Metropolitan Nashville
Airport Authority

AIRPORT IMPROVEMENT REQUEST MANUAL

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SECTION 1 - GENERAL INFORMATION

1.0 PURPOSE AND SCOPE

The Metropolitan Nashville Airport Authority's (MNAA) goal is to develop and maintain safe, secure, efficient, customer-friendly, sustainable, energy efficient and aesthetically pleasing facilities. This MNAA Airport Improvement Request Manual (AIRM) defines uniform design and construction standards for physical improvements on the Nashville International Airport (BNA), John C. Tune Airport (JWN) properties and MNAA Properties Corporation (MPC).

This document is provided as a guide for Tenants within the Terminal, Tenants in non-Terminal buildings, MNAA Departments and MPC properties. It is important that the Tenants and their associates responsible for the preparation of drawings and specifications follow the procedures outlined herein. It is realized that general instructions cannot cover every situation. Specific problems unique to the Tenant shall be resolved by the Tenant working jointly with MNAA for design related issues. Prior to any new construction, addition, renovation, modification, or change in use, the Tenant's project host (Sponsor) must submit to MNAA for approval the concept and/or design for the improvement(s) or modification(s), along with other required information set forth herein. Only specific businesses, activities, and operations will be approved. MNAA reserves the right to restrict businesses, activities, and operations at its sole discretion.

The use, improvement, subdivision, access and other conditions related to the leased premises are controlled and regulated by MNAA according to the lease provisions and as stated herein. No modifications to leased premises may be made without prior written authorization by MNAA. Building, demolition, grading, and/or other permits may be required by Metropolitan Nashville, the state of Tennessee, or other regulatory agencies. No work may proceed until all required permits and necessary approvals have been obtained.

Sponsors are strongly encouraged to become familiar with the intent and details of this document prior to the commencement of work. It is the Sponsor's responsibility to visit the site and verify existing conditions. Each Sponsor shall maintain its premises in a safe, secure, clean, neat, visually attractive, and sanitary condition at all times during improvement implementation. Sponsors shall comply with all applicable laws, rules and regulations including rubbish, junk, health, sanitation, and environmental hazards promptly and at its expense.

1.1 DISCLAIMERS

MNAA shall have absolute right of review and approval over all aspects of airport improvements, as well as the discretion to waive any of the aesthetic criteria so long as, in the MNAA's opinion, neither the concept, quality and character of the project nor the Terminal Building's aesthetics or functions are significantly, adversely affected.

Constructability and compliance to governing codes and regulations remains the responsibility of the Sponsor. If discrepancy arises between this document and local codes and regulations, it is the responsibility of the Sponsor to comply with those codes and regulations. The Sponsor must also inform MNAA of such discrepancy and obtain written approval prior to proceeding. MNAA reserves the right to require Sponsor design changes based upon the MNAA's opinion of potential impacts to, or interfaces with, other Airport projects.

This document does not apply to MNAA capital improvement projects, which are vetted through MNAA's Capital Improvement Process (CIP). This document does apply to all improvements being proposed by Sponsor, MNAA and/or MNAA Properties Corporation (MPC) that are categorized as miscellaneous or renovation/new construction projects.

This manual is dynamic in nature and may be updated by MNAA from time to time. Before using this as a reference for the preparation of construction documents, it should be verified as being the most current edition by contacting MNAA's Business Development Department Tenants and their Sponsors must become familiar with these documents and shall be responsible for remaining current with revisions to this document.

1.2 ADMINISTRATION

MNAA will administer all improvement projects from preliminary discussion and concept development, through the design and review/approval process, construction, and project close-out. Initial questions and correspondence concerning improvements should be directed to:

Airport/Tenant Improvement Request – Business Development Department
Metropolitan Nashville Airport Authority
One Terminal Drive, Suite 501
Nashville, TN 37214-4114
businessdevelopment@nashintl.com

1.3 QUALIFIED DESIGNER SELECTION

Airport-related planning and design require the understanding of complex and divergent procedures which require specialized training. It is essential that qualified personnel undertake the responsibility for preparation of drawings and specifications. All required plans, surveys, design calculations, test reports, etc., shall be prepared and reproduced at Sponsor's expense, and, when required, must be prepared, signed and sealed, by professional architects, engineers, graphics designers, landscape architects, or special consultants, as appropriate. These professionals must be currently licensed to practice in the state of Tennessee and the jurisdiction of MNAA as judicially interpreted. Where the term architect and engineer are referred to without qualification, it shall mean a qualified professional as described in this paragraph. Modification of mechanical, electrical plumbing, security, structural, or other airport systems must be designed by a qualified engineer of the appropriate discipline. Modification of fire protection and alarm systems shall be designed by a qualified engineer. Construction administration services shall be provided by a qualified architect, engineer, or construction manager.

1.4 CODES

All construction must meet the requirements of applicable codes, laws, and any subsequent amendments or additions. All improvements must additionally meet the most recent requirements of Americans with Disabilities Act (ADA), including current governing local, state, and federal codes and guidelines as adopted by Davidson County &

State of Tennessee. These standards shall be part of, but may not be the full extent of regulations, affecting the premises and/or the lease agreements with MNAA.

1.5 DEFINITIONS

The following definitions are used throughout the AIRM and shall be interpreted as follows:

Acceptance "accept", "accepted", "acceptable", "acceptance" and words of similar import mean that acceptance by the Airport or its authorized representatives are required unless otherwise stated. Acceptance must always be in writing.
ADA refers to the Americans with Disabilities Act.
Air Operations Area (AOA) - "Air Operations Area" means any area of the Airport used or intended to be used for landing, take-off or surface maneuvering of aircraft. The AOA shall include such paved or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft, in addition to its associated runway, taxiway or apron.
Airport is the Metropolitan Nashville Airport Authority, President/CEO or duly appointed designee.
Airport/Tenant Improvement is the construction, renovation, alteration, repair, relocation, enhancement or demolition of any structure, building, facility, or any part thereof including, but not limited to, paving, fencing, signs, landscaping, and utility services to or within any building site or interior site.
Airport Improvement Request Manual means the specifications and regulations adopted and so designated by the MNAA that governs the construction or alternation of improvements in and on the facilities of the Nashville International Airport.
Airport Improvement Request Review Board (AIR Review Board) refers to MNAA representatives who will be reviewing, approving, and/or coordinating improvements at MNAA.
Alteration shall have the meaning set forth in Section 12.1 of the Tenant's Lease Agreement.
Approval "approve", "approved", "approval" and words of similar import mean that approval of MNAA or its authorized representatives is required unless stated otherwise. Approval must always be in writing.
Authority Having Jurisdiction is the duly appointed body that governs, regulates and enforces applicable standards, codes, and regulations.
Base Building means all improvements that will be designed, funded and constructed by the MNAA, but specifically excluding Tenant improvements within the exclusive use areas.
Base Building Construction Manager means the general contractor/construction manager or its designee who will be responsible to coordinate the construction of all Base Building components for the Airport. The airport has contracted with Austin Commercial to serve as General Contractor/Construction Manager to deliver the Base Building and to provide services for the following work with respect to the Base Building: (i) site civil/infrastructure improvements; (ii) the Circulation Core Area; (iii) the operational floor plates of the Ready/Return Area; and (iv) the QTA Space and Storage Area.
Base Building Design Team refers to the design team comprised of multi-disciplined architects and engineers who designed the Base Building components. The members of the Base Building design team are subject to replacement by the MNAA.
CFM is cubic feet per minute.
Circulation Core Area refers to the main common use circulation area located on the first through third floors of the CONRAC Ready/Return Area to be utilized for customer access to the Tenant's Exclusive Use Premises.
Closure is an operable item used to close or screen openings within or on the perimeter of the Tenant space such as a door, sliding panel, or grille.

Common / Public Area is the space used by the general public that is designed and maintained by MNAA.
Common Use Areas refers to those portions of the CONRAC and the CONRAC site that are not included within either (i) the Exclusive Use Areas or (ii) any portion of the Reserved Area which is not utilized in the management and operation of the CONRAC. The Common Use Areas shall also be understood to include the following: (a) the roof (both structure and covering/membrane), exterior walls, foundation and building structure of those portions of the CONRAC otherwise falling within the Exclusive Use Areas; (b) the pavements, canopies and other physical structures otherwise falling within the Exclusive Use Areas; (c) the utilities systems serving the CONRAC or the CONRAC site up to the point of connection by a particular Tenant in its Exclusive Use Premises; (d) any portion of the Reserved Area utilized in the management and operation of the CONRAC; (e) the QTA Equipment; and (f) the Fuel Facilities.
Concourse is that portion of a Terminal Building consisting of gate hold rooms and boarding areas, public circulation zones and amenities directly adjacent to and supporting these functions.
Concept Proposal Information Form (CPIF) refers to the informational form that must be completed, submitted and approved by MNAA for applicable Airport/Tenant improvements.
CONRAC means the consolidated rental car facility that includes, without limitation, the Ready/Return Area, the QTA Space, the Storage Area, the Common Use Areas, the Reserved Area, the Exclusive Use Areas and all other improvements (including any additional special facilities) on the CONRAC site.
CONRAC Storage Area refers to the floor of the CONRAC building located directly above the QTA Space and utilized by Tenants for purposes of storing vehicles.
Contractor refers to a person or company that undertakes a contract with a Tenant to provide materials or labor to perform a service or do a job within the boundaries of MNAA property.
Construction Specification means one of the design and construction specifications for the CONRAC developed by the Base Building Design Team entitled “Construction Documents Volumes No.1 and No.2.
Days (whether capitalized or not) means and refers, unless otherwise specified, to calendar days, not business days.
Deadline for Substantial Completion is the date identified by MNAA for the Tenants’ substantial completion of their Tenant Improvements.
Demising Walls are walls that mark the demising lines between independent Tenant-leased areas or other separately designed spaces, including public spaces, service corridors, etc.
Display Area is the 5’-0” deep zone directly behind the storefront lease line that has special requirements for merchandise display, lighting and finishes.
Easements are designated land areas available for limited improvements and use, but intended for use by MNAA, other contractors, or utility companies.
Exclusive Use Areas means, collectively, the Exclusive Use Premises of each CONRAC Tenant.
Exclusive Use Premises refers to the portions of the CONRAC Ready/Return Area, the QTA Space and the Storage Area that are leased to the Sponsor on an exclusive basis pursuant to its Lease Agreement.
FAA means for Federal Aviation Administration.
Facility Manager is the party retained by MPC CONRAC LLC to operate and maintain portions of the CONRAC and the CONRAC site in accordance with the requirements of and subject to the limitations set forth in the Lease Agreements.
FTC is a fire alarm/detection circuit panel terminal box furnished as a part of the Base Building.
Fuel Facility Manager is the party retained by the Tenants to operate and maintain the Fuel Facilities in accordance with the requirements of and subject to the limitations set forth in the Lease Agreements
Fuel Facilities refers to (i) the specific improvements installed on or about the CONRAC site as depicted in Exhibit P to the Lease Agreements for purposes of fueling rental car vehicles by Tenants, and (ii) all underground storage tanks, underground and aboveground piping, related underground and aboveground structures and equipment,

including tank fill ports, fuel dispensers, spill containment structures, oil-water separators, storm water management systems, required network of monitoring wells, leak prevention and detection systems, and the surrounding areas used in connection with their operation, including areas of hazardous substance transfer, dispensing and containment systems, wherever located on the CONRAC site.

Heat Island Effect the phenomenon where urban areas are 10 degrees warmer than their rural counterparts due to excessive, dark hardscape and roofing materials.

IBC refers to the International Building Code, as amended and adopted by the Metropolitan Government of Nashville and Davidson County.

Lease Agreement is the lease agreement by and between MNAA and a particular Tenant, together with the exhibits to such lease agreement and all agreements supplemental to or modifying such lease agreement, whether made contemporaneously therewith or subsequent thereto. “Lease Agreements” means all such Lease Agreements, collectively.

Lease Lines are lines that extend across the Tenant space storefront that separate the Tenant demised space from public common area.

LEED refers to the Leadership in Energy and Environmental Design certification program.

Metropolitan Codes Department refers to the Department of Codes and Building Safety of the Metropolitan Government.

Metropolitan Nashville refers to the consolidated city and county government of Davidson County, TN that has local jurisdiction over construction projects at MNAA.

MNAA Metropolitan Nashville Airport Authority is the political authority that governs the airport.

MNAA Business Development is the MNAA Department which will be the primary contact between the Tenant and MNAA through conceptual development. Once the concept is approved by AIR Review Board, the Technical Advisor will be the primary contact through design development, approval, construction, and project closeout.

MNAA Properties Corporation (MPC) is the entity responsible for operation, maintenance, and development of the properties such as the international plaza and multipurpose building, which exist on MNAA property, but are owned and operated by MPC.

Non-Public Areas are areas that are not generally accessible to the public and are designed for the restricted or exclusive use of Tenants or MNAA employees, or other authorized users such as airline offices, storage and maintenance areas, baggage handling areas, and/or apron.

Opening Date is the date identified by MNAA for the public opening of, and commencement of business within the Tenant space; provided, however, that the Opening Date shall not, unless otherwise agreed by MNAA and the Tenants, be less than thirty (30) days following the Deadline for Substantial Completion.

Project Site refers to the area on or within MNAA property where the improvement/work is to occur, as described in the agreement between MNAA and the Sponsor.

Public Areas are areas not designed for the restricted or exclusive use of Tenants, MNAA employees, or other authorized users which generally serve and are visible by the public and are open to passengers and customers, such as ticket lobbies, concourses, baggage areas, public corridors, and departure lounges.

Quick Turn Around Space (QTA) refers to the quick turnaround areas to be located immediately to the north of structure that houses the Ready/Return Area and to be utilized by Sponsors for purposes of car washing, cleaning or fueling activities.

Quick Turn Around (QTA) Space Equipment is the equipment supplied by MNAA in the QTA Space to be used in connection with car washing and cleaning. The QTA Equipment includes, without limitation, the standard car washes and associated standard equipment, the vacuums and all fluid and/or compressed air dispensing systems.

Ready/Return Area refers to those portions of the first through third floors of the CONRAC (exclusive of the QTA Space and the Storage Area) to be utilized by the Sponsors for purposes of stacking, staging, returning and delivering rental vehicles.

Repair Maintenance refers to the replacement, in kind, of an existing item. For example, replacing an existing door in an existing frame with a door matching the existing specification.
Required "required" and "required by the MNAA" and words of similar import mean "as required to complete the work", as is applicable to the context of the place where used, unless stated otherwise.
Reserved Area refers to those portions of the CONRAC initially described in X to the Sponsor's Lease Agreement and reserved to MNAA for its use, as modified from time to time.
Rights-Of-Way refers to the land area wholly owned by MNAA, the state of Tennessee or the Metropolitan Government of Nashville, for the purpose of accessing streets, roadways, utilities, and infrastructure, etc.
Roughed-In means to be extended and terminated near or within the Sponsor's Exclusive Use Premises, with the Tenant's responsible for completing the remaining portions of such work as required.
SIDA stands for Security Identification Display Area.
Sponsor refers to any person, firm, corporation, or other entity who wishes to perform improvements including renovation and/or new construction within the boundaries of MNAA property.
Standards means this Airport Improvement Request Manual, as modified or supplemented from time to time by MNAA.
Submit "submit", "submittal", "submission" and other terms of similar import will include the meaning of the phrase "submit to Airport for approval" unless otherwise expressly stated.
Sub-Tenant refers to any person, firm, corporation, or other entity who has or enters into an MNAA-approved agreement with the Tenant to conduct business within the boundaries of a MNAA property. All proposed improvements by a sub-Tenant must be submitted to MNAA through the Tenant.
Terminal Building is the Nashville International Airport terminal building, concourses, Office Building and connectors.
Technical Advisor is the designee from the MNAA Development & Engineering Department.
Tenant refers to any person, firm, corporation, or other entity who has or enters into an agreement with MNAA to conduct business within the boundaries of a MNAA property. Sponsor shall also be considered Lessee, Concessionaire, or Permittee.
Tenant Improvements means the design, construction, renovation, alteration, repair, relocation or demolition by the Tenant of its initial contracted improvements in its Exclusive Use Premises prior to the Opening Date.
UL refers to Underwriters' Laboratories, Inc.
USGBC – U.S. Green Building Council is committed to a sustainable, prosperous future through LEED, the leading program for green buildings and communities worldwide.

1.6 MNAA RESPONSIBILITY

The following is an overview of responsibilities assumed by MNAA for construction and improvements to the Tenant Leased Premises within the Terminal Building and CONRAC:

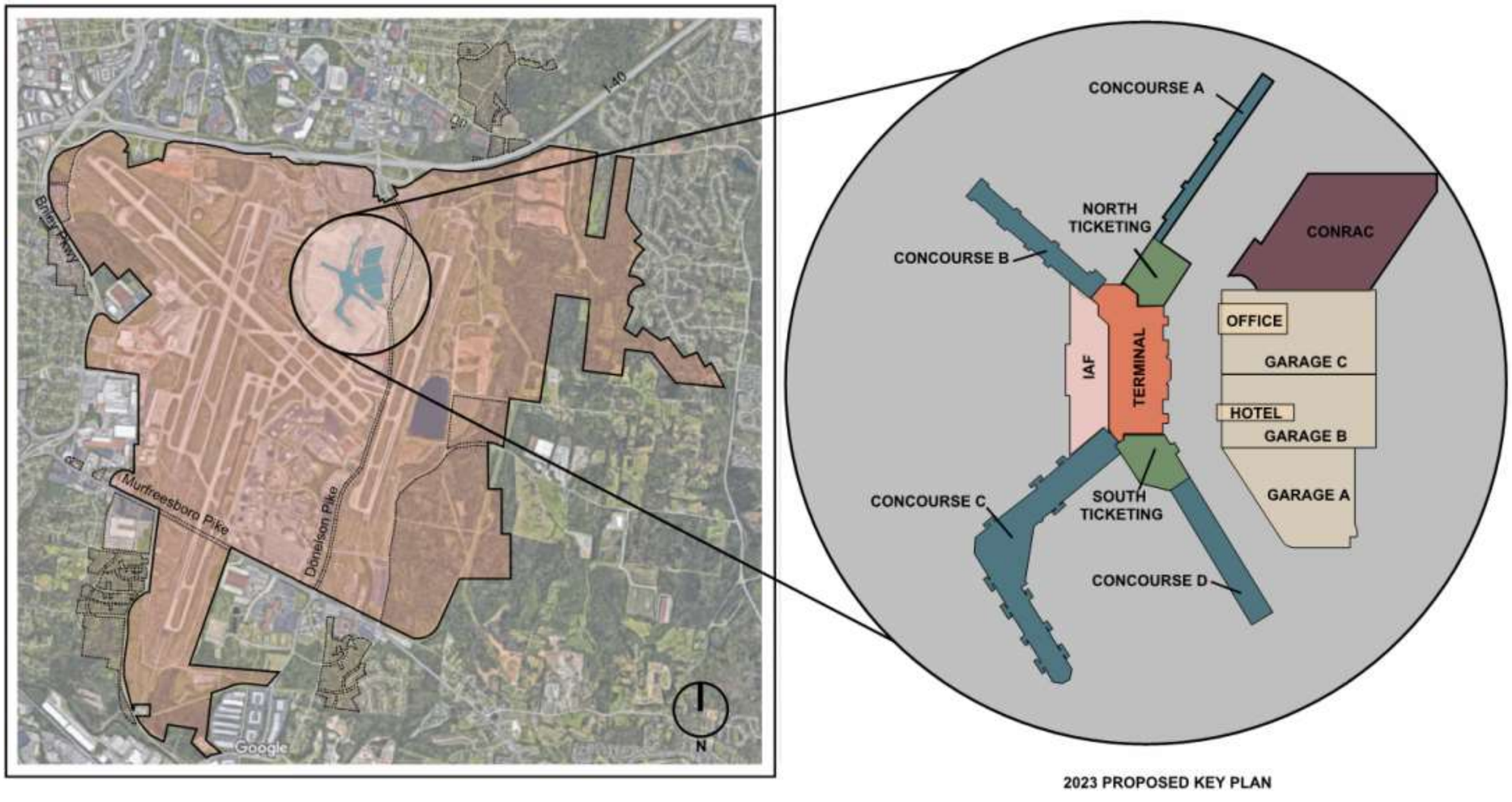
1. Construction of common areas
2. Pedestrian circulation areas/systems
3. Inspection and coordination for compliance with Tenant agreement with MNAA
4. Provision of necessary Tenant required utilities for operation

Design construction materials will be at the sole discretion of MNAA and will be subject to change in accordance with MNAA's determination. All previously occupied Tenant spaces will be available in their "as is" condition, unless

otherwise agreed upon by the MNAA. In non-Terminal Buildings, MNAA is only responsible for inspection and coordination for compliance with Tenant Agreement with the MNAA.

1.7 REFERENCES

1.7.1 AIRPORT REFERENCE PLAN



2023 PROPOSED KEY PLAN

1.7.2 MNAA STANDARDS

MNAA provides the following guidelines for Computer-Aided Design and Drafting (CADD) and Building Information Modeling (BIM).

A. APPENDIX L – CADD Standards Manual.
B. APPENDIX M – MNAA BIM Project Execution Plan (PxP).

These guidelines serve as an instructive template for all MNAA projects. Sponsors are to confirm with MNAA if CADD or BIM guidelines shall be used on a project-by-project basis.

1.8 TYPES OF TENANTS

1.8.1 TENANTS

MNAA has several Tenant entities. Except for concessionaires within the Terminal Building and rental car Tenants, all Tenants must abide by Section 2 of this Manual. Concessionaire Tenant requirements may be requested from MNAA. This manual also contains standards specific to rental car Operators within the CONRAC, MPC and other MNAA Departments. These standards can be found in Section 3 of this Manual.

A. Non-Terminal Tenants

Non-Terminal Buildings include any building not considered part of the Terminal Buildings.

B. Terminal Tenants

The Terminal Buildings include but are not limited to Concourses A, B, C and D, the International Arrivals Facility, main terminal, the administrative office building and the hotel.

1.8.2 CONRAC

The Nashville International Airport Consolidated Rental Car Facility (CONRAC) contains Common Use Areas and Exclusive Use Premises of a rental car operator, including: allocated vehicle ready/return facilities, quick turnaround vehicle service areas, exit security booths and customer service booths.

1.9 TYPES OF PROJECT IMPROVEMENTS

1.9.1 MISCELLANEOUS PROJECTS

Miscellaneous projects are defined as minor, non-structural, decorative changes that do not modify the location of existing walls, floors, ceilings, fixed equipment, or utilities. No modifications to electrical, mechanical or plumbing systems are required. Examples of miscellaneous projects include repainting public areas or the replacement of existing floor covering with similar material. A feasibility study also may fall into the miscellaneous project category.

Once the improvement has been categorized as a miscellaneous project, the Sponsor must complete the steps outlined in Section 1.10.

1.9.2 RENOVATION/NEW CONSTRUCTION

Renovation and new construction projects are defined as those that involve the relocation, demolition, construction, installation or removal of non-load or load bearing walls, partitions, electrical lines, mechanical diffusers, ducts, plumbing equipment, and fixed equipment. Structural modifications are generally limited to minor penetrations through slabs for electrical conduit or plumbing lines. A renovation or new construction project may involve new construction at an undeveloped site or extensive modifications within existing facilities. It will generally involve at least one of the following: increase in electrical power supply requirements, an increase of the load requirements on the airport central plant systems, an increase in site utilities, impact on existing terminal HVAC systems, penetrations of existing structural slabs, impact on passengers, and airline or vehicle circulation systems. A renovation or new construction project requires considerable MNAA involvement from concept through project closeout. Note that signage and graphics modifications will likely fall into the renovation/new construction project category.

Once an improvement has been categorized as a renovation or new construction project, the Sponsor must complete all the steps, and meet the requirements outlined in Sections 1.10.1 and 1.10.2 .

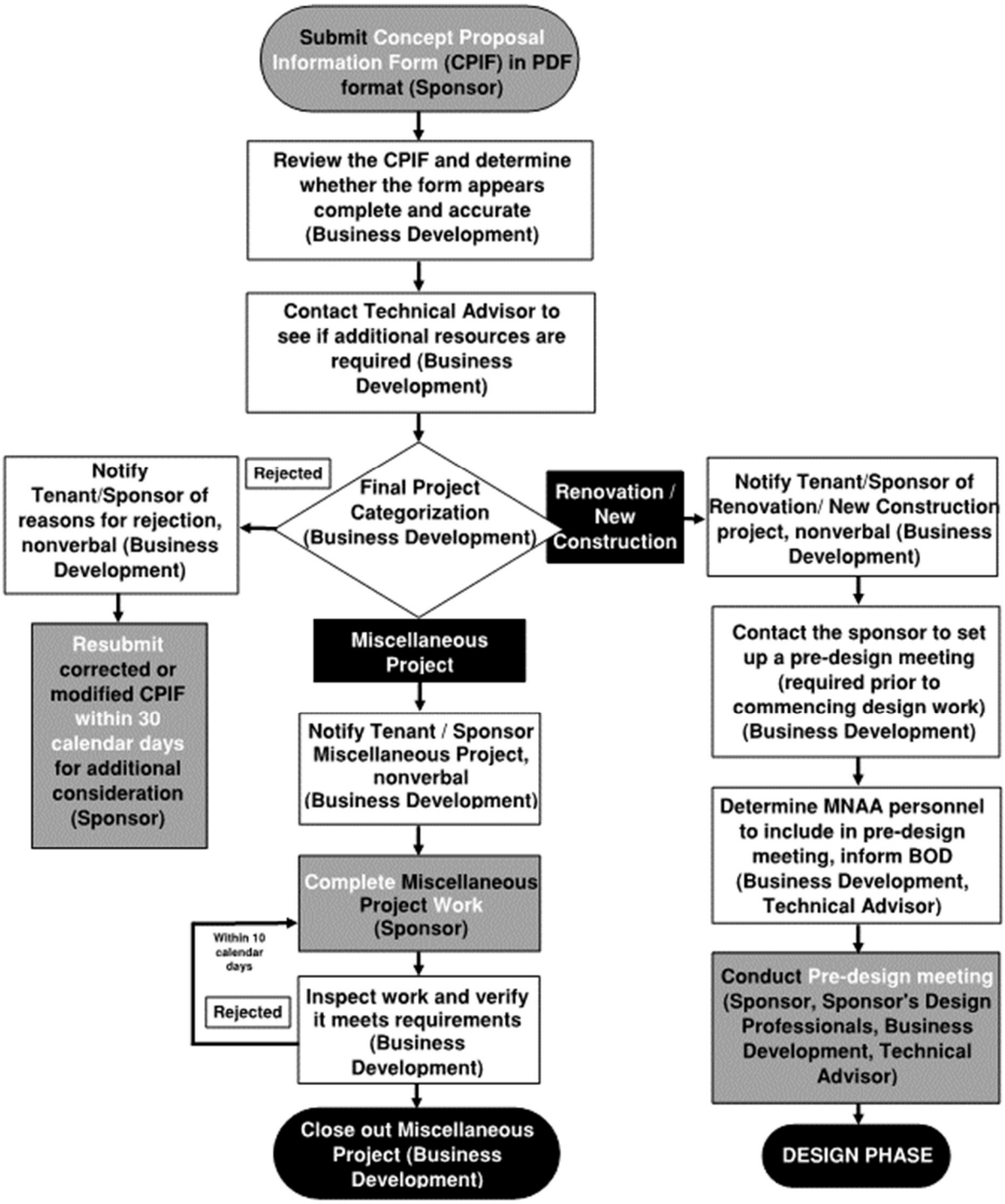
1.10 MNAA APPROVAL PROCESS

Primarily, the Sponsor shall be responsible for the preparation and execution of complete design drawings, specifications, cost estimates, engineering studies, reports, and engineering computations related thereto within the scope of the Tenant's lease agreement with MNAA. The Sponsor shall submit to MNAA a professionally designed project through the concept proposal process for improvement consideration and review by MNAA. The project submitted by the Sponsor shall embody the best engineering and/or architectural practices with all alternative solutions thoroughly explored. The Sponsor will be required to perform at his or her own expense, redesign or revision of drawings, specifications, or other materials furnished under the agreement, if the MNAA Technical Advisor determines that such revision is necessary to correct errors or deficiencies for which the Sponsor is responsible. Incomplete drawings, models or submissions are unacceptable. All project improvements at the Airport must be submitted to AHUs, accompanied by stamped drawings from an architect or engineer.

Submittals will be reviewed for compliance with the criteria set forth in the manual. Designs for public areas will be judged in context with adjacent Tenant storefronts and public areas, along with compliance with the MNAA's policies and applicable sections of this manual. MNAA will then provide a written response with review comments and approval status. MNAA approval does not relieve the Sponsor of responsibility for constructability, compliance with the Tenant's lease agreement, and all governing codes and regulations, field verification of existing conditions, or proper engineering and safety.

The Sponsor may be required to attend a pre-construction conference prior to the commencement of work. The Sponsor shall not release security sensitive project information to anyone other than MNAA's Technical Advisor without prior approval of MNAA.

1.10.0 CONCEPT PROPOSAL PROCESS DIAGRAM

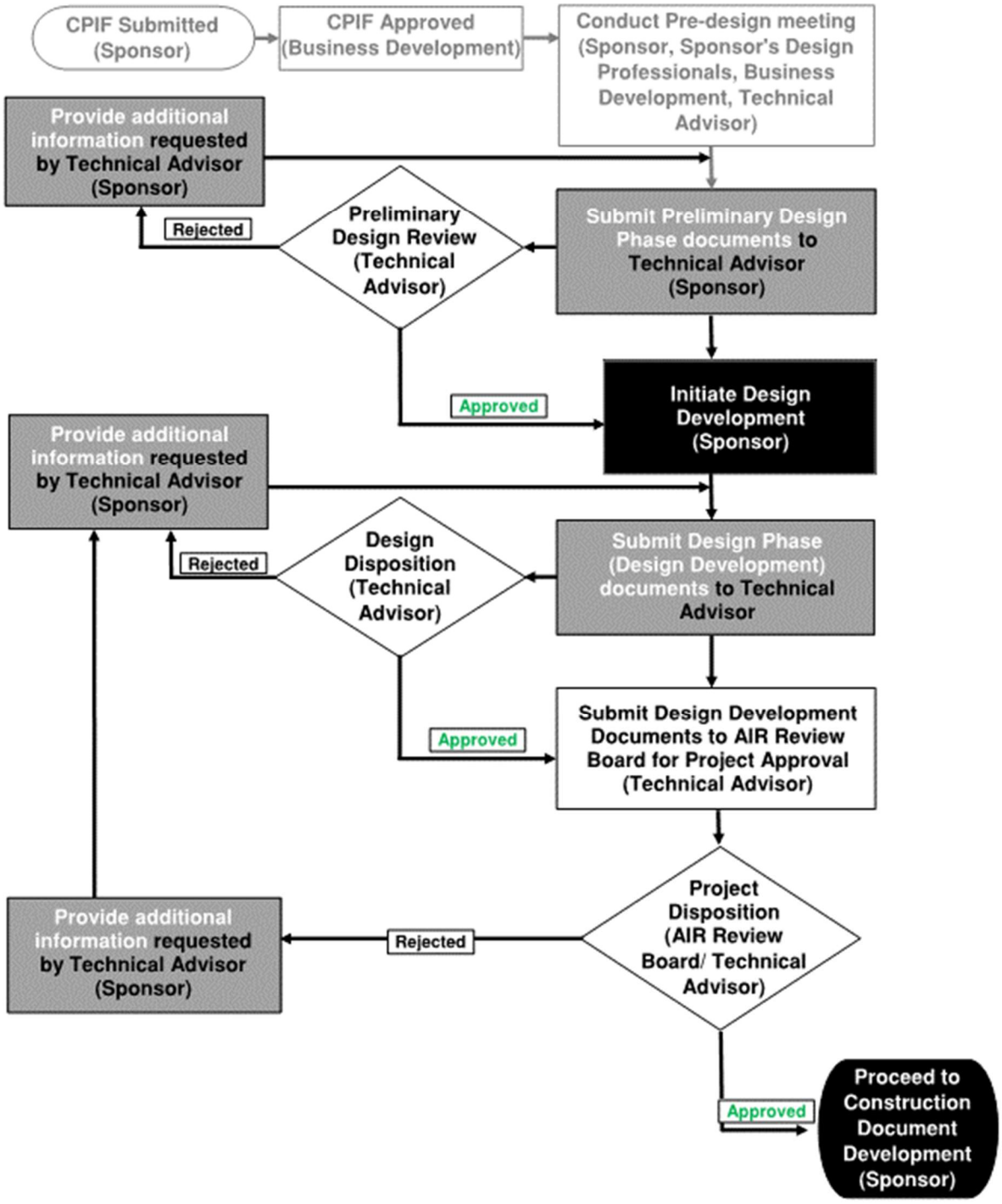


1.10.1 CONCEPT PROPOSAL REQUIREMENTS FOR ALL PROJECT TYPES

To initiate an improvement, the Sponsor shall complete the appropriate Concept Proposal Information Form (CPIF), Appendix A, and submit to MNAA Business Development office. All submissions shall be submitted to MNAA in electronic PDF format. Upon receipt of the form, MNAA Business Development will:

1. Review the CPIF and determine whether the form appears complete and accurate.
2. Contact an MNAA Technical Advisor and confirm project category and evaluate whether any special circumstances exist requiring additional coordination.
3. If the concept portrayed in the CPIF is acceptable and the project is designated a miscellaneous project and approved, the Sponsor will be notified in writing by MNAA Business Development. Implementation of the project may then initiate. The Sponsor will notify MNAA D&E Department before the work will begin and a Project Coordinator will be assigned to facilitate and inspect the work. The Sponsor will notify D&E and Business Development upon completion of the improvement and an inspection will be performed. If implemented work is acceptable, the project will be closed. If unacceptable, MNAA Business Development will notify the Sponsor and the Sponsor shall make corrective measures within 10 calendar days.
4. If the concept portrayed in the CPIF appears acceptable and the project is designated a renovation/new construction project, then MNAA Business Development will contact the Sponsor to set up a pre-design meeting. This meeting shall be between the Sponsor and Sponsor's design professionals and MNAA. MNAA Business Development and Technical Advisor shall determine which MNAA personnel, including Business Development, should be included in this meeting based on information within the CPIF. The purpose of this meeting is to review the next steps in working toward an approved design and successful implementation and a review of MNAA design guidelines will occur. This meeting will additionally cover lines of communication, design schedule, submittal requirements, special requirements, and site-specific requirements. Sponsors must attend a pre-design meeting prior to commencing design work. An overview of the minimum of addition design submission requirements is summarized below.
5. Should the CPIF not be approved, MNAA will notify the Sponsor of the reason(s) for rejection. The Sponsor may resubmit a corrected or modified CPIF within 30 calendar days for additional consideration by MNAA. If a corrected CPIF is not received within 30 calendar days, the Sponsor's request for improvement shall be considered null and void.

1.10.2 DESIGN PHASE PROCESS DIAGRAM



1.10.3 DESIGN PHASE REQUIREMENTS FOR RENOVATION/NEW CONSTRUCTION PROJECTS

MNAA maintains a database of drawings and models depicting existing and as-built conditions of MNAA facilities and a geographic information system (GIS). Sponsors may review this material upon request, provided it is not sensitive security information. This material represents the latest information MNAA has on file; however, all 'as-built' conditions may not be completely recorded or accurate. Therefore, the Sponsor is advised to field measure and verify all dimensions and existing conditions before proceeding with design development. Sponsor shall confirm any 3D scanning requirements with MNAA.

After the pre-design meeting is held, the following minimum additional design submissions will be required for review prior to project approval by MNAA. All submissions shall be submitted to MNAA in electronic PDF format. At this stage of the improvement project, communication and coordination is transferred from MNAA Business Development to the designated MNAA Technical Advisor.

Successful approval of the CPIF and attendance at the pre-design meeting is required prior to proceeding with the preliminary design phase.

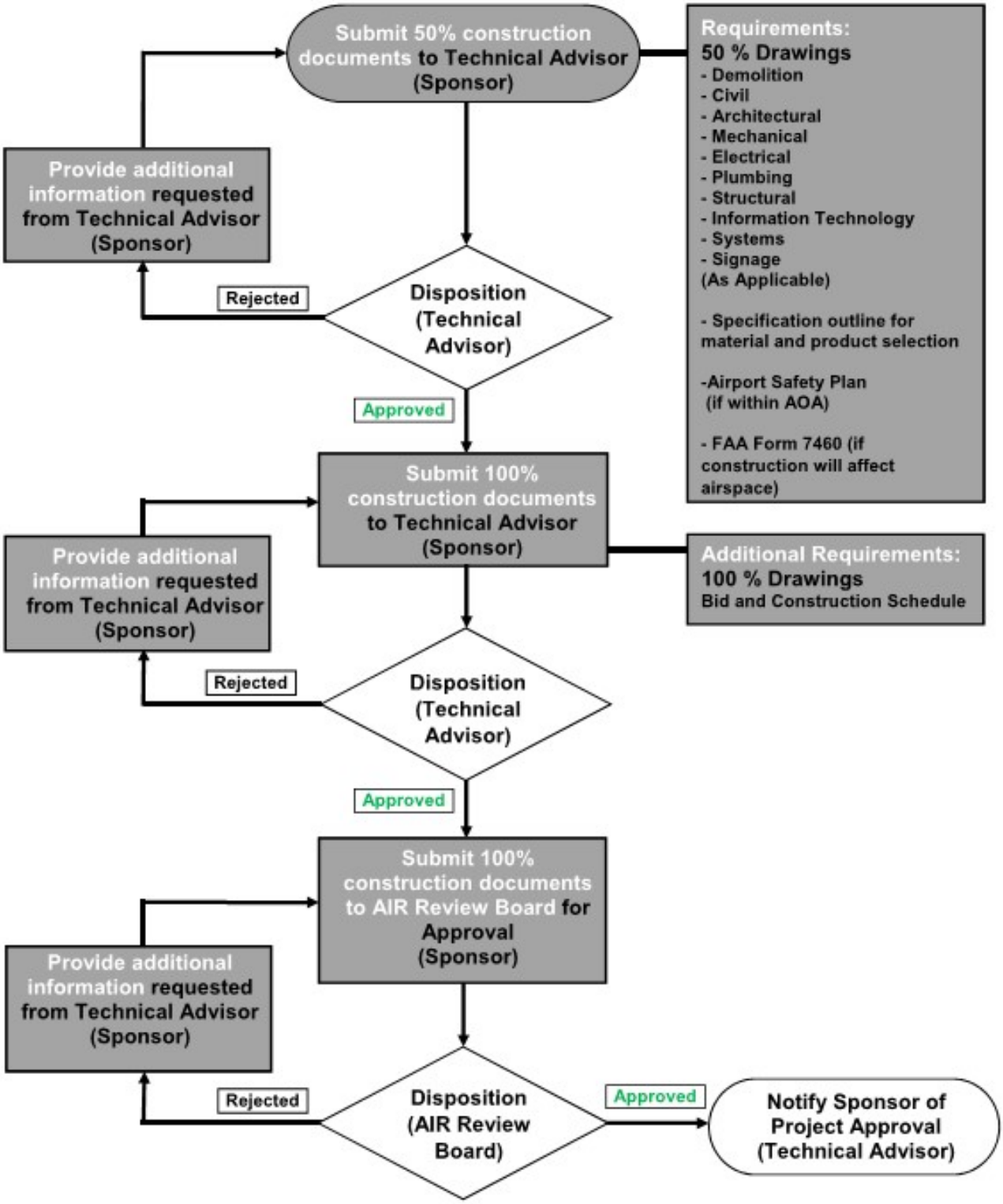
A. Preliminary Design Phase Submittal

A MNAA Technical Advisor will review this preliminary submittal for form, function and assess utility needs for the proposed concept. The technical advisor will work directly with the sponsor to obtain sufficient information to authorize the improvement design to proceed with design development.

B. Design Development Document Submittal

The design development documents shall be reviewed by a Technical Advisor for completeness and if adequate, the documents will be distributed to AIR Review Board for review and approval. If the documents are not adequate for distribution, the Technical Advisor will notify the Sponsor requesting additional information. If the AIR Review Board approves the design development documents, the Sponsor will be authorized to proceed with construction document development.

1.10.4 CONSTRUCTION DOCUMENT DEVELOPMENT PHASE PROCESS DIAGRAM



1.10.5 CONSTRUCTION DOCUMENT DEVELOPMENT PHASE

Once the design development documents have been approved by the AIR Review Board, the Sponsor may proceed with construction document development as detailed below.

A. 50% Construction Documents

The 50% construction documents shall include demolition, civil, architectural, mechanical, electrical, plumbing, structural, information technology, systems, and signage as applicable. The submission shall also include a specification outline for material and production selection. On all projects where the construction or staging of the project may affect or fall inside the Airport Operations Area (AOA), the construction documents shall include an Airport Safety Plan (Appendix C). The 50% construction documents shall be reviewed by the Technical Advisor for completeness and acceptability. The Technical Advisor will inform the Sponsor whether additional information is needed or if the documents can proceed to 100% construction document development.

Should cranes or other air space penetrating equipment be required for project implementation, the Sponsor must provide information required for MNAA to complete and submit to the Federal Aviation Administration (FAA) for approval, FAA form 7460. The FAA normally requires a minimum of 30 days to review the form. Approval from FAA is required prior to initiating construction.

B. 100% Construction Documents

The 100% construction phase documents shall include, at a minimum, drawings in the native authoring format, preferably CAD (Autodesk or MicroStation) or Revit for final demolition, civil, architectural, mechanical, electrical, plumbing, structural, information technology, systems, and signage drawings and specifications and details as appropriate. The 100% submission shall also include a bid and construction schedule. The Technical Advisor will review the 100% construction phase documents and determine whether they are complete and adequate for distribution to the AIR Review Board.

If acceptable, the documents will be distributed by the Business Development AIR Manager to the review board to the Board for review and approval. If approved, the Sponsor will be notified by the Business Development AIR Manager that they may proceed with permit acquisition and move into the bidding phase. MNAA authorization does not presume approval of the work by Metropolitan Government of Nashville or other federal, state, or local agencies. It is the Sponsor's responsibility to determine the need for building and/or demolition permits and/or all other required permits, and to secure the required permits prior to the pre-construction phase. No permits shall be procured prior to receiving a letter of authorization by MNAA. Projects which include modifications or additions to plumbing and/or impact water or waste water systems may require that MNAA issue a letter of availability for the Sponsor to secure necessary permits. The Sponsor is responsible for all costs associated with proving availability, permit acquisition and inspections.

Should the Sponsor solicit a variance or appeal a code or regulation, they must notify the MNAA Technical Advisor prior to proceeding with such action. MNAA reserves the right to reject any variance or appeal request.

Any comments from the AIR Review Board shall be addressed by the Sponsor in a revised 100% set of documents prior to releasing the documents for bid or permit acquisition.

If not acceptable, the Technical Advisor will notify the Sponsor and provide Board comments. The Sponsor will have 30 calendar days to resubmit a corrected or modified design for consideration with all comments addressed. If corrections are not received within 30 days, the project will be considered null and void. Resubmissions will follow the same review and approval process discussed above. Should AIR Board approval be received, the Technical Advisor will notify the Sponsor that they may proceed with project bidding.

1.10.6 CONSTRUCTION PHASE PROCESS DIAGRAM



1.10.7 CONSTRUCTION PHASE REQUIREMENTS

A. Bidding Phase

During the Sponsor's bidding phase, MNAA will be informed by the Sponsor of any addenda or code changes that arise. Copies of any pertinent correspondence or any addenda will be transmitted to the Technical Advisor. Once a successful bidder is established, and contract executed between the Sponsor and selected Contractor, the Sponsor will advise MNAA and a preconstruction meeting will be set up by the Technical Advisor.

B. Pre-Construction Requirements

No physical construction may occur until all the requirements of the pre-construction phase have been met. The Sponsor will work with the Technical Advisor to submit and/or schedule for the following prior to initiating construction:

1. Construction Documents and Construction Schedule
2. Defined Project Progress/Coordination Meeting Schedule
3. Building Permit
4. Security training and badging
5. 24-hour project contact list including Sponsor, Designer, and Contractor
6. Approved shop drawings and submittals
7. Certificate of Insurance
8. Site Specific Safety Plan & QC Plan
9. Attendance at Pre-Construction Meeting

Once the Technical Advisor is satisfied that all preconstruction requirements have been met, the Sponsor will be issued a notice to proceed and construction may begin.

C. Construction Requirements

The construction phase may initiate after the Sponsor has received a notice to proceed from MNAA. The Sponsor will work with MNAA's Technical Advisor to coordinate, inform and/or submit the following requirements:

1. Proposed requests for information.
2. Progress/Coordination Meetings.
3. Code Inspections.
4. Use and Occupancy Permit.
5. Training and Opening.
6. Updated Construction Schedule.
7. IFC set of drawings in CADD, GIS, or BIM format as applicable once issued.
8. Submit IFC set of drawings to InfrastructureDataGroup@nashintl.com

All required building permits from local, state, and federal agencies must be clearly posted at the project site, and a copy provided to the Technical Advisor prior to initiating construction.

All contractors shall be properly licensed in the state of Tennessee to do the type of work required under their contract. All construction must meet the requirements of applicable codes, laws, and any subsequent amendments or additions thereto. It is the Sponsor's responsibility to determine which codes and regulations are applicable to the project and to assure that the project is designed and constructed in accordance with those requirements.

A project schedule must be provided to the Technical Advisor and must depict any construction which may affect airport operations, or the work of another contractor. All work activities must be planned to have minimum impact on airport operations. The work must then be done in accordance with the schedule.

The Sponsor is responsible for construction inspection. MNAA will observe the work in progress to assure that the work appears to conform to approved submissions. MNAA reserves the right to reject work which is not in conformance with the approved submissions and to reject workmanship which is considered substandard in quality. MNAA may order work to cease should unauthorized work be observed. The Sponsor must advise MNAA prior to covering work requiring inspection (such as water proofing, conduit, and piping). In addition, the Sponsor's contractor is responsible for maintaining a set of accurate red-lined drawings that depict all changes during the project. These drawings will be reviewed with the contractor by MNAA Inspection Staff on a weekly basis for accuracy. The red-lined drawings will be used by the Sponsor's qualified designer to complete the required as-built drawings to be submitted in accordance with
3.2.6.

It is the Sponsor's responsibility to secure necessary inspections, approvals, and certificates from other inspecting or permitting agencies. These inspections and approvals are required before MNAA conducts a final inspection.

1.11 SUBMISSION REQUIREMENTS

Design teams are required to verify the submittal requirements with the Technical Advisor.

1.11.1 DOCUMENT REQUIREMENTS

A. Concept Submittal

Conceptual Analysis:

1. Site plan
2. One (1) copy mounted and labeled Conceptual Elevation showing proposed new space in context to the adjacent space.
3. Perspective sketches illustrating the design concept and photographs of precedents, if available, related to this application.
4. A complete 11 x 17 materials and finish board with all proposed colors and materials. Samples shall be firmly attached to illustration board and labeled with product information and

intended use. Submittal shall distinguish between primary and accent materials by comparative size or other appropriate means.

Preliminary Design Submission

The purpose of this submittal is to accelerate the design approval process by acquainting MNAA with the Sponsor's intended design concept and correcting any criteria compliance problems before proceeding with the final working drawing phase. Design concepts for lighting and signage must be included in this submission.

The Sponsor's submission shall include, but not necessarily be limited to, the following:

1. Preliminary Drawings
2. Outline Specifications
3. Preliminary Cost Estimates

Preliminary Design and Construction Schedule

1. Floor plans (scale 1/4" = 1'0")
2. Sections (scale 1/4" = 1'0")
3. Storefront elevation (scale 1/4" = 1'-0")
4. Section, including signage (scale 1/2" = 1'0")
5. Food service Tenants shall include front counter details and food presentation concept (scale 1" = 1'-0")

Final Design Submission 100% Complete

The purpose of this phase is the preparation and submission of working drawings and specifications describing in technical detail the contract work to be done, including materials, equipment, workmanship and finishes required for architectural, structural, mechanical and electrical work and related utility connections and special equipment. Engineering design must bear the seal of a registered professional engineer. All submissions are to be electronic including material boards unless directed others.

Sheets shall be prepared on 24"x36" or 30"x42" sheets and include a block for MNAA approval signatures near the lower right corner. Signature blocks to include space for a minimum of three signatures with dates.

The Tenant's submission shall include but shall not be limited to, the following:

a. Architectural Drawings

1. Floor plans (scale 1/4" = 1'-0")
2. Reflected ceiling plan (scale 1/4" = 1'-0")
3. Storefront plan, elevation and section (scale 1/2 = 1'-0")
4. Interior elevations (scale 1/4" = 1'-0")
5. Sections (scale 1/4" = 1'-0")
6. Details of special conditions (scale 1" = 1'-0")

7. Finish schedules
8. Specifications
9. Staging and laydown areas
10. Revit models, CAD files, or necessary support documents, including but not limited to shared parameter files, keynote files, laser scan data, model progression documents, etc

Shop Drawings (for signs and menu boards) (scale 1/2" = 1'-0" or larger)

1. Elevations and sectional views
2. Letter style and size
3. Colors and materials
4. Method of illumination and electrical requirements

b. Specifications

c. Final Cost Estimate

d. Proposed construction schedule showing project duration

e. Mechanical Design Drawings

1. HVAC, plumbing, and fire protection plans and details
2. Plumbing riser diagram indicating pipe sizes and connection points
3. Heating and cooling load calculations including demand requirements and Airport owned equipment
4. Supply air, chilled water, and hot water requirements
5. Record drawings upon project completion

f. Electrical Design Drawings

1. Electrical plans and details
2. Electrical riser diagram indicating sizes and types of feeders, fuses, disconnect switches, main breakers, etc.
3. Low Voltage & Audio/Visual including security, access control telephone, point-of-sale, wifi, computer cabinetry/racking, projection, speakers, paneling, controls, etc.
4. Panel board schedules indicating all breaker sizes and loads
5. Electrical load summary including connected and demand load calculations
6. Fixture schedule
7. Record drawings upon project completion

g. Structural Design Drawings

1. Structural plans and details
2. Geotechnical information as applicable
3. Live loads, dead loads, wind load criteria and calculations
4. Materials used and design strength (min. 3000 psi concrete)
5. Basis of seismic design
6. Location of primary load bearing members
7. Record drawings upon project completion

1.11.2 PROJECT CLOSEOUT REQUIREMENTS

The Sponsor is responsible for providing the following documents and models to the Technical Advisor for project closeout:

1. Electronic record drawings (also known as as-built drawings and models)
2. Operation and maintenance manuals
3. Approved shop drawings and product maintenance data requirements

If project closeout documents are not received within sixty (60) calendar days from opening or beneficial use of new improvements, MNAA shall impose daily liquidated damages in accordance with lease terms and conditions and/or per agreements made during the pre-design meeting. Record drawings must be accurate and reflect any changes made during implementation of the improvement.

The Sponsor shall furnish MNAA with Electronic file format deliverables as listed below:

1. MicroStation *.DGN (V8i or later) or AutoCAD *.DWG (Version 2013 or later) format
2. Building Information Model format *.RVT - Autodesk Revit / BIM 360 Team (Ver. 2017.1 or later)
3. Adobe *.PDF format
4. ASCII points file, (P, N, E, Z, D) of all “As Built” field run survey shots.

All electronic CADD drawings shall be delivered in “Model Space” format or one (1) complete 2D/3D model. Individual sheet drawing files in ‘paper’ or ‘sheet’ space will not be accepted.

Provide ArcGIS (10.2 or later) shapefiles or file geodatabase format if applicable.

Electronic files to be submitted to: infrastructuredatagroup@nashintl.onmicrosoft.com for review and approval.

Milestones/timeline for required deliverables.

Issued for Construction (IFC) set:

One (1) full IFC set in CADD (DGN or DWG) and BIM (if available) format files shall be delivered when IFC drawing PDFs are submitted to MNAA. All submissions are to be submitted electronic material boards unless directed by MNAA.

Record Drawings

Record Drawings shall be delivered in the following formats, up to ninety (60) calendar days after project completion:

- One (1) complete set of field/contractor ‘redline/markup” in either print (ANSI B or Arch C or ARCH D size) or PDF format
- One (1) complete final or ‘Record Drawings’ set in the following formats:
- One (1) complete PDF format file
- One (1) complete CAD model (DGN or DWG) and reference files
- One (1) complete Building Information Model (BIM) if available
- One (1) complete GIS (SHP or GDB) with associated databases, if available
- Electronic ASCII points file (P, N, E, Z, D) of all Design and As Build field run survey data

Sponsors shall submit an Operations and Maintenance Manual to MNAA upon completion of construction. The manual shall include the following:

1. Identification of equipment, location, intended use, identification numbers, systems, etc
2. Equipment function, normal operating characteristics, and limiting conditions
3. Instructions for assembly, installation, alignment, adjustment, and checking
4. Operating instructions for start-up, routine and normal operation, regulation and control, shut down, and emergency conditions
5. Lubrication and maintenance instructions
6. Guide to "troubleshooting”
7. Parts lists and predicted life of parts subject to wear and recommended spare parts list
8. Outline, cross section and assembly drawings, engineering data and wiring diagrams
9. Test data and performance curves, where applicable

O&M manuals shall be in addition to any instructions or parts lists packed with or attached to the equipment when delivered.

The following information shall be provided for each piece of equipment’s manufacturer data:

1. Name and description
2. Size and model number
3. Manufacturer’s name, address, and telephone number
4. Supplier’s and Installer’s name, address and telephone number
5. All equipment serial numbers
6. Name Plate Data, including Horsepower, RPM, Volts, Amps, Watts, Phases, Hertz, Frame, Type, BTU/H, CFM, GPM, and PSI
7. Other pertinent information

Manuals shall be submitted in electronic PDF format.

1.12 GENERAL CONDITIONS OF CONSTRUCTION

1.12.1 CONSTRUCTION STANDARDS

Sponsors shall comply with all rules and regulations set forth by the Metropolitan Government of Nashville and Davidson County, Tennessee Codes Department and these Standards. A contractor shall be properly licensed

to do the type of work required under its contract. The Contractor is responsible for all code inspections and testing of work and equipment. The Contractor shall take all necessary safety precautions to protect workers, the general public, and private and public property and comply with all requirements of the Occupation Safety and Health Act (OSHA). Smoking is not permitted anywhere in the terminal buildings and non-terminal buildings, including stores under construction. In the Terminal Buildings, smoking areas have been designated by MNAA. The Contractor shall provide drinking water for its employees. The Sponsor and its contractors and subcontractors are responsible for transporting their respective employees to and from the worksite.

A. Insurance

The Contractor shall not commence work under this contract nor allow any subcontractor to commence work until all insurance required has been procured and such insurance submitted and approved by MNAA. The specific requirements for insurance are contained in the Tenant's lease agreement/contract. Insurance as hereinafter provided shall be kept intact and in force throughout the term of the contract.

B. Bonds

Requirements for Bonding of Contractors shall be as defined in the Tenant's lease agreement/contract.

C. Permits

The Sponsor is responsible for acquiring all necessary permits required for constructing its Tenant Improvements in a timely manner. Electronic copies of all permits shall be submitted to the MNAA prior to initiating work. All permits must be clearly posted in a location designated by MNAA for the duration of the construction project. If applicable, the Sponsor shall submit its construction management erosion control plan/air quality permit to the MNAA Technical Advisor prior to initiating work.

D. Work Hours

In general, work in public areas is restricted to hours when the area is closed to the public. Work in non-public areas should be between 7:00 am and 5:00 pm. Any deviation from this work schedule should be submitted to MNAA for approval.

In the Terminal Buildings, the MNAA requires certain work activities to take place between the hours of 11:00 p.m. and 5:00 a.m. as follows:

1. Major service disruptions
2. Jack-hammering, roto-hammering, core-drilling or other noisy operations
3. Work requiring blocking of public entrances
4. All other work which would prevent continuous operation of the building
5. Hauling of demolished material
6. Setting up and removal of construction partitions
7. Delivery of large materials

E. Construction Signs

Construction project signs are not allowed, except for safety and traffic control and must be approved by MNAA.

F. Coordination with Other Tenants

MNAA reserves the right at any time to contract for and perform other or additional work on or near the work covered by the Sponsor's contracts. The Sponsor shall conduct its work so as not to interfere with or hinder the progress or completion of the work being performed by other Sponsors. All Sponsors working on the site shall cooperate with each other. The Sponsor shall arrange its work and shall place and dispose of the materials being used so as not to interfere with the operations of other Sponsors or MNAA.

1.12.2 SECURITY AND SAFETY

Security and safety procedures when working on airfield areas are outlined in MNAA's Airport Safety Plan (Appendix C). The Contractor's supervisory personnel must be familiar with this document. The following paragraphs give a brief description of basic security/safety procedures that must be observed. This is considered in addition to the provided Site Specific Safety Plan (SSSP), which must be submitted by the GC for acceptance prior to work initiating.

B. Cleanliness

All work is to be accomplished with a consistent effort to eliminate unnecessary noise, dust, dirt, water, paint, cement, sprayed materials, smoke, fumes, glare, obstructions, and other annoyances. The contractor may not unreasonably encumber the premises with unused materials, equipment, or scaffolds. The Terminal Buildings, including concourses and flight stations, must be kept fully operational at all times. Work areas and nearby public spaces must be kept clean and free of debris, dust and vapors through positive barriers and dally housekeeping. Any debris that constitutes a hazard to the operation of the Airport or creates an eyesore must be removed. Do not track dust onto the common area floor. The contractor must provide means of cleaning dust from employee's shoes.

The Sponsor shall leave its work areas of the site broom-clean for exterior locations and site vacuum-clean throughout the day for interior spaces at the end of every shift. The Contractor is responsible for cleaning the work area to the satisfaction of MNAA. If the Sponsor fails to do so within 24 hours after request by MNAA to the Sponsor, MNAA may take such action as it deems necessary, and the reasonable and customary cost of MNAA's actions shall be charged to the Sponsor.

The Sponsor shall take care to avoid the spread other substances on or about the site or onto adjacent property and shall clean splatters or spills of materials at the time of occurrence. Cleaning materials must not harm the finished surface being cleaned.

The Sponsor is required to take reasonable steps to control dust caused by its construction operations. It's recommended that Sponsors create a Construction Indoor Air Quality Management Plan to promote the wellbeing of workers and building occupants. If the Sponsor does not take adequate steps to control dust caused by its construction operations and the mechanical system is damaged, or it is necessary to replace filters early, the cost for repairs or replacement filters will be charged to the Sponsor.

The Sponsor shall inform all trades and workers of clean-up requirements specified and monitor where work is in progress to ensure full compliance with all cleanliness requirements in these Standards.

The Sponsor shall not dispose of any rubbish or waste materials in fills or backfills. Disposal of wastes such as paint, thinner and mortar mix into drains is prohibited at all times. All disposal activity shall conform to federal, state and local laws, ordinances, rules, regulations and pertaining orders. Sponsors shall attend Airport spill prevention training. The Sponsor shall provide adequate storage for all items awaiting removal from the site and shall observe all requirements for fire prevention and protection of the environment. The Sponsor shall to provide temporary access keys to DPS at the start of the work for emergency access needs only. Upon project completion, the Sponsor shall provide a copy of the key to MNAA Department of Public Safety (DPS) access to the space for emergency use only.

C. Temporary Walls

The Contractor must maintain a positive barrier between the work area and public areas. Exterior barricades must be constructed with a minimum of plywood sheathing on rigid stud partitions. Interior barricades must be constructed with a minimum of 5/8” gypsum wall board on rigid stud partitions with the public side painted and maintained throughout the duration of the work, unless otherwise approved for using prefabricated barrier systems. In areas of greater public exposure, MNAA may require higher levels of finish for such barriers and barricades. The work area must be secured from access by unauthorized persons and must not constitute a hazard to the public. All dust walls are to be painted Porter Paint Hi-Hide, Terminal White, 385, egg shell or approved equal. The Sponsor is responsible for all injury to persons and damage to property resulting from his contractor's failure to properly maintain barricades and lighting.

D. Perimeter Fencing

Prior to removing or making any holes in the Airport perimeter fencing, the contractor must obtain approval from MNAA Department of Public Safety (DPS) and TSA. Additional temporary fencing may be required to be placed by the Sponsor to maintain security.

E. Restricted Areas

When the Sponsor's contractor's work areas are located within designated Airport restricted areas, contractor’s personnel will be limited to specific work areas, storage areas, or other areas designated by MNAA.

F. Identification

When the Sponsor’s Contractor’s work areas are located within designated Airport restricted areas, including the AOA, all contractors’ personnel must be provided with, and carry on their person, identification which positively associates them with the Contractor's firm. Badging forms and procedures are available from the MNAA Department of Public Safety (DPS). Construction staff who will be operation and performing work within the Sterile, SIDA or secure areas of the Airport property must be badged for security reasons and are subject to reviews at all times.

G. Inspections

MNAA reserves the right to enter Tenant's leased premises in accordance with the Tenant's lease agreement/contract for the purpose of fire protection, emergency, and routine security, safety, and health inspections.

H. Confined Space Entry Regulations

The Contractor shall comply with applicable portions of Federal Regulation 29 CFR S 1910.146 and any state regulations regarding employee entrance into confined spaces on this project.

I. Material Delivery

The Sponsor is responsible for unloading and transporting its own materials and shall provide flagging personnel as necessary for deliveries. Sponsors shall coordinate and obtain approval for equipment mobilization and demobilization as well as placement on the site. No material shall be delivered to, or transported through, any public area without the express approval of MNAA. The Sponsor shall provide to MNAA a description (make and model), maximum loads and maximum floor load for all equipment to mobilize to the site. Floor loads within the building are limited. See Exhibit 4 of Appendix L for specific load limits in the CONRAC.

The passenger elevators and the escalators shall not be used to transport equipment, materials, or tools. Any material transported through public areas or stairways, etc., shall be moved on pneumatic rubber tire trucks using adequate hardboard sheets, protective cloths, etc., to safeguard existing floors. No concrete, plaster, terrazzo, debris, or other bulk materials may be transported through lobbies or concourses in use by passengers except by written permission of MNAA. Any damage resulting from movement of materials, etc., shall be repaired by Contractor responsible.

J. Equipment

Cranes and other construction equipment with an overall height in excess of 25 feet must be lowered during hours of darkness or be equipped with obstruction lighting in accordance with current FAA Regulations or as required by MNAA. Additionally, all cranes, new building antennas, site light poles, etc.. must have 7460’s forms filed with MNAA Airspace and approved by the FAA prior to the start of any work.

No unattended equipment, material, or tools will be permitted in the common areas of the Airport. Construction materials may not be stored in areas accessible to the general public.

In the Terminal Buildings, all equipment, material, tools, or merchandise must be brought through the nearest service entrance. Construction traffic is not permitted in the common areas etc., to safeguard existing floors. All lifts and wheeled equipment shall have white pneumatic wheels to avoid damage to finish floors. The Sponsor must provide floor slab protection from equipment oil/hydraulic fluids. Any damage resulting from movement of materials, etc., shall be repaired by the contractor responsible.

Confine storage of equipment or material to the demised premises or other locations specifically designated by MNAA. Stored materials shall not exceed the loading capacity of the floor. In the

Terminal Buildings, storage in service corridors, truck docks, vacant lease spaces, or other areas is not permitted at any time. The Sponsor shall not store combustibles (e.g., card board packaging, wood crating), except for work in progress during a work shift. All combustibles shall be disposed of in dumpsters or off-site at the end of each work shift. Failure to comply will result in removal of all materials with the Sponsor bearing responsibility for the costs incurred.

K. Fire Protection

Prior to the initial delivery and storage of any combustible materials at the work site, the Contractor must supply and maintain appropriate means of fire protection. The protection is to be maintained as long as there are combustible materials at the site.

The storage of combustible materials and the means of fire protection shall be in compliance with all federal, state, and local regulations and conform to requirements of applicable insurance policies. Permits from MNAA Department of Public Safety (DPS) are required for all cutting and welding operations. Contact MNAA DPS for additional permit information.

L. Hazardous Building Materials

Certain building materials used in existing facilities may contain hazardous components, such as asbestos, or lead. The Sponsor is to evaluate the potential of exposure during a renovation/demolition project and submit to MNAA a remediation plan that is consistent with applicable guidelines and regulations.

If, during the course of construction, the Sponsor's Contractor encounters a suspected hazardous material, the Contractor is to stop work immediately, secure the area to prevent exposure of personnel, and contact MNAA Airport Communications Center (ACC) and MNAA Development & Engineering (D&E) immediately with a containment and remediation plan.

M. Staging

Limited lay-down area is available. The Sponsor is encouraged to schedule just-in-time deliveries. The Sponsor must not obstruct circulation and access routes upon or adjacent to the CONRAC site. MNAA may reclaim or reconfigure the Sponsor’s lay-down area at the Airport’s sole discretion at any time.

Lay-down areas must be kept clean at all times to the satisfaction of MNAA. Daily and end of shift cleaning is required. The Sponsor shall protect floor slab sealant material from any damage.

The Sponsor may utilize the portion of the Ready/Return Area included within its Exclusive Use Premises as a lay-down area so long as such usage does not affect the Base Building construction. The Sponsor may place its materials in its assigned lay-down area. The Sponsor is responsible for confirming that its materials so stored do not exceed the load

limits. See Appendix L - Exhibit 4 hereto for load limits. The Sponsor shall protect all expansion joints from construction loads.

N. Site Access

Access and Access Roads

Requirements for haul roads, parking, materials storage, etc. should be noted in the original submittal for approval. MNAA will designate such areas upon final authorization of the project. The Sponsor will be responsible for any damage to pavements, underground utilities, or other improvements caused by the Sponsor's Contractor.

If the contractor requires access to the Airport through a gate normally closed to the public, security must be provided as directed by MNAA.

Any access roads needed for the work must be included in the original submittal for approval and must be removed and the site restored upon completion of the work. Location and grade of such roads are subject to MNAA approval. Suitable drainage as directed by MNAA must be provided.

Hauling on Airport pavement, bridges, and roads is subject to load limits established by MNAA.

O. Vehicles

Markings

Sponsor's contractor's vehicles within the AOA must display signs of company identification on both sides of the vehicle which identify the vehicle as belonging to the contractor. Firm or contractor’s name must appear in letters a minimum of two inches high in contrasting color to sign background or vehicle.

Vehicle Operation in AOA

Contractor's vehicle operating within the AOA must follow safety procedures outlined in Appendix C – Site Safety Plan.

Parking Identification

The contractor will contact MNAA Operations to register vehicles to be used in secure areas and/or to obtain parking passes. These passes are to be returned at the end of the project.

CONRAC

The Sponsor is allowed one on-site parking space for one contractor vehicle at a location provided at the Sponsors pre-construction meeting. Additional Sponsor vehicles may be parked at the portion of the Ready/Return Area included within such Sponsor’s Exclusive Use remises with the approval of MNAA. Overnight parking of a contractor’s vehicles at the CONRAC site or elsewhere on the Airport campus is not permitted. The Sponsor may not have trailers on the CONRAC site.

Construction staff who will be operation and performing work within the Sterile, SIDA or Secure areas of the airport property must be badged for security reasons and are always subject to review.

1.12.3 DEMOLITION AND REMOVAL

Contractors shall demolish only those items specifically shown on the Construction Documents. Demolition is to proceed only with written MNAA approval.

A. Flagmen During Construction

The Contractor must furnish flagmen during all times that MNAA permits the use of public roads, aprons, taxiways, or runway approaches where the contractor's equipment may be traveling or working. Flagmen are to use the standard STOP-SLOW sign or a red flag not less than 2 feet square in accordance with FAA 150/15370-2E and Appendix C.

B. Barricades, Flags, And Obstruction Lighting

The Contractor is required to barricade all construction areas and activities that present a potential danger to aircraft, vehicular, and/or pedestrian traffic. All work is to be coordinated with MNAA and is to be in accordance with Appendix C. Two-way radio contact may be required by MNAA. Barricades, approved by MNAA, shall be provided in sufficient numbers and positioned in such a manner as to clearly define the potential hazard. During hours of darkness or periods of reduced visibility, all barricades are to be lighted with battery-powered flashing red lights at a minimum. Orange and white checkered flags are an acceptable substitute for the flashing light barricades for daytime operations. MNAA shall direct the placement of barricades.

The Contractor must ensure that all barricade and obstruction lighting is on and operating between sunset and sunrise or during periods of fog or reduced visibility. Specific personnel must be designated to replace or relight barricade and obstruction lights and must be available 24 hours per day for the duration of the project. Names and phone numbers of responsible parties are to be provided to MNAA in order that they may be summoned if necessary.

C. Protection of Property

All existing work must be adequately protected against damage during accomplishment of the Contractor's work.

D. Temporary Utilities

Temporary heating, air conditioning, and ventilation shall be provided by contractor when building primary systems are out of service during certain phases of construction. Make arrangements for temporary utility connections as directed by MNAA and pay the cost of the connections and removal, and all utility charges incurred by the work.

E. Protection of Utilities

Any utilities encountered during demolition are to be properly protected, relocated, or removed as instructed by MNAA. When any utilities are encountered that were not indicated prior to the work, notify MNAA and the agencies having jurisdiction immediately.

No demolition work will be permitted to disrupt any existing utilities, including telephone and electrical cables, conduit, and airfield lighting. Such work must be delayed until the utilities have been rerouted.

The original condition of the ground must be restored immediately following the installation of any utility, including restoration of pavement and landscaping.

F. Damage to Airport

The Sponsor must repair, at his own expense and to the satisfaction of MNAA, any damage his operations or contractors, including subcontractors, cause to existing Airport pavement, roads, bridges, drainage, pipelines, duct lines, lighting systems, or other Airport improvements. When essential utilities are damaged, or service interrupted, repairs shall be made immediately.

G. Erosion Control

Soils exposed during construction must be protected against erosion using proper sediment control methods and procedures. All construction projects must conform to the most current erosion control rules and regulations of the Metropolitan Government of Nashville and Davidson County, Tennessee, and the Tennessee Department of Environment and Conservation. MNAA, through its NPDES permit, has ultimate control for all discharges of water from MNAA property. Therefore, MNAA shall receive and approve all erosion and sediment control plans for construction projects where any ground disturbance occurs. All erosion and sediment control devices and structures must be in place and functioning before construction can start. If erosion or sediment control structures become damaged or inoperative, MNAA can issue a stop work order for the project until such devices are restored.

H. Welding and Cutting

Contractors should take the necessary precautions in preparation for hot work such as welding and cutting. These precautions should be in accordance with NFPA 51B, *Standard Prevention During Welding, Cutting and Other Hot Work*.

All welding or cutting shall be reported to the MNAA Department of Public Safety (DPS) prior to the start of the job, and upon completion of the project on a daily basis. A fire watch shall be provided by the Contractor, suitable fire extinguishers shall be on hand within 20’ of the work being performed and accessible at all times. Welding or cutting shall cease 30 minutes before closing the job site for the day and inspected prior to the employees leaving the site for the day.

I. Floor and Roof Penetrations

Prior to making any roof and/or floor penetrations in the Terminal Buildings, the Sponsor must obtain approval of the proposed locations from MNAA. All cutting, patching and core-drilling will require written approval by MNAA before initiating work. The Sponsor is responsible for locating any concealed reinforcement or utilities prior to cutting and for repairing any damage to reinforcing steel, conduit, wiring, piping, etc., resulting from this operation. Weatherproofing of all roof penetrations must be performed by the MNAA’s authorized roofing contractor at the Sponsor’s expense. Floor penetrations in upper level spaces with concrete must be core-drilled. All penetrations must be sleeved and sealed with one pipe permitted per sleeve. Penetrations shall be sealed with fire sealant as per local fire code requirements. All upper level floor penetrations shall be completely sealed to prevent permeation of odors or liquids to the space below.

SECTION 2 - TENANTS

2.0 INTRODUCTION

This section is intended to guide Sponsors at Nashville International Airport (BNA). This section refers to two types of Tenants, Non-Terminal Tenants and Terminal Tenants. Refer to Section 01 of this manual for details regarding the delineation between types of Tenants. The performance standards outlined in this section are subject to MNAA approval. All Sponsors are required to conform to applicable codes and regulations.

2.1 NON-TERMINAL TENANTS

2.1.1 SITE PLANNING PARAMETERS

"Site planning" and "site work" include all site-covering elements such as paving, curbs and gutters, drainage, landscaping and irrigation systems, site lighting, screen walls, fencing and the building siting.

A. AOA Security Assurances

Access to the AOA from Tenant's leased premises must conform strictly to MNAA and TSA regulations. It is the responsibility of each Sponsor's whose premise is in or adjacent to the AOA to control access to the AOA to MNAA's and TSA's satisfaction.

B. Building Height

The maximum overall building height, including rooftop structures shall follow FAA's FAR Part 77 Surfaces, Objects Affecting Navigable Airspace criteria or other applicable criteria. The building will be evaluated at the closest point on the proposed roofline, or maximum structure elevation, to the runways, present and future (as shown on MNAA's current Airport Layout Plan). Equipment towers and other apparatus such as antennae may extend above rooflines as long as they conform to other standards herein and to FAR Part 77 criteria.

C. Setbacks

No building shall be located nearer to the boundaries of the leased premises than the minimum setbacks set forth below.

From Public Streets:

From lease boundaries that abut a public street, the setbacks shall conform to all local zoning ordinances. Lease boundaries will be considered property lines for interpretation of zoning regulations.

From Non-Public Streets, AOA Roads, AOA-Abutting Boundaries, Adjacent Lease Areas:

The setbacks shall comply with standards established by local zoning ordinances unless approved by MNAA and all applicable agencies. Lease boundaries will be considered property lines for interpretation of zoning regulations.

To Loading Docks and Service Carts:

The setback from any street and lease boundaries shall be a distance sufficient to provide space for all probable vehicles to park without projecting into the public way or onto adjacent premises. Adjacent to public streets the setback shall also include vehicle maneuvering space plus all landscaping.

Security and Guardhouses:

Security and MNAA approved access-control guardhouses and MNAA approved access control devices must be situated within the Sponsor's leased premises. Such guardhouses and devices must be set back from the street sufficient distance to permit at least one 35-foot long vehicle to stop clear of traffic lanes.

Projections:

Minor overhangs, cornices, awnings, and sunshades, if entirely supported by projection or cantilever from the main structure, may protrude into the setbacks as allowed by local zoning ordinances.

2.1.2 LANDSCAPING

A. Site Coverage

All leased premises' ground areas not covered by buildings shall be either paved or landscaped, and shall be properly graded, drained, and maintained, in accordance with local zoning ordinances, according to the standards specified herein.

B. Landscaping Requirements/Public Roads

Landscaping is a major feature of the Airport. This character will be maintained and reinforced by subsequent Airport improvements. In view of the special nature of this area, the following guidelines apply specifically to parcels fronting onto public roads or their adjacent access roads.

New curb cuts are discouraged and must be approved by MNAA. Where possible, all access to Tenant parcels must be from the adjacent access or service roads.

The setback area between the premise boundary lines and the curb must be landscaped in a manner and style matching the existing parkways. The use of evergreen trees is recommended.

Parking areas must be screened from the major thoroughfares.

When parking areas are in the setback area between the premise boundary line and the building, a 10-foot-wide landscaped strip shall separate the building from the parking area. Sidewalks, when required, are allowed in this landscaped strip.

No trash containers, compactors or other such equipment may be visible from the thoroughfares or their immediate access roads. All such units must be screened by dense foliage or by an opaque fence and should be located at the rear of Tenant parcels. All garbage trucks maneuvering to pick up trash must be accomplished completely within the Tenant’s leased premises and not in any of the setback areas between curb line and property line.

C. Landscaping Requirements/General

The Sponsor is responsible for installing and maintaining all landscaping within the leased premises. For all areas, including the major thoroughfares, the following requirements apply:

Completion:

The approved landscaping shall be completed within six months of the completion of construction of the project, or of occupancy of the facility, whichever comes first.

Drainage:

Soil drainage systems shall be provided where applicable to assure proper drainage of the soil and suitable growing conditions for the planting materials. Further requirements for drainage are in Section 2.1.4 (D).

Soils:

All planting soils, including those for lawns, shall be specially prepared, humus-enriched topsoil mixes with adequate drainage characteristics, or similar modifications of the existing soils to achieve the same characteristics.

Plant Materials:

Plant materials may consist of ground covers, lawns, trees, shrubbery and where appropriate may include other plant types; use of evergreen plants is encouraged. Plant materials shall be of high grade quality as defined by published landscape standards applicable to the state of Tennessee. MNAA may require that trees be limited to a height as defined by FAA FAR Part, 77 Surface regulations, whichever height is lower. Implementation of this stipulation shall include trimming or removal at Sponsor's expense. See Appendix C for approved trees that may planted. Any unlisted tree must be submitted to MNAA for approval.

Extent of Perimeter Landscaping:

A continuous landscaping strip is required on all parcels abutting public street(s) along those street(s), except for permitted curb cuts. The dimensions of said strip(s) shall be as defined in the Section 2.1.1 (C) titled "Setbacks." The criteria, specifications, and standards for the design and maintenance of this landscaping shall conform to the other standards herein, including its irrigation system and water, at Tenant expense.

Fences:

Tenant must follow FAA Actual Surveillance Performance guidelines. Due to security reasons, Tenants shall request this information from MNAA if applicable.

Maintenance:

Landscaping shall be properly maintained and watered to assure a healthy, neat, and trimmed appearance of all elements of the landscaping and other elements affected by the landscaping such as adjacent buildings, traffic lanes, and utilities. Irrigation cycles and times shall be adjusted as seasons change and incidental weather conditions occur to assure appropriate amounts and frequencies of water, without allowing waste. Grass lawns shall be regularly mowed, and other plant materials shall be appropriately trimmed to maintain healthy, attractive plants, and to assure that plants do not encroach on the rights-of-way or on parcels of others. Unhealthy, unsightly, damaged or dead plant elements shall be promptly removed, replaced, and/or repaired by the Tenant. Weeds, trash, and fallen leaves shall be regularly and promptly removed. Fertilizer, pest control, and disease control substances shall be applied to plant materials regularly, as allowed by applicable ordinances.

D. Irrigation

Irrigation systems shall be provided by the Sponsor to serve all landscaped areas on the site with sufficient water coverage and volume to maintain a healthy plant life and growth.

E. Sidewalks

MNAA may require the installation of public sidewalks within Tenant lease boundary lines adjacent to public streets. All public and private sidewalks on Tenant leased premises shall conform to the standards set forth by the Metropolitan government of Nashville and Davidson County.

2.1.3 PARKING AND PAVING

A. Off-Street Parking, Service Area, Other Light Paving

The parking plan, maneuvering areas and traffic lanes shall be laid out in accordance with the standards set in the Metropolitan Government of Nashville and Davidson County Zoning Ordinance and Building Codes. The Sponsor's site plan must demonstrate that the driveways into the parking areas do not negatively impact the movement of vehicles or pedestrians near the site.

B. Parking Requirements

The Sponsor must provide parking entirely within the leased premises for all vehicular parking needs projected for the operation, including: at least one stall for each anticipated employee per working shift, unless remote parking is otherwise provided, at least 50% in excess of this quantity if working shifts may overlap in time; also visitor or customer parking in quantities to meet anticipated demand, and Sponsor company vehicle parking. No curb side parking on public streets or public rights of way is allowed. Space requirements for all off-street parking shall conform to the standards set by Metropolitan Government of Nashville and Davidson County Zoning Ordinance. Designated handicap parking spaces and locations are to be incorporated as per governing codes and regulations. Stormwater management and islands for vegetation and canopy cover provisions are to be in accordance with Metropolitan Government of Nashville and Davidson County Zoning Ordinance.

C. Curb Cuts

Access from the public streets to the Tenant's parking lots, loading dock areas and other service areas is limited to curb cuts of maximum 30 feet width for auto parking and 35 feet for large trucks, measured at the narrowest point of vehicular passage. Driveway geometrics, curb cuts profiles, and spacing between curb cuts shall conform to the standards established by Metropolitan Government of Nashville and Davidson County. Maneuvering into and/or out of Tenant’s parking spaces or loading/service areas shall not be directly from or onto the public streets. Maneuvering space shall be provided entirely within the Tenant's leased premises in parking or service lots that meet other stipulations of this standard, such as setbacks and landscaping.

D. Paving Requirements

Parking and maneuvering areas and driving lanes shall be paved and edged according to the standards of Metropolitan Government of Nashville and Davidson County to provide all-weather surfaces durable for the anticipated loads and lease term life. All paving shall be properly sloped to storm drains, which are connected to the Airport's storm drainage system. All paved areas shall be properly abutted to other paved areas, or entirely bounded by standard concrete curb or curb-and-gutter sections, as appropriate to the drainage plan, or by standard concrete curb cut sections to streets. Paving materials may be asphaltic concrete or concrete. Light-colored concrete is preferred for heat island reduction. Shell or gravel paving areas are not permitted.

E. Aircraft Pavement Areas

All aircraft taxiways, apron areas, hardstands, maneuvering, and parking areas on the premises shall be paved according to the standards for aircraft paving, set by FAA Advisory Circular 150/5320-6C, as amended, for aircraft to be operated on leasehold property. All pavement shall be marked per FAA standards.

Edge treatments, striping, hold downs, stabilized shoulders, and new-to-old paving connections shall be constructed according to the FAA engineering standards listed above at Sponsor’s expense.

2.1.4 CIVIL AND SITE UTILITIES

A. Engineering Standards

All site improvements and civil structures shall be designed and specified in accordance with FAA Advisory Circulars 150/5320-6D, CHG 3 Airport Pavement Design & Evaluation, 150/5315, CHG 1 Management of Airport Industrial Waste, and 150/5340-30 Design and Installation Details for Airport regulations and accepted engineering standards, and to the requirements of Metropolitan Government of Nashville and Davidson County and accepted engineering standards.

B. Site Grading

Excessive fill, as determined by MNAA, in relation to adjacent properties and the road and airfield systems, shall not be placed on the leased premises. No change shall be made to elevation or

grading of the leased premises that will divert surface drainage onto adjacent property without approval of MNAA.

C. Storm Drainage Master Plan

The Sponsor shall submit a site drainage plan, prepared by a registered engineer, that conforms to the criteria established by MNAA and local, state, and federal guidelines. Sponsor's plan will show capacity of existing system, increased runoff amount, and proposed storm sewer requirements. Sponsor may be required to pipe runoff from the leased premises to the nearest collector ditch. Individual detention ponds on the leased premises may be required. Sponsor is advised to consult with MNAA regarding drainage capacity before commencing engineering design.

D. Drainage

No discharges of any illicit substances into the storm water system are permitted. All runoff must be treated in accordance with the latest regulations of the Tennessee Department of Environment and Conservation (TEDC) and the Environmental Protection Agency (EPA). No storm runoff or other site drainage shall flow onto adjacent lease premises. Storm drainage shall be taken into the public storm sewer system and drainage ditch system. No industrial or domestic waste, toxic or other objectionable material shall be emptied into the city storm sewer system or drainage ditch system. Washing of aircraft or other equipment must comply with all applicable federal, state, local, and MNAA regulations. Any taxiway crossing of drainage ditch culverts shall be reinforced concrete pipe, conforming to FAA Circular 150 5320-6C Airport Pavement Design & Evaluation.

E. Sanitary Sewer

Due to limited sewer system capacity, the Sponsor must ensure that systems are capable of supporting the intended function of the modification. All sanitary sewer originating on the leased premises shall be connected to Metropolitan Nashville Department of Water Service’s sanitary sewer system. The Sponsor shall not provide nor install sanitary sewage treatment facilities on the Tenant's leased premises.

F. Water Supply

Water supply by the City will be normal water pressure at street or road level in mains located in the street, road, easements, or adjacent airfield area as determined by the City. Sponsor shall provide and pay for service lines and connection and meter charges as required by City ordinances.

G. Site Utilities, Lighting and Other Electrical Elements

All utility service shall be underground, including power, telephone, communication or other service for the building(s), outbuildings, lighting elements, or any other purpose. Temporary service during construction may be above ground. Transformer, switchgear, and related equipment enclosure boxes may be mounted on grade, provided they are fully enclosed for safety, are screened by planting or opaque fences, and are incorporated into the landscaping plan.

Site lighting, if provided, shall match the existing site lighting in the area and shall be LED 4000 kelvin luminaries from fixtures installed on the building(s), or on freestanding metal poles. The use of wooden utility poles is prohibited.

Light poles and fixtures may not exceed the height restrictions set forth in the latest edition of FAA. Refer to FAA current Standards for Specifying Construction of Airports for additional requirements for airport lighting.

All area lighting, street lights, and flood lights shall be "cutoff" type lighting, equipped with a shade or skirt so that the light source will not be directly visible from airborne aircraft, or to control tower personnel.

Taxiway lighting when supplied by the Sponsor, shall be in accordance with MNAA Maintenance criteria and FAA requirements, and shall connect to the MNAA system as directed and approved by MNAA.

H. Blast Fences

Wherever Tenant's operations will produce aircraft engine blast that could affect adjacent properties, blast fences of sufficient height to provide full protection to personnel and property of adjacent Tenants, MNAA installations, properly, personnel, the public and other Airport users, shall be provided and installed by Sponsor. Blast fences will be designed and constructed in accordance with FAA Advisory Circular 150/5300-13 Airport Design Standards - Transport Airports.

2.1.5 ARCHITECTURE

A. Introduction

The Airport and its buildings were designed in a modern or contemporary style, with an emphasis on simple functional structures. Sponsor structures and buildings will conform to this style, without excessive ornamentation. Buildings shall generally match adjacent ones in color, materials and character. MNAA intends to assure a uniformly high-quality standard of appearance, function, durability, and maintenance, for present and future Sponsor of the Airport.

B. Materials

Materials shall be selected from those permitted by the Metropolitan government of Nashville, Davidson County and other applicable codes and regulations. Materials must be of a high quality and durability and must enhance the overall aesthetic appearance of the area. Materials that resist blows and scrapes shall be used in areas subject to vehicular and pedestrian wear, and appropriate materials, coatings, sealants, and details shall be used to resist soiling, corrosion and damage.

C. Equipment Towers and Storage Tanks

All equipment, tanks, etc. placed on roofs of buildings or on the ground shall be enclosed or screened from view in a manner that is architecturally compatible with the building and its environment. Whenever possible, such equipment should be installed on roofs and completely concealed from view from public streets.

Permitted storage tanks located in designated fuel farm parcels are excluded from this stipulation, except that their visual appearance shall be consistent in color with nearby buildings and with the other specifics herein insofar as is reasonably possible. See Section 2.1.6 (D) for further restrictions on storage tanks.

D. Exterior Wall Materials

In the interest of maintaining continuity of appearance throughout the Airport, and maintaining a high quality of building construction, MNAA reserves the right to stipulate the specific use of exterior wall building systems on specific projects. MNAA, in its sole judgment, may require that the Sponsor's building conform in appearance and construction to adjacent properties. In other cases, the Sponsor is requested to design the buildings with approved wall systems such as the following:

1. Insulated precast concrete panels
2. Insulated metal panels
3. Brick veneer wall systems
4. Painted or anodized metal siding
5. Painted or anodized metal aluminum panels
6. Exposed aggregate tilt slab panels
7. Stone masonry panels, such as marble, limestone, or granite
8. Painted or integrally dyed concrete masonry block (allowable only when the parcel is not directly visible from major public thoroughfares)

Specific exterior wall systems not approved for use at MNAA facilities are:

9. Wood siding, cementitious board sheet or lap siding, vinyl siding
10. EIFS or stucco
11. Wood shingles, or asphalt shingles
12. Residential-type aluminum siding
13. Residential-type construction involving wood frame and joist systems

Structures clad primarily in reflective glass are discouraged and will be approved only if the Sponsor can demonstrate that reflected light and glare from the glass does not interfere with flight operations or Control Tower visibility. In specific locations the Sponsor may be required to use non-radar reflective materials.

E. Exterior Wall Systems That Face the Street

In the interest of maintaining continuity of appearance throughout the Airport, and maintaining a high quality of building construction, MNAA reserves the right to stipulate the specific use of exterior wall building systems, which face the street on specific projects. MNAA, in its sole judgment, may require that the Sponsor's building conform in appearance and construction to adjacent properties. In other

cases, the Sponsor is requested to design the side of the building facing the street with approved wall systems such as the following:

14. Insulated precast concrete panels
15. Brick veneer wall systems
16. Exposed aggregate tilt slab panels
17. Stone masonry panels, such as marble, limestone, or granite
18. Painted or integrally dyed concrete masonry block (allowable only when the parcel is not directly visible from major public thoroughfares)

Specific street facing exterior wall systems NOT approved for use at MNAA facilities are:

19. Wood siding, wood shingles, or asphalt shingles
20. Residential-type aluminum siding
21. Residential-type construction involving wood frame and joist systems
22. Painted or anodized metal siding
23. Painted or anodized metal aluminum panels

F. Color

Strong or bright colors are prohibited, except upon approved signs, and limited to recognized corporate logo programs. Samples of proposed colors for all elements shall be submitted for approval with plans. MNAA, in its sole judgment may require the Tenant to paint or otherwise color buildings to match adjacent properties. The exterior finishes and colors of existing nearby structures must be considered when selecting colors for new buildings. Reference Appendix E for acceptable paint colors.

G. Security Booths and Gatehouses

Such ancillary structures shall be constructed of materials similar to those employed in the primary buildings on the site. Security Booths shall be constructed behind the line of the perimeter fence whenever possible. Residential type construction, or mobile structures are specifically forbidden. Prefabricated gatehouses are acceptable if the design is complementary to the primary building(s).

H. Roofs

"Flat" or low slope membrane roofing systems shall be one-piece membrane system integrated with proper flashing and counter flashing systems. Thermal transmittance values must meet International Energy Conservation Code requirements. Light-colored roofing is recommended to reduce heat island effect. Roof penetrations must meet warranty requirements. Built up roof systems, loose gravel fill and asphalt roofing is not allowed. Existing roofs that do not abide by these standards can remain and be maintained. All new roofs must abide by these standards and should integrate seamlessly with existing roof systems. Provide appropriate access to roofs from within the building. Roof walking or protection mats surfaces compatible with the roofing system must be provided. Provide internal roof leaders with overflow scuppers or secondary roof drainage, with piped discharge to grade or approved underground storm lines.

Sloped roofs are acceptable with gutters and leaders for drainage. Metal roofs are acceptable. Glass skylights or reflective roofing material must not interfere with flight operations or the control tower due to reflective light and glare.

2.1.6 BUILDING AND UTILITY SYSTEMS

A. Exterior Envelopes

Insulation and isolation systems shall be designed and constructed to inhibit and prevent humidity migration, vapor pressure infiltration, and exfiltration, condensation, and moisture deposits that would cause safety hazards, corrosion, decay, peeling, cracking, delaminating, and other moisture-related problems. Penetrations and joints in the thermal envelope shall be properly detailed to resist thermal and water vapor migration. Joints less than 1 1/2" wide that are receiving sealant only must have a foam backer rod support. Plumbing, including roof drainage systems, shall be properly protected from freezing and corrosion in an energy-conservative manner.

The building envelope includes all enclosing surfaces (roofs, walls, floors, fascia, soffits, windows, doors of all types, and all other openings) and applies to interior separations between conditioned and unconditioned spaces. Exterior doors of conditioned spaces, and interior doors between conditioned spaces and unconditioned spaces, shall be equipped with automatic door closing devices and must be insulated.

Sun-shading devices should be considered for surfaces particularly susceptible to radiant heat gain and incorporated into the design wherever cost-effective and appropriate. When required, fixed exterior louvers may be provided. In curtain wall application, the louvres must be fully integrated into the curtain wall system. Mechanical louvers and shades are not permitted. Window tinting or friting on Non-Terminal building may be considered. All sun-shading devices including interior shades or other window concerning are subject to MNAA approval.

B. Mechanical Systems

Central chilled and high temperature heating hot water systems are provided in the Terminal Buildings only, however, capacity is limited. These services are not available outside the existing terminal building envelope. Window or thru-the-wall air conditioning units are not allowed except for gatehouses and similar one or two-person structures.

C. Electrical Systems

MNAA provides no electrical power service to Tenants leased premises outside the existing terminal building envelopes. Electrical loads are limited to Central Utility Plant (CUP) capacity, anything beyond CUP capacity will be Sponsor’s responsibility.

D. Storage Tanks/Fuel Farms

Tanks for the storage of regulated substances and petroleum products, when and where otherwise permitted, shall conform in design, situation, and proximity to other uses and developments (whether of the Tenant, other Tenant of MNAA or of MNAA’s own uses), and to all applicable standards and

regulations of Federal Environmental Protection Agency and Tennessee Department of Environment and Conservation (TDEC). These regulations pertain to all solid, liquid, semi-solid or gaseous products or other substances, storage tank(s), piping, pumping, and control valve systems, whether below or above around.

All new tank systems must be secondarily contained. New above ground storage tanks (AST) must have secondary containment and be two-hour fire rated. Spills must be cleaned up immediately and completely and reported to the Airport Communications Center (ACC).

Sponsors shall include MNAA, on all notifications to EPA and TDEC. MNAA categorizes the modification or removal of storage tanks a major construction project, and the Sponsor must submit the project plans for MNAA review and approval before beginning any work. Where any Tenant facility has the possibility for petroleum products or waste to reach the storm water drainage system, the Sponsor is to install an oil/water separator. All plans and specifications for oil/water separators must be approved by MNAA.

E. Telecommunications Systems

Telecommunication service is provided by AT&T or Comcast. Outside line service shall be contracted directly by the Sponsor. Telecommunication service within the Tenant's premises shall be the responsibility of the Sponsor. No radio-frequency cell-to-cell transmission is allowed without prior MNAA approval. Building wide broad-band or carrier-band cable systems are recommended for use in new facilities to be occupied by a single Tenant.

F. Wi-Fi / Wireless Communications

The Wi-Fi signal must only be accessible to Sponsor for operational needs and not transmit out beyond Tenant’s leasehold space.

G. Lighting

Tenant Lease Area Lighting

The type of light fixtures for typical Tenant office space is strictly controlled by MNAA. In general, lighting designs must match lighting in the immediate area for a similar function.

An average maximum of 0.82 watts per square foot or current IECC for jurisdiction of lease area in most typical office situations. The guidelines allow for approximately one lay-in LED fixture per eighty-one hundred (100) square feet of space. All fixtures shall be U-L listed. All new, repaired or replaced lighting must meet LEED standards to maintain MNAA standards. The following are the approved light fixture standards.

2’ x 2’ or 2' x 4' LED Fixture:

Fixtures shall be recessed 4" depth maximum, regressed center lensed, 3500 kelvin, >80 CRI > 100 lumens/watt, L60/80,000. Drivers shall be 0-10 volt flicker dimmable, low-current inrush, 89% efficiency and low EMI. The lens assembly shall be high performance extruded acrylic, curved or square form with anidolic nominating optical components. LED lamps located at one end of the

housing accessible from below. Fixture should have a coefficient of utilization (CU) of .80 at a room cavity ratio (RCR) of 1 for a reflectance of 80-50-20. The fixture shall have air return capabilities. Each fixture must be secured to the structure above at all four corners.

Recessed Downlight Fixture:

Recessed downlights to be LED with regressed and clear anodized cone reflector, 3500 kelvin, > 80 CRI > 88 lumens/watt, L70/50,000 and be submitted to MNAA for approval. Other specialized light fixtures for specific functional or aesthetic requirements must be submitted to MNAA for an approval with a written explanation of the need for such lights. Sponsor functions (such as warming lights for cafeteria serveries) will be considered on a case-by-case basis subject to the Sponsor meeting the watts per square foot criteria of the specific application.

Exterior Area Lighting

When Airport improvements include provisions for new apron lighting, the basic criteria for apron lighting design shall be as follows:

1. Lighting shall not interfere with the night vision of control tower personnel and pilots, according to accepted industry standards. Uniformity of luminance pattern on apron pavement and aircraft shall be as high as technically and economically feasible.
2. Direct and reflected glare shall be minimized.
3. Luminaires shall be LED at 4000 kelvins.
4. Daytime appearance of the lighting system elements (towers and luminaires) shall be aesthetically compatible with existing Airport elements.
5. Ease and low cost of maintenance of the lighting system shall be maximized.
6. The lighting system shall facilitate ground traffic flow and provide for maximum use of peripheral vision.
7. The lighting system shall facilitate all aircraft servicing and minor maintenance functions.
8. The specified luminaires shall have no refractors as part of their optical system. This will further minimize direct glare and provide positive cut-offs for control tower personnel, pilots, and operators of apron vehicles.
9. The light sources must be of minimum feasible size to facilitate maximum beam control. Good color rendition characteristics of the light source are very important.
10. The governing safety factor shall be the ability of the lighting system to facilitate perception of obstacles in the path of an aircraft or an apron vehicle.
11. Light levels shall be as recommended by the IES Handbook.
12. All cables and equipment installed by the Sponsor become property of MNAA in accordance with the terms and conditions of the Tenants lease agreement/contract.
13. All lighting provisions must match existing MNAA standards as installed for their various functions.
14. Cut-off and shielding should meet sustainability requirements when applicable.

H. Acoustics

Sponsors are required to minimize the transmission of sound from their lease space to the concourse and adjacent Tenants. The Sponsor must provide the following as a minimum:

1. Noise Criteria (NC) Values from the heating, ventilation, and air conditioning (HVAC) systems as generally accepted practice by the American Society of the Heating, Refrigeration and Air Conditioning Engineers (ASHRAE). NC Level outside the Tenant space as a result of the HVAC system should be limited to NC 40 in any adjacent occupied space or lease space.
2. HVAC systems and equipment will be installed with vibration isolators as accepted practice by ASHRAE.
3. The minimum Sound Transmission Class (STC) design value between Tenant spaces for no-critical noise intrusion is STC 47.
4. Space planning for adjacent Tenants will need to be considered and the Sponsors should inquire as to adjacencies.
5. Impact Isolation Criteria (IIC) will be a minimum of 50 for all hard-surfaced floor areas above occupied spaces.
6. All waterproofing underlayment material must also be rated to increase the IIC class of the floor assembly.
7. Music systems are permitted with MNAA approval. However, the volume of sound must be controlled to limit the levels to the lease space boundaries and not intrude into the adjacent lease spaces or the concession aisle ways, so that the Terminal PA System and Emergency Messaging System can be clearly heard without interference from lease space sound systems. The noise from any lease space to the exterior shall not exceed 6 dBA above the ambient level. The ambient level is scheduled to be 50 dBA; therefore, the maximum level for the lease space will not exceed 56 dBA.

Regulatory signs (i.e., "No Parking" and "Tow Away") must comply with state and local standards including international symbol.

2.2 TERMINAL TENANTS

2.2.1 INTRODUCTION

The Terminal Buildings have undergone major renovations under the BNA Vision projects. This program combines many landside and airside facility improvements targeted to enhance the passenger experience while positioning BNA for the bright future ahead. Tenants within the Terminal Buildings are expected to uphold MNAA’s commitment to the user through thoughtful designs which implement the below performance standards. These sections include but are not limited to architecture, building and utility systems, and signage.

2.2.2 ARCHITECTURE

A. Exterior Terminal Improvements

Addition to Terminal Buildings

Additions to the Terminal Buildings that will increase the perimeter, floor area or building envelope, or Tenant structures adjacent to the Terminal are prohibited except in extreme circumstances. Any such additions must match the finish materials of adjacent terminal construction.

Rooftop Equipment

Roof top installation is discouraged and must have MNAA approval. All equipment located on the Terminal roof must have a permanent label indicating the Sponsor using the equipment. Equipment no longer in use is to be removed by the Tenant and appropriate repairs made to the Terminal building.

Roofing Modifications

Sponsors may use roof penetrations providing appropriate details meet Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) standards, are approved by MNAA, and work is performed by a qualified contractor. Roofing modifications are subjected to review and FM Global (MNAA's Insurance Carrier) approval and must meet their standards. In addition, the tenant must have oversight by the MNAA approved roofing contractor to maintain existing warranty requirements.

Exterior Envelope

The building envelope includes all enclosing surfaces (roofs, walls, floors, fascia, soffits, windows, doors of all types, other openings) and applies to interior separations between conditioned and unconditioned spaces.

Airport improvement projects requiring alterations or renovations to the exterior envelope of the Terminal Buildings are discouraged. Such alterations must match existing adjacent construction in color, material, type of construction, and quality. Materials that resist damage and deterioration must be installed.

The Sponsor shall provide thermal insulation and isolation in accordance with applicable federal, state, and local energy codes and standards as applicable to Davidson County, TN. Such insulation must be designed and installed to properly control heat gain and heat loss by convection, conduction, radiation, and transmission and to inhibit and prevent humidity migration, vapor pressure infiltration and exfiltration, condensation and moisture deposits that would cause safety hazards, corrosion, decay, peeling, cracking, delaminating and other moisture-related problems. Penetrations and joints in the thermal envelope shall be properly detailed to account for thermal and water vapor migration.

Any penetrations in the exterior envelope must be repaired, sealed and repainted as necessary. No exposed conduit or piping will be allowed on the exterior face of the Terminals, including areas not visible from public spaces.

Any new doors provided in the Terminal exterior will follow MNAA standards for construction and meet MNAA requirements for security and keying (see Section 2.1.9 (E). Wherever appropriate, exterior doors of conditioned spaces, and interior doors between conditioned and unconditioned spaces shall be equipped with automatic door closing devices. Doors are to be insulated and have power run to electric strikes in the frame or overhead magnetic locking. Electrical components are to be concealed.

Exterior Ceilings, Soffits

New exterior ceilings must be constructed to industry standards for metal ceilings, painted cement plaster or exterior grade gypsum board should be at a minimum 5/8” thick. Acoustical ceiling tile is not permitted for installation where exposed to the exterior. Light fixtures (other than apron lighting) should be recessed into ceilings. If applicable, provide access to MEP infrastructure through design placement or access panels.

Glazing

Laminated or tempered glass shall be installed in areas subject to blast or public access, except where fire separation requirements dictate wire glass or other construction. Glazing is to match glass in the area adjacent to the installation and with a similar function. The use of plexiglass panels in lieu of glass is prohibited. Exterior glazing shall be insulated to meet applicable code values. Alterations to existing glass windows are not allowed without prior MNAA approval.

Window Frames

Frames shall match frames in the area adjacent to the installation and with a similar function and color. Provide continuous sill pan and perimeter sealant or drainage.

B. Airport Provided Interior Finishes

Introduction

MNAA will provide no finishes, equipment, or services to or within leased premises other than those described herein. Deviations from this established standard may be negotiated in specific lease areas for specific Tenants but will, in those cases, be specified in the particular lease agreement contract.

Demising Wall

Specific demising wall obligations are stipulated in the lease agreements. The exterior or public side of partitions fronting onto public spaces will be constructed to match the surrounding decor as to color, finish and quality levels. Demising walls shall have appropriate fire rating as required by codes.

Ceiling

Generally, a finished ceiling and lighting is provided for public areas of Tenant leased premises. The Sponsor may not change the ceiling or the layout or type of lighting fixture. The Sponsor is not allowed to paint this ceiling or hang objects or equipment from it.

In the non-public areas of Tenant leased premises, no ceiling will be provided by MNAA. It is the responsibility of the Sponsor to provide a ceiling based upon the performance criteria set forth in Section 2.2.2.(D). In cases where a ceiling is in place from a previous lease, MNAA may allow the Sponsor to utilize the existing ceiling if it is in acceptable condition.

Floor Finish

Floor construction of unsealed concrete will be provided by MNAA. It is the responsibility of the Sponsor to provide appropriate floor material based upon the performance criteria set forth in the following Section 2.2.2 (C). MNAA reserves the right to specify the type of finished flooring to be installed at the Sponsor's expense in certain areas.

C. Tenant Interior Finishes - Public Areas

Interior finish materials shall be selected from those permitted by the Metropolitan Government of Nashville, Davidson County, and other applicable codes and regulations, must be of a high quality and durability, and must enhance the overall appearance of the area. Material that resist blows and scrapes shall be used in areas subject to vehicular and pedestrian wear and appropriate materials, coating, sealants, and details shall be used to resist soiling, corrosion and damage. Any materials not included in these Standards are subject to MNAA approval.

Floor Materials

In areas of high public use floors shall be covered with highly durable flooring materials such as ceramic tile, marble, granite, terrazzo, wood, or revenue-grade carpeting. All finished floor surfaces must be installed level or properly sloped to drain, with a maximum surface variation of 1/4" in 10 feet. Under no circumstances may the existing concrete slab be chipped to accommodate flooring underbeds. Transitions between Sponsor floor materials and MNAA controlled finish floor materials will be the responsibility of the Sponsor. Tenant spaces do not have flooring restrictions. Transitions between finish floor elevations cannot vary by more than 1/8" vertically. Ramping of floor materials for transitions is discouraged. Floor finishes and transition strips must be slip resistant and consistent with the latest American with Disability Act (ADA) requirements. Vinyl Composition Tile (VCT), linoleum, painted concrete, and bamboo flooring will not be permitted.

Carpeting

Carpeting in public areas must meet or exceed the following minimum specifications:

- The colors and design of the carpet will have soil masking capabilities that help to conceal stains, gum spots, and small burns.
  The latest edition of The Carpet and Rug Institute Standard for Installation of Commercial Carpet shall serve as the minimum standard for carpet installation.

- Carpet installed must be dimensionally stable and must not wrinkle, "dome" or mound, delaminate, have loose seams, or experience edge ravel.
- Carpet that is taped or shows any of the failures listed above, or is excessively dirty, will be removed and replaced by MNAA at the Sponsor's expense.

Terrazzo

Sponsor is responsible for inspecting the existing floor slabs and adjacent construction thoroughly for suitability of substrate to receive terrazzo. Avoid using terrazzo where slab vibration and movement may cause the terrazzo to crack. Slab must be cleaned and prepared to comply with the National Terrazzo and Mosaic Association's specifications for type of terrazzo indicated.

24. Terrazzo may be a Portland cement or polyester resin matrix.
25. Installation may be monolithic, banded, or sand cushioned terrazzo.
26. In public areas an integral border and vertical terrazzo base is recommended with a 3'8" minimum topping on under bed bonded to the wall.
27. Installation and composition of all Terrazzo must comply with the National Terrazzo and Mosaic Association, Terrazzo Technical Data and Guide Specifications, current edition.
28. Coordinate to match existing design intent.

Ceramic Tile

Ceramic Tile specified for use in public spaces must be installed according to the Tile Council of America - *Handbook for Ceramic Tile Installation* and ANSI A137.1 - Recommended Standard Specifications for Ceramic Tile. Tile should have a low moisture absorption rating and be slip resistant. Quarry tile is not recommended in public areas due to its higher moisture absorption rate, and tendency to soil. Tile and mortar joints should be constructed in such a manner to avoid audible noise and minimize tripping hazard when used by rolling luggage. It is recommended that the Sponsor provide metal transition strips at exterior corners of tile termination.

Stone Flooring

Stone flooring must be specified and installed to the minimum requirements of the National Building Granite Quarries Association Specifications for Architectural Granite, the Marble Institute of America - Marble Design Manual, and/or the Tile Council of America Handbook for Ceramic Tile Installation. Appropriate grade of stone should be used to avoid chipping and spalling.

Stone material must be of appropriate density and hardness for high traffic pedestrian areas. Stone flooring must meet the minimum recommended standards for compressive strength, modulus of rupture, and abrasion resistance for flooring materials set by the industry associations referenced above for these conditions.

Highly absorptive materials, such as unsealed limestone or natural fissured travertine are not allowed as flooring materials.

Stone materials must be slip resistant. Polished granite flooring is not allowed. Honed granite is acceptable, though flame-cut granite is preferred. Polished marble pavers are permitted. Stone installation may be either thin-set or thick-set bed applications forming a flush floor plane with no two contiguous pavers out of flatness by more than 1/32 inch. Stone flooring and mortar joints should be

constructed in such a manner to avoid audible noise and minimize tripping hazard when used by rolling luggage.

Stone tile thickness must be a minimum of 5/8" thick.

When recommended by the manufacturer, stone flooring should be sealed with two coats of a penetrating sealer.

Wood Flooring

Wood Flooring specified for use in public spaces must be installed according to the National Oak Flooring Manufacturer's Association Recommended Standard Specifications. Flooring should have a low moisture absorption rating and be slip resistant. Finish should be durable and capable of resisting marring and scuffing under the intended traffic flow. Specific woods, finishes, and maintenance schedules and techniques are to be submitted to MNAA for approval. Simulated wood finish and wood veneer will not be allowed.

Wall Finishes

Tenant wall finishes (when permitted by terms of the lease agreement/contract) must be of ASTM E84 as tested by UL for Class I flame-spread construction as defined by the applicable codes and regulations. All wall finishes must be highly impact resistant, scratch and scrape resistant, easily removable for repair, or capable of being repaired in place. All wall finishes must be washable in place. External Tenant demising walls which are not to receive special cladding are to have MNAA standard wall finishes. The following finishes are permitted:

Plastic Laminate Faced Panels

High pressure laminate shall be general purpose type with a normal 0.050-inch thickness applied to either 3/4-inch fire retardant plywood or industrial grade wood particle board meeting ANSI 1-M-3, with a minimum 45-pound density. Either panel backing shall have a fire rating of 25 maximum (ASTM-E84). Edges of the plastic panels must be protected in high traffic public areas, either through butt joints, or metal edge protectors. In certain areas, plastic laminate color(s) and installation details must conform to MNAA standards and criteria.

Aluminum or Steel Faced Panels

Panels may be painted, anodized or natural finish and must be identical to or coordinate with similar adjacent materials. Panel thickness must be appropriate to resist impact without denting. Panels should be removable for maintenance. Scratches and dents in the panels must be promptly repaired. All metals shall conform to the National Association of Architectural Metal Manufacturers, *Metal Finishes Manual.*

Glass Partitions

Interior glass partitions, glass doors and sidelights in all public areas or facing public areas shall be constructed of tempered glass of plate or float quality or laminated glass, 1/4-inch thickness minimum.

Pressure sensitive graphic decals shall be applied to the interior face of sliding glass doors and glass panels adjacent to door. Graphics shall be an approved translucent crystal color applied as a film at

42-inch height above the finish floor. The logo size shall be maximum 4” vertical and 6” horizontal dimensions repeated horizontally on the glass surface. The purpose of the graphic is to warn pedestrians of the presence of the glass surface. Graphics are to be submitted for MNAA approval.

Frames must be of extruded aluminum alloy or stainless steel. Aluminum frame finish can be factory applied, painted or anodized to match adjacent finishes. Butt glazing (frameless systems) are allowed with a minimum ½” thick glass and free of tong marks.

Installation shall be in conformance with the *Flat Glass Marketing Association Glazing Manual* and 16CFR1201 Safety Standard for Architectural Glazing Material by the Consumer Product Safety Commission.

Gypsum Wall Surfaces

All new wall surfaces facing public areas shall be 5/8” Gypsum Wall Board Portland Cement Plaster on metal lath with the three-coat application process, meeting the requirements of ASTM C842-79 - Standard Specifications for Application of Interior Gypsum Wall Board.

In Holdrooms, walls are required to have protective materials. Paint is permitted at 8’-0” above the finish floor and higher.

Vinyl Wallcovering is discouraged on exterior walls: If used, type II, minimum face weight 22 ounces. Wallcoverings will be washable and shall be manufactured and installed to meet Federal Specification QCJ-W-408 - Wall Covering Vinyl Coated. Nicks, gouges, and other minor imperfections of plaster surfaces should be filled, sanded smooth, and sealed prior to wallcovering application. Paper-based wall coverings are not allowed.

Fabric Wallcovering: Allowed only in areas where there is minimal contact with the general public. Fabric and backing panels must meet Class I flame spread requirements as a complete system.

Paint: Latex paint, minimum two coat application with semi-gloss, textured or smooth troweled finish. Oil-based and other paints with hazardous fumes or offensive odors while setting, are not allowed in public areas.

Stone, Ceramic and Porcelain Tile Wall Surfaces

Stone and ceramic tile wall surfaces must be installed to be highly impact resistant. Stone veneer wall panels must be a minimum of 5/8 inches thick. Installation shall be as recommended by the industry associations listed in Section 2.2.2 C. A above. Ceramic wall tile shall be set on gypsum plaster in metal lath, concrete/cementitious board, rather than gypsum wallboard. Epoxy-based grout product are preferred.

Millwork and Automated Service Devices

All new millwork should be constructed to American Woodworking Institute (AWI) Quality Standard Premium Grade Specifications. Radiused corner details or metal edge protection are required for exposed veneer edges.

Ticketing and Curbside

In the main Ticketing Lobbies and Curbside, all counters are strictly controlled as to profile, finish, signage, and color. All new Ticketing and Curbside counters must match the approved MNAA Standard counters. Modifications to the public side of existing kiosks or counters in public areas is not permitted. Curbside counters must be constructed with appropriate exterior garage materials. A protective cover may be required when curbside counters are not in use. Airline specific Ticket and Curbside counters will not be considered. For additional information coordinate with MNAA.

Gates

In the Holdrooms, Gate millwork such as a Gate Counters, Backwalls and Electronic Gate Reader (EGR) podiums are strictly controlled as to profile, finish, signage and color. All new construction must match the adjacent counter profiles and finish. MNAA standard Gate Counters, Backwalls, and EGRS podiums are to be used at all common-use gates. Additional information from MNAA upon request. Airline specific gate millwork will be considered from MNAA approval. Doors in Backwalls at Gate Counter locations must be of identical finish material and color as the adjacent Backwall and should be detailed to be as inconspicuous as possible.

Baggage Claim Areas

In the Baggage Service Offices (BSO), Airline specific counters and kiosks will be considered.

Miscellaneous

Miscellaneous millwork items such as lecterns, displays, television consoles, and storage cabinets visible from public areas must match other Sponsor millwork counters in style, finish and quality. Exposed plywood or particle board is not allowed at any time.

Automated Service Devices

Automated service devices (ASD) include self-service bag-drop, automated ticket dispensing machines, automobile rental ticket or key dispensers, ATM's, etc. The location of ASD’s in queuing areas is subject to MNAA review and approval. The location of the Tenant's ASD must not obstruct visibility to or from an adjacent Sponsor. No graphics or signage is allowed on any surface of the ASD other than the front/user side. The front/user side of the ASD may include graphics or signage indicating the Sponsor and may include the official logo in official colors. Instructions should be kept to a minimum and as simple as possible. ASD's must be silent except for audible instructions provided for accessibility requirements. ASD's must be serviceable from the agent or back side of the unit. All cables for power, communications, etc., must be concealed. Protective conduit must also be concealed. Graphic displays must be of an instructional nature necessary for proper operation of the ASD. Advertising using the video display screen of an ASD is not permitted. ASD's must not dispense large amounts of paper product which will require installation of waste receptacles adjacent. Linerless bag tag printers are recommended. The Sponsor will be held responsible for housekeeping in the area of the counter and ASD. ASD's out of service for longer than eight (8) hours must be removed or replaced.

MNAA standard common use self-service ticketing kiosks are to be used at common-use ticketing areas. This MNAA standards kiosk may also be installed at non-common use ticketing areas. Specifications are available upon request.

See Section 2.3.3 for Airline ticketing signage requirements. See Section 2.3.4 for Auto Rental Agency backwall and signage requirements.

Public Seating and Furniture

In certain waiting areas, the Sponsor may provide public seating. Seating should be consistent with other seating for similar functions and must be approved by MNAA. Seating should have vinyl, or other impervious type upholstery, and will conform to BIFMA Voluntary Upholstered Furniture Flammability Standard F-1-1978 and California Code for fire resistance and construction. Minimum aisle widths and clearances for exiting as specified by the Codes will be maintained. Review and approval of seating types and layout by MNAA is required

In the holdrooms, MNAA recommends MNAA standard seating. Alternate seating types may be considered for MNAA approval. In order to maintain a level of consistency throughout the airport. All holdroom seating must utilize MNAA standard upholstery. Specifications are available upon request.

Accessories/Equipment in Public Areas

- Sponsors will be allowed to provide various accessory items such as trash receptacles but must be consistent with similar accessories with similar functions in the facility and approved by MNAA.
- Storage cases such as cardboard boxes are not authorized in public lobbies or concourses. Garment boxes and the like for use by Sponsor's customers or personnel must be stored out of public view at all times.
- Sponsor equipment such as wheel chairs must be stored out of public view.
- Vending machines where permitted must comply with terms and conditions of the concession agreement and with MNAA design criteria for such installation.
- Rope stanchions or tensile barriers may be used for queuing purposes at airline ticket counters or check-in, podiums only (subject to MNAA approval). Rope stanchions must conform to the following design criteria:

Finish:	Black
Belt Length:	7 feet retractable
Belt Color:	Black
Stanchion Height:	40 inches
Stanchion Base:	14 inches diameter

Frames for stanchion mounted signs will be 11" high by 14" long.

- Tenant’s logos and text are not allowed on the belt or stanchion.
- Artificial plants are not allowed in the public areas.

Window Treatments Public Areas

No window coverings are allowed on windows in public areas. No films may be applied to the glass. No signs or advertising may be applied to the windows or be displayed against them.

D. Tenant Finishes- Non-Public Areas

Tenant finishes not exposed to public view will be at the Sponsor's option subject to MNAA review and approval, and must conform to all applicable building codes and standards, with the following additional conditions:

Window Coverings

MNAA will specify the approved window covering for exterior windows. No other screens or films may be applied to the glass. No signs or advertising may be displayed from the windows.

Diffusers

Supply and return air grilles will be adjustable-pattern, perforated face, aluminum with white factory finish. Frames of supply diffusers must be mitered and welded, fitted with controllers of adjustable pattern. Provide return air devices where sufficient return air cannot be drawn through return air type light fixtures.

Doors and Frames

Doors in demising partitions will be 1-3/4" hollow metal doors with silencers, and with the appropriate UL label for partition type. Only wood doors with applicable fire rating are acceptable. Doors with specific security requirements will be considered for MNAA approval. Doors and frames must be similar size, material and color to the doors in the immediate vicinity and approved by MNAA. Only fully welded metal frames are allowed unless previously approved by MNAA.

Partitions

Interior Tenant partitions when not a fire-rated or demising partition, or a plumbing chase, may terminate at the suspended ceiling. Provide appropriate termination as required with proper endcap. Do not physically attach to the end of the partition to the window mullion.

Wall partitions terminating at a window wall must terminate at a window mullion and not on the glass. Wiring and conduit for all equipment must be concealed in partitions. Provide proper wall termination with endcap. Do not physically attach the end of the partition to the window mullion.

Gypsum wall board systems shall be installed in accordance with recommendations of ASTM C754: Installation of Steel Framing Members to Receive Screw Attached Gypsum Wall Board Backing Board or Water-Resistant Backing Board, and GA-216: Recommended Specifications for the Application and Finishing of Gypsum Board.

Sponsors may not cut into existing plumbing chases and shafts. Before demolishing any existing partitions, the Sponsor must consult MNAA for availability of drawings and records of existing conditions.

Hardware

The Tenant's contractor will install locks as directed by MNAA. The Sponsor shall obtain from and pay MNAA for construction and permanent cores. MNAA will install the permanent cores and determine the keying plan.

Any electronically switched security lock system must be coordinated with the Airport security system.

Hardware should be code compliant. Hardware must meet ANSI A156.1 through A156.8 Standards for Various Hardware Items. Doors with access to the concourse are required to be keyed. Single and double acting doors should be self-closing.

Toilet Hardware and Accessories

Generally, MNAA provides and maintains the public restrooms within the Terminal and each concourse. Should the Sponsor construct a new private restroom facility or substantially remodel existing ones, the Sponsor must provide hardware and fixture types that match the Airport's quality. Low-flow fixtures and efficient hardware are recommended to reduce and conserve water. Provide supply water line shut off valves at all fixture locations available for immediate use. All flexible lines to be pre-made stainless steel braided lines. Field-cut plastic lines will not be acceptable.

Ceilings

In Tenant non-public areas enclosed from public view, Sponsors shall provide a 2' x 2' or 2' x 4' lay-in ceiling with a painted standard width T-bar system. The ceiling tile shall be an acoustically efficient, non-combustible mineral wool tile with an NRC of 75, a STC Range of 30-34 (continuous ceiling), and flame spread classification 0-25 (ASTM E84). All plenum areas above the ceiling must be completely accessible. No Sponsor equipment or conduit may be hung from the ceiling unless otherwise noted

In order to comply with building code requirements for certain occupancies, non-standard ceiling types may be required. In such instances, it is the responsibility of the Sponsor to provide and install the appropriate material and systems with prior MNAA approval.

2.2.3 BUILDING AND UTILITIES SYSTEMS

A. Structure

Structural modifications will be at the Sponsor's option subject to MNAA review and approval, and must conform to all applicable building codes and standards, with the following additional conditions:

Floor Loading

The Sponsor must provide for MNAA review any requirements for special floor loading (such as areas of dense filing, heavy equipment, libraries, etc.). The structural capacity of the affected area must be verified by Sponsor's structural engineer and coordinated with MNAA during the review process.

Floor/Wall Penetrations

Penetrations in any floor or structural wall must be kept to the minimum and require prior approval by and coordination with MNAA. Floor and wall penetrations must be located to eliminate the possibility of compromising the structural integrity of the floor or wall. The Sponsor may be required to x-ray the slab before making floor penetrations. All floor or wall openings must be properly fire-rated and sealed.

Roof Penetrations

Tenant roof penetrations are not permitted without MNAA approval. Sponsors are required to use an MNAA approved roofing contractor for all roof penetrations to not void any roof warranties.

Slab Elevations

Slight variations in existing slab elevations in the Tenant's leased premises should be verified by field measurements prior to construction. In no case, may the Sponsor make elevation corrections by chipping or grinding the existing slab.

Attachments to Structure

All elements of the Sponsor's proposed improvements which are to be suspended from the structure above the Tenant's leased premises must be detailed, including method(s) of attachment and load calculations, in the Sponsor's submittal for approval. If spray-applied fire-resistant material is removed from the structure during installation, then the Sponsor is responsible for cleaning the debris and for reapplying new fire-resistant material on the exposed structure.

B. Mechanical Systems

All new systems and modifications to existing systems for heating, ventilation, air conditioning (HVAC), and plumbing systems shall be designed in accordance with applicable codes and manufacturer guide lines. Appropriate vibration isolation must be provided for all components of the system.

Central Chilled and Heated Water System

Chilled and heated water for space conditioning will be provided from the Central Utility Plant. Existing Central Utility Plant capacity is limited. Sponsors who desire connection to the central system utilities must demonstrate, through calculations to be reviewed and approved by MNAA, that this demand is within the capacity of the system and consistent with other planned operations. If connection is to be made to the existing central systems, low measuring devices shall be installed by the Sponsor for computing utility charges. Cost of connection shall be borne by the Sponsor.

New Chilled and Heating Water Systems

When building modifications and/or additions exceed this stated capacity, new chilled and heating water equipment and distribution systems shall be provided and installed by the Sponsor as located and approved by MNAA. Footprint area for condensing/compression units around the terminals is severely restricted. Direct expansion refrigeration for air conditioning systems that reject heat into the building interior space (including concealed, above ceiling spaces) shall not be permitted. Systems that reject heat of compression into the chilled water system are expressly prohibited. Direct expansion systems are limited to those systems that are AHRI rated.

Control Systems

Fresh air and exhaust air systems shall be provided by the Sponsor. Temperature control systems shall be terminal-wide electronic energy management systems. Provide auxiliary starter contacts for equipment on/off status reporting. Pneumatic control systems shall be configured for EMS overlay. Compressed air for pneumatic control is limited to existing quantities in use in the space.

C. Fire Safety

Fire Separation

The Sponsor shall provide code-appropriate rated fire rated partitions, with appropriate fire rated opening protection between Sponsor spaces, where applicable. The Sponsor shall be responsible for maintaining fire rated partitions, walls, roofs and ceilings along Tenant lease lines.

Means of Egress

The occupant load for Tenant spaces and the required number and location of exits shall be determined by applicable current building codes and must be properly posted.

Fire Alarms

All fire alarm equipment shall be programmed into the fire alarm system by a certified technician. All fire alarm system modifications shall comply with NFPA 72 and local codes. Sponsor must coordinate with MNAA electrical shop prior to relocating any fire alarm system components. All modifications are to be approved by MNAA.

Fire Suppression

An automatic sprinkler system exists within each Tenant space in the Terminal Buildings. The Sponsor is responsible for modifying or revising this sprinkler system to comply with applicable codes and requirements of authorities having jurisdiction. This may include reconfiguring any existing systems, adding and changing sprinkler heads and relocating or changing the height of sprinkler heads to comply with the new layout of the space. All changes to the system will be at the Sponsor's sole cost and expense. Taps into the existing building sprinkler system must be coordinated with MNAA. FM Global (MNAA's Insurance provider) will review fire protection shop drawings.

D. Acoustics

Tenants are required to minimize the transmission of sound from their lease space to the concourse and adjacent Sponsors.

The Sponsor must provide the following as a minimum:

1. Noise Criteria (NC) Values from the Heating, Ventilation, and Air Conditioning (HVAC) systems as generally accepted practice by the American Society of the Heating, Refrigeration and Air Conditioning Engineers (ASHRAE). NC Level outside the Sponsor space as a result of the HVAC system should be limited to NC 40 in any adjacent occupied space or lease space.
2. HVAC systems and equipment will be installed with vibration isolators as accepted practice by ASHRAE.
3. The minimum Sound Transmission Class (STC) value between Sponsor spaces for non-critical noise intrusion is STC 47.
4. Space planning for adjacent Sponsors will need to be considered and the Sponsor's should inquire as to adjacencies.
5. Impact Isolation Criteria (IIC) will be a minimum of 50 for all hard-surfaced floor areas above occupied spaces.
6. All waterproofing underlayment material must also be rated to increase the IIC class of the floor assembly.

The noise from any lease space to the exterior shall not exceed 6 dBA above the ambient level. The ambient level is scheduled to be 50 dBA; therefore, the maximum level for the lease space will not exceed 56 dBA.

E. Electrical Systems

Distribution

Electrical service to the Sponsor's leased premises is available from MNAA's building power distribution system. Distribution panelboards are located in electrical rooms at various locations. It is the Sponsor's responsibility to verify service capacity and availability as per applicable NEC requirements. The Sponsor shall bear all costs to obtain electrical service for its leased premises. If the Sponsor's electrical service requirements exceed the capacity of the existing distribution system, the Sponsor shall be responsible for securing a dedicated outside circuit for their uses from Nashville Electric Service. All wiring is to be copper. Aluminum wiring is not allowed. Provide panel surge protection devices. If the tenant intends to add load to an existing electrical panel, then it is the responsibility of the tenant to provide MNAA with a Load study of the panel to verify capacity and loading capacity.

Service Feeders

Service feeders between MNAA's switchgear and the Sponsor's distribution equipment shall be installed at the Sponsor's expense. Kilowatt-hour meters, where required, shall be provided by the Sponsor and maintained by MNAA Maintenance. Panel boards are to be the same brand and type as others in the immediate vicinity of the installation serving a similar function.

Telephone Rooms

Telephone rooms and closets are located at various locations. Distribution of telephone service from the telephone room or closet to and within the Sponsor's leased premises will be the Sponsor's responsibility, subject to MNAA approval. Cables from the telephone room or closet to the Sponsor's leased premises shall be run in minimum ¾" conduit or cable tray. All cables not run in conduit shall be laid in trays and shall be UL listed for use in environmental air plenums where applicable.

Conduit and Cable Tray

A cable tray or conduit distribution system for communication and data cables is required. All Sponsors shall be required to use this system. No exposed wires are allowed. All conduit shall be a minimum of ¾" diameter. All cables shall be marked every 50 feet or less with the owner's name, vendor, type of system served, and a phone number to be called for additional information. If the Sponsor requires additional tray or an extension of the existing system, it will be the Sponsor's responsibility to acquire, and install a tray or conduit system compatible with the existing system. Installation may not proceed prior to MNAA review and approval. All open conduits ends are to have plastic bushings.

Cable and conduit removed from service must be removed from the plenum promptly. Under no circumstances may conduit or cables be draped over the suspended ceiling. When the Sponsor commences improvements to an existing lease area, the Sponsor shall examine the plenum areas and identify and remove any unused conduit and cable. All open conduit ends are to have plastic bushings for edge protection.

Emergency Power

Emergency power panelboards are located in electrical closets at various locations.

Public Address System

Modifications to or extension of the public-address system must be requested at the time of initial submittal of the Airport Improvement Proposal. No modifications to the PA system by the Sponsor will be allowed. Any required modifications will be paid for by the Sponsor.

Tenant Lease Area Lighting

The type of light fixtures for typical Tenant office space is strictly controlled by MNAA. In general, lighting designs must match lighting in the immediate area for a similar function.

An average maximum of two watts per square foot of lease area in most typical office situations. The guidelines allow for approximately one lay-in LED fixture per eighty (80-100 range) square feet of space. All fixtures shall be listed. The following are the approved light fixture standards.

a. *2’ x 2’ and 2' x 4' LED Fixture:*

Fixtures shall be recessed 3" deep minimum LED lamps located at one end of the housing accessible from below. The louver shall be of static-free anodized aluminum, with mitered corners and rigid louver structure. Louver assembly shall be hinged and latched from either side. Fixture should have a coefficient of utilization (CU) of .80 at a room cavity ratio (RCR) of 1 for a reflectance of 80-50-20. The fixture shall have air return capabilities. Each fixture must be secured to the structure above at all four corners.

b. *Recessed Downlight Fixture:*

Recessed downlights should be LED and similar to those in the immediate vicinity of the installation and be submitted to MNAA for approval. Other specialized light fixtures for specific functional or aesthetic requirements must be submitted to MNAA for approval with a written explanation of the need for such lights. Sponsor functions (such as warming lights for cafeteria serveries) will be considered on a case-by-case basis subject to the Sponsor meeting the watts per square foot criteria of the specific application.

Exterior Area Lighting

When Airport improvements include provisions for new apron lighting, the basic criteria for apron lighting design shall be as follows:

1. Lighting shall not interfere with the night vision of control tower personnel and pilots, according to accepted industry standards.
2. Uniformity of luminance pattern on apron pavement and aircraft shall be as high as technically and economically feasible.
3. Direct and reflected glare shall be minimized.
4. Luminaires shall be LED.
5. Daytime appearance of the lighting system elements (towers and luminaires) shall be aesthetically compatible with existing Airport elements.
6. Ease of use and low maintenance costs shall be maximized in all lighting systems.
7. The lighting system shall facilitate ground traffic flow and provide for maximum use of peripheral vision.
8. The lighting system shall facilitate all aircraft servicing and minor maintenance functions.
9. The lighting system shall create a visual environment which is attractive to the public within the Terminals.
10. The specified luminaires shall have no refractors as part of their optical system. This will further minimize direct glare and provide positive cut-offs for control tower personnel, pilots, and operators of apron vehicles.
11. The light sources must be of minimum feasible size to facilitate maximum beam control.
12. Good color rendition characteristics of the light source are very important.
13. The governing safety factor shall be the ability of the lighting system to facilitate perception of obstacles in the path of an aircraft or an apron vehicle.
14. Light levels shall be as recommended by the IES Handbook.
15. All cables and equipment installed by the Sponsor become property of MNAA in accordance with the terms and conditions of the Tenants lease agreement/contract.

Egress / Emergency Lighting

Emergency power panelboards are located in electrical closets at various locations. Emergency Lighting should meet current codes' requirements.

Access Control System

Product selection, installation and programming shall be coordinated with MNAA. No Sponsor should put in access control systems that tie into the Airport system. If the Sponsor's access control system comes in contact with the secure airside it must be secure and approved by MNAA. All additions are to be approved by MNAA.

Holdroom Electrical Outlet Supply Requirements

For passenger use and convenience, Airline Tenants are permitted to provide power at holdroom seating. Power modules may be integral to the seating unit design. Retrofit power modules will also be considered. Requirements vary based on proposed power module and existing conditions. Sponsors are to confirm requirements for 3D scanning and electrical load capacity for floor or wall outlets with regards to proposed module with MNAA. All proposed power modules, specification, drawings and details must be submitted to MNAA for review and approval.

Power at holdroom seating must meet all Metropolitan Government of Nashville, Davidson County and Americans with Disabilities Act (ADA) requirements.

Telecommunications Systems

Telecommunication service is provided by AT&T or Comcast. Outside line service shall be contracted directly by the Sponsor. Telecommunication service within the Tenant's premises shall be the responsibility of the Sponsor. No radio-frequency cell-to-cell transmission is allowed without prior MNAA approval.

Wi-Fi / Wireless Communications

The Sponsor should coordinate with Boingo for the cabling and instruments required in the Terminal Buildings. Separate communications closets are available for shared Tenant use. The Wi-Fi signal must only be accessible to Sponsor for operational needs and shall not transmit out beyond Tenant's leasehold space. MNAA's wireless communications company contact is available upon request.

F. Submetering

Domestic water, gas and electrical will be metered and appropriate charges assessed to the Sponsor. The Sponsor shall provide their own meters as approved by MNAA.

2.2.4 RESPONSIBILITY SUMMARY

	MNAA RESPONSIBILITY	TENANT IMPROVEMENTS
DEMISING WALLS	MNAA shall be responsible for providing any new demising walls.	The exterior or public side of partitions fronting onto public spaces will be constructed to match the surrounding décor as to color, finish and quality levels. Demising wall will have appropriate and maintained fire rating as required by codes.
CEILINGS	In the non-public areas of Sponsor leased premises, no ceiling will be provided by MNAA.	By Sponsor in accordance with approved design criteria.
ACOUSTICAL SOUND TRANSMISSION PROTECTION		By Sponsor in accordance with approved design criteria.
FLOORS (TENANT INTERIOR)	Floor construction of unsealed concrete will be provided by MNAA. MNAA reserves the right to specify the type of finished flooring to be installed at the Sponsor's expense in certain areas.	It is the responsibility of the Sponsor to provide appropriate floor material based on the performance criteria in these guidelines.
FLOORS (PUBLIC UNWALLED AREAS)	Transitions between Sponsor floor materials and MNAA controlled finish floor materials will be the responsibility of the Sponsor. Transitions between finish floor elevations cannot vary by more than 1/8" vertically.	It is generally the Sponsor's responsibility to provide finishes in these areas, based upon specific lease agreements and these guidelines.
ELECTRICAL	MNAA to provide utility stub.	Service feeders, meters, panel boards, tray or conduit systems, lighting, and appliances to be based on the criteria in these guidelines.
EXHAUST DUCTS (IF APPLICABLE)		Fresh air and exhaust air systems shall be provided by the Sponsor in accordance with these guidelines. Sponsor must coordinate all penetration work and roofing modifications w/ MNAA and use MNAA roofing contractor to perform work to maintain warranties.
HVAC	MNAA to provide utility stub.	All new systems and modifications to existing systems for HVAC and plumbing systems shall be designed in accordance with applicable codes and manufacturer guidelines. Appropriate vibration isolation must be provided for all components of the system.
CHILLED AND HEATING WATER	Chilled and heated water for space conditioning will be provided from the Central Utility Plant.	Existing Central Utility Plant capacity is limited. Sponsors who desire connection to the central system utilities must demonstrate, through calculations to be reviewed and approved by MNAA, that this demand is within the capacity of the system and consistent with other planned operations. If connection is to be made to the existing central systems, low measuring devices shall be installed by the Sponsors for computing utility charges. Cost of connection shall be borne by the Sponsors.
DOMESTIC WATER	Domestic cold water (no guaranteed pressure) shall be available. Domestic hot water (no guaranteed pressure) at 100 degrees F minimum temperature shall be available.	Flow measuring devices shall be installed by the Sponsors for computing utility charges. Cost of connection shall be borne by the Sponsors. All necessary fixtures and water heating above 100 degrees F shall be provided by the Sponsor.
SANITARY WASTE WATER	MNAA to provide utility stub.	Sanitary waste primary piping shall be installed and routed as directed by MNAA.
PLUMBING VENTS		Fresh air and exhaust air systems shall be provided by the Sponsors.
GREASE		Grease interceptors shall be installed outside the building envelope unless approved inside by MNAA. In all cases Sponsors must indicate to MNAA how the interceptor will be serviced.
NATURAL GAS	MNAA to provide utility stub.	Gas will be metered. Sponsors are responsible for providing their own meters as approved by MNAA.
FIRE PROTECTION SYSTEM		Automatic fire sprinkler systems, where required by code, shall be provided by the Sponsor. Connections to existing fire water mains shall be as approved by MNAA. Cost of connection shall be borne by the Sponsor. Special extinguishing systems for food preparation areas shall be provided by the Sponsor.
FIRE ALARM AND DETECTION/ VOICE COMMUNICATION SYSTEM		All fire alarm equipment must be programmed into the fire alarm system by a certified technician. Sponsor must coordinate with MNAA electrical shop prior to relocating any fire alarm system components. All modifications are to be approved by MNAA.
FIRE PROOFING		The Sponsor shall provide one-hour, fire rated partitions, with appropriate fire rated opening protection between Sponsor spaces. The Sponsor shall be responsible for maintaining fire rated partitions, walls, roofs, ceilings and primary building structure along Tenant lease lines. Modifications to and application of fire resistant material to be in-field reviewed by a qualified 3rd-party reviewing agency – not GC, not Owner.
ITS/COMMUNICATIONS		Telecommunication service within the Sponsor's premises shall be the responsibility of the Sponsor. No radio-frequency cell-to-cell transmission is allowed without prior MNAA approval.

2.3 SIGNAGE AND GRAPHIC DESIGN

2.3.1 PURPOSE AND SCOPE

A. Scope

This signage and graphic design standard incorporate the latest revisions of the Operating Instructions to provide Tenants with the criteria and standards for signage.

B. Applicability

All Sponsors who desire to erect signage of any description on property leased from MNAA will be bound by this signage and graphic design standard.

C. Procedure

All requests for permanent signage will be submitted to MNAA as an Airport improvement project (Appendix 6.1.3). Sketches and graphic designs must accompany each request. The prescribed text must be accurately represented, to scale, on elevation drawings of the surface on which the proposed signage is to be installed. Exterior elevations must show the entire face of the building. All power requirements and installation details must be included.

Requests for promotional signs and displays will be submitted to MNAA using the attached form. This form must be submitted at least ten (10) days prior to the requested date for the display.

2.3.2 GENERAL RULES

1. Except for locations where company name or logo may be displayed, all text must match Swis721 BT Medium in a size proportional for the location.
2. All Sponsor (including sub-Sponsor) signs must be of an informative nature. "For Sale," "For Lease," or "For Rent" signs are not permitted.
3. Signs are not permitted on the rooftops of any buildings.
4. All signs shall be surface mounted or recessed to a flush condition using stainless steel attachments. provide grommets in masonry walls. Signs painted on any surface of a building are not permitted.
5. Signs are not permitted on building end walls where the end walls parallel a street or road.
6. Flashing or blinking signs are not permitted.
7. Portable signs are not permitted.
8. Signs on doors and windows are not authorized except as permitted by this policy.
9. Exposed mounting devices, crossovers, conduit or raceways are not permitted.
10. All signs must meet safety standards. All illuminated signs must bear the Underwriters Laboratories, Inc. label, and meet all local code requirements. The Sponsor is responsible for obtaining any permits required by the Local, State or Federal Agencies and the American with Disabilities Act (ADA).
11. Signs of a promotional nature are not permitted except as permitted by this policy.
12. Handwritten signs are prohibited.
13. Signs not covered in this policy are not permitted.

2.3.3 TREATMENT OF AIRLINE TICKETING & CHECK-IN COUNTERS & BACKWALLS

1. MNAA will provide and install required Federal Regulation notifications in accordance with 49 CFR 175.25 at ticket counters, at gate check-in counters, and curbside counters. No other signage or graphics will be attached or installed on the counters.
2. Promotional signs, literature, and advertising materials are prohibited from being located or displayed on the counters or backwalls.
3. Ticket counter informational signage, if installed, must be flat black finish. No names or logos may be installed or attached to the counter informational signage.
4. Sponsor identification provided by MNAA in the bulkhead above the ticket counters is limited to digital display monitors. The frequency and distance between digital displays is governed by the ticket counter length and number of ticket positions. All digital graphics and content are subject to MNAA review and approval. The word "airlines" will be excluded from graphics unless the word "airlines" is an integral part of the corporate name.
5. Counter Backwall design and graphics must be submitted for approval as detailed in this section. No other items may be installed on the Backwall. Common-use counters are required to use dynamic signage. Airline specific counters may use static or dynamic signage within the dedicated branding zone. Sponsors are to coordinate with MNAA for acceptable dynamic signage specifications and display sizes. Static signage must be acrylic or similar material panels attached with signage stand-offs. The frequency and distance between these signs are governed by ticket counter length but shall abut the adjacent Sponsor’s signage so that a continuous signage band behind ticket counters is maintained. Height of both static and dynamic signage shall align and be equal for continuous signage band appearance. No graphics are permitted on end walls, inside or outside the branding zone including MNAA provided wall finishes.
6. Signage in the queuing area shall include the 49 CFR 175 stanchion mounted sign regarding security.
7. Queuing signage must be submitted for approval as detailed in Section 2.3.7. Airlines with less than 60 linear feet of ticket counter may have one large (22” wide x 28” tall, maximum) double-sided stanchion sign and two small (7” wide x 11” tall, maximum) double-sided stanchion signs. Airlines with more than 60 linear feet of ticket counter may have two large (22” wide x 28” tall, maximum) double sided stanchion sign and three small (7” wide x 11” tall, maximum) double sided stanchion signs. The stanchion sign frame shall be black.
8. Gate area backscreen design and graphics must be submitted for review and approval. For airline specific Backwalls, Airlines may display their name and logo. The name and logo may not be internally illuminated. The name and logo should have raised letters. The airlines may also LCD or LED to display their flight information on the gate area backscreen. For MNAA Standard Backwalls, signage is limited to the digital display monitor. All graphics and digital content are subject to MNAA review and approval.

2.3.4 TREATMENT OF COUNTERS & BACK WALLS OTHER THAN AIRLINE TICKETING AND CHECK-IN COUNTERS

1. No signage or graphics of any kind, temporary or permanent, may be installed on the counters.

2. Digital Monitors or Dynamic Signage may be considered.
3. Promotional signs, literature and advertising materials are prohibited from being located or displayed on the counters, backwalls, or at automobile rental agency counters.
4. Counter backwall design and graphics must be submitted for approval as detailed in Section 2.3.3. The corporate name or logo may be internally illuminated. No graphics are permitted on end walls, inside or outside the counter area.
5. One (1) reservation telephone instrument may be installed at the counter. Any printed instructions for the use of the instrument must be in compliance with MNAA signage requirements and criteria. All connections, cables, wires, mounting devices, etc. must be concealed.

2.3.5 MNAA: SIGNAGE IN THE BAGGAGE CLAIM AREAS

1. Baggage claim offices signage is to meet the standards for Airline check-in counters and backwalls. See Section 2.3.3.
2. No signs may be installed on the columns in the baggage claim areas.
3. Pedestal signs are not permitted in the baggage claim areas.

2.3.6 CURBSIDE TREATMENT BY AIRPLANE TENANTS

1. Airline identification may not be installed on the front or side of the curbside check-in counter. Coordinate with MNAA for requirements including use of static or dynamic signage.
2. Tenant signs on Terminal exterior walls are prohibited.

2.3.7 PROMOTIONAL SIGNS

1. Promotional signs are defined as any sign, banner, flag, or display of any size, configuration, color or method of attachment or installation within the Tenant's leasehold, which is intended to promote a specific product or service for a limited period of time.
2. Promotional signs requiring electrical power must be submitted to MNAA for review and approval 10 days prior to installation. Substitution or replacement in kind of existing previously approved signs requiring electrical power must be approved by MNAA prior to installation.
3. All promotional signs intended for display for 30 calendar days or less, must be approved by MNAA prior to installation. The approval will be for a specified length of time. The promotional sign must be removed at the end of the period of approved display, all installation devices and fasteners removed, and the surface(s) on which installation occurred restored to their condition prior to the installation. At the discretion of MNAA, up to two (2) extensions may be granted up to a maximum display period of ninety (90) calendar days.
4. Promotional signage must be maintained in good condition for the duration of display. Any such signage which is not maintained in good condition by the Tenant will be removed by MNAA without prior notice to the Tenant.

5. Promotional signs must not be at variance with provisions of MNAA advertising concession agreements or of any other provisions of this Airport Improvement Request Manual.

2.3.8 MISCELLANEOUS SIGNS

1. Signage on personnel doors within the Terminals must be approved by the MNAA. Personnel doors may be marked as to the function (i.e., "Lost and Found"). These signs shall be installed on the door front and have a dark gray background with white lettering. Company name/logo may be displayed directly below the function sign. The name and logo must fit within a rectangular area of 5 inches tall x 6 inches wide.
2. Airlines may display corporate name and logo on the outside walls of passenger loading bridges with MNAA approval.
3. Signatory Airlines may display their corporate signage inside leased passenger loading bridges. The signage must be in a black or silver frame, no larger than 24” x 36”. The signage can be on no more than every other panel, and mounting must not harm the integrity of the passenger loading bridge. The design, installation method, and location of the signs must be approved by MNAA prior to installation.
4. Pedestal signs inside terminal areas must match the queuing stanchions at ticket counters as detailed in the Accessories and Equipment in Public Areas section (Section 2.2.2). Pedestal signs may be used at security check points. Handwritten signs are prohibited.
5. All signs on buildings facing the airfield will meet MNAA architectural design standards and be approved through MNAA improvement review procedure.
6. Images displayed on electronic signage visible to the public are for information, promotion and marketing of the concept/product/company of the location in which they are located. The graphic and text should be relative to that concept. No outside or non-concept advertisements will be permitted. Images should be displayed for a length of time sufficient to reasonably disseminate information to the viewer and not have image changes that cause distractions.

2.3.9 SIGNAGE IN THE CARGO AREA

Buildings in cargo areas occupied by one Tenant may have one sign on the building front identifying that Tenant. This sign must conform to the architectural scheme of the Airport and be approved in writing by MNAA Business Development Department. If Tenant subleases portions of the building, the provisions of this section apply to the sublease(s).

Signs displaying company name or logo may be installed over cargo doors. Lettering and coloring may be in accordance with the design distinguishable to the company. Sign size shall be appropriate for the sign’s function and shall be approved by MNAA.

All signs over cargo doors on the same side of a building must be at the same elevation determined by the highest cargo door opening. Sign size shall be appropriate for the sign’s function and shall be approved by MNAA.

Signs identifying the Tenant at personnel doors shall meet the MNAA standards. No signs, except office hours and address numbers, may be displayed on personnel doors. No signs may be displayed on windows. Office hours must match the color of the address numbers.
Regulatory signs (i.e., "No Parking" and "Tow Away") must comply with state and local standards including international symbol.

2.3.10 EXTERIOR SIGNAGE-NON-TERMINAL BUILDING

Exterior signs on all other non-Terminal facilities must comply with the provisions of this section and be in compliance with all local, state and federal requirements.

Major building/Tenant identification signage may be installed in a maximum of two (2) locations for facilities with airfield frontage, or one location for facilities without airfield frontage.

Sign message content is limited to primary building Tenant name and/or logo only. No cartoons or supplementary graphics are permitted. Signage shall meet all ADAAG requirements for size, placement, braille, etc, where applicable. Sign may be individual letters and/or logo installed on wall surface or may be a unit sign installed on the wall surface subject to total sign area restrictions indicated below. Signage shall meet the Americans with Disability Act (ADA) requirements when applicable.

Signs may be internally illuminated provided such illumination does not constitute a hazard to personnel, motorists or aircraft operations.

The maximum size of sign faces including all lettering will be reviewed based upon criteria of appropriateness, required visibility distance, conformance to established rules for certain Tenant occupancies and coordination with the building architecture and function. In no case may the sign length exceed 25% of the entire building face length, or 15% of the building face height.

Signs on personnel doors must comply with the requirements of Section 2.3.8. Regulatory signs must comply with the requirements of Section 2.3.9.

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SECTION 3 - CONRAC

3.0 INTRODUCTION

3.0.1 TENANT IMPROVEMENTS

The Tenant shall be solely responsible for the funding, design, construction and commissioning of its Tenant Improvements. The Sponsor shall design its Tenant Improvements to merge with the Base Building design. The Tenant is responsible for clarifying all questions regarding the Base Building design during the design process for its Tenant Improvements. Each Sponsor shall clarify all assumptions with respect to Base Building scope during the design for its Exclusive Use Premises.

The Sponsor's Improvements generally will include its improvements to the portion of the Ready/Return Area and QTA Space included within its Exclusive Use Premises and the furniture, fixtures and equipment required by such Tenant in its Exclusive Use Premises.

A. Ready/Return Area

Base Building Scope

The Base Building construction in the Ready/Return Area includes the operational floor plate structure, vertical circulation cores, wayfinding signage, lighting, common use area striping and roughed-in utilities.

Tenant Scope

The Tenant's operational floor plate (vehicle rental, return, parking and staging areas) within its Exclusive Use Premises is set forth in its Lease Agreement. The Tenant shall secure its parking allocations and control its public entry/exit by exit booths and access control devices such as "tiger teeth" and gate arms. The Tenant with a larger market share may utilize multiple exit points and exit booths.

The Tenant shall be responsible for the costs of labor, material and equipment required for enhancements that may include, without limitation, signage elements associated with preferred customer convenience (booths, signs, etc.) and other items dedicated to customer convenience and satisfaction. Other basic requirements within the portion of the Ready/Return Area included within the Tenant's Exclusive Use Premises include:

1. Passive and active vehicular control systems (e.g., "tiger teeth" devices and gate arms) shall be surface mounted.
2. The Tenant shall supply its unique parking space designation signs, electrical wiring and communication cabling for all equipment, paint striping, wheel stops and other miscellaneous temporary and permanent traffic circulation signage.

The Sponsor shall provide customer service and exit booths and pavement markings required for vehicular circulation.

The location of customer service and exit booths shall be restricted to areas of the Ready/Return Area operational floor plates that are structurally reinforced to accommodate the increased floor loads as part of the Base Building. See Exhibit 4 hereto. The Sponsor's customer service and exit booths shall not be constructed or located to obstruct customer visibility or interfere with access to or visibility of booths owned by another Sponsor.

Electrical, communications, HVAC, fire suppression and other utility services to customer service and exit booths shall be provided by the Sponsor.

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B. Barriers

Base Building Scope

The perimeter of the secured vehicle storage areas located on the Ready/Return Area operational floor plates shall be separated from non-secured areas and from the Exclusive Use Premises of neighboring Sponsors with a re-locatable concrete divider system provided by the Base Building.

Tenant Scope

Barriers within the Sponsor's Exclusive Use Premises shall be provided by such Sponsor. Barriers may only be located in structurally reinforced areas as shown on Exhibit 4 hereto and along column lines in the east/west direction.

C. QTA Space

Support Areas

Base Building Scope:

Similar to an office building, the Base Building shall include basic building systems (fire protection, mechanical, electrical, communications, etc.) that are roughed-in as part of the construction of the Base Building. It is anticipated that the portion of the QTA Space included within the Sponsor's Exclusive Use Premises shall include "back-of-the-house" space which such Sponsor may utilize for office space to support other service functions or to provide additional administrative functions. Design standards have been established that address acceptable materials and quality to which the Sponsor shall adhere. See Exhibit 21 and Exhibit 22 hereto.

Common use features of the QTA Space include:

1. Common use multi-purpose room(s).
2. Windshield fluid storage drums.
3. Common-use vacuum system.
4. Common-use compressed air system.
5. Traffic control signage for circulation, and signage required by applicable building codes, located in the Common Use Areas between Exclusive Use Areas.
6. Miscellaneous pavement markings in Common Use Areas.

Tenant Scope

The Sponsor is responsible for the design, cost and construction of improvements in the portion of the QTA Space included within its Exclusive Use Premises, including, without limitation, administration

areas, exclusive-use employee break rooms, interior wall construction, flooring, ceilings, all finishes, specialty millwork, extension of the mechanical/electrical/plumbing systems, extension and modifications to the fire detection and protection systems, data and communications wiring, lighting, signage, furniture and other leasehold improvements.

Car Wash Area

Base Building Scope

Each wash bay will include an automated car washing system with water reclamation and reverse osmosis systems, including flush drains at the perimeter of the car wash area. The infrastructure (physical space and utility allowances) for customary optional pieces of equipment is provided.

Tenant Scope:

The Tenant is responsible for the design, cost and construction of optional pieces of equipment such as air blowers, fast-acting doors, pre-wash system and blasters, and plastic slats at car wash entry and exit openings.

Maintenance

Vehicle maintenance or repair, with the exception of car washing, cleaning and refueling, is prohibited at the CONRAC.

Fueling Area

Base Building Scope

Each fuel dispenser will serve two cars under a lighted structure. In any case, there will be no more than three rows of dispensers and no less than two. A concrete fuel island will separate the traffic lanes. See Exhibit 13 hereto for typical fuel island design. Equipment installed in the fueling areas as a part of the Base Building shall include:

1. Fuel dispensers and fuel monitor control infrastructure.
2. Fuel storage tanks.
3. Drainage for the fueling area, including storm water retention and oil/water separators.
4. Lighted structure.
5. Hose bib at center columns.
6. Overhead vacuum(s) and overhead compressed air.
7. Overhead windshield fluid dispensers.

Tenant Scope:

Tenant may install a fuel monitor control system (card reader or pin pad) for additional inventory tracking of fueling system use.

3.1 DESIGN STANDARDS

3.1.1 FACILITY STANDARDS

A. Tenant Equipment/Accessories

Tenant equipment such as roof racks, baby seats, wheel chairs, etc., shall be stored out of public view at all times.

B. Signage

1. The Base Building will provide all necessary identification, wayfinding and code-required signage within the Common Use Areas. The Tenant is required to provide current corporate identity graphics along with any pertinent usage specifications to MNAA for its use in providing these signs. MNAA will apply Tenant identification as required and appropriate for facility wayfinding.
2. Except for signage where a company name or logo may be displayed, all text must match Helvetica Medium in a size proportional for the signage and location.
3. Sign message content is limited to primary building Tenant name and/or logo only. No cartoons or supplementary graphics are permitted. All Tenant (including sub-Tenant) signs must be of an informative nature. “For Sale,” “For Lease” or “For Rent” signs are not permitted.
4. Signs are not permitted on exterior walls or rooftops.
5. Signs are not permitted on interior walls of the Ready/Return Area.
6. All signs shall be surface mounted or recessed to a flush condition. Signs painted on any surface of the CONRAC are not permitted.
7. All exterior metal sign materials, fasteners and clips of all types shall be hot-dipped galvanized iron, stainless steel or brass.
8. Signs are not permitted on end walls where the end walls parallel a street or road.
9. Flashing or blinking signs are not permitted.
10. Portable signs are not permitted.
11. Signs on doors and windows are not authorized except as permitted by these Standards.
12. Exposed mounting devices, crossovers, conduits or raceways are not permitted.
13. All signs must meet safety standards. All illuminated signs must bear the UL label, and meet all local code requirements. The Tenant is responsible for obtaining any permits required by federal, state and local authorities.
14. Signs of a promotional nature are not permitted.
15. Handwritten signs are not permitted.
16. Signs printed on bond paper are not permitted at any time.
17. Signs not specifically permitted by these Standards are not permitted.
18. All Tenant signage to be provided shall be incorporated into the Tenant’s design submittals and shall be subject to approval by MNAA.

C. Structural

All elements of the Sponsor’s proposed Tenant Improvements that are suspended from the structure or from a shell building wall, floor or roof shall be detailed (including methods of attachment and load

calculations) in the Tenant's construction document submittals to MNAA for review. Load calculations shall be prepared by a structural engineer licensed in the state of Tennessee and sealed as a part of the Tenant's submittals to MNAA.

Floor penetrations shall be kept to a minimum. Floor penetrations shall be located by the Tenant so as to eliminate the possibility of compromising the structural integrity of the floor. Plans and test results shall be submitted to MNAA for written approval prior to drilling holes. The Tenant is responsible for repair on any Base Building or Tenant systems damaged by penetrations or attachments to the structure. Penetration scanning shall occur prior to the drilling of any holes. Holes shall be sealed appropriately.

Roof penetrations are permitted at stairwells for wireless antennas for wireless service. All roof penetrations shall be coordinated and approved by MNAA prior to installation. Penetrations shall not in any way diminish any remaining warranty on the entire roofing assembly. The Tenant must provide a letter from the roofing manufacturer stating that the penetrations were made in accordance with its requirements and that any remaining warranty has not been impaired or affected and is still in full force and effect.

Any installed antenna must be installed in a manner that will not void the roof warranty. An example of acceptable antenna installation is the use of a metal pan with CMU blocks for ballast placed on top of roof pads.

For floor penetrations and openings and attachments to the CONRAC structure, see Specifications 01610 and 01611 in Appendix A hereto for detailed requirements. All concrete slab penetrations shall be properly evaluated so that post tension cables or in-slab utilities will not be affected. Subsurface scanning (x-ray/radar/infrared) shall be used at a minimum at penetration locations. Results of testing shall be provided to the Airport Project Manager prior to any penetration of or attachment to the structure.

The Tenant shall coordinate mechanical, electrical, plumbing and fire sprinkler work with existing structural members. All floor/roof or wall openings/penetrations shall be properly fire-safe.

Roof Load Limits

See Specifications 01610 and 01611 in Appendix A hereto for detailed requirements. The Tenant shall not attach to or hang any loads from the overhead structure.

Floor/Roof/Wall Penetrations

See Specifications 01610 and 01611 in Appendix A hereto and Section 3.1.2(G) hereof for detailed requirements.

Attachment to Structure

See Specifications 01610 and 01611 in Appendix L, Section 5.12.2 hereto for detailed requirements.

D. Communication Systems

Cabling Requirements

A minimum of Category 6 cabling is required to support installation of telephone and/or data connections. All cabling should be run in a minimum of ¾" conduit. All wall jacks installed will follow the color coding scheme outlined in ANSI/TIO/EIA 606A Administration Standard for Telecommunications Infrastructure standards as follows: Data = orange; Phone = green (digital or analog).

All cables should be labeled back to patch panel in this format per ANSI/TIO/EIA 606A Administration Standard for Telecommunications Infrastructure standards.

All phone and data cables should be punched down on BIX blocks per ANSI/TIO/EIA 606A Administration Standard for Telecommunications Infrastructure.

Closets

All cable/connections will be secured at switch via lockable racks in the closet. UPS devices should have management capability and be rack mounted. VOIP switch suitable to work with Nortel CS1000M is required to connect to Airport telephone systems.

E. Wireless Systems

The Tenant may utilize any wireless frequency for which it owns or holds a license, subject to review and approval by MNAA; provided, however, that the Tenant's wireless equipment shall not in any way interfere with the operation of the existing 800MHZ Airport radio system. There may be limitations to the use of wireless systems on non-licensed frequencies because of the proximity of users. All wireless systems of the Tenant are subject to the approval of MNAA prior to the installation or use thereof, and the Tenant may install and maintain its own wireless systems within its Exclusive Use Premises after such approval from MNAA has been obtained. The Tenant shall not permit a wireless service provider to sublease or otherwise use or occupy any of its Exclusive Use Premises.

F. Fire Detection and Alarm System

The Base Building will provide a fire alarm and detection system for the CONRAC. The Airport uses a proprietary fire alarm system manufactured by Edwards Systems Technologies. The main fire alarm control panel will be located in a location approved by the Fire Marshal. The Tenant will be responsible for any necessary fire alarm/detection design and installation associated with its customer service and exit booths. The Base Building construction will provide an FTC for the Tenant's use in the main electrical room that will contain connection terminal points for a fire detection signal and a fire alarm notification circuit from the Tenant's customer service and exit booths. The Tenant is responsible for providing and installing Edwards Systems Technologies compatible fire detection and alarm devices within its customer service and exit booths, and the associated conduit and wiring to connect these devices to the FTC provided by the Base Building. The fire alarm system design, testing and commissioning of the fire alarm detection and alarm circuits and devices for the customer service and exit booths will be the Tenant's responsibility. All design and installation shall be in compliance with all federal, state, local and Airport codes and regulations. Fire alarm systems

installation shall be contracted with an MNAA-approved vendor, Siemens Building Technologies. Alternate fire alarm systems/providers shall not be permitted. The Tenant shall schedule a “pre-test” with MNAA prior to requesting or performing a life safety inspection by the Metropolitan Codes Department. Life safety inspections by the Metropolitan Codes Department shall be scheduled through the Technical Advisor.

3.1.2 READY/RETURN AREA REQUIREMENTS

A. Introduction/Base Facility

The Ready/Return Area has three operational floor plates. Customers will pick-up and return cars in these areas. Expected Tenant Improvements in the Exclusive Use Areas in the Ready/Return Area include customer service and exit booths, Tenant signage and support systems.

B. Separation of Common Use Area/Exclusive Use Areas

The entire entry core area and adjacent core extension areas (moving sidewalks) shall be included within the Common Use Areas. See Exhibit 1, Exhibit 2 and Exhibit 3 hereto for the limits of the Common Use Areas.

C. Tenant Improvements

Any conduit installed by the Tenant shall be concealed from public view or painted to match the adjacent surfaces to which it is attached. All conduit runs shall be attached to existing horizontal or vertical surfaces and shall be a minimum of 1” from any joint line. The Tenant is encouraged to locate utilities parallel to grid lines and minimize the visual and structural impact while maintaining National Electrical Code clearance requirements. The Tenant shall not install any utilities below 9’-6” above the finished floor.

D. Operational Elements

Exhibit 4 hereto depicts the typical operational aspects of a floor of the Ready/Return Area, including, without limitation, barrier types and locations, common use exit/entrance lanes, and various other functions.

Pavement Markings

The Tenant is responsible for furnishing and installing all pavement markings within the portion of the Ready/Return Area included within its Exclusive Use Premises. At a minimum, pavement markings shall be provided to delineate parking spaces, space identifiers, pedestrian walkways, exit directions and vehicle circulation flow. All pavement markings required by applicable codes will be furnished as a part of the Base Building. Pavement marking paint within the Ready/Return Area shall be a non-reflective latex waterborne emulsion. Painted “No Parking” zones shall be furnished as a part of the Base Building in Common Use Areas and where required by applicable codes.

Primary Perimeter Barriers

Concrete jersey barriers provided and installed as a part of the Base Building shall delineate the limits of the portions of the Ready/Return Area occupied by different Tenants and the perimeter boundary of the parking areas between the Ready/Return Area and the common customer roadway. Primary

perimeter boundaries shall provide openings for entrances and exits with locations requested by the applicable Tenant and approved by MNAA.

See Appendix L hereof for barrier placement limitations.

Lease Delineation Barriers

The Base Building will provide concrete jersey barriers between the Exclusive Use Areas as shown in Exhibits 18-22 hereto. See Section 3.1.2(G) hereof for floor loading limitations.

Internal Barriers

Barriers within the Tenant's Exclusive Use Premises shall be provided by the Tenant and approved by MNAA. Barriers are not required to match those provided as part of the Base Building but must be the same within the Tenant's Exclusive Use Premises. See Section 3.1.2(G) hereof for barrier placement limitations. MNAA will provide the name of the supplier of the barriers furnished as part of the Base Building, and the Tenant may arrange purchases with that supplier.

Exterior Trash Receptacles

The Tenant shall provide adequate trash and recycling receptacles within the portion of the Ready/Return Area included within its Exclusive Use Premises to match the Base Building receptacles in appearance. See Construction Specification 12 96 23 – "Trash and Litter Receptacles.

E. Architectural

Exit Booths and Exit Control Devices

Locations for customer service and exit Booths are limited. See Exhibit 4 hereto for reinforced floor load zones.

Exit booths and access control devices, including associated software and wiring, shall be provided and installed by the Tenant within the portion of the Ready/Return Area included within its Exclusive Use Premises. These devices and/or structures shall be installed behind the perimeter barrier and with a setback from the perimeter roadway to permit clearance from the adjacent traffic lane of at least one car-length. Access control devices installed by the Tenant, such as gate arms, tiger teeth, etc., must be located within the portion of the Ready/Return Area included within its Exclusive Use Premises.

Exit Booths shall be self-contained pre-fabricated booths with tubular steel welded frame and metal or glass panel inserts. Booths shall be shop-painted with a standard color selected by the Tenant (and approved by MNAA), sealed for weather protection, and protected from cars with curbs and/or bollards. Bollard type and position are to be approved by MNAA.

Access control devices at exits shall be manually controlled or controlled by key pad, card swipe, bar code scanner or other secure technology from an adjacent booth; only entrances shall have automatic access control devices.

For exit booths that are factory-built structures as defined by the Tennessee State Department of Labor and Industry, the foundation (in this case, the CONRAC operational floor deck or slab) and the connections thereto must be designed to meet the IBC requirements for the wind and seismic loads

imposed. The Metropolitan Codes Department, which is authorized to evaluate and permit these structures, also will check access to these structures (ramp or stairs) for code compliance. Booths in excess of 300 square feet will require a ramp and landing.

Allowable exit booths that are component structures must comply with MNAA's approval process and must meet the assembly quality assurance standards of the IBC. A component structure is defined as a structure that is built in sections or panels and is assembled on-site. The manufacturers or plants where these components are built must have the IBC quality assurance procedures in place and must provide MNAA with written certification to verify compliance with these procedures. The component connections to each other and to the structure below must be designed by a licensed design professional to meet all loads imposed in accordance with the IBC. All other applicable codes must be met, including, without limitation, electrical, ventilation, energy code, access to structure, etc.

The Tenant shall provide MNAA with written certification that its exit booths meet state of Tennessee regulations before the exit booths are delivered to the CONRAC site. Exit booths shall be delivered to the CONRAC site fully wired per UL requirements with an electrical sub-panel and may have rooftop/sidewall-mounted HVAC units. Doors shall either swing open or be integrally sliding doors with deadbolt locks. An exit booth also may have a counter and sliding window for the Tenant's customer service representative to interface with the Tenant's customer. The maximum floor area of an exit booth shall be 8' x 10'. An exit booth shall not exceed 75 lbs. per square foot in weight, including occupant load, and shall not be placed closer than 8'-0" to an adjacent customer service or exit booth.

The placement of leveling compounds to achieve level exit booth flooring is prohibited. Any floor leveling measures to be utilized are subject to the prior approval of MNAA and must be delineated in the Tenant's initial design/construction submittal for its Tenant Improvements.

An exit booth shall not be placed closer than 8'-0" to an adjacent barrier unless the barrier is located directly over a beam, at which point the exit booth shall not be located within 4'-0" of an adjacent barrier. See Section 3.1.2(G) hereof and Exhibit 4 hereto for acceptable locations of barriers. The Tenant's exit booths shall not be located so as to limit or obstruct the visibility of booths operated by other Tenants. See Section 3.2.1(E) hereof for exit booth location, structure connection information and weight limitations. The Tenant's restrooms and break rooms shall not be in its customer service or exit booths or elsewhere within the portion of the Ready/Return Area included within its Exclusive Use Premises. Temporary or portable exit booths are prohibited.

Customer Service Booths

Requirements for Tenant customer service booths shall be similar to the requirements for exit booths, excluding size limitations. Customer service booths or structures shall be located entirely within the Tenant's Exclusive Use Premises in designated areas approved by MNAA. The maximum total superimposed weight of a customer service booth, including occupant load and any materials required to level the operational floor plate, shall not exceed 125 lbs. per square foot. A customer service booth shall not be placed closer than 8'-0" to an adjacent customer service booth or exit booth or closer than 8'-0" to an adjacent barrier (unless the barrier is located directly above a beam at which point the customer service booth shall not be located within 4'-0" of the adjacent barrier). See Section 3.1.2(G)hereof and Exhibit 4 hereto for acceptable locations of barriers. The Tenant's customer

service booth shall be fully self-contained and have finishes similar to those used at its customer service building. See Section 2.4.5.2 hereof for customer service booth location and weight limitations.

See Exhibit 4 hereto for the reinforced floor load zones where the placement of customer service and exit booths may be placed with the prior approval of MNAA.

F. Signage

With the exception of variable message reader board signs directing customers to vehicles that are required for the Tenant's operations, signs with variable message signs, moving images or moving lights are not permitted. No advertising materials, including slogans or language used in promotions, marketing or advertising campaigns that are intended for all customers and create an association with a specific brand, shall be permitted. MNAA reserves the right to require the removal of any Tenant advertising, displays or decorating that, in MNAA's sole discretion, is distasteful or is in any way in conflict with the best interest of the CONRAC environment. The Tenant must provide and install all signage in its Exclusive Use Premises; all such Tenant signage must be incorporated into the Tenant's design submittals and approved by MNAA.

Tenant Signage

Tenant-specific identification signage furnished and installed by the Tenant is permitted in the interior of portion of the Ready/Return Area included within such Tenant's Exclusive Use Premises for vehicle return, special programs, space numbering and other directional information. Signs shall be surface mounted to the structural columns with compression fittings or hung from the surface of the beams or from the structure. See Section 2.3.3 hereof for penetration and attachment limitations and information. All Tenant signage within drive aisles shall be mounted with a 8'-9" clearance above the finish floor. The location and orientation of the Tenant's signage may not block other the signage of other Tenants or the Base Building wayfinding/directional signage.

All regulatory and warning signage and pavement markings shall comply with the Manual on Uniform Traffic Control Devices (MUTCD). Power requirements for all electrical signage of the Tenant located within its Exclusive Use Premises shall be the responsibility of the Tenant and included in such Tenant's metered power allotment. See Section 3.1.2(I) Section 2.2.(3) E hereof for electrical systems requirements.

Customer Service Booth Signage

Signage on a customer service booth shall not exceed 24" in height. Promotional banners and signage are prohibited. Interior signage within a customer service booth is permitted. A preferred service reader board may be mounted to the exterior of a customer service booth.

Exit Booth Signage

An exit booth may have up to an 18" sign band at the top. The sign band may be a company color.

G. Structural

Floor loading limits

Locations for customer service and exit booths and barriers are limited. The floor loading limit for customer service and exit booths and barriers are set forth in Exhibit 4 hereto. The weight limit and placement of barriers shall conform to the following:

1. The weight of a barrier shall not exceed 350 lbs. per linear foot.
2. Barriers shall be placed directly above inverted-tee and L beams.
3. Reinforced load locations for customer service and exit booths are shown in Exhibit 4 hereto. If a reinforced load location for a customer service or exit booth is not placed directly over a beam, then adjacent barriers or an adjacent customer service or exit booth may not be placed closer than 4'-0".
4. Barriers shall not be placed within 12" of any expansion joint cover.
5. Expansion joint covers shall be protected from wheel loads when barriers are being installed and relocated.

H. Mechanical Systems

HVAC

Outside air is not supplied by the Base Building mechanical system for use in customer service and exit booths. Any supply air provided by the Tenant to its customer service or exit booths shall be filtered (activated carbon filters) to remove vehicle exhaust odors. It is the Tenant's responsibility to heat or cool the air as needed or desired. An HVAC system for a customer service or exit booth shall be a standalone package terminal air conditioner with a heat pump for electric heating, a cooling condensate removal system and a filter system for outside air. The content of outside air shall be calculated using the latest version of ASHRAE Standard 62. Required HVAC equipment energy efficiencies shall be as set forth in the latest International Energy Conservation Code or ASHRAE 90.1, whichever is more stringent.

Domestic Water System

Water and sewer services are not provided by the Base Building for customer service or exit booths. Water and sewer source and discharge connection locations for a customer service or exit booth shall be identified in the Tenant's design document submittals and subject to the prior approval of MNAA.

Fire Sprinkler System

No fire sprinkler system is provided in the Ready/Return Area. The Base Building will include manual dry standpipe systems for the unheated emergency egress stairs. The systems are sized per NFPA and local code requirements.

I. Electrical Systems

Power

The Base Building includes secure electrical demarcation rooms to serve as Airport/CONRAC electrical demarcation points for the Tenant's portion of the Ready/Return Area included within its Exclusive Use Premises. Each floor of the Ready/Return Area includes one electrical room located adjacent to the data room on that floor. See Exhibit 16 hereto.

The power source for the Tenant's Exclusive Use Premises shall be normal power derived from the Airport distribution panelboard. The service utility is 277/480-volt, 3-phase, or 120/208-volt, 3-phase. There is no standby/emergency power source available. The normal power is not conditioned, filtered or isolated, and does not have "transient voltage suppression" equipment.

Depending upon the size of the Tenant's Exclusive Use Premises, the Tenant will have access to one or two electrical rooms that are adjacent to its Exclusive Use Premises and provided as part of the Base Building. The Base Building will include a 200-amp circuit breaker within the 120/208-volt Airport power distribution panelboard for the Tenant to connect the Tenant's subpanel for its customer service booth. In addition, each permissible exit booth location shall have a space and load allocation within a 120/208-volt Airport power distribution panelboard for the Tenant to power the exit booth. As typical exit booth power requirements vary by manufacturer, a circuit breaker has not been provided for a permissible exit booth location as a part of the Base Building. The Tenant shall provide all necessary circuit breakers, feeder cables and disconnects for its exit booths.

All transformation, power distribution, lighting, conduits, wiring and devices extending from an Airport-furnished pullbox shall be provided by the Tenant, including temporary or standby power sources where required.

Kilowatt-hour meters shall be required for each customer service and exit booth. The meter unit shall be a Siemens Series 1000 Digital Energy Monitor (Airport standard) and shall be fully integrated with the Airport Energy Management System. The meter unit shall be provided/installed by the Tenant.

Maximum power allowance per Tenant has been estimated at 14 watts per square foot (w/sq.ft.) of customer service booth area plus signage and exit booth power loads. This value is comprised of 1 w/sq.ft. for lighting, 2 w/sq.ft. for miscellaneous power loads, 11 w/sq.ft. for heating loads for a customer service booth, 5,000 total watts for an exit booth, and 3,000 total watts for athe Tenant's signage within its Exclusive Use Premises. This value is based on a total combined maximum of 7,500 square feet for all customer service booths of all Tenants (a maximum of eight exit booths on each level of the Ready/Return Area). From this demarcation point, the Tenant shall be responsible for installing all electrical lighting panels and power subpanels, electrical conduit, wiring, fixtures, etc., to serve its supplementary lighting and power needs for its booths, gates, illuminated signage, security systems, etc. All of the Tenant's electrical panels and equipment in the Ready/Return Area will be located within its Exclusive Use Premises. All of the Tenant's fit-out loads shall originate from the Tenant's power panels.

Tenants requiring power in excess of the amount listed above shall pay the entire cost of installing the additional service, including any necessary power distribution equipment. Additional excess power loads are subject to the prior approval of MNAA.

It is the Tenant's responsibility to verify service capacity and availability for its Exclusive Use Premises space. The Tenant shall be responsible for providing sizing requirements based on its specific needs.

Shutdown of the Base Building service or any main electrical distribution must be coordinated with MNAA not less than two weeks in advance, and must be performed between the hours of 1:00 a.m. and 5:00 a.m. These times are subject to change, and the Tenant is responsible for complying with

the then-current restrictions. All electrical work required to complete the system to accommodate the Tenant's plans shall be performed by the Tenant's electrical contractor at the Tenant's sole cost and expense.

All Tenant wiring (e.g., power, telephone, data, communications, low voltage, controls, etc.) must be in conduit. Conduit used shall be EMT in interior spaces. Any conduit routed in areas that are subject to damage from motorized vehicles, machinery, etc., shall be RGS. All special systems must be routed in separate conduit. New panel boards must have hinged covers with door-in-door construction. The Tenant shall field coordinate the routing of conduit within the existing precast structure to avoid penetrations of precast "double-tee".

All wiring is to be copper. Aluminum wiring is not permitted.

Dry-type transformers shall be located in compliance with Article 450.13 of the National Electrical Code. Tenants shall be permitted to locate a transformer not exceeding 50 kVA above an accessible ceiling in the Tenant's portion of the Ready/Return Area included within its Exclusive Use Premises so long as the space is fire resistant, ventilated and accessible. Transformers shall not be permitted to be located above accessible ceilings where the area is utilized for environmental air distribution, i.e., plenum. The Tenant's transformer exceeding 50 kVA shall be mounted in a visible location adjacent to the appropriate electrical panel. A transformer may be either floor-mounted on a four-inch concrete housekeeping pad or wall-mounted with listed wall brackets. Connections to the transformers are to be liquid-tight.

All electrical equipment shall be labeled by UL for the intended use. Exposed conduit ends must have bushings. The minimum conduit size is ¾" diameter. No residential equipment or devices are permitted.

The Base Building electrical loads are not separately metered.

Lighting

Lighting throughout the CONRAC will be provided as a part of the Base Building. Lighting levels have been established at an average of 10 foot-candles at 30" above the parking surface level. Areas surrounding permitted locations for customer service booths shall have an increased light level with an average of 15 foot-candles at 30" above the parking surface level. Perimeter lighting will be screened to prevent glare at the perimeter of the CONRAC and will be zoned and automatically controlled by the use of a lighting relay system. Operational floorplate lighting will be provided by metal halide lamps. The Tenant shall submit additional lighting fixtures and levels in its design submittals for MNAA's review and approval and shall match or complement the Base Building fixtures and levels. The Tenant is responsible for lighting within its customer service and exit booths.

The use of mercury vapor lamps is not permitted; fluorescent lamps and ballasts shall be T8 with electronic ballasts.

Emergency Lighting/Standby Power

The Tenant is responsible for emergency lighting and standby power for its customer service and exit booths.

J. Communication Systems

For purposes of this Section 3.1.2, a “service provider” means a telephone service provider. “Access Provider” means the Airport’s Information and Communications Technology group.

The Tenant shall use the Base Building wiring system to route to the nearest telecommunications room adjacent to its Exclusive Use Premises through the use of cross connects to route between areas of its Exclusive Use Premises. The Tenant shall be responsible for providing the conduit infrastructure from the nearest telecommunications room to and within the portion of the Ready/Return Area included within its Exclusive Use Premises. The Tenant shall also be responsible for providing the communications cables and any required inner-duct and pull ropes within all conduit infrastructures from the nearest telecommunications room adjacent to its Exclusive Use Premises to its Exclusive Use Premises, as well as within its Exclusive Use Premises. In addition, the Tenant shall be responsible for providing a demarcation box on the ceiling directly above the portion of the Ready/Return Area included within its Exclusive Use Premises with a standard compliment of fiber and copper cabling as defined with the appropriate termination hardware to accommodate future connections by the Tenant. See Exhibit 8 and Exhibit 15 hereto for typical cabinet contents. See Exhibits 5, 6, 7, 8 and 15 hereto and the Base Building drawings for typical recommended raceway paths.

The Tenant shall not route conduit under beams but should instead use designated beam penetrations where provided. Prior to installing any conduit, pull box, manhole or communications cable, the Tenant shall submit construction plans and obtain the prior approval of MNAA. All conduit and cables entering the communications rooms shall be furnished and installed by the Tenant.

The Tenant shall furnish one original hardcopy of all testing and warranty documents and electronic copies of the same in Adobe Acrobat PDF and editable formats. All cables, inner-ducts, pull ropes, demarcation boxes, splice enclosures, cross-connects, termination equipment and associated accessories that are installed within the Access Provider’s conduit infrastructure shall become the property of the Access Provider. The Tenant shall coordinate with the Airport Project Manager when developing the construction documents and shall adhere to any location-specific installation directions provided by MNAA.

The telecommunication rooms provided by the Base Building will only be used as conduit and cable access and connection points and will not function as a storage area in any way. The Tenant may add cable termination blocks, splice closures and patch panels in its Exclusive Use Premises only. Electronic equipment or any other type of device that requires a power source to function will not be permitted in the telecommunication rooms.

3.1.3 QTA SPACE

A. Introduction

QTA Base Building Operations

The Base Building includes the following components of the QTA Space: the back-of-the-house building shell, six employee restrooms, pre-wash slabs, car washes and refueling areas. See Exhibit

10 hereto for typical information. Within the portion of the QTA Space included within its Exclusive Use Premises, the Tenant shall install and construct its Tenant Improvements as required to support its operations therein. All of the Tenant's Improvements, signage, furnishings, etc., therein shall be contained within the limits of its Exclusive Use Premises. See Exhibit 9 hereto for the Common Use Areas and Exclusive Use Areas of the QTA Space.

General Information

The Tenant's design of the portion of the QTA Space included within its Exclusive Use Premises shall include, without limitation, support offices, locker rooms, employee break rooms and miscellaneous exclusive-use storage areas. The Tenant's support areas shall be contained within the physical boundaries of the portion of the QTA Space included within its Exclusive Use Premises.

Portions of the QTA Space may be shared dependent upon space allocations. The size and design of each QTA Space service area may vary. The construction of exclusive use restrooms by the Tenant in the QTA Space is allowed subject to the restrictions established in Section 3.1.3(E) hereof.

All exposed exterior equipment in the QTA Space will be painted to match the Base Building construction.

The location and use of the Tenant's break rooms shall not adversely affect adjacent Tenants. The Tenant's break rooms shall be properly insulated, ventilated and sound-proofed so as not to disturb adjacent Tenants.

Tenant finishes not exposed to public view shall be at the Tenant's option and shall conform to all applicable building codes and standards.

B. Architectural/Operational – Back-Of-The-House

Demising Partitions

The Base Building will furnish demising partitions between the Exclusive Use Areas and between the Exclusive Use Areas and the Common Use Areas.

The Base Building will include CMU or metal wall studs at demising walls located between the Exclusive Use Areas. The Tenant shall be responsible for finishing demising walls (including providing and installing gypsum wall board, taping, sanding, painting, base trim, etc.) on its side of a partition.

Any modifications to demising partitions shall be constructed by the Tenant to match the Base Building standards and require the prior approval of MNAA.

Exterior Walls

The exterior walls of the back-of-the-house buildings are CMU or precast concrete. The Tenant shall provide and install rigid insulation, furring, gypsum wall board and all finishes. Fire-rated walls shall be constructed to the roof deck above.

Interior Walls

Interior Tenant partitions, when not required to be fire-rated or a plumbing chase, may terminate above the suspended ceiling, unless otherwise required by applicable codes.

Wall Finishes

All wall finishes shall be high-impact resistant, scratch and scrape resistant and easily removable for repair or capable of being repaired in place. All wall finishes shall be washable in place.

Floors

The Tenant may provide floor finish material(s) as selected by the Tenant and as appropriate for the conditions of use.

All finished floor surfaces shall be installed level and smooth with a maximum surface variation of ¼" vertical in 10' (Class A floor finish). Under no circumstances may the existing concrete slab be chipped to accommodate flooring underlayment or any other construction. Transitions between the Tenant's flooring and Airport-controlled finish floor materials shall be the responsibility of the Tenant. Transitions between any finish floor elevations cannot vary by more than 1/8" vertically. Ramping of floor materials at transitions is not permitted.

Floor materials and their respective methods of adhesion shall be subject to the prior approval of MNAA. Adhesives, thin-set mastic, applied backings, etc., shall be of such properties so as to eliminate or drastically reduce the occurrence of cracking, delaminating, shifting, popping and other negative results.

Ceilings

No ceiling system (grid, tile, etc.) will be provided by the Airport in the QTA Space. The Tenant shall provide a ceiling that meets applicable codes in the portion of the QTA Space included within its Exclusive Use Premises. In no case shall the weight of the ceiling finishes exceed 3 lbs. per square foot without the prior approval of MNAA. The recommended ceiling height is 9'-0".

Doors, Frames and Hardware

Tenant doors and frames shall match those in the Base Building construction areas. See Construction Specifications 08 01 13, 08 31 00 and 08 71 00.

All interior doors at service buildings shall be solid core wood stain grade or 18-gauge (minimum) hollow-core metal doors with hollow metal, 16-gauge (minimum) frames.

All hardware shall match the Airport's current use proprietary lock system. All Tenant hardware must accommodate door knobs by Primus, ND Series, IC core, C145P keyway. Panic hardware shall be manufactured by Von Duprin or Airport-approved equal.

Windows and Window treatments

Window coverings may be installed by the Tenant subject to the prior approval of MNAA. Advertising and the application of decorative films are prohibited on all exterior windows. Windows shall be kept free of blockage at all times.

Millwork

The Tenant shall provide all millwork within the portion of the QTA Space included within its Exclusive Use Premises.

Tenant Equipment/Accessories

Vending machines are not permitted on the exterior of the service buildings in the QTA Space or otherwise to be in public view.

C. QTA Space Signage

QTA Traffic Control Signage

The Base Building will include traffic control signage. The Tenant may install additional traffic control signage in the portion of the QTA Space included within its Exclusive Use Premises as required. The Tenant shall follow state of Tennessee and MUTCD Standards for regulatory and warning signage and pavement markings.

QTA Exterior Building Signage

The Base Building will provide one identification sign adjacent to each door entering the Tenant's portion of the QTA Space included within its Exclusive Use Premises for the sole purpose of identifying the staff entrance thereto. The sign shall contain the corporate name of the applicable Tenant only, and placement is to be contiguous with such Tenant's portion of the QTA Space included within its Exclusive Use Premises. The Tenant's identification signage shall be non-illuminated letterforms/graphics using such Tenant-specific corporate standard colors as applicable.

D. QTA Space Structure

All elements of the Tenant's proposed Tenant Improvements that are suspended from the structure above the portion of the QTA Space included within its Exclusive Use Premises, or from a shell building wall, floor or roof, shall be detailed (including methods of attachment and load calculations) in the Tenant's design submittals to be provided to MNAA. Load and signage wind load calculations shall be prepared by a structural engineer licensed in the state of Tennessee and sealed as a part of the Tenant's design submittals.

Floor penetrations shall be kept to a minimum. Floor penetrations shall be located by the Tenant to eliminate the possibility of compromising the structural integrity of the floor. Plans and test results shall be submitted to MNAA for written approval prior to drilling holes. The Tenant is responsible for repairing any Base Building or Tenant systems damaged by penetrations or attachments to the structure.

The Tenant shall coordinate mechanical, electrical, plumbing and fire sprinkler work with existing structural members. All floor, roof or wall openings shall be properly fire-safe.

Floor Load Limits at the Storage Area

Floor load limits in the Storage Area are:

1. Live Load=50 lbs. per square foot;
2. Superimposed Dead Load=5 lbs. per square foot.

Storage Area

The Storage Area will be supported on a separate foundation, and the Tenant shall not attach anything, including signage, to the concrete structure of the Storage Area.

E. Mechanical Systems – Back-of-The-House

Space Heating and Cooling Systems

The Base Building does not include a centralized HVAC system in the QTA Space. For the portion of the QTA Space included within its Exclusive Use Premises, the Tenant shall be responsible for providing a vertical floor mounted split system heat pump with supplemental electric heat and associated air distribution system, including ductwork, grilles, dampers, fire dampers, etc. The Tenant shall insulate ductwork and limit flexible ductwork to be 5'-0" long to connect galvanized steel ducts to air distribution devices. Ductwork shall be constructed and installed in accordance with the latest SMACNA construction standards.

The vertical split system heat pump shall be manufactured by Lennox, Trane or York and shall utilize R-410A refrigerant and 208/1/60 for an outdoor heat pump unit and 208/1/60 for an indoor unit. Maintenance to verify with new regulations and codes. The Base Building allows the Tenant a maximum of 300 square feet per ton of cooling capacity. The Tenant shall not install an outdoor heat pump unit above the ceiling but rather shall install an outdoor heat pump unit where indicated on Base Building mechanical drawings. An outdoor heat pump shall be protected on each corner with bollards.

The Base Building does not include a centralized ventilation system in the QTA Space. The Tenant is responsible for providing ventilation air in accordance with latest ASHRAE Standard 62. The Base Building provides a main ventilation duct on the west side of the QTA Space, and the Tenant is responsible for connections to the main ventilation duct and to its indoor HVAC unit. The Tenant shall be responsible for cutting any opening in a wall, patching, repairing, sealing, fire damper, etc., for any connections to its indoor HVAC unit. No opening in a wall shall be cut without the prior approval of MNAA, and any such opening shall be sealed to be air and moisture tight.

The Base Building does not include a centralized exhaust system in the QTA Space. The Tenant is responsible for providing exhaust systems as required for such Tenant space requirements by applicable codes. The Tenant shall be responsible for providing, in the portion of the QTA Space included within its Exclusive Use Premises, an in-line centrifugal exhaust fan, associate ductwork, grilles, etc. An exhaust duct shall terminate on the west side of the QTA Space at a wall louver, which shall be anodized aluminum in a custom color selected by the Base Building Design Team. Each wall louver opening shall be sealed air and moisture tight.

The Tenant shall provide a residential re-circulating hood with fire suppression system over any cooking stove top. The residential re-circulating hood shall be constructed of stainless steel and the fire suppression system shall be equal to Guardian III and shall include stove cut-off, audible alarm (both local and remote), and remote strobe light and manual remote pull station.

Required HVAC equipment energy efficiencies shall be as set forth in the latest International Energy Conservation Code or ASHRAE 90.1, whichever is more stringent.

All HVAC equipment and temperature sensors shall be connected to the Airport Siemens

APOGEE building energy management system.

The Tenant must provide unobstructed access to all mechanical units for maintenance purposes. Unobstructed access must also be available for ease of filter replacement and other maintenance.

Sanitary and Domestic Water Systems

A main, four-inch waste line will be available for the use of Tenants in the QTA Space. The Tenant shall be responsible for coring the floor in the portion of the QTA Space included within its Exclusive Use Premises and making the tie-in to the waste line. One four-inch vent will be available to the Tenant, and the Tenant is responsible for tying in the venting for any fixture installed by the Tenant. Domestic cold water will be available and will be extended by the Base Building to the vicinity of the portion of the QTA Space included within the Tenant's Exclusive Use Premises. See Base Building drawings for locations.

The maximum number of plumbing fixtures that the Tenant can add in the portion of the QTA Space included within such Tenant's Exclusive Use Premises is two water closets, one urinal, two lavatories and one sink.

The Tenant shall connect water to its plumbing fixtures, drinking fountains, etc., at its sole cost. All necessary plumbing fixtures, water heating devices and water meters (when required by MNAA) shall be provided by the Tenant. A water heater shall be electric and shall not be larger than 25 KW.

Fire Sprinkler Systems

The Base Building will provide an automatic deluge system in the fueling area of the QTA Space in accordance with applicable codes. No other portion of the QTA Space will have a fire suppression system.

F. Electrical Systems–Back-of-The-House

Distribution

The Base Building construction includes back-of-the-house conduit, feeder cable and electrical panels in the QTA Space. From the panels provided in the Base Building, the Tenant is responsible for installing all electrical breakers, conduit, wiring, fixtures, etc., required to serve the lighting and power needs of the portion of the QTA Space included within such Tenant's Exclusive Use Premises. See Exhibit 15 hereto for the plan and elevation of the electrical/communication rooms where electrical panels are located.

The Tenant's portion of the QTA Space included within its Exclusive Use Premises is sub-metered and is supplied with 120/208 volt, three-phase, three-wire panel, with an average demand of capacity of 30 kVA. The Tenant shall verify its service capacity and the availability for its space.

With the exception of car wash blower system improvements, all of the Tenant's improvement electrical loads in the portion of the QTA Space included within its Exclusive Use Premises shall originate from such Tenant's power panelboard. Base Building electrical loads are not separately metered.

Lighting

Canopy lighting in the QTA Space is designed to provide an average illumination level of 20 foot-candles per square foot.

Lighting for the perimeter areas in the QTA Space is metal halide and designed to provide average minimum illumination levels of five foot-candles per square foot. The Tenant shall provide all lighting fixtures within the portion of the QTA Space included within its Exclusive Use Premises. Lighting is limited to one watt per square foot within the QTA Space.

The Tenant shall provide and be responsible for the installation, connection and operation of all exit lights within the portion of the QTA Space included within its Exclusive Use Premises in accordance with applicable codes.

In order to keep the electrical and HVAC loads within the QTA Space within allowable loads, Tenants shall use energy efficient fixtures within the QTA Space.

The Tenant is responsible for emergency lighting and exit signage within the portion of the QTA Space included within its Exclusive Use Premises.

Emergency and Auxiliary Power

Emergency power and auxiliary power will not be provided in the QTA Space. For the Tenant's critical computer applications, uninterruptible power supplies are recommended in the event of temporary power loss. The Tenant shall be responsible for providing, installing and maintaining all of its uninterruptible power supply systems.

G. Communications Systems – Back-of-The-House

For purposes of this Section 3.1.3.G, "service provider" means the telephone service provider. The Base Building will include an unmonitored "demarcation box" for the Tenant. The Base Building will provide the necessary conduit and premises wiring infrastructure from the communication room in the QTA Space to the Tenant's utility closet that will function as the demarcation point for the service provider. The Tenant shall be responsible for providing the conduit infrastructure from the demarcation box to the portion of the QTA Space included within its Exclusive Use Premises. The Tenant shall also be responsible for providing the communications cables and any required inner-duct and pull ropes within all conduit infrastructures from the demarcation box to equipment within the portion of the QTA Space included within its Exclusive Use Premises. All surface penetrations shall be caulked and sealed upon completion of the work.

See Exhibit 15 hereto for the plan and elevation of the communication room where the demarcation box is located and for cabinet details. Prior to installing any conduit, pull box or communications cable, the Tenant shall submit construction plans to the Airport Project Manager and obtain the approval of MNAA. All cables, inner-ducts, pull ropes, splice enclosures, cross-connects, termination equipment and associated accessories that are installed within the Airport's conduit infrastructure shall become the property of MNAA. The Tenant shall coordinate with the Airport Project Manager when developing its construction documents and shall adhere to any location specific installation directions provided by MNAA.

The demarcation box provided by the Base Building will only be used as a conduit and cable access and connection point and will not function as a storage area in anyway. The Tenant may add cable termination blocks, splice closures and patch panels in its area of the demarcation box, if these components conform to Airport standards. Electronic equipment or any other type of device that requires power shall not be installed in the demarcation box.

H. QTA Washing, Fueling and Other Equipment

Fueling System

The Base Building construction will include the Fuel Facilities that will be operated and maintained by the Fuel Facility Manager. Three underground 20,000-gallon fuel storage tanks will be located in the service yard that is adjacent to the CONRAC.

The Fuel Facilities will include a fuel management system for the purposes of tracking the use of fuel at each nozzle by the Tenant. The Base Building will include junction boxes with wiring for power and communication at two locations at each fuel island. If desired for security purposes or more detailed fuel usage tracking, the Tenant may, at its sole discretion and expense, install its own compatible card readers at these junction box locations. The Tenant shall coordinate tracking and reporting requirements with the Fuel Facility Manager.

Information on the selected fueling system will be available as construction progresses. See Exhibit 13 hereto for layout of typical fueling area and potential card reader locations. The Tenant is responsible for removing the junction box enclosure for the installation of card readers, and, if a card reader is ever removed, the Tenant is responsible for replacing the enclosure.

Car Washes

The Base Building will include car wash facilities in the QTA Space that utilize a minimum of 90% recycled water. Car wash units and equipment will be enclosed within the car wash tunnel. Car wash operation runoff will drain to the sanitary sewer system, where it is pretreated and discharged as required by applicable codes. The Base Building construction does not include air blowers, fast-acting doors, pre-wash system, blasters or plastic

Tenant-Installed Equipment

Space and power allowances have been made for Tenant installation of blowers, pre-wash equipment and blasters. The Tenant shall provide the conduit (similar to existing conduit) and wiring for any such equipment that is installed.

Water lines shall be extended downstream of the backflow preventer for pre-wash and reverse osmosis systems.

The Tenant is required to follow procedures in Specifications 01610 and 01611 in Appendix L, Section 5.12.2 for attachments to the Base Building structure.

Maintenance

Vehicle maintenance or repair, with the exception of car washing, cleaning and refueling, is prohibited in the CONRAC or upon the CONRAC site.

Other Equipment

The Base Building includes a fully operational vacuum system at the fueling islands.

The Base Building includes a fully operational windshield washer fluid system, including pumps and hose reels, at the fuel islands. One drum serves two islands.

The Base Building includes a fully operational compressed air system, including air compressor and hose reels, at the fuel islands.

SECTION 4 – SUSTAINABILITY

4.0 INTRODUCTION

Section 4 of the AIRM outlines sustainable measures and set standards that will enrich the lives of users and reduce the environmental footprint of the airport. These guidelines introduce the sustainable strategies of the BNA Vision projects in order to provide Tenants with a better understanding of the context within which sustainability is achieved at BNA. These guidelines are intended to help tenants understand and take advantage of the high-performance features and sustainability efforts of BNA's campus.

4.1 NASHVILLE INTERNATIONAL AIRPORT (BNA)

The Tenants have a remarkable opportunity to help lead the shift to sustainability in buildings, and in the process, define a new kind of workplace. The BNA Vision program has worked to set a standard that identifies MNAA as a leader in sustainability in both the aviation community and the Nashville Region. MNAA believes an integrated sustainable design approach is important not only because it is the right thing to do but also because it will provide a better future for generations to come. While a holistic approach to sustainability will be followed, MNAA also appreciates the structure and oversight that programs like LEED and Parksmart provide a project when integrating sustainability strategies. The BNA Vision has set a higher standard with high-performance technologies that use less energy, consume less water, and leave a smaller footprint on the city's resources than traditional building practices. Sustainability decisions will be driven by good design and construction practices complimented with ongoing operational policies that, when combined, will make for an exemplary, high performance project that leads the way in the Aviation industry and the greater Western Tennessee Region.

4.2 BNA SUSTAINABILITY STRATEGIES

A. Location and Transportation

All parts of the BNA Vision project will be built on previously developed land to help minimize the environmental impact of the project and there are many services located on site to help reduce daily trips on and off site.

Providing access to quality transportation for employees, tenants, and visitors is a priority for MNAA. Currently, the Nashville MTA has one bus line that provides transportation from Downtown to the Airport. Opryland, Hotel Shuttles, Charter Buses and Off-Airport shuttles also provide several trips from the Airport to various locations in Nashville. MNAA is in discussions with regional transit to extend bus services, possibly adding an express bus as well as a future light rail station. Tenants should investigate all options and encourage the use of public transportation options.

MNAA is also looking at ways to expand the use of alternative energy fueled automobiles. Tenants are encouraged to support this effort where feasible. To date, a dozen charging stations are planned for Parking Garage A and MNAA owns five compressed natural gas work vehicles and 28 natural gas shuttle buses, which all help reduce the overall carbon footprint of the Airport.

B. Sustainable Sites

The built environment can have a significant impact on the natural environment. Thoughtful decisions about how a project interacts with its surroundings can help minimize this impact and encourage occupants and the building to have a healthy interaction with nature.

In support of local code and best construction practices, MNAA will require an erosion and sedimentation control plan on all applicable projects. Tenants will coordinate with MNAA and follow City of Nashville requirements on all projects that affect the hydrology and rainwater management on site. Added or modified hardscape and roof areas will be carefully considered, not only for the impacts on rainwater management but also the contribution to the heat island effect. A concrete mix that is lighter than typical gray concrete is being considered both airside and landside to be in compliance with LEED SRI (Solar Reflective Index) requirements and reduce the heat island effect.

MNAA encourages site lighting strategies that minimize light pollution. Where possible, tenants are to implement design strategies support the light pollution goals, good practices such as proper fixture selection, distribution, and direction of light will be executed.

C. Water Efficiency

Water conservation has been identified as one of the top 3 sustainability goals at BNA. In support of this goal, MNAA has set a standard for water use both inside and outside the facility. Tenants are highly encouraged to install low flow and high efficiency fixtures, allowing for water savings that are 25% better than code allowance. The reduction of outdoor water use for landscaping is encouraged by the use of climate appropriate plant selection and smart irrigation systems. Tenant Improvement projects that include landscaping and vegetation are encouraged to reduce irrigation use by a minimum of 50% when using the EPA WaterSense Water Budget Tool as a guide. Building level meters and tenant/use level sub-meters will be used across all projects.

The central utility plant (CUP) will provide chilled water and heated hot water throughout parts of the BNA Vision project. The CUP contains water-cooled chillers which will connect to the existing terminal geothermal system and utilize cooling towers for a hybrid cooling system.

D. Energy and Atmosphere

Energy reduction was noted as the top priority for sustainability goals at BNA. With an understanding of the multiple benefits to energy savings, MNAA strongly encourages Tenants to achieve optimized energy performance and efficiency through envelope improvements, solar control, LED lighting, lighting power density reduction, daylight controls, HVAC efficiency, and domestic hot water flow reduction and efficiency. Building-level, tenant-level, and system-level energy metering will be implemented at BNA. Energy modeling is an effective method to design for energy performance that will prove to be better than what is allowable by code.

All the BNA Vision projects will participate in an extensive commissioning process to ensure all buildings and systems are preforming as designed and providing the efficiencies expected. Tenants are encouraged to include a commissioning process in their plans and may contact MNAA for additional information on the commissioning process implemented on the Vision projects.

MNAA will consider on site renewable energy production by Tenants, but all efforts must be coordinated with MNAA. Green power and carbon offsets can be used by Tenants to help offset environmental impacts.

E. Materials and Resources Selection

The use of healthy materials is another high priority for MNAA. Healthy spaces start with the materials used to create them. The BNA Vision projects will have an emphasis on materials extracted and sourced in a responsible manner as well as have environmentally, economically, and socially preferable life cycle impacts. Tenants encouraged to specify and use materials that have environmental product declarations and demonstrate impact reduction below industry average. Materials and products extracted/harvested and manufactured regionally are also highly encouraged. MNAA recommends specifying materials from manufacturers who identify and optimize the chemical inventory of their product through third party sources. Tenants are highly encouraged to select low emitting materials to help improve the air quality within the buildings. At a minimum, all paint, coating, adhesives, sealants, flooring and composite wood will meet the VOC requirements outlined in LEED v4. Ceiling, wall and insulation options are to be investigated early and all efforts should be made to include products that meet the VOC requirements when reasonable.

Each of the BNA Vision projects will implement a construction and demolition waste management plan to meet or exceed the 75% waste diversion goal. Tenants are encouraged to set and meet similar goals for landfill waste diversion.

The recycling program in Nashville is a single stream with paper, plastic, cardboard, and metal being sorted at the recycling facility. Collection bins for building occupant recyclables will be placed throughout the BNA campus and Tenants are encouraged to include recycling bins in their space. Compactors for recyclables are located at Concourses B and C, and at the Southwest Airlines Provisioning area. Batteries, mercury lamps and bulk metal items are also recycled. Coffee grounds are also collected and incorporated into the composting. Once

a year, MNAA facilitates an electronic recycling day for the community at the airport. MNAA recommends the tenants to maintain the campus wide recycling initiatives, please contact MNAA for additional information on how to participate.

F. Indoor Environmental Quality

Projects with a healthy indoor environment provide a more comfortable and effective space for occupants and often increase a building's value. In support of healthy interior environments, smoking at BNA will be limited to the existing smoking rooms in Concourses B and C and labeled designated outdoor smoking areas. Smoking is prohibited within 25 feet of occupied buildings.

MNAA encourages Tenants to incorporate good ventilation practices and to look at options to reduce interior cross contamination. Tenants shall include effective filtration requirements and entryway systems where appropriate. During design, Tenants shall reference ASHRAE 55-2010 or better for thermal comfort standards and consider occupant controls for temperature, humidity and air flow to allow for better individual thermal comfort. Best practices in lighting control and quality will have measurable benefits and should be incorporated when feasible. Good acoustic environments are also an important feature of a space and should be considered during design of Tenant spaces.

G. Innovation in Design

At a campus level several LEED v4 Innovation credits are being investigated. A copy of the innovation credits achieved in previous projects will be made available upon request. The project teams are encouraged to be innovative and implement strategies throughout the project process. Innovation is encouraged during the design and construction process, but the team is also encouraged to suggest innovation strategies that can be carried out through airport operations. Because sustainability is such a key focus for MNAA, including a strong commitment to being good stewards in the aviation industry and the greater Nashville region, sustainability strategies with a positive regional impact will be seriously considered for inclusion in the project.

4.3 TENANT SUSTAINABILITY RECOMMENDATIONS

MNAA opted to seek LEED certification where reasonable on projects within the BNA Vision. Tenants located within the BNA Vision projects will benefit from sustainability strategies already in place on campus and MNAA encourages tenants to strive to consider LEED certification. MNAA's sustainability goals set a standard that the airport will endeavor to enrich passenger's and employee's lives through environmentally responsible design and construction management. While MNAA only recommends these sustainable strategies, many of them are attainable. If Tenants choose to seek LEED certification, there may be campus strategies that could be beneficial to project efforts. Tenants are encouraged to coordinate with MNAA on these strategies. A USGBC submitted Tenant Design Guidelines

may be made available for Tenants seeking LEED certified sustainability to utilize as a resource. Please coordinate with MNAA for a copy of the guidelines.

SECTION 5 – APPENDIX

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5.0 APPENDIX A - CONCEPT PROPOSAL INFORMATION FORMS

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5.0.1 FAST TRACK CONCEPT PROPOSAL INFORMATION FORM

GENERAL INFORMATION

Date: _____

Sponsor: _____

Sponsor's Representative (primary contact for improvement): _____

Address: _____

Phone Number (office): _____

Phone Number (cellular): _____

Fax Number: _____

Email: _____

Description of Improvement (include color, aesthetic, finish): _____

_____

Location of Improvement (must include site location map): _____

Estimated Dates to Implement Improvement:

Start: _____

Finish: _____

DESIGN VARIANCE

By requesting a design variance from MNAA, the Sponsor is seeking relief from one of more requirements of the Airport Tenant Guidelines Manual (AIRM). Design variance requests will be reviewed and approved by MNAA on a case by case basis. The Sponsor is to coordinate with MNAA for any variance request requirements.

5.0.2 CONCEPT PROPOSAL INFORMATION FORM

GENERAL INFORMATION

Date: _____

Sponsor: _____

Sponsor's Representative (primary contact for improvement): _____

Address: _____

Phone Number (office): _____

Phone Number (cellular): _____

Fax Number: _____

Email: _____

MISCELLANEOUS PROJECT

Miscellaneous projects are defined as minor, non-structural, decorative changes leaving walls, floors, ceilings and fixed equipment in place. No modifications to electrical, mechanical or plumbing systems are required. Examples of Miscellaneous projects include repainting or refinishing, or the replacement of existing floor covering with similar material.

Description of Improvement (include color, aesthetic, finish): _____

_____

Location of Improvement (must include site location map): _____

Estimated Dates to Implement Improvement:

Start: _____

Finish: _____

DESIGN VARIANCE

By requesting a design variance from MNAA, the Sponsor is seeking relief from one of more requirements of the Airport Tenant Guidelines Manual (AIRM). Design variance requests will be reviewed and approved by MNAA on a case by case basis. The Sponsor is to coordinate with MNAA for any variance request requirements.

5.0.3 CONCEPT PROPOSAL INFORMATION FORM – RENOVATION/NEW CONSTRUCTION

GENERAL INFORMATION

Date: _____

Sponsor: _____

Sponsor's Representative (primary contact for improvement): _____

Address: _____

Phone Number (office): _____

Phone Number (cellular): _____

Fax Number: _____

Email: _____

RENOVATION/NEW CONSTRUCTION PROJECT

Renovation/new construction projects are defined as those that involve the relocation, demolition, construction, installation or removal of non-load or load bearing walls, partitions, electrical lines, mechanical diffusers, ducts, plumbing equipment, and fixed equipment. Structural modifications are generally limited to minor penetrations through slabs for electrical conduit or plumbing lines. A renovation/new construction project may involve new construction at an undeveloped site or extensive modifications within existing facilities. It will generally involve at least one of the following: increase in electrical power supply requirements, an increase of the load requirements on the airport central plant systems, an increase in site utilities, impact on existing terminal HVAC systems, penetrations of existing structural slabs, impact on passenger, airline or vehicle circulation systems. A renovation/new construction project requires considerable MNAA involvement from concept through project closeout. Note that signage and graphics modifications will likely fall into the renovation/new construction project category.

Description of Improvement (include color, aesthetic, finish): _____

_____

Location of Improvement (must include site location map): _____

Estimated Dates to Implement Improvement:

Start: _____

Finish: _____

Name and Address of Architect and/or Engineer: _____

_____

Estimated cost of the Improvements: _____

Are the improvements within the area and terms of an existing lease agreement?

_____

Are the improvements within an area currently under a sub-lease to another Tenant?

_____

Are the improvements being sponsored by MNAA or MPC?

_____

Are there future plans of additional improvements or expansion planned beyond this proposal?

_____

What specific security area do the improvement occur (non-secure, AOA, SIDA, restricted)?_____

Will aircraft movement be affected? _____

Will aircraft pavement be modified or constructed? _____

Will the contractor require storage of materials? _____

Will hazardous substances or materials be transported or stored in or around the proposed facility during or after construction? _____

Will there be any grease or oil produced as a result of the proposed improvements?

_____

Will a crane be required to implement the proposed improvements? _____

Are there are applicable height restrictions? _____

Will an FAA 7460 need to be filed? _____

Will a grading permit be required? _____

Will a dig permit be required? _____

Will a building permit be required? _____

Will health department approval be required? _____

Will a Water/Sewer and grease trap permit be required? _____

Will traffic control be required? _____

Will blasting be required? _____

Will the improvements be constructed over or near any existing utilities? _____

Is an environmental assessment required or recommended? _____

Are there any special construction requirements? _____

Will the proposed improvements produce:

- Noise?: _____
- Odors?: _____
- Hazards or detriments to health? _____
- Changes in the delivery of goods? _____

Do the proposed improvements require new connections to existing utilities? _____

- Water - Estimated Flow _____
- Sewer - Estimated Flow _____
- Gas _____
- Power – What is the electrical demand.? _____
  - Will a Load Study be completed or required?_____
- Telephone? _____
- Communications/Data/Alarms/Security? _____
- Audio/Visual (General use or Performance Level?_____
- HVAC? _____
- Estimated heating and cooling load? _____
- Wi-Fi / Wireless Router installation? _____

Will the structural system be affected? _____

Will the proposed modifications affect drainage patterns or the rate and amount of surface water runoff?

_____

Will the proposed improvements be visible to the public? _____

Will the proposed improvements create any visual obstructions? _____

Does the proposed improvement include:

Lighting? _____

Landscaping? _____

Will the improvement include any new or modified signage? _____

List all attachments:

_____

_____

_____

5.1 APPENDIX B - AIRPORT SAFETY PLAN

“Safety” is the most important factor related to project construction.

The Contractor’s attention is directed to the safety provisions incorporated in the following Federal Aviation Administration (FAA) documents, which are available for review in the offices of the Metropolitan Nashville Airport Authority - Advisory Circular Number 150/5370-10F, “Standards for Specifying Construction of Airports”; Advisory Circular Number 150/5370-2F, “Operational Safety on Airports During Construction” (Including at end of Section S); Federal Aviation Regulation FAR Part, 107 and 139.

5.1.1 SCHEDULING OF WORK

Prior to the commencement of any work, the Contractor shall confer with MNAA to assure that the scheduling of construction activities in conjunction with aircraft operations is fully understood.

Construction shall be scheduled as outlined in Section 80-03 of Advisory Circular Number 150/537010F to minimize delays to aircraft operations. Movement from one area of construction to another shall be coordinated with MNAA.

5.1.2 CONTRACTOR'S STORAGE & STAGING AREA

The Contractor shall store all material and equipment (when not in use) in the area designated on the Plans provided, however, the storage of all explosives, electrical blasting caps and primer cord shall be governed by Section 70.09.

No storage will be allowed within the AOA.

5.1.3 LIMITATION OF OPERATIONS

The Contractor shall not commence work in any area until:

The proposed work has been previously coordinated with the Chief Engineer and or their designee; he has received MNAA’s authorization to do so and; any and all required security and safety measures and temporary markings are in place.

5.1.4 RUNWAY OR TAXIWAY CLOSURES

Should a runway be required to be closed, it shall be marked by a lighted "X". Closed taxiways shall be marked as indicated in the Plans. Typical taxiway closures may include Type 1 and Type 2 Low Profile barricades with reflective orange and white stripes, alternating orange and white flags, and solar or battery powered flashing lights with red lenses (as needed), red surface-mounted 14-inch L-853 Airport Markers. Airfield lighting and signage within a leading to a closed area must be covered in a manner acceptable to the Owner.

Closed runway marking shall conform to the requirements of FAA AC 150-5340-1 (Current Edition) and shall be submitted to MNAA for approval.

The lighted “X” shall be positioned above the runway numbers on a closed Runway. Said positioning shall be performed by MNAA at the beginning of each work period. At the end of each work period, MNAA shall remove the closed markers.

5.1.5 PAINTING TEMPORARY & TAXIWAY CLOSED MARKERS

Painted runway and taxiway closed markers will not be permitted because of the short-term (temporary) closures anticipated.

A. CONTRACTOR'S ACCESS TO AIRPORT

Since the area of construction is within the active AOA, the Contractor is responsible for anyone entering the AOA, which are related to their activities in any manner. The AOA definition is denoted in Section 10.

Contractor's access to the construction site shall be via the indicated gate(s) only; no other access points are permitted. Gate(s) shall remain secure at all times and opened by the contractor only to allow for ingress/egress of contractor's vehicles and personnel to construction site. Contractor shall not interfere with normal airport operations to include response through contractor-controlled gates by airport emergency vehicles or personnel. The contractor may also be given access to certain restricted or security areas. Such access shall be granted in writing by Owner. The contractor shall observe all rules and regulations pertaining to said areas. Violations of any and all rules and regulations and/or failure to properly lock, with all locks, said areas shall be grounds for a fine of up to $500 per violation and repeated violations shall be cause to remove the Contractor, its equipment, vehicles, and/or personnel from said areas and utilize other Contractors of Owner’s section, with all costs so incurred chargeable to the Contractor. Any fines assessed against Owner by the FAA or any other unit of government shall be assessed against the Contractor, if the assessment of such fines shall be due to the act or omission of the Contractor, its subcontractors, suppliers or any of their employees. Any fines provided for in this section may at Owner’s sole discretion, be deducted from funds due or to become due to the Contractor.

Employee parking will only be permitted in the area designated for the Contractor's staging and storage area. No personal vehicles permitted within the AOA.

All vehicular traffic in the AOA shall be coordinated with the Tower. This shall include, but not be limited to the following:

1. Movement of Contractor's vehicles from staging area into the AOA.
2. Movement of Contractor's vehicles from one area in the AOA to another, and
3. Movement of Contractor's vehicles out of the AOA.

Each of these mentioned movements shall be by drivers, furnished by the Contractor, who hold a valid AOA driver's license or approved escorts. At no time will unescorted movement of vehicles and/or personnel be permitted, except for movement within a designated closed area on the AOA.

All Contractor vehicles or Contractor related vehicles accessing the construction site shall be issued and properly display an Airport Authority numbered vehicle pass, along with visual company identification (decal or sign) attached to both sides of vehicle. The Contractor and his gate guard shall maintain a log of all vehicle passes issued. Refer to Section 5.2.14 for detailed gate-guard orders.

All Contractor personnel and Contractor related personnel accessing the construction site (designated closed area) are required to have either an Airport Authority numbered photo ID badge or be within visual and physical control of personnel with a photo ID badge with escorting privileges. Contractor must have sufficient personnel with photo ID badges to maintain physical control of all personnel without photo ID badges.

Limit of number of escorted individuals in the construction site. (designated closed area.)

1. General Aviation and Airfield (AOA) – 1 escort per 15 individuals
2. Secured SIDA Ramp (Terminal Ramp) – 1 escort per 10 individuals

The Contractor, at a minimum, will be required to have the following photo badged personnel on-site:

1. A guard at each active temporary AOA access gate. The guard assigned to the gate can be a Contractor employed person or person contracted directly by the Contractor;
2. A supervisor for each trade (superintendent or crew chief employed by the Contractor or subcontractor) and in each unique area of the construction site (designated closed area) where work is active. Plan quantities for Gate Guards and Visual Escorts are for AOA entry and site access only. The Contractor is required to have badged visual escorts at each active work area. Quantity overruns for Visual Escorts not utilized for site access will not be approved;
3. Contractor shall designate a person, whose name is on file with Airport Police ID Section, to authorize issuance of ID badge to all Contractor and subcontractor personnel.
4. When the designated work area is defined in the Secured SIDA Apron, in addition to the above requirements, all vehicle operators, that will transverse the Secured SIDA Apron, will be required to be badged in accordance to the Secured SIDA requirements. (Refer to Section 5.1.9)
5. To the extent possible, deliveries shall be to the Contractor's staging area. Minimize deliveries directly to the AOA.

5.1.6 LIMITS OF CONSTRUCTION

The Contractor shall work within the limits of construction as designated on the plans. The Contractor shall remove equipment from the construction area at the end of each workday if said equipment penetrates the limits of the airfield's imaginary surfaces as per FAR Part 77, when noted surfaces are active or if so directed by the Owner. The Contractor shall not work within 75' of the edge of active aprons and taxiways and 181' of the edge of active runways unless noted aprons, taxiways, and

runways are closed. At the end of each workday, rough grades or open excavation in excess of three (3") inches deep shall not be permitted within the above noted areas if the apron, taxiway, and/or runway is to be opened to traffic unless the drop-off is properly marked and approved by MNAA.

The Contractor shall notify MNAA two (2) days in advance if it becomes necessary to work within or have equipment enter/traverse any Glide Slope Critical Area. The Contractor shall remove their equipment from the Glide Slope Critical Area at the end of each workday.

The boundary of the construction site, as indicated, shall be clearly marked. For the “unrestricted access construction limits barricade.” This marking shall consist of brightly colored ribbon or flagging (minimum width 6”) suspended at least 4’ above ground elevation. For the “restricted access construction limits barricades” this marking shall consist of portable Type I barricades placed at 8' centers. No Contractor or Contractor related personnel shall be allowed beyond these boundaries.

When, at the end of a workday, a drop-off in excess of 3” is necessary, with approval from the Owner, the Contractor shall delineate this edge with lighted low-level barricades as detailed elsewhere within this safety plan. These barricades shall be placed as close to the edge as possible and shall be continuous. The low-level barricade placement shall be approved by MNAA prior to opening the adjacent AOA area.

5.1.7 MOTORIZED VEHICLES

When operating in active AOA areas it is essential vehicles be clearly identifiable for control purposes by means of checkered pattern flag (orange and white) and flashing yellow light.

Vehicles must have affixed on both sides visual identification (decal or sign) of the company name or logo while operating within the Air Operations Area (AOA) and secured SIDA apron, in addition to authorized airport vehicle passes.

5.1.8 DEBRIS

Waste and loose material capable of causing damage to aircraft landing gears, propellers or being ingested in jet engines will not be placed on active aircraft movement areas. Material tracked on these areas will be removed continuously during the work project. Failure to control debris will result in fines of $500.00 per occurrence of debris on runways and taxiways.

The Contractor shall delineate the haul routes for all phases with Type II lighted barricades placed at locations as directed by the Tenant. The paved portion of the haul routes shall be kept continuously “broom clean” with motorized clean-up equipment or as approved by MNAA.

The Contractor shall provide a dedicated clean-up crew to maintain the cleanliness of the haul route where it crosses active runways or taxiways. These crossings must be maintained “broom clean” at all times. Failure to maintain a clean haul route will result in the immediate suspension of work. The Contractor will not be permitted to resume work until a clean-up procedure satisfactory to MNAA in its place.

5.1.9 NOTICE OF PROPOSED CONSTRUCTION

The Contractor must submit FAA Form 7460-1, "Notice of Proposed Construction and Alteration", copies of which can be obtained from the Owner, to the Federal Aviation Administration and obtain approval, 90 days prior to bringing equipment onto the airport and into the construction area.

5.1.10 PROJECT STIPULATIONS

The Contractor's attention is directed to Section 80-06 Project Stipulations.

5.1.11 SECURITY

The Contractor agrees to observe all security requirements of Transportation Security Administration (TSA) 49 CFR 1540 and 1542, the Airport Security Program, and as they may be amended hereafter, parts of which will be furnished to Contractor, as approved by the TSA, and to take such steps as may be necessary or directed by MNAA to insure that subcontractor, material suppliers, employees, invitees, and guests observe these requirements.

If MNAA incurs any fines and/or penalties imposed by TSA on or any expense in enforcing the regulations of TSA 1542 and/or the Airport Security Program, as a result of the acts or omissions of the Contractor, the Contractor shall pay and/or reimburse all such costs and any expense. The Contractor further agrees to rectify any security deficiency as may be determined as such by MNAA or TSA. MNAA reserves the right to take whatever action necessary to rectify any security deficiency as may be determined as such by MNAA or the TSA, in the event Contractor fails to remedy the security deficiency.

The Contractor shall furnish Department of Public Safety a letter outlining the project’s security plan. The plan must be approved, and a security inspection conducted prior to the issuances of the Notice to Proceed.

The Contractor shall provide on-call personnel, and their emergency phone numbers, 24 hours a day to respond in case of emergencies or security violations.

If necessary, the Contractor shall conduct monthly onsite security meetings with the Engineer and Department of Public Safety to discuss security concerns and update construction changes affecting security.

If requested by MNAA, a Security Plan shall be submitted two days prior to Notice to Proceed for review and approval.

Without modifying the foregoing, the Contractor shall be required to obtain MNAA security badges for all supervisory personnel of the contractor and its subcontractors when working within the AOA and/or Secured SIDA areas. All supervisory personnel shall have had background checks and SIDA training. Security badges shall not be issued without the completion of proper background investigations and SIDA training.

The background investigation shall consist of a Criminal History Records Check (CHRC) by means of fingerprint submission to the Federal Bureau of Investigation. The CHRC must show that the individual has not been found guilty of any of the crimes listed in 49 CFR Part 1542.209 in the last ten years. Contractor must certify to MNAA that none of its employees and agents, including its subcontractors and their employees and agents, shall be allowed in a secured area on the job site at any time for any purpose unless a satisfactory background investigation has been completed on such individual or such individual is to be, at all times, escorted by a person who has the correct security badge with escorting privileges.

MNAA requires that the Contractor's personnel not under escort, have attached to and worn at all times, on an outer garment, above the waist, an identification badge issued by MNAA Department of Public Safety. Absence of this identification card shall be grounds for removing the supervisor/employee from the construction area.

The following charges shall be in effect for issuing identification badges but are subject to change without notice (Verify pricing with DPS):

1. CHRC Fingerprinting $40.00 per applicant
2. Initial Badge Issue - Non-Refundable $25.00
3. Reissue Lost Security ID Access Badge $100.00
4. Reissue Stolen Security ID Access Badge $25.00
5. Reissue Stolen Security ID Access Badge (without police report) $100.00
6. Reimbursement for Found ID Badge $50.00
7. Replacement Cost for Any Issued Item Not Returned (Includes: badge, key, placard, etc.) $100.00
8. Vehicle ID Sticker $24.00 per Vehicle per Year

Upon completion of the project and prior to final payment, all security items issued shall be returned to the Metropolitan Nashville Airport Authority's Department of Public Safety. A charge of $100 per item shall be imposed for each security item not returned.

All authorized vehicles, including escorted vehicles, must display the appropriate numbered color-coded vehicle identification pass as issued by the MNAA's Department of Public Safety or their designee.

5.1.12 REQUIRED CONTRACTOR AOA ESCORTS

The Contractor shall be required to hire, at their own expense, an AOA approved escort, which MNAA has approved. Minimum charges of $18.00/hour should be considered as a standard fee for the position. Flaggers and/ or visual escorts may be required as part of the safety plan, the Contractor shall be required to supply them at their own expense.

5.1.13 REQUIRED SIDA APRON CHECKPOINT

For the purpose of the contract and these specifications, access to the secured SIDA area, will be required. The Contactor must notify the Construction Director ten working days prior to heavy traffic operations so that additional access points may be established.

5.1.14 CONSTRUCTION GATE-GUARD REQUIREMENTS

The guard must have either a radio or cell phone at all times while monitoring the gate entrance.

Guard must have an airport issued ID badge media for the area.

To notify Airport Police for assistance, emergency or breach of security call 275-1703.

Each truck's initial entry must be signed-in with the driver's name, truck identification, Company name and truck number. Verification of trucking company must be compared to authorized list provided by the Contractor.

Individuals allowed through the gate must have proper individual airport ID media and vehicle identification stickers or placards and must be verified on each entry by guard. Individuals and vehicles without proper identification media must obtain the proper vehicle placard and be under escort or physical observation of the dedicated flagman before movement from gate area.

Log must indicate the time and date of every entry and exit.

Each time the truck returns, there must be another verification of the driver from the original sign-in and truck identification along with time of entry and exit. Guard must stop and verify driver identity on each truck's re-entry.

Only authorized construction vehicles are allowed through the gate and all other unauthorized vehicles must be prohibited from entering. The gate guard should not interfere with normal operations such as response by airport emergency vehicles.

Any unauthorized entry by vehicle or individual must be reported immediately to the Airport Police immediately by calling 275-1703.

At no time will the gate be left unmonitored when in the open and unsecured position for any length of time.

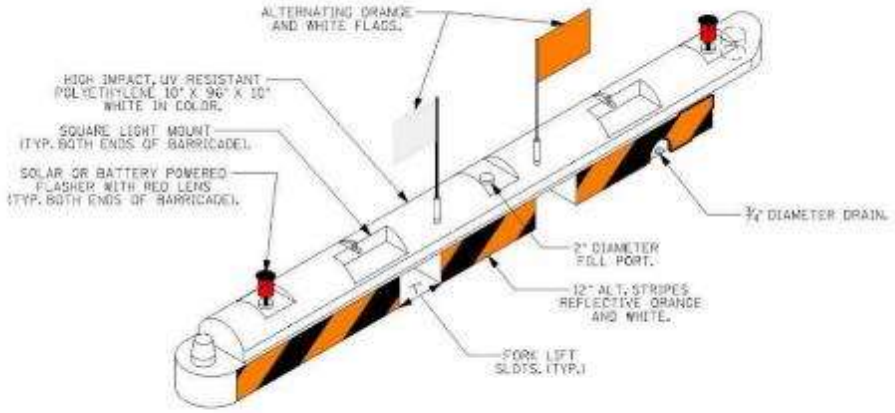
At the end of the day, the guard will verify with the contractor that all vehicles have been removed from the construction site before the gate is secured for the evening.

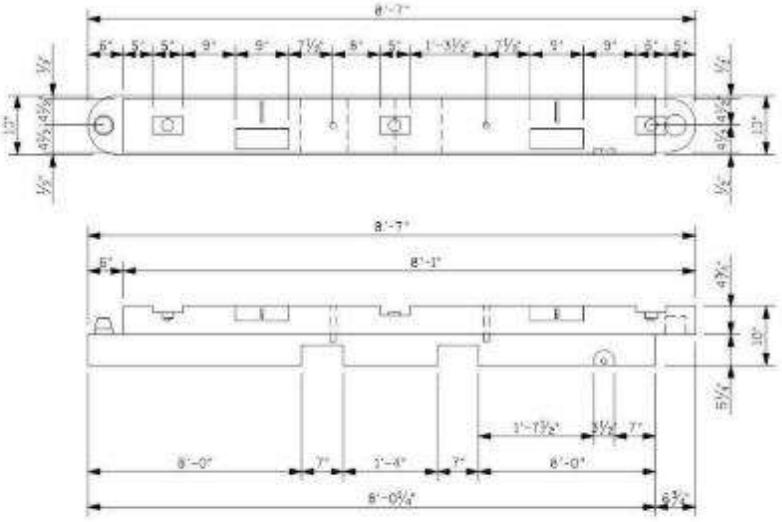
Guard must be able to answer all security access and procedure questions asked by TSA officials or MNAA officials when questioned and be able to present a copy of this procedure for review.

A fine of up to $10,000 can be issued by TSA for failure to comply with any of the above listed gate-guard requirements.

5.1.15 TYPE 2 MULTI-BARRIER LOW PROFILE (WHITE) WATER FILLED AIRCRAFT BARRICADE DETAIL

PRELIMINARY DESIGN - NOT FOR CONSTRUCTION





NOTES:

1.) INTENDED USE FOR THE FOLLOWING:
- MARKING/LIGHTING OF TEMPORARY HAZARDS WITHIN THE ADA.
- LONGTERM CLOSURE OF AIRCRAFT ROUTES.

2.) INSTALL AT 12" O/C SPACING ALONG FULL WIDTH OF PAVEMENT.

3.) USE TYPE 2 AIRCRAFT BARRICADES IN AREAS SUBJECT TO JET BLAST.

4.) BARRICADE SHALL BE EQUIPPED WITH ALTERNATING ORANGE AND WHITE 20"x20" FLAGS.

5.) BARRICADES SHALL BE WATER-FILLED AND MODULAR TO ASSEMBLE/DISASSEMBLE AND NEST FOR COMPACT STORAGE.

6.) OWNER WILL PROVIDE ALL BARRICADES.

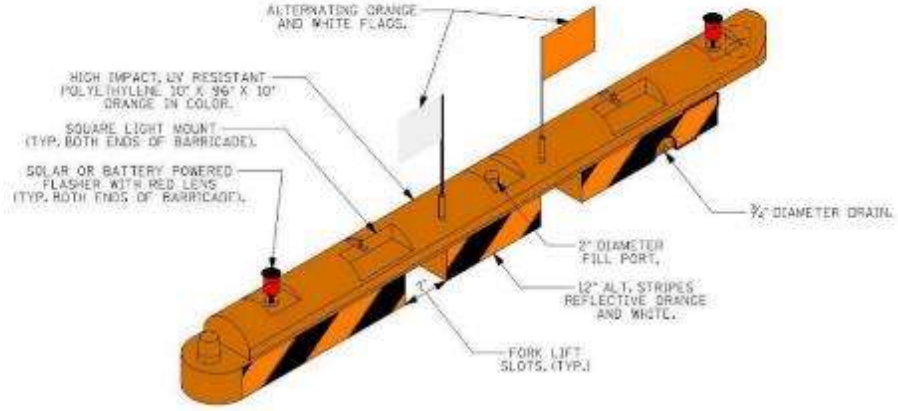
TYPE 2 - MULTI-BARRIER LOW PROFILE WHITE WATER FILLED AIRCRAFT BARRICADE DETAIL

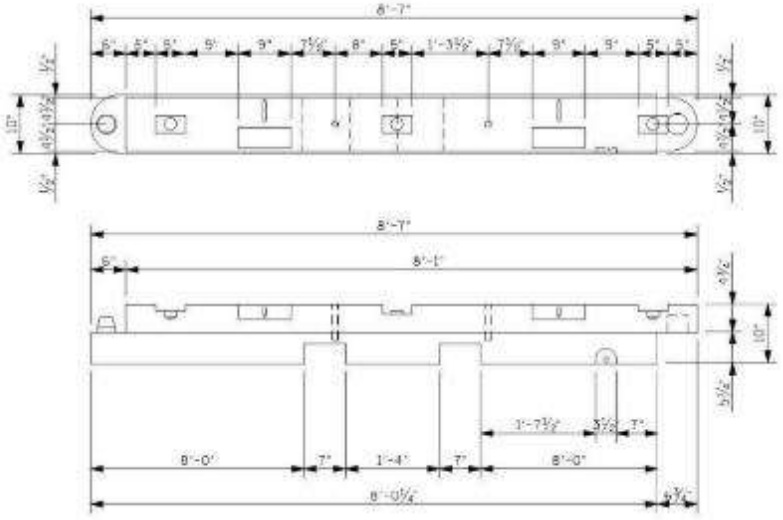
N.T.S.

PRELIMINARY DESIGN - NOT FOR CONSTRUCTION

5.1.16 TYPE 2 MULTI-BARRIER LOW PROFILE (ORANGE) WATER FILLED AIRCRAFT BARRICADE DETAIL

PRELIMINARY DESIGN - NOT FOR CONSTRUCTION





NOTES:

1.) INTENDED USE FOR THE FOLLOWING:
- MARKING/LIGHTING OF TEMPORARY HAZARDS WITHIN THE AOA.
- LONGTERM CLOSURE OF AIRCRAFT ROUTES.

2.) INSTALL AT 12' C/C SPACING ALONG FULL WIDTH OF PAVEMENT.

3.) USE TYPE 2 AIRCRAFT BARRICADES IN AREAS SUBJECT TO JET BLAST.

4.) BARRICADE SHALL BE EQUIPPED WITH ALTERNATING ORANGE AND WHITE 20"x20" FLAGS.

5.) BARRICADES SHALL BE WATER-FILLED AND MODULAR TO ASSEMBLE/DISASSEMBLE AND NEST FOR COMPACT STORAGE.

6.) OWNER WILL PROVIDE ALL BARRICADES.

TYPE 2 - MULTI-BARRIER LOW PROFILE ORANGE WATER FILLED AIRCRAFT BARRICADE DETAIL

N.T.S.

PRELIMINARY DESIGN - NOT FOR CONSTRUCTION

5.2 APPENDIX C - MNAA APPROVED TREE LIST

The following is a list of approved trees that may be planted. Any tree not on this list must be submitted to MNAA for approval. Reference FAA Advisory Circulars and regulations for management of vegetation in the airport environment.

1. Dogwood
2. Redbud
3. Oaks (Pin Oak, Red Oak, Post Oak, Blackjack Oak)
4. Magnolia
5. Sweet Gum
6. Maple
7. Hickory
8. Sycamore

5.3 APPENDIX D - MNAA APPROVED PAINT COLORS

1.	Terminal Steel	#4110 1J IE 1T
2.	Hand Rails Toll Booths	#Alabaster SW7008
3.	Terminal Walls	#105 1E 1/2J 1K 3T
4.	Air Link Walls	#689 21/2E 1Y1J 16K
5.	Air Link Doors and Trim	#109
6.	Floor Enamel Red	#1079
7.	Rhino Orange	#2748
8.	Equipment Room Green	#104
9.	Outside Walls Bridges	Column Gray, also made in a DTM
10.	Cleaver Brooks Blue	#2748
11.	Burn Orange	#4138 Snow Plow
12.	Doors Frames Concourse & HM Frames	#2744
13.	Play Ground Blue	#4138
14.	Chilled Water Green	#2907
15.	Domestic Hot Water	#108
16.	Boiler Room Sink	#4140
17.	Boiler Room Walls	#109
18.	Dark Blocks	Gray #919
19.	Chain Fence	Gray #2749
20.	Door Jams	White #2710 &#915
21.	Door Jams	Ivory
22.	Toll Plaza Canopy	#4110 2E 2J 2T
23.	Bathroom	Crimson (Dark Burgundy)
24.	Blue Curbs	#907
25.	Thrifty Blue	#104
26.	Ceiling	#515 Primer & 520 Finishes

Porter Paint – *All formulas are on file at MNAA Maintenance Offices.*

5.4 APPENDIX E - STANDARD OPERATING PROCEDURES FOR FIELD-RUN SURVEY

5.4.1 FOREWORD

This Manual establishes uniform policies and procedures for surveys within the Metropolitan Nashville Airport Authority (MNAA) owned and operated airports. A legal standard for surveys is not established or intended. It is published solely for information, and guidance for third party surveyors, and consultants and Tenants.

The Manual does not establish any legal or administrative interpretations of MNAA contracts. In the event that the terms of a Contract and the Manual are in conflict, the Manual is subordinate to the Contract.

A. APPROVED FOR DISTRIBUTION



Director, Design Division Date 04/12/2017

MNAA AIRPORT SURVEYOR

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APPROVED REVISIONS

Revision: 1 Date:01/11/2017 By: MDF

Revision: 2 Date: 04/12/2017 By: MDF

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* Sections of this document were taken from the TDOT Survey Manual

5.4.3 SECTION 1 - INTRODUCTION AND GENERAL INFORMATION

A. Purpose

The purpose of this manual is to establish and document criteria and parameters to be used by design consultants, surveyors, airport Tenants, third-party developers, the Federal Aviation Administration (FAA), and Metropolitan Nashville Airport Authority (MNAA).

B. Organization

MNAA currently owns and operates two airports in the middle Tennessee region.

1. Nashville International Airport (BNA)
2. John C. Tune Airport (JWN)

Although there are different safety and access requirements to perform work on either airfield, the same survey standards are expected to be followed at each airport.

The information included in this manual has been developed in conformance with applicable department directives, policies and procedures, as well as, nationally accepted geodetic surveying standards and practices to provide guidance during the field-run surveying of projects

This manual is neither a textbook nor a substitute for surveying knowledge, experience or professional judgment. It is intended to establish minimum MNAA surveying standards, provide uniform procedures for implementing survey best practices, assure quality and continuity in collection of survey data, and assure compliance with Federal and State performance criteria.

National Geodetic Survey (NGS) and FAA have produced several manuals relating to Airport Surveying. The current versions of the FAA Advisory Circulars (AC) are as follows:

1. AC150/5300-16A, “General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey” dated September 15, 2007.
2. AC150/5300-17C “Standards for Using Remote Sensing Technologies in Airport Surveys” dated September 30, 2011
3. AC150/5300-18C “General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards” dated September 30, 2015.
4. AC150/5300-19 “Airport Data and Information Program” dated September 30, 2015.

Users of this document must use the most current version of each AC at the time of employment with MNAA. In the event that guidance conflicts among these publications, the more stringent guidance shall be implemented unless otherwise directed by MNAA.

This manual requires the use of the Tennessee Spatial Reference Network (SPC TN). NAD 83 (2011) is a spatial reference network of continuously operating Global Positioning System (GPS), reference stations (CORS) throughout Tennessee that can be used for differential GPS applications.

The procedures and criteria included in this manual shall be adhered to unless subsequent study and decisions by MNAA authorize changes. It is not intended that the procedures and criteria in this manual are all inclusive, but they do include the major items thought to impact design projects.

The information presented in this Standard Operating Procedure (SOP) is generally applicable to all locations, except where state-specific requirements differ concerning certifications, licenses and registrations. Specific surveying problems encountered by the survey crew may require the adaptation of existing equipment or design of new equipment. Such innovations shall be documented in the survey crew's field logbook.

C. Responsibilities

The surveyor shall take all reasonable precautions to prevent damage to airport property and adjacent public and private property and shall restore the work area to the condition existing prior to the surveyor's entry.

All work shall be completed under the direction of a registered Tennessee Professional Land Surveyor. All work shall be conducted using, equipment, personnel, and procedures that will insure compliance with the accuracy standards as defined below and by the Standard of Practice as defined by Chapter 0820-03, Title 62, Chapter 18, *T.C.A.*

It is the responsibility of the supervising land surveyor to ensure that all work complies with all state and local regulations. All documents submitted shall bear the surveyor's seal, signature, and a certificate that all work was done under the surveyor's supervision and that all information contained in the document is true and is accurately shown.

Survey Manager:

The Survey Manager is responsible for ensuring that all work is in accordance with acceptable surveying practices. The Survey Manager is required to coordinate with MNAA's Airport Surveyor and obtain the latest control point list and maps of the MNAA monuments closest to the project area. Prior to the commencement of any work, the Survey Manager shall confer with the Airport Surveyor to assure that the scheduling of construction activities in conjunction with aircraft operations is fully understood.

Field Team Leader:

The Field Team Leader is responsible for ensuring that procedures are implemented in the field and that those personnel performing surveying activities have been briefed and trained to execute these procedures. The Team Leader will be required to coordinate all activities with the Airport Surveyor and or Airport Project Manager on a daily basis.

D. Badging and Security

All surveying personnel working within the AOA will be required to have a current MNAA-issued security badge with escorting privileges and vehicle sticker. Work will not be allowed until all badging requirements are complete.

MNAA guidelines require that all consultants, subconsultants, and contractor's personnel not under escort, have attached to and worn at all times, on an outer garment, above the waist, an identification badge

issued by the MNAA Department of Public Safety. Absence of this identification card shall be grounds for removing the supervisor/employee from the construction area.

E. Public Relations

Each surveyor employed by MNAA is a representative of MNAA and is responsible for developing and maintaining public goodwill. The outdoor nature of surveying, keeps field personnel in the “public eye” much of the time. Work shall be accomplished efficiently and with a minimum of idle time. All direct contact with the public shall be pleasant, courteous, and businesslike. This includes answering questions, listening to criticism (justified or not) and suggestions.

F. Controlling Traffic During Survey

The Surveyor shall not commence work in any area until the proposed work has been previously coordinated with the Airport Surveyor and/or their designee. All reasonable measures shall be used to prevent interference with aircraft and vehicular movement. This section will serve as the specific policies and regulations required to perform surveying operations inside the AOA. Surveying outside the AOA will require project specific approvals and coordination with the Airport Surveyor and/or their designee.

There is no specific law authorizing members of a survey party to control aircraft or vehicle traffic. However, MNAA personnel and their consultants are empowered to survey “without interference.” All reasonable measures shall be used to preclude interference with aircraft and vehicular movement.

Below are four basic area types of surveying, each one is further defined below.

ACTIVE AREA

Is defined as any area open to aircraft movement, this includes aprons, ramps, taxiways and runways. This is not the preferred method and only will be used to pick up missing topo data on a very limited basis. On special occasions, very short closures or special situations may be handled by the Airport Surveyor and/or their designee.

Accessing and working in this area will require someone with AOA driving privileges to coordinate their movement on the active airfield by communication with the FAA tower or at JWN be able to monitor the Unicom radio transmissions.

CLOSED AREA

Is defined as any area closed to aircraft movement, this includes aprons, ramps, taxiways and runways. This is the preferred method of surveying while at the BNA and JWN airports. This will involve coordinating closure of the area with operations and maintenance departments. The Airport Surveyor and/or their designee will be the point of contact to coordinate the date, time and length of the airfield closure. The amount of airfield closures will be kept to a minimum due to the impact on aircraft operations. All survey crews are encouraged to work extended hours to minimize the closures.

Access to the area will be provided by an AOA approved escort. Once in the closed area, survey crews will be required to stay within the closed and barricaded areas. Crews shall have all equipment and supplies to remain in the work/closed area for the full duration of the work period. Multiple trips in and out of the work area will not be permitted.

CONSTRUCTION AREA

Is defined as the area of the airfield closed for an extended period to allow for construction of a project. Access into the construction area will be defined on the issued for construction plan set.

The prime contractor will be responsible for the survey crew's access to the construction work area.

All other surveying in areas outside the AOA is concerned to be as defined below:

REMOTE AREA

Is defined as any area outside the AOA, including but not limited to, parking lots, private and public roadways, leased areas, etc. The Airport Surveyor and/or their designee will be the point of contact to coordinate work and access into the work area.

While surveying on public roadways, lane closures shall not be considered until all other alternatives have been exhausted. In the event that traffic control measures are necessary, they shall be determined by the procedures outlined in the Manual on Uniform Traffic Control Devices (MUTCD).

G. Unmanned Aircraft Systems

The Metropolitan Nashville Airport Authority advises all surveyors and mapping companies that the use of Unmanned Aircraft Systems (UAS), Unmanned Aircraft Vehicles (UAV) or "drones" are prohibited on and above airport property. This applies to UAS and UAV's of all shapes and sizes at both BNA and JWN airports.

For more information about UAS/UAV use, see FAA Part 107 which defines the regulations of these systems for revenue and recreation use.

H. Safety

Survey personnel perform their work in many different hazardous environments including rugged terrain, around moving and parked aircraft, and high-speed vehicular traffic. The promotion of a safe atmosphere requires the acknowledgment of hazards and attention to safe practices by all employees. However, the Field Supervisor in charge of the party must assure safe conditions exist. As a part of this responsibility, he or she shall make sure all Personal Protection Equipment (PPE) and safety practices are maintained and in use at all times.

Placement of vehicles, equipment and personnel shall not interfere with active runways, taxiways, and apron areas. PPE shall be used any time employees are out of their vehicles. PPE includes, but is not limited to, a hard hat, a class III reflective safety vest, and substantial footwear. The use of seat belts by all parties in vehicles is mandatory. No smoking is allowed inside the AOA and the Surveyor must adhere to FAA's strict "no texting while driving" policy.

5.4.4 SECTION 2 – GENERAL SURVEY INFORMATION

A. Survey Datums and the Tennessee Grid System

Origin of Datums

The North American Datum of 1927, established by the United States Coast and Geodetic Survey (USC & GS), has recently been adjusted and republished by the National Geodetic Survey (NGS). This new North American Datum of 1983 (NAD 83) has been adopted for reference of control for all MNAA projects. The reference for vertical control, the Sea Level Datum of 1929 established by the USC & GS, has also been adjusted by NGS. This new North American Vertical Datum of 1988 (NAVD 88) has been adopted for reference of vertical control for all MNAA projects.

Vertical Datum

Vertical datum is mean sea level. A network of monuments has been established throughout the United States and a listing has been published by NGS. An assumed vertical reference will not be used for any airport projects.

Horizontal Datum

All survey projects shall be tied to the Tennessee Geodetic Reference Network (TGRN). This will allow all surveys to be correlated to a single reference framework. Point locations will be fixed and cannot be considered legally lost. Overlapping projects will be consistent and plane surveying will be possible over large areas without the introduction of significant error. Also, a uniform computational base will be established and fewer errors will go undetected.

Tennessee Grid System

The Tennessee Grid System is derived from the Lambert Conformal Conic Projection. Both BNA and JWN airports are based on this grid system.

Airport Geodetic Reference Network (AGRN)

To more easily and accurately provide ties to NAD 83 and the Tennessee grid system, the AGRN has been developed. It is a highly accurate network of three dimensional monuments designed for use with Global Navigation Satellite System (GNSS) equipment. The AGRN was tied to and is consistent with NAD 83 and the TGRN.

All Airport surveys that relate to the grid system shall be datum adjusted to raise or lower the plane of projection of the surveyed points to the earth's surface. Each datum adjustment factor is airport specific and is computed by holding the NGS published position for the airports, (BNA or JWN) PACS monument, see Section 3 (4) for data.

Standard Units

The standards specified in this manual were selected to assure a consistent precision and accuracy in all the measurements, coordinates, elevations, base mapping, digital terrain models (DTM) and survey reports upon which design engineering, the airport and FAA mapping are based. The surveyor shall certify that the required standards and specifications have been achieved.

The following measurement unit conventions shall be used on all MNAA surveys:

1. Length or distance measurements shall be in US survey feet.
2. Area units shall be described in square feet.
3. Angular measurements shall be in degrees, minutes, seconds.
4. Control line & boundary line directions shall be described by bearings.

B. Data Collectors and Field Books

General

The primary method of recording data for field surveys is the electronic data collector. However, field books are frequently used to supplement recorded data. Notes must be legible and written with clarity.

Bench Mark Levels

Bench Mark level notes are recorded in the field book and must be reduced and checked.

C. Horizontal and Vertical Measurements

Linear Measurement

Electronic distance measuring equipment shall be used whenever possible to obtain linear measurements. Total stations shall be used to measure the distances between points.
Horizontal distances are to be used in the preparation of maps and plans, and in centerline stationing.

Angular Measurement

A horizontal angle is the act of making one direct and one reverse observation on each backsight and foresight point and averaging the angles. Vertical angles shall be read in both direct and reverse positions of the scope, and the angles averaged. For extending straight lines, “double-centering” of the transit or theodolite shall be used.

Vertical Measurement

When an engineer's level and level rod are used, the turning points shall be "balanced", and the level run tied to a known bench mark. When an EDM is used, vertical angles shall be read in both direct and reverse positions of the scope, and angles averaged.

5.4.5 SECTION 3 - SURVEYING PROCEDURES AND PRACTICES

A. General Survey Procedures

This section details the various activities involved in the survey process, including data requirements and procedures for gathering and presenting the data. Recent developments in surveying technology have made many methods obsolete. In general, it is assumed that the surveyor is using total stations, data collectors, GNSS equipment, network real time kinematic (RTK), data reduction software, and a computer aided drafting system. The requirements specified in this manual are intended to control the end product rather than intermediate activities, i.e., data collector formats. The required product will be a complete survey in electronic format, certain check plots and required notes, and documentation. Because of rapidly changing technology, data transfer methods will not be defined here.

B. Project Control (General)

Horizontal

All survey projects shall be tied to the Airport Geodetic Reference Network (AGRN). Ties shall consist of intervisible monuments along the length of the project. Spacing will depend on the type of project, terrain, etc. and will be determined by the party ordering the survey. Project control points shall be set at a maximum distance of 500 feet.

Semi-permanent monuments shall be 5/8" reinforcing bars with plastic caps. The plastic caps shall be inscribed with the survey company information.

Coordinate values for the monuments will be "Tennessee State Plane Grid Coordinates". These coordinates will be datum adjusted before being supplied to field crews for surveying and/or mapping. All ties to the AGRN will be made utilizing GNSS techniques. All GNSS surveys shall meet First Order (1:100000) accuracy standards as an absolute minimum. One part in one million closure for GNSS control work is required.

Project control traverses are also approved to be used. The traverse will commence and end at pairs of AGRN tied control points. Since these surveys originate and terminate at points with datum adjusted Tennessee State Plane Coordinates, all computed coordinates will be datum adjusted Tennessee State Plane Coordinates. No further datum adjustment is required.

Project control traverses shall meet Second Order Class II Standards (1:20000) or better.
After the raw field data for project control has been compiled, computed, and minimum standards met, traverses shall be adjusted using the least squares method.

Each leg of the project control survey (between adjacent pairs of AGRN tie points) shall be considered and adjusted independently.

Coordinates will be listed with current notation plus the year of the upgrade in parentheses, immediately following. Therefore, reference to current coordinate values will be, for example: NAD 83 (2011) for geographic coordinates and SPCS 83 (2011) for state plane coordinates.

Vertical

GNSS methods may not be used as for vertical control for projects. Hard levels must be run through each control point to insure correct elevations for each point.

C. MNAA CADD / GIS Base Files

MNAA maintains both MicroStation master files and ESRI Geographic Information Systems (GIS) database for both BNA and JWN airports. On request, MNAA provides consultants and subconsultants these files for use. These files are given as is and with no warranty of the accuracy of the line work. The engineer, architect, or surveyor shall verify all data.

D. MNAA CORS Base Station

MNAA currently operates a local GPS Continuing Operating Reference Station (CORS) that is used as the main control station for all MNAA surveys at both BNA and JWN airports. The base station is located on top of the terminal building and can provide streaming RTK corrections and static log files upon advance notice and approval to help supplement local and TDOT network control observations.

The current Meta date for MNAA BASE is as follows:

Trimble NetR9 base Station, Antenna Type:	Zephyr Geodetic 2 Antenna
Measurement Method:	Bottom of antenna mount
Reference Latitude:	36°07'53.19375" N
Reference Longitude:	86°40'09.69557" W
Reference Height:	158.778 [m] 520.924 [sft]
Date:	May 2016

Positions were established by multiple OPUS solutions observed in November 2014 and the precise ephemeris was used. Horizontal values are NAD 83 (2011), and the vertical values are NAVD 88 computed using Geoid 12A.

E. AGRN Control Points

BNA

Three National Geodetic Survey (NGS) monuments are used as the basis of the BNA AGRN. Survey data sheets can be obtained from the NGS database.

AA4380 – BNA ARP 1964
Primary Airport Control Station (PACS) Cooperative Base Network Control Station

AA4381 – BNA AP 1964 STA A2
Secondary Airport Control Station (SACS)

AA4382 – BNA AP 1964 STA B2
Secondary Airport Control Station (SACS)

There are currently eighty-nine (89) brass disk monuments set in concrete airfield sign bases across the airfield that make up the AGRN.

Contact Airport Surveyor for current list for AGRN control points.

JWN

Three National Geodetic Survey (NGS) monuments are used as the basis of the JWN AGRN. The survey data sheets can be obtained from the NGS database.

DG7706 – JWN A 1990
Primary Airport Control Station (PACS) Cooperative Base Network Control Station

DG7707 – JWN B 1996
Primary Airport Control Station (SACS) Cooperative Base Network Control Station

The 1996 SACS monument listed below has been destroyed but not removed from the NGS database.

DG7711 – JWN C 1996
Secondary Airport Control Station (SACS) Cooperative Base Network Control Station

A new SACS monument has been set and observed. The data has been submitted to the FAA Airports Surveying Geographic Information System (AGIS) and NGS.

JWN D 2016
Secondary Airport Control Station (SACS)

Contact Airport Surveyor for current list of AGRN control points.

F. Bench Levels and Check Levels

Vertical Datums

All vertical datums shall be tied to monuments established by the NGS. Note: Assumed datums or the use of GNSS to establish vertical control is NOT permitted.

Methods and Accuracy

Bench marks will be set, and check levels run before they are used for development of the DTM. Third order accuracy shall be obtained before adjustments are made. Check level calculations shall be shown in the notes of the field book.

Bench Mark Location

Bench marks shall be set for each project. All bench marks will be permanent in nature. Usually, GNSS project control points will be used as bench marks.

Descriptions

All bench marks are to be fully described. Example: B.M. No. 35, elev. 594.68, Aluminum disk atop 5/8" rebar stamped "HV-4" driven flush to the ground, 16 ft right, Airfield Guidance Sign 243.

Field Notes

Field notes are not a required part of the survey. However, a field book shall be kept to record information which would be of use during data analysis and editing, development of plots, and review of activities.

G. Construction Surveying

During the construction phase, the contractor must employ a registered Tennessee surveyor to perform all setting stakes or marks to establish alignment, grade, and slopes for grading, ditches, to establish alignment and grade for base and surface courses; and to establish location, grade, and alignment of structures. Construction survey work will also consist of taking measurements, such as cross sections or a digital terrain model (DTM), for determining quantities of work.

If any survey monuments set by MNAA are carelessly or willfully destroyed or disturbed by the contractor, the cost of replacement will be charged to the contractor

At a minimum, the FAA Advisory Circular 150/5370-10, Section 50-06 titled "Construction Layout and Stakes" shall be used for all construction layout work at both BNA and JWN airports. The current AC revision, 10G is included in Appendix 1 of this document.

In addition, survey data from the contractor is required for the following as verification of existing conditions and conformance to the tolerances and design grades: Existing elevations and infrastructure locations within project limits, subgrade elevations, base stone elevations, subbase elevations, pavement elevations and any other verifiable infrastructure such as manholes, inlets, trench drains, signs, etc.

It must be understood that each level of construction must be checked and confirmed as being within the required tolerances before the next level of construction can proceed. Please reference corresponding Appendix 1 for more details on this requirement.

H. As-Built Surveys

Construction as-built surveys are used to show the finished condition of the work as it was actually constructed and accepted. The process requires that any change that modifies the original design be incorporated by recording the change upon one set of contract documents earmarked just for that purpose. The final survey shall be complete within 45 days of Substantial Completion of the project.

Prior to issuance of the final release of retainage, the Contractor and their surveyor of record shall provide to MNAA an electronic file of as-built surveys with all required revisions included as the final as-built survey. Record drawings will be submitted to the Authority as electronic data files in MicroStation V8i or AutoCAD (Version 2010 or later) and Adobe PDF format.

All changes made during the construction process must be made to the electronic file. Neglecting to provide the required information will delay the final payment to both the consultant and contractor.
.
All measurements are to be made by the Surveyor or Engineer who will be certifying the project “as constructed”. The Contractor is responsible for coordinating with the Surveyor or Engineer during construction and shall provide access to all utilities prior to being buried to allow accurate horizontal and vertical measurements to be acquired by the Surveyor or Engineer. In the event of any discrepancies identified by MNAA and at no cost to MNAA, the Contractor shall verify the location and measurements of any buried utilities that were part of the project.

Any and all utility information must be collected, regardless of “typical” alignments (including existing obstructing, conflicting, or crossing utility infrastructure).

I. Survey Deliverables

Surveyor shall submit at a minimum, the following to the Airport Surveyor:

1. Printed copy of final survey stamped by surveyor of record.
2. Electronic copy of final survey map in MicroStation V8i or AutoCAD (Version 2010 or later).
3. ASCII points file (csv) of entire field run data including all control points set.
4. Electronic copy of control level loops.
5. Electronic copy of all field notes and sketches.

J. FAA 1A Certification

When requested, the surveyor of record must certify the provided survey accuracy in the form of a FAA 1A certification letter. 1A accuracy is 20’ (6 m) horizontal, and 3’ (1 m) vertical.

See corresponding Appendix 2 for an example of a 1A certification.

5.4.6 APPENDIX, FIGURES, AND TABLES FOR THE STANDARD OPERATING PROCEDURES FOR FIELD-RUN SURVEY

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A. Appendix 1 – FAA Section 50-06 - Construction Layout and Stakes

For construction layout and stakes, the Engineer shall establish horizontal and vertical control only. The Contractor shall satisfy itself as to the accuracy of all horizontal and vertical control data furnished by the Engineer before constructing any permanent structure and shall not take advantage of any errors which may have been made in laying out the work. The Contractor must establish all layout required for the construction of the work. Such stakes and markings as the Engineer may set for either their own or the Contractor's guidance and shall be preserved by the Contractor. In case of negligence on the part of the Contractor, or their employees, resulting in the destruction of such stakes or markings, an amount equal to the cost of replacing the same may be deducted from subsequent estimates due the Contractor at the discretion of the Engineer.

The Contractor will be required to furnish all lines, grades and measurements from the control points necessary for the proper execution and control of the work contracted for under these specifications.

The Contractor must give copies of survey notes to the Engineer for each area of construction and for each placement of material as specified to allow the Engineer to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. All surveys must be provided to the Engineer prior to commencing work items that will cover or disturb the survey staking as set by the Contractor's surveyor. Survey(s) and notes shall be provided in the following format(s): ASCII point file. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

Construction Staking and Layout includes but is not limited to:

1. Clearing and Grubbing perimeter staking
2. Rough Grade slope stakes at 100-foot (30-m) stations
3. Drainage Swales slope stakes and flow line blue tops at 50-foot (15-m) stations

Subgrade blue tops at 25-foot (7.5-m) stations and 25-foot (7.5-m) offset distance (maximum) for the following section locations:

1. Runway – minimum five (5) per station
2. Taxiways – minimum three (3) per station
3. Holding apron areas – minimum three (3) per station
4. Roadways – minimum three (3) per station

Base Course blue tops at 25-foot (7.5-m) stations and 25-foot (7.5-m) offset distance (maximum) for the following section locations:

1. Runway – minimum five (5) per station
2. Taxiways – minimum three (3) per station
3. Holding apron areas – minimum three (3) per station

Pavement areas:

1. Edge of Pavement hubs and tacks (for string line by Contractor) at 100-foot (30-m) stations.
2. Between Lifts at 25-foot (7.5-m) stations for the following section locations:
    - Runways – each paving lane width

SECTION 1 Taxiways – each paving lane width

Holding areas – each paving lane width

1. After finish paving operations at 50-foot (15-m) stations:
    - All paved areas – Edge of each paving lane prior to next paving lot
2. Shoulder and safety area blue tops at 50-foot (15-m) stations and at all break points with maximum of 50-foot (15-m) offsets.
3. Fence lines at 100-foot (30-m) stations minimum.
4. Electrical and Communications System locations, lines and grades including but not limited to duct runs, connections, fixtures, signs, lights, Visual Approach Slope Indicators (VASIs), Precision Approach Path Indicators (PAPIs), Runway End Identifier Lighting (REIL), Wind Cones, Distance Markers (signs), pull boxes and manholes.
5. Drain lines, cut stakes and alignment on 25-foot (7.5-m) stations, inlet and manholes.
6. Painting and Striping layout (pinned with 1.5-inch PK nails) marked for paint Contractor. (All nails shall be removed after painting).
7. Laser, or other automatic control devices, shall be checked with temporary control point or grade hub at a minimum of once per 400 feet (120 m) per pass (that is, paving lane).

The establishment of the Survey Control and/or reestablishment of survey control shall be by a state licensed Land Surveyor.

Controls and stakes disturbed or suspect of having been disturbed shall be checked and/or reset as directed by the Engineer without additional cost to the Owner.

SECTION 6 Appendix 2 – Example 1A Certification

October 24, 2016

1A Accuracy Certification

The data below is for the location and elevation verification of four corners of Area 1 for the proposed contractor's laydown area as shown on the attached exhibit. This area is located in the Runway Protection Zone (RPZ) of runway 2R at the Nashville International Airport (BNA).

Area 1

Point 1
Latitude 36° 06' 16.21648"N
Longitude 086° 40' 06.67562"W
Elevation 602

Point 2
Latitude 36° 06' 17.07111"N
Longitude 086° 40' 08.77479"W
Elevation 605

Point 3
Latitude 36° 06' 27.79516"N
Longitude 086° 40' 05.20651"W
Elevation 591

Point 4
Latitude 36° 06' 27.13697"N
Longitude 086° 40' 03.08093"W
Elevation 587

The horizontal datum (coordinates) are in terms of the North American Datum of 1983 (NAD 83) and expressed as degrees, minutes and seconds. The vertical datum (elevation) are in terms of the North American Vertical Datum of 1988 (NAVD 88) and expressed as Mean Sea Level (MSL).

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SECTION 7 Figure 1 - BNA Control Network



SECTION 8 Figure 2 - JWN Control Network



SECTION 9 Table 1 - BNA Primary Control Points

ID	Latitude	Longitude	Ortho Height	Geoid Height	Ellipse Height	Description
BNA ARP 1964	36° 07' 35.77122"N	086° 40' 55.41542"W	175.84m	-29.271m	146.603m	PACS/CBN
BNA AP 1964 STA A2	36° 07' 03.13157"N	086° 41' 13.74534"W	181.21m	-29.256m	151.986m	SACS
BNA AP 1964 STA B2	36° 08' 18.18795"N	086° 40' 44.31329"W	167.52m	-29.293m	138.269m	SACS
BERRY FIELD	36° 06' 49.01534"N	086° 40' 44.11543"W	175.2m	-29.245m	147.041m	CGS Monument
KILO MNAA	36° 08' 01.28589"N	086° 41' 21.03114"W	171.0m	-29.288m	141.738m	MNAA Monument

SECTION 10 Table 2 - JWN Primary Control Points

ID	Latitude	Longitude	Ortho Height	Geoid Height	Ellipse Height	Description
JWN_A	36° 11' 07.12678"N	086° 52' 59.07638"W	150.759m	-29.419m	121.352m	PACS/CBN
JWN_B	36° 10' 30.95100"N	086° 53' 18.74500"W	138.942m	-29.402m	109.552m	SACS/CBN
JWN_D	36° 11' 25.63399"N	086° 52' 58.49114"W	150.025m	-29.426m	120.612m	SACS

SECTION 11 Table 3 – Survey Standards Horizontal

SURVEY STANDARDS HORIZONTAL

	FIRST ORDER	SECOND ORDER		THIRD ORDER	
		Class I	Class II	Class I	Class II
POSITION CLOSURE	1:100,000 or 0.17 ft. $\sqrt{M}$	1:50,000 or 0.33 ft. $\sqrt{M}$	1:20,000 or 0.83 ft. $\sqrt{M}$	1:10,000 or 1.66 ft. $\sqrt{M}$	1:5,000 or 3.33 ft. $\sqrt{M}$
NUMBER OF COURSES BETWEEN AZIMUTH CHECKS	5-6	10-12	15-20	20-25	30-40
AZIMUTH CLOSURE AT AZIMUTH CHECKPOINT NOT TO EXCEED	1.0" per traverse point or 2"$\sqrt{N}$	1.5" per traverse point or 3"$\sqrt{N}$ Urban 2" per traverse point or 3"$\sqrt{N}$	2.0" per traverse point or 6"$\sqrt{N}$ Urban 4" per traverse point or 8"$\sqrt{N}$	3.0" per traverse point or 10"$\sqrt{N}$ Urban 6" per traverse point or 15"$\sqrt{N}$	8.0" per traverse point or 30"$\sqrt{N}$

N = The number of traverse points for carrying azimuth.
M= Distance in miles
In expressions for closing errors, use the formula that gives the smallest permissible closure.

SECTION 12 Table 4 – Survey Standards Vertical

SURVEY STANDARDS VERTICAL

	FIRST ORDER		SECOND ORDER		THIRD ORDER
	Class I	Class II	Class I	Class II	
Closure error not to exceed	0.017 ft.$\sqrt{M}$	0.021 ft.$\sqrt{M}$	0.025 ft.$\sqrt{M}$	0.035 ft.$\sqrt{M}$	0.050 ft. $\sqrt{M}$

M = Distance in miles

5.5 APPENDIX F – DIG PERMIT PROCESS

5.5.1 DOCUMENT PURPOSE

The purpose of this document is to communicate the process for:

1. Initiation of a Dig Permit
2. Approval of a Dig Permit
3. Closure of a Dig permit

This process applies to all digs, regardless if work will be completed by MNAA employees or contractors. Digs may be initiated through a capital project, AIR project or maintenance work order. It is the responsibility of anyone conducting a dig to assure an approved dig permit is sent to MNAA Business Development before excavation begins.

The individual initiating a dig request is responsible for assuring compliance with this process.

5.5.2 INITIATE DIG PERMIT

Who	Step	Description
Dig Initiator (MNAA or Contractor)	1	Go to MNAAGIS: DIG PERMIT Submittal map  Login: Username: MNAA_GIS PW: P@ssw0rd **NOTE**: (use of the @ symbol and the zero)
	2	Navigate to the dig site location on the map using your mouse wheel or device touchscreen to zoom/pan.
	3	Click “Edit/Add New Dig Area”. 

		Then select the appropriate badge access requirements: Restricted, Secure, or Non-secure. 
	4	Draw Dig Site. Double click when complete. 
	5	Input All Dig Information – Dig Description * – Status (Approved/Closed/New Request/Dig In Process) * – MNAA Project Number (if applicable) – Airport Campus – Restriction Type (auto-filled) – Start Date * – End Date * – Name/Title of Responsible Person – Contractor (if applicable or known) – Contractor Phone – Responsible person Email * **NOTE:** All fields should be completed, but the * denotes required fields. Select 'Close' when all information has been input. **NOTE**: If you need to remove the dig site, click delete on this screen. If you need to re-draw the dig site, click on the site again and adjust by pulling (click and drag) handles.
	6	Submit for approval.

		After exiting the edit toolbar, Click on the site once, and then click on hyperlink. This will generate an email to the approval groups for Review and Approval – Maintenance – Operations – Construction – Arch – Construction – Civil – Public Safety – IT – Environmental – Revenue Development – Airfield Electrical – Airfield Grounds **NOTE**: If approvals are needed for an Emergency, please note in PRIORITY field.

5.5.3 REVIEW AND APPROVE DIG PERMIT

Who	Step	Description
Reviewer	1	Go to the GIS DIG PERMIT Reviewer.  DIG PERMIT Reviewer You can get to permit by clicking on the link in the notification email. **NOTE**: Permits should be approved within 5 days. Reviewers should be proactive and timely in reviewing permits. If work is emergency, reviews should be completed ASAP. Reviewers are responsible for communicating and soliciting feedback within their departments.

	2	Indicate approval status: Select from the drop-down list for: • Approved as Requested • Conditional Approval, See Comment Below • Reschedule Due to Conflict • Not Applicable to Reviewer and provide any comments or suggestions, as necessary. Fields are available for: – Maintenance – Operations – Construction – Bldg. – Construction – Civil – Public Safety – IT – Airfield Elec – Airfield Grids – Environmental
Dig Initiator	3	Assure resolution of any issues, until final approval is reached.

5.5.4 COMMUNICATE DIG

Who	Step	Description
Dig Initiator	1	Share dig permit with potentially impacted departments – Planning – Revenue Development – Any other department that may have an interest
Impacted Departments	2	Provide feedback, as appropriate, to the dig initiator.
Dig Initiator	3	Assure resolution of any issues. Update Dig Status to “Approved”.

5.5.5 DIG

Who	Step	Description
Dig Initiator	1	Communicate final approval of dig permit
Digger	2	Review dig permit, and update status to “In-Progress”.
	3	Complete dig.

	4	Update status of Permit to “Completed”.

5.5.6 UPDATE RECORDS

Who	Step	Description
Dig Initiator	1	Provide updated drawing and As-Built to D&E, as necessary.
D&E	2	Incorporate information into GIS/CADD
	3	Update status of Permit to “ICF Received” or “As-Built Received”

5.5.7 CLOSE DIG PERMIT

Who	Step	Description
CADD/GIS	1	After dig is complete and records updated, update status of dig permit to “Closed”

5.6 APPENDIX G - SITE SPECIFIC SAFETY PLAN

_____. is a company that is committed to protecting employees, clients and the general public on all our projects. This premise is a Company value of great importance. Our goal is ZERO incidents. The following guiding principles will evidence this philosophy and our future success:

1. Senior management is responsible to support and monitor the safety, health and risk management process.
2. The line organization is responsible and accountable to lead and implement the safety, health and risk management process.
3. Supervision shall possess the skills and training commensurate with project responsibilities.
4. All employees must comply with safety, health, and risk management requirements.
5. We will work towards continuous improvement.
6. We will foster a culture that aligns safety, health and risk management with the other business objectives.
7. The emphasis will be on the Safety, Health and Risk Management Planning Process, and reduction of incidents will be the measure of our success.

The Site Specific Safety Plan (SSSP) comprises the following elements:

1. Responsibility/Identification of Key Line Personnel
2. Scope of Work Evaluation
3. Hazard/Risk/Exposure Assessment
4. Control Measures
5. Periodic Inspections
6. Daily Safety Planner
7. Compliance
8. Written Progressive Disciplinary Program
9. Hazard Correction
10. Training and Instruction
11. Project Site Orientation

5.6.1 RESPONSIBILITY / IDENTIFICATION OF KEY LINE PERSONNEL

Project/Safety Manager: _____

Site Supervisor: _____

Safety Director: _____

The above noted personnel have the authority for implementing the provisions of this program. All managers and supervisors are responsible for implementing and maintaining the SSSP Program in their work areas and for answering worker questions about the SSSP Program. A copy of this SSSP Program is available from each manager and supervisor.

5.6.2 SCOPE OF WORK EVALUATION

5.6.3 HAZARD/RISK/EXPOSURE ASSESSMENT

The major safety hazards/risks and exposures have been assessed as follows:

1. Falling objects
2. Working aloft
3. Ladder/climbing
4. Scissor lift work

5.6.4 CONTROL MEASURES

_____. site staff will monitor the hazards/risks and exposures in accordance with this Safety Plan. The plan addresses the various hazards/risks and exposures and will bring any concerns or violations to the attention of the staff for correction. Unsafe or unhealthy work conditions; practices or procedures shall be corrected in a timely manner based on the severity of the hazard. Minimum required protective equipment (PPE) would be:

1. Eye protection
2. Safety boots
3. Hearing protection (if applicable)
4. Gloves (if applicable)
5. Fire extinguishers
6. Hard hats
7. Fall Protection
8. Lock-Out/Tag-Out Protection

Personnel will be trained in the proper use and application of PPE.

5.6.5 PERIODIC INSPECTIONS

Periodic inspections will be performed according to the following schedule:

1. When we initially establish our SSSP Program
2. Daily
3. When required by local regulators

4. When new substances, processes, procedures or equipment, which present potential new hazards, are introduced into our workplace
5. When new previously unidentified hazards are recognized
6. When occupational injuries and illnesses occur
7. When we hire and/or reassign permanent or intermittent workers to process, operations, or tasks for which a hazard evaluation has not been previously conducted
8. Whenever workplace conditions warrant an inspection

Periodic inspection consists of identification and evaluation of work place hazards utilizing applicable sections of the above Hazard Assessment Checklist, the Daily Safety Planner, and any other effective methods to identify and evaluate workplace hazards.

5.6.6 COMPLIANCE REQUIREMENTS

Management is responsible for ensuring that all safety and health policies and procedures are clearly communicated and understood by all employees. Managers and supervisors are expected to enforce the rules fairly and uniformly. All employees are responsible for using safe work practices, for following all directives, policies and procedures, and for assisting in maintaining a safe work environment.

Our system of ensuring that all workers comply with the rules and maintain a safe work environment includes:

1. Informing workers of the provisions of our SSSP Program
2. Evaluating the safety performances of all workers
3. Recognizing employees who perform safe and healthful practices
4. Providing training to workers whose safety performance is deficient
5. Disciplining workers for failure to comply with safe and healthful practices

5.6.7 WRITTEN PROGRESSIVE DISCIPLINARY PROGRAM

Non-compliance with Site Specific Safety Plan will result in disciplinary action provided for in the corporate discipline program.

5.6.8 HAZARD CORRECTION

Unsafe or unhealthy work conditions; practices or procedures shall be corrected in a timely manner based on the severity of the hazards. Hazards shall be corrected according to the following procedures:

1. When observed or discovered
2. When an imminent hazard exists which cannot be immediately abated without endangering employee(s) and/or property, we will remove all exposed workers form the area except those necessary to correct the existing condition.

3. Workers necessary to correct the hazardous condition shall be provided with the necessary protection; and all such actions taken and dates they are completed shall be documented on the appropriate forms.

5.6.9 TRAINING AND INSTRUCTION

All workers, including managers and supervisors, shall have training and instruction on general and job-specific safety and health practices. Training and instruction shall be provided as follows:

Workplace safety and health practices for all locations include, but are not limited to, the following:

1. Explanation of the SSSP Program, Contractor's/Client's Safety Program, emergency action plan and fire prevention plan, and measures for reporting any unsafe conditions, work practices, injuries and when additional instruction is needed
2. Ensure proper use of appropriate clothing, including gloves, footwear, and personal protective equipment, and lock-out/tag-out equipment.
3. Daily Safety Planner System
4. Required information about chemical hazards to which employees could be exposed and other hazard communication program information
5. Availability of toilet, hand washing and drinking water facilities for impacted employees
6. Provisions for medical services and first aid including emergency procedures
7. In addition, we provide specific instructions to all workers regarding hazards unique to their job assignment, to the extent that such information was not already covered in other training.

5.6.10 EMERGENCY ACTION PLAN

In the event an evacuation of the work site is necessary, it will be announced and all staff and visitors are to leave the area immediately and assemble at a pre-determined emergency meeting location.

The Supervisor (or acting supervisor) shall contact the Project Manager any time an emergency action plan has been enacted. The on-site Client Representative will also be contacted immediately.

5.6.11 SITE SPECIFIC MEDICAL EMERGENCY PLAN

Should an emergency situation occur at the airport, it shall be reported immediately to the Airport first responders by dialing 615-275-1703.

If the injury is the result of an accident on site, a First Report of Injury or Illness form (refer to Appendix B) is to be filled out by the Site Supervisor and submitted to the Project/Safety Manager. _____, . employees MUST report all injuries or illnesses, as soon as possible, to the Site Supervisor.

5.6.12 HAZARD COMMUNICATION PLAN

In order to comply with OSHA 1910.1200, Hazard Communications Standard, the following written Hazard Communication Program has been established for _____ _____,

The supervisor of each area will ensure that all secondary containers (those containers other than the original) will be labeled with:

1. Content identification. (The identity must match the corresponding MSDS.)
2. Appropriate hazard warnings, (including route of entry and target organs)

Storage of Hazardous Materials

All hazardous material containers (paints, solvents, etc.) will be stored in explosion proof storage lockers.

Material Safety Data Sheets (MSDS)

All _____, employees are trained annually to the “Right to Know” OSHA policy and these training records are kept on file at the _____, .

In accordance with Project Specifications and MWAA requirements, copies of the MSDS sheets applicable to the Project shall be kept on the job site in a MSDS Manual for all employees to readily use and reference. In addition, copies will be submitted to the Fire Code Enforcement Division prior to start of construction.

The Site Foreman will be responsible for obtaining and maintaining the material safety data sheets.

It is _____, . policy that when toxic or hazardous substances are received without an MSDS or the appropriate MSDS is not on file at _____, . that the chemical will not be accepted until such information is available.

The Site Foreman will review the incoming date sheets for new and significant health/safety information. He will see that any new information is passed on to the affected employees. If a MSDS is incomplete, the Site Foreman will request a new MSDS from the manufacturer/supplier. MSDS sheets are available to each employee during his/her work shift.

5.7 APPENDIX H - PROCESS FOR ACQUIRING NEW BUILDING ADDRESS

Address Request Form

Email: addressing@nashintl.com

CONTACT INFORMATION

Applicant Name:_____Application Date: _____

Mailing Address: _____

Phone Number:_____ Email:_____

SITE INFORMATION

Parcel number(s): _____

Property Address (if known): _____

Reason for Request:_____

_____

New Address (currently no address) Change Address (delete existing address) Additional Address

ATTACHMENT (MAY BE REQUIRED):

_ Site Plan with building footprint, unit outline, unit main entrance, and driveway or property's main access to street

_ Floor Plan (needed for multi-floor & multi-suite buildings)

_ Letter of Agency (if not property owner or contractor)

ADDRESS TYPE

_ Situs

Residential	Commercial	
_ Single Family	__Condo	__Utilities
_ Duplex	__Apartment	__Park Site
_ Second Residential Unit	__Office Building	__Industrial
	_ Retail	__Other:

Will mail be delivered to this address? Yes No Zip Code _____

Related Application Number(s): _____

INTERNAL USE ONLY

Address Application Number:_____Notification Sent Date: _____

Proposed Address: _____

_____

MNAA-18-6804 Revised 04.11.18

5.8 APPENDIX I - THIRTY DAY LOAD STUDY RESULTS LETTER

MM/DD/YYYY: _____

Engineering Firm: _____

Address: _____

_____

To: Metropolitan Nashville Airport Authority – Development & Engineering

From: _____

Subject: 30 Day Electrical Load Study Results

MNAA Project No: _____

MNAA Project: _____

Results of an electrical load study performed over period of thirty (30) consecutive calendar days, beginning _____and ending _____

Panel/Equipment Designation _____

Panel/Equipment Location _____

Panel/Equipment Bus Rating _____

Panel Type: _____MCB _____ MLO

Panel Voltage _____ Number of Phases _____

Peak Demand Load over 15 min. interval _____ kW

Peak Demand Current Phase A _____ Amps

Peak Demand Current Phase B _____ Amps

Peak Demand Current Phase C _____ Amps

_____ _____ _____

Electrical Engineer Date Seal

5.9 APPENDIX J - CONRAC

5.9.1 SPECIFICATION SECTION 01610

SEISMIC REQUIREMENTS FOR NONSTRUCTURAL COMPONENTS

A. General

Summary

1. Nonstructural components and their attachments to the structure shall meet all requirements of the contract documents, including the governing seismic design code as specified in the contract documents, which includes the requirements of ASCE 7-05, Chapter 13.
2. This section includes seismic design requirements for design build nonstructural components.

Related Sections

1. Specification 01611, “Attachment to Structure.”

Design Criteria

1. Seismic Forces: SEI/ASCE 7-05, “Minimum Design Loads for Buildings and Other Structures,” Chapter 13 as amended by IBC Section 1613, using the following parameters: Chapter 13
2. Seismic Use Group II
3. Seismic Design Category B
4. SDS = 0.221
5. For the purpose of seismic design calculations, roof height shall be treated as follows:

b. *Ready/Return Area*

1. Levels 1 through 3: The base of the building shall be considered to be reference ground floor datum, elevation 548’-6”. Average roof height, with respect to the base, shall be 42 feet.
2. Level Canopy: All portions shall be considered to be at the mean roof height.
3. High Roof: All portions shall be considered to be at the mean roof height.
4. Helix and bridges attached to helix: The base of the helix shall be considered to be reference ground floor datum, elevation 548’-6”.
5. Stair Towers: The base of the stair towers shall be considered to be reference ground floor datum, elevation 548’-6”. Average roof height, with respect to the base, shall be 52 feet.

c. *QTA Space*

1. QTA Deck Structures: All portions shall be considered to be at the mean roof height.
2. QTA Back-of-House Structures: Floors shall be considered to be at one-half of the mean roof height. Roofs shall be considered to be at the mean roof height.

3. Fp shall be determined in accordance with Equations 13.3-1, 13.3-2, and 13.3-3.

d. *Seismic Relative Displacements:*

Interstory Drifts: Accommodate the following interstory drifts.

1. Seismic Joints: Systems crossing seismic joints shall accommodate the following movements. The movements listed below are the amount that the building separation may increase or decrease in the course of a seismic event.

Detailed System Requirements

1. See Specification 01611 for requirements for attachment to structure, and permissible anchor types.

Submittals

These submittal requirements are in addition to other submittal requirements stated elsewhere in the contract documents.

1. Construction Documents: Prepare in accordance with ASCE 7-05 Section 13.2.7 sealed and signed by the registered design professional responsible for their preparation.
2. Statement of Special Inspections: Prepare in accordance IBC Section 1705.
3. Component Certification: Mechanical and electrical components shall meet the Component Certification requirements of ASCE 7-05, Section 13.2.2, including submission of manufacturer's certificate of compliance for review by the Architect and Structural Engineer.
4. Shop Drawings: Submit shop drawings for all attachments to the structure. These attachments include, but are not limited to, seismic bracing for equipment, conveyances, and architectural components; seismic restraints of vibration isolation systems; and details of seismic bracing and attachment systems designed to accommodate differential seismic moving between building levels.
5. Structural Calculations: Submit calculations sealed and signed by the registered design professional responsible for their preparation. These calculations are for information only and will not be stamped as reviewed or returned to the submitter.
6. Contractor's Statement of Responsibility: Submit in accordance with the IBC Section 1706.

Quality Assurance

1. The registered design professional responsible for the design of structural elements of non-structural components shall be a professional licensed to practice in the state of Tennessee.

5.9.2 SPECIFICATION SECTION 01611- ATTACHMENT TO STRUCTURE

A. GENERAL

Summary

1. Attachments to the structure shall meet all requirements of the contract documents, including the governing seismic design code where applicable.
2. This section includes requirements for all design/build attachments to the structure.

Related Sections

1. Specification 01610, “Seismic Requirements for Nonstructural Components.”
2. Construction Specification 03300, “Cast-In Place Concrete.”
3. Construction Specification 05120, “Structural Steel.”

Limitations on Attachment to Structure

1. Roof Deck: Attachment to roof deck is not permitted.

Slab-on-deck and cast-in-place conventionally reinforced concrete slabs:

1. Loading not to exceed 2,000 pounds vertically and 4,000 pounds horizontally.
2. Anchorage shall not damage reinforcing.
3. When selecting and designing anchors, consider all concrete to be cracked.

Post-Tensioned Concrete:

1. Loading not to exceed 2,000 pounds vertically and 4,000 pounds horizontally.
2. No anchorage shall be permitted on the post-tensioned structure until the slab/beam has been x-rayed and care is taken not to damage any post-tensioning or reinforcing.

Slabs & Beams:

1. Horizontal
2. Loading parallel to beam: Attachment shall be centered on beam web and loading shall not exceed 2,000 pounds.
3. Loading perpendicular to beam: Attachment shall be within top 1/3 of beam and loading shall not exceed 2,000 pounds.
4. Vertical: Attachment shall be centered on beam web.
5. Do not drill or shoot any anchors into the bottom of the inverted tee beam.
6. Drilling or shooting of anchors into the ledge of the inverted tee beam is permitted, however: the anchors must be no closer than 3” from the top or bottom of the ledge and not within 2’-0” of a double tee stem.
7. No coring in the ledge.
8. Drilling or anchoring into the inverted tee beam must be a minimum of 4” above the top of the ledge and 8” down from the top of the beam.
9. Do not drill through reinforcement.

Pre-Cast Concrete-Double Tees:

1. Loading not to exceed 2,000 pounds vertically and 4,000 pounds horizontally.
2. Structurally reinforced zones: 125 lbs/square feet
3. No drilling, coring, shooting or anchoring anything into the bottom of the double tee stem.
4. No expansion anchoring into double tee stem.
5. Only through bolting is an acceptable attachment method into the upper portion of the double tee stem. Provide sketch for Metromont Corporation review prior to any work being done.
6. Expansion anchoring into double tee flange is permitted but only after topping has been poured. Maximum embedment is 3”.
7. Drilling, anchoring, or through bolting into the double tee flange is permitted. Metromont Corporation is not responsible for chips or spalls that may occur.
8. Coring of the double tee flange is permitted. The hole must be a minimum of 6” clear from edge of the hole to the edge of the double tee.
9. Attachment to the structure using post-installed anchors is subject to the following limitations:
    a. Anchorage shall not damage the post-tensioning tendons or mild reinforcing.
    b. When selecting and designing anchors, consider all concrete to be cracked.
    c. Anchors with an embedment depth and hole depth of ¾” or less may be used at any location in the structure.
    d. Anchors with an embedment and hole depth of 1-1/4" or less may be used at the following locations:
10. Slab soffits, within 5’ of the centerline of the supporting element.
11. Beam sides and soffits.
    a. Where anchor embedment or hole depth does not meet the requirements of items 3 or 4 above, comply with following:
        i. Slabs: x-ray or ferro-scan to locate post-tensioning tendons and mild reinforcing in the vicinity of the anchor. Anchors shall be located to miss mild reinforcing and to be 6” clear from post-tensioned tendons.
        ii. Beams: Attach to sides of beam only. Where anchor embedment or hole depth exceeds 2”, x-ray or ferro-scan slab to locate post-tensioning tendons and mild reinforcing in the vicinity of the anchor. Anchors shall be located to miss mild reinforcing and to be 6” clear from post-tensioned tendons.

Pre-Cast Concrete-Columns:

1. Drilling for anchorage is permitted but must be a minimum of 5” clear of the corner.
2. Core drilling is NOT allowed.
3. Do NOT drill through reinforcement.
4. Anchorage shall not damage reinforcing.
5. When selecting and designing anchors, consider all concrete to be cracked.

Pre-Cast Concrete-Walls

1. Typical wall panels have main reinforcing (prestress strand or mild reinforcement) running longitudinally. Coring must be a minimum of 3” clear distance from the edge of hole to main reinforcing. Anchoring devices must meet the requirements of the manufacturer and not cut the main reinforcement.
2. For insulated wall panels, maximum embedment depth for anchors is 1.5”. In shear grid insulated wall panels, anchorage should be made in the 2’-0” wide trough which provided 3.5” of embedment depth for anchors. No drilling or coring through reinforcement and shear grid mesh is allowed.
3. A sketch detailing the location and size of a cored hole must be submitted to Metromont Corporation for review prior to any work being performed.

Submittals

1. These submittal requirements are in addition to other submittal requirements stated elsewhere in the contract documents.
2. Anchor Installation Plan: For all post-installed concrete anchors, submit anchor installation plan, including the following information:
    a. Anchor types, applications and locations.
    b. Pre-installation requirements.
    c. Installation inspection requirements.
    d. ICC-ES Reports: Submit ICC-ES report valid for the IBC for the following post-installed anchor types:
    e. Mechanical anchors.
    f. Adhesive anchors.
    g. Power actuated fasteners.
    h. Drop-In anchors.
    i. Shop Drawings: Submit for embedded plates in accordance with Construction Specification 05120.

Products

1. All attachments to structure shall be protected against corrosion through the use of either:
    a. Carbon steel, zinc plated in accordance with ASTM B 633, or hot-dipped galvanized in accordance with ASTM A-153-78. Provide mill test reports and manufacturer’s quality control certification upon Engineer’s request.
    b. Stainless steel anchors, manufactured from ASTM A303, A304, or A306 stainless steel. Provide mill test reports and manufacturer’s quality control certification upon Engineer’s request.

Embedded Plates

1. Anchorage to concrete shall be made using one of the following anchors:
2. ASTM A108 welded headed studs installed in accordance with Construction Specification 05120.
3. ASTM A706 reinforcing steel welded to the embed plate in accordance with Construction Specification 03300.

Design Capacities

1. The design shall consider the effects of eccentricities, including eccentricities due to construction tolerances.
2. The capacity of the steel plate shall be determined in accordance with AISC 13th Edition.
3. The capacity of the reinforcing steel shall be determined in accordance with ACI 318-05.
4. The capacity of the welded headed studs shall be determined in accordance with ACI 318-05 Appendix D.

Post-Installed mechanical and adhesive anchors:

1. Anchors shall be manufactured by Hilti Fastening Systems, ITW Ramset/Red Head, Simpson Anchor Systems, or accepted equivalent and shall have ICC-ES reports demonstrating compliance with IBC for use in cracked concrete. Pre-approved ICC-ES reports include the following:
2. ESR-1917: Hilti Kwik Bolt TZ
3. ESR-1771: Simpson Strong-Bolt
4. ESR-2322: Hilti HIT-RE 500-SD
5. Adhesive anchors shall not be used to resist pullout forces in overhead and wall installations unless proper consideration is given to fire conditions. Consult with manufacturer's engineer.
6. If necessary for purposes of determining tensile and/or shear capacity in questionable base material, testing shall be done prior to actual anchor installation. A maximum of five tension and/or shear tests shall be performed by the manufacturer's engineer. Anchors shall be proof loaded in tension and/or shear to assure that working load capacity is within specified allowable load limit as published in the ICC-ES report.
7. Anchor spacing and edge distance per ICC-ES report.
8. Anchor installation shall be as required by manufacturer's written instructions and the ICC-ES report.

Concrete Inserts:

1. Inserts shall be manufactured by Unistrut Cooper B-Line, Mason Industries, or accepted equivalent and shall be positively anchored to the concrete by means of headed or hooked elements that conforms to ACI Appendix D. Products which are pre-approved as being in conformance with ACI Appendix D for anchorage geometry are:
    a. Cooper B-Line
    b. Spot Inserts
    c. Wood-Knocker
    d. Bang-It
    e. B25 series
    f. Continuous Inserts
    g. B22 series
    h. B32 series
    i. B52 series

j. Unistrut
k. Spot Inserts
l. M26/M2812
m. M3245
n. M24/M2512
o. Continuous Inserts
p. P32 series
q. P33 series+

Capacity of the insert shall be determined by the lesser of:

1. The concrete capacity as determined by Appendix D of ACI 318-05.
2. The manufacturer's published capacity. Where the manufacturer's published capacity is expressed in terms of allowable lad, this capacity may be increased by a factor of 1.5 for comparison to the capacity calculated in accordance with ACI Appendix D.

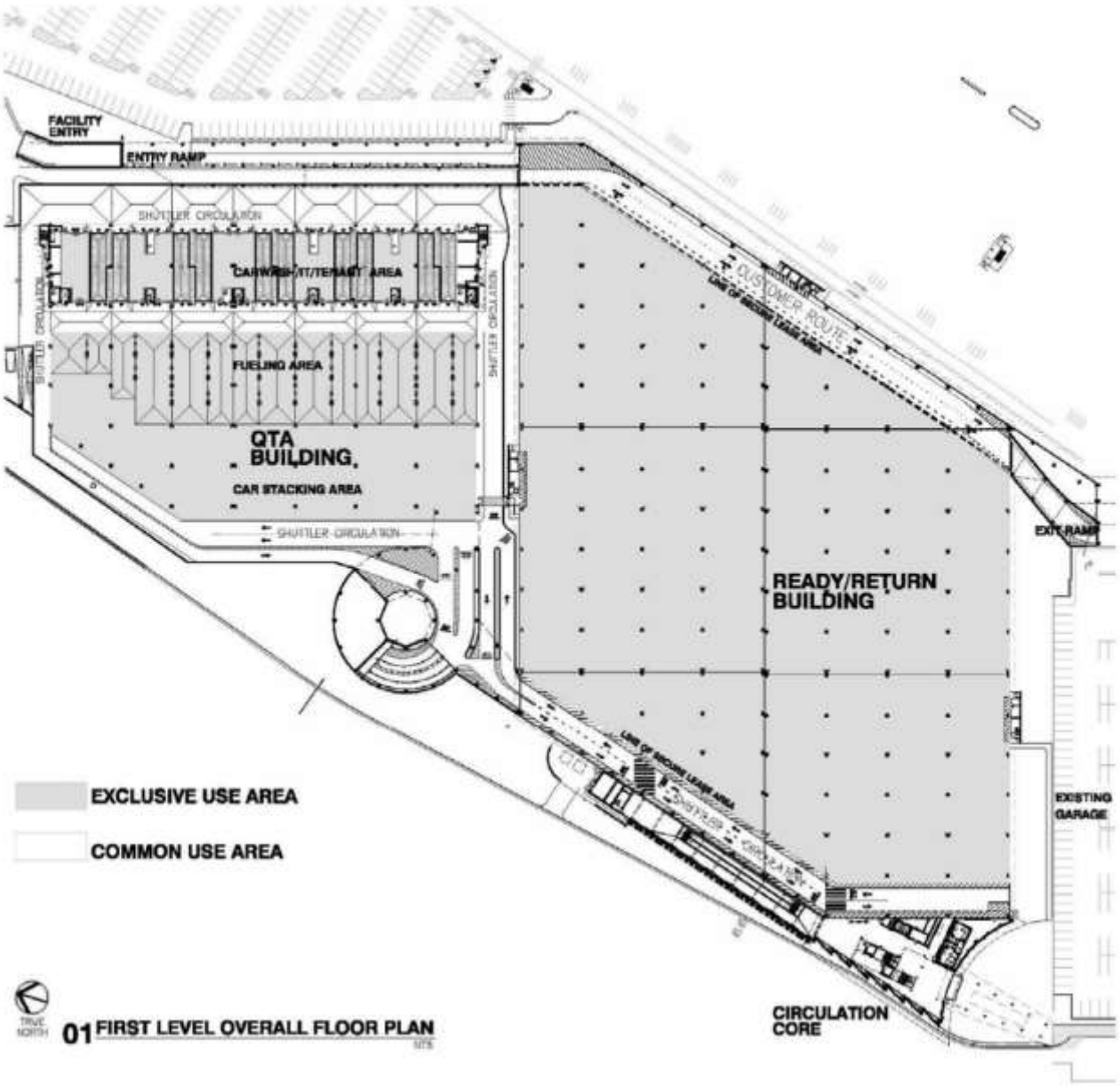
Shallow Anchors: Post-Installed Power Actuated and Drop-In Fasteners.

1. Fasteners shall be manufactured by Hilti Fastening Systems, Tulsa Oklahoma, ITW Ramset/Red Head, Wood Dale, IL, Simpson Anchor Systems, Columbus, OH, or accepted equivalent and shall have a current ICC-ES report demonstrating compliance with ICC-ES acceptance criteria AC70. Pre-approved ICC-ES reports include the following:
    a. ESR-1663: Hilti Low-Velocity Power-Driven Fasteners.
    b. ESR-2269: Hilti Low-Velocity X-U Universal Powder Driven Fasteners.
    c. ESR-1779: Ramset Powder-Driven Fasteners.
    d. ESR-2138: Simpson Powder-Driven Fasteners.
    e. These anchors shall not be used to resist tension loads, except for surface mounted, non-emergency electrical and communications conduit weight pounds per lineal foot or less. When used in cracked concrete, the allowable tension capacity published in the ICC-ES report shall be divided by five.

5.10 APPENDIX K – CONRAC EXHIBITS

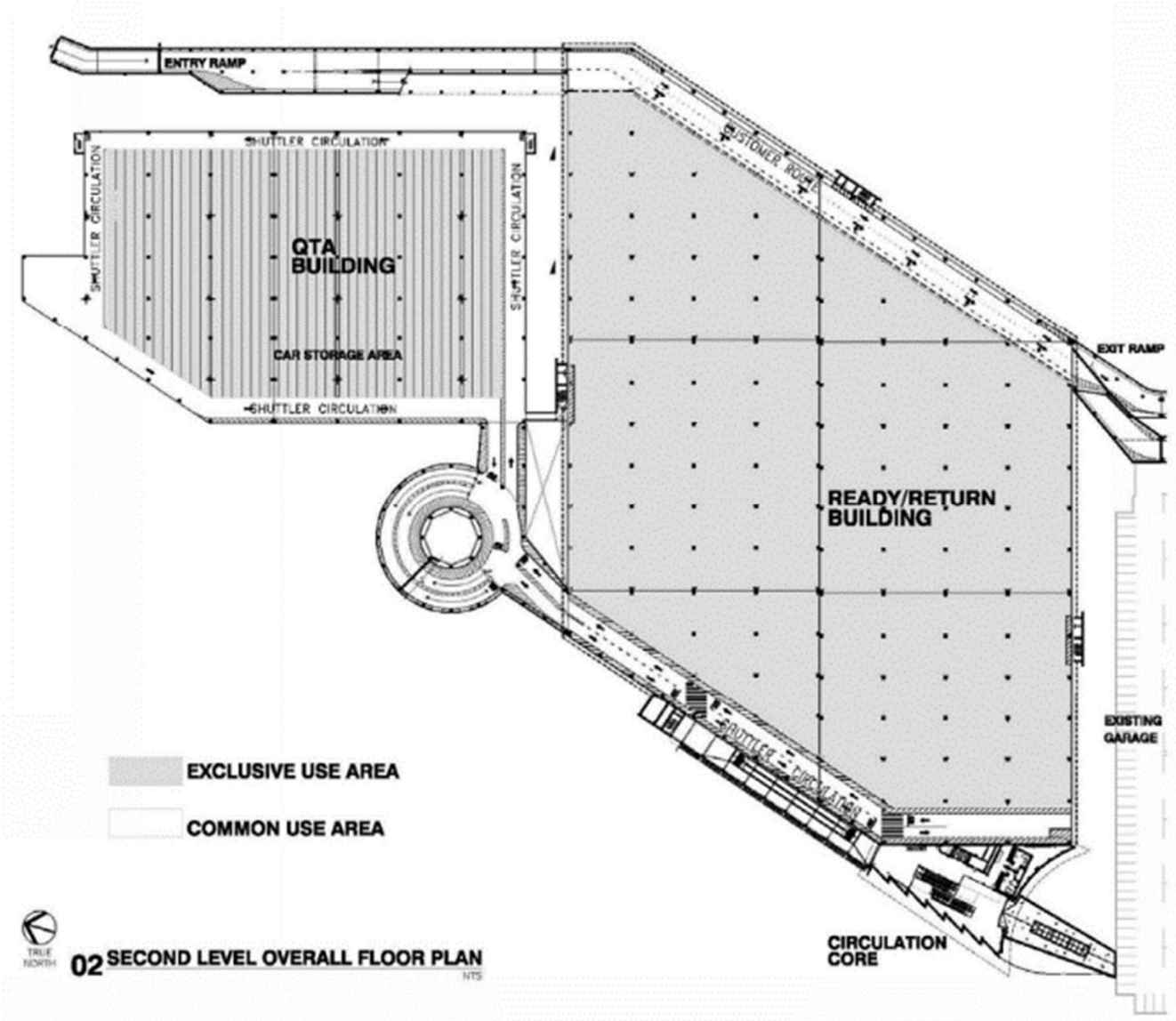
5.10.1 EXHIBIT 1 - EXCLUSIVE USE AREAS AND COMMON USE AREAS

FIRST LEVEL OVERALL FLOOR PLAN



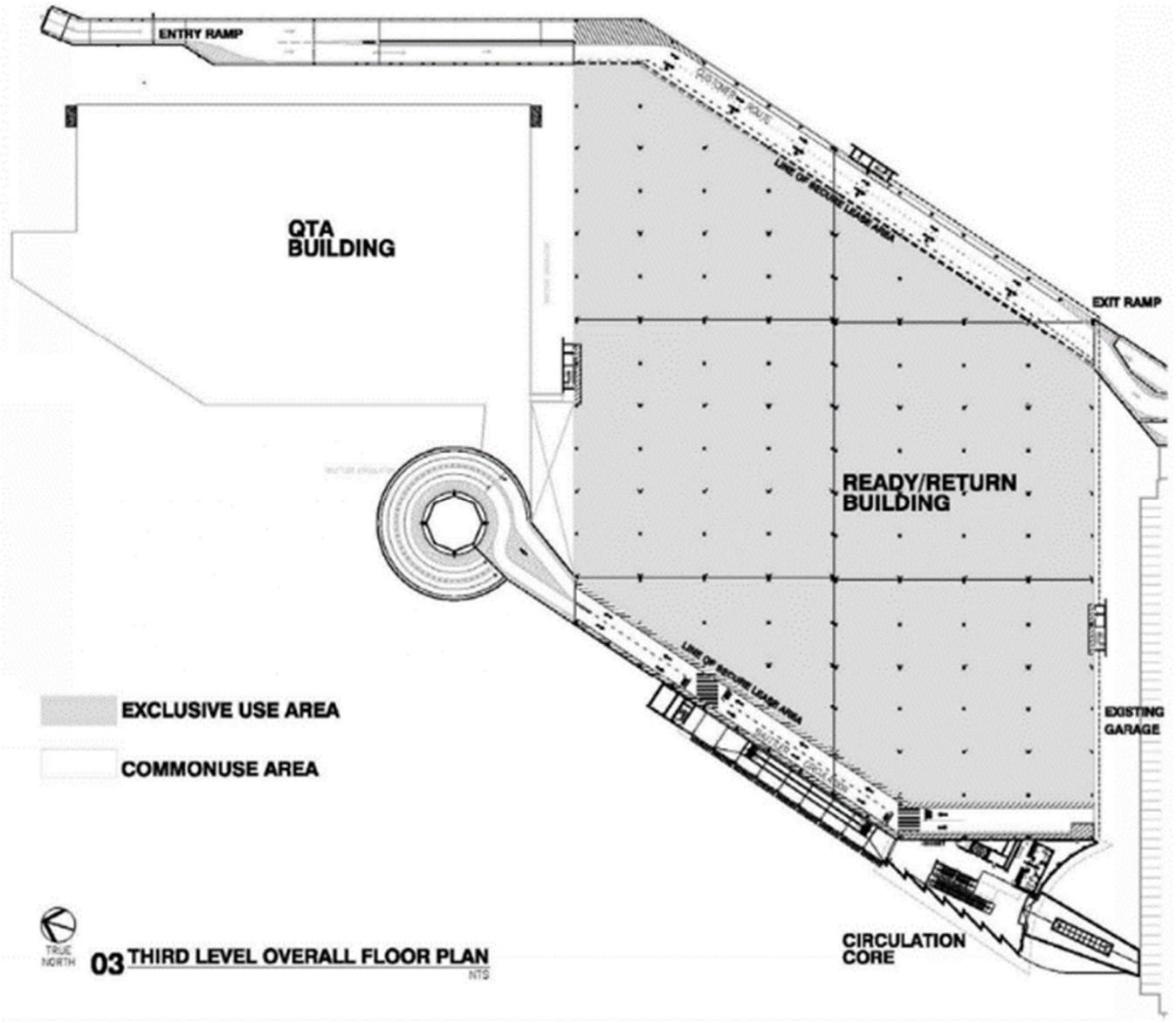
5.10.2 EXHIBIT 2 - EXCLUSIVE USE AREAS AND COMMON USE AREAS

SECOND LEVEL OVERALL FLOOR PLAN



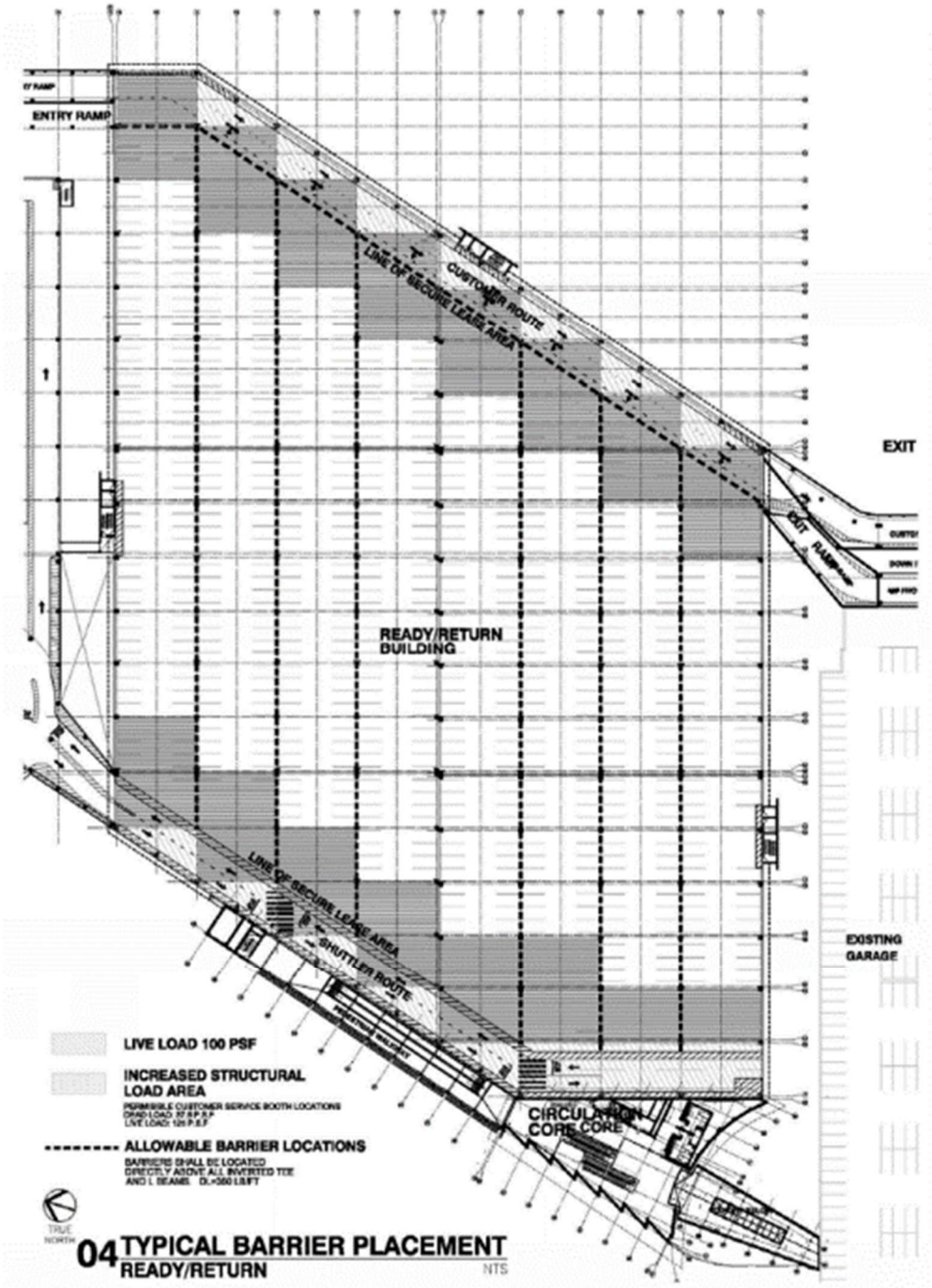
5.10.3 EXHIBIT 3 - EXCLUSIVE USE AREAS AND COMMON USE AREAS

THIRD FLOOR OVERALL FLOOR PLAN

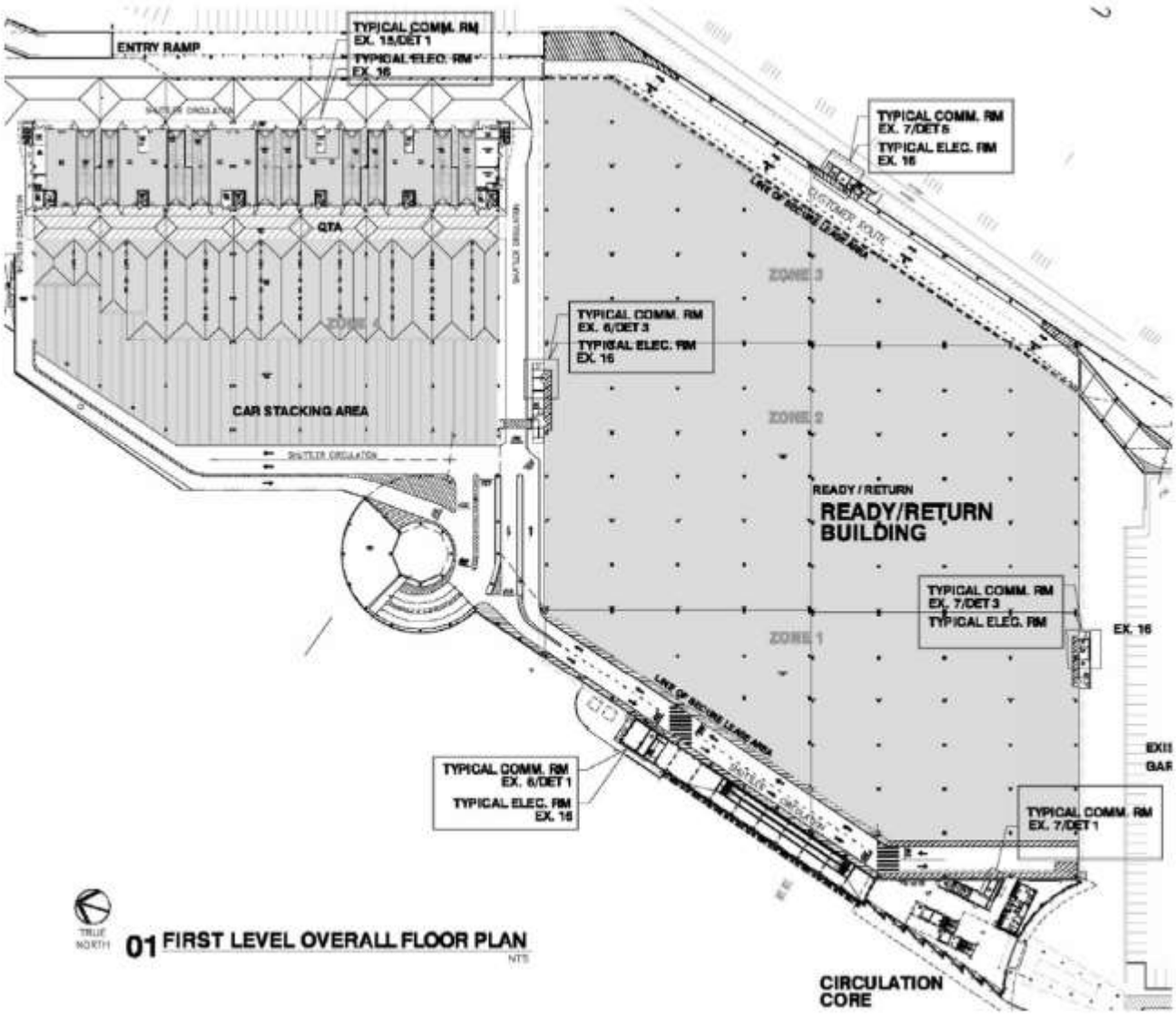


5.10.4 EXHIBIT 4 - TYPICAL BARRIER PLACEMENT : SUPERIMPOSED DESIGN LOADS

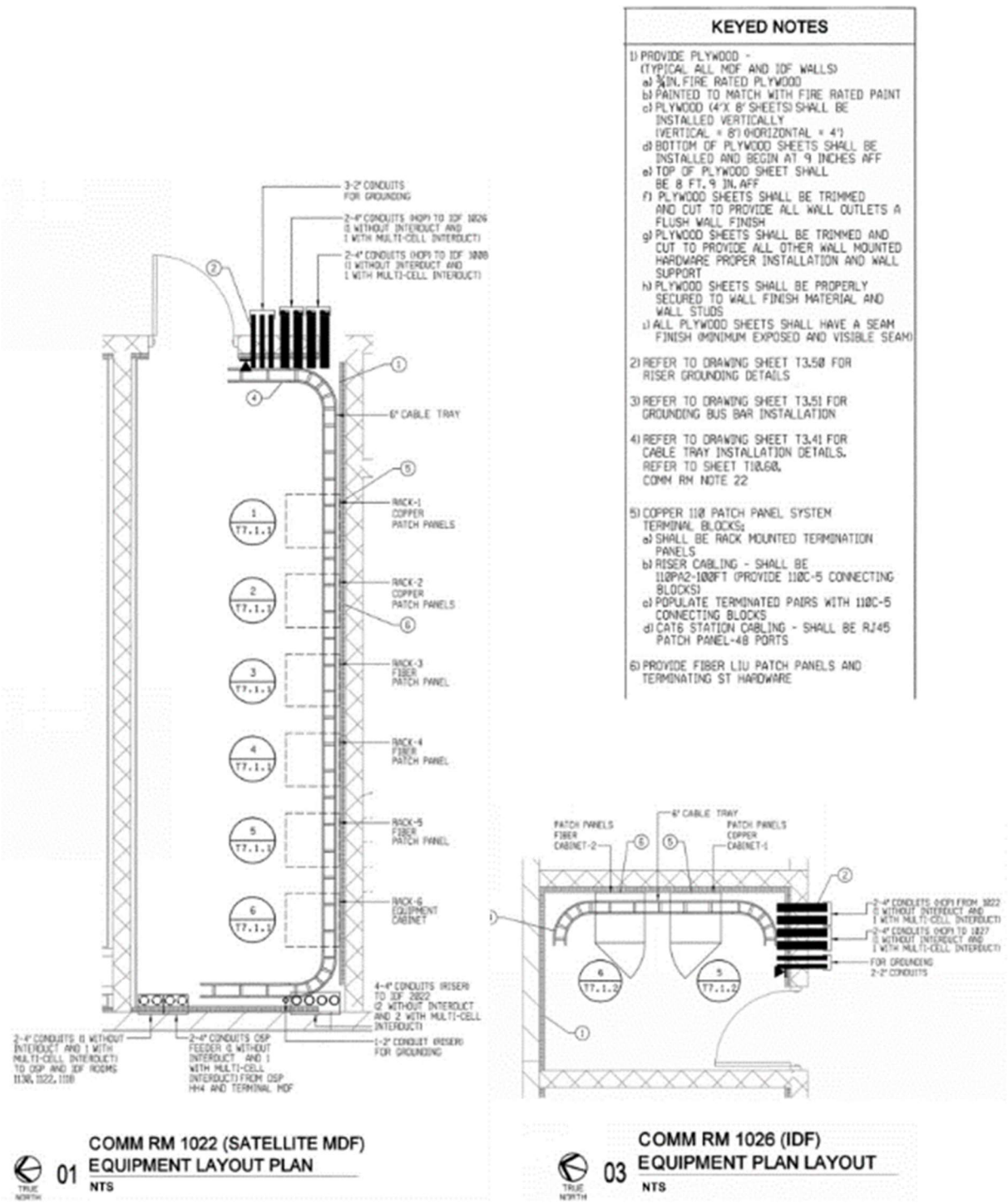
READY/RETURN AREA



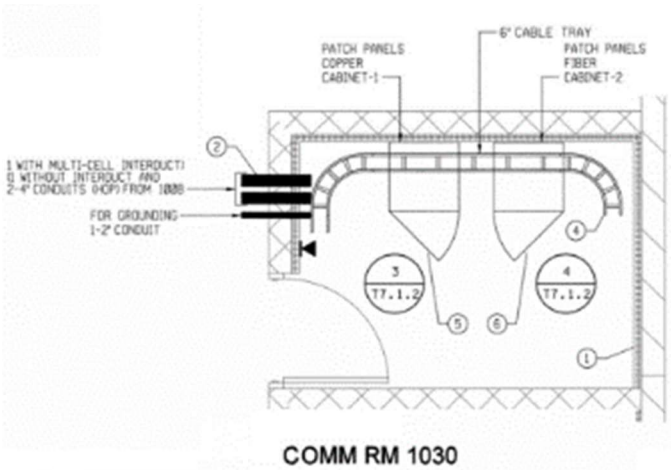
5.10.5 EXHIBIT 5 – ELECTRICAL AND COMMUNICATION ROOM LOCATION PLAN



5.10.6 EXHIBIT 6 – READY/RETURN - TYPICAL MDF/IDF ROOM



5.10.7 EXHIBIT 7 – READY/RETURN AREA - TYPICAL COMM. ROOM



COMM RM 1030
03 EQUIPMENT LAYOUT PLAN
NTS

KEYED NOTES

1) PROVIDE PLYWOOD -
(TYPICAL ALL MDF AND IDF WALLS)
a) ¾IN. FIRE RATED PLYWOOD
b) PAINTED TO MATCH WITH FIRE RATED PAINT
c) PLYWOOD (4'X 8' SHEETS) SHALL BE INSTALLED VERTICALLY (VERTICAL = 8') (HORIZONTAL = 4')
d) BOTTOM OF PLYWOOD SHEETS SHALL BE INSTALLED AND BEGIN AT 9 INCHES AFF
e) TOP OF PLYWOOD SHEET SHALL BE 8 FT. 9 IN. AFF
f) PLYWOOD SHEETS SHALL BE TRIMMED AND CUT TO PROVIDE ALL WALL OUTLETS A FLUSH WALL FINISH
g) PLYWOOD SHEETS SHALL BE TRIMMED AND CUT TO PROVIDE ALL OTHER WALL MOUNTED HARDWARE PROPER INSTALLATION AND WALL SUPPORT
h) PLYWOOD SHEETS SHALL BE PROPERLY SECURED TO WALL FINISH MATERIAL AND WALL STUDS
i) ALL PLYWOOD SHEETS SHALL HAVE A SEAM FINISH (MINIMUM EXPOSED AND VISIBLE SEAM)

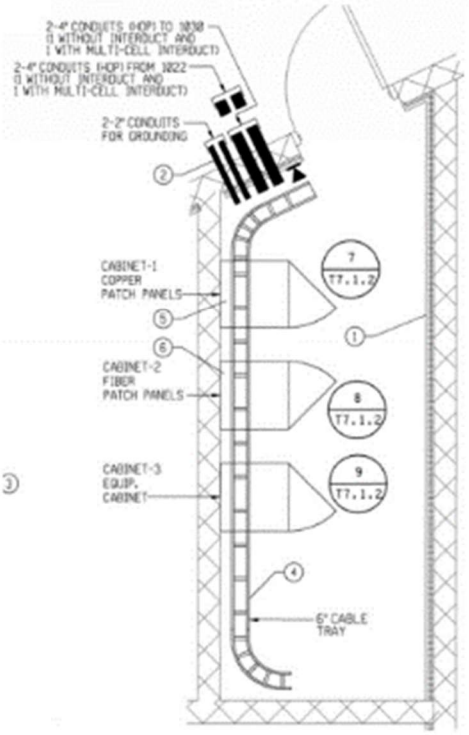
2) REFER TO DRAWING SHEET T3.50 FOR RISER GROUNDING DETAILS

3) REFER TO DRAWING SHEET T3.51 FOR GROUNDING BUS BAR INSTALLATION

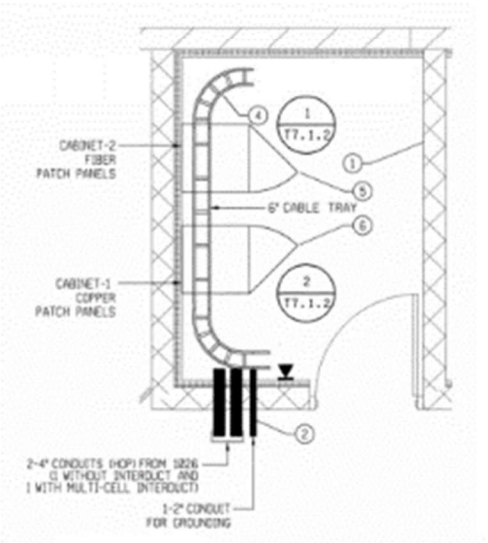
4) REFER TO DRAWING SHEET T3.41 FOR CABLE TRAY INSTALLATION DETAILS. REFER TO SHEET T10.60, COMM RM NOTE 22

5) COPPER 110 PATCH PANEL SYSTEM TERMINAL BLOCKS;
a) SHALL BE RACK MOUNTED TERMINATION PANELS
b) RISER CABLING - SHALL BE 110PA2-100FT (PROVIDE 110C-5 CONNECTING BLOCKS)
c) POPULATE TERMINATED PAIRS WITH 110C-5 CONNECTING BLOCKS
d) CAT6 STATION CABLING - SHALL BE RJ45 PATCH PANEL-48 PORTS

6) PROVIDE FIBER LIU PATCH PANELS AND TERMINATING ST HARDWARE

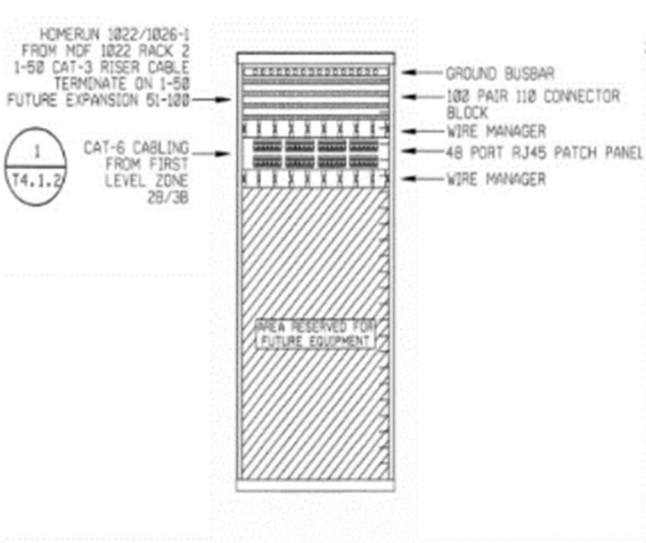


COMM RM 1008
01 EQUIPMENT LAYOUT PLAN
NTS

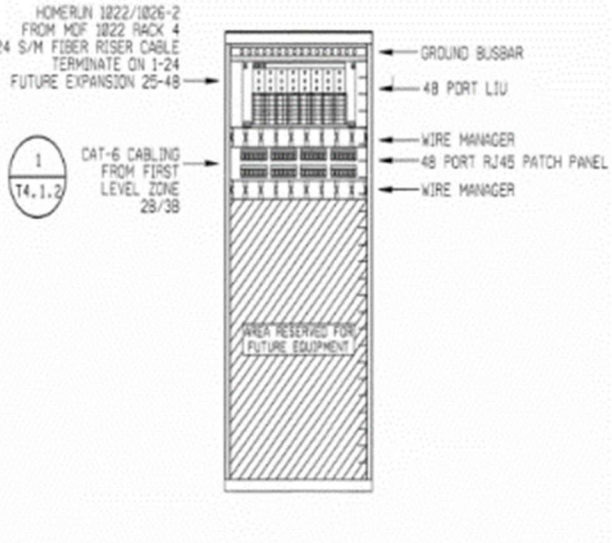


COMM RM 1027
05 EQUIPMENT LAYOUT PLAN
NTS

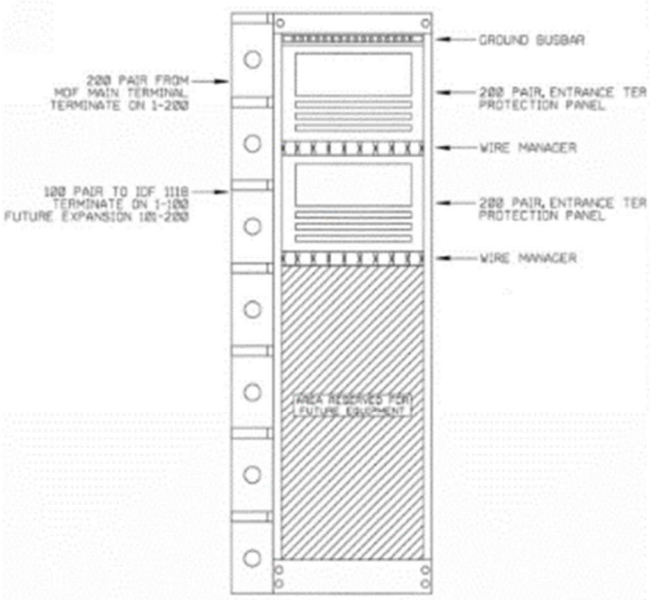
5.10.8 EXHIBIT 8 – READY/RETURN AREA - TYPICAL MDF/IDF CABINETS



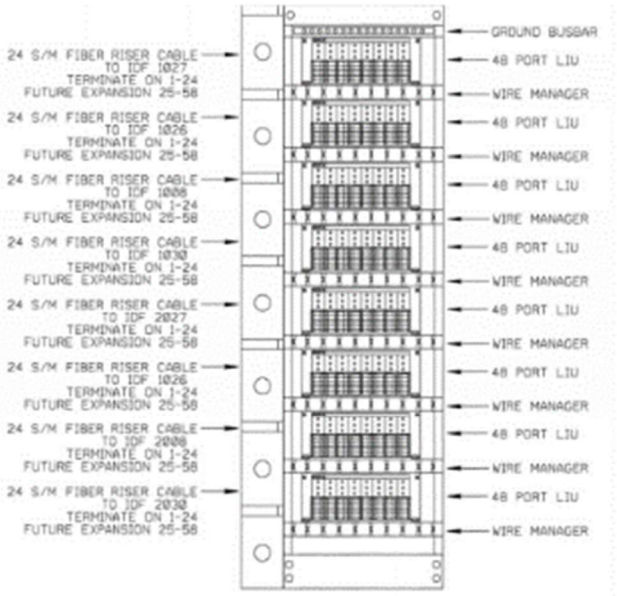
05 COMM RM 1026 (IDF) CABINET 1
NTS (COPPER)



06 COMM RM 1026 (IDF) CABINET 2
NTS (FIBER)

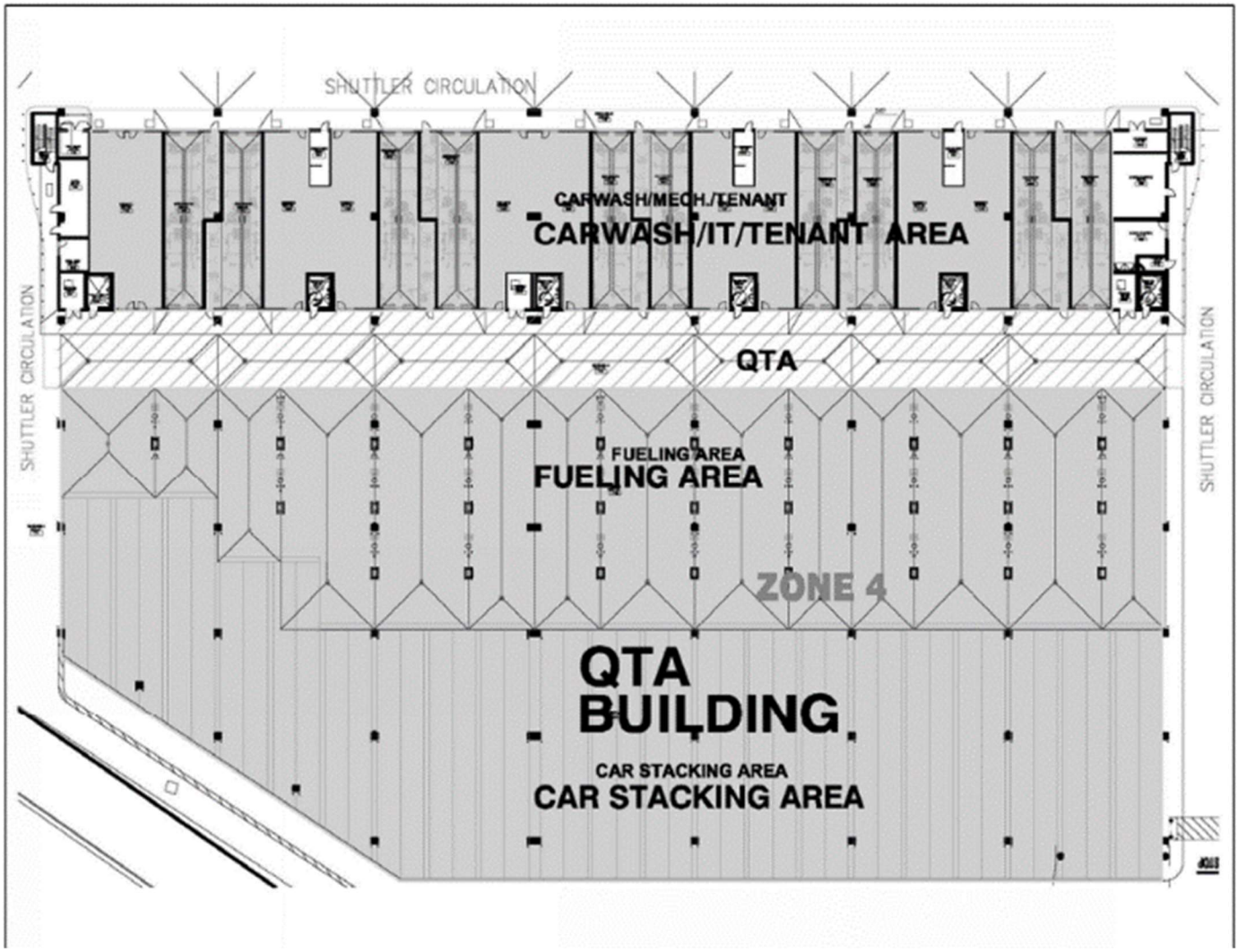


01 COMM RM 1022 (SATELLITE MDF) RACK 1
NTS (COPPER)

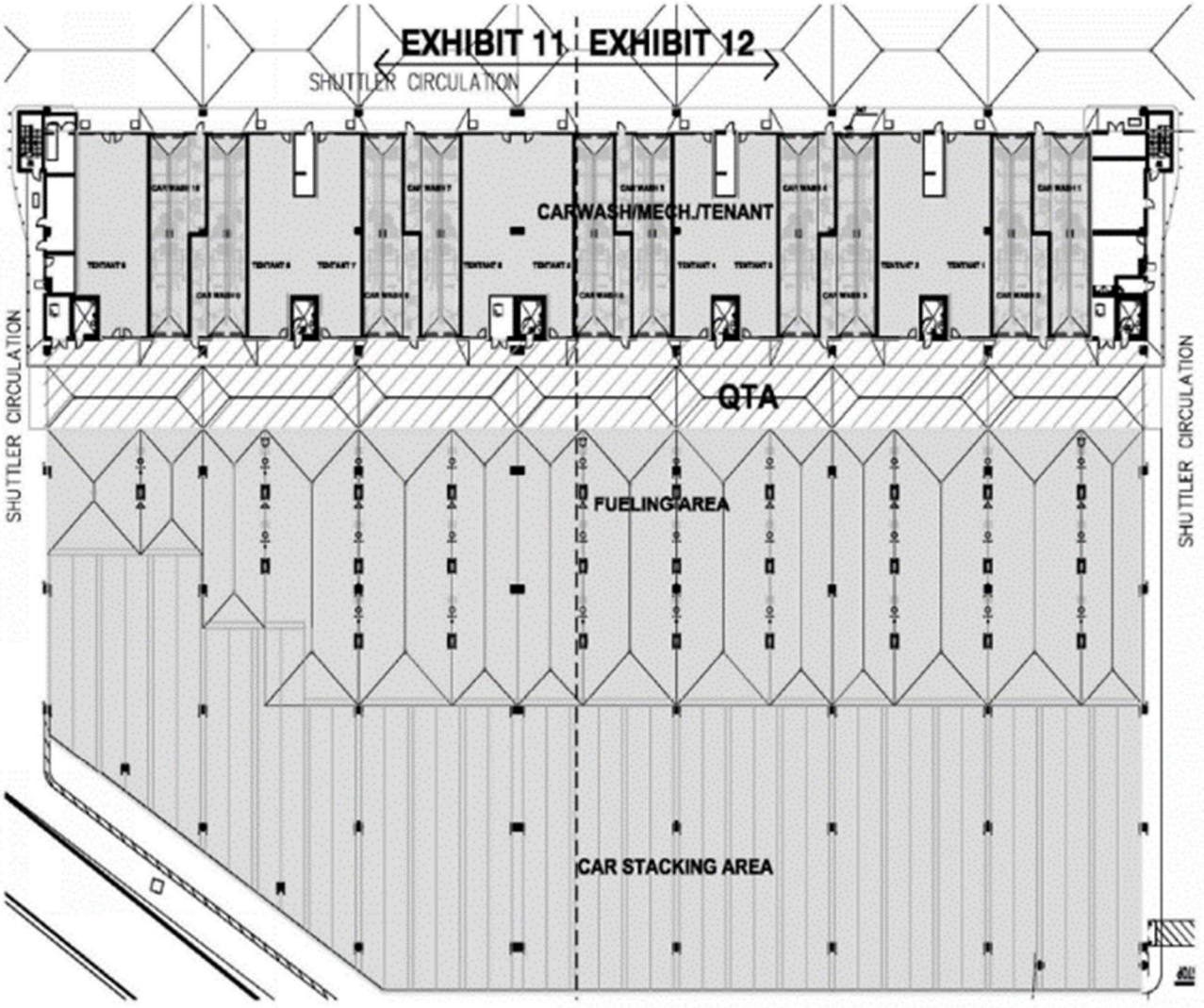


04 COMM RM 1022 (SATELLITE MDF) RACK 4
NTS (FIBER)

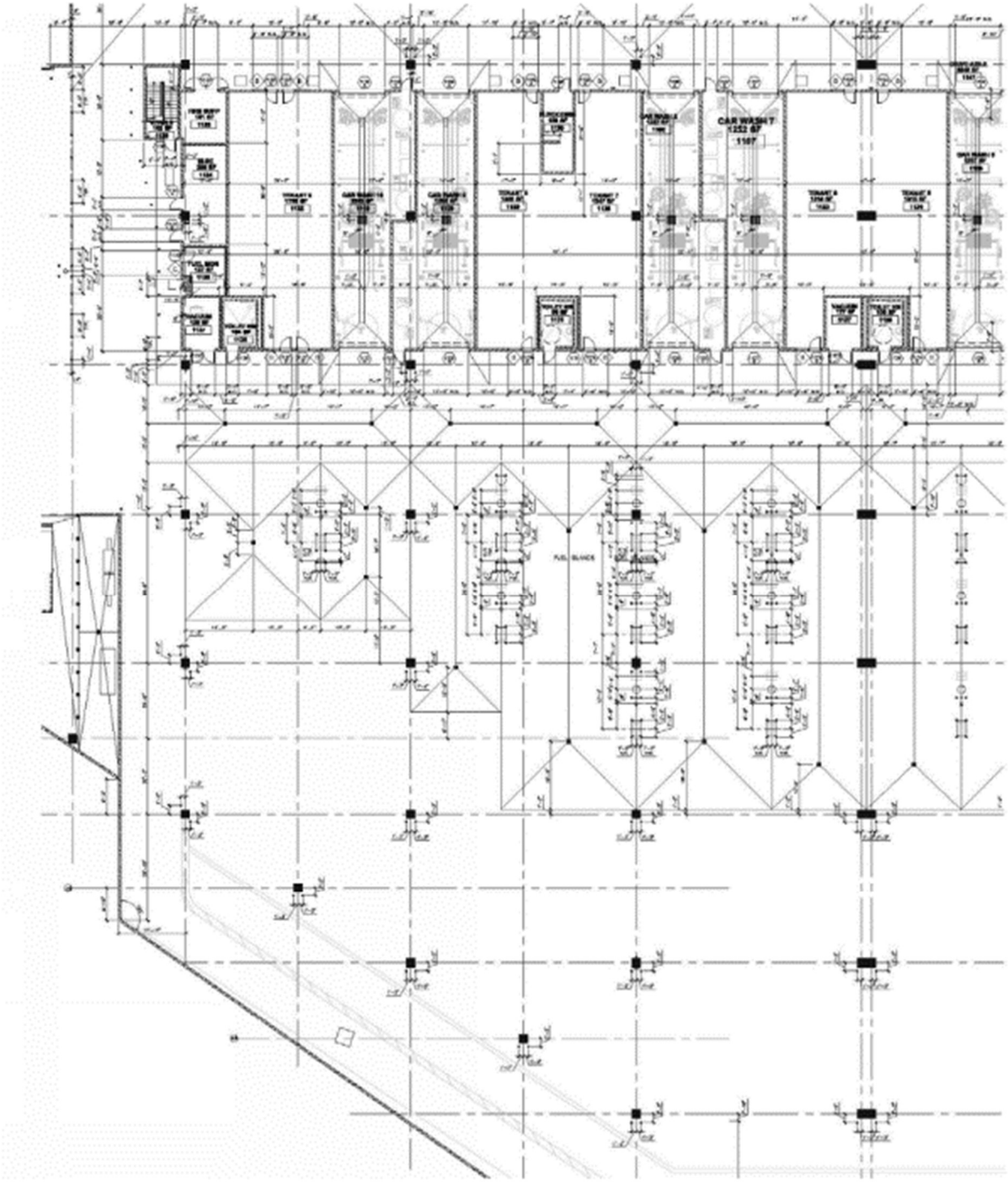
5.10.9 EXHIBIT 9 – QTA SPACE EXCLUSIVE USE AREAS AND COMMON USE AREAS



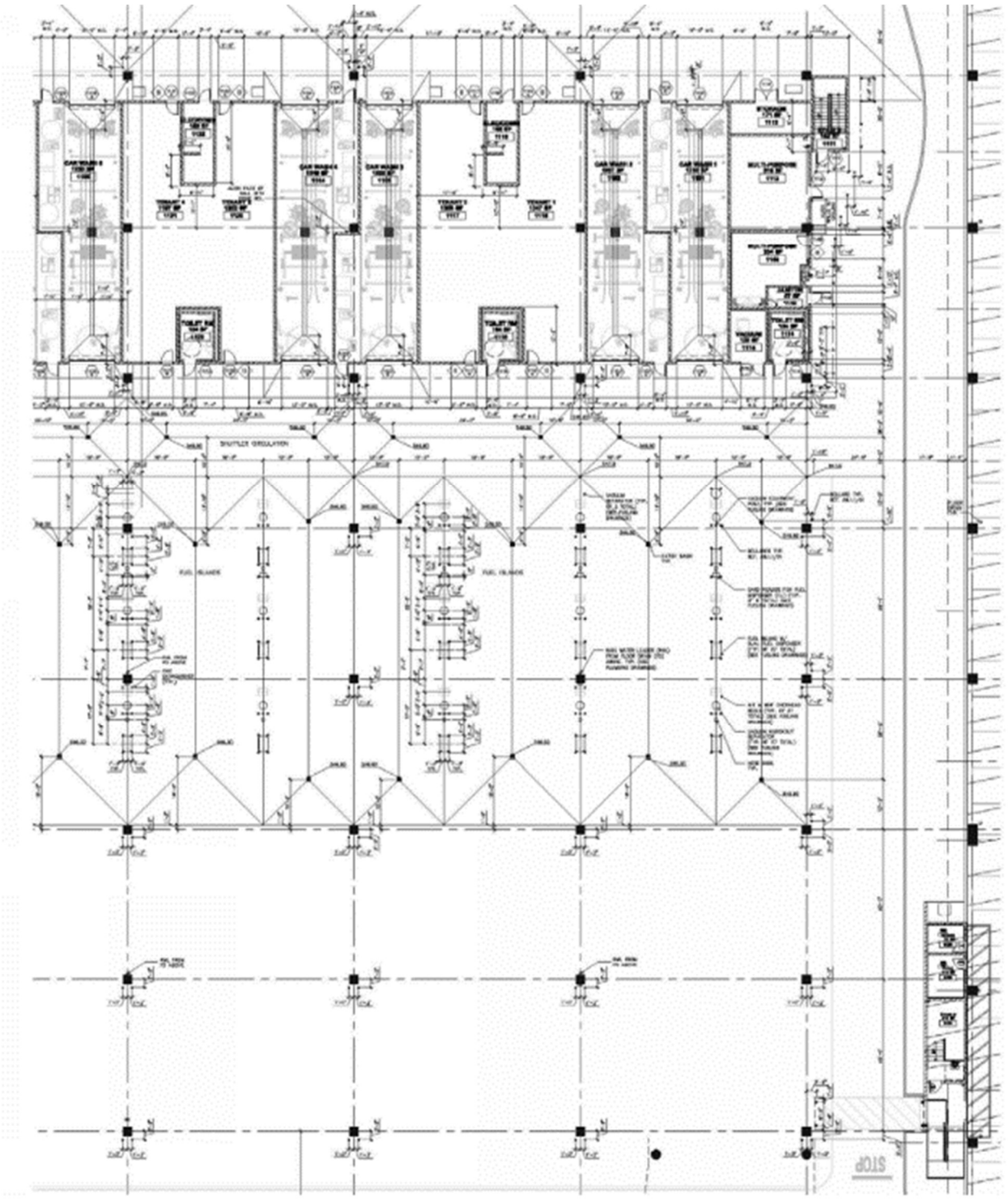
5.10.10 EXHIBIT 10 – QTA SPACE OVERALL PLAN – TENANT IMPROVEMENT AREAS



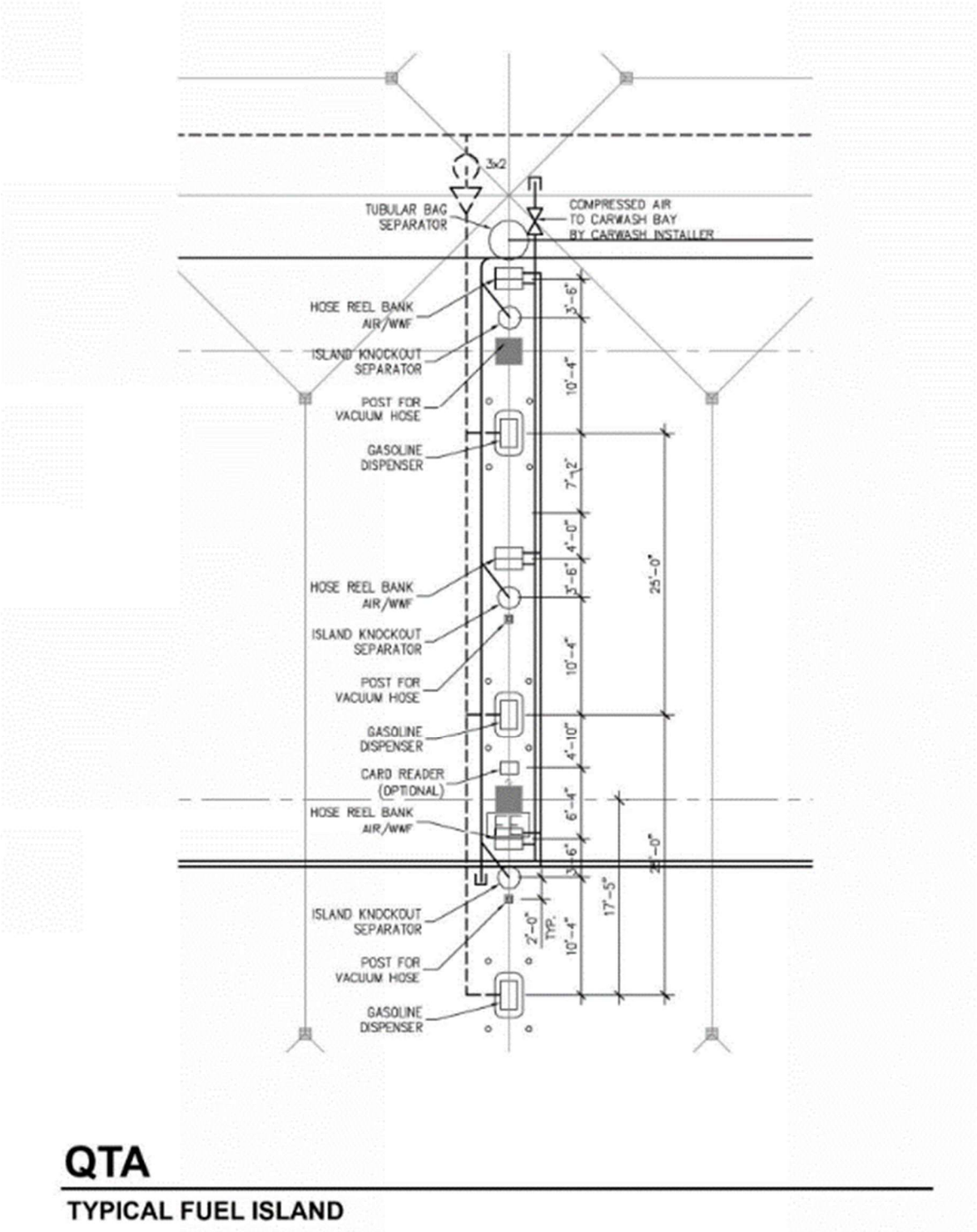
5.10.11 EXHIBIT 11 – QTA SPACE PLAN NORTH – TENANT IMPROVEMENT AREAS



5.10.12 EXHIBIT 12 – QTA SPACE PLAN SOUTH – TENANT IMPROVEMENT AREAS



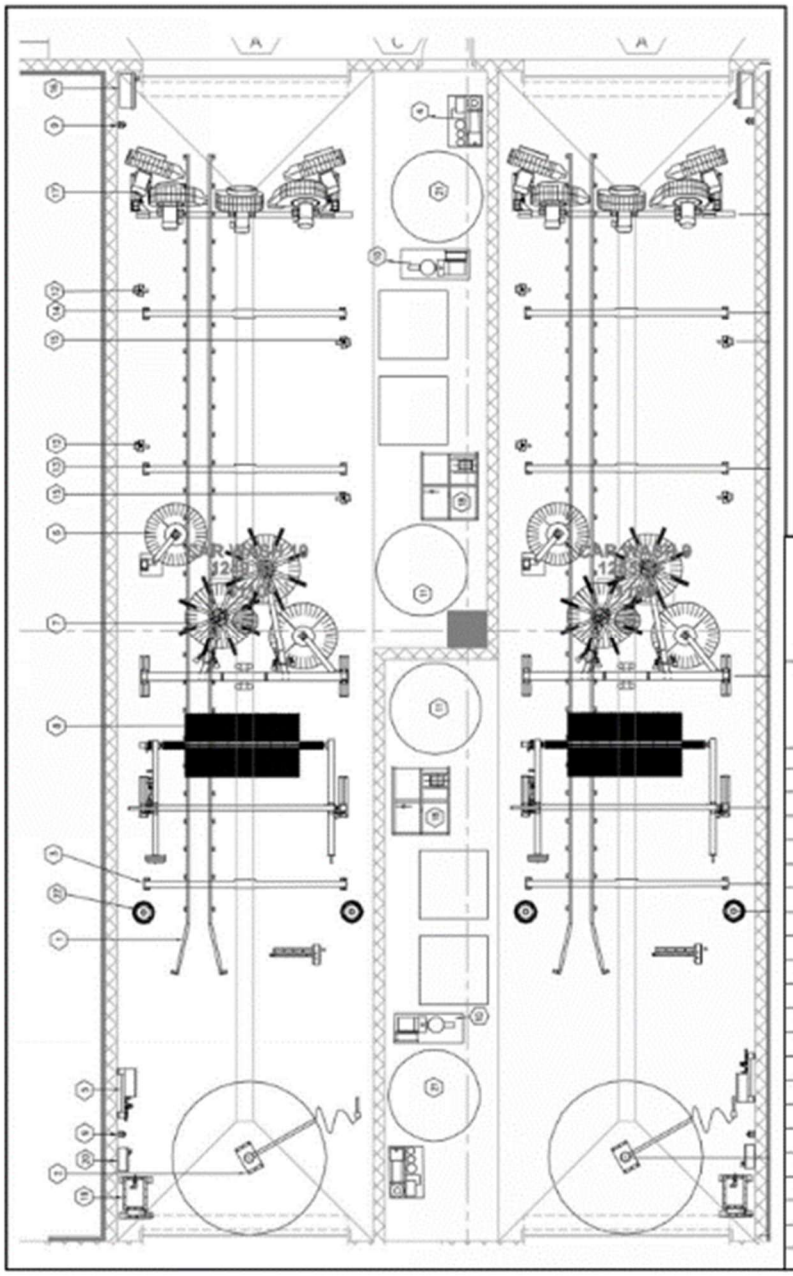
5.10.13 EXHIBIT 13 – QTA SPACE – TYPICAL FUEL ISLAND



QTA

TYPICAL FUEL ISLAND

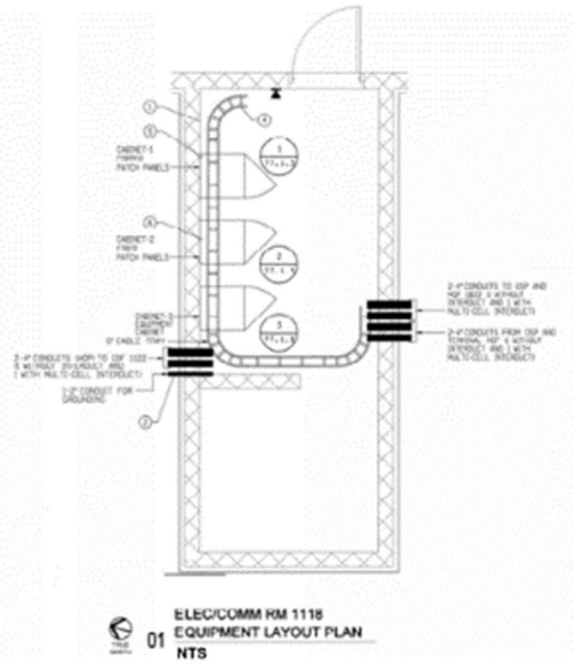
5.10.14 EXHIBIT 14 – QTA SPACE – TYPICAL CARWASH

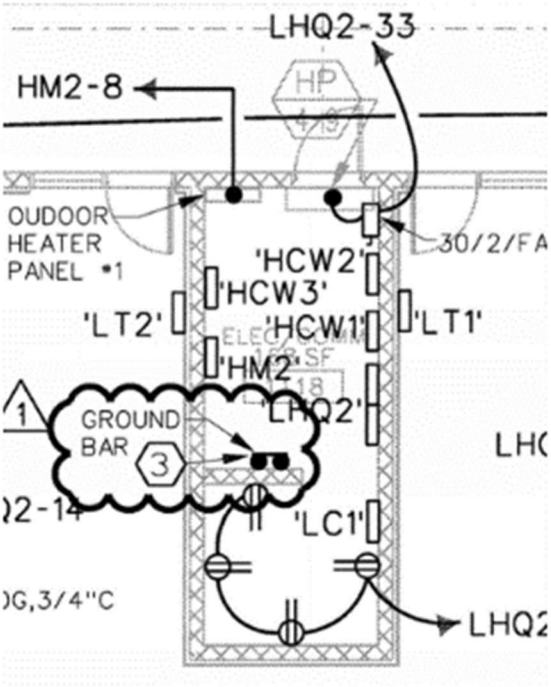


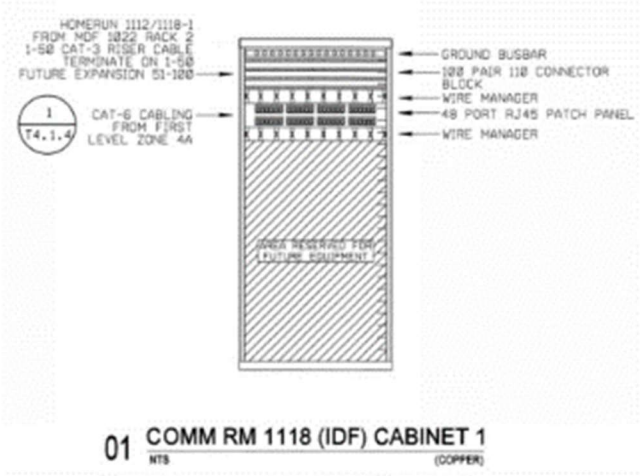
EQUIPMENT SCHEDULE

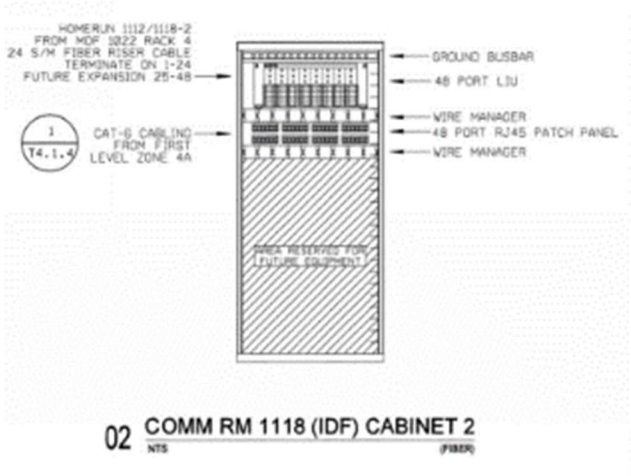
ITEM	DESCRIPTION
1	GUIDE RAIL
2	PREWASH BOOM AND SPRAYER (TENANTS IMPROVEMENT) – NIC
3	PREWASH ARCH
4	3,000 GPD REVERSE OSMOSIS UNIT
5	MACHINE CONTROL CENTER
6	LOW SIDE BRUSHES
7	SIDE BRUSHES
8	TOP BRUSHES
9	EMERGENCY STOP
10	RECLAIM LIFT PUMP WITH SAND SEPARATOR
11	1,500-GAL. RECLAIM WATER STORAGE TANKS, 115"H x 64" DIA.
12	PHOTO-EYE
13	FINAL RINSE ARCH
14	RO RINSE ARCH
15	PHOTO-EYE
16	DRYER CONTROL PANEL (TENANTS IMPROVEMENT) – NIC
17	DRYER – 50 HP (TENANTS IMPROVEMENT) – NIC
18	RECLAIM PUMPING STATION
19	7.5 HP PUMPING STATION (TENANTS IMPROVEMENT) – NIC
20	PREP JET STARTER PANEL (TENANTS IMPROVEMENT) – NIC
21	2,000-GAL. REVERSE OSMOSIS WATER STORAGE TANK, 144"H x 64" DIA.
22	BLASTERS

5.10.15 EXHIBIT 15 – QTA SPACE – TYPICAL ELEC/COMM ROOM

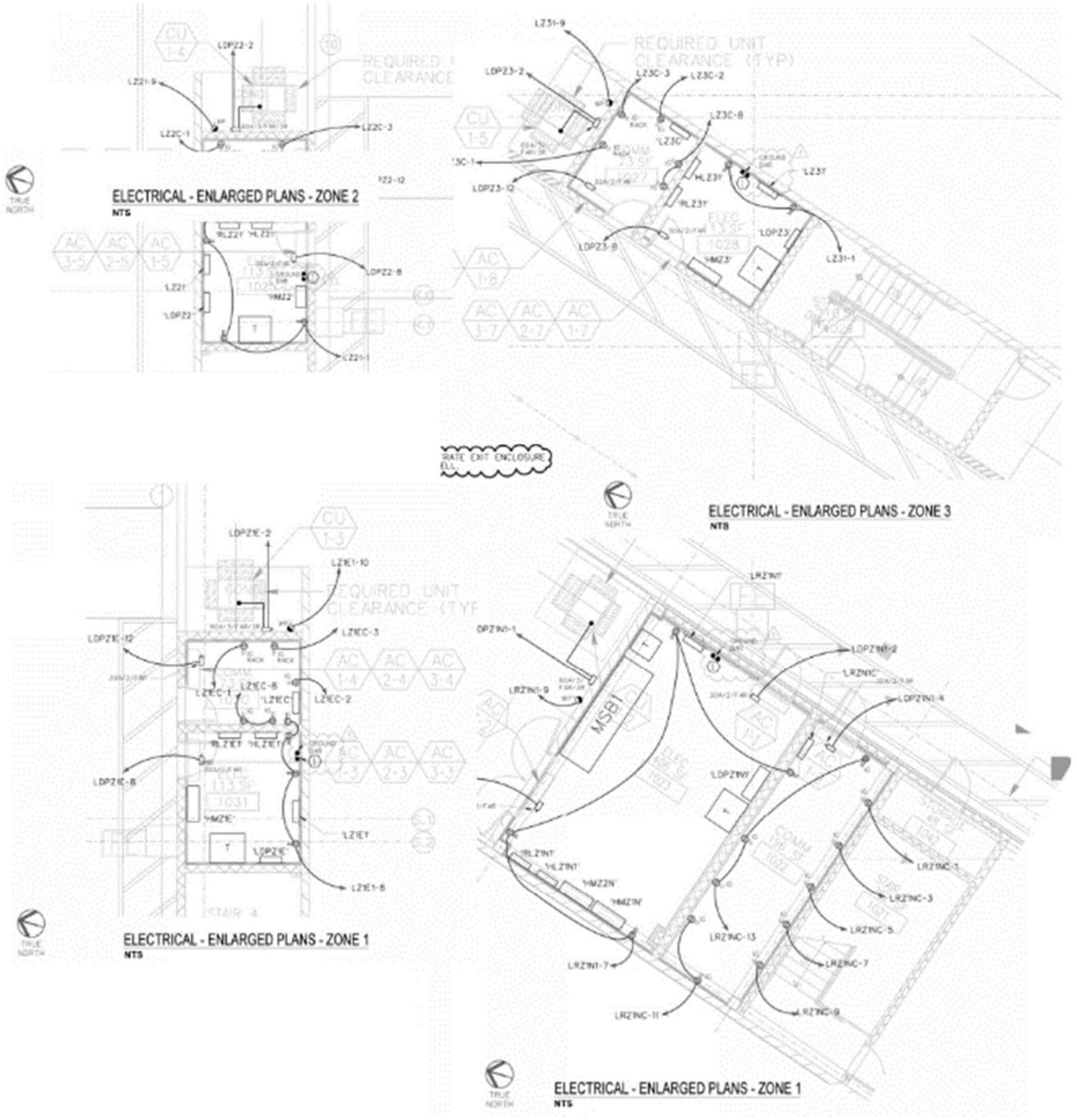




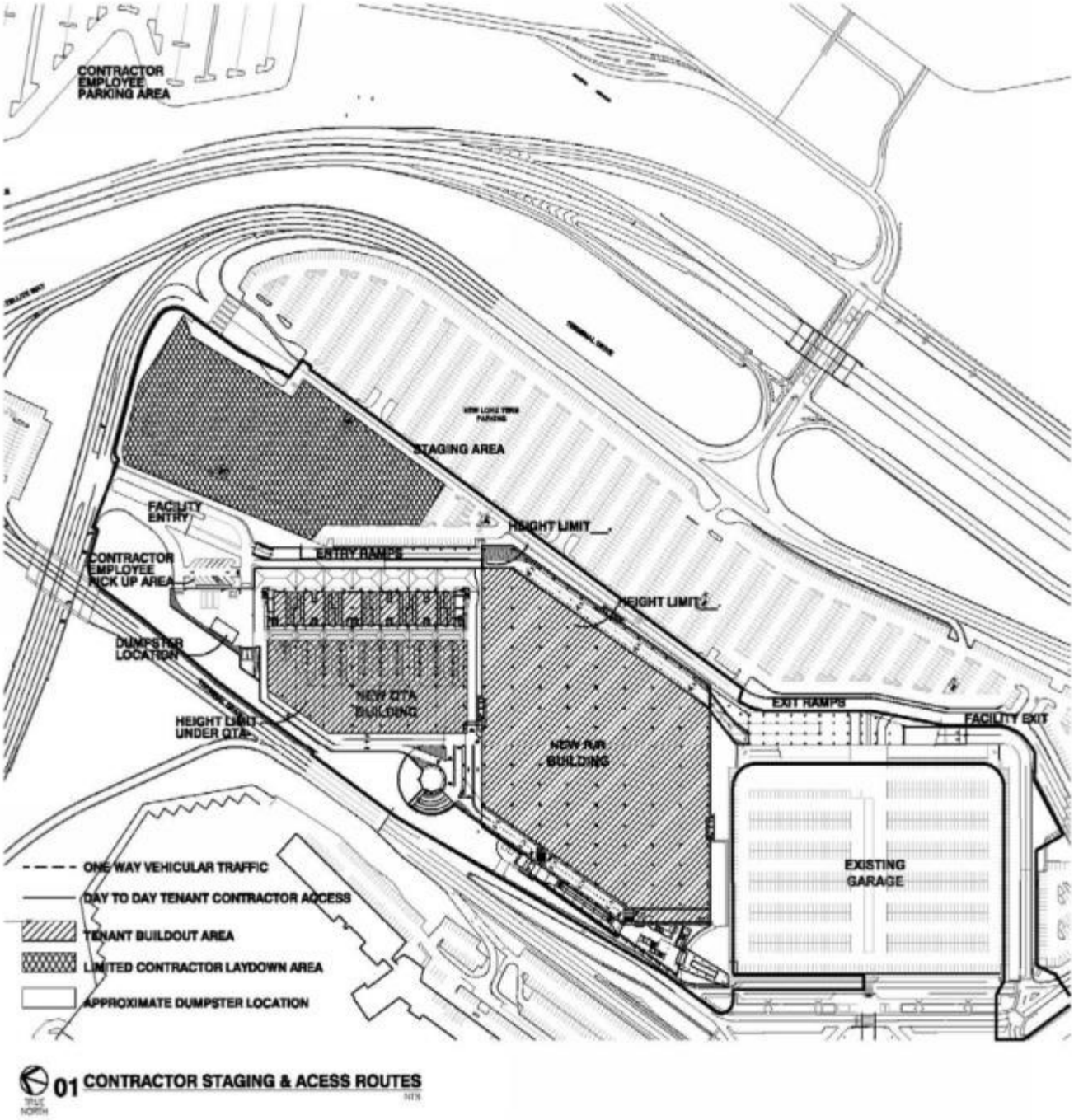




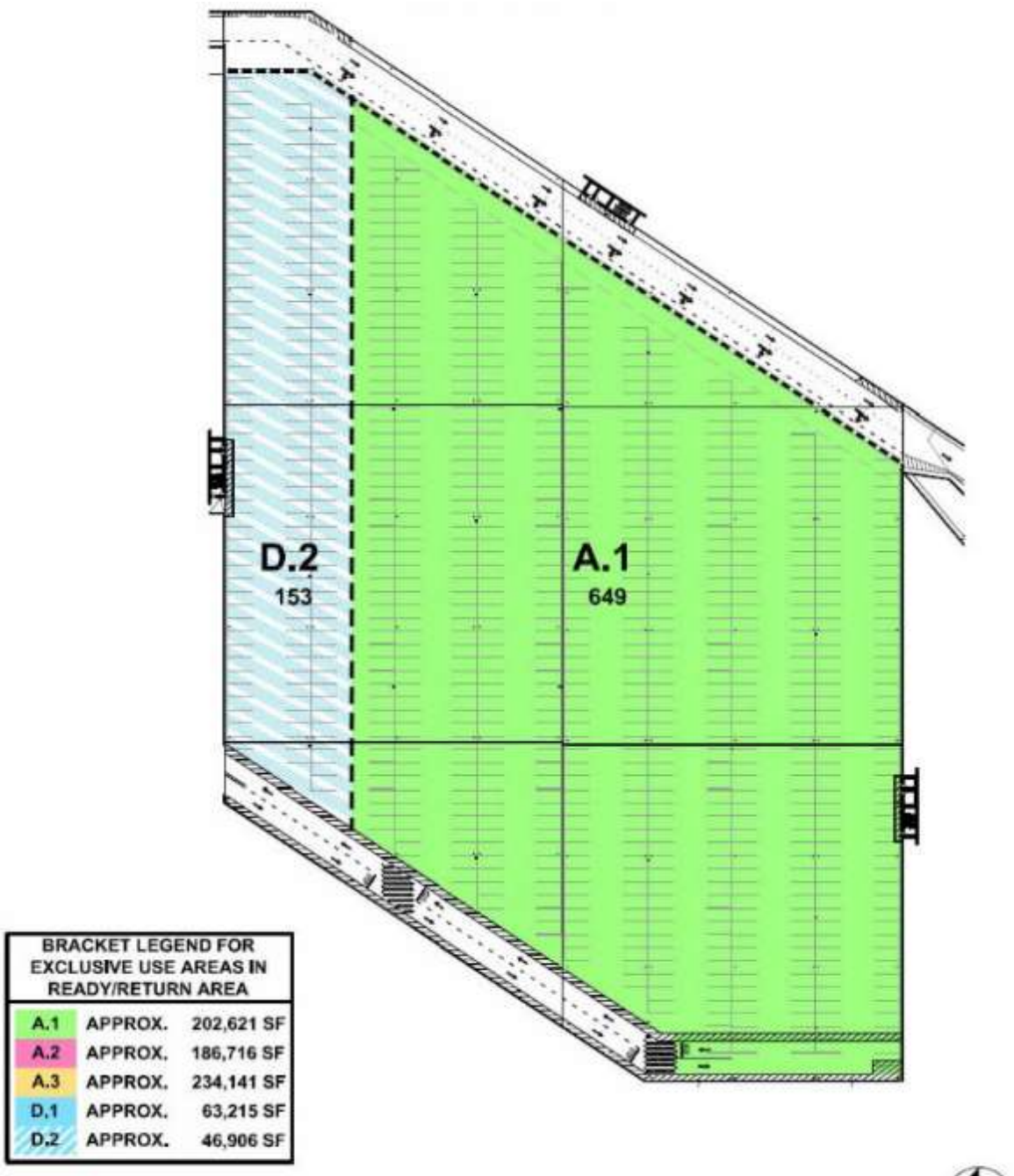
5.10.16 EXHIBIT 16 – READY/RETURN AREA TYPICAL ELECTRICAL ROOM



5.10.17 EXHIBIT 17 – CONTRACTOR STAGING AND ACCESS ROUTES

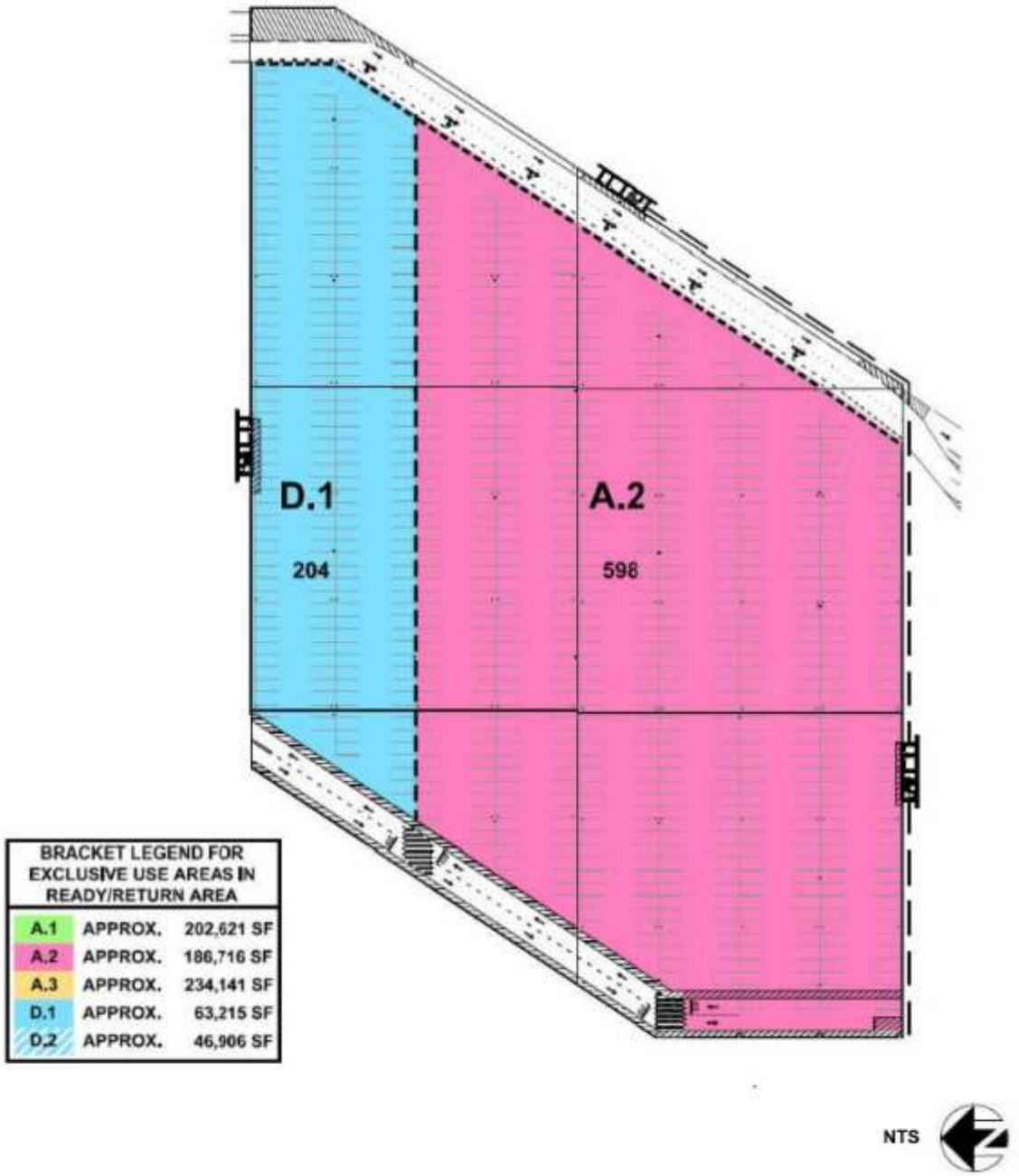


5.10.18 EXHIBIT 18 – READY/RETURN AREA – EXCLUSIVE USE AREAS LEVEL 1



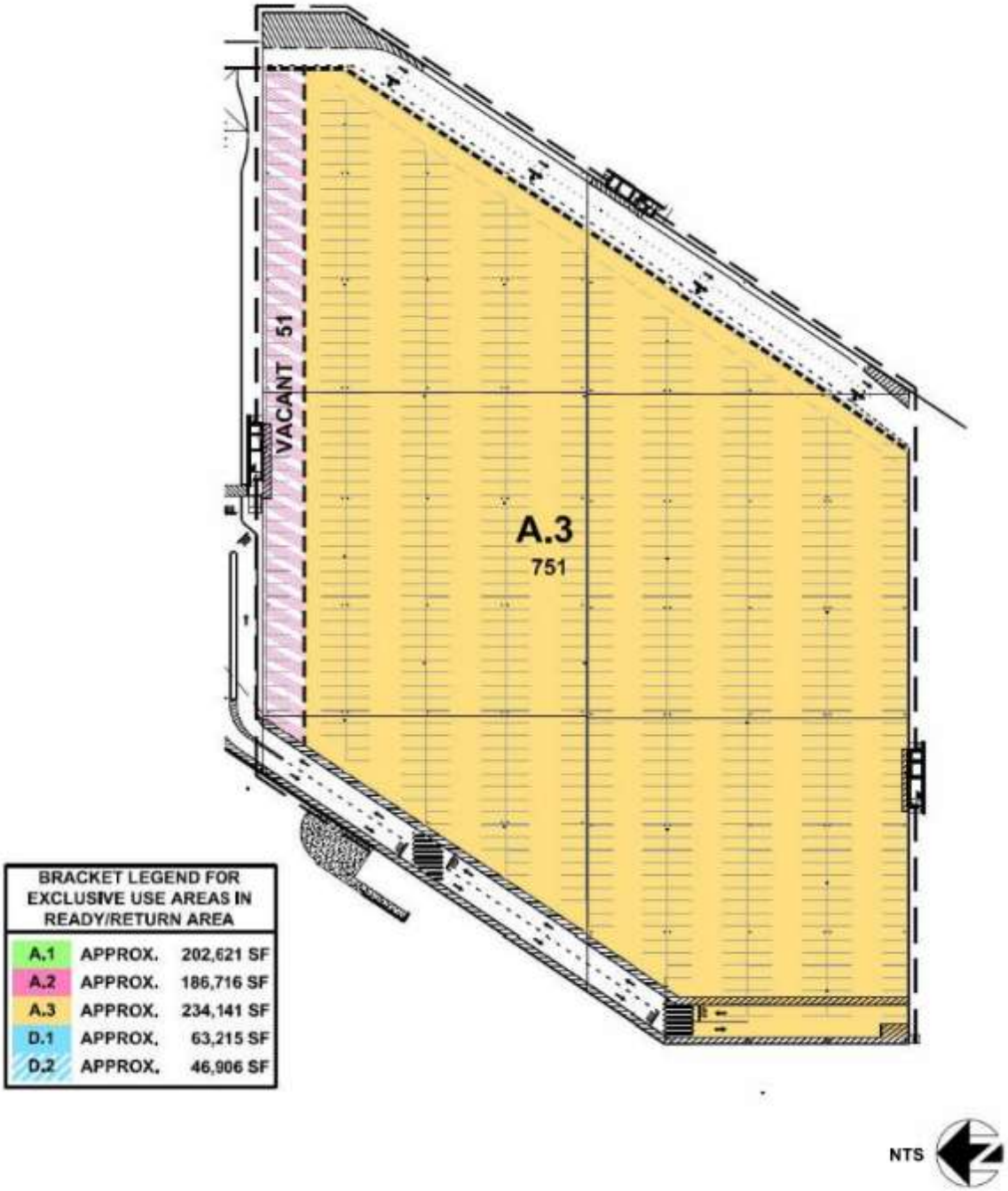
EXCLUSIVE USE AREAS IN READY/RETURN AREA LEVEL 1

5.10.19 EXHIBIT 19 – READY/RETURN AREA – EXCLUSIVE USE AREAS LEVEL 2



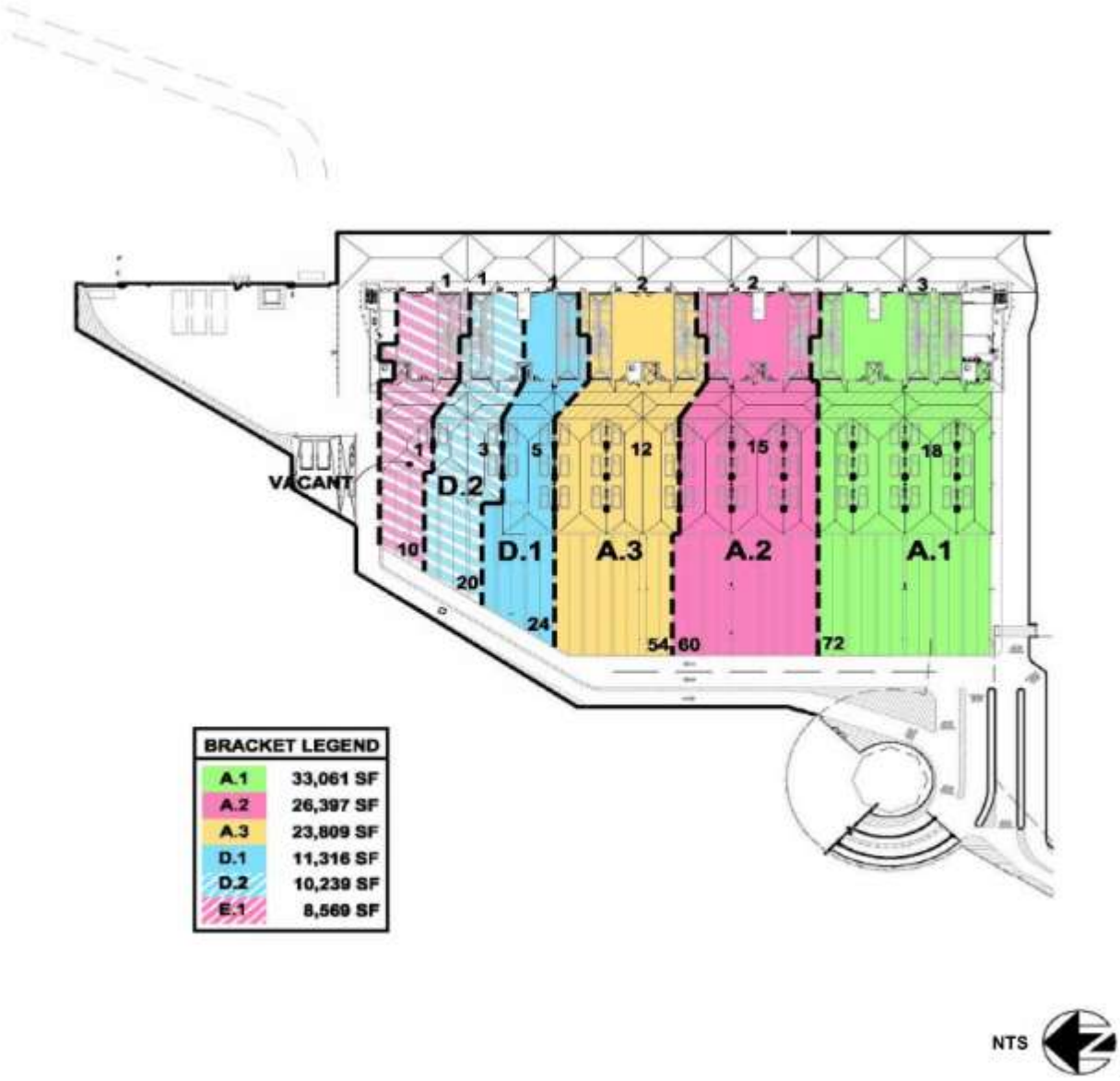
EXCLUSIVE USE AREAS IN READY/RETURN AREA LEVEL 2

5.10.20 EXHIBIT 20 – READY/RETURN AREA – EXCLUSIVE USE AREAS LEVEL 3



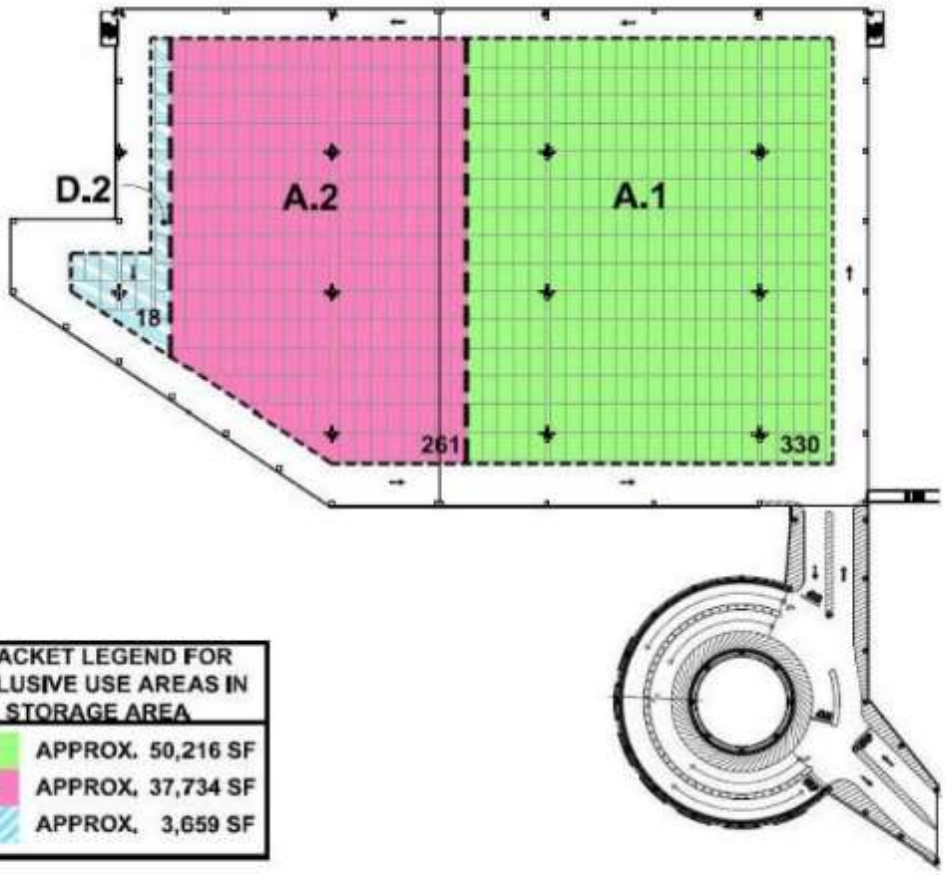
EXCLUSIVE USE AREAS IN READY/RETURN AREA LEVEL 3

5.10.21 EXHIBIT 21 – QTA SPACE – EXCLUSIVE USE AREAS



EXCLUSIVE USE AREAS IN QTA SPACE

5.10.22 EXHIBIT 22 – STORAGE AREA – EXCLUSIVE USE AREAS



BRACKET LEGEND FOR EXCLUSIVE USE AREAS IN STORAGE AREA	
A.1	APPROX. 50,216 SF
A.2	APPROX. 37,734 SF
D.2	APPROX. 3,659 SF

NTS

EXCLUSIVE USE AREAS IN STORAGE AREA

(LOCATED ON THE LEVEL OF THE CONSOLIDATED RENTAL CAR FACILITY THAT IS DIRECTLY ABOVE THE QTA SPACE)

5.11 APPENDIX L – CADD STANDARDS MANUAL

5.11.1 INTRODUCTION

INTRODUCTION

The MNAA CADD Standards manual is a comprehensive document containing all CADD information for projects at Nashville International Airport and John C. Tune Airport. This document includes CADD standards for all disciplines, electronic file delivery requirements, general drafting standards, levels, and cells.

SCOPE AND PURPOSE

This manual establishes specific requirements for the development and delivery of CADD files for all MNAA design and construction projects. These standards are necessary to ensure compatibility, consistency and usability of all CADD, GIS and other project files. The primary purposes for these standards are:

1. at a later date or referenced on future projects.
2. To ensure proper file structure and format of all CADD files so to provide a consistent and compatible electronic record of each project that can be recreated and that incorporation into the Airport's GIS is as effortless as possible.

SOURCE

This manual is based on the "A/E/C CADD Standards Manual" developed by the Tri-Service CADD/GIS Technology Center (TSTC) for the Army, Navy, Air Force, Corps of Engineers, American Institute of Architects (AIA), Construction Specifications Institute (CSI), the United States Coast Guard, the Sheet Metal and Air Conditioning Contractors National Association (SMACNA), the General Services Administration (GSA), and the National Institute of Building Sciences (NIBS). The "A/E/C CADD Standards Manual" is widely considered the ***National CADD Standard***. While MNAA has adopted those portions of the Standard that are applicable to preparing Construction Documents for Airport projects, MNAA has modified the document in a variety of areas to meet its unique requirements.

COMPLIANCE

Compliance with these standards is subject to the terms and conditions of the individual consultant contracts. When the contract specifically requires compliance with these standards, the consultant shall use these standards for all file exchanges during the course of a project and for all files transmitted as record drawings at the completion of a project. These requirements apply to all survey and sub-consultants that will be exchanging or transmitting files. Contractor / Consultant will use resource files provided by MNAA. Any modification to the resource files will be with the express permission of the MNAA Development & Engineering Department.

REQUEST FOR VARIANCE

It is recognized that variances or clarifications to these standards may be necessary. A request for variance shall be submitted along with any substantiating documentation to MNAA Development & Engineering Department.

PROCEDURES FOR CHANGES TO THIS MANUAL

Proposed changes to this manual should be documented on the attached form located at the end of this chapter, and submitted to MNAA Development & Engineering Department for consideration.

5.11.2 PROPOSED CHANGE TO CADD STANDARDS MANUAL

Date: _____

From:

Requestor	
Company/Department	
Address City/State	
Phone	
Fax	
E-Mail	

To: Metropolitan Nashville Airport Authority
Development & Engineering Department
One Terminal Drive, Suite 501
Nashville, Tennessee 37214-4114

Phone #_____
Fax # _____
E-Mail _____

CADD Standards Manual:

Section		Sub-Section	
Page		Subject	

Justification for Change:

Existing Provisions are:

	Incomplete		Inaccurate		Redundant
	Conflicting		Obsolete		Other

Or

	The proposed change represents new provisions not covered in the current CADD Standards Manual.

Detailed Justification:

Description of Change:

Reviewed by:

D & E Dept.		Date	
Disapproved		Approved	
Reason for Disapproval			

Concurrence by:

D & E VP		Date	

5.11.3 PROJECT ORGANIZATION AND FILE NAMING CONVENTIONS

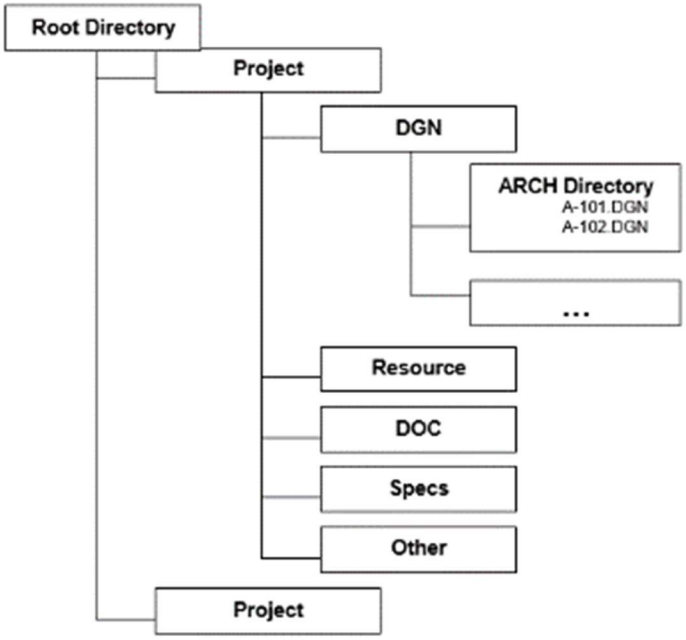
INTRODUCTION

This chapter defines the project structure, the three types of drawing files (model, sheet, and Master CADD Maps), the naming conventions for the different file types and recommendations for numbering the final plotted sheets.

PROJECT STRUCTURE

The project directory structure will use the Project Code (defined below) as the primary project directory name and will contain the following sub-directories:

Dgn	The Design Drawing Directory contains all design files and reference files subdivided into separate directories by discipline as required (e.g. arch, civil, survey, struct, mech, elec)
Resource	The Resource Directory contains all necessary resource and configuration files subdivided into separate directories as required
Doc	The Documentation Directory contains the electronic version of all required CADD documentation
Spec	The Specifications Directory contains the final version of the project's technical specifications
Other	The Other Directory contains any miscellaneous files associated with the project



Project Directory Naming Convention

The project directory name shall be the same as the **Project Code.** The project code is a three or four digit number preceded by a two digit number denoting the year. MNAA provides the project code.

TYPES OF DRAWING FILES

There are three types of CADD files defined in this manual: model files, sheet files and Master CADD Maps.

- **Model Files**

Model files are drawn at full scale. A model file contains the actual proposed work to be performed for the project. This includes design information such as roads, utilities, runways, building components such as columns, walls, windows, ductwork, piping, plans, elevations, sections, etc.

- **Sheet Files**

A sheet file represents the final plotted CADD drawing file. A sheet file contains notes, annotation, call-outs, titles, etc., with the model file(s) referenced to it (including the border sheet) and is used to convey the design to the contractor and others. Border sheets are attached as scaled reference files. The referenced model file(s) is clipped within the border sheet image area to display the portion of design are as required. Sheet files are plotted at the scale associated with a particular area of the design. (E.g.: plan/profile sheet file may be plotted using a plot scale of 50:1; building plan sheet file may be plotted using a plot scale of 8:1.)

- **Master CADD Maps**

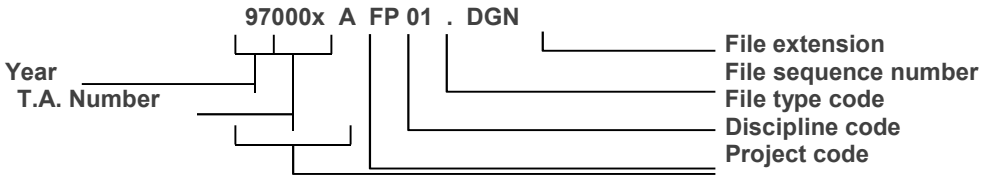
Master CADD Maps represent the most current set of compiled maps available. These Maps are referenced to represent existing conditions. Since these Maps may be superseded by current survey and construction activity, the user is urged to inquire about current survey and construction activities prior to commencing design of any Airport project. For more information on Master CADD Maps refer to Chapter 21.

FILE NAMING CONVENTION (MODEL FILES)

Model files (CADD files used to develop construction documents) are project wide files in which the actual design is performed. While the Master CADD Files typically represent existing conditions the model files depict the proposed construction or modification.

The model file naming convention utilizes a project code, a discipline code, a file type code, a file sequence number and a file extension code. The model file naming convention consists of up to fifteen character spaces not including periods.

Example: < Model Files >



< Model Files >

Spaces	• Contents
1 – 6	Identifies the unique **project code**. Normally only the first five characters are used. The sixth character identifies a sub-task within a given tenant alteration project number.
7 or 7–8	Identifies the **discipline code**
8- 9 or 9-10	Identifies the **file type code**
10 – 11 or 11 – 12	Identifies the **file sequence number** of the design files. (i.e., a series of consecutive plan/profile sheets) This sequence number is for CADD file identification and is **not related to the sheet number** in the construction documents.
12 or 13	Optional – Identifies file as **3D** with the addition of a "z".
13-15 or 14-16	Identifies the file extension of **.dgn** for all MNAA projects.

Note: As shown above, Code locations in the filename are relative to the number of character spaces required for discipline and file type codes.

Discipline Codes < Model Files >

A	Architectural
B	Baggage Handling System
C	Civil (includes overall site layout, staging & phasing)
CO	Communications
E	Electrical
EA	Electrical Airfield
F	Aircraft Fuel Hydrant / Piping System
FP	Fire Protection
G	General (as required for cover sheet, sheet index, location map)
I	Interiors
L	Landscaping
M	Mechanical
N	Navaids
P	Plumbing
S	Structural (Building)
SB	Structural (Bridge)
U	Utilities
V	Survey

Note: File type codes can only be used with the associated discipline. The “General” file type code may be used with all discipline codes.

File Type Codes – All Disciplines < Model Files >

DP	Demolition Plan	**SH**	Schedule
DT	Detail	**SP**	Site Plan
EL	Elevation	**QP**	Equipment Plan
FP	Floor Plan	**XP**	Existing Plan
SC	Section	**3D**	Isometric/3D

File Type Codes – Architectural (A-) < Model Files >

CC	Cabinets/Casework	**NP**	Finish Plan
CP	Reflected Ceiling Plan	**RP**	Roof Plan
GP	Graphics Plan	**SE**	Stairs/Elevators/Escalators
IP	Furniture Plan	**SG**	Signage Plan
LS	Life Safety Plan		

File Type Codes – Baggage Handling Systems (B-) < Model Files >

BP	Baggage Handling Plan		

File Type Codes – Civil (C-) < Model Files >

AF	Airfield Plan	**PV**	Pavement Plan
• **BL**	Boring Log	**RD**	Road Plan
CP	Channel Plan	**SA**	Staging Area Plan
DP	Drainage Plan	**SP**	Striping Plan
EP	Erosion Control Plan	**SV**	Survey Plan
GP	Grading Plan	**TC**	Traffic Control Plan
HR	Haul Routes	**TS**	Transportation Site Plan
LD	Contractor Lay Down	**UP**	Utility Plan
PF	Profiles		

File Type Codes – Communications (CO-) < Model Files >

DP	Data Plan	• **SC**	Security Plan
• **TP**	Telephone Plan	**CP**	Communications Plan

File Type Codes – Electrical (E-) < Model Files >

• **AX**	Auxiliary Power Plan	**LP**	Lighting Plan
• **DG**	One Line Diagram	**PP**	Power Plan
GP	Grounding Plan		

File Type Codes - Fire Protection (F-) < Model Files >

FA	Fire Alarm	**KP**	Sprinkler Plan
RD	Riser Diagram		

File Type Codes – General (G-) < Model Files >

CO	Cover Sheet	**IN**	Sheet Index
CS	Construction Sequence	**KP**	Key Plan
GN	General Notes		

File Type Codes – Interiors (I-) < Model Files >

File Type Codes – Landscaping (L-) < Model Files >

GP	Grading Plan	**LP**	Landscape Plan
HP	Hardscape Plan	**TP**	Turf Plan
IP	Irrigation Plan	•	

File Type Codes – Mechanical (M-) < Model Files >

CP	Control Plan	**MD**	Machine Design
EQ	Equipment Plan	**MH**	Materials Handling
HP	HVAC Ductwork Plan	**PP**	Piping Plan

File Type Codes – Plumbing (P-) < Model Files >

PP	Plumbing Plan	**RD**	Riser Diagram

File Type Codes – Structural (S-) < Model Files >

CP	Column Plan	**PP**	Pier Plan
FF	Floor Framing Plan	**RF**	Roof Framing Plan
NP	Foundation Plan		

File Type Codes – Survey (V-) < Model Files >

AS	As-built Survey	**LS**	Lease Exhibit
BS	Boundary Survey	**PL**	Plat
CT	Control Points	**PT**	Survey Points
DK	Deed Sketch	**SC**	Search Coordinates
DS	Design Survey	**SU**	3D Planimetrics
EX	Exhibit	**TC**	Point Tics
FN	Final	**TR**	Traverse
FS	Field Survey	**TP**	Topographic Survey

File Type Codes – Utility (U-) < Model Files >

AE	Airfield Electrical	**NG**	Natural Gas
AF	Aviation Fuel	**PT**	Pre-Treatment
CP	Communication	**SD**	Storm Drain
DW	Domestic Water	**SS**	Sanitary Sewer

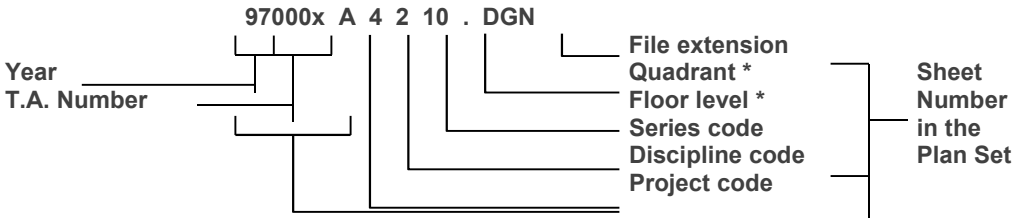
File Type Codes – Utility (U-) (continued) < Model Files >

EP	Electrical	**VF**	Vehicular Fuel
GL	Glycol		

FILE NAMING CONVENTION (SHEET FILES)

A sheet file represents the final plotted CADD drawing and is comprised of scaled model files referenced into a border. The sheet file naming convention utilizes a project code, a discipline code, a series code, floor level, a quadrant number, a sheet sequence number (where applicable) and a file extension code. The model file naming convention consists of up to fifteen character spaces not including periods.

Example: < Sheet Files >



< Sheet Files >

Spaces	• Contents
1–6	Identifies the unique **project code**. Normally only the first five characters are used. The sixth character identifies a sub-task within a given tenant alteration project number.
7 or 7-8	Identifies the **discipline code.** Normally a single digit with a few exceptions that require two digits.
8 or 9	Identifies the **series code**
9-11 or 10-12	**Structures:** Identifies the **floor level** (1 digit) and **quadrant number** (2 digits). **Sites:** A **sheet sequence number** (3 digits) is used to identify consecutive sheets with the same series code.
12-14 or 13-15	Identifies the file extension. **.DGN** for all MNAA projects.

Note: As shown above, Code locations in the filename are relative to the number of character spaces required for discipline and series codes.

Discipline Code < Sheet Files >

A	Architectural
B	Baggage Handling Systems
C	Civil
CO	Communications (Telephone/Security)
E	Electrical
EA	Electrical Airfield
F	Aircraft Fuel Hydrant/Piping System
FP	Fire Protection
G	General (sheet index)
I	Interiors
L	Landscape
M	Mechanical

Discipline Code (continued) < Sheet Files >

N	Navaids
P	Plumbing
S	Structural (Building)
SB	Structural (Bridge)
U	Utility
V	Survey

SECTION 13 Series Codes

The following are series codes in the order they appear in the construction document set:

Series Code – General < Sheet Files >

NA	Cover Sheet includes: • Project Title • Project Team • Vicinity Map • Rendering of Project (if applicable) No series code required
1	Index Sheet
2	General Notes
3	Construction Sequence
4	Demolition Plans

Series Code – Civil < Sheet Files >

1	Notes Construction Sequencing Haul Routes Contractor Laydown Area Traffic Control Site Plan
2	Dimension Control
3	Demolition Plan Clearing and Grubbing
4	Grading Plan
5	Paving Plan Jointing Plan
6	Paving Profiles
7	Striping Plan
8	Drainage Area Plan
9	Erosion Control Plan Seeding/Sodding Plans

Series Code – Civil (cont'd) < Sheet Files >

10	Utility Plans Storm Drain
	• Water • Sanitary Sewer • Pre-Treatment • Glycol • Electrical Duct Banks • Fire • Communications
11	Utility Profiles
12	Details

Series Code - Structural Bridge < Sheet Files >

1	General Notes Area Plan
2	Plans
3	Elevations
4	Typical Sections
5	Foundation Plan
6	Retaining Walls
7	Deck & Approach Slabs
8	Details

Series Code - Landscape Architecture < Sheet Files >

1	Landscape Planting Site Plan
2	Landscape Planting Details
3	Grading Plans
4	Hardscape Site Plan
5	Hardscape Details
6	Irrigation Plans
7	Irrigation Details
8	Utility Plans

Series Code – Architecture < Sheet Files >

1	General Information including:
	• Building Summary
	• Doors
	  • Elevations
	  • Frame Types
	  • Type Plan Designators
	  • Type Schedule
	  • Accessory/Location Guide
	• Sealant Joint details
	• Control Joint details
	• Metal Fabrication Details
	• Toilet Types/Accessories Sheets
	• Partition Types

2	Floor plans
3	Reflected Ceiling Plans
4	Equipment
5	Cabinets/Casework
6	Roof Plans
7	Roof details
8	Exterior Elevations
9	Wall Sections
10	Details (Interior Elevations if required)
11	Stair Plans & Details Elevator Plans & Details Escalator Plans & Details

Series Code – Interiors < Sheet Files >

1	Furnishing Floor Plans
2	Floor Pattern Plans
3	Details

Series Code - Baggage Handling < Sheet Files >

1	Floor Plans
2	Details

Series Code – Structural < Sheet Files >

1	General Notes Symbols Typical Details Schedules
2	Foundation Plans
3	Floor Framing Plans
4	Roof Framing Plans
5	Framing Details
6	Wind Brace Element Details
7	Bents/Piers/Concrete Details
8	Structural Sections
9	Structural Details Structural Schedules

Series Code – Mechanical < Sheet Files >

1	General Notes Symbols
2	HVAC Floor Plans
3	HVAC Roof Plans
4	Mechanical Room Plans & Details
5	HVAC Details & Schedules
6	HVAC Controls

Series Code – Plumbing < Sheet Files >

1	General Notes, Symbols
2	Floor Plan
3	Risers
4	Details Schedules

Series Code – Electrical < Sheet Files >

1	General Notes Symbols
2	Lighting Plans (Site)
3	Lighting Details (Site) Lighting Schedules (Site)
4	Lighting Plans (Building)
5	Lighting Details (Building) Lighting Schedules (Building)
6	Power Plans
7	Electrical Roof Plans
8	Electrical Plans (Mechanical Rooms) Electrical Transformer Vaults & Switchgear Electrical Room Plans
9	Details Schematics Panel Schedules
10	Cathodic Protection

Series Code - Fire Protection < Sheet Files >

1	General Notes Symbols
2	Floor Plans

Series Code – Communications < Sheet Files >

1	General Notes Symbols
2	Floor Plans
3	Details Schematics

Series Code - Electrical Airfield < Sheet Files >

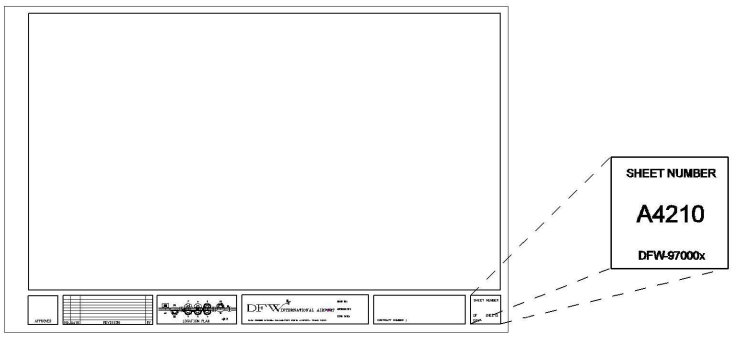
1	Layout and Dimension Plan
2	Details
3	Lighting and Signage Identification Plans
4	Electrical Vault

Series Code – Navaids < Sheet Files >

1	Plans
2	Details

SHEET FILE NAME VERSUS SHEET NUMBER

The sheet number that appears on finished plots will approximate the sheet file name. The sheet number uses the same discipline code, series code, and floor level and quadrant number (e.g.: structures) or sheet sequence number (e.g.: civil) that is utilized in the sheet file naming conventions (see exhibit following page.)



FILE NAMING CONVENTIONS (MASTER CADD MAPS)

The MNAA Master CADD Maps are the design files compatible with the Airport's Geographic Information System. The map file naming convention consists of an acronym to approximate a description of the file contents. The following is a list of current Master CADD Map names:

CIVIL	< Master CADD Maps>
AIRFIELD-BNA	Taxiways, runways, aprons and emergency roads
BOUNDARY	Property boundary, leases, easements and right-of-ways
BUILDINGS	Buildings, ramps, stairs, and sidewalks
CABLE_UTIL	Cable utilities
COMM_FAA	Communications utilities & equipment for FAA
CONTOURS_J_96	Contours for Quad maps 96C, & 96D
CONTOURS_J_107	Contours for Quad maps 107A, 107B, 107C, & 107D
CONTOURS_J_108	Contours for Quad maps 108A, 108B, 108C, & 108D
CONTOURS_J_120	Contours for Quad maps 120A, 120B, 120C, & 120D
CONTOURS_J_121	Contours for Quad maps 121A, 121B, & 121D
CONTOURS_J_134	Contours for Quad maps 134A, 134B, & 134C
CONTOURS_J_135	Contours for Quad map 135A
CONTOURS_J_962D	Contours for Quad maps 96C, & 96D
CONTOURS_J_1072D	Contours for Quad maps 107A, 107B, 107C, & 107D
CONTOURS_J_1082D	Contours for Quad maps 108A, 108B, 108C, & 108D
CONTOURS_J_1202D	Contours for Quad maps 120A, 120B, 120C, & 120D
CONTOURS_J_1212D	Contours for Quad maps 121A, 121B, & 121D
CONTOURS_J_1342D	Contours for Quad maps 134A, 134B, & 134C
CONTOURS_J_1352D	Contours for Quad maps 135A
EASEMENTS	Private/public utility, access, & avigation easements
ELEC_AIR	Airfield lighting, signing and electrical
ELEC_MNAA	Electrical power, equipment, and lighting for BNA roadways
ELEC_OTHERS	Electrical power and equipment for Others Electric
FENCES	AOA fences and gates
FIBER_OPTICS	Fiber optic utilities
FLOOD	Floodways & 100/500 year floodplains
FUEL	Fuel utilities

GRIDS	State Plane grid and various others
HYDROLOGY	Creeks, lakes, ponds & streams
IRRIGATION	Irrigation systems
NATL_GAS	Natural gas utilities & equipment
PARKING	Parking lots
RAMP	Parklines, lead-in lines, tugroads, etc.
ROADSIGNS	Roadway signage
ROADWAYS	Public & private roadways
SEWER	Sanitary sewer utilities & equipment
STORM	Storm drain utilities & structures
SURVEY	Control points & monuments
TELEPHONE	Telephone utilities & equipment
TRAILS	Walking trails
VEGETATION	Trees, shrubs and ground cover
WATER	Water utilities & equipment

ARCHITECTURAL < Master CADD Maps>

BNA1AB	Concourses A & B, Tunnel level (utilities)
BNA1CD	Concourses C & D, Tunnel level (utilities)
BNA1T	Main Terminal area, Ground Transportation level (Garage one)
BNA2AB	Concourses A & B, Ramp/Operations level
BNA2CD	Concourses C & D, Ramp/Operations level
BNA2T	Main Terminal area, Baggage Claim level
BNA3AB	Concourses A & B, Concourse level
BNA3CD	Concourses C & D, Concourse level
BNA3T	Main Terminal area, Ticketing level
BNA3D	Concourses D, Office/Concourse level
BNA4AB	Concourses A & B, Roof level
BNA4CD	Concourses C & D, Office level (Operations offices)
BNA4D	Concourses D, Mechanical level
BNA4T	Main Terminal area, Mezzanine level (MNAA Offices)
BNA5CD	Concourses C & D, Mechanical level
BNA5T	Main Terminal area, Penthouse level
BNA6CD	Concourses C & D, Control Center level (AOC)
BNA6T	Main Terminal area, Roof level
BNA7CD	Concourses C & D, Control Tower level (OPS Tower)
GARAGE-1	Short Term Parking Garage, first level
GARAGE-2	Short Term Parking Garage, second level
GARAGE-3	Short Term Parking Garage, third level
4309-1	CONRAC facility, first level
4309-2	CONRAC facility, second level

-----END OF CHAPTER----

5.11.4 DRAWING FILE DESIGN PLANE

INTRODUCTION

This chapter defines the MicroStation concept of the Design Plane, Working Units and Global Origin. As a general rule, MNAA CADD drawings shall be configured as 2D files. However, there may be special circumstances where 3D work may be required. 3D configurations are covered in Chapter 7. Use of the Seed File, provided with this document and as defined in Chapter 7, will ensure compatibility with MNAA 's design plane.

DESIGN PLANE

MicroStation utilizes a finite design plane that has 4,294,967,296 positional units (P.U.) or Units of Resolution (U.O.R.'s) in each axis (x, y, z). These points are grouped to comprise the design file Working Units. Working Units are made up of Master Units, Sub Units and Positional Units expressed as MU:SU:PU.

- Master Units (MU) = Largest unit of the design plane, typically set to feet with a value of 1.
- Sub Units (SU) = Second largest unit of the design plane that divides the master unit into smaller components: inches with a value of 12 or tenths of feet with a value of 10.
- Positional Units (PU) = Smallest unit of the design plane. The number of positional units per sub unit determines the drawing's precision and the size of the design plane. The greater the number of positional units, the higher the drawing's precision, but the smaller the design plane. MNAA uses 100 PU's for Civil Engineering and 8000 PU's for Architectural Files. MicroStation J utilizes enhanced precision which allows ten additional points of accuracy between two U.O.R.s.

- **WORKING UNITS**

Together, these groups of units are called Working Units (MU:SU:PU). When differing values are assigned to the working units, the measurable limits of the design plane changes.

MNAA's standard working units for **Architectural** drawings are **1:12:96000** with MU=survey feet and SU=inches.

MNAA's standard working units for **Civil** drawings are **39.37:47.24409449:10000** with MU=survey feet and SU=tenths of survey feet.

SECTION 14 REFERENCE FILES

When referencing files having similar MU:SU:PU allocations, files are attached coincidentally.

When referencing a Civil Design File to an Architectural Design File or visa versa, a scale factor of 1:1 is applied to the reference file:

-----END OF CHAPTER-----

5.11.5 LEVEL ASSIGNMENTS

INTRODUCTION

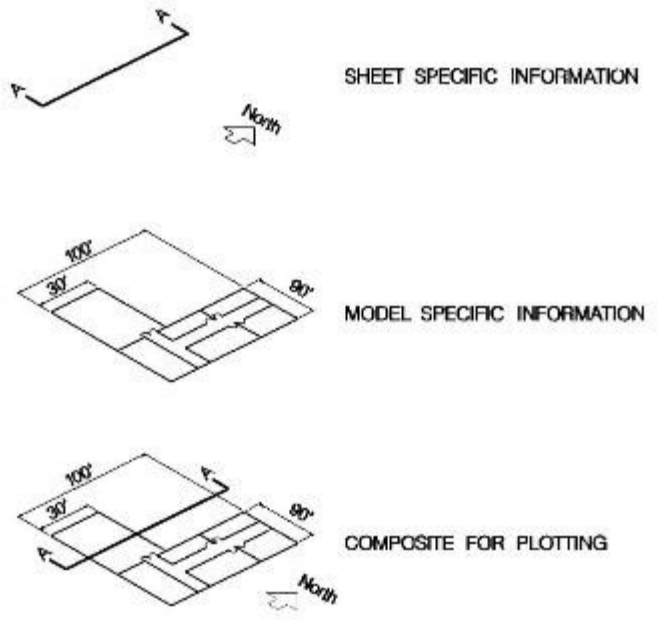
This chapter explains the use of levels in both the model and the sheet file, the conventions used to name levels, and the use of referenced model files in the creation of the sheet files.

LEVELS DEFINED

The information represented by individual levels is grouped into two primary types: model-specific information and sheet-specific information (see figure below).

- Model-specific information includes site, roads, buildings or other objects depicting existing and/or proposed conditions. This information is often shared among drawings. Examples include utilities, roads, runways, walls, doors, light fixtures, room numbers, etc. Model-specific information may be either literal (e.g., curbs, walls) or symbolic (e.g., manholes, electrical outlets).

- Sheet-specific information may include notes, annotative symbols, and titles. This type of information is usually not shared between drawings.



LEVEL NAMING CONVENTION

The level is the basic tool used in CADD for managing graphic information. The levels defined within these standards are based on the recommendations set forth in the 1997 American Institute of Architects' publication, "CAD Layer Guideline", with modifications for use on MNAA projects. This manual offers one method for level naming consisting of the following:

- Discipline Code – two characters (e.g., "A-" for Architectural, "M-" for Mechanical)
- Major Group Code – four characters (e.g., "DOOR" for Doors, "LITE" for Lighting fixtures)
- Minor Group Code – four characters (e.g., "EXTR" for exterior versus "INTR" for interior).

MODEL FILE LEVEL ASSIGNMENTS

The levels assignment tables in Chapters 10 through 21 include:

- The levels assigned to each model file.
- The level number assigned to each level name.
- A detailed description of each level.
- The line style, line width, and color associated with each level.

Annotation Levels

The first seven levels of every model file represent the annotation levels (except the "Detail" model file) and are identical except for the Discipline Code. These levels contain the model-specific information that might not be required by other disciplines. ***Note: Levels 8 and 9 (except on the "Detail" model files) are reserved for additional text as required to meet different plot scales.***

LEVEL NAME	DESCRIPTION
*-ANNO-DIMS	Witness/extension lines, dimension arrowheads/dots/slashes and dimension text
*-ANNO-KEYN	Keynotes with associated leader lines and arrowheads, ConDoc keynotes.
*-ANNO-NOTE	General notes and remarks
*-ANNO-NPLT	Construction lines, reference targets, review comments, area calculations and other non-plot items
*-ANNO-PATT	Miscellaneous patterning, cross hatching, poche.
*-ANNO-SYMB	Miscellaneous symbols.
*-ANNO-TEXT	Miscellaneous text and callouts with associated leader lines and arrowheads.

Primary Levels

Levels 8 through 49 of every model file represent the primary levels. These levels are unique for each model file and contain the major portions of work represented by that model file.

Status Levels

Levels 50 through 60 of a model file are the status levels (except the “Detail” and “Demolition” model files) and are identical except for the Discipline Code. These levels differentiate between phases of work (demolition work, existing work, and future work) and contain the minor portions of work represented by that model file.

Example: For a new addition to an existing building, the majority of items will be New Items, and will therefore be on the Primary Levels. Items to be demolished, will be shown on the *-STAT-DEMO level and existing to remain items will be shown on the *-STAT-EXST level.

LEVEL NAME	DESCRIPTION
*-STAT-DEMO	Existing to be demolished
*-STAT-EXST	Existing to remain
*-STAT-FUTR	Future work
*-STAT-MOVE	Items to be moved
*-STAT-NICN	Not in contract
*-STAT-PHS#	Phase number (the # is replaced with 1-9)
*-STAT-RELO	Relocated items
*-STAT-TEMP	Temporary work

SECTION 15 SHEET FILE LEVEL ASSIGNMENTS

The level assignment tables in Chapters 10 through 21 include:

- The levels assigned to each sheet file.
- The level number assigned to each level.
- The level name assigned to each level.
- A detailed description for each level.
- The style, line width, and color associated with each level.

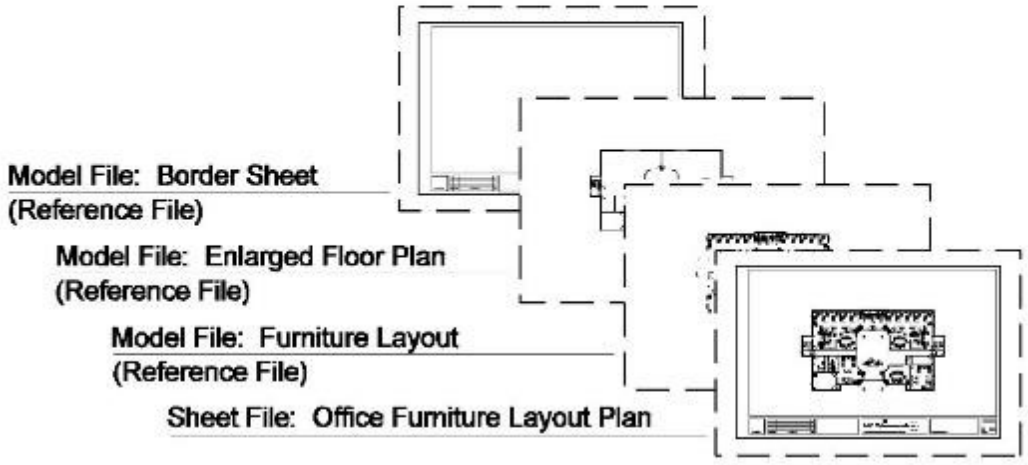
Annotation Levels

The first nine levels of every sheet file represent the annotation levels and are identical except for the Discipline Code. These levels contain the sheet-specific information not required by other disciplines.

LEVEL NAME	DESCRIPTION
*-ANNO-DIMS	Sheet specific witness/extension lines, dimension arrowheads/dots/slashes and dimension text
*-ANNO-KEYN	Sheet-specific keynotes with associated leader lines and arrowheads, ConDoc keynotes
*-ANNO-LEGN	Legends and schedules
*-ANNO-NOTE	Sheet-specific general notes and remarks
*-ANNO-PATT	Sheet-specific patterning, cross hatching, poche
*-ANNO-REDL	Redlines, markups
*-ANNO-REVS	Revisions, amendments, addenda, and modifications
*-ANNO-SYMB	Sheet-specific symbols (north arrows, scales, etc.)
*-ANNO-TEXT	Sheet-specific text and callouts with associated leader lines and arrowheads

Development of Sheet Files

Reference files are used in the creation of sheet files by opening or creating the appropriate sheet file and referencing the selected model files (Refer to the illustration below).



-----END OF CHAPTER-----

5.11.6 DRAFTING STANDARDS

INTRODUCTION

This Chapter identifies basic drafting standards used in creating Construction Documents for MNAA projects. When possible, these standards have been pre-established in the MNAA Seed File.

SECTION 16 GRAPHIC ATTRIBUTES

In general, the graphic attributes are defined on the level assignment sheet and include line weight, line style and color. This section offers additional information for the choices made.

Line Weight

Line Thickness	Millimeter	MicroStation Line Weight	Utilization
Extra Fine	0.18	wt = 0	Poche, patterning
Fine	0.25	wt = 1	Dimension lines, dimension leader and witness lines, note leader lines, line terminators, phantom lines, center lines, long break lines, objects seen at a distance
Medium	0.35	wt = 2	Minor object lines, dimension text, text for notes and callouts, schedule text, hidden lines
Wide	0.50	wt = 3	Major object lines , schedule boxes, charts
Extra Wide	0.70	wt = 5	Minor title underlining, text for titles, object lines requiring special emphasis, elevation grade lines, building footprints, top of grade lines on section/foundation details
Option 1	1.00	wt = 7	Major title underlining, cutting plane lines, separating portions of the drawing
Option 2	1.40	wt = 10	Border sheet outlines, cover sheet line work
Option 3	2.00	wt = 15	Border sheet outlines, cover sheet line work

Line Style

Designator	Description	Usage
0	Continuous/Solid	New work, dimension lines, leader lines
1	Dotted	Varies
2	Medium Dash	Varies
3	Long Dash	Existing
4	Dot Dash	Centerlines
5	Short Dash	Varies
6	Dash Dot Dot	Boundaries
7	Long Dash Short Dash	Varies

Color

Refer to the level assignment sheets in Chapters 10 through 21 for the colors that have been assigned to specific objects. To ensure compatibility with MNAA colors, always use the color table: **MNAAcolor.tbl**.

TEXT ATTRIBUTES

The following are guidelines for the application of text strings and text nodes on all construction documents.

Fonts

The approved font for all construction documents is Font 3 (FT=3). However, for certain conditions other fonts may be more desirable, such as presentation graphics, titles, and sheet numbers. To ensure compatibility with MNAA fonts, always use the font library: **MNAA_font.rsc.**

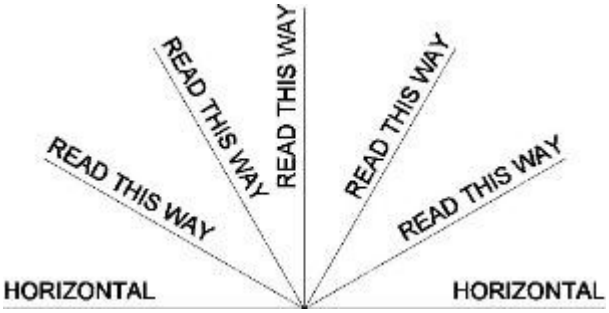
2. Text Sizes

Plotted Size	Actual Size	Description
.10 inch	Plot scale X .10	General notes, standard text, dimensions, callouts
.12 inch	Plot scale X .12	Emphasized text
.15 inch	Plot scale X .15	Sub-titles
.20 inch	Plot scale X .20	Titles
.25 inch	Plot scale X .25	Sheet numbers, project title

Text Justification

The typical justification for all text strings and text nodes is Left Bottom. However, for certain conditions Center Bottom or Center Center are preferred such as titles and sheet numbers.

Text Orientation

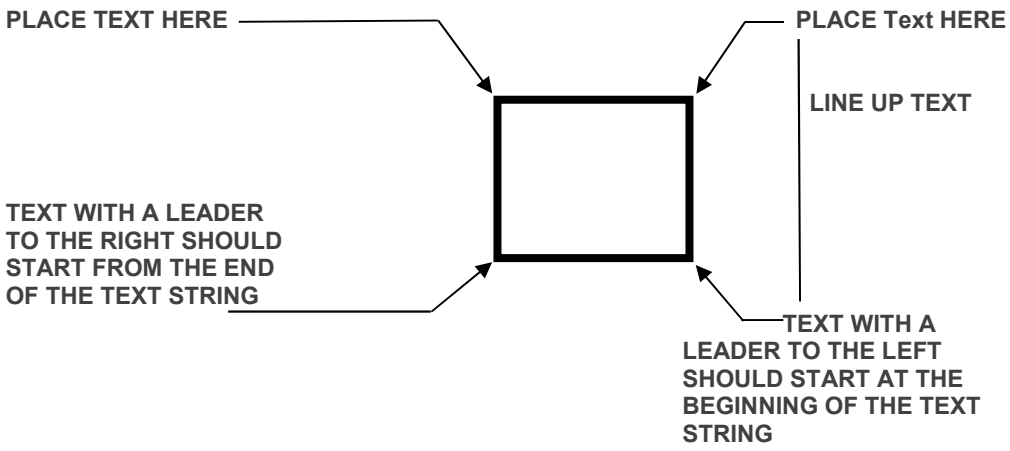


Line Spacing

Line spacing will be 50% of the text height. (LS = .5 x TH)

Leader Lines

Leader lines shall be line strings with an arrow terminator. Leader Lines that terminate to the left should start at the center of the first line of text. Leader lines that terminate to the right should start at the center of the last line of text.



Terminators

The approved line terminator for notes on all construction documents is the standard filled terminator in the dimension settings. The size of the filled terminators is a width of .5 and length of 1.5 x the text height.

DIMENSION ATTRIBUTES

The following are guidelines for the application of dimensions on all construction documents. In general, these settings have been pre-established in the MNAA Seed File.

- **Terminators –** The approved line terminator for dimensions on all construction documents is the standard filled terminator in the dimension settings. The size of the filled terminators is a width of .5 and length of 1.5 x the text height.

- **Dimensioning -** Dimensions shall be placed with a justification of LB or CB. Line spacing shall be at least one half the overall height of the capitalized font. Text may be placed above and below a dimension line, but never solely below.

BORDER SHEETS

Use the following guidelines for border sheets on all construction documents:

- **Border Sheets**

Border sheets are referenced to the sheet file with the appropriate border sheet model file based on the chart below. Use the sizes that are shaded for work performed for MNAA Airport. The Border Sheets reference files are scaled per the plot scale of the Sheet File.

ANSI Letter	ANSI Inches	Arch Letter	Arch Inches	File Name
A	8.5 X 11.0	A	9.0 X 12.0	MNAABORDER8511.DGN
B	11.0 X 17.0	B	12.0 X 18.0	MNAABORDER1117.DGN
C	17.0 X 22.0	C	18.0 X 24.0	MNAABORDER1722.DGN
D	22.0 X 34.0	D	24.0 X 36.0	MNAABORDER2234.DGN
E	34.0 X 44.0	E	30.0 X 42.0	MNAABORDER3444.DGN

- **Title Blocks**

Title block cells contain enter data fields and are placed in the sheet file from the MNAA Sheet cell library: **MNAAsheet.cel** The title cells are scaled to the same value as the reference border sheet with the insertion point being the lower left-hand corner of the border sheet.

- **Symbols**

Sheet file symbols such as North Arrows, Seals (if allowed by profession), and Graphic Scales are placed in the sheet file from the MNAA Sheet cell library:

MNAAsheet.cel

Note: The various border sheets are shown in the MNAAsheet.cel library for your convenience. Do not place a border sheet cell in the Sheet File.

-----END OF CHAPTER-----

5.11.7 SOFTWARE REQUIREMENTS

INTRODUCTION

This chapter identifies the software packages and file formats used by the Metropolitan Nashville Airport Authority (MNAA) in the production and maintenance of project documentation.

COMPATIBILITY

All electronic files (construction documents, as-builts, specifications, etc.) delivered to MNAA Airport must be in the applicable format listed below. **DGN IS PREFERRED CAD DELIVERABLE FORMAT. DXF and DWG file formats WILL now be accepted.**

SOFTWARE

Type	Product	Manufacturer	Formats
Operating System	Windows 7 Professional, Windows 10	Microsoft, Inc.	
Drafting Software	MicroStation (V8i or greater)	Bentley Systems, Inc.	dgn, dwg, dxf
Plotting Software			
Civil Software	Terramodel	Trimble	dgn, ttn
GIS Software	ArcGIS	ESRI	dgn, mge, gdb, shp, mxd
BIM	Autodesk REVIT 17		rvt, rvx, ifc
Survey Software	Trimble Business Center	Trimble	dgn
Database	Access 2016, SQL Server 2008	Microsoft, Inc.	mdb
Word Processing	Word 2016	Microsoft, Inc.	doc
Spreadsheet	Excel 2016	Microsoft, Inc.	xls

VERSION

In general, MNAA uses the latest version for all software products. However, the consultant is required to confirm version prior to beginning project work.

-----END OF CHAPTER-----

5.11.8 SEED FILES AND COORDINATE SYSTEMS

INTRODUCTION

Use of the following seed files on all CADD design files for MNAA will ensure compatibility with base maps and design files.

ENGINEERING SEED FILE (2D) – mnaa2dcivil_SurveyFt.dgn

Primary Coordinate System	State Plane NAD 1983
Secondary Coordinate System	1996 Adjustment
Global Origin (GO=)	x: 0.0000 y: 0.0000
Master Units (MU)	Survey Feet
Sub-Master Units (SU)	th
SU:PU	39.37000000:47.24409449
Positional Units (PU):SU	10,000
Working Area	170,591,236 Miles
Active Level (LV)	1
Active Weight (WT)	0
Active Line Code (LC)	0
Active Color (CO)	0
Active Scale (AS)	1
Active Angle (AA)	0
Levels Displayed	1-63
Text Height (TH), Text Width (TW)	Not less than 0.09375’ (3/32”) on final construction plans
Stacked Fraction	On
Line Spacing (LS)	50% of text height
Line Length (LL)	225
Font (FT)	1
Text Justification	LT
Text Node Justification	LT
Font Library	MNAAfont.rsc
Set PARSEALL	Off
Locks On	Multi-Snap
Fence Mode	Inside
Fast Display – Cells	Off (all views)
Fast Display – Curves	Off (all views)
Fast Display – Font	Off (all views)
Fast Display - Ref Clipping	Off (all views)
Display Attributes – Construction	Off (all views)
Display Attributes – Dimensions	On (all views)
Display Attributes – Dynamics	Off (all views)
Display Attributes – Data Fields	Off (all views)
Display Attributes – Fill	On (all views)
Display Attributes – Grid	Off (all views)
Display Attributes – Level Symbology	Off (all views)
Display Attributes – Line Styles	On (all views)
Display Attributes – Line Weights	On (all views)
Display Attributes – Patterns	On (all views)
Display Attributes – Ref Boundary	Off (all views)
Display Attributes – Tags	On (all views)
Display Attributes – Text	On (all views)
Display Attributes – Text Nodes	Off (all views)
Cell Library Attached	MNAAsheet.cel
Reference Files Attached	None

ENGINEERING SEED FILE (3D) – mnaa3dcivil_SurveyFt.dgn

Primary Coordinate System	State Plane NAD 1983
Secondary Coordinate System	1996 Adjustment
Global Origin (GO=)	x: 0.0000 y: 0.0000 z: 0.0000
Master Units (MU)	Survey Feet
Sub-Master Units (SU)	th
SU:PU	39.37000000:47.24409449
Positional Units (PU):SU	10,000
Working Area	170,591,236 Miles
Active Level (LV)	1
Active Weight (WT)	0
Active Line Code (LC)	0
Active Color (CO)	0
Active Scale (AS)	1
Active Angle (AA)	0
Levels Displayed	1-63
Text Height (TH), Text Width (TW)	Not less than 0.09375’ (3/32”) on final construction plans
Stacked Fraction	On
Line Spacing (LS)	50% of text height
Line Length (LL)	225
Font (FT)	1
Text Justification	LT
Text Node Justification	LT
Font Library	MNAAfont.rsc
Set PARSEALL	Off
Locks On	Multi-Snap
Fence Mode	Inside
Fast Display – Cells	Off (all views)
Fast Display – Curves	Off (all views)
Fast Display – Font	Off (all views)
Fast Display - Ref Clipping	Off (all views)
Display Attributes – Construction	Off (all views)
Display Attributes – Dimensions	On (all views)
Display Attributes – Dynamics	Off (all views)
Display Attributes – Data Fields	Off (all views)
Display Attributes – Fill	On (all views)
Display Attributes – Grid	Off (all views)
Display Attributes – Level Symbology	Off (all views)
Display Attributes – Line Styles	On (all views)
Display Attributes – Line Weights	On (all views)
Display Attributes – Patterns	On (all views)
Display Attributes – Ref Boundary	Off (all views)
Display Attributes – Tags	On (all views)
Display Attributes – Text	On (all views)
Display Attributes – Text Nodes	Off (all views)
Cell Library Attached	MNAAsheet.cel
Reference Files Attached	None

ARCHITECTURAL SEED FILE (2D) –mnaa2darch_SurveyFt.dgn

Primary Coordinate System	MNAA Surface 88
Secondary Coordinate System	State Plane 1983
Global Origin (GO=)	x: 0:0 y: 0:0
Master Units (MU)	Survey Feet
Sub-Master Units (SU)	“
SU:PU	12:1
Positional Units (PU):SU	96000
Working Area	17,769,920 Miles
Active Level (LV)	1
Active Weight (WT)	0
Active Line Code (LC)	0
Active Color (CO)	0
Active Scale (AS)	1
Active Angle (AA)	0
Levels Displayed	1-63
Text Height (TH), Text Width (TW)	Not less than 0.09375’ (3/32”) on final construction plans
Stacked Fraction	On
Line Spacing (LS)	50% of text height
Line Length (LL)	225
Font (FT)	1
Text Justification	LT
Text Node Justification	LT
Font Library	MNAAfont.rsc
Set PARSEALL	Off
Locks On	Key Point Snap
Fence Mode	Inside
Fast Display – Cells	Off (all views)
Fast Display – Curves	Off (all views)
Fast Display – Font	Off (all views)
Fast Display - Ref Clipping	Off (all views)
Display Attributes – Construction	Off (all views)
Display Attributes – Dimensions	On (all views)
Display Attributes – Dynamics	Off (all views)
Display Attributes – Data Fields	Off (all views)
Display Attributes – Fill	On (all views)
Display Attributes – Grid	Off (all views)
Display Attributes – Level Symbology	Off (all views)
Display Attributes – Line Styles	On (all views)
Display Attributes – Line Weights	On (all views)
Display Attributes – Patterns	On (all views)
Display Attributes – Ref Boundary	Off (all views)
Display Attributes – Tags	On (all views)
Display Attributes – Text	On (all views)
Display Attributes – Text Nodes	Off (all views)
Cell Library Attached	MNAAsheet.cel
Reference Files Attached	None

ARCHITECTURAL SEED FILE (3D) – mnaa3darch_SurveyFt.dgn

Primary Coordinate System	MNAA Surface
Secondary Coordinate System	State Plane 1983
Global Origin (GO=)	x: 0:0 y: 0:0 z: 0:0
Master Units (MU)	Survey Feet
Sub-Master Units (SU)	“
SU:PU	12:1
Positional Units (PU):SU	96000
Working Area	17,769,920 Miles
Active Level (LV)	1
Active Weight (WT)	0
Active Line Code (LC)	0
Active Color (CO)	0
Active Scale (AS)	1
Active Angle (AA)	0
Levels Displayed	1-63
Text Height (TH), Text Width (TW)	Not less than 0.09375’ (3/32”) on final construction plans
Stacked Fraction	On
Line Spacing (LS)	50% of text height
Line Length (LL)	225
Font (FT)	1
Text Justification	LT
Text Node Justification	LT
Font Library	MNAAfont.rsc
Set PARSEALL	Off
Locks On	Key Point Snap
Fence Mode	Inside
Fast Display – Cells	Off (all views)
Fast Display – Curves	Off (all views)
Fast Display – Font	Off (all views)
Fast Display - Ref Clipping	Off (all views)
Display Attributes – Construction	Off (all views)
Display Attributes – Dimensions	On (all views)
Display Attributes – Dynamics	Off (all views)
Display Attributes – Data Fields	Off (all views)
Display Attributes – Fill	On (all views)
Display Attributes – Grid	Off (all views)
Display Attributes – Level Symbology	Off (all views)
Display Attributes – Line Styles	On (all views)
Display Attributes – Line Weights	On (all views)
Display Attributes – Patterns	On (all views)
Display Attributes – Ref Boundary	Off (all views)
Display Attributes – Tags	On (all views)
Display Attributes – Text	On (all views)
Display Attributes – Text Nodes	Off (all views)
Cell Library Attached	MNAAsheet.cel
Reference Files Attached	None

PRIMARY COORDINATE SYSTEM

This primary coordinate system is based on MNAA Surface 88, a site-specific coordinate system for MNAA. It was derived from NAD83 with the 1996 adjustment.

SECTION 17 Coordinate System

System	State Plane Coordinate System 1983	Tennessee 4100 Lambert Conformal Conic 2 Parallel
	Longitude of Origin:	86:00:00.0000
	Latitude of Origin:	34:20:00.0000
	Standard Parallel 1	36:25:00.0000N
	Standard Parallel 2	35:15:00.0000N
	False Easting	0 ft
	False Northing	600,000 ft
Geodetic Datum	North American 1983	
Ellipsoid	World Geodetic System 1984	
	Equatorial Radius	20925646.325 ft
	Polar Radius	20855486.595 ft
	Eccentricity	0.081819190928906
	Flattening	0.00335281068118232
	Flattening Inverse	298.257222101

Units and Format

	latitude and longitude	d:m:s
	Northing and Easting	Ft
	Height	Ft

Description

	MNAA Surface 88	

Vertical Datum

	North American Vertical Datum 1988	
	Orthometric	
	Average Undulation	0.000 ft

Spherical Model

	User Specified	20926146.325 ft

Greenwich Offset

	00:00:00.0000	d:m:s

SECONDARY COORDINATE SYSTEM

This secondary coordinate system is based on NAD83 with the 1996 adjustment.

SECTION 18 Coordinate System

System	State Plane Coordinate System 1983	Tennessee 4100 Lambert Conformal Conic 2 Parallel
	Longitude of Origin:	86:00:00.0000
	Latitude of Origin:	34:20:00.0000
	Standard Parallel 1	36:25:00.0000N
	Standard Parallel 2	35:15:00.0000N
	False Easting	0 ft
	False Northing	600,000 ft
Geodetic Datum	North American 1983	
Ellipsoid	World Geodetic System 1984	
	Equatorial Radius	20925646.325 ft
	Polar Radius	20855486.595 ft
	Eccentricity	0.081819190928906
	Flattening	0.00335281068118232
	Flattening Inverse	298.257222101

Units and Format

	latitude and longitude	d:m:s
	Northing and Easting	ft
	Height	ft

Description

	None	

Vertical Datum

	North American Vertical Datum 1988	
	Orthometric	
	Average Undulation	0.000 ft

Spherical Model

	User Specified	20926146.325 ft

Greenwich Offset

	00:00:00.0000	d:m:s

-----END OF CHAPTER-----

5.11.9 WORKSPACES

Introduction

MNAA will be developing applications that will assist the CADD operator in conforming to these standards. These applications will be available in the near future.

-----END OF CHAPTER-----

5.11.10 ELECTRONIC FILE TRANSFER

INTRODUCTION

This chapter identifies the requirements for electronic file transfers. It includes details on which files are required for the transfers, and the methods and media used in the transfer process. The intent of this electronic file transfer is to provide a complete archive of the entire project required for retention requirements and future use, and an update of base map information required for inclusion into the Airport's GIS.

CONTENTS

The consultant will include in the file transfer the following:

1. **Project Information File** – Defined at the end of this chapter.
2. **Sheet Files** - Design files that represent each sheet in the project drawing set. This includes all reference files used in the development of the design files.
3. **Model Files** - Design files representing any changes to the MNAA Master CADD Maps as a result of the project in question. Design changes will be contained in separate CADD file(s) with referenced base maps and will comply with the Master CADD Maps Standards in Chapter 21.
4. **Resource Files** - Any resource and configuration files (i.e.: pen tables, seed files) necessary for the use and production of the projects design files.
5. **Specifications Files** - Project specifications.

FORMAT

All files must meet the software and file format requirements detailed in Chapter 6, and they must be delivered in the directory structure indicated below.

MEDIA

All file transfers are to be uploaded using Dropbox and placed in the specified Dropbox folder. All files are to be uncompressed in the file format specified in these standards.

Before a file is uploaded to Dropbox, the following procedures should be performed:

1. Remove all extraneous graphics outside the border area, and set the active parameters to a standard setting or those in the seed file.
2. Make sure all reference files are attached without device or directory specifications.
3. Include all files, both graphic and non-graphic required for the project (color tables, pen tables, user command files, plot files, etc.)
4. Include any standard sheets (abbreviation sheets, standard symbol sheets, etc.) necessary for a complete project.

PROJECT DIRECTORIES

The Projects Root Directory will use the Tenant Alteration Number as the directory name and will contain the INFOFILE.TXT file and the following sub-directories:

1. **DGN** – The Design Drawing Directory contains all design files and reference files subdivided by discipline as required for larger projects.
2. **RESOURCE** – The Resource Directory contains all necessary resource and configuration files subdivided as required.
3. **SPEC** – The Specifications Directory contains the final version of the project's technical specifications.
4. **OTHER** – The Other Directory contains any miscellaneous files associated with the project.

PROJECT INFORMATION FILE

The information file (INFOFILE.TXT) is a read only text file viewable in notepad and stored in the root project directory. It includes the following information:

1. PROJECT TITLE:
2. PROJECT DESCRIPTION:
3. AIRPORT RESPONSIBLE DEPARTMENT:
4. AIRPORT PROJECT MANAGER:
5. AIRPORT DESIGN MANAGER:
6. AIRPORT CONSTRUCTION MANAGER:
7. DESIGN CONSULTANT:
8. CONTACT:
9. DESIGN CONTRACT NO:
10. TENANT ALTERATION NUMBER:
11. ISSUE FOR BID DATE:
12. ISSUE FOR CONSTRUCTION DATE:
13. GENERAL CONTRACTOR:
14. CONTACT:
15. CONSTRUCTION CONTRACT NO:
16. NOTICE TO PROCEED:
17. PROJECT COMPLETION DATE:
18. RECORD DRAWINGS SUBMITTED:
19. ARCHIVE STATUS:

5.11.11 CADD MASTER MAPS – ARCHITECTURAL STANDARDS

Introduction

This chapter includes level assignment sheets and cell library documentation that supports the development of General sheet files and model files for MNAA.

MNAA CADD Architectural Level Scheme						
Discipline: **Architectural**		File Type: **Microstation Drawing Sheet Files (Page 1 or 2)**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	A-ANNO-DIMS	Sheet-specific dimensions	0	V	V	
2	A-ANNO-KEYN	Sheet-specific key notes	0	V	V	
3	A-ANNO-NOTE	Sheet-specific notes and general remarks	0	2	4	
4	A-ANNO-SYMB	Sheet-specific symbols (scales, north arrows, sect cuts)	V	2	5	
5	A-ANNO-TEXT	Sheet-specific text, callouts, leader lines, title block	0	2	4	
6	A-CLNG-ACCES	Accessories	0	1	3	
7	A-CLNG-ACCS	Access panels, ceiling penetrations	0	2	5	
8	A-CLNG-CONT	Ceiling control joints	0	2	4	
9	A-CLNG-GRID	Ceiling grid	0	1	3	
10	A-CLNG-HVAC	Ceiling supply diffusers (only when HVAC symbols unavailable)	0	3	7	
11	A-CLNG-LITE	Ceiling lights	0	3	7	
12	A-CLNG-PATT	Ceiling patterns (e.g. gypsum, plaster, user defined)	0	0	9	
13	A-CLNG-SPRK	Sprinkler heads	0	1	3	
14	A-COLS-ENCL	Column enclosures/fire protection	0	3	7	
15	A-DETL-CABS	Cabinets	0	2	4	
16	A-DETL-EXWL	Exterior wall materials	0	2	5	
17	A-DETL-GLAZ	Glazing	0	0	1	
18	A-DETL-HEAVY	Heavy Line	V	2	0	
19	A-DETL-LIGHT	Light Line	V	0	144	
20	A-DETL-MEDIUM	Medium Line	V	1	80	
21	A-DOOR-FULL	Full height (to ceiling) door; swing and leaf	0	2	5	
22	A-DOOR-IDEN	Door number and symbol, hardware group, etc.	0	2	5	
23	A-DOOR-PRHT	Partial height door; swing and leaf	0	2	5	
24	A-DOOR-SYMB	Miscellaneous door symbols (e.g. overhead, bifold, pocket, etc)	0	1	3	

25	A-ELEV-FNSH	Finishes, woodwork, trim	0	1	2	
26	A-ELEV-OTLN	Building outlines	0	2	5	
27	A-ELEV-PATT	Textures and hatch patterns	0	0	9	
28	A-ELEV-PFIX	Plumbing fixtures	0	2	5	
29	A-ELEV-SIGN	Signage	0	1	3	
30	A-EQPM	Equipment	0	3	7	
31	A-EQPM-IDEN	Equipment identification numbers	0	2	5	
32	A-FLOR-CASE	Case work (manufactured cabinets)	0	1	2	
33	A-FLOR-EVTR	Elevator cars and equipment	0	2	4	
34	A-FLOR-HRAL	Stair and balcony handrails, guard rails	0	1	3	
35	A-FLOR-NUMB	Room/space identification number and symbol	0	3	7	
36	A-FLOR-OVHD	Overhead items (skylights, overhangs, etc.)	2	0	9	
37	A-FLOR-PATT	Material patterns (e.g. paving, tile, carpet)	0	0	1	
38	A-FLOR-PFIX	Plumbing fixtures (only when P-SANR-FIXT not available)	0	2	5	
39	A-FLOR-SIGN	Signage	0	1	3	
40	A-FLOR-STRS	Stair risers/treads, escalators, ladders	0	2	4	

MNAA CADD Architectural Level Scheme						
Discipline: **Architectural**	File Type: **Microstation Drawing Sheet Files (Page 2 of 2)**			Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
41	A-FLOR-TPTN	Toilet partitions and handicap grab bars	0	1	3	
42	A-FLOR-WDWK	Architectural woodwork (field built cabinets and counters)	0	1	2	
43	A-FNSH-PATT	Finish patterns	0	0	9	
44	A-FURN-FURN	Furniture	0	0	4	
45	A-GLAX-FULL	Full height glazed walls and partitions (see A-WALL-CWMG)	0	1	3	
46	A-GLAZ-IDEN	Window number and symbol	0	2	5	
47	A-GLAZ-PRHT	Windows and partial height glazed partitions	0	1	3	
48	A-GLAZ-SILL	Window sills	0	3	7	
49	A-LSFT-EQPM	Fire equipment (fire extinguishers)	0	0	1	
50	A-LSFT-TRVL	Travel distances	0	2	5	

51	A-LSFT-WALL	Wall fire ratings (see also A-WALL-FIRE)	0	1	2	
52	A-ROOF-CRTS	Crickets flow arrows flow information	0	2	4	
53	A-ROOF-DRNS	Roof drains	0	1	3	
54	A-ROOF-EQUIP	AC Units, dishes, antenna	0	1	2	
55	A-ROOF-EXPN	Expansion joints	0	2	4	
56	A-ROOF-OTLN	Roof perimeter/edge, roof geometry	0	3	7	
57	A-ROOF-PATT	Roof surface patterns, hatching	0	0	9	
58	A-ROOF-SPCL	Roof specialties, accessories, access hatches, ladders, walks	0	1	2	
59	A-SECT-HEAVY	Heavy Line	V	2	0	
60	A-SECT-LIGHT	Light Line	V	0	144	
61	A-SECT-MEDIUM	Medium Line	V	1	80	
62	A-SECT-PATT	Textures and hatch patterns	0	0	9	
63	A-STAT-DEMO	Demolition	2	2	5	
64	A-STAT-EXST	Existing to Remain	0	1	2	
65	A-STAT-FUTR	Future Work	7	2	4	
66	A-STAT-MOVE	Items to be moved	5	2	5	
67	A-STAT-NICN	Not in contract	3	0	9	
68	A-STAT-PHS#	Phase numbers (# = 1-9)	0	2	4	
69	A-STAT-RELO	Relocated items	2	0	1	
70	A-STAT-TEMP	Temporary work	4	3	7	
71	A-WALL-CAVI	Cavity wall lines	0	2	4	
72	A-WALL-CNTR	Wall centerlines	7	0	1	
73	A-WALL-CWMG	Curtain wall mullions and glass	0	1	3	
74	A-WALL-EXTR	Exterior full height walls	0	2	4	
75	A-WALL-FIRE	Fire wall designators (patterning)	0	2	4	
76	A-WALL-HEAD	Door and window headers (appear on reflected ceiling plan)	0	3	7	
77	A-WALL-IDEN	Wall identification/type text or tags	0	3	7	
78	A-WALL-INTR	Interior full height walls	0	2	5	
79	A-WALL-JAMB	Door and window jambs (do not appear on RCP)	0	3	7	
80	A-WALL-MOVE	Moveable wall partitions	0	0	1	

81	A-WALL-PATT	Material patterns (e.g. insulation, hatching and fill)	0	0	9	
82	A-WALL-PRHT	Partial height walls (do not appear on reflected ceiling plan)	0	1	3	
83	A-WALL-SPCL	Wall hung specialties (fixtures, grab bars, phones, toilet)	0	1	3	

Architectural Cell Libraries

MNAA CADD Cell Libraries			
Discipline: **Architectural**		File Type: **Cell Libraries**	Date: **05/2013**
LV	Library Name	Library Description	Notes
1	ARCHITECTURAL CELL LIBRARY	ARCHITECTURAL ELEMENTS	UNDER CONSTRUCTION
2	DOOR CELL LIBRARY	INTERIOR AND EXTERIOR DOORS	COMPLETED
3	ELECTRICAL CELL LIBRARY	ELECTRICAL ELEMENTS	UNDER CONSTRUCTION
4	EQUIPMENT CELL LIBRARY	EQUIPMENT	UNDER CONSTRUCTION
5	FIRE CELL LIBRARY	FIRE DETECTION, PROTECTION, & SYSTEM ELEMENTS	UNDER CONSTRUCTION
6	FURNITURE CELL LIBRARY	TERMINAL & CONCOURSE FURNITURE	UNDER CONSTRUCTION
7	MECHANICAL CELL LIBRARY	MECHANICAL ELEMENTS	UNDER CONSTRUCTION
8	MNAAsheet	TITLE BLOCKS	COMPLETED
9	NOTES CELL LIBRARY	PROJECT NOTES	UNDER CONSTRUCTION
10	PLUMBING CELL LIBRARY	PLUMBING ELEMENTS	UNDER CONSTRUCTION
11	WINDOW CELL LIBRARY	WINDOWS	UNDER CONSTRUCTION

-----END OF CHAPTER-----

5.11.12 CADD MASTER MAPS – CIVIL STANDARDS

Introduction

This chapter includes level assignment sheets and cell library documentation that supports the development of General sheet files and model files for MNAA.

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Hydrology**		Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
1	HYDRO-ZON2 BFFR ABAN	ABANDONED ZONE 1 BUFFER				
2	HYDRO-ZON2 BFFR	ZONE 2 BUFFER				
3	HYDRO-ZON1 BFFR ABAN	ABANDONED ZONE 1 BUFFER				
4	HYDRO-ZON1 BFFR	ZONE 1 BUFFER				
5	HYDRO-WELL	WELLS				
6	HYDRO-TRTMNT CELL	TREATMENT CELL				
7	HYDRO-TOP BANK	TOP OF BANK				
8	HYDRO-STRM TEXT	STREAM TEXT				
9	HYDRO-STRM	STREAM				
10	HYDRO-SPRTR	OIL/WATER SEPARATORS				
11	HYDRO-POND OTLN	OUTLINE OF POND				
12	HYDRO-POND BFFR	POND BUFFER ZONE				
13	HYDRO-HDWTR TXT	HEADWATER TEXT				
14	HYDRO-DTNT TEXT	DETENTION TEXT				
15	HYDRO-BFFR TEXT	BUFFER ZONE TEXT				
16	HYDRO-BLLN STRM	BLUELINE STREAM				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Roadsigns**		Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
1	RDSGN-BLDG SHAD	BUILDING SHADE				
2	RDSGN-BRDG	BRIDGES				
3	RDSGN-BLDG	BUILDINGS				
4	RDSGN-ENTR	ENTRANCE				
5	RDSGN-ESIGN					
6	RDSGN-FENC	FENCE				
7	RDSGN-LANE DIVS	LANE DIVISION				
8	RDSGN-NEW ROAD	NEW ROAD				
9	RDSGN-PSIGN					
10	RDSGN-RAMP	RAMP				
11	RDSGN-RGLRY	REGULATORY				
12	RDSGN-ROAD	ROADS				
13	RDSGN-TITL BLCK	TITLE BLOCK				
14	RDSGN-UTIL	UTILITY				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Irrigation**		Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
1	IRRG-PLNT TEXT	PLANTING TEXT				
2	IRRG-BSLN	BASELINE				
3	IRRG-CNPY	CANOPY				
4	IRRG-PVMT STRP	PAVEMENT STRIPPING				
5	IRRG-SIGN TEXT	SIGN TEXT				
6	IRRG-XREF	XREF				
7	IRRG-ELIGHTING	ELIGHTING				
8	IRRG-EXST HEDG	EXISTING HEDGES				
9	IRRG-EXST TREE	EXISTING TREES				
10	IRRG-FR	FR				
11	IRRG-CORT YARD	COURTYARD				
12	IRRG-PLNT PLAN	PLANTING PLAN				
13	IRRG-LIGHT	LIGHT				
14	IRRG-MVIEW	MVIEW				
15	IRRG-ABUT	ABUTMENT				
16	IRRG-BLDG	BUILDING				
17	IRRG-COL-E	COL-E				
18	IRRG-S COL P	COL-P				
19	IRRG-S FOOT E	FOOT-E				
20	IRRG-S FOOT P	FOOT-P				
21	IRRG-PVMT WALK WAY	PAVEMENT WALKWAY				
22	IRRG-NEW DATA	NEW DATA				
23	IRRG-HATCH	HATCH				
24	IRRG-PTRN CLAS	PATTERN CLASS				
25	IRRG-DRIP	DRIP				
26	IRRG-EQUP	EQUIPMENT				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Ramp**		Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
1	RAMP-ABAN MRKG	ABANDONED MARKINGS				
2	RAMP-ACRFT	AIRCRAFT				
3	RAMP-CNST STG					
4	RAMP-DICE	DEICE				
5	RAMP-DICE MRKG	DEICE MARKINGS				
6	RAMP-EQUIP	EQUIPMENT				
7	RAMP-GATE NMBR	GATE NUMBER				
8	RAMP-GLYCOL	GLYCOL				
9	RAMP-GRP5 TW					
10	RAMP-GRP5 TEXT					
11	RAMP-GRP5 TXWY					
12	RAMP-JBRDG	JET BRIDGE				
13	RAMP-LEAD-IN LINE	LEAD-IN LINES				
14	RAMP-LEASE					
15	RAMP-LEAS MRKG	LEASE MARKINGS				
16	RAMP-LEAS TEXT	LEASE TEXT				
17	RAMP-LEAS UNASIGN	LEASE UNASSIGNED				
18	RAMP-NNMVMNT MRKG	NONMOVEMENT MARKINGS				
19	RAMP-OVHD CLR	OVERHEAD CLEARANCE				

20	RAMP-PARK LINE	PARK LINE				
21	RAMP-PARK MRKG	PARKING MARKINGS				
22	RAMP-SFNV MRKG					
23	RAMP-TXLN	TAXILANE				
24	RAMP-TRFC	TRAFFIC				
25	RAMP-TGRD	TUG ROAD CENTERLINE				
26	RAMP-TGRD CL	TUG ROAD CENTERLINE				
27	RAMP-T					

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Part 77**		Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
1	PRT77-13-31 ICON					
2	PRT77- 13-31 CON					
3	PRT77- 13-31 CL					
4	PRT77-13-31					
5	PRT77-2R-20L ICON					
6	PRT77- 2R-20L CON					
7	PRT77- 2R-20L CL					
8	PRT77-2R-20L					
9	PRT77-2L-20R ICON					
10	PRT77- 2L-20R CON					
11	PRT77- 2L-20R CL					
12	PRT77-2L-20R					
13	PRT77-2C-20C ICON					
14	PRT77- 2C-20C CON					
15	PRT77- 2C-20C CL					
16	PRT77-2C-20C					

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Shading**		Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
1	SHAD-RNWY	RUNWAY SHADING				
2	SHAD-TXWY	TAXIWAY SHADING				
3	SHAD - APRN	APRON SHADING				
4	SHAD - NON MVMNT	NONMOVEMENT SHADING				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Fiber Optics**		Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
1	FIBR-ABAN	ABANDONED FIBER OPTICS				
2	FIBR-ARFLD	AIRFIELD FIBER OPTICS				
3	FIBR-CCTV					
4	FIBR-CCTV TEMP					
5	FIBR-CNTRL					
6	FIBR-DUCT BANK	DUCT BANKS FOR FIBER OPTICS				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Grids**		Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
1	GRID-EMRG	EMERGENCY				
2	GRID-EMRG PNTS	EMERGENCY POINTS				
3	GRID-EMRG TEXT	EMERGENCY TEXT				
4	GRID-GEODETIC	GEODETIC				
5	GRID-METRO	METRO				
6	GRID-STATE	STATE				
7	GRID-2011 PLNMTRC UPDT LMTS	2011 PLANIMETRIC UPDATE LIMITS				
8	GRID-AERIAL 2011 LEAF OFF	AERIAL 2011 LEAF OFF				
9	GRID-AERIAL 2011 LEAF ON	AERIAL 2011 LEAF ON				
10	GRID-BLDG NMBR MAP COPY	BLDG NMBR MAP COPY				
11	GRID-EXBT B COPY	EXBT B COPY				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Flood**		Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
1	FLOD-FLOD PLN 100 YR	100 YEAR FLOODPLAIN				
2	FLOD-FLOD PLN 500 YR	500 YEAR FLOODPLAIN				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Landscape**		Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
1	LAND-GRND COVR IDEN	GROUND COVER ANNOTATIONS				
2	LAND-GRND	GROUND COVER ANNOTATIONS				
3	LAND-SHRB IDEN	SHRUB ANNOTATION				
4	LAND-SHRB LINE	SHRUB LINE				
5	LAND-SHRB	SHRUBS				
6	LAND-TREE IDEN	TREE ANNOTATION				
7	LAND-TREE LINE	TREE LINE				
8	LAND-TREE	TREES				
9	LAND-IRRG EQUIP	IRRAGATION EQUIPMENT				
10	LAND-IRRG IDEN	IRRRAGATION ANNOTATIONS				
11	LAND-IRRG PIPE	IRRAGATION PIPING				
12	LAND-IRRG SPRNK	IRRAGATION SPRINKLERS				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Buildings**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	BLDG-OFF SITE	OFFSITE BUILDING				
2	BLDG- ON SITE	ONSITE BUILDING				
3	BLDG-BLRDS	BOLLARDS				
4	BLDG-IDEN	INDENTIFIER TEXT				
5	BLDG-OTLN	BUILDING OUTLINE				
6	BLDG-TXT	BUILDING TEXT				
7	BLDG-LARTXT	LARGE BUILDING NUMBERS				
8	BLDG-SITE-IDEN	SITE ANNOTATION				
9	BLDG-SITE-RAMP	RAMPS				
10	BLDG-SITE-STRS	STAIRS				
11	BLDG-SITE-WALK	SIDEWALKS, WALKS & TRAILS				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Communications**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	COMM-ABND-MNAA	ABANDONED CABLES				
2	COMM-IDEN-MNAA	IDENTIFIER TAGS AND TEXT				
3	COMM-UNDR-MNAA	UNDERGROUND CABLES AND DUCTBANK				
4	COMM-DEVC-MNAA	DEVICES				
5	COMM-JBOX-MNAA	J-BOXES, PULL BOXES, MANHOLES, ETC.				
7	COMM-ABND-FAA	ABANDONED CABLES				
8	COMM-IDEN-FAA	IDENTIFIER TAGS AND TEXT				
9	COMM-UNDR-FAA	UNDERGROUND CABLES AND DUCTBANK				
10	COMM-DEVC-FAA	DEVICES				
11	COMM-JBOX-FAA	J-BOXES, PULL BOXES, MANHOLES, ETC.				
13	COMM-ABND-GTE	ABANDONED CABLES				
14	COMM-IDEN-GTE	IDENTIFIER TAGS AND TEXT				
15	COMM-UNDR-GTE	UNDERGROUND CABLES AND DUCTBANK				
16	COMM-DEVC-GTE	DEVICES				
17	COMM-JBOX-GTE	J-BOXES, PULL BOXES, MANHOLES, ETC.				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Easements**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	ESMT-ROW PROP ESID	EASEMENT ANNOTATION				
2	ESMT-ROW PROP ESMT	EASEMENT				
3	ESMT-ROW PROP PLID	PROPERTY LINES ANNOTATION				
4	ESMT-ROW PROP LINE	PROPERTY LINES				
5	ESMT-ROW PROP RWID	RIGHT-OF-WAYS ANNOTATION				
6	ESMT-ROW PROP RWAY	RIGHT-OF-WAYS				
7	ESMT-ROW PROP LEID	LEASE ANNOTATION				
8	ESMT-ROW PROP LEAS	LEASES				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Storm**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	STRM-CULV	CULVERTS, DRAINAGE, INLETS, ETC.				
2	STRM-HDWL	STOEM DRAINAGE HEADWALLS				
3	STRM-IDEN	CULVERTS, INLETS, ETC. ANNOTATIONS				
4	STRM-MAHL	STORM DRAIN MANHOLES				
5	STRM-UNID	UNDERGROUND ANNOTATION				
6	STRM-UNDR	UNDERGROUND PIPING				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Telephone**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	TELE-CABLE	CABLE TV CABLES				
2	TELE-HAND HOLE LOC	HANDHOLE LOCATIONS				
3	TELE-MH	MANHOLE				
4	TELE-OH	OVERHEAD CABLES				
5	TELE-TEXT	PLAN TEXT				
6	TELE-REV HAND HOLE	REVISED HANDHOLES				
7	TELE-UNDR GRND ABAN	ABANDONED UNDERGROUND CABLES				
8	TELE-UG	UNDERGROUND CABLES				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Fuel**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	FUEL-VHCL DEVC	VEHICLE FUEL FILTERS, METERS, ETC.				
2	FUEL-VHCL TANK	VEHICLE FUEL TANKS				
3	FUEL-VHCL PUMP	VEHICLE FUEL PUMP STATION				
4	FUEL-VHCL STID	VEHICLE FUEL TAGS, NOTES, TEXT				
5	FUEL-VHCL IDEN	VEHICLE FUEL TAGS, NOTES, TEXT				
6	FUEL-VHCL MAIN	VEHICLE MAIN FUEL PIPING				
7	FUEL -VHCL SERV	VEHICLE FUEL SERVICE PIPING				
9	FUEL-AVFL-DEVC	AVIATION FUEL FILTERS, METERS, ETC.				
10	FUEL-AVFL-TANK	AVIATION FUEL TANKS				
11	FUEL-AVFL-PUMP	AVIATION FUEL PUMP STATION				
12	FUEL-AVFL-STID	AVIATION FUEL TAGS, NOTES, TEXT				
13	FUEL-ANFL-IDEN	AVIATION FUEL TAGS, NOTES, TEXT				
14	FUEL-AVFL-MAIN	AVIATION MAIN FUEL PIPING				
15	FUEL-AVFL-SERV	AVIATION FUEL SERVICE PIPING				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Sewer**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	SEWR-WWTR DEVC	DEVICES-METERS, PUMP, VALVES, ETC.				
2	SEWR-WWTR ABAN	ABANDONED PIPING				
3	SEWR-WWTR IDEN	IDENTIFIER TAGS AND TEXT				
4	SEWR-WWTR MAIN	MAIN WASTE WATER PIPING				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Survey**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	SRVY-1996 CORS	1996 COORDINATES				
2	SRVY-ABAN MON	ABANDONED MONUMENT				
3	SRVY-ARPRT CNTRL	AIRPORT CONTROL				
4	SRVY-CNTRL MNMT	CONTROL MONUMENT				
5	SRVY-CNTRL TEXT	CONTROL TEXT				
6	SRVY-CORD	COORDINATES				
7	SRVY-ELEV	ELEVATIONS				
8	SRVY-GPS MON	GPS MONUMENTS				
9	SRVY-GPS TEXT	GPS TEXT				
10	SRVY-LAT LONG TEXT	LAT. & LONG. TEXT				
11	SRVY-NTWRK	NETWORK				
12	SRVY-NGS TEXT	NGS TEXT				
13	SRVY-STATE TEXT	STATE TEXT				
14	SRVY-TIC MARK	SURVEY TIC MARK				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Boundary**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	BNDRY-ABAN LEAS	ABANDONED LEASE				
2	BNDRY-ASR-INFO 234	ASR INFORMATION				
3	BNDRY-BNDRY LINE	BOUNDARY LINE				
4	BNDRY-CONTRS 197	COUNTOURS				
5	BNDRY-FAA PWR 125	FAA POWER				
6	BNDRY-HRDNG PL ROW	HARDING PLACE RIGHT OF WAY				
7	BNDRY-LEAS AREA TEXT	LEASE AREA TEXT				
8	BNDRY-LEAS LINE	LEASE LINES				
9	BNDRY-LEAS TEXT	LEASE TEXT				
10	BNDRY-LOT BEAR DIST	LOT BEARING DISTANCE				
11	BNDRY-LOT LINE	LOT LINES				
12	BNDRY-PRCL	PARCEL LINE				
13	BNDRY-PRCL TEXT	PARCEL TEXT				
14	BNDRY-QUARY 246	QUARRY				
15	BNDRY-ROW	RIGHT OF WAY				
16	BNDRY-ROW SHOT	RIGHT OF WAY SHOT				
17	BNDRY-RVR TWER LOC 196	RVR TOWER LOCATION				
18	BNDRY-SATA LEAS	SATA LEASE				

19	BNDRY-TRCT 1 SURVEY	TRACT 1 SURVEY				
20	BNDRY-TRCT SHAD 218	TRACT SHADE				

MNAA CADD Civil Level Scheme			
Discipline: **Civil**	File Type: **Roadways**	Date: **05-01-2013**	

LV	Level Name	Description	LC	WT	CO	Notes
1	ROAD-CNTR	ROAD CENTERLINES				
2	ROAD-GDRL	GUARDRAILS				
3	ROAD-LANE DIVS	LANE DIVISION				
4	ROAD-PRIM	PRIMARY ROADS				
5	ROAD-PROP PVMT MARK	PROPOSED PAVEMENT MARKINGS				
6	ROAD-QUAR	QUARRY				
7	ROAD-RLRD	RAILROADS				
8	ROAD-RETAIN WALL	RETAINING WALL				
9	ROAD-CURB	CURB				
10	ROAD-TEXT	ROAD TEXT				
11	ROAD-TEXT LARG	LARGE ROAD TEXT				
12	ROAD-TEXT MED	MEDIUM ROAD TEXT				
13	ROAD-SDWK	SIDEWALK				
14	ROAD-SIGN	ROAD SIGNS				
15	ROAD-SERV	SERVICE ROADS				
16	ROAD-STAT	ROAD STATIONS				
17	ROAD-STOP BAR	STOP BARS				
18	ROAD-SUB DIV TEXT	SUBDIVISION TEXT				
19	ROAD-TEMP ROAD	TEMPORARY ROADS				
20	ROAD-TRAF MARK	TRAFFIC MARKINGS				
21	ROAD-ABAN	ABANDON ROADS				
22	ROAD-ACCESS	ACCESS ROADS				
23	ROAD-AREIALS 2011	AERIAL PHOTO				
24	ROAD-AREA TEXT LARG	LARGE AREA TEXT				
25	ROAD-BRDG	BRIDGES				
26	ROAD-PROP SDWK	PROPOSED SIDEWALK				
27	ROAD-PROP SDWK HATCH	PROPOSED SIDEWALK HATCH PATTERN				
28	ROAD-IDEN	ROAD-ANNOTATION				
29	ROAD-OTLN	ROAD-OUTLINES				
30	ROAD-SHLD	ROAD SHOULDER-OUTLINE				
31	ROAD-EMRD CNTR	EMERGENCY ROAD-CENTERLINE				
32	ROAD-EMRD OTLN	EMERGENCY ROAD-OUTLINES				
33	ROAD-NVRD CNTR	NAVAID ROADS-CENTERLINES				
34	ROAD-NVRD OTLN	NAVAIDS ROADS-OUTLINES				
36	ROAD-RAIL CNTR	CENTERLINES				
37	ROAD-RAIL IDEN	ROAD-ANNOTATION				
38	ROAD-RAIL OTLN	ROAD-OUTLINES				
40	ROAD-PMVR IDEN	(AIRPORT TRN.) -ANNOTATION				
41	ROAD-PMVR OTLN	(AIRPORT TRN.) -OUTLINES				

MNAA CADD Civil Level Scheme		
Discipline: **Civil**	File Type: **Natural Gas**	Date: **05-01-2013**

LV	Level Name	Description	LC	WT	CO	Notes
1	NGAS-DEVC	NATURAL GAS VENTS, METERS, ETC.				
2	NGAS-TANK	NATURAL GAS TANKS				
3	NGAS-STID	NATURAL GAS ANNOTATIONS				
4	NGAS-ABND	NATURAL GAS ABANDON PIPING				
5	NGAS-IDEN	NATURAL GAS ANNOTATIONS				
6	NGAS-MAIN	NATURAL GAS MAIN PIPING LINE				
7	NGAS-SERV	NATURAL GAS SERVICE PIPING				

MNAA CADD Civil Level Scheme

Discipline: **Civil**	File Type: **Fence**	Date: **05-01-2013**

LV	Level Name	Description	LC	WT	CO	Notes
1	FENC-PERI	PERIMETER AOA FENCE & GATES				
2	FENC	OTHER FENCES & GATES				
3	FENC-IDEN	ANNOTATIONS				
4	FENC-GATE AOA	AOA GATE NUMBERS				
5	FENC-GATE SIDA	SIDA GATE NUMBERS				
6	FENC-ABAN	ABANDON FENCE				
7	FENC-METRO-DATA	DATA ON VARIOUS CEMETARY LOCATION				
8	FENC-ABAN	ABAN. OR RELOCATED FENCES & GATES				
9	FENC-POST	FENCE POST				
10	FENC-GATE ARM	GATE ARM LOCATIONS				
11	FENC-CONS TEMP	TEMPORARY CONSTRUCTION FENCE				
12	FENC-PERI AOA	PERIMETER AOA FENCE & GATES				
13	FENC-OTHER	OTHER FENCES & GATES				
14	FENC-GATE AOA	AOA GATE LOCATIONS				
15	FENC-GATE LOCK KEY	LOCK AND KEY CONTROL				
16	FENC-GATE CARD READ	CARD READER CONTROL				
17	FENC-GATE INTR	INTRUSTION DETECTION CONTROL				
18	FENC-GATE LOCAL	LOCAL CONTROL SYSTEMS				
19	FENC-GATE NON-AOA	NON AOA GATE LOCATIONS				
20	FENC-GIS	LINEWORK TO ENCLOSE AOA FENCE AREA				
		CEMETARY LOCATIONS				

MNAA CADD Civil Level Scheme

Discipline: **Civil**	File Type: **Airfield Electrical**	Date: **05-01-2013**

LV	Level Name	Description	LC	WT	CO	Notes
1	ARFLD-LIGHT CABL ABND	ABANDON AIRFIELD ELECTRIC LINES				
2	ARFLD-LIGHT PRIM IDEN	PRIMARY IDENTIFIER TAGS & TEXT				
3	ARFLD-LIGHT PRIM UNDR	PRIMARY UG AIRFIELD ELEC. LINES				
4	ARFLD-LIGHT SCND IDEN	SECONDARY IDENTIFIER TAGS & TEXT				
5	ARFLD-LIGHT SCND UNDR	SECONDARY UG AIRFIELD ELEC. LINES				
6	ARFLD-LIGHT SITE DEVC	CAPACITORS, REG, MOTORS, ETC.				
7	ARFLD-LIGHT SITE DUCT	DUCTBANKS				

8	ARFLD-LIGHT SITE JBOX	J-BOXES, MANHOLES, ETC.				
9	ARFLD-LIGHT LITE IDEN	IDENTIFIER TAGS & TEXT				
10	ARFLD-LIGHT LITE AIRF	AIRFIELD LIGHTS				
11	ARFLD-LIGHT SIGN IDEN	IDENTIFIER TAGS & TEXT				
12	ARFLD-LIGHT SIGN AIRF	AIRFIELD SIGNS				
13	ARFLD-LIGHT SIGN VAULTS	LIGHTING VAULTS				
15	ARFLD- CIRCUIT LIMA E	TAXIWAY LIMA EAST CIRCUITRY				
16	ARFLD-CIRCUIT DUCT	DUCT HOMERUN				
17	ARFLD-CIRCUIT EL HND	HANDHOLES				
18	ARFLD-CIRCUIT EL END LIGHTS 2L-20R	END LIGHTS 2L-20R				
19	ARFLD-CIRCUIT INTRUSION	INTRUSION DETECTION				
20	ARFLD-CIRCUIT EL RWEG LIGHT	RUNWAY EDGE LIGHTS				
21	ARFLD-CIRCUIT LIMA W	TAXIWAY LIMA WEST CIRCUITRY				
22	ARFLD-CIRCUIT KILO W	TAXIWAY KILO WEST CIRCUITRY				
23	ARFLD-CIRCUIT 13-31	RUNWAY 13-31 CIRCUITRY				
24	ARFLD-CIRCUIT SIER N	TAXIWAY SIERRA NORTH CIRCUITRY				
25	ARFLD-CIRCUIT SIGNS	AIRFIELD SIGNAGE				
26	ARFLD-CIRCUIT SIER S	TAXIWAY SIERRA SOUTH CIRCUITRY				
27	ARFLD-CIRCUIT NOV	TAXIWAY NOVEMBER CIRCUITRY				
28	ARFLD-CIRCUIT JL EDGE	TAXIWAY JULIET/LIMA CIRCUITRY				
29	ARFLD-CIRCUIT J APRON	TXWY APRON CIRCUITRY FOR JULIET				
30	ARFLD-CIRCUIT SCAN SYS	SCAN SYSTEM CIRCUITRY				
31	ARFLD-CIRCUIT SMGCS	SURFACE MOVEMENT GUIDANCE SYS.				
32	ARFLD-CIRCUIT ROTATING BEACON	ROTATING BEACON				
33	ARFLD-CIRCUIT REIL LIGHTS	REIL LIGHTS				
34	ARFLD-CIRCUIT TDZ LIGHTS 2L	TOUCH DOWN ZONE LIGHTS 2L				
35	ARFLD-CIRCUIT CL 2L-20R	RNWY 2L-20R CENTERLINE CIRCUITRY				
36	ARFLD-CIRCUIT CL 2R-20L S	RNWY 2R-20L S. CENTERLINE CIRCUITRY				
37	ARFLD-CIRCUIT TDZ CIRC 2R	TOUCH DOWN ZONE CIRCUITRY FOR 2R				
38	ARFLD-CIRCUIT VASI	VASI CIRCUITRY				
39	ARFLD-CIRCUIT CL LIGHTS 2L-20R	CENTERLINE LIGHTS 2L-20R				

40	ARFLD-CIRCUIT TWOB-LIGHT	TAXIWAY OBSTRUCTION LIGHTS				
41	ARFLD-CIRCUIT CL 2R-20L N	RNWY 2R-20L N. CENTERLINE CIRCUITRY				
42	ARFLD-CIRCUIT TDZ CIRC 2L	TOUCH DOWN ZONE CIRCUITRY FOR 2L				
43	ARFLD-CIRCUIT MANHOLES	MANHOLES				
44	ARFLD-CIRCUIT WIGWAG IDEN	LARGE WIG WAG IDENTIFIERS				
45	ARFLD-CIRCUIT RPU PWR FEED	REMOTE POWER LINE CIRCUITRY				
46	ARFLD-CIRCUIT TWEG LIGHT	TAXIWAY EDGE LIGHTS				
47	ARFLD-CIRCUIT 2R-20L N	RUNWAY 2R-20L NORTH CIRCUITRY				
LV	Level Name	Description	LC	WT	CO	Notes
48	ARFLD-CIRCUIT DCTBNK DIAG	DUCT BANK DIAGRAM				
49	ARFLD-CIRCUIT BLAST FENCE	BLAST FENCE CIRCUITRY				
50	ARFLD-CIRCUIT PANELS	ELECTRIC PANELS				
51	ARFLD-CIRCUIT 2R-20L S	RUNWAY 2R-20L SOUTH CIRCUITRY				
52	ARFLD-CIRCUIT WIGWAG 2R	WIG WAG 2R				
53	ARFLD-CIRCUIT KILO E	TAXIWAY KILO EAST CIRCUITRY				
54	ARFLD-CIRCUIT T4	T4 CIRCUITRY				
55	ARFLD-CIRCUIT ALPH N	TAXIWAY ALPHA NORTH CIRCUITRY				
56	ARFLD-CIRCUIT PANEL INFO	ELECTRIC PANEL INFORMATION				
57	ARFLD-CIRCUIT ALPH S	TAXIWAY ALPHA SOUTH CIRCUITRY				
58	ARFLD-CIRCUIT H N	TAXIWAY HOTEL NORTH CIRCUITRY				
59	ARFLD-CIRCUIT BRAVO N	TAXIWAY BRAVO NORTH CIRCUITRY				
60	ARFLD-CIRCUIT WIND SOCK	AIRFIELD WINDSOCK				
61	ARFLD-CIRCUIT BRAVO S	TAXIWAY BRAVO SOUTH CIRCUITRY				
62	ARFLD-CIRCUIT DCT CROSSING	DUCT BANK CROSSING				
63	ARFLD-CIRCUIT CANS	PULL CANS				
64	ARFLD-CIRCUIT WIGWAG 2L	WIG WAG 2L				
65	ARFLD-CIRCUIT H S	TAXIWAY HOTEL SOUTH CIRCUITRY				
66	ARFLD-CURCUIT CL H N	TXWY HOTEL N. CENTERLINE CIRCUITRY				
67	ARFLD -CIRCUIT 2C-20C	RUNWAY 2C-20C CIRCUITRY				
68	ARFLD-CIRCUIT 2L-20R	RUNWAY 2L-20R CIRCUITRY				

69	ARFLD-CIRCUIT TDZ LIGHTS 2R	TOUCH DOWN ZONE LIGHTS 2R				
70	ARFLD-CIRCUIT CL H S	TXWY HOTEL S., CENTERLINE CIRCUITRY				
71	ARFLD-CIRCUIT CL HS S	TXWY HOTEL S., HIGH SPEED CIRCUITRY				
72	ARFLD-CIRCUIT CL LIGHTS 2R-20L	CENTERLINE LIGHTS 2R-20L				
73	ARFLD-CIRCUIT TWHLBR LIGHT	TAXIWAY HOLD BAR LIGHTS				
74	ARFLD-CIRCUIT TWCL LIGHT	TAXIWAY CENTERLINE LIGHTS				

MNAA CADD Civil Level Scheme

Discipline: **Civil**		File Type: **Electrical**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	ELEC-CABL-ABAN-FAA	ABANDONED ELEC. UTILITY LINES				
2	ELEC-PRIM-IDEN-FAA	IDENTIFIER TAGS AND TEXT				
3	ELEC-PRIM-UNDR-FAA	UNDERGROUND ELEC. UTILITY LINES				
4	ELEC-SITE-JBOX-FAA	J-BOXES, MANHOLES, ETC.				
5						
6	ELEC-CABL-ABAN-MNAA	ABANDONED ELEC. UTILITY LINES				
7	ELEC-PRIM-IDEN-MNAA	IDENTIFIER TAGS AND TEXT				
8	ELEC-PRIM-UNDR-MNAA	UNDERGROUND ELEC. UTILITY LINES				
9	ELEC-SITE-JBOX-MNAA	J-BOXES, MANHOLES, ETC.				
10	ELEC-LITE-IDEN-MNAA	IDENTIFIER TAGS AND TEXT				
11	ELEC-LITE-STRT-MNAA	STREET LIGHTS				
12						
13	ELEC-CABL-ABAN-NES	ABANDONED ELEC. UTILITY LINES				
14	ELEC-SERV-IDEN-NES	IDENTIFIER TAGS AND TEXT				
15	ELEC-SERV-UNDR-NES	UNDERGROUND ELEC. UTILITY LINES				
16	ELEC-SITE-JBOX-NES	J-BOXES, MANHOLES, ETC.				
17	ELEC-SITE-SUBS-NES	SUBSTATIONS				
18						
19	ELEC-CABL-ABAN-TVA	ABANDONED ELEC. UTILITY LINES				
20	ELEC-SERV-IDEN-TVA	IDENTIFIER TAGS AND TEXT				
21	ELEC-SERV-UNDR-TVA	UNDERGROUND ELEC. UTILITY LINES				
22	ELEC-SITE-JBOX-TVA	J-BOXES, MANHOLES, ETC.				
23	ELEC-SITE-SUBS-TVA	SUBSTATIONS				

MNAA CADD Civil Level Scheme

Discipline: **Civil**		File Type: **Parking**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	PARK-BOC	BACK OF CURB				
2	PARK-CL	CENTERLINES				
3	PARK-IDEN	ANNOTATUION				
4	PARK-ISLD	ISLANDS/MEDIANS				
5	PARK-SPAC CONT	PARKING SPACE COUNT				
6	PARK-OTLN	PARKING OUTLINE				

7	PARK-STAL MRKG	PARKING SPACE/STALL MARKINGS				
8	PARK-HDCP STRP	PARKING STRIP./HANDICAPPED SYMB.				
9	PARK-TOC	TOE OF CURB				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Airfield**		Date: **05-01-2013**		
LV	Level Name	Description	LC	WT	CO	Notes
1	ARFLD-APRN	Apron				
2	ARFLD-CONC JONT PTRN	Concrete Joint Pattern				
3	ARFLD-PVMNT	Airfield/Taxiway/Runway Pavement				
4	ARFLD-ABAN	Pavement Abandoned In Place				
5	ARFLD-DEMO	Pavement Removed				
6	ARFLD-SHLDR	Airfield Shoulders				
7	ARFLD-STAT	Airfield Stationing				
8	ARFLD-TEXT	Runway/Taxiway/Apron Text				
9	ARFLD-TEXT SML	Runway/Taxiway/Apron Text - scaled				
10	ARFLD-BLDG RESTRICTI LIMT	Runway Building Restriction Limit				
11	ARFLD-RNWY CNTR LN	Runway Centerline				
12	ARFLD-RNWY CLR ZN	Runway Clear Zone				
13	ARFLD-RNWY CLR ZN TEXT	Runway Clear Zone Text				
14	ARFLD-RNWY NAVID	Runway Navaid				
15	ARFLD-RNWY GLID SLOP	Runway Glide Slope				
16	ARFLD-RNWY MRKNG	Runway Marking				
17	ARFLD-RNWY OBST FREE ZONE	Runway Obstacle Free Zone				
18	ARFLD-RNWY PRCT ZONE TEXT	Runway Protection Zone Text				
19	ARFLD-RNWY SFTY AREA	Runway Safety Area				
20	ARFLD-LEVELS 60-89 (TAXIWAY)					
21	ARFLD-TXWY CNTR LN	Taxiway Centerline				
22	ARFLD-TXWY MARKING	Taxiway Marking				
23	ARFLD-RAMP NNMVMNT	Non Movement Markings on Ramp				
24	ARFLD-APRN FUT	Future Apron				
25	ARFLD-APRN FUT MRKNG	Future Apron Marking				
26	ARFLD-RNWY FUT	Future Runway				
27	ARFLD-RNWY FUT MRKNG	Future Runway Marking				
28	ARFLD-TXWY FUT	Future Taxiway				
29	ARFLD-TXWY FUT MRKNG	Future Taxiway Marking				
30						
31	ARFLD-TXWY CNTR	CENTERLINES				
32	ARFLD-TXWY IDEN	TAXIWAY ANNOTATIONS				
33	ARFLD-TXWY JOIN	TAXIWAY JOINTS				
34	ARFLD-TXWY OTLN	TAXIWAY OUTLINES				
35	ARFLD-TXWY SHLD	TAXIWAY SHOULDERS				
36	ARFLD-TXWY SHAP	TAXIWAY SHAPE				
37						
38	ARFLD-BPAD CNTR	CENTERLINES				
39	ARFLD-BPAD IDEN	BLAST PAD ANNOTATIONS				
40	ARFLD-BPAD OTLN	BLAST PAD OUTLINES				

41	ARFLD-BPAD SHLD	SHOULDERS				
42	ARFLD-BPAD SHAP	BLAST PAD SHAPE				
43						
44	ARFLD-APRN CNTR	CENTERLINES				
45	ARFLD-APRN IDEN	APRON ANNOTATIONS				
46	ARFLD-APRN JOIN	APRON JOINTS				
47	ARFLD-APRN OTLN	APRON OUTLINES				
48	ARFLD-APRN SHLD	APRON SHOULDERS				
LV	Level Name	Description	LC	WT	CO	Notes
49	ARFLD-APRN SHAP	APRON SHAPE				
50						
51	ARFLD-RNWY CNTR	CENTERLINES				
52	ARFLD-RNWY IDEN	RUNWAY ANNOTATIONS				
53	ARFLD-RNWY JOIN	RUNWAY JOINTS				
54	ARFLD-RNWY-OTLN	RUNWAY OUTLINES				
55	ARFLD-RNWY SHLD	RUNWAY SHOULDERS				
56	ARFLD-RNWY SHAP	RUNWAY SHAPE				

MNAA CADD Civil Level Scheme						
Discipline: **Civil**		File Type: **Utilities**			Date: **05-01-2013**	
LV	Level Name	Description	LC	WT	CO	Notes
1	UTIL-HYDR WTCL	WATER CENTERLINE				
2	UTIL-HYDR WTID	WATER ANNOTATION				
3	UTIL-HYDR WTOT	WATER OUTLINE				
4	UTIL-HYDR FPLC	FLOODPLAIN CENTERLINE				
5	UTIL-HYDRFPID	FLOODPLAIN ANNOTATION				
6	UTIL-HYDR FPOT	FLOODPLAIN ANNOTATION				
7	UTIL-HYDR WLCL	WETLAND CENTERLINE				
8	UTIL-HYDR WLID	WETLAND ANNOTATION				
9	UTIL-HYDR WLOT	WETLAND OUTLINE				
10						
11	UTIL-PTRE DEVC	DEVICES-PUMPS, VALVES, ETC.				
12	UTIL-PTRE ABND	ABANDOINED PIPING				
13	UTIL-PTRE IDEN	IDENTIFIER TAGS AND TEXT				
14	UTIL-PTRE MAIN	MAIN PREW-TREAT WATER PIPING				
15	UTIL-PTRE JBOX	J-BOXES AND MANHOLES				
16	UTIL-PTRE RSID	IDENTIFIER TAGS AND TEXT				
17						
18	UTIL-DOMW DEVC	DEVICES-HYDRANTS, METERS, ETC.				
19	UTIL-DOMW STID	IDENTIFIER TAGS AND TEXT				
20	UTIL-DOMW ABND	ABANDOINED PIPING				
21	UTIL-DOMW IDEN	IDENTIFIER TAGS AND TEXT				
22	UTIL-DOMW MAIN	MAIN DOMESTIC WATER PIPING				

Civil Cell Libraries

MNAA CADD Cell Libraries			
Discipline: **Civil**		File Type: **Cell Libraries**	Date: **05/2013**
LV	Library Name	Library Description	Notes
1	ARCHITECTURAL CELL LIBRARY	ARCHITECTURAL ELEMENTS	UNDER CONSTRUCTION
2	CIVIL CELL LIBRARY	CIVIL ELEMENTS	UNDER CONSTRUCTION
3	COMMUNICATIONS CELL LIBRARY	COMMUNICATION ELEMENTS	UNDER CONSTRUCTION
4	ELECTRICAL CELL LIBRARY	ELECTRICAL ELEMENTS	UNDER CONSTRUCTION
5	FIRE PROTECTION CELL LIBRARY	FIRE PROTECTION ELEMENTS	UNDER CONSTRUCTION
6	LANDSCAPE CELL LIBRARY	LANDSCAPE ELEMENTS	UNDER CONSTRUCTION
7	MASTER CADD MAPS CELL LIBRARY	MASTER CADD MAPS ELEMENTS	UNDER CONSTRUCTION
8	MECHANICAL CELL LIBRARY	MECHANICAL ELEMENTS	UNDER CONSTRUCTION
9	MNAA_SHEET CELL LIBRARY	TITLE BLOCKS	COMPLETED
10	PLUMBING CELL LIBRARY	PLUMBING ELEMENTS	UNDER CONSTRUCTION
11	STRUCTURAL CELL LIBRARY	STRUCTURAL ELEMENTS	UNDER CONSTRUCTION
12	SURVEYING CELL LIBRARY	SURVEY ELEMENTS	UNDER CONSTRUCTION
13	UTILITY CELL LIBRARY	UTILITY ELEMENTS	
14			

-----END OF CHAPTER----

5.11.13 CONTACTS

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-----END OF CHAPTER-----

5.12 APPENDIX M – MNAA BIM GUIDELINES

5.12.1 INTRODUCTION

A. Foreward

The Metropolitan Nashville Airport Authority is excited to advance our technology platforms for the use of design, construction and asset management activities. Through careful review and consideration, our first step in this process is the development of the Building Information Modeling Guidelines you can read here. Our second step is to engage our design and construction partners in helping us establish BIM as the standard delivery method for all airport building assets. Please assist us in making this transition.

Improvements at Nashville International Airport not only modernize the passenger experience, increases capacity to meet the population increase for the region and modernize facilities for more aviation opportunities, it also gives us a chance to modernize internal workflows taking advantage of new and improved design and construction technologies. BIM is the movement into the future and allows the MNAA to visualize projects before they are constructed in the field. It allows our stakeholders to make better decisions sooner in the design process. It allows our internal engineers and maintenance staff better tools to manage the building infrastructure and assets throughout its lifecycle.

We appreciate you working with us in utilizing these standards and moving the MNAA into the future.

Sincerely,
Traci Holton
Chief Engineer, Development & Engineering Dept., MNAA
of Basic Services. The Building Information Modeling (BIM) software shall be compliant with Industry Foundation Class file format.

B. Mission Statement

MNAA’s goal in implementing BIM, and its continued use beyond, is to establish the instrument which provides an integrated process to increase efficiency, accuracy, minimize design errors, and subsequently reduce RFI’s and construction costs. The integration of Revit® BIM is key to drive team collaboration through construction and to provide a living, record model for operational use, post construction. Thus, enhancing the effectiveness of MNAA processes and routines to better maintain current Terminal and Concourse conditions, post program.

5.12.2 ABOUT THE GUIDELINES

A. Overview and Purpose

The MNAA BIM Guidelines shall serve as an instructive template for all MNAA projects that utilize BIM, large or small. By establishing the standards of practice (and sticking to them), MNAA may ensure a smooth and successful integration of BNA project BIM data into their current systems of data access and management. The goal is to use an integrated design process to enhance the visualization, efficiency, accuracy, sustainability and increase profitability in building design and construction. This will be achieved with the integration of Revit® by enabling parametric change, easy retrieval of information, increased delivery time, improved coordination, reduced costs and embedded information from vendors. MNAA and prime consultants have adopted Autodesk® Revit® platform as the new design software for generating and managing virtual building data and design documents.

A building information model (BIM) will incorporate geometry, 3D spatial relationships between all disciplines, analysis capabilities, quantities, and element properties of building components. The Architect/Engineer shall utilize Building Information Modeling (BIM) authoring software and BIM based design processes to produce model(s) for this project. The Architect/Engineer shall be knowledgeable of BIM use for all phases of the design and utilize data, graphics, and drawings derived from the model for decision making support and construction documentation as part of Basic Services. The Building Information Modeling (BIM) software shall be compliant with Industry Foundation Class file format.

B. Guidelines Change Management and Change Log

This is designed to be a living document that will change throughout the life of the project. Changes requested to this document must be submitted in writing to the Assistant Manager of Data Infrastructure for MNAA. To be accepted into the document, changes must be agreed to by the MNAA Data Infrastructure Team.

C. Overview Date Reuse Guidelines

Subcontractors will be provided access to all BIM content for their use. It is the responsibility of the Subcontractor to translate the provided BIM files into the format that they require. Subcontractors will also provide models back to the Owner or Owner selected entity in the format required. All Design or Construction related requests for Digital Data Files shall be submitted to the Owner’s Assistant Manager of Data Infrastructure or Owner selected entity in writing/email. Typical turn-around for Digital Data File requests is 48 hours.

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D. Ownership and Rights of Data

MNAA has ownership of and to all CAD files, BIM files, and GIS files as defined in the contract for any BNA project. The Design-Builder's Digital Data Files: Electronic copies of Building Information Model(s) including sheet views and/or CAD Drawings of the Contract Drawings, as applicable, shall be provided by the Design-

Builder to all Subcontractors and Vendors for use in preparing submittals. Confirm your organization has signed the necessary MNAA Confidentiality and Non-Disclosure Agreement form required by MNAA Development & Engineering Department (sample form below).

Metropolitan Nashville Airport Authority™

CONFIDENTIALITY AND NON-DISCLOSURE AGREEMENT

Date _____

_____ _____
Contract Number Contract Name

_____ _____
Project Number Project Description / Title

1. I, _____, an employee of _____ ("Contractor").

2. Contractor, under contract (the "Contract") with the Metropolitan Nashville Airport Authority, is executing the acceptance of its responsibilities for Airport Security at Nashville International Airport (referred to herein as the "Authority").

3. Pursuant to the Contractor's work for the Authority under the Contract, the Contractor has and will request that the Authority provide it with various documents or other records (collectively, "documents").

4. I understand the following with respect to any documents, or information therein, that are provided by the Authority to me, or which come into my possession pursuant to the Contractor's work for the Authority:

   A. These documents may be considered Sensitive Security Information ("SSI") under applicable federal regulations;

   B. These documents may be protected from disclosure under the Tennessee Open Records Act;

   C. These documents may be protected from disclosure under the federal Freedom of Information Act.

   D. These documents are considered by the Authority to contain information that is vital to the security and safe operation of Nashville International Airport, whether or not these documents are otherwise classified by any other entity or law as containing such information.

   E. These documents are considered by the Authority to possibly contain information that is commercially or financially sensitive or which is a trade secret.

CONFIDENTIALITY AND NON-DISCLOSURE AGREEMENT

Date _____

Contract Number	Contract Name
Project Number	Project Description / Title

5. I agree to the following with respect to any documents, or information therein, that are provided by the Authority to me, or which come into my possession pursuant to the Contractor's work for the Authority.

   A. I will safeguard these documents and the information therein, to prevent inadvertent disclosure of them by keeping under the control of authorized persons, when in use, and stored the documents in a secure container, such as a locked desk, file cabinet or locked room when not in use;

   B. I will not release these documents, or the information therein, to any party, company, person, organization or entity for any reason that does not expressly serve the Contractor's obligations to the Authority under its contract with the Authority, as determined by the Contractor's employee with appropriate supervisory and decision-making authority;

   C. I will not release these documents, or the information therein, pursuant to the request under the Tennessee Open Records Act or the Freedom of Information Act without affording the Authority the opportunities under those laws to protect these documents from disclosure;

   D. I will notify the Authority if a request is made for these documents, or the information therein; and

   E. I shall return, or destroy, these documents following the completion of the agreed upon contract, or following the bidding process, if not selected as the Contractor; and

   F. Specifically with regards to SSI,
      1) I shall comply with the broadest possible interpretation of the federal regulations in handling SSI (49 CFR § 1520, as amended);
      2) I shall provide the Airport with an SSI Return or Destruction Compliance Form, listing all SSI material that I have destroyed.

6. I further understand that the Authority may seek appropriate legal remedies for any violation of my agreements herein.

CONFIDENTIALITY AND NON-DISCLOSURE AGREEMENT

Date _____

Contract Number	Contract Name
Project Number	Project Description / Title

My signature below, I hereby affirm and agree to the matters set forth above.

Contractor:	Owner:
Print Name	Print Name (MNAA)
Signature	Signature (MNAA)
Title	Title (MNAA)
Company	MNAA Representative Metropolitan Nashville Airport Authority

E. Request for Variance

It is recognized that variances or clarifications to these standards may be necessary. A request for variance shall be submitted along with any substantiating documentation to MNAA Development & Engineering Department Assistant Manager of Data Infrastructure.

F. Procedures for Changes to this Manual

Proposed changes to this manual should be documented on Owner approved form and submitted to MNAA Development & Engineering Department Assistant Manager of Data Infrastructure for consideration.

5.12.3 BIM DESIGN EXECUTION & PROJECT ORGANIZATION

SECTION 19 Project Execution Plan Overview

The BIM Design Execution & Project Overview section will describe the scope and size of projects that will use a BIM-centric workflow. Although information described within this section can be found in many other places, the intent of the guideline, and ultimately the project execution plan, is to consolidate this into one document for ease of access and updating.
Additionally, the section outlines the importance of the GIS program, MNAA Development & Engineering uses to link all of our stakeholders together, as well as roles and responsibilities for maintaining a consistent workflow using the MNAA GIS. All of these people and systems working together will aid in completing efficient and productive projects

SECTION 20 The Purpose and Expectation of a Project Execution Plan

A Building Information Model (BIM) Project Execution Plan (PxP) shall be required per the direction of MNAA Development & Engineering department, and include, but not limited to, items identified in this section.
The BIM PxP defines uses for BIM on the project (e.g. design authoring, cost estimating, and design coordination), along with a detailed design of the process for executing BIM throughout the project lifecycle. The goal of developing the BIM PxP is to stimulate planning and direct communication by the project team during the early phases of a project. The process of BIM is to focus on the development, use and transfer of digital information to improve the design, construction and operations of a project. The BIM PxP is to provide stakeholders with a delineation of roles and responsibilities detailing scope of information to be shared, relevant business processes and supporting software.

The BIM Procedure will:

1. Identify BIM Goals and Uses through defining project and team values.
2. Develop a BIM Execution process that includes tasks supported and Information Exchanges through BIM.
3. Develop Information Exchanges with information content, level of development (LoD) and responsible parties for each exchange.
4. Define supporting infrastructure for BIM implementation required to host the developed BIM Process.

During the design process, the model(s) shall be utilized for Design Authoring, Design Reviews and Space Tracking. Cost Estimation, 3D Coordination, Facilities Management Data and Record Modeling shall be determined by the scope and size of the project. These workflows shall be defined in the BIM PxP.

SECTION 21 Project Scope and Schedule Matrix

BNA has multiple projects of all sizes and scope of work every year. These projects are simple to complex and require much coordination. MNAA has determined BIM is a useful tool for modeling and data information. It is critical to maintain the BIM model(s) with accurate and precise information.
The chart below dictates MNAA's goal for BIM requirements for projects. While this is a guide, and will hold true to most projects, MNAA may require more information than what is presented below. This will be determined based on the need of information from the scope of a project.

SCOPE SIZE	COST	DURATION	AREA	MODEL R'QD	PXP R'QD
Small	*< $50k*	*< 3 mos*	*< 5 ksf*	*No*	*No*
Medium	*$50k-$500k*	*3-12 mos*	*5k – 100 ksf*	*Maybe*	*Yes (short)*
Large	*> $500k*	*>12 mos*	*> 100 ksf*	*Yes*	*Yes (long)*

SECTION 22 INTEGRATION WITH MNAA'S GIS SYSTEM (ArcGIS & ESRI)

MNAA utilizes the ArcGIS system for tracking GIS data, field inspections and work order maintenance. It is the intent that the BIM process shall make efforts to incorporate captured data from the building information models and integrate into the GIS system. Integrating spatial information from within the models into a GIS system makes the data non-proprietary to tools MNAA already owns, and helps the data become more searchable. This searchable data will be made available to larger groups of users in a much timelier manner. The MNAA GIS system will also allow any BIM data to be accessible in broader formats, via the web or database viewer.
The requirements to meet GIS importing standards is outlined in the GIS STANDARDS section below.

5.12.4 BIM DESIGN EXECUTION & PROJECT ORGANIZATION

A. Introduction

This section is reserved to establish administrative information concerning the project at hand. There will be multiple deliverable requirements for electronic submissions. MNAA will require the submission of drawings electronically in MicroStation or AutoCAD backgrounds. BIM submission shall be submitted REVIT format to MNAA. Contact Design and Engineering Assistant Manager of Data Infrastructure for any requests.

SECTION 23 Project Information

It's important to establish basic information about the project early on, and provide the information in the Project Execution Plan. The chart below must be included in the PxP, and its values must be populated to describe the project in question. Create new line items as necessary.

PROJECT INFORMATION	
Project Owner:	
Project Name:	
Project Location and Address:	
Contract Type / Delivery Method:	
Brief Project Description:	
ADDITIONAL PROJECT INFORMATION	**PROJECT NUMBERS**
Contract Number:	
Project Number:	

SECTION 24 Project Schedule and Milestones

This section is reserved to describe the agreed project milestones. The chart below must be included, and its values must be populated to align with the project in question. Create new line items as necessary.

PROJECT PHASE / MILESTONE	ESTIMATED START DATE	ESTIMATED COMPLETION DATE	PROJECT STAKEHOLDERS INVOLVED
Phase 1			
Phase 2			
Phase 3			

SECTION 25 Project roles, Responsibilities and Contacts

This section is reserved for identifying the team members of a project by role, as well as the responsibilities of that role. The chart below must be included, and its values must be populated to align with the project in question. Create new line items as necessary.

Role	Organization	Contact Name	Location	E-Mail	Phone
Role 1					
Role 2					
Role 3					

For projects meeting the requirements to have a PxP, the following roles shall be identified. MNAA will have final determination on what roles will be required per project based on scope, cost and duration. It is the expectation that the following minimum levels of responsibilities be met with an identified project lead.

Project Manager (BIM) Responsibilities

Management of a Project Team to provide a design utilizing BIM technology.

1. Communicating and coordinating his/her resource requirements with Discipline Heads, Lead Architect, Lead Engineer, and the BIM Manager
2. Establishes a project manual for the project that incorporates all relevant BIM requirements for the project and for documenting and/or communicating the manual to the Project Team.
3. Communicates to all stakeholders regarding the BIM requirements for the project.
4. Secures all contracts and communicates the scope of work to the project team.
5. Establishes and follows proper communication protocols.
6. Coordinates with the BIM Coordinator and the BIM Manager for the project setup and management.
7. Prepares a work breakdown structure (WBS), defines scope to meet project requirements, monitors and controls standards.
8. Prepares project schedule to meet the project requirements including milestones.
9. Monitors and communicates updates to the project team.
10. Ensures that all QA/QC quality checks, including BIM Requirements are accurately performed and documented.
11. Establishes and maintains documentation records.
12. Prepares project budget and develops Engineering Order to meet project requirements.
13. Identifies, assembles, and manages resources.
14. Conducts necessary kick-off and progress meetings.
15. Estimates cost-to-complete monthly and revise Engineering Order accordingly.
16. Manages post design activities.

BIM Manager Responsibilities

1. Ensure consistency of BIM standards, training and practices within their office.
2. Lead Model, Content, and View Manager for all models.
3. Ensures data quality assurance by using quality reporting tools.
4. Manages the size of the model.
5. Coordinates team file management.
6. Reviews Content (Family) Creation produced by disciplines.
7. Performs audits on BIM files; checking the data quality and publishing quality reports.
8. Assures all technical discipline models are properly referenced.
9. Attends BIM kick-off meeting and project kick off meeting.
10. When requested by the Project Manager, interfaces with MNAA and sub-consultant BIM coordinators as necessary.
11. Assists/coordinates BIM Project Coordinators during all phases of production.
12. Coordinates software training for the project team.
13. Facilitates BIM technical meetings with BIM Project Coordinators.
14. Interfaces with BIM Design team and with Design Systems Support to ensure software is installed and operating properly.
15. Coordinates the set-up of shared file server with Design team and IT staff.
16. Responsible for data transfers.

BIM Coordinator(s) Responsibilities

1. All major design technical disciplines/trades (architecture, structure, MEP, interior design, civil) shall have individuals assigned to the role of BIM Designer to coordinate their work with the entire design/construction team. The individuals shall have relevant BIM experience required by the complexity of the project.
2. Lead Model, Content, and View Manager for individual model.
3. Coordinate and communicate with other BIM Coordinators.

4. Responsible for design requirements for their respective design discipline.
5. Ensures that all BIM work and 2D information on paper follows the appropriate standard.
6. Executes the design and design changes in a 3D environment.
7. Implements the BIM Execution Plan for the project.
8. Model content per BIM Standards.
9. Coordinates technical discipline BIM development, standards, data requirements, etc. as required with the BIM Coordinator.
10. Leads the discipline team model in its documentation and analysis efforts.

Design Team Responsibilities

1. Manage and update the Revit model(s) through the end of the construction phase, incorporating all updates and/or revisions to the model(s) as necessary to reflect design changes initiated by RFI, Owner Changes, or coordination with existing conditions.
2. The Design Team shall complete all model updates during construction and provide MNAA with Record Drawings (digital BIM file (RVT, IFC, PDFs, and other formats as requested) reflecting all constructed conditions, including but not limited to; change orders, RFIs, and field orders prior to their application for final payment. Timeframe for submission of Record Drawings shall be discussed with MNAA and approved prior to the completion of construction.

Design Systems Support Responsibilities

1. These individuals, within the IT department, will have sufficient BIM experience and have the proficiency in the proposed BIM authoring and coordination software. These individuals will serve as the main point of contact for the BIM Manager to satisfy all BIM related software and hardware issues. The Design Systems Support staff will also support any staff, offices and divisions with any BIM related efforts provided they be contacted through the Help Desk.
2. Coordinates and communicates BIM efforts routinely with the BIM Manager(s).
3. Keeps current of industry trends by attending training and conferences for BIM and makes recommendations for improvements in BIM technology and processes.
4. Provides and suggests appropriate BIM hardware for optimum BIM technology performance.
5. Provides appropriate desktop and project support to help ensure a project's continued progress.
6. Ensures and maintains the proper number of licenses for each of the BIM platforms.
7. Creates and maintains internal process and procedure documents related to all BIM efforts.

5.12.5 BIM DELIVERY & INFORMATION SHARING

The BIM Project Delivery & Information Sharing section will describe how the project(s) will be delivered in a BIM centric workflow. The BIM roadmap can be stated as follows

GOALS & OBJECTIVES lead to BIM USES which create BIM PROCESSES

From project to project, depending on scope, time and budget, these items will vary greatly. It is the intent of the project teams to identify the proper uses of BIM and how they will work together. Ultimately, MNAA has the final say on what the BIM expectations are for each project.

5.12.6 BIM PROJECT EXECUTION – OVERALL

A. BIM GOALS AND OBJECTIVES

Once the fundamental project information is identified, it is critical to determine the objectives and goals to describe how the project will utilize BIM. There is also an opportunity at this step to connect any potential BIM Uses to the goals of the project (for more on BIM Uses, see below, “BIM Uses”). The chart below must be included, and its values must be populated to align with the project in question.

PRIORITY (HIGH/ MED/ LOW)	GOAL DESCRIPTION	POTENTIAL BIM USES
	Goal/Objective 1	
	Goal/Objective 2	
	Goal/Objective 3	

SECTION 26 BIM USES

Standard to the industry, there are 36 common Uses of BIM. To understand the resources and workflows required to accomplish the previously identified BIM Goals and Objectives, it is critical to opt into the appropriate BIM Uses. The uses have been categorized by the stage of a project they apply to (i.e. Planning, Design, Construction, or Operation). The chart below must be included. The BIM Uses that are being applied to the project shall be denoted with an ‘X’, while the Uses that require more discussion before committing to them will be denoted with a ‘?’, and all shall be assigned to the company responsible, if applicable.

X	PLAN	FIRM	X	DESIGN	FIRM	X	CONSTRUCT	FIRM	X	OPERATE	FIRM
	Programming			Design Authoring			Site Utilization Planning			Building Maintenance Scheduling	
	Site Analysis			Design Reviews			Construction System Design			Building System Analysis	
				3d Coordination			3d Coordination			Asset Management	
				Trade Partner Involvement							
				Structural Analysis			Digital Fabrication			Space Management / Tracking	

				Lighting Analysis			3D Control and Planning			Disaster Planning	
				Energy Analysis			Record Modeling			Record Modeling	
				Mechanical Analysis							
	GIS Data Acquisition			GIS Data Exchange			GIS Data Exchange				
				Other Eng. Analysis							
				Sustainability (LEED) Evaluation							
				Code Validation							
	Phase Planning (4D Modeling)			Phase Planning (4D Modeling)			Phase Planning (4D Modeling)			Phase Planning (4D Modeling)	
	Cost Estimation			Cost Estimation			Cost Estimation			Cost Estimation	
	Existing Conditions Modeling			Existing Conditions Modeling			Existing Conditions Modeling			Existing Conditions Modeling	

SECTION 27 BIM PROCESS MAPPING

Mapping the process of each BIM Use, as well as the more general processes of BIM, is essential to its successful execution. At this level, the “Plan” in PxP is resolved in detail, from conception to completion. It is in the creation of these Process Maps that the Information Exchanges and sequences of each BIM Use are fully realized. This will also be an opportune time to address any scheduling issues and clarify any areas where BIM Uses might overlap with each other.

Within the collection of Process Maps, they fall into one of two levels (Level 1 and Level 2). Level 1 Process Maps describe large-scale project Processes such as the BIM Execution Planning Process, which describes the BIM Uses and tasks required to successfully fulfill the BIM Execution Plan. When the teach reaches this stage in project execution planning, the BIM Uses they have prescribed for the project shall be used to complete the Level 1 Process Maps.

Level 2 Process Maps endeavor to detail out the processes inherent to each BIM Use and task that has been assigned to a Level 1 Process. For example, Cost Estimation might be a desired BIM Use, which has earned a place in the sequence of the Level 1 Process Map for BIM Execution Planning. A Level 2 Process Map for Cost Estimation must then be composed, consisting of the various tasks required to successfully perform Cost Estimation.

The structure of each Process Map is broken down to incorporate any inputs or reference material necessary to performing the prescribed tasks, the steps or tasks themselves, and any output that may be produced throughout the process.

SECTION 28 COMMUNICATION AND MEETING PROCEDURES

To optimize workflow and keep data as up-to-date as possible throughout the life of the project, the team must establish procedures for frequency and quality of communication. Take the time to clarify all the various

meeting types that are expected or required for thoroughly executing a project. The chart below must be included, and its values must be populated to align with the project in question. Create new line items as necessary.

MEETING TYPE	PROJECT STAGE	FREQUENCY	PARTICIPANTS	LOCATION
Meeting Type 1				
Meeting Type 2				
Meeting Type 3				

In close proximity, the team must dictate which electronic communication methods will be utilized, as well as the supporting software required to execute this. The project team must ensure they have provided a system for the management of each type of unique data produced by the project. This includes any production files (models, CAD Drawings), RFIs, submittals, email correspondence, etc. The chart below must be included, and its values must be populated to align with the project in question.

FILE LOCATION	FILE STRUCTURE / NAME	FILE TYPE	PASSWORD PROTECT	FILE MAINTAINER	UPDATED
File 1					
File 2					
File 3					

As the team mandates the use of specific platforms to host different output of the project, it is paramount that these platforms are packaged with explicit instruction on how to engage with them. For example, if Newforma has been chosen to host all project correspondence, compose verbiage and helpful screenshot or diagrams to aid in the process information exchange and any other activities that are pertinent to the project at hand.

SECTION 29 GIS Standards

MNAA utilizes a robust Geographic Information System (ESRI ArcGIS). It is the intent that the BIM parameters and modeling data be created in a way to integrate into the existing GIS System.

MNAA GIS can directly read Revit file formats 2015 – 2018. BIM should not be compressed, downsized, or otherwise “dumbed-down” for GIS use. GIS is optimized to retrieve BIM data as-is and can query large models as needed. GIS Standards will be met in accordance with BIM requirements being achieved.

It is the expectation of the MNAA Development & Engineering group that data captured during design authoring, modeling, construction administration, construction activities, and closeout be coordinated with necessary stakeholder and shared in a way they can potentially be imported into the GIS program.

5.12.7 BIM PROJECT EXECUTION – DESIGN PHASE

A. BIM Expectations During Design

BIM serves an integral part in the project discovery, project design exploration and deliverable development phases of a project. These tasks, as defined by the BIM objectives, uses and goals, are not limited to only developing a Revit model, or using Navisworks for clash detection. BIM should be expanded into shared workflows and parameter (information) development to better serve MNAA.

This section not only describes what would be considered CAD standards, but it also serves as a guide to help define how teams will work together within a single project, but also from project to project. It must be understood that your project is one with a start and an end, but exists within the airport campus and is a small part of the whole facility managed by MNAA. This requires attention to details and a consistent deliverable. This also requires clean and efficient development of models to reduce re-work for MNAA or future users of the deliverables. Errors must be reduced; quality assurances must be met. Parameters must be named and sequenced correctly to plug into future uses, specifically GIS.

Finally, models and elements should be appropriate for the expected deliverables. A level of development of 400 model or element creations shouldn't be created for a simple patch and repair project scope. Conversely, projects which require heavy structural or mechanical coordination should be modeled to the appropriate LoD for 3D coordination and system exploration. All this information should be established, maintained and shared with MNAA and all design team partners for buy-in and execution.

SECTION 30 Model Accuracy AND Tolerances (Level of Development Definitions)

The BIMForum has developed a Level of Development (LoD) system which shall serve as the basis for each MNAA project, with project-specific modifications as shown in the following requirements. Regardless of LoD, the model(s) shall be capable of being presented in three dimensions, and shall be an object-based parametric database system. The LoD definitions are taken from the BIMForum.org website. The chart below must be included in the Project Execution Plan.

LEVEL OF DEVELOPMENT	FORMAL DESCRIPTION / BIMFORUM INTERPRETATION
100	*The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e. cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements.*
	LOD 100 elements are not geometric representations. Examples are information attached to other model elements or symbols showing the existence of a component but not its shape, size, or precise location. Any information derived from LOD 100 elements must be considered approximate.
200	*The Model Element is graphically represented within the Model as a generic system, object, or assembly with approximate quantities, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.*

	At this LOD elements are generic placeholders. They may be recognizable as the components they represent, or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.
300	*The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.*
	The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs. The project origin is defined and the element is located accurately with respect to the project origin.
350	*The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems. Non-graphic information may also be attached to the Model Element.*
	Parts necessary for coordination of the element with nearby or attached elements are modeled. These parts will include such items as supports and connections. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.
400	*The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. Non-graphic information may also be attached to the Model Element.*
	An LOD 400 element is modeled at sufficient detail and accuracy for fabrication of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.
500	*The Model Element is a field verified representation in terms of size, shape, location, quantity, and orientation. Non-graphic information may also be attached to the Model Elements.*
	Since LOD 500 relates to field verification and is not an indication of progression to a higher level of model element geometry or non-graphic information, this Specification does not define or illustrate it.

Refer to the document from BIMForum regarding LoD for a more in-depth description of its expectations.

SECTION 31 MODEL STRUCTURE

Take time to describe the condition of the project as it pertains to the models that make it up. Attach any supporting documents or diagrams that convey the sheet layouts across the building, the way the models are divided up, how those models are linked together, and the various nomenclatures that organize the models, sheets, views, etc. Follow the document below for MNAA-approved file naming standards:

FILE NAMES FOR MODELS SHOULD BE FORMATTED AS:		
SET NUMBER – AIRPORT CODE – LEVEL 2 DESIGNATOR - BUILDING NAME		MODEL AUTHOR
GENERAL INFO MODEL	01-BNA-GE-XXYY.RVT	*Determine responsible party*
HAZARDOUS MATERIALS MODEL	02- BNA -HE-XXYY.RVT	*Determine responsible party*
SURVEY/MAPPING MODEL	03-BNA-VE-XXYY.RVT	*Determine responsible party*

FILE NAMES FOR MODELS SHOULD BE FORMATTED AS:		
GEOTECHNICAL MODEL	04-BNA-BE-XXYY.RVT	*Determine responsible party*
CIVIL MODEL	05-BNA-CE-XXYY.RVT	*Determine responsible party*
LANDSCAPE MODEL	06-BNA-LE-XXYY.RVT	*Determine responsible party*
STRUCTURAL MODEL	07-BNA-SE-XXYY.RVT	*Determine responsible party*
ARCHITECTURAL MODEL	08-BNA-AE-XXYY.RVT	*Determine responsible party*
INTERIORS MODEL	09-BNA-IE-XXYY.RVT	*Determine responsible party*
EQUIPMENT MODEL	10-BNA-QE-XXYY.RVT	*Determine responsible party*
FIRE PROTECTION	11-BNA-FE-XXYY.RVT	*Determine responsible party*
PLUMBING MODEL	12-BNA-PE-XXYY.RVT	*Determine responsible party*
PROCESS MODEL	13-BNA-DE-XXYY.RVT	*Determine responsible party*
MECHANICAL MODEL	14-BNA-ME-XXYY.RVT	*Determine responsible party*
ELECTRICAL MODEL	15-BNA-EE-XXYY.RVT	*Determine responsible party*
TELECOMMUNICATIONS MODEL	16-BNA-TE-XXYY.RVT	*Determine responsible party*
RESOURCE MODEL	17-BNA-RE-XXYY.RVT	*Determine responsible party*
OTHER DISCIPLINES MODEL	18-BNA-XE-XXYY.RVT	*Determine responsible party*
CONTRACTOR/SHOP DRAWINGS MODEL	19-BNA-ZE-XXYY.RVT	*Determine responsible party*
OPERATIONS MODEL	20-BNA-OE-XXYY.RVT	*Determine responsible party*

The colors in the model name code to the following:

08-BNA-AE-CONCOURSE A.RVT

Set number 08 (Architectural), Airport Code BNA, Level 2 Designator Architectural Element, Building Name Concourse A

Note: Consistent use of discipline designator "E" (Model Element) is reserved for the main models. Discipline IDs and more specific breakdowns of the designators are found in the following link.

If the project is large enough to divide up the package files, ensure that the project team specifies how the package files are assigned and broken down. For example, the following chart enumerates the relevant package models that contain the documentation of each discipline. A similar chart may be required to communicate those relationships for the project at hand.

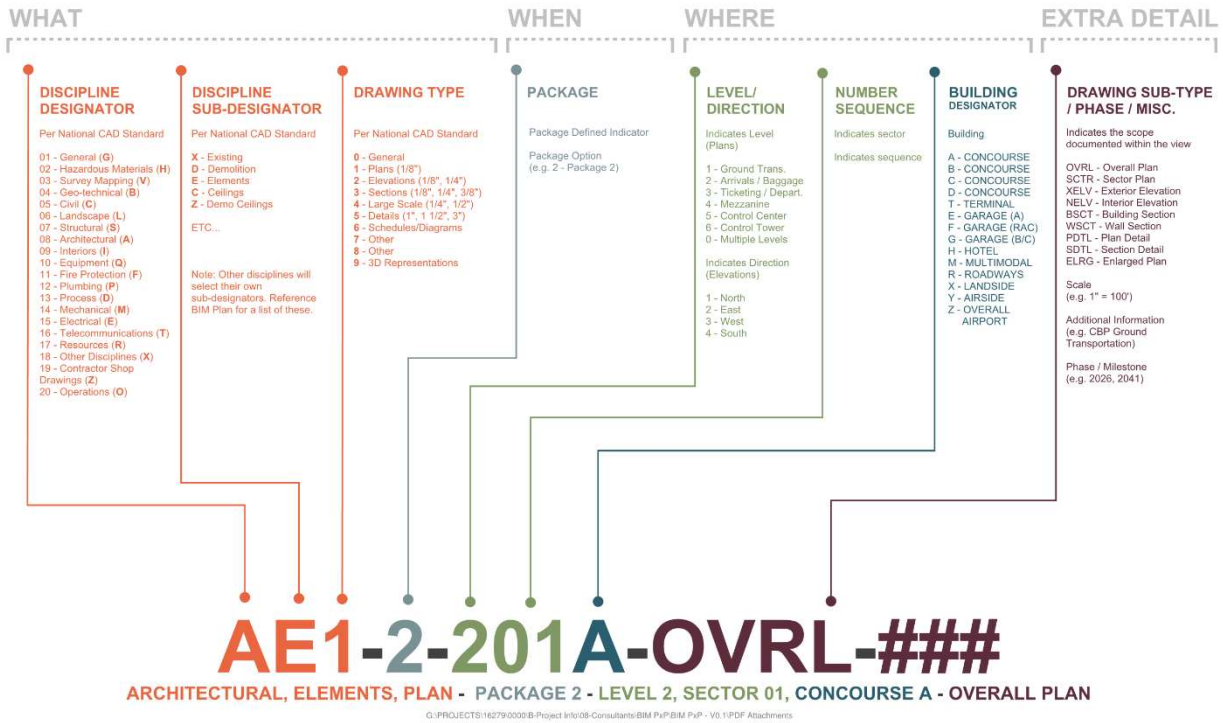
01 - General (G)

01-BNA-GE-ANNO-PKG1	*File to produce Design Documents for BNA Package 1; View set-up, Drafting & Detailing*
01-BNA-GE-ANNO-PKG2	*File to produce Design Documents for BNA Package 2; View set-up, Drafting & Detailing*
01-BNA-GE-ANNO-PKG3	*File to produce Design Documents for BNA Package 3; View set-up, Drafting & Detailing*
01-BNA-GE-ANNO-PKG4	*File to produce Design Documents for BNA Package 4; View set-up, Drafting & Detailing*
01-BNA-GE-PRESENTATION	*File to produce Design Documents; View set-up, Drafting & Detailing*

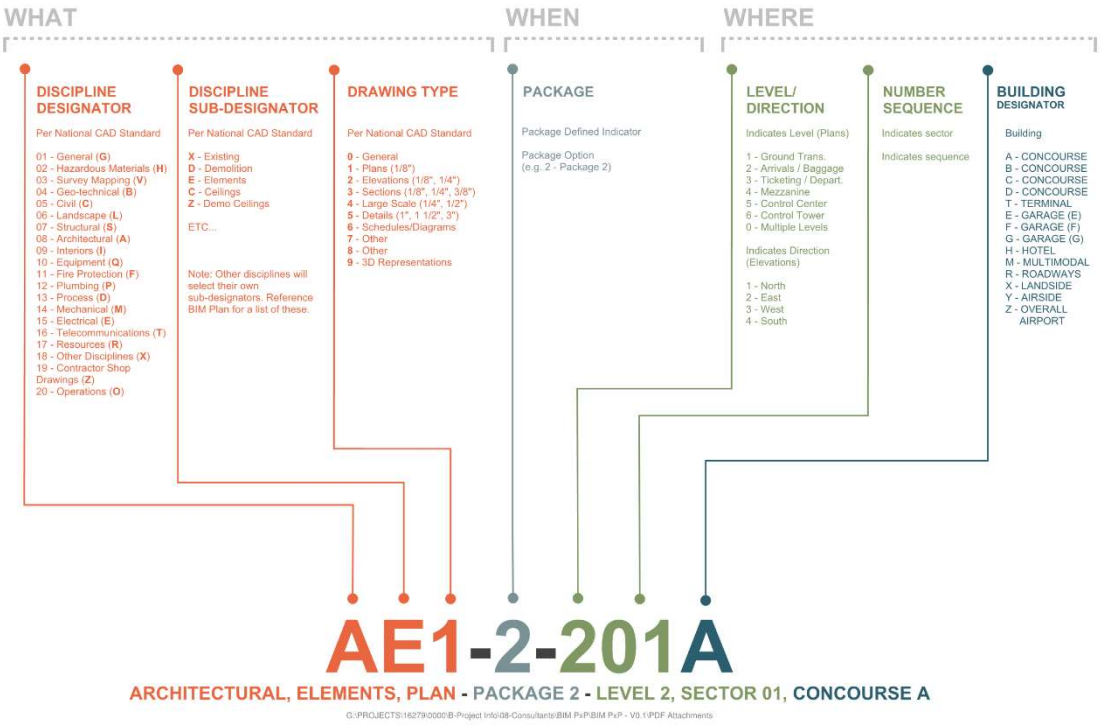
05 - Civil (C)

05-BNA-CE-CONCOURSE A	*File to produce working modeling elements for Concourse A & IAB; 3D Modeling, Design, Coordination [IAB may turn into its own file - updated as needed]*
05-BNA-CE-CONCOURSE B	*File to produce working modeling elements for Concourse B; 3D Modeling, Design, Coordination*
05-BNA-CE-CONCOURSE C	*File to produce working modeling elements for Concourse C; 3D Modeling, Design, Coordination*
05-BNA-CE-CONCOURSE D	*File to produce working modeling elements for Concourse D; 3D Modeling, Design, Coordination*
05-BNA-CE-TERMINAL	*File to produce working modeling elements for Main Terminal; 3D Modeling, Design, Coordination*

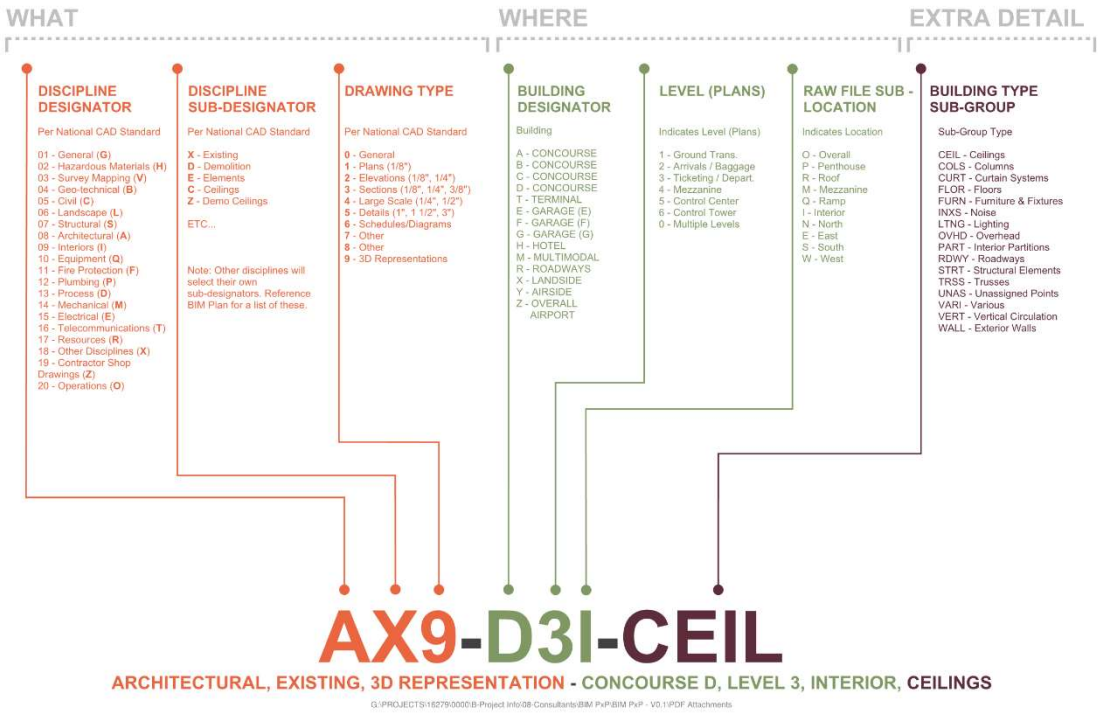
Follow the document below for MNAA-approved View Naming standards:



Follow the document below for MNAA-approved Sheet Numbering standards:



Follow the document below for MNAA-approved Point Cloud naming standards, if applicable:



For larger projects, it may also be pertinent to identify all the relevant Building Levels and their respective elevations. Let this chart also serve as a container of the common levels and their names and elevations in an effort to promote datum consistency between disciplines. Below is an example of such a chart and its potential Level name and elevation values.

07-BNA-SE-SHARED LEVELS AND GRIDS	
BUILDING NAME	
LEVEL 1	*100'-0"*
LEVEL 2	*114'-6"*
LEVEL 2 T.O.S.	*126'-6"*
LEVEL 3	*129'-0"*
LEVEL 4	*133'-6"*

The values colored blue shall indicate Building Levels that have Floor Plan views associated to them. In contrast, those that are not are intermittent levels, meant more for anchoring elements, or not pertaining to every discipline.

SECTION 32 Coordinates Systems

Primary Coordinate System: The primary coordinate system is based on MNAA Surface 88, a site-specific coordinate system for MNAA. It was derived from NAD83 with the 1996 adjustment.

Secondary Coordinate System: The secondary coordinate system is based on NAD83 with the 1996 adjustment

PRIMARY COORDINATE SYSTEMS

System	State Plane Coordinate System 1983	Tennessee 4100 Lambert Conformal Conic 2 Parallel
	Longitude of Origin:	86:00:00.0000
	Latitude of Origin:	34:20:00.0000
	Standard Parallel 1	36:25:00.0000N
	Standard Parallel 2	35:15:00.0000N
	False Easting	0 ft
	False Northing	600,000 ft
Geodetic Datum	North American 1983	
Ellipsoid	World Geodetic System 1984	
	Equatorial Radius	20925646.325 ft
	Polar Radius	20855486.595 ft
	Eccentricity	0.081819190928906
	Flattening	0.00335281068118232
	Flattening Inverse	298.257222101

SECONDARY COORDINATE SYSTEMS

System	State Plane Coordinate System 1983	Tennessee 4100 Lambert Conformal Conic 2 Parallel
	Longitude of Origin:	86:00:00.0000
	Latitude of Origin:	34:20:00.0000
	Standard Parallel 1	36:25:00.0000N
	Standard Parallel 2	35:15:00.0000N
	False Easting	0 ft
	False Northing	600,000 ft
Geodetic Datum	North American 1983	
Ellipsoid	World Geodetic System 1984	
	Equatorial Radius	20925646.325 ft
	Polar Radius	20855486.595 ft
	Eccentricity	0.081819190928906
	Flattening	0.00335281068118232
	Flattening Inverse	298.257222101

Refer to MNAA CADD Standards Manual for additional coordinate related items and data.

SECTION 33 MODEL ELEMENT PROGRESSION

Part and parcel to the LoD conversation is the discussion of a model element's development in the model over the course of the project. Depending on the category of element, there will be different expectations depending on where the model stands in the overall project timeline. The Model Progression Schedule will serve to determine at what LoD a category or subcategory of elements is expected to be during the various stages of the project, as well as which parties will be responsible for hosting said elements.

The document will be provided in Excel spreadsheet format (.xlsx), and may be taken from any number of sources, though a popular version is taken from BIMForum.org. BIMForum's Model Progression Schedule document is a four-level breakdown of each category of elements, each of which assigns a value for further describing the Uniformat and Omniclass element organization. The column headers each represent a project milestone or deliverable. Where the element category (row) meets a project milestone (column), and agreed LoD value will populate the cell. This number describes to what degree a model element will be developed at this stage of the project. See a snip of the aforementioned chart below for more context. If the team is unfamiliar with Uniformat and Omniclass organization standards, find them here:

- http://www.omniclass.org/
- http://www.uniformat.com/

SECTION 34 SHARED PARAMETER FILE

There will be a common Shared Parameter file for all organizations to use on the project. MNAA will maintain this common shared parameter file. The file will be named as follows:

MNAA Universal Shared Parameters.txt

The file will contain all the shared parameters that are to be used by all disciplines/organizations on the project. As updates are made to shared parameters, MNAA will issue a new shared parameter file and each organization will overwrite the old shared parameter file with the newly revised file. By maintaining the file names and overwriting the old file, no loss of data will occur.

In addition, all organizations will maintain their own shared parameter file as necessary. These organization specific shared parameter files are to be named as follows:

MNAA [Organization Name] Shared Parameters.txt

Each organization will be responsible for maintaining their shared parameters file. However, any shared parameters that are used by multiple organizations must be added to the Universal Shared Parameter file maintained by MNAA.

Room Numbering Standards

Level 1 – Ground Transportation / Service Level / Tunnels: 0 through 999 Series
Level 2 – Baggage Claim / Arrivals / Ramp Level Offices: 1000 Series
Level 3 – Ticketing / Departures / Concourse Level: 2000 Series numbers
(100 series for Interim IAB/FIS at end of Concourse A)
Level 4 – Mezzanine (MNAA Offices at Terminal) / Admirals Club (Concourse C) /
Mechanical Floor (Concourse D): 3000 Series
Level 5 – Penthouse (Terminal) / Mechanical (Concourse C): 4000 Series
Level 6 – Control Center (Concourse C): 5000 Series
Level 7 – Control Tower (Concourse C): 6000 Series

PREFIXES FOR TERMINAL AND CONCOURSE(S) SPACE IDENTIFIERS

T Terminal (Core Structure)
TN Terminal North (North Wing Expansions on Baggage and Ticketing – Vision Project 1)
TS Terminal South (South Wing Expansions on Baggage and Ticketing – Vision Project 1)
N North Concourses (Both A & B Concourse spaces, all levels, share the common prefix of 'N')
S South Concourses (Both C & D: All rooms on both the existing Concourse C and the new Concourse D (Vision Project 1) will have the same 'S' prefix.

SECTION 35 ELEMENT ATTRIBUTE ORGANIZATION

The design team will work with MNAA to create and deliver necessary model element databases for use by MNAA. These element attribute dictionaries (EADs) are still in development. The EADs will specify model elements and their parameters that will independently define how they will be used in the necessary BIM or CAD environment. The ultimate goal of aligning the required EADs is for use in the appropriate MNAA asset management system, be it GIS or from another department within MNAA.

The attribute organization will align with MNAA business goals for operations and maintenance. The will carry the appropriate Level of Development (LoD) at the appropriate project delivery milestone. Elements defined

herein will be aligned with industry standards for design and construction and have the ability to carry across the BIM and CAD systems utilized by MNAA.

SECTION 36 ELEMENT ATTRIBUTE DICTIONARY (The Parameters)

The EAD is under development. Utilizing a single EAD across all projects will provide consistency for MNAA during handover of digital project data in BIM and linked into the GIS system.

SECTION 37 BIM REQUIREMENTS FOR 2D INFORMATION

Though BIM is intrinsically associated to 3D data, when possible, the two-dimensional products of those data (such as element schedules) shall also be populated with information from the BIM. In other words, manual data entry has no place in the BIM when describing model attributes are rich with pre-populated information. 2D information came be found in, but is not limited to, the following:

- Door schedules
- Window schedules
- Finish annotations
- Mechanical schedules
- Plumbing schedules
- Electrical schedules

SECTION 38 QUALITY CONTROL / QUALITY ASSURANCE CHECKS

The intent of Quality Control and Quality Assurance (QA/QC) is to provide significant engagement with various MNAA user groups to ensure the optimal quality of the delivered product. This integrated approach supports the effort to develop a Quality Control plan into a reliable measure of the quality of and execution of the work in line with MNAA standards.QA/QC must adhere to the following key components:

1. Established procedures and instructions that comply with generally accepted industry standards, Federal, State, Local regulating authorities, the project specifications and standards established by MNAA
2. Identification and timely issuance to the project team of any required controls, processes, inspection equipment, fixtures, tools, materials and labor skills needed to properly execute our QC Plan
3. Updating, as necessary, of quality control, inspection, and testing techniques, including the development of new methods and procedures.
4. Clarification of the standards of acceptability as required, supporting the overall QA/AC Program and MNAA's objectives.
5. Procedures to ensure that all our quality control documentation reflects how activities are actually performed. Effective maintenance of quality records to document and track performance and improvement.

Every team must engage in Revit Model clean up processes on a regular basis. This must include, but is not limited to, various processes to minimize file size, resolving potential corruptions, and urging any extraneous data from the model.

There are also various formal checks that must be performed in order to uphold the efforts of Quantity Control and Quality Assurance. Below is a chart enumerating the minimum QA/QC checks and their descriptions. Each project must fulfill these checks regularly, as well as any additional pertinent checks with regard to the project scope at hand.

CHECKS	DEFINITION	RESPONSIBLE PARTY	SOFTWARE PROGRAM(S)	FREQUENCY
Visual Check	*Confirm there are no unintended model components and the design intent has been followed*	*All*	*Revit*	*Daily*
Model Health Assessment	*Review of Revit model to determine implementation of BIM Standards / practices. The MHA will document issues that are present within the model and provide information that can be resolved*	*All*	*Revit*	*Monthly (or as required)*
Interference Check	*Detect problems in the model where two building components are clashing including soft and hard*	*Model Manager*	*Navisworks*	*Designated Clash Detection Workshops*
Standards Check	*Confirm that the BIM and AEC CADD Standard have been followed (fonts, dimensions, line styles, levels/layers, etc)*	*Model Manager*	*Revit*	*Designated BIM Coordination Meetings*
Model Integrity Checks	*Describe the QC validation process used to confirm that the Project Facility Data set has no undefined, incorrectly defined or duplicated elements and the reporting process on non-compliant elements and corrective action plans*	*Content / View Managers*	*Revit*	*Designated BIM Coordination Meetings*

SECTION 39 BIM COLLABORATION STRATEGIES

Describe how the project team will collaborate. Include items such as communication methods, document management and transfer, and record storage, etc.

List of examples: Newforma, A360, Bluebeam Studio, 360 Glue, Email (subject line preference), etc. Collaboration between the Design-Build Team will be accomplished through multiple tools relating to the BIM process. The goal is to apply multiple tools that the Design-Build Team has at hand to create a process that is conducive to the execution of the BIM PxP. The Design Team will collaborate through the use of model production (Revit, Navisworks, SketchUp), file transfers (Autodesk A360 / BIM 360 Team), documentation (Bluebeam Revu) and communication (Outlook, OneNote, Lync / Skype for Business, GoTo Meeting). The Design-Build Team will follow scheduled file transfers and meetings to ensure that each member of the team is current on project documents / files.

SECTION 40 BIM COLLABORATION TOOLS

Collaboration between the Design-Build Team will be accomplished through multiple tools relating to the BIM process. The primary goals are to apply multiple tools that the Design Team has at hand to create a process that is conducive to the execution of the BIM PxP, as well as optimize said collaboration procedures in an effort to thoroughly utilize BIM. The Design Team will collaborate through the use of model production, file transfers, documentation and team communication. The Design Team will follow the specified schedule of file transfers and meetings to ensure that each member of the team is current on project documents and files.

The chart below must be included, and its values populated to align with the project in question.

BIM USE	DISCIPLINE (if applicable)	SOFTWARE	VERSION

In some cases, there may be more than one software allotted to a BIM Use. For example, Civil engineers might use Autodesk AutoCAD Civil 3d, while the rest of the Design-Builder team uses Autodesk Revit for production. Upon new software releases, MNAA and Design-Build Team will implement the required upgrade plan. It's also worth noting the preferred format when providing content and reference material within collaboration tools. Let the chart below serve as an example of this concept.

BIM USE	DISCIPLINE (if applicable)	MODELING CONTENT / REFERENCE INFORMATION	VERSION
Design Authoring	*Arch*	*Revit Families*	*Version 2017.1*
Estimating	*Contractor*	*Proprietary database*	*Version X.X (YEAR)*

SECTION 41 USE OF INTERACTIVE WORKSPACES

The project team should consider the physical environment it will need throughout the lifecycle of the project to accommodate the necessary collaboration, communication, and reviews that will improve the BIM Plan decision making process. Describe how the project team will be located. Consider questions like "will the team be collocated?" If so, where is the location and what will be in that space? Will there be a BIM Trailer? If yes, where will it be located and what will be in the space such as computers, projectors, tables, table configuration? Include any additional information necessary information about workspaces on the project.

SECTION 42 REQUIRED DELIVERABLE FORMATS

MNAA requires that every deliverable be provided in various formats, depending on the quality of the deliverable, and the current stage of the project. Include the chart below, and populate its values to align with the project in question.

BIM SUBMITTAL ITEM	STAGE	Approximate Due Date	FORMAT	NOTES
Deliverable 1				
Deliverable 2				
Deliverable 3				

All Drawing Sets must be submitted in Portable Document Format (PDF). All Record Models must be submitted in Revit Project File format (RVT). All Progress Backgrounds must be submitted in Owner approved format.

SECTION 43 PUBLISHING OF BIM DATA

Certain protocol must be followed when publishing or uploading BNA BIM content to an external server. For example, if a project is hosted to the Autodesk BIM 360 server for the purpose of conducting production in the cloud, the team must decide what the various tasks associated to upload might be. Some measures include creating a new model separate from the Central model, purging unnecessary modeling elements / information, removing any Revit or CAD links, compacting the file, etc. An Autodesk-authored Revit add-in, eTransmit, is available for downloading that will streamline this process.

In order to preserve model fidelity over the course of the project, model maintenance prior to interdisciplinary information exchange should be at the forefront of the conversation.

The model will likely need to be frequently published for a number of different uses of the course of a project. Progress uploads of the model file will be required by all members of the Design-Builder team in order to provide the latest backgrounds at all times. Schedules from the models may need to be exported for cost estimation or material takeoffs. If the Design-Build team is utilizing BIM 360 to conduct their model production, the model will regularly need to be published to the BIM 360 Team website for consultants to use. Generally, the publishing expectations relies heavily on the chosen model hosting platform and how integrated the Design-Build team will be.

In any case, published data must be cleaned – not just as a courtesy, but also to optimize efficiency of software when linking shared data. Add-ins such as eTransmit (by Autodesk), can run various purges and deletions that provide recipients of model data with exactly what they need to execute production, without bloat or extraneous information.

If exporting CAD data for the purpose of sharing, it's critical the files be run through a gamut of cleanup functions, such as AUDIT, PURGE, OVERKILL, and in some cases, FLATTEN. Additionally, there will be no data isolated a great distance from the CAD building (no boneyards). If this condition is produced and linked into BIMs, it will undoubtedly lead to issues.

SECTION 44 SECURITY SENSITIVE INFORMATION (SSI)

All consultants and trade partners must take care of any data provided to and/or by MNAA for their use or the use of the consultants and trade partners. All data must be appropriately handled and distributed to comply with CFR Parts 15 and 1520 pertaining to Security Sensitive Information (SSI).

The Design-Builder team or data providers shall develop a data management process to ensure secure transfer of SSI as determined by MNAA. These deliverables shall include a transmittal, chain-of-custody documentation, and delivery handling receipt.

All SSI will be created in a standalone model and referenced where required.

5.12.8 BIM PROJECT EXECUTION – DESIGN PHASE

A. BIM EXPECTATIONS DURING CONSTRUCTION PHASE

As determined in the Design-Build authoring phase of a project, BIM can be utilized to better manage construction methods and review tasks. It is the expectation of MNAA that BIM-centric workflows be applied to cost-estimating, coordinate clash detection of elements prior to installation, virtual construction tasks, ongoing construction status, and other determined construction activities. The BIM uses defined above shall be the baseline for BIM during construction and will be further defined in this section.

SECTION 45 BIM COLLABORATION STRATEGIES

On a regular basis during construction, and as determined my time, cost, and scope of the project, with direction from MNAA, a BIM coordination meeting will be scheduled to discuss these workflows. This meeting, or series of meetings, will occur following the Issue for Construction set of documents. These meetings can be scheduled on their own or in conjunction with other OAC related activities.

At the center of the collaboration proceedings will be a Revit or Navisworks related model for review of Design-Builder intent coordinated with scheduled construction activities. Other digital means will be utilized and determined by the Design-Builder or contractor, which will include, but not limited to, project management software, information exchange, digital data sharing procedures and ability to view tasks in the field. The Design-Build team will present these strategies to MNAA for approval.

SECTION 46 BIM COLLABORATION TOOLS

The project team must specify the tools they will be using to execute construction of the project. This may be done by enumerating all the software required per prescribed BIM Use. The chart below must be included, and its values populated to align with the project in question.

BIM USE	DISCIPLINE (if applicable)	SOFTWARE	VERSION

SECTION 47 PUBLISHING OF BIM DATA

The Design-Build team will establish publishing requirements for information in formats that MNAA can use. This will be determined on a project by project case. Further development of this section will be provided.

5.12.9 BIM PROJECT EXECUTION – POST CONSTRUCTION

This section contingent on conversations with ESRI, MNAA and other GIS parties. More system information is required to complete this section.

A. Required Deliverable Formats

This section under development

SECTION 48 Publishing of BIM Data

This section under development

SECTION 49 Maintenance Workflows

This section under development

SECTION 50 Business Development Workflows

This section under development

5.12.10 BIM PROJECT EXECUTION – POST CONSTRUCTION

Other Links for referencing and review

State of TN:

https://www.tn.gov/osa/article/osa-bim-standards

BIMGuide:

https://www.tn.gov/assets/entities/osa/attachments/BIM_Standards_20150729.pdf

NASA:

https://fred.hq.nasa.gov/jxstaff_design.html

BIM Guide:

https://fred.hq.nasa.gov/Assets/Docs/2017/NASA_BIM_Scope_Services_Requirements_Revised_2017_TAGGED.pdf

WBDG:

https://www.wbdg.org/ffc/va/bim-standards

AIA:

https://network.aia.org/technologyinarchitecturalpractice/home/bimstandards

GSA BIM Guides:

https://www.gsa.gov/real-estate/design-construction/3d4d-building-information-modeling/bim-guides

5.12.11 GLOSSARY

1. As-Built BIMs: Multiple Construction BIMs, delivered by the Contractor, and reviewed by the Designer, organized by building system and floor and registered spatially, that represent the final as-constructed building and components.
2. As-Built Drawings: In the BIM context, As-Built Drawings are extracted from the coordinated construction BIMs. These replace drawings that are prepared by the contractor and show, in red ink, on-site changes to the original construction documents, as described by the AIA Knowledge Resources Team
3. BIM: Building Information Model(ing). The 3D representation of the project that is the basis for the more advanced analyses and processes encompassed by Virtual Design and Construction.
4. VDC: Virtual Design and Construction. Management of integrated multi-disciplinary models for design and construction projects.
5. Trade Partners: Organizations contracted by the general contractor to provide design assist and/or construction services for the project.
6. Level of Development (LoD): A definition of the content and scope of work included in the model, as outlined in the Model Progression Specification (MPS) and the Content Plan.
7. Model Element Author (MEA): The party responsible for modeling the scope of work indicated in the Model Progression Specification (MPS).
8. Model Progression Specification (MPS): A plan developed to outline the modeling requirements and deliverables at each phase of the project. The MPS is organized by the UniFormat assembly and shows the LoD progression and MEA across the project design and construction phases.
9. Model Files: Model files are drawn at full scale. A model file contains the actual proposed work to be performed for the project. This includes design information such as roads, utilities, runways, building components such as columns, walls, windows, ductwork, piping, plans, elevations, sections, etc.
10. Content Plan: A detailed document outlining the elements to be modeled, organized by UniFormat assembly and containing the identifying characteristics, the Level of Development (LoD) and the responsible party or Model Element Author (MEA).
11. Location Breakdown Structure (LBS): A description of how the project is divided for scheduling and quantity extraction (e.g. floors, areas)
12. Work Breakdown Structure (WBS): The organizational schema for dividing the project for cost estimating purposes.
13. Design Model Manager (DMM): The person with lead responsibility for the BIM aspects of the project during the design phase.
14. Record Drawings: As it relates to BIM, Drawings prepared by the Design-Build Team to reflect on-site changes noted in the As-Built drawings. They are often compiled as a set of on-site changes made for the owner.
15. Construction Model Manager (CMM): The general contractor staff person with lead responsibility for delivery of the BIM aspects of the project throughout the project duration.
16. 3D: Model with 3D geometry used for drawing production, coordination, fabrication and visualization

17. 4D: Model + time used for phasing studies and the construction simulation
18. 5D: Model + cost used for model-based estimating

5.12.12 SIGNATURE PAGE

My signature below, I hereby affirm and agree to the matters set forth above.

Contractor:	Owner:
_____	_____
Print Name	Print Name (MNAA)
_____	_____
Signature	Signature (MNAA)
_____	_____
Title	Title (MNAA)
_____	MNAA Representative Metropolitan Nashville Airport Authority
Company	

5.12.13 APPENDIX & ATTACHMENTS

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