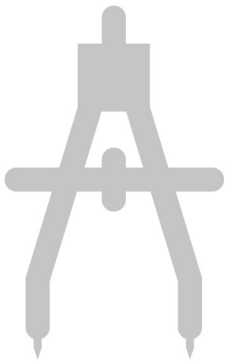
DENVER INTERNATIONAL AIRPORT

DESIGN STANDARDS MANUAL

Architecture

Design, Engineering and Construction

Revised: Q4 2023



Included Technical Specification Requirements	Manual
Division 02: Existing Conditions	**Architecture**
Division 03: Concrete	Civil
Division 04: Masonry	Structural
Division 05: Metals	**Architecture**
Division 06: Wood, Plastics, and Composites	**Architecture**
Division 07: Thermal and Moisture Protection	**Architecture**
Division 08: Openings	**Architecture**
Division 09: Finishes	**Architecture**
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Division 12: Furnishings	**Architecture**
Division 13: Special Construction	Structural
Division 14: Conveying Equipment	**Architecture**
Division 21: Fire Suppression	Life Safety
Division 22: Plumbing	Mechanical
Division 23: Heating, Ventilating, and Air-Conditioning (HVAC)	Mechanical
Division 26: Electrical	Electrical
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Division 31: Earthwork	Civil
Division 32: Exterior Improvements	Civil
Division 33: Utilities	Civil

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Summary of Revisions

The following tables list the revisions to the Architecture DSM.

2023 Revisions

Fourth Quarter

Reference	Revision Description
Throughout	Minor punctuation and grammar changes.
1.5.13 2-Way Communication System: Area of Refuge	Moved the interior 2 way communication to the Accessibility section
2.0.2.6 Roof	Added information on FM Global plan review
2.0.2.7 Roof Access	Added information
Table 2-1: Roof Types	Walkway pavers and changing to White 60mil Fleece backed EPDM
2.0.2.9 Vinyl Overhead Doors	Added information
2.0.3.4 Overhead Doors	Added information
2.1.2 2-Way Communication System: Shuttle Stops	Updated section to accessible shuttle stop phone (Exterior 2 way communication)
3.6.8.2 Fixtures for Public Restrooms Including Family Restrooms	New sink type to remove the integrated soap and air dryer systems
Figure 3-13: Basis of Design Fixture: Expand Width of Trough as Needed	New illustration
3.6.8.3 Accessories	Updated to include family restrooms
3.18.2 Business Offices (Offices occupied or maintained by DEN)	Added office cubicle standards
Section 075323: Ethylene-Propylene-Diene-Monomer (EPDM) Roofing	Added specification for Fleeced backed membrane.

Second Quarter

Reference	Revision Description
Throughout	Minor punctuation and grammar changes
Section 087100: Door Hardware	Added new note to refer designers to request standard specification
Appendix B- Access Control Standard Door Hardware	Added Standard door hardware models for interface with access control

2022 Revisions

Fourth Quarter

Reference	Revision Description
Throughout	Minor punctuation and grammar changes.
1.3 Outlying Building Code Information	Added new Table 1-2: DEN Outlying Building Data Table providing information on buildings at DEN not included in the main terminal complex.
1.5.12 Accommodations for Service Dogs in the Public Areas	Added drainage mat guideline for K-9 relief areas.
3.3.13 Sustainability	Disallowed gas appliances at DEN.
3.6.11 Adult Changing Station	Added design guidance for Adult Changing Stations.
3.18.4 Quiet Rooms	Added new section providing description and design guidelines for the Quiet Rooms at DEN.
3.21.2.2 Automated External Defibrillator (AED) Cabinets	Added new section providing design guidelines for the Automated External Defibrillator (AED) Cabinets.
Section 104313: Defibrillator Cabinets and Duress Alarms	Added DEN Technical Requirements for Defibrillators Cabinets and Duress Alarms.

Second Quarter

Reference	Revision Description
Throughout	Minor punctuation and grammar changes
1.2 Building Descriptions	New section
2.0.3 Concourse and Connecting Bridge	Removed 2.0.3.4 Roof information
Table 2-3: Preliminary Exterior Building Attenuation Requirements	Updated table notes
Table 3-3: List of elevators at DEN with Machine Rooms and Comm. Room	New table added for reference
3.2.4 STC Rating Charts	Added sections with elements that can be made to accommodative a quiet room
3.18.3 Break Rooms	Updated equipment information
3.18.4 Quiet Rooms	Added section with elements that can be made to accommodate a quiet room
Section 083323: Overhead Coiling Doors	Added new information on overhead coiling doors

Revision Notation: Revisions made to this Manual during this revision cycle are annotated as shown in the example below:

A vertical line in the left-hand margin is used to annotate paragraphs that have been added or revised in the current publication. Revisions may include items such as new requirements, clarification of existing requirements, or removal of requirements that no longer apply to projects. Revision annotation is applied to each publication individually; revisions made in past publications are not annotated in subsequent publications.

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Purpose of Design Standards Manuals

The DEN Design Standards have been developed to ensure a unified and consistent approach to the thematic and technical design for DEN. These standards are for use and strict implementation by all consultants under contract to DEN, to tenants, and all other consultants under contract to any other entity for the design of projects at DEN.

The Standards Manuals are working documents, which will be revised and updated, as required, to address the general, conceptual, design, and technical standards for all areas of design for DEN.

This Design Standards Manuals (DSM) for DEN has been prepared for use by competent, professionally licensed architectural and engineering consultants under the direction of DEN Maintenance and Engineering or tenants of DEN.

The Design Standards shall not be quoted, copied, or referenced in any bidding or construction contract documents. Content contained in this Manual shall not be copied in any bidding or construction documents, except where specifically instructed to do so. All information contained in these standards must be fully explained and shown in all bidding and contract documents.

The Design Standards Manuals are intended to be used as a whole, as each manual is complimentary to the other DSMs. To understand the overall thematic and design standards for DEN, the applicable manuals must be utilized together and not separated from the Design Standards Manuals.

The Consultant shall not reproduce, duplicate in any manner, transmit to other consultants or other entities, or use in conjunction with other projects without the express written consent of DEN.

NOTE: This document is optimized for duplex (double-sided) printing.

VARIANCE FROM DEN DESIGN STANDARDS MANUALS

Requests for non-conformance or variance from DEN Design Standards manuals, for any DEN or Tenant Projects, must be formally submitted using the online DSM Variance Request form at the following website:

DEN DSM Variance Request Form

Variance requests may or may not be approved by DEN and response will be communicated to the requestor.

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Chapter 1 - General

1.0 Introduction

The purpose of this document is to provide Designers a reference point in which to start their project prior to beginning design. The following key plan is representative of the facility starting on the south with the Hotel Transit Center northward through the Jeppesen Terminal, the Concourses, and all the way to the AGTS Maintenance Building. There are underground Transit Systems and Utility Tunnels that also run from the Hotel Transit Center past Concourse C and contain the AGTS Maintenance facility north of Concourse C.

Table 1-1: Abbreviations

Name	Abbreviation
Airport Office Building	AOB
Automated Baggage System	ABS
Automated Gateway Transportation System	AGTS
Central Utility Plant	CUP
Concourse A	CCA
Concourse B	CCB
Concourse C	CCC
Denver International Airport	DEN
Hotel Transit Center	HTC
Jeppesen Terminal	TML
Parking Garages	PKG
Security Screening Checkpoint	SSCP

1.0.1 DEN Design Principles

DEN strives to enable design professionals to fulfill DEN's aspiration that the airport's architecture and interiors became a seamless, unified embodiment of their design values and brand idea. Such visions are demonstrated in the DEN Design Principles.

For more information on the Design Principles, visit the website:

DEN Design Principles

1.0.2 Design Review Committee (DRC)

The intent of the design review process is to ensure that the proposed projects and design are compatible with, and enhance, the aesthetic intent and design quality of airport facilities and wayfinding systems. This document describes the design review process for airport facilities and tenant improvements and the role the Design Review Committee (DRC) plays in that process.

For more information on the Design Review Committee (DRC), visit the website:

DEN Design Review

1.1 Art Program

DEN represents an extraordinary opportunity for the creation of works by artists that will reflect the diversity and vitality of the region to which Denver is the gateway, significantly enhance the visual and social environment, and help humanize the vast scale of the airport environment. DEN has prepared a Master Plan for Public Art Project integration. The DEN Project Manager (DEN PM) will assist with the RFP for any public art element and coordinate impacts to the project's scope, schedule, and budge. In summary, Denver's Public Art Ordinance calls for 1% of construction cost to go to integrating public art into the City. This is for projects in the public view of over one million-dollar construction budgets. DEN may decide to bank the money for an art installation elsewhere or integrate it into the actual project. The Ordinance for Public Art is special to the City of Denver. Visit Denver Public Art Policy for rules that apply to eligible construction projects. The DEN Public Art Master Plan is special to DEN. It outlines areas for future public art considerations on our property.

DEN Public Art Policy

The airport art program seeks to present artists with both opportunities and challenges to create works that substantially enrich the airport experience. The thrust of the art program is an investigation of the architecture and landscape, as well as the technology, psychology, environmental characteristic, and social dynamics of this highly specialized public facility. It encourages the invention of works which are designed to be seen and experienced as part of the airport environment and which will engage the public passing through. It is intended to generate work that activates its site, and takes its cues in scale, materials, and media from the environmental, social, and physical conditions of the airport.

The incorporation of art is intended to enhance the airport's visibility as a civic monument and contemporary symbol and to surprise and delight the traveler.

1.1.1 Program Components

The art program comprises three components: design consultations, commissions, and site-specific projects.

1.1.1.1 Design Consultations

Design consultations bring artists into the design process at the earliest possible point. As design consultants, they participate in decision-making, which shapes major public spaces at the airport and develops projects that are integral to those spaces. This is the major emphasis of the art program during the design phase.

1.1.1.2 Commissioned Works

Commissioned works are site-specific permanent works designed by artists in direct response to the special conditions of a given space. Sites and budgets for specific commissions may be established by the art program following the review and approval of the proposals generated through each design consultation. Commissioned works are a subsidiary activity to design consultations and site-specific projects.

1.1.1.3 Site Specific Projects

Site-specific projects are commissioned at changing locations throughout the airport. Spaces are not built or dedicated specially for these works. Instead, artists are periodically invited to choose sites within existing airport

public settings and propose works for them. Site-specific projects are of limited duration and proposed within the given budgetary and feasibility guidelines established by the Airport Art Program. Time-permanent commissions will be developed out of successful projects.

1.1.2 Implementation

The airport art program is implemented by the authority of the Mayor's Executive Order #92 and coordinated by the Denver Commission on Cultural Affairs through the Airport Art Program staff.

Responsibilities of the Denver Commission on Cultural Affairs include:

A. Allocation of funds for art projects
B. Selection of sites for commissioned works
C. Artist selection, including the advertisement of opportunities for artists
D. Contracting with artists
E. Proposal review and commissioning of all works

1.1.3 Architects and Designers

Architects and Designers will have a role in these decisions and are urged to consult with their DEN PM immediately following initial notice to proceed from DEN, to familiarize themselves with DEN procedures, and to work out an effective implementation schedule for the projects outlined herein.

1.2 Building Descriptions

1.2.1 Introduction

The purpose of this section is to define the boundaries of each building within the DEN Terminal Complex. Figure 1-1: Orientation Plan-DEN Terminal Complex provides an overall context of the terminal complex, oriented with north facing the top of the page. The Terminal Complex starts at the south end with the Hotel Transit Center, continues north through the Jeppesen Terminal and the Concourses, and ends at the north with the AGTS Maintenance Building. There are north-south underground tunnels for building utilities as well as the movement of passengers, employees, and baggage that also run from the Hotel Transit Center to the AGTS Maintenance facility.

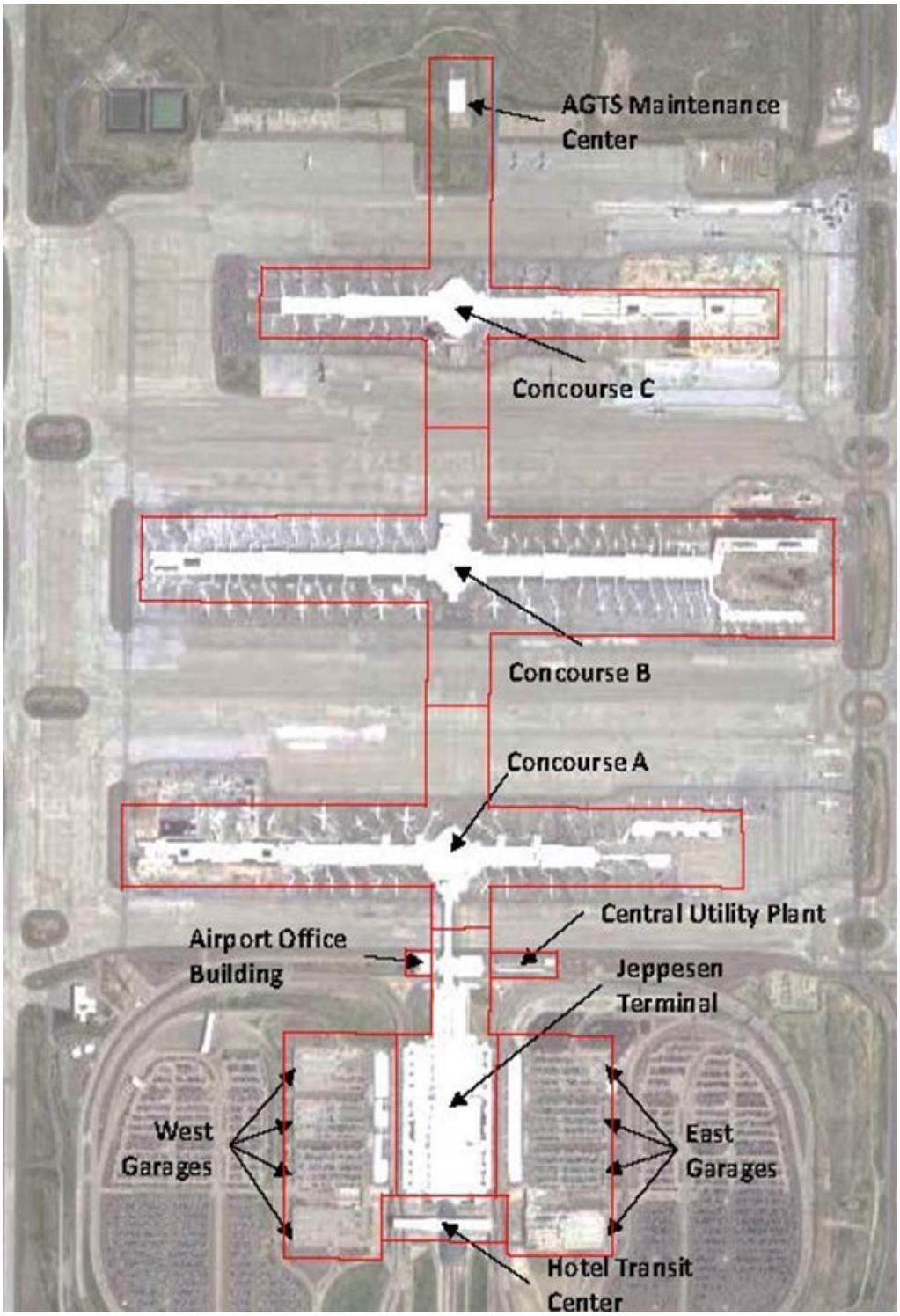

Figure 1-1: Orientation Plan -DEN Terminal Complex

This section contains graphical depictions of each building to provide context for the descriptions. All plan views depicted in this section are oriented with north towards the top of the page. Elevation views may be depicted as north, south, east, or west, as described in the accompanying caption.

1.2.2 Hotel Transit Center

1.2.2.1 General Description

The Hotel Transit Center (HTC) is located at the south end of the terminal complex. Column numbering described below is independent of other buildings and is used for comparison to the BIM model maintained by the DEN DFI department. As depicted in the graphics below, the RTD train platform to the south is not considered part of the HTC.

Plan and Elevation views – see Figure 1-2: HTC West Elevation through Figure 1-7: HTC Levels 6 through 15 Plan View for the diagrammatic presentation of this building.

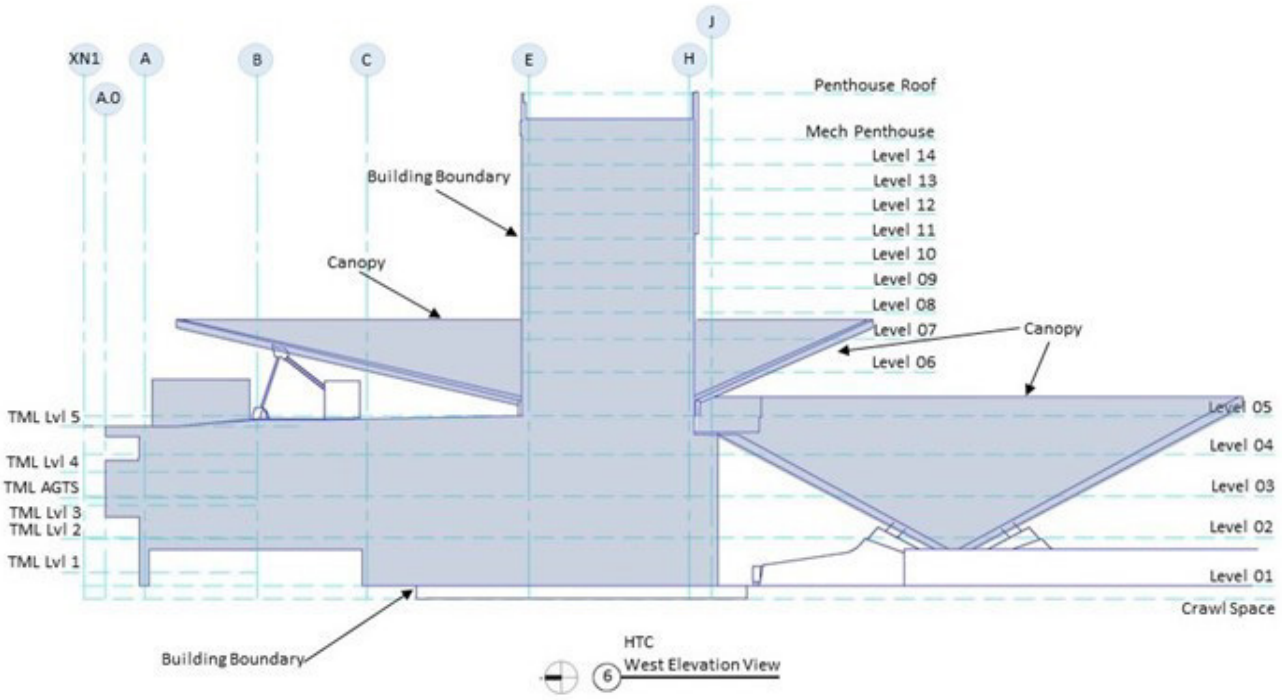

Figure 1-2: HTC West Elevation

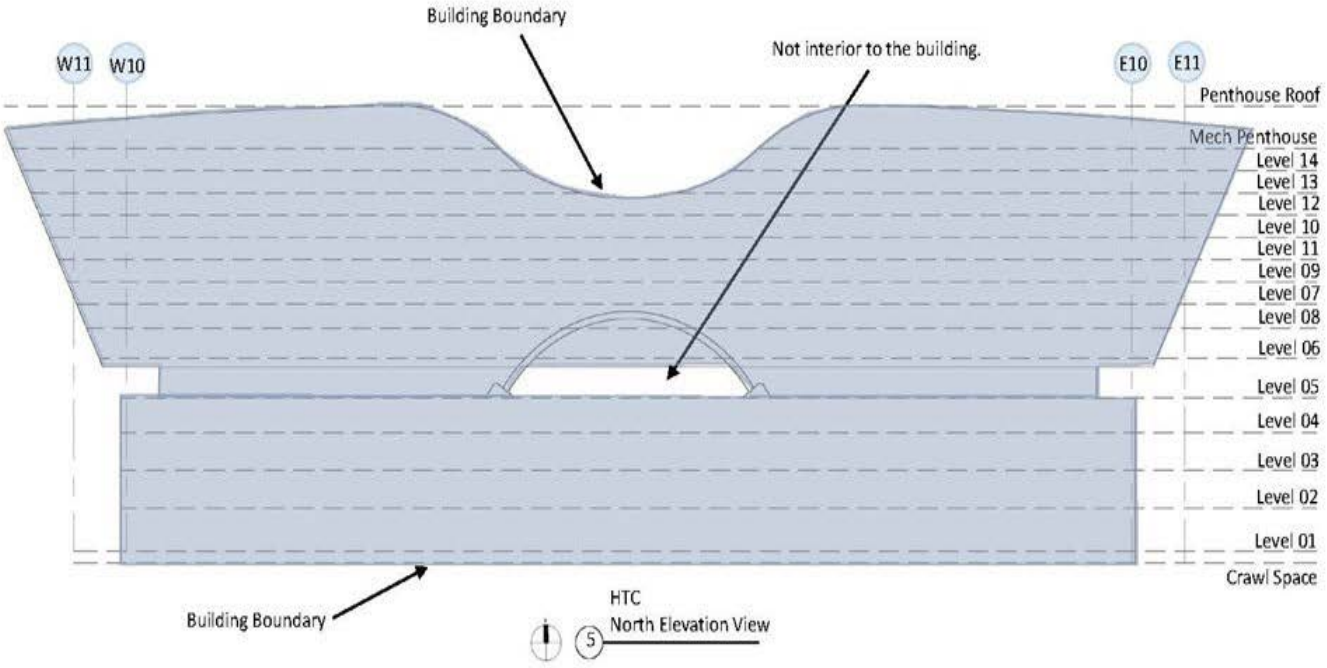

Figure 1-3: HTC North Elevation

1.2.2.1.1 Code Summary

Building Type: IA
High-rise: Yes
Occupancies: A-2, A-3, B, F-1, M, R-1, S-2

Occupancy areas can be obtained from DEN DFI department upon request.

1.2.2.1.2 Location

Building Address: 8300 Peña Boulevard
Denver, Colorado 80249

1.2.2.2 AGTS and Baggage Tunnels

At present, there are no AGTS or Baggage Tunnels utilized in this building. However, Level 3 is reserved for this function should DEN complete the work necessary.

1.2.2.3 Crawlspace

There is no basement included in this building. Instead, a crawlspace with utilities serves equipment installed on Level 1.

1.2.2.4 Level 1

This level has several different functions. The boundary limits of the building extend from Column A to Column J and a width between columns W10 and E10. The Roadway extends from Column A to Column C for the full width of this building. This level includes the ground level escalator that rises to the 5th level for entrance into the Terminal and a road for buses to pick up and drop off area. There are two areas with interior space extending from Column W10 to W2 and Columns C to J and Columns E2 to E10 and Columns C to J. This is the level the fire department responds to.

Refer to Figure 1-4: HTC Level 1 Plan View for a graphical depiction of Level 1.

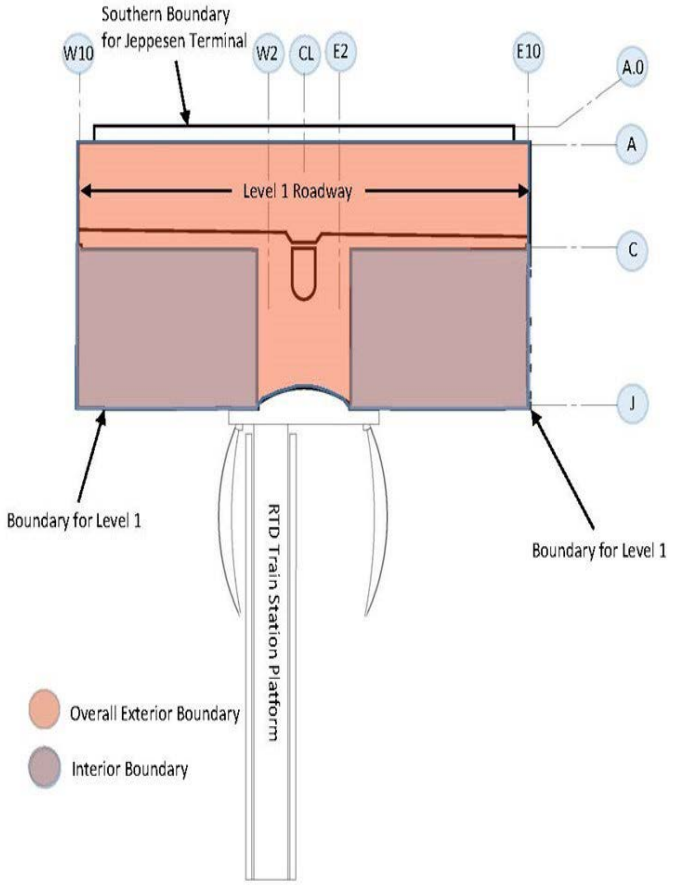

Figure 1-4: HTC Level 1 Plan View

1.2.2.5 Level 2

The boundary limits of this level extend from Column A to Column J and a width between columns W10 and E10. Refer to Figure 1-5: HTC Level 2, 3, 4 Plan View for a graphical depiction of level 2.

1.2.2.6 Level 3

The boundary limits of this level extend from Column A0 to Column J and a width between columns W10 and E10. This level contains three direct connections to the Terminal that are designated for future use. It also contains the building's mechanical and electrical equipment rooms for levels 1 through 5. Refer to Figure 1-5: HTC Level 2, 3, 4 Plan View for a graphical depiction of level 3.

1.2.2.7 Level 4

The boundary limits of this level extend from Column A to Column J and a width between columns W10 and E10. This level was initially intended for use as a security screening checkpoint (SSCP) but is currently unfinished shell space. Refer to Figure 1-5: HTC Level 2, 3, 4 Plan View for a graphical depiction of level 4.

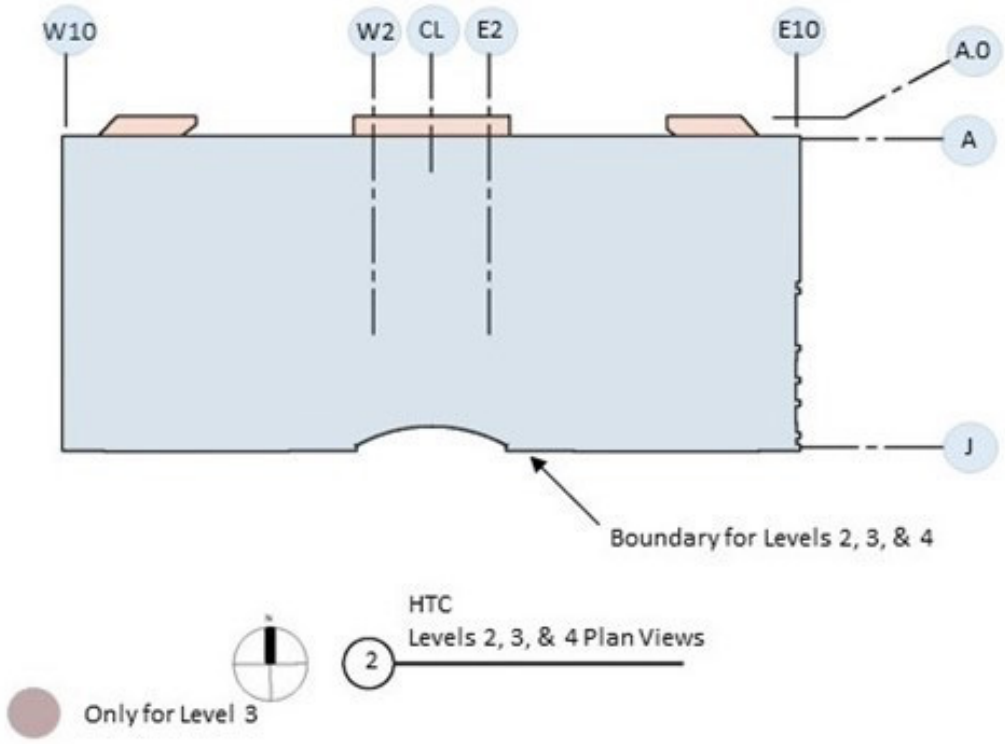

Figure 1-5: HTC Level 2, 3, 4 Plan View

1.2.2.8 Level 5 (Plaza Level)

This level has two different areas. The overall area is exposed to the elements and compromises the area informally called the Plaza. There are two areas with interior spacing housing restaurants. The overall boundary limits of this level extend from Column A0, which is the southern boundary of the Jeppesen Terminal, to Column J to the south and from Column W10 next to the Terminal West level 5 roadway to Column E10 next to the Terminal's East Level 5 roadway. The interior areas are from Column E to Column H, and the width between columns W9 and W3 and Columns E3 and E9. Refer to Figure 1-6: HTC Level 5 Plan View for a graphical depiction of level 5.

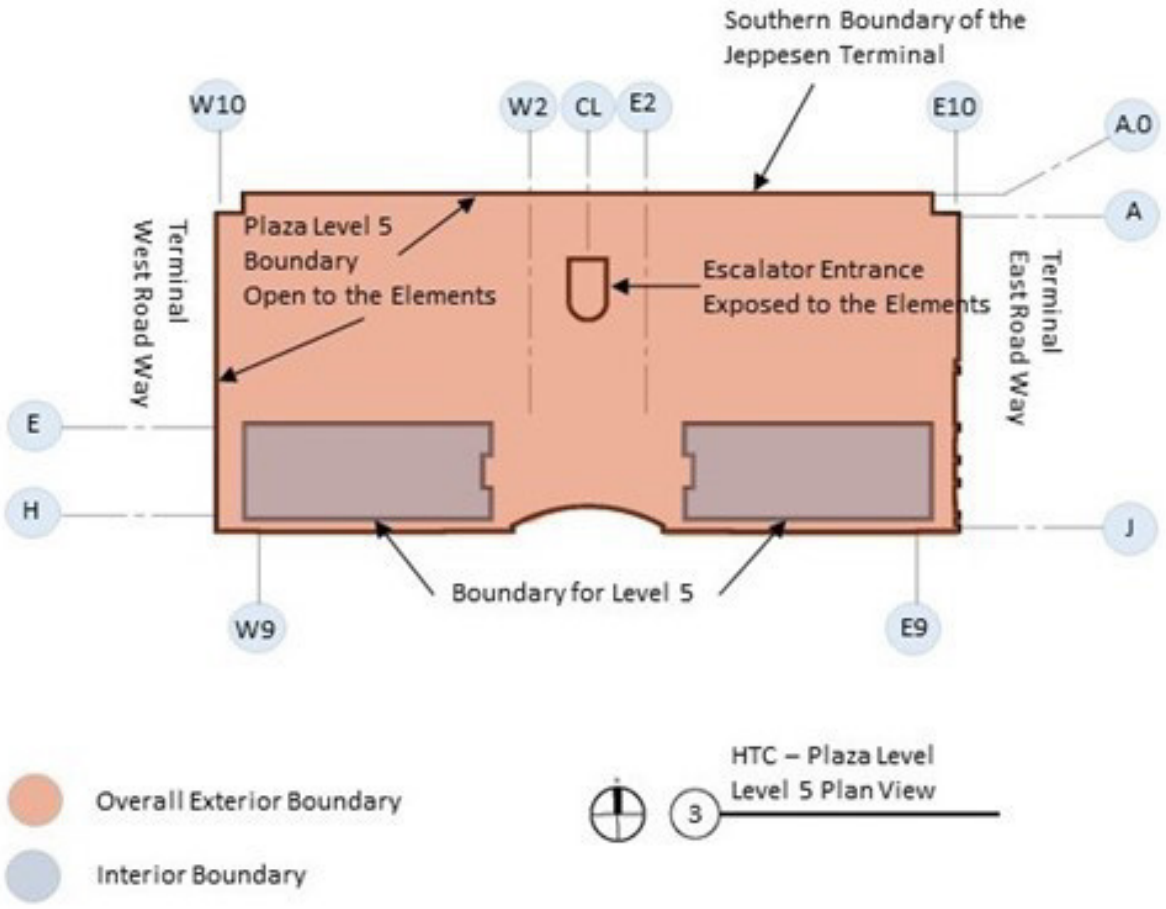

Figure 1-6: HTC Level 5 Plan View

1.2.2.9 Levels 6, 7, 8, 9 & 10

The boundary limits of this level extend from Column E to Column J and a width between columns W11 and E11. Level 6 contains the first level of the Hotel and is the narrowest. As the levels increase, the width also increases at a nominal rate of 4'8" on each side outward, with the Mechanical Level as the widest part of the Hotel. The floors are continuous from the East side to the West side. Refer to Figure 1-7: HTC Levels 6 through 15 Plan View for a graphical depiction of levels 6 through 15.

1.2.2.10 Level 11

The boundary limits of this level extend from Column E to Column H and a width between columns W11 and E11. This level contains the swimming pool and workout room in the center of the floor which splits the floor into the East and West wings. The separation is approximately Column W2 to E2. Refer to Figure 1-7: HTC Levels 6 through 15 Plan View for a graphical depiction of levels 6 through 15.

1.2.2.11 Levels 12, 13, 14 & Mechanical

The boundary limits of these levels extend from Column E to Column H and a width between columns W11 and E11. This level is split into the West and East wings, with the center missing between W2 and E2. The outer edge moves outward at a distance of about 16' per floor for each side, thus, creating the iconic shape of an airplane wing. Refer to Figure 1-7: HTC Levels 6 through 15 Plan View for a graphical depiction of levels 6 through 15.

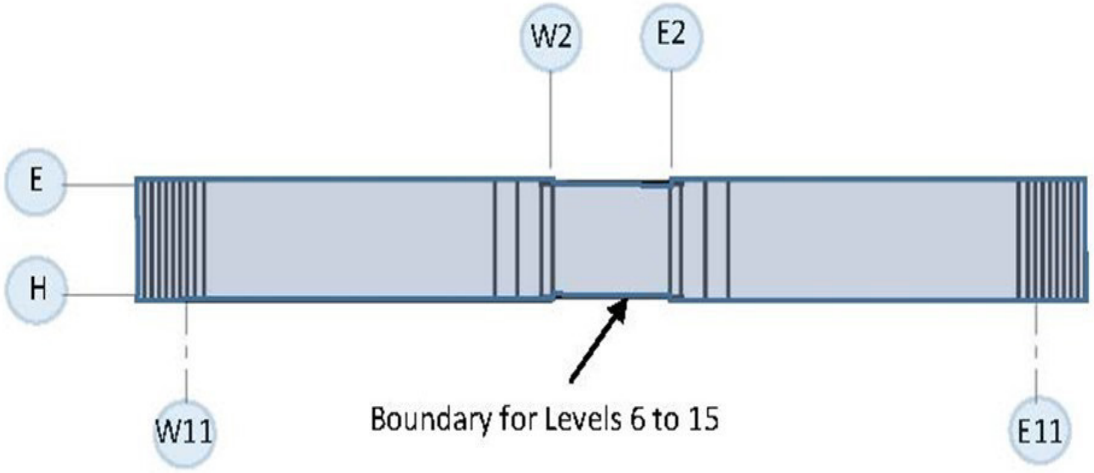

Figure 1-7: HTC Levels 6 through 15 Plan View

1.2.3 Jeppesen Terminal

1.2.3.1 General Description

This building description of the Jeppesen Terminal Building (TML) and its supporting structure and the structure defined herein is below ground and above ground, and each level is independently defined. The use of column numbers is important to identify the current state of the building's boundaries on each level described. The column numbers relate to the column numbers used for the Main Terminal Building, better known as the Jeppesen Terminal.

The area north of the large open area of the Terminal is commonly known as the 'North Terminal' and extends from N31 to N48.8.

Plan and Elevation views – see Figure 1-8: TML East Elevation through Figure 1-16: TML Level 7 Plan View for the graphic presentation of this building.

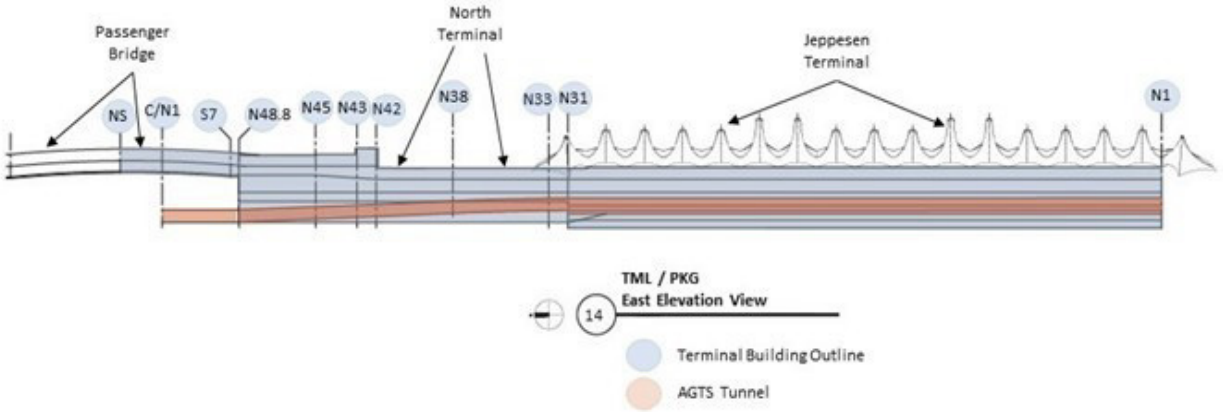

Figure 1-8: TML East Elevation

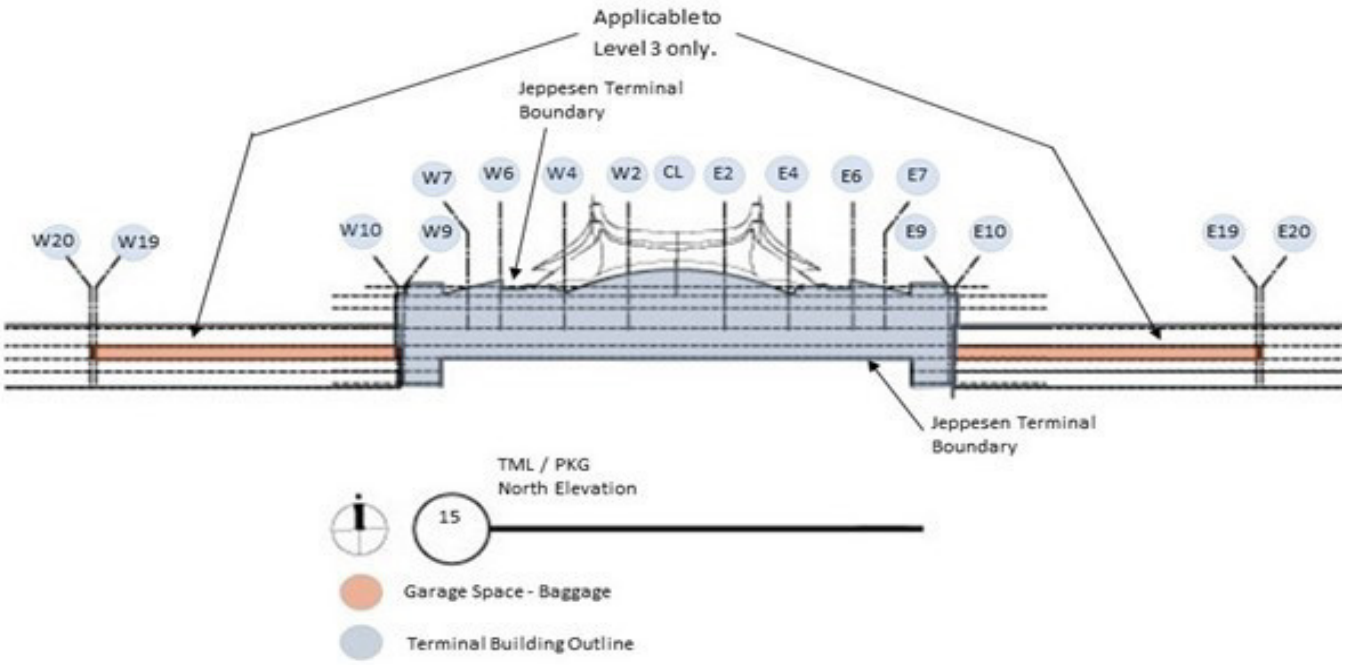

Figure 1-9: TML North Elevation

1.2.3.1.1 Code Summary

Building Type: IA
High-rise: No
Occupancies: A-2, A-3, B, F-1, M, S-2

Occupancy areas can be obtained from DEN DFI department upon request.

1.2.3.1.2 Location

Building Address: 8400 Peña Boulevard
Denver, Colorado 80249

1.2.3.2 Levels 1 & 2

Level 1 and 2 extend north-south between columns N1 and N31 and west-east between columns W9-W8, and E8-E9. Interior space on levels 1 and 2 is limited to perimeter areas as shown in Figure 1-10: TML Level 1 Plan View and Figure 1-11: TML Level 2 Plan View.

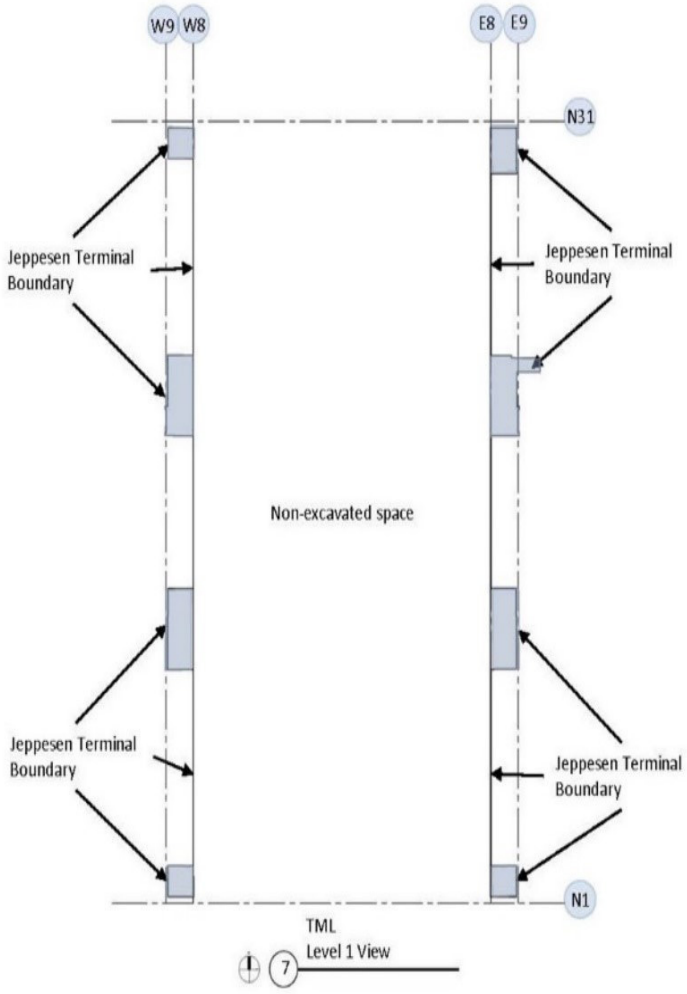

Figure 1-10: TML Level 1 Plan View

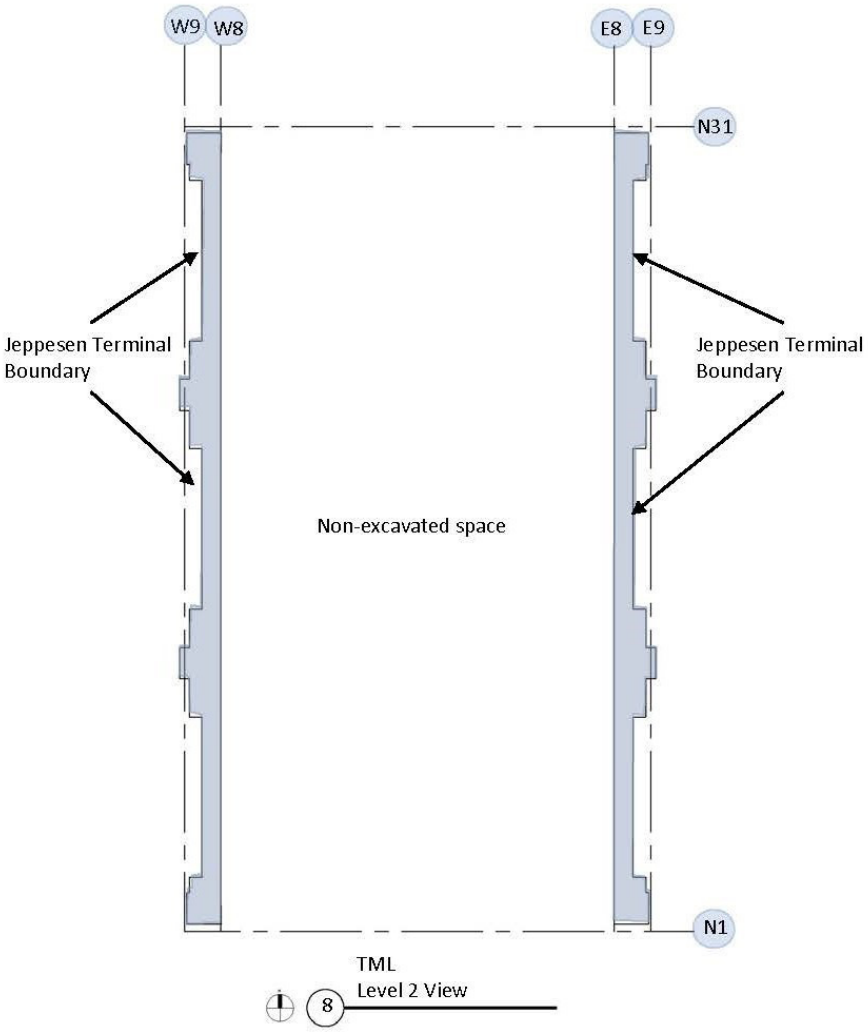

Figure 1-11: TML Level 2 Plan View

1.2.3.3 Level 3

Level 3 of TML extends south-north between column N1 and N45 and west-east between column W9 and E9. Although the AGTS & Baggage tunnels continue to the north on this level, the portion considered part of TML is bounded at N45. Refer to Figure 1-12: TML Level 3 Plan View for a graphical depiction of level 3.

1.2.3.3.1 Level 3 Baggage Handling Area

Although the baggage handling area extends into the parking garages, Level 3 in the garages (outside the column lines noted in 1.4.3 above) are considered part of the garages. This area is described in the Garage Chapter.

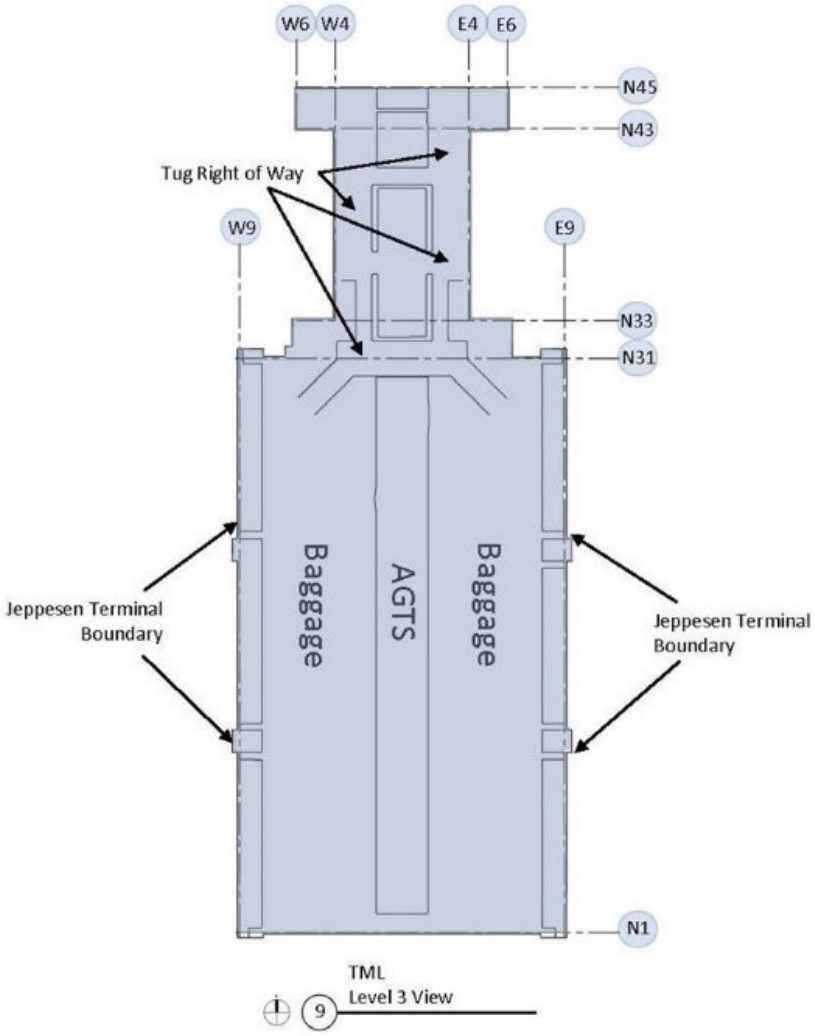

Figure 1-12: TML Level 3 Plan View

1.2.3.4 Level 4 (AGTS)

This level is separated into 3 distinct different areas. They are defined as follows: Column W9 to E9 and Columns N1 to N31, then from N31 to N43 and W4 to E4, then from N43 to N45 and W7 to E7. Refer to Figure 1-13: TML Level 4 Plan View for a graphical depiction.

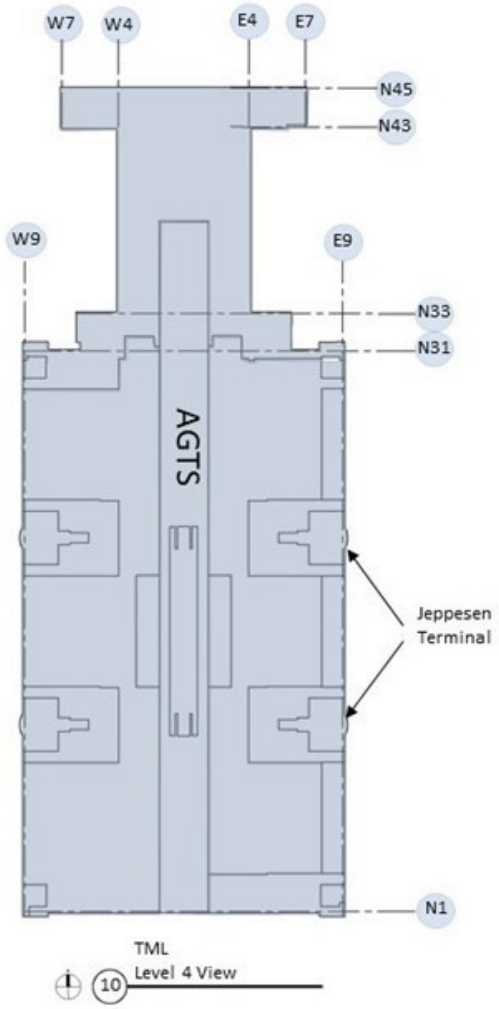

Figure 1-13: TML Level 4 Plan View

1.2.3.5 Level 5

5th Level is considered the Lowest level of Fire Department Access.

This level is defined as follows: Column W9 to E9 and Columns N1 to N31, then from N31 to N43 and W4 to E4, then from N43 to N45 and W6 to E6 and the last portion N45 to N49 and from W2 to E2. Refer to Figure 1-14: ML Level 5 Plan View for a graphical depiction of level 5.

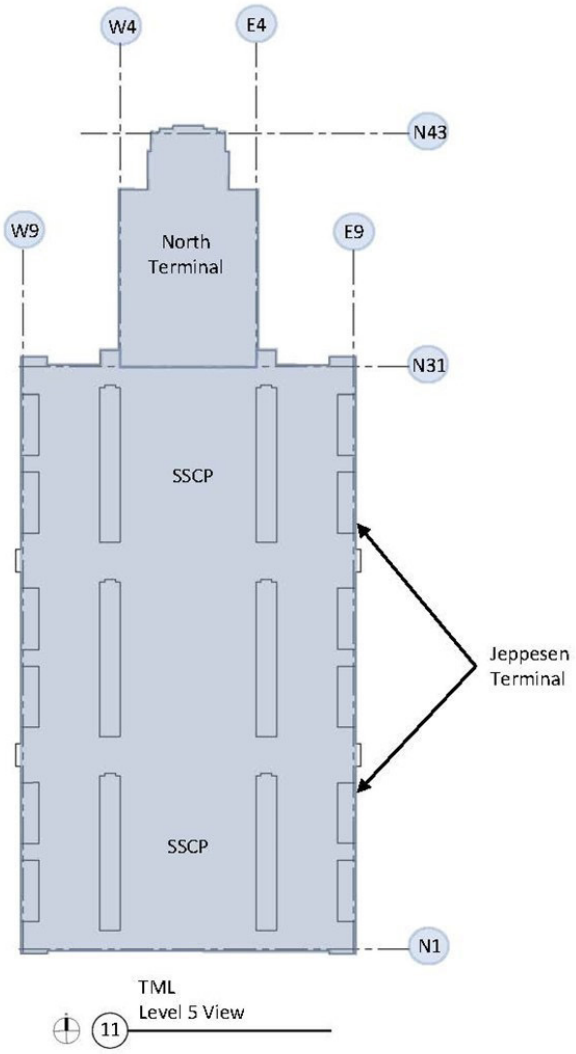

Figure 1-14: ML Level 5 Plan View

1.2.3.6 Level 6

This level is defined as follows: Column W9 to E9 and Columns N1 to N31, then from N31 to N43 and W4 to E4, then from N43 to N45 and W4 to E4 and the last portion N45 to N48.8 and from W2 to E2. The passenger bridge extends to Concourse A and from the 6th Level of the Terminal transitions to the Mezzanine Level of Concourse A. Refer to Figure 1-15: TML Level 6 Plan View for a graphical depiction.

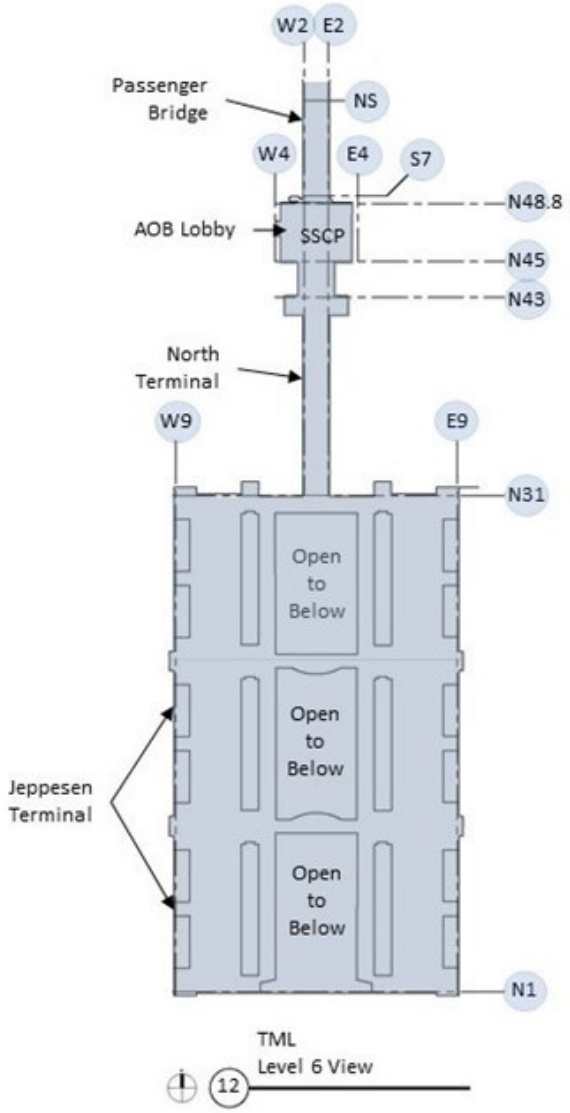

Figure 1-15: TML Level 6 Plan View

1.2.3.7 Level 7

This level is defined as follows: Column W4 to E4 and Columns N42 to N48.8. The passenger bridge extends to Concourse A and from the 7th Level of the Terminal transitions to the Level 4 of Concourse A. This is dedicated to Border Patrol and isolated from the rest of the Passenger Bridge and Terminal till the exit of the International Travel Section.

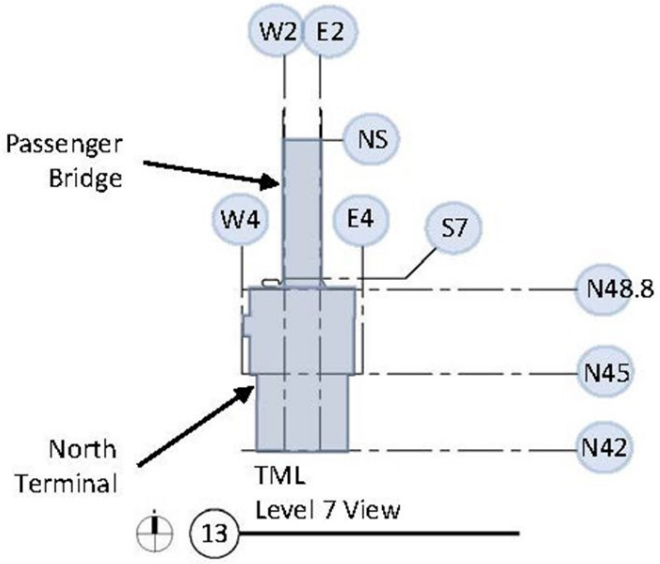

Figure 1-16: TML Level 7 Plan View

1.2.3.8 Commonly Referenced Areas

The following areas of the terminal are commonly referenced by DEN. These areas are not distinct buildings and are described here for Designer's reference only.

1.2.3.8.1 North Terminal

The area of the TML commonly referred to as the North Terminal consists of the portion of the building north of N31 and excludes the Airport Office Building (AOB).

1.2.3.8.2 Passenger Bridge

The area commonly referred to as either the Passenger Bridge or the Concourse A Bridge is considered part of both the TML and Concourse A (CCA). The portion of the Bridge up to column NS is considered part of the TML, and the remaining portion to the north is part of CCA.

1.2.4 Parking Garages

1.2.4.1 General Description

These building descriptions of the Parking Garages (PKG) and their supporting structure the structure defined herein is above ground and each level is independently defined. The use of column numbers is important to present the current state of the building's limits on each level described. The column numbers relate to the column numbers used for the Main Terminal Building.

Plan and Elevation views – see Chapter 1-17: PKG Overall Plan View on page 37 and Figure 1-18: PKG North Elevation for the graphic presentation of this building.

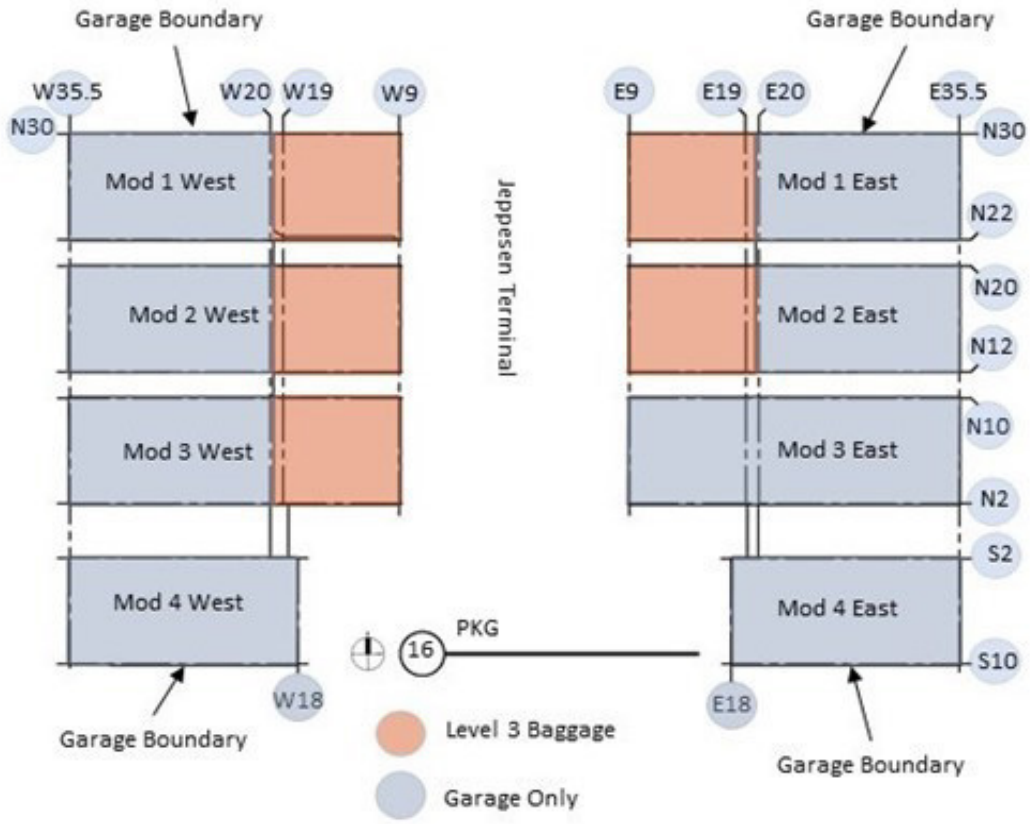

Figure 1-17: PKG Overall Plan View

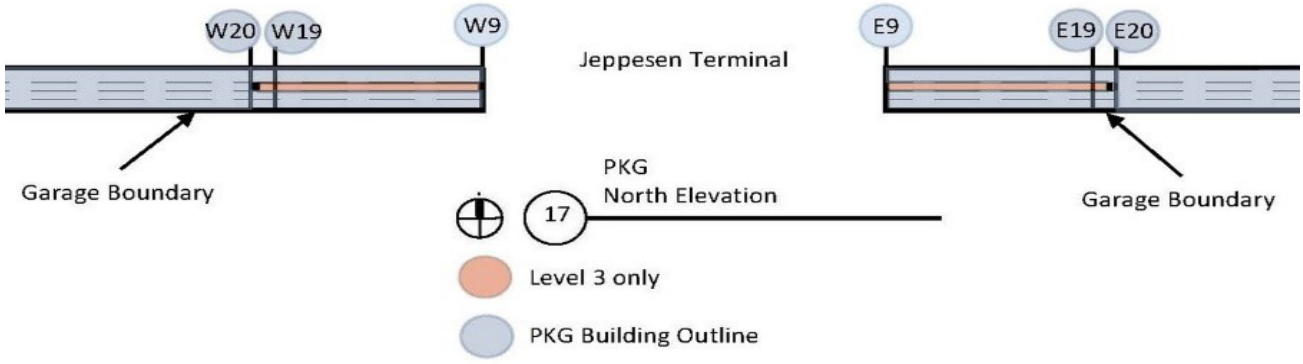

Figure 1-18: PKG North Elevation

1.2.4.1.1 Code Summary

Building Type: IA
High-rise: No
Occupancies: S-1, S-2

Occupancy areas can be obtained from DEN DFI department upon request.

1.2.4.1.2 Location

Building Address: 8400 Peña Boulevard
Denver, Colorado 80249

1.2.4.2 All Levels

Each of these garages has 5 levels that correspond to the similar level with the Jeppesen Terminal.

1.2.4.2.1 Mod 1 West

This garage is defined as follows: Column W9 to W35.5 and Columns N22 to N30.

The orange area is included with Level 3 only and is separated and not considered part of the Jeppesen Terminal. Refer to Figure 1-17: PKG Overall Plan View and Figure 1-18: PKG North Elevation.

1.2.4.2.2 Mod 2 West

This garage is defined as follows: Column W9 to W35.5 and Columns N12 to N20.

The orange area is included with Level 3 only and is separated and not considered part of the Jeppesen Terminal. Refer to Figure 1-17: PKG Overall Plan View and Figure 1-18: PKG North Elevation.

1.2.4.2.3 Mod 3 West

This garage is defined as follows: Column W9 to W35.5 and Columns N2 to N10.

The orange area is included with Level 3 only and is separated and not considered part of the Jeppesen Terminal. Refer to Figure 1-17: PKG Overall Plan View and Figure 1-18: PKG North Elevation.

1.2.4.2.4 Mod 4 West

This garage is defined as follows: Column W18 to W35.5 and Columns S2 to S10.

1.2.4.2.5 Mod 1 East

This garage is defined as follows: Column E9 to E35.5 and Columns N22 to N30.

The orange area is included with Level 3 only and is separated and not considered part of the Jeppesen Terminal. Refer to Figure 1-17: PKG Overall Plan View and Figure 1-18: PKG North Elevation.

1.2.4.2.6 Mod 2 East

This garage is defined as follows: Column E9 to E35.5 and Columns N12 to N20.

The orange area is included with Level 3 only and is separated and not considered part of the Jeppesen Terminal. Refer to Figure 1-17: PKG Overall Plan View and Figure 1-18: PKG North Elevation.

1.2.4.2.7 Mod 3 East

This garage is defined as follows: Column E9 to E35.5 and Columns N2 to N10.

1.2.4.2.8 Mod 4 East

This garage is defined as follows: Column E18 to E35.5 and Columns S2 to S10.

1.2.5 Airport Office Building

1.2.5.1 General Description

This building description of the Airport Office Building (AOB) and its supporting structure the structure defined herein is above ground and each level is independently defined. The use of column numbers is important to

present the current state of the building's limits on each level described. The column numbers relate to the column numbers used for the Main Terminal Building.

Plan and Elevation views – see Figure 1-19: AOB Overall Floor Plan and Figure 1-20: AOB North Elevation for the graphic presentation of this building.

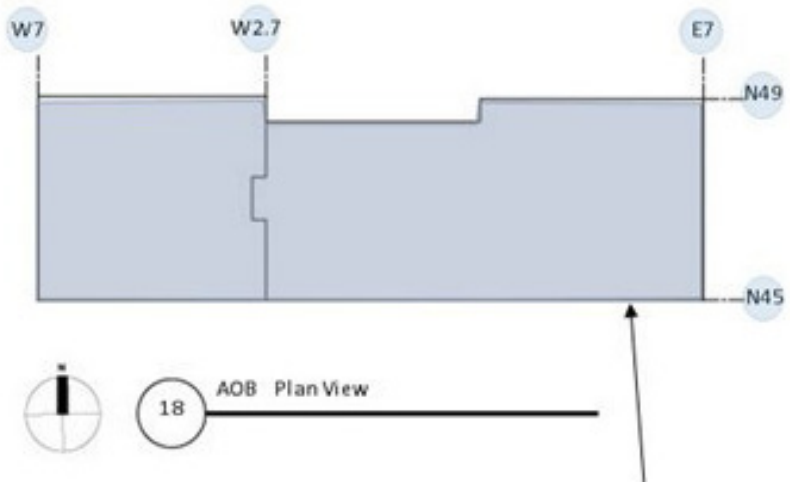

Figure 1-19: AOB Overall Floor Plan

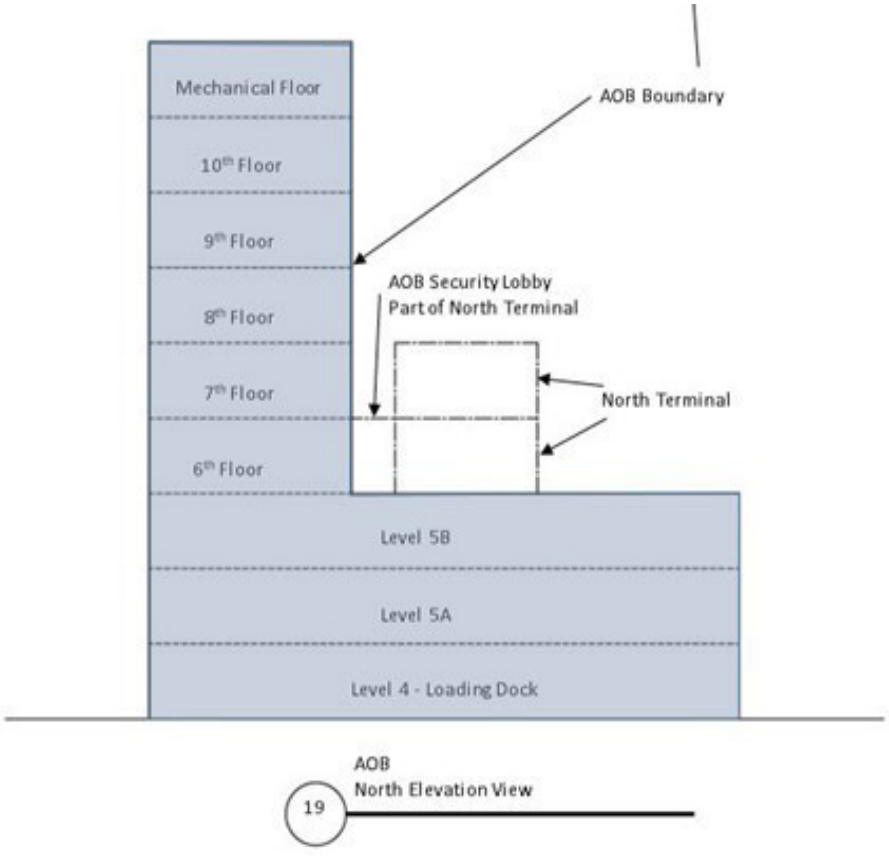

Figure 1-20: AOB North Elevation

1.2.5.1.1 Code Summary

Building Type: IA
High-rise: Yes
Occupancies: B, S-2

Occupancy areas can be obtained from DEN DFI department upon request.

1.2.5.1.2 Location

Building Address: 8500 Peña Boulevard
Denver, Colorado 80249

1.2.5.2 AGTS and Baggage Tunnels

The AGTS and baggage tunnels are located underground and are not considered part of the AOB.

1.2.5.3 Level 4 (Loading Dock)

This portion of the building contains the loading dock. It extends from Column W7 to E7 and Column N45 to N49.

1.2.5.4 Levels 5A & 5B

Both these levels are used for parking, electrical and mechanical rooms. They extend from Column W7 to E7 and Column N45 to N49.

1.2.5.5 Levels 6 through Mechanical

These levels represent a smaller footprint, and the 6th floor connects directly with the North Terminal. These floors extend from Column W7 to Column W2.7 and Column N45 to N49. Although there is a Security Entrance for the AOB, this room is considered part of the North Terminal and not the AOB.

1.2.6 Central Utility Plant

1.2.6.1 General Description

The Central Utility Plant (CUP) is the structure defined herein and contains elements both below and above ground and each level is independently defined. The use of Column numbers is important to indicate the current state of the building's limits on each level described.

Plan and Elevation views – see Figure 1-21: CUP Overall Plan View and Figure 1-22: CUP North Elevation for the graphic presentation of this building.

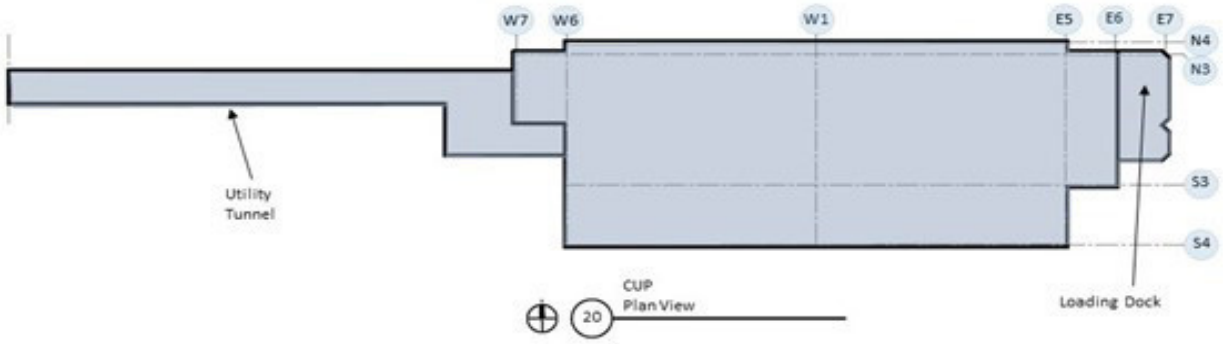

Figure 1-21: CUP Overall Plan View

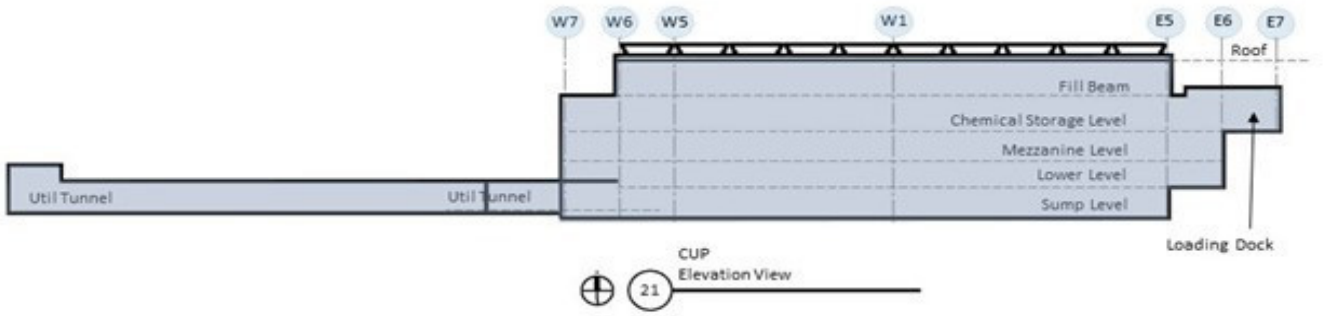

Figure 1-22: CUP North Elevation

1.2.6.1.1 Code Summary

Building Type: IA
High-rise: No
Occupancies: F-1

Occupancy areas can be obtained from DEN DFI department upon request.

1.2.6.1.2 Location

Building Address: 26920 E. 86th Avenue
Denver, Colorado 80249

1.2.6.1.3 Building Boundaries

The CUP extends north-south between columns N4 and S4 and west-east between columns W7 and E7. A utility tunnel extends to the west and connects directly with the North Terminal as depicted in Figure 1-21: CUP Overall Plan View and Figure 1-22: CUP North Elevation. The west boundary of the CUP is shared with the east boundary of the North Terminal. Refer to 1.2.3: Jeppesen Terminal for more information.

1.2.6.2 Boundary

This building houses the boilers and the chillers that supply the Terminal and Concourses with heat and cooling water. It is a separate building just to the east of the Airport Office Building, however it does have utility tunnels that extend from this building to the Terminal, AOB, and all three concourses and not considered part of this building.

The building is bound by its own column grid system as described here. From Column N4 to S4 and Columns W7 to E7.

1.2.7 Concourse A

1.2.7.1 General Description

This is the building description of the Concourse A (CCA) and its supporting structure. The structure defined herein is both below and above ground. As such each level is independently defined. The use of column numbers are important to identify the current state of the building's limits on each level described.

Plan and Elevation view – see Figure 1-23: CCA Overall Plan View and Figure 1-24: CCA North Elevation for the graphic presentation of this concourse.

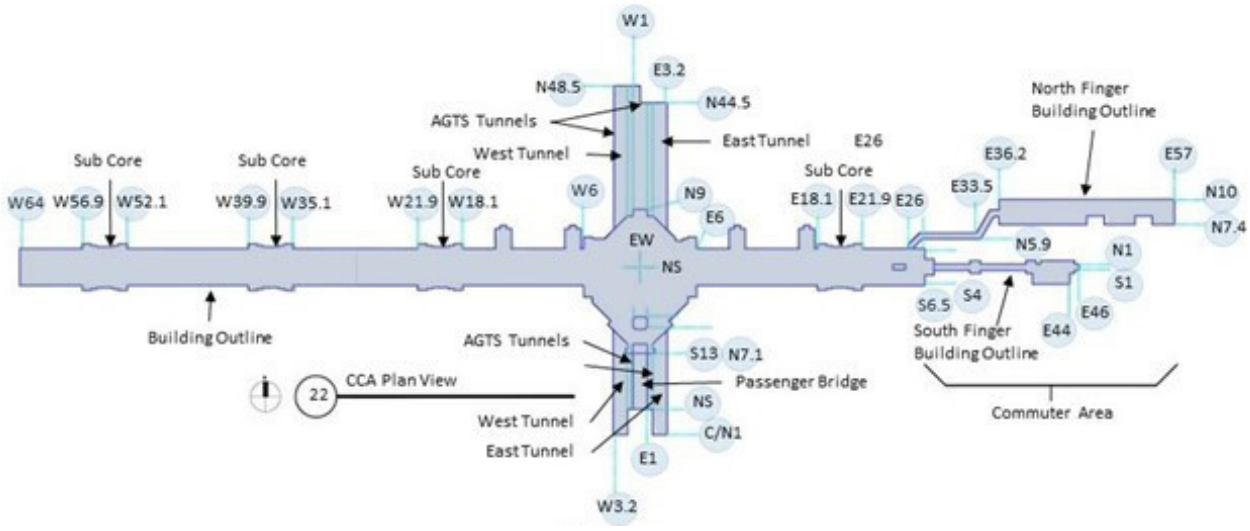

Figure 1-23: CCA Overall Plan View

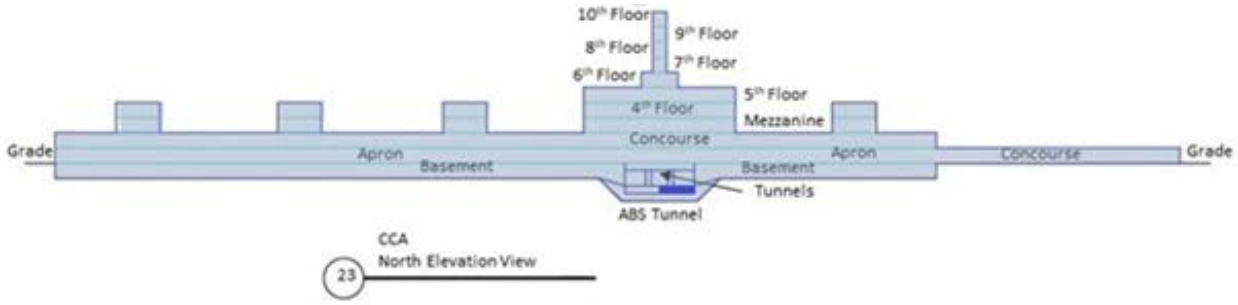

Figure 1-24: CCA North Elevation

1.2.7.1.1 Code Summary

Building Type: IA
High-rise: No
There is a tower that rises up to 10 floors.
Occupancies: A-2, A-3, B, M, S-2

Occupancy areas can be obtained from DEN DFI department upon request.

1.2.7.1.2 Location

Building Address: 8700 Peña Boulevard
Denver, Colorado 80249

1.2.7.2 AGTS and Baggage Tunnels

The AGTS and baggage tunnels are located underground, at varying floor and ceiling heights throughout the complex. The AGTS and baggage tunnels bounded by columns C/N1, on the south to N48.5 (West) / N44.5 (East), on the north is considered part of CCA for ease of maintenance, firefighting, and smoke control. The Tunnels are continuous from the Hotel Transit Center to the AGTS Maintenance Facility.

1.2.7.3 Level 0 (Basement)

Central core of the basement extends from Column W6 to Column E6 with the central column line identified as Column EW and Column N9 to Column S13 with the central column line identified as Column NS.

The West Basement extends from Column W6 to Column W28 and column N4 to column S6.5, then from Column W28 to W64 from Column N4.4 to S4.4.

The East Basement extends from Column E6 to Column E28 and column N4 to column S6.5.

1.2.7.4 Level 1 (Apron Level)

Central core extends from Column W6 to Column E6 with the central column line identified as Column EW and Column N9 to Column S13 with the central column line identified as Column NS.

West Apron extends from Column W6 to Column W28 and column N4 to column S4 with exit stairs protruding both directions.

East Apron extends from Column E6 to Column E28 and column N4 to column S4 with exit stairs protruding both directions.

Commuter area (South finger) extends from Column E28 to Column E46 and a width between columns N1.5 and S1.5.

Commuter area (North Finger) extends from column E26 to E36.2 as a corridor and then from E36.2 to E57 as a Concourse with the width from N7.4 to N10.

1.2.7.5 Level 2 (Concourse Level)

Central core extends from Column W6 to Column E6 with the central column line identified as Column EW and Column N9 to Column S13 with the central column line identified as Column NS.

West Concourse extends from Column W6 to Column W64 and column N5 to column S5 with exit stairs protruding both directions.

East Concourse extends from Column E6 to Column E28 and column N4 to column S4 with exit stairs protruding both directions.

1.2.7.6 Mezzanine Level and higher

This level and higher fall within the physical parameters of the Concourse Level and only present themselves within the core and sub-core structures.

1.2.7.7 Passenger Bridge

The Passenger Bridge is a two-level structure and extends from the Levels 4 and 5 towards the North Terminal. The associated column lines are E1 to W1 and S13/N7.1 to the NS line midpoint of the bridge. Level numbering between the Terminal and Concourse change at the bridge midpoint column NS.

1.2.8 Concourse B

1.2.8.1 General Description

This is the building description of the Concourse B (CCB) and its supporting structure. The structure defined herein is both below and above ground and each level is independently defined. The use of Column numbers are important to present the current state of the building's limits on each level described.

Plan and Elevation view – see Figure 1-25: CCB Overall Plan View and Figure 1-26: CCB North Elevation for the graphic presentation of this concourse.

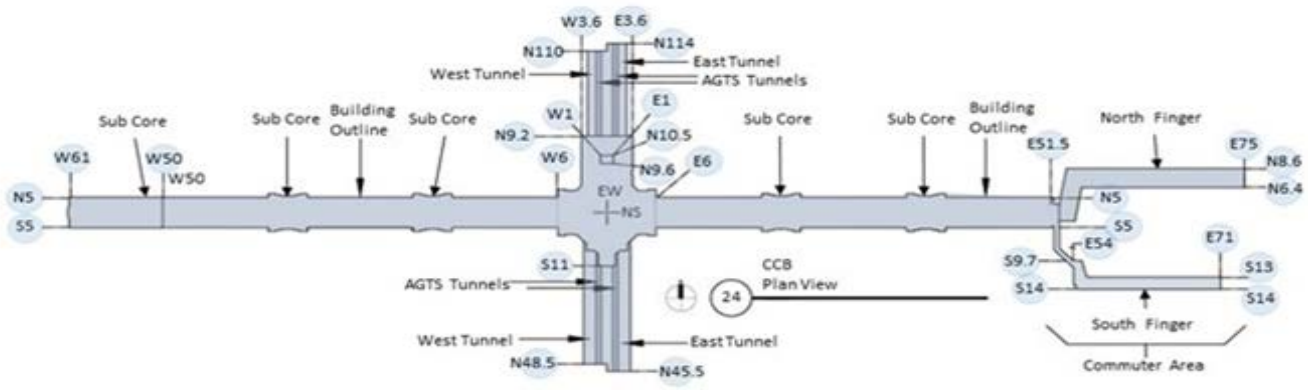

Figure 1-25: CCB Overall Plan View

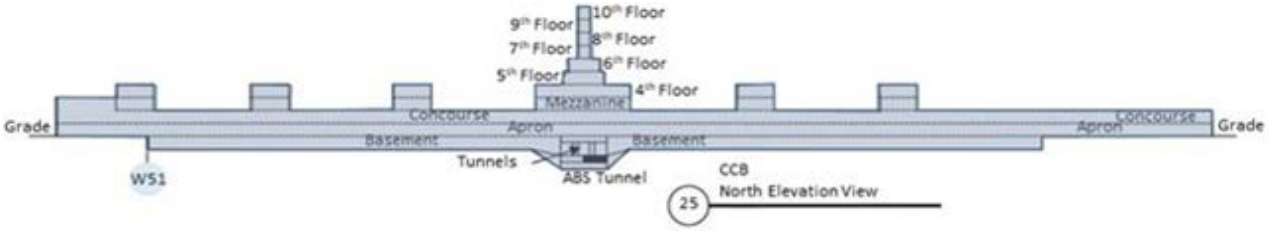

Figure 1-26: CCB North Elevation

1.2.8.1.1 Code Summary

Building Type: IA
High-rise: No
Occupancies: A-2, A-3, B, M, S-2

Occupancy areas can be obtained from DEN DFI department upon request.

1.2.8.1.2 Location

Building Address: 8900 Peña Boulevard
Denver, Colorado 80249

1.2.8.2 AGTS and Baggage Tunnels

The AGTS and baggage tunnels are located underground, at varying floor and ceiling heights throughout the complex. The AGTS and baggage tunnels bounded by columns N48.5 to N110 on the West side to N44.5 to N114.5, on the East side and considered part of CCB for ease of maintenance, firefighting, and smoke control. The Tunnels are continuous from the Hotel Transit Center to the AGTS Maintenance Facility.

1.2.8.3 Level 0 (Basement)

Central core extends from Column W6 to Column E6 with the central column line identified as Column EW and Column N9.2 to Column S11 with the central column line identified as Column NS.

West Basement extends from Column W6 to Column W61 and column N6 to column S6.

East Basement extends from Column E6 to Column E51 and column N6 to column S6.

AGTS/Baggage Tunnel see the above description.

1.2.9 Level 1 (Apron Level)

Central core extends from Column W6 to Column E6 with the central column line identified as Column EW and Column N9.2 to Column S11 with the central column line identified as Column NS.

West Apron extends from Column W6 to Column W61 and column N5 to column S5 with exit stairs protruding both directions.

East Apron extends from Column E6 to Column E51.5 and column N5 to column S5 with exit stairs protruding both directions.

North Finger extends from E51.5 to E75. The corridor portion angles north to the main part width from Column N6.4 to N8.6.

South Finger Commuter Level extends from Column E51.5 to E 71 and S13 to S14.

1.2.10 Level 2 (Concourse Level)

Central core extends from Column W6 to Column E6 with the central column line identified as Column EW and Column N9 to Column S13 with the central column line identified as Column NS.

West Concourse extends from Column W6 to Column W50 and column N4 to column S4 with exit stairs protruding both directions with a building envelope measuring 118’ wide.

East Concourse extends from Column E6 to Column E51.5 and column N4 to column S4 with exit stairs protruding both directions.

North Finger extends from E51.5 to E75. The corridor portion angles north to the main part width from Column N6.4 to N8.6.

1.2.11 Mezzanine Level and higher

This level and higher fall within the physical parameters of the Concourse Level and only present themselves within the core and subcore structures.

1.2.12 Concourse C

1.2.12.1 General Description

This is the building description of the CCC and its supporting structure. The structure defined herein is both below and above ground and each level is independently defined. The use of Column numbers are important to identify the current state of the building’s limits on each level described. The buildings known as the FAA Base Building and FAA Tower are not part of CCC.

Plan and Elevation view – see Figure 1-27: CCC and AGTS Maintenance Overall Plan View and Figure 1-28: CCC North Elevation for the graphic presentation of this concourse.

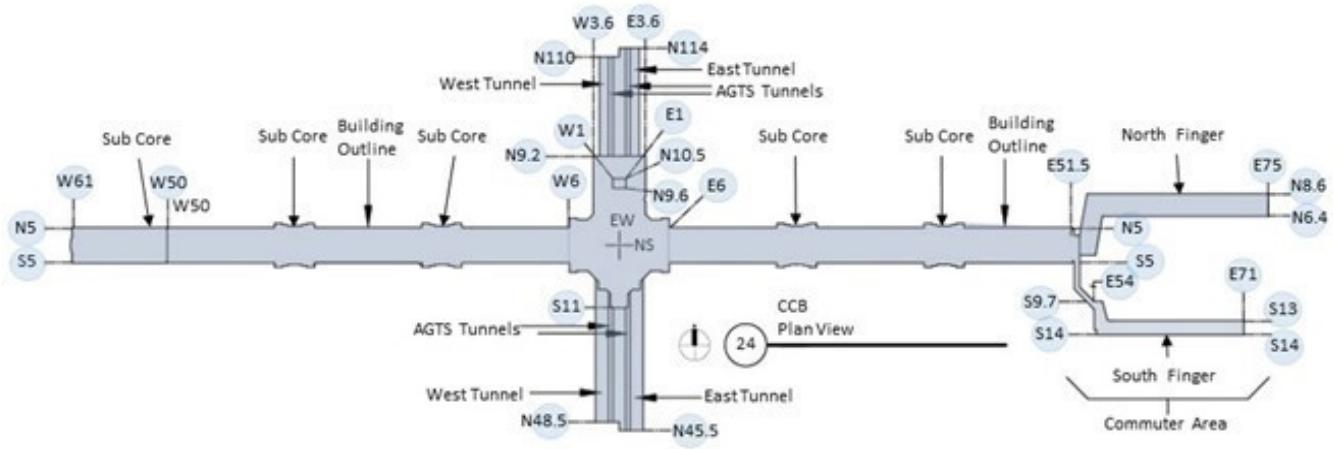

Figure 1-27: CCC and AGTS Maintenance Overall Plan View

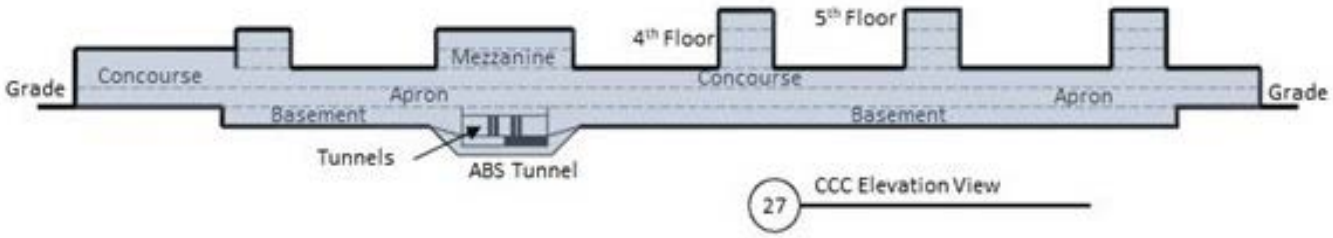

Figure 1-28: CCC North Elevation

1.2.12.1.1 Code Summary

Building Type: IA
High-rise: No
Occupancies: A-2, A-3, B, M, S-2

Occupancy areas can be obtained from DEN DFI department upon request.

1.2.12.1.2 Location

Building Address: 9100 Peña Boulevard
Denver, Colorado 80249

1.2.12.2 AGTS and Baggage Tunnels

The AGTS and baggage tunnels are located underground, at varying floor and ceiling heights throughout the complex. The AGTS and baggage tunnels bounded by columns N110 to N205 on the West side to N114.5 to N205, on the East side and includes the AGTS Maintenance Facility which is considered part of CCB for ease of maintenance, firefighting, and smoke control. The Tunnels are continuous from the Hotel Transit Center to the AGTS Maintenance Facility.

1.2.12.3 Level 0 (Basement)

Central core extends from Column W6 to Column E6 with the central column line identified as Column EW and Column N9 to Column S9 with the central column line identified as Column NS.

West Basement extends from Column W6 to Column W23 and column N4 to column S4.

East Basement extends from Column E6 to Column E58 and column N5.3 to column S5.3.

1.2.12.4 Level 1 (Apron Level)

Central core extends from Column W6 to Column E6 with the central column line identified as Column EW and Column N9 to Column S9 with the central column line identified as Column NS.

West Apron extends from Column W6 to Column W37 and column N4 to column S4.

East Apron extends from Column E6 to Column E65 and column N5.3 to column S5.3.

1.2.12.5 Level 2 (Concourse Level)

Central core extends from Column W6 to Column E6 with the central column line identified as Column EW and Column N9 to Column S9 with the central column line identified as Column NS.

West Concourse extends from Column W6 to Column W37 and column N4 to column S4.

East Concourse extends from Column E6 to Column E68 and column N5.3 to column S5.3.

1.2.12.6 Levels 3, 4 & 5 (Mezzanine and higher)

Mezzanine Level and higher fall within the physical parameters of the Concourse Level and only present themselves within the core and sub-core structures.

1.2.12.7 AGTS Maintenance Building

The AGTS Maintenance building is located north of CCC and includes a portion of the AGTS tunnel. Contact the DEN project manager for code information related to the AGTS maintenance facility.

The AGTS Maintenance building extends to the building exterior of the facility itself and includes the AGTS and baggage tunnels north of column N164. Refer to Figure 1-27: CCC and AGTS Maintenance Overall Plan View and the BIM model for details.

1.3 Outlying Building Code Information

Table 1-2: DEN Outlying Building Data Table

Building	Address	Sprinkled	Construction Type	Occupancy Class	Square Footage	Stories
VEHICLE SERVICE BAY	27500 E. 80TH AVENUE	YES	V-B	B & S-1	94,069	1
FLEET MAINTENANCE BUILDING	27500 E. 80TH AVENUE	YES	II-B	B & S-1	90,000	2
EAST TOLL PLAZA GARAGE	8214 PENA BOULEVARD	NO	V-B	B	1,680	1
EAST TOLL BOOTH ECONOMY	8192 PENA BOULEVARD	NO	V-B	B	825	1
WEST TOLL PLAZA GARAGE	8496 PENA BOULEVARD	NO	V-B	B	1,744	1

Table 1-2: DEN Outlying Building Data Table (Continued)

Building	Address	Sprinkled	Construction Type	Occupancy Class	Square Footage	Stories
WEST TOLL BOOTH ECONOMY	8466 PENA BOULEVARD	NO	V-B	B	728	1
TURNSTILE A & C	26480 E 78TH AVENUE	YES	I-B	B	4,095	1
TURNSTILE B	26296 E 78TH AVENUE	YES	I-B	B	8,668	1
DELTA/UPS WAREHOUSE	26400 E 75TH AVENUE	YES	II-B	S-1, H-4, accessory B	84,300	2
JOINT USE CARGO	7648 UNDERGROVE ST	YES	V-B	S-1, B	125,000	2
GROUND TRANSPORTATION OFFICE	7800 SHADY GROVE ST	YES	V-B	A-3, B	8,033	1
FIREHOUSE 1	8525 NEW CASTLE ST	YES	II-B	R-2, B, S-1	19,533	3
BUILDING OPS TRAILER A	8472 VAN ALLMAN ST	YES	V-A	B	2,700	1
BUILDING OPS TRAILER B		YES	V-A	R-2, A-3	2,700	1
WA DE-ICE	8437 IRVINGTON WAY	YES	V-B	B, accessory A-3	2,835	2
WEST LIGHT VAULT	8529 N IRVINGTON WAY	NO	V-B	F-1	4,711	1
GLYCOL RECOVERY PLANT	25225 E 88TH AVENUE	YES	II-B	F-1	4,000	1
ANTENNTA FARM TOWER 1 BUILDING A	8713 N QUENCY ST	NO	II-B	U	660	1
ANTENNTA FARM TOWER 1 BUILDING B	8713 N QUENCY ST	NO	II-B	U	660	1
ANTENNTA FARM TOWER 2 BUILDING A	8877 SHAWNEE ST	NO	II-B	U	200	1

Table 1-2: DEN Outlying Building Data Table (Continued)

Building	Address	Sprinkled	Construction Type	Occupancy Class	Square Footage	Stories
ANTENNTA FARM TOWER 3 BUILDING A	8945 SHAWNEE ST	NO	II-B	U	200	1
ANTENNTA FARM TOWER 3 BUILDING C	8945 SHAWNEE ST	NO	II-B	U	200	1
ANTENNTA FARM TOWER 4 BUILDING A	9013 N SHAWNEE ST	NO	II-B	U	200	1
ANTENNTA FARM TOWER 4 BUILDING B	9013 N SHAWNEE ST	NO	II-B	U	200	1
ARFF 3 aka DFD STATION 33	8882 N ELECTRA ST	YES	II-B	R-2, B, S-1	11,462	3
EAST AIRFIELD LIGHTING VAULT	8732 ALLIUM ST	NO	V-B	F-1	4,720	1
PENA SNOW TRAILER	7635 PENA BOUELVARD	NO	V-B	B		1
FIREHOUSE 4	9878 N KEWAUNEE ST	YES	II-B	R-2, B, S-1	9,175	3
WC LIGHT VAULT		NO	V-B	F-1, S-1, H-2	10,642	1
LIFT STATION 2	28600 E 114TH AVENUE	NO	II-B	U	6,087	1
CDL TRAILER	27065 E 71ST AVENUE	NO	V-B	B		1
ELECTRIC TRAILER	26835 E 72ND AVENUE	NO	V-B	B		1
HSS TRAILER	26943 E 71ST AVENUE	NO	V-B	B		1
SOUTHEAST HUT	7034 N POWHATON ROAD	NO	II-B	S-1	782	1
CARPENTER BUILDING	6960 VALLEY HEAD ST	YES	V-B	B, S-1	5,200	1
WORLDPORT	24735 E 75TH AVENUE	YES	II-B	B, accessory A-3	60,000	1

Table 1-2: DEN Outlying Building Data Table (Continued)

Building	Address	Sprinkled	Construction Type	Occupancy Class	Square Footage	Stories
ARFF TRAINING FACILITY	11345 TRUSSVILLE ST	NO	II-B	S-1, B, accessory A-3	6,152	2

1.4 Code Information

1.4.1 Building Description

Buildings are described in 1.2: Building Descriptions

1.4.2 Terminal Building Height

The Terminal Building Height is defined in IBC Section 202 as the vertical distance from the Grade Plane to the highest roof surface (Height, Building definition from IBC Section 202). The Grade Plane is located at an elevation of 5,347.0 feet.

1.4.2.1 Terminal

The fabric roof system extends from the flat-roof plane over Level 6 (Level 7) to the highest peak over the Great Hall at an elevation of 5,536 feet (189 feet above Grade Plane). The main Terminal Building has a total of 6 stories above Grade Plane plus mechanical penthouses on Level 7. Level 6 is located approximately 85 feet above Grade Plane. Buildings of Construction Type IA are permitted to be of unlimited height.

1.4.2.2 Hotel and Transit Center

The top of the HTC roof is located at an elevation of 5,524.4 feet (177.4 feet above Grade Plane). The HTC portion of the building is a total of 15 stories above Grade Plane. The HTC portion of the building has its lowest level of fire department vehicle access at Level 1, making Level 14 more than 150 feet above fire department vehicle access. Therefore, this portion of the building is fully designed as a high-rise.

1.4.2.3 Airport Office Building

This building is fully designed as a high-rise.

1.4.2.4 Number of Stories

The highest portion of each Concourse is the Center Core area, which consists of four stories above ground, plus a penthouse and a basement level as follows:

- Level 0 – Basement Level
- Level 1 – Apron Level (grade level)
- Level 2 – Concourse Level
- Level 3 – Mezzanine Level (only occurs at Center Core and Sub-core)
- Level 4 – (only occurs at Center Core and Sub-core)
- Level 5 – Mechanical Penthouse (only occurs at Center Core)

1.4.3 Mezzanines

1.4.3.1 Center Core Level 3

For the Center Core areas, based on the use and configuration of the Level 3 Mezzanine, these areas will be considered a story and not a mezzanine.

1.4.3.2 Sub-core Level 3

A mezzanine is defined as an intermediate level or levels between the floor and ceiling of any story, and in accordance with IBC Section 505.3, A mezzanine in compliance with IBC Section 505.2 shall be considered a portion of the story below. Such mezzanines shall not contribute to either the building area or the number of stories as regulated by IBC Section 503.1. The area of the mezzanine shall be included in determining the fire area. The clear height above and below the mezzanine floor construction shall be not less than 7 feet.

The Sub-core Mezzanine Level of the Concourses meets the requirements of IBC consistent with mezzanines:

- Aggregate area of the mezzanine does not exceed one-half of the floor area of the Concourse Level.
- Mezzanine means of egress will comply with IBC Chapter 10.
- Each mezzanine area will be provided with at least two means of egress. Therefore, openness requirements do not apply.

1.4.4 Concourse Building Height

The Concourse Building Height is defined as the vertical distance from the Grade Plane to the highest roof surface.

1.4.4.1 Concourse A

For Concourse A, the Grade Plane is located at an elevation of 5,376 feet. The highest roof level is 5,460 at the roof of the atrium for a height at the center core of 84 feet. The highest occupied floor is at an elevation of 5,433 feet, which is 57 feet above grade. Based on this height, Concourse A is not a high-rise.

1.4.4.2 Concourse B

For Concourse B, the Grade Plane is located at an elevation of 5,370 feet. The highest roof level is 5,450 at the roof of the atrium for a height at the center core of 80 feet. The highest occupied floor (i.e., Level 5, which is primarily mechanical) is at an elevation of 5,427 feet, which is 57 feet above grade. Based on this height, Concourse B is not a high-rise, excluding the Ground Control tower.

1.4.4.3 Concourse C

For Concourse C, the Grade Plane is located at an elevation of 5,352 feet. The highest roof level is 5,413 for a height at the center core of 61 feet. The highest occupied floor is at an elevation of 5,394 feet, which is 42 feet above grade. Based on this height, Concourse C is not a high-rise.

1.4.5 Building Area

1.4.5.1 Terminal

The Building Area is defined by IBC Section 202 as “The area included within surrounding exterior walls (or exterior walls and fire walls) exclusive of vent shafts and courts. The gross square footage and, thus, the total building area for the Terminal is approximately 2,772,000 square feet currently. The Great Hall Redevelopment project will increase the footprint for levels 5 and 6, resulting in an increase of 131,250 square feet for a total area of 2,902,584 square feet (need to verify this with the Great Hall Team).

1.4.5.2 Federal Inspection Service (FIS)

Level 5 of the Terminal on the North end is especially designed with US Customs and Border Patrol. The existing FIS exiting was reduced and agreed upon with the AHJ at the time of the original design in a Memorandum of Understanding. Customs and Border Patrol meters the occupants to not exceed the occupancy of the exits.

1.4.5.3 Hotel and Transit Center

The HTC was attached as a technically non-separated addition to the Terminal and increased the area by approximately 789,000 square feet. The HTC is connected at the Level 3 baggage tunnel of Type IA Construction.

1.4.5.4 Airport Office Building

Buildings are of Construction Type IA (other than High Hazard occupancies) are permitted to be of unlimited area. Therefore, the building area is acceptable for the total structure, and no calculations based on IBC Section 506 are required.

1.4.6 Building Area – Concourses

The Building Area is defined as "The area included within surrounding exterior walls (or exterior walls and fire walls) exclusive of vent shafts and courts. 3 Buildings of Construction Type IA (other than High Hazard occupancies) are permitted to be of unlimited area. Therefore, the building areas noted below are acceptable for the total structure, and no calculations are required regardless of expansion project area increases.

1.4.6.1 Concourse A

The gross square footage and, thus, the total building area for Concourse A is approximately 1,397,800 square feet. Prior to completion of the A-West Expansion project.

1.4.6.2 Concourse B

The gross square footage and, thus, the total building area for Concourse B is approximately 2,186,000 square feet. Prior to completion of the B-West and B-East Expansion projects.

1.4.6.3 Concourse C

The gross square footage and, thus, the total building area for Concourse C is approximately 1,302,700 square feet. Prior to completion of the C-East Expansion project.

1.4.7 Occupancy Classifications

1.4.7.1 Terminal

The Terminal occupancy classification is to be determined as specified in the current Denver Building Code and IBC. IBC 2015 Section 303.3 defines restaurants, dining facilities, and bars as Assembly Group A-2. IBC Section 303.4 defines waiting areas in transportation terminals as Assembly Group A-3. The primary occupancy for the Great Hall Redevelopment Project will therefore be defined as Assembly. The appropriate occupancy classification based on IBC Chapter 3 for the various uses of the Building are shown in Table 1-3: Terminal Occupancy Classifications.

Table 1-3: Terminal Occupancy Classifications

Use	Occupancy Classification
Restaurant	A-2*
Bar	A-2*
Commercial Kitchen	A-2*
Ticketing	A-3*
Security Checkpoint & Queueing	A-3*
Baggage Claim	A-3*
Offices	B
Mechanical / Electrical Spaces	F-1
Retail Stores	M

**A building or tenant space used for assembly purposes with an occupant load of less than 50 persons shall be classified as a Group B occupancy*

The building has multiple occupancies and is a mixed-use facility. Section 508 of the 2015 IBC identifies two approaches for addressing mixed-use conditions: non-separated and separated. IBC Section 508.1 allows buildings to be designed using a non-separated approach, a separate approach, or a combined approach.

The Terminal originally utilized a separated occupancy approach based on the 1988 Uniform Building Code Section 503, as the code of record did not recognize non-separated occupancies. The basement baggage system platforms were defined as an accessory used in the baggage area and therefore did not require occupancy separation. Renovations are to comply with the current adopted code. The HTC building utilized a non-separated occupancy approach, except that the hotel residential areas where separated from the remainder of the building by a 1-hour vertical and horizontal fire barrier.

Future renovations may utilize a non-separated occupancy approach as specified in IBC Section 508.3. Non-separated occupancies do not utilize fire barriers to separate occupancies except where the code requires special use separation, such as incidental uses (IBC 509) or residential dwelling units. Each portion of the building is individually classified by use group and function of space. The type of construction required is determined through the application of height and area limitations for each of the applicable use groups to the entire building, and the most restrictive construction type is used for the entire building.

Based on Table 1-3: Terminal Occupancy Classifications, the building contains Group A-2, A-3, B, F-1, M, and S-1 occupancies. IBC Tables 504.3, 504.4, and 506.2 indicate that buildings of Type IA construction have the same height, area, and the number of story limitations for all applicable occupancies. As such, the non-separated occupancy approach from IBC Section 508.3 may be utilized for these occupancies in the building, provided the most restrictive applicable provisions of IBC Chapter 9 are applied to the building or portion thereof in which the non-separated occupancies are located.

1.4.7.2 Accessory Occupancies

Accessory occupancies will not be utilized based on the non-separated occupancy approach.

1.4.7.3 Incidental Accessory Occupancies

IBC Table 509 provides requirements for fire-rated separation and/or suppression systems for a variety of room uses. These requirements are applicable regardless of specific occupancies and whether mixed-use areas apply a Separated or Non-separated approach. The potential incidental use areas for the Terminal are addressed in Table 1-4: Separation Requirements by Room.

Table 1-4: Separation Requirements by Room

Room or Area	Separation and/or Protection
Furnace Room where any piece of equipment is over 400,000 BTU per hour input	1-hour or provide automatic fire extinguishing system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1-hour or provide automatic fire extinguishing system
Refrigerant machinery room	1-hour or provide automatic fire extinguishing system
Waste and linen collection rooms over 100 square feet	1-hour or provide automatic fire extinguishing system

Table 1-4: Separation Requirements by Room (Continued)

Room or Area	Separation and/or Protection
Stationary storage battery system having a liquid electrolyte capacity of more than 50 gallons, or lithium-ion capacity of 1,000 pounds used for facility standby power, emergency power or uninterrupted power supplies	2-hours in Group A
Rooms containing fire pumps in high-rise	2-hours
Communications Rooms	2-hours

1.4.8 Construction Type: Existing Building Elements

At the time of original construction, the Terminal was built using Construction Type I, Fire Resistive (Type 1 FR), per the 1988 Uniform Building Code (UBC) with the 1990 Denver Building Code amendments (1990 IBCA), with an exception granted for not rating the Great Hall membrane roof. Table 1-5: Building Elements: Type I, FR defines fire resistance requirements for various building elements.

Table 1-5: Building Elements: Type I, FR

Building Elements Type I, Fire Resistive	Hours
Structural frame (columns and primary beams)	3
Roof construction (Great Hall with room >25')	0
Roof construction, other than Great Hall	2
Floor construction	2
Exterior bearing walls	4
Interior bearing walls	*
Exterior nonbearing walls	0
Nonbearing interior partitions	0
Shafts and exit stair enclosures	2
Public corridor walls	0
Horizontal exit firewalls	2

**New interior bearing walls shall comply with current code*

The fire resistance ratings of existing elements permitted at the time of construction are permitted to be maintained unless they are modified as part of the project. Many specialized construction materials have significantly evolved since the Terminal was originally permitted (e.g., spray-applied fireproofing and through-penetration firestop); in utilizing modern construction materials, the associated requirements will be implemented (e.g., special inspection) in accordance with current building codes.

The AGTS and Baggage Tunnels are considered an outside environment with the floor pitched to discourage any ponding of water. As a result, the Baggage/AGTS Tunnels do not require supplemental safeguards for water intrusion.

1.4.9 New Building Elements

Type I, Fire Resistive construction, is most closely related to Type IA construction in the International Building Code. Any new building elements constructed as a part of this project (that do not support existing building elements) shall comply with the following table for Type IA construction. All construction materials are to be noncombustible except where complying with IBC Section 603. New building elements shall comply with 2016 IBC for Construction Type IA, listed in Table 1-6: Building Elements, Type 1A. Existing building elements replaced in their entirety shall also comply with the 2016 IBC.

Table 1-6: Building Elements, Type 1A

Building Elements Type 1A	Hoursc
Primary structural frame – including columns, girders, trusses	3a
Tent roof construction (Great Hall with roof > 25') and secondary members (cables, tie-downs, etc.)	0
Roof construction – including secondary beams and joists	1.5b
Floor construction – including secondary beams and joists	2
Bearing exterior wallsd	3
Bearing interior walls	3a
Nonbearing exterior walls and partitions (Fire separation distance ≥ 30')	0
Nonbearing interior walls	0
Shafts and exit stair enclosures (IBC 713 & 1022)	2
Exit access corridors (IBC Table 1020.1)	0
Exit passageways (IBC 1024)	2

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

c. Not less than the fire-resistance rating required by building codes and amendments.

d. Not less than the fire-resistance rating based on fire separation distance.

Per IBC Section 403.2.4, sprayed fire-resistant materials installed throughout shall have a minimum bond strength of 430 psf.

1.4.9.1 Seismic Design Criteria

The seismic design criteria shall meet the 2018 IBC and 2019 IBCA Chapter 16 requirements for a risk category III building as specified in IBC Table 1604.5.

1.4.10 Essential Facility Designation

Based on the definition from IBC 202, the Terminal is not required to be considered an Essential Facility. Additionally, DEN Management has evaluated the need for this designation based on IBC Chapter 1604 and has determined that the Terminal Building is not to be considered an Essential Facility.

1.4.11 Interior Finish

New materials in the Great Hall shall meet the requirements for Atrium and Covered Mall Interior Finishes9. Class B (or Class A) interior finishes shall be provided for the Great Hall as required by IBC402.6 and 404.8. For other areas of the Terminal, new interior finishes are to comply with NFPA 415 Section 4.1.2, which allows only Class A or B finishes.

Wall and ceiling finishes are classified as follows:

Class A: Flame spread 0-25; smoke-developed index 0-450

Class B: Flame spread 26-75; smoke-developed index 0-450

Class C: Flame spread 76-200; smoke-developed index 0-450

1.4.11.1 Combustible Construction Materials

Tenant spaces located in the Great Hall shall meet the requirements of IBC Section 402.6.2 for combustibility of construction, except plastic and aluminum composite materials shall only be permitted on a case-by-case basis with corresponding administrative modifications. Tenant Spaces include walled or unwalled covered areas larger than 200 sf (aggregate) used to display or sell merchandise, for general business functions or services, for dining and drinking, or for similar purposes. Other areas of the Terminal are to comply with IBC Section 603 for combustible materials permitted in buildings of Type I construction.

1.4.12 Atrium Combustible Loading Restrictions

IBC Section 404.2 states that the floor of an unsprinklered atrium, such as areas in the HTC, Terminal, and Concourses, shall be used for low-hazard uses only and that materials and decorations are required to comply with the IFC. This restriction will apply to unsprinklered areas of the Great Hall, such as waiting areas, restaurant seating areas, or temporary installations.

1.4.13 Storage Use Restrictions

Neither the IBC nor the IFC provides a definition of “low-hazard use.” IFC Chapter 32, the high-piled combustible storage chapter, classifies commodities as Class I through Class IV or high-hazard. It can therefore be inferred that Class I through IV commodities are a low or moderate hazard. NFPA 101 Life Safety Code (2015 Edition) is not an adopted code for the Terminal building but is used as a reference herein as it provides more detailed information. NFPA 101 Section 6.2.1.2 requires the hazard of contents to be classified by the registered design professional and approved by the AHJ. NFPA 101 Section 6.2.2.2 defines low-hazard contents as materials with low combustibility that do not propagate fire.

1.4.14 Other Special Uses

The following uses, materials, and decorations are considered low hazard and are permitted:

A. Waiting areas
B. Passenger security screening areas and associated equipment
C. Any structure built of noncombustible materials
D. Garbage collection bins (trash cans)
E. Structures, including artwork, with combustible components meeting requirements of DBC Section 603
F. Seating and associated furniture and floor coverings (i.e., tables, foot stools, rugs, etc.) meeting one of the following:
    1. Non-upholstered furniture with a Class A or B flame spread rating per ASTM E84 or equivalent test standard.
    2. Upholstered furniture tested in accordance with NFPA 260 or having an Upholstered Furniture Action Council (UFAC) rating.

3. Upholstered furniture that has been tested in accordance with, and passed, California Technical Bulletin 133.
4. Non-upholstered wood furniture constructed of solid wood (excluding particle board) components with a minimum dimension of 1 inch.
5. Floor coverings (i.e., rugs, carpeting, etc.) having a Class II rating per NFPA 253.
6. Furniture having a potential heat of 9,000 Btu per pound or less .

G. Vending stands [kiosks] less than 200 sq.ft. in area9 constructed primarily of noncombustible materials, fire retardant wood or solid wood materials (excluding particle board) with a minimum dimension of 1 inch and with plastic components meeting DFC Section 807.5.1.1
H. Decorative vegetation as allowed for Group A occupancies in DFC Section 806
I. Decorative materials as allowed for Group A occupancies in DFC, Section 807
J. Single vehicles with fuel removed
K. Art installations consisting of quantities of plastic equal to or less than identified in DFC Section 807.5.1.1.

1.4.14.1 Concession Kiosks

Note that the allowance to leave small kiosks unsprinklered comes with the provision that the kiosk will have beam detection and automatic fire alarm notification to the building upon activation of two detection devices. At this time, it is understood that this approach is not the preference of the airport.

1.4.15 References

DEN has the following references available upon request. Submit a request to the DEN Project Manager if the following documents are required for the project:

A. Administrative modification defining building boundaries
B. Formal analysis of fire-rated walls and doors in the Terminal

1.5 Accessibility

1.5.1 Accessible Interior Design Intent

DEN facilities shall be universal and barrier-free, designed and constructed. All designs shall comply with (ICC A117.1, ADA), the latest referenced standard. That being said: The DEN complex shall be designed and constructed to accommodate the user of the future. Statistics confirm that the population is becoming increasingly diverse. Integrating the needs of the entire population- children, the aged, and persons with disabilities, including sensory and/or cognitive challenges- creates design challenges that can be optimized by adopting the concept of universal design. Universal design is a design that works for everyone. It is successfully achieved by integrating the principles of barrier-free design (i.e., handicapped accessibility standards) as an integral component of the design process.

It is paramount that the design of DEN focuses around solutions that give priority to accessibility and thus eliminate architectural barriers confronting persons with disabilities. The objective of barrier-free design or universal design is to afford the same opportunity of mobility and independent movement in the environment to the person with a disability as is available to an able-bodied person. Moreover, the consequence of disability should not deprive people of experiencing their environment with an aesthetically pleasing design.

Accessibility standards shall be followed in all areas used by the public as well as areas intended for employee use. Accessibility shall be provided throughout all buildings and in overall site design for all buildings constructed on the City and County of Denver property.

1.5.2 Identifying Obstacles

It has been referenced from governmental sources that many travelers with disabilities have negative experiences in the use of transportation systems and structures. The functions required in a travel environment that could cause frustration include:

A. Wait standing
B. Long travel distances
C. Go up and down stairs
D. Go up and down inclines
E. Stoop, kneel, crouch
F. Lift and carry weights up to ten pounds
G. Reach, handle, or grasp
H. Move in crowds
I. Identify visual cues
J. Identify audio cues
K. Communication
L. Non-intuitive wayfinding
M. Environments that cause sensory overload

Additionally, limitations of these functions occur in people without disabilities, such as shoppers carrying parcels, airline passenger carrying baggage, parents struggling with toddlers, older persons overcome with fatigue, and a skier with a broken leg. In a transportation environment, architectural barriers are compounded by moving crowds and pressure to meet schedules. It is the designer's responsibility to mitigate these barriers.

1.5.3 Design Requirements

All DEN facilities shall be designed in compliance with the most recent version of ICC A117.1 Accessible and Usable Buildings and Facilities, the Air Carrier Access Act (ACAA), the ADA Accessibility Guidelines (ADAAG), and local applicable building codes. To follow is a list of key areas of emphasis and additional requirements.

1.5.4 Accessible Route

An integral concept in accessible design is the notion of an accessible route. An accessible route is defined in ANSI A117.1 as,

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A continuous unobstructed path connecting all accessible elements and spaces in a building or facility that can be negotiated by a severely disabled person using a wheelchair and that is also safe for and usable by people with other disabilities. Interior accessible routes may include corridors, floors, ramps, elevators, lifts, and clear floor space at fixtures. Exterior accessible routes may include parking access aisles, curb ramps, walks, ramps, and lifts.

All primary public circulation paths shall be accessible routes unless otherwise signed in parking areas. There are some accessible routes technically infeasible to make and maintain. DEN Parking manages a shuttle service in economy parking areas to minimize routes.

1.5.5 Elevators, Escalators, and Moving Sidewalks

Elevator access shall be within a primary circulation path between all floors.

Elevator accessibility shall be within close proximity, preferably adjacent, to all escalator routes.

Prominent signage shall indicate the location of elevators. Coordinate wayfinding signage with Planning and Design’s Wayfinding Design Standards.

Audible and Visual messaging system shall be utilized to announce all levels in the elevator cab.

1.5.6 Signage and Flight Information

Audible and visible flight announcements shall be provided.

A reasonable number of monitors for flight announcements shall be at eye level.

Accommodations shall be provided for blind and hearing-impaired persons to obtain directions to a particular destination in the terminal.

The marking and naming of the concourses shall be keyed to specific landmarks throughout the terminal and concourse.

Elevators, toilet facilities, phone locations, and parking space locations need appropriate signage, including raised lettering for the visually impaired.

Signage shall be contrasting to provide better visibility for the visually impaired.

1.5.7 Public Toilet Facilities

Every multi-fixture toilet room shall have a minimum of two handicapped-accessible toilet compartments.

Every single-user toilet room shall be designed to be accessible.

Lavatories shall be of universal design. There shall be no distinction between accessible lavatories and standard lavatories.

Mirrors shall be mounted with the bottom edge at 40" AFF. An additional full-length mirror is preferable in the public toilet rooms of the terminal and concourse.

1.5.8 Public Area Seating

Accessible seating shall be provided in all restaurants at a percentage to meet the current codes in all seating areas and types offered. Chair seating shall be included in fixed seating areas.

1.5.9 Doors

Maneuvering clearance at all doors shall comply with the requirements for an accessible route. To facilitate movement and circulation where possible, doors shall be one of the following:

A. Held in open position
B. Double egress
C. Push-pull, non-latching
D. Automatically operated
E. Eliminated

1.5.10 Phones, Drinking Fountains, and Accessories

When amenities (i.e., drinking fountains, telephones, paging phones, vending machines, seating, or rest areas) are provided to the public, they shall also be accessible to persons with disabilities and comply with reach ranges and maneuvering space requirements.

1.5.11 Life Safety Issues

Refuge areas shall be provided in all stairwells that require enclosed stairs for fire safety.

When fire alarms are provided, they shall be both audible and visual.

Where more than one exit is required by the DBC, at least two accessible routes shall serve as a means of egress for emergencies or connect to an accessible place of refuge.

1.5.12 Accommodations for Service Dogs in the Public Areas

A pet relief area shall be provided for service dogs in the public areas. In areas of the Terminal that are classified as Sterile, an indoor pet relief area shall be provided with a drainable and washable area. The hose bib provided shall meet accessible standards and be provided with a paddle handle. The room shall be equipped with a bag dispenser and a sealable waste receptacle. Lighting/electrical, flooring, and wall protection need to be rated for wet locations.

K-9 pet relief drainage mat Elite system is the basis of design for indoor and outdoor pet relief areas. Use of manufacturer's specifications requires coordination with other project documents.

1.5.13 2-Way Communication System: Area of Refuge

Connect areas of refuge in the building with the DEN Communication Center with the use of phone system integrated into the 2-way communication system. Refer to the Life Safety DSM for additional requirements.

1.6 Sustainability

1.6.1 LEED Rating

Per the City and County of Denver Executive Order 123, All City buildings that are more than 5000 sf are required to be designed to attain a LEED Gold rating. It is standard practice to design to LEED Gold even if the specific project is not officially registered because DEN is a LEED Campus.

Each project will be considered for XCEL Energy rebates, so participating in the energy analysis for the sake of rebates can help determine design features.

Refer to the Sustainability DSM for more detailed guidance.

1.7 Passive Strategies

1.7.1 Building Orientation

Controlling solar gain is key to any design, be it in the terminal complex or a new build on unitary equipment. DEN works to reduce the energy load for heating and cooling for many reasons, so the extent the design offers a reduced load in summer and winter will lead to a successful design. This is done primarily through orientation but also properly designed exterior shade features and glazing types.

1.7.2 Daylighting

This section describes the design standards to integrate daylighting design and suggested design process for buildings at Denver International Airport.

Minimum requirements for building energy performance, including daylighting performance, design criteria, and methods for determining compliance, are defined in ANSI/ASHRAE/IES Standard 90.1 (ASHRAE 90.1), the overall energy design standard for airport facilities. Accordingly, this section will defer to this general standard rather than setting forth a new one. Note that although buildings are governed by ASHRAE 90.1 2007 at present, more recent versions of the standard have included more stringent daylighting requirements. It is recommended that design teams identify options to comply with the most recently adopted version of IECC or ASHRAE 90.1.

1.7.3 Daylighting Design Standard - General Description

Incorporating daylighting strategies into a building is undertaken for two primary objectives- to provide superior lighting quality and visual comfort, along with reducing energy consumption due to artificial lighting. It should be noted that without careful design and evaluation, increases in heating and cooling loads would exceed the reductions due to daylight access. Excessive energy use due to over-lighting the interior spaces should be avoided.

Daylighting Design is defined as configuring the building in such a way as to allow natural light to be introduced into the interior spaces to provide diffuse illumination instead of artificial lighting. Daylight Harvesting is a term that describes the combination of daylight entering the space in conjunction with sensors and controls that dim or turn off artificial lighting to maintain a consistent lighting level. In a well-day-lit space, this can mean a significant number of hours per year with no artificial lighting at all. Using different materials, along with shading and diffusing elements, daylight without glare can be used to provide high-quality spaces with even lighting. Numerous studies have illustrated the health and productivity benefits to building occupants of naturally day-lit spaces.

It should be noted that the protection of regularly occupied interior spaces from direct-beam solar illumination should be a primary goal of daylighting design. This can be accomplished through the use of internal or external shading devices or the use of translucent materials to block direct solar glare.

Under ASHRAE Standard 90.1, Energy usage is demonstrated in either a prescriptive path or a performance path. The prescriptive path identifies specific requirements and limits that must be followed. The performance path allows for one set of strategies to make up for performance below standard for another set.

For the Prescriptive method, lighting design is governed by allowances of connected power. This is calculated in one of two ways: Building Area Method or the Space-by-Space Method.

Under the Building Area Method, there is an overall allowance of lighting power density, expressed as watts per square foot, defined by overall building type. Under the Space-by-Space method, each space type is given a separate allowance of lighting power density, and the project team can assess how many square feet of each space type is included and use that to calculate allowable lighting power density. Note that daylighting will not affect compliance with either of these methods, as they measure connected lighting load- how many watts of lighting equipment is connected, not how many hours the lighting is turned on.

The performance path, also called the whole building Energy Performance method, is where all end uses of energy are modeled and compared to a baseline building's energy usage. In this method, savings in one area of performance can make up for other areas that use more energy than the baseline. In this case, daylight dimming can have an impact by reducing the modeled overall lighting energy usage. The 2010 version of ASHRAE 90.1 requires daylight dimming controls as an aspect of the baseline building.

The second mechanism, the system/component method, establishes lighting power allowances for buildings by the Unit Power Density (UPD) method. This method takes the various functions of a building into account when determining the total power allowance for the lighting of the building.

The performance method sets forth an Energy Cost Budget for a building type based on the energy cost of a base building with design features meeting the prescriptive requirements. This method allows for tradeoffs between different systems. Additional information about this process can be found in Chapter 11 of ASHRAE Standard 90.1 2007 (Energy Cost Budget), including methodology and simulation tool requirements.

Compliance with required visual comfort levels is determined by analysis of glare and contrast levels. Glare must be considered as both direct glare and veiling reflections. The Daylight Glare Index (DGI), described by Robbins (1986), should be as low as possible. It must be lower than the maximum DGI for the illuminance category of each zone of the building.

1.7.4 Daylighting Design Considerations

The process of daylighting design is an attempt to meet the following criteria:

A. Provide the psychological and aesthetic benefits of natural light
B. Eliminate or minimize glare and contrast problems
C. Reduce electrical lighting requirements
D. Maximize the lighting contribution of daylight, up to the required illumination levels for each zone
E. Reduce the cooling load, or at least maintain the same level
F. Minimize additions to the heating requirements
G. Minimize building cost increases

H. Ease of maintenance and access

Some daylighting design criteria may conflict with one or more of the others. Therefore, successful daylighting design is generally achieved through a balance between design criteria. Daylight sensors shall be arranged to be out of sight as much as possible while maintaining effectiveness in the control of the lighting. Refer to the Electrical DSM Chapter 5 for lighting requirements.

Ideally, both energy consumption and energy cost are reduced in a successful design, but compliance can result from a reduction in either one.

1.7.5 Daylighting Design Process

To comply with the design standard objectives and criteria, the following daylighting design process is suggested. This design process is not a requirement of the standard but supports compliance with the design standard.

A. Set design illuminance levels.

B. Identify and select daylighting design solutions.

C. Identify and select daylighting design solutions that are appropriate to programmatic needs and architectural design concepts.

D. Create preliminary daylighting design

E. Because this design is likely to change, it should be somewhere between a conceptual and a 35% design. Floor plans and simple elevations, showing apertures and other pertinent features such as light shelves or light fins, are sufficient.

F. Model and analyze preliminary daylighting design.

G. Modeling and analysis of preliminary designs can be done with physical scale models and/or calculation methods. Several computer programs are now available to perform these calculations. Physical modeling is described by Moore (1985), Evans (1981), and Robbins (1986).

H. Daylight Simulation of Point-in-time analysis: Analysis at a specific time of day and year. For LEED, this is calculated on the Solar Equinox (March or September) at 9 AM and 3 PM; the threshold is 75% of regularly occupied areas will be between 300 lux and 3000 lux at both of those times. For spaces with automated shades, it is all spaces higher than the minimum 300 lux during those times.

    a. Daylight Simulation
    Annualized analysis: Analysis of the regularly occupied spaces in the facility to determine whether spaces meet both requirements:

    b. Spatial Daylight Autonomy (SDA 300/50)
    Annual analysis of all occupied hours and determines that 55% of regularly occupied floor area receives at least 300 lux for at least 50% of annual occupied hours.

    c. Annual Sunlight Exposure (ASE 1000/250)
    No more than 10% of regularly occupied spaces shall receive more than 1000 lux for more than 250 hours over the course of a year.

I. Revise daylighting design based on results of analysis.

J. The design, modeling, and analysis process is repeated until a design evolves which approaches design illumination requirements without causing glare or contrast problems. If possible, determine the approximate impact on heating and cooling loads. Designs that incur significant heating and/or cooling penalties can be rejected or modified, eliminating the time spent on rigorous calculations of inappropriate designs later in the process.

K. Repeat the previous steps until daylighting design meets illumination and glare requirements.

L. Integrate daylighting design with overall energy design and analyze.

M. After a daylighting design has been completed, the building's structural and load characteristics are modeled with a computer simulation tool that meets the requirements of sections 5-10 of ASHRAE Standard 90.1.

N. Compare results of thermal model to energy standard and/or base model.

If the increases in heating and cooling loads and/or costs do not exceed the reductions in lighting and cooling loads and/or costs, and the design complies with ASHRAE Standard 90.1, the design meets this standard. Ideally, the daylighting design is optimized to result in the lowest possible total energy consumption and/or cost, the greatest possible amount of daylight, and the highest possible visible comfort level throughout the building.

End of Chapter

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Chapter 2 - Building Exteriors

2.0 General

Design of building exteriors shall complement the existing terminal complex. Similar use of form, material, and color palette is preferred. Application of the DEN Design Principles is required. Approved and prohibited materials are described below. Variations to the existing design aesthetic must be approved by the DRC. Design must take energy efficiency and sustainability into account based on the function and orientation of the space. Design must accommodate the right of way for building services.

2.0.1 Aesthetic Considerations

The existing terminal complex building exterior unity relies on the building's shape, palette of materials, color schemes, and repetitive/rhythmic patterns. These items are expressed in overall building massing, structural frame, exterior wall systems, horizontal roof planes, ceilings, Soffits, and clerestory fenestration.

The massing and form for DEN is a three-dimensional modular system changing in height and width to reflect the functional spaces being enclosed. The modularity is created by structural column bays and the grid of the curtain wall system. All future building designs for DEN are to consider the existing building's modular system and provide an appropriate acknowledgment or response.

2.0.2 Terminal

2.0.2.1 Overall Façade and Glazing

A. Approved Materials
    a. Metal panel
    b. Concrete
    c. Curtain wall/storefront glazing
    d. Natural stone
B. Prohibited Materials
    a. EIFS
    b. Concrete Masonry Units in exposed public areas.

2.0.2.2 Curbside Façade

Application and use of materials must take into consideration that pavement de-icing operations occur all the way to the door on landside.

A. Approved Materials
    a. Curtain wall/storefront glazing
    b. Metal panel
    c. Concrete
B. Prohibited Materials
    a. Glass Block
    b. Wood
    c. Exposed Concrete Masonry Units
    d. Brick

2.0.2.3 Canopies and Awnings

Design must consider ease of maintenance, cleaning system and snow guards:

A. Textile/polytetrafluoroethylene (PTFE)
B. Metal panel

C. Glass

2.0.2.4 Existing Terminal Service Level (levels 3, 2, 1, and only)

A. Concrete
B. Finished face Concrete Masonry Units

2.0.2.5 Exterior Waste and Recycling Receptacles

All exterior waste and recycling receptacles shall be blast-proof when located in zones around the perimeter of the terminal building and within 200 feet of secure perimeters. Coordinate exact receptacle locations with DEN Security, Operations, and Environmental during the design process.

The current standard used for this purpose at DEN is the Mistral, model #BCD-L1. For recycling, use the same model with a bifurcated top option.

2.0.2.6 Roof

A. Designer of Record is required to submit an electronic review set of drawings and specifications to DEN's Insurance underwriter before submittal for permit or acceptance of contractor pricing. Currently the DEN Insurance underwriter is FM Global. Copy the DEN PM on the submittal to: engstlouisplanreview@fmglobal.com. A complete submittal includes a wind uplift and hail resistance study per the current specifications related to FM Global requirements.
B. Denver Green Roof Initiative: November 7, 2017, the Citizens of Denver voted in favor of the Ordinance for all buildings in the City of Denver to comply with the "Green Roof Initiative". Which requires a certain percentage of all building's roofs to have dedicated space for vegetation or solar power generation. DEN has worked with Denver City Council to make a plan that complies with this building permit requirement. The Green Building Ordinance went into effect November 2018.
C. At DEN, the square footage of the roof area on new buildings above 25,000 sf is tracked against the square footage of solar the collection area across the property.
    a. If a new roof anywhere on Department of Aviation land is over 25,000 sf, the architect will work with the Project Manager during schematic design to devise a strategy to either:
    - Add solar electricity collection, add vegetation, in compliance with the Green Building Initiative, OR
    - The Project is subject to withdraw space from the bank of solar collection area. This area is tracked by DEN's Sustainability division.
    b. Adding vegetation is not an option for roofs in and near the airfield fence.
    c. The Architect and the Project Manager will coordinate the Permit application form for the Green Roof Initiative with DEN sustainability at the time of Permit Plan Review Submission.
D. Five roof membrane types are acceptable for use for low-slope roof systems within the main terminal complex. White is the required color for low-slope roofs. Other colors listed below are approved only for special use and require approval by the DRC. The use of sloped roofs requires the approval of the DRC. For detailed information on requirements for roof systems, refer to Table 2-1: Roof Types.
E. Existing roofs being replaced are required to have the existing roof membrane removed and replace a damaged underlayment. Also, replacement roofs must comply with the "Cool Roof" requirements passed with the Green Roof Initiative Ordinance for Existing Buildings. For detailed information on requirements for Cool Roof systems, refer to Table 2-2: Cool Roof Requirements.
F. Existing EPDM roof Coating replacement is Firestone AcrylicTop, a base coat, and two topcoats for a 15 mil thickness. There are other manufacturers of this type of system that could be acceptable. The rubber roof membrane is required to be washed with soap and water before the base coat, and the Metro Sanitary District does not allow DEN to dump too much soapy water into the sanitary system, and certainly none in the storm system. DEN is limited to a certain number of soapy gallons per day. The Contractor will need to plug the storm system drains and collect the soapy water for disposal into the sanitary system.

2.0.2.7 Roof Access

Most of the building's roof planes are to be nominally flat (low-sloped), simple, and uncluttered. Roofs shall slope 1/4" per foot to drain. These roof planes are to be separated vertically by clerestory windows. Long-span, high bay buildings may have a sloped roof.

Access must be provided to all roof areas for maintenance and window cleaning.

Membrane Walkway Pavers: White EPDM Roofing systems shall provide adhered membrane walkway pavers consistent with warranted systems. Arrange pavers sufficient for RTU Maintenance and window washing access etc.

Other acceptable roofing systems shall provide walkway pavers consistent with their system's warranty.

2.0.2.7.1 Mechanical Enclosures

Rooftop mechanical enclosures are to be minimized. With prior approval, the use of exposed enclosures should be simple and visually unobtrusive. They are to adapt to the three-dimensional, modular curtain wall grid by matching the proportions described in 2.0.3.8.1 Curtain Walls. Rooftop mechanical enclosures are to have interior access via roof hatch or stairs. Exterior access across roof surfaces is prohibited.

2.0.2.7.2 Exposed acoustical metal roof decks

Exposed acoustical metal roof decks may be required in certain buildings for adherence to the design theme.

Table 2-1: Roof Types

Roof Type	Description of Roof Type	Traits and Preferred Use
White EPDM	*60 mil fleece backed EPDM roofing - Carlisle FleeceBACK is a externally reinforced (Sure)-white EPDM membrane, no-fold panel with 3" (76 mm) or 6" (152 mm) wide QuickSeam™ tape factory laminated continuously along lengthwise edge of the panel.*	*The factory applied tape assists and accelerates field installation of fleece backed membrane in fully adhered applications. For use on flat roofs in the terminal complex.*
EPDM	*60 mil EPDM roofing membrane system with white acrylic coating.*	*Terminal Complex flat roof systems. Where such systems are already in place. Use as a first option on any building with critical operational infrastructure under the roof.*
KEE	*Fully adhered bright white, off-white, tan, green, or grey ketone ethylene esterterpolymer (KEE), also known as Dupont Elvaloy®) modified polyvinyl chloride (PVC) reinforced membrane. The bright white or off-white membrane shall be used on projects where LEED certification is desired.*	*Very good hail and chemical resistance, superior puncture resistance and good weatherability. Recommended on buildings where a "Cool Roof" is required or a simulated standing seam metal roof is desired.*
PVC	*Fully adhered bright white, off-white, tan, green, or grey polyvinyl chloride (PVC), or KEE modified (PVC) copolymer reinforced membrane. The bright white or off-white membrane shall be used on projects where LEED certification is desired.*	*Good hail resistance and weatherability. Recommended on buildings where a "Cool Roof" is required or a simulated standing seam metal roof is desired. The cost is typically slightly less than KEE.*
SBS	*Adhered styrene-butadiene-styrene (SBS) modified bitumen reinforced two-ply membrane system, with a granulated cap sheet, adhered with no VOC cold application cement.*	*Excellent hail and puncture resistance and good weatherability. Recommended on critical facilities and roofs that will receive extraordinary foot traffic. Not recommended in environment where oil and grease are present.*
APP	*Adhered atactic-polypropylene (APP) modified bitumen reinforced two-ply membrane system, with a granulated cap sheet, adhered with no VOC cold application cement.*	*Good hail and excellent puncture resistance and excellent weatherability. Recommended on critical facilities and roofs that will receive extraordinary foot traffic.*

Table 2-2: Cool Roof Requirements

Roof Type	Initial Minimum Reflectance	3 Year Minimum Reflectance	Initial SRI Minimum	3 Year SRI Minimum
Low Sloped Roofs: Slope less than 2:12				
Low Slope roofs (except materials specified below).	*0.70*	*0.55*	*78*	*64*
Low Slope metal roofs	*0.50*	*Not available*	*Not available*	*Not available*
Low Slope concrete pavers or a concrete surface or stone roofs	*0.20*	*Not available*	*Not available*	*Not available*
Character defining roof	***	***	***	***
Steep Sloped Roofs: Slope 2:12 or steeper				
Steep Slope roofs (except materials specified below)	*0.25*	*0.15*	*39*	*32*
Clay or Concrete roof tile installed on elevated battens	*None required*	*Not available*	*Not available*	*Not available*
Character defining roof	***	***	***	***

*** A character-defining roof must be at least partially visible from a public vantage point, like a publicly accessible street, park, or campus. The roof's relationship to the overall shape of the building and its distinctive materials, craftsmanship, or decorative details must be important to the overall visual character of the building. If the materials, color, or shape of the roof were to change, it would impact the visual character of the building. For buildings that have character-defining roofs, the cool roof requirement may be reduced to allow the use of materials and colors that keep with the visual character of the building.*

To request a character-defining roof determination, include the following in the submittal:

- *Roof plan (new buildings only or existing buildings if a roof plan exists)*
- *Photographs of the building and the roof from public vantage points (existing buildings only)*
- *Elevations (new buildings only since photographs would not be possible)*
- *General information about the proposed roof materials, color, and finish; the materials' solar reflectance; and the importance of the roof in context of the building or its location*
- *Demonstrate at least one of the following:*
- *The roof is highly visible and contributes to the architectural identity of the building or its context.*
  - *There are certain roof features important to the profile of the building against the sky or its background, such as cupolas, multiple chimneys, dormers, cresting, or weather vanes.*
  - *The roof material's color or patterns (such as patterned slate tile) is more noticeable than the shape or slope of the roof.*
  - *The roof is identified as being an integral part of the building's character and an identified feature for any historically designated building in its designation materials. Such historical designation may be local, state or national.*
  - *Staff will review this information to determine whether the roof is a character-defining roof or if it will need to comply with the cool roof provisions of the ordinance.*

2.0.2.8 Openings

Under Development

2.0.2.9 Vinyl Overhead Doors

DEN does not allow coiling metal doors because of the likelihood of damage from vehicles and the incidence of high-wind conditions at DEN. Therefore, our standard basis of design is vinyl roll doors like Dynaco doors for the exterior (Dynaco Power M3) and interior (D4). Coordinate the method of opening (manual switch or automatic sensor) with the DEN Project Manager based on the specific application. In certain design conditions, an

administrative modification with the authority having jurisdiction may be required to alleviate code issues with vinyl doors. Contact the DEN PM for past examples.

2.0.2.10 Doors

Automatic doors are required at passenger access areas. The DEN Basis of Design is the Gildor SLM Model built for very heavy use. Light use is not allowable in areas used by airline passengers.

A. Glass and aluminum
B. Stainless Steel

2.0.2.11 Overhangs and Soffits

A. Linear metal panel systems

2.0.2.12 Column Covers

A. Metal/metal panel
B. Exposed structure with intumescent paint as applicable

2.0.2.13 Guard rails

A. Stainless Steel
B. Glass

2.0.3 Concourses and Connecting Bridges

2.0.3.1 Canopies

A. Approved Materials
    a. Metal paneling (braced/clipped to accommodate wind uplift)
    b. Concrete
B. Prohibited Materials
    a. Tensile or fabric structures
    b. Solar panels (only allowed with glare study per FAA Regulations)
    c. Fiberglass

2.0.3.2 Façade and Glazing

A. Approved Materials
    a. Metal panel
    b. Concrete
    c. Curtain wall/storefront glazing
    d. Natural stone
B. Prohibited Materials
    a. EIFS

2.0.3.3 Apron Level

A. Concrete
B. Finished face Concrete Masonry Units

2.0.3.4 Overhead Doors

A. High Speed Fabric Doors

B. Steel Coiling Doors (where not subject to wind and/or vehicle damage)

2.0.3.5 Personnel Doors

Automatic doors are required at passenger access areas.

A. Glass and aluminum
B. Stainless steel
C. Hollow Metal at service locations only

2.0.3.6 Overhangs and Soffits

A. Metal panel- These systems must be braced/clipped to accommodate wind uplift
B. Cementitious stucco/plaster

Exterior grade suspended grid systems will be considered only where mechanical access is required. These systems must be braced/clipped to accommodate wind uplift.

2.0.3.7 Building Facades

2.0.3.8 Walls

2.0.3.8.1 Curtain Walls

The primary wall cladding is a curtain wall comprised of alternating horizontal grids of five feet (5') and ten feet (10') nominally, as well as five feet (5') vertical grid when the structural grid is a 5' x 5' module to match the terminal.

2.0.3.8.2 Glazing

Vision glass is tinted (based on orientation and function) and contains no reflective coatings. If there are reflective properties, the maximum reflectivity shall be 20%.

Spandrels are laminated insulating panel or spandrel-insulated glazing unit.

In the selection of glazing types and quantity, strict attention must be given to the applicable ASHRAE standards regarding energy codes and energy consumption criteria. Refer to Mechanical DSM.

Selection of new glazing materials must complement the existing and be thoughtfully implemented.

2.0.3.9 Opaque Walls

Opaque walls are constructed of an appropriate material and color selection to blend in harmoniously with the design theme and color scheme.

2.0.3.9.1 Vision Windows

Vision windows (punched openings) in opaque walls are to be used sparingly and thoughtfully integrated.

2.0.3.9.2 Clerestory Windows

The use of clerestory windows for daylighting purposes is integral to the design theme of DEN. The height of the clerestory of the existing facility is no less than ten feet (10') vertically above the finished floor and is integral to the three-dimensional grid established by the curtain wall system.

2.0.3.10 Exterior Walls

Typical Exterior Walls are sealed against air and water intrusion but do not trap moisture. Each building envelope must be included in the Building Commissioning Design and Construction Scope.

Most Exterior walls are finished in a powder-coated “terminal white” pre-finished Aluminum Composite Panel System.

2.0.3.11 Bird Control

DEN has had many claims due to damage from pigeon waste on cars parked in the parking structures. In addition, DEN leads airports in bird strikes, usually big birds of prey attracted by pigeons. The recommended method of bird control in parking structures is to provide bird spikes and/or slides in all rousting ledges. Where visually problematic or large surface areas exist, the recommended bird control method is electronic bird deterrent systems.

2.0.4 Exterior Noise Intrusion

2.0.4.1 Exterior Envelope

The exterior walls, glazing, roof deck, and skylights are all areas that will be exposed to aircraft and landside traffic noise. The minimum composite FSTC rating that may be required to achieve the selected NC level within each type of occupied space is provided in Table 2-3: Preliminary Exterior Building Attenuation Requirements. A composite FSTC rating is based on the attenuation provided by different elements of the exterior wall or roof construction and the percentage of the total area of each building element. As an example, a building wall with 50% glazing and 50% masonry will have a higher composite FSTC rating than a building wall with 90% glazing and 10% masonry. The same applies to roof decks with skylights. Table 2-3: Preliminary Exterior Building Attenuation Requirements lists the minimum composite FSTC ratings that may be required to achieve adequate building attenuation from aircraft and vehicular noise intrusion.

Table 2-3: Preliminary Exterior Building Attenuation Requirements

Space Activity	Indicative Minimum Composite FSTC Rating
Public Occupied Space	*30 to 35*
Private Occupied Space	*35 to 40*
Guestrooms	*40 to 45*

Note:
These ratings are preliminary and need to be confirmed when the location of the different types of occupied spaces and their proximity to the proposed aircraft gates and runways is finalized

Exterior noise ingress should not exceed the values provided in section 102.3, entitled Exterior Aircraft and Vehicular Traffic Noise Ingress.

2.0.4.2 Exterior Aircraft and Vehicular Traffic Noise Ingress

Noise ingress from aircraft and vehicular traffic operations will have varying effects on different types of occupied spaces. The level of acceptable exterior noise intrusion is based on the activity and background noise level of the occupied space affected and the characteristics of the intrusive noise.

The three categories of occupied spaces that will be affected are public occupied spaces, private occupied spaces, and hotel guestrooms. Short-term noise intrusions are considered acceptable at the following levels:

A. 10 to 15 dB above the background noise level for public occupied spaces
B. 8 dB to 12 dB above the background level for private occupied spaces
C. 5 dB above the background noise level for hotel guestrooms where the most important acoustical design consideration is to avoid sleep interference.

Background noise level should be defined by the NC values in the Mechanical DSM.

2.0.4.3 Exterior Noise Intrusion - Automobile Traffic

Acoustical properties of exterior walls of buildings have been specified in Table 2-4: Exterior Building STC for Traffic Noise Intrusion for building facades that will not be exposed directly to aircraft noise, but will be exposed to automobile traffic activities, the following FSTC ratings are recommended.

Table 2-4: Exterior Building STC for Traffic Noise Intrusion

	Indicative Minimum Composite FSTC Rating
Guestrooms	*33 to 38*
Private Occupied Spaces	*30 to 35*
Public Occupied Spaces	*30 to 35*

The above-recommended FSTC ratings are preliminary guidelines without detailed analysis of proximity of traffic lanes to building exterior, as well as traffic projections in terms of low volume and mix. In developing the design of the exterior facade in this regard, analysis of traffic flow and mix should be carefully conducted.

2.0.4.4 Curbside

Where curbside traffic lanes are provided with canopies or other forms of weather-protective enclosure, the potential for noise build-up may exist due to traffic and drop-off activities. Acoustical absorptive treatments should be considered for the underside of overhead or ceiling surfaces to manage noise level build-up.

Minimize reverberation time as far as practicable.

2.0.5 Building envelope

2.0.5.1 Requirements

Refer to the Sustainability DSM, Chapter 4, for more information on requirements for building envelope commissioning specifications. Some of the most common and costliest sources of building failure involve building envelopes. Building Envelope Commissioning (BECx) can significantly reduce the primary sources of these failures – air and moisture infiltration. It can also significantly reduce the operating costs associated with poor or ineffective thermal breaks and insulation. DEN requires BECx as part of an overall commissioning plan for projects for new buildings and in existing building areas. DEN References to follow NIBS Guideline 3-2006 used in conjunction with ASHRAE Guideline 0-2005.

2.0.5.2 Elements of the building envelope

Insulation – Exterior foundation, wall, soffit, and roof insulation systems are required to be designed and specified as part of a system to reduce thermal bridging and air infiltration.

Air Barrier – Air barrier system is required to resist air leakage and is designed to form a continuous plane around a building to prevent uncontrolled air movement in and out of the building envelope.

Vapor Barrier – a vapor barrier is required where elements of the design are required to limit the amount of water vapor diffusing through the wall because of different vapor pressures. A vapor barrier does not have to be continuous, does not have to be sealed, does not have to be free of holes and does not have to be lapped.

Water Resistive Barrier – a water resistive barrier is required to keep liquid water from entering the building enclosure. Combined with flashing and other materials, the water resistive barrier ensures that there is a shingled assembly to direct liquid water to the exterior. This is a necessary for sloping exterior walls at DEN.

Water-proofing – DEN requires cold fluid applied waterproofing as a part of an insulated system on foundation walls. Hot fluid applied membrane systems as a part of an outdoor plaza surface.

Foundation wall assembly – typically basement walls at DEN are required to have a foundation drain that feeds into a basement sump system. The foundation drain is required to be fed from a drainage panel system between the waterproofing.

2.1 Accessibility

2.1.1 ADA Compliance

A. Check with DEN PM on area of work requirements. DEN has areas that are exempt because of requirements to perform the essential duties of the job cannot have disabilities.
B. Every (3) three years the FAA requires that DEN assess the Public Domain governed by Title II of the ADA. This assessment would have DEN meet the latest requirements of the ADA.
C. Areas occupied by employees shall also meet ADA requirements, but are exempt from the (3) year assessment identified above.

2.1.1.1 Parking and Passenger Loading Zones

A. Two percent of all required parking spaces shall be designated as accessible.
B. Location of parking spaces shall be as near as possible to the building entrance.
C. Wherever possible, designated walkways shall be provided to eliminate the need to walk or wheel behind parked vehicles.
D. Curb cuts shall be located where it is impossible to be obstructed by vehicles or other barriers.
E. If loading zones are provided, at least one handicapped designated loading or unloading spot shall be provided for each distinct area.
F. The minimum height of the garages shall be 9 feet to accommodate oversized vans.
G. Adequate ventilation shall be provided in parking garages.
H. Parking ticket machines shall be provided at two heights, one height to accommodate passenger cars, and one height to accommodate vans. The operating mechanism shall not require twisting or pinching.

2.1.2 2-Way Communication System: Shuttle Stops

Connect Accessible shuttle stops in the parking lots with the Parking shuttle office that are fully ADA compliant and weather resistant enclosures.

End of Chapter

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Chapter 3 - Interior Environment

3.0 General Architectural Information

3.0.1 Aesthetic Considerations

Application of the DEN Design Principles will enable the fulfillment of DEN's aspiration that the airports' architecture and interiors become a seamless, unified embodiment of their design value and brand idea. Appropriateness of the approach will ultimately be determined by the Design Review Committee (DRC).

For additional information on the Design Review Committee (DRC) refer to the following site:

DEN Design Review

3.0.2 Elements of Design

Design elements of the existing terminal complex are described below. Deviations from this approach that are based on the DEN Design Principles guidelines are permitted but require approval from the DRC.

3.0.2.1 Structure

The structural grid and module must be evaluated to respond to both the requirements of the individual facility and to the grid and module expressed in the terminal complex. The existing terminal complex utilizes a 5'x5' module, which is articulated as a visual element wherever possible. Other buildings may need to utilize other module types.

3.0.2.2 Life Safety Design

Refer to the Life Safety DSM for standards on preparing code study for projects applying for building Permits.

3.0.2.3 Interior Partitions

The primary interior wall types consist of abuse-resistant gypsum board, stainless steel, or terrazzo base. Generally, partitions go-to structure. Rated walls, smoke zones, and plenums are required to comply with the Life Safety Master Plans found in the Life Safety DSM.

3.0.2.4 Additional Space Requirements

Where electrical rooms are added to buildings, ensure that the electrical room is sized to accommodate a minimum of 25% additional future experiments and provide wall space to accommodate the same. Ensure that the extra wall space provided for future equipment also takes all code-required equipment clearances and working space into consideration.

3.1 Vertical Circulation - General

Conveying systems for the horizontal and vertical transport of people and freight will be required in the Denver International Airport complex.

This section is intended to set standards for the selection of horizontal and vertical transportation systems.

3.1.1 Primary passenger movement

The primary vertical transportation system for passenger movement shall be via escalators between adjacent levels.

Escalators shall be 48" wide (32" tread width minimum) maximum, operating at a nominal 90 fpm and a 30-degree incline.

48" wide escalators operating at 90 fpm are rated at 8,000 passengers per hour at 100 percent utilization. Prior experience and studies indicate 4,080 passengers per hour be used for passenger transport design criteria.

Escalators should be located proximate to major pedestrian traffic lanes with adequate areas at the top and bottom landings for passenger queuing based on 5 square feet per passenger. A minimum of 15 feet shall be provided from the escalator landing to major pedestrian cross-traffic lanes or building obstructions.

3.1.2 Secondary Passenger Movement

Elevators shall be provided for transport of persons with disabilities, baby strollers, baggage carts, stretchers, etc., as well as people who cannot or will not use escalators.

Elevators shall be proximate to escalators and major pedestrian traffic lanes.

Elevator equipment types and speed shall be related to facility height and demand, as shown in Table 3-1: Equipment Type and Speed.

Hydraulic elevators are prohibited at DEN.

Table 3-1: Equipment Type and Speed

Travel	Number of Starts Per Hour	Acceptable Type	Speed (fpm)
Up to 50 ft.	More than 60	Geared Traction	350
Over 50 ft.	N/A	Geared Traction	350

Passenger elevators shall be relatively wide and shallow with center-opening doors. Minimum capacity shall be 2500 lbs. and maximum capacity 4000 lbs. depending on calculated passenger loading. Platform sizes shall conform to industry standards as shown in Table 3-2: Passenger Elevator Capacities.

Table 3-2: Passenger Elevator Capacities

Capacity	Platform Size	Door Size
2500 lbs.	7'-0" wide x 5'0" deep	3'-6" wide
3000 lbs.	7'-0" wide x 5'-6" deep	3'-6" wide
3500 lbs.	7'-0" wide x 6'-2" deep	3'-6" wide
4000 lbs.	8'-0" wide x 6'2" deep	4'-0" wide

3.1.3 Freight Movement

Freight movement shall be via service elevators. Freight includes concession supplies, building maintenance carts, janitorial carts, and supplies, etc.

Service elevators shall be shaped narrow and deep for easy loading and unloading.

Service elevators used for freight movement using hand trucks, carts, dollies, etc., shall be classified as passenger elevators with horizontal sliding doors and may be used for passenger transport with no restrictions.

Service elevators used for freight movement using industrial truck loading (for lifts, etc.) shall be classified as freight elevators with vertically opening doors and restricted passenger use. Freight elevators shall be designed for Class A, B, or C loading as appropriate for loading method and load carried per ANSI A17.1 Rule 207.2 B.

3.1.4 2-Way communication system

Coordinate phone system in a designated area of refuge near each hoistway entrance of 2-way communication programmed to call the Operations Center at DEN for floors without access to a public way egress.

Conduit for this phone system cannot be run in the elevator shaft. Refer to the Life Safety DSM for additional requirements.

3.1.5 Conveyance Location Reporting system

Coordinate car location reporting system programmed to call the Operations center at DEN elevator.

Integrate wi-fi or hardwired device with elevator controls. Commission system with Operations prior to permit closeout.

Table 3-3: List of elevators at DEN with Machine Rooms and Comm. Rooms

UNIT	LOCATION	Machine room door number	Communication room door number
AE-01	SOUTH CENTER CORE FREIGHT	CCA025C013	35C51
AE-02	A-CONC. CENTER CORE	CCA025C031	35C51
AE-03	SOUTH CENTER CORE	CCA065C001	35C51
AE-04	SOUTH CENTER CORE	CCA065C001	35C51
AE-05	SOUTH CENTER CORE	CCA065C001	35C51
AE-06	SOUTH CENTER CORE	CCA065C001	35C51
AE-07	NORTH CENTER CORE	CCA051C004A	11C07
AE-08	NORTH CENTER CORE	CCA051C004B	11C07
AE-09	A-CONC. SW CENTER	CCA002C010	11C07
AE-10	EAST SUBCORE FREIGHT	CCA003E004	14E02
AE-11	WEST SUBCORE FREIGHT	CCA003W076	14W02
AE-12	A-CONC EAST SUBCORE	CCA015E109	14E02
AE-14	A-CONC. NE CENTER CORE	CCA003C022	11C07
AOB-1	AOB PASSENGER	AOB112W001	66A79
AOB-2	AOB PASSENGER CAR	AOB112W001	66A79
AOB-3	AOB FREIGHT	AOB112W001	66A79
BE-01	SOUTH CENTER CORE	CCB051S002	11C07
BE-02	SOUTH CENTER CORE	CCB051S002	11C07
BE-03	SOUTH CENTER CORE	CCB051S002	11C07
BE-04	SOUTH CENTER CORE	CCB052C004	11C07
BE-05	SOUTH CENTER CORE	CCB054C002	11C07
BE-06	SOUTH CENTER CORE	CCB054C002	11C07

Table 3-3: List of elevators at DEN with Machine Rooms and Comm. Rooms (Continued)

UNIT	LOCATION	Machine room door number	Communication room door number
BE-07	NORTH CENTER CORE	CCB053C002	11C07
BE-08	NORTH CENTER CORE	CCB053C002	11C07
BE-09	NORTH CENTER CORE	CCB051C005	11C07
BE-10	TOWER ELEVATOR	CCB091N004	A8N03
BE-11	B-CONC. SW CENTER CORE	CCB002C010	11C07
BE-12	EAST SUBCORE FREIGHT	CCB003E006	CCB_002E_058/ 14E02
BE-13	B-CONC. WEST SUB CORE FREIGHT	CCB053W002	14W02
BE-14	B-CONC. EAST SUBCORE	CCB006E006	17E02
BE-15	WEST SUBCORE FREIGHT	CCB006W042	17W02
BE-16	B-CONC. EAST SUB CORE	CCB058E026	36E07
BE-17	B-CONC, WEST SUB CORE	CCB008W010	36W07
BE-18	SOUTH COMMUTER (Regional Jet facility)	CCB0115C010	19E02
BE-20	B-CONC. N. COMMUTER	CCB011NC010	CCB_01_1NC_030
BE-22	B-CONC. N.COMMUTER	CCB011NL028	CCB_01_1NC_030
BE-24	B-CONC. NE CENTER CORE	CCB003C179	13C24
BRCE-01	WEST RED CARPET CLUB ELEVATOR	CCB013W008	14W02
BRCE-02	EAST RED CARPET CLUB ELEVATOR	CCB013E078	14E02
CE-01	SOUTH CENTER CORE	CCC004C002	11C07
CE-02	C-CONC SOUTH CENTER CORE	CCC004C002	11C07
CE-03	NORTH CENTER CORE	CCC003C010	11C07
CE-04	NORTH CENTER CORE	CCC003C010	11C07
CE-05	SOUTHWEST CENTER CORE FREIGHT	CCC002L008	11C07
CE-06	EAST SUBCORE FREIGHT	CCC003E002	14E02
CE-07	WEST SUBCORE FREIGHT	CCC003W034	14W02
CE-08	EAST SUBCORE	CCC014E024	14E02
CE-10	NORTHEAST CENTER CORE FREIGHT	CCC003C022	11C07
TE-01	MAIN TERMINAL WEST	TML0411E026	44A22
TE-02	MAIN TERMINAL EAST	TML0411E026	44A22
TE-03	MAIN TERMINAL WEST	TML048W048	48D24

Table 3-3: List of elevators at DEN with Machine Rooms and Comm. Rooms (Continued)

UNIT	LOCATION	Machine room door number	Communication room door number
TE-04	MAIN TERMINAL EAST	TML048W048	48D24
TE-05	MAIN TERMINAL CENTER	TML038W074	38D10
TE-06N	MAIN TERMINAL EAST	TML0411E018	48D24
TE-06S	MAIN TERMINAL EAST	TML0411E018	48D24
TE-08N	MAIN TERMINAL WEST	TML0411W056	44A22
TE-08S	MAIN TERMINAL WEST	TML0411W056	44A22
TE-30	MAIN TERMINAL WEST	TML0714W001	64C14
TE-31	MAIN TERMINAL WEST	TML0714W001	64C14
TE-32	MAIN TERMINAL WEST	TML0714W001	64C14
TE-33	MAIN TERMINAL WEST-FREIGHT	TML0314W112	34C12
TE-34	MAIN TERMINAL WEST	TML0714W002	611W84
TE-35	MAIN TERMINAL WEST	TML0714W002	611W84
TE-36	MAIN TERMINAL WEST	TML0714W002	611W84
TE-37	MAIN TERMINAL WEST	TML0714W002	611W84
TE-38	MAIN TERMINAL WEST	TML0714W002	611W84
TE-39	MAIN TERMINAL WEST	TML0714W002	611W84
TE-40	MAIN TERMINAL WEST-FREIGHT	TML0311W130	31C01
TE-50	MAIN TERMINAL WEST	TML0711W006	68C14
TE-51	MAIN TERMINAL WEST	TML0711W006	68C14
TE-52	MAIN TERMINAL WEST	TML0711W006	68C14
TE-53	MAIN TERMINAL WEST	TML0711W006	68C14
TE-54	MAIN TERMINAL WEST	TML0711W006	68C14
TE-55	MAIN TERMINAL WEST	TML0711W006	68C14
TE-56	MAIN TERMINAL WEST-FREIGHT	TML038W094	38C10
TE-57	MAIN TERMINAL WEST	TML078W007	68C14
TE-58	MAIN TERMINAL WEST	TML078W007	68C14
TE-59	MAIN TERMINAL WEST	TML078W007	68C14
TE-60	MAIN TERMINAL WEST FREIGHT	TML078W007	68C14
TE-70	MAIN TERMINAL EAST	TML0714E009	64D14
TE-71	MAIN TERMINAL EAST	TML0714E009	64D14

Table 3-3: List of elevators at DEN with Machine Rooms and Comm. Rooms (Continued)

UNIT	LOCATION	Machine room door number	Communication room door number
TE-72	MAIN TERMINAL EAST	TML0714E009	64D14
TE-73	MAIN TERMINAL EAST-FREIGHT	TML0314E006	34D12
TE-74	MAIN TERMINAL EAST	TML0714E011	61D14
TE-75	MAIN TERMINAL EAST	TML0714E011	61D14
TE-76	MAIN TERMINAL EAST	TML0714E011	61D14
TE-77	MAIN TERMINAL EAST	TML0714E011	61D14
TE-78	MAIN TERMINAL EAST	TML0714E011	61D14
TE-80	MAIN TERMINAL EAST-FREIGHT	TML0311E008	31D05
TE-90	MAIN TERMINAL EAST	TML0711E014	68D14
TE-91	MAIN TERMINAL EAST	TML0711E014	68D14
TE-92	MAIN TERMINAL EAST	TML0711E014	68D14
TE-93	MAIN TERMINAL EAST	TML0711E014	68D14
TE-94	MAIN TERMINAL EAST	TML0711E014	68D14
TE-95	MAIN TERMINAL EAST-FREIGHT	TML038E008	38D10
TE-96	MAIN TERMINAL EAST	TML078E017	68D14
TE-97	MAIN TERMINAL EAST	TML078E017	68D14
TE-98	MAIN TERMINAL EAST	TML078E017	68D14
TE-99	MAIN TERMINAL WEST-FREIGHT	TML078E017	68D14
IE-01	NORTH TERMINAL-CUSTOMS	TML035E003	38D10
IE-02	NORTH TERMINAL-CUSTOMS	TML045E080	45B08
IE-03	A-CONC. WEST CENTER CORE	CCA031C003	31C01
IE-04	A-CONC. NE CENTER CORE	CCA033C005	33C54
IE-05	A-CONC. 1ST SUB-CORE WEST		11C07
IE-06	A-CONC. 1ST SUB-CORE EAST	CCA011E044	12E72
IE-07	A-CONC. 1ST SUB-CORE WEST	CCA012W120	12W92
IE-08	A-CONC. 1ST SUB-CORE EAST	CCA012E042	12E72/14E02
GEW-1	MOD 4 WEST PARKING GARAGE	PKG0516W002	54C14
GEW-2	MOD 4 WEST PARKING GARAGE	PKG0516W003	54C14
GEW-3	MOD 4 WEST PARKING GARAGE	PKG0516W004	54C14
NTE-03	NORTH TERMINAL (QWEST)	TML032E004A	45A01

Table 3-3: List of elevators at DEN with Machine Rooms and Comm. Rooms (Continued)

UNIT	LOCATION	Machine room door number	Communication room door number
XE-01	CENTRAL PLANT FREIGHT	CPT021W101	AS_O40
SIGNATURE	SIGNATURE HANGER FACILITY		SIGNATURE COMM
EXPANSION UNITS			
AE-13	A Concourse	TBD	TBD
AE-15	A Concourse	TBD	TBD
AE-17	A Concourse	TBD	TBD
AE-19	A Concourse	TBD	TBD
AE-21	A Concourse	TBD	TBD
AE-23	A Concourse	TBD	TBD
IE-09	A Concourse International	TBD	TBD
IE-11	A Concourse International	TBD	TBD
IE-13	A Concourse International	TBD	TBD
IE-15	A Concourse International	TBD	TBD
IE-17	A Concourse International	TBD	TBD
BE-26	B Concourse	TBD	TBD
BE-28	B Concourse	TBD	TBD
BE-30	B Concourse	TBD	TBD
CE-12	C Concourse	TBD	TBD
CE-14	C Concourse	TBD	TBD
CE-16	C Concourse	TBD	TBD
CE-18	C Concourse	TBD	TBD
CE-20	C Concourse	TBD	TBD
CE-22	C Concourse	TBD	TBD
CE-24	C Concourse	TBD	TBD

3.2 Acoustics

This section outlines the acoustical criteria and guidelines to be used as the design standards for DEN. The following building types where occupied spaces are located are addressed:

A. Terminal building
B. Concourses
C. Hotel
D. Office buildings

E. Communications center

F. All other occupied spaces

The Terminal Building and Concourses are large public spaces where high occupancy pedestrian activities may generate high noise levels. Control of noise within these spaces, and control of aircraft noise intrusion into occupied spaces, is a major consideration in the building design.

3.2.1 Criteria and Guidelines

Table 3-4: Definitions

Term	Abbreviation	Definition
Decibel	dB	The unit of sound pressure level as a ratio between a measured sound pressure level and the reference pressure.
Field Sound Transmission Class	FSTC	The difference between the STC and FSTC is that the FSTC is a field performance and includes sound leads and flanking paths. Typically, FSTC = STC-5.
Impact Isolation Class Rating	IIC	The rating of impact noise heard through the floor/ceiling in the space below/above.
Noise Criterion	NC	A rating system based on the octave band sound pressure levels for a given noise spectrum. The NC value is determined when the given noise spectrum does not exceed any sound pressure levels of the lowest possible NC curve. These curves are based on satisfactory speech communication without being annoying.
Reverberation Time	N/A	The time, in seconds, taken for a sound within a space to decrease by 60 dB after the sound source has stopped.
Speech Intelligibility	N/A	The measure of how comprehensible speech is in a given condition, using the STI.
Sound Transmission Class	STC	The STC is an integer rating given to a building partition that denotes how well a building partition attenuates airborne sound. It is based on a laboratory performance of a test sample.
Speech Transmission Index	STI	STI is the objective measurement predictor of speech transmission quality.

Acoustic criteria are provided for the following:

A. Background noise levels within occupied spaces due to HVAC system and mechanical equipment noise using Noise Criteria Curves (NC).

B. Exterior noise ingress from aircraft and vehicular traffic operations using Noise Criteria Curves (NC).

C. Acoustical separation between occupied spaces and between non-occupied mechanical room spaces and occupied spaces using field transmission class (FSTC).

D. Impact Isolation using impact insulation (IIC).

E. Reverberation time of occupied spaces to control noise levels within large spaces and achieve acceptable speech intelligibility of public address announcements using reverberation time and speech transmission index (STI).

F. Minimum exterior building attenuation to reduce noise intrusion from both landside traffic movements and airside aircraft operations.

3.2.2 HVAC Background Noise Levels

Noise Criteria Curves, NC, have been selected for the assessment of acceptable background noise levels in occupied spaces due to HVAC and mechanical equipment. The NC curve selected has been based on preliminary programmed use and activity of the spaces. The relevant curves are listed in the Mechanical DSM, Chapter 1.

3.2.3 Structural Design for Vibration Control

3.2.3.1 Aircraft

The terminal building complex may, at times, be subject to significant levels of acoustic energy transmitted from airplane activities on the airside of the terminal building complex. Aircraft under maximum power for take-off or reverse throttle, as well as rev-ups of aircraft for the start of taxi activities, may impose sound pressure levels in the range of 90 to 110 dBL or higher in the lower frequency octaves of 63, 125, and 250 Hz. Such sound waves may induce structural vibrations to the framework and glazing panels and need to be accounted for. Design of the structure should therefore consider structural fatigue, perceptible vibration, as well as control of noise transmission to the interior spaces. Appropriate selection of mass, stiffness, and damping parameters should be made for the structure to provide an appropriate fatigue design life, limit perceptible structural vibrations to within guidelines provided in ASHRAE Handbook – HVAC Applications or other applicable standards, and provide sufficient façade transmission loss to meet interior noise targets.

3.2.3.2 Vibration Criteria

Vibration transmission from mechanical and electrical equipment: All mechanical and electrical equipment shall be balanced, both dynamically and statically.

Furthermore, all such equipment shall be provided with appropriate vibration isolation mounting systems designed to provide minimum of 95% isolation efficiency based on the lowest rotational or reciprocating speeds. Resultant vibration levels in the floor structure supporting such equipment, when measured in the nearest occupied areas adjacent to the equipment spaces, shall comply with the vibration levels for human comfort provided in the ASHRAE Handbook – HVAC Applications or other applicable standards.

A. Vibration transmission due to AGTS
   AGTS vehicles will generate vibration due to the wheel and rail interaction. The level of vibration is to be assessed, and mitigation may be required to achieve appropriate levels of vibration as provided in ASHRAE Handbook – HVAC Applications or other applicable standards.
B. Vibration induced by outside vehicle activities.
   The building structures shall be designed as much as practical to limit internal floor vibration levels to appropriate levels of vibration as provided in ASHRAE Handbook – HVAC Applications or other applicable standards for this type of structure/occupancy. The most practical way of dealing with this is by sensible siting of speed bumps and drainage (away from buildings) and local treatment of the building foundation to limit vibration transmission where building columns will be adjoined by vehicular traffic lanes. Soil properties shall be determined, by test or otherwise, and the feasibility of structural designs will be studied to avoid resonance response of the building structure to impacts created by vehicles rolling over speed bumps or severe surface imperfections on the traffic lanes.
C. Floor dynamic response factor
   For floor areas where heavy foot traffic will take place, the floor slab design shall consider the dynamic response of the structure to control its response and prevent excessive vibration on the floor surface. Structural engineers shall utilize published design standards to limit the floor dynamic response to be within appropriate levels of vibration provided in ASHRAE Handbook – HVAC Applications or other applicable standards.

3.2.4 STC Rating Charts

A. Hotel uses and other tenant design standards for STC ratings, take precedence to DEN's minimum STC Standards in these tables:

Table 3-5: Typical STC Rating Expectations

STC	What can be heard at this level
25	Soft speech can be heard and understood
30	Normal speech can be heard and understood
35	Loud speech can be heard and understood
40	Loud speech can be heard, but not understood
45	The threshold at which privacy begins
50	Loud sounds can be heard; but are very faint
60+	At this level, good soundproofing begins. Neighbors generally are not disturbed by very loud speech from inside.

Table 3-6: DEN STC Standards by Room Type and Adjacencies

Target STC		
Adjacencies		STC
Retail	Retail	50
Standard Office	Standard Office	45
Executive Office	Executive Office	50
Conference Room	Conference Room	50
	Administrative	45
	Office	55
Mechanical Room	Occupied area	60
Training Room	Training room	50
	Restroom	53
Quiet Room	Occupied area	55

3.3 Interior Design Features

3.3.1 Floor-to-Floor Heights

Wherever possible, the floor-to-floor height is to conform to the five feet (5') vertical grid. This alignment is meant to enhance the horizontal and vertical compatibility of floors, roofs, ceilings, sills, bases, etc.

3.3.2 Exposed Concrete Surfaces

The use of exposed concrete surfaces as an architectural element is generally acceptable. Care should be taken in specifying an appropriate finish surface and technique. Samples must be approved by the DRC.

3.3.3 Stone Surfaces

The use of stone as an accent to the primary wall and floor surfaces is encouraged. The use of Colorado or Rocky Mountain stone is further encouraged. Samples must be approved by the DRC.

3.3.4 Metal Finish

The existing terminal complex utilizes a “Terminal White” metal finish in a complementary color scheme where infill metal panels, spandrel glass, and other opaque surfaces that are a part of the curtain wall are contrasted against the curtain wall grid. Selection of new metal finishes must complement the existing and be thoughtfully implemented.

Where stainless steel is listed as a material option, the finish will not be prescribed in this document. Specific finish selection will be reviewed with the DRC for specific projects.

3.3.5 Ceilings

Ceiling planes delineate, define, and provide scale to space. Certain areas will have an exposed structural framework, while other areas will be scaled for a more finished, private space.

For any area of the ceiling where access is required for maintenance, material selection that facilitates easy access is required.

3.3.6 Diffusers

Diffusers shall be coordinated and selected per the Mechanical DSM. Modifications to the standard diffusers as an architectural feature will be required to not only be an element presented to the Design Review Committee (DRC) but are subject to revision by the DEN Mechanical Engineer. In general, hidden diffusers are the preferred approach.

3.3.7 Lighting

The lighting design component for all spaces, especially public spaces, is of critical importance to achieve and maintain the design theme. The balance between the daylighting requirement and light fixture luminance is to be carefully designed to meet the desired lighting levels in each area. Lighting design standards are presented in detail in these standards. Design professionals are responsible for reviewing, coordinating, and incorporating Electrical standards. Refer to the Electrical DSM. Light fixtures need to be approved by the DRC. Track lighting is prohibited in concession spaces.

The use of daylighting optimization criteria for the interior spaces is required for DEN. This requirement is intended to enhance overall light quality and reduce the overall energy consumption of the buildings.

3.3.8 Glare

Reflective surfaces, such as reflective glass, are not permitted. This requirement is intended to control glare.

Requirements regarding the Building Envelope should be considered by designers.

3.3.9 Exposed Conduit

Generally, all conduits shall be concealed. Exposed conduit is not considered a design element. In open ceiling public areas, where conduits are exposed, conduits shall be painted to match adjacent surface or structure to conceal conduit to greatest extent possible.

3.3.10 Cameras/Monitors

Placement and location of cameras and monitors must be integral with the aesthetic design of all public spaces. Number and approval of location(s) will be determined specific to each project.

3.3.11 IECC Compliance

Building must be designed in conformance with the currently applicable version of the International Energy Conservation Code.

3.3.12 Window Treatments

Window treatments are generally not permitted. Special conditional use must be approved by the DRC. Potential options are listed below.

A. Window tinting
B. Window film- high-performance low-e coatings
C. Decorative coatings- digitally printed frit with ceramic ink on glass (including heat-treated, insulated glass units and laminated glass).
D. Operable solutions are acceptable in Concessions and office areas but not holdrooms, etc.

3.3.13 Sustainability

Sustainability is an important objective of all DEN projects. Sustainable design shall be an integral part of all projects. The incorporation of educational sustainability experiences is encouraged as a LEED point we like to pursue. The Designer of Record may be required to supply graphic design.

Gas appliances are not allowed at DEN, including but not limited to gas fireplaces, in accordance with the City and County of Denver's Office of Climate Action, Sustainability and Resiliency (CASR), ***Energize Denver Ordinance***.

3.3.14 Application and Use of Materials

Materials are intended to be used in a fashion that is representative of their natural state. Unauthentic or faux use of materials are prohibited. DRC approval is required for any materials that do not meet this guideline. Sufficient backstock for all materials should be readily available for ongoing maintenance activities.

3.3.15 Contact Surface Definition

Throughout this manual, the usage of various materials is defined as approved at "non-contact areas." To follow is a definition of the location (height above finished floor) for surfaces that would be considered non-contact areas.

A. High-traffic areas (concourses, all holdrooms and passenger boarding areas, terminals, baggage claim, and public walkways)
    a. All areas above 8'- 0" are considered non-contact
B. Food Court areas and common seating areas (not holdrooms)
    a. All areas above 4'- 0" are considered non-contact
C. Other heights are to be reviewed by variance with the DRC.

Table 3-7: Interior Finish Materials - Ceilings and Walls

ROOM TYPE/ LOCATION	CEILINGS	Acoustical Lay-In Tile	Acoustical Wood Ceilings	Acoustical Metal Ceilings	Gypsum Board, Painted	WALLS	Engineered Stone Paneling	Ceramic Mosaic Tile	Glass Mosaic Tile	Metal Column Cladding	Fiber Cement Panel	Metal Paneling	Heavy Duty Water Based Urethane	Dry Erase Wall Covering	Thru Body Porcelain Tile	Porcelain Panel	Natural Stone Paneling	Resin/Plastic Panels	Translucent Honeycomb Panel	Laminated MDF Panel	High Pressure Laminate Panels	Perforated Imaging Metal Paneling	Glass	Concrete Tile
PASSENGER AREAS																								
Ceiling		4																						
Wall								3	3						1		7	3	7					
Floors																								
NON PASSENGER AREAS																								
Ceiling																								
Wall																								
Floors																								
Casework																								
PASSENGER RESTROOMS																								
Ceiling																								
Wall																								
Floor																								
Casework																								
NON PASSENGER RESTROOMS																								
Ceiling																								
Wall																								
Floor																								
Casework																								

NOTE: Table keynotes and general notes follow Table 3-8: Interior Finish Materials- Floors and Casework.

Table 3-8: Interior Finish Materials - Floors and Casework

ROOM TYPE/ LOCATION	FLOORS	Dyed Polished Concrete	No-Wax Resilient Tile	No-Wax Resilient Sheet	Broadloom Carpet	Carpet Tile	Resinous Flooring	Terrazzo Tile	Porcelain Panels	Thru-Body Porcelain Tile,	Decorative Polymer	Epoxy Terrazzo	Engineered Stone	Natural Stone	Concrete Tile	CASEWORK	Engineered Stone	Solid Surface	Laboratory Grade
PASSENGER AREAS																			
Ceiling																			
Wall																			
Floors		2						2		1	6								
NON PASSENGER AREAS																			
Ceiling																			
Wall																			
Floors																			
Casework																			
PASSENGER RESTROOMS																			
Ceiling																			
Wall																			
Floor											5, 6								
Casework																			
NON PASSENGER RESTROOMS																			
Ceiling																			
Wall																			
Floor							5												
Casework																			

Notes:

1- Not more than 25% of surface area.

2- Refer to text for approval usage.

3- Not more than 5% of surface area.

4- Use only where necessary for access.
5- Textured finish.
6- Pricing varies based on color, pattern, and finish.
7- Not more than 15% of surface area.

3.4 Passenger Terminal Areas

3.4.1 Introduction

Terminal areas are one of the most important public spaces. As one of the first impressions guests will experience in an airport facility, they set the foundation for a positive passenger experience. These areas constitute a key functional role for passenger check-in, initial processing, and meeting arriving passengers. Adequate visual hierarchy, inviting spaces with human scale, and an authentic regional feel are critical aspects of the design as they relate to the DEN experience. As the front door of DEN, the terminal should be a grand urban space that allows for relaxation while feeling connected to the city and the natural Colorado landscape. For these reasons, high-level durable, abuse-resistant finishes with low maintenance and enhanced aesthetic qualities shall be implemented in all Terminal Public/Passenger use areas.

3.4.2 Flooring

All flooring selections must take the ease of “wheeled bag traffic” into consideration.

3.4.2.1 Approved Materials

A. Epoxy Terrazzo
The use of epoxy terrazzo must only include standardized universal colors (RAL, pantone, or other definable colors). The specific aggregate mix must be clearly defined. The use of a “match existing” designation is prohibited. All new terrazzo floors must have definable features that can be easily reproduced. Accent terrazzo colors shown on finish boards are, for example, only and should be used in limited amounts. Selected colors should be coordinated with the approved color scheme as reviewed by the DRC.

B. Thru-Body Tile
Porcelain, granite, natural/engineered stone – tile must have high compressive strength and be able to sustain repeated heavy traffic of maintenance lifts without damage.

C. Granite or Natural/Engineered Stone Slab

D. Concrete Tile

E. Decorative Polymer Flooring
This product is installed like a resinous epoxy floor and only requires typical cleaning and maintenance.

F. Porcelain Panels

G. Broadloom Carpet

Use is approved at the following locations:

A. Baggage Claim/Baggage Carousel

B. Elevator Lobbies

C. Entry Vestibules

D. Bridge/Connectors/Walkway to AOB

3.4.2.2 Prohibited Materials

A. Wood/engineered wood/laminate

B. Ceramic tile

C. Exposed/sealed/stained concrete

D. VCT use is prohibited in all spaces operated and/or maintained by DEN.

E. Resilient tile or sheet product.
F. Raised transition strips. Material transitions in high-traffic areas shall be flush.

3.4.3 Walls

3.4.3.1 Approved Materials

A. High-Pressure Laminate Panels- Various finishes
    a. Trespa or equivalent
B. Wood Paneling- At non-contact and accent areas only
All-natural wood products need to be properly sealed and kiln-dried, preferred for the “high desert”/arid climate.
C. Metal Paneling- Reinforced, heavy gauge
D. Natural/Engineered Stone Paneling
E. Glass/Aluminum Systems
All treatments applied to glass must be on the back unexposed side or laminated. Framing system may function as a wall base. No additional base application is required.
F. Resin/Plastic Panels- For decorative use only
G. Thru Body Tile/Glass Tile/Ceramic Mosaic Tile
Special detailing is required for locations subject to movement.
H. Gypsum board, painted
At non-contact areas only
    a. Acrylic satin finish
I. Perforated Imaging Metal Paneling
At non-contact areas only
Graphic imaging is preferred over photo-realistic. Imagery requires DRC approval.
J. Laminated MDF Panels
Special detailing is required for fixtures or controls located in dimensional panels)
K. Concrete Tile
L. Fiber Cement Panels
M. Porcelain Panels

3.4.3.2 Prohibited Materials

A. Faux Finish Materials
B. Speckle Paint Finish- Polomyx or equivalent
Only acceptable for use in repair at transitional existing locations or at locations where new projects meet existing areas.
C. Painted and powder-coated metals

3.4.4 Wall Base

6" high minimum

3.4.4.1 Approved Materials

A. Epoxy terrazzo
B. Stainless steel- Heavy gauge and reinforced backing
C. Natural/Engineered stone slab or tile
D. Thru-body Tile

a. Porcelain
b. Granite
c. Natural/engineered stone

3.4.4.2 Prohibited Materials

A. Rubber and resilient base
B. Wood

3.4.5 Column Cladding

3.4.5.1 Orthogonal corners

Must have corner guards/ protective corner treatment.

3.4.5.2 Approved Materials

A. Stainless steel
B. Wood- At non-contact/accent areas only
C. High-Pressure Laminate Panels- Various finishes
    a. Trespa or equivalent
D. Other natural metals- At non-contact/accent areas only
E. Glass/glass and aluminum systems
F. Plastic/Resin- decorative only
Must be “non-institutional” in appearance. DRC approval required
    a. 3form or equivalent
G. Engineered/Natural Stone
H. Concrete/concrete panels
I. Gypsum board
At non-contact areas only.
    a. Painted, acrylic satin finish

3.4.5.3 Prohibited Materials

A. Plastic/resin

3.4.6 Corner Guards

3.4.6.1 Approved Materials

A. Stainless steel
B. Aluminum

3.4.6.2 Prohibited Materials

A. Plastic/resin
B. Wood

3.4.7 Ceilings

3.4.7.1 Approved Materials

A. Acoustical Lay-In Tile Ceiling
No custom sizes. Use only where access is required use of broad uninterrupted expanses of lay-in ceiling in public areas requires approval by the DRC.

B. Acoustical Wood Ceilings
Limited to 35% maximum area. Grid/egg crate systems are prohibited.

C. Acoustical Metal Ceilings

D. Acoustical Metal Deck
Use of exposed structure requires careful detailing of conduit, fasteners, and fittings and approval by the DRC.

E. Other Panelized Metals

F. Gypsum Panelized Systems
    a. Curves/ angles/geometric shapes

G. Gypsum Board
    a. Painted, eggshell finish
    b. Painted, acrylic satin finish
    At non-contact areas only

H. Concrete/Concrete Panels

3.4.7.2 Prohibited Materials

A. Exposed- In areas under 12'-0" in height
    a. Narrow suspended grid systems.

B. Completely Exposed
    a. Any ceiling systems which require the use of specialized tools/knowledge or removal of large sections of the ceiling system to gain access above.

3.4.8 Approved Materials

The following materials have been approved by DEN for use in this area.

Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC. Refer to 3.0 General Architectural Information for additional information on materials.

A. Epoxy Terrazzo
B. Thru-Body Tile
C. Granite
D. Concrete Tile
E. Decorative Polymer Flooring
F. Porcelain Panels (floors or walls)
G. Porcelain Panels (walls only)
H. Engineered Stone (floors or walls)
I. Engineered Stone (walls only)
J. High Pressure Laminate Panels
K. Metal Paneling
L. Glass
M. Resin

N. Glass Tile
O. Ceramic Mosaic Tile
P. Perforated Imaging Metal Paneling
Q. Laminated MDF Panels
R. Fiber Cement Panels
S. Translucent Honeycomb Panels
T. Heavy Duty Water Based Urethane Paint
U. Heavy Duty Water Based Urethane Paint
V. Metal Column Cladding
W. Solid Surface
X. Acoustical Lay-In Tile
Y. Acoustical Wood Ceiling
Z. Acoustical Metal Ceiling

3.5 Entry Vestibules

The entry vestibules of the airport are the first spaces many passengers and visitors of the airport will experience; likewise, these spaces are some of the hardest-wearing and most exposed in the entire facility. Material choice must consider the implications that come along with spaces prone to heavy traffic, constant weather, and extreme temperature exposure. The vestibules are the front door to the airport and a key factor in an excellent passenger experience. Refer to 3.4 Passenger Terminal Areas for material information. Conditions unique to this use are addressed below.

3.5.1 Flooring

3.5.1.1 Approved Materials

A. Carpet
B. Walk-off carpet

3.5.1.2 Prohibited Materials

A. Metal grate systems

3.6 Passenger Restrooms

DEN's core brand idea is to "Live Life" and "Travel Well." DEN strives to empower customers to make the most of their time and keep their lives moving during their travel journey by offering options that balance work and play with a unique experience that embraces both global sophistication as well as the beauty and spirit of the modern West.

Public restrooms are functional spaces that nearly all DEN customers will visit during their stay, making the restroom an important space to express the DEN's brand. The DEN public restrooms will be family and customer focused environment accessible to customers of all abilities. They shall provide the necessities of travel, adequate space for travelers and their bags, and amenities, such as nurseries and companion care. Equally important, the restrooms shall enhance the customer experience to align with DEN's core brand idea and design principles.

The intent of this chapter is to illustrate DEN's restroom design goals and opportunities for renovation and continued innovation. The document shall be interpreted as a baseline for the design teams. It describes the best practices to ensure a high level of customer service. Applicability of these practices will be project based.

This document shall not be interpreted as a replacement of codes, regulations, and laws, and it shall be the design team's responsibility to comply with all codes, regulations, and laws applicable to public restrooms.

3.6.1 DEN Restroom Principle Values

These design standards are presented as a kit of parts that can be applied, as appropriate, throughout DEN. It is understood that unique situations may arise that require creative adaptation or interpretation of these standards. For this reason, each standard includes a summary of the design intent to further inform the thought behind its inclusion and allow for creative and appropriate adaptation.

3.6.1.1 Sense of Inviting and Peace

DEN's vision is for all restrooms to be customer experience focused with amenities. Sense of inviting and peace, calming music, and spacious vanity counters all contribute to the sense of place. Design should be acoustically tuned to de-amplify sounds.

3.6.1.2 Customer and Family Focus

Amenities such as companion care room, sensory room, and nursing mother room shall be provided to travelers of all ages.

3.6.1.3 Ease of Use and Maintenance

Signage and accessory locations shall be designed for anxiety reduction and barrier-free navigation. Materials shall be considered for routine cleaning and maintenance.

3.6.1.4 Sustainability

Energy and water consumptions, lifecycle costs, and maintainability of the restrooms shall all be considered.

3.6.2 Restroom Block Location and Size

Restroom locations are determined based on access by the customers in different zones of the airport. These zones include the Terminal and Concourses. Space shall be allocated to meet current and future peak demands based on aircraft sizes, capacity, adjacencies to other programmed spaces, and the desired level of service.

3.6.2.1 Desired Restroom Block Locations

A. General
   No more than 250 feet apart
B. Ticketing
   Between the ticketing area and security screen checkpoint in each direction
C. Baggage Claim
   Baggage and arrivals level near exits of the AGTS Train Platform and additional locations between baggage carousel groups
D. Boarding Areas
   Every 6 – 8 Gates

3.6.2.2 Fixture Quantities and Restroom Size

In general, the demand for restroom fixtures far exceeds the amount of fixtures required by codes. The fixture counts are calculated based on peak passenger flows based on the fixture-to-passenger ratio per the following. The frequencies and separation between restroom block locations shall also be considered.

A. Ticketing: 1 Fixture to 15 Passengers
   Total number of people = Peak 20 minutes originating passengers + well-wishers
B. Baggage Claim: 1 Fixture to 15 Passengers
   Total number of people = Peak 20 minutes terminating passengers + meet-and-greet

C. Boarding Areas 1 Fixture to 8 Passengers
Total number of people = Peak 20 minutes enplaned and deplaned passengers time number of Gates.

The designer shall consider simulating and validating the restroom access at peak times with flow modeling software.

3.6.3 Circulation Space

Space requirements in airport restrooms are larger than standard restroom clearances due to the extra luggage and personal items that guests carry. Because each DEN restroom is restricted to a limited footprint, space circulation must be carefully considered. Figure 3-1: Aisle Between Toilet Compartments, Figure 3-2: Aisle Between Toilet Compartments and Urinals, and Figure 3-3: Aisle Between Lavatories depict minimum clearances for typical restroom conditions. For conditions not specifically depicted below, maintain a minimum clearance of 5'-0".

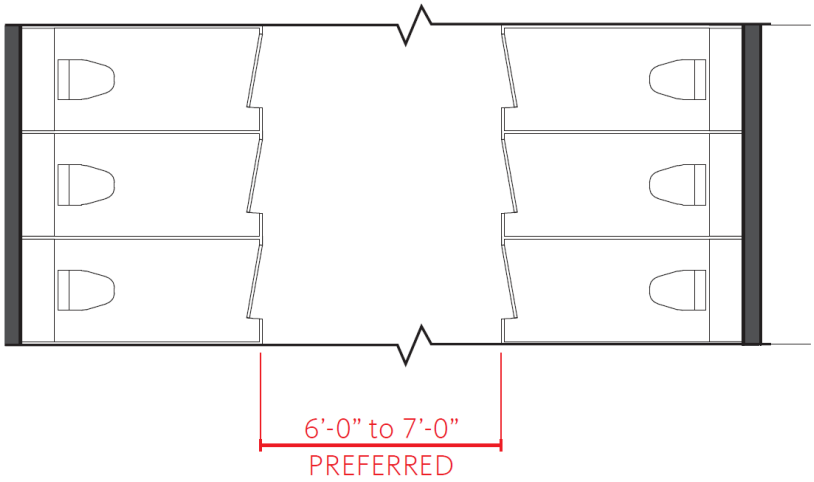

Figure 3-1: Aisle Between Toilet Compartments

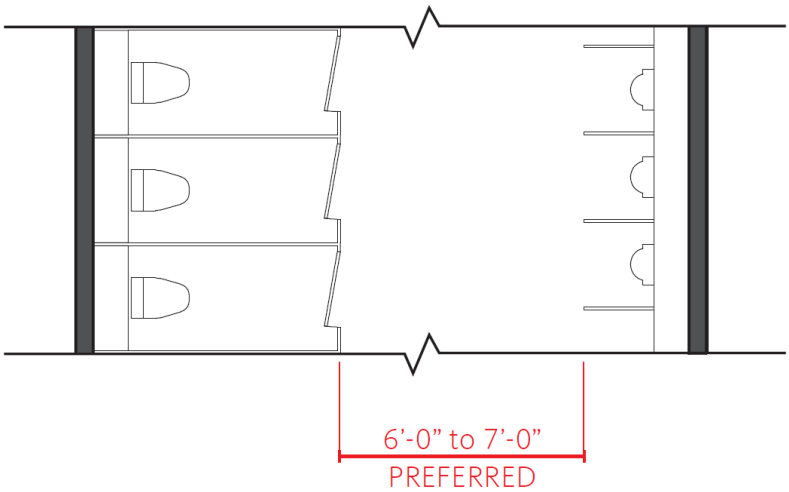

Figure 3-2: Aisle Between Toilet Compartments and Urinals

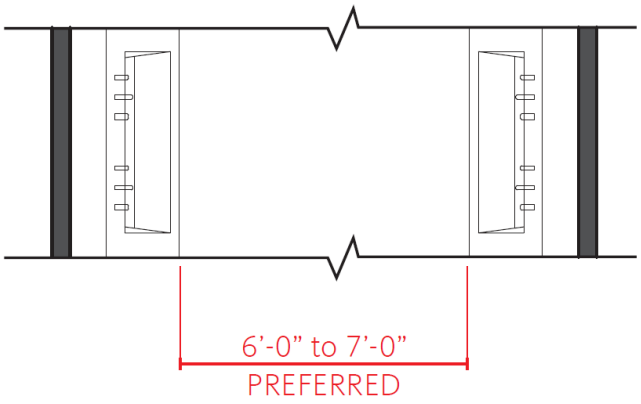

Figure 3-3: Aisle Between Lavatories

Passenger experience has been identified as the most important aspect associated with successful restroom design. Adequate room to move and function is a large part of that experience. Where minimum circulation dimensions are not achievable, consider design changes to allow for clearances to be met. Alternate configurations, expanding existing facilities, reducing fixture counts, or removing plumbing chases should be considered before compromising the preferred circulation recommendations made in this section.

3.6.4 Utility Chase

Utility chases shall be provided in restrooms to allow for easy maintenance access out of the sight of airport guests, as well as providing the opportunity for recessed flush valves.

3.6.4.1 Utility Chase Configurations

All utility chases shall be provided with floor drains and convenience outlets. Humidity detection is recommended for leak detection prior to infiltration damage.

Utility chases shall meet the minimum dimension requirements shown in Figure 3-4: Lavatory Utility Chase Dimensions and Figure 3-5: Toilet/Urinal Utility Chase Dimensions.

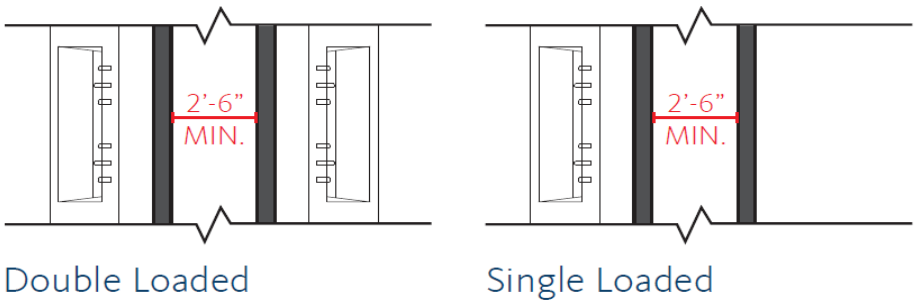

Figure 3-4: Lavatory Utility Chase Dimensions

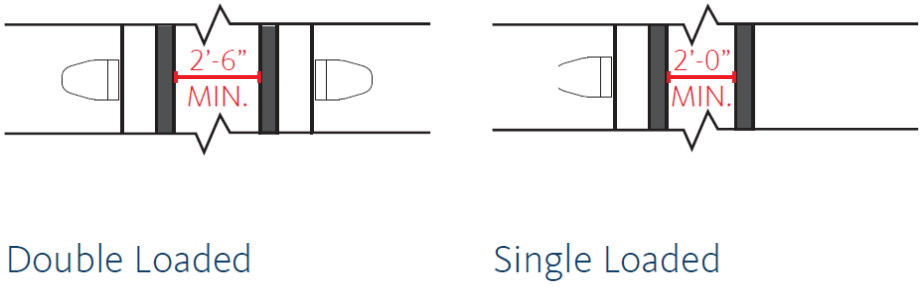

Figure 3-5: Toilet/Urinal Utility Chase Dimensions

3.6.4.2 Utility Chase Curb Assembly

Utility chases shall be provided with a standard curb assembly as shown in Figure 3-6: Utility Chase Curb Assembly.

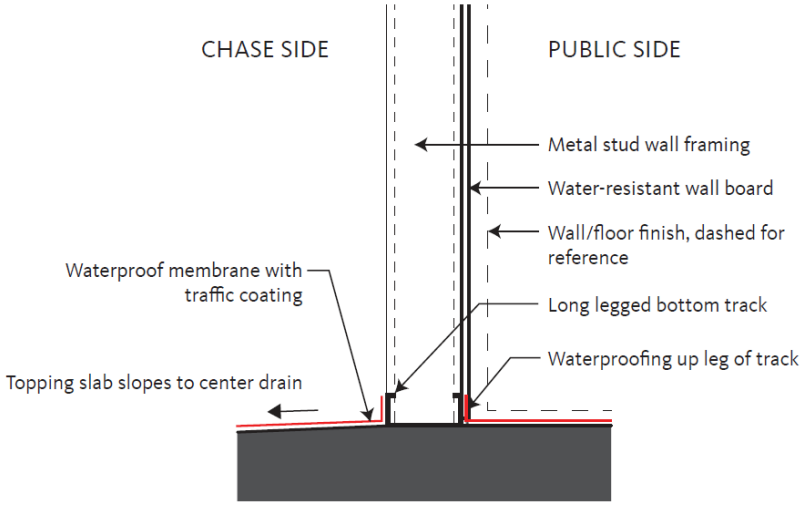

Figure 3-6: Utility Chase Curb Assembly

3.6.4.3 Utility Chase Alternates

Ideally, all restrooms should include a utility chase to allow for maintenance. However, because customer space/ experience is to be prioritized over maintenance convenience, design teams may explore alternatives where utility chases are not feasible. DEN maintenance team and management must be consulted for priorities of circulation, maintenance space, and shelf space prior to implementation of these alternates.

A. Removal of the shelf behind toilets with the addition of a fold-down shelf within the stalls.
B. Removal of the chase entirely, providing exposed flush valves in restroom locations where a utility chase makes it impossible to achieve the recommended minimum circulation dimensions. If this direction is taken, wall stud size must be confirmed with plumbing fixture carriers.

3.6.5 Entry Vestibule

The entry to the restroom is the most significant pinch point in the guest experience. Passengers are entering and exiting with personal belongings such as luggage and strollers, so ample space must be provided. The vestibule should have clear, universal signage that is intuitive to people from all over the world.

Provide straight runs between turns, preferably no less than 3'-0" long. If necessary, expand the entry vestibule area in adjacent rooms to provide a longer entry experience with less turns. The preferred entry vestibule configuration is shown in Figure 3-7: Preferred Restroom Entry Vestibule Configuration. Do not locate any fixtures or accessories, including mirrors and hand dryers, within the sight line into the restroom.

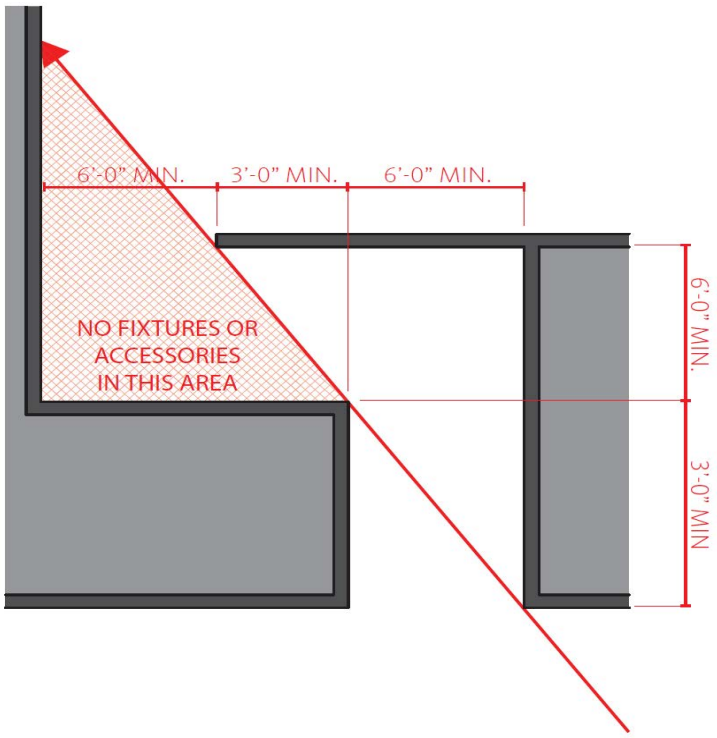

Figure 3-7: Preferred Restroom Entry Vestibule Configuration

3.6.5.1 Alternate Entry Configuration

Avoid the "S" curve configuration when possible. However, when relocation or shrinking of adjacent rooms is prohibitive to expanding the vestibule, deepen the vestibule to allow for more circulation space per Figure 3-8: Alternate Restroom Entry Vestibule Configuration. In every configuration, avoid curved walls and provide 90-degree interior corners.

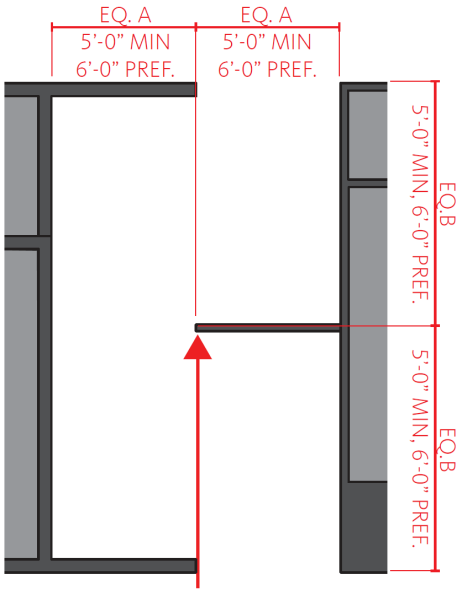

Figure 3-8: Alternate Restroom Entry Vestibule Configuration

3.6.5.2 Signage and Graphics

Entry signage is to be compatible with DEN signage standards. Restroom entries present the opportunity for dynamic digital signage that may include additional information, such as the nearest complimentary facilities.

3.6.6 Toilet Compartment

Toilet compartments should be spacious, clean, and durable. Passenger experience while using the facilities should be prioritized over the number of fixtures (assuming code minimums are accounted for). Each restroom design team shall determine the appropriate design approach per conditions.

3.6.6.1 Size

Standard stall size shall be as depicted in Figure 3-9: Toilet Compartment Plan, Elevation, and Section. Maintain a minimum depth of 6'-0", width of 3'-0", with a preferred width of 3'-4". Front partition shall run from floor to ceiling.

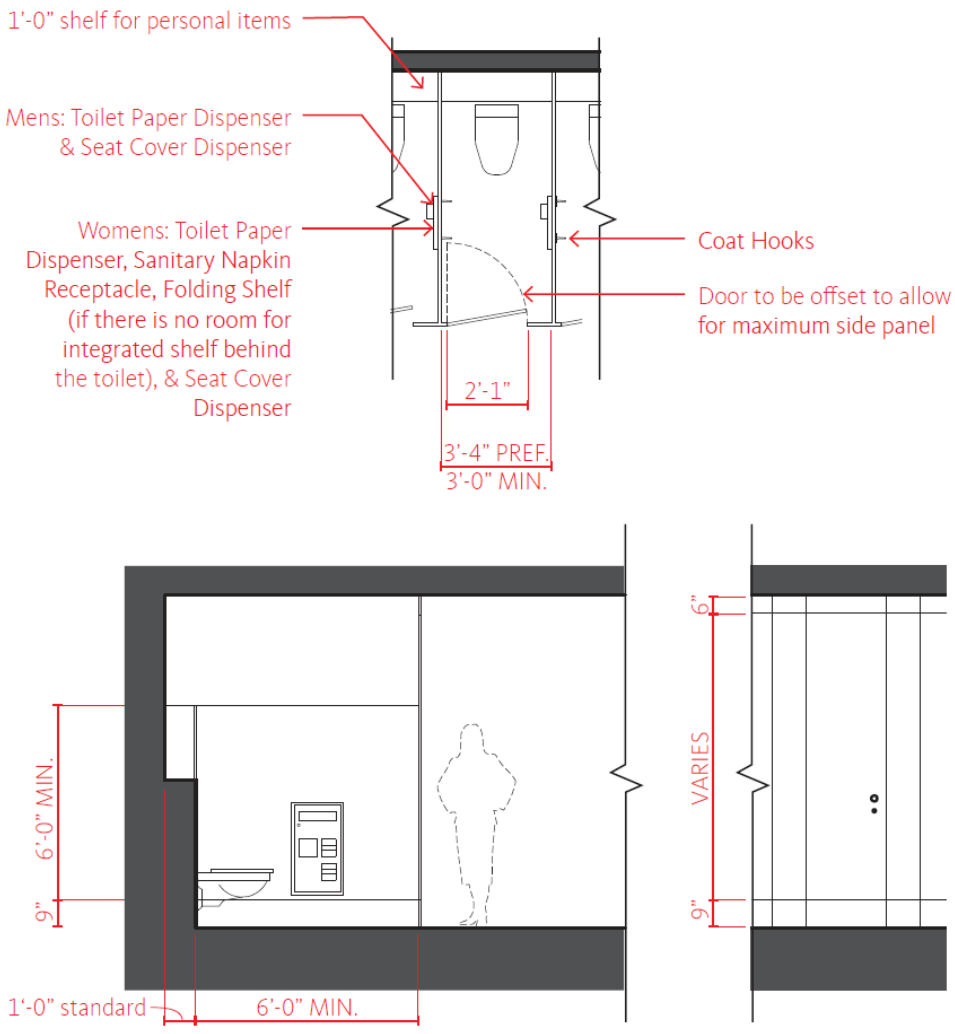

Figure 3-9: Toilet Compartment Plan, Elevation, and Section

Provide continuous support of partitions at the wall, with no gaps between the end partitions and perpendicular wall.

3.6.6.2 Compartment Door

The door should run from 9" above the floor to 6" below the ceiling. Minimum door width shall be 25" wide and be constructed to remain slightly open, 6" to 8", in the resting position, to visually indicate vacant stalls. The door shall have a concealed gap detail where it connects to the partition to allow for improved privacy – this is an important issue, especially for international guests.

Door hardware shall include a vacancy latch, an interior handle, the ability to lock from the exterior for maintenance (either an exterior lock or a locking system), and a continuous hinge to support the weight of the full-height door. No hooks are allowed on the door. The door shall be offset in the compartment to allow for the maximum side panel.

3.6.6.3 Materials

The partitions and doors shall be constructed from 3/4" thick phenolic panels with integral color.

For the back wall, consider incorporating art. Artwork on the walls behind each stall provides an unexpected experience that will stand out in guests' minds. Provide a custom high-pressure laminate system with custom artwork in each stall from floor to ceiling, with a 4" tile base to match floor tile.

3.6.6.4 Fixtures

Provide automatic, high-efficiency, wall-mounted, elongated siphon jet-type toilet. Refer to the Mechanical DSM for fixture flow rate requirements. Provide a concealed flush valve. Exposed flush valves shall only be provided in locations where the utility chase was eliminated, as discussed in 3.6.4 Utility Chase.

3.6.6.5 Accessories

Through bolt all partition-mounted accessories or provide plate stiffeners within partition at accessory locations. All accessories shall be mounted to partitions at standard stalls and recessed into the wall at ADA stalls. For increased privacy, do not mount accessories back-to-back.

Provide the following accessories in each stall:

A. Toilet paper dispenser: Confirm quantities of toilet paper required per restroom with DEN Maintenance.
B. (2) Hooks mounted to the divider partitions with rubber bumpers at 38" AFF (confirm with current code).
C. Shelf, 8" wide, integrated into the wall behind the stall for belonging storage. In there is no room in the plan for the integrated shelf; provide a fold-down shelf in the women's room and no shelf in the men's room.
D. Sanitary napkin receptacle (women's room only).
E. Grab bars (ADA and ambulatory stalls only).

3.6.7 Urinal

Urinals shall be clean and durable, as well as allowing ample room per passenger to account for luggage. Room per passenger should be prioritized over the number of fixtures (assuming that code minimums are accounted for). Basis of design fixtures, accessories, and materials have been provided for reference only. Each restroom design team shall determine the appropriate design approach per the conditions.

3.6.7.1 Size

Urinal stalls shall be 2'-6" maximum width, with a preferred width of 2'-4" between stalls. Partitions shall be 4'-6" tall and 1'-4" deep and mounted 6" from above the finished floor. Provide a 10" shelf built into the wall above each urinal for personal items. Refer to Figure 3-10: Urinal Plan and Figure 3-11: Urinal Elevation and Section.

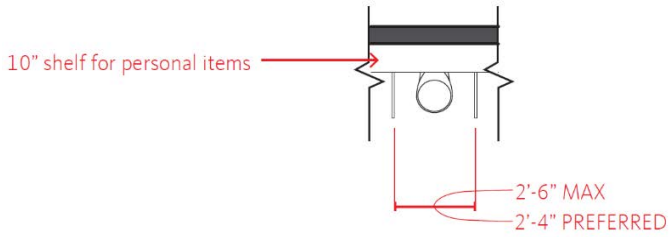

Figure 3-10: Urinal Plan

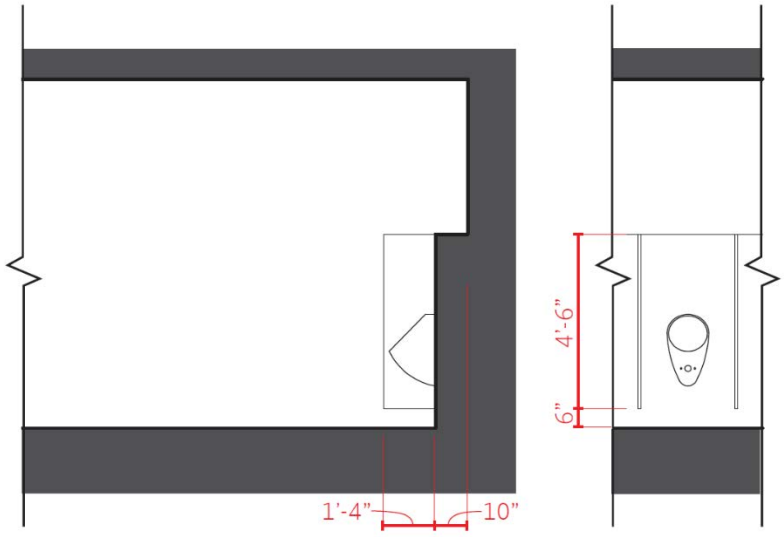

Figure 3-11: Urinal Elevation and Section

3.6.7.2 Fixtures

Provide automatic, high-efficiency, wall hung, back outlet, exposed trap type toilet. Provide a concealed flush valve. Exposed flush valves shall only be provided in locations where the utility chase was eliminated, as discussed in 3.6.4 Utility Chase.

3.6.8 Lavatory

As many passengers are traveling with bags, children, and other additional items, the lavatory area should provide extra space and be easy to use without adding stress to the airport experience. Major elements to be aware of are ergonomics for people of different ages & conditions, minimizing water being dripped onto surfaces such as countertops and floors, and intuitive design that can be understood by every international customer. The mirrors should be large to help the space feel open and clean. Each restroom design team shall determine the appropriate design approach per conditions. Refer to Figure 3-12: Lavatory Plan, Elevation, and Section.

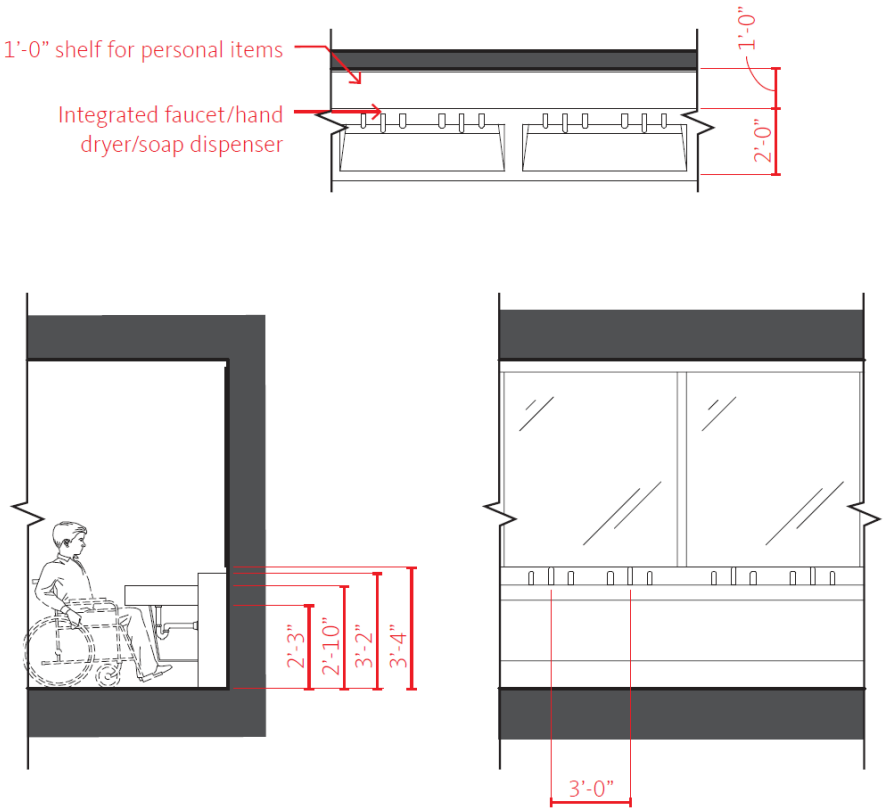

Figure 3-12: Lavatory Plan, Elevation, and Section

3.6.8.1 Dry Counter

Every restroom shall provide a dry counter that is raised 2" from the sink countertop either behind the sinks or next to every other sink. Dry counters behind sinks should be 10", and dry counters next to sinks should be 1'-0" minimum, 1'-6" preferred.

3.6.8.2 Fixtures for Public Restrooms Including Family Restrooms

Design needs to accommodate wall mounted soap dispenser. The sink basin should be integrated into the counter system as well, and if it is not, it should be designed in such a way to prevent splash-back.

A. Corian solid surface with fused joints
B. Acceptable Fixture system: See Figure 3-13: Basis of Design Fixture: Expand Width of Trough as Needed on next page as current basis of design. Coordinate with Mechanical Engineer for similar options.
C. Color: white

Figure 3-13: Basis of Design Fixture: Expand Width of Trough as Needed

3.6.8.3 Accessories

Provide the following accessories:

A. Mirror: Entire length from countertop to ceiling, with integrated lighting
B. Recessed trash receptacles: At exit
C. Family restrooms: Pull-out step for children to reach the sink and mirror
    a. Step should remain retracted in the wall unless pulled out.

3.6.9 Vanity

Every restroom should provide an area for guests to step aside from the sinks and do makeup, gather items, and check the mirror before or after a flight. The intent of the vanity is to provide this space without making it so large that customers mistake it for a baby changing area, which should be a separately defined space in the restroom. Refer to Figure 3-14: Vanity Plan, Elevation, and Section.

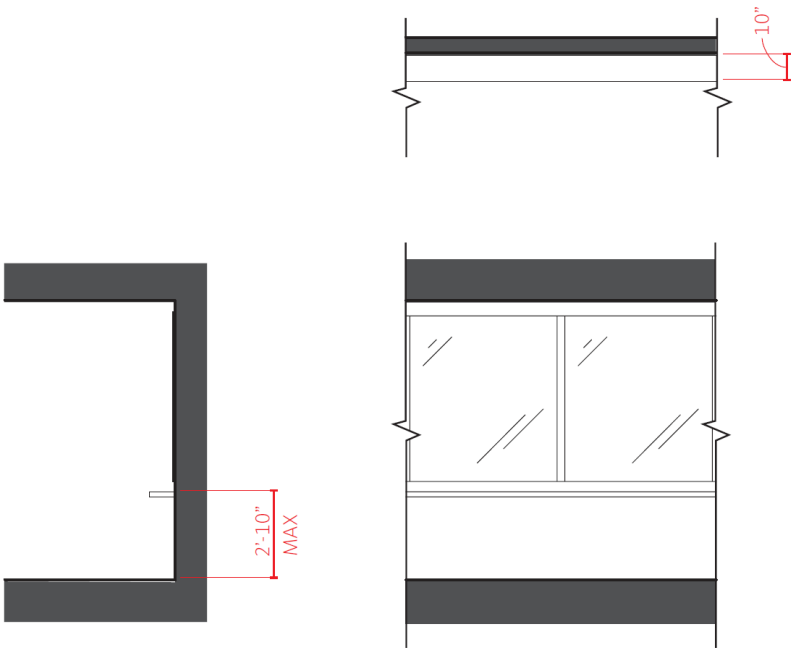

Figure 3-14: Vanity Plan, Elevation, and Section

3.6.10 Baby Changing Station

Traveling with a newborn or toddler can be a stressful experience, and designing an attractive baby changing station can lessen that stress. The quantity, location, configuration, and accessories provided for baby changing stations all play a part. Baby changing areas should be tucked out of the main circulation path for privacy and be located near the toilet compartments rather than the lavatories. Each restroom design team must determine the appropriate design approach per conditions. Refer to Figure 3-15: Baby Changing Station Plan and Elevation for recommended dimensions.

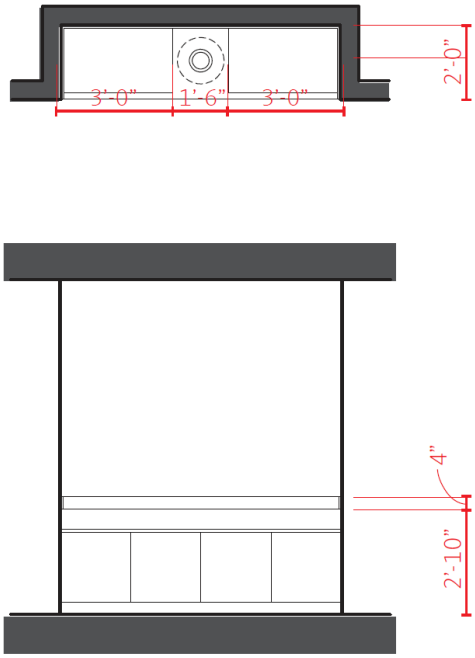

Figure 3-15: Baby Changing Station Plan and Elevation

Baby changing stations should be tucked out of the way and allow for space for a stroller and other items without making the guest feel "in the way." Do not locate baby changing stations along a queuing area or gathering area.

3.6.10.1 Materials

Provide solid surface quartz countertop to match lavatory countertops. Provide dark grey laminate on the millwork doors below for access to the trash.

3.6.10.2 Accessories

Provide the following accessories:

A. Paper towel dispenser.
B. Lotion and hand sanitizer dispenser.
C. Trash can under counter, between every (2) stations.
D. Coat hook under counter, one for each station.
E. Plastic baby changing mat
    a. Coordinate the size of the mat with the size of the inset in the quartz countertop for ease of cleaning.

3.6.11 Adult Changing Station

Plans need to maintain at least one Adult Changing Station in a Family restroom in center core concourses.

A. Basis of Design: Max-Ability Pressalit Care 3000 adjustable table. Use of manufacturere's specifications requires coordination with other project documents.

3.6.12 Restroom Remodels

When remodeling existing restrooms, it is important to carefully consider the existing footprint and find ways to meet the intent of this DSM. In some cases, constraints associated with the existing space may require some compromise, but it is important to consider all factors prior to moving forward with design.

As shown in Figure 3-16: Example Existing Restroom Plan – Concourse B, Center Core, some aspects of the example restroom floor plan do not meet the requirements of this Section. Figure 3-17: Example Proposed Restroom Remodel Plan – Concourse B, Center Core depicts a proposed remodeled layout within the same footprint, providing additional circulation space and a layout that meets the intent of this Section, although necessitating the removal of some utility chases as a result.

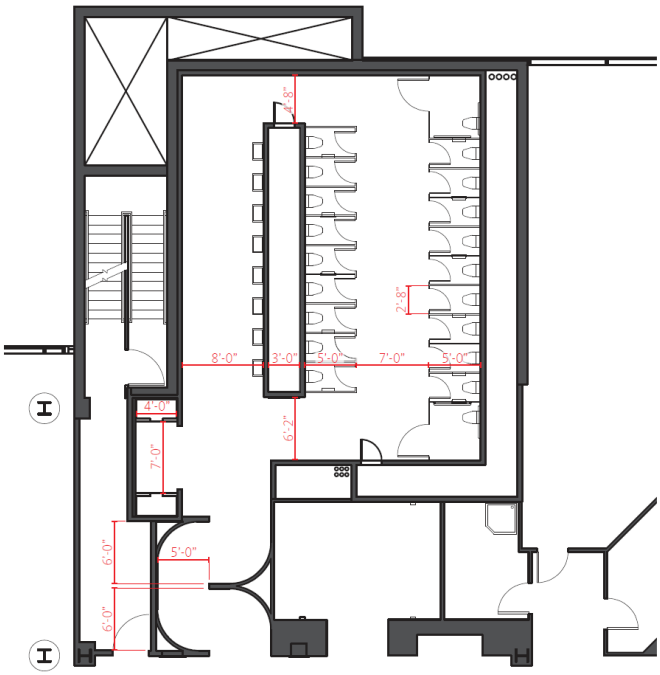

Figure 3-16: Example Existing Restroom Plan – Concourse B, Center Core

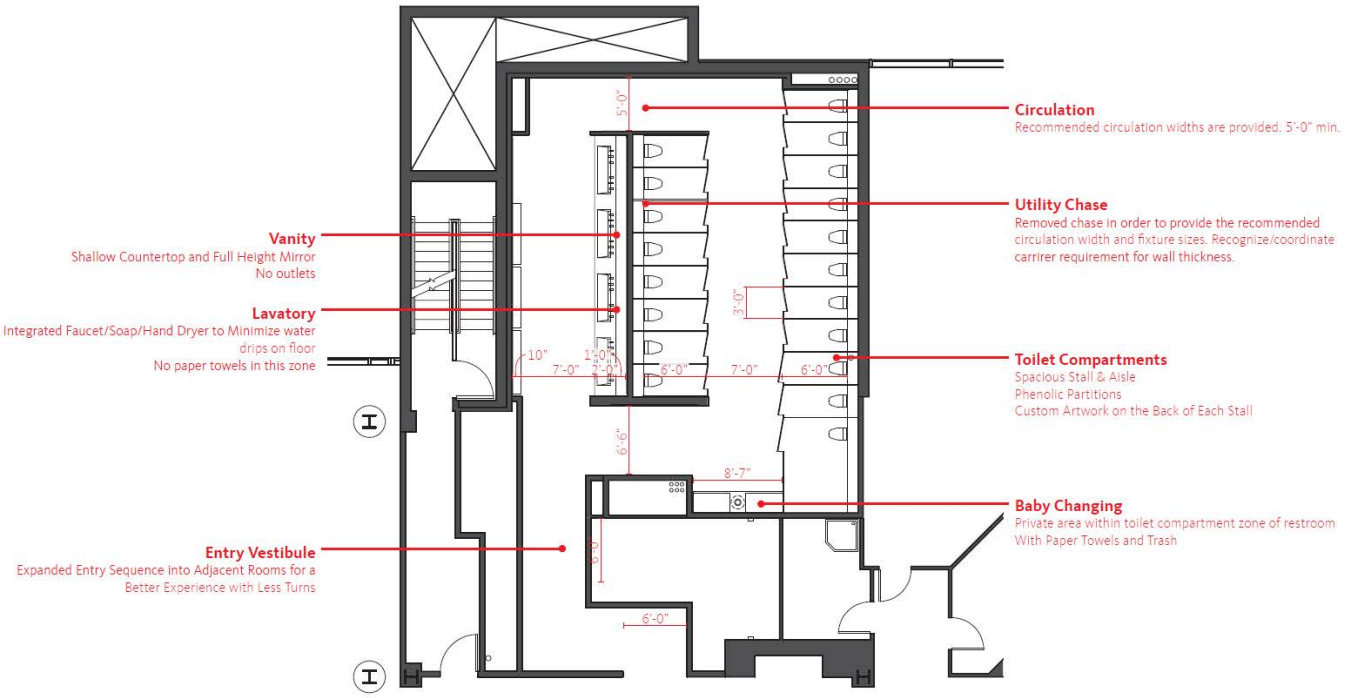

Figure 3-17: Example Proposed Restroom Remodel Plan – Concourse B, Center Core

Note that the removal of utility chases, as depicted in the example, requires a written variance request to be submitted by the designer of record.

3.6.13 Restroom Component Modules

3.6.13.1 Restroom Block

A. Typical Toilet Compartment
B. Typical Urinal Stall
C. Lavatory and Hand Dryer Counter
D. Baby Changing Area
E. Entry / Exit Vestibule

ADA Compliant Drinking Fountain with bottle filler station between restrooms

3.6.13.2 Amenities

A. Companion Care with Adult changing area
B. Family Room
C. Nursing Mother Room
D. Sensory Room

3.7 Security Checkpoint

3.7.1 Introduction

Security checkpoints need to meet all requirements of the Transportation Security Administration (TSA). They frequently have a high occupancy load and need high-level durable materials while addressing the physical comfort of standing passengers. For this reason, carpet and resilient flooring may be used in the queuing area. The security

checkpoint offers an opportunity to enhance the passenger experience as they transition from landside to airside. Refer to 3.4 Passenger Terminal Areas for material information. Conditions unique to this use are addressed below.

3.7.2 Flooring

3.7.2.1 Approved Materials

A. Resilient Type Floors
B. Carpet- limited use/queuing area

3.7.2.2 Prohibited Materials

A. Broadloom carpet at TSA screening equipment area

3.8 Connecting Walkways

3.8.1 Connections between Terminal, Concourses, and Adjacent Buildings

This section addresses the walkways that connect the various passenger use areas housed within the terminal and concourses. The connecting areas need to provide continuity in the level of service while offering a logical transition point along the journey. They provide a unique opportunity for the design that bridges between spaces of varied design and must provide cohesiveness to the whole.

Refer to 3.4 Passenger Terminal Areas for material information. Conditions unique to this use are addressed below.

3.8.2 Flooring

At these locations, the use of broadloom carpet is approved.

3.9 Customs and Border Protection Facilities

These spaces must comply with the most recent edition of the Customs and Border Protection (CBP) Regulations and be designed in accordance with CBP Facilities Design Standards Guidelines. These spaces will need to accommodate a large fluctuating number of arriving passengers at any given time. They are one of the first spaces that international passengers will experience within the airport. The finishes should be welcoming and inviting. Due to the dwell time in this location, the design of the CBP area will have a significant impact on the perception of the international arrival experience at DEN.

3.9.1 Processing Areas

3.9.1.1 Approved Flooring Materials

A. Broadloom Carpet
   Approved colors are indicated at the end of this section. Usage to be reviewed by the DRC. Custom colors are prohibited.
B. Level 5
   Only carpet may be used at primary processing areas (beginning at the bottom of escalators in the existing facility until after processing) – finish can then transfer to a hard surface.
C. Level 7 and sterile corridor
   Carpet is allowed but not mandated.
D. Epoxy Terrazzo
   The use of epoxy terrazzo must only include standardized universal colors (RAL, pantone, or other definable colors). The specific aggregate mix must be clearly defined. The use of a “match existing” designation is prohibited. All new terrazzo floors must have definable features that can be easily reproduced. Accent terrazzo colors shown on finish boards are. for example, only and should be used in

limited amounts. Selected colors should be coordinated with the approved color scheme as reviewed by the DRC.

E. Thru-Body Tile
Porcelain, granite, natural/engineered stone tile must have high compressive strength and be able to sustain repeated heavy traffic of maintenance lifts without damage.

F. Granite or Natural/Engineered Stone Slab

G. Concrete Tile

H. Porcelain Panels

I. Decorative Polymer Flooring
This product is installed like a resinous epoxy floor and only requires typical cleaning and maintenance.

3.9.1.2 Prohibited Flooring Materials

A. Carpet Tile

B. Vinyl composite tile (VCT)

C. Resilient tile or sheet product

3.9.1.3 Walls

Refer to 3.4 Passenger Terminal Areas for wall, base, and column cladding material information.

3.9.1.4 Approved Corner Guards Materials

A. Stainless Steel

B. Solid Surface

3.9.1.5 Prohibited Corner Guard Materials

A. Plastic/Resin
(Acrovyn or similar)

3.9.1.6 Approved Ceiling Materials

Baggage claim area Ceiling is required to be acoustical treated

A. Acoustical lay-in tile ceiling
No custom sizes. Use only where access is required use of broad uninterrupted expanses of lay-in ceiling in public areas requires approval by the DRC.

B. Acoustical wood ceilings
Limited to 35% maximum area grid/egg crate systems.

C. Acoustical metal ceilings

D. Acoustical metal deck
Use of exposed structure requires careful detailing of conduit, fasteners, and fittings and approval by the DRC.

E. Other panelized metals

F. Gypsum Panelized Systems
    a. Curves/angles/ geometric shapes

G. Gypsum board
    a. Painted, eggshell finish
    b. Painted, acrylic satin finish- At non-contact areas only.

H. Concrete/concrete panels

3.9.1.7 Prohibited Ceiling Materials

Exposed- In areas under 12'-0" in height

A. Narrow suspended grid systems.
B. Completely exposed
C. Any ceiling systems which require the use of specialized tools/knowledge or which require the removal of large sections of the ceiling to gain access above.

3.9.1.8 Approved Processing Areas Materials

The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC.

A. Broadloom Carpet Mohawk, construction to meet DEN standards, patterns, and colors.
B. Epoxy Terrazzo
C. Thru-Body Tile
D. Granite
E. Concrete Tile
F. Decorative Polymer Flooring
G. Porcelain Panels (floors or walls)
H. Porcelain Panels (floors or walls)
I. Engineered Stone (floors or walls)
J. Engineered Stone- Walls only
K. High Pressure Laminate Panels
L. Metal Paneling
M. Glass
N. Resin
O. Glass Tile
P. Ceramic Mosaic Tile
Q. Perforated Imaging Metal Paneling
R. Laminated MDF Panels
S. Fiber Cement Panels
T. Translucent Honeycomb Panels
U. Heavy Duty Water Based Urethane Paint
V. Metal Column Cladding
W. Solid Surface
X. Acoustical Lay-In Tile
Y. Acoustical Wood Ceiling
Z. Acoustical Metal Ceiling

3.9.2 Passenger Walkways - Circulation Areas

Refer to 3.4 Passenger Terminal Areas for material information. Conditions unique to this use are addressed below.

3.9.2.1 Flooring

All flooring selections must take ease of “wheelie bag traffic” into consideration.

3.9.2.2 Broadloom Carpet

A. Primary Material
Approved colors are indicated at the end of this section. Usage to be reviewed by the DRC. Custom colors are prohibited. Acoustical performance of selected materials is to be considered for all areas.

3.9.2.3 Approved Flooring Materials

The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC.

A. Broadloom Carpet Mohawk
Construction to meet DEN standards
B. Epoxy Terrazzo
C. Thru-Body Tile
D. Granite
E. Concrete Tile
F. Decorative Polymer Flooring
G. Porcelain Panels- Floors or walls
H. Porcelain Panels (walls only)
I. Engineered Stone- Floors or walls
J. Engineered Stone (walls only)
K. High Pressure Laminate Panels
L. Metal Paneling
M. Glass
N. Resin
O. Glass Tile
P. Ceramic Mosaic Tile
Q. Perforated Imaging Metal Paneling
R. Laminated MDF Panels
S. Fiber Cement Panels
T. Translucent Honeycomb Panels
U. Heavy Duty Water Based Urethane Paint
V. Metal Column Cladding
W. Solid Surface
X. Acoustical Lay-In Tile
Y. Acoustical Wood Ceiling
Z. Acoustical Metal Ceiling

3.9.3 Passenger Restrooms

Refer to 3.6 Passenger Restrooms.

3.9.4 CBP Offices

Refer to 3.18 Airport Support Services- Offices.

3.9.5 CBP Bag Claim/Agricultural Areas

Refer to 3.10 Baggage Claims Area for material information. Conditions unique to this use are addressed below.

3.9.5.1 Prohibited Flooring Materials

A. Carpet

3.9.6 Vestibule and Adjacent Recheck Area

Refer to 3.4 Passenger Terminal Areas

3.10 Baggage Claims Area

3.10.1 Introduction

The baggage claim areas are high-use public spaces within the terminal. These areas also provide a parting impression of the airport while setting the stage for DEN as the front door to the Rocky Mountains. Passenger orientation in the baggage claim areas is a critical goal that shall be incorporated into any design, renovation, or new construction. Main passenger throughways, decision-making points, and entries and exits shall be clearly identified via wayfinding and architectural elements. Refer to 3.4 Passenger Terminal Areas for material information. Conditions unique to this use are addressed below.

3.10.1.1 Approved Interior Flooring Materials

Hard surface required at baggage carousels. Must be slip resistant and resistant to oil stains.

3.10.1.2 Prohibited Interior Flooring Materials

A. Carpet and carpet tile

3.10.1.3 Walls

Any wall materials chosen should be conducive towards art/advertising installations.

3.11 Concourses

3.11.1 Concourse Corridors/Circulation Space

Concourse corridors provide the main circulation routes through which passengers move to and from the gate areas. Clear signage and wayfinding is critical to the passenger experience. Adequate width must be provided to handle varying numbers of passengers. Natural daylight and views to the outside should be maximized. Refer to 3.4 Passenger Terminal Areas for material information. Conditions unique to this use are addressed below.

3.11.1.1 Flooring

Hard surface (granite or epoxy terrazzo) is preferred; use of carpet requires approval by the Design Review Committee.

3.11.2 Holdrooms

Holdrooms should offer passengers a comfortable and relaxing space to utilize while awaiting departure. Natural daylight and views to the outside are important as part of the overall ambiance of these spaces. Refer to 3.4 Passenger Terminal Areas for materials, unique conditions are addressed below.

3.11.2.1 Flooring

All flooring selections must take the ease of “wheeled bag traffic” into consideration.

A. Broadloom Carpet

a. Primary Material
Approved colors are indicated at the end of this section. Usage to be reviewed by the DRC. Custom

colors are prohibited. Acoustical performance of selected materials is to be considered for all areas. Other flooring materials are to be limited use in holdrooms.

b. Any direct from outdoor entries require walk-off carpet.
c. Expansion joints are only permitted at the perimeter, not within the middle of the holdrooms.

3.11.2.2 Walls

Walls adjacent to loading/disembarkation area must comply with high-traffic area criteria.

3.11.2.3 Seating/Furniture/Fixtures

Refer to DEN standard specifications for allowable furniture/seating selections. As a standard, power hub locations, and seating need to be coordinated. Designer to co-ordinate passenger staging areas with DEN and Airline stakeholders. FIDS and GIDS are to be provided with the layout as required to ensure an optimal level of service.

3.11.3 Approved Materials

The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC.

A. Broadloom Carpet Mohawk, construction to meet DEN standards, patterns, and colors
B. Epoxy Terrazzo
C. Thru-Body Tile
D. Granite
E. Concrete Tile
F. Decorative Polymer Flooring
G. Porcelain Panels- Floors or walls
H. Porcelain Panels- Walls only
I. Engineered Stone- Floors or walls
J. Engineered Stone- Walls only
K. High Pressure Laminate Panels
L. Metal Paneling
M. Glass
N. Resin
O. Glass Tile
P. Ceramic Mosaic Tile
Q. Perforated Imaging Metal Paneling
R. Laminated MDF Panels
S. Fiber Cement Panels
T. Translucent Honeycomb Panels
U. Heavy Duty Water Based Urethane Paint
V. Metal Column Cladding
W. Solid Surface
X. Acoustical Lay-In Tile
Y. Acoustical Wood Ceiling
Z. Acoustical Metal Ceiling

3.12 Food Courts, Concession Common Areas, and Common Seating Areas

Concession Common Areas are a waypoint for many passengers before or after travel or between flights. Tenant spaces shall meet all requirements in the Tenant Development Guidelines.

3.12.1 Food Courts/Concession Common Areas/Common Seating Areas

Refer to 3.4 Passenger Terminal Areas for material information. Conditions unique to this use are addressed below.

3.12.1.1 Additional Approved Flooring Materials

A. Terrazzo Tile
B. Dyed/Polished Concrete

3.12.1.2 Additional Prohibited Flooring Materials

A. Stained Concrete where stain is surface applied, and a wax/polish wear coat is required.

3.12.1.3 Walls

For use of Metal Panel products, vandal resistant product must be used at contact areas, heavier gauge, and more scratch/scuff resistant.

3.12.1.4 Wall Base

A. Six-inch-high minimum- Dimensional base is required 1/2" minimum depth to protect against the floor cleaning machines; other thickness may be acceptable based on the actual material being used but requires DEN approval.
B. Base-to-floor transition detail is required to be conducive towards food use/cleaning.
C. Coved base is preferred.

3.12.1.5 Column Cladding

A. Additional approved material:
B. Thru-body tile: porcelain, glass, epoxy, natural or engineered stone.
    a. Tile may only be used with integral/engineered corner protection treatments. Exposed tile at corners is prohibited.

3.12.1.6 Corner Guards

Full Height – 8'-0" AFF minimum

A. Additional approved material
Integral/engineered corner protection treatments associated with approved wall materials.

3.12.1.7 Ceilings/Acoustics

A. Additional Prohibited Materials
    a. Completely Exposed

3.12.1.8 Approved Seating/Furniture/Fixtures Materials

A. Solid Surface Tops are required.
B. All seating must be Slip/Tip Resistant, including resistance to tipping forward.
C. Waste/Recycling Receptacles: Match DEN standard

3.12.1.9 Prohibited Seating/Furniture/Fixtures Materials

A. Painted Metal Finishes
B. Plastic Laminate Tops
C. Compressed/Pressed fiber board or foam

3.12.1.10 Approved Food Courts/Concession Common Areas/Common Seating Areas Materials

The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC.

A. Epoxy Terrazzo
B. Thru-Body Tile
C. Granite
D. Concrete Tile
E. Decorative Polymer Flooring
F. Terrazzo Tile
G. Dyed Polished Concrete
H. Porcelain Panels (floors or walls)
I. Porcelain Panels (walls only)
J. Engineered Stone (floors or walls)
K. Engineered Stone (walls only)
L. High Pressure Laminate Panels
M. Metal Paneling
N. Glass
O. Resin
P. Glass Tile
Q. Ceramic Mosaic Tile
R. Perforated Imaging Metal Paneling
S. Laminated MDF Panels
T. Fiber Cement Panels
U. Translucent Honeycomb Panels
V. Heavy Duty Water Based Urethane Paint
W. Metal Column Cladding
X. Solid Surface
Y. Acoustical Lay-In Tile
Z. Acoustical Wood Ceiling
AA. Acoustical Metal Ceiling

3.12.2 Concession Back of House Areas

All Materials used must be durable, abuse resistant, and cleanable

3.12.2.1 Walls

Stainless steel panels or zinc coated tear plate provide full height (8'-0" AFF) or to 4'-0" AFF with a dimensional heavy-duty chair rail (8"h x 2"d minimum).

3.12.2.2 Floor

Slip-resistant seamless floor with an integral base. Poured/troweled epoxy resinous flooring is preferred.

3.12.2.3 Ceiling

A. Vinyl faced acoustical ceiling tiles/in suspended ceiling grid system
B. Epoxy painted gypsum board

3.12.2.4 Doors

A. Approved Materials
    a. Stainless clad doors (heavy gauge), fully welded frames.
B. Prohibited Materials
    a. Knockdown frames

3.13 Concessions

3.13.1 Introduction

The concessions located throughout the terminal and concourses are intended to contribute heavily to the DEN passenger experience. These spaces must be engaging, enjoyable, and informal and are important components to place-making. The retail design elements must embody the DEN Design Principles and activate the DEN brand strategy.

Refer to Concourse Concession Design Guidelines for Concession standards and DEN Design Principles for a road map to reach the design goals and aspirations of DEN.

3.14 Passenger Boarding Bridges

Refer to the following DEN standard specification sections for passenger boarding bridge information:

3.14.1 Over the Wing Passenger Boarding Bridges

This Section specifies the furnishing and installing of new Passenger Boarding Bridges, including new bridges, new walkways, new pedestals and rotundas, and new foundations.

3.14.2 Apron Drive Passenger Boarding Bridges

This Section specifies the furnishing and installing of new Passenger Boarding Bridges, including new bridges, new walkways, new pedestals and rotundas, new foundations, removal and re-installation of the existing Pre-conditioned Air Units, and removal and re-installation of the 400 Hz aircraft power units.

3.14.3 Radial Drive Passenger Boarding Bridges

This Section specifies the design, fabrication, testing, transporting, installing, and commissioning of new Radial Drive Passenger Boarding Bridges (“PBB” or “bridge”), including new bridges, new walkways, new pedestals, and rotundas as shown on the Contract Documents.

3.15 Automated Guideway Transit System

3.15.1 Introduction

The Automated Guideway Transit System (AGTS) stations serve as the main highway for passenger circulation within the secure area of the airport. They have an obvious impact on the overall positive passenger experience while facilitating the key functional role of passenger movement throughout an airport. Effective interaction of

passengers with the AGTS system requires quick orientation in the space, the ability to focus on critical information, and the safe process of boarding and exiting the AGTS vehicles.

These requirements shall be acknowledged and addressed in the design of the stations. Clean and simple spaces that focus on the boarding areas and the immediate ability for passengers to locate the trains and circulation elements is imperative, as is visual access to the vertical circulation. Refer to 3.4 Passenger Terminal Areas for material information. Conditions unique to this use are addressed below.

3.15.2 Stations

Refer to 3.4 Passenger Terminal Areas for materials, unique conditions addressed below.

3.15.2.1 Flooring

A. Additional approved materials:
    a. Terrazzo Tile
B. Prohibited Materials
    a. Carpet and carpet tile
    b. Wood/Engineered wood/laminate
    c. Resilient flooring, tile, or sheet product, VCT
    d. Exposed/sealed/stained concrete
    e. Ceramic tile/porcelain tile (including thru body)
    f. Raised transition strips. Material transitions in high traffic areas shall be flush.

3.15.2.2 Walls

A. Prohibited Materials
    a. Faux Finish Materials
    b. Speckle Paint Finish (Polomyx or equivalent) – only acceptable for use in repair at transitional existing locations or at locations where new projects meet existing areas.
    c. Vinyl Wall Coverings
    d. Painted and power coated metals
    e. Perforated metal
    f. Composite wood veneer/ wood look paneling

3.15.2.3 Wall Base – (1'-0" minimum height)

A. Approved Materials
    a. Epoxy Terrazzo
    b. Stainless steel (heavy gauge, reinforced backing)
    c. Stone/Tile- thru-body product
    d. Engineered Stone/Tile
    e. Thru-body Porcelain
B. Prohibited Materials
    a. Plastic (Acrovyn)
    b. Resilient products

3.15.2.4 Ceilings

A. Approved Materials
    a. GFRG – Glass Fiber Reinforced Gypsum
    b. Gypsum- limit use to 25% of area for acoustical considerations.
B. Prohibited Materials
    a. Exposed (in areas under 12'-0" in height)

b. Narrow suspended grids systems.
c. Completely Exposed
d. Any ceiling systems which require the use of specialized tools/knowledge or removal of large sections of the ceiling system to gain access above.
e. No open lattice/grid ceiling is permitted in low areas accessible by the public. All ceilings less than 12'-0" AFF must be sealed to prevent public access.

3.15.2.5 AGTS Doors (Entry Portals)

A. Glass Doors (hardware size verification will be required on existing stations)
B. Stainless Steel Panel Doors

3.15.2.6 Approved Materials

The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC.

A. Epoxy Terrazzo
B. Terrazzo Tile
C. Granite
D. Decorative Polymer Flooring
E. Porcelain Panels
F. Engineered Stone (floors or walls)
G. Engineered Stone (walls only)
H. High Pressure Laminate Panels
I. Metal Paneling
J. Glass
K. Fiber Cement Panels
L. Heavy Duty Water Based Urethane Paint
M. Metal Column Cladding
N. Acoustical Lay-In Tile
O. Acoustical Wood Ceiling
P. Acoustical Metal Ceiling

3.16 Vertical Circulation

3.16.1 Introduction

Vertical circulation elements, which consist primarily of escalators, elevators, and stairs, are an important component of any multilevel public spaces. Within the existing terminal/concourse areas, the vertical circulation cores play a significant role in facilitating passenger and employee flow. A key objective in the proper functioning of vertical circulation is strategic location, visibility, and adequate capacity. Reference DEN standard specifications for additional requirements.

3.16.2 Elevators

3.16.2.1 Public Passenger Elevator Cabs (within weight allowance per manuf.)

A. Flooring
    a. Approved Materials
        1. Porcelain, Granite, Natural/Engineered Stone- Thru body tile or slab
        2. Porcelain Panels

b. Prohibited Materials
    1. Ceramic tile (non thru-body)
    2. Rubber flooring/resilient tile or sheet product
    3. Walk off mat/carpet
    4. Wood/laminate

B. Walls (Must be vandal resistant)
    a. Approved Materials
        1. Stainless Steel Panels (reinforced/heavy gauge)
        2. Back-lit Stone Panels
        3. Glass Panels
        4. High Pressure Laminate Panels
        5. Plastic/Resin Panels
        6. Other Panelized Metals
        7. Stone Tile (engineered)
    b. Prohibited Materials
        1. PLAM Panels
        2. Perforated Metal
        3. Wood Panels

C. Ceilings
    a. Approved Materials
        1. Stainless Steel Panels
        2. Luminous Panel/Resin/Plastic
        3. Wood Panels
    b. Prohibited Materials
        1. Perforated Metal Panels

D. Lighting
    a. LED Downlights
    b. LED Strip Cove Lights
    c. Luminous Ceiling

E. Elevator Entry Portals
    a. Stainless Steel (reinforced)
    b. Glass Panels
    c. Other Metals

F. Approved Materials
    The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC.
    a. Thru-Body Tile
    b. Granite
    c. Porcelain Panels (walls only)
    d. Engineered Stone (floors or walls)
    e. Engineered Stone (walls only)
    f. High Pressure Laminate Panels
    g. Metal Paneling
    h. Glass
    i. Resin

3.16.2.2 Non-Public (Service)

A. Flooring
    a. Zinc coated tear plate
    b. Rubber Floor

B. Walls
    a. Removable Padding (hooks)
    b. Car Buffer Rails
    c. Zinc coated tear plate
    d. Powder Coated Steel
C. Ceilings
    a. Stainless Steel
    b. Powder Coated Steel
D. Lighting
    a. Linear LED Light Fixtures
E. Doors
    a. Overhead Gates where any cart traffic (not where passengers can occupy)
    b. Sliding Doors
F. Entry Portal
    a. Stainless Steel (reinforced/heavy gauge)

3.16.3 Escalators/Moving Walks

A. Glass Balustrade Panels
B. Stainless Steel Panels
C. LED Comb Lighting
D. Abuse resistant shroud (reinforced stainless steel, backing)
E. Conveyance Location Reporting System
    a. Coordinate conveyance reporting system programming to call the operations center at DEN.
    b. Integrate Wi-fi or hard-wired device(s) with conveyance controls
    c. Commission system with DEN Operations prior to permit closeout

3.16.4 Stairs

3.16.4.1 Interior Public Stairs (Enclosed) – no exposed utilities

A. Railing
    a. Approved Materials
        1. Stainless Steel
        2. Wood/Engineered Wood
    b. Prohibited Materials
        1. Powder coated steel
B. Stair Tread/Riser (non-slip)
    a. Stone/Engineered
    b. Thru-Body Tile with metal edges
    c. Terrazzo
    d. Epoxy Terrazzo
    Must utilize standardized universal colors (RAL, pantone, or other definable colors only.) Specific aggregate mix must be included. “Match existing” designation is prohibited for future projects. All new terrazzo floors must have definable features that can be easily reproduced. Accent terrazzo colors shown on finish boards are, for example, only and should be used in limited amounts. Selected colors should be coordinated with the approved color scheme and reviewed at DRC.
C. Precast Concrete (Hotel Staircase)
D. Concrete Tile
    a. Walls

b. Gypsum Board, painted, acrylic satin finish (non-contact areas)
c. Stone/Engineered
d. High Pressure Laminate Panels
e. Resin/Plastic (decorative only)
f. Acoustical Panels (non-contact areas)
g. Ceilings
- Wood Panels/Acoustical
- Metal Panels/Acoustical
- Gypsum Board, painted, eggshell finish

E. Approved Materials
The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC.

a. Epoxy Terrazzo
b. Thru-Body Tile
c. Granite
d. Concrete Tile
e. Porcelain Panels (walls only)
f. Engineered Stone (floors or walls)
g. Engineered Stone (walls only)
h. High Pressure Laminate Panels
i. Resin
j. Acoustical Wood Ceiling
k. Acoustical Metal Ceiling

3.16.4.2 Interior Public Stairs (Open)

A. Handrail
a. Approved Materials
1. Stainless Steel
2. Wood/Engineered Wood
b. Prohibited Materials
1. Powder coated steel

B. Railing Panel (Balustrade Panel)
a. Tempered/Safety Glass
b. Metal Panel
c. Edge-lit LED Panel
d. Cable Ties
e. Stainless Steel
f. Resin/Plastic

C. Stair Tread/Riser
a. Terrazzo
b. Thru-Body Tile with metal edges
c. Stone/Engineered
d. Sealed/Stained Concrete
e. Epoxy Terrazzo (Hotel Stair Material)
Must utilize standardized universal colors (RAL, pantone, or other definable colors only.) Specific aggregate mix must be included. “Match existing” designation is prohibited for future projects. All new terrazzo floors must have definable features that can be easily reproduced.
f. Precast Concrete (Hotel Staircase)
g. Concrete Tile

D. Approved Materials
The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC.
    a. Epoxy Terrazzo
    b. Thru-Body Tile
    c. Granite
    d. Concrete Tile
    e. Engineered Stone (floors)
    f. Resin

3.16.4.3 Interior Non-Public Stairs

A. Railing
    a. Powder coated steel
    b. Painted Steel
B. Stair Tread/Riser
    a. Sealed concrete
    b. Metal Grating (exterior only)
    c. Precast Concrete (Hotel Staircase)
C. Walls
    a. CMU
    b. Sealed Concrete
    c. Gypsum (zinc coated tear plate wainscot), painted, heavy duty water-based urethane
    d. Gypsum (abuse resistant at contact areas), painted, heavy duty water-based urethane
D. Ceilings
    a. Open to Structure
    b. Acoustical Lay-In
E. Approved Materials
The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC.
    a. Heavy Duty Water Based Urethane Paint

3.17 Airport Support Services

3.17.1 Introduction

Support spaces should be designed with operational needs in mind, as each area has unique operational requirements. Primary emphasis is on durable and low-maintenance materials. Any exterior façades visible to passengers shall be complementary to the building exterior. Wall and corner protection shall be standard at any areas subject to high traffic or impact. The general guidelines of this section shall apply to all support spaces.

3.17.2 Break Rooms

Refer to 3.18 Airport Support Services- Offices

3.17.3 Service Corridors

Service corridors should be constructed of durable and low maintenance materials; wall protection should be standard at any impact areas.

A. Flooring
    a. Sealed concrete
B. Prohibited Materials

a. All other materials. Alternate materials may be approved with a demonstrated need.

C. Walls
   a. Gypsum Board, painted, acrylic satin finish (non-contact areas)
   b. Zinc coated tear plate
   c. Concrete Masonry Unit, painted, heavy duty water-based urethane paint

D. Wall Base
   a. Rubber (at gypsum board walls, non-contact areas only)
   b. Zinc coated tear plate

E. Column Cladding
   a. Zinc coated tear plate

F. Corner Guards
   a. Stainless Steel
   b. Heavy duty EPDM

G. Ceilings
   a. Acoustical ceiling tile (standard sizes only)
   b. Open to structure
   c. Gypsum board, painted, eggshell finish, with appropriate access
   d. Prohibited Materials
   - Narrow grid

H. Approved Materials
   The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC. Refer to 3.0 General Architectural Information for additional information on materials.
   a. Heavy Duty Water Based Urethane Paint
   b. Rubber Base

3.17.4 Ramp Level (Baggage Make-Up)

Materials should be utilitarian in nature and must resist severe abuse. TSA areas must match TSA standards.

A. Flooring
   a. Sealed concrete
   b. Resinous epoxy flooring

B. Walls
   a. Utilitarian areas are an important part of the secure perimeter and materials must maintain integrity of the perimeter. Composition is important.
   b. Concrete, painted, heavy duty water-based urethane paint
   c. Concrete masonry unit, painted, heavy duty water-based urethane paint
   d. Zinc coated tear plate (8'-0" AFF)
   e. Gypsum Board, painted, acrylic satin finish (non- contact areas)
   f. Bumper rails, traffic rated rails. Steel channels welded to bollards in contact areas, where tugs and bag cart traffic is prevalent.

C. Wall Base (Where Applicable)
   a. Rubber
   b. Stainless Steel, heavy gauge/reinforced
   c. Resinous epoxy flooring cove base

D. Column Cladding
   a. Bumper rails

E. Corner Guards

a. Stainless Steel
b. Heavy duty EPDM
c. Steel bollards required, where exposed to tug and cart traffic. Core drilled installation is required except at precast concrete or structural floor locations.

F. Ceilings
a. Open to Structure
b. Gypsum, painted, eggshell finish, where required for fire rating
c. Acoustical ceiling tile (standard size only)
d. Prohibited Materials
- Narrow grid

G. Overhead Doors
a. Overhead high-speed fabric doors
b. Steel Coiling Doors (at Secure Perimeter and Tritcherator rooms only)

H. Personnel Doors
a. Fiberglass

I. Acoustical Considerations
a. Acoustical separations required where adjacent to passenger areas or DEN offices.

J. Approved Materials
The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC. Refer to 3.0 General Architectural Information for additional information on materials.
a. Resinous Flooring
b. Heavy Duty Water Based Urethane Paint
c. Rubber Base

3.18 Airport Support Services - Offices

3.18.1 Introduction

While support spaces should be designed with operational needs in mind, office, and associated work areas must also promote a positive, healthy, and productive work environment for the occupants while allowing for future flexibility and adaptation of the space. Any interior spaces accessible by the public must compliment the design of adjacent airport spaces. Any exterior façades visible to passengers shall be complementary to the building exterior. The general guidelines of this section shall apply to all DEN capitalized assets.

3.18.2 Business Offices (Offices occupied or maintained by DEN)

A. Flooring
a. Carpet tile preferred; broadloom carpet considered for public/feature areas
b. No-wax resilient tile or sheet flooring- stairwells, janitor closet, and storage areas
c. Dyed Polished Concrete may be approved under special circumstances
d. Prohibited Materials
- Vinyl Composition Tile
- Stained (topical) or sealed concrete

B. Walls
a. Gypsum board, painted, acrylic satin finish
b. Dry erase wallcovering
c. Prohibited Materials
- Vinyl Wallcovering
- Exposed Concrete Masonry Units

C. Wall Base- 4" high minimum

a. Rubber or resilient
b. Stainless steel (heavy gauge/reinforced)
c. Prohibited Materials
- Carpet
- Wood

D. Column Cladding (corners must have stainless steel corner guards/ corner treatment)
a. Gypsum board, painted, acrylic satin finish
b. Prohibited Materials
- Wood

E. Corner Guards- (circulation spaces)
a. Stainless Steel
b. Solid Surface
c. Resin/Plastic
d. Prohibited Materials
- Clear Plastic
- Wood

F. Ceilings
Acoustical separations required where adjacent to passenger areas or DEN offices.
a. Gypsum board, painted, eggshell finish (accent and feature area only)
b. Acoustical ceiling tile (standard size only)
c. Open to structure may be approved under special circumstances
d. Prohibited Materials
- Narrow grid

G. Furnishings
Approved manufacturers of systems furniture are Steelcase, Herman Miller, and Haworth. In an interest to reduce the City's surplus of various systems and standardize maintenance, we are focused on one particular basis of design at this time.

H. Basis of Design for System Furnishings:
1. Basic Employee Cubicle Station:
a. Steelcase Answer
b. Frameless Glass Add Up
c. Height Adjustable desk with Fixed Return
d. Mobile box file pedestal
e. Base Power infeed with 3+1 power, 2 duplexes per station
2. Office Station:
a. Steelcase currency
b. L- shaped height adjustable desk
c. Modesty Panel option where applicable
d. Mobile box file pedestal with cushion
3. Office chair:
a. Steelcase Amia

3.18.3 Break Rooms

A. Floors
a. No-wax resilient flooring

B. Casework- Cabinets
a. Laboratory grade cabinets

C. Casework- Countertops
a. Solid surface

b. Quartz
c. Prohibited Materials
- Plastic Laminate

D. Equipment
a. Dishwasher
b. Coffee Machine
c. Full Height Refrigerator
d. Garbage Disposal
e. Microwave (above counter), must be accessible

3.18.4 Quiet Rooms

Quiet rooms are one or more rooms or spaces provided for people to rest and relax, but not to be a dormitory or sleeping unit. Quiet rooms are only allowed on the 5th and 6th levels of the Jeppesen Terminal and on the Apron Level and above on the concourses. Quiet rooms may be considered for airline personnel while between flights or Airport personnel required to be on call at night or longer than 12 hours. Because quiet rooms are not defined in the current building code, the designer must develop and obtain approval of an administrative modification to obtain agreement from the AHJ on quiet room requirements.

Design conditions for an acceptable administrative modification shall be coordinated with the AHJ. Conditions may include, but are not limited to:

A. Construction type shall not be less than II-B
B. A single quiet room may contain up to 10 lounge chairs in one or more compartments for a maximum load of 10
C. Shall be sprinkled, Ordinary Hazard 1
D. Shall have a smoke detector in the area of the quiet room
E. Shall annunciate individually at the Fire Command Center
F. Shall have a Low Frequency Sounder as part of the smoke detector assembly
G. Any fabric curtains are required to be listed as passing NFPA 701
H. Shall be separated from the adjacent areas with a smoke partition
I. At least one Emergency Communication Speaker shall be in the quiet room
J. A 15 cd Strobe shall be located with each lounger of the quiet room separated by a curtain
K. Lighting may be lowered at the entrance to the quiet room. Upon alarm activation, the illumination shall return to normal.
L. Refer to STC table in the acoustical section for acoustical properties of a quiet room

3.18.5 Approved Materials

The following materials have been approved by DEN for use in this area. Method/implementation of use requires DRC approval. Additional materials will be allowed as approved by the DRC. Refer to 3.0 General Architectural Information for additional information on materials.

A. Carpet Tile Mohawk, construction to meet DEN standards, patterns, and colors listed below
B. No-wax Resilient Tile Flooring
C. No-wax Resilient Sheet Flooring
D. Dyed Polished Concrete
E. Dry Erase Wallcovering
F. Rubber Base
G. Solid Surface
H. Casework-Cabinets

I. Resin Corner Guard

3.19 Non-Passenger Restrooms

3.19.1 Introduction

This section deals with non-passenger restrooms or non-public restrooms. A restroom should provide privacy and functionality for the most valuable resource, staff, and tenants. With airports becoming used around-the-clock more than ever, durability is a major concern. DEN wants to provide non-passenger restrooms that are utilitarian, functional, accessible, durable, clean, and bright.

A. Every single user toilet room shall be designed accessible.
B. Lavatories shall be of universal design. There shall be no distinction between accessible lavatories and standard lavatories.
C. Mirrors shall be mounted with the bottom edge at 40" AFF if mounted over the counter or lavatory.
D. Restroom accessories (paper towel dispenser, hand dryer, soap dispenser, etc.) will be mounted 44"-48" AFF. When determining the mounting location of restroom accessories, the operable parts (start buttons, dispensing mechanisms, sensors, etc.) will be located no more than 48 inches AFF.
E. Entry Portals Accessibility standards should be carefully studied. Meeting or exceeding the minimum maneuvering clearances at doorways is an important aspect in design to ensure proper access.

These back-of-house spaces should be durable and utilitarian but also pleasant, clean, and accessible. The universal design approach includes improved usability characteristics to ensure they are usable to the greatest extent possible by people of all ages and abilities, even if a particular feature has a more limited target group.

3.19.2 Public

Refer to 3.6 Passenger Restrooms for requirements for restrooms that may be utilized by the public.

3.19.3 Non-Public (service/back of house)

A. Flooring
    a. Tile- Through body porcelain
    b. Resinous flooring
B. Wall Finishes
    a. Tile- through body porcelain
    b. Porcelain panel
C. Counter Tops
    a. Solid surface
D. Ceiling
    a. Acoustical Metal Ceilings
    b. Painted Gypsum Board
E. Approved Materials
    a. Resinous Flooring
    b. Thru-Body Tile
    c. Porcelain Panels
    d. Heavy Duty Water Based Urethane Paint
    e. Acoustical Metal Ceiling
    f. Solid Surface

3.20 Signage and Wayfinding

3.20.1 General Requirements

All signage and wayfinding elements shall be designed as a uniform and cohesive system. The design and utilization is intended to be integral to the overall architectural design theme and in accordance with the DEN Design Principles. Implementation of dynamic signage and digital displays is strongly encouraged. Signs shall comply with all DEN agency requirements, Federal, State, and local code; Den agency requirements, and international standards.

3.20.2 Design Requirements

3.20.2.1 Sign Construction

Signs that frequently change must be made of local, readily available materials. All message changes must be streamlined to update changes overnight if necessary. Signs that historically change most frequently at DEN are tenant listings and parking signs.

3.20.2.2 Flexibility

Frequently updated signs must be easily maintained and not require sole sourced parts. Include, “spare” panels for frequently revised sign faces for DEN Graphic Shop use. Spare panes allow the changes to be made in the shop and changed out in the field. Unique custom signs are not acceptable.

3.21 Life Safety Equipment

3.21.1 General Requirements

All Life Safety Equipment elements shall be designed as part of a uniform and cohesive system as described in Life Safety Master Plans found in the Life Safety Design Standards Manual. The design and utilization are intended to be integral to the overall Life Safety system as well as the architectural design principles. Signs shall comply with all DEN agency requirements, Federal, State, and local code; DEN agency requirements; and internal standards.

3.21.2 Design Requirements

Refer to the Life Safety DSM for detailed requirements of Fire Protection, Fire Alarm, Emergency Communication, and Smoke Control system design and specifications.

3.21.2.1 Fire Extinguisher and Fire Department Connect Cabinets

Unlike the Defibrillator Cabinet with data connection for Fire Alarm tie-in, the Fire Extinguisher Cabinets are not connected. However, the cabinets must have an ADA-compliant handle and must not be locked. Extinguishers can be in hose cabinets if they are unlocked and accessible. Being accessible also includes each to the Extinguisher valve handle. Generally, these architectural accessories are fire-rated and recessed Stainless Steel Cabinets in all areas.

3.21.2.2 Automated External Defibrillator (AED) Cabinets

Provide AEDs in semi-recessed cabinets. Each cabinet shall be provided with a data line reporting to the DEN Communication Center, generating an alarm when the cabinet is opened. Power is required at the cabinet to charge the AED unit. Refer to Section 104313: Defibrillator Cabinets and Duress Alarms.

End of Chapter

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Chapter 4 - Outlying Buildings

4.0 General Information

Outlying buildings are ancillary to the main Airport Terminal Complex. These buildings are typically more utilitarian in nature and are remotely located. However, these buildings may still act as the first or last impression of the Airport for various customer segments and therefore require careful design consideration.

The general design aesthetic is to be aviation based. As such, these buildings are to follow the design guidelines set forth below.

4.1 Building Exteriors

Designer must justify the selected building orientation and provide a glare study as required. DEN Land Use Master Plan shall be referenced for zoning and additional requirements specific to the areas for outlying buildings.

A. Overall Façade and Glazing
    a. Approved Materials
        1. Metal panel, aluminum composite panel
        2. Architectural precast concrete
        3. Curtain wall/storefront glazing
        4. Wood paneling, accents only
        5. Natural stone, accents only
        6. Masonry used for accents only
    b. Prohibited Materials
        1. Glass block
        2. EIFS
        3. Wood
        4. Brick

B. Curbside Façade- The design of curbside areas shall be integrated with signage and wayfinding to create a seamless experience for arriving and departing customers.
    a. Approved Materials
        1. Curtain wall/storefront glazing
        2. Metal panel
        3. Architectural precast concrete
    b. Prohibited Materials
        1. Glass block
        2. Wood
        3. Exposed concrete masonry units
        4. Brick

C. Canopies and Awnings (if used)
    a. Textile/polytetrafluoroethylene (PTFE)
    b. Metal panel
    c. Glass
    d. Solar panels (use will require glare study)

D. Doors and Openings
    a. Stainless steel
    b. Hollow metal (painted)
    c. Glass/aluminum

E. Overhead Service Doors
    a. Approved Materials
        1. High-speed fabric doors

2. High wind rated/insulated doors

b. Prohibited Materials
1. Sectional doors
2. Rolling steel doors

F. Overhangs and Soffits
Must be finished construction, designed as part of the envelope. Bird roosting opportunities are to be minimized. Exposed/open soffits are prohibited.

G. Guardrails
Must compliment the architectural style of building.

H. Services (Trash Enclosures/Generator/etc.)
The design must screen services from public view with the following approved materials/features:

a. Berms
b. Metal panel enclosure/screen
c. Concrete masonry unit enclosure/screen
d. Precast architectural concrete enclosure/screen
e. Solar panels (use will require a glare study)

The following materials are prohibited:

a. Wood
b. Brick
c. EIFS
d. Glass block

I. Exterior Building Lighting
Refer to the DEN Design Principles and Electrical DSM for exterior building lighting design guidance.

J. Building Address signage
To be reviewed by the DRC

a. Signage to be white/translucent as standard.

4.2 Interior Finishes

A. For all DEN capitalized assets, refer to the applicable terminal standards for public and service/support spaces.

B. Non-DEN capitalized assets require DRC approval on aesthetics.

4.3 Building Signage

The Intent of these standards is to allow flexibility in signage design and location while following a coordinated program ensuring a higher standard of design quality and a cohesive feel for signage throughout the airport. There are multiple types of signs that building designers may choose to employ. Examples are outlined below; all signage is subject to DRC review and approval. Refer to the DEN Design Principles and Electrical DSM for exterior building lighting design guidance.

A. Signage Categories

a. Short-Distance Signage
Signs viewed from a short distance are generally smaller in scale and provide greater visibility at the pedestrian level and a greater degree of visual interest to the overall building composition.

b. Long-Distance Signage
Signs viewed from a long distance are typically larger in scale and intended to identify a business from a distance. In accordance with this intent, the placement of these signs will be higher on the building facade and may be strategically located for the greatest visibility to the intended audience.

B. Signage Types

a. Wall Signs
Wall-mounted signs are permitted to be placed vertically or horizontally on the building fascia above the first-floor glazing and up to the height of the roofline. Signs to be architecturally respectful to the building on which it is placed. Dimensional letters and logo forms are fabricated from suitable materials that have a translucent, painted, gilded, or metal finish. Letters are to be illuminated with an external point source; bracket mounted light fixtures that accentuate the form of the letter and logo forms.

b. Projecting Signs
"Blade" signs mounted perpendicular to the building facade that project from the building 18"-48". The design and materials should convey the personality and display the unique character of each tenant and be complimentary to the architecture upon which they are located. Only one blade sign per tenant storefront is allowed and must be approved by DRC.

c. Canopy Signs
Defined by their association with architectural entry canopies. Colors, finishes, and materials used for signs shall be complementary to the facade or architectural entry element.

d. Window Signs
Signs placed directly onto or behind the second surface of a glass of windows and/or doors.

e. Ground Signs
Freestanding monuments or pylons located away from a building, within the property landscape area, including Major Tenant Signs. Material may include but are not limited to, metals, stone masonry, concrete, or other materials that match or complement the building and hardscape palettes.

f. Roof Signs
Signs attached to the roof or parapet of a building which projects above the roof line or lowest height of the parapet to which it is attached. Roof signs should be designed to appear as an integral part of the building to which they are attached. Materials should complement the building's material palette.

C. Material and Performance requirements

a. Approved Materials
1. Masonry
2. Metals
3. Fasteners- all exposed fasteners shall be tamperproof and resistant to corrosion.
4. Paints and finishes
5. Vinyl film
6. Digital prints

b. Prohibited Materials
1. Animated, audible, or flashing signs
2. Backlit sign boxes
3. Two-dimensional signs or lettering affixed directly to the storefront or base building soffit.
4. Internally lit neon-embedded pan channel letters, with or without face material
5. Exposed or visible neon
6. Roof mounted signage
7. Signage using foam core, cloth, paper, or any other material deemed to be of low quality by DEN and their retail architect.

DEN reserves the right to reject any signage proposal it deems to be inferior design, quality, or durability. DEN also reserves the right to request the removal of any advertising or promotional signage it deems inappropriate. Alternatively, this signage shall be removed by the Airport at the building owner's expense.

End of Chapter

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Chapter 5 - Technical Specification Requirements

5.0 General

Designers are required to provide project specifications on all DEN projects in accordance with the Standards and Criteria DSM, Chapter 11. The project specifications should encompass all aspects of the project and be based on industry-standard construction methods and products, with content based on the DEN Standard Specifications (where available) or from an industry-standard guide specification.

5.0.1 How to Use This Chapter

5.0.1.1 DEN Standard Specifications

The DEN Standard Specifications listed in this chapter have been developed to ensure project consistency and compliance with DEN policy and procedure. For sections available as DEN Standard Specifications, the designer must obtain and use these sections for their project.

5.0.1.2 DEN Technical Requirements

This chapter, as well as similar chapters in other DSMs, provides DEN-specific requirements that must be included in nonstandard specifications for all DEN projects. An itemized list of DEN-specific technical specification requirements is provided, which may include general requirements, product requirements, and execution requirements. The designer shall incorporate these requirements into their project specification content as appropriate for the project scope. Requirements are provided in an outline format similar to construction specifications for ease of incorporation. Content may be copied directly from this chapter, with article/paragraph numbering and structure modifications as needed to ensure a cohesive document.

Note: *This chapter is intended to be used as an aid to development of a project specification and* ***is not intended to represent a complete specification as presented****.*

The designer is responsible for developing a complete specification, incorporating the requirements of this chapter, which encompasses all aspects of the project and complies with general specification requirements outlined in the Standards & Criteria DSM, Chapter 11. After incorporating the requirements listed herein, the project specification should be reviewed to ensure it is free of redundant and/or conflicting information.

5.0.1.3 Notes to the Designer

Notes to the designer are included throughout the chapter, shown in colored or highlighted text. These are provided for guidance and clarification of requirements, and are intended for use only by the designer in development of their specification.

Notes to the designer shall not be incorporated into the final project specifications.

5.0.2 Specification Numbering

5.0.2.1 Numbering of Deliverables

Project deliverables should utilize Section names and numbers contained in the latest edition of MasterFormat Numbers & Titles at the time of project kickoff, which may vary from those in this chapter. It is the designer's responsibility to ensure that all applicable DEN requirements are reflected accurately in the appropriate sections of the project specifications.

5.0.2.2 Numbering Provided in This Chapter

Specification section names and numbers provided in this chapter are based on MasterFormat Numbers & Titles, 2014 edition.

5.0.3 Product and Manufacturer Listings

Where manufacturers and products are listed in this chapter, they represent approved manufacturers and/or products. Do not include additional manufacturers and/or products for that Article or paragraph without written permission from the DEN Project Manager.

For sections without manufacturer and/or products listed in this chapter, designer shall select a basis of design based on current industry standards which complies with all applicable requirements in this and other DEN DSMs, the DEN Standard Specifications, and the Denver Building Code. Provide at least (2) acceptable alternatives to the basis of design for all products, for a total of (3) or more acceptable products, except where a sole-source selection has been approved in writing by the DEN Project Manager.

5.1 DEN Standard Architectural Specifications

Refer to Table 5-1: DEN Standard Specifications – Division 8: Openings, Table 5-2: DEN Standard Specifications – Division 12: Furnishings and Table 5-3: DEN Standard Specifications – Division 14: Conveying Equipment for a listing of DEN standard architectural specification sections. The following Sections must be obtained from the DEN Project Manager when required for use in the project.

Table 5-1: DEN Standard Specifications – Division 8: Openings

Section No.	Section Title
087100	Door Hardware

Table 5-2: DEN Standard Specifications – Division 12: Furnishings

Section No.	Section Title
129300	Site Furnishings

Table 5-3: DEN Standard Specifications – Division 14: Conveying Equipment

Section No.	Section Title
147300	Over the Wing Passenger Boarding Bridges
147310	Apron Drive Passenger Boarding Bridges
147320	Radial Drive Passenger Boarding Bridges

5.2 DEN Technical Requirements – Division 02: Existing Conditions

Except where directed by designer notes, add the following requirements to all project specification sections. Where there are similar or matching specification section names, include all content below in addition to the content in the generic specifications. The content below may be omitted where related equipment, mechanical systems, and furnishments are not in the project scope.

Section 024119: Selective Demolition

PART 1 GENERAL

1.01 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain DEN's property, demolished materials shall become the Contractor's property and shall be removed from the Project site.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.02 FIELD CONDITIONS

A. When there are occupied portions of buildings immediately adjacent to selective demolition area, conduct selective demolition so DEN's or tenant's operations will not be disrupted.

1. Provide not less than 72 hours' notice to DEN Project Manager of activities that will affect DEN's or tenant's operations.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before selective demolition, Owner will remove the following items:

a. <Insert items to be removed by Owner>.

C. Notify DEN Project Manager of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work.
2. If suspected hazardous materials are encountered, do not disturb; immediately notify DEN Project Manager. Hazardous materials will be removed by Owner under a separate contract.

1.03 INFORMATIONAL SUBMITTALS

A. Submit Schedule of Selective Demolition Activities. Indicate the Following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure DEN's and tenant's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Do not interrupt utility services without prior written request and approval from DEN Project Manager and authorities having jurisdiction.
4. Coordination for shutoff, capping, and continuation of utility services.
5. Use of elevator and stairs.
6. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

B. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

C. Predemolition Photographs or Video: Submit before Work begins.

D. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

5.3 DEN Technical Requirements – Division 05: Metals

Except where directed by designer notes, add the following requirements to all project specification sections. Where there are similar or matching specification section names, include all content below in addition to the content in the generic specifications. The content below may be omitted where related equipment, mechanical systems, and furnishments are not in the project scope.

Section 050510: Welding

PART 1 GENERAL

1.01 SUBMITTALS

A. Submittal requirements for Steel Studs

1. Certified material test reports (CMTR) from the steel supplier indicating diameter, chemical properties, and grade on each heat number delivered.
2. In the absence of Quality Control tests, the provisions of AWS D1.1-2000, 7.3.4, and 7.3.5 apply with the exception that DEN Project Manager or DEN Project Manager's representative will replace engineer in the process. All costs are at Contractor’s expense.

B. Individual Welder Qualifications: Submit Welding Performance Qualification Records (WPQR) for all welders, shop, and field, prior to any welding per Paragraph below.

1.02 QUALITY REQUIREMENTS

A. Qualifications for Welding Work:

1. Any welding done without submission to and approval by the DEN Project Manager of WPQRs of the individual welders doing the welding and Procedure Specifications for the actual welding will be considered defective and subject to the provisions of Title 17 of the DEN General Contract Conditions.
2. All WPS and WPQR qualification testing must be in accordance with this specification and the applicable welding code requirements.

B. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the Work.

1. Promptly notify DEN Project Manager whenever design of members and connections for any portion of structure are not clearly indicated.

C. Welding and materials must be inspected and tested by an Independent Testing Agency furnished and paid for by the Contractor. The Independent Testing Agency will have authority to reject weldments and materials. Such rejection may be based on visual inspection where, in the Inspectors opinion, the weldment or material would not pass more detailed investigation. Reference Article 3.01 below for inspection and testing requirements. DEN’s Quality Assurance Inspectors, per the provisions of General Conditions Title 17, will also inspect welding and materials. Inspections by either the Independent Testing Agency or DEN’s Quality Assurance Inspector may take place in the mill, shop, and field.

1. Promptly remove and replace materials or fabricated components that do not comply with requirements as set forth in the Contract Documents.

PART 2 PRODUCTS

2.01 FABRICATION

A. Contractor will notify DEN Project Manager or DEN Project Manager's representative at least 48 hours prior to any commencing fabrication. Notification to include starting date and duration of the Work.

B. Holes for Other Work: Provide holes required for securing other work to components, and for passage of other work through components, as shown on final shop drawings.

1. Cut, drill, or punch holes perpendicular to metal surfaces. The DEN Project Manager must approve any enlarging of holes by flame cutting.

PART 3 EXECUTION

3.01 EXECUTION

A. Do not enlarge misaligned or undersized holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

B. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members, which are not under stress, as acceptable to DEN Project Manager. Finish gas-cut sections equal to a sheared appearance when permitted.

C. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Once Independent Testing Agency and DEN Quality Assurance Inspector have approved welds, apply paint to exposed areas using same material as used for shop painting.

D. No welding machines are to be operated using DEN power until such machines have been tested for harmonic distortion per IEEE-1992 and approved by DEN Project Manager.

E. Contractor will notify DEN Project Manager or DEN Project Manager's representative at least 48 hours prior to any inspections to be performed by ITA.

3.02 TESTING AND INSPECTION

A. Independent Testing Agency (ITA):

1. See Division 1 for Independent Testing Agency requirements.
2. The General Contractor must provide the ITA for all subcontractors. Subcontractors cannot contract with a separate ITA.
3. Contractor will engage an Independent Testing Agency to inspect welded connections and to perform tests and prepare test reports. The Contractor's Quality Control Inspector will coordinate the inspections and tests performed by the testing lab inspectors and testing personnel.
    a. The Contractor’s Independent Testing Agency and DEN Project Manager’s staff will conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom. All reports must be delivered to the DEN Project Manager. Results not complying with requirements are to be brought to the DEN Project Manager’s attention within 24 hours of discovery. All reports must be sequentially numbered.
    b. Provide access for Independent Testing Agency to places where work is being fabricated or produced so that required inspection and testing can be accomplished.
    c. The Independent Testing Agency must inspect Work at the plant before shipment; however, DEN Project Manager reserves right, at any time before final acceptance, to reject material not complying with specified requirements.
        1. Inspections and tests conducted by the ITA or DEN does not in any way relieve the Contractor of the Contractor’s responsibility and obligation to meet all specifications and referenced standards. Employment of the ITA does not relieve the Contractor of providing the required Quality Control Program.

d. Welding Inspection Personnel Qualifications: All visual welding inspections must be performed by AWS CWI, qualified in accordance with AWS QC1. Inspectors qualified in accordance with the most current edition of the American Society for Nondestructive Testing Recommended Practice No. SNT-TC 1A, must perform all non-destructive inspections other than visual inspections

e. Independent Testing Agency Inspectors working for the Contractor must identify with a distinguishing mark all parts and joints they have inspected and accepted. Marks to be visible from at least 50 feet. DEN Project Manager and the Quality Control Inspectors must mutually agree upon identifying marks.

f. Independent Testing Agency welding inspector must be on job site however much time it takes to guaranty that all requirements of Project Specifications and codes are being met and provide written reports showing specific requirements have been met. Shop inspections by ITA welding inspector must be performed in such a manner as to guaranty that all provisions of Project Specifications and codes are being met and provide written reports showing specific requirements have been met.

4. The Contractor must furnish such facilities and provide such assistance as may be required for carrying out the inspection prescribed herein. The Contractor must notify the Independent Testing Agency and the DEN Project Manager at least two weeks in advance of the start of any qualification testing for welding.

5. The Testing Agency's Inspector will perform the Inspector's duties in such a way that neither fabrication nor erection is unnecessarily delayed or impeded. The Testing Agency must notify the DEN Project Manager of any scheduled inspections at least 48 hours prior to such time. The DEN Project Manager must also be notified as soon as possible prior to any unscheduled inspections. In no case will the inspector recommend or prescribe the method of repair of a defect.

6. Inspection of welding will be such as to assure that all requirements of Project Specifications AWS D1.1, and other applicable welding codes are being complied with. Reports must show the following items as being in conformance, but not be limited to just the items shown:

   a. Verify that electrodes used for welding conform to the requirements Manufacturer, AWS, and other applicable Welding Codes and Standards.

   b. Verify that the approved Welding Procedure Specifications and the approved welding sequence are followed without deviation.

   c. Verify that only welding operators and welders who have been properly qualified will perform the welding. The inspection agency will witness such qualification testing of welding operations and welders, as may be required.

   d. Verify that the fit up, joint preparation, size, contour, extent of reinforcement, and length and location of welds conform to specified requirements such as but not limited to applicable welding codes, Welding Procedure Specifications, and Drawings.

   e. Review Mill Test Reports of material for compliance with Project Specifications, all applicable Codes, and Drawings.

   f. ITA inspection reports must list all inspected, nonconforming, repaired, and accepted welds.

7. DEN Project Manager must be informed at least 48 hours prior to shop and field welding so random inspections can be performed as stipulated in these specifications and General Conditions, TITLE 17.

8. All welders must mark their welds with identifying marks. Contractor must furnish DEN Project Manager with list of welders and their marks. List must be updated each time a welder is added or subtracted.

B. Structural Steel

1. Additional Field Weld Testing:

a. In addition, if defective welds are discovered, the remaining un-inspected welds must receive such ultrasonic or magnetic particle inspection as may be required by the DEN Project Manager. If more than 10 percent of a welder's welds fail or when a CWI feels that the quality of the qualified welder's work appears to be below the requirements of the applicable AWS Code, he/she must be removed from the job and retested to demonstrate compliance with AWS D1.1 (Latest Edition) or other applicable AWS codes and all other applicable AWS codes.

b. Additional testing is required if more than 10% of the Magnetic Particle tested welds are rejected. Then an additional 10% will be tested using either Magnetic Particle or Dye Penetrant Testing. This 10% additional testing will be repeated until rejection rate drops below one in 10.

c. When ultrasonic indications arising from the weld root can be interpreted as either a weld defect or the backing strip, the backing strip will be removed at the expense of the contractor, and if no root defect is indicated on this retest, and no significant amount of the base and weld metal have been removed, the joint needs no further repair or welding. If a defect is still indicated, it must be repaired.

d. The welding inspector will have the authority to reject weldments. Such rejection may be based on visual inspection where in the welding inspector's opinion the weldment would not pass a more detailed investigation.

e. Reports by the Independent Testing Agency inspector will contain, as a minimum, an adequate description of each weld tested, the identifying mark of the welder responsible for the weld, a critique of any defects noted by visual inspection or testing, and a statement regarding the acceptability of the weld tested, as judged by current A.W.S. standards. A copy of all tests results, including ultrasonic and x-ray, must be provided to the DEN Project Manager within 48 hours of the test occurrence. This requirement includes all failed tests. Any test that shows work not in conformance with the contract requirement must be retaken after the non-conformity is corrected. The retest must refer to the failed test. Radiographic testing may be substituted for ultrasonic.

C. Precast Concrete

1. AISC Manual of Steel Construction, Chapter J, Section J2 must be complied with.

a. If welds with larger effective throat thickness than shown in Table J2.2 are to be used, random testing will have to be performed on shop and field welds to ensure that effective throats sizes are being met.

1. Three percent of all such welds shop and field will have to be tested by removing, cross sectioning, and Macroetch tested as called out in AWS D1.4-98, Section 6.2.5.2.

2. Welds to be tested will be randomly picked by DEN Project Manager.

Section 051200: Structural Steel Framing

PART 1 GENERAL

1.01 QUALITY ASSURANCE

A. Promptly notify DEN Project Manager whenever design of members and connections for any portion of structure are not clearly indicated.

B. Paint testing: Provide certification that factory applied paint complies with specified requirements. Submit copy to DEN Project Manager prior to steel erection.

C. Independent Testing Agency or DEN Project Manager's Quality Control Inspector will have authority to reject weldments. Such rejection may be based on visual inspection where, in the opinion of the Independent Testing Agency or DEN Project Manager, weldment would not pass more detailed investigation.

Section 051213: Architecturally Exposed Structural Steel (AESS) Framing

PART 1 GENERAL

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. DEN Project Manager will observe all AESS in place to determine acceptability relating to aesthetic effect.

Section 052100: Steel Joist Framing

PART 1 GENERAL

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 FIELD QUALITY OF CONTROL

A. The DEN Project Manager may visually inspect joist installation including bolted and welded connections before work is closed in. Bolted and welded connections which do not pass visual inspection shall be tested as specified in Section 051200 “Structural Steel Framing”.

Section 053100: Steel Decking

PART 1 GENERAL

1.01 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:

1. Powder-actuated mechanical fasteners. Powder-actuated fasteners to be used only if approved by DEN Project Manager.
2. Acoustical roof deck.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 INSTALLATION, GENERAL

A. Mechanical fasteners, either powder actuated or pneumatically driven, may be used in lieu of welding if approved by DEN Project Manager.

1. Locate mechanical fasteners and install in accordance with deck manufacturer's instructions. Where decking will be used to contain fluid materials, such as fresh concrete, deck shall be placed so that fluid will not leak through or underneath.

Section 055000: Metal Fabrications

PART 1 GENERAL

PART 2 PRODUCTS

2.01 METAL FABRICATION LEVELING DEVICES

A. Normanizers – series of galvanized plates designed to be removed under metal fabrications on a slab to account for concrete slab heaving per soils report.

Section 055813: Column Covers

PART 1 GENERAL

PART 2 PRODUCTS

2.01 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

C. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

D. Directional Satin Finish: No. 4.

5.4 DEN Technical Requirements – Division 06: Wood, Plastics, and Composites

Except where directed by designer notes, add the following requirements to all project specification sections. Where there are similar or matching specification section names, include all content below in addition to the content in the generic specifications. The content below may be omitted where related equipment, mechanical systems, and furnishments are not in the project scope.

Section 061600: Sheathing

Make sheathing part of building envelope commissioning system.

Section 066400: Plastic Paneling

PART 1 GENERAL

PART 2 PRODUCTS

2.01 PLASTIC SHEET PANELING

A. General: Gelcoat-finished, glass-fiber reinforced plastic panels complying with ASTM D 5319.

1. Manufacturers: Basis of Design: Marlite. Provide products by Basis of Design manufacturer or, subject to compliance with requirements, provide products by one of the following:
   a. Kemlite Company Inc.
   b. Nudo Products, Inc.
   c. or approved equal.
2. Manufacturers: CE7- Basis of Design: Crane Composites. Provide products by Basis of Design manufacturer or, subject to compliance with requirements, provide products by one of the following:
   a. Crane Composites.
   b. or approved equal.
3. Low-Emitting Materials: Reference 1.3, B for LEED low-emitting requirements and VOC limits.
4. Nominal Thickness: Not less than 0.12 inch (3.0 mm).
5. Surface Finish: Molded pebble texture.
6. Color: As indicated on the Finish Legend

2.02 ACCESSORIES

A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners outside corners, and caps as needed to conceal edges.

1. Color: Match panels.

B. Trim Accessories: Manufacturer's standard two-piece, snap-on vinyl extrusions designed to cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.

1. Color: Match panels.

C. Concealed Mounting Splines: Continuous, H-shaped aluminum extrusions designed to fit into grooves routed in edges of factory-laminated panels and to be fastened to substrate.

D. Adhesive: As recommended by plastic paneling manufacturer.

5.5 DEN Technical Requirements – Division 07: Thermal and Moisture Protection

Except where directed by designer notes, add the following requirements to all project specification sections. Where there are similar or matching specification section names, include all content below in addition to the content in the generic specifications. The content below may be omitted where related equipment, mechanical systems, and furnishments are not in the project scope.

Section 070150.19: Preparation for Re-Roofing

PART 1 GENERAL

1.01 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site and brought to DEN approved landfill as designated by Owner.

1.02 PROJECT CONDITIONS

A. Hazardous Materials: It is not expected that hazardous materials such as asbestos-containing materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work. Existing roof will be left no less watertight than before removal.
2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify DEN Project Manager. Hazardous materials will be removed by Owner under a separate contract.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate with DEN Project Manager to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

3.02 ROOF TEAR-OFF

A. General: Notify DEN Project Manager each day of extent of roof tear-off proposed for the following day and obtain prior authorization from DEN Project Manager to proceed.

B. Partial Roof Tear-Off: Remove existing roofing membrane and immediately check for presence of moisture by visually observing cover boards, roof insulation, and substrate boards that will remain.

1. Coordinate with DEN Project Manager to schedule times for tests and inspections immediately after membrane removal.

3.03 DECK PREPARATION

A. If broken or loose fasteners that secure deck panels to one another or to structure are observed or if deck appears or feels inadequately attached, immediately notify DEN Project Manager. Do not proceed with installation until directed by DEN Project Manager.

B. If deck surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify DEN Project Manager. Do not proceed with installation until directed by DEN Project Manager.

3.04 TEMPORARY ROOFING MEMBRANE

A. Prepare the temporary roof to receive new roofing membrane according to approved temporary roofing membrane proposal. Restore temporary roofing membrane to watertight condition. Obtain approval for temporary roof substrate from roofing membrane manufacturer and DEN Project Manager before installing new roof.

3.05 FASTENER PULL-OUT TESTING

A. Retain independent testing and inspecting agency to conduct fastener pull-out tests according to the latest ANSI/SPRI FX-1 and submit test report to DEN Project Manager and roofing membrane manufacturer before installing new membrane roofing system.

1. Obtain DEN Project Manager’s and roofing membrane manufacturer's approval to proceed with specified fastening pattern. DEN Project Manager and roofing membrane manufacturer may furnish revised fastening pattern commensurate with pullout test results.

3.06 DISPOSAL

A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

1. Storage or sale of demolished items or materials on-site is not permitted.

B. Transport and legally dispose of demolished materials off Owner's property in landfill approved by DEN.

Section 071326: Self-Adhering Sheet Waterproofing

No Plaza deck systems of this type allowed at DEN.

Section 071353: Elastomeric Sheet Waterproofing

No Plaza deck systems of this type allowed at DEN.

Section 071354: Thermoplastic Sheet Waterproofing

Thermoplastic sheet waterproofing is an approved roofing option at DEN, but it is prohibited for use in Plaza Paver systems.

It is prohibited for use in Plaza Paver systems.

PART 1 GENERAL

PART 2 PRODUCTS

2.01 PVC SHEET WATERPROOFING

A. Products: Subject to compliance with requirements, provide one of the following:

1. Sika Sarnafil Inc.; Sarnafil G476 Membrane (system).
2. Insert manufacturer's name; product name or designation.
3. or approved equal.

B. PVC Sheet: 96-mil- thick, PVC membrane with integral pigments, stabilizers, UV absorbers, biocide, and nonwoven fiberglass reinforcement; with the following properties measured according to standard test methods referenced:

1. Tensile Strength: 1500 psi minimum; ASTM D 638.
2. Elongation at Break: 240 percent minimum, machine direction; ASTM D 638.
3. Seam Strength: 90 percent minimum of tensile strength; ASTM D 638.
4. Retention of Properties after Heat Aging: 95 percent minimum retention of tensile strength and elongation; ASTM D 638 after 168 hours at 194 deg F; ASTM D 3045.
5. Tear Resistance: 21 lbf minimum; ASTM D 1004.
6. Low-Temperature Bend: Pass at minus 40 deg F; ASTM D 2136.
7. Linear Dimension Change: 0.002 percent maximum after 6 hours at 176 deg F; ASTM D 1204.
8. Water Absorption: 2.5 percent maximum weight gain after 168 hours' immersion at 158 deg F; ASTM D 570.
9. Dynamic Puncture Resistance: 117.7 ft-pdl minimum; ASTM D 5635.

2.02 INSULATION

Confirm compressive strength with DEN Project Manager

PART 3 EXECUTION

Section 071413: Hot Fluid-Applied Rubberized Asphalt Waterproofing

This is the DEN standard for plaza deck pavers.

PART 1 GENERAL

PART 2 PRODUCTS

2.01 AUXILIARY MATERIALS

A. Reinforcing Fabric: Manufacturer's recommended, spun-bonded polyester fabric.

B. Protection Course: ASTM D 6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:

1. Thickness: 1/4 inch, nominal.

2.02 INSULATION

Confirm compressive strength with DEN Project Manager.

2.03 PLAZA DECK PAVERS

Confirm compressive strength with DEN Project Manager.

PART 3 EXECUTION

3.01 MEMBRANE APPLICATION

Include a requirement to obtain hot work permits, and for directing the ventilation of fumes away from adjacent fresh air intakes of DEN HVAC systems when membrane application is within the Terminal Complex or nearby any occupied buildings.

3.02 FIELD QUALITY CONTROL

Confirm with DEN Project Manager whether DEN is engaging a third-party testing agency to observe flood testing or a Building Envelope Commissioning Agent for the project.

Section 071416: Cold Fluid-Applied Waterproofing

No Plaza deck systems of this type allowed at DEN.

Section 071613: Polymer Modified Cement Waterproofing

DEN has used this product in MSE walls.

PART 1 GENERAL

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 EXAMINATION

A. Notify DEN Project Manager in writing of active leaks or defects that would affect system performance.

Section 071616: Crystalline Waterproofing

DEN has used this product type for internal elevator pit pours in wet areas.

Section 072100: Thermal Insulation

PART 1 GENERAL

PART 2 PRODUCTS

2.01 INSULATION

Confirm compressive strength with DEN Project Manager.

Section 072413: Polymer-Based Exterior Insulation and Finish System (EIFS)

This product is prohibited at DEN.

Section 072500: Weather Barriers

Include this Section for any projects with new or modified exterior walls in project scope. It is important that weather barrier requirements are defined for all exterior walls at DEN.

Section 072713: Modified Bituminous Sheet Air Barriers

Consider this product as part of a rain screen system. Coordinate requirements with the DEN Project Manager.

Section 074113.13: Formed Metal Roof Panels

When developing this Section, obtain loading factors from DEN's FM Global insurance representative via the DEN Project Manager.

Section 074113.16: Standing-Seam Metal Roof Panels

When developing this Section, obtain loading factors from DEN's FM Global insurance representative via the DEN Project Manager.

Section 075323: Ethylene-Propylene-Diene-Monomer (EPDM) Roofing

When developing this Section, obtain loading factors from DEN's FM Global insurance representative via the DEN Project Manager.

PART 1 GENERAL

1.01 WARRANTY

A. Special Project Warranty: Manufacturer's standard or customized form, without monetary limitation, signed by Manufacturer of primary roofing materials and their authorized Installer, in which manufacturer and installer agree to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.

1. Special Project Warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories, roof pavers, and other components of membrane roofing system. Warranty shall include all components specified by this section.
2. Warranty Period: Minimum 30 years from date of Substantial Completion.
3. Provide system tested and approved for FM I-90, secured per FM Data Sheets I-28 and I-29S.

PART 2 PRODUCTS

2.01 EPDM MEMBRANE ROOFING

A. EPDM: ASTM D 4637, Type II, scrim or fabric internally reinforced,] uniform, flexible EPDM sheet.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Carlisle SynTec Incorporated.
   b. ERSystems.
   c. Firestone Building Products.
   d. GAF Materials Corporation.
   e. GenFlex Roofing Systems.
   f. International Diamond Systems.
   g. Johns Manville.
   h. Mule-Hide Products Co., Inc.
   i. Protective Coatings, Inc.
   j. Roofing Products International, Inc.
   k. StaFast Building Products.
   l. Versico Incorporated.

m. or approved equal.

2. Thickness: 90 mils, nominal.

3. Exposed Face Color: White on black. If white facing not offered by the manufacturer, apply white coating

a. Coating: (Need to find this spec)

2.02 BASIS OF DESIGN

A. Fleece backed 60mil White EPDM.

PART 3 EXECUTION

3.01 COATING INSTALLATION

Section 077100: Roof Specialties

PART 1 GENERAL

1.01 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: Minimum 20 years from date of Substantial Completion.

Section 077129: Manufactured Roof Expansion Joints

PART 1 GENERAL

1.01 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: Minimum 20 years from date of Substantial Completion.

B. Special Warranty: Manufacturer and Installer agree to repair or replace roof expansion joints and components that leak, deteriorate beyond normal weathering, or otherwise fail in materials or workmanship within specified warranty period.

1. Warranty Period: Minimum 5 years from date of Substantial Completion.

Section 077200: Roof Accessories

PART 1 GENERAL

1.01 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: Minimum 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 HEAT AND SMOKE VENTS

A. Hatch-Type Heat and Smoke Vents: Manufacturer's standard, with double-walled insulated curbs, welded or mechanically fastened and sealed corner joints, integral condensation gutter, and cap

flashing. Fabricate with insulated double-walled lid and continuous weathertight perimeter lid gaskets and equip with automatic self-lifting mechanisms and UL-listed smoke-detection system.

1. Heat and Smoke Vent Standard: Provide units that have been tested and listed to comply with UL 793 and are FM Approved.

Section 077253: Snow Guards

On sloped metal roofs at DEN, specify pad-type snow guards over doors and exterior patios, unless directed otherwise by the DEN Project Manager.

Section 078446: Fire-Resistive Joint Systems

PART 1 GENERAL

1.01 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, “Approval of Firestop Contractors,” or been evaluated by UL and found to comply with UL's “Qualified Firestop Contractor Program Requirements.”

1.02 COORDINATION

A. Notify Owner's testing agency at least seven (7) days in advance of fire-resistive joint system installations; confirm dates and times on day preceding each series of installations.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 INSTALLATION

A. At Full Height Fire Rated Walls: Install fire safing insulation as shown on the drawings at wall head condition and as required to meet Denver Building Code (DBC) requirements.

B. Protect all fire safing insulation by installing 22 gage galvanized sheet metal closure at top and bottom, which complies with the DBC for protection of fire safing insulation.

3.02 IDENTIFICATION

Designer shall specify identification methods for this Section.

3.03 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

Designer shall develop a fire-resistive joint system schedule applicable to the project.

Section 079200: Joint Sealants

PART 1 GENERAL

1.01 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Minimum twenty (20) years from date of Substantial Completion.

5.6 DEN Technical Requirements – Division 08: Openings

Except where directed by designer notes, add the following requirements to all project specification sections. Where there are similar or matching specification section names, include all content below in addition to the content in the generic specifications. The content below may be omitted where related equipment, mechanical systems, and furnishments are not in the project scope.

Section 081113: Hollow Metal Doors and Frames

PART 1 GENERAL

PART 2 PRODUCTS

2.01 MATERIALS

A. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

1. Power-actuated fasteners shall be used only with prior approval by DEN Project Manager.

Section 081416: Flush Wood Doors

PART 1 GENERAL

PART 2 PRODUCTS

2.01 DOOR CONSTRUCTION, GENERAL

A. Certified Wood: Fabricate doors with cores and veneers of all wood products produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, FSC Principles and Criteria for Forest Stewardship.

B. WDMA I.S.1-A Performance Grade:

1. Extra Heavy Duty: Public and office toilets, Janitor's closets, assembly spaces, exits, paramedic offices, and where indicated.

Section 083113.53: Security Access Doors and Frames

Include this Section for all projects located in the sterile and FIS areas at DEN where accessible to public, and for any projects where directed by the DEN Project Manager.

Section 083213: Sliding Aluminum-Framed Glass Doors

PART 1 GENERAL

PART 2 PRODUCTS

2.01 SLIDING AUTOMATIC ENTRANCES

A. General: Provide manufacturer's standard automatic entrances including doors, sidelites, framing, headers, carrier assemblies, roller tracks, door operators, controls, and accessories required for a complete installation.

B. Sliding Automatic Entrance:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Biparting-Sliding Units:

1. Gildor Automatic Doors.

C. Basis of Design

1. Manufacturer: Manufacturer: Subject to compliance with requirements, provide automatic entrance doors from the following:

a. Electro-Mechanical-Operated Sliding Units, Gildor Inc., Model SLM – BI-Parting Door Package:

1. Part Number:

a. Exterior Doors – SLM-4FBO2-12S

b. Interior Doors – SLM-4FBO4.0-12S

Section 083323: Overhead Coiling Doors

Overhead coiling doors are not allowed at DEN.

PART 1 GENERAL

PART 2 PRODUCTS

2.01 OVERHEAD COILING DOORS

A. General: Provide manufacture's standard automatic entrances including doors, sidelites, framing, headers, carrier assemblies, roller tracks, door operations, controls, and accessories required for a complete installation.

B. Sliding Automatic Entrance:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Electro-Mechanical-Operated Sliding Units, Gildor Inc., Model SLM– Bi-Parting Door Package:

1. Part Number:

a. Exterior Doors – SLM-4FBO2-12S

b. Interior Doors – SLM-4FBO4.0-12S

Section 084229.23: Sliding Automatic Entrances

PART 1 GENERAL

PART 2 PRODUCTS

2.01 SLIDING AUTOMATIC ENTRANCES

A. General: Provide manufacturer's standard automatic entrances including doors, sidelites, framing, headers, carrier assemblies, roller tracks, door operators, controls, and accessories required for a complete installation.

B. Sliding Automatic Entrance:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. Biparting-Sliding Units:

1. Gildor Automatic Doors.

C. Basis of Design

1. Manufacturer: Manufacturer: Subject to compliance with requirements, provide automatic entrance doors from the following:

a. Electro-Mechanical-Operated Sliding Units, Gildor Inc., Model SLM – BI-Parting Door Package:

1. Part Number:

a. Exterior Doors – SLM-4FBO2-12S
b. Interior Doors – SLM-4FBO4.0-12S

Section 084229.44: Platform Station Door System

Proprietary specification available upon request.

Section 084413: Glazed Aluminum Curtain Walls

PART 1 GENERAL

1.01 WARRANTY

A. Special Assembly Warranty:

1. Warranty Period: 10 years from Substantial Completion

B. Special Finish Warranty:

1. Warranty Period: 10 years from Substantial Completion

PART 2 PRODUCTS

2.01 FRAMING

A. Construction: Thermally Broken

PART 3 EXECUTION

Section 085113: Aluminum Windows

PART 1 GENERAL

1.01 WARRANTY

A. Special Assembly Warranty:

1. Warranty Period: 10 years from Substantial Completion

B. Special Finish Warranty:

1. Warranty Period: 10 years from Substantial Completion

PART 2 PRODUCTS

2.01 FRAMING

A. Construction: Thermally Broken

PART 3 EXECUTION

Section 085653: Security Windows

DEN will require ballistic type glazing around security areas, or other areas where a Threat Vulnerability Assessment (TVA) would suggest its use.

Section 086300: Metal-Framed Skylights

PART 1 GENERAL

1.01 WARRANTY

A. Special Assembly Warranty:

1. Warranty Period: 10 years from Substantial Completion

B. Special Finish Warranty:

1. Warranty Period: 10 years from Substantial Completion

PART 2 PRODUCTS

PART 3 EXECUTION

Section 087100: Door Hardware

The entire specification section is in the DEN Standard Specification Package. Refer to Appendix for specific door hardware models with access control.

Section 088000: Glazing

PART 1 GENERAL

PART 2 PRODUCTS

2.01 GLAZING TYPES

A. Glass Type IG-1: Insulating Coated Glass:

1. VE2-48 Insulating Coated Glass as manufactured by Viracon.
   a. Exterior Glass Ply: ¼" Green
      1. Type HS at all locations unless noted otherwise.
      2. Type FT where required for safety performance.
   b. Coating: VE-48 on #2 Surface
   c. Space 1/2" black aluminum airspace, air filled
   d. Silicone: black
   e. Interior Glass Ply: 1/4" Clear
      1. Type HS at all locations unless noted otherwise.
      2. Type FT where required for safety performance.
2. Performance Requirements
   a. Visible Light Transmittance: 41%
   b. Exterior Reflectance: 14%
   c. Winter U-Value: 0.31
   d. Summer U-Value: 0.29
   e. Shading Coefficient: 0.32
   f. Solar Heat Gain Coefficient: 0.28
   g. Light to Solar Gain Ratio: 1.46

PART 3 EXECUTION

Section 088853: Security Glazing

Security glazing is required around security check and TSA areas, as well as any areas identified by a project specific TVA.

5.7 DEN Technical Requirements – Division 09: Finishes

Except where directed by designer notes, add the following requirements to all project specification sections. Where there are similar or matching specification section names, include all content below in addition to the

content in the generic specifications. The content below may be omitted where related equipment, mechanical systems, and furnishments are not in the project scope.

Section 092216: Non-Structural Metal Framing

Designer shall provide this Section as required for the project. Provide language in Part 3 prohibiting use of powder actuated fasteners.

Section 095113: Acoustical Panel Ceilings

Coordinate latest requirements to match recent projects in the area with the DEN Project Manager.

Section 095133: Acoustical Metal Pan Ceilings

Coordinate latest requirements to match recent projects in the area with the DEN Project Manager.

Section 095423: Linear Metal Ceilings

Coordinate latest requirements to match recent projects in the area with the DEN Project Manager.

Section 096613: Portland Cement Terrazzo Flooring

This product is not allowed at DEN.

Section 096623: Resinous Matrix Terrazzo Flooring

PART 1 GENERAL

1.01 QUALIFICATIONS

Designer shall include a requirement for certified contractors, and include a minimum amount of experience commensurate with the scope of work for the Project.

PART 2 PRODUCTS

Designer shall develop a product requirement with white on white (Color 1), colors to match DEN standard restrooms (color 2), and a semi-gloss sheen.

PART 3 EXECUTION

Designer shall include a prohibition on waxing of this product.

Section 096723: Resinous Flooring

This product is typically specified in pet relief rooms and has also been used in de-icing tank rooms at DEN.

Section 096813: Tile Carpeting

Obtain latest standards from the DEN project manager.

Section 096816: Sheet Carpeting

Obtain latest standards from the DEN project manager.

Section 099419: Multicolor Interior Finishing

Obtain latest standards from the DEN project manager.

5.8 DEN Technical Requirements – Division 10: Specialties

Except where directed by designer notes, add the following requirements to all project specification sections. Where there are similar or matching specification section names, include all content below in addition to the content in the generic specifications. The content below may be omitted where related equipment, mechanical systems, and furnishments are not in the project scope.

Section 102113: Toilet Compartments

PART 1 GENERAL

PART 2 PRODUCTS

2.01 MATERIALS

A. Stainless-Steel: ASTM A 743/A 743M.

2.02 PLASTIC HPL UNITS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ASI Global Partitions (basis of design product: Alpaco Elegance Collection)
2. or approved equal.

B. Toilet-Enclosure Style: Floor supported and overhead braced with stainless steel rail.

C. Urinal-Screen Style: Wall hung.

D. Door, Panel and Pilaster Construction: HPL panel material with and with rounded and polished edges and no-sightline system. Provide minimum 1.2-inch- (13-mm-) thick doors and pilasters and minimum 1/2-inch- (13-mm-) thick panels. Door and Pilaster edges shall be routed and overlapped to block sight lines into the compartments.

E. Pilaster Shoes and Sleeves (Caps): Fabricated from stainless-steel sheet, not less than 0.031-inch (0.79-mm) nominal thickness and 3 inches (76 mm) high, finished to match hardware.

F. Brackets (Fittings):

1. Stirrup Type: Ear or U-brackets, stainless steel.

G. Plastic Panel Finish:

1. Facing Sheet Finish: One color and pattern in each room.
2. Color and Pattern: As indicated on the Finish Legend.
3. Edge Color: Black

2.03 STAINLESS STEEL UNITS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ASI Global Partitions, Eastanollee, GA 30538 2. or approved equal.

B. See Finish and Accessory Legend for additional information.

2.04 SOLID PLASTIC (HDPE) UNITS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ASI Global Partitions, Eastanollee, GA 30538
2. ASI Accurate Partitions, Burr Ridge IL
3. or approved equal

B. See Finish and Accessory Legend for additional information.

2.05 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.

1. Material: Stainless steel.
2. Hinges: Manufacturer's standard surface mounted barrel hinges.
3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit with indicator of occupancy, designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

B. Overhead Bracing: Manufacturer's continuous, 1 ¼ inch diameter stainless steel tube attached in clips to top of pilaster.

C. Compartment to be supported by Type 304 stainless steel pedestal placed under the panels approximately 12 inches behind pilaster. Pedestal to be adjustable in height plus or minus 1 inch. Pedestals to be secured to the floor with corrosion resistant anchors.

D. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.06 FABRICATION

A. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

B. Door Size and Swings: Unless otherwise indicated on Drawings, provide 24-inch- (610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible. Doors shall be self-closing type.

PART 3 EXECUTION

3.01 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Installation Tolerances:
   a. Maximum variations from plumb or level: 1/8 inch (3 mm).
   b. Maximum clearance between wall surfaces and panels or pilasters: 1½ inches (38 mm).
2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel.
   a. Locate wall brackets so holes for wall anchors occur in floor/wall tile joints.
   b. Align brackets at pilasters with brackets at walls.

B. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches (51 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position. Use purpose-designed fasteners for attaching to various components.

C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

Section 102226.13: Accordion Folding Partitions

This product is not allowed at DEN.

Section 102600: Wall and Door Protection

PART 1 GENERAL

PART 2 PRODUCTS

2.01 WALL AND DOOR PROTECTION MATERIALS

A. Stainless-Steel Sheet: ASTM A 240/A 240M.

2.02 CORNER AND END-WALL GUARDS

A. Surface-Mounted, Metal Corner Guards : Fabricated from one-piece, formed, or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.

1. Manufacturers: Subject to compliance with requirements, provide products by one mfr.
2. Thickness: Minimum 0.0781 inch
3. Finish: Directional satin
4. Radius: 1/8 inch (3 mm).
5. Mounting: Heavy-Duty Adhesive.
6. Wing Size: 2 inches.
7. Height: as shown on Drawings.

Section 102800: Toilet, Bath and Laundry Accessories

PART 1 GENERAL

PART 2 PRODUCTS

2.01 PUBLIC-USE WASHROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Bobrick Washroom Equipment, Inc.

B. Combination Toilet Tissue (Roll) and Seat Cover Dispenser:

1. Women's room
   a. B-3579 (shared partition mount condition)
   b. B-3571 (Accessibility condition)
2. Men's Room
   a. B-3479 (shared partition mount condition)
   b. B-34571 (Accessibility condition)

C. Recessed Waste Receptacle: B-3644

D. Combination Towel (Roll) Dispenser/Waste Receptacle: B-3974

E. Robe Hook: B-7671

F. Automatic Soap Dispenser and Distribution System:

1. Single-Feed Reservoir for Family Restrooms, Baby Changing Areas, Nursing Rooms, Pet Relief Rooms
   a. The Splash Lab (TSL) Reservoir system TS2L.270002
2. Multiple-Feed Reservoir for Concourse Mezzanine & Sterile Corridor Restrooms. Refer to Plans for locations and number of supply lines.
   a. TSL Reservoir system TSL.MR60.05
3. Multiple-Feed Reservoir for Concourse Passenger Restrooms. Refer to Plans for locations and number of supply lines.
   a. TSL Reservoir system TSL.MR60.10
4. System Accessories:
   a. Power Supply

Coordinate with electrical consultant.

   b. Soap dispenser: The Ribbon system, stainless steel
   c. Auto Soap Foamer
   d. Soap Supply Lines

Section 104313: Defibrillator Cabinets and Duress Alarms

PART 1 GENERAL

1.01 DEFINITIONS

A. AED: Automated External Defibrillator

B. ADA: Americans with Disabilities Act

C. CBP: Customs and Border Protection

D. TSA: Transportation Security Administration

1.02 GENERAL REQUIREMENTS

A. All elements shall be integrated as part of a uniform and cohesive system.

B. Signs shall comply with all DEN agency requirements, Federal, State, and local code; DEN agency requirements; and international standards.

1.03 DESIGN REQUIREMENTS

A. Contact DEN Business Technologies for detailed requirements of the Omnia System.

B. Installation of AED Cabinets and Duress Alarms must meet ADA requirements.

PART 2 PRODUCTS

2.01 AED CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. ZOLL Medical Corporation
   a. Part #8000-0811 Fully Recessed Wall Cabinet

2.02 DURESS ALARMS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

B. CBP Duress Alarm

1. Honeywell
   a. 269R/270R/269SN
   b. Any substitution requests must be approved by Business Technologies.

C. TSA Breach Duress Alarm

1. TSA Breach Duress Alarms hardware model is approved by TSA.
2. TSA Breach Alarms are managed and supported through TSA leadership/contracts.

D. Hold Up Duress Alarm

1. Honeywell
   a. Dry contact

PART 3 EXECUTION

3.01 AED CABINETS INSTALLATION

A. Provide AEDs in semi-recessed cabinets. Each cabinet shall be provided with a data line reporting to Room 45A01 generating an alarm in the DEN Communication Center when the cabinet is opened. Power is required at the cabinet to power the AED cabinet.

B. If the AED cabinet is requested to generate an alarm into the Airport Communications Center when the door of the cabinet is opened, the cabling backend design must route into Room 45A01. Cross connection and back-end termination must be approved by DEN PWC Sr. Manager.

C. AED cabinet hardware must adhere to make/model and key number as determined by Terminal Operations.

D. Provide additional inputs to Omnia controller. Spare inputs must always account for at least 10% of the total controller capacity.

E. Naming conventions of AED cabinets are limited to 50 characters. Naming conventions are approved by Terminal Operations and the DEN Communications Center.

F. Approved signage must be co-located with AED cabinet.

3.02 DURESS ALARMS INSTALLATION

A. There are different “duress alarms” with different business owners at the airport.

1. TSA Breach Duress Alarms are supported and configured by the TSA.
2. CBP Duress Alarms are configured and supported by DEN.
3. Hold Up Duress Alarms are configured and supported by DEN.

B. CBP Duress Alarms and the Hold Up Duress Alarms cable architecture must backend into Room 45A01. Cross connection and back-end termination must be approved by DEN’s PWCS Sr. Manager.

C. TSA Breach Duress Alarms cable architecture must pass through room 64D14, and then backend into Room 45A01. Cross connection and back-end termination must be approved by DEN PWCS Sr. Manager.

D. Provide additional inputs to the Omnia controller. Spare inputs must always account for at least 10% of the total controller capacity.

E. Configuration of the CBP Duress Alarm and Hold Up Alarms into Omnia is completed by Business Technologies.

F. Naming conventions of the CBP Duress Alarms and Hold Up Duress alarms are limited to 50 characters. Naming conventions are approved by Terminal Operations and the DEN Communications Center.

G. Naming conventions of the TSA Breach Duress Alarms are limited to 50 characters. Naming conventions are approved by TSA, Terminal Operations, and the DEN Communications Center.

3.03 AUTOMATED EXTERNAL DEFIBRILLATOR AND DURESS ALARM CONNECTIONS

A. Automated External Defibrillator Cabinets, CBP Duress Alarms, and Hold UP alarms have connection into Room 45A01. The TSA Breach Duress Alarms have a connection through TSA Room 64D14. All Duress Alarms and Automated External Defibrillator Cabinets integrate into Omnia software/hardware solution that alarm(s) into the DEN Airport Communication Center.

Section 104413: Fire Valve and Extinguisher Cabinets

PART 1 GENERAL

PART 2 PRODUCTS

2.01 EXTINGUISHER CABINETS

A. Cabinet type, suitable for mounting conditions indicated, of the following types:

1. Fire Extinguisher Cabinets (Recessed):
   a. Type: Larsen “Architectural” series, Model 2712-R, stainless steel finish.
   b. Door Style: Stainless steel 5/16 inch flat trim fully recessed; No key lock allowed.
   c. Glazing: Clear tempered breakaway glass.
   d. Interior Dimensions: 27 inches by 12 inches by 8 inches; interior capacity sufficient for one 10-pound fire extinguisher.
   e. Provide one 10-pound fire extinguisher with each fire extinguisher cabinet.
2. Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semi-recessed cabinet installation.
   a. Square-Edge Trim: 1-1/4- to 1-1/2-inch backbend depth.
   b. Type: Larsen “Architectural” series, Model 2717-SM, stainless steel finish.
   c. Door Style: Stainless steel finish and breakaway glazing; No key lock allowed.
   d. Glazing: Clear tempered breakaway glass.
   e. Interior Dimensions: 30-1/2 inches by 15-1/2 inches by 8 inches; interior capacity sufficient for one 10-pound fire extinguisher.
3. Fire Extinguisher Cabinets (Surface Mounted):
   a. Type: Larsen “Architectural” series, Model 2717-SM, Stainless steel finish.
   b. Door Style: Stainless Steel finish and breakaway glazing; No key lock allowed.
   c. Glazing: Clear tempered breakaway glass.

d. Interior Dimensions: 30-1/2 inches by 15-1/2 inches by 8 inches; interior capacity sufficient for one 10-pound fire extinguisher.

PART 3 EXECUTION

3.01 INSTALLATION

A. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semi-recessed fire protection cabinets.

a. Handle must not be locked and meet accessibility requirements.

Section 104416: Fire Extinguishers

Provide Section as required. NOTE: Large, wheeled extinguishers required at aircraft gates are not supplied by owner.

5.9 DEN Technical Requirements – Division 12: Furnishings

Except where directed by designer notes, add the following requirements to all project specification sections. Where there are similar or matching specification section names, include all content below in addition to the content in the generic specifications. The content below may be omitted where related equipment, mechanical systems, and furnishments are not in the project scope.

Section 122113: Horizontal Louver Blinds

PART 1 GENERAL

This product is not allowed on the concourses or terminal, and may only be used in office spaces.

PART 2 PRODUCTS

Designer shall specify stainless steel 1” slat type.

PART 3 EXECUTION

Section 122116: Vertical Louver Blinds

This product is not allowed at DEN.

Section 124813: Entrance Floor Mats and Frames

Include this Section as required. Coordinate requirements with the DEN Project Manager; DEN has a contract with entry floor mat service.

Section 129300: Site Furnishings

Include this Section as required. Waste receptacles must be blast resistant for standard, exterior, non-secure installation. specification availble upon request.

5.10 DEN Technical Requirements – Division 14: Conveying Equipment

Except where directed by designer notes, add the following requirements to all project specification sections. Where there are similar or matching specification section names, include all content below in addition to the content in the generic specifications. The content below may be omitted where related equipment, mechanical systems, and furnishments are not in the project scope.

Section 142100: Electric Traction Elevators

PART 1 GENERAL

1.01 REFERENCES

A. American Society of Mechanical Engineers (ASME):

1. A17.1- Safety Code for Elevators and Escalators. Provide the latest version of the ASME A17.1 as enforced by the local authority having jurisdiction (AHJ). Please note that DIA-DEN has chosen to include the two (2) way text and video communication and three dimensional (3D) electronic safety edge (for passenger elevators) requirements of the ASME A17.1 2019 Code. All elevators must include these provisions.

B. U.S. Architectural & Transportation Barriers Compliance Board:

1. ADA Accessibility Guidelines- September 2010- American Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities.

1.02 ALLOWANCES

Retain this article if using an allowance for elevator car finishes. Note that "Elevator Car Allowances" Paragraph below includes installing items listed, rather than just furnishing them, as is typical for allowance items.

A. Elevator Car Allowances: Provide finished passenger and service elevator cars under the Elevator Car Allowance specified in Section 012100 "Allowances" – estimated at $25,000 per elevator. Allowance includes furnishing and installing the following:

Revise list below to suit Project. Coordinate with requirements for elevator car enclosures and hoistway entrances in Part 2.

1. Car wall finishes including trim.
2. Car floor finishes.
3. Car ceiling finishes.
4. Car door and hoistway door finishes – to be included in the base proposal and excluded from the cab interior allowance.
5. Car doorsills if part of the modernization process, to be included in the base proposal and excluded from the cab interior allowance.
6. Car light fixtures.
7. Handrails.
8. Cutouts and other provisions for installing elevator signal equipment in cars – includes cladding of front returns, transoms, inside car jambs if applicable.

ENGINEER/ARCHITECT SHALL NOT REDUCE THE REQUIREMENTS BELOW WITHOUT PERMISSION FROM THE DEN PROJECT MANAGER.

1.03 ACTION SUBMITTALS

A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures, hoistway entrances, and operation, control, and signal systems.

1. Include data substantiating that materials comply with requirements.

B. Shop Drawings:

1. Include plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment.
2. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, locations of equipment and signals, and maximum and average power demands.
3. Include large-scale layout of car-control station and standby power operation control panel.

Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs below for two-stage Samples.

Coordinate sample requirements with DEN Project Manager.

C. Samples for Initial Selection: For finishes involving color selection.

D. Samples for Verification: For exposed car, hoistway door and frame, and signal equipment finishes; 3-inch square Samples of sheet materials; and 4-inch lengths of running trim members.

1.04 INFORMATIONAL SUBMITTALS

Coordinate "Qualification Data" Paragraph below with qualification requirements in Section 014000 "Quality Requirements" and as may be supplemented in "Quality Assurance" Article.

A. Qualification Data: For Installer.

Retain "Seismic Qualification Certificates" Paragraph below if required by seismic criteria applicable to Project. See ASCE/ SEI 7 for certification requirements for equipment and components.

B. Seismic Qualification Certificates: For elevator equipment, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
4. Current seismic risk zone for Denver International Airport (DIA) is zone 1 and all equipment is to meet such requirements.

C. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room or control closet layout and dimensions, as shown on Drawings, and electrical service including standby power generator if applicable, as shown and specified, are adequate for elevator system being provided. Existing conditions known at the time of pricing the project will be provided to the purchaser. Unknown, unforeseen or hidden conditions will be provided to the purchased as soon as such conditions are determined and/or known including additional costs, if applicable.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.

Usually delete subparagraph below for projects where Owner's staff will not maintain elevators; retaining increases cost of elevators.

1. In addition to items specified in Section 017823 “Operation and Maintenance Data,” include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.

B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

C. Manufacturer shall furnish a letter stating all components are designed by an Engineer and are suitable for the intended purpose.

D. Signage directly related to the operation of the elevator

E. Maintenance manuals for each different electric traction elevator, including operation and maintenance instructions, parts listing with sources indicated, recommended parts inventory listing, emergency instructions, and similar information. Include all diagnostic and repair information available to manufacturer's and Installer's maintenance personnel. Submit for Owner's information at project closeout as specified in Division 01.

Verify requirements for as-built plans with DEN Project Manager.

F. As-Built Plans: Submit complete as-built plans of all Work, including interface with other Work, in accordance with requirements as specified in Section 013300 “Submittal Procedures”.

Paragraphs above provide maintenance service through warranty period. Paragraphs below provide service contracts beyond that. Possibly include below with above. Typically, this contract is already in place at DEN. Coordinate with DEN Project Manager.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Engage the elevator manufacturer or an experienced Installer approved by the elevator manufacturer who has completed elevator installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

Always retain code compliance requirement below.

B. Regulatory Requirements: In addition to local governing regulations, comply with the applicable provisions of the following:

1. ASME A17.1, “Safety Code for Elevators and Escalators,” referred to as the “Code.” provide the latest version of the ASME A17.1 as enforced by the local authority having jurisdiction (AHJ). Please note that DIA-DEN has chosen to include the two (2) way text and video communication and three dimensional (3D) electronic safety edge (for passenger elevators) requirements of the ASME A17.1 2019 Code. All elevators must include these provisions.

1.07 COORDINATION

A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.

B. Coordinate locations and dimensions of other work relating to electric traction elevators including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways, pits, and machine rooms.

1.08 WARRANTY

When warranties are required, verify with Owner's counsel that warranties stated in this article are not less than remedies available to Owner under prevailing local laws.

Coordinate warranty requirements with DEN Project Manager.

A. Manufacturer's Special Warranty: Manufacturer agrees to provide replacement moving walk components/parts as part of the project. The contractor is to provide a comprehensive spare parts list to the purchaser for approval. All parts will be provided to the purchaser prior to final completion of each project task order. Bidders are to include a $15,000 per unit spare parts allowance with their proposals.

PART 2 PRODUCTS

2.01 OPERATION SYSTEMS

A. Future Monitoring Provisions:

1. Provide Lift-Net interface provisions within the solid-state elevator control system for potential future use by the airport.
2. Provide BACNET interface provisions only within the solid-state elevator control system for potential future use by the airport.

Basic operation systems for a single car (selective-collective operation) and for two-car groups (group automatic operation) are defined in ASME 17.1/CSA B44 and do not require further specification. For groups of three or more cars, usually retain “Group Automatic Operation with Demand-Based Dispatching” Paragraph below. System in paragraph is not necessarily reprogrammable and provides better response time than standard group automatic system and does not add much cost. Revise to suit individual Project systems.

B. Group Automatic Operation with Demand-Based Dispatching: Where group operation exists, provide reprogrammable group automatic system that assigns cars to hall calls based on a dispatching program designed to minimize passenger waiting time. System automatically adjusts to demand changes for different traffic conditions including heavy incoming, heavy two-way, heavy outgoing, and light off-hours as variations of normal two-way traffic.

If retaining “Security Features” Paragraph below, indicate in “Elevators” Article which elevators require security features.

C. Security Features: Provide the following security features, where indicated. Security features shall not affect emergency firefighters' service.

In “Card-Reader Operation” Subparagraph below, usually retain only one option (usually first) for card-reader location unless complex security arrangements require otherwise; additional card readers add cost to system and are annoying to passengers.

1. Card-Reader Operation: For secured elevators, the system uses proximity ID card readers at the car-control stations and hall push-button stations to authorize calls. The security system determines which landings and at what times calls require authorization by card reader. Provide required conductors in traveling cable and panel in machine room for interconnecting card readers, other security access system equipment and elevator controllers for continued use following the completion of the modernization process. Allow space as indicated for card reader in car on the main and/or auxiliary car operating panel as determined by the purchaser.
   a. When the security system is activated, car calls to restricted landings do not register unless the ID card is first presented to the proximity card reader. Security access system determines which landings are restricted and which of those are accessible to cardholder.

b. When operating on Independent Service, the proximity ID card reader must be swiped prior to a call being registered by the operator.

c. Security access system equipment is specified in Section 281300 “Access Control” and is to be kept strictly confidential.

Retain above for security system specified in another section; below for a separate security system contract. Coordinate either with system used.

“Keyswitch Operation” Subparagraph below describes a simple security feature. Usually retain only one keyswitch location; additional keyswitches add cost to system and are annoying to passengers.

Above and below are offered by some manufacturers. Verify availability.

“Keypad Operation” and “Car-to-Lobby Feature” subparagraphs below describe features offered by some manufacturers. Verify availability before retaining. Retain first option in “Car-to-Lobby Feature” Subparagraph for single elevators; second option, for groups.

2. Car-to-Lobby Feature: If applicable and requested by the purchaser, this feature activated by keyswitch at main lobby causes a car or all cars in a group to return immediately to lobby and open doors for inspection. On deactivation by keyswitch, calls registered before keyswitch activation are completed and normal operation is resumed.

2.02 SIGNAL EQUIPMENT

Retain one of two “General” paragraphs below. First is for all but destination-based systems; second is for destination-based systems.

Coordinate new elevator signal equipment with DEN Project Manager and with existing elevator functions and aesthetics at DEN.

A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements with long-life LEDs.

B. General: Where purchaser requests DD, provide signal equipment designed for destination-based system. Fabricate lighted elements with long-life LEDs.

Retain “Car-Control Stations” or “Swing-Return Car-Control Stations” Paragraph below. Recessed control station in first paragraph usually fits into an opening in return panel, with a faceplate covering opening and overlapping edges of opening. Show details of signs and other surface-mounted items and coordinate with related work (in Part 1 and in other appropriate Sections) if not work of this Section.

C. Car-Control Stations: Where existing, provide manufacturer's standard applied/swing car-control stations. Include call buttons for each landing served and other buttons, switches, and controls required for specified car operation. Provide operating device symbols as required by the applicable codes. Mount in return panel adjacent to car door unless otherwise indicated.

1. Mark buttons and switches for required use or function. Use both tactile symbols and Braille.
2. Provide “No Smoking” sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.

Swing-return car-control stations are an alternative feature available from elevator manufacturers. Verify cost before retaining.

3. Mount controls as shown or scheduled and at heights complying with ANSI A117.1.

Retain either above or below subparagraph with either of 2 paragraphs above.

4. Mount controls as shown or scheduled and at heights complying with ADA Accessibility Guidelines.

Retain below as extra-cost option with either of 2 paragraphs above for center-opening doors and large car sizes with heavy peak traffic, such as in an office building, and for hospital elevators.

5. Provide 2 car control stations in each passenger elevator; equip only 1 with required keyswitches, if any.

D. Emergency Communication System: Elevators at DEN shall be equipped with a Talk-a-Phone model ETP103 OEM elevator telephone installed per manufacturer's instructions behind the control panel in each elevator car. DEN technologies will provide cabling and an analog telephone line from the DIA PABX system for each telephone. Telephones are powered from the PABX system, which in turn is backed up by battery. The PABX is programmed to rung down calls from the elevators to the 24/7 police positions at the airport communications centers. Elevator telephones are polled once per day using Talk-a-Phone Talk-a-Lert software to confirm health and status of the telephones. Technicians are dispatched to repair or replace any telephone that fails during a polling cycle. Telephone products from other vendors shall not be permitted, as they cannot be polled.

E. Provide and install the two (2) way text and video communication requirements of the ASME A17.1 2019 Code. All elevators must include provisions for this feature.

Retain "Firefighters' Two-Way Telephone Communication Service" Paragraph below where required by authorities having jurisdiction.

F. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted cabinet in each car and required conductors in traveling cable for firefighters' two-way telephone communication service.

PART 3 EXECUTION

3.01 REQUIRED DOCUMENTATION

A. Submit Seismic, manufacturers, and Installer Qualifications within 30 days of Notice to Proceed to the DEN Project Manager.

3.02 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate elevator(s).

1. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train DEN personnel in procedures to follow in identifying sources of operational failures or malfunctions. Confer with DEN Project Manager on requirements for a complete elevator maintenance program.
2. Schedule training with Owner, through DEN Project Manager, with at least seven (7) days advance notice.

B. Check operation of each elevator with DEN Project Manager's personnel present before date of Substantial Completion and again not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

Section 142113: Electric Traction Freight Elevators

PART 1 GENERAL

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 REQUIRED DOCUMENTATION

A. Submit Seismic, manufacturers, and Installer Qualifications within 30 days of Notice to Proceed to the DEN Project Manager.

Section 142400: Hydraulic Elevators

This product is not allowed at DEN.

Section 142413: Hydraulic Freight Elevators

This product is not allowed at DEN.

Section 143100: Escalators

PART 1 GENERAL

1.01 SUMMARY

Retain third option in first paragraph below only if retaining other requirements for high-traffic escalators. High-traffic escalators should be specified for applications such as transit systems, sports and entertainment facilities, and other occupancies where large crowds and a sense of urgency result in a high concentration of passengers, causing structural and machinery loads to be higher than normal. High-traffic escalators cost approximately 25 to 50 percent more than standard escalators, so they should not be specified indiscriminately.

Edit to suit Project.

A. Section includes high-traffic/heavy-duty (NON-APTA) [interior and exterior escalators. Escalator modernization projects where the existing truss will be retained and refurbished will follow the specifications to the highest degree possible since some items/sections may not apply.

B. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

1. The contractor is to provide the cost and project management of all related work for completion of this scope of work for a turn-key project.
2. Section 033000 “Cast-in-Place Concrete” for setting sleeves, inserts, and anchoring devices in concrete.
3. Section 051200 “Structural Steel Framing” for attachment plates, angle brackets, and other preparation of structural steel to support escalator trusses.
4. Section 083113 “Access Doors and Frames” for wall and ceiling access panels and access doors in escalator enclosures.

Usually delete first subparagraph below to make “Caution” signs work of this Section for undivided responsibility of escalator work. Retaining below and specifying “Caution” signs in the sign Section allow some aesthetic and material quality control over signs.

Section 101400 “Signage” for “Caution” signs required by ASME A17.1/CSA B44.Subparagraph below allows power to be disconnected from motor before fire sprinkler activation.

Retain paragraph below if Alternates are specified in Division 01 Section 012300 "Alternates" for work in this Section. Coordinate requirements for Alternates with DEN Project Manager.

C. Alternates: Refer to Division 01 Section 012300 "Alternates" for description of Work in this Section affected by Alternates. Contractors are to provide alternate pricing for the following items:

Common example at DEN

1. LED under handrail lighting – full length of each escalator – both sides.

1.02 DEFINITIONS

A. Definitions in ASME A17.1/CSA B44 apply to work of this Section.

Retain "High-Traffic Escalators" Paragraph below only if retaining other requirements for high-traffic escalators.

B. High-Traffic Escalators: Designed specifically for high-traffic-volume use that produces dense occupancy resulting in structural, machinery, and brake loads much higher than normal. All running equipment to have heavier duty rating over standard escalator units.

C. Defective Escalator Work: Operation or control system failures; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

1.03 REFERENCES

A. U.S. Architectural & Transportation Barriers Compliance Board:

1. ADA Accessibility Guidelines – September 2010- American Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities – as applicable.

ENGINEER/ARCHITECT SHALL NOT REDUCE THE REQUIREMENTS BELOW WITHOUT PERMISSION FROM THE DEN PROJECT MANAGER.

1.04 ACTION SUBMITTALS

A. Product Data: Include capacities, sizes, performances, safety features, finishes, and similar information.

1. Include data substantiating that materials comply with requirements.

B. Shop Drawings:

1. Include plans, elevations, sections, and details indicating coordination with building structure and relationships with other construction.
2. Indicate maximum loads imposed on building structure at points of support, and power requirements.
3. Indicate access and ventilation for escalator machine space.

Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs below for two-stage Samples.

Coordinate sample requirements with DEN Project Manager.

C. Samples for Initial Selection: For exposed materials involving color selection.

D. Samples for Verification: For exposed escalator finishes, 3-inch square Samples of sheet materials, and 4-inch lengths of running trim members.

Retain “Delegated-Design Submittal” Paragraph below if design services have been delegated to Contractor.

E. Delegated-Design Submittal: For escalators.

1.05 INFORMATIONAL SUBMITTALS

Coordinate “Qualification Data” Paragraph below with qualification requirements in Section 014000 “Quality Requirements” and as may be supplemented in “Quality Assurance” Article.

A. Qualification Data: For Installer.

Retain “Seismic Qualification Certificates” Paragraph below if required by seismic criteria applicable to Project. See ASCE/ SEI 7 for certification requirements for equipment and components.

B. Seismic Qualification Certificates: For escalator equipment, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
4. Current seismic risk zone for Denver International Airport (DIA) is zone 1 and all equipment is to meet such requirements.

C. Manufacturer Certificates: Signed by manufacturer certifying that escalator layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for escalator system being provided.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For escalators to include in emergency, operation, and maintenance manuals.

Usually delete subparagraph below for projects where Owner's staff does not maintain escalators; retaining increases cost of escalators.

1. In addition to items specified in Section 017823 “Operation and Maintenance Data,” include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.

B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted escalator use.

“Continuing Maintenance Proposal” Paragraph below provides service contract beyond initial maintenance period. If continuing maintenance proposal is submitted at time of bid, include that information in the Instructions to Bidders.

Verify requirements for as-built plans with DEN Project Manager.

C. As-Built Plans: Submit complete as-built plans of all Work, including interface with other Work, in accordance with requirements as specified in Section 013300 “Submittal Procedures”.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: Escalator manufacturer or an authorized representative who is trained and approved by manufacturer on the specific equipment installed/modernized .

1.08 WARRANTY

Delete this article if appropriate, especially if a good maintenance agreement is established.

When warranties are required, verify with Owner's counsel that warranties stated in this article are not less than remedies available to Owner under prevailing local laws.

Coordinate warranty requirements with DEN Project Manager.

A. Manufacturer's Special Warranty: Manufacturer agrees to provide replacement escalator components/parts as part of the project. The contractor is to provide a comprehensive spare parts list to the purchaser for approval. All parts will be provided to the purchaser prior to final completion of each project task order. Bidders are to include a $15,000 per unit spare parts allowance with their proposals.

PART 2 PRODUCTS

2.01 MANUFACTURERS

Retain “Manufacturers” Paragraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. KONE Inc.
2. Otis Elevator Co.
3. Schindler Elevator Corp.
4. thyssenkrupp Elevator

B. Source Limitations: Obtain escalators and if applicable, moving walks, specified in another Section, from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

The International Building Code (IBC) requires compliance with ASME A17.1/CSA B44. Insert other requirements, if any, of authorities having jurisdiction.

A. Regulatory Requirements: Comply with the latest ASME A17.1/CSA B44 code in effect by the local authority having jurisdiction (AHJ).

First “Braking Performance” Paragraph below is an additional safety feature; verify availability with manufacturers before retaining.

B. Braking Performance: Provide brakes that stop escalator in up-running mode at a rate no greater than 3 ft./s2.

“Braking Performance” Paragraph below is an additional safety feature offered by Schindler. Do not retain both “Braking Performance” paragraphs.

C. Braking Performance: Provide brakes that produce a stopping force on escalator in up-running mode that is one-third that used in down-running mode.

“Step/Skirt Performance Index” Paragraph below requires escalators that comply with ASME A17.1/CSA B44 without using skirt deflector devices. Verify availability with manufacturers before retaining.

D. Step/Skirt Performance Index: Not more than 0.15.

Retain "Delegated Design" Paragraph below if Contractor is required to assume responsibility for design.

E. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design escalators.

Retain "Seismic Performance" Paragraph below with "Seismic Qualification Certificates" Paragraph in "Informational Submittals" Article for projects requiring seismic design. The IBC and ASCE/SEI 7 establish criteria for buildings subject to earthquake motions; the IBC requires compliance with seismic structural-design requirements of ASCE/SEI 7. Coordinate requirements with structural engineer Licensed in the state of Colorado.

F. Seismic Performance: Current seismic risk zone for Denver International Airport (DIA) is zone 1 and all equipment is to meet such requirements.

Information in three subparagraphs below is needed to design elevator to comply with ASCE/SEI 7 or the IBC. Information in first two subparagraphs is typically included in structural notes on Drawings.

Design earthquake spectral response acceleration short period (Sds) is determined by Project's location and site classification.

Retain "Structural and Mechanical Performance for High-Traffic Escalators" Paragraph below for high-traffic escalators.

G. Structural and Mechanical Performance for High-Traffic Escalators: For the purposes of structural design, driving machine and power transmission calculations, and brake calculations, design high-traffic escalators for loads not less than one and one-half times the design loads required by ASME A17.1/CSA B44.

Consider retaining "Structural Performance of Balustrades, Deck Barricades, and Handrails" Paragraph below; revise if local building code has more stringent requirements. ASME A17.1/CSA B44 has structural requirements for handrails, but they are not the same as those in ASCE/SEI 7. Authorities having jurisdiction may require compliance with railing requirements in building code, which usually references ASCE/SEI 7.

H. Structural Performance of Balustrades, Deck Barricades, and Handrails: Provide components and assemblies capable of withstanding the effects of loads indicated in ASCE/SEI 7 for handrail assemblies and guardrail systems.

2.03 ESCALATORS

Retain "Escalators, General" or "High-Traffic Escalators, General" Paragraph below. Retain second paragraph for high-traffic escalators.

A. Escalators, General: Manufacturer's standard escalators complying with requirements. Unless otherwise indicated, manufacturer's standard, heavy-duty rated (NON-APTA) components shall be used, as included in standard escalator systems and as required for complete system.

B. High-Traffic Escalators, General: Manufacturer's high-traffic escalators complying with requirements. Unless otherwise indicated, manufacturer's heavy-duty components shall be used, as included in standard high-traffic escalator systems and as required for complete system.

C. Design and equip escalators to run in either direction.

Retain one of three options in first paragraph below. Two flat steps are typical, three steps are used for longer runs and faster escalators, and four steps are the maximum allowed by ASME A17.1/CSA B44 and are seldom used.

D. Provide escalators with a Code-required minimum of two (2)- flat steps at top and bottom landings for new installation projects. Where additional space allows, provide three (3) flat steps. For escalator modernization projects, contractors/suppliers are to provide the greatest number of flat steps possible at top and bottom landings based on existing site conditions/dimensions.

Revise "Rated Speed" Paragraph below if another speed is required and available. Either 90 or 100 fpm (0.46 or 0.5 m/s) is standard with most manufacturers; 100 fpm (0.5 m/s) is the maximum allowed by ASME A17.1/CSA B44.

E. Rated Speed: 100FPM.

2.04 COMPONENTS

A. Fabricate exposed metalwork, including deck covers, balustrade panels, and trim to provide surface flatness equivalent to stretcher-leveled standard of flatness and sufficient strength for indicated use; increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as necessary. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.

Usually retain "Opaque Balustrades" or "Transparent Balustrades" Paragraph below. Indicate on Drawings if using both types.

B. Transparent Balustrades: Manufacturer's standard profile or arrangement of moving handrails on guide rail that is supported by tempered glass panels, with deck covers, skirts, trim, and accessories. Prepared for exterior finish below the deck covers.

Direction indicator lights allow approaching passengers to determine direction of escalator travel.

C. Direction Indicator Lights: Provide red and green LED-illuminated indicator lights at least 2 inches in diameter in right or left-hand - balustrade newels at both upper and lower landings. Green light indicates entrance end, and red light indicates exit end. When escalator is stopped, red lights are illuminated at both ends.

D. Guards at Ceiling Intersection: Clear plastic with smooth edges.

E. Handrails: Smooth, jointless, reinforced neoprene.

1. Color: Black in color with anti-microbial rating.
2. Sterilization: Provide internally mounted UV-C handrail sterilization devices on each handrail from EHC Global, Inc. or approval equal. Provide display signs on each escalator entry and exit indicating the device is present/functional on the unit.

F. Deck Covers and Trim: Provide #4 brushed/satin stainless steel finish for proper wear and tear and ease/cost of refinishing. Includes outer and common decking sections.

Retain "Antislide Devices" Paragraph below if required for escalators with opaque balustrades. Antislide devices are raised objects that are required with high-deck balustrades where the outer edge of a deck is more than 8 inches (200 mm) from the handrail edge or when the distance between handrails is more than 12 inches (300 mm); they are usually required for side-by-side parallel escalators to prevent people from sliding down the deck.

G. Antislide Devices: Provide #4 brushed/satin stainless steel finish where applicable. Evenly space throughout the decking area from top to bottom.

Retain "Balustrade Interior Panels" Paragraph below if required for escalators with opaque balustrades.

H. Balustrade Interior Panels: Provide #4 brushed/satin stainless steel finish for proper wear and tear and ease/cost of refinishing.

Retain “Balustrade Exterior Panels (and Escalator Soffits)” Paragraph below unless specifying escalator's exterior finish in another Section; coordinate with “Related Requirements” Paragraph in “Summary” Article.

I. Balustrade Exterior Panels and Escalator Soffits: Provide #4 brushed/satin stainless steel finish for proper wear and tear and ease/cost of refinishing.

For maximum competition, retain option in title of “Skirt Panels(, if Applicable)” Paragraph below; see Evaluations. Retaining last option also helps maximize competition.

J. Skirt Panels, if Applicable: Provide manufacturer's satin stainless steel with exposed surface coated with clear PTFE or standard low-friction material.

K. Skirt Lighting: Provide LED skirt lighting evenly spaced and running the entire length of both skirts.

L. Skirt Deflector Devices: Provide manufacturer's standard brush-type device running entire length of skirt panels.

M. Steps: One-piece, die-cast aluminum with demarcation grooves at front and rear of tread surface.

Retain “Finish” Subparagraph below if required. Verify availability and color selection with manufacturers before retaining.

1. Finish: Powder-coated, Manufacturer’s standard graycolor

Step demarcation in “Step Demarcation” Subparagraph below makes sides and backs of steps more visible and is required by ASME A17.1/CSA B44.

2. Step Demarcation: 1-1/2- to 2-inch- wide yellow stripe at sides and backs of step treads.
3. Nosing Demarcation: 2-inch- wide yellow stripe at nosings of step treads.

Most combs are now made of plastic; before the color yellow came into use; most combs were made of aluminum.

N. Combs: Provide manufacturer’s standard

ASME A17.1/CSA B44 requires visual contrast between comb and steps (by color, pattern, or texture). Before retaining one of four options in “Comb Color” Subparagraph below, verify availability of colors with manufacturers.

1. Comb Color: Yellow

Combplate lights, which are especially desirable if lighting levels are low, are used in addition to green lights that illuminate gaps between steps and are required by ASME A17.1/CSA B44 to be placed under steps at landings.

O. Combplate Lights: Provide recessed, LED-illuminated light fixtures with flush lenses mounted in skirt panels at each side of combplates, designed to illuminate combplate steps.

Retain last option in “Floor Plates” Paragraph below for exterior applications and near building entrances. Verify, with manufacturers, availability of abrasive surface stainless steel before retaining.

P. Floor Plates: Provide manufacturer’s standard cast or extruded aluminum with grooved or patterned surface for interior escalators and manufacturer’s standard stainless steel with abrasive material embedded in or metallically bonded to floor-plate surface for exterior escalators.

2.05 FEATURES

If needed, revise location of switches in “Operational Control” Paragraph below; starting switch must be located with steps in sight.

A. Operational Control: Provide key-operated starter switches and key-operated switches for directional control located on exterior deck above newel base at both upper and lower landings of escalators.

B. [Future] Monitoring Provisions:

1. Provide Lift-Net interface provisions within the solid-state escalator/walk control system for potential future use by the airport.
2. Provide BACNET interface provisions only within the solid-state escalator/walk control system for potential future use by the airport.

Most manufacturers offer some form of fault indicator to help determine the cause of malfunctions. Consult manufacturers and revise "Fault Indicator" Paragraph below if necessary. Delete if not required.

3. Fault Indicator: Provide escalators with a microprocessor unit that monitors safety devices, motor temperature, and escalator speed and records in nonvolatile memory the date, time, and device identification if a safety device is activated or escalator malfunctions.
4. Provide built-in unit to display recorded fault and operational information on the exterior surface of the escalator such as a skirt cap or balustrade/newel end.

"Reduced-Current Starting" Paragraph below is an alternative with some manufacturers and is standard with others.

C. Reduced-Current Starting: Provide escalator motors with wye-delta or solid-state starting.

Verify availability and cost of feature in "Energy-Saving Feature" Paragraph below before specifying. Extra cost could be recouped by energy savings.

D. Energy-Saving Feature / "Sleep Mode" Operation: Provide escalator motors and controls designed for motors running on partial windings (at reduced power) when not under full load. Infrared triggering devices will be provided at both ends of the escalators allowing the escalator to reach full speed by the time a passenger breaks the infra-red beams and steps onto the step band. The unit will return to "sleep mode" operation after a specific time frame of no traffic (time frame to be set through a programmable/adjustable timer).

First paragraph below requires heavy-duty motors; retain only for high-traffic escalators.

E. Provide motors complying with NEMA MG 1, Insulation Class B.

F. Brake-Saving Feature: Provide stopping mechanism that allows escalator to coast to a stop before applying brakes, unless stopping is initiated by a safety device.

Step-chain lubricators add cost but may also reduce wear and maintenance costs and prolong escalator life. Consider retaining first paragraph below for standard escalators; always retain for high-traffic escalators.

G. Equip step drive mechanism with automatic step-chain lubricators.

Oil drip pan is an optional feature with most manufacturers but is usually specified.

H. Oil Drip Pan: Provide metal pan under full width and length of escalator to collect and hold oil and grease drippings from lubricated components. Design and fabricate drip pan to sustain a load of 250 lbf on a 1.0-sq. ft. area at any location without permanent deflection. Contractor to advise owner / purchaser if existing pan or truss sections supporting structure requires modification or repair to accommodate the replacement escalator as part of the surveying/submittal process where possible. If pan and/or truss is retained for an escalator modernization process, thoroughly degrease and clean the oil drip pan and associated truss sections as needed and paint with rust-

inhibitive paint. Contractor to advise if existing pan or truss sections are damaged and require further repair.

Verify availability of 20 percent overspeed governor with manufacturers. ASME A17.1/CSA B44 does not require a governor if motor is directly connected to driving machine, unless it has variable-frequency control. If required by ASME A17.1/CSA B44, governor need only activate at 40 percent above rated speed.

I. Overspeed Governor: Provide units with overspeed governor that is activated if speed of steps exceeds rated speed by more than 20 percent.

"Upper-Landing, Step Upthrust Device" Paragraph below describes a safety device. ASME A17.1/CSA B44 only requires step upthrust device at lower landing.

J. Upper-Landing, Step Upthrust Device: Activated if a step is displaced against upthrust track at upper curve in passenger-carrying line of track system.

Retain one of two "Comb-Step Impact Device" paragraphs below. First is a requirement in ASME A17.1/CSA B44. Second is a more stringent requirement that was included in ASME A17.1/CSA B44 until 1997 Addenda changed required forces. See Evaluations.

K. Comb-Step Impact Device: Activated if a horizontal force in direction of travel is applied exceeding 400 lbf at either side or exceeding 800 lbf at center of front edge of combplate, or a resultant force in upward direction is applied exceeding 150 lbf at center of front edge of combplate.

L. Comb-Step Impact Device: Activated if a horizontal force in direction of travel is applied exceeding 112 lbf at either side or exceeding 225 lbf at center of front edge of combplate, or a resultant force in upward direction is applied exceeding 150 lbf at center of front edge of combplate.

M. Step Demarcation Lights: Provide a sealed, LED-illuminated, green hue step demarcation light per Code in both ends (exit and entry points) of the escalators. The demarcation lights will remain illuminated if the escalator is shut off with the keyswitches on each end of the unit.

2.06 EXTERIOR ESCALATORS

Revise this article to suit local climate and exposure conditions. Indicate on Drawings which escalators are exterior. ASME A17.1/CSA B44 requires that exterior escalators be covered.

Usually retain first option in first paragraph below. Coordinate with finishes in "Components" Article.

A. Fabricate exposed components from stainless steel unless otherwise indicated.

B. For new installation/replacement outside escalators, hot-dip galvanize escalator trusses and other structural components to comply with ASTM A 123/A 123M. Use only stainless-steel or zinc-plated fasteners.

If retaining first paragraph below, which is recommended, retain "Oil Drip Pan" Paragraph in "Features" Article.

C. Fabricate oil drip pan from galvanized-steel sheet. Provide drain and oil/water separator in oil drip pan.

D. Provide drains, weeps, and drips to prevent water accumulation on horizontal surfaces and to direct water away from electrical equipment and moving parts.

E. Provide enclosures complying with NEMA 250, Type 4 for electrical connections, switches, and equipment.

F. Provide totally enclosed motors complying with NEMA MG 1, Insulation Class B.

Delete first paragraph below if retaining automatic step-chain lubricators in "Features" Article.

G. Equip step drive mechanism with automatic step-chain lubricators.

Delete first paragraph below if heat is considered unnecessary due to local climate.

H. Provide electric heaters with integral thermostats in escalator truss space to maintain temperature above 40 deg F. Separate electrical disconnects for each heater will be provided by electrical contractors.

Delete paragraph below if heat in paragraph above is sufficient or is considered unnecessary due to local climate.

I. Equip combplates with 400-W electric heaters to prevent ice and snow accumulation. Please note this feature will be electrically fed from disconnect added in the item above.

2.07 MATERIALS

A. Standard Application- Stainless Steel: ASTM A 240/A 240M, [Type 304, except use Type 316 for exterior escalators.

Usually retain "Satin Finish" Subparagraph below and delete three remaining subparagraphs.

1. Satin Finish: No. 4 directional satin.

Revise "Satin Bronze Sheet" and "Satin Bronze Extrusions" paragraphs below if oxidized finish is needed.

Retain "Steel Sheet" Paragraph below if specifying PTFE-coated steel skirt panels.

B. Steel Sheet: Cold-rolled steel sheet, ASTM A 1008/A 1008M, commercial steel, Type B, exposed, matte finish.

Insert other finish materials, if required, such as anodized aluminum, plastic laminate, etc.

C. Clear Tempered Glass: ASTM C 1048, Condition A (uncoated surfaces), Type 1 (transparent glass, flat), Class 1 (clear), Quality q3 (glazing, select), Kind FT (fully tempered), 12.0mm thick.

PART 3 EXECUTION

3.01 REQUIRED DOCUMENTATION

A. Submit Seismic, manufacturers, and Installer Qualifications within 30 days of Notice to Proceed to the DEN Project Manager.

3.02 FIELD QUALITY CONTROL

Coordinate inspection and testing requirements with DEN Project Manager.

A. Acceptance Testing: On completion of escalator installation and before permitting escalator use, perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by authorities having jurisdiction.

1. For escalators specified to comply with requirements more stringent than those of ASME A17.1/CSA B44, perform tests for compliance with specified requirements. Test safety devices that are not required by ASME A17.1/CSA B44 as well as those that are.

B. Advise Owner, DEN Project Manager, and authorities having jurisdiction in advance of dates and times that tests are to be performed.

3.03 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate the escalators.

1. Schedule training with Owner, through DEN Project Manager, with at least seven (7) days advance notice.

B. Check operation of escalators with Owner's personnel present before date of Substantial Completion and again not more than one month before end of warranty period where applicable. Determine that operation systems and devices are functioning properly.

Section 143200: Moving Walks

PART 1 GENERAL

1.01 SUMMARY

Edit to suit Project.

A. Section includes interior and [exterior] moving walks.

B. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

1. The contractor is to provide the cost and project management of all related work for completion of this scope of work for a turn-key project.
2. Section 033000 “Cast-in-Place Concrete” for setting sleeves, inserts, and anchoring devices in concrete.
3. Section 051200 “Structural Steel Framing” for attachment plates, angle brackets, and other preparation of structural steel to support moving walk trusses.
4. Section 083113 “Access Doors and Frames” for wall and ceiling access panels and access doors in moving walk enclosures.

Usually delete first subparagraph below, making “Caution” signs work of this Section for undivided responsibility of moving walk work. Retaining subparagraph and specifying “Caution” signs in the sign Section allow some aesthetic and material quality control over signs.

Section 101400 “Signage” for “Caution” signs required by ASME A17.1/CSA B44.Retain paragraph below if Alternates are specified in Division 01 Section 012300 “Alternates” for work in this Section. Coordinate requirements for Alternates with DEN Project Manager.

C. Alternates: Refer to Division 01 Section 012300 “Alternates” for description of Work in this Section affected by Alternates. Contractors are to provide alternate pricing for the following items:

1. LED under handrail lighting – full length of each escalator – both sides.

1.02 REFERENCES

A. U.S. Architectural & Transportation Barriers Compliance Board:

1. ADA Accessibility Guidelines – September 2010- American Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities – as applicable.

ENGINEER/ARCHITECT SHALL NOT REDUCE THE REQUIREMENTS BELOW WITHOUT PERMISSION FROM THE DEN PROJECT MANAGER.

1.03 ACTION SUBMITTALS

Usually delete “Product Data” Paragraph below and review catalog information before editing this Section.

A. Product Data: Include capacities, sizes, performances, safety features, finishes, and similar information.

1. Include data substantiating that materials comply with requirements.

B. Shop Drawings:

1. Include plans, elevations, sections, and details indicating coordination with building structure and relationships with other construction.
2. Indicate maximum loads imposed on building structure at points of support, and power requirements.
3. Indicate access and ventilation for moving walk machine space.

Coordinate sample requirements with DEN Project Manager.

C. Samples for Verification: For exposed finishes, 3-inch- square Samples of sheet materials and 4-inch lengths of running trim members.

1.04 INFORMATIONAL SUBMITTALS

Coordinate “Qualification Data” Paragraph below with qualification requirements in Section 014000 “Quality Requirements” and as may be supplemented in “Quality Assurance” Article.

A. Qualification Data: For Installer.

B. Manufacturer Certificates: Signed by manufacturer certifying that moving walk layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for moving walks being provided.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For moving walks to include in emergency, operation, and maintenance manuals.

Usually delete subparagraph below for projects where Owner's staff does not maintain moving walks; retaining below increases cost of moving walks.

1. In addition to items specified in Section 017823 “Operation and Maintenance Data,” include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.

B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted use of moving walks.

“Continuing Maintenance Proposal” Paragraph below provides service contract beyond initial maintenance period. If continuing maintenance proposal is submitted at time of bid, include that information in the Instructions to Bidders.

Verify requirements for as-built plans with DEN Project Manager.

C. As-Built Plans: Submit complete as-built plans of all Work, including interface with other Work, in accordance with requirements as specified in Section 013300 “Submittal Procedures”.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Moving walk manufacturer or an authorized representative who is trained and approved by manufacturer on the specific equipment installed/modernized.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials, components, and equipment in manufacturer's protective packaging. Store materials, components, and equipment off of ground, under cover, and in a dry location prior to installation of the equipment.

1.08 COORDINATION

A. Coordinate installation of sleeves, block outs, moving walk equipment with integral anchors, and other items that are embedded in concrete or masonry for moving walk equipment. Furnish templates, sleeves, moving walk equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.

B. Coordinate locations and dimensions of other work relating to moving walks including sumps and floor drains in pits; electrical service; and electrical outlets, lights, and switches in pits.

1.09 WARRANTY

Delete this article if appropriate, especially if a good maintenance agreement is established.

When warranties are required, verify with Owner's counsel that warranties stated in this article are not less than remedies available to Owner under prevailing local laws.

Coordinate warranty requirements with DEN Project Manager.

A. Manufacturer's Special Warranty: Manufacturer agrees to provide replacement moving walk components/parts as part of the project. The contractor is to provide a comprehensive spare parts list to the purchaser for approval. All parts will be provided to the purchaser prior to final completion of each project task order. Bidders are to include a $15,000 per unit spare parts allowance with their proposals.

Retain article below if required for Project. Coordinate requirements with DEN Project Manager.

1.010 CONSTRUCTION WASTE MANAGEMENT

A. Construction waste shall be managed in accordance with provisions of Section 017419 “Construction Waste Management and Disposal”. Documentation shall be submitted to satisfy the requirements of that Section.

PART 2 PRODUCTS

2.01 MANUFACTURERS

Retain “Manufacturers” Paragraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers.

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

Coordinate list below with type of moving walk specified. Most manufacturers make pallet-type units. Westmont Industries makes belt-type units.

1. KONE Inc.
2. Otis Elevator Co.
3. Schindler Elevator Corp.

4. thyssenkrupp Elevator

B. Source Limitations: Obtain moving walks and if applicable, escalators, specified in another Section, from a single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

The International Building Code (IBC) requires compliance with ASME A17.1/CSA B44. Insert other requirements, if any, of authorities having jurisdiction.

A. Regulatory Requirements: Comply with the latest ASME A17.1/CSA B44 code in effect by the local authority having jurisdiction (AHJ).

Consider retaining "Structural Performance of Balustrades, Deck Barricades, and Handrails" Paragraph below; revise if local building code has more stringent requirements. ASME A17.1/CSA B44 has structural requirements for handrails, but they are not the same as those in ASCE/SEI 7. Authorities having jurisdiction may require compliance with railing requirements in building code, which usually references ASCE/SEI 7.

B. Structural Performance of Balustrades, Deck Barricades, and Handrails: Provide components and assemblies capable of withstanding the effects of loads indicated in ASCE/SEI 7 for handrail assemblies and guardrail systems.

2.03 MOVING WALKS

A. Moving Walks, General: Manufacturer's standard pallet heavy-duty rated (NON-APTA) type moving walks complying with requirements. Unless otherwise indicated, manufacturer's standard components shall be used as included in standard moving walk systems and as required for complete system.

B. Design and equip moving walks to run in either direction.

Retain one of five options in "Rated Speed" Paragraph below or revise to suit Project. ASME A17.1/CSA B44 limits speed to 180 fpm (0.9 m/s) for moving walks that are sloped no more than 8 degrees and to 140 fpm (0.7 m/s) for those sloped more than 8 degrees but no more than 12 degrees.

C. Rated Speed 100 fpm.

2.04 COMPONENTS

A. Fabricate exposed metalwork, including deck covers, balustrade panels, and trim to provide surface flatness equivalent to stretcher-leveled standard of flatness and sufficient strength for indicated use; increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as necessary. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.

Usually retain "Opaque Balustrades" or "Transparent Balustrades" Paragraph below. Indicate on Drawings if using both types.

B. Transparent Balustrades: Manufacturer's standard profile or arrangement of moving handrails on guide rail that is supported by clear tempered glass panels, with deck covers, skirts, trim, and accessories. Prepared for exterior finish below the deck covers.

Direction indicator lights allow approaching passengers to determine travel direction of moving walk.

C. Direction Indicator Lights: Provide red and green LED-illuminated indicator lights at least 2 inches in diameter in right or left-hand balustrade newels at both entry and exit points. Green light

indicates entrance end, and red light indicates exit end. When moving walk is stopped, red lights are illuminated at both ends.

D. Handrails: Smooth, jointless, reinforced neoprene.

1. Color: Black in color with anti-microbial rating.
2. Sterilization: Provide internally mounted UV-C handrail sterilization devices on each handrail from EHC Global, Inc. or approval equal. Provide display signs on each escalator entry and exit indicating the device is present/functional on the unit.

E. Deck Covers and Trim: Provide #4 brushed/satin stainless steel finish for proper wear and tear and ease/cost of refinishing. Includes outer and common decking sections.

F. Balustrade Interior Panels: Provide #4 brushed/satin stainless-steel finish for proper wear and tear and ease/cost of refinishing.

Retain "Balustrade Exterior Panels" Paragraph below unless specifying moving walk exterior finish in another Section; coordinate with "Related Sections" Paragraph in Part 1 "Summary" Article.

G. Balustrade Exterior Panels: Provide #4 brushed/satin stainless steel finish for proper wear and tear and ease/cost of refinishing

ASME A17.1/CSA B44 allows skirtless moving walks with interior balustrade panels that overhang the treadway rather than skirt panels that fit alongside the treadway.

H. Skirt Panels, if Applicable: Provide manufacturer's satin stainless steel with exposed surface coated with clear PTFE or standard low-friction material.

Subparagraph below is stricter than requirement in ASME A17.1/CSA B44 but may reduce the risk of accidents.

1. Clearance between skirt panels or overhanging balustrade panels and treadway shall not exceed 1/16 inch.

I. Skirt Lighting: Provide LED skirt lighting evenly spaced and running the entire length of both skirts.

Most combs are now made of plastic; before the color yellow came into use, most combs were made of aluminum.

J. Combs: Provide manufacturer's standard

ASME A17.1/CSA B44 requires visual contrast between comb and steps (by color, pattern, or texture). Before retaining one of four options in "Comb Color" Subparagraph below, verify availability of colors with manufacturers.

K. Comb Color: Yellow

Feature in "Combplate Lights" Paragraph below is especially useful if lighting levels are low.

L. Combplate Lights: Provide recessed, LED-illuminated light fixtures with flush lenses mounted in interior balustrade panels at each side of combplates, designed to illuminate treadway at combplate.

Retain last option in "Floor Plates" Paragraph below for exterior applications and near building entrances. Verify availability of abrasive surface stainless steel with manufacturers before retaining.

M. Floor Plates: Provide manufacturer's standard cast or extruded aluminum with grooved or patterned surface for interior escalators and manufacturer's standard stainless steel with abrasive material embedded in or metallically bonded to floor-plate surface for exterior escalators.

2.05 FEATURES

If needed, revise location of switches in "Operational Control" Paragraph below; starting switch must be located with treadway in sight.

A. Operational Control: Provide key-operated starter switches and key-operated switches for directional control located on exterior deck above newel base at both upper and lower landings of escalators.

B. Future Monitoring Provisions:

1. Provide Lift-Net interface provisions within the solid-state escalator/walk control system for potential future use by the airport.
2. Provide BACNET interface provisions only within the solid-state escalator/walk control system for potential future use by the airport.

Most manufacturers offer some form of fault indicator to help determine the cause of malfunctions. Consult manufacturers and revise "Fault Indicator" Paragraph below if needed. Delete if not required.

C. Fault Indicator: Provide moving walks with a microprocessor unit that monitors safety devices, motor temperature, and moving walk speed and records in nonvolatile memory date, time, and device identification if a safety device is activated or moving walk malfunctions.

1. Provide built-in unit to display recorded fault and operational information on the exterior surface of the escalator such as a skirt cap or balustrade/newel end.

"Reduced-Current Starting" Paragraph below is an alternative with some manufacturers, standard with others.

D. Reduced-Current Starting: Provide moving walk motors with wye-delta or solid-state starting.

Verify availability and cost of feature in "Energy-Saving Feature" Paragraph below before specifying. Extra cost could be recouped by energy savings.

E. Energy-Saving Feature / "Sleep Mode" Operation: Provide moving walk motors and controls designed for motors running on partial windings (at reduced power) when not under full load. Infrared triggering devices will be provided at both ends of the escalators allowing the escalator to reach full speed by the time a passenger breaks the infra-red beams and steps onto the step band. The unit will return to "sleep mode" operation after a specific time frame of no traffic (time frame to be set through a programmable/adjustable timer).

F. Brake-Saving Feature: Provide stopping mechanism that allows moving walks to coast to a stop before applying brakes, unless stopping is initiated by a safety device.

Mechanism in first paragraph below can add considerable cost but may also reduce wear and maintenance costs and prolong life of moving walk. Delete if belt-type treadways are exclusively specified.

G. Equip pallet drive mechanism with automatic pallet drive-chain lubricators.

H. Oil Drip Pan: If applicable, provide metal pan under full width and length of moving walks to collect and hold oil and grease drippings from lubricated components. Design and fabricate drip pan to sustain a load of 250 lbf on a 1.0-sq. ft. area at any location without permanent deflection. Contractor to advise owner / purchaser if existing pan or truss sections supporting structure requires modification or repair to accommodate the replacement walk as part of the surveying/ submittal process where possible.

Retain one of two "Comb-Step Impact Device" paragraphs below. First is a requirement in ASME A17.1/CSA B44. Second is a more stringent requirement that was included in ASME A17.1/CSA B44 until 2000 Addenda changed required forces.

I. Comb-Step Impact Device: Activated if a horizontal force in direction of travel is applied exceeding 400 lbf at either side or exceeding 800 lbf at center of front edge of combplate, or a resultant force in upward direction is applied exceeding 150 lbf at center of front edge of combplate.

J. Comb-Step Impact Device: Activated if a horizontal force in direction of travel is applied exceeding 112 lbf at either side or exceeding 225 lbf at center of front edge of combplate, or a resultant force in upward direction is applied exceeding 150 lbf at center of front edge of combplate.

K. Step Demarcation Lights: Provide a sealed, LED-illuminated, green hue step demarcation light per Code in both ends (exit and entry points) of the moving walk. The demarcation lights will remain illuminated if the moving walk is shut off with the keyswitches on each end of the unit.

2.06 MATERIALS

A. Standard Application- Stainless Steel: ASTM A 240/A 240M, Type 304, except use Type 316 for exterior moving walks

Usually retain "Satin Finish" Subparagraph below and delete three remaining subparagraphs.

1. Satin Finish: No. 4 directional satin.

Retain "Steel Sheet" Paragraph below if specifying PTFE-coated steel skirt panels.

B. Steel Sheet: Cold-rolled steel sheet, ASTM A 1008/A 1008M, commercial steel, Type B, exposed, matte finish.

Insert other prime exposed-finish materials, if required, such as anodized aluminum, plastic laminate, etc.

C. Clear Tempered Glass: ASTM C 1048, Condition A (uncoated surfaces), Type 1 (transparent glass, flat), Class 1 (clear), Quality q3 (glazing, select), Kind FT (fully tempered), 12.0 mm thick.

PART 3 EXECUTION

3.01 REQUIRED DOCUMENTATION

A. Submit Seismic, manufacturers, and Installer Qualifications within 30 days of Notice to Proceed to the DEN Project Manager.

3.02 FIELD QUALITY CONTROL

Coordinate inspection and testing requirements with DEN Project Manager.

A. Acceptance Testing: On completion of moving walk installation and before permitting moving walk use, perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by authorities having jurisdiction.

1. For moving walks specified to comply with requirements more stringent than those of ASME A17.1/CSA B44, perform tests for compliance with specified requirements.

B. Advise Owner, DEN Project Manager, and authorities having jurisdiction in advance of dates and times that tests are to be performed.

3.03 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate the moving walks.

1. Schedule training with Owner, through DEN Project Manager, with at least seven (7) days advance notice.

B. Check operation of moving walks with Owner's personnel present before date of Substantial Completion and again not more than one month before end of warranty period where applicable. Determine that operation systems and devices are functioning properly.

Section 147300: Over the Wing Passenger Boarding Bridges

DEN uses JBT systems for passenger loading bridges. Full design / build specification is available upon request.

Section 147310: Apron Drive Passenger Boarding Bridges

DEN uses JBT systems for passenger loading bridges. Full design / build specification is available upon request.

Section 147320: Radial Drive Passenger Boarding Bridges

DEN uses JBT systems for passenger loading bridges. Full design / build specification is available upon request.

End of Chapter

Appendix A- Sketch Exhibits

Appendix A- Sketch Exhibits

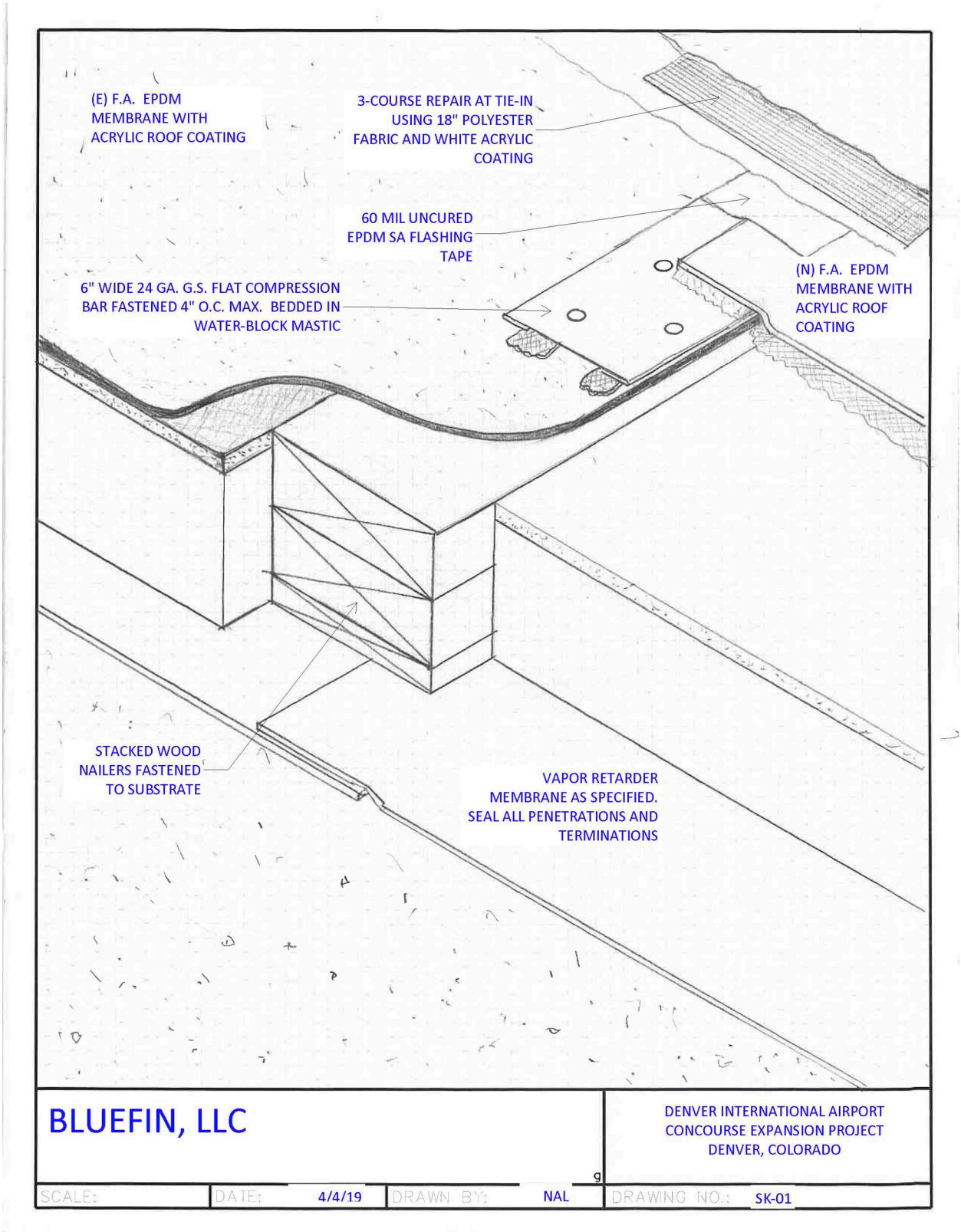

Exhibit Standard (Basis-of-Design) Door System

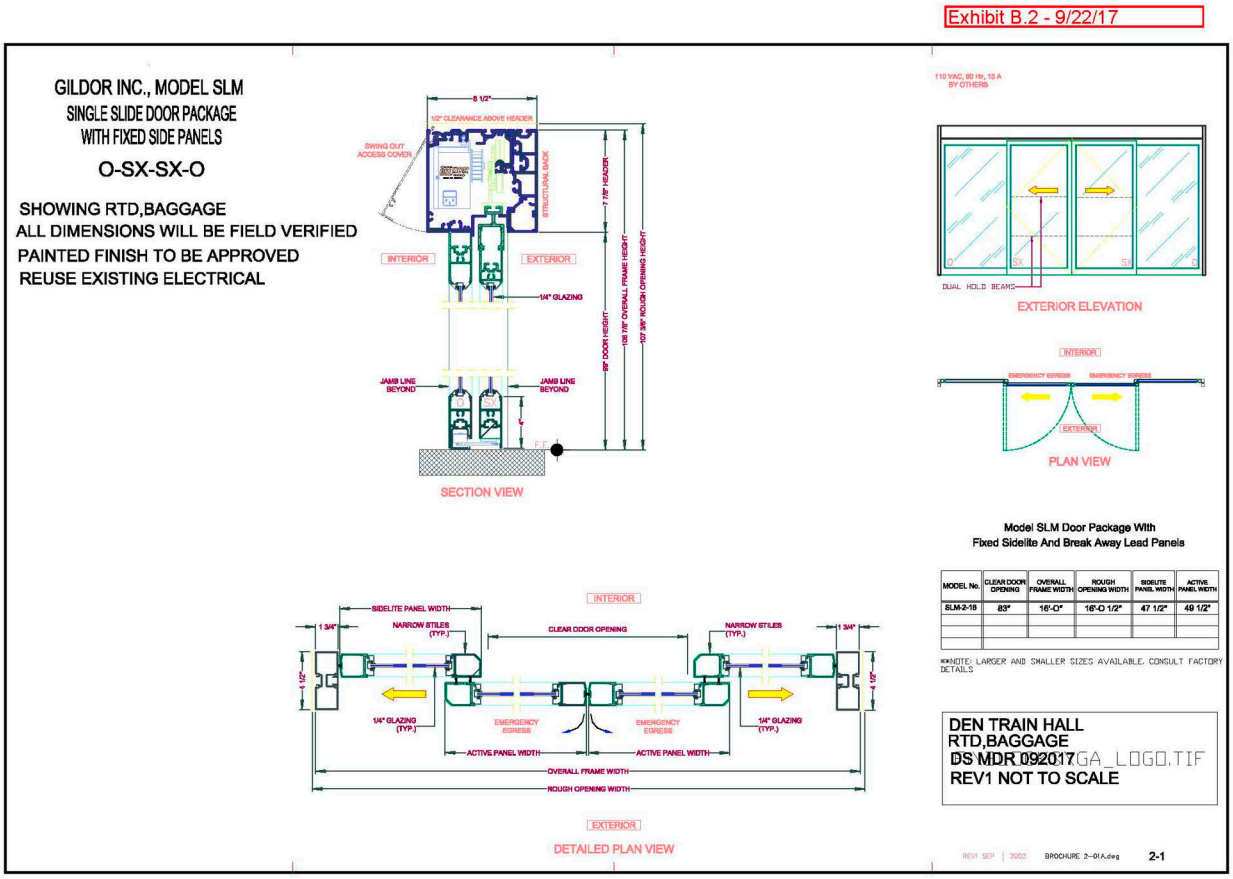

Exhibit Standard (Basis-of-Design) Door System

Appendix B- Access Control Standard Door Hardware

Access Control Standard Door Hardware
(05-03-2021)

Rim Panic Bar	Von Duprin: (-F if fire rated) RX-LD-98-L-06-SNB
E996 Electrified Trim *(Discontinued 2021)*	Von Duprin: Fire rated: RX-LD 98L-F x E996L-FSE-06 x US26D x RHR x 48" x SNB (for right hand reverse)
E996 Electrified Trim *(Discontinued 2021)*	Von Duprin: Fire rated: RX-LD 98L-F x E996L-FSE-06 x US26D x LHR x 48" x SNB (for left hand reverse)
M996 Electrified Trim	Von Duprin: M996L *(E996 replacement)*
Key core needed for E996 & M996	*Verify with DEN-Lockshop* MEDEA: 100108 NEXGEN XT SFIC CYLINDER $125.75
Electric Hinge ***(replaced with EPT-10)***	Hagar: BB1168 4.5x4.5 ETW-8 24" leads (revise this for size and finish)-or- Hagar: BB1168 5x4.5 ETW-8 24" leads
Electric Power Transfer Hinge	Von Duprin: EPT-10 *(Hager Hinge replacement)*
Fire Alarm Module	Simplex: 4090-9002 (verify with Life Safety)
Magnetic Lock	Schlage: M490P
Power Supply	Von Duprin: PS914 or PS904
Delay Egress Module	Von Duprin: DIA Special DE5300 part# 114986-00
Photoelectric Sensor	Banner: S18SN6L (NPN) or {2 leaf use S18-2VNLV-2M and BRT-60X40C (reflector)}
Card Reader	HID: 3110-2405-SD006 *(discontinued)*
Intelligent Door Controller	IDC-750IP
Biometric Reader	AFP3010
Moxa Edge Switch	EDS205-M-ST (5-port) or EDS208-M-ST (8-port)
HID Card Reader i Class SE	RP40 920PNNTEK20508 -or- RPK40 921PNNTEK20507
Audio/Video (A/V) Module	IPAV750-IPE-IP7DMX
Sentrol Door Position Switch	2507A (standard door) $37.00 *(discontinued)* 2207AU (roll-up door)
George Risk Industries (GRI)	4402-A
Electrified Mortise Lever Lock	Best: 45HW-7-DEU (fail secure) $700.00
Floor Door Hold Open Magnet	SEM7820 (floor) SEM7850 (wall)
Floor Magnet	Rixon: 980M 50-55 holding force
Power Transfer Hinge	Securitron: CEPT #EL-CEPT-C5E-10B *(Contractor installed this item on the B-con West expansion project. This is not an authorized item.)*

Access Control Standard Door Hardware
(05-03-2021) (Continued)

Motion Sensor	Securitron: XMS Exit motion sensor
Emergency Push to Exit Button	Securitron: EEB2 (use the red “Push To Exit” cover) This comes with a cover plate.

Note: *Contact Mert Larsen at Cyber Country Systems, 303-342-2907, for Intelligent Door Controller, Biometric Reader and A/V pricing.*

End of Appendix