MILWAUKEE COUNTY'S

GENERAL MITCHELL INTERNATIONAL AIRPORT

Proposed Terminal Expansion and Central Checkpoint Feasibility Study & Cost Estimate

Proposed Concourse E International Terminal Study & Cost Estimate

March 17, 2015

Prepared by

Graef-USA, Inc.

with

James G Otto Architect, LLC
Kindness Architecture + Planning
Vic Thompson Company
Middleton Construction Consulting, LLC
Corgan Associates, Inc.

Milwaukee County Project No. A201-14012

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1. Introduction/Overview

1.1 Overview and Study Process

This study includes three components; the Central Checkpoint, the Terminal Mall Expansion and the Concourse E International Terminal. This report presents both the analysis and the conclusions in general in the executive summary, and in detail in the body of the report, regarding the conceptual feasibility for all three components. Alternatives were explored and analyzed by the design team and representatives of the General Mitchell International Airport for all three components.

The study process began with a data gathering phase which included obtaining and reviewing available record drawings of the affected areas, and specific user group meetings to obtain metrics and requirements related to the checkpoint design. The study process included three interactive planning workshops with the design team and General Mitchell International Airport leadership to review issues, options, concepts and achieve consensus on the direction of all three study components. The first workshop focused primarily on the checkpoint design criteria and general layout possibilities, and the international terminal design criteria and general layout possibilities. The second workshop continued with refinement of the issues and options developed from workshop one and began development of the terminal mall design criteria and general layout possibilities including functional diagraming of the factors impacting the potential layouts. The third workshop began the process of synthesizing the existing facility information, formulated demand data, planning & design options criteria, stakeholder requirements, code requirements, airport operational requirements, constructability requirements and costs along with the results of workshops one and two with the impacts and constraints of the existing terminal facility, and passenger flow. Throughout the study process, the Planning & Design Criteria were continuously updated to reflect the evolution of then design options.

Terminal Mall Expansion: General Mitchell International Airport has three concourses which connect to a central terminal mall. Each concourse has an independent checkpoint dedicated to each concourse located at the junction of the concourse and terminal mall. The current arrangement isolates the terminal mall after passengers clear the checkpoints, limiting the potential traffic to the terminal mall concessions. The current arrangement also prevents passengers from transferring from concourse to concourse without the need to be re-screened at each concourse. The study considered and presents options to consolidate the three independent checkpoints into a central checkpoint to improve efficiency and passenger comfort, and to expand the terminal mall to increase concessions opportunities and improve the passenger experience.

Exhibit 1.1 depicts the existing terminal mall and adjacent concourse areas.
Exhibit 1.2 depicts the RFP terminal mall expansion concept.

Concourse E International Terminal: Currently international arrivals are processed at a separate stand-alone facility located northwest of the main terminal, isolating returning passengers from the main terminal facilities and creating a less than optimum passenger experience. The study considered and presents options to relocate the international terminal facilities contiguous with the main terminal to improve the passenger experience and staffing efficiencies.

1.2 Project Team

This report was prepared for General Mitchell International Airport.

This report was prepared by:

- Graef-USA, Inc.
- James G Otto Architect, LLC
- Kindness Architecture + Planning
- Vic Thompson Company
- Middleton Construction Consulting, LLC
- Corgan Associates, Inc.

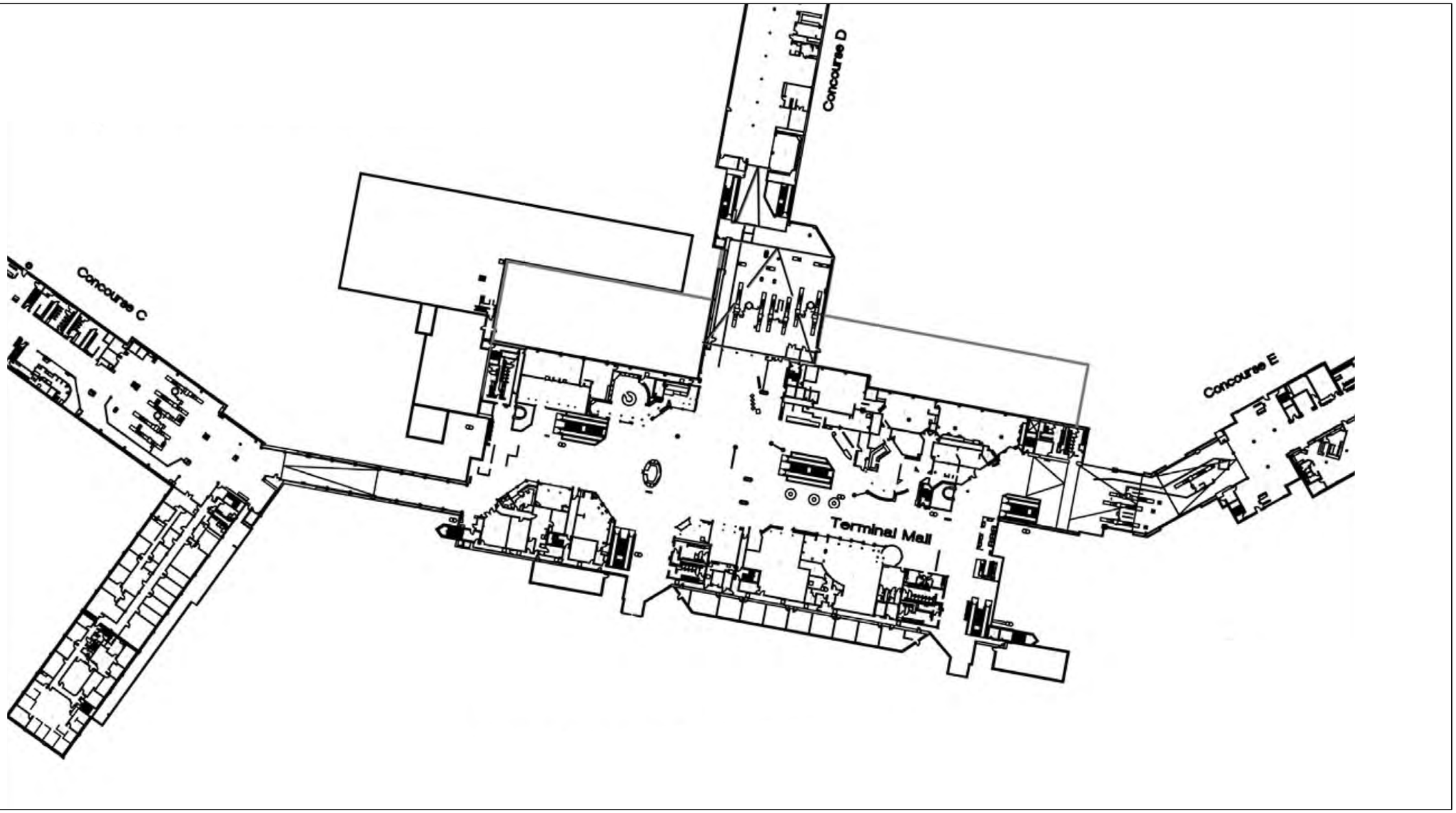

Exhibit 1.1

north

Not To Scale

Existing Terminal Mall and Adjacent Concourse Areas

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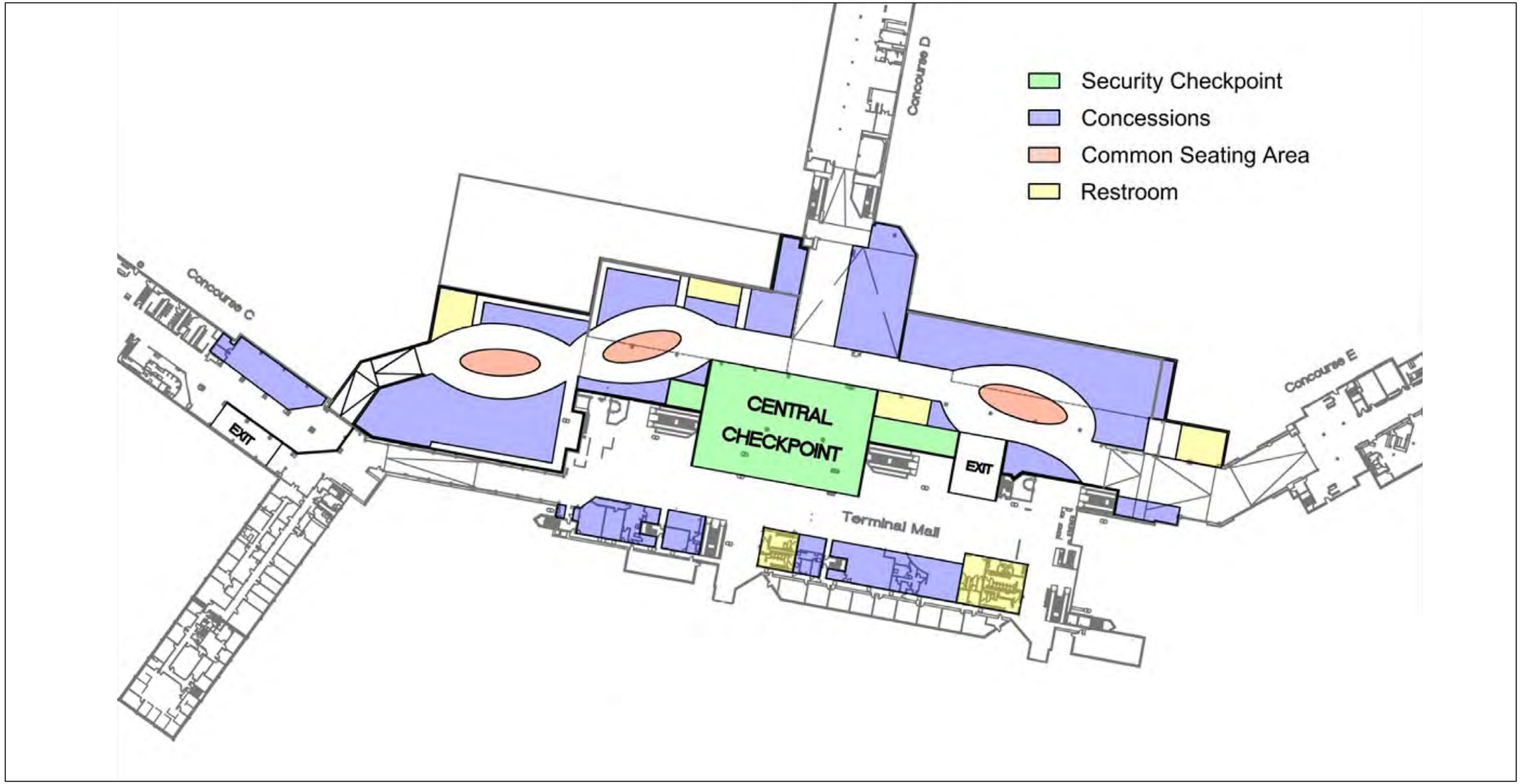

Exhibit 1.2

north

Not To Scale

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

RFP Terminal Mall Expansion
Concept Diagram

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2. Executive Summary

2.1 Proposed Central Checkpoint

Passenger screening checkpoints are located at the entrance of all three concourses, each of which experience restricted space for passenger flow and less than ideal conditions for performing the screening functions. Concourse C has five (5) lanes, Concourse D has six (6) lanes and Concourse E has three (3) lanes plus one convertible lane when required. With these decentralized checkpoints, TSA resource utilization is less than optimal particularly when peak periods of traffic are spread between concourses.

Checkpoint configuration is dictated by TSA. Guidelines for determining those configurations and space requirements are provided in TSA's Checkpoint Design Guidelines version 5.1 (CDG) and were used as the basis of the recommended checkpoint layout. Various options were examined for the design of the central checkpoint during the course of this study using TSA checkpoint screening data for the month of March, 2011 which was provided by GMIA and represents a period of time where all concourses (C, D and E) were operating a full capacity.

Based on calculated values of hourly peak passengers processed and TSA's declared processing times for PreCheck and Standard screening protocols, eight (8) passenger screening lanes with the ability to add two (2) for future growth was determined to provide the appropriate capacity. Using the "8+2 lane" footprint for passenger screening, two checkpoint layout variations were examined across the terminal area: single configuration and split (mirrored image) configuration. While both options maintained the necessary space and functional requirements by TSA, it was determined that the split configuration consumed more square footage and did not offer the expected flexibility in space planning. Therefore, the study concentrated on the single checkpoint configuration as the model to retrofit within the existing terminal area.

It is the intention of GMIA for the employee screening function to be conducted outside of the main terminal area. However, it is considered by GMIA and the local TSA stakeholders that requirements to screen employees within the main terminal area could become a necessity in the future, and should be given consideration in the final footprint of the planned central checkpoint space.

The preferred central checkpoint design consists of an "8+2+2" configuration with 8 lanes being required to support current peak passenger screening demand, 2 lanes provided for expansion when required for additional passenger screening (2023 projection), and 2 lanes of adjacent space earmarked for employee screening should it become required by TSA.

2.2 Proposed Terminal Mall Expansion

General Mitchell International Airport has three concourses which connect to a central terminal mall. Each concourse has an independent checkpoint dedicated to each concourse located at the junction of the concourse and terminal mall. The current arrangement isolates the terminal mall after passengers clear the checkpoints, limiting the potential traffic to the terminal mall concessions. The current arrangement also prevents passengers from transferring from concourse to concourse without the need to be re-screened at each concourse. Passenger access to the terminal mall is via multiple paths; two mall level bridges, two elevators from the ticketing level, and three sets of escalators / stairs. Concessions access to the terminal mall is via a freight elevator located at the northeast corner of the mall level. Access to Airport Administration is via the passenger bridge to Concourse C.

Various terminal expansion and checkpoint location / orientation options were investigated during the course of the study. Options considered included expanding the terminal eastward to the east boundary of the tug tunnel and northward to the blast wall adjacent to the Concourse C apron. While these

expansion options were eliminated due to the required square footage and cost, current planning allows for future expansion, and these options remain available should a future need arise.

The overarching strategy for the preferred option was to maximize the utilization of the existing terminal mall and infrastructure, while achieving the desired functional design, security and passenger flow efficiencies.

The preferred option inserts ten security checkpoint lanes into the terminal mall level oriented with the flow from the south to slightly northeast. This focuses the passenger migration directly towards a centralized concession area that will serve as a point of orientation/decision making open area. This post security area will be conceptually like a public plaza, with the perimeter defined by a variety of concessions readily visible, encouraging passengers to linger, and increase the potential for retail transactions.

The total concession area on the secure side is approximately 30,300 square feet. The museum and conference rooms will be relocated to the west side of the terminal mall, to what becomes the non-secure side, along with 2,500 square feet of concession area.

2.3 Proposed Concourse E International Terminal

MKE's existing traditional two stop layout Customs Border Protection (CBP) facility is located in a stand-alone 23,000 sf one story building with one arrival only gate. An interior ramp is used to de-board passengers from the aircraft down to the on-grade Primary Immigration queuing area. Once passengers are processed through immigration, they proceed to bag claim where they are routed either into secondary processing for further inspection or cleared to exit the facility through the Meeter & Greeter lobby.

The remote location of the FIS facility is inconvenient to the passengers in that they must walk across the roadway in order to connect to another flight or access the parking garage. This is particularly the case since most of the international traffic occurs during the winter months.

The facility is under-sized and doesn't meet current CBP facility standards required by the 2012 Airport Technical Design Standards (ATDS).

The team looked at several site location options, reviewing the advantages and disadvantages of each. It was determined that incorporating the facility into Concourse E would be the preferred option. This location improves passenger's access to the main terminal, connecting flights and ground transportation. Being part of the main terminal creates international passenger flows similar to domestic operations which would simplify signage and way finding. Meeter & Greeters would better understand where to wait for arriving international passengers and they would have access to main terminal concession opportunities.

Several options were studied, including both traditional two stop layouts and current CBP preference is a one-stop layouts. Current CBP preference is a one-stop layout for new FIS facilities. One-stop is a process where the passengers de-board, claim their baggage, then enter Immigration/Customs and if cleared exit the facility. This layout decreases the passenger wait time and requires fewer agents to process the passengers.

There are two options that can be recommended for further study by a final design team.
Option 1D; One-Stop minimal infill, this option might be the most viable of these options. By repurposing the rotunda holdroom for bag claim (remote feed carousel or flat plate) and new restrooms it would allow the reminder of the concourse for CBP functions. Program area requirements for primary and secondary processing would require expanding to the west. By reusing the apron area for CBP administration directly under secondary CBP would likely be accepted with new internal elevator / stair access. This option allows international arrivals only with no opportunity for departures from Concourse E.

Option 2; The development of a new two story building adjacent to the west side of Concourse E, with the CBP facility at the concourse level could be nearly column free which would allow for future flexibility. Getting approvals from CBP for a new building with a clean layout will be much easier than any infill project approach. This option would eliminate the major concourse renovation.

2.4 Project Cost Summary

The planning level estimate of project cost for the Terminal Mall Expansion and Central Checkpoint includes a Base Cost, including five recommended enhancements, and six Optional Alternates that provide enhanced functionality and aesthetics. Detailed cost figures separating hard construction costs, contingency costs and normal soft costs are presented in Section 7 and Appendix A of this report. The planning level cost estimates include the described terminal additions, terminal mall renovation and finishes, central checkpoint (excluding TSA equipment), and "white box" level of finish for concessions areas. Costs related to the fit-out of the concessions areas are not included in the noted costs.

The planning level estimate of total project cost for the Terminal Mall Expansion and Central Checkpoint Base Cost, including the five recommended enhancements based on the current conceptual level design is $41,724,700. The planning level estimate of total project cost for the Terminal Mall Expansion and Central Checkpoint Base Cost, including the five recommended enhancements and the six Optional Alternates based on the current conceptual level design is $52,263,985.

The planning level estimate of project cost for the Concourse E International Terminal (Arrivals Only) includes Major renovation of the concourse, addition shell and finish and shell area with no finishes for a "One-Stop" CBP facility. The costs are based on rough square foot allowances (a detailed analysis was not performed). Cost figures separating hard construction costs, contingency costs and normal soft costs are presented in Section 7 of this report.

The planning level estimate of total project cost for the Concourse E International Terminal (Arrivals Only) based on current conceptual level design is $22,594,915. The planning level estimate of total project cost for the Concourse E International Terminal including the Optional Alternate connector between the Concourse E Rotunda and the Secure Side of the Checkpoint at the Terminal based on current conceptual level design is $28,323,015.

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3. Planning and Design Criteria

The following planning and design criteria were established in coordination with the Airport and TSA for use in the development and evaluation of Central Checkpoint Options, Terminal Mall Expansion Options and Concourse E International Terminal Options.

3.1 Central Checkpoint Planning and Design Criteria

General

- Compliance with TSA's Checkpoint Design Guidelines (CDG) and Airport Planning Design and Construction Document
- Allow for potential future passenger checkpoint footprint expansion and flexibility in accordance with TSA's standards
  - Planned use for passenger screening only – capacity projections assume that employees will be screened outside of the centralized checkpoint
  - Risk Based Security
  - Flexibility for multiple screening protocols within each lane

- Plan for "8+2+2 lanes": 8 lanes for passenger screening plus 2 lanes for future growth in passenger demand plus 2 lanes for employee screening should it become a requirement by TSA
  - 3 – 4 PreCheck Lanes
  - 4 – 5 Regular Lanes
  - 1 – 2 Lanes for expansion of passenger screening when traffic volumes require it
  - 1 – 2 Lanes configured for employee screening (based on TSA protocols at the time)

- Future passenger demand increases beyond a total of 10 lanes will require an additional remote location to accommodate the residual passenger demand
- Added ("plus 2 lanes") checkpoint space may be utilized in the interim for employee screening until needed for passengers

Forecasts / Metrics

- Hours of operation are 3:00 am to 9:30 pm or extended as required day by day
- Passenger Capacity Planning Assumptions
  - Passenger demand and processing times only – employees are not intended to use this checkpoint
  - March 2011 passenger screening statistics are the baseline metric representing full use, peak hourly demand for the terminal

    NOTE: The March 11, 2011 screening statistics provided by GMIA as the baseline projections for checkpoint capacity was inclusive of employees screened on that day as well. Employee screening volumes cannot be separated from the overall statistics but should be factored in when decisions regarding number of passenger lanes are made, i.e., passenger volumes are somewhat overstated based on those projections.
  - Estimated Hourly Traffic Surge – 10%
  - Estimated PreCheck Participation – 50%
  - Average Passengers Per Hour (PPH) processed through a Precheck Lane – 300
  - Average PPH processed through a Standard Lane – 150

- Employee Capacity Planning Assumptions (including contractors and vendors)
  - Peak Daily Employee Demand = 1500 employees estimated by GMIA at full terminal utilization with a goal of screening all employees prior to secured side access

- Peak Hourly Demand (used to determine capacity required) = 1500 employees / day * .4 (slightly higher morning shift at startup) * 1.5 (average rescreens per employee before breaks) = 900 Peak Hour Employees
- Additional screening capacity (assuming Pre-Check protocol) = 900 / 300 = 2 up to 3 Lanes
- Employee screening estimates will be used to determine the amount of adjacent space to the centralized checkpoint footprint that may be used for employee screening should it become a requirement by TSA

Design Considerations

Checkpoint Placement in Terminal

- Placement of checkpoint function should complement passenger flow into airside/secured side terminal space – ideally with optimal access to secured side concessions
  - Orient checkpoint to focus on Concourses C and D
- Checkpoint may be a single straight-through design or a two split design as determined to accommodate space and flow requirements
- Split queuing can be used to maximize narrow dimensions of the mall area
- Allow for passenger queuing overflow with ability to expand queuing if necessary to improve management of overflows at peaks
- Upon recombobulation, passenger has clear visibility to gate and concessions options
- Avoid clustering/chokepoints for passengers exiting the checkpoint once screened allowing for passenger integration into secured-side traffic flow
- Co-locate the following functions adjacent to the respective checkpoint areas:
  - Checkpoint supervisor
  - Threat containment unit storage (2 at the checkpoint) – enclosed space for two 3'X3'X3' units
- Coordinate placement of "meeter-greeter" space for arriving passengers on non-secured side with close access to limited concessions and restrooms
- Employee screening function is not included within the passenger checkpoint layout as designed
- Remote employee checkpoint to serve dual purpose for inspection of concessions stock which removes that function from the planned centralized passenger checkpoint. Should it become a requirement to screen employees within the main terminal, adjacent space to the new central checkpoint will be identified and earmarked for possible use in the future
- Plan to relocate concessions "inspection" which may include:
  - Delivery to a warehouse where stock is inspected and repackaged for airside pickup and delivery to concessions
  - Separate space within the terminal area for inspection, e.g. a loading dock, then picked up / delivered to concessions once processed

Checkpoint Layout & Features

- Provide kiosk banks for all airlines in close proximity to the checkpoint entrance for print/reprint of boarding passes
- Maintain flexibility to assign these passengers to either a standard or PreCheck screening lane
- Provide adequate facilities and paths for screening of wheelchair assistance passengers
- Consider lighting and acoustics to avoid constricted feeling, checkpoint should give impression of a flow-through space with a visible destination beyond
- Position equipment to avoid screen image line of site issues with passengers passing through checkpoint areas
- Mitigation alternatives for processing passengers under irregular operations and/or security breach events
- Effective use of glass barriers, FIDS, signage, etc. to make passengers aware of where they need to go and what options they have ahead of them so that they can formulate a plan for themselves quickly once screened
- Place supervisors podium at the rear of the checkpoint with visibility to all queuing, screening and post-screening activity – and to the degree possible exit lanes

- Integrate LEO into the TSA's supervisor monitoring station
- Breach containment accomplished through alarm and communications systems ("48 Alarm")
- Duress alarm system is installed by TSA and will need to be integrated into the new checkpoint
- Checkpoint must be secured/closed down when not in operation

Exit lanes

- Plan for one or two exit lanes as necessary to accommodate traffic flow pattern
  - 2,000 arriving passengers at a peak hour results in 34 passengers per minute through the exit portal(s)
- Plan for ability to prevent non-secured flow backwards into secured areas
- Located for visibility for monitoring by TSO supervisors and/or TSA backup staff
- Provide clear delineation for the public between security checkpoint entry and exit lane departing areas
- Exit lanes will be monitored by TSA during operational hours
- Exit lanes will be monitored by a security firm (paid by airlines) from checkpoint closing to midnight
- Exit lanes will be monitored by the Sherriff from midnight to checkpoint opening
- Exit lane(s) should accommodate entry and removal of "oversized" maintenance equipment from the secured terminal space
- "Employees" (airport, TSA, concessions and contractors) entering the secured side space are not anticipated to use these lanes
- Do not consider automation options that reduce or restrict available open space within the exit lanes

3.2 Terminal Expansion Planning and Design Criteria

General

- Maintain convenient hassle free low cost alternative to Chicago
- Maintain feel of convenient friendly customer service oriented airport
- Northerly expansion maximum build-to line is defined by existing blast wall / fence
- Easterly expansion maximum build-to line is approximately defined by the tug tunnel east wall, however, further eastward expansion is feasible
- Design must be cost effective
- Wayfinding should allow for efficient and soothing direction
- Locate and design checkpoint configuration to accommodate efficient passenger and employee flow

Building Expansion

- Plan for a phased implementation strategy of overall expansion plan
- Checkpoint must be visible with an obvious flow pattern
- Post checkpoint flow pattern must be obvious
- Plan for future flexibility
- Plan for well placed meeter-greeter space on non-secured side with close access to concessions
- Plan for adequate rest room facilities on the sterile and non-sterile areas
- Plan for the Museum on the non-secure side of the checkpoint.
- Plan for the Conference Rooms on the non-secure side of the checkpoint.
- Finishes must be durable and provide a cozy mid-west (non-sterile) feel
  - Prefer terrazzo flooring, cost permitting
- Natural light preferred to provide "bright and airy" transparent environment
- Design should provide a special sense of place environment
- Expanded terminal facilities should maintain existing mall level and ticketing level finished floor elevations where possible
- Building over the loading dock area poses security issues, but is an acceptable option
  - Accommodate truck movements and Sherriff's Office

- Plan for 50,000 sf of concessions space (total after all expansion phases are implemented, including existing concessions spaces on the concourses)
  - Plan for a total of 25,000 sf of concessions space at completion of Phase One
  - 20,000 in Mall on secured side
  - 5,000 maximum on unsecured side
  - Plan for future Mall expansion
  - Fit-Out Concourse C Checkpoint area for concessions
- Create an efficient and cost effective "back of house" concept related to sequencing, flow, and functionality for security, staffing, airlines, concessionaires, goods and services, (basically "back of house"), and how these activities ultimately interface with the experience of passengers and visitors, or "front of house"
- Plan for non-sterile access to Administration Office
- Planning should resolve / accommodate the current multiple access / egress airport traffic flow issues
  - Resolve cross traffic flow
  - Resolve horizontal and vertical flows
  - Resolve flow to / from Concourse E International Terminal
- Avoid "pinch points" at queuing and checkpoint transition to concourse flow
- Planning should provide a traffic pattern that encourages circulation and lingering at concessions areas
  - Stream Concept with concessions one side and retail on other to provide continuous motion with distractions to pull / push passengers into each area
- Design "nodes" and "plazas" into the circulation.
- Utilize double loaded concessions that focus on centralized seating nodes/plazas to create differentiated and defined areas that will give visual relief from the linear circulation
- Construction phasing should minimize disruptions to passenger and employee flow
  - Accommodate passenger and employee safety during construction
- Construction phasing should minimize disruptions to existing concessions operations
- Construction phasing should minimize disruptions to existing MEP/FP systems
- Line of sight considerations from the Tower are not an issue related to the eastward or northward expansion options
- Existing Airport Operations Office can be relocated off-site from the terminal
- Consider sustainability / LEED opportunities
- Fueling and Isolation valve pits must be a minimum of 50 feet from any propose addition
- Mezzanine space has the potential for success (museum or bar)

3.3 Concourse E International Terminal Planning and Design Criteria

General

- Design to proposed standards
- Plan for Arrivals only facility
- Allow for potential incorporation into future Terminal / Concourse F &G expansion.
- Capability to accommodate one B747 arrival will be maintained.
  - Gate E68 is the current wide body gate
  - If Gate E68 becomes an international arrival gate only, a replacement domestic wide body gate is required
- Eliminate the need to shuttle international arrivals passengers to the terminal

Forecasts / Metrics

- Plan for 400 to 600 passenger per hour peak demand
- Design to accommodate three narrow body and / or one narrow body plus one wide body aircraft

3.4 Concept Evaluation Criteria and Decision Drivers

General

- Cost is the primary decision driver and evaluation criteria
- Phased implementation to achieve full build-out
- TSA Criteria
- Operations & Phasing during construction
- Flow (passengers / goods)
- Concessions available square footage
- Concessions related to flow of passengers
- Concourse E International Terminal Function
- Impact to other operations
  - Airport Operations Office
  - Available Gates
  - Loading dock
  - Sherriff's Office

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4. Central Checkpoint

4.1 Existing Condition

4.1.1 Terminal/Concourse

As is shown in **Exhibit 1.1**, the terminal is situated in the center of the Airport and is centrally located between Concourses C, D and E. The terminal landside faces west and is served by a single level roadway. Access into the terminal is gained through the lower level ticketing lobby and through the parking garage. Within the main terminal, shops and restaurants are available for public access although due to pressures to get through the checkpoints, traveling passengers often overlook these concessions in their haste.

Passenger screening checkpoints are located at the entrance of all three concourses, each of which experience restricted space for passenger flow and less than ideal conditions for performing the screening functions. Concourse C has five (5) lanes, Concourse D has six (6) lanes and Concourse E has three (3) lanes plus one convertible lane when required. With these decentralized checkpoints, TSA resource utilization is less than optimal particularly when peak periods of traffic are spread between concourses.

Currently, employee screening and concessions inspections are conducted through the concourse checkpoints as well.

4.1.2 Airside

Passengers screened through the concourse checkpoint are considered to be on the “secured” side and may not return to the main terminal without being rescreened by TSA. Airside facilities include the hold rooms, limited concessions, restrooms and airline customer service functions.

4.2 Options

Checkpoint configuration is dictated by TSA. Guidelines for determining those configurations and space requirements are provided in TSA’s Checkpoint Design Guidelines version 5.1 (CDG) and were used as the basis of the recommended checkpoint layout below. Included in the CDG are the considerations for flexibility between TSA’s standard and PreCheck lane configurations, equipment operations and maintenance, and the infrastructure and ancillary space required for TSA operations.

Various options were examined for the design of the central checkpoint during the course of this study which included the following considerations.

4.2.1 Central Checkpoint Capacity

Passenger demand and processing throughput dictate the capacity required of the centralized checkpoint. **Table 4.2.1** contains a summary matrix matching GMIA’s projected passenger screening demand with TSA’s processing throughput rates to determine the number of lanes required to support a fully utilized airport terminal. As a baseline for checkpoint demand estimating, TSA checkpoint screening data for the month of March, 2011 was provided by GMIA which represents a period of time where all concourses (C, D and E) were operating a full capacity. Since that time, airport traffic has declined and would not provide an appropriate reflection of peak airport traffic volumes.

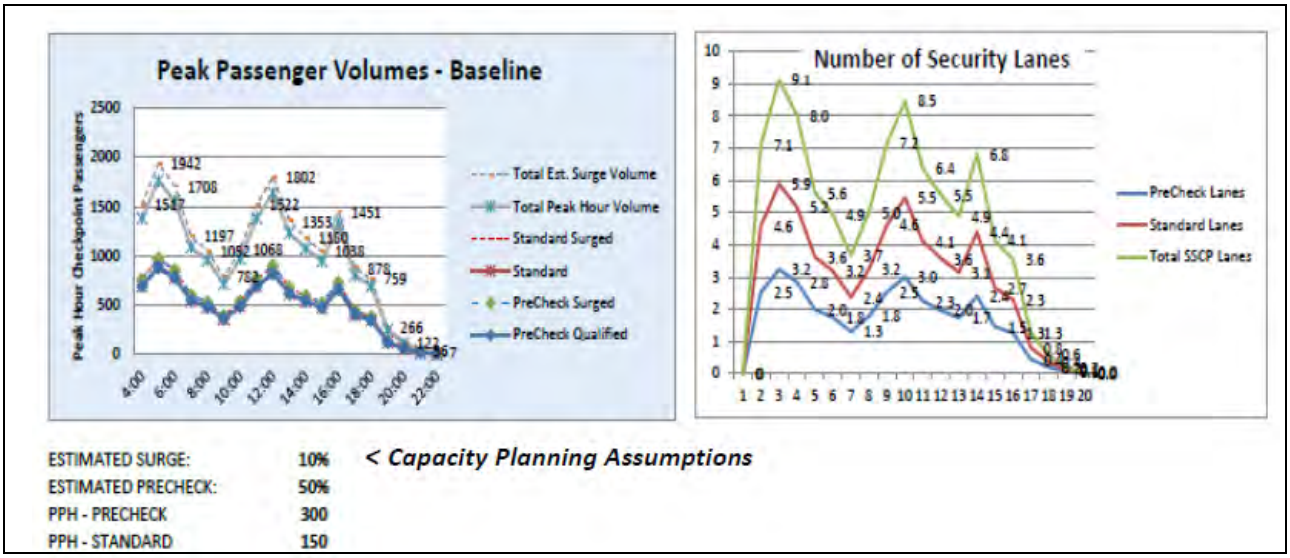

Exhibit 4.2.1 – Future Demand and Checkpoint Lane Quantity Analysis

Based on calculated values of hourly peak passengers processed and TSA's declared processing times for PreCheck and Standard screening protocols, eight (8) passenger screening lanes with the ability to add two (2) for future growth was determined to provide the appropriate capacity. The resulting checkpoint design in Section 4.3 supports these passenger screening capacity requirements.

In addition to the Capacity Planning Assumptions shown in Exhibit 4.2.1, additional assumptions in the demand and capacity calculations include:

1. The March 11, 2011 hourly screening statistics provided include both passengers and employees screened on that day. Employee statistics cannot be isolated for analysis but represents a certain degree of "cushion" in the determination of the number of required lanes for the new central checkpoint.
2. Future employee screening and concessions inspections capacity requirements were not factored into the determination of the number of central checkpoint lanes for passenger screening. Employee screening is discussed further in Section 4.3.3.
3. As an option to maximize screening capacity on an ongoing basis, lane configurations are designed for "flexing" to allow for redirection of passengers between PreCheck and standard screening protocols as passenger volumes and screening requirements change

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4.2.2 Passenger Queuing Approach

The focus in the Pre-screening function from a space planning perspective is largely on determination of the appropriate level a queuing space required. Queues should represent a continual flow of moving traffic with little backup when adequate TSA screening capacity is provided. Queue management is an ongoing function of TSA and queuing equipment is intentionally mobile so that TSA may scale and adjust to the needs and volumes of the traveling public.

4.2.3 Configuration Alternatives

Using the "8+2 lane" footprint for passenger screening, two checkpoint layout variations were examined across the terminal area: single configuration and split (mirrored image) configuration (refer to **Exhibit 4.2.3**). While both options maintained the necessary space and functional requirements by TSA, it was determined that the split configuration consumed more square footage and did not offer the expected flexibility in space planning. Therefore, the study concentrated on the single checkpoint configuration as the model to retrofit within the existing terminal area.

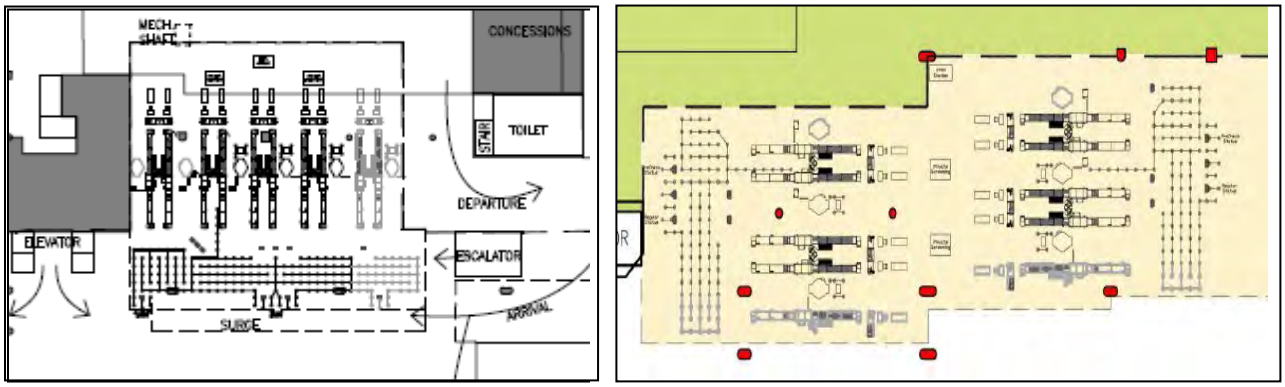

Exhibit 4.2.3 – Single versus Split Checkpoint Configurations

4.3 Checkpoint Design

It was established that an eight lane checkpoint with an option to expand to ten lanes was the optimal capacity required for the new central checkpoint. This checkpoint would provide TSA screening of all traveling passengers at GMIA complimented with an exit lane that supported the traffic flow and functional needs of TSA, departing and arriving passengers.

4.3.1 Design Footprint

The recommended checkpoint footprint based on TSA's CDG is depicted in **Exhibit 4.3.1**. This layout includes space for the pre-screening function (primarily passenger queuing), passenger and carryon item screening, and post-screening (focused on passenger "re-combobulation" and efficient movement towards the gates). "Re-combobulation" refers to the ability for passengers to gather their belongings, redress and reassemble their carry-on items once the screening process is complete.

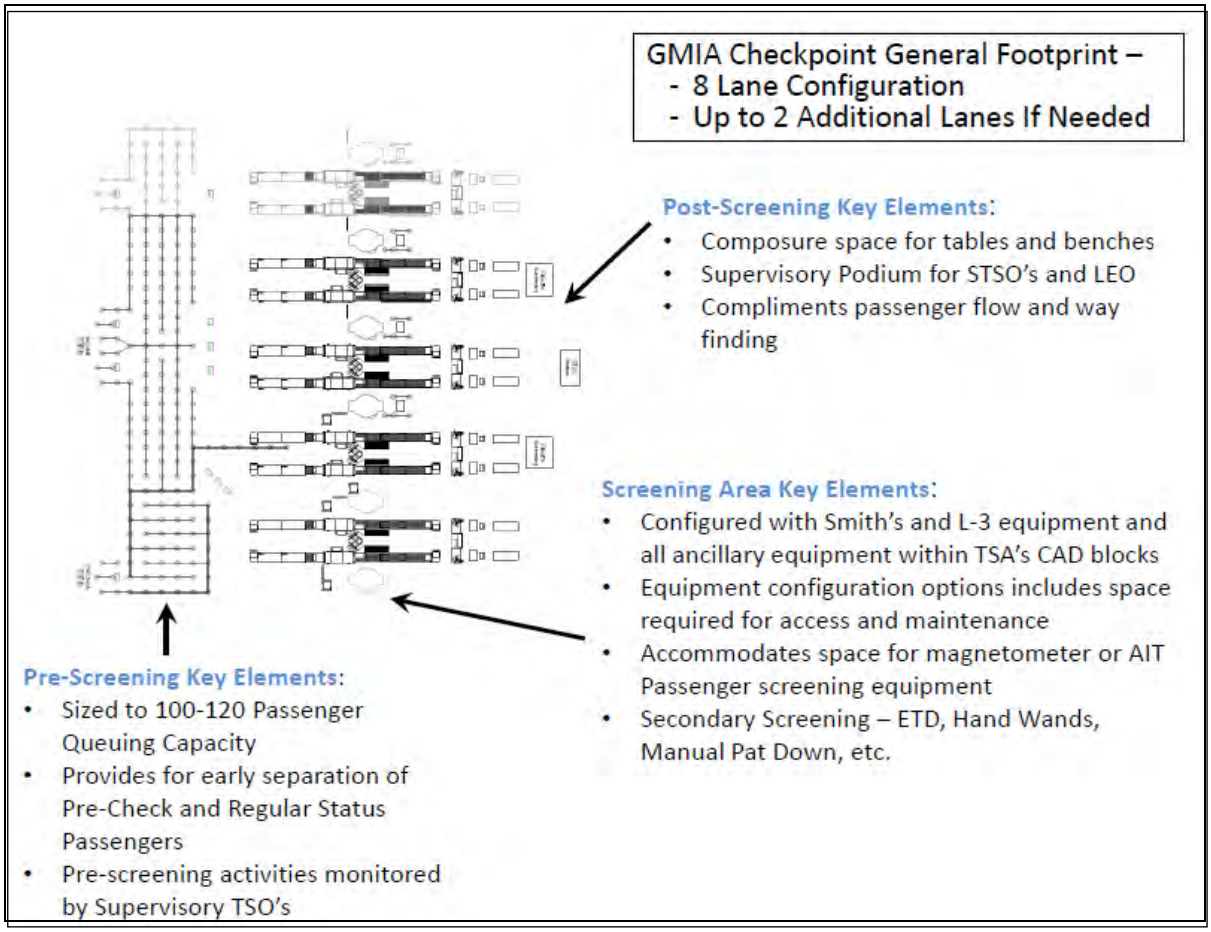

Exhibit 4.3.1 – GMIA Recommended Checkpoint Footprint

With examination of **Exhibit 4.3.1** above, notice the distinction between the black and gray objects within the checkpoint layout presented. Black objects represent the design for the eight (8) lane checkpoint configuration. Gray objects which are located at the top of the drawing represent the additional configuration of two (2) lanes included for future expansion if/when needed for a total capacity of ten (10) lanes. All ten (10) lanes are configured to offer flexibility for passenger processing and protocol changes.

TSA requires ancillary space located in close proximity to the checkpoint for a TSO supervisors' office, employee break and personal item storage area, and threat containment units (TCU) storage. Space is allocated for these functions in the central checkpoint space planning recommendations described further in this document.

4.3.3 Employee Screening Accommodations

For the purposes of this study, "employee" represents all airport, airline (including Known Crew Members),TSA and law enforcement staff; concessions vendors; and contractors required to enter the secured side terminal area as a course of their responsibilities. It is the intention of GMIA for the employee screening function to be conducted outside of the main terminal area. However, it is considered by GMIA and the local TSA stakeholders that accommodations to screen employees within the main terminal area could become a necessity in the future, and should be given consideration in the final footprint of the planned central checkpoint space.

Employee screening demand and the anticipated processing throughput dictate the capacity required to conduct employee screening. **Exhibit 4.3.3** contains a summary matrix matching GMIA's projected

employee screening demand to the number of screening lanes required. For the purpose of identifying peak hourly employee screening volumes, the hourly employee demand profile is calculated on an hourly curve based on the percentage of each hourly passenger screening volume over the daily total passengers screened. TSA's processing throughput rates are estimated utilizing TSA's PreCheck and standard processing times in order to estimate the total number of employee screening lanes required.

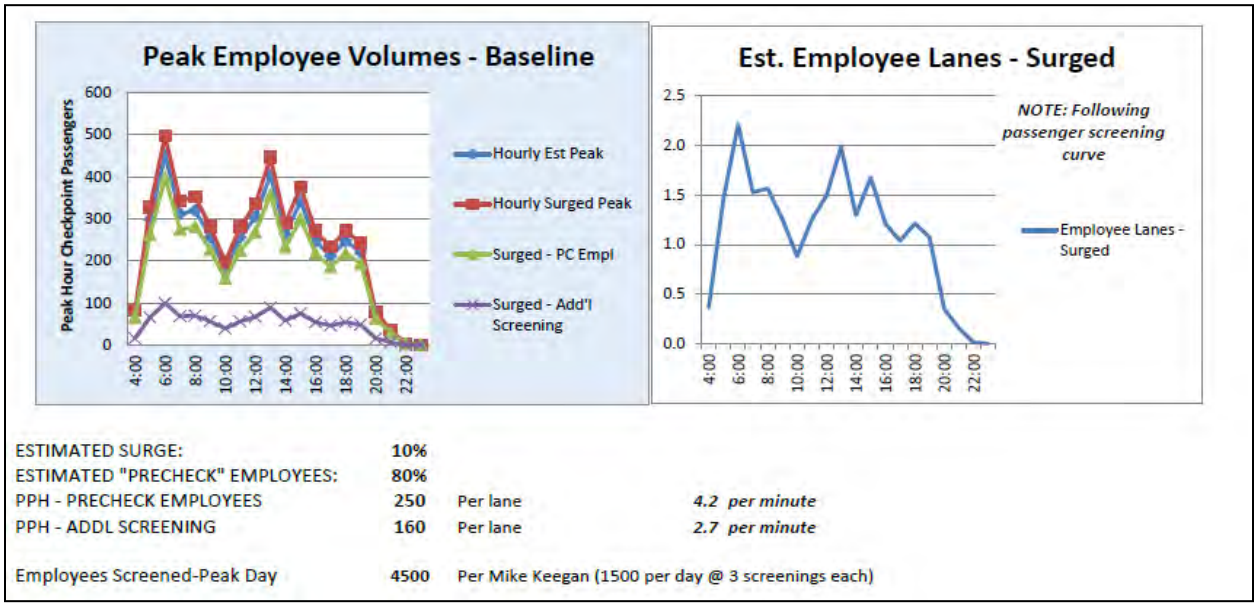

Exhibit 4.3.3 – Future Employee Screening Hourly Demand and Lane Quantity Analysis

Assumptions to be noted with these capacity estimates include:

1. Screening times for employees are similar to those of passengers based on how the employee is classified: general pool of employees requiring little or no additional screening, and some minority of the employees who do require additional processing times due to tools, equipment, etc. Greater stratification of employees has not been taken into consideration in the estimates.
2. Employee screening demand estimates do not account for concessions inspections which are assumed to be performed outside of the main terminal.

4.3.4 Exit Lane

Though not a core part of the security checkpoint, the exit lane(s) remain a critical part of the TSA's security function within the airport's main terminal. Users of the Exit Lane(s) are arriving passengers exiting the airport from all existing concourses, installation/maintenance staff delivering or removing equipment utilized in the secured side terminal space, and other airport/TSA/concessions staff exiting the secured side terminal space.

Included in the checkpoint design is a single exit lane placed equitably between Concourse C and D entrance/exit locations (refer to **Exhibit 5.1**) – based on the assumption that Concourse E will become an arrivals only concourse. Refer to Section 5 for more information on this function.

The placement of the exit lane is co-located within the security checkpoint proximity to supervisory TSO's and/or TSA backup staff for monitoring and supporting the exit lane monitoring function. Exit lane accommodations provide for the ability to prevent non-secured flow into secured areas, e.g. access of an unscreened person into secured terminal space by accident or design. Public safety plan, TSA safety/OJI considerations, and ADA compliance are also factors in the new exit lane functions. Exit lanes must remain open and unencumbered to allow equipment into and out of the concourse areas.

Planning assumptions for the exit lane design and placement include the following:

1. Using the departing passenger metric of 2,000 peak passengers per hour as a planning baseline, 2,000 arriving passengers at a peak hour results in 34 passengers per minute through the exit portal(s) in terms of capacity needed
2. Provide continuous flow through exit lane and out into non-secured terminal space without introducing traffic bottlenecks during high traffic and to maximize exit lane space
3. Consider egress and overflow requirements with the potential of adding exit lanes (possibly for emergency use only) where needed

4.4 Recommendations

Based on the preferred option for a central checkpoint design, the following recommendations were made:

1. Checkpoint layout supports TSA current standards for space configuration and supporting functions in accordance with TSA's CDG version 5.1
2. A central checkpoint was designed utilizing an **"8+2+2" configuration** with **8 lanes** being required to support current peak passenger screening demand, **2 lanes** provided for expansion when required for additional passenger screening (2023 projection), and **2 lanes** of adjacent space earmarked for employee screening should it become required by TSA.
3. Consider provisions for passenger conveniences on the unsecured space prior to entering the checkpoint queues including airline customer service kiosks, TSA consumer information and wayfinding assistance directing passengers to the checkpoint entrance
4. Provisions for post-screening activities by passengers should include use of glass barriers, FIDS, wayfinding signage, etc. for intuitive re-combobulation and movement towards concessions and the gates
5. Incorporate TSO supervisors and law enforcement officers into a single oversight function within the checkpoint to support cross communications and effective responsiveness to problems when required
6. A single exit lane will be utilized by all arriving passengers (non-emergency) which is placed equitably between Concourses C and D in order to provide the most convenience access for travelers while also supporting TSA's need for efficient supervision of the exit lane function.

4.5 Checkpoint Space Requirements and Layout Plan

4.5.1 Space Requirements

Computer Automated Drawings (CAD) were created to determine the recommended Central Checkpoint layout in accordance with TSA's CDG. The following square foot space of terminal space will be utilized by both the eight (8) lane and ten (10) lane configurations, as well as TSA's required ancillary space.

Design Footprint	Square Foot (sf) by Function
8 Lanes – Total 13,285 sf	Pre-Screening - 3531 sf Screening – 5887 sf Post-Screening – 3867 sf
10 Lanes – Total 16,942 sf	Pre-Screening – 4836 sf Screening – 7305 sf Post-Screening – 4801 sf
TSA Ancillary Space	800-1000 sf
Employee Lanes (1-2 Additional)	Plus an additional 3,600 sf - Allocated by Function according to TSA requirements if needed

Table 4.5.1 – Space Requirements by Checkpoint Function

To achieve the optimal use of the available terminal space, the final layout of the Pre-Screening, TSA Ancillary, and Employee Lane earmarked spaces will be determined within the existing facility while still providing the space required.

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5. Terminal Mall Expansion

5.1 Existing Conditions

General Mitchell International Airport has three concourses which connect to a central terminal mall. Each concourse has an independent checkpoint dedicated to each concourse located at the junction of the concourse and terminal mall. The current arrangement isolates the terminal mall after passengers clear the checkpoints, limiting the potential traffic to the terminal mall concessions. The current arrangement also prevents passengers from transferring from concourse to concourse without the need to be re-screened at each concourse. Passenger access to the terminal mall is via multiple paths; two mall level bridges, two elevators from the ticketing level, and three sets of escalators / stairs. Concessions access to the terminal mall is via a freight elevator located at the northeast corner of the mall level. Access to Airport Administration is via the passenger bridge to Concourse C.

5.2 Terminal Mall Conceptual Design

Various options were developed for the terminal mall expansion as the study progressed through the three workshops and follow-up meetings, and are documented in Appendix B.

The terminal mall study process and resulting feasibility concept options considered and addressed the following issues as the final preferred option evolved:

- Checkpoint configuration and layout options in relation to passenger flow and overall mall area configuration
- Horizontal and vertical flow options
    - Passenger concession access
    - Passenger concourse access
    - Passenger ticketing access
    - Passenger concourse exiting
    - Staff access
    - Service traffic / Loading Dock access
        - Vehicle maneuverability
        - Goods and supplies delivery
        - Waste removal
- Resulting Available Concession Space options
- Replacement of Impacted Facilities
    - Airport Operations Office
    - Existing Checkpoints
    - Existing Concessions
    - Restrooms
    - Elevators
    - Stairways
    - Temporary flow patterns
    - Facilities and TSA equipment maintenance and support impacts
- Spatial Aesthetic options
    - Architectural unification
        - Incorporation of the Checkpoint and Secure / Non-Secure separation
        - GMIA image / appeal
    - Structural integration
        - Structural system types and capacities
        - Structural system available depths
- Building Systems, Site, and Utility options
    - Plumbing / Fire Protection
    - HVAC
    - Electrical (power and systems)

        - Distribution equipment
        - Pathways, penetrations, and routing of large feeders, cableways
        - Cabling and IT infrastructure
        - Lighting
        - Systems; fire alarm, paging
    - FIDS
    - Security & camera surveillance
    - Site
        - Existing underground storm sewer, sanitary sewer, and fire main constraints
        - Fuel line setback requirements
        - Vertical clearances
        - Air field / aircraft clearances
        - FAA control tower sight lines
        - Loading dock and other airport entry points
- Building code concerns
- Phasing options
    - Constructability
    - Operations and contingencies during construction
    - Operations upon completion
    - Costs related to interim reconfigurations, additional equipment and staffing
- Cost

5.3 Options

Various terminal expansion and checkpoint location / orientation options were investigated during the course of the study. The final preferred option presented in **Exhibits 5.1, 5.1b, 5.2, 5.3, and 5.4** is the result of elimination and / or refinement of the various studied options presented in the workshop meeting minutes and **Exhibits A.1 - A.19** through an interactive process including General Mitchell International Airport staff and the design team.

The amount of concessions space required, a primary design criteria, evolved from 50,000 square feet excluding existing concessions located on the concourses to 25,000 square feet excluding existing concessions located on the concourses at completion of phase 1 construction, as the study progressed and actual needs were developed.

The future function of Concourse E also evolved over the course of the study which affected the orientation and location of the central checkpoint. Concourse E functions considered included:

- Domestic arrivals / departures (current function)
- Departures and Domestic / International arrivals
- International arrivals (preferred future option)

Options considered included expanding the terminal eastward to the east boundary of the tug tunnel and northward to the blast wall adjacent to the Concourse C apron. While these expansion options were eliminated due to the required square footage and cost, current planning allows for future expansion, and these options remain available should a future need arise. During discussions and development of options related to expanding over the loading dock area, security issues, relocation of the primary dock functions and concessions screening / inspection were considered.

The preferred option also illustrates new concessions space at Concourse C where the existing checkpoint is removed. However, these concessions areas are not programmatically required based on immediate need, and implementation could be delayed.

5.4 Terminal Mall Conceptual Feasibility Plans

The preferred concept is presented in **Exhibit 5.1** (Gate Level), **Exhibit 5.2** (Grade Level), **Exhibit 5.3** (Basement Level) and **Exhibit 5.4** (Mezzanine Level). An alternate concept which adds 2 lanes for employee screening is presented in **Exhibit 5.1b** (Gate Level – Alternate) should it become a requirement by TSA.

The concept minimizes construction of new enclosed terminal area while allowing for the logical potential of future additions to the north (over the loading dock) and to the southeast (over the south baggage makeup area) as the need may arise.

5.5 Terminal Mall Architectural and Engineering Narratives

This section of the report summarizes the architectural and engineering conceptual feasibility planning and design concerns and recommendations.

5.5.1 Terminal Mall Architectural Narrative

The overarching strategy for the preferred option was to maximize the utilization of the existing terminal mall and infrastructure, while achieving the desired functional design, security and passenger flow efficiencies.

5.5.1.1 Mall Level

The major driver of this exercise, the ten security checkpoint lanes, are inserted into the terminal mall level oriented with the flow from the south to slightly northeast. This focuses the passenger migration directly towards a centralized concession area that will serve as a point of orientation/decision making open area.
This post security area will be conceptually like a public plaza, with the perimeter defined by a variety of concessions readily visible, encouraging passengers to linger, and increase the potential for retail transactions.

The passenger migratory routes are only minimally altered with this design. The furthest north escalator/stair and the center escalator/stair will be removed and replaced. The north passenger elevator will also be removed. The new location to replace the escalators/stairs/elevator has passengers arriving at the mall level approximately where the information desk is currently located, oriented towards the southwest. This allows passenger arriving at this level to immediately visually observe the queuing for the checkpoint, making it self-evident where to circulate. Other advantages of this location include utilizing the structure from the former FAA control tower to create the proper size opening for the escalators/stairs/elevator, and incorporating the existing higher ceiling at the arrival point to create a more grand sense of entry when one arrives at the mall level.

The south existing passenger elevator and escalator will remain in their present locations.

The design also creates a viewing opportunity to the south east while passengers are processed through the checkpoint with numerous windows along the small proposed addition over the exiting roof of the south baggage makeup area. This will enhance the passenger experience by creating an open, airy and spacious environment as passengers flow through the checkpoint.

The total concession area on the secure side is approximately 30,300 square feet. To achieve this along with providing the proper clearances for passenger flow, and create a central gathering place, an addition is required to the east over the existing north baggage makeup area roof, and for a short distance along the north side of Concourse D.

A single exit has been located centrally between Concourse C and Concourse D, and in a position to minimize cross traffic and congestion.

The museum and conference rooms will be relocated to the west side of the mall, to what becomes the non-secure side, along with 2,500 square feet of concession area.

All of the existing toilet rooms have been incorporated into the new design. There is an alternate cost in the budget to remove the rooms just south of the north parking connector bridge if it is determined that additional space is needed for additional passenger flow. New men's and women's facilities have been added to the secure side, near the central gathering space for further convenience to the passengers.

The existing stairs that serve the mezzanine shall remain. This element can provide a central anchoring location for advertising or F.I.D.S.

The existing freight elevator will remain, however, it now will be accessing the secure side. The design plans for screening to occur at the mall level.

A small connector corridor will be added to the west side the bridge to Concourse C which will have windows along its length to provide a more open experience. This new corridor will allow non-secure access to the Administration building via the existing corridor along the west side of the mall.

5.5.1.2 Grade Level

The relocation of the escalators, stairs and elevator to a central location creates the need for a small addition to the west. This addition will also prove two entrances for passenger drop-off, along with a secure stair to the basement level.

The stair and two elevators immediately behind ticketing will have the stair and the north elevator removed to the gate level, they will remain for access to the basement. The south elevator will be removed, but the shaft will remain.

5.5.1.3 Basement

Relocation of the central escalators, stairs and elevator also requires relocating a required egress stair from the basement to grade. Remodeling in the basement is a minor portion of the project.

5.5.2 Terminal Mall Civil Engineering Narrative

The vast majority of terminal mall improvements shall be conducted within the existing facility and will not result in impacts to exterior infrastructure. However, a west expansion of the Concourse "C" Connector (to allow a non-secure passageway) will necessitate site work activity. Additional columns are necessary to support widening the concourse connector. While there is some flexibility with the proposed column spacing, they would typically be directly offset from existing column locations. Depending upon the results of a geotechnical investigation, these new columns would be placed upon small spread footing foundations or a small pile cap with helical piers. This foundation work has an impact upon existing site infrastructure in the vicinity.

The proposed construction of relocated underground facilities will conform to the Milwaukee County Department of Public Works Standard Specifications. Relocation of facilities will be done in an effort to minimize service disruption for future routine and emergency maintenance. This study has not evaluated the condition or the hydraulic capacities of the impacted sanitary sewer, storm sewer, and fire protection facilities. It has been understood that the existing utility lines are adequately sized, function effectively, and will not require an upgrade to meet code based on the proposed improvements.

Airport operations shall remain in service throughout all phases of construction. Relocation of existing underground utilities will need to be phased to ensure that loading dock access is maintained without significant disruption. Pavement replacement will generally match the existing design section and consist of Portland Cement Concrete material.

5.5.2.1 Sanitary Sewer

An existing sanitary sewer manhole is located within the Ticketing roadway, approximately 25' west of the Concourse "C" Connector. Two separate sanitary sewer lines extend upstream from this manhole. A 10-inch main extends beneath the connector in a northeast direction and provides service to Concourse "C". An 8-inch main extends beneath the connector in a southeast direction and provides service to Ticketing. It appears that these existing sanitary sewer manhole and main will not be impacted by proposed column locations for the Concourse "C" Connector expansion. However, it is recommended to field verify the sewer alignment during future design efforts.

5.5.2.2 Storm Sewer

An existing storm sewer manhole is located within the landscape median between Hutsteiner Drive and the Ticketing roadway, approximately 15' west of the Concourse "C" Connector. A 15-inch storm sewer pipe extends beneath the connector in an east direction and provides service to the loading dock. A few storm sewer catch basins also connect directly to the manhole.

It appears that the existing storm sewer configuration within this vicinity will likely conflict with proposed column locations for the Concourse "C" Connector expansion. The storm sewer relocation effort shall provide adequate clearance from column foundations and maintain positive drainage.

5.5.2.3 Fire Protection

Existing fire protection main will also be impacted by proposed column locations for the Concourse "C" Connector expansion. A fire hydrant is located at the northeast corner of Baggage Claim, directly beneath the connector. This hydrant is presently serviced by a 6-inch lead that extends from a water main tee within Hutsteiner Drive. The hydrant lead will likely require relocation in an effort to provide adequate clearance from column foundations.

The fire protection main within Hutsteiner Drive also extends to service Concourse "C". It appears that the existing main in this area will not be impacted by proposed column locations for the Concourse "C" Connector expansion. However, it is recommended to field verify the fire protection alignment during future design efforts.

5.5.2.4 Miscellaneous

Existing underground electrical conduit is situated in a north-south orientation, directly beneath the Concourse "C" Connector. A single feeder provides service to pole mounted lighting fixtures located approximately 10' north of the sanitary sewer manhole within the Ticketing roadway. The light pole electrical service will likely require relocation to avoid conflicts by proposed column locations for the Concourse "C" Connector expansion.

5.5.3 Terminal Mall Structural Engineering Narrative

5.5.3.1 General

- Expansion of structure is nearly identical in each area
  - Structural steel roof joists or HSS tubes on steel beams depending on appearance
  - Structural Steel floor system using concrete slab on metal deck on steel beams and girders
  - Roof and floor frame into existing steel framing, existing steel members loaded by the addition beyond capacity are to be reinforced by welding steel plates to the members
  - Foundations in areas where they can be added are spread footing on grade. Underpinning is required in some area
  - Tug tunnel walls and foundations are used for structural support as soils investigation for previous construction of the BHS addition showed additional loads on the foundations were allowable. South east expansion will use a similar system to the BHS addition built over the tug ramp walls

- Expansion over existing structures will frame higher loads into those portions of the structure that have additional foundation capacity where heavy precast wall panels will be removed and in areas where a mezzanine along line J was planned and never built.

5.5.3.2 Building Area Descriptions

Each expansion area has unique concerns and cost factors described below. The level of finish and exposed structure requirements require architectural decisions and will influence the steel weight per square foot. System description follows:

5.5.3.3 Addition over North Roof over baggage make up: 70'x180' area

- The precast roof over the baggage make up area is to remain as it supports an extensive automated baggage handling system which must remain in service.
- Floor system: 3-1/4" lightweight concrete over 1-1/2" metal deck
- 2nd level 12" deep structural steel hung from the roof structure due to depth limitations over the make-up roof. Approx. 10psf steel weight. Steel requires fireproofing but will be difficult to install, consider intumescent paint.
- Girders at lines J and K need reinforcing to support floor framing, Line L had 4 additional columns with footings added sized for this addition when BHS addition was constructed
- Roof structure is assumed to be steel joists above suspended ceiling with a white box type finish considering retail use and views are blocked by BHS.
- 6 foot deep steel roof trusses at 40' spacing supports terminal floor below with a transfer girder and W10 columns at 20' spacing suspending the floor below, Approx. 12psf steel weight with 1-1/2" 20 ga metal deck, includes columns and assumes short metal siding or precast walls above BHS walls.
- Construction in the area will be difficult. This area is in a "hole" between the terminal and the new baggage screening building. A tall crane will be needed for erection. It will be operating on the Concourse D apron and will necessitate vacation gate D-30 for crane operations and lay-down. The crane operation times will be restricted by FAA and control tower since it will block site lines.
- The existing baggage roof needs to be stripped to the bare precast as the insulation takes up too much room considering the minimal depth remaining for the floor structure. The roof must be kept watertight during construction because of the baggage handling equipment and operations below.
- This area is also on the secure side of the airport and all workers will need to be badged for security. This may limit availability of labor and be more restrictive of work time.

5.5.3.4 Addition over South Roof over baggage make up: 54'x180 + 44'x50' area

- The precast roof over the baggage make up area is to remain as it supports and extensive automated baggage handling system which must remain in service.
- Floor system: 3-1/4" lightweight concrete over 1-1/2" metal deck
- 2nd level 12" deep structural steel hung from the roof structure due to depth limitations over the make up roof. Approx. 10psf steel weight. Steel requires fireproofing, consider intumescent paint.
- Girders at lines K and K.4 need reinforcing to support floor framing.
- Line L.2 needs 5 additional columns with footings added, sketches are attached.
- Roof structure is assumed to be steel joists above suspended ceiling for a white box type finish considering retail use.
- 40" steel roof girders at 40' spacing supports floor below with a transfer girder and W10 columns at 20' suspending the floor below Approx. 11psf steel weight with 1-1/2" 20 ga metal deck,
- Main columns at 40' spacing require reinforcement and extension.
- For exposed steel HSS purlins instead of joists at 10' spacing add 3psf steel weight and change roof deck to 3" 20 gage.

- Exterior East and South Walls will be curtain-walls and will require 4 psf steel for column and girt back up.
- See construction concerns for the north make-up roof. They will be similar here but erection will not have to be over another building. Lay-down area may be less disruptive using the low traffic Concourse E apron.

5.5.3.5 Sloped floor to Concourse D at 2006 Checkpoint Widening: 55'x 95' area

- Sloped area to be made flat to match terminal elevation. 35'x 40' area is 3" lightweight slab over rigid insulation fill.
- Slab is to be removed, additional fill placed to bring slab to match terminal, new 3" lightweight slab to be placed, average 12" fill needed.
- Remainder of area to have rigid insulation fill and new 3" lightweight slab added, average fill 24". Only minimal steel reinforcing is expected. Clearance below roof steel is about 14 feet.
- There is an area of about 700 sf at the east end of this addition that the floor is 4'-8 below the terminal and the roof is 6 feet lower than the adjacent area. The floor could be filled and the roof removed and a new raised roof installed to match or the area could be left as is for retail at the concourse level.
- Construction here will be indoors and require security clearance for workers.

5.5.3.6 Concourse C Connector West Widening: 9'x 150'

- Floor system: 4-1/2" normal weight concrete over 3"20 ga metal deck
- Floor beams up to 36" deep spanning 60', 20psf steel
- Roof structure 18" steel beams. 12psf steel weight with 3" 20 ga metal deck
- Small spread footing foundations or small pile cap with helical piers depending on geotechnical investigation
- Expansion joints and double columns required.
- Existing metal panel and windows on west side to be removed with similar façade on new west wall.
- Large precast column cover at terminal to be removed above the second floor
- Existing columns should support 4' tributary width of addition without reinforcement
- This area does not require security badging of construction workers.

5.5.3.7 Elevator and Escalator Removal

- Eliminating elevator and escalators require filling the opening with concrete on metal deck on steel beams and connection the beams to the opening perimeter. For escalators the floor beam at end not supporting the escalator may need to be reinforced
- At the decorative open elevators the large concrete columns would need to be demolished down to the first level. They do not support the second level.

5.5.3.8 New Escalators in Center at Old Control Tower Bay, 45'x80' Area of Demolition and Reconstruction, 35'x70' opening for escalator

- Demolish entire 45'x80' bay at the second floor removing floor framing and the 8 old control tower columns down to grade level.
- Cut 2 openings in grade level floor and basement floor for escalator pits 11'x16', provide 18" reinforced mat foundation on 8-25ton helical piers each. Pit walls are full height 12" reinforced concrete walls supporting existing floor framing at perimeter.
- Floor system: 5" normal weight concrete over 2" 20ga metal deck
- Second floor framing will use 30" cantilevered beams with moment connections to support portions of the floor, escalators and stairs. Heavy moment connections will be required. Some beams and girders require reinforcing. About 15 tons of steel required.
- Stair to be 12" thick reinforced concrete.

5.5.4 Terminal Mall Plumbing Engineering Narrative

The proposed construction of the new security checkpoint will require extensive renovation to the plumbing systems currently serving the existing concessions areas. The existing sanitary, storm and domestic water systems are of adequate size to accommodate the relocation of services to new proposed concession areas. The exact locations of the sanitary sewer and domestic water are discussed in their respective sections below. The existing central area restroom fixtures comply with the minimum requirements of LEED standards and will therefore not have any negative impact on obtaining LEED certifications.

5.5.4.1 Sanitary Drainage

The airport Main Terminal has existing 6" sanitary sewers running north and south on both the east and west sides of the terminal in the interstitial space above Ticketing and below the Concourse levels. These are adequately sized for, not only the current loads they serve, but also additional loads that may be put in service in all options presented. Four sanitary sewage ejectors are located in the basements of the Main Terminal and in the Baggage Claim Buildings. In the Main Terminal, two sewage ejectors are located at the base of the tug-tunnel ramps east of the connecting tunnel running under the baggage Handling Buildings. These ejectors serve all the basement level sanitary sewer systems with the south ejector serving the southwest dedicated grease waste line from the Food Court and Miller Brew House. The third ejector is located in the middle of the west end of the basement of the Baggage Claim Building and collects waste from the south portion of the Main Terminal, Baggage Claim Building and the E-Concourse. Current sanitary utility upgrades in the facility will accommodate current and proposed additional sewer loads presented in this report. Keeping with current airport trends, grease waste lines with grease interceptors will need to be installed for the new concessions areas as part of this project. The interceptors may be placed in the basement area mechanical rooms with the grease waste lines routed to them from the Concourse level concessions areas. Discharge from the interceptors will be connected to the existing sewage ejectors and pumped to the site sanitary sewer system. Careful planning must be taken when the construction of the new toilet room facilities are added to the secure side of the proposed plan, especially in the southwest area of the Concourse level due to the installation of a dedicated grease waste line that currently serves the kitchen areas of the Food Court and Miller Brew House. Adequate sanitary sewer lines are available for additional conveyance for the proposed toilet rooms.

5.5.4.2 Storm Drainage

The proposed additions in the plan options pose no additional change to the current footprint of the existing structures. The expansion of the facility will extend to over the north baggage handling building which has roof storm drains installed and connected to the site storm drainage system. Since expansion is proposed to extend over an existing structure, no change to the building foot print is expected, therefore there will be no increase to the current storm water conveyance systems.

5.5.4.3 Domestic Water Supply

The main terminal has an existing 8" water main entering the basement level in room H-4A-B below the baggage handling building and continues through the basement to the fire hydrant loop that surrounds the three terminals. In the Baggage Claim basement, the 8" line separates into a 4" branch line to serve the Main Terminal. The 4" line then separates in to four main lines serving the Baggage Claim and Main Terminal. The branch lines currently serving the existing concessions and toilet rooms in both the proposed secured and unsecured areas are adequate for the proposed expansion. These lines run parallel the sanitary sewer lines and are located in the interstitial spaces above the Ticketing Level ceiling and below the Concourse Level floor. Constructing additional concessions and or toilet rooms will not adversely affect the demands placed upon the domestic water system. Existing water heaters located in the current loading dock areas are adequately sized for the existing toilet rooms. Concession spaces currently utilize individual water heaters and it is expected that any concessions build-outs will install dedicated water heaters. Water heaters currently serving the Food Court and Miller Brew House are

located in the mezzanine mechanical space over the concessions areas. These will need to be relocated if the mezzanine mechanical spaces are removed in the project scope.

5.5.4.4 Fixtures

The existing toilet room plumbing fixtures are of low flow type which conforms to the minimum standards accepted by LEED as a prerequisite for additional LEED points. The current facility standard requires the use of sensor flush valves for toilets and urinals and sensor faucets for lavatories. The addition of new plumbing fixtures to the remodeled areas will maintain the LEED minimum requirements for water efficiency which harmonize with the facility standard for sensor operated fixtures.

5.5.4.5 Fire Protection

The existing fire protection system in the Main Terminal is partially installed. The facility has an 8" water main that enters the facility in the basement of the Baggage Claim building in room H-4A-B. The 8" main travels through the Main Terminal basement to a fire hydrant loop that circles C, D and E Concourses. Connections to the 8" loop for fire sprinkler systems in prior construction projects have provided adequate water flow and pressure to operate the automatic sprinkler systems for wet, dry, pre-action and deluge systems without the aid of a fire pump. Hydraulic analysis of this system has shown that adequate capacity and pressure are available to provide for a fire sprinkler system to be installed in the Main Terminal. Recent renovations to the Baggage Claim, Baggage Handling and Baggage Screening Buildings have had fire sprinkler systems installed to current NFPA standards and insurance under-writers requirements. The areas that have fire sprinkler systems in the Main Terminal installed are the basement and the offices behind the Ticketing areas. All other areas of the building do not have fire sprinklers installed and will require the installation of a fire sprinkler system.

5.5.4.7 Recommendations

As outlined in the Sanitary Sewer description, it is recommended that separate grease waste sewer lines be installed as part of any concessions build-out. The new large capacity grease interceptors may be located near the existing sewage ejectors in the basement areas and connected to the existing sanitary sewer system.

New plumbing fixture selections for new toilet rooms must meet the current LEED standards for low and ultra-low flow systems. Water closets shall be a minimum of 1.28 gallons-per-flush (GPF) or of the dual flush, 1.6/1.1 GPF fixtures to aid in obtaining additional LEED points. Urinals shall be sensor operated ultra-low flow designs that require 0.128 GPF and lavatories shall be sensor operated and be equipped with strainers to limit flow to 0.5 GPM.

For the areas of the Main Terminal that are not currently protected with a fire sprinkler system, it will be required to install fire sprinklers to meet NFPA and the Insurance Underwriters requirements. The primary areas requiring the installation of fire sprinklers are the Mezzanine, Concourse and Ticketing levels of the Main Terminal.

5.5.5 Terminal Mall Mechanical Engineering Narrative

5.5.5.1 Air Distribution System

A total of ten packaged air handling units are used for heating and cooling of the open mall, gate level, and adjacent spaces. The units are operating at a constant volume, with variable frequency drives used for balancing purposes. The units have filters, hot water heating coils and chilled water cooling coils. They are located in four general mezzanine equipment areas above the project area.

5.5.5.2 Chilled Water System

Chilled water is provided by the Central Power Plant's four 500-ton chillers. The impact of the proposed work can most likely be accommodated by the existing system's 8-inch chilled water mains serving the

area. It is advisable that the chilled water distribution system (pumps and associated controls) be further analyzed to ensure that chilled water flow can be properly distributed for the proposed work as well as for the rest of the facility. While recent reconstruction associated with the baggage claim area may have impacted existing capacity, the distribution system most likely has the necessary capacity but should be optimized to ensure flow is distributed appropriately.

5.5.5.3 Hot Water System

In general, heating hot water is provided by the Central Power Plant's three boilers during the heating season, each providing 15,000 MBH output capacity. A fourth boiler was recently added to the plant to handle miscellaneous heating loads occurring in the cooling season. The impact of the proposed work can most likely by accommodated by the existing system. It is advisable that the heating hot water distribution system (pumps and associated controls) be further analyzed to ensure that chilled water flow can be properly distributed for the proposed work as well as for the rest of the facility. While recent reconstruction associated with the baggage claim area may have impacted existing reserve capacity, the distribution system most likely has the necessary capacity but should be optimized to ensure flow is distributed appropriately.

5.5.5.4 Recommendations

The existing affected HVAC systems are in serviceable condition and still have several years of expected use available. They have the capacity to handle some, but not all, of the proposed remodeling and addition. The following measures are recommended:

- Due to proposed building addition(s) for this project, a new air handling unit will be necessary. We anticipate this unit to be located in a mezzanine equipment space similar to the existing units.
- Due to the reconfigurations and addition occurring in the area of the southeast equipment mezzanine, the air handling equipment (AHU-12, -13, -14, -15, -16, and -17) in that equipment space should be replaced and / or relocated as noted below to accommodate the proposed plan revisions. Existing duct distribution systems would be re-utilized to the maximum extent possible.
    - AHU-12, -13, -14, and -15 are owned by the current food service vendors and will be removed as part of the removal of these existing vendors. Space for new units should be planned for to accommodate similarly sized units which will be developed to meet the needs of new vendors.
    - AHU-16 should be relocated and ductwork extended to allow them to maintain their existing service areas.
    - AHU-17 should be replaced with a new unit, similar in total capacity, that is properly sized to handle the area it serves. The existing unit has both chilled water and DX (refrigerant) coils to accommodate the system's cooling load. We recommend the replacement unit have a chilled water cooling coil sized to accommodate the system's full cooling load.
- As part of the renovation work, the air distribution ductwork should be modified to optimize ventilation airflow throughout the space based on the new space configuration.

5.5.5.5 Proposed Mechanical Systems

In general the proposed expansion schemes impose cooling loads of approximately 75 tons and heating loads of 600 MBH. Chilled water and hot water piping will be extended to the new air handling units located in proposed mechanical equipment rooms. Hot water piping will be extended to new hot water heating coils located in variable air volume boxes. Air distribution will be via variable air volume air handling units using variable frequency drives for modulation of system air flow. Zone temperatures will be maintained by variable air volume boxes with hot water heating coils. Control of all HVAC devices will be by extending the direct digital building automation system. The overall HVAC system configuration is consistent for all of the proposed plan alternatives. The following provides airflow capacities for the proposed and existing air handling units:

- New AHU: 30,000 CFM
- AHU-12: 2,515 CFM

- AHU-13: 1,960 CFM
- AHU-14: 2,055 CFM
- AHU-15: 2,000 CFM
- AHU-16: 28,000 CFM
- AHU-17: 1,965 CFM
- AHU-18: 28,000 CFM
- AHU-19: 28,000 CFM
- AHU-20: 28,000 CFM
- AHU-21: 3,900 CFM

5.5.6 Terminal Mall Electrical Engineering Narrative

Airport operations shall remain operational throughout all phases of construction. Existing electrical power, lighting, data communications and systems will need to be phased so that airport operations can remain operational without significant disruption.

5.5.6.1 Power Distribution System

The airport engineering office has asked that the substations that are located on the mezzanine be removed (LR-S and LR-N). Two new distribution panels will need to be installed to pick up the loads that were supplied by the two substations being removed. The two new distribution panels will get fed from the existing substations in the basement (BS-SA).

Two equipment rooms will be installed for load panels and for telecommunication needs. These rooms will need to be approximately 10' x 12'. These equipment rooms will also contain the three emergency system branch panels that are supplied by the existing generator.

A load study will need to be performed to determine if the existing substation has the capacity to provide power to the two new distribution panels on the mezzanine and the new panels that are required in the new space. If the existing substation does not have the capacity a new substation will need to be installed. The concept design includes a space allocation for a new substation and the budget includes the costs for a new substation if one is required.

5.5.6.2 Lighting, Receptacle, and Tenant Power System

All existing lighting systems will be removed along with all associated branch circuits back to the source panel board.

A complete new lighting system will need to be provided. Light levels per IES recommended guidelines and TSA requirements will need to be installed.

Tenant power will be supplied by the panels in the equipment rooms. Depending on power demands it may become economical to install load panels in the tenant space. Each tenant will need revenue grade metering means.

5.5.6.3 Emergency Power and Lighting

New Exit and Emergency Egress Lighting will be installed. Exit signs and egress lighting will be supplied from the emergency branch panel board. Any additional lighting that is required to be on standby power will be fed from the standby branch.

Emergency power will be supplied by the emergency branch, legally required branch or the standby branch depending on the specific load.

5.5.6.4 Telephone System

There will need to be telephone jacks throughout the area. The two equipment rooms described above will also contain the telephone system patch panels.

If the facility moves to a VOIP phone system, these jack will become standard network jacks. In any case, these jacks should be wired so that they can support any type of phone system.

5.5.6.5 Data and Flight Information Display Systems

There will need to be network jacks throughout the area. The two equipment rooms described above will also contain the network racks. These two rooms will need to be located so that no network jack is further than 275' (cable length) from one of these rooms.

Flight information displays will need to be installed in the space. The exact count and locations will need to be determined with input from the airport.

5.5.6.6 Clock and Paging Systems

All existing clock and paging systems should be replaced. New paging speakers throughout the remodeled space will need to be provided. New amplifiers may need to be supplied based on final location, number of zones and number of speakers required. The existing clock system should be extended into the new area utilizing clocks.

5.5.6.7 Fire Alarm System

Provide new addressable fire alarm devices and new notification appliances throughout the renovated space. Provide pull stations, smoke detectors and flow and tamper switches as required. All existing devices will be removed. The new devices will need to be compatible with the existing fire alarm system.

5.5.6.8 Security System

All existing security devices (card readers, cameras, door position switches, door contacts, etc) will be removed. New devices will be installed at locations specified by the client.

5.6 Terminal Mall Expansion Phasing Approach and Safety Requirements

A definitive construction phasing plan will need to be developed when the project progresses into the design phases based on the final plan layout. Implementation of the Terminal Expansion and Central Checkpoint will require a multi-phased approach. Demolition and construction must be coordinated in a strategic sequence of events to maintain the operations of the terminal and concourses throughout the remodeling process. The final phasing approach should consider the following:

- Maintaining operations on a 24/7 basis during all phases of construction.
- Removal/replacement of existing building systems including; HVAC, Electrical, Telecommunications, Plumbing, Fire Protection, Security and Life Safety, while providing uninterrupted operation of the terminal and providing continuous passenger comfort.
- Maintaining convenient and efficient checkpoint/concourse/concessions access for passengers and airport personnel during all phases of construction.
- Maintaining the safety of passengers and airport personnel during all phases of construction.
- Maintaining clarity of passenger way-finding.

The following conceptual phasing approach is based on the conceptual feasibility plans, and it is anticipated that these major phases would be supplemented by sub-phases when the final phasing approach is developed.

Phase 1

- Construct new Northeast, Concourse D access, and East shell enclosure with minimal disruption of existing ongoing operations

Phase 2

- Construct new conference rooms at the Bag Claim second floor addition
- Take the museum offline and store exhibits
- Demolish the northeast concessions, conference rooms and museum

Phase 3

- Temporary concessions could be fit-out in the northwest addition if desired / required
- Construct temporary finishes / dust partitions at northeast

Phase 4

- Demolish southeast concessions, new checkpoint area, and conference room
- Demolish center escalator, infill mall level and ticketing level floor structure, repair ticketing level finishes
- Construct new center escalators, stair, and elevator
- Construct new basement egress stair and demolish existing egress stair
- Construct new entry to ticketing

Phase 5

- Construct new checkpoint
- Construct new non-secure connector to Administration
- Construct new concourse D access corridor finishes
- Construct new non-secure concessions and museum

Phase 6

- Demolish north escalator and elevator, infill mall level and ticketing level floor structure, repair ticketing level finishes

Phase 7

- Establish new secure / non-secure line and new exit lane
- Transfer screening to the new checkpoint

Phase 8

- Construct new concessions at concourse D
- Construct new northeast concessions
- Construct new northwest concessions
- Complete finishes at mall level

Phase 9

- Construct concourse C concessions as needed

Concourse E can be remodeled into the new International Arrivals Terminal at any point in the remodeling process.

5.7 Terminal Mall Expansion Sustainability and LEED Opportunities

The design process for the proposed terminal mall expansion should evaluate and implement when appropriate, Milwaukee County's sustainable design program and Leadership in Energy and Environmental Design (LEED) guidelines.

Potential Sustainability and LEED Opportunities include:

- Finish materials containing a percentage of either post-consumer or post-industrial recycled content
- Finish materials having a low V.O.C. (Volatile Organic Compounds)
- Low flow faucets
- Efficient urinals: waterless or low flow
- Energy efficient transformers and lighting fixtures
- Lighting controls including occupancy/vacancy sensors and daylight harvesting controls
- Selecting materials and components based on the analysis of their full life-cycle and the conditions under which they will be used, including analyzing the durability of the products and verifying that they will remain serviceable over their anticipated service life

- Specifying demolition and construction procedures that require the diversion of as much waste as possible from landfill by recycling the demolition waste as well as waste created during the construction process
- Currently, many of the systems at the facility are constant volume without any means implemented to modulate airflow based on demand, recover energy from exhaust or relief airstreams, or adjust ventilation air based on occupancy. The following options could be considered to provide a more sustainable design aspect to the proposed systems as well as potential LEED credits under Energy & Atmosphere and Indoor Environmental Quality:
  - Variable Air Volume Control. It may be possible to implement variable volume operation to reduce fan energy as well as mechanical heating and cooling energy due to reduced airflow. This will require further analysis, however, to ensure that proper air distribution and space pressurization is maintained to support the needs of various cooking exhaust requirements throughout the facility.
  - Energy Recovery. The duct systems may be able to be configured or re-configured to accommodate air-to-air heat exchangers or heat recovery coils in able to utilize heat energy which would normally be discharged from the building in order to temper incoming ventilation air. The impact this option would have on the existing duct distribution systems would require further analysis.
  - Demand Controlled Ventilation. Because the population of the facility constantly varies, an option exists to allow fresh air levels to be decreased during periods where fewer people are present. This would be accomplished by installing sensors to measure carbon dioxide levels and adjusting the fresh air flow rates based on the readings of these sensors. This lowers the energy usage associated with tempering the necessary ventilation air. The variation in fresh airflow that could be achieved would need further analysis to ensure proper air distribution and space pressurization is maintained to support the needs of various cooking exhaust requirements throughout the facility.

CURRENT CONCESSIONS: 32,750 SF
PROPOSED CONCESSIONS: 30,735 SF (SECURE) + 2,900 SF = 33,635 SF TOTAL

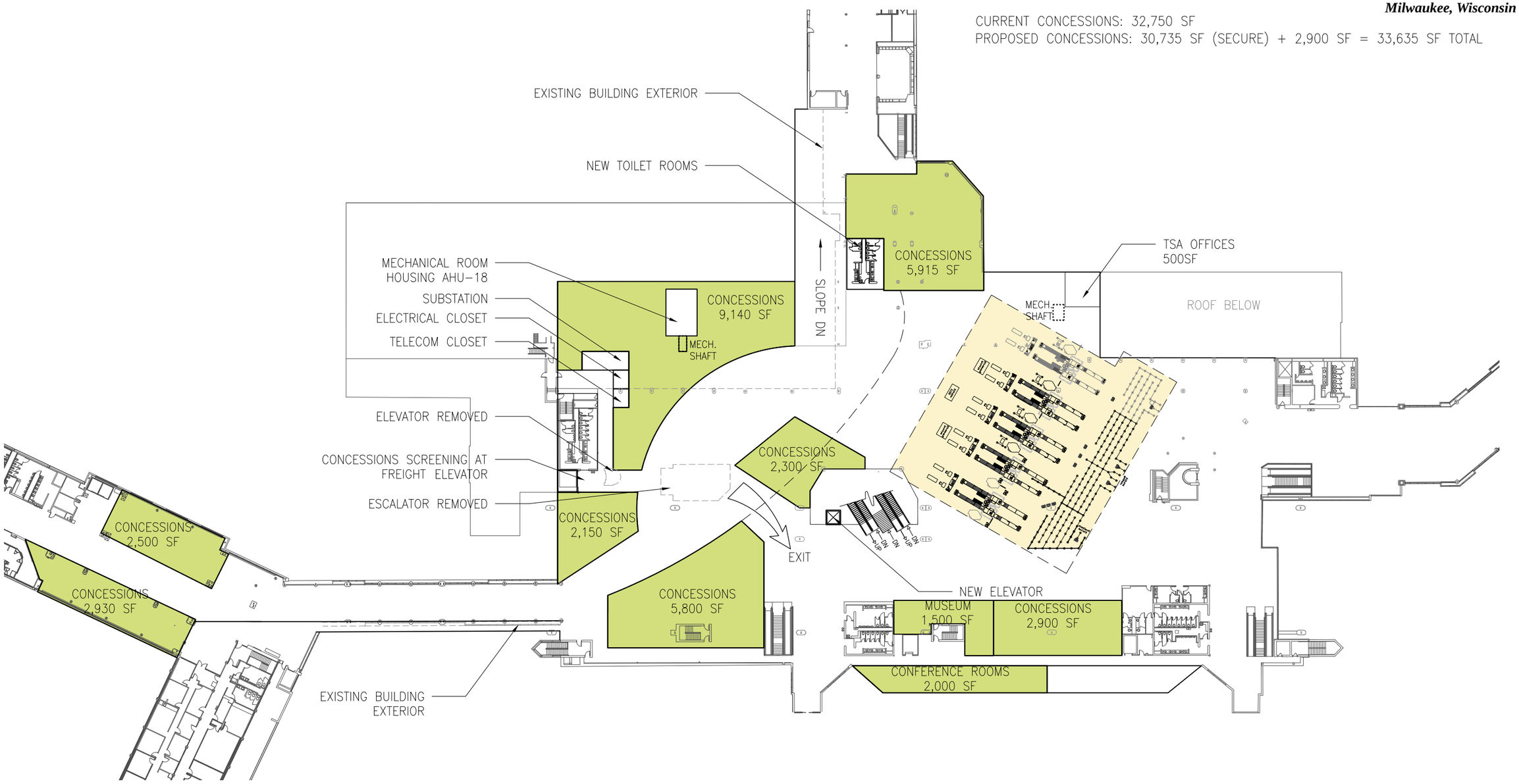

Exhibit 5.1

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Concept Plans
Gate Level

March 17, 2015

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CURRENT CONCESSIONS: 32,750 SF
PROPOSED CONCESSIONS: 30,735 SF (SECURE) + 2,900 SF = 33,635 SF TOTAL

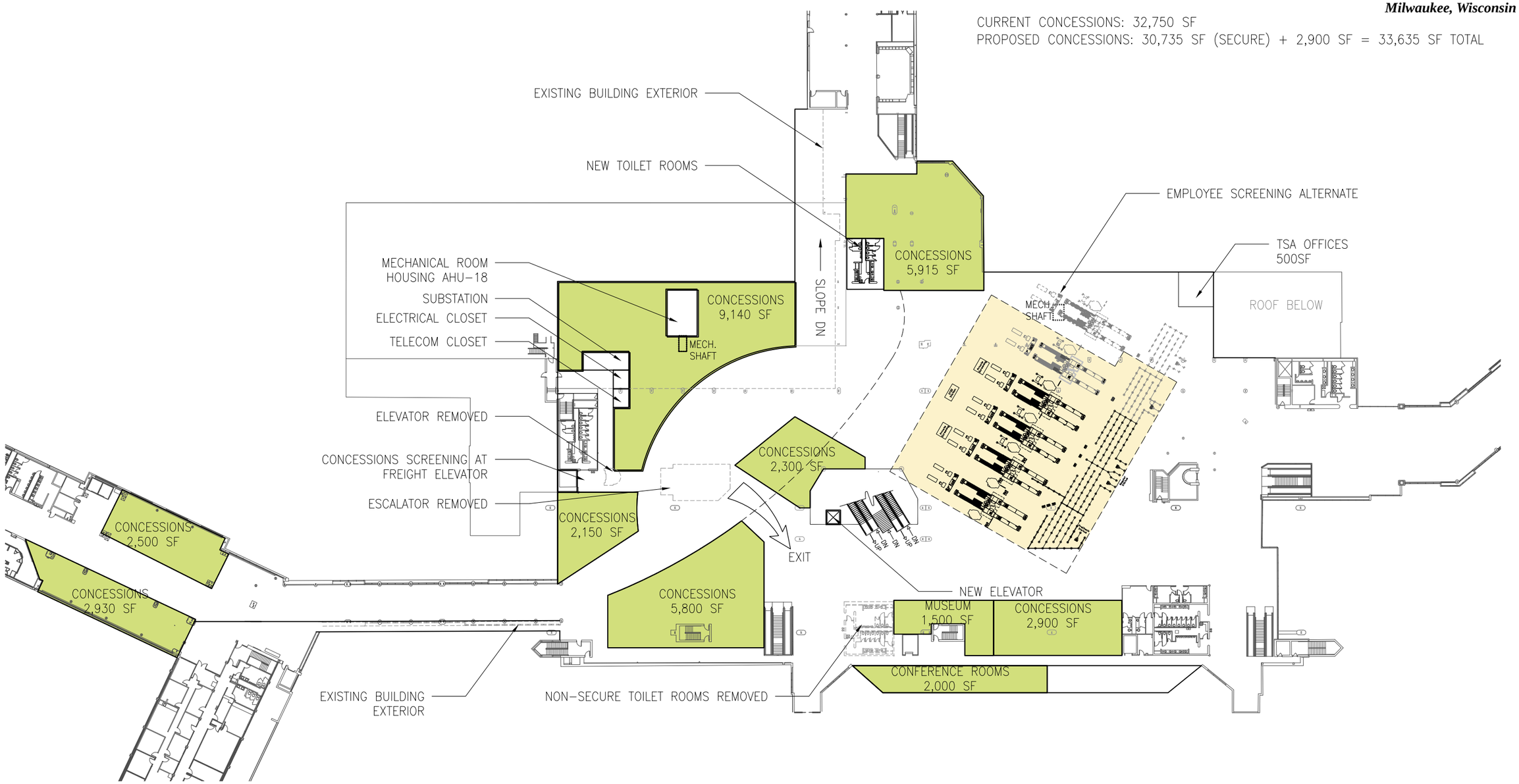

Exhibit 5.1b

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Concept Plans
Gate Level - Alternate

March 17, 2015

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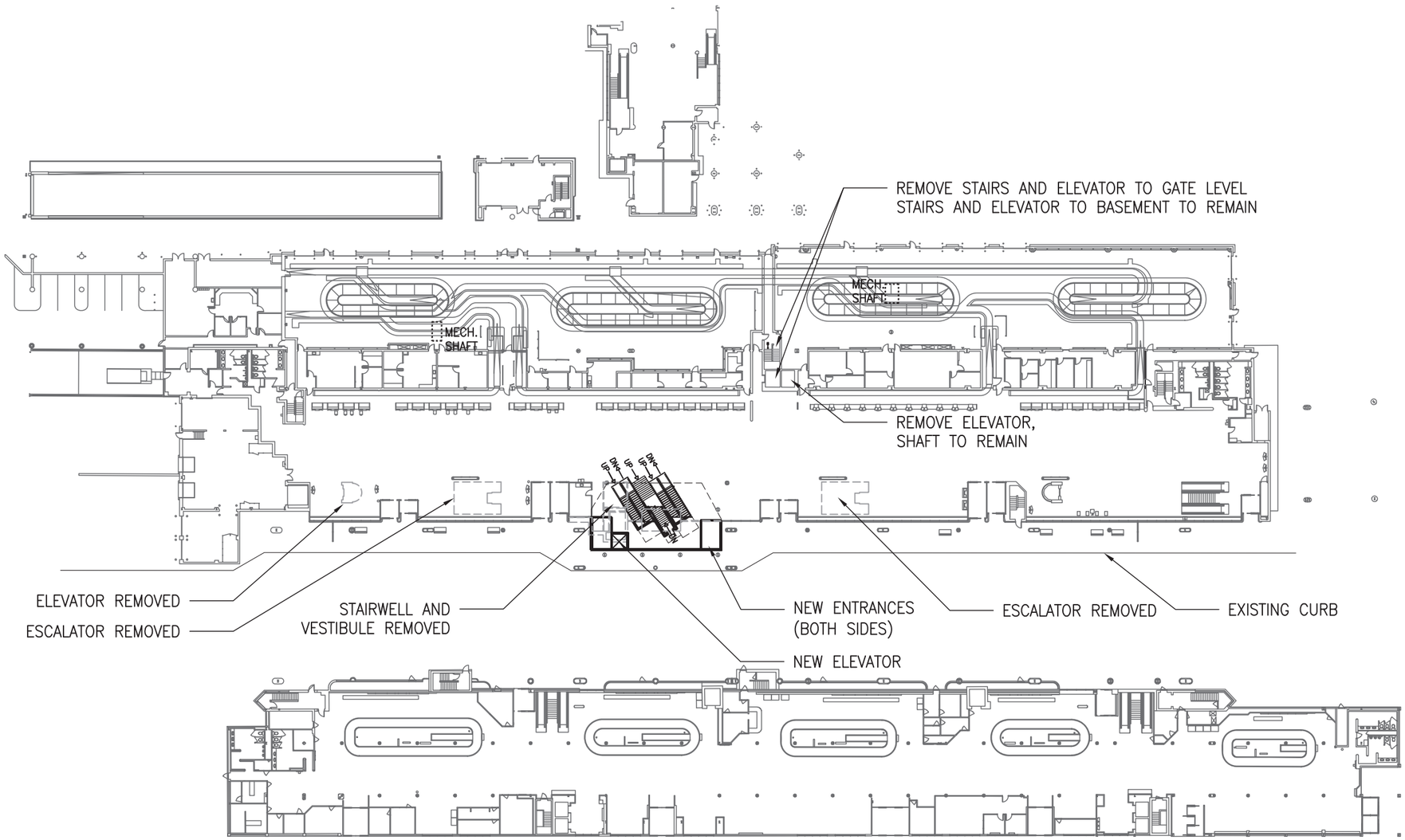

Exhibit 5.2

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Concept Plans
Ground Level

March 17, 2015

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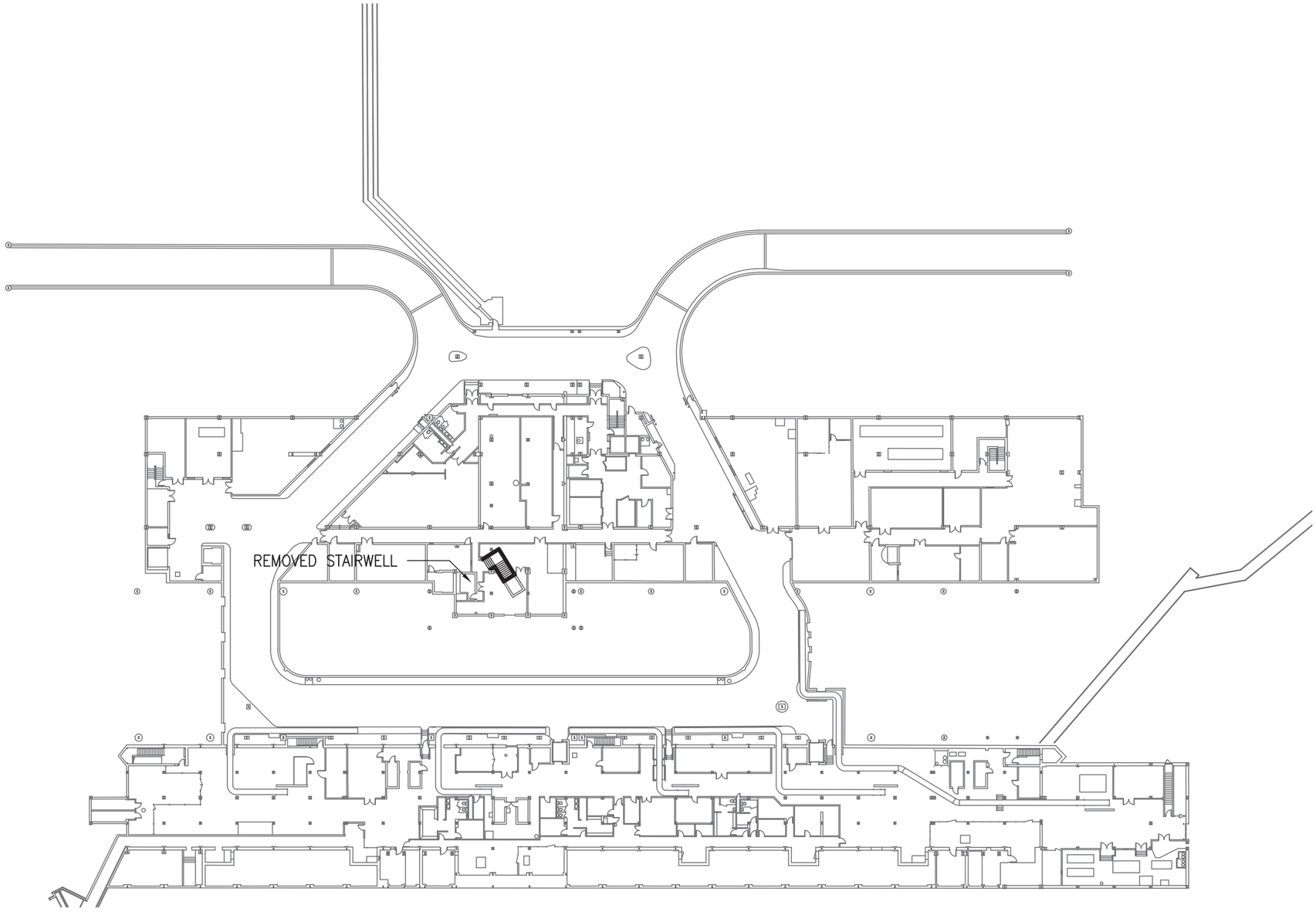

Exhibit 5.3

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Concept Plans
Basement Level

March 17, 2015

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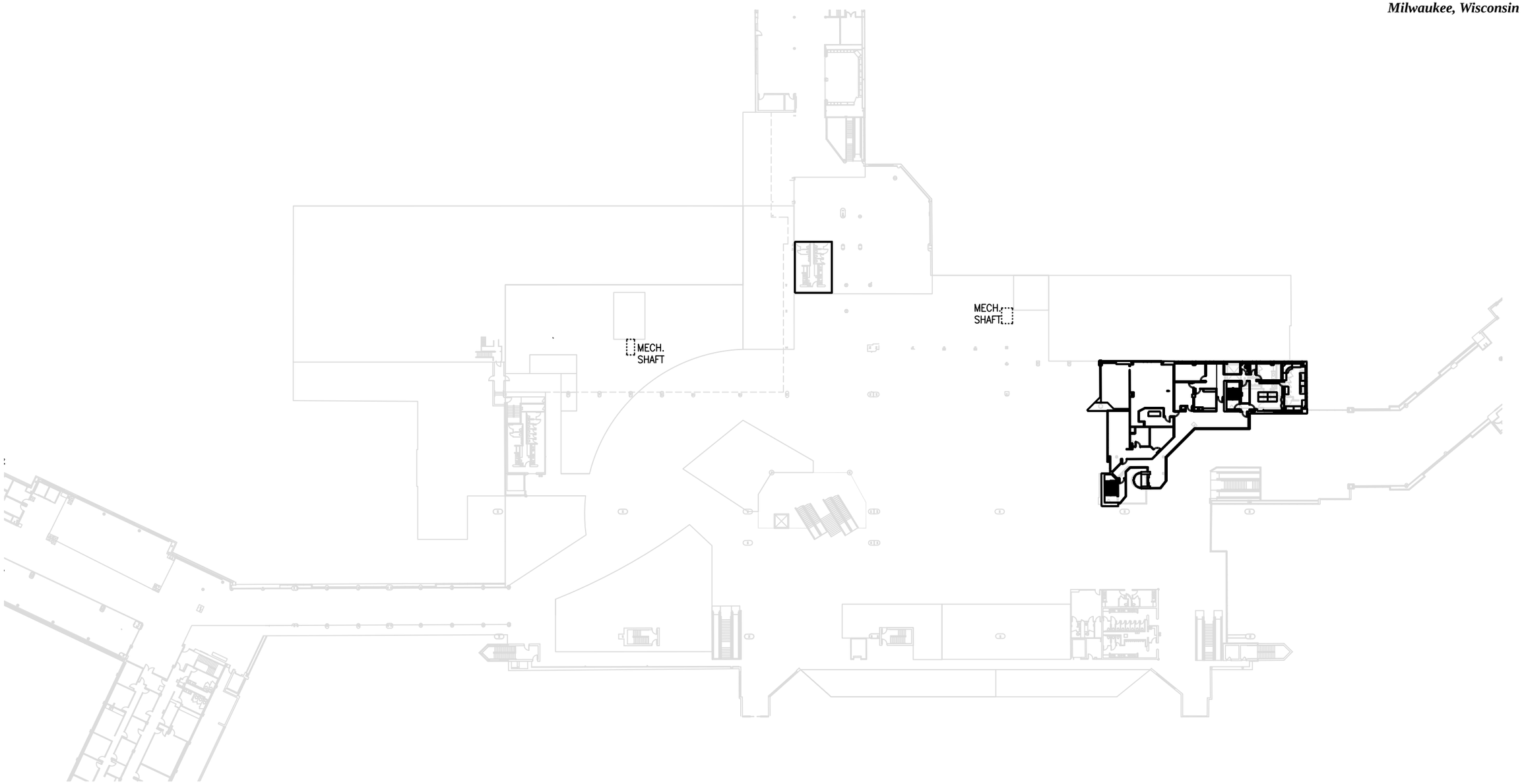

Exhibit 5.4

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Concept Plans
Mezzanine Level

March 17, 2015

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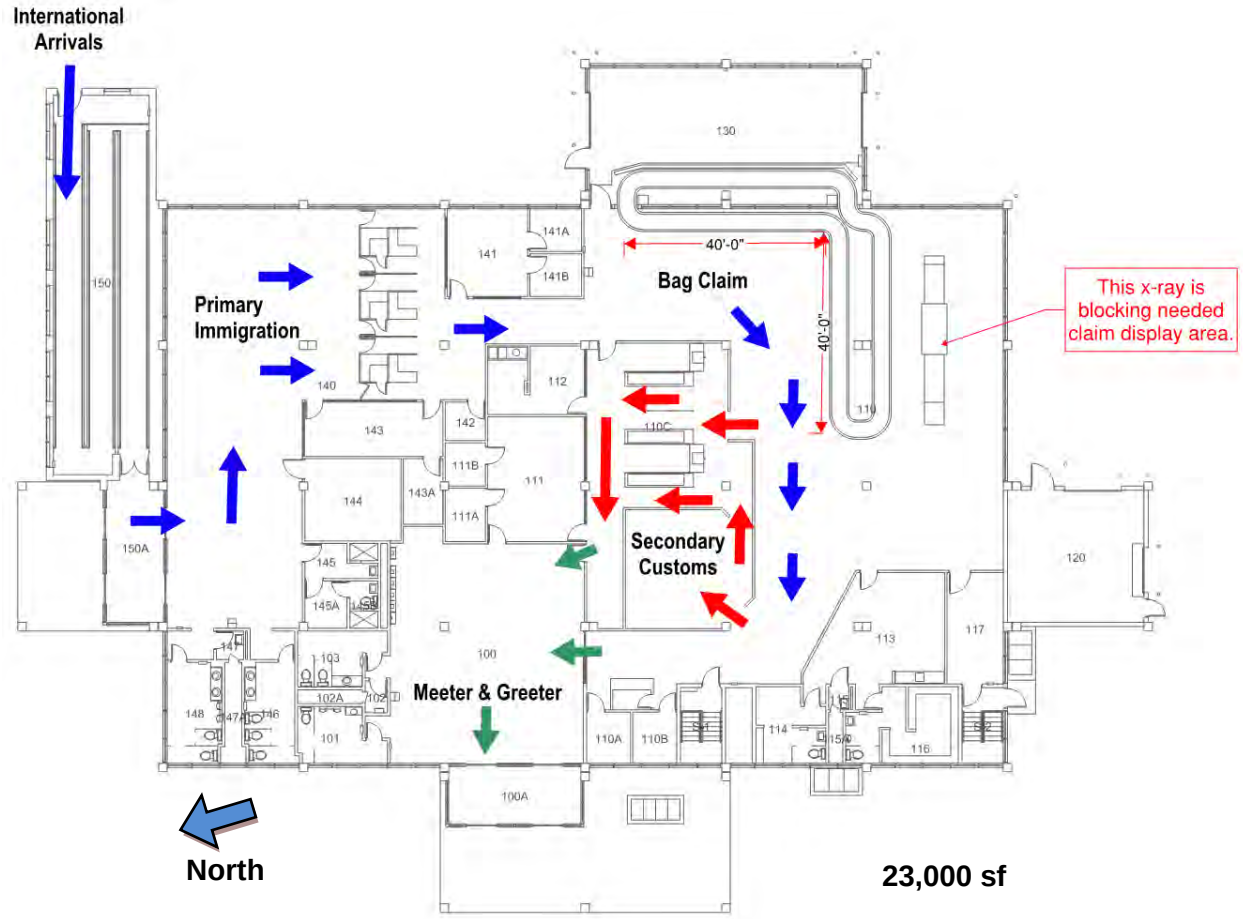
6.0 Concourse E International Terminal

6.1 Existing International Arrivals Building Conditions

MKE's existing traditional two stop layout Customs Border Protection (CBP) facility is located in a stand-alone 23,000 sf one story building with one arrival only gate. An interior ramp is used to de-board passengers from the aircraft down to the on-grade Primary Immigration queuing area. Once passengers are processed through immigration, they proceed to bag claim where they are routed either into secondary processing for further inspection or cleared to exit the facility through the Meeter & Greeter lobby.

The remote location of the FIS facility is inconvenient to the passengers in that they must walk across the roadway to connect to another flight or access the parking garage. This is particularly bad for passengers since most of the international traffic occur during the winter months.

The facility is under-sized and does not meet current CBP facility standards required by the 2012 Airport Technical Design Standards (ATDS).

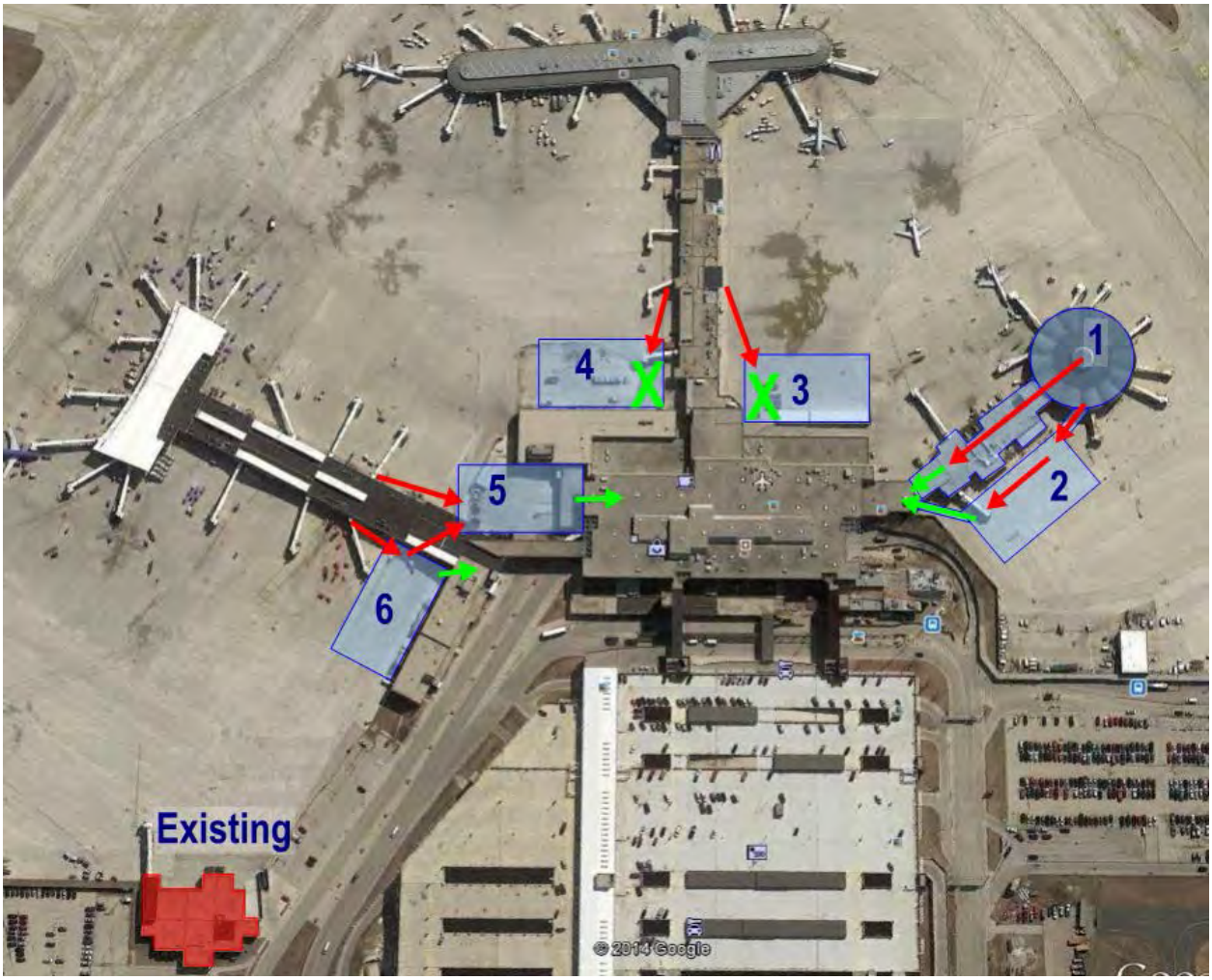


Existing International Arrivals Building

Existing CBP facility

6.2 Options

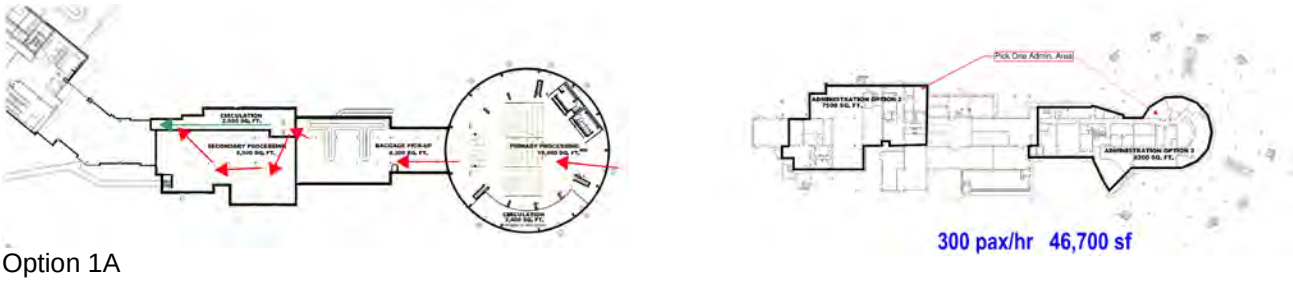
We looked at several site location options, reviewing the advantages and disadvantages of each. It was determined that locations 1 or 2 were able to achieve the projects goals. Site locations 3 & 4 were determined not viable because they had a conflict where arriving international passengers who had cleared CBP but could not cross the secured concourse at level 2 or the bag system at level 1. Site location 5 was determined to be not viable due to its required relocation of the loading dock, major utilities and prohibitive cost. Site location 6 was determined as not viable due to its conflict with active assigned gates and location would block all the windows on the adjacent offices.



Current flight activity allows Concourse E to become surplus unused space. The airport wants to retain this asset, and until traffic increases, re-purpose this concourse possibly as a FIS/CBP.

Option 1A: CBP - Within Existing Building Area.
Several options were studied; but due to the existing structural grid layout, exiting stairs, main mechanical and main electrical equipment locations, renovation into a CBP would be impractical as shown below. All mechanical/electrical and plumbing would have to be demolished and reconfigured. Also, the CBP functions would not have adequate space and would conflict with current columns and structure.

To develop a CBP within current building footprint, the required building area is not available. Option 1A is **Not Viable.**

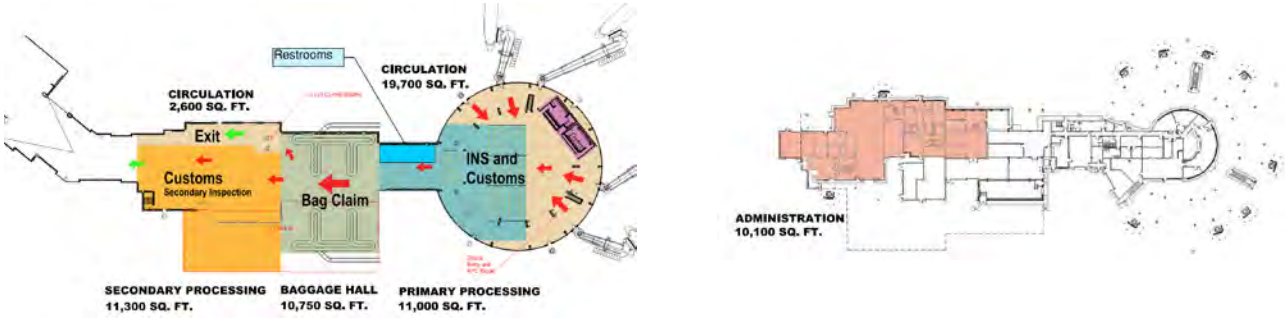


Option 1A

Options 1B, 1C, & 1D: CBP - Existing Building Area with Infills.
The existing concourse E has had several small infills and added to the sides of the concourse over time. When these were constructed a second row of columns were added and created unusual routing of MEP to support these additions. This has resulted in a building with internal double columns and MEP chases which restrict the ability to make open areas needed in an efficient CBP layout. Options 1-B thru 1D will require significant demolition of current facilities back to structure. The resultant structural grid and MEP requirements will impose a less efficient CBP layout and have a higher level of design risk than a new structure.

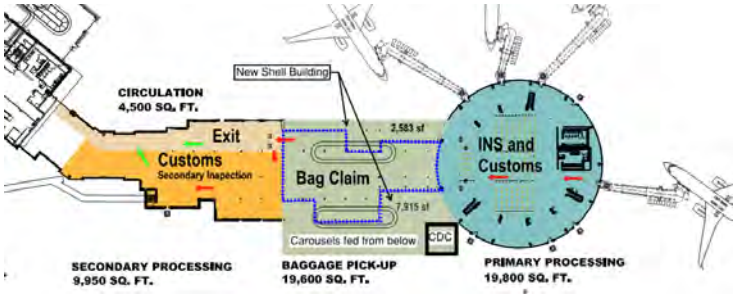
Redeveloping Concourse E as a new CBP, while problematic, is possible with additions to the building, and working closely with CBP officials. We studied both One-Stop and Two-Stop passenger configurations with various building infills to determine the best option.

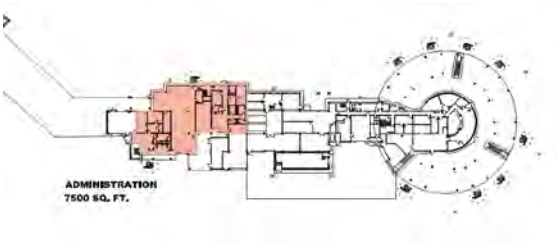
Option 1B: Two-Stop minimal infill expansion to building and major renovation. This option is viable but not preferred due to the "Two-Stop" layout.



Option 1B

Option 1C: Two-Stop minimal infill expansion to building and major renovation. This option is viable but not preferred due to the "Two-Stop" layout.

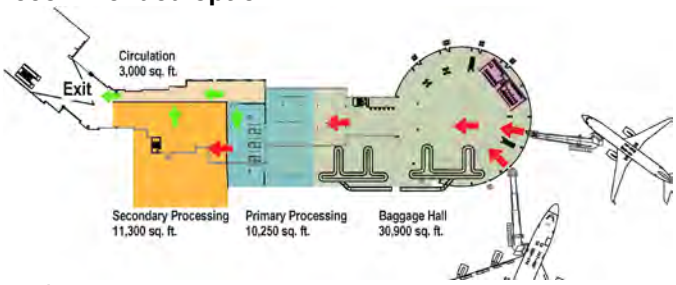


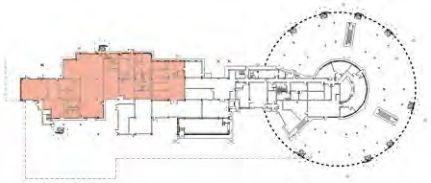


Option 1C

Option 1D: One-Stop with infill: By repurposing the rotunda holdroom for bag claim (remote feed carousel or flat plate) and new restrooms it would allow the reminder of the concourse to be available for CBP functions. Program area requirements for primary and secondary CBP processing require expanding the building to the west. Locating CBP administration directly under secondary may be acceptable to CBP officials with a new internal elevator / stair access core. This option is planned to have Concourse E serve international arrivals only. When traffic increases a secure connector (between the terminal and segregated holdrooms in the rotunda) could be constructed along the east side of concourse E. This would allow reactivation of gates 62 through 65 for domestic arrivals / departures. Construction of an interior dependent gate connecting corridor could increase the number of international arrival gates for flexibility.

CBP has recently started to prefer new facilities to be of the "One-Stop" layout. **Option 1D is the recommended option.**





Option 1D

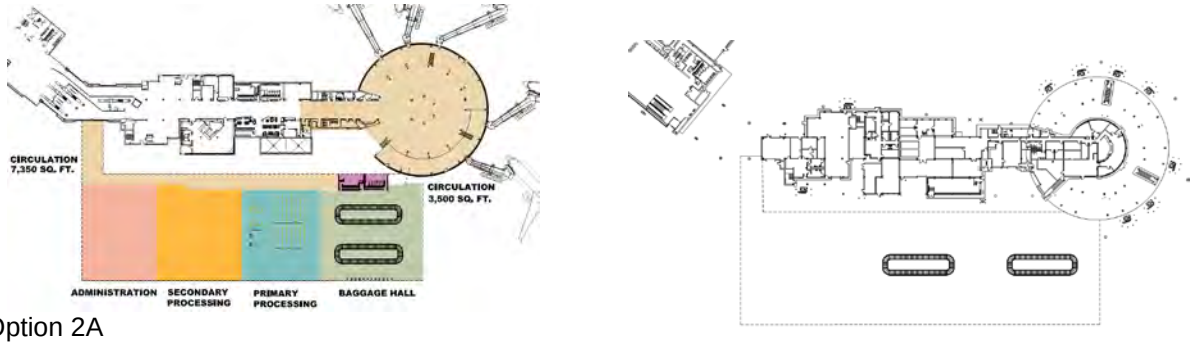
Option 2: CBP - New Building for CBP Function
The development a new two story building adjacent to the west side of Concourse E, with the CBP facility at concourse level could be nearly column free which would allow for future flexibility. Securing CBP approvals for a new building with a clean layout will be much easier than any infill project approach. This option would also eliminate major renovation scope. Design and final footprint location of the addition will need to consider and accommodate the existing wide body parking position which is controlled by the adjacent taxiway.

Option 2A:
Concourse E would remain available as a fully functioning concourse; both domestic and international operations could operate. To accommodate both the domestic and international travel, sterile corridors with interlocking doors would need to be incorporated to allow each gate to operate independently. Gates 60 and 69 on the west side would be permanently closed for the CBP construction. By keeping the CBP on the second level it would avoid the need for two costly elevators and escalators for access down and back up. This would provide first level spaces that can be used for other airport functions.

Because CBP is very concerned with security of their facility, being on a second level over tug accessible areas could cause concern. However, there are other CBP's located with tug traffic below on the secured AOA areas. We do not anticipate CBP requiring the structure to be hardened from blast due to its secured AOA traffic location. Hardening was not included as a line item in our cost projections.

In the event of concourse E gates not having scheduled departing flights the concourse could accept diverted international flights allowing passengers to de-plane into the internationally sterile concourse. This helps airlines avoid problems with FAA's three hour rule. Diverted international flights could de-board, utilize this hold room for long delays, and either re-board or be internationally processed at MKE. This flexibility might be very useful to the region when airports such as Chicago have significant irregular operations.

Further refinement of this option could look at locating the 10,000 sf of CBP administration area into the existing concourse which would reduce the amount of new building area required.

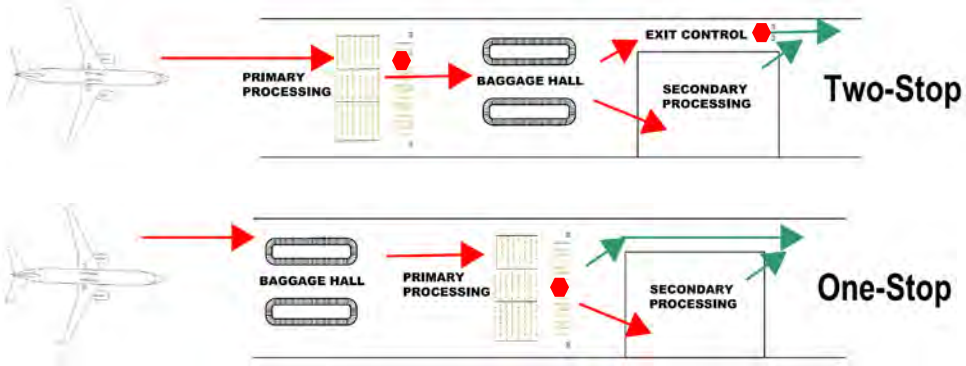


Option 2A

Option 2B: Options 2B is basically the same configuration as Option 2A, but with the CBP constructed on apron level. This increased the costs of two vertical cores to access down from arriving gates and back up to the exit corridor. This option eliminates the underutilized apron level construction included in option 2A at a likely higher cost.

6.3 Customs Border Protection Design

CBP has started requesting airport sponsors consider "One-Stop" layouts, they prefer this options since it reduces their head count while still provides a good level of service for the passengers.



Customs and Border Patrol Layout Options

6.3.1 Traditional Layout "Two-Stop"

6.3.1.1 **INS (STOP ONE)** - Passengers arrive at the Primary Screening Booth Area

- Global Entry approved passengers may fill out paperwork at Kiosks and Proceed to Primary Inspection Booth queue
- Individuals with US or Canadian passports may proceed to the APC Kiosks and fill out paperwork and proceed to Primary Inspection Booth queue.
- Passengers with Visas and those not cleared by the Kiosks must be processed through queue to full service Primary Inspection Booths
- Once Cleared through Primary Inspection passengers retrieve baggage and proceed to exit control booth queue.

6.3.1.2 **Bag Claim**

- Passengers with declarations or other Issues are directed to Secondary Processing Area for further screening.

6.3.1.3 **Customs**

- **Cleared** Passengers are released to enter U.S.
- **Secondary** Those flagged for further inspection or with Paperwork issues are directed to Secondary Processing.

6.3.1.4 **Exit Control (STOP TWO)**

- Passenger present their customs declaration form.

6.3.1.5 **Exit Meeter Greeter**

6.3.2 Preferred "One—Stop"

6.3.2.1 **Bag Claim**

- Passengers arrive directly into Baggage Claim Area.
- Global Entry and APC eligible passengers may fill out paperwork at the Kiosks while waiting for their luggage to be delivered.

6.3.2.2 **INS / Customs (STOP ONE) -** After retrieving luggage Passengers proceed to Inspection Booth Queues.

- Passengers cleared by Kiosks proceed to Cleared Line
- Passengers with Visas or those not cleared by the Kiosks proceed to full service Processing Booth.
- Both Passport and Declaration Paperwork are reviewed at the processing booth

6.3.2.3 **Customs**

- **Cleared** passengers are free to enter the country
- **Secondary -** Passengers flagged for further inspection or with Paperwork issues are directed to Secondary Processing.

6.3.2.4 **Exit Meeter Greeter**

6.4.0 Recommendations

6.4.1 **Location:** Sites 1 or 2 provide direct access to the main terminal. This location improves passenger's access to, re-check ticketing, connecting flights and ground transportation. Arriving into the main terminal creates an international passenger flows similar to domestic operations which simplify signage and way finding. Meeter & Greeters would have access to landside concession while wait for arriving international passengers.

6.4.2 **CBP Processing Option:** Current CBP preference is a one-stop layout for new FIS facilities. We would recommend this layout for this facility.

6.4.3 **Single Level:** Having immigrations, customs and secondary screening on one level reduces the need for duplicate search and interview rooms and allows for a reduction of CBP head count. For the size MKE is considering we would recommend all CBP processing to be on one level. CBP prefers a single level operation.

6.4.4 **Recommended Option 1D:**

Pro:

- Smallest total building area for O&M considerations
- Fully repurposes and reuses Concourse E
- Anticipated to be a lower cost than Option 2A or 2B
- While vacant construction should have limited phasing issues.

Con:

- Reuse of E gates for future domestic or outbound international will require construction of eastside connector and partition / holdroom modifications.
- Design Risk – Major renovation of older facility have inherit hidden conditions.
- Existing building's structural grid will make CBP space planning less efficient.

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7. Planning Level Estimate of Project Cost

The planning level estimate of project cost for the Terminal Mall Expansion and Central Checkpoint has been prepared by Middleton Construction Consulting, LLC, Inc. (refer to complete unit cost data and estimate conditions contained in Appendix A).

The planning level estimate of project cost for the Concourse E International Terminal Checkpoint has been prepared by Corgan Associates, Inc.

The cost estimates are based on an assumed construction start of Winter 2016 in accordance with direction given to the study team, and must be escalated by the actual rate of inflation to the actual construction start date. Given current market conditions in the construction industry, the average rate of inflation as reported by Engineering News Record can be assumed to range between 3% and 4% per year.

7.1 Terminal Mall Expansion and Central Checkpoint

7.1.1 Terminal Mall Expansion and Central Checkpoint

Base Cost	$24,258,790	
Roof Replacement	$1,647,511	
Skylight Replacement		
Translucent Panel Replacement	$226,471	
Lighting Upgrade	$707,426	
Clean Space Frame and Paint Roof Deck	$448,493	
Add Toilet Rooms Secure Side	$270,558	
Subtotal Construction	**$27,559,249**	
Wayfinding	$413,389	
FIDS Monitors and Data Support	$551,185	
FF&E	$1,653,555	
Design Phase Contingency	$4,133,887	
Public Art	$275,592	
Soft Costs @ 25.9%	$7,137,845	
Estimated Total Project Cost*		**$41,724,702**
* Including 10% Construction Phase Contingency		

7.1.2 Terminal Mall Expansion and Central Checkpoint Optional Alternates

West Addition to C Connector	$2,314,295	
Skylight Replacement Glass Replacement	$367,243	
Exterior Glazing Replacement	$1,969,612	
Terrazzo Flooring Upgrade	$3,302,807	
Remove North Non-Secure Side Toilet Rooms	$143,664	
Add Employee Checkpoint	$2,441,660	
Subtotal Optional Alternates	**$10,539,281**	
* Including Soft Costs		
Estimated Total Project Cost Including All Optional Alternates*		**$52,263,983**
* Including 10% Construction Phase Contingency		

7.1.3 Terminal Mall Expansion and Central Checkpoint Base Cost per Square Foot

Mall Level Addition Area	$392.00
Mall Level Renovation Area	$159.77
Mezzanine Level Area	$0 – Costs Carried in Mall Level Renovation
Ticketing Level Area	$294.00
Basement Level Area	$0 – Costs Carried in Mall Level Renovation
Total Project Area	137,861 Square Feet
Construction Cost per Square Foot	$199.91
Project Cost per Square Foot	$302.66

7.1.4 Project Soft Costs / Notes

The following soft costs are included in the above estimates:

Airport Logistics	5.0%	
Permits, Plan Review and Testing	0.3%	
Hazardous Materials Abatement	0.1%	
Temporary Relocations	1.5%	
A/E Design Fees and Reimbursables	10.5%	
Construction Manager & County Project Management	8.5%	
Total Soft Costs*		25.9%

* excludes financing
* excludes TSA equipment

7.2 Concourse E International Terminal

7.2.1 Concourse E International Arrivals Terminal

Construction Cost – Major Renovation	$8,527,500	
Construction Cost – Shell and Finish	$6,160,000	
Construction Cost – Shell No Finish	$1,760,000	
Subtotal Construction		**$16,447,500**
FF&E	$325,000	
Design Phase Contingency	$1,644,750	
Public Art	$164,475	
Soft Costs @ 24.4%	$4,013,190	
Estimated Total Project Cost*		**$22,594,915**

* Including 10% Construction Phase Contingency

7.2.2 Concourse E International Arrivals Terminal Cost per Square Foot

Major Renovation Area	$248.00	
Shell and Finish Area	$385.00	
Shell No Finish Area	$110.00	
Total Project Area	73,100 Square Feet	
Construction Cost per Square Foot		$225.00
Project Cost per Square Foot		$309.10

7.2.3 Soft Costs / Notes

The following soft costs are included in the above estimates:

Airport Logistics	5.0%	
Permits, Plan Review and Testing	0.3%	
Hazardous Materials Abatement	0.1%	
A/E Design Fees and Reimbursables	10.5%	
Construction Manager & County Project Management	8.5%	
Total Soft Costs*		24.4%

* excludes financing
* excludes CBP furniture, fixtures and equipment

7.2.4 Concourse E International Arrivals Terminal Optional Alternate

Permanent construction connector between the Concourse E Rotunda and the Secure Side of the Checkpoint at the Terminal – elevated concourse level and no apron level enclosure	$5,728,100	
* Including Soft Costs		
Estimated Total Project Cost Including Optional Alternate*		**$28,323,015**

* Including 10% Construction Phase Contingency

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8. Appendices

8.1 Appendix A – Terminal Mall Expansion and Central Checkpoint Planning Level Estimate of Project Cost Detail

8.2 Appendix B – Meeting Notes

September 17, 2014	Data Gathering Meetings
September 17, 2014	Kick-Off Meeting
September 19, 2014	Workshop Number One
October 8, 2014	Workshop Number Two
October 20, 2014	Planning & Design Criteria Update
November 25, 2014	Workshop Number Three
December 17, 2014	Concept Update
February 3, 2015	Concept Review

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8. Appendices

8.1 Appendix A

Conceptual Cost Estimate – Terminal Mall Expansion

8.1.1 Explanation of cost data included in Appendix A

The planning level estimate of project cost for the Terminal Mall Expansion and Central Checkpoint has been prepared by Middleton Construction Consulting, LLC, Inc.

The cost estimates are based on an assumed construction start of Winter 2016 in accordance with direction given to the study team, and must be escalated by the actual rate of inflation to the actual construction start date. Given current market conditions in the construction industry, the average rate of inflation as reported by Engineering News Record can be assumed to range between 3% and 4% per year.

The conceptual cost estimates include the described terminal additions, terminal mall renovation and finishes, central checkpoint (excluding TSA equipment), and “white box” level of finish for concessions areas. Costs related to the fit-out of the concessions areas are not included in the noted costs.

The conceptual cost estimates contained in Appendix A are provided as the basis for the cost estimates included in Section 7 of this report.

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DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
00 BASE BID				
01300 Temporary Facilities & Controls				
Temp Signage	1	EACH	29,411.76	29,412
SUBTOTAL: Temporary Facilities & Controls				**$29,412**
01500 Infection Control				
Temporary enclosures	1	LSUM	367,647.06	367,647
SUBTOTAL: Infection Control				**$367,647**
02100 Selective Demolition				
Remove exterior wall for tie in at Expansion	13,244	SQFT	13.92	184,298
SUBTOTAL: Selective Demolition				**$184,298**
02300 Building Demolition				
Demo for interior Minor Renovations	53,047	SQFT	3.45	183,106
Demo for interior Checkpoint work	18,205	SQFT	6.90	125,679
Demo for interior Concession Space work	17,760	SQFT	6.90	122,607
SUBTOTAL: Building Demolition				**$431,391**
03100 Concrete Formwork				
Infill at Escalators	1,000	SQFT	56.70	56,698
SUBTOTAL: Concrete Formwork				**$56,698**
05100 Structural Steel				
Structural steel beams & columns, floor, allow 11 lbs/sf @ addition	21,291	SQFT	51.20	1,090,015
SUBTOTAL: Structural Steel				**$1,090,015**
05300 Stairs				
Rework Egress stair	400	SQFT	588.24	235,294
SUBTOTAL: Stairs				**$235,294**
07400 Roofing				
Roof System at Expansion	21,291	SQFT	15.96	339,795
SUBTOTAL: Roofing				**$339,795**
08200 Curtainwall & Storefront				
Exterior Solar Shades	210	LNFT	182.16	38,254
Exterior Wall System at Expansion	12,276	SQFT	145.95	1,791,693
SUBTOTAL: Curtainwall & Storefront				**$1,829,947**
09000 FINISHES				
Renovate Ticketing Area for new escalators	2,000	SQFT	294.12	588,235
SUBTOTAL: FINISHES				**$588,235**
09100 Plaster & Gypsum Board				
Buildouts/Finishes at Concession Areas White Box	17,760	SQFT	88.24	1,567,059
Buildouts/Finishes at Minor Renovation Areas	53,047	SQFT	102.94	5,460,721
Buildouts/Finishes at Checkpoint addition/renovation	18,205	SQFT	132.35	2,409,485
Build Outs for Meeting Rooms and Museum	1,500	SQFT	132.35	198,529
SUBTOTAL: Plaster & Gypsum Board				**$9,635,794**
14000 CONVEYING EQUIPMENT				
Structural work required for new elevators	1	EACH	88,209.41	88,209

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
Hydraulic psgr elev stop	8	EACH	39,875.64	319,005
Add for glass enclosed cab	4	EACH	18,825.41	75,302
Escalators-Flip Existing	1	EACH	1,653,894.12	1,653,894
		SUBTOTAL: CONVEYING EQUIPMENT		**$2,136,410**
21000 FIRE SUPPRESSION				
Wet sprinkler system - $/SF-Additions	21,291	SQFT	7.68	163,581
Wet sprinkler system - $/SF-Minor Renovations	53,047	SQFT	5.38	285,346
Reconfigure existing wet sprinkler system for Checkpoint Renovations	18,205	SQFT	4.82	87,836
Reconfigure existing wet sprinkler system for Concession Renovations	17,760	SQFT	4.82	85,689
		SUBTOTAL: FIRE SUPPRESSION		**$622,453**
22000 PLUMBING				
Plumbing Risers/drainage at additions	21,291	SQFT	3.82	81,407
Water lines at Renovated Concession Areas	17,760	SQFT	3.24	57,459
		SUBTOTAL: PLUMBING		**$138,866**
23200 Ventilation & Exhaust				
HVAC Systems Minor Renovation Areas	53,047	SQFT	8.35	442,872
HVAC Systems Renovated Checkpoint Areas	18,205	SQFT	55.97	1,019,009
HVAC Systems Renovated Concession Areas	17,760	SQFT	40.27	715,240
HVAC Systems Additions	21,291	SQFT	49.10	1,045,304
		SUBTOTAL: Ventilation & Exhaust		**$3,222,424**
26000 ELECTRICAL				
Service and distribution - Main switchboard, distribution panels, - Addition	21,291	SQFT	4.43	94,316
Service and distribution - Main switchboard, distribution panels, Checkpoint Renovations	18,205	SQFT	5.07	92,356
Service and distribution - Main switchboard, distribution panels, Concession Renovations	17,760	SQFT	4.30	76,412
Service and distribution - Main switchboard, distribution panels, Minor Renovations	53,047	SQFT	3.61	191,648
Emergency Service and distribution - Distribution panels, ATSs and associated feeders - Addition	21,291	SQFT	1.81	38,493
Emergency Service and distribution - Distribution panels, ATSs and associated feeders - Minor Renovation Area	53,047	SQFT	1.41	74,539
Emergency Service and distribution - Distribution panels, ATSs and associated feeders - Checkpoint Renovations	18,205	SQFT	2.28	41,478
Emergency Service and distribution - Distribution panels, ATSs and associated feeders - Concession Renovations	17,760	SQFT	1.41	24,955
		SUBTOTAL: ELECTRICAL		**$634,197**
26500 Lighting				
Lighting System - Light fixtures- Addition	21,291	SQFT	11.33	241,246
Lighting System - Light fixtures- Checkpoint Renovation	18,205	SQFT	9.56	174,018
Lighting System - Light fixtures- Concession Renovation	17,760	SQFT	9.56	169,788
Lighting System - Light fixtures- Minor Renovation	53,047	SQFT	6.71	355,735
Lighting System - Emergency and Exit Lights- Addition	21,291	SQFT	1.04	22,089
Lighting System - Emergency and Exit Lights- Checkpoint Renovation	18,205	SQFT	1.04	18,888
Lighting System - Emergency and Exit Lights- ConcessionRenovation	17,760	SQFT	1.04	18,426
Lighting System - Emergency and Exit Lights- Minor Renovation Area	53,047	SQFT	1.04	55,036

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
			SUBTOTAL: Lighting	**$1,055,227**
27200 Tele/Data Systems				
Telecommunication/Data & Television System, complete- Addition	21,291	SQFT	7.92	168,694
Telecommunication/Data & Television System, complete- Concession Renovations	17,760	SQFT	7.92	140,717
Telecommunication/Data & Television System, complete- Checkpoint Renovation	18,205	SQFT	7.92	144,242
			SUBTOTAL: Tele/Data Systems	**$453,653**
27300 Intercom & Public Address Systems				
Public Address System, complete- Checkpoint Renovations	18,205	SQFT	4.76	86,728
Public Address System, complete- ConcessionsRenovations	17,760	SQFT	2.43	43,086
Public Address System, complete-Additions	21,291	SQFT	4.24	90,283
			SUBTOTAL: Intercom & Public Address Systems	**$220,098**
28200 Fire Alarm Systems				
Fire alarm System, complete- Addition	21,291	SQFT	2.97	63,184
Fire alarm System, complete- Checkpoint Renovation	18,205	SQFT	2.97	54,026
Fire alarm System, complete- Concession Renovation	17,760	SQFT	2.97	52,705
Fire alarm System, complete- Minor Renovation	53,047	SQFT	1.44	76,450
			SUBTOTAL: Fire Alarm Systems	**$246,366**
28400 CCTV System				
CCTV/Security System, Checkpoint Renovations	18,205	SQFT	9.63	175,357
CCTV/Security System, Concessions Renovations	17,760	SQFT	4.59	81,487
CCTV/Security System, Additions	21,291	SQFT	6.70	142,618
			SUBTOTAL: CCTV System	**$399,462**
31100 Site Preparation & Excavation				
Excavation/Sitework at Additions	21,291	SQFT	11.84	252,176
			SUBTOTAL: Site Preparation & Excavation	**$252,176**
33000 UTILITIES				
Site Utility Relocates/Tie Ins	21,291	SQFT	4.18	88,934
			SUBTOTAL: UTILITIES	**$88,934**
TOTAL: BASE BID				**$24,258,790**

01 WEST CONNECTOR TO GATE C

01500 Infection Control				
Temporary enclosures	1	LSUM	58,823.53	58,824
			SUBTOTAL: Infection Control	**$58,824**
02100 Selective Demolition				
Modify structure @ west connector	4,014	SQFT	30.58	122,755
Remove exterior wall	4,400	SQFT	15.85	69,751
			SUBTOTAL: Selective Demolition	**$192,506**
02300 Building Demolition				
Demo for interior work	2,160	SQFT	10.72	23,156
			SUBTOTAL: Building Demolition	**$23,156**
05100 Structural Steel				
Structural steel beams & columns, floor, West Connector	2,160	SQFT	77.26	166,878

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
			SUBTOTAL: Structural Steel	**$166,878**
07400 Roofing				
Roof System at West Connector	2,160	SQFT	18.44	39,831
			SUBTOTAL: Roofing	**$39,831**
08200 Curtainwall & Storefront				
Exterior Solar Shades	240	LNFT	182.16	43,719
Exterior Wall System at West Connector	4,100	SQFT	145.95	598,399
			SUBTOTAL: Curtainwall & Storefront	**$642,117**
09100 Plaster & Gypsum Board				
Buildouts/Finishes at West Connector	2,160	SQFT	117.65	254,118
			SUBTOTAL: Plaster & Gypsum Board	**$254,118**
21000 FIRE SUPPRESSION				
Wet sprinkler system - $/SF-West Connector	5,836	SQFT	7.68	44,839
			SUBTOTAL: FIRE SUPPRESSION	**$44,839**
22000 PLUMBING				
Plumbing Risers/drainage at West Connector	2,160	SQFT	3.82	8,259
			SUBTOTAL: PLUMBING	**$8,259**
23200 Ventilation & Exhaust				
HVAC Systems West Connector	2,160	SQFT	49.10	106,047
			SUBTOTAL: Ventilation & Exhaust	**$106,047**
26000 ELECTRICAL				
Service and distribution - Main switchboard, distribution panels, - West Connector	2,160	SQFT	4.43	9,568
Emergency Service and distribution - Distribution panels, ATSs and associated feeders - West Connector	2,160	SQFT	1.81	3,905
			SUBTOTAL: ELECTRICAL	**$13,474**
26500 Lighting				
Lighting System - Light fixtures- West Connector	2,160	SQFT	11.33	24,475
Lighting System - Emergency and Exit Lights- West Connector	2,160	SQFT	1.04	2,241
			SUBTOTAL: Lighting	**$26,716**
27200 Tele/Data Systems				
Telecommunication/Data & Television System, complete- West Connector	2,160	SQFT	7.92	17,114
			SUBTOTAL: Tele/Data Systems	**$17,114**
27300 Intercom & Public Address Systems				
Public Address System, complete-West Conncector	2,160	SQFT	4.24	9,159
			SUBTOTAL: Intercom & Public Address Systems	**$9,159**
28200 Fire Alarm Systems				
Fire alarm System, complete- West Connector	2,160	SQFT	2.97	6,410
			SUBTOTAL: Fire Alarm Systems	**$6,410**
28400 CCTV System				
CCTV/Security System, West Connector	2,160	SQFT	6.70	14,469
			SUBTOTAL: CCTV System	**$14,469**
31100 Site Preparation & Excavation				

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
Excavation/Sitework at West Connector	2,160	SQFT	32.50	70,196
SUBTOTAL: Site Preparation & Excavation				**$70,196**
33000 UTILITIES				
Site Utility Relocates/Tie Ins-West Connector	2,160	SQFT	7.00	15,117
SUBTOTAL: UTILITIES				**$15,117**
TOTAL: WEST CONNECTOR TO GATE C				**$1,709,228**
02 ROOF REPLACEMENT				
07400 Roofing				
Remove and Replace Roof System	119,819	SQFT	13.75	1,647,511
SUBTOTAL: Roofing				**$1,647,511**
TOTAL: ROOF REPLACEMENT				**$1,647,511**
03 SKYLIGHT/GLASS/PANEL REPLACEMENT				
08000 OPENINGS				
Skylight Replacement-Frame to Remain	4,626	SQFT	58.82	272,118
Kalwall Replacement-Frame to Remain	4,400	SQFT	51.47	226,471
SUBTOTAL: OPENINGS				**$498,588**
TOTAL: SKYLIGHT/GLASS/PANEL REPLACEMENT				**$498,588**
04 EXTERIOR GLAZING REPLACEMENT				
08200 Curtainwall & Storefront				
Glazing-Exterior Replacement-Frame to Remain	15,218	SQFT	95.59	1,454,662
SUBTOTAL: Curtainwall & Storefront				**$1,454,662**
TOTAL: EXTERIOR GLAZING REPLACEMENT				**$1,454,662**
05 TERRAZZO FLOORING UPGRADE				
09200 Floor Finishes				
Delete Base Level Finishes	-86,296	SQFT	9.56	-824,888
Terrazzo flooring, Upgrade from Base	86,296	SQFT	37.83	3,264,184
SUBTOTAL: Floor Finishes				**$2,439,296**
TOTAL: TERRAZZO FLOORING UPGRADE				**$2,439,296**
06 LIGHTING UPGRADE				
26500 Lighting				
Upgrade Lighting in Terminal	68,234	EACH	10.37	707,426
SUBTOTAL: Lighting				**$707,426**
TOTAL: LIGHTING UPGRADE				**$707,426**
07 CLEAN SPACE FRAME				
09600 Paints & Coatings				
Clean Space Frame	119,819	SQFT	3.74	448,493
SUBTOTAL: Paints & Coatings				**$448,493**

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
TOTAL: CLEAN SPACE FRAME				**$448,493**
08 ADD TOILET ROOMS SECURE SIDE				
09000 FINISHES				
Build-out Toilet Rooms on Secure side	800	SQFT	338.24	270,588
SUBTOTAL: FINISHES				**$270,588**
TOTAL: ADD TOILET ROOMS SECURE SIDE				**$270,588**
09 REMOVE NORTH NON-SECURE SIDE TOILET ROOMS				
02100 Selective Demolition				
Remove Toilet Rooms on North Non-Secure Side	1,110	SQFT	95.59	106,103
SUBTOTAL: Selective Demolition				**$106,103**
TOTAL: REMOVE NORTH NON-SECURE SIDE TOILET ROOMS				**$106,103**
10 ADD EMPLOYEE CHECKPOINT				
09000 FINISHES				
Add Employe Checkpoint Lane-Addition	3,832	SQFT	470.59	1,803,294
SUBTOTAL: FINISHES				**$1,803,294**
TOTAL: ADD EMPLOYEE CHECKPOINT				**$1,803,294**

8. Appendices

8.2 Appendix B

8.2.1 Meeting Notes

September 17, 2014	Data Gathering Meetings	
September 17, 2014	Kick-Off Meeting	
September 19, 2014	Workshop Number One	
	Exhibit A.1	Concept Option WS1-A
	Exhibit A.2	Concept Option WS1-B
	Exhibit A.3	Concept Option WS1-C
	Exhibit A.4	Concept Option WS1-D
October 8, 2014	Workshop Number Two	
	Exhibit A.5	Concept Option WS2-A
	Exhibit A.6	Concept Option WS2-B
	Exhibit A.7	Concept Option WS2-C
	Exhibit A.8	Concept Option WS2-D
October 20, 2014	Planning & Design Criteria Update	
November 25, 2014	Workshop Number Three	
	Exhibit A.9	Concourse E One Stop Addition Concept
	Exhibit A.10	Concourse E One Stop Addition Concept
	Exhibit A.11	Concourse E Traditional Renovation Concept
	Exhibit A.12	Concourse E One Stop Renovation Concept
	Exhibit A.13	Concept Option WS3-A
	Exhibit A.14	Concept Option WS3-B
	Exhibit A.15	Concept Option WS3-C
	Exhibit A.16	Concept Option WS3-D
	Exhibit A.17	Concept Option WS3-E
December 17, 2014	Concept Update	
	Exhibit A.18	Concept Update – Gate Level
February 3, 2015	Concept Review	
	Exhibit A.19	Concept Review - Gate Level “A”
	Exhibit A.20	Concept Review - Gate Level “B”
	Exhibit A.21	Concept Review - Ground Level
	Exhibit A.22	Concept Review – Basement
	Exhibit A.23	Concept Review - Mezzanine

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One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
414 / 259 1500
414 / 259 0037 fax
www.graef-usa.com

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September 17, 2014

Meeting Notes – Data Gathering #1 - #3

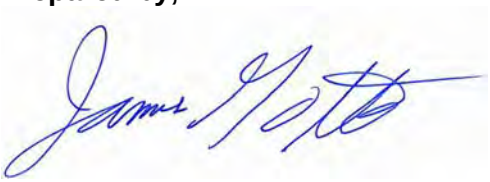
Terminal Expansion and Central Checkpoint Feasibility Study and Cost Estimate
General Mitchell International Airport
Milwaukee County Project No. A201-14012

Present	For General Mitchell International Airport:			
	Terry Blue		#2	
	Timothy Karaskiewicz		#2	
	Ed Baisch		#2	#3
	Michael Keegan	#1		
	Kevin Demitros			#3
	Pat Rowe		#2	
	For TSA:			
	Robert Ronge	#1		
	For Vic Thompson Company:			
	Angie McHorse	#1	#2	#3
	For James G. Otto Architect:			
	Jim Otto	#1	#2	#3

Three formal Data Gathering meetings were held to begin the data gathering process including confirmation of previously received demand criteria, discussion of general checkpoint design criteria, employee screening design criteria, and concessions inspection criteria in preparation for Workshop #1. The information received provided the basis for Workshop #1 activities and is included in the Workshop #1 discussion notes.

These meeting notes constitute the author's understanding of the issues discussed and the decisions reached. Please contact the undersigned with any additions, deletions or changes.

Prepared by,



James G. Otto, AIA, NCARB
Project Manager

One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
414 / 259 1500
414 / 259 0037 fax
www.graef-usa.com

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125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
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September 17, 2014

Meeting Notes

Project Kick-Off

Terminal Expansion and Central Checkpoint Feasibility Study and Cost Estimate
General Mitchell International Airport
Milwaukee County Project No. A201-14012

Present For General Mitchell International Airport:
Terry Blue
Timothy Karaskiewicz
Ed Baisch
Michael Keegan
Kathleen David
Kevin Demitros
Pat Rowe
For TSA:
Robert Ronge
For GRAEF:
Lori Rosenthal
Bob Schumacher
Terry Foster
Richard Koenig
Ed Prasser
For Vic Thompson Company:
Angie McHorse
For Kindness Architecture + Planning:
Scott Kindness
For James G. Otto Architect:
Jim Otto

The meeting was held as the kick-off meeting and provided the opportunity for introductions, discussions and clarification of project procedures/processes, project execution plan, and alignment of project goals/objectives/visions.

All communication should flow through Jim Otto and Ed Baisch. However in order to avoid delays a direct contact is okay as long as Jim and Ed are informed.

Overview of this morning's meetings along with other pre meetings was provided by Jim Otto.

A handout was provided, "Project Understanding & Approach "– page 5 was highlighted.

Descriptions were provided by Jim Otto of what to expect at workshops one, two, and three, as well as documents that will be provided.

Discussion was then opened to the GMIA members for their thoughts, concerns and visions. Comments included the following:

1. Centralize checkpoint
2. Determine what we are as an airport
    a. Convenient friendly, customer service alternative to Chicago
3. 2015 end of current airline leases
    a. expect a reshuffling of air carriers
    b. Possible consolidation on Concourse C and D
    c. E – mothball or convert into international terminal
        i. Does it say "Welcome to Milwaukee"
        ii. Remote IAB is passenger issue (shuttle)
4. 3 security checkpoints and independent concessions are not efficient
5. Finishes – need to be durable
6. Image - look and feel
    a. Would love to have Terrazzo but question cost
    b. Current building is very cozy and has a Mid-western feel
        i. Denver too sterile except for terminal
    c. Bright and airy. Natural light. Want windows.
    d. Check point should have good lighting and more welcoming feel
    e. Check point should have a flow through a space
    f. Concessions – what makes visitors/passengers linger or circulate
        i. Denver successfully provides room and space
        ii. Traffic patterns
        iii. Want space to linger, not confined
        iv. Glass walls for barriers and transparency
        v. Indianapolis – uses glass beyond to avoid mouse maze image – two check points that converge. O'Hare does Indy badly
    g. Sense of place – what makes Milwaukee special.
    h. Must be cost effective – numbers must work.
    i. Question need for repairs to existing roof and windows.
7. Loading dock – security issues – Warehouse issues
    a. Potential tunnel delivery system
    b. All goods must be checked to concessions. Currently affects finishes through checkpoint.

Other items discussed:

Workshop two rescheduled to Wednesday, October 8th, 2014, 9:00 – 11:00am.

Badging needs confirmed. Jim Otto will email a list of company names/representatives to Ed.

These meeting notes constitute the author's understanding of the issues discussed and the decisions reached. Please contact the undersigned with any additions, deletions or changes.

Prepared by,

James G. Otto, AIA, NCARB
Project Manager

One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
414 / 259 1500
414 / 259 0037 fax
www.graef-usa.com

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One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
414 / 259 1500
414 / 259 0037 fax
www.graef-usa.com

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September 19, 2014

Meeting Notes - Workshop #1

Terminal Expansion and Central Checkpoint Feasibility Study and Cost Estimate
General Mitchell International Airport
Milwaukee County Project No. A201-14012

Present For General Mitchell International Airport:
Timothy Karaskiewicz
Ed Baisch
Michael Keegan
Kathleen David
Kevin Demitros
Pat Walslager
For TSA:
Robert Ronge
For GRAEF:
Lori Rosenthal
For Vic Thompson Company:
Angie McHorse
For Kindness Architecture + Planning:
Scott Kindness
For Corgan:
Marie Pistor
For James G. Otto Architect:
Jim Otto

The meeting was held to present Workshop #1 for purposes of 1) confirming foundation information and relevant background to support the study; and 2) gain consensus on GMIA's priorities, design parameters, constraints and opportunities to exploit during the study. Workshop #1 was conducted by Angie McHorse. A copy of her workshop discussion notes are attached for reference.

These meeting notes constitute the author's understanding of the issues discussed and the decisions reached. Please contact the undersigned with any additions, deletions or changes.

Prepared by,

James G. Otto, AIA, NCARB
Project Manager

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General Mitchell International Airport (MKE) – Checkpoint Consolidation Feasibility Study **9/19/2014**
Workshop #1 – Planning & Design Options Criteria Working Session for Checkpoint Design ***Workshop Discussion Notes - Updated***

Workshop #1 – Discussion Topics

Introductions

- Workshop Objectives:
  1. Confirm foundation information and relevant background to support the study
  2. Gain consensus on GMIA and TSA's priorities, design parameters, constraints and opportunities to exploit during the study

Data Collection

- Conclusions and Findings So Far
- Outstanding Needs for the Study
- Guiding Principles for the Project

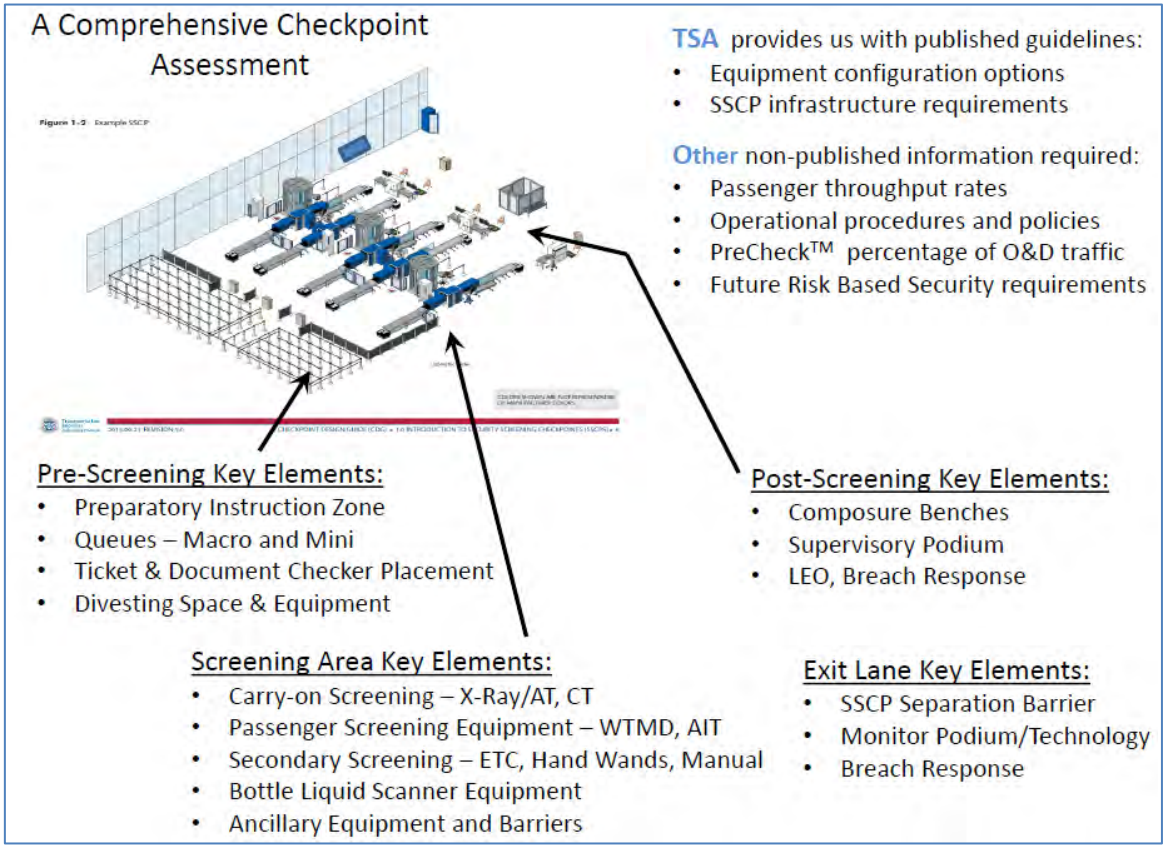
Security Checkpoint Design Factors

- Passenger Screening Function at GMIA – The Checkpoint in General
- Pre-screening
- Screening – Passengers & Carry-on Items
- Post-screening
- Exit Lanes and TSA Operations Support

Other Design Factors

- Departing Passenger Experience (curb, ticketing hall, en route)
- Federal Inspection Services (FIS) / CBP
- Concessions Space Planning (Unsecured side and secured side)

Workshop #1 Wrap-up



Guiding Principles for Design Team

1. Streamline concessions delivery and screening
2. Maintain GMIA's established culture and reputation for convenience and low-cost airport to fly
3. Economic feasibility and ability to sell to tenants is a driving force in the projects future
4. Maximize use of existing limited mall area space – breadth and depth – and leverage existing resources where possible in order to minimize costs and avoidable disruption
5. Provide for alignment of TSA operations and efficiency of TSA resources
6. Anticipate future needs and accommodate worst case scenarios for TSA and GMIA operations
7. Build for durability and extended life for GMIA assets
8. Phasing of final solution must provide for "reasonable" disruption and alternatives for concessions offerings
9. Design for ***Flexibility*** considering the possibility for changes by TSA, market demand, etc.

Checkpoints In General

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Passenger throughput – daily, hourly and surged peaks Number of lanes – Pre-Check and Regular TSA staffing / shift Other staffing / shift	Current air service diminished since 2011 but seeing uptake in traffic this year. March 2011 statistics provide a fair representation of full use and peak hourly demand profile with GMIA at virtually full capacity 3 separate checkpoints with 15 lanes total: Conc C – 5 lanes Conc D – 6 lanes Conc E – 3 lanes +1 Wait times – - PreCheck - <5 minutes - Regular - <10 minutes as a rule; >10 minutes seen as urgent response by TSA Hours of operations are ~ 3am to 9:30pm or extended as required by day Breach containment accomplished through alarm and communications systems ("48 Alarm")	**Number of CP lanes considered for space allocation planning:** **Near-term needs** – 8 lanes to include 3-4 PreCheck and 4-5 Regular configurations **Future needs (2023)** – 10 lanes to include 4-5 PreCheck and 5-6 Regular configurations **Tertiary considerations** in case of significant changes to screening protocols or demand increases – Identify space to add 2 lanes but could impede concessions space Consolidate checkpoint and supporting operations into a centralized function Locate checkpoint function to compliment passenger and employee flow into airside/secured side operations Compliance with TSA's Checkpoint Design Guidelines Duress alarm system is installed by TSA in will need to be integrated into the new checkpoint *(this is not the same as GMIA's 48 Alarm)*	Non-disruptive and labor efficient phasing Reuse TSA screening equipment currently installed Reuse CCTV assets where possible in the new configuration Improve supervisors ability to see and support TSO's while checkpoints are active Where might renovations to Terminal E impact the options for phasing for the consolidated checkpoint? Consider options outside of mall area or off-site for screening to improve accessibility for concessions vendors Employee screening needs to be located within main terminal where they perform their duties Identify any foreseen changes to TSA's Checkpoint Design Guidelines for consideration in space allocation and costs

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
	Current CP's are located based on space availability and each has individual challenges with aesthetics, flow, lighting, etc. which are not ideal. Passenger and TSO staff experiences are negatively impacted by these issues.	Checkpoint function compliments mall area and provides Passengers with a non-threatening experience Provide updated, appealing aesthetics, lighting and signage that creates an unthreatening, positive experience for passengers and TSO's Compliance with airport and TSA safety standards Compliance with ADA and other public space standards	Leverage what has worked (or not) from other airports with consolidated checkpoints – IND, DEN, MCO, ATL, PHL-D, etc.—with regard to layout and aesthetics that positively impact passengers security experience
	Concessions screened through existing 3 checkpoints at off-peak times	Separate concessions screening from Passenger screening for overall benefit to passengers and concessionaires	
	Badged employees screened through the existing 3 checkpoints Known Crew Members verified through the checkpoint exit lanes FFDO and FAM's verified at exit lanes	Separate employee and Known Crew Member screening from Passenger screening areas	
	Approximately 12-13 lanes routinely staffed across checkpoints	Gain staff efficiencies with less lanes and higher productivity due to an efficient layout of the SSCP	

Pre-Screening Function

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Wait times in queue - PreCheck < 5 minutes - Regular < 10 minutes	Adequate queuing except for highest peak traffic GMIA PreCheck processing rates at approximately 38-42% as directed by TSA. TSA is striving to increase numbers as much as possible	Ability to expand queuing if necessary to improve management of overflows at peaks Provide kiosk banks for all airlines in close proximity to the checkpoint entrance for print/reprint of boarding passes	Flow into checkpoint queuing that is convenient for passengers Use split queuing layout to maximize narrow dimensions of the mall area Address function and location of escalators as the flow into and from the checkpoint is evaluated
Pre-Check status ratio	3 types of queues: 1. Regular service feeds standard screening lanes 2. PreCheck service feeds PreCheck screening lanes 3. Preferred Passengers (as designated by the airlines) feeds either regular or PreCheck based on TSA or airline policy GMIA PreCheck lane participation is approximately 40% including MI2 additions where it can be more	Configure for lane "flexing" to allow for redirecting Passengers between lane types alternatively throughout the day TSA goal is for >50% of qualified passengers to go through PreCheck	Locate Ticket Checker position as close to the entrance into queuing as possible to direct Passengers to correct queues

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Processing peak demand	"Expedited Screening" passengers are defined by TSA and directed between lane types according to policy	Maintain flexibility to assign these passengers to either a regular or PreCheck screening lane	
Processing peak demand	Group and charter processing counted in demand projections	Provide adequate facilities and paths for screening of wheelchair assistance passengers	Charter passengers tend to surge the checkpoint so assess the impact of these surges in the demand projections
Staffing / shift (TSA, Other)	TSA staffs Ticket Checker positions Airlines staff a pre-queue position to assist passengers at queue entry		Consider relocating Ticket Checker positions to the head of the queue where designed queues are separated between PreCheck and Standard lines Use of fully automated ticket and identification validation can improve throughput at the ticket checker position
Checkpoint security		Checkpoint must be secured/closed down when not in operation	

Screening Function - Passenger & Carry-on Items

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Pre-Check Status processing times = >300-400 pph Regular Status processing times = > 150-180 pph	Flexibility to adjust to multiple screening protocols within each lane	Retain the flexibility for multiple screening protocols within each lane	Adaptable to future TSA requirements for screening, e.g. Risk Based Security (RBS) Seamless mitigation plans for processing passengers under irregular operations and/or security events
Asset utilization	Current mix of screening equipment (primarily L-3 and Smiths) are adequate to use in a new checkpoint	AT Full features in the Smith's AT units to further improve checkpoint capacity Efficient location of secondary screening functions for passengers and TSO's	Full utilization of the equipment capabilities in a new configuration Position equipment to avoid screen image line of site issues with passengers passing through checkpoint areas
Hourly passenger throughput	Wheelchair and charter passengers take more time to process than the regular passengers	Provide adequate facilities and paths for screening of wheelchair assistance passengers	Charter passengers tend to take more because of the items they choose to travel with
Staffing per lane	Currently meeting productivity and TSA standards with staffing	Improvements would be based on changes to TSA screening protocol or staffing availability	?

Post-Screening Function

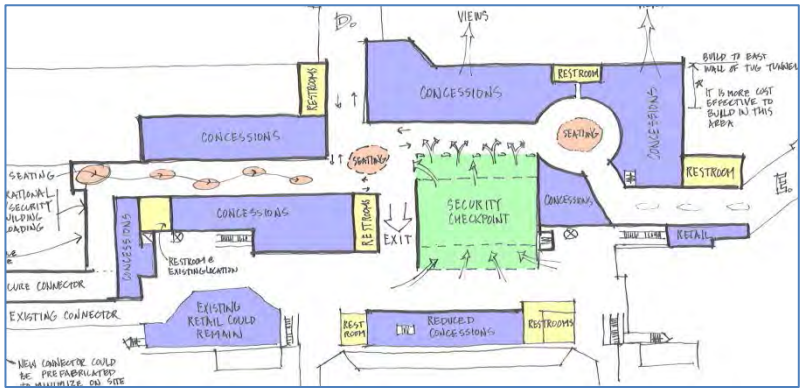
Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Expedient recomposure by passengers	Adequate space and flow to support recomposure function	Upon recomposure, passenger has clear visibility to gate and concessions options Avoid clustering/chokepoints for passengers exiting the checkpoint once screened	Passenger integration into secured-side traffic flow Effective use of glass barriers, FIDS, signage, etc. to make passengers aware of where they need to go and what options they have ahead of them so that they can formulate a plan for themselves quickly once screened
TSA Staffing - Supervisors	Typically 2-3 supervisors per checkpoint focused on the beginning and rear of the screening area for support to TSO's	Place supervisors podium at the rear of the checkpoint with visibility to all queuing, screening and post-screening activity Integrate LEO into the TSA's supervisor monitoring station	

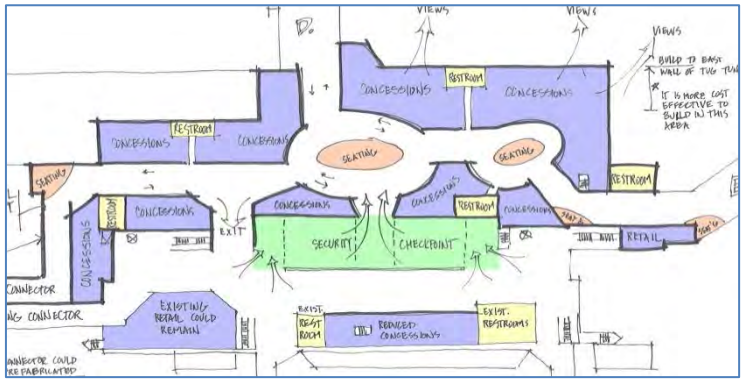
Exit Lane Function and TSA Operations Support

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Staffing / shift (TSA, Other)	TSA staff covers each of 3 exit lanes during regular hours of operation Airport contractors cover off-hour until mid-night Sheriff's department covers 12a until checkpoint opens the next morning Exit lanes are the entry portal for large equipment	TSA will continue to staff exit lanes Exit lanes must remain as open space and unencumbered to allow equipment into and out of the concourse	Visibility to TSO supervisors Visibility to departing passengers Flow between secured side and non-secured side movement Labor efficiency Consider automation options that do not reduce available open space on the exit lanes
Facility sf for TSA	TSA has designated space adjacent to the checkpoints and away from the checkpoint supporting all TSA functions at GMIA	Co-locate the following functions adjacent to the respective checkpoint areas: Checkpoint supervisory –TBD TSO breakroom/lunch space close proximity to CP – needs storage space for winter wear TSA Management close proximity to CP – 1-2 managers (up to 4) may occupy the space Threat containment unit storage (2 at the CP) – enclosed space for a 3'X3'X3' unit	Utilize existing space where possible *–> Review functionality and spec's for Supervisors Station from other US centralized checkpoints: IND, MCO, ATL, DEN, PHL-D, DTW, …* Do you need both TCU's if you have a consolidated CP?

Departing Passenger Experience

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Traffic through various entry points throughout the airport	Passengers enter many entry points throughout the airport and use all 3 escalators Extensive meeter-greeter areas on non-secured areas	Direct flow as much as possible past lobby and directly to the central checkpoint Provide the necessary self-service functions closest to the checkpoint queue entry for convenience Well placed meter-greeter space on non-secured side with close access to concessions on	Optimize flow from ticketing lobby up to consolidated checkpoint Locate central checkpoint in the most convenient location to all entry points (according to utilization) Explore eliminating/relocating/replacing escalator(s) to streamline Passenger flow to the new checkpoint
Passenger time in airport	Ticket counters are used primarily to check bags and deal with issues Express bag drop positions are offered by 3 airlines to expedite checking bags: SWA, Delta, Frontier (?)		Align the highest utilized positions closest to checkpoint for the most efficient flow benefiting the majority of passengers





Concessions Accommodations

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Concessions sf allocation	Most concessions are in unsecured areas which do not effectively support airport goals for passenger concessions revenue and convenience	50,000 sf of concessions: 70-80% secured side 20-30% or maybe less to remain on unsecured side **based on AirMallUSA feedback*	Optimize mix between non-secured and secured side concessions space based on local market and history
	Concessions inventory is ***inspected*** through the existing checkpoints at off-peak times as per TSA protocol	Streamlined processes for delivery and inspecting concessions inventory – out of passenger flow if possible Consider potential space requirements for additional security equipment or processes	Contemplate areas outside of the mall area to comply with screening requirements either below or behind public passenger space while also providing for vendor convenience Three options for handling concessions inventory to consider: 1. Delivery to warehouse where stock is inspected and repackaged for airside pickup and delivery to concessions 2. Separate space within the terminal area for inspection, e.g. a loading dock, then picked up / delivered to concessions once processed 3. Use employee checkpoint for dual purpose inspection of concessions stock **based on AirMallUSA feedback*
Concession revenues	Relocation of concessions happens and is successfully managed with proactive communications by GMIA	Disruption with major phasing must be manageable for maintaining concessions service to passengers and minimizing loss of revenue for the vendors	Early consideration for phasing options may drive the ultimate plan for executing the project Proactive involvement of the airlines and vendors will benefit the overall program and help them to adequately prepare their resources throughout phasing

FIS / CBP

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Passenger peak demand (hourly)	RJ from Canada 737's from charters 200 planes diverted this year from Chicago largely due to weather Mitigation space approved by CBP Gate 68 is the current wide body gate	Est. 400-600 pax per hour for a planning peak number with 2-757s possible Included in demand estimate	
Checked baggage demand	?	Belts or carousels for : At 1.0 bag per pax = 400-600 bag capacity per hour At 1.5 bag per pax = 600-750 bag capacity per hour	Process for reclaiming bag is TBD for future requirements
Improved customer service	Remote IAB facility	Eliminate the need to shuttle passengers between FIS building and main terminal	Improve the convenience and overall experience at GMIA for international arriving passengers
Cost control	Current facility has no significant costs associated with it Passengers are transported by shuttle to the main terminal	Need to be clarified	Leverage existing facilities and infrastructure where possible to minimize the capital and operating costs associated with relocating the FIS/CBP function -- including CCTV Consider federal compliance requirements associated with the relocation options including blast proofing and sprinkler requirements

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Optimize the space requirement	Existing facility is not up to current CBP standards	Allocate space for the following functions: Primary processing – Baggage pickup – Secondary processing – CBP Administration -	CBP standards as a baseline and optimize with available space

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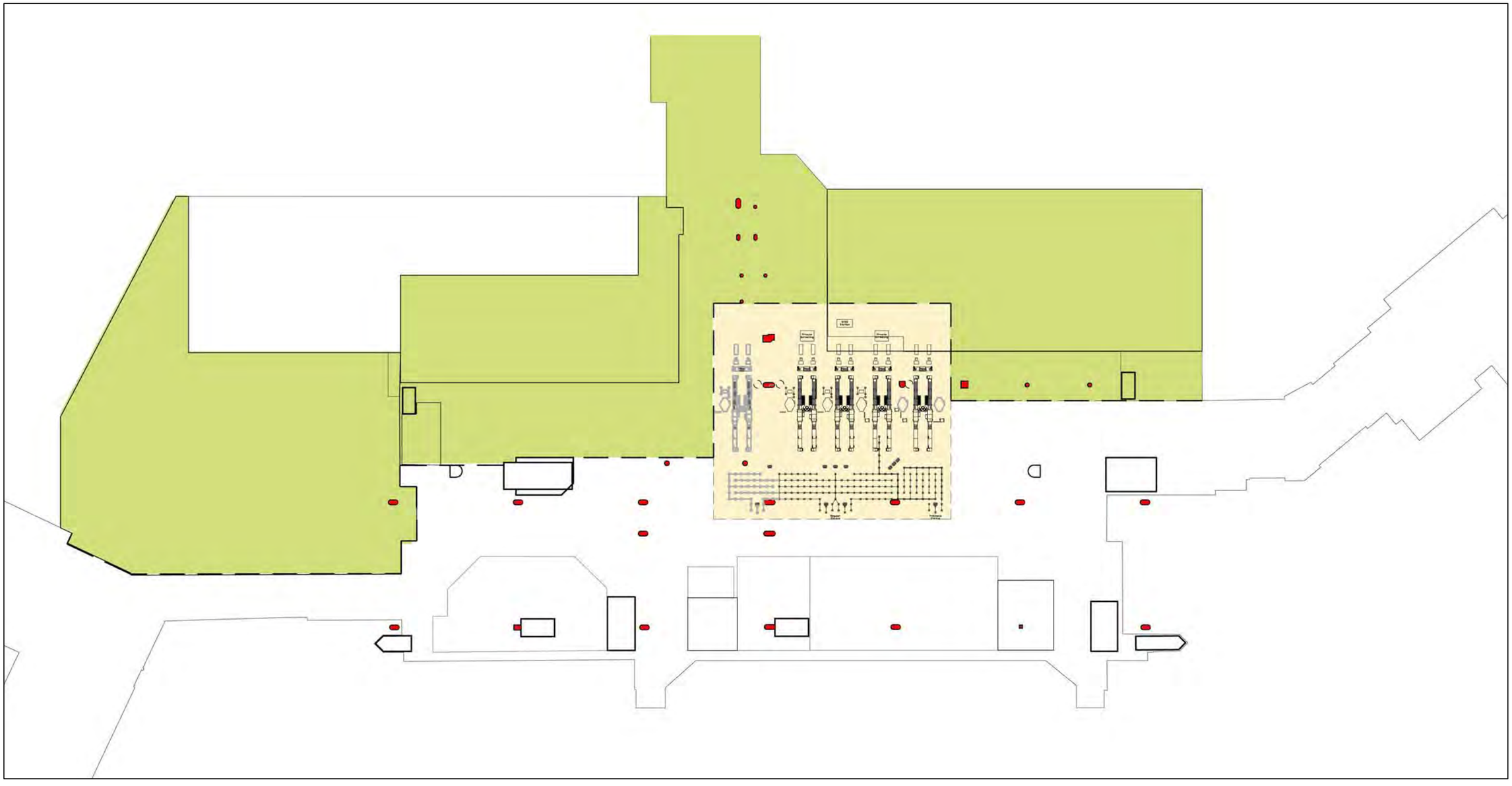

Exhibit A.1

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 1
Concept Option WS1-A

March 17, 2015

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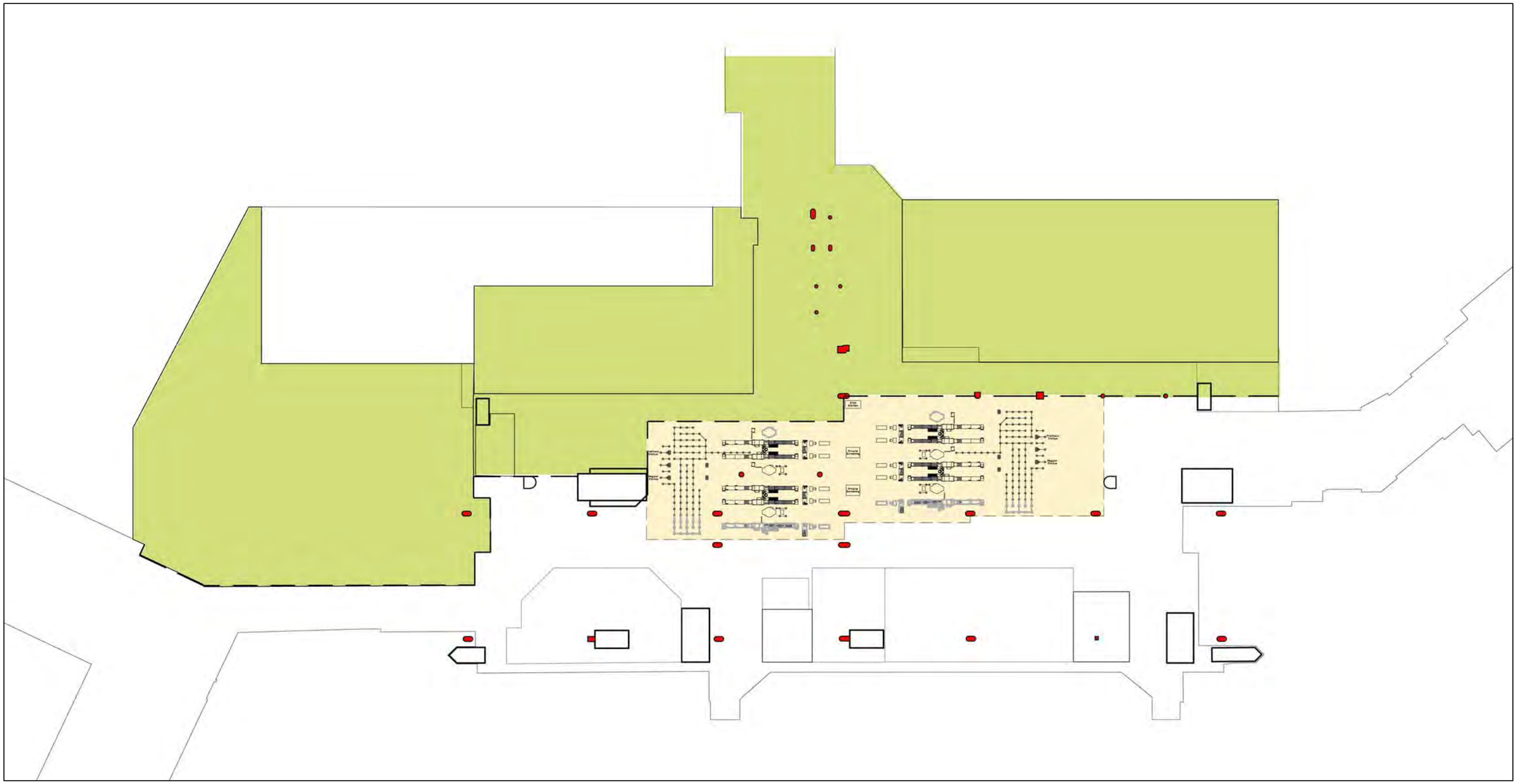

Exhibit A.2

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 1
Concept Option WS1-B

March 17, 2015

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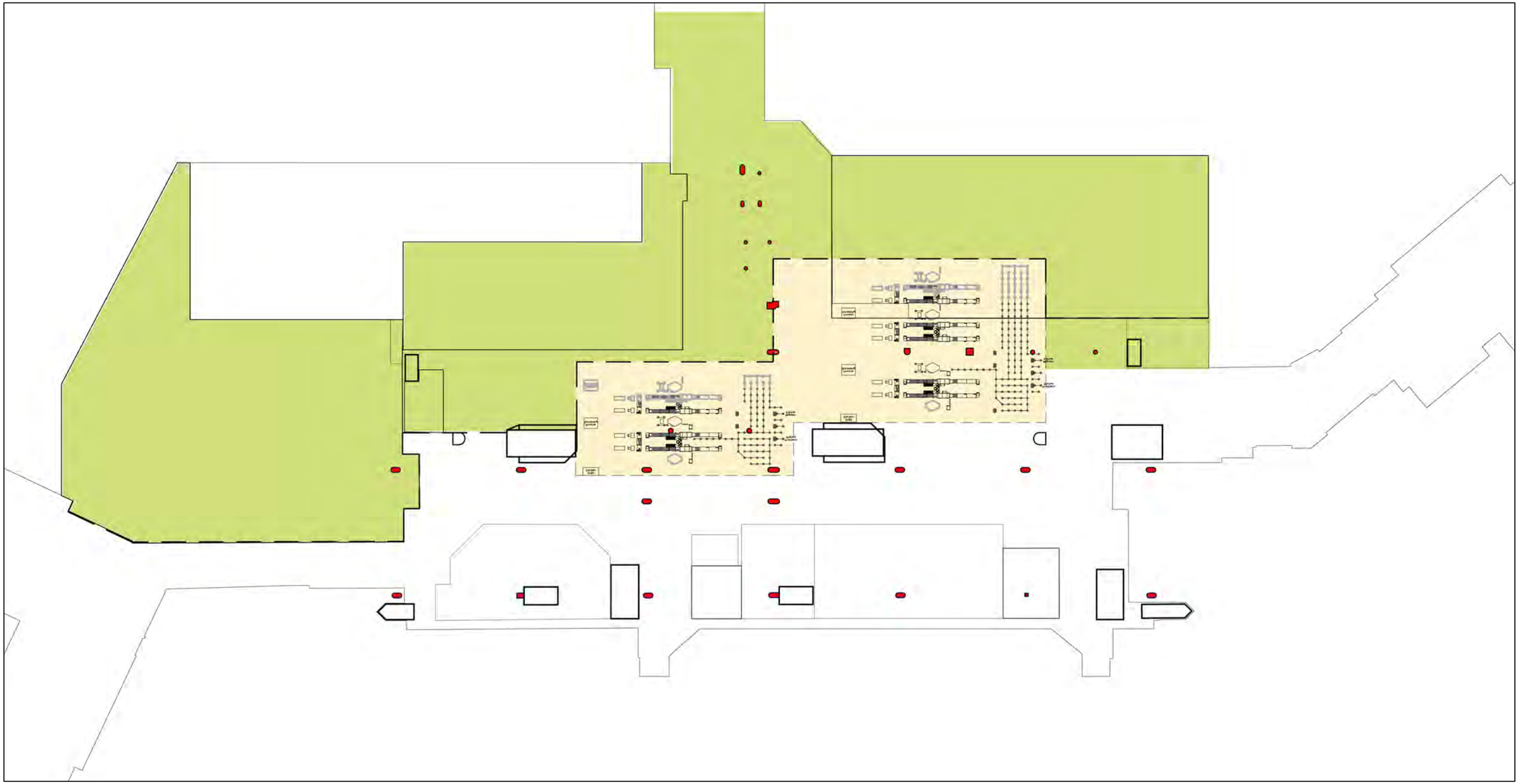

Exhibit A.3

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 1
Concept Option WS1-C

March 17, 2015

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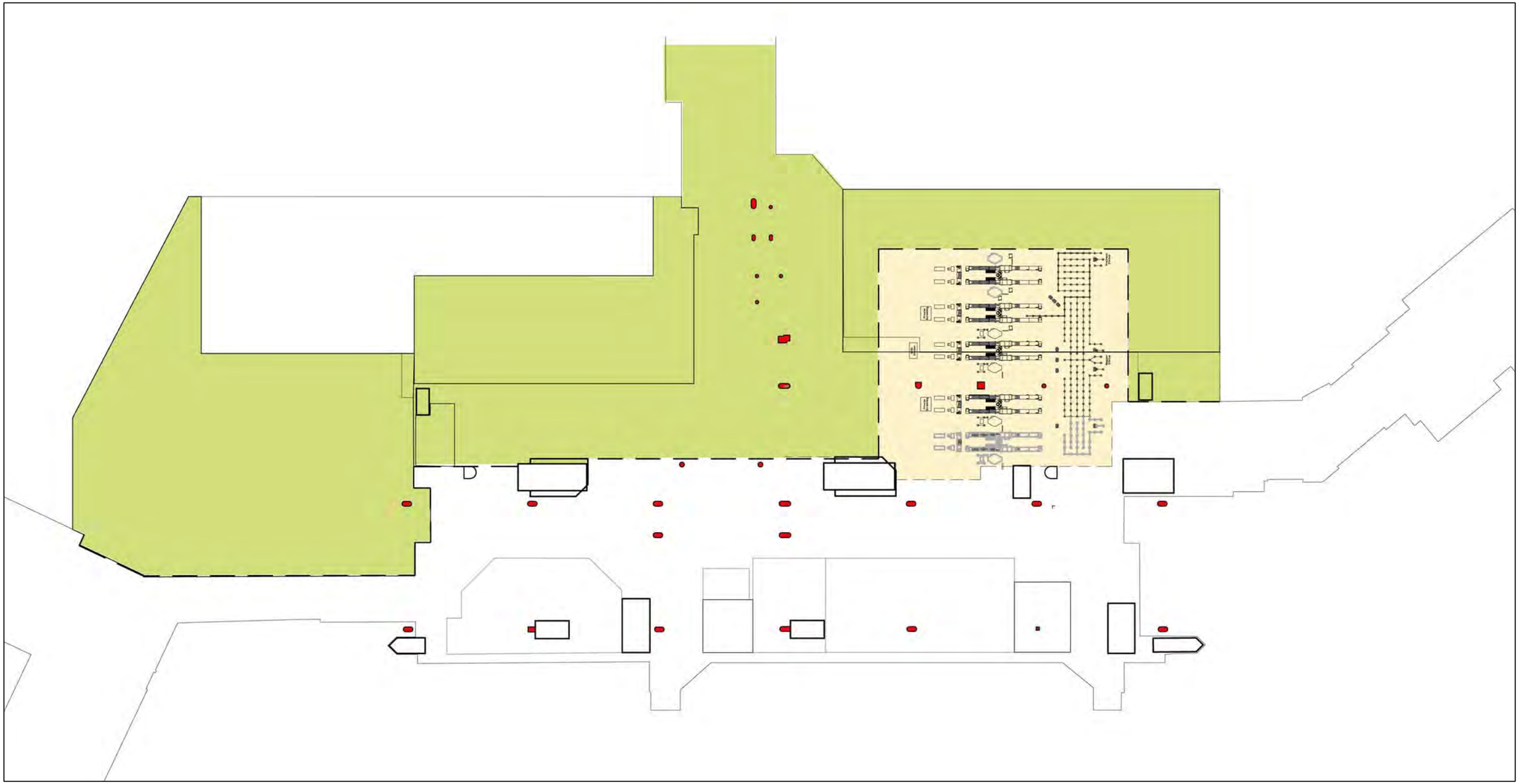

Exhibit A.4

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 1
Concept Option WS1-D

March 17, 2015

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One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
414 / 259 1500
414 / 259 0037 fax
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October 8, 2014

Meeting Notes - Workshop #2

Terminal Expansion and Central Checkpoint Feasibility Study and Cost Estimate
General Mitchell International Airport
Milwaukee County Project No. A201-14012

Present For General Mitchell International Airport:
Terry Blue
Timothy Karaskiewicz
Ed Baisch
Michael Keegan
Kathleen David
Pat Rowe
Pat Walslager
For TSA:
Robert Ronge
For GRAEF:
Lori Rosenthal
Bob Schumacher
Chris Stipe
Terry Foster
Richard Koenig
Ed Prasser
For Vic Thompson Company:
Angie McHorse
For Kindness Architecture + Planning:
Scott Kindness
For Corgan:
John Murphy
For Middleton Construction Consulting:
Tom Middleton
For James G. Otto Architect:
Jim Otto

The meeting was held to present Workshop #2, including Checkpoint Planning & Design Options Criteria, working session for terminal expansion and Concourse E International terminal. An outline grid, covering checkpoint metrics/targets, design criteria, and opportunities/challenges was provided as a handout, and will be attached to these minutes.

PART 1 CHECKPOINT LAYOUT AND ORIENTATION - Angie McHorse:

Number of lanes:

Angie opened the discussion with a brief recap of the number of lanes needed.

1. Agreed that there is a future demand need to have in the range of 10 lanes.
2. She explained the planning assumptions that drives the number of lanes, and stated she changed from 20% to 10% on an estimated surge for a realistic number on TSA's perspective
3. Using the assumption of 75% capacity, she recommends a total of 8 lanes. She asked for agreement to this number. **8 lanes agreed.**

Employee Screening:

1. Estimated peak volume 1500 employees a day - rescreens estimated 3 times/day - going back and forth between checkpoints.
2. Formula used to come up with a number during peak hour (and not putting them through central checkpoint) = 900 employees to plan for.
3. Need additional 3 lanes – includes vendors, to screen during peak
4. Concessions staff in/out at checkpoint - thru put
    a. Concession goods inspected at another location
5. Concession staff will be added to the employee screening demand. Employee volume and concessions will not be included for checkpoint.

FOOT PRINT AGREEMENT:

1. Checkpoint - 8 lanes plus 2 lanes can be added
2. TSO must be able to see Exit lane.

Flow considerations:

Angie shared a series of Centralized checkpoints at various airports. Observations validating many of the discussions to date were demonstrated in the series.

Another observation shared was that '*Centralized'* checkpoint does not always mean it has to be centralized – such as at the Indianapolis, Detroit, and Denver Airports. Concerns expressed during discussion included:

a. Split checkpoints cause passenger angst if one is closed – not normal flow for a passenger, especially if they cannot see the open checkpoint.
b. Appropriate signage/monitoring can be used to alleviate this problem.

Examples were shared of airports needing to address facility limitations. Understanding where those limitations are will impact your overall through put.

Examples shared of aesthetics - space, lighting all very valid. Jim Otto stated that by the end of the next phase we will be painting a 'word picture' of what we are developing for cost estimating purposes – what is the level of quality and level of finish so that Tom can accurately estimate the scope. Comments shared:

a. TSA would want 12' ceilings for cameras
b. Can suspend cameras

Jim stated that hopefully we are now at the point of creating the design criteria and getting them onto paper but keeping in mind that there are flow issues needing to be addressed. A large part of that is the E Concourse and if that becomes an 'Arrivals' only terminal, it opens up a few options for opening up the checkpoint that we would lose if it is used for departures and arrivals. At this time he turned the meeting over to John Murphy to discuss what they have looked at on International Terminal E.

PART 2 International Terminal – Concourse E – John Murphy

Findings and options were presented with details highlighted in PowerPoint slides.

1. Earlier meetings it was discussed to move from 300 to a 600 passenger per hour facility
2. Challenge is a facility side and a staffing side. On the CBP side - with staffing comes with its own issues. On the facility side support space is not where the growth comes in. The growth comes with bag claim – it becomes a choking point.

Options: Two conceptual options were presented in detail.

1. Arrivals only renovate existing Concourse level – reusing the building – requires minimal remodeling. This option keeps the 300 throughput and it does fit.
    a. "E" works as is.
    b. Historic issues may need to be considered due to the concourse approaching 50 years.
2. Departures and arrivals (domestic and international) requiring an addition – one or two levels for future expansion. This option allows for the 600 passengers per hour as previously discussed.
    a. The question of where build it was explored
        i. At Concourse E
        ii. Adjacent to Concourse D
        iii. Adjacent to Concourse C / Loading Dock
            1. Loading dock would need relocation, many other issues.

b. Arrivals would need to be on Northwest side of C to avoid disruption on C.
c. Concourse D was eliminated due to cross flow issues

PART 3 Checkpoint Positioning – Jim Otto and Scott Kindness

Jim presented four 'functional diagrams' demonstrating where functions can be located specifically the checkpoint – how much space it will take out of the existing building and potential conditions. He walked through each diagram highlighting positive aspects as well as concerns.

1. 8 plus 2 - straight through, queuing, central escalator are eliminated. No exit lane shown at this point. Footprint showing maximum build out.
2. Split checkpoint into two - requires some HVAC relocation
3. 2nd split checkpoint diagram driving passengers more towards C and D.
4. 8 lanes straight through - in a north/south direction

Jim reported that from a general building issue there is nothing that cannot be accomplished. It is a matter of what best serves the airport needs, and cost factors.

Questions needing input: -

1. How many gates can you potentially give up if expansion moves into the D apron area?
2. If expansion vertically can airport operations be moved? Yes that is a possibility.
3. If loading dock is relocated – need to develop methodology to handle trash removal, goods receipt and concessions inspection. This starts a lot of dominos – includes concessions storage. Can do it, but not advisable to relocate.
4. E Concourse decision needs to be made. *(remains open at this time)*

Lengthy discussions were held and clarifications of diagrams and assumptions were provided.

1. Distance for passengers still is issue.
2. Concern over losing an escalator.
3. Add bag claim plan areas
4. Exit lane – need large
5. Queue should allow for overflow
6. 8 lane + 2 for quick growth or employee screening – with 10 total.
7. 50,000 sf concessions include new mall area only.
8. Space in the rotunda
9. Concourse E Glycol equipment can be removed
10. "E" is either Arrivals or mothballed
11. Determine cost for "E"
    a. Cost to replicate existing International Arrivals at "E"
    b. Cost to do addition

c. Develop an “E” addition option for second baggage device
    i. Design for 3 narrow body or 1 wide body + 1 narrow body

12. Arrival is a road block at mall level.

Jim Otto stated they have enough information to come up with a number of options. The next workshop will be a roll up your sleeves with drawings. Next meeting is tentatively scheduled for week of November 3rd, Moved to following week – November 12th at 8:00 am. Any additional thoughts until then please call or send an e-mail.

These meeting notes constitute the author's understanding of the issues discussed and the decisions reached. Please contact the undersigned with any additions, deletions or changes.

Prepared by,

James G. Otto, AIA, NCARB
Project Manager

One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
414 / 259 1500
414 / 259 0037 fax
www.graef-usa.com

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Checkpoint Layout and Orientation

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Number of lanes – Pre-Check Regular	3 separate checkpoints with 15 lanes total: Conc C – 5 lanes Conc D – 6 lanes Conc E – 3 lanes +1 Hours of operations are ~ 3am to 9:30pm or extended as required by day	**Number of CP lanes considered for space allocation planning:** **Near-term needs** – 8 lanes to include 3-4 PreCheck and 4-5 Regular configurations **Future needs (2023)** – 10 lanes to include 4-5 PreCheck and 5-6 Regular configurations **Tertiary considerations** in case of significant changes to screening protocols or demand increases – Identify space to add 2 lanes Locate checkpoint function to compliment passenger and employee flow into airside/secured side operations	Where might renovations to Terminal E impact the options for the consolidated checkpoint?
Employee Screening Employee Demand	Badged employees screened through the existing 3 checkpoints Known Crew Members verified through the checkpoint exit lanes FFDO and FAM's verified at exit lanes	Separate employee and Known Crew Member screening from Passenger screening areas ALL EMPLOYEES: Peak Employee Demand = 1500 employees/day * .4 (slightly higher morning shift at startup) * 1.5 (average rescreens per employee before breaks) = **900** Additional screening capacity	Employee screening needs to be located within main terminal where they perform their duties

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	Future State / Goals	
		(assuming Pre-Check protocol) = 900 / 300 = 3 Lanes	

International Terminal – Concourse E

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
Passenger peak demand (hourly)	RJ from Canada 737's from charters 200 planes diverted this year from Chicago largely due to weather Gate 68 is the current wide body gate	Est. 400-600 pax per hour for a planning peak number with 2-757s possible	Option 1 Arrivals only relocated to Existing Concourse Level Potential passengers per hour maximum capacity Option 2 Departures and Arrivals (domestic and international) requires an addition
Potential Alternate Locations			Concourse E / Loading Dock Area Build-Out grade level for facility Relocate Dock to ?? IAB ?? Sherriff's Office / Parking
Improved customer service	Remote IAB facility Passengers are transported by shuttle to the main terminal	Eliminate the need to shuttle passengers between FIS building and main terminal	Improve the convenience and overall experience at GMIA for international arriving passengers
Optimize the space requirement	Existing facility is not up to current CBP standards	Allocate space for the following functions: Primary processing – Baggage pickup – Secondary processing – CBP Administration -	CBP standards as a baseline and optimize with available space

Terminal Expansion

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	Future State / Goals	
Checkpoint Positioning		Adaptable to future TSA requirements for screening, e.g. Risk Based Security (RBS) Seamless mitigation plans for processing passengers under irregular operations and/or security events Position equipment to avoid screen image line of site issues with passengers passing through checkpoint areas Locate Ticket Checker position as close to the entrance into queuing as possible to direct Passengers to correct queues Ability to expand queuing if necessary to improve management of overflows at peaks Provide kiosk banks for all airlines in close proximity to the checkpoint entrance for print/reprint of boarding passes Avoid “pinch points” at queuing	Flow into checkpoint queuing that is convenient for passengers Use split queuing layout to maximize narrow dimensions of the mall area Address function and location of escalators as the flow into and from the checkpoint is evaluated Consider relocating Ticket Checker positions to the head of the queue where designed queues are separated between PreCheck and Standard lines Use of fully automated ticket and identification validation can improve throughput at the ticket checker position

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	Future State / Goals	
		and checkpoint transition to concourse flow	
Concessions Screening	Concessions screened through existing 3 checkpoints at off-peak times Concessions inventory is ***inspected*** through the existing checkpoints at off-peak times as per TSA protocol	Separate concessions screening from Passenger screening for overall benefit to passengers and concessionaires Streamlined processes for delivery and inspecting concessions inventory – out of passenger flow if possible Consider potential space requirements for additional security equipment or processes	Contemplate areas outside of the mall area to comply with screening requirements either below or behind public passenger space while also providing for vendor convenience Three options for handling concessions inventory to consider: 1. Delivery to warehouse where stock is inspected and repackaged for airside pickup and delivery to concessions 2. Separate space within the terminal area for inspection, e.g. a loading dock, then picked up / delivered to concessions once processed 3. Use employee checkpoint for dual purpose inspection of concessions stock **based on AirMallUSA feedback*
FAA Tower Sight-Lines			It appears we may be impacting the Tower sight-lines if we build to the full terminal roof elevation out to the "build-out" lines. Further detailed study is necessary. FAA has apparently accepted the condition at Gate D30, which has the full height terminal roof stepped back from the inline baggage addition roof. If we use a similar step back for the northward addition, Gate C9 should be acceptable. If we build full height at the southeastward addition, we will lose the first parking position, Gate D27, first fueling pit. Gate E61 may be impacted if we build-out the connector

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	Future State / Goals	
			bridge knuckle.
Physical Impediments			Structural Roof over baggage make up areas north and south do not have capacity to support terminal floor loads. 50' to 54' spans require a floor structure depth of about 30" deep, only 18" is available above the roof to the terminal floor level. Beams and columns on east edge of north make up roof have additional columns and foundations used to support the new BHS building. The new and existing columns and foundations have additional capacity to support new terminal loads. Similar additional columns can be added to the south make up area 2) Beams on the west edge can be analyzed and reinforced as needed. Removal of precast walls will provide additional capacity for columns and foundations. Geotechnical engineer can analyze recent soil borings taken for BHS building to evaluate if existing drilled pier foundations can resist additional loads. Civil Building an addition over the existing loading dock area represents a significant logistical challenge to ongoing operations. The loading docks have recently been reconfigured or retrofitted to accommodate an exterior trash compactor, a single box-style truck, and two semi-trailers. The docks are of paramount

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	Future State / Goals	
			importance to the facility and concession operations given the daily inflow of products/supplies and outflow of refuse/recyclables. Hydrant Fuel System pits closer than 50 from the proposed building will require relocation. HVAC OPS Mezzanine Equipment Room Mechanical Mezzanine intakes and exhausts
Security Issues			Dock Area Building over the existing loading dock. Any construction over this highly used area presents challenges in constructability, structural, and operation interference. This translates into significant dollars and effect on operations. Building over the Loading Dock also presents a potential security safety risk to the facility and occupants if vehicle access is uncontrolled. Stair Exits to Apron
Adjacent Facilities Impacts			Airport Operations Office Dock Area Waste Removal Toilet Facilities GMIA existing facility analysis

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	Future State / Goals	
Exit lane(s)	TSA staff covers each of 3 exit lanes during regular hours of operation Airport contractors cover off-hour until mid-night Sheriff's department covers 12a until checkpoint opens the next morning Exit lanes are the entry portal for large equipment	TSA will continue to staff exit lanes Exit lanes must remain as open space and unencumbered to allow equipment into and out of the concourse	Visibility to TSO supervisors Visibility to departing passengers Flow between secured side and non-secured side movement Labor efficiency Consider automation options that do not reduce available open space on the exit lanes
Traffic through various entry points throughout the airport	Passengers enter many entry points throughout the airport and use all 3 escalators Extensive meeter-greeter areas on non-secured areas	Direct flow as much as possible past lobby and directly to the central checkpoint Provide the necessary self-service functions closest to the checkpoint queue entry for convenience Well placed meter-greeter space on non-secured side with close access to concessions on Design "nodes" and "plazas" into the circulation. Utilize double loaded concessions that focus on centralized seating nodes/plazas	Optimize flow from ticketing lobby up to consolidated checkpoint Locate central checkpoint in the most convenient location to all entry points (according to utilization) Explore eliminating/relocating/replacing escalator(s) to streamline Passenger flow to the new checkpoint

Metrics / Targets	Design Criteria		Opportunity & Challenges
	Current State	**Future State / Goals**	
		to create differentiated and defined areas that will give visual relief from the linear circulation.	
Concessions	Most concessions are in unsecured areas which do not effectively support airport goals for passenger concessions revenue and convenience	50,000 sf of concessions: 70-80% secured side 20-30% or maybe less to remain on unsecured side **based on AirMallUSA feedback* Create an efficient and cost effective "back of house" concept related to sequencing, flow, and functionality for security, staffing, airlines, concessionaires, goods and services, basically "back of house", and how these activities ultimately interface with the experience of passengers and visitors, or "front of house".	Optimize mix between non-secured and secured side concessions space based on local market and history Minimize single loaded concessions locations.
Employee Parking Lot Shuttle Service			Hutsteiner Drive traffic flow Sherriff's Office / Parking

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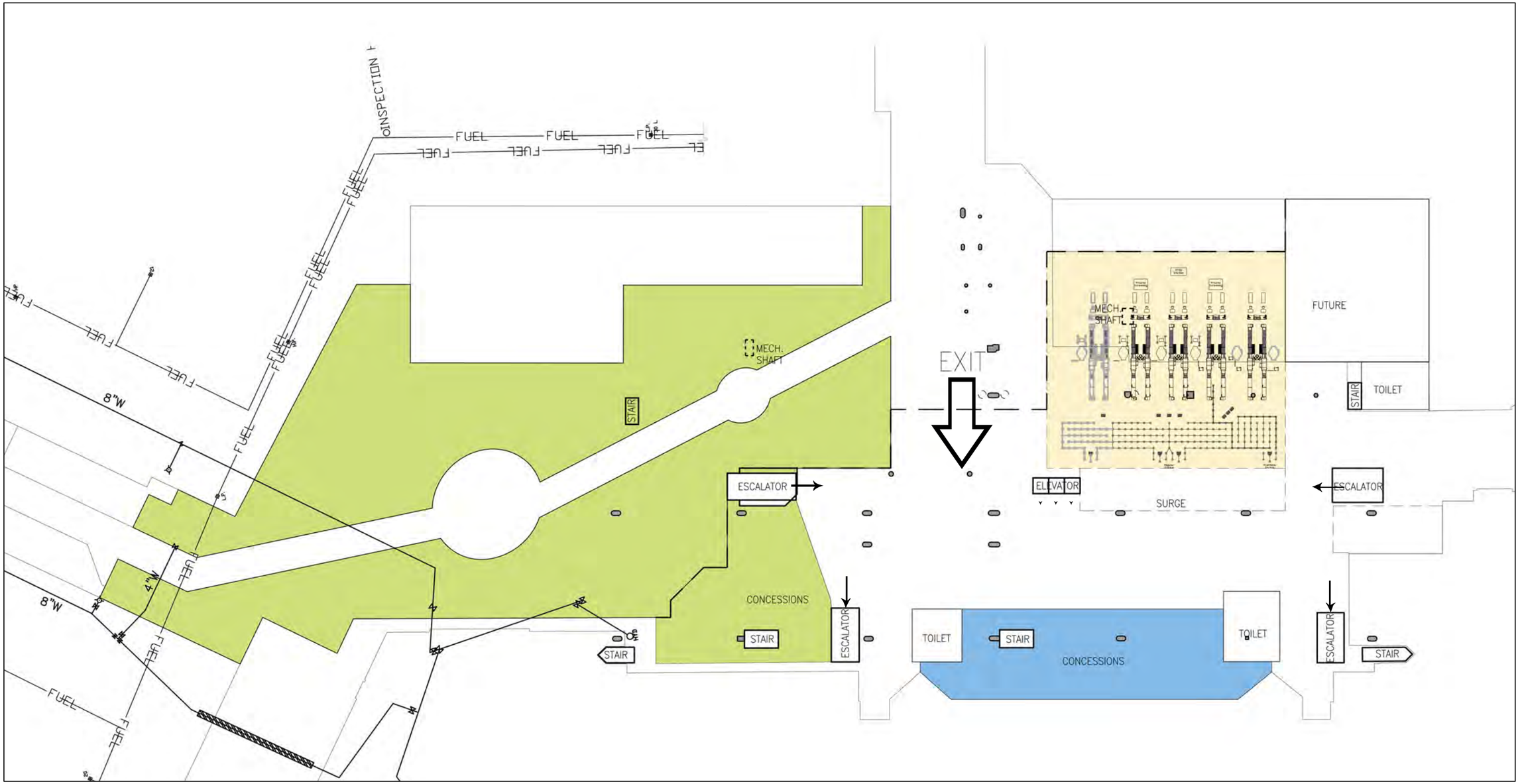

Exhibit A.5

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 2
Concept Option WS2-A

March 17, 2015

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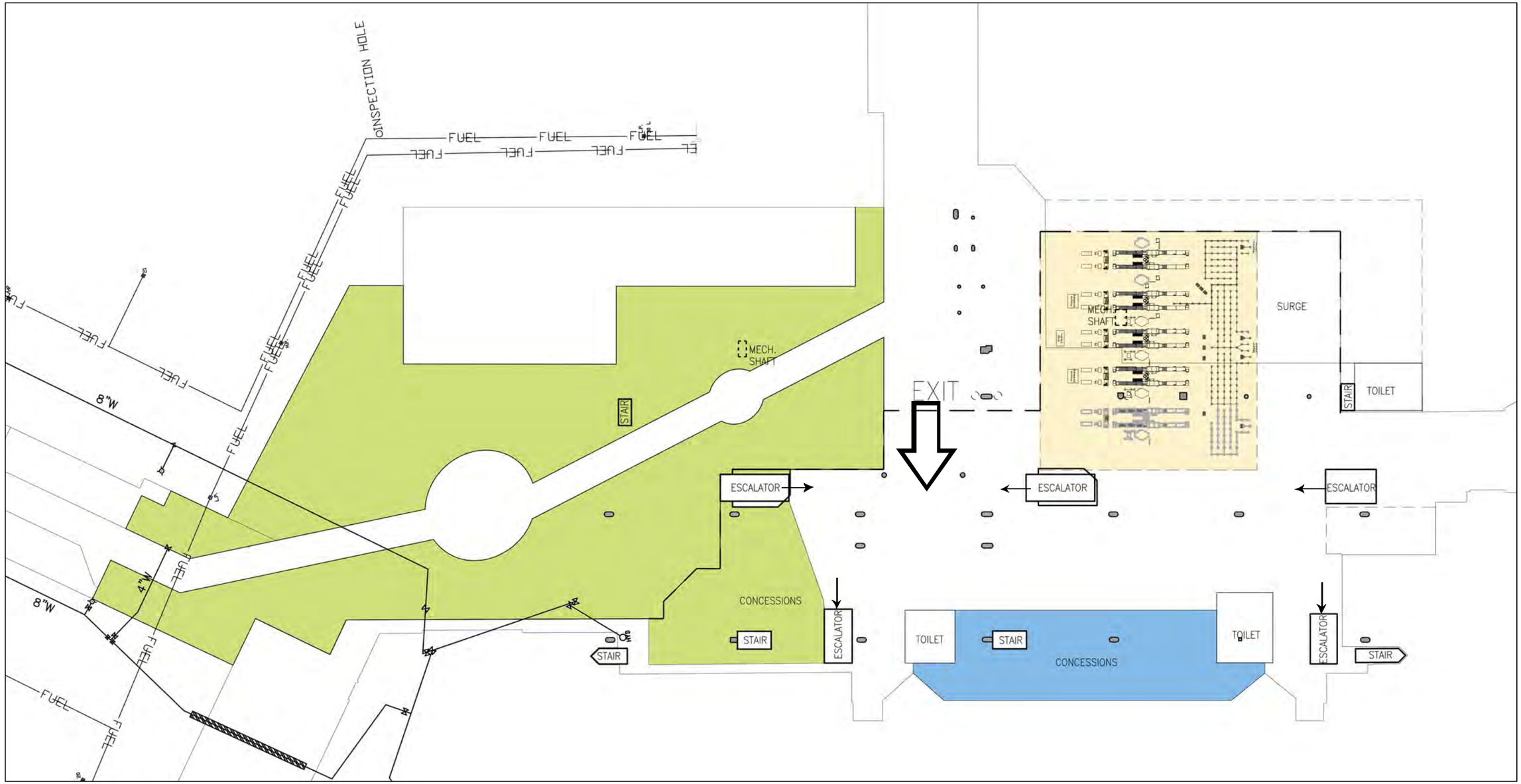

Exhibit A.6

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 2
Concept Option WS2-B

March 17, 2015

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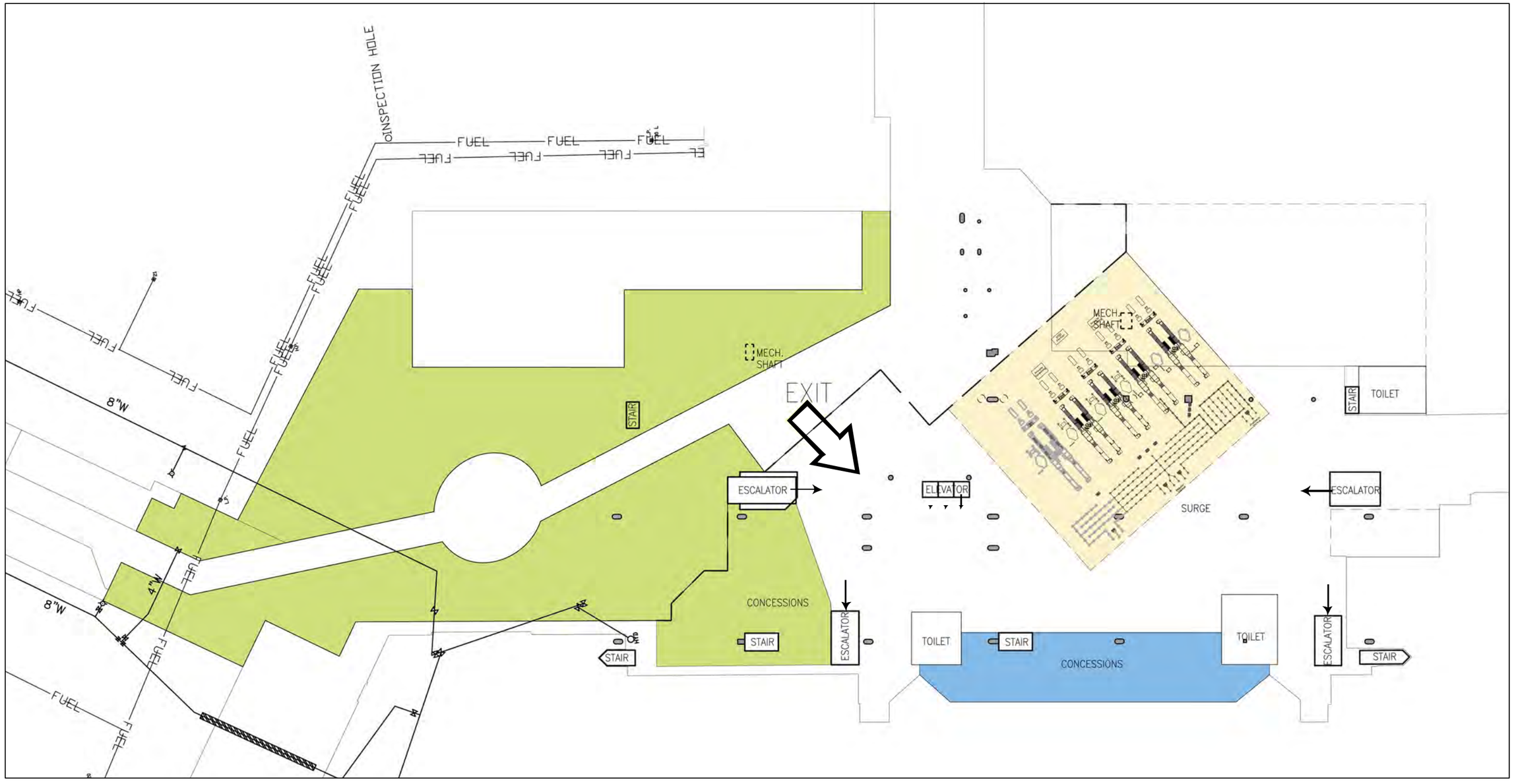

Exhibit A.7

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 2
Concept Option WS2-C

March 17, 2015

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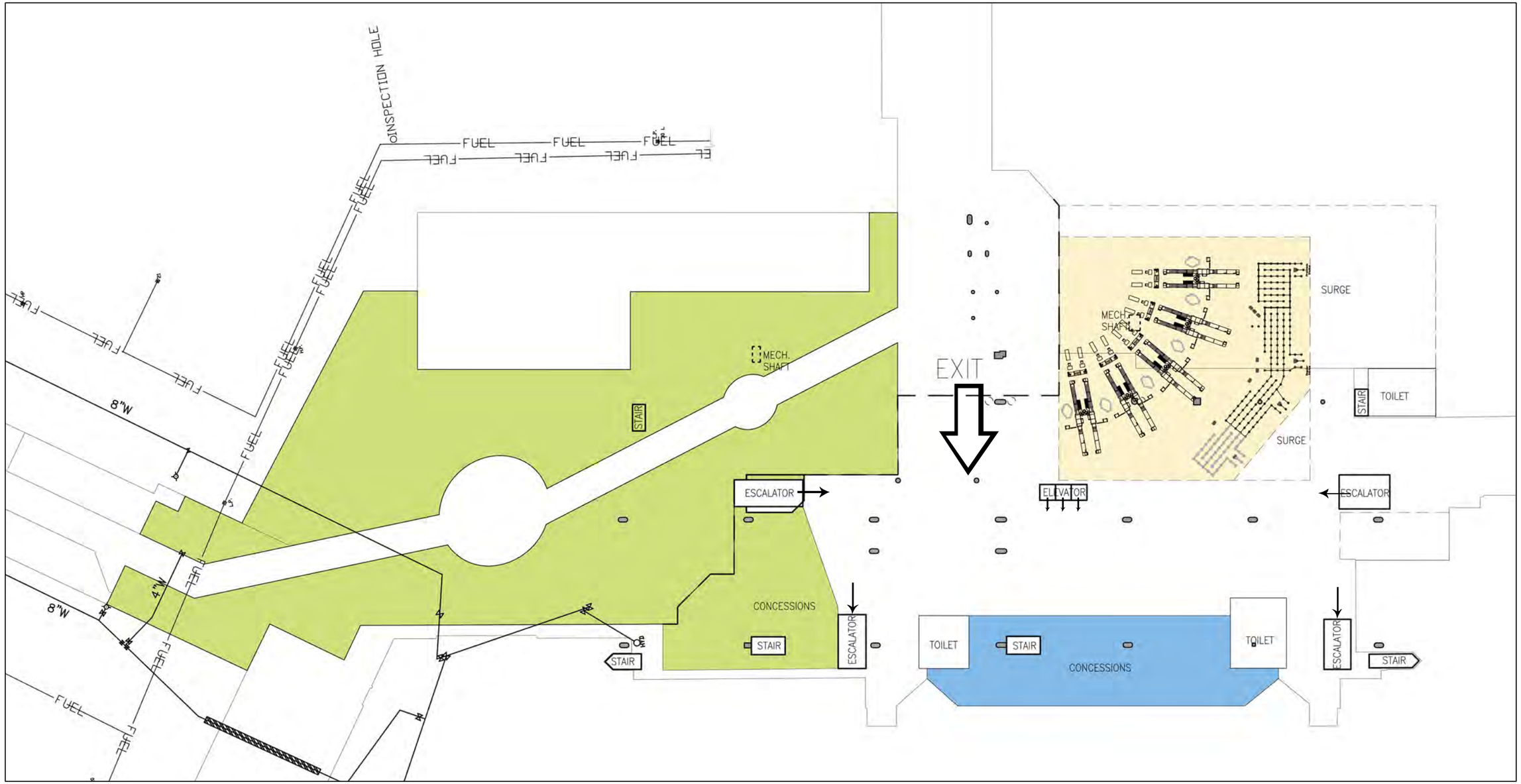

Exhibit A.8

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 2
Concept Option WS2-D

March 17, 2015

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One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
414 / 259 1500
414 / 259 0037 fax
www.graef-usa.com

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October 20, 2014

Meeting Notes - Design Criteria Approval

Terminal Expansion and Central Checkpoint Feasibility Study and Cost Estimate
General Mitchell International Airport
Milwaukee County Project No. A201-14012

Present For General Mitchell International Airport:
Terry Blue
Timothy Karaskiewicz
Ed Baisch
Pat Rowe
For GRAEF:
Lori Rosenthal
For Kindness Architecture + Planning:
Scott Kindness
For James G. Otto Architect:
Jim Otto

The meeting was held to review and obtain approval of the Design Criteria document. Jim Otto provided a handout which outlined Central Checkpoint Planning and Design Criteria including Design Considerations; Terminal Expansion Planning and Design Criteria; and Concourse E International Terminal Planning and Design Criteria. Concept evaluation criteria, and decision drivers were included in the discussions.

After document review the following comments and points were made.

GENERAL

1. Concessions Use phased approach – i.e. 25,000 square feet now with possible expansion later (50,000 square feet including concourse ultimate)
2. Cost is number one priority. – design for phased implementation allowing for expansions and "wish list" items to be added later
3. Get primary objectives covered and move incrementally
4. Checkpoints must be visible.
5. Stream concept rushes passengers to retail in a continuous flow
6. Relocating OPS and remodeling the Mezzanine into the museum and bar pre-security located above Checkpoint is a possibility
7. View of airfield a positive
8. Obviousness of flow necessary

PHASED IMPLEMENTATION (Also discussed above)

1. Plan for future flexibility- long term, full build out
2. Consider operations and phasing during construction

FLOW
1. Passengers
2. Concessions

CONCESSIONS
1. Change from last meeting - Plan for total 25,000 sf to include new square footage on Concourse C checkpoint area
2. Flow of passengers is critical

IMPACT TO OTHER OPERATIONS
1. Airport ops office – will be reviewed to determine if moving area can be avoided.
2. Concourse D Available Gates – based on current discussions it appears it will not be necessary to encroach on the D apron.
3. Loading Dock – will not need to go into this area but will keep in plan for future.
4. Sheriffs' Office - will not need to go into this area.
5. Concourse E - will continue to include in the concept as a departure concourse and determine the final direction during Workshop 3.

Updated schedule was presented. Workshop 3 will be next meeting where this will all come together. We will use a white board presentation. A change of date was made so all could attend – 11/20/14 starting at 1:00 PM. (schedule 3 hour meeting). .

These meeting notes constitute the author's understanding of the issues discussed and the decisions reached. Please contact the undersigned with any additions, deletions or changes.

Prepared by,

James G. Otto, AIA, NCARB
Project Manager

One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
414 / 259 1500
414 / 259 0037 fax
www.graef-usa.com

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November 25, 2014

Meeting Notes - Workshop #3

Terminal Expansion and Central Checkpoint Feasibility Study and Cost Estimate
General Mitchell International Airport
Milwaukee County Project No. A201-14012

Present For General Mitchell International Airport:
Terry Blue
Timothy Karaskiewicz
Ed Baisch
Michael Keegan
Kathleen David
Kathy Nelson
Pat Rowe
Pat Walslager
For TSA:
Robert Ronge
For GRAEF:
Lori Rosenthal
Bob Schumacher
Chris Stipe
Ed Prasser
For Vic Thompson Company:
Angie McHorse
For Kindness Architecture + Planning:
Scott Kindness
For Corgan:
John Murphy
For Middleton Construction Consulting:
Tom Middleton
For James G. Otto Architect:
Jim Otto

The meeting was held to present Workshop #3. Jim Otto opened the meeting stating the objective today is to go through a number of options plus recap where we have been, and with the use of the white board, concept diagrams, and interactive participation, come up with one solution. He stated there is a logical progression to the meeting allowing for decisions throughout the day which will lead to that solution. He stated the first milestone decision to reach today is whether or not Concourse E should be a Departures and Arrivals terminal or Arrivals only. If the decision becomes Departures and Arrivals it does affect how the checkpoint is laid out and oriented as we move ahead this afternoon. He turned the meeting over to John.

CONCEPT OPTION DIAGRAMS

Concourse E – International Terminal - John Murphy

John provided three alternate concept designs and cost ranges for the Traditional and One Stop layouts for 500-600 passengers/hour. Copies of these had been distributed to the GMIA Team prior to the meeting. He walked through the designs – two designs tried to fit the functions in the current concourse, on the concourse level. All three options are for the 500 to 600 range (the understanding of the target size desired - two wide body, three narrow body, an increase from current capacity). John stated the issues/requirements are the same when you are looking at 300 to 600 passengers/hour ranges - and baggage claim is an issue – need more than one carrousel.

Option 1 – Traditional - This is the current CBP guidelines but not where CBP is currently trending – one stop option is trending. This design is only in-bound flow. We cannot get out-bound and in-bound flow in this type of operation – gets too narrow. There are also problems when more than one plane comes in – passengers get intermixed. In this design administration is split (Customs and Immigrations prefer one level, but allows administration to be split). John also stated one other thought for this concept - if international flight got diverted from Chicago, temporarily this area could be used for a sterile/secure holding allowing for passengers to get off the plane.

This flow concept allows the 600 passengers/hour desired, but the building will need to be increased by 12,000 sf.

Option 2 – One Stop: This is somewhat similar - John described the flow - Passengers come off the plane, go to Baggage Claim, claim bag and APC (automated passport controls) for 'ticket' –then to immigration booths/podium as needed on through the clearing process. Because of the bag claim geometry – this concept is looking at a fairly large building area increase. John stated he would want to put this all on one level to avoid the administration split. The area was never meant to be used for bag claim and they are looking for a carrousel that wraps around all the columns.

This One Stop option would be preferred by CBP as it reduces labor costs for them. But would require increased in building area.

Option 3 – New Apron level - would allow out-bound and in-bound on Concourse E. John stated that potentially all the gates could be domestic departure. There is still full functionality of the concourse. Depending upon the demand for gates we could do a vertical core to bring people around and then down. It is just a one story building on the apron level. It would be a simple shaped building. It could

have additional floor if that works for Master Plan. John described how passengers would get through immigrations and baggage.

The approximate costs are:
Option 1 -$17 million
Option 2 - $16 million
Option 3 - $22 million new building

John recapped – Options 1&2 eliminate ability for future departures on E. Option 3 allows departure so would need security checkpoint access– which impacts the decisions on the next five options. John addressed questions.

Q. – what advantage would there be to have a departures option from that concourse?
A. It could cost $6 million or more to add gate at a new concourse if needed in the future.

Q. Is it possible to do option 3 in stages – arrivals initially, and then arrivals and departures if needed in the future?
A. Yes, but you will have the cost of keeping that asset "live". He stated the downside of having a vacant facility - if you are not using it, will be some sort of major renovation will be needed in a few years when you are ready to start occupying it.

Q. Above question clarified – can the options be stepped and eventually build option 3?
A. It could be designed, but the CBP will not operate it - they will want to occupy a completed facility on day one.

Q. Can you give us a complete Option 1 or 2 facility that at some point we can add on to that is like Option 3?
A. There is one option that might be possible, changes to bag claim and capacity would be needed

Q. Is there any way to have departures and arrivals later without the big increase in costs?
A. You will be paying nearly the $17 million on day one and then the $22 million later. However a suggestion was made by the design team to build the bag claim and then in the future add what is needed down below (completed in two phases). A review of a concept design that might accommodate this was conducted, as were the possible cost savings. There would be money saved in Phase 1, but there is a 3.5% increase each year after that until phase two due to the loss of purchasing power.

This concept was reviewed further with a cautious estimate of $18 million. Bag claim issues still a concern.

DECISION: Dual use. Leave In-bound / out-bound on the table – down line. John will take a look to see if we can do this as a minor addition with the option of completing later if GMIA wants to go full in-bound/out-bound. And as we work on the checkpoints we will look at the checkpoint that allows the concourse to be both in-bound/out-bound, with in-bounds only initially

Short-term costs – approximately $16 million (take all of the concourse functions out replace with customs) vs long-term if departures are needed add $22 Million (which would include stem renovation - concessions - put things back as is today.)

Additional study will be done.

At this point in the workshop, Jim turned the meeting over to Scott Kindness to respond to GMIA's question from the last meeting - What happens if we do not add to the building at all? Can we put a checkpoint in the mall space right now and how does it work?

Scott presented several options to show what the issues and implication are. He explained the process used in reaching the options which included totaling the concessions square footage of the entire building, excluding Concourse E. Concourse C has approximately 4,000 sf; Concourse D has just under 13,000 sf. The existing mall has approximately 33,000 sf. In total just under 55,000 sf excluding Concourse E. (57,365 w/E; 54,000 wo/E). A diagram was shared showing what it would look like with the checkpoint at the north end of the mall - not enough room without some expansion. The next diagram was what it would look like if the checkpoint was placed to the south. It takes up the entire band width of the space. Next option rotating it – it fits but requires all available space – it takes up the entire mall. Scott stated this is why at the preliminary meetings the design team has been showing some type of expansion. He then reviewed 3 options showing "build to" lines - looking at what is the least amount of space we can build, to get the function of a central checkpoint. Build to lines in options 1, 2, and 3 escalated - 2 added building as a scalable event, while 3 showed infilling over the roof, (Tom is looking at what the cost implications).

Scott stated what we are trying to achieve today is flow and how to provide the best experience for the passenger. He led the discussions with 5 options which were shared in a progression. A copy of the options are included with these minutes.

Option 1 - includes a couple options for E - allows E go either way in the future.

Comments

1. Bridge to Admin – access
2. Museum – non-secured side
3. Conference rooms – non-secured side
4. Relocation of Ops is possible
5. Queue – 4500 sf

Option 2 - clarifications provided

Option 3a - clarifications provided. Comment - Do not use bag claim addition space

Option 3b – clarifications provided - Comment – too tight of feel

Option 4 – clarifications provided

Option 5 – clarifications provided - affords the best option for the "wow factor" – also saves everything in the existing building. Comments – too expensive. Good circulation

COSTS – Tom Middleton presented the construction costs.

Base Line	$16.4 Million	plus new escalator
Loading dock	2.7 Million	Add
Bag Make up	2.5 Million	Add
Build out 2, line 2	3.0 Million	Add
Build out 3, Line 3	2.0 Million	Add

(does not include checkpoint equipment costs)

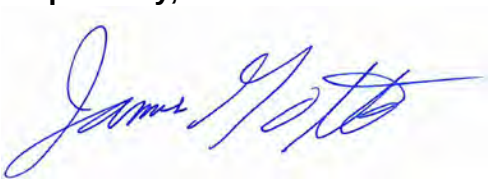
Bridge additions still need to be calculated will be expensive
Angle to NE will be calculated
Phasing issue for food concessions during construction needs decision
Freight elevator – secure side causes operational issues that can be accommodated by operations processes
Exit width and height must accommodate lifts and high equipment
Need an elevator at the North area

Next steps:

1. Tom will update costs with other options
2. Smaller group will get together in approximately 2 weeks to, review the options

These meeting notes constitute the author's understanding of the issues discussed and the decisions reached. Please contact the undersigned with any additions, deletions or changes.

Prepared by,



James G. Otto, AIA, NCARB
Project Manager

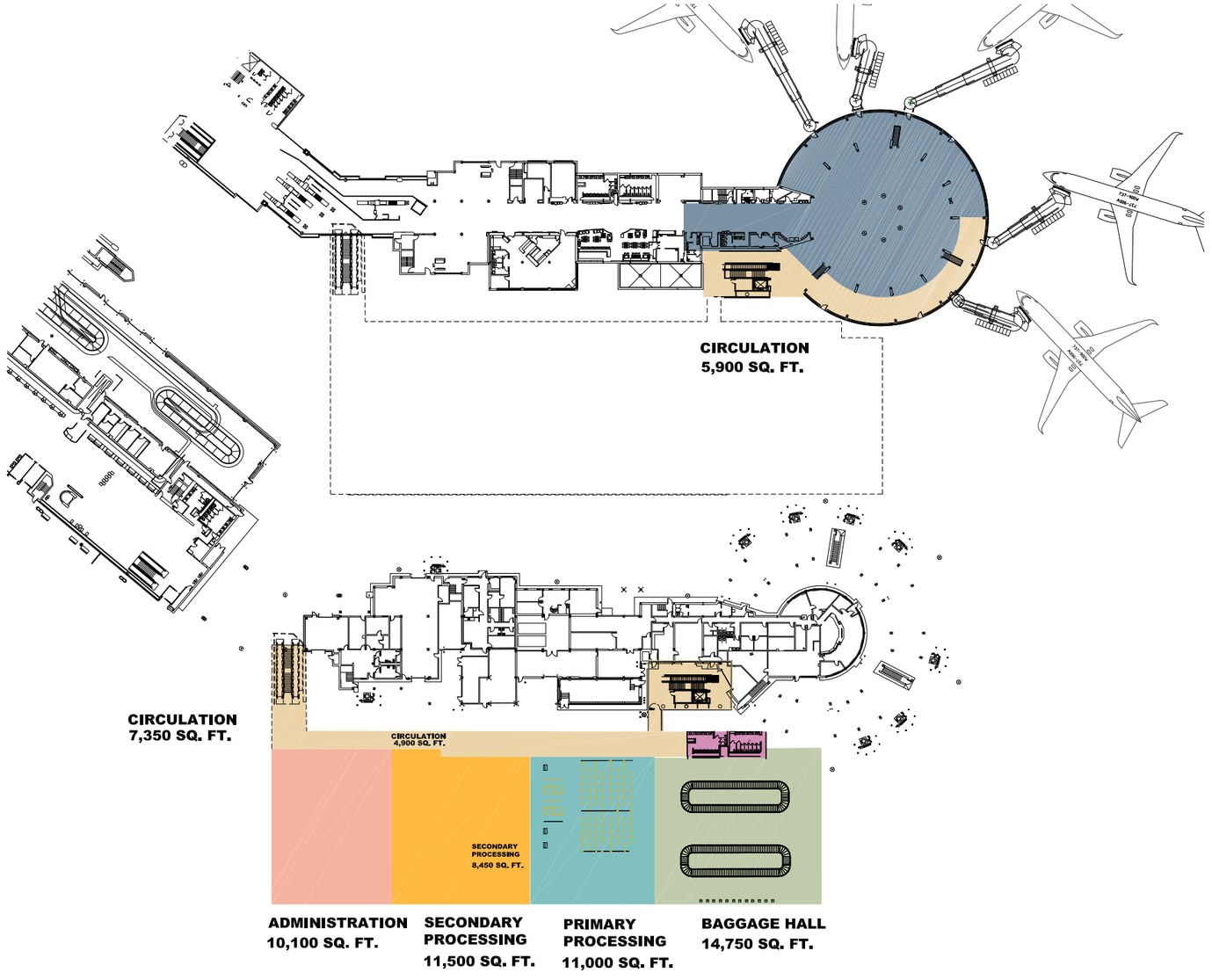


Exhibit A.9

north

Not To Scale

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 3
Concourse E Diagrams

March 17, 2015

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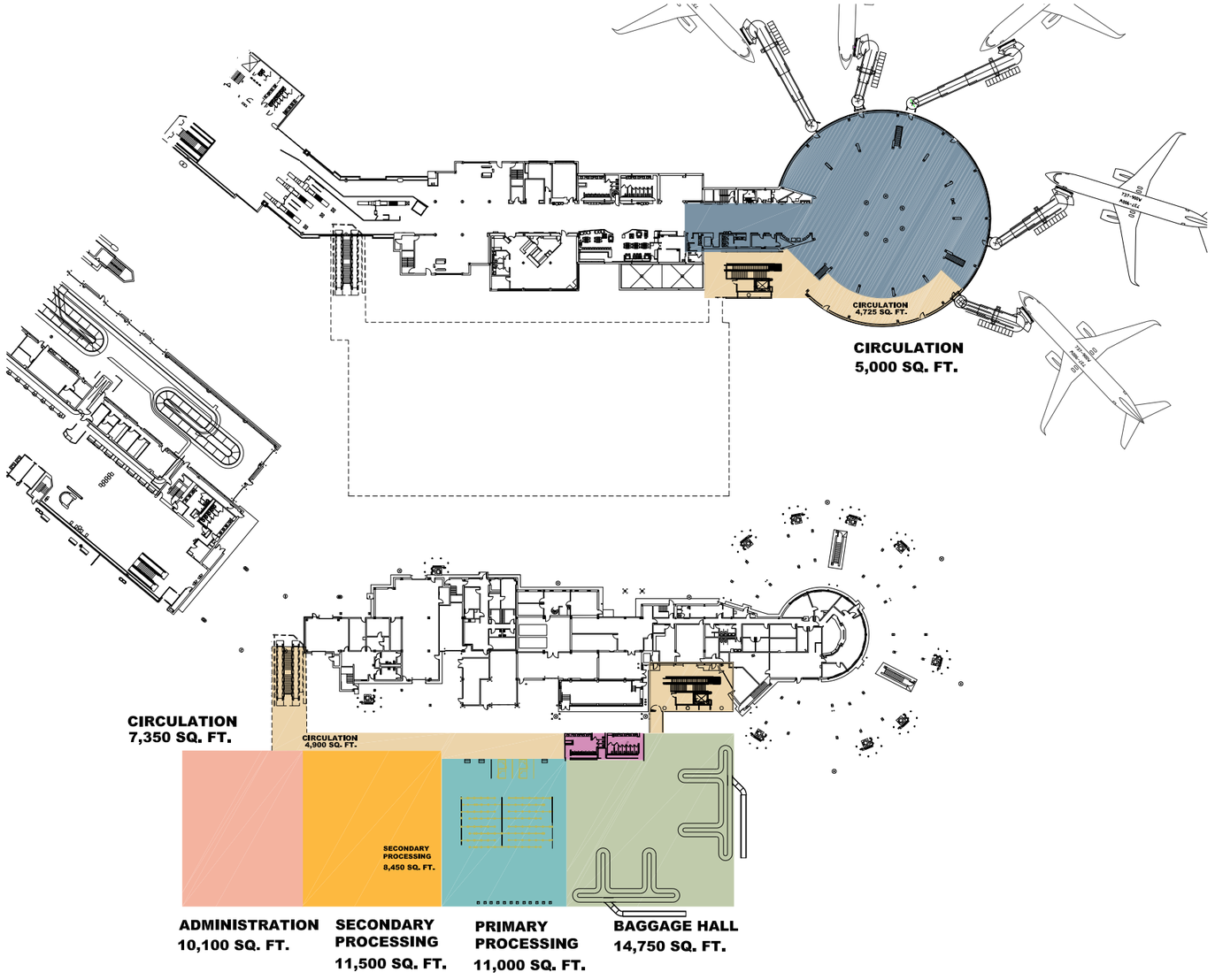

Exhibit A.10

north

Not To Scale

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 3
Concourse E Diagrams

March 17, 2015

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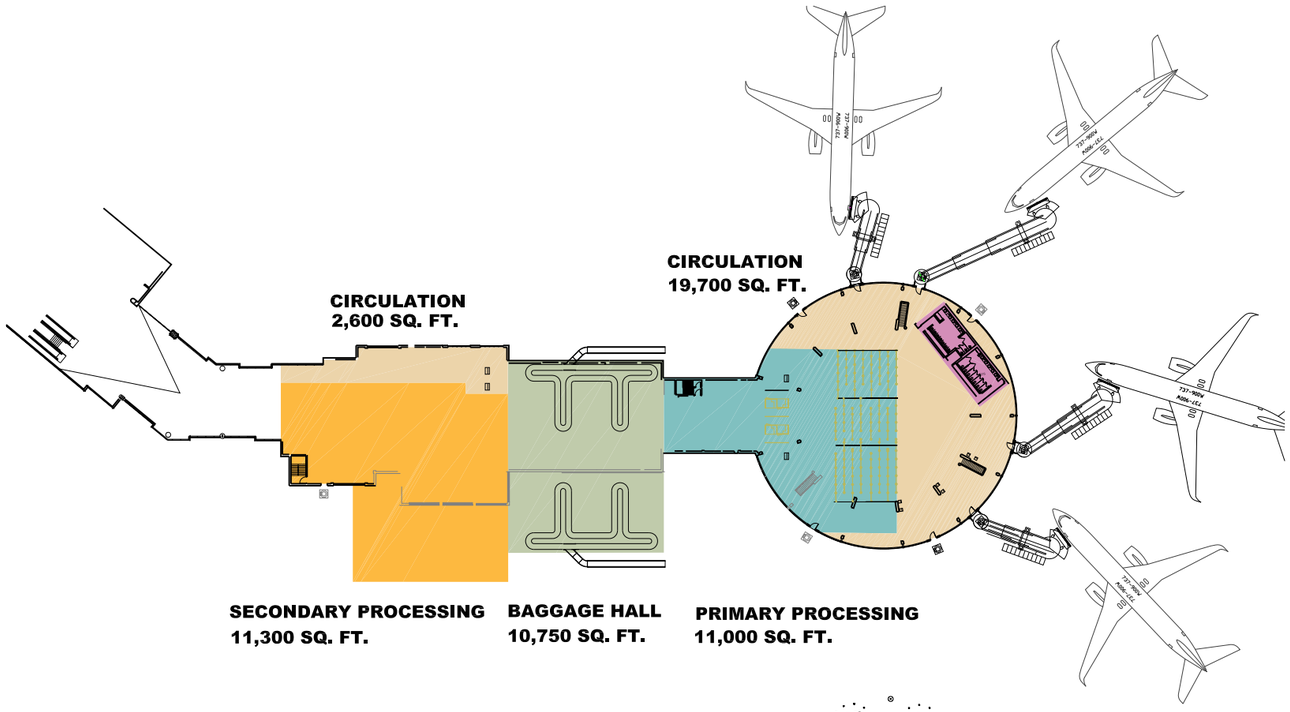

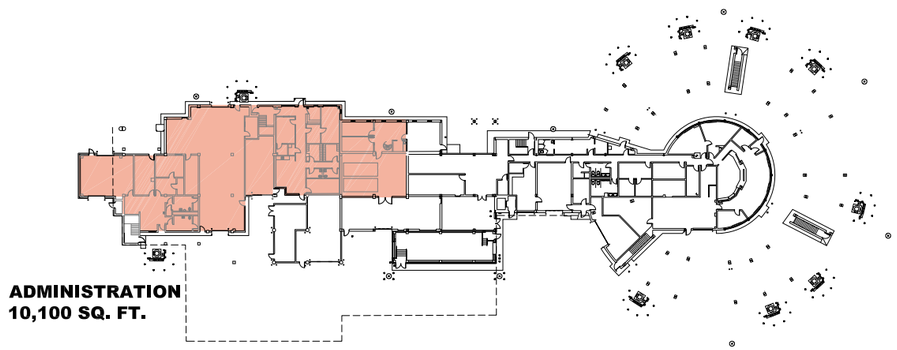

Exhibit A.11

north

Not To Scale

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 3
Concourse E Diagrams

March 17, 2015

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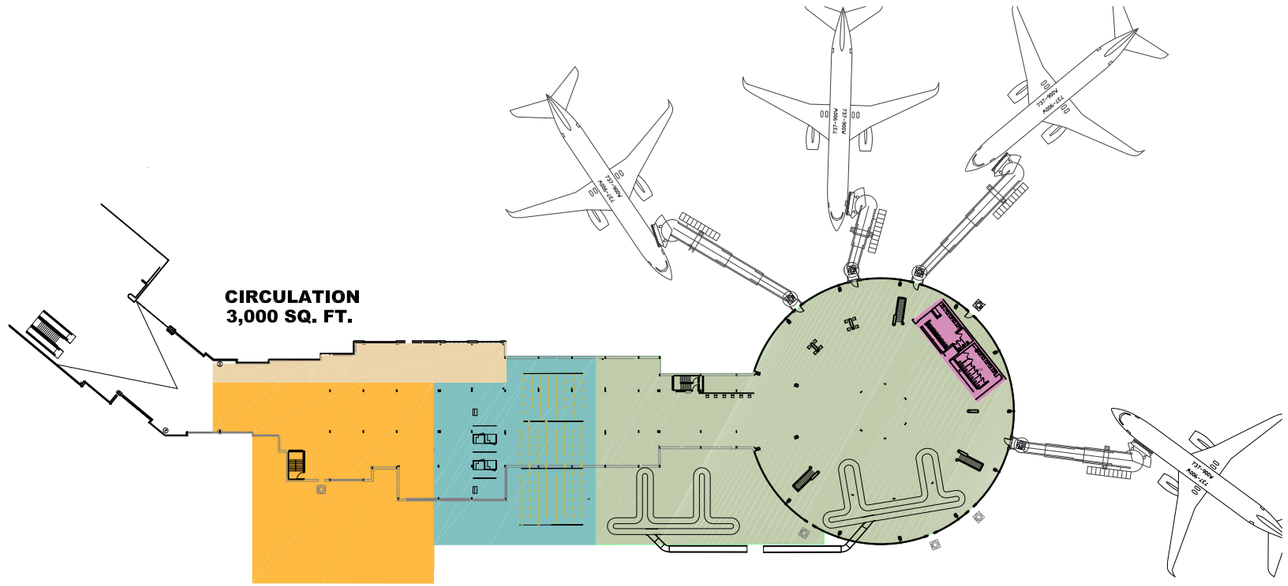

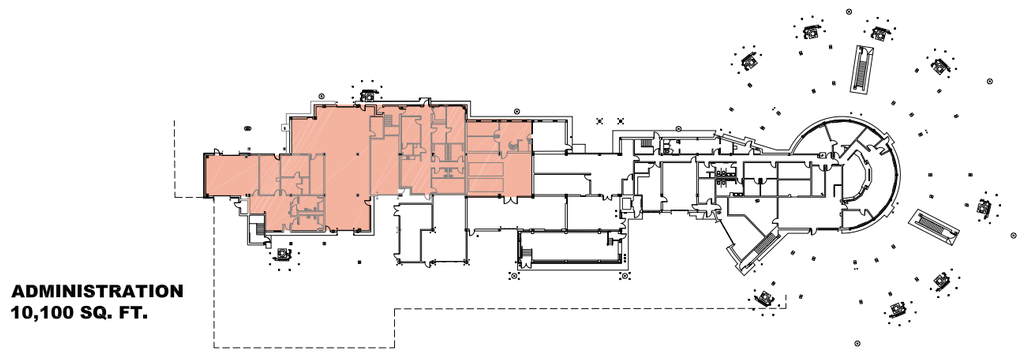

Exhibit A.12

north

Not To Scale

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 3
Concourse E Diagrams

March 17, 2015

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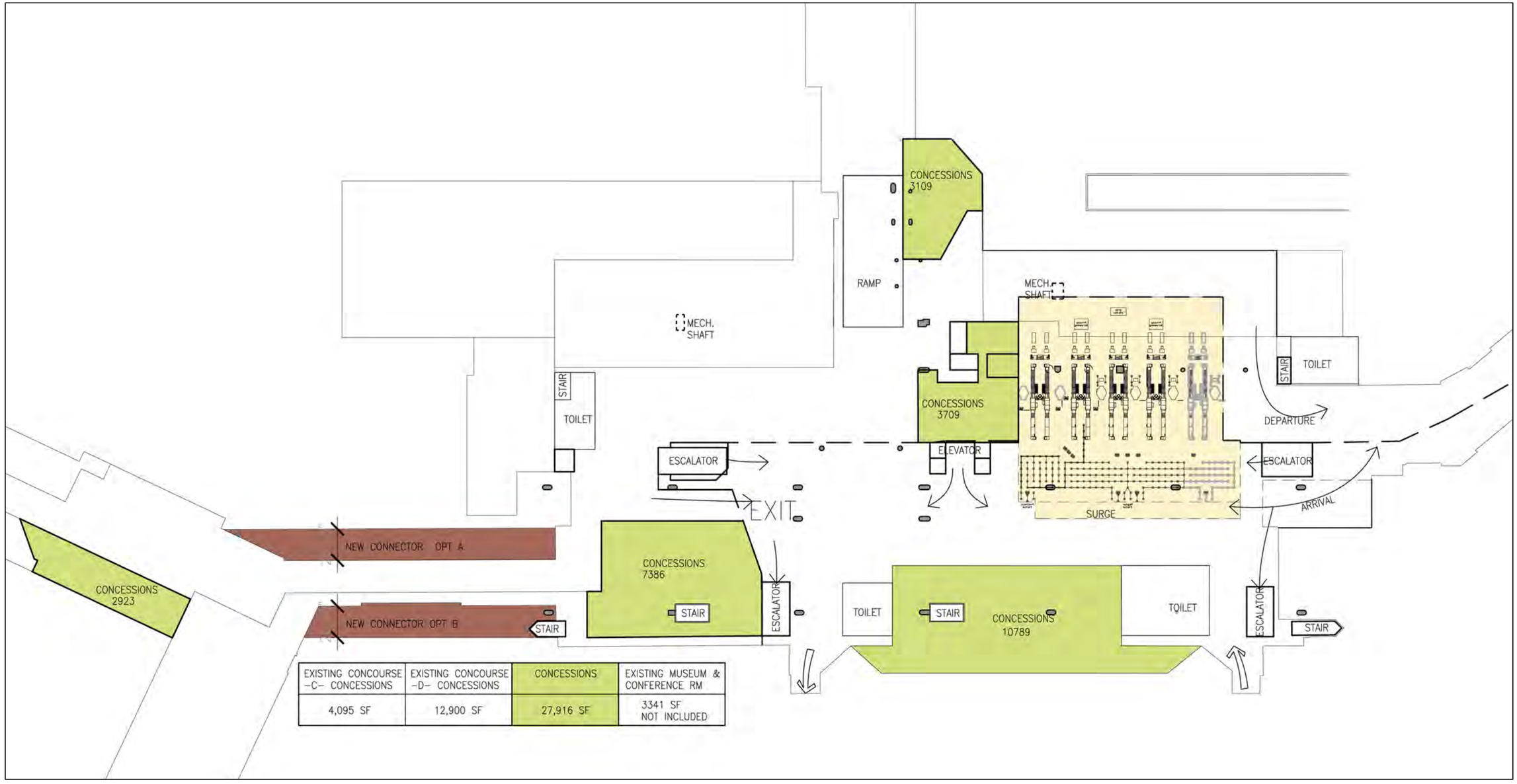

EXISTING CONCOURSE -C- CONCESSIONS	EXISTING CONCOURSE -D- CONCESSIONS	CONCESSIONS	EXISTING MUSEUM & CONFERENCE RM
4,095 SF	12,900 SF	27,916 SF	3341 SF NOT INCLUDED

Exhibit A.13

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 3
Concept Option WS3-A

March 17, 2015

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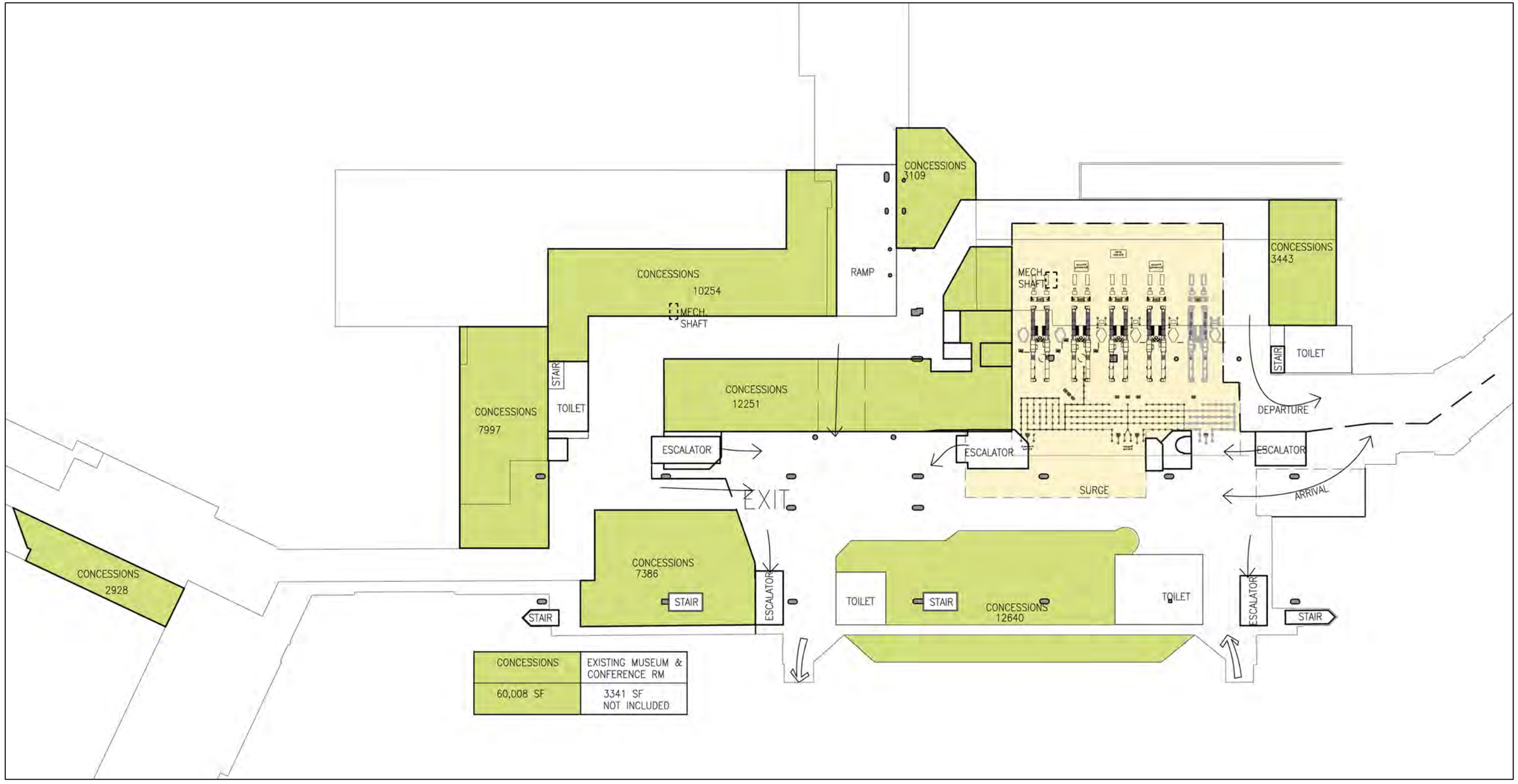

Exhibit A.14

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 3
Concept Option WS3-B

March 17, 2015

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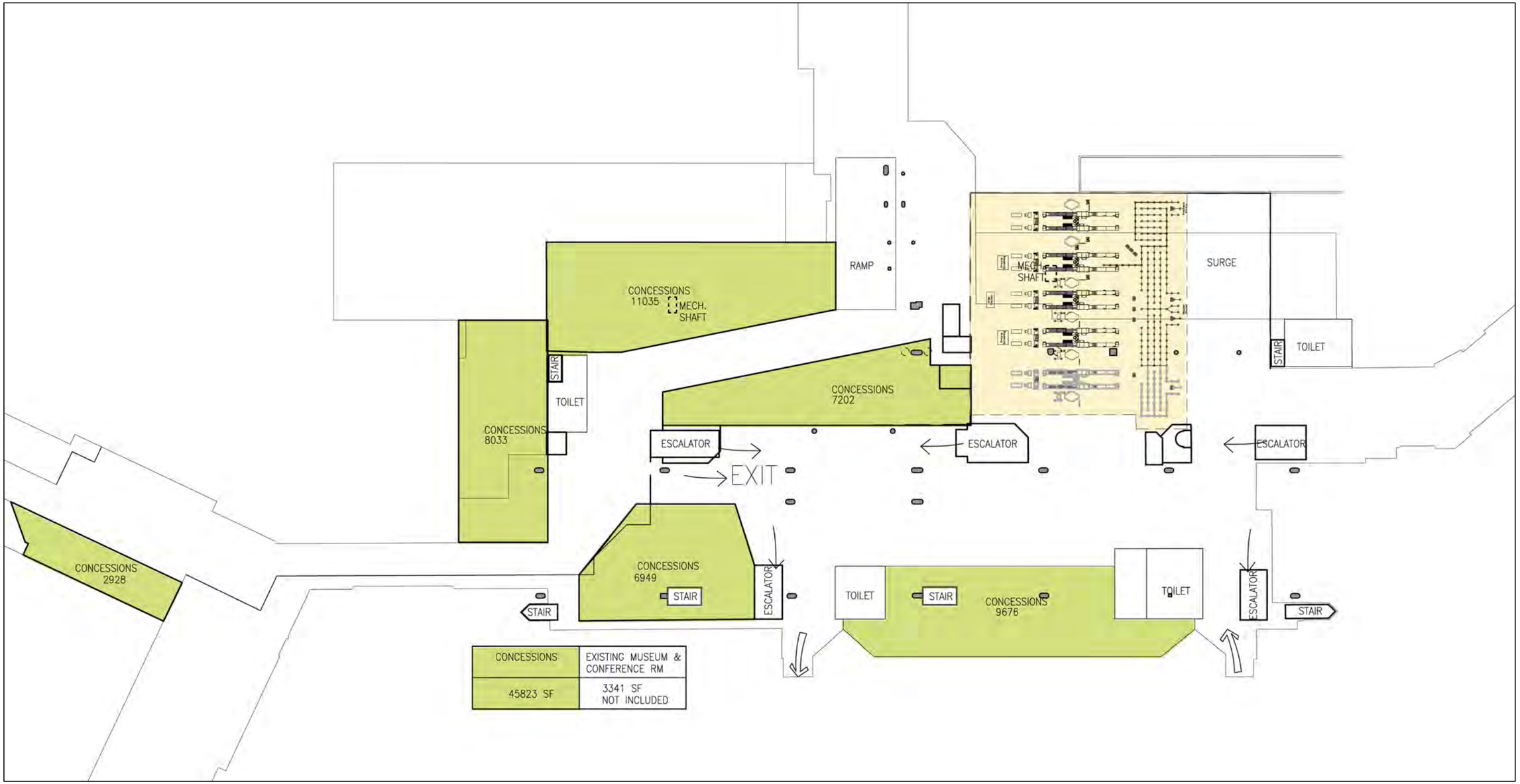

Exhibit A.15

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 3
Concept Option WS3-C

March 17, 2015

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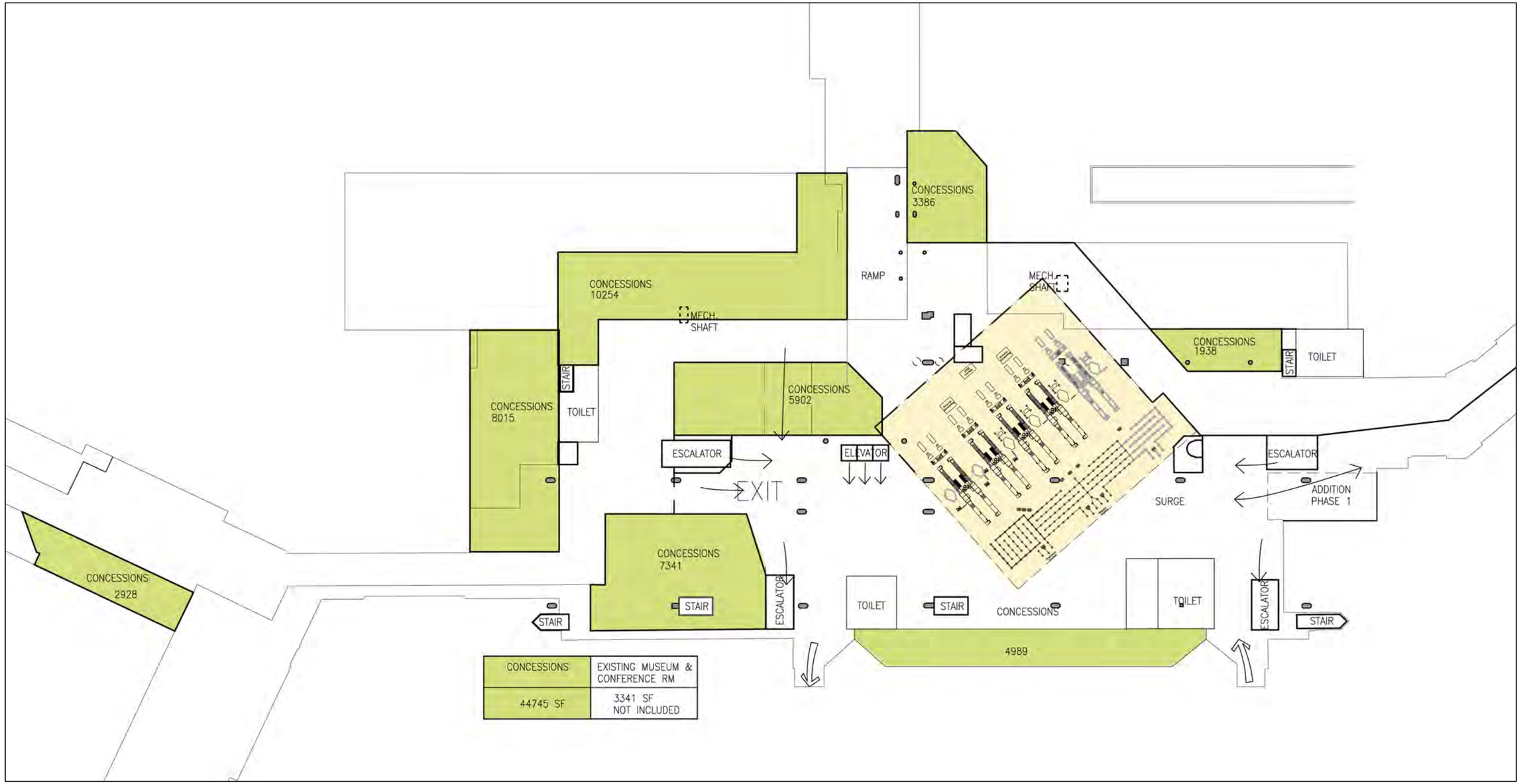

Exhibit A.16

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 3
Concept Option WS3-D

March 17, 2015

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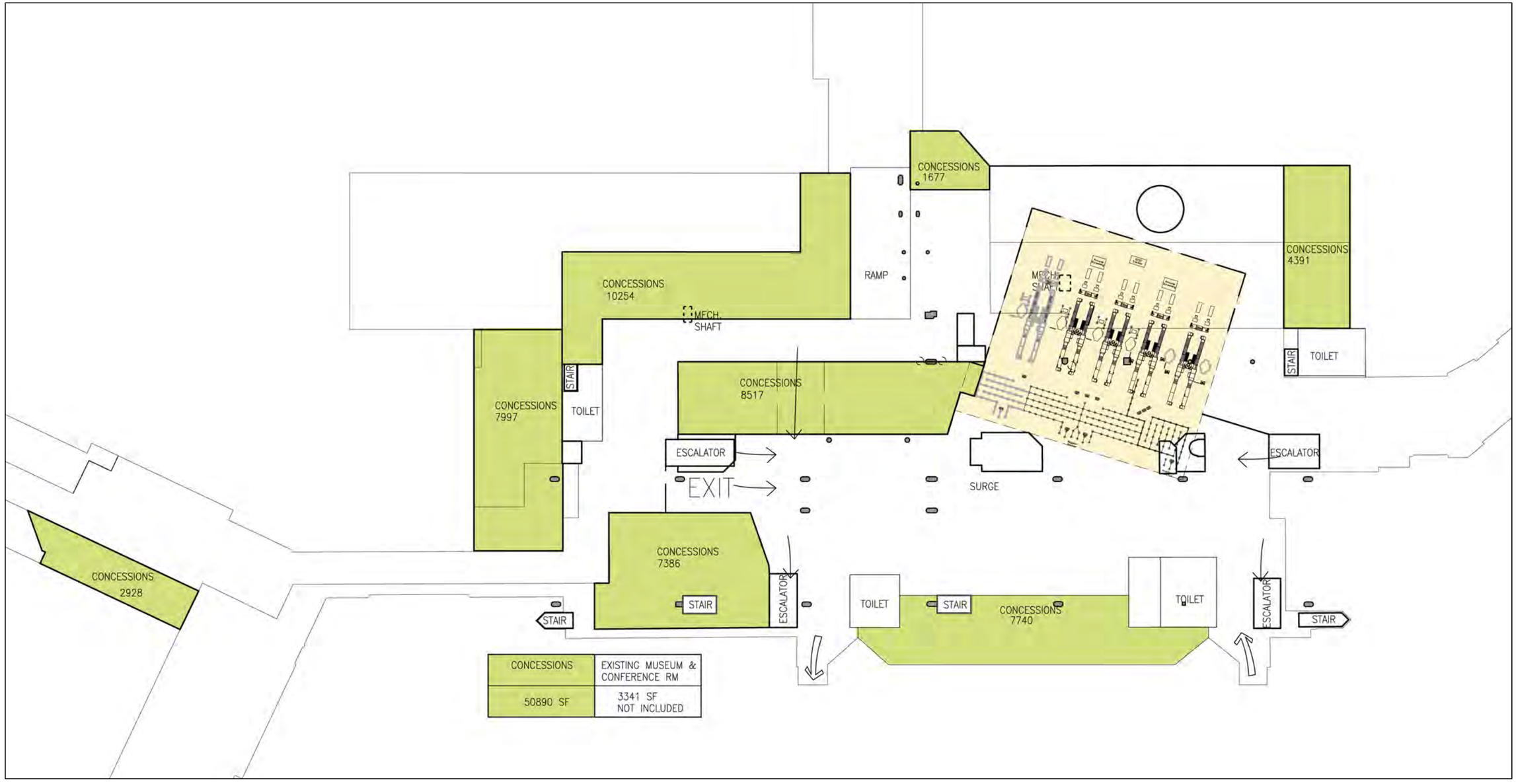

Exhibit A.17

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Workshop 3
Concept Option WS3-E

March 17, 2015

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One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
414 / 259 1500
414 / 259 0037 fax
www.graef-usa.com

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December 17, 2014

Meeting Notes – Workshop #3 – Follow –Up – Concept Update

Terminal Expansion and Central Checkpoint Feasibility Study and Cost Estimate
General Mitchell International Airport
Milwaukee County Project No. A201-14012

Present For General Mitchell International Airport:
Terry Blue
Timothy Karaskiewicz
Ed Baisch
Michael Keegan
Kathleen David
Pat Rowe
Pat Walslager
Kathy Nelson
For GRAEF:
Lori Rosenthal
For Kindness Architecture + Planning:
Scott Kindness
Middleton Construction Consulting:
Tom Middleton
For James G. Otto Architect:
Jim Otto

The meeting was held to discuss comments, concerns, and issues raised during Workshop #3 meeting.

Tim Karaskiewicz shared Air Mall thoughts and concerns regarding limitations of Checkpoint based on current design:

1. Expand Checkpoint with added lane.
2. Expand checkpoint with extra lane during holiday and spring break travel
3. Change orientation of Checkpoint flow to focus on C & D, and Concessions.
4. 40,000 square feet to 45,000 square feet total appropriate amount of concessions for the airport
    a. 25,000 sf on concourses
        i. 20,000 square feet in Mall secure side – do not add new square footage
        ii. 5,000 square feet maximum pre-security concessions
            1. News & Gifts, coffee shop with light food
5. Loading dock area expansion will be too expensive.
6. Would like the possibility for future expansion of the mall.
7. Air Mall uses the following square footage costs as a budget test:
    a. $600/sf is used for additions with fit-out
    b. $350/sf is used for interior renovations with fit-out

8. Would like to level off the ramp at “D” with plaza, steps and escalator. Scott Kindness indicated that accessibility issues will need to be considered in the final design.

As an introduction to Scott’s presentation, Jim Otto indicated he had a discussion with Ed Baisch about the issues raised during Workshop #3 by the GMIA team (concerning checkpoint location/flow, concessions locations, and costs). Based on that discussion, Scott and Jim developed sketch concepts that addressed the issues. The meeting was turned over to Scott. He illustrated an option showing the checkpoint exiting in a northeast direction (between Concourse C and D) into the concessions mall area. The escalator in the north and middle have to be removed to pull people through and going into the right direction. There will be the sense of entry. It offers future expansion options with flexibility. It is cost effective.

Escalators could be reused.
Escalators would be two up / two down with center stairs.
Non-secure side: conference rooms and museum plus maximum 5,000 square feet of concessions
The option allows for the possibility to connect to concourse E on the secure side
Need to replace the removed north elevator– possibly adjacent to the two new escalators.
Add a set of secure side toilet rooms
Concourse E becomes arrivals only.

Next steps will be to develop the revised plan and update the cost estimate.

These meeting notes constitute the author's understanding of the issues discussed and the decisions reached. Please contact the undersigned with any additions, deletions or changes.

Prepared by,

James G. Otto, AIA, NCARB
Project Manager

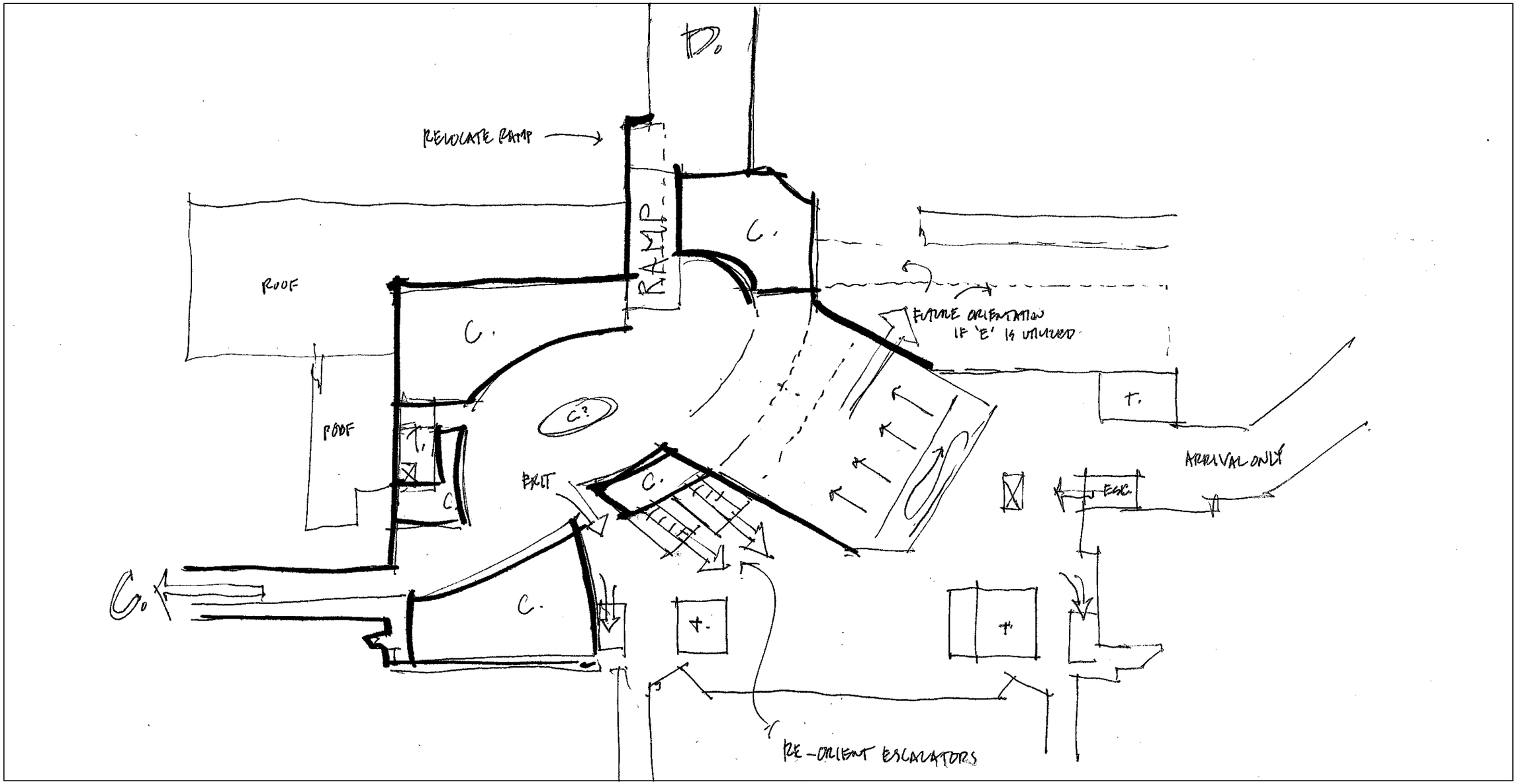

Exhibit A.18

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Concept Update
Gate Level

March 17, 2015

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One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
414 / 259 1500
414 / 259 0037 fax
www.graef-usa.com

GRAEF

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February 3, 2015

Meeting Notes – Concept Review

Terminal Expansion and Central Checkpoint Feasibility Study and Cost Estimate
General Mitchell International Airport
Milwaukee County Project No. A201-14012

Present For General Mitchell International Airport:
Terry Blue
Timothy Karaskiewicz
Ed Baisch
Michael Keegan
Kathleen David
Kathy Nelson
For TSA:
Mark Lendvay
For GRAEF:
Lori Rosenthal
For Kindness Architecture + Planning:
Scott Kindness
For Middleton Construction Consulting:
Tom Middleton
For James G. Otto Architect:
Jim Otto

The meeting was held to provide a review outlining how we have reached this point, a review of the current plans, a cost estimate update, and concept approval/refinements. A PowerPoint presentation was used. The option drawings are included in the report appendices.

Jim Otto opened the meeting with a review of the last meeting and the updates to the Planning and Design Criteria.

1. Orient the checkpoint toward concourses C and D
2. Put the Museum on the non-secured side
3. Put the conference rooms on the non-secured side
4. Modified the amount of concessions down to 20,000 sf on the secured side and 5,000 sf on the unsecured side
5. Plan for future Mall expansion
6. Concourse E
    a. Design to proposed standards (one stop)
    b. Plan for arrivals only facility

Jim also provided a review of how we got to where we are:

1. Design of checkpoint

2. Metrics -how many passengers do we have – how many can be accommodated
3. Planning layout options
4. Aesthetics
5. Other airports were reviewed as to how they designed their checkpoints
    a. Do we want one checkpoint? Or do we want to split it into two checkpoints and the pros and cons of each option.
    b. Conclusion was split checkpoint created staffing and functionality issues and decided to avoid that if we could which brought us to the current layout
6. Another thing looked at in concert with the checkpoint was the flow – passengers, staff, and goods on secured and non-secured sides
7. Looked at where are the best places to build – looked at pros and cons
    a. Solvable issues with all options.
    b. Decided on what layout functions the best
    c. Follow-up to Workshop 3, reviewed the requested planning refinements and the current option
8. We were asked to look at the connection from the Mall to the administration building in a non-secured connector
    a. Look at two opportunities –
        i. Narrow corridor that we will put along the West face
        ii. Letting the passenger flow through the existing bridge and adding to the Easterly side
9. Concourse E
    a. Number of different possibilities were looked at for relocating the international arrivals terminal from the current building to various sites adjacent to the terminal
    b. Due to cost and functionality concerns, Concourse E was determined as the most appropriate location based on current operations
        i. Arrivals/Departure
        ii. Arrivals only
        iii. Traditional
        iv. One stop (proposed new standard)
        v. One stop arrivals only – selected option

Scott Kindness presented the plan layout overview and modifications.

1. Concourse Level includes conference rooms over the bag claim area
2. Concourse Level – alternate
3. Mezzanine Level
4. Grade Level
5. Basement Level

6. Cost estimate update – presented by Tom Middleton
    a. 1 year escalation period included in estimate
    b. Alternate items were reviewed
    c. 15% design contingency included for unknowns
    d. Construction contingency included

Thoughts/Comments:

1. Option question for build shell for future 2 lanes
2. Add secured toilet rooms
3. Employee screening is concern – review through put issues
4. West connection to admin
5. Hold off on Final Report pending GMIA review
6. AHU – good – leave as is
7. Concessions – white box
8. Jim will review checkpoint with Angie
9. Add concession screening at freight elevator
10. Option to demo North toilet rooms

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Prepared by,

James G. Otto, AIA, NCARB
Project Manager

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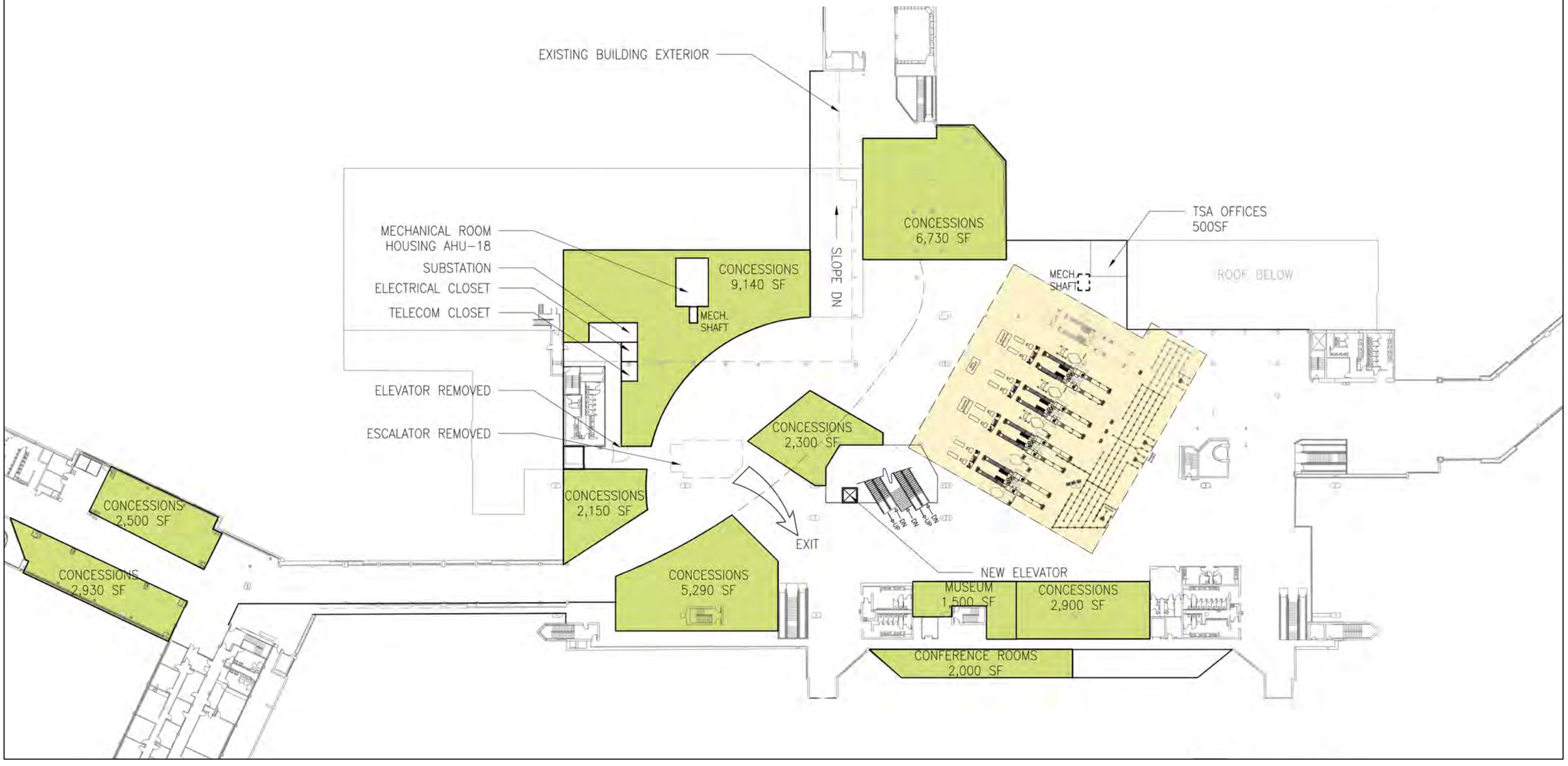

Exhibit A.19

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Concept Review
Gate Level Plan "A"

March 17, 2015

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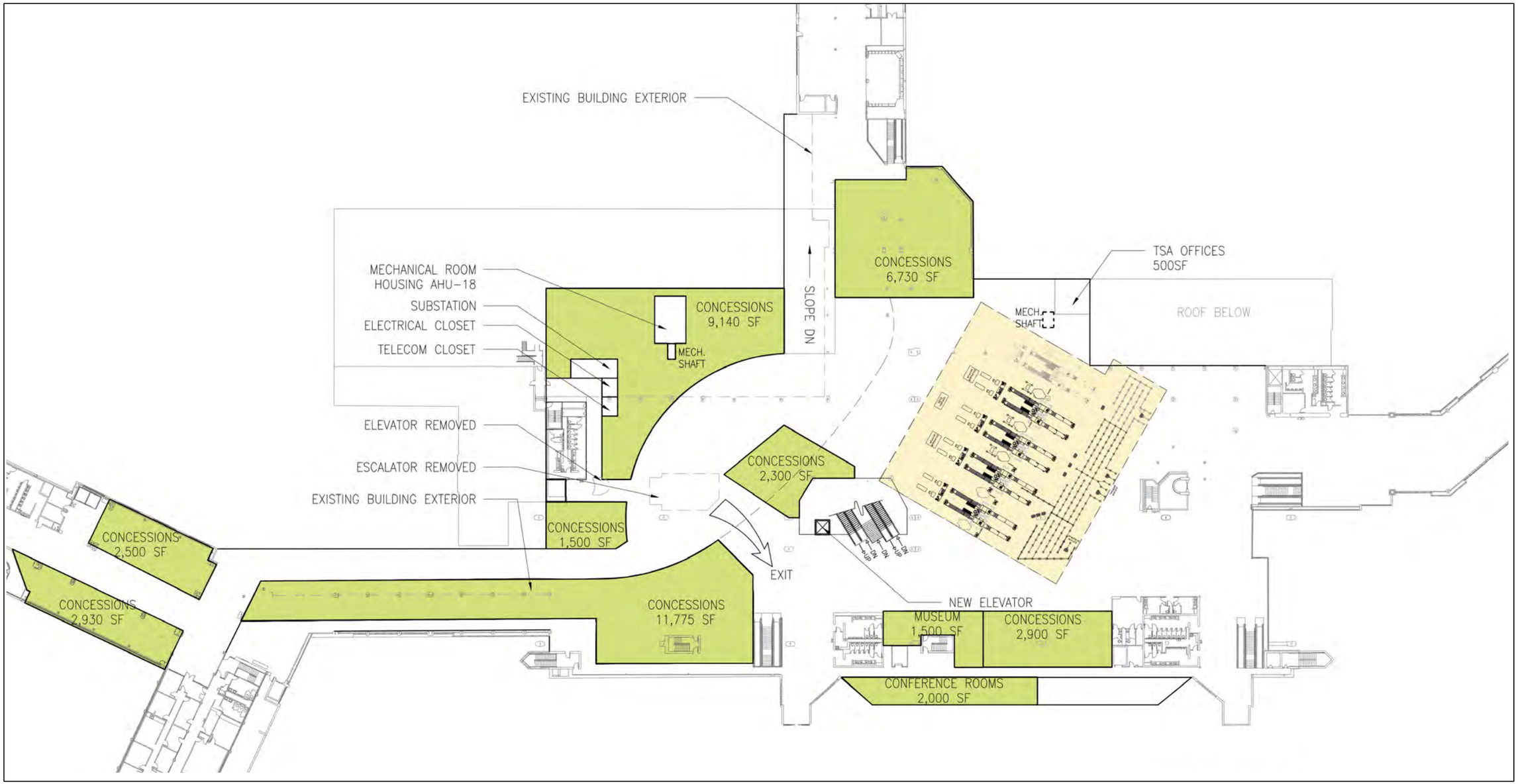

Exhibit A.20

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Concept Review
Gate Level Plan "B"

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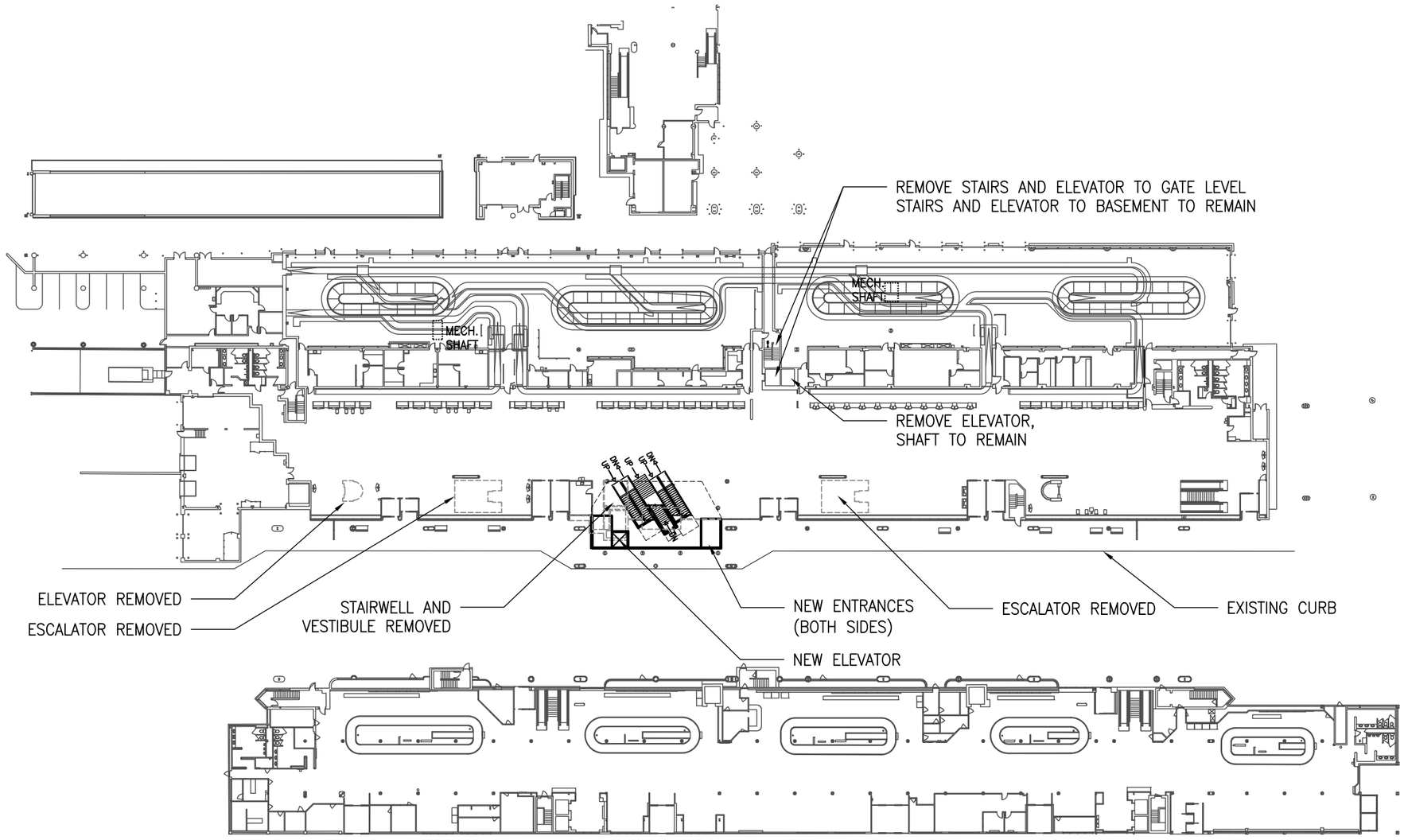

Exhibit A.21

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Concept Review
Ground Level Plan

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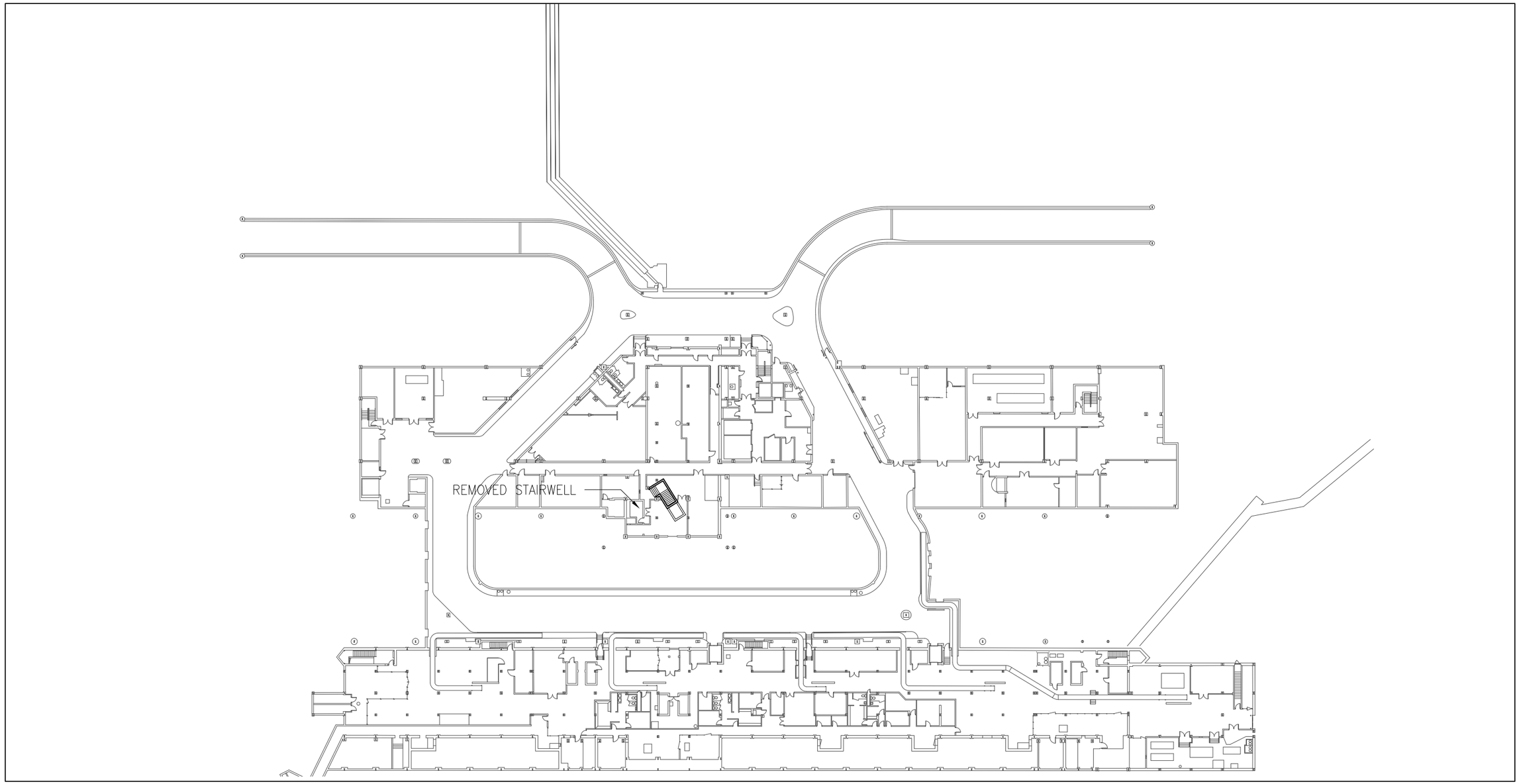

Exhibit A.22

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Concept Review
Basement Level Plan

March 17, 2015

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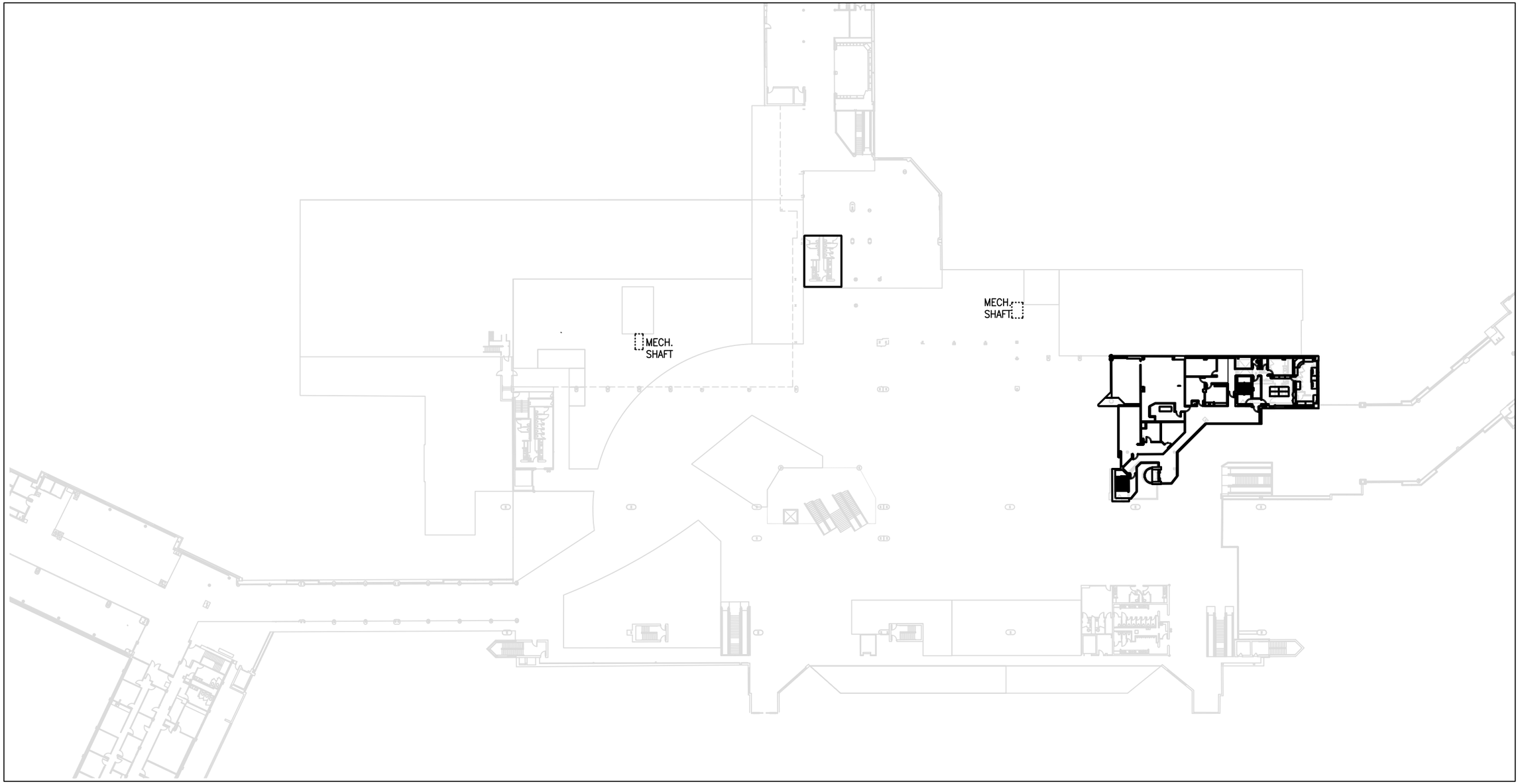

Exhibit A.23

north

Scale 1/64" = 1'-0"

Proposed Terminal Expansion & Central Checkpoint Feasibility Study & Cost Estimate
Proposed Concourse E International Terminal Study & Cost Estimate

Concept Review
Mezzanine Level Plan

March 17, 2015

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