
Total curb length required in feet for courtesy shuttles in peak 20-minutes	35	45	52	53	58	79	91
Additional demand in off-peak hours	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Total length of deplaning curb	345	579	667	687	745	1,004	1,157
Total Low Fare Carrier Curb Length	556	914	1,052	1,084	1,174	1,577	1,816

	Existing	2010	2015	2020	2025	2030	2040	2050
Annual Enplanements	617,000	617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Peak Hour Enplanements	450	450	810	1,090	1,120	1,205	1,585	1,960

FOCUS CITY SUMMARY

Terminal Functional Areas	Existing	Projections 2010	2015	2020	2025	2030	2040	2050
Airline								
Number of check-in counters - exclusive use	36	8	11	11	8	2	3	3
Number of check-in kiosks - exclusive use	20	5	10	16	18	24	31	38
Check-in counter and kiosk length in lineal feet - exclusive use	228	54	93	118	115	113	148	183
Number of departure lounges or holdrooms	13	10	12	13	13	14	17	20
Number of slope-plate baggage claim devices*	2	2	3	4	4	4	5	6
Lineal feet of baggage claim frontage	250	268	402	536	536	536	670	804
Total square foot area of exclusive use check-in counters and kiosks	1,936	820	1,390	1,770	1,720	1,690	2,220	2,750
Square foot area of check-in queue - exclusive use	1,891	860	1,600	2,030	2,110	2,360	3,090	3,830
Airline office square foot area	4,951	1,100	1,900	2,400	2,300	2,300	3,000	3,700
Baggage make-up square foot area	9,000	14,800	14,800	14,800	22,200	29,600	37,000	44,400
Total square foot area of departure lounges or holdrooms	33,094	25,950	31,140	38,710	38,710	41,690	50,620	59,550
Inbound baggage input square foot area	4,152	3,200	4,800	6,400	6,400	6,400	8,000	9,600
Baggage claim retrieval square foot area	8,491	10,800	14,400	14,400	14,400	14,400	18,000	21,600
Square feet of baggage service offices	895	840	980	980	980	980	980	980
Subtotal Square Feet of Airline Functional Areas	64,410	54,770	67,410	81,490	88,820	99,420	122,910	146,410
Security								
Number of 2009 TSA security screening check point position(s)	4	3	6	8	8	9	12	15
Number of full body scanners	0	1	2	3	3	3	4	5
Number of complete body pat down areas	0	1	1	2	2	2	2	3
Number of ETD primary screening positions	8	0	0	0	0	0	0	0
Number of EDS primary screening positions	0	0	0	0	0	0	0	0

FOCUS CITY SUMMARY

Terminal Functional Areas	Existing	Projections 2010	2015	2020	2025	2030	2040	2050
Total square foot area of 2009 TSA security station(s)	2,674	3,320	4,980	5,810	5,810	4,980	4,980	5,810
Square foot area of 2009 TSA security station(s) queue	1,735	900	1,800	2,400	2,400	2,700	3,600	4,500
Total square foot area of full body scanning position(s)	0	0	420	600	600	600	810	1,020
Total square foot area for full body scanning position(s) queue	0	0	90	135	135	135	180	225
Total square foot area of complete pat down areas	0	0	40	80	80	80	80	120
Total square foot area of complete pat down area queue	0	0	10	10	10	10	10	20
Total square foot area of post security screening check point	0	600	1,200	1,600	1,600	1,800	2,400	3,000
Total square foot area of ETD primary baggage screening	0	960	0	0	0	0	0	0
Total square foot area of EDS primary baggage screening	0	0	0	0	0	0	0	0
Total square foot area of in-line EDS primary baggage screening	0	0	14,310	17,460	20,610	20,610	23,770	26,920
TSA offices and support space in square feet	1,346	1,900	3,300	4,500	4,500	5,000	6,500	8,200
Subtotal Square Feet of Security	5,755	7,680	26,150	32,600	35,750	35,920	42,330	49,820
Terminal Concessions in Square Feet								
Food/beverage/retail	16,953	6,520	11,470	13,910	16,320	19,080	24,510	31,480
Rental car counters and offices	2,184	2,180	2,180	2,290	2,690	3,140	4,040	5,190
Rental car queue	1,126	450	450	470	560	650	840	1,070
Subtotal in Square Feet of Terminal Concessions	20,263	9,150	14,100	16,670	19,570	22,870	29,390	37,740
Public Areas in Square Feet								
Non-secure public restrooms	1,207	2,500	4,400	5,900	6,200	6,600	8,900	10,800
Secure public restrooms	2,706	2,300	4,200	5,600	5,800	6,200	8,200	10,200
Terminal conference rooms	1,276	1,170	1,430	1,560	1,560	1,690	2,080	2,470
Waiting and seating	3,990	7,740	13,740	18,340	18,840	20,240	26,540	32,640
Public circulation including lobby and entrance	52,448	26,900	45,500	57,700	62,600	69,600	88,700	108,700
Subtotal Public Areas in Square Feet	61,627	40,610	69,270	89,100	95,000	104,330	134,420	164,810

FOCUS CITY SUMMARY				Projections				
Terminal Functional Areas	**Existing**	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2050**
Non-Public Areas in Square Feet								
Airport Operations	1,174	1,100	1,400	1,500	1,500	1,600	2,000	2,400
Airport Police	1,289	1,300	2,400	3,200	3,300	3,600	4,700	5,800
Maintenance, storage and janitorial	907	2,780	4,890	5,930	6,950	8,130	10,440	13,410
Circulation	924	1,710	2,870	3,530	3,900	4,410	5,670	7,130
Mechanical/electrical/utility	27,842	16,920	28,990	36,940	40,240	44,880	57,260	70,360
Subtotal Non-Public Areas in Square Feet	32,136	23,810	40,550	51,100	55,890	62,620	80,070	99,100
SUBTOTAL PROJECT AREA (Net)	**184,191**	**136,020**	**217,480**	**270,960**	**295,030**	**325,160**	**409,120**	**497,880**
Net to Gross Factor	6,080	4,490	7,180	8,940	9,740	10,730	13,500	16,430
SUBTOTAL PROJECT AREA (Gross)	**190,271**	**140,510**	**244,660**	**279,900**	**304,770**	**335,890**	**422,620**	**514,310**
Square Feet Per Annual Enplaned Passenger	0.31	0.23	0.21	0.21	0.20	0.19	0.18	0.17
Square Feet Per Peak Hour Passenger	423	312	277	257	272	279	267	262
Terminal Ancillary Areas								
Airline operational square foot area	12,932	4,500	5,500	6,000	6,000	6,500	8,000	9,500
Airport Administrative Offices	4,267	8,100	9,900	10,800	10,800	11,700	14,400	17,100
Customs and Border Protection								
Sterile Corridor System		80	80	80	80	80	80	80
Primary Processing		2,940	2,940	2,940	2,940	6,160	7,540	8,920
Secondary Processing		3,810	3,810	3,810	3,810	4,550	4,930	5,280
CBP Administration		1,520	1,520	1,520	1,520	1,780	1,980	2,170
Preclearance Facilities		0	0	0	0	0	0	0
Circulation and Building Services		5,060	5,060	5,060	5,060	7,620	8,800	9,970
Subtotal Customs and Border Patrol in Square Feet	7,688	13,410	13,410	13,410	13,410	20,190	23,330	26,420
Subtotal Terminal Ancillary Areas	24,887	26,010	28,810	30,210	30,210	38,390	45,730	53,020
TOTAL BUILDING AREA	**215,158**	**166,520**	**253,470**	**310,110**	**334,980**	**374,280**	**468,350**	**567,330**

CBP = Customs and Border Protection
EDS = Explosives Detection System
PH = Peak Hour
TSA = Transportation Security Administration
* Two existing flat-plate baggage claim devices devices

FOCUS CITY FORECAST	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2050**
Enplanements							
Annual Enplaned Passengers	617,000	1,086,000	1,317,000	1,545,000	1,806,000	2,320,000	2,980,000
Peak Month (9.1% of Annual)	56,147	98,826	119,847	140,595	164,346	211,120	271,180
Average Day (30 days)	1,872	3,294	3,995	4,687	5,478	7,037	9,039
Peak Hour Enplanements	450	810	1,090	1,120	1,205	1,585	1,960
Peak 20-minute Enplanements	225	405	545	560	603	793	980
Deplanements							
Annual Deplanements	610,830	1,075,140	1,303,830	1,529,550	1,787,940	2,296,800	2,950,200
Peak Hour Deplanements	383	689	927	952	1,024	1,347	1,666
Peak 20-minute Deplanements	255	459	618	635	683	899	1,111
Commercial Operations							
Annual	24,700	29,500	29,000	33,100	39,000	46,800	57,800
Average Day	75	89	88	100	118	142	175
Peak Hour	18	22	24	24	26	32	38
Gates	10	12	13	13	14	17	20
Average Passengers per Peak Hour Flight	50	74	91	93	93	99	103

DATA AND ASSUMPTIONS - FOCUS CITY	2010	2015	2020	2025	2030	2040	2050
Check-in							
Number of airlines operating at the airport	6	7	7	6	6	6	6
Average processing time per passenger at conventional check-in in seconds	150	150	150	150	150	150	150
Average processing time per passenger at kiosk check-in in seconds	90	90	90	90	90	90	90
Width per check-in counter including bag wells in lineal feet	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Width per kiosk including bag wells in lineal feet	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Depth per check-in counter or kiosk in lineal feet(1)	15	15	15	15	15	15	15
Maximum queuing time at check-in in minutes	10	10	10	10	10	10	10
Percentage of passengers using check-in	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of passengers using conventional check-in	50.0%	40.0%	30.0%	20.0%	5.0%	5.0%	5.0%
Percentage of passengers using kiosk check-in	50.0%	60.0%	70.0%	80.0%	95.0%	95.0%	95.0%
Square foot area per person in check-in queue	14	14	14	14	14	14	14
Passenger Security Screening							
Processing time per passenger at 2009 security in seconds	28	24	20	18	16	12	10
Additional processing time per passenger with full body scan in seconds	24	24	24	24	24	24	24
Additional processing time per passenger for full body pat-down	180	180	180	180	180	180	180
Square foot area per 2009 security station (2)	830	830	830	830	830	830	830
Square foot area per full body scanner	90	90	90	90	90	90	90
Square foot area of pat-down area	40	40	40	40	40	40	40
Percentage of passengers also full body scanned	0.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of passengers with complete pat down	0.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Maximum queue time in minutes at 2009 security (TSA Goal)	10	10	10	10	10	10	10
Maximum queue time in minutes at full body scan	2	2	2	2	2	2	2
Maximum queue time in minutes a complete pat-down	2	2	2	2	2	2	2
Square foot area per person in security queue (per TSA)	9	9	9	9	9	9	9
Baggage Security Screening							
Percentage of passengers checking bags	50%	50%	50%	50%	50%	50%	50%
Average number of checked bags per passenger checking baggage	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Percentage of bags primary screened with ETD	100%	0%	0%	0%	0%	0%	0%
Percentage of bags primary screened with EDS system	0%	0%	0%	0%	0%	0%	0%
Percentage of bags primary screened with in-line EDS system	0%	100%	100%	100%	100%	100%	100%
ETD processing rate of bags per hour including opening 100% of bags	45	45	45	45	45	45	45
EDS processing rate of bags per hour	60	60	60	60	60	60	60
In-line EDS processing rate in bags per hour	225	225	225	225	225	225	225
Departure Lounges or Holdrooms							
Square foot area per passenger in departure lounge	15	15	15	15	15	15	15
Percentage of 1-20 seat aircraft in aircraft mix	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Percentage of 21-50 seat aircraft in aircraft mix	97.1%	56.4%	0.0%	0.0%	0.0%	0.0%	0.0%
Percentage of 51-80 seat aircraft in aircraft mix	0.0%	23.6%	73.1%	45.3%	34.3%	34.9%	35.7%
Percentage of 81-110 seat aircraft in aircraft mix	0.0%	0.0%	0.0%	24.9%	33.6%	31.2%	31.0%
Percentage of 111-130 seat aircraft in aircraft mix	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Percentage of 131-160 seat aircraft in aircraft mix	2.9%	20.0%	26.0%	29.9%	32.1%	33.0%	33.2%
Percentage of 161-180 seat aircraft in the aircraft mix	0.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%

DATA AND ASSUMPTIONS - FOCUS CITY	2010	2015	2020	2025	2030	2040	2050
Baggage Claim							
Time in minutes each flight remains on baggage claim device (average)	20	20	20	20	20	20	20
Minutes average passenger with meeter/greeters remains in baggage claim	15	15	15	15	15	15	15
Number of seats on largest aircraft served	150	150	175	175	175	175	175
Square foot area per passenger in baggage claim area	18	18	18	18	18	18	18
Average number of meeter/greeters per passenger	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Assumed length of baggage claim per bag	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Restrooms							
Percentage of PH passengers in peak 10 minutes	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH enplaning pax using restrooms airside	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of PH enplaning pax using restrooms landside	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH deplaning passengers using restrooms landside	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of PH deplaning passengers using airside restrooms	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Percentage of PH well-wishers using landside restrooms	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH meeter/greeters using landside restrooms	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Percentage of men passengers	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of women passengers	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Time in minutes per use for men	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Time in minutes per use for women	3	3	3	3	3	3	3
Square foot area per fixture	100	100	100	100	100	100	100
Meeter/Greeter/Well-wishers							
Number of well wishers per passenger	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Number of meeter/greeters per passenger	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Restaurant							
Percentage of Daily passengers using Restaurant	15.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Square feet per person in Restaurant	35	35	35	35	35	35	35
Rental Cars							
Number of rental car companies at Airport	5	5	5	6	7	9	12
Terminal Curbs							
Percentage of passengers using a private auto	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%
Percentage of private autos at enplanement curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of private autos at deplaning curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Average number of persons per private auto	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Average dwell time for private auto at the enplaning curb in minutes	3	3	3	3	3	3	3
Average dwell time for a private auto at the deplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a private auto in feet	25	25	25	25	25	25	25
Percentage of passengers using a taxi	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Percentage of taxis at enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Percentage of taxis at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per taxi	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Average dwell time for a taxi at the enplanement curb in minutes	3	3	3	3	3	3	3
Average dwell time for a taxi at the deplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a taxi in feet	25	25	25	25	25	25	25

Percentage of passengers using a rental car	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of rental cars at the enplaning curb	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%

DATA AND ASSUMPTIONS - FOCUS CITY	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2050**
Percentage of rental cars at the deplaning curb	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Average number of persons per rental car	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Average dwell time for rental car at the enplaning curb in minutes	4	4	4	4	4	4	4
Average dwell time for rental car at the deplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a rental car in feet	25	25	25	25	25	25	25
Percentage of passengers using a courtesy shuttle	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Percentage of courtesy shuttles at the enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Percentage of courtesy shuttles at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per courtesy shuttle	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Average dwell time for a courtesy shuttle at the enplaning curb in minutes	3	3	3	3	3	3	3
Average dwell time of a courtesy shuttle at the deplaning curb in minutes	2	2	2	2	2	2	2
Average length at the curb of a courtesy shuttle in feet	35	35	35	35	35	35	35

(1) Includes take-away belt, area behind counter, counter and corridor in front of counter

(2) TSA 2009 Standards for Layout SAT.LWBI.3.2.a (near square foot average area per position for layouts with three or more positions)

PH = Peak Hour

pax = passengers

well-wishers = terminal visitors accompanying departing passengers

meeter/greeters = terminal visitors waiting for and greeting arriving passengers

	Projections						
CHECK-IN COUNTERS - FOCUS CITY	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2050**
Peak Hour Enplanements	450	810	1,090	1,120	1,205	1,585	1,960
Peak Hour Aircraft Departures	9	11	12	12	13	16	19
Percentage of 20-minute peak passengers	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Ratio of additional demand in off -peak hours	1	1	1	1	1	1	1
Percentage of enplaning passengers using check-in	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of enplaning passengers using conventional check-in	50.0%	40.0%	30.0%	20.0%	5.0%	5.0%	5.0%
Percentage of enplaning passengers using kiosk check-in	50.0%	60.0%	70.0%	80.0%	95.0%	95.0%	95.0%
Peak 20-minute passengers using conventional check-in - Common Use	56	81	82	56	15	20	25
Peak 20-minute passengers using kiosk check-in - Common Use	56	122	191	224	286	376	466
Maximum queuing time in minutes	10	10	10	10	10	10	10
Average processing time per passenger at check-in counter in seconds	150	150	150	150	150	150	150
Average processing time per passenger at check-in kiosk in seconds	90	90	90	90	90	90	90
Total number of airlines operating at airport	6	7	7	6	6	6	6
Length per check-in counter or kiosk including 1/2 bag well in lineal feet	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Depth per check-in counter or kiosk in lineal feet (1)	15	15	15	15	15	15	15
Conventional Check-in Counters - Common-Use							
Total number of check-in positions	8	11	11	8	2	3	3
Length of check-in counters in lineal feet	34	49	49	34	9	12	15
Total check-in counter square foot area	510	733	739	506	136	179	222
Check-in Kiosks - Common-Use							
Total number of check-in kiosks	5	10	16	18	24	31	38
Length in lineal feet of check-in kiosks	20	44	69	81	104	136	168
Total check-in kiosk square foot area	306	659	1,035	1,215	1,553	2,043	2,526
Conventional Check-in Counters - Exclusive Use							
Peak 20-minute passengers using conventional check-in	56	81	82	56	15	20	25
Total Number of Check-in Counter positions	8	11	11	8	2	3	3
Length in Lineal Feet	34	49	49	34	9	12	15
Total Check-in Counter square foot Area	510	733	739	506	136	179	222
Check-in Kiosks - Exclusive Use							
Peak 20-minute passengers using kiosks check-in	56	122	191	224	286	376	466
Total Number of kiosk positions	5	10	16	18	24	31	38
Length in lineal feet	20	44	69	81	104	136	168
Total Kiosk square foot area	306	659	1,035	1,215	1,553	2,043	2,526
Total square foot area of conventional and kiosk check-in positions - Common Use	820	1,390	1,770	1,720	1,690	2,220	2,750
Total square foot area of conventional and kiosk check-in positions - Exclusive Use	820	1,390	1,770	1,720	1,690	2,220	2,750

CHECK-IN QUEUE - FOCUS CITY	2010	2015	2020	2025	2030	2040	2050
	Projections						
Peak Hour Enplanements	450	810	1,090	1,120	1,205	1,585	1,960
Number of airlines operating at the airport	6	7	7	6	6	6	6
Peak Hour Operations	18	22	24	24	26	32	38
Additional demand in off-peak hours	1	1	1	1	1	1	1
Percentage of passengers using check-in	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum queuing time in minutes	10	10	10	10	10	10	10
Average processing time in seconds per passenger at counter	150	150	150	150	150	150	150
Average processing time in seconds per passenger at kiosk	90	90	90	90	90	90	90
Square foot area per passenger in check-in queue	14	14	14	14	14	14	14
Common-Use							
Peak 20-minute passengers using conventional check-in	56	81	82	56	15	20	25
Number of check-in counters	8	11	11	8	2	3	3
Maximum number of passengers in counter queue	31	45	45	31	8	11	13
Square foot area of check-in counter queue	433	624	629	431	116	153	189
Peak 20-minute passengers using kiosk check-in	56	122	191	224	286	376	466
Number of kiosks	5	10	16	18	24	31	38
Maximum number of passengers in kiosk queue	31	67	105	123	157	207	256
Square foot area of kiosk queue	31	67	105	123	157	207	256
Total square foot area of check-in queues - Common Use	460	690	730	550	270	360	440
Exclusive-Use							
Peak 20-minute passengers conventional check-in	56	81	82	56	15	20	25
Number of check-in counters	8	11	11	8	2	3	3
Maximum number of passengers in counter queue	31	45	45	31	8	11	13
Square foot area of check-in counter queue	430	620	630	430	120	150	190
Peak 20-minute passengers using kiosk check-in	56	122	191	224	286	376	286
Number of kiosks	5	10	16	18	24	31	38
Maximum number of passengers in kiosk queue	31	70	100	120	160	210	260
Square foot area of kiosk queue	430	980	1,400	1,680	2,240	2,940	3,640
Total square foot area of check-in queues - Exclusive Use	860	1,600	2,030	2,110	2,360	3,090	3,830

BAGGAGE MAKE-UP - FOCUS CITY	2010	2015	2020	2025	2030	2040	2050
	Projections						
No. Equivalent aircraft Gates	5.0	6.8	7.7	9.0	10.1	12.4	14.6
Depart per Gate Peak 2-4 Hr Period	1.4	1.4	1.2	1.4	1.5	1.5	1.6
Staged Carts per Departure	2.0	2.0	2.0	2.0	2.5	2.5	2.5
Total Peak Staged Carts	14	19	18	25	38	47	58
Perpendicular Parked Carts (25%)	4	5	5	6	9	12	15
Parallel Parked Carts (75%)	11	14	14	19	28	35	44
Perpendicular Cart Frontage (8') LF	28	38	37	50	76	93	117
Parallel Cart Frontage (15') LF	158	214	208	284	426	523	657
Number of Airlines	6	7	7	7	7	7	7
Number of Carousels (144')	1.3	1.8	1.7	2.3	3.5	4.3	5.4
Effective Number of Carousels	2.0	2.0	2.0	3.0	4.0	5.0	6.0
Area per Carousel, incl Staging SF	7,600	7,600	7,600	11,400	15,200	19,000	22,800
Carts Maneuvering / Circulation SF	7,200	7,200	7,200	10,800	14,400	18,000	21,600
Total Bag Make-Up Area SF	14,800	14,800	14,800	22,200	29,600	37,000	44,400

SECURITY - FOCUS CITY	Projections 2010	2015	2020	2025	2030	2040	2050
Security Screening Checkpoint							
Peak Hour Enplanements	450	810	1,090	1,120	1,205	1,585	1,960
Peak 10-minute enplanements (.20)	90	162	218	224	241	317	392
Average processing rate (secs.)	28	24	20	18	16	12	10
Number of lanes needed	4	6	7	7	6	6	7
Space requirement per lane (SF)	830	830	830	830	830	830	830
Total square foot of lane space	3,320	4,980	5,810	5,810	4,980	4,980	5,810
2009 Security Screening Checkpoint Queue							
Maximum security screening checkpoint queue time in minutes	10	10	10	10	10	10	10
Maximum number passengers queuing	100	200	267	267	300	400	500
Square foot area per passenger in queue	9	9	9	9	9	9	9
Total square foot area of 2009 security queuing	900	1,800	2,400	2,400	2,700	3,600	4,500
Full Body Scan Screening							
Percentage of passengers also full body scanned	0.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Additional processing time per passenger with full body scan in seconds	24	24	24	24	24	24	24
Number of full body scanners required	0	2	3	3	3	4	5
Square foot area per full body scanner	90	90	90	90	90	90	90
Remote threat analysis screening in square feet	0	80	110	110	110	150	190
Staff support space square foot area	0	160	220	220	220	300	380
Additional required area for full body scanner(s)	0	420	600	600	600	810	1,020
Full Body Scan Queue							
Maximum queue time in minutes	2	2	2	2	2	2	2
Maximum number of passengers in queue	0	10	15	15	15	20	25
Square foot area per passenger in queue	9	9	9	9	9	9	9
Square foot area of full body scan queue	0	90	135	135	135	180	225
Complete Pat-Down Screening							
Percentage of passengers with complete pat down	0.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Additional processing time per passenger for full body pat-down	180	180	180	180	180	180	180
Number of full body pat-down areas	0	1	2	2	2	2	3
Square foot area of pat-down area	40	40	40	40	40	40	40
Additional area required for complete pat-down	0	40	80	80	80	80	120
Complete Pat Down Screening Queue							
Maximum queue time in minutes	2	2	2	2	2	2	2
Maximum number of passengers in queue	0	1	1	1	1	1	2
Square foot area per passenger in queue	9	9	9	9	9	9	9
Square foot area of complete pat-down queue	0	10	10	10	10	10	10
Post Security							
Square foot area post security	600	1,200	1,600	1,600	1,800	2,400	3,000

SECURITY - FOCUS CITY	Projections 2010	2015	2020	2025	2030	2040	2050
Deplaning Corridor							
Peak 20-minute deplaning passengers	255	459	618	635	683	899	1,111
Minimum width of deplaning corridor in lineal feet	6	6	6	6	6	7	8
Length of deplaning corridor in lineal feet	49	49	49	49	49	49	49
Square foot area of deplaning corridor	293	293	293	293	293	340	386
Total Square Foot Area of Security Screening Checkpoint	4,283	8,832	11,757	11,757	13,087	17,379	21,719
Checked Baggage Screening							
% Enpl. Checking Bags		50%	50%	50%	50%	50%	50%
Avg Bags Per Enpl Checking Bags		1.3	1.3	1.3	1.3	1.3	1.3
Total Peak Hour Checked Bags		293	527	709	728	783	1,030
Peak hour number of checked bags	225	405	545	560	603	793	980
Area per ETD screening position	120	120	120	120	120	120	120
Percentage of bags primary screened with ETD	100%	0%	0%	0%	0%	0%	0%
ETD processing rate of bags per hour including opening 100% of bags	45	45	45	45	45	45	45
Number of ETD primary screening stations required	8	0	0	0	0	0	0
Total square foot area of primary ETD screening	960	0	0	0	0	0	0
Percentage of bags primary screened with in-line EDS system	0%	100%	100%	100%	100%	100%	100%
In-Line Processing Rate	225	225	225	225	225	225	225
Qty In-Line EDS Stations	1.3	2.3	3.1	3.2	3.5	4.6	5.7
Actual EDS Stations	2	2	3	4	4	5	6
Area Per EDS Station SF	650	650	650	650	650	650	650
Total Area EDS Stations SF	1,300	1,300	1,950	2,600	2,600	3,250	3,900
Conveyor Control Room SF	800	800	1199	1599	1599	1999	2399
Conveyor Storage and Maint. SF	130	130	195	260	260	325	390
Baggage Encoding Station SF	3,600	3,600	3,600	3,600	3,600	3,600	3,600
EDS Storage and Maint. SF	400	400	400	400	400	400	400
Threat Resolution Room SF	144	144	216	288	288	360	432
EDS Staff Support SF	300	300	450	600	600	750	900
Qty Secondary Screening Stations	4	4	6	8	8	10	12
Area per Secondary Screening Station	120	120	120	120	120	120	120
Total Area Secondary Screening SF	480	480	720	960	960	1,200	1,440
Total Area In-Line EDS System SF	7,154	7,154	8,730	10,307	10,307	11,884	13,461
Conveyor Space Factor SF	7,154	7,154	8,730	10,307	10,307	11,884	13,461

EDS= Explosives Detection System

ETD = Explosives Trace Detection

DEPARTURE LOUNGES/HOLDROOMS - FOCUS CITY	2010	2015	2020	2025	2030	2040	2050
				Projections			
Peak Hour Enplanements	450	810	1,090	1,120	1,205	1,585	1,960
No. of Gates	10	12	13	13	14	17	20
Largest Regular Aircraft (seats)	150	150	175	175	175	175	175
Percent PAX Accommodated / Gate	85%	85%	85%	85%	85%	85%	85%
Passengers Accommodated	127.5	127.5	148.75	148.75	148.75	148.75	148.75
Holdroom Seating Area	22,950	27,540	34,807.5	34,807.5	37,485	45,517.5	53,550
Deplaning Corridor	1,800	2,160	2,340	2,340	2,520	3,060	3,600
Airline Operational Space	1,200	1,440	1,560	1,560	1,680	2,040	2,400
Total Holdroom Area	25,950	31,140	38,710	38,710	41,690	50,620	59,550

BAGGAGE CLAIM - FOCUS CITY	2010	2015	2020	2025	2030	2040	2050
				Projections			
Seats on Largest Aircraft		150	150	175	175	175	175
Checked Bags per Aircraft		98	98	114	114	114	114
Ideal Frontage per Bag LF		1.2	1.2	1.2	1.2	1.2	1.2
Claim Frontage per Aircraft LF		117	117	137	137	137	137
No. Peak Hour Arriving Aircraft		9	11	11	12	13	16
Avg. Minutes Occupying Carousel		20	20	20	20	20	20
Number Carousels		3	4	4	4	4	5
Sloped Plate Carousel Frontage LF		134	134	134	134	134	134
Area per Carousel incl Passengers SF		3,600	3,600	3,600	3,600	3,600	3,600
Total Bag Claim Area SF		10,800	14,400	14,400	14,400	14,400	18,000

Customs and Border Protection (CBP) Federal Inspection Services (FIS)	Projections						
Focus City	2010	2015	2020	2025	2030	2040	2050
Peak Hour International Deplaning Passengers	200	200	200	200	400	500	600
Peak Hour In-transit passengers							
Sterile Corridor System							
Number of gates	1	1	1	1	1	1	1
Square Feet of Outbound Interview Room	80	80	80	80	80	80	80
Number of VIP lounges	0	0	0	0	0	0	0
VIP lounges in square feet	0	0	0	0	0	0	0
Number of in-transit lounges	0	0	0	0	0	0	0
In-transit lounge area in square feet	0	0	0	0	0	0	0
In-transit lounge office in square feet	0	0	0	0	0	0	0
Additional In-transit lounge standards in square feet	0	0	0	0	0	0	0
Sterile Corridor Area in square feet	0	0	0	0	0	0	0
Subtotal Sterile Corridor System	80	80	80	80	80	80	80
Primary Processing							
Processing rate per passenger in minutes	1	1	1	1	1	1	1
Number of positions required	3	3	3	3	7	8	10
Number of Piggy-back Counters	2	2	2	2	4	5	6
Area per Piggy-back Counter with circulation and queue in square feet	1,380	1,380	1,380	1,380	1,380	1,380	1,380
Total area of Piggy-back with circulation in square feet	2,300	2,300	2,300	2,300	5,520	6,900	8,280
Number of CBP Forms Counters	1	1	1	1	1	1	1
Area per CBP Forms Counter in square feet	24	24	24	24	24	24	24
Area of all CBP Forms Counters in square feet	24	24	24	24	24	24	24
Area per CBP Coordination Center in square feet	255	255	255	255	255	255	255
Number of CBP Coordination Centers required	1	1	1	1	1	1	1
Total area for CBP Coordination Centers in square feet	255	255	255	255	255	255	255
Area per Counter Terrorism Response Suite in square feet	475	476	477	478	479	480	481
Number of public restroom fixtures required (local codes may supersede)	2	2	2	2	2	2	2
Area required per fixture in square feet	180	180	180	180	180	180	180
Total restroom area required in square feet	360	360	360	360	360	360	360
Subtotal Primary Inspection	2,940	2,940	2,940	2,940	6,160	7,540	8,920
Secondary Processing							
Rover Coordination Center (for multi-level facilities only) in square feet	225	225	225	225	225	225	225
Area required per waiting passenger in square feet	25	25	25	25	25	25	25
Number of passengers queuing	10	10	10	10	20	25	30
Total area of passenger queue in square feet	250	250	250	250	500	625	750
Triage Podium (single and double) in square feet	180	180	180	180	180	180	180
Triage Podium (quad) in square feet	0	0	0	0	0	0	0
Number of referral passengers waiting	5	5	5	5	10	13	15
Area per passenger in square feet	25	25	25	25	25	25	25
Total referral passenger waiting area in square feet	125	125	125	125	250	325	375
Number of Secondary Baggage Exam podiums and baggage belts	0	0	0	0	0	0	0

Customs and Border Protection (CBP) Federal Inspection Services (FIS)	Projections						
Focus City	2010	2015	2020	2025	2030	2040	2050
Minimum processing area per position in square feet	756	756	756	756	756	756	756
Total area Secondary Baggage Exam and baggage belts in square feet	0	0	0	0	0	0	0
Number of Secondary Baggage X-ray Processing workstations	1	1	1	1	1	1	1
Minimum area per Secondary Baggage X-ray Processing Workstation in square feet	1,476	1,476	1,476	1,476	1,476	1,476	1,476
Total Area for Secondary Baggage X-ray Processing Workstations in square feet	1,476	1,476	1,476	1,476	1,476	1,476	1,476
Cashier's Office in square feet	0	0	0	0	0	0	0
Number of CBP Agricultural Laboratory and Disposal Rooms (varies by CBP)	1	1	1	1	1	1	1
Minimum area per Agricultural Laboratory and Disposal Room in square feet	150	150	150	150	150	150	150
Total minimum area of Agricultural Laboratories and Disposal Rooms in square feet	150	150	150	150	150	150	150
CBP/APHIS VS Bird Quarantine and Bird Hold Facilities (varies by CBP) in square feet							
Number of public restroom fixtures required (local codes may supersede)	2	2	2	2	4	5	6
Area required per fixture in square feet	180	180	180	180	180	180	180
Total restroom area required in square feet	360	360	360	360	720	900	1,080
Number of Interview Rooms	1	1	1	1	1	1	1
Area per Interview Room in square feet	80	80	80	80	80	80	80
Total area of all Interview Rooms in square feet	80	80	80	80	80	80	80
Number of Search Rooms	1	1	1	1	1	1	1
Area per Search Room in square feet	80	80	80	80	80	80	80
Total area of all Search Rooms in square feet	80	80	80	80	80	80	80
Area of Male Detention Room with toilet and fixtures in square feet	115	115	115	115	115	115	115
Area of Female Detention Room with toilet and fixtures in square feet	115	115	115	115	115	115	115
Area of Juvenile Detention Room with toilet and fixtures in square feet	115	115	115	115	115	115	115
Area of food preparation and storage in square feet	0	0	0	0	0	0	0
Expedited/Voluntary Removal Room Male (as required by CBP) in square feet	0	0	0	0	0	0	0
Expedited/Voluntary Removal Room Female (as required by CBP) in square feet	0	0	0	0	0	0	0
Subtotal Secondary Processing	3,271	3,271	3,271	3,271	4,006	4,386	4,741
Secondary Operations and Support							
Area of ADIT Room in square feet	110	110	110	110	110	110	110
Area of JABS/Identification Room in square feet	0	0	0	0	0	0	0
Area of Fraudulent Document Analysis Room in square feet	0	0	0	0	0	0	0
Area of Secondary Supervisor's Office in square feet	150	150	150	150	150	150	150
Prosecution Officer's Office In square feet	0	0	0	0	0	0	0
Number of detainee baggage storage rooms	1	1	1	1	1	1	1
Total area of detainee baggage storage rooms in square feet	50	50	50	50	50	50	50
Number of canine kennels (varies by CBP)							

Customs and Border Protection (CBP) Federal Inspection Services (FIS)				Projections			
Focus City	2010	2015	2020	2025	2030	2040	2050
Area per canine kennel in square feet	100	100	100	100	100	100	100
Total area of canine kennels in square feet	0	0	0	0	0	0	0
Canine unit secure aid storage in square feet	0	0	0	0	0	0	0
Canine unit general training aid storage in square feet	0	0	0	0	0	0	0
Canine unit general storage in square feet	50	50	50	50	50	50	50
Area for Passenger Service Representative in square feet	0	0	0	0	0	0	0
Number of agents offices: US ICE (ICE) (varies)							
Area per agent's office in square feet	150	150	150	150	150	150	150
Total area for ICE agent's office in square feet	0	0	0	0	0	0	0
Subtotal Secondary Operations and Support	360	360	360	360	360	360	360
Exit Podium							
Number of Single Exit Podiums	1	1	1	1	1	1	1
Exit Podium (single, single aisle) in square feet	180	180	180	180	180	180	180
Number of Double Exit Podiums	0	0	0	0	0	0	0
Exit Podium (double, double aisle) in square feet	0	0	0	0	0	0	0
Subtotal Exit Podiums	180	180	180	180	180	180	180
Subtotal Secondary Processing	3,811	3,811	3,811	3,811	4,546	4,926	5,281
CBP Administration							
CBP officer/staff area in square feet							
Port Director's office in square feet	225	225	225	225	225	225	225
Port Director's conference room in square feet	0	0	0	0	0	0	0
Port Director's secretary/reception area in square feet	0	0	0	0	0	0	0
Assistant Port Director's office in square feet	0	0	0	0	0	0	0
Chief Officer's office in square feet	175	175	175	175	175	175	175
Number of Supervisor's offices	1	1	1	1	1	1	1
Area per Supervisor's office in square feet	150	150	150	150	150	150	150
Total area of Supervisor's offices in square feet	150	150	150	150	150	150	150
Intelligence office in square feet	0	0	0	0	0	0	0
Number of general office workstations "C"	2	2	2	2	4	5	6
Area per general office workstation in square feet	64	64	64	64	64	64	64
Total area per general office workstation	128	128	128	128	256	320	384
Number of Anti-terrorism Contraband Enforcement Team modules "B"	-	-	-	-	-	-	-
Area per module "B" (4 @64 sf)in square feet	256	256	256	256	256	256	256
Anti-Terrorism Contraband Enforcement Team Office B in square feet	0	0	0	0	0	0	0
Number of Passenger Analysis Unit (PAU) offices	-	-	-	-	-	-	-
Area per PAU office (4 @ 64 sf) in square feet	256	256	256	256	256	256	256
Passenger Analysis Unit office (4 @ 64 sf) in square feet	0	0	0	0	0	0	0
Outbound Team office (4 @ 64 sf) in square feet	-	-	-	-	-	-	-
Canine Unit office (4 @ 64 sf) in square feet	-	-	-	-	-	-	-
Subtotal CBP Administration Officers/Staff Area	678	678	678	678	806	870	934
CBP Support Spaces							
Airport reception in square feet	0	0	0	0	0	0	0

Customs and Border Protection (CBP) Federal Inspection Services (FIS)				Projections			
Focus City	2010	2015	2020	2025	2030	2040	2050
Public Reception/Entrance & Clearance (E&C) Office (varies, See CBP) in square feet							
Airport Identification (I.D. Badging and secure file) room in square feet	0	0	0	0	0	0	0
Conference training room in square feet	0	0	0	0	0	0	0
Conference training equipment storage in square feet	0	0	0	0	0	0	0
Mail/copier/shredder room in square feet	0	0	0	0	0	0	0
Weapons storage room in square feet	0	0	0	0	0	0	0
Communications room (telephone and radio) in square feet	60	60	60	60	60	60	60
Computer room in square feet	80	80	80	80	80	80	80
General storage/file room in square feet	150	150	150	150	150	150	150
Secure storage room(s) in square feet	60	60	60	60	60	60	60
Break room in square feet	275	275	275	275	275	275	275
Number of officers	5	5	5	5	10	15	20
Male and female staff toilets/showers/lockers minimum (varies) in square feet	220	220	220	220	350	480	610
Union office in square feet	0	0	0	0	0	0	0
Physical training room (varies) in square feet							
US-PASS/NEXUS Enrollment Center and storage (as determined by CBP) in square feet							
Subtotal CBP Support Spaces	845	845	845	845	975	1,105	1,235
Subtotal CBP Administration	1,523	1,523	1,523	1,523	1,781	1,975	2,169
Preclearance Facilities							
CBP Coordination Center in square feet	475	475	475	475	475	475	475
Counter Terrorism Response Suite (per code) in square feet							
Rover Coordination Center (for multi-level facilities only) in square feet	225	225	225	225	225	225	225
Number of passenger referrals (confirm with CBP)	10	10	10	10	20	25	35
Area per passenger in secondary queue in square feet	25	25	25	25	25	25	25
Total area of secondary queue in square feet	250	250	250	250	500	625	875
Triage Podium (single and double) in square feet	180	180	180	180	180	180	180
Triage Podium (quad) in square feet	0	0	0	0	0	0	0
Number of Secondary Baggage Exam Podiums and baggage belts	1	1	1	1	1	1	1
Minimum processing area per position in square feet	1476	1476	1476	1476	1476	1476	1476
Total area Secondary Baggage Exam and baggage belts in square feet	1,476	1,476	1,476	1,476	1,476	1,476	1,476
Cashier's Office in square feet	0	0	0	0	0	0	0
Number of CBP Agricultural Laboratory and disposal rooms	1	1	1	1	1	1	1
Area of CBP Agricultural Laboratory and disposal rooms in square feet	150	150	150	150	150	150	150
Total area of CBP Agricultural Laboratory and disposal rooms in square feet	150	150	150	150	150	150	150
Number of Interview Rooms	1	1	1	1	1	1	1
Area per Interview Room in square feet	80	80	80	80	80	80	80
Total Area of Interview Rooms	80	80	80	80	80	80	80

Customs and Border Protection (CBP) Federal Inspection Services (FIS)	Projections						
Focus City	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2050**
Number of Search Rooms	1	1	1	1	1	1	1
Area per Search Room in square feet	80	80	80	80	80	80	80
Total Area of Search Rooms	80	80	80	80	80	80	80
ADIT Room in square feet	110	110	110	110	110	110	110
JABS/Identification Room in square feet	0	0	0	0	0	0	0
Fraudulent Document Analysis room in square feet	0	0	0	0	0	0	0
Secondary Supervisor's office in square feet	150	150	150	150	150	150	150
Prosecution Officer's office in square feet	0	0	0	0	0	0	0
Exit Podium (single, single aisle) in square feet	180	180	180	180	180	180	180
Number of Exit Podiums (double, double aisle)	0	0	0	0	0	0	0
Area per Exit Podium (double, double aisle) in square feet	315	315	315	315	315	315	315
Exit Podium (double, double aisle) in square feet	0	0	0	0	0	0	0
Chief Officer's office in square feet	175	175	175	175	175	175	175
Number of Supervisors' offices	1	1	1	1	1	1	1
Area per Supervisors' office in square feet	150	150	150	150	150	150	150
Total area of Supervisors' offices in square feet	150	150	150	150	150	150	150
Number of general offices space "C"	2	2	2	2	4	5	6
Area per office space "C" in square feet	64	64	64	64	64	64	64
Total area of general office space "C" in square feet	128	128	128	128	256	320	384
Conference/training room in square feet	0	0	0	0	0	0	0
Mail/copier/shredder room in square feet	0	0	0	0	0	0	0
Communications room (telephone and radio) in square feet	60	60	60	60	60	60	60
Computer room in square feet	80	80	80	80	80	80	100
General storage/file room in square feet	150	150	150	150	150	150	150
Secure storage rooms in square feet	60	60	60	60	60	60	60
Break room in square feet	275	275	275	275	275	275	285
Number of officers	5	5	5	5	10	15	20
Male and female staff toilets/showers/lockers in square feet	220	220	220	220	350	480	610
Number of Attorney Client Interview rooms (Canada Only) in square feet	0	0	0	0	0	0	0
Area per Attorney Client Interview rooms (Canada Only) in square feet	80	81	82	83	84	85	86
Attorney Client Interview room (Canada Only) in square feet	0	0	0	0	0	0	0
Number of public restroom fixtures required (local codes may supersede)	2	2	2	2	2	2	2
Area required per fixture in square feet	180	180	180	180	180	180	180
Total restroom area required in square feet	360	360	360	360	360	360	360
Subtotal Preclearance Facilities	0	0	0	0	0	0	0
Circulation and Building Services							
Circulation in square feet	2,757	2,757	2,757	2,757	4,147	4,792	5,429
Mechanical space in square feet	1,667	1,667	1,667	1,667	2,507	2,897	3,282
Building structure in square feet	639	639	639	639	961	1,110	1,258
Subtotal Circulation and Building Services	5,062	5,062	5,062	5,062	7,615	8,799	9,968
Total Area Air Carrier Facilities	12,738	12,738	12,738	12,738	19,376	22,450	25,484

Customs and Border Protection (CBP) Federal Inspection Services (FIS)	Projections						
Focus City	**2010**	**2015**	**2020**	**2025**	**2030**	**2040**	**2050**
Minimum number of parking spaces for official vehicles	2	2	2	2	2	2	2
Minimum number of parking spaces for employee vehicles	11	11	11	11	18	24	30

ADIT = Alien Documentation Identification and Telecommunication
APHIS = Animal and Plant Health Inspection Service
AQI = Agricultural Quarantine Inspection
CBP = Customs and Border Protection
FIS = Federal Inspection Services
GAF = General Aviation Facilities
ICE = Immigration and Customs Enforcement
JABS = Joint Agency Booking System (now referred to as the CBP Coordination Center
PAU = Passenger Analysis Unit

PASS/NEXUS = a joint venture between the Canada Border Services (CBSA) and the CBP, it is designed to expedite the border clearance process for low risk, pre-approved travelers into Canada and the US.
VIP = Very Important Persons
VS = Veterinary Services

RESTROOMS - FOCUS CITY	2010	2015	2020	2025	2030	2040	2050
	Projections						
Peak Hour Enplaning Passengers	450	810	1,090	1,120	1,205	1,585	1,960
Peak Hour Deplaning Passengers	383	689	927	952	1,024	1,347	1,666
Number of well-wishers per passenger	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Number of meeter/greeters per passengers	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Percentage of men passengers and visitors	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of women passengers and visitors	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Minutes per restroom use for men	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Minutes per restroom use for women	3	3	3	3	3	3	3
Airside Restrooms							
Percentage of PH enplaning passengers in peak 10 minutes	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH enplaning pax using airside restrooms	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Percentage of PH deplaning passengers using airside restrooms	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Number of fixtures for men	5	9	12	12	13	17	21
Number of fixtures for women	9	17	23	23	25	33	41
Number of restrooms	3	5	7	7	8	10	12
Square foot area per fixture	100	100	100	100	100	100	100
Total airside toilet square foot area for men	482	867	1,167	1,199	1,290	1,696	2,098
Total airside toilet square foot area for women	939	1,691	2,275	2,338	2,515	3,309	4,092
Family room square foot area	568	1,023	1,377	1,415	1,522	2,002	2,476
Janitorial square foot area	341	614	826	849	913	1,201	1,485
Total airside restrooms	2,330	4,195	5,645	5,800	6,240	8,208	10,150
Landside Restrooms							
Percentage of PH Enplaning passengers using landside restrooms	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH Deplaning passengers using landside restrooms	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of passengers in peak 10 minutes	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH well-wishers using landside restrooms	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Percentage of PH meeter/greeters using landside restrooms	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Number of fixtures required for men	5	9	12	13	13	18	22
Number of fixtures required for women	10	18	24	25	27	36	44
Number of restrooms	3	5	7	8	8	11	13
Square foot area per fixture	100	100	100	100	100	100	100
Total landside toilet square foot area for men	500	900	1,200	1,300	1,300	1,800	2,200
Total landside toilet square foot area for women	1,000	1,800	2,400	2,500	2,700	3,600	4,400
Family room square foot area	600	1,080	1,440	1,520	1,600	2,160	2,640
Janitorial square foot area	360	648	864	912	960	1,296	1,584
Total landside restrooms	2,460	4,428	5,904	6,232	6,560	8,856	10,824
Total Restrooms							
Total airside restroom square foot area	2,330	4,195	5,645	5,800	6,240	8,208	10,150
Total landside restroom square foot area	2,460	4,428	5,904	6,232	6,560	8,856	10,824
Total restroom square foot area	4,790	8,623	11,549	12,032	12,800	17,064	20,974

FOOD & BEVERAGE - FOCUS CITY	2010	2015	2020	2025	2030	2040	2050
	Projections						
Peak Hour Passengers	450	810	1,090	1,120	1,205	1,585	1,960
Percentage of Persons Using Restaurant	15%	20%	20%	20%	20%	20%	20%
Number of Peak Hour Passengers in Restaurant	68	162	218	224	241	317	392
Number of Well-wishers per Passenger	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Number of Employees using Restaurant in Peak Hour	4	11	14	15	16	21	25
Total Peak Hour Persons in Restaurant	92	221	298	306	329	433	535
Square Feet per Person in Restaurant	35	35	35	35	35	35	35
Square Feet Required for Restaurant	3,225	7,740	10,415	10,702	11,514	15,145	18,728
Square Feet Required for the Bar	967	2,322	3,124	3,210	3,454	4,543	5,618
Number of Restaurant/Bar Locations	3	3	3	3	3	3	3
Square Feet Required for Support & Storage Space	2,515	6,037	8,124	8,347	8,981	11,813	14,608
Total Area for Food and Beverage	6,708	16,098	21,663	22,259	23,949	31,501	38,954

CURBS - FOCUS CITY	Projections 2010	2015	2020	2025	2030	2040	2050
Enplanement Curb							
Peak 20-minute Enplanements	225	405	545	560	603	793	980
Number of well wishers per passenger	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Number of peak 20-minute passengers and well-wishers	293	527	709	728	783	1030	1274
Percentage of passengers using a private auto	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%
Percentage of private autos at enplanement curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Average number of persons per private auto	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Number of private autos at the curb in the peak 20-minutes	24	42	57	59	63	83	102
Average dwell time for private auto at the enplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a private auto in feet	25	25	25	25	25	25	25
Total length of curb required for private autos in the peak 20-minutes	88	159	214	220	236	311	384
Percentage of passengers using a taxi	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Percentage of taxis at enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per taxi	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Number of taxis at the enplaning curb in the peak 20-minutes	12	21	28	29	31	41	51
Average dwell time for a taxi at the enplanement curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a taxi in feet	25	25	25	25	25	25	25
Total length of curb required for taxis in the peak 20-minutes	44	79	106	109	117	155	191
Percentage of passengers using a rental car	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of rental cars at the enplaning curb	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Average number of persons per rental car	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Number of rental cars at the enplaning curb in the peak 20-minutes	0.5	0.9	1.2	1.2	1.3	1.7	2.1
Average dwell time for rental car at the enplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a rental car in feet	25	25	25	25	25	25	25
Total length of curb required for rental cars in the peak 20-minutes	25	25	25	25	25	25	25
Percentage of passengers using a courtesy shuttle	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Percentage of courtesy shuttles at the enplanement curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per courtesy shuttle	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Number of courtesy shuttles at the curb during the peak 20-minutes	5	8	11	11	12	16	20
Average dwell time for a courtesy shuttle at the enplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a courtesy shuttle in feet	35	35	35	35	35	35	35
Total length of curb requires for courtesy shuttles in the peak 20-minutes	35	43	57	59	63	83	103
Additional demand on off-peak hours	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Total length of the enplanement curb	211	336	442	454	486	631	774

CURBS - FOCUS CITY	Projections 2010	2015	2020	2025	2030	2040	2050
Deplaning Curb							
Peak 20-minute Deplanements	255	459	618	635	683	899	1111
Number of meeter/greeters per passenger	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Number of peak 20-minute passengers and meeter/greeters	459	827	1112	1,143	1,230	1,618	2,000
Percentage of passengers using a private auto	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%	74.0%
Percentage of private autos at deplaning curb	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Average number of persons per private auto	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Average number of private autos at the curb in the peak 20-minutes	37	66	89	92	99	130	161
Average dwell time for a private auto at the deplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a private auto in feet	25	25	25	25	25	25	25
Total length of curb required for private autos in the peak 20-minutes in feet	185	332	447	460	495	651	804
Percentage of passengers using a taxi	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Percentage of taxis at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per taxi	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Average number of taxis at the deplaning curb in the peak 20-minutes	18	33	44	46	49	65	80
Average dwell time for a taxi at the deplaning curb in minutes	3	3	3	3	3	3	3
Average length at the curb of a taxi in feet	25	25	25	25	25	25	25
Total length of curb required for taxis at the deplaning curb in feet	69	124	167	171	184	243	300
Percentage of passengers using a rental car	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Percentage of rental cars at the deplaning curb	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Average number of persons per rental car	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Average number of rental cars at the curb in the peak 20-minutes	0.4	0.7	0.9	1.0	1.0	1.3	1.7
Average dwell time for rental car at the deplaning curb in minutes	4	4	4	4	4	4	4
Average length at the curb of a rental car in feet	25	25	25	25	25	25	25
Total curb length in feet required for rental cars in the peak 20-minutes	25	25	25	25	25	25	25
Percentage of passengers using a courtesy shuttle	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Percentage of courtesy shuttles at the deplaning curb	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Average number of persons per courtesy shuttle	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Average number of courtesy shuttles at the curb in the peak 20-minutes	7	13	17	18	19	25	31
Average dwell time of a courtesy shuttle at the deplaning curb in minutes	2	2	2	2	2	2	2
Average length at the curb of a courtesy shuttle in feet	35	35	35	35	35	35	35
Total curb length required in feet for courtesy shuttles in peak 20-minutes	35	45	60	62	66	87	108
Additional demand in off-peak hours	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Total length of deplaning curb	345	579	769	789	847	1106	1,361
Total Focus City Curb Length	556	914	1,211	1,243	1,333	1,737	2,134

Annual Enplanements	617,000	2,000,000
Peak Hour Enplanements	450	1,410
TWO MILLION ANNUAL ENPLANED PASSENGERS SUMMARY		**Projections**
Terminal Functional Areas	**Existing**	**2 MAEP**
Airline		
Number of check-in counters - exclusive use	36	21
Number of check-in kiosks - exclusive use	20	18
Check-in counter and kiosk length in lineal feet - exclusive use	228	171
Number of departure lounges or holdrooms	13	16
Number of slope-plate baggage claim devices*	2	5
Lineal feet of baggage claim frontage	250	670
Total square foot area of exclusive use check-in counters and kiosks	1,936	2,560
Square foot area of check-in queue - exclusive use	1,891	2,860
Airline office square foot area	4,951	3,400
Baggage make-up square foot area	9,000	29,600
Total square foot area of departure lounges or holdrooms	33,094	47,640
Inbound baggage input square foot area	4,152	8,000
Baggage claim retrieval square foot area	8,491	18,000
Square feet of baggage service offices	895	980
Subtotal Square Feet of Airline Functional Areas	64,410	113,040
Security		
Number of 2009 TSA security screening check point position(s)	4	11
Number of full body scanners	0	4
Number of complete body pat down areas	0	2
Number of ETD primary screening positions	8	0
Number of EDS primary screening positions	0	0
Number of in-line EDS primary screening positions	0	4
Total square foot area of 2009 TSA security station(s)	2,674	4,980
Square foot area of 2009 TSA security station(s) queue	1,735	3,300
Total square foot area of full body scanning position(s)	0	810
Total square foot area for full body scanning position(s) queue	0	180
Total square foot area of complete pat down areas	0	80
Total square foot area of complete pat down area queue	0	10
Total square foot area of post security screening check point	0	2,200
Total square foot area of ETD primary baggage screening	0	0
Total square foot area of EDS primary baggage screening	0	0
Total square foot area of in-line EDS primary baggage screening	0	20,610
TSA offices and support space in square feet	1,346	6,100
Subtotal Square Feet of Security	5,755	38,270

Terminal Concessions in Square Feet		
Food/beverage/retail	16,953	21,130
Rental car counters and offices	2,184	3,480
Rental car queue	1,126	720
Subtotal in Square Feet of Terminal Concessions	20,263	25,330
Public Areas in Square Feet		
Non-secure public restrooms	1,207	7,900
Secure public restrooms	2,706	7,400
Terminal conference rooms	1,276	1,950
Waiting and seating	3,990	24,040
Public circulation including lobby and entrance	52,448	77,200
Subtotal Public Areas in Square Feet	61,627	118,490
Non-Public Areas in Square Feet		
Airport Operations	1,174	1,900
Airport Police	1,289	4,300
Maintenance, storage and janitorial	907	9,000
Circulation	924	5,040
Mechanical/electrical/utility	27,842	51,590
Subtotal Non-Public Areas in Square Feet	32,136	71,830
SUBTOTAL PROJECT AREA (Net)	**184,191**	**366,960**
Net to Gross Factor	6,080	12,110
SUBTOTAL PROJECT AREA (Gross)	**190,271**	**379,070**
Square Feet Per Annual Enplaned Passenger	0.31	0.19
Square Feet Per Peak Hour Passenger	423	269
Terminal Ancillary Areas		
Airline operational square foot area	**12,932**	7,500
Airport Administrative Offices	**4,267**	13,500
Customs and Border Protection		
Sterile Corridor System		80
Primary Processing		2,940
Secondary Processing		3,810
CBP Administration		1,520
Preclearance Facilities		0
Circulation and Building Services		5,060
Subtotal Customs and Border Patrol in Square Feet	7,688	13,410
Subtotal Terminal Ancillary Areas	24,887	34,410
TOTAL BUILDING AREA	**215,158**	**413,480**

CBP = Customs and Border Protection
EDS = Explosives Detection System
PH = Peak Hour
TSA = Transportation Security Administration
* Existing baggage claim devices are flat-pleat devices

TWO MILLION ENPLANED PASSENGERS FORECAST	2 MAEP
Enplanements	
Annual Enplaned Passengers	2,000,000
Peak Month (9.1% of Annual)	182,000
Average Day (30 days)	6,067
Peak Hour	1,435
Peak 20-minute	718
Deplanements	
Annual Deplaned Passengers	1,980,000
Peak Hour	1,220
Peak 20-minute	814
Commercial Operations	
Annual	41,800
Average Day	127
Peak Hour	30
Gates	16
Average Passengers per Peak Hour Flight	96

	Projections
DATA AND ASSUMPTIONS - TWO MILLION ANNUAL ENPLANED PASSENGERS	**2 MAEP**
Check-in	
Number of airlines operating at the airport	7
Average processing time per passenger at conventional check-in in seconds	150
Average processing time per passenger at kiosk check-in in seconds	90
Width per check-in counter including bag wells in lineal feet	4.4
Width per kiosk including bag wells in lineal feet	4.4
Depth per check-in counter or kiosk in lineal feet(1)	15
Maximum queuing time at check-in in minutes	10
Percentage of passengers using check-in	50.0%
Percentage of passengers using conventional check-in	40.0%
Percentage of passengers using kiosk check-in	60.0%
Square foot area per person in check-in queue	14
Passenger Security Screening	
Processing time per passenger at 2009 security in seconds	12
Additional processing time per passenger with full body scan in seconds	24
Additional processing time per passenger for full body pat-down	180
Square foot area per 2009 security station (2)	830
Square foot area per full body scanner	90
Square foot area of pat-down area	40
Percentage of passengers also full body scanned	25.0%
Percentage of passengers with complete pat down	2.0%
Maximum queue time in minutes at 2009 security (TSA Goal)	10
Maximum queue time in minutes at full body scan	2
Maximum queue time in minutes a complete pat-down	2
Square foot area per person in security queue (per TSA)	9
Baggage Security Screening	
Percentage of passengers checking bags	50%
Average number of checked bags per passenger checking baggage	1.3
Percentage of bags primary screened with ETD	0%
Percentage of bags primary screened with in-line EDS system	100%
ETD processing rate of bags per hour including opening 100% of bags	45
In-line EDS processing rate in bags per hour	225
Departure Lounges or Holdrooms	
Square foot area per passenger in departure lounge	15
Percentage of 1-20 seat aircraft in aircraft mix	0.0%
Percentage of 21-50 seat aircraft in aircraft mix	0.0%
Percentage of 51-80 seat aircraft in aircraft mix	38.7%
Percentage of 81-110 seat aircraft in aircraft mix	34.3%
Percentage of 111-130 seat aircraft in aircraft mix	0.0%
Percentage of 131-160 seat aircraft in aircraft mix	23.2%
Percentage of 161-180 seat aircraft in the aircraft mix	3.9%
Baggage Claim	
Time in minutes each flight remains on baggage claim device (average)	20
Time in minutes average passenger with meeter/greeters remains in baggage claim	15
Number of seats on largest aircraft served	175
Square foot area per passenger in baggage claim area	18

DATA AND ASSUMPTIONS - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Average number of meeter/greeters per passenger	0.8
Assumed length of baggage claim per bag	1.2
Restrooms	
Percentage of PH passengers in peak 10 minutes	25.0%
Percentage of PH enplaning pax using restrooms airside	50.0%
Percentage of PH enplaning pax using restrooms landside	25.0%
Percentage of PH deplaning passengers using restrooms landside	20.0%
Percentage of PH deplaning passengers using airside restrooms	5.0%
Percentage of PH well-wishers using landside restrooms	25.0%
Percentage of PH meeter/greeters using landside restrooms	30.0%
Percentage of men passengers	50.0%
Percentage of women passengers	50.0%
Time in minutes per use for men	1.5
Time in minutes per use for women	3
Square foot area per fixture	100
Meeter/Greeter/Well-wishers	
Number of well wishers per passenger	0.3
Number of meeter/greeters per passenger	0.8
Restaurant	
Percentage of daily passengers using restaurant	20.0%
Square feet per person in restaurant	35
Rental Cars	
Number of rental car companies	8
Terminal Curbs	
Percentage of passengers using a private vehicle	74.0%
Percentage of private vehicles at enplanement curb	25.0%
Percentage of private vehicles at deplaning curb	25.0%
Average number of persons per private vehicle	2.3
Average dwell time for private vehicle at the enplaning curb in minutes	3
Average dwell time for a private vehicle at the deplaning curb in minutes	4
Average length at the curb of a private vehicle in feet	25
Percentage of passengers using a taxi	4.0%
Percentage of taxis at enplanement curb	100.0%
Percentage of taxis at the deplaning curb	100.0%
Average number of persons per taxi	1.0
Average dwell time for a taxi at the enplanement curb in minutes	3
Average dwell time for a taxi at the deplaning curb in minutes	3
Average length at the curb of a taxi in feet	25
Percentage of passengers using a rental car	20.0%
Percentage of rental cars at the enplaning curb	1.0%
Percentage of rental cars at the deplaning curb	0.5%
Average number of persons per rental car	1.2
Average dwell time for rental car at the enplaning curb in minutes	4
Average dwell time for rental car at the deplaning curb in minutes	4
Average length at the curb of a rental car in feet	25
Percentage of passengers using a courtesy shuttle	2.0%
Percentage of courtesy shuttles at the enplanement curb	100.0%
Percentage of courtesy shuttles at the deplaning curb	100.0%

DATA AND ASSUMPTIONS - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Average number of persons per courtesy shuttle	1.3
Average dwell time for a courtesy shuttle at the enplaning curb in minutes	3
Average dwell time of a courtesy shuttle at the deplaning curb in minutes	2
Average length at the curb of a courtesy shuttle in feet	35

(1) Includes take-away belt, area behind counter, counter, and corridor in front of counter
(2) TSA 2009 Standards for Layout SAT.LWBI.3.2.a (square foot average area per position for
layouts with three or more positions)

PH = Peak Hour
pax = passengers
well-wishers = terminal visitors accompanying departing passengers
meeter/greeters = terminal visitors waiting for and greeting arriving passengers
TSA = Transportation Security Administration

CHECK-IN COUNTERS - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Peak-hour enplanements	1,410
Peak Hour Aircraft Departures	15
Percentage of 20-minute peak passengers	50.0%
Ratio of additional demand in off-peak hours	1
Percentage of enplaning passengers using check-in	50.0%
Percentage of enplaning passengers using conventional check-in	40.0%
Percentage of enplaning passengers using kiosk check-in	60.0%
Peak 20-minute passengers using conventional check-in - Common Use	144
Peak 20-minute passengers using kiosk check-in - Common Use	215
Maximum queuing time in minutes	10
Average processing time per passenger at check-in counter in seconds	150
Average processing time per passenger at check-in kiosk in seconds	90
Total number of airlines operating at airport	7
Length per check-in counter or kiosk including 1/2 bag well in lineal feet	4.4
Depth per check-in counter or kiosk in lineal feet (1)	15
Conventional Check-in Counters - Common-Use	
Total number of check-in positions	20
Length of check-in counters in lineal feet	87
Total check-in counter square foot area	1,298
Check-in Kiosks - Common-Use	
Total number of check-in kiosks	18
Length in lineal feet of check-in kiosks	78
Total check-in kiosk square foot area	1,168
Total square foot area of conventional and kiosk check-in positions - Common Use	2,470
Conventional Check-in Counters - Exclusive Use	
Peak 20-minute passengers using conventional check-in	144
Total number of check-in counter positions	21
Length in lineal feet	91
Total check-in counter square foot area	1,366
Check-in Kiosks - Exclusive Use	
Peak 20-minute passengers using kiosks check-in	215
Total number of kiosk positions	18
Length in lineal feet	80
Total kiosk square foot area	1,199
Total square foot area of conventional and kiosk check-in positions - Exclusive Use	2,560

(1) Includes area behind counter, counter, and corridor in front of counter

CHECK-IN QUEUE - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Peak-hour enplanements	1,410
Number of airlines operating at the airport	7
Peak-hour operations	30
Additional demand in off-peak hours	1
Percentage of passengers using check-in	50.0%
Maximum queuing time in minutes	10
Average processing time in seconds per passenger at counter	150
Average processing time in seconds per passenger at kiosk	90
Square foot area per passenger in check-in queue	14
Common-Use	
Peak 20-minute passengers using conventional check-in - Common Use	144
Number of check-in counters	20
Maximum number of passengers in counter queue	79
Square foot area of check-in counter queue	1,105
Peak 20-minute passengers using kiosk check-in - Common Use	215
Number of kiosks	18
Maximum number of passengers in kiosk queue	118
Square foot area of kiosk queue	118
Total square foot area of check-in queues - Common Use	1,220
Exclusive-Use	
Peak 20-minute passengers conventional check-in	144
Number of check-in counters	21
Maximum number of passengers in counter queue	83
Square foot area of check-in counter queue	1,160
Peak 20-minute passengers using kiosk check-in	215
Number of kiosks	18
Maximum number of passengers in kiosk queue	122
Square foot area of kiosk queue	1,700
Total square foot area of check-in queues - Exclusive Use	2,860

BAGGAGE MAKE-UP	Projections 2 MAEP
No. Equivelent aircraft Gates	11.5
Depart per Gate Peak 2-4 Hr Period	1.5
Staged Carts per Departure	2.5
Total Peak Staged Carts	43
Perpindicular Parked Carts (25%)	11
Parallel Parked Carts (75%)	32
Perpindicular Cart Frontage (8') LF	86
Parallel Cart Frontage (15') LF	485
Number of Airlines	7
Number of Carousels (144')	4.0
Effective Number of Carousels	4.0
Area per Carousel, incl Staging SF	15,200
Carts Maneuvering / Circulation SF	14,400
Total Bag Make-Up Area SF	29,600

SECURITY - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Security Screening Checkpoint	
Security Screening Checkpoint	
Peak Hour Enplanements	1,410
Peak 10-minute enplanements (.20)	282
Average processing rate (secs.)	12
Number of lanes needed	6
Space requirement per lane (SF)	830
Total square foot of lane space	4980
2009 Security Screening Checkpoint Queue	
Maximum security screening checkpoint queue time in minutes	10
Maximum number passengers queuing	367
Square foot area per passenger in queue	9
Total square foot area of 2009 security queuing	3,300
Full Body Scan Screening	
Percentage of passengers also full body scanned	25.0%
Additional processing time per passenger with full body scan in seconds	24
Number of full body scanners required	4
Square foot area per full body scanner	90
Remote threat analysis screening in square feet	150
Staff support space square foot area	300
Additional required area for full body scanner(s)	810
Full Body Scan Queue	
Maximum queue time in minutes	2
Maximum number of passengers in queue	20
Square foot area per passenger in queue	9
Square foot area of full body scan queue	180
Complete Pat-Down Screening	
Percentage of passengers with complete pat down	2.0%
Additional processing time per passenger for full body pat-down	180
Number of full body pat-down areas	2
Square foot area of pat-down area	40
Additional area required for complete pat-down	80
Complete Pat Down Screening Queue	
Maximum queue time in minutes	2
Maximum number of passengers in queue	1
Square foot area per passenger in queue	9
Square foot area of complete pat-down queue	9
Post Security	
Square foot area post security	2,200
Deplaneing Corridor	
Peak 20-minute deplaning passengers	814
Minimum width of deplaning corridor in lineal feet	7

SECURITY - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Length of deplaning corridor in lineal feet	49
Square foot area of deplaning corridor	321
Total Square Foot Area of Security Screening Checkpoint	16,030
Checked Baggage Screening	
Peak hour enplanements	1,435
% Enpl. Checking Bags	50%
Avg Bags Per Enpl Checking Bags	1.3
Total Peak Hour Checked Bags	917
Area per ETD screening position	120
Percentage of bags primary screened with EDS system	0.0%
EDS processing rate of bags per hour	60
Number of EDS machines required	0
Square foot area per EDS machine (Reveal type)	360
Number of secondary screening ETD tables	0
Square foot area of all secondary screening ETD tables	0
Total square foot area of EDS screening	0
Percentage of bags primary screened with in-line EDS system	100.0%
In-Line Processing Rate	225
Qty In-Line EDS Stations	4.1
Actual EDS Stations	4
Area Per EDS Station SF	650
Total Area EDS Stations SF	2,600
Conveyor Control Room SF	1599
Conveyor Storage and Maint. SF	260
Baggage Encoding Station SF	3,600
EDS Storage and Maint. SF	400
Threat Resolution Room SF	288
EDS Staff Support SF	600
Qty Secondary Screening Stations	8
Area per Secondary Screening Station	120
Total Area Secondary Screening SF	960
Total Area In-Line EDS System SF	10,307
Conveyor Space Factor SF	10,307
Total Area Bag Screening SF	20,614

EDS= Explosives Detection System
ETD = Explosives Trace Detection

DEPARTURE LOUNGES/HOLDROOMS - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Peak Hour Enplanements	1,410
No. of Gates	16
Largest Regular Aircraft (seats)	175
Percent PAX Accommodated / Gate	85%
Passengers Accommodated	148.75
Holdroom Seating Area	42,840
Deplaning Corridor	2,880
Airline Operational Space	1,920
Total Holdroom Area	47,640

BAGGAGE CLAIM - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Seats on Largest Aircraft	175
Checked Bags per Aircraft	114
Ideal Frontage per Bag LF	1.2
Claim Frontage per Aircraft LF	137
No. Peak Hour Arriving Aircraft	19
Avg. Minutes Occupying Carousel	20
Number Carousels	5
Sloped Plate Carousel Frontage LF	134
Area per Carousel incl Passengers SF	3,600
Total Bag Claim Area SF	18,000

CUSTOMS AND BORDER PROTECTION	200 Peak-hour Deplaning International Passengers
Peak-hour international deplaning passengers	200
Peak-hour in-transit passengers	0
Number of CBP gates	1
Sterile Corridor System	
Number of VIP lounges	0
Number of in-transit lounges	0
Outbound interview room area	80
VIP lounge area	0
In-transit lounge area	0
In-transit lounge office	0
Additional in-transit lounge standards	0
Sterile corridor area	0
Subtotal square feet of Sterile Corridor System	80
Primary Processing	
Processing rate per passenger in minutes	1
Number of piggy-back positions required	3
Number of piggy-back counters	2
Square foot area per piggy-back counter with circulation and queue	1,380
Number of CBP forms counters	1
Square foot area per CBP forms counter	24
Number of CBP Coordination Centers required	1
Square foot area per CBP Coordination Center	255
Number of public restroom fixtures required (local codes may supersede)	2
Square foot area required per public restroom fixture	180
Area of piggy-back positions with circulation	2,300
Area of all CBP forms counters	24
Total area for CBP Coordination Centers	255
Total public restroom area required	360
Subtotal square feet of Primary Inspection	2,940
Secondary Processing	
Square foot area required per waiting passenger	25
Number of passengers queuing	20
Number of Referral Passengers Waiting	10
Area per Referral Passenger	25
Number of Secondary Baggage Exam podiums and baggage belts	0
Minimum square foot processing area per Secondary Baggage Exam position	756
Number of Secondary Baggage X-ray processing workstations	1
Minimum square foot area per Secondary Baggage X-ray processing workstation	1,476
Number of CBP agricultural laboratory and disposal rooms (varies by CBP)	1
Minimum area per agricultural laboratory and disposal room	150
Number of public restroom fixtures required (local codes may supersede)	2

CUSTOMS AND BORDER PROTECTION	200 Peak-hour Deplaning International Passengers
Square foot area required per restroom fixture	180
Number of interview rooms	1
Square foot area per interview room	80
Number of search rooms	1
Square foot area per search room	80
Square foot area of Rover Coordination Center (for multi-level facilities only)	225
Total square foot area of passenger queue	250
Square foot area of Triage Podium (single and double)	180
Square foot area of Triage Podium (quad)	0
Total square foot Referral Passenger waiting area	125
Total square foot area Secondary Baggage Exam and baggage belts	0
Total square foot area for Secondary Baggage X-ray processing workstations	1,476
Cashier's Office	0
Total minimum area of agricultural laboratories and disposal rooms	150
CBP/APHIS VS Bird Quarantine and Bird Hold Facilities (varies by CBP)	
Total public restroom area required	360
Total area of all interview rooms	80
Total area of all search rooms	80
Area of Male Detention Room with toilet and fixtures	115
Area of Female Detention Room with toilet and fixtures	115
Area of Juvenile Detention Room with toilet and fixtures	115
Area of food preparation and storage	0
Expedited/Voluntary Removal Room Male (as required by CBP)	0
Expedited/Voluntary Removal Room Female (as required by CBP)	0
Subtotal square foot area of Secondary Processing	3,271
Secondary Operations and Support	
Number of detainee baggage storage rooms	1
Number of canine kennels (varies by CBP)	
Square foot area per canine kennel	100
Number of agents offices: US ICE (ICE) (varies)	
Area per ICE agent's office	150
ADIT room area	110
JABS/Identification room area	0
Fraudulent Document Analysis room area	0
Secondary Supervisor's office area	150
Prosecution Officer's office area	0
Total square foot area of detainee baggage storage rooms	50
Total square foot area of canine kennels	0
Canine Unit Secure Aid storage area	0
Canine Unit general training aid storage area	0
Canine Unit general storage area	50
Passenger Service Representative area	0
Total square foot area for ICE agent's office	0
Subtotal square foot area of Secondary Operations and Support	360

CUSTOMS AND BORDER PROTECTION	200 Peak-hour Deplaning International Passengers
Exit Podium	
Number of single exit podiums	1
Square foot area per exit podium (single, single aisle)	180
Number of double exit podiums	0
Square foot area of exit podium (double, double aisle)	0
Total square foot area of single exit podiums	180
Total square foot area of double exit podiums	0
Subtotal square foot area of Exit Podiums	180
Subtotal square foot area of Secondary Processing	3,811
CBP Administration	
Number of supervisor's offices	1
Square foot area per supervisor's office	150
Number of General Office Workstations "C"	4
Square foot area per general office workstation	64
Number of Anti-Terrorism Contraband Enforcement Team modules "B"	0
Square foot area per Anti-Terrorism Contraband Enforcement Team module "B" (4 @64 sf)	256
Number of Passenger Analysis Unit (PAU) offices	0
Square foot area per PAU office (4 @ 64 sf)	256
CBP officer/staff area	
Port Director's office	225
Port Director's conference room	0
Port Director's secretary/reception area	0
Assistant Port Director's office	0
Chief Officer's office	175
Total square foot area of Supervisor's offices	150
Intelligence office	0
Total square foot area general office workstations	128
Anti-Terrorism Contraband Enforcement Team area	0
Passenger Analysis Unit office area (4 @ 64 sf)	0
Outbound Team office area (4 @ 64 sf)	0
Canine Unit office area (4 @ 64 sf)	0
Subtotal square foot area of CBP offices	678
CBP Support Spaces	
Number of officers	7
Airport reception	0
Public reception/Entrance & Clearance (E&C) office (varies, See CBP)	
Airport Identification (I.D. Badging and secure file) room	0
Conference training room	0
Conference training equipment storage	0
Mail/copier/shredder room	0
Weapons storage room	0

CUSTOMS AND BORDER PROTECTION	200 Peak-hour Deplaning International Passengers
Communications room (telephone and radio)	60
Computer room	80
General storage/file room	150
Secure storage room(s)	60
Break room	275
Male and female staff toilets/showers/lockers minimum (varies)	220
Union office	0
Physical training room (varies)	
US-PASS/NEXUS Enrollment Center and storage (as determined by CBP)	
Subtotal square foot area of CBP Support Spaces	845
Subtotal square foot area of CBP Administration	1,523
Circulation and building services	
Circulation	2,757
Mechanical	1,667
Building structure	639
Subtotal square feet of Circulation and Building Services	5,062
Total square foot area of Air Carrier CBP Facilities	13,416
Minimum number of parking spaces for official vehicles	2
Minimum Parking for Employee Vehicles	8

ADIT = Alien Documentation Identification and Telecommunication
APHIS = Animal and Plant Health Inspection Service
AQI = Agricultural Quarantine Inspection
CBP = Customs and Border Protection
FIS = Federal Inspection Services
GAF = General Aviation Facilities
ICE = Immigration and Customs Enforcement
JABS = Joint Agency Booking System (now referred to as the CBP Coordination Center)
PAU = Passenger Analysis Unit

PASS/NEXUS = a joint venture between the Canada Border Services (CBSA) and the CBP, it is designed to expedite the border clearance process for low risk, pre-approved travelers into Canada and the U.S.
VIP = Very Important Persons
VS = Veterinary Services

RESTROOMS - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Peak-hour enplaning passengers	1,435
Peak-hour deplaning passengers	1,220
Number of well-wishers per passenger	30.0%
Number of meeter/greeters per passenger	0.8
Percentage of men passengers and visitors	50.0%
Percentage of women passengers and visitors	50.0%
Minutes per restroom use for men	1.5
Minutes per restroom use for women	3
Airside Restrooms	
Percentage of PH enplaning passengers in peak 10 minutes	25.0%
Percentage of PH enplaning pax using airside restrooms	50.0%
Percentage of PH deplaning passengers using airside restrooms	5.0%
Number of fixtures for men	15
Number of fixtures for women	30
Number of restrooms	9
Square foot area per fixture	100
Total airside toilet square foot area for men	1,536
Total airside toilet square foot area for women	2,996
Family room square foot area	1,813
Janitorial square foot area	1,088
Total airside restrooms	7,432
Landside Restrooms	
Percentage of PH enplaning passengers using landside restrooms	25.0%
Percentage of PH deplaning passengers using landside restrooms	20.0%
Percentage of passengers in peak 10-minutes	25.0%
Percentage of PH well-wishers using landside restrooms	25.0%
Percentage of PH meeter/greeters using landside restrooms	30.0%
Number of fixtures required for men	16
Number of fixtures required for women	32
Number of restrooms	10
Square foot area per fixture	100
Total landside toilet square foot area for men	1,600
Total landside toilet square foot area for women	3,200
Family room square foot area	1,920
Janitorial square foot area	1,152
Total landside restrooms	7,872
Total Restrooms	
Total airside restroom square foot area	7,432
Total landside restroom square foot area	7,872
Total restroom square foot area	15,304

FOOD & BEVERAGE - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Peak-hour passengers	1,435
Percentage of persons using restaurant	20%
Number of peak-hour passengers in restaurant	287
Number of well-wishers per passenger	0.3
Number of employees using restaurant in peak hour	19
Total peak-hour persons in restaurant	392
Square feet per person in restaurant	35
Square feet required for restaurant	13,711
Square feet required for the bar	4,113
Number of restaurant/bar locations	3
Square feet required for support and storage	10,695
Total square foot area for Food and Beverage	28,520

CURBS - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Enplanement Curb	
Peak 20-minute	718
Number of well wishers per passenger	0.3
Number of peak 20-minute passengers and well-wishers	933
Private Vehicles	
Percentage of passengers using a private vehicle	74.0%
Percentage of private vehicles at enplanement curb	25.0%
Average number of persons per private vehicle	2.3
Number of private autos at the curb in the peak 20-minutes	75
Average dwell time for private vehicle at the enplaning curb in minutes	3
Average length at the curb of a private vehicle in feet	25
Total length of curb required for private vehicles in the peak 20-minutes	281
Taxis	
Percentage of passengers using a taxi	4.0%
Percentage of taxis at enplanement curb	100.0%
Average number of persons per taxi	1.0
Number of taxis at the enplaning curb in the peak 20-minutes	37
Average dwell time for a taxi at the enplanement curb in minutes	3
Average length at the curb of a taxi in feet	25
Total length of curb required for taxis in the peak 20-minutes	140
Rental Cars	
Percentage of passengers using a rental car	20.0%
Percentage of rental cars at the enplaning curb	1.0%
Average number of persons per rental car	1.2
Number of rental cars at the enplaning curb in the peak 20-minutes	1.6
Average dwell time for rental car at the enplaning curb in minutes	4
Average length at the curb of a rental car in feet	25
Total length of curb required for rental cars in the peak 20-minutes	25
Courtesy Shuttle	
Percentage of passengers using a courtesy shuttle	2.0%
Percentage of courtesy shuttles at the enplanement curb	100.0%
Average number of persons per courtesy shuttle	1.3
Number of courtesy shuttles at the enplaning curb during the peak 20-minutes	14
Average dwell time for a courtesy shuttle at the enplaning curb in minutes	3
Average length at the curb of a courtesy shuttle in feet	35
Total length of curb requires for courtesy shuttles in the peak 20-minutes	75
Additional demand on off-peak hours	1.1
Total length of the enplanement curb	574
Deplaning Curb	
Peak 20-minute	814
Number of meeter/greeters per passenger	0.8
Number of peak 20-minute passengers and meeter/greeters	1,464

CURBS - TWO MILLION ANNUAL ENPLANED PASSENGERS	Projections 2 MAEP
Percentage of passengers using a private vehicle	74.0%
Percentage of private vehicles at deplaning curb	25.0%
Average number of persons per private vehicle	2.3
Average number of private autos at the curb in the peak 20-minutes	118
Average dwell time for a private vehicle at the deplaning curb in minutes	4
Average length at the curb of a private vehicle in feet	25
Total length of curb required for private vehicles in the peak 20-minutes in feet	589
Taxis	
Percentage of passengers using a taxi	4.0%
Percentage of taxis at the deplaning curb	100.0%
Average number of persons per taxi	1.0
Average number of taxis at the deplaning curb in the peak 20-minutes	59
Average dwell time for a taxi at the deplaning curb in minutes	3
Average length at the curb of a taxi in feet	25
Total length of curb required for taxis at the deplaning curb in feet	220
Rental Cars	
Percentage of passengers using a rental car	20.0%
Percentage of rental cars at the deplaning curb	0.5%
Average number of persons per rental car	1.2
Average number of rental cars at the deplaning curb in the peak 20-minutes	1.2
Average dwell time for rental car at the deplaning curb in minutes	4
Average length at the curb of a rental car in feet	25
Total length of curb in feet required for rental cars at the curb in the peak 20-minutes	25
Courtesy Shuttle	
Percentage of passengers using a courtesy shuttle	2.0%
Percentage of courtesy shuttles at the deplaning curb	100.0%
Average number of persons per courtesy shuttle	1.3
Average number of courtesy shuttles at the deplaning curb in the peak 20-minutes	23
Average dwell time of a courtesy shuttle at the deplaning curb in minutes	2
Average length at the curb of a courtesy shuttle in feet	35
Total length of curb required in feet for courtesy shuttles in the peak 20-minutes	79
Additional demand in off-peak hours	1.1
Total length of deplaning curb	1,004