Duplin County
AirPark Development Ordinance

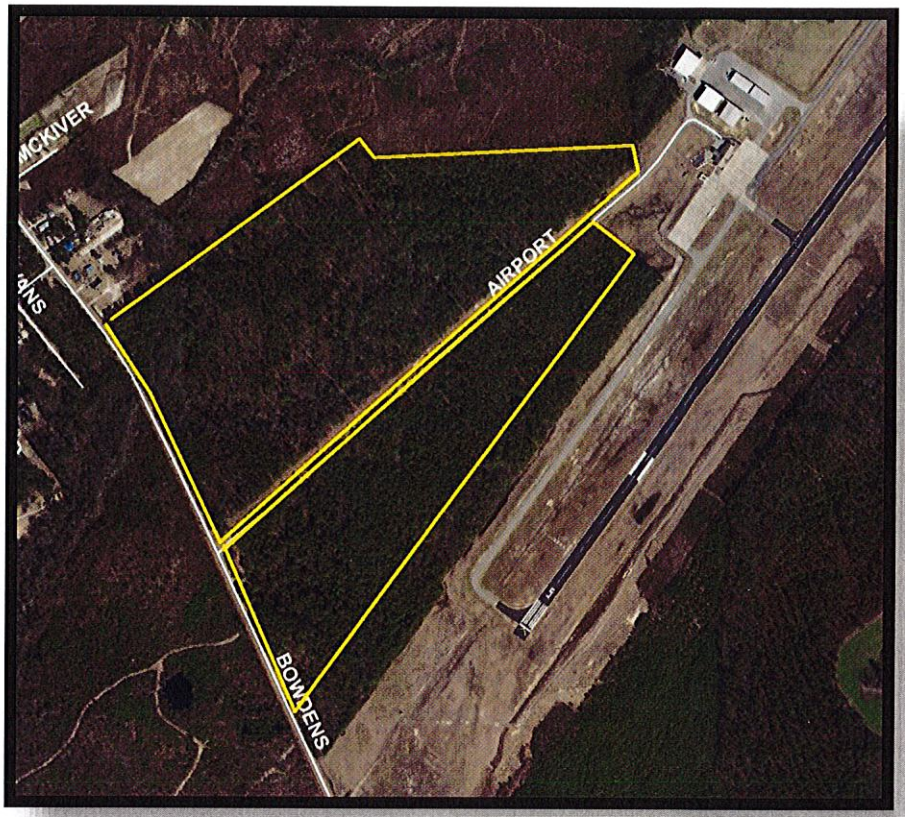
Adopted by

Duplin County Board of Commissioners

Duplin County Airport Commission

Duplin County Planning Board

Duplin County Economic Development Commission



Prepared by

George Futrelle, Airport Director

Elizabeth Stalls, Planning Director

James Wolfe, Economic Development Director

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Executive Summary

Objective

The Duplin County Airport Commission, Economic Development Commission, and Planning Board initiated the AirPark Development Ordinance with the objective of identifying potential uses, design, and development objectives of the AirPark, Duplin County's Business and Industry Center. Emphasis is placed on developing a detailed plan for development covenants to create a defined character and identify of the business park, with functional and accessible uses for industrial, research, office, and commercial companies.

Purpose

The AirPark Development Ordinance was constructed with the purpose of aligning the uses of the AirPark with the County's objectives to develop a business and industry center in close proximity to the airport for expedited transportation potential. The AirPark Development Ordinance will guide planning, public investment, and economic development in the AirPark by giving structure to a vision for the ultimate development of the property and building types that are desired both locally and by those primary and future targeted industries.

Site History

The AirPark, as depicted on the AirPark Planning Concept Layout (see Appendix A), was studied and reviewed in the early 2000s for its potential as a future commercial and business park development. Duplin County and the Airport collectively own approximately 123 acres along Airport Road, with 110 acres being suitable for development. The "Airside" portion of the AirPark is located on the southeast side of Airport Road, and is adjacent to the south parallel taxiway. The "Landside" portion of the AirPark is located on the northwest side of Airport Road. Approximately 35 acres of the AirPark is located on the airside and approximately 75 acres is located on the landside.

A study by W.K. Dickson & Co., Inc. was conducted in 2008 on the AirPark location to ascertain more information about the best utilization of the property, environmental assessments, and to analyze the opportunities for development. The 35 acres airside is included in the Airport's land for future terminal development and reserved for development related to air industry only. The landside section of the AirPark is available for any kind of commercial development permitted under this ordinance, including those unrelated to air industry.

Utilities

Electricity
Tri-County Electric Membership Corporation provides 3-phase 12 ½ Kilovolt distribution line through the site.

Water
The Duplin County Water Department indicates that there is six-inch line running along Airport Road.

Communications
Fiber optic cable is available, and can be purchased from the utility provider, CenturyLink.

Natural Gas

Piedmont Natural Gas provides an eight inch 550 psi gas line that is located 3 ½ miles from the AirPark site.

Wastewater

Wastewater service is available is provided along Airport Road by the City of Kenansville.

Highway Access

Bowdens Road is the rural major collector road traveling adjacent to Airport Road. Developers can coordinate with the NC Department of Transportation for traffic concerns, with the potential for a deceleration lane or turning lanes to address increased traffic load entering the site.

ARTICLE 1: AIRPARK REVIEW COMMITTEE & BOARD

I. AIRPARK REVIEW COMMITTEE

The AirPark Review Committee members are:

- Duplin County Airport Director
- Duplin County Economic Development Director
- Duplin County Planning Director

The AirPark Review Committee shall have the authority to grant AirPark permits as defined in Article 3, Sections I and II of this Ordinance that meet the requirements set therein. The AirPark Review Committee was created under the direction of the Airport Commission, Economic Development Commission, Planning Board, and the Board of County Commissioners. The AirPark Review Committee members are employees of Duplin County serving an administrative role. The AirPark Review Committee facilitates the administrative review of AirPark applications and site plans, and issues site plan permits for AirPark development. A Design Review Checklist (see Appendix B) has been developed by the AirPark Review Committee as a guide for prospective developers to reference during site plan development.

II. AIRPARK REVIEW BOARD

The AirPark Review Board members are:

- Duplin County Economic Development Commission Chairman
- Duplin County Planning Board Chairman
- Duplin County Airport Commission Chairman

The AirPark Review Board shall have the authority to hear requests for variance as defined in Article 3, Section VI of this Ordinance that meet the requirements set therein.

III. ENFORCEMENT OFFICER

The Enforcement Officer is the:

- Duplin County Planning Director

The Enforcement Officer is appointed by the AirPark Review Board and shall carry out the duties delegated to the Enforcement Officer under Articles 3 and 4 of this Ordinance.

ARTICLE 2: AIRPARK DEVELOPMENT COVENANTS

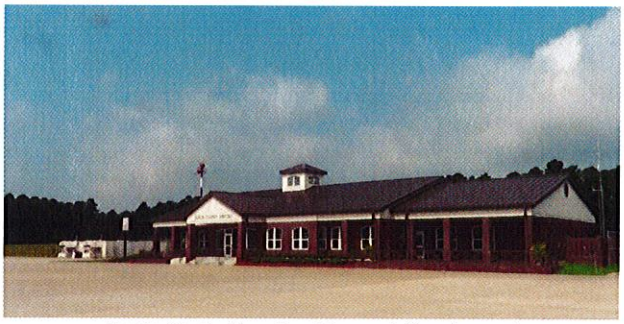
The Covenants herein established are subject to review and compliance with all Duplin County Ordinances and Federal and State Regulations. (i.e. Duplin County Airport Land Use and Height Restriction Ordinance, FAA Safety Bulletins, etc.)

General Design Concept

The overall design concept for the AirPark—Duplin County Business and Industrial Center, hereinafter referred to collectively as "AirPark", is to create a strong sense of project identity and character throughout the business park, conveying an attractive, functional, well-planned, and accessible employment center supporting a wide variety of high-quality industrial, research, office and commercial land uses. The design and development standard for the Duplin County Industrial AirPark is organized in the following categories:

I. **Site Planning and Design Standards**
II. **Building Design Standards**
III. **Landscape Design Style and Standards**
IV. **Signage Standards**
V. **Parking Standards**

All of these standards combined are intended to provide guidance for high quality, attractive, and functional commercial land uses in the AirPark.



Duplin County Airport and Economic Development

I. SITE PLANNING and DESIGN STANDARDS

The site planning for the AirPark is intended to provide direction for the layout of each parcel within the business park area, and they are intended to ensure site designs that are efficient, convenient and safe for pedestrian and circulation access, and provide attractive frontages, landscaping, and external areas. Effective site planning techniques will establish a strong outline and framework for guiding future individual development projects, and create a unique high quality business park. The successful integration of effective site planning techniques, with the basic design elements on individual projects, will enhance the visual experience in the business area, and promote a true sense of place.

1. Airside development is included in the Airport's land for future terminal development and is reserved for development related to air industry only.

2. Landside development is available for any kind of commercial development permitted under this ordinance, including those unrelated to air industry.

Site and design plans are reviewed by the AirPark Review Committee and may be subject to review by architectural and engineering consultants. Every attempt will be made to reply to planning and design submissions within 30 to 60 calendar days.

A. Service Areas

Functional service areas are critical to industrial buildings that have frequent truck traffic and research facilities that receive and/or distribute chemicals, gas tanks and other controlled materials. Service areas include delivery and loading zones, trash disposal areas and spaces that hold transformers.

Each building must have an adequate and appropriate amount of space dedicated to these services that are easy for their users to access. Service areas shall be designed to shield the public from potential unsightly, noisy, and noxious environments.

1. Delivery and Loading Areas

i. There shall be at least 85 feet from the edge of all loading docks to the far edge of the maneuvering area. Preferred spacing for extended trailers and larger docking areas may be up to 130 feet.

ii. Service areas and delivery areas (such as loading docks and storage areas) shall be located away from the street and screened from the street view. Appropriate screening methods include recesses, walls, trellises, landscaping, or some combination of these elements.

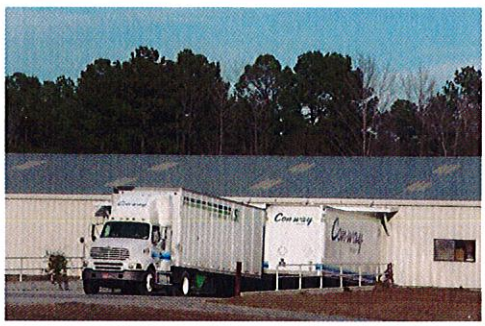
iii. Loading zones shall be clearly signed and articulated

iv. Utility equipment shall be screened with plantings, berms, or an enclosure.

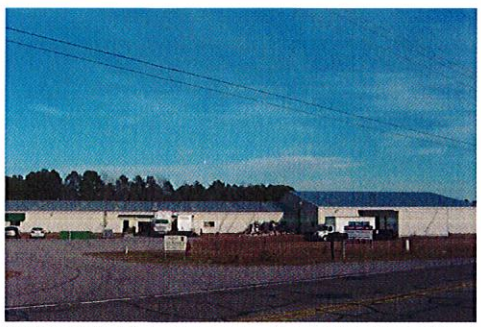
v. Loading space, exclusive of driveways, shall be provided in addition to required parking spaces.

vi. Every building or structure in the AirPark used for commercial or industrial uses shall provide truck loading and unloading space.

vii. Loading bays shall be adequately sized and spaced for the uses that they are intended to serve. Examples of adequate dimensions of loading bays are 52' x 52' for smaller facilities and 60' x 52' for larger facilities.



Service Loading/unloading area – Design Workshop Warsaw



Service Loading/unloading area – Design Workshop Warsaw

2. **Trash Enclosures and Transformers:**

i. Outdoor trash areas shall be visually screened by a minimum 6-foot high, noncombustible enclosure constructed of the same materials and finishes as the adjacent building or fencing with solid panels. The same screening materials can be used for both service and delivery areas.

ii. Trash enclosures shall be designed and located so as not to be highly visible from adjacent streets and property.

iii. Transformers and emergency generators, where required, shall be screened by walls, fences with solid panels, enclosures, or dense landscaping.

iv. Aboveground transformers and trash enclosures shall not be permitted within the front building setback. Transformers located in the front setback shall be underground.

v. Aboveground switching devices, installed as part of the backbone utility system, shall be screened from view from adjacent streets and shall not be permitted in the front setback.

B. Setbacks

Building setback indicate the distance between the outer edge of the building façade and the property line, and the edge of the public right-of-way. Standard setback regulations ensure a visually consistent corridor and establish development character. These regulations also contribute to a pedestrian-friendly environment by de-emphasizing large-scale buildings and reinforcing sidewalk edges with consistent landscaping and appropriate screening.

i. Front Setback – 50 feet minimum from edge of pavement

ii. Side Setback – 20 feet minimum from edge of pavement for corner lots, property line for interior lots

iii. Rear Setback – 20 feet minimum from property line

C. Site Utilities

Aboveground utility poles can be visually obstructive and detract from the landscaping and design elements on the site. The intent of these standards is to restrict the use of above ground utilities to the duration of the construction process.

i. All new utilities shall be installed and maintained underground.

ii. Utilities shall be designed and installed to minimize disruption of off-site activity during construction.

iii. Temporary overhead power and telephone facilities shall be permitted only during construction.

II. BUILDING DESIGN STANDARDS

Buildings within the AirPark should be attractive and high quality, providing a comfortable environment for employees and visitors. The AirPark design concept encourages an underlying compatibility among the various buildings and building types, using harmonious materials, finishes, and colors while promoting individual expression and identity.

The AirPark will be an image of quality buildings with clean lines constructed of glass, architectural metal, manufactured or natural stone, brick, and precast concrete as preferred materials. Other materials will be reviewed on an individual basis with respect to the architectural quality.

One of the main problems in business parks with industrial uses is the difference in use, scale and construction of the office portion and the plant portion of an industrial building or buildings. Scale and massing of the buildings will vary depending on the size of the lot and the building use. Both office portions and industrial plants should be unified by the architectural treatment. Where this is not possible, the office portion should be designed as an architectural focal point with a neutral background for industrial plant architecture.

The following design standards comprise the minimum architectural standards for buildings within the AirPark.

A. AirPark Airside

Innovative design and the use of higher quality materials is highly encouraged. Buildings and hangars constructed on the airside must meet the standards and specifications set forth in the Minimum Requirements for Construction of Pre-Engineered Corporate Hangars and T-Hangars at the Duplin County Airport (see Appendix C); however, it is also encouraged that buildings constructed on the landside of the AirPark align with the same standards, if possible.

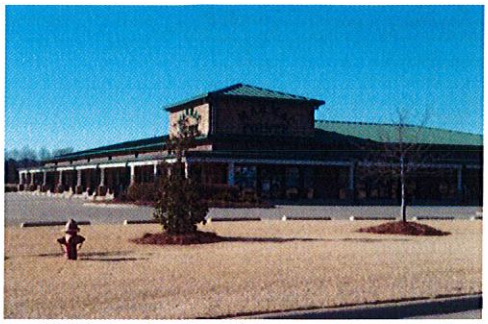
B. Building Orientation

Building orientation standards are intended to ensure that buildings will be located on a site in a manner that is welcoming for employees and visitors, with entrances clearly delineated.

i. Building entries, public areas, administration areas, and other window areas should be oriented towards adjacent streets when possible.

ii. Relationships to adjacent buildings shall be considered concurrent with individual project layout. Projects shall be "off-set" to minimize views directly into opposing buildings when buildings are fewer than 80 feet apart.

Duplin Professional Court – Warsaw



Mar Mac Pointe – Goldsboro

C. Building Height

Establishing a maximum building height helps to ensure that the buildings within the AirPark and are appropriately sized and scaled, and adequate to serve the proposed industrial and office uses.

i. Maximum building heights shall be 60 feet, except for lots on the airside, which shall be 50 feet. Should the applicant desire to build a taller building, they may do so by using the following formula: for every foot you go up in height, you must set the building back two more feet than what is normally required.

D. Building Entries

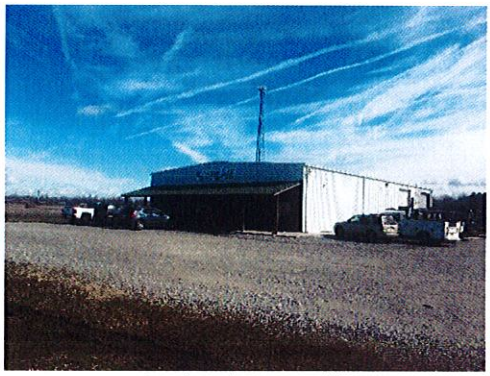
The following standards help to ensure that building entries are clearly defined and accessible, in order to create a welcoming, comfortable environment for employees of and visitors to uses within AirPark.

i. The primary building entry shall face the street, and shall be clearly defined with special massing, lighting, architectural detail and/or landscape treatment to make it stand apart from the rest of the building.

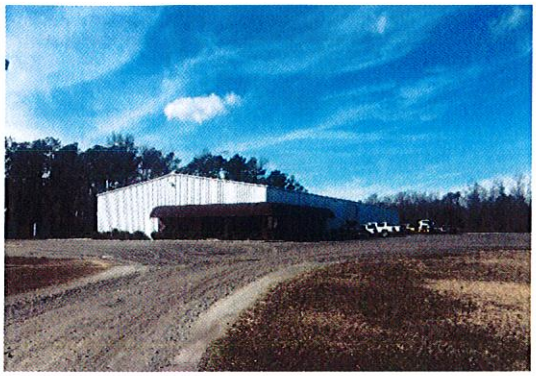
ii. Building entries shall be obvious. The primary building entry shall be clearly defined for pedestrians, with an enhanced hardscaped entryway for each building. Front doors shall be substantial in appearance.

iii. Secondary entrances may be oriented toward parking areas.

iv. The use of architectural features, such as porticos, canopies, or arcades, special roof treatments and/or landscape treatments such as entry plazas or courtyards can create an easily identifiable entry, and shall be required.



Benchmark – Kenansville



Dail Farms – Kenansville

E. Articulation of Building Façades

Building façade standards are intended to help create varied and visually interesting buildings.

i. Façades shall be continuous on buildings with both office and industrial uses.

ii. Large flat unarticulated building elevations shall not be permitted.

iii. The building design shall be articulated with either a change in materials, color and finishes, fenestration pattern and size, façade plane/vertical plane, a special building entrance, and/or arcade.

iv. Architectural details and multiple color schemes help break up the long façades of industrial buildings and make them more aesthetically interesting.

v. Building façades shall be articulated with a combination of windows, entries, and bays.

vi. Building façades shall incorporate recesses and projections, entry elements and layering of wall planes to create visual interest.

F. Articulation of Building Massing

Industrial/Office buildings are often very large, and can be difficult to relate to a pedestrian scale. The following standards are intended to help guide the development of buildings in AirPark to ensure they are visually appealing and interesting, even at a large scale.

i. Buildings should be well articulated by changes in roof heights and vertical planes to reduce the appearance of bulk, and create interesting building façades.

ii. Changes in building massing such as second story areas and/or vaulted areas establish a rich composition and shall be enhanced and articulated on the building façade.

iii. "Terraced" building designs with second story areas set back from the street are strongly encouraged, and help to create a more pedestrian-friendly streetscape.

G. Energy Conservation Techniques

Energy conservation techniques for building design are strongly encouraged. Effective techniques to conserve power and water consumption can reduce utility operating costs and can be achieved through a variety of design techniques. Following are standards that may be incorporated into the design of a building design for energy conservation.

i. Computerized controls to monitor temperatures in tenant spaces and adjust heating and cooling should be considered.

ii. Lighting controls that monitor and adjust lights needed for working, security, or aesthetics are strongly encouraged.

iii. Specification of Energy Star and appliance, light and equipment is desirable.

iv. Specifications of low-flow plumbing fixtures are strongly encouraged.

v. Encourage the construction of narrower floor plates that allow more windows or install skylights to reduce the need for artificial lighting. This improves the quality of the work environment, reduces energy use and adds interest to exterior façades.

vi. The use of low-emissive double glazed windows is recommended.

vii. Effective insulation should be installed for walls and roofs.

viii. Radiant heating systems should be installed in spaces with large roll-up or sliding doors in lieu of or in addition to forced air heat as appropriate.

H. Building Materials

The use of high quality materials is essential to creating a high quality employment center, where buildings will have long-lasting value and appeal.

High quality building materials and quality construction shall be used for all buildings, and a variety in building materials is encouraged. Primary building materials constitute the majority of the building's exterior and provide the greatest visual impact.

i. Acceptable primary building materials shall consist of high-quality industrial building materials and may include, but are not limited to architectural concrete (finished surface, exposed aggregate, or sand blasted), natural stone, architectural steel, and masonry (brick, terra cotta, tile, glass block). Building materials may be a combination of the permitted materials as long as the combination holds to a clearly articulated architectural design strategy.

ii. The use of prefabricated metal, such as roll formed metal siding or corrugated metal, shall be permitted. It is recommended that some alternative material be used for the façade. This does not preclude the use of metal detail as part of architecturally designed buildings, such as "Cor-Ten" steel, aluminum, or other high quality metals needed to complete an architectural design.

iii. Glazing shall be tinted with high-performance materials and glazing colors, and transparency and reflectiveness shall be limited to green, blue, light gray, clear, or other lightly tinted shades.

iv. Reflective or darkly tinted glass shall not be allowed.

v. Roof materials shall complement the materials and colors of façades, and provide texture or relief.

vi. Use of recycled, local and/or rapidly renewable materials is encouraged.

Jet Techs – Duplin County Airport

House of Raeford – Duplin County Airport

I. Architectural Detailing

Architectural details help to provide visual interest, and inclusion of detailing will help to create a cohesive design element throughout the AirPark, and reinforce the AirPark as a high quality employment center. The following standards can be applied to all building elements, including entries, façades, and roofs.

i. Architectural details shall have a consistent style that creates a unified design across the building. For example, window details shall be consistent with door and canopy details.

ii. The use of industrial materials and accent features is required to animate building façades and entries. These features shall include window canopies, trellises, structural pilasters or columns, window mullions and mechanical screens.

iii. Architectural and water features are encouraged in site and building design to enhance and strengthen development character. Water features may range in size but may include larger water areas that can be used for recreation for employees, or smaller water areas, such as fountains, which can promote corporate identity.

iv. Sculptural elements in public spaces are strongly encouraged.

J. Site and Building Lighting

Lighting in the AirPark serves several purposes: to create a safe and secure environment, and as decorative elements to help reinforce the character of the area, and the appearance of the buildings. Lighting within a development should be consistent and uniform, using recommended lighting standards.

i. Lights shall be designed and placed to direct lighting to appropriate surfaces and minimize glare into adjacent areas.

ii. Lighting shall be used to provide illumination for security and safety or parking, loading, and access areas.

iii. All lighting shall be shielded (full cut off) to keep light spread within the site boundaries.

iv. Pole light fixtures shall not exceed 30 feet in height.

v. Security light fixtures shall not project above the fascia or roofline of the building.

vi. Exterior building lighting shall be used to reinforce the architectural design. Emphasis shall be placed on entries, landscaping elements, major architectural features, etc. The use of up lighting to accent interesting architectural features or landscaping is encouraged. Luminaries used for up lighting are encouraged to be low spotlights to reduce glare and light pollution.

vii. Lighting shall be directed toward the building and not towards adjacent properties.

viii. Light standards ranging from 12' – 16' in height are recommended throughout a project area and shall illuminate all sidewalks and connecting walkways.

ix. Placement of light standards and trees shall not conflict with one another. Light standards shall not rise above tree canopies such that the trees keep occupied spaces in shadow from the lighting.

Interior Lighting – House of Raeford, Duplin County Airport

Exterior Lighting – Duplin Tech Center

K. Building Utilities

Rooftop and ground mounted mechanical equipment and trash storage areas shall be screened from view as much as possible from adjoining properties, and public rights-of-way to shield the public from unsightly, noisy, and noxious environments.

i. All rooftop equipment or devices including vents, louvers, hoods, and mechanical equipment shall be painted to match the building color.

ii. Any device for transmission or reception of communication signals shall be screened with compatible material and finishes as utilized in the building.

iii. Roof-mounted equipment shall not be mounted on any exterior building elevation. Rooftop devices may extend above the building's highest architectural element but no such equipment shall be visible from the public right of way.

iv. Any screening device shall be constructed of the same materials as the supporting building or closely matching materials; the screen shall blend in with the rest of the building.

v. HVAC air intakes shall be located as far as possible and upwind from loading docks and other vehicular access points.

III. LANDSCAPE DESIGN STYLE and STANDARDS

The quality of site landscaping is a major consideration in a quality business park. Landscape plans should be related to and coordinated with those proposed on adjacent parcels. The landscaping shall be appropriate for industrial and office uses, and should help to provide an attractive, welcoming, and pedestrian friendly environment that is pleasant for the AirPark employees and visitors to the area.

The landscape standards for AirPark are intended to provide a uniform character and identity to the AirPark, and help establish a "sense of place" with both functional and aesthetic considerations.

The preferred approach is to group trees and shrubs to frame the front face of the building and to use landscaping and/or berming to screen parking areas. Consideration should be given to the angled sight lines from the street. Site grading should complement the landscaping. Foundation planting which complements and focuses attention to the office portion of the building is encouraged.

A. Landscape Standards

i. Perimeter setback areas shall be landscaped with a consistent pattern of trees and shrubs to function as framing elements for each development area. Shrubs shall be a maximum of three feet high within 25 feet of driveways for safe visibility.

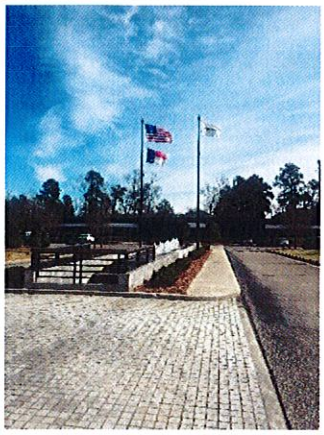
ii. Front and side setbacks shall be landscaped.

iii. Landscape lighting, with no visible light source, is encouraged to accent focal elements of building sites. An example would be up lighting for signs and trees located at a primary driveway entry. Low angle spotlights are encouraged for reduction of glare and light pollution.

iv. Design of curbs to allow passage of storm water into planted areas at islands and along the lot edges is encouraged. This strategy shall include appropriate design of islands and edge plantings to manage storm water flows.

v. Planting around building perimeters are recommended to be colorful and highly accented. It is suggested that trees shrubs have either colorful foliage or flowering characteristics, except where restrictive areas require more vertical species. More intense plantings of colored ground

cover and shrubs should be utilized to accent major architectural features of the building, such as entries.



Front Entrance to Smithfield – Warsaw

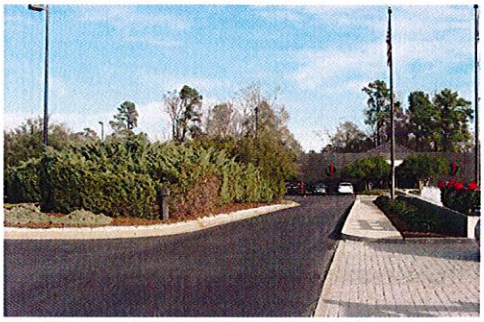
Front Entrance to Dail Farms – Kenansville

B. General Planting Standards

The following general planting standards will help ensure a healthy, attractive, and sustainable landscape for new office and industrial development in the AirPark.

i. Native and drought-tolerant plant materials are strongly encouraged. Where recycled water is or will be available, use plants tolerant of the water source. Turf lawns are encouraged only at areas designated for human access, such as a round picnic tables or benches.

ii. Mulched planting beds are encouraged as a replacement for turf areas. Acceptable organic shredded mulches and bark chips, wood grinding (from non-infected wood sources), synthetic mulch, leaf mulch, or stone. Sheet plastic in planting areas should not be used.



Smithfield Complex—Warsaw

Duplin Professional Court –Warsaw

C. Irrigation

Irrigation standards are intended to help ensure efficient use of water and resources, and to help maintain an attractive and comfortable landscape environment.

ii. For efficient water use, irrigate turf areas separately from other plantings. Landscaped plantings should be grouped according to similar water needs.

iii. Trees, shrubs, flowers and ground covers should be watered efficiently by an automatic system with low volume drip, or bubbler emitters.

iv. Spray emitters are discouraged.

v. Low-volume irrigation equipment shall be required for all planted areas within the individual sites.

vi. Irrigation water should not overthrow onto walks, common areas, or onto any architectural walls.

vii. Utility cabinets and irrigation hardware shall be screened by landscaping.

D. Walls and Screening Elements

Walls and fences are to be utilized for either landscape design elements to create visual barriers for screening purposes. The following standards are intended to ensure that walls and fences within the AirPark are visually appealing, consistently designed, and provide adequate screening.

i. Walls or fences shall be required as a means of screening when the AirPark Review Committee determines landscaping materials alone to be insufficient.

ii. Walls or fences required for screening of loading, outdoor storage areas, trash enclosures and other storage areas shall be a minimum of six feet high.

iii. Walls constructed within the required front setback areas shall not exceed three feet in height.

iv. Walls shall be constructed of masonry, architectural metals or concrete materials consistent with, and complementary to, the architecture of the building.

v. Chain link fencing shall not be permitted, except for side and rear setback areas of interior lots that are not visible from the public right-of-way.

vi. Walls or fences shall not be required between separate lots unless deemed necessary for security or screening purposes. Such walls located on property lines between lots shall not exceed six feet in height.

vii. Landscaped screening shall be required in front of walls.

IV. SIGNAGE STANDARDS

The following signage standards identify a framework in which advertising a place of business, or providing directions and information can be accomplished without detracting from the overall quality and character of the AirPark. Design, color, materials, and placement are all important in creating signs that are architecturally attractive and integrated into the overall AirPark design. The intent of Signage standards is to create and promote a quality visual environment by allowing signs, which are compatible with the proposed development and which effectively, communicate their message.

i. Visible signage shall be present for all buildings that provide the building address, and to establish a strong identity for the entire development.

ii. A coordinated signage plan should be included for all developments with multiple tenants.

iii. All signage shall be designated to complement the architectural style and setting of the structure or use to which it is adjacent. Building wall and fascia signs shall be compatible with the predominant visual elements of the building.

iv. Sign letters and materials shall be professionally designed and fabricated.

v. Signs shall be constructed using high-quality materials such as metal, stone, brick and/or wood.

vi. Exposed conduit and tubing is prohibited. All transformers and other equipment shall be concealed.

vii. Signage shall be located at every major site-entry to establish development character.

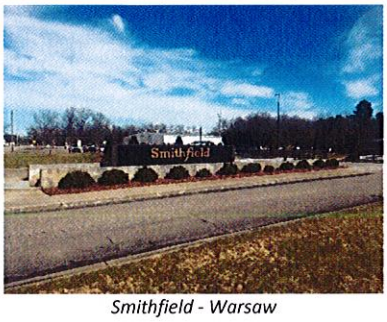
viii. Wall signs and logos attached to the building shall be individual letters and surface mounted.

ix. Signs shall not be painted directly onto buildings.

x. Wall signs shall only be located on the building face adjacent to the street, and shall be limited to identify tenants within each building. These signs shall be restricted to the name of the firm, company, or corporation only.

xi. All freestanding signs shall be of a monument design and include business identification, business directories, and informational/directional identification. Maximum height for freestanding monument signs shall be seven feet. Freestanding signs for business identification shall be limited to perimeter locations adjacent to existing arterials.

xii. Monument signs shall be designed to complement the architectural style of the buildings they serve and shall utilize high quality materials such as brick, stone, tile, cast concrete or similar masonry materials. A cabinet sign placed on a base does not meet the intent of these standards. Cabinet signs may be allowed provided the entire cabinet exclusive of the sign face is encased in the above-mentioned materials or if the overall design of the sign is unique and meets the intent of these standards.



Smithfield - Warsaw

Ag Provision – Warsaw

V. PARKING STANDARDS

The intent of the following parking standards is to provide for well-organized adequate parking, with safe and convenient pedestrian connections to buildings within AirPark.

A. Parking Standards

The minimum required number of parking spaces for the land uses within the AirPark are as follows:

i. Industrial /Warehouse/Distribution: two spaces per three employees on largest shift.

ii. Office Flex (this includes office space within Industrial/Warehouse and Distributions centers): one space per 300 square feet of gross floor area of office.

iii. Additional uses: one space per employee on largest shift plus one per 300 square feet gross floor area of customer service/public access areas.

B. Parking Lot Design

Parking shall be designed to provide flexibility for the buildings to change uses. Additional landscaped areas that can be converted to expand parking or building coverage is required in lieu of constructing oversized parking lots.

C. Location of Parking

To the extent possible, employee parking areas shall be located to the side and rear of building. Visitor and handicap parking may be located in the front of the building and near the primary building entry. In such cases, appropriate screening and landscaping shall be provided to visually buffer all parking areas from the street.

Loading zones shall be clearly delineated and kept separate from parking areas, and entries shall be located to reduce the potential of pedestrian/truck and automobile/truck conflicts. Uses with operations requiring a heavy volume of truck traffic shall have separate truck parking areas that are clearly delineated, in order to prevent trucks from parking on the street.

D. Pedestrian Connections

Tree-lined sidewalks shall connect parking lots directly to building entries. Where parking layouts exceed two rows in depth, parking shall be aligned in the direction of the pedestrian movement. A pedestrian island walkway should be provided within the planted area.

ARTICLE 3: PERMIT REQUIREMENTS

I. REVIEW BY AIRPARK REVIEW COMMITTEE

The AirPark Permit Application is available from the Enforcement Officer (also see Appendix D) and may be amended or modified by an act of the Board of County Commissioners. A permit application shall accompany a site plan. Upon approval of the application and site plan, the AirPark Review Committee will issue an AirPark Permit. No building permits shall be issued by the Duplin County Building Inspector until an AirPark Permit is issued by the AirPark Review Committee. A copy of an issued AirPark Permit shall be immediately provided to the Building Inspections department by the Enforcement Officer.

II. PERMITS REQUIRED – FUTURE USE

No change shall be made in the use of land or the establishment of a structure unless a permit has been applied for and granted by the AirPark Review Committee. Each application shall indicate the purpose for which the permit is desired, with sufficient information regarding whether the resulting use or structure would conform to the regulations prescribed in this section.

The Duplin County Building Inspector shall not issue a building permit for the construction of any new structure within the AirPark prior to the approval of the site plan and issuance of an AirPark Permit by the Duplin County AirPark Review Committee.

III. PERMITS REQUIRED – EXISTING USES

Before any existing use or structure may be replaced or substantially altered within any area of the AirPark, an AirPark Permit shall be secured authorizing such replacement, change or repair. No such permit shall be granted that would allow the establishment or creation of an airport hazard or permit a nonconforming use when the application for a permit is made. Except as indicated, all applications for a permit for replacement change or repair of an existing structure shall be granted.

IV. VIOLATIONS

AirPark Permits shall be valid until revoked. The Enforcement Officer is tasked with periodically inspecting the structure(s), trees, and land use to determine continued compliance with this ordinance. If the land use or obstruction is in violation, the Enforcement Officer shall advise the owner in writing of the violations and of action necessary to bring the obstruction or land use into compliance. Failure by the owner to correct violations within 120 days of notification shall constitute grounds for revocation of the permit. Further, violators of this ordinance shall be subject, upon conviction, to fine and/or imprisonment as provided by G.S. 14-4.

V. REVOCTION OF PERMIT

Valid permits may be revoked by the Enforcement Officer for any of the following reasons:

(1) Incorrect or misrepresented information on the permit application.
(2) Failure to construct structure in accordance with application and permit.
(3) Any other violation of these covenants.

In the event the permit is revoked, the Enforcement Officer shall advise the owner in writing of the status of the permit, the action necessary to correct the violation and of the enforcement techniques available to the County to remedy continued violation. The Enforcement Officer shall immediately notify the Building Inspections Department of any revocation of AirPark permit in the event that the premise has not received a Certificate of Occupancy. When the Enforcement Officer determines that the structure or land use has been brought back into compliance with these covenants, the Enforcement Officer shall reinstate the permit.

VI. VARIANCE and EXCEPTION

Upon a request for Variance, the AirPark Review Board may issue variances and exceptions from the requirements of these covenants such that would not be contrary to the public interest, or the spirit and intent of these covenants, and where due to special conditions, a literal enforcement of the provisions of these covenants would result in an unnecessary hardship. In granting a variance, the AirPark Review Board may prescribe appropriate conditions and safeguards as it deems necessary to preserve the intent of this ordinance. In granting a variance or exception to these covenants, the AirPark Review Board must determine the following:

(1) Special conditions and circumstances exist which are peculiar to the land or buildings involved and which are not applicable to other land or buildings.

(2) The literal interpretations of the provision of this ordinance would deprive the applicant of rights commonly enjoyed by other properties.

(3) Special conditions and circumstances do not result from the actions of the applicant.

(4) Granting the variance required will not confer on the applicant any special privilege that is denied by this ordinance to other- lands or- buildings.

Upon granting a variance it shall continue for an indefinite period of time unless otherwise specified at the time granted. A hearing in front of AirPark Review Board for a variance shall be a quasi-judicial hearing. The AirPark Review Board shall determine contested facts and make its decision within a reasonable time period. Every quasi-judicial decision shall be reduced to writing to reflect the Board's determination of contested facts and their application to the applicable standards. The written decision must be signed by the chair or other duly authorized member. The written decision shall be delivered to the applicant by either personal delivery of first-class mail. In the event of denial of a Variance from the AirPark Review Board, the applicant shall be permitted to file an appeal with the County Manager within thirty (30) business days from receipt of denial. In the event that the applicant fails to appeal within thirty (30) business days they shall lose their right to appeal to the Board of Commissioners. Upon receipt of a timely appeal the County Manager shall schedule a hearing on the appeal with the Board of Commissioners within sixty (60) days of the Appeal. The Applicant shall provide the Board of Commissioners and the County Attorney with a copy of their application, any documents or exhibits they plan to present at the Appeal and a list of any witnesses they plan to call at least seven (7) days prior to the scheduled Appeal date. A member from the AirPark Review Board shall be present at the hearing and be available as a witness. The AirPark Review Board shall also provide a copy of their written decision to the Board of Commissioners and County Attorney within seven (7) days prior to the scheduled Appeal date.

Every quasi-judicial decision shall be subject to review by the Superior Court by proceedings in the nature of certiorari pursuant to G.S. 160A-393. A petition for review shall be filed with the Clerk of Superior Court by

the later of 30 days after the decision is effective or after a written copy thereof is given in accordance with this Ordinance. When first-class mail is used to deliver notice, three days shall be added to the time to file the petition.

Any request for a variance to the Height Restrictive portion of this Ordinance shall be accompanied by a finding from the Federal Aviation Administration as to the impact the variance may have on the safe, efficient use of the airport and its airspace.

Issuance of a variance shall not set precedence and each case shall be reviewed independently of others.

ARTICLE 4: LEGAL PROVISIONS

I. ENFORCEMENT

The ordinance may be enforced by any one or more of the remedies authorized by G.S. 153A-123.

II. COMPLAINTS

Whenever a violation of this ordinance occurs, or is alleged to have occurred, any person may file a written complaint with the Enforcement Officer stating the cause and basis for the complaint. The Enforcement Officer shall record the complaint, investigate and take such action as may be necessary to enforce these covenants.

III. SEVERABILITY

Should any section or provision of this ordinance be declared by the courts to be invalid for any reason, such declaration shall not affect these covenants as a whole, or any part thereof other than the part so declared to be invalid.

IV. AMENDMENT

Petitions for amendment to this ordinance may be filed with the Enforcement Officer by any citizen of the County, any county department or agency, or any board or commission of the County.

V. ORDINANCE AMENDMENT

The provisions and requirements of this ordinance may be amended by the County Commissioners according to the procedure set forth:

(1) County Planning Board Review - No amendment shall become effective unless it has been reviewed by the Planning Board. The Planning Board shall have 45 days in which to review the proposed amendment and to make recommendation to the County Commissioners. If the Planning Board fails to report to the Commissioners within forty-five (45) days, it shall be deemed to have approved the proposed amendment.

(2) County Economic Development Commission - No amendment shall become effective unless it has been reviewed by the Economic Development Commission. The Economic Development Commission shall have forty-five (45) days in which to review the proposed amendment and to make recommendation to the County Commissioners. If the Economic Development Commission fails to report to the Commissioners within 45 days, it shall be deemed to have approved the proposed amendment.

(3) Airport Commission Review - No amendment shall become effective unless it has been reviewed by the Airport Commission. The Airport Commission shall have 45 days in which to review the proposed amendment and to make recommendation to the County Commissioners. If the Airport Commission fails to report to the Commissioners within forty-five (45) days, it shall be deemed to have approved the proposed amendment.

(4) County Commissioners Review - No amendment shall become effective until after being adopted by the County Commissioners and upon a public hearing.

VI. ADOPTION OF ORDINANCE

Effective Date

The Duplin County AirPark Development Ordinance shall become effective the 2nd day of July, 2018.

The Duplin County AirPark Development Ordinance is adopted by the Duplin County Board of Commissioners on the 2nd day of July, 2018.

Chairman
Duplin County Board of Commissioners

ATTEST: _____
Clerk

The Duplin County AirPark Development Ordinance is adopted by the Duplin County Airport Commission on the 26TH day of JUNE, 2018.

Chairman
Duplin County Airport Commission

ATTEST: _____
Clerk

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The Duplin County AirPark Development Ordinance is adopted by the Duplin County Planning Board on the 12 day of June, 2018.

Chairman
Duplin County Planning Board

ATTEST: _____
Clerk

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The Duplin County AirPark Development Ordinance is adopted by the Duplin County Economic Development Commission on the 30 day of June, 2018.

Chairman
Duplin County Economic Development Commission

ATTEST:
Clerk

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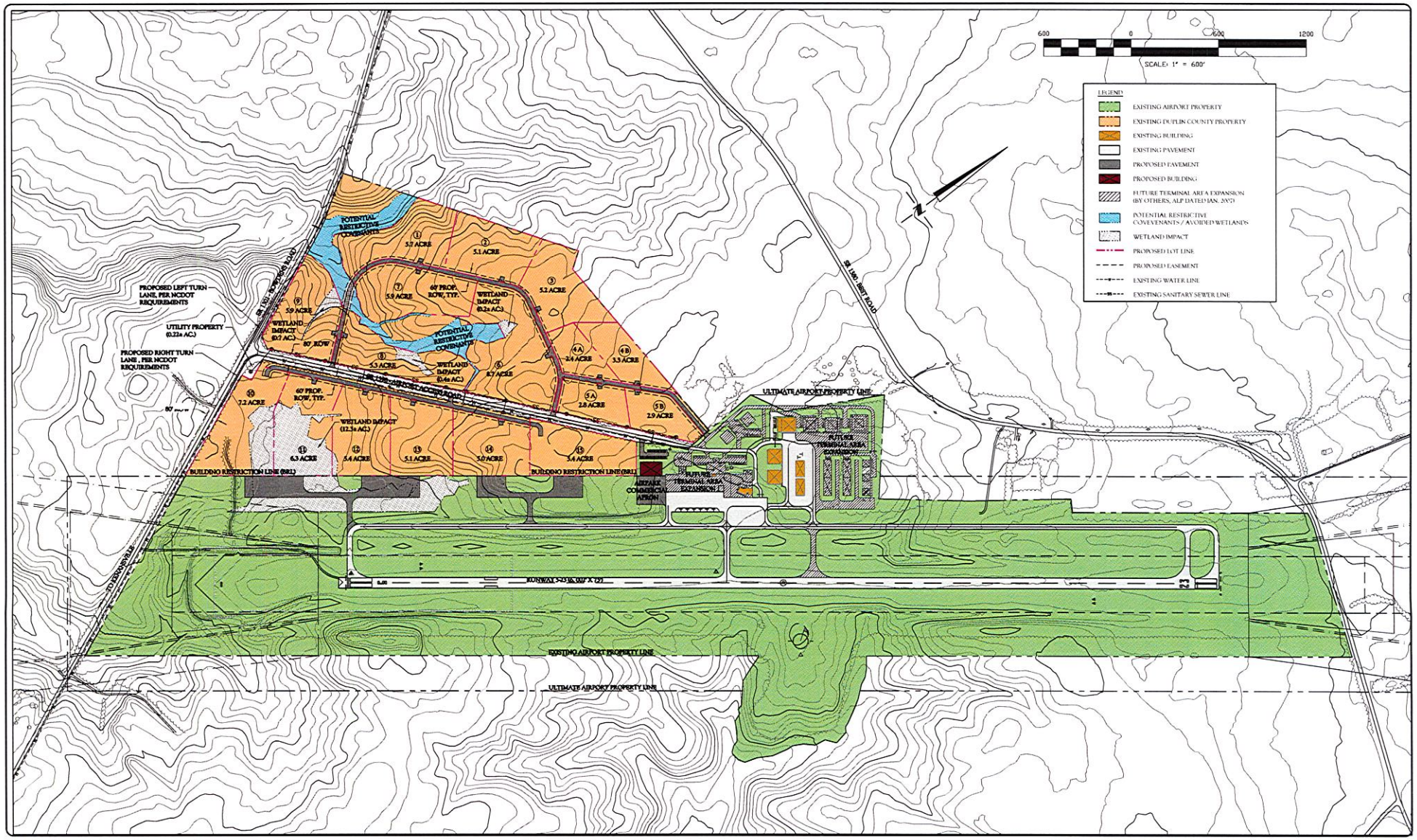
Appendix A

AirPark Planning Concept Layout



REV. NO.	DESCRIPTION	DATE
	REVISIONS	

PROJECT MANAGER	JAN
DESIGN/Drawn BY	DSF
APPROVED BY	JAN
FILE NAME	Duplin Airpark_BASE
DRAWING SCALE	AS SHOWN
PROJECT DATE	JUNE 2009
PROJECT NUMBER	80182.00.CA

WK DICKSON
community infrastructure consultants

1001 PINNACLE POINT DR., SUITE 110
COLUMBIA, SC 29223
(803) 786-4264

Office Locations:
North Carolina
South Carolina
Georgia
Florida

RELEASED FOR	DATE
APPROVALS	
BIDDING	
CONSTRUCTION	
RECORD DWG.	

AIRPARK PLANNING
FOR THE
DUPLIN COUNTY AIRPORT
KENANSVILLE, NORTH CAROLINA

CONCEPT LAYOUT 1A OVERALL

1/2

Appendix B

Design Review Checklist

Design Review Checklist

The following shall be used by the applicants and the review committee as a checklist for items to be included on the Site Plan Drawings.

Site Plan Drawings

1. Building Siting (including future expansion areas if applicable).
2. Driveways, parking and loading areas included curb details, and surface materials.
3. Sidewalks, other paved areas.
4. Existing trees with existing and proposed grades.
5. Lot grading and drainage showing approved grades on the site.
6. Service lead-ins (storm, sanitary, water, hydro, gas and telephone).
7. Hydro poles, transformers, meters, fire hydrants, Siamese connections.
8. Fence and wall locations, design, height, materials, and colors.
9. Exterior lighting locations, design, color and throw.
10. Exterior storage areas and their screening (including garbage).

Building Elevation Drawings

1. Elevation drawings.
2. Materials types and colors to be used (samples may be requested).
3. All mechanical equipment, vent stacks, etc. on elevation of roofs (locations, size, color) and proposed screening.
4. Building signage (if applicable).

Landscape Plans

1. Existing trees, grades and measures proposed to preserve them.
2. Site contours.
3. All planting, including location, type (common and scientific name), size in caliper, height and spread.
4. All screening, including details.
5. Coordination with minimum landscape requirements for streetscape edge, foundations planting, and landscape buffers.

Signage and Exterior Furnishings (If Applicable)

1. Flags, banner, sculpture, fountains, benches, planters, waste receptacles, including locations, size, design materials and colors.
2. Exterior signs and graphics.
3. Location in Site Plan.
4. Elevations depicting building mounted signage, 1:100 minimum scale.
5. Materials and colors; may be required to provide samples on request.
6. Type of lettering. Show graphics on elevations.
7. Lighting. (Location, color and throw)
8. Framing and supporting walls of devices.

Appendix C

Minimum Requirements for Construction of Pre-Engineered Corporate Hangars and T-Hangars at the Duplin County Airport

Duplin County Airport

Hangar Performance Specifications

Minimum Requirements for Construction of Pre-Engineered Corporate Hangars and T-Hangars at the Duplin County Airport as part of the Preliminary Terminal Area Development Project

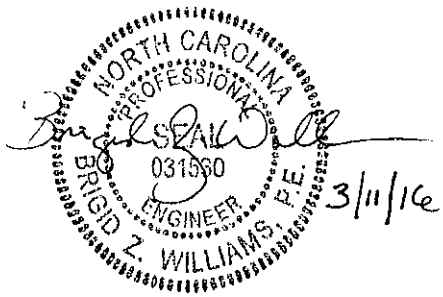
260 Airport Road
Kenansville, North Carolina 28349

WKD No: 20150121.00.RA
DPL No: 44-7538
NCDOT DOA No: 36237.13.13.1

WK DICKSON
community infrastructure consultants

720 Corporate Center Drive
Raleigh, NC 27607
License No. F-0374

March 11, 2016



DO NOT USE FOR CONSTRUCTION

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TABLE OF CONTENTS

The following specification divisions are organized by MasterFormat Construction Specification Institute (CSI) Standards and illustrate minimum requirements for construction/development of Hangars at Duplin County Airport:

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DIVISION 01 – GENERAL REQUIREMENTS

PART 1- GENERAL

1.1 SUMMARY

A. These specifications have been established to provide an outline of the minimum requirements for construction of pre-engineered corporate hangars and T-hangars at the Duplin County Airport. These specifications are intended to provide a standard for planning, design, and construction. All hangars to be constructed on airport property must meet or exceed all requirements specified herein.

B. For the purposes of this document, the term Owner shall refer to Duplin County or its designated representative, including the Duplin County Airport Commission and the Airport Director.

C. Hangars may not be constructed on airport property unless approved by the Owner and the Owner's Engineer for conformance with the following:

1. Current Airport Layout Drawing (ALD)
2. Current Terminal Area Drawing (TAD)
3. Current Terminal Area Development Plan

D. The Developer will be responsible for obtaining a Duplin County Building Permit and any other permits required by Duplin County or the Town of Kenansville.

E. The developer will be responsible for obtaining an Erosion and Sediment Control permit from North Carolina Department of Environmental Quality (NCDEQ) for development that creates one (1) or more acres of ground disturbance.

F. Construction must be in compliance with FAA regulations for design and construction, height restrictions, and all other regulations established by applicable agencies having jurisdiction over the project.

G. Design must conform to FAA requirements and shall incorporate FAA standard construction specifications located in Advisory Circular 150/5370-10, Standards for Specifying Construction of Airports (current edition).

H. Anyone constructing a hangar on airport property must follow the Owner's Rules & Regulations, Stormwater Pollution Prevention Plan (SWPPP), and Spill Prevention Control and Countermeasure Plan (SPCC).

I. Hangar construction must be in compliance with the National Fire Protection Association (NFPA) regulations, all state and local Fire Codes. All construction must be approved by the local Fire Marshal.

1.2 SUBMITTALS

A. Plans and specifications for construction must be prepared by a Professional Engineer (PE) licensed in the State of North Carolina. The cost of all engineering and permitting services shall be the Developer's responsibility.

B. The Developer is responsible for preparing all documents contained in this section and submitting documents to Owner and to the Owner's Consulting Engineer for review and approval. The Developer is responsible for all cost associated with the Owner's Consulting Engineer's review of the proposed plans, specifications, shop drawings and submittals.

C. 30% Design Submittal

1. Developer shall submit to the Owner three (3) sets of 22"x34" plans, as well as a PDF copy. The plan set shall include the following at a minimum:

    a. Cover Sheet
    b. Project Layout and Safety Plan
        i. Existing and proposed geometry
        ii. Haul route
        iii. Staging and stockpile areas
        iv. Phasing and construction safety measures
    c. Typical Sections - for proposed pavement and hangar floor
    d. Proposed Profiles - for proposed access roads and taxilanes
    e. Demolition Plans
    f. Geometric Layout Plan
    g. Grading and Drainage / Site Plan
        i. Existing and proposed contours
        ii. Proposed hangar fixed floor elevation (FFE)
        iii. Proposed drainage pipes and structures
    h. Utility Layout Plan

2. The Owner shall complete review of the 30% submittal and return comments within

14 days of receipt.

D. Pre-Construction Submittal

1. Project must be approved by Owner before construction may begin.

2. Developer shall submit three (3) sets of 22"x34" plans sealed by a Professional Engineer (PE) licensed in the state of North Carolina, as well as a PDF copy. The plan set shall include the following at a minimum:

   a. Cover Sheet

   b. Project Layout and Safety Plan

      i. Existing and proposed geometry

      ii. Haul Route

      iii. Staging and Stockpile Areas

      iv. Project Limits

      v. Phasing and construction safety measures

      vi. Traffic control devices, if necessary

   c. Typical Sections - for proposed details for pavement and hangar floor

   d. Demolition Plans

   e. Geometric Layout Plan

   f. Joint Layout Plan – for concrete aprons and hangar floor

   g. Erosion Control Plans

   h. Grading and Drainage / Site Plan

      i. Existing and Proposed Contours

      ii. Spot Elevations

      iii. Proposed hangar fixed floor elevation (FFE)

      iv. Proposed drainage pipes and structures

      v. Pipe invert and size

   i. Utility Layout Plan

      i. Proposed water service, sanitary sewer service, oil/water separator, grinder pump, electrical service, data/communication service

      ii. Associated utility details

   j. Landscaping Plan

k. Structural Plans

l. Building Plans

m. Foundation/Footing Details

n. Mechanical, Electrical, and Plumbing Plans and Details

3. Project specifications

4. Shop drawings, material information, and other items as specified in other Divisions.

5. The Developer is responsible for submitting a Notice of Proposed Construction, Form 7460-1, to the FAA for review and approval. The Developer shall submit this form once the Owner has approved the hangar site location and hangar size. Form 7460-1 reviews typically take 45-90 days to process and approve. No construction will be allowed to begin until an approved FAA 7460-1 form is on file with the Owner.

E. Complete set of Record Drawings upon the completion of construction. Record Drawings shall be submitted in AutoCAD format, as well as a set of 24" x 36" drawings.

1.3 WARRANTY REQUIREMENTS

A. Warranty periods begin at the date of Substantial Completion.

1. Metal Panel Finishes – 20 years
2. Weathertightness Warranty for Metal Roof Panels – 2 years
3. Grinder Pump – 2 years
4. Warranty for Corrosion and Structural Defects of Oil/Water Separators – 10 years
5. Warranty for all other construction – 1 year

1.4 CONSTRUCTION ADMINISTRATION, INSPECTION, & QUALITY ASSURANCE

A. The Owner's Consulting Engineer and Duplin County shall be allowed to inspect any and all work done during the construction phase of the project. The Developer shall authorize the Owner's Consulting Engineer and/or Duplin County to stop work at the Hangar immediately in the event that any of the plans or specifications are not being followed. In the event that the Owner's Consulting Engineer and/or Duplin County stops Work at the Hangar, the Developer shall be immediately notified and the parties shall work towards a sufficient solution to avoid any unnecessary delays.

B. The Owner's Consulting Engineer shall provide quality assurance testing to ensure the Developer's compliance with any and all of the Owner's construction specifications and

all project specifications. The Developer is solely responsible for any and all costs related to the Owner's Consulting Engineer's quality assurance testing to verify conformance with earthwork, stone base, concrete, and asphalt to the minimum requirements outlined in the Owner's Construction Specification and the project specifications.

C. The Owner's Consulting Engineer shall provide periodic construction inspection services to ensure all elements of the project are being constructed in accordance with Owner's Development Plan, Professional Engineer's plans and specifications, respectively. The Developer is solely responsible for any and all costs related to the Owner's Consulting Engineer's periodic construction inspection services.

1.5 GENERAL REQUIREMENTS DURING CONSTRUCTION

A. All construction activities must conform to the requirements of FAA Advisory Circular 150/5370-2 (current edition), Operational Safety on Airports During Construction.

B. Developer must utilize a General Contractor properly licensed in the State of North Carolina to oversee all construction.

C. Developer shall be required to locate and protect existing utilities and facilities from damage by equipment or personnel. The locations of existing underground utilities are shown in an approximate way only on the Owner's Terminal Area Development Plan. Developer is responsible for repair of any utilities or facilities damaged during construction.

D. Developer will be required to transport and store all equipment and materials in a manner which will not damage any existing pavement, buildings, signs, lights, etc. Any damage will be repaired by the Developer at no cost to the Owner.

E. No debris of any nature shall be allowed outside of the Developer's approved construction area. All loose materials must be kept within the limits of construction. No loose materials that could blow into aircraft operations areas shall be allowed in the construction area.

F. Developer shall control and continuously remove waste or loose materials that might attract wildlife during construction.

G. Developer must not leave or place foreign object debris (FOD) on or near active aircraft operations areas (AOA). Material tracked onto these areas must be continuously removed during the construction project.

1.6 GENERAL REQUIREMENTS FOR OPERATION OF HANGAR

A. All improvements made by the Developer to the hangar building throughout the life of the ground lease shall remain in the hangar and become the property of the Owner when ownership of the hangar reverts to the Airport.

B. Developer shall be responsible for providing for his own trash removal. Dumpsters will not be allowed adjacent to the corporate or T-hangars. A dumpster must be provided by the Developer and located in a centralized location on airport property, as directed by the Owner.

C. Developer shall be responsible for the cost of all utilities provided to the hangar building.

D. Developer shall be responsible for costs associated with annual testing of backflow preventers, as required by Duplin County.

END OF DIVISION 01

DIVISION 03 – CONCRETE

PART 1- GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete for building slabs on grade
2. Concrete floor finish

1.2 REFERENCES

A. FAA Advisory Circular 150/5370-10 (current edition) - Standards for Specifying Construction of Airports.

1.3 SUBMITTALS

A. Submit product information and mix design for concrete pavements.

B. Product Data:

1. Aggregate certifications
2. Joint materials, admixtures, and curing compounds
3. Reinforcing materials

C. Product and process data for penetrating liquid floor treatment for polished concrete.

D. Manufacturer's product data.

E. Manufacturer's installation instructions.

F. Catalog pages illustrating products to be incorporated into project.

G. Foundation and footing design to be approved by Owner's Consulting Engineer.

1.4 RELATED WORK SPECIFIED ELSEWHERE

A. Requirements for concrete pavements for both landside and airfield pavements are detailed in Division 32 Exterior Improvements.

PART 2 – PRODUCTS

2.1 CONCRETE SECTION AND MATERIALS

A. Concrete hangar slabs shall be Portland cement concrete.

B. Cement shall conform to the requirements of ASTM C150 Type I.

C. Concrete hangar slabs designed for aircraft weighing 30,000 lbs. or less shall be constructed in accordance with Item P-501 from FAA AC 150/5370-10. All concrete for hangar floors, foundations, and footings shall have a minimum 28-day compressive strength of 4,400 psi.

D. Concrete hangar slabs designed for aircraft weighing over 30,000 lbs. shall be constructed in accordance with Item P-501 of FAA AC 150/5370-10. All concrete for hangar floors, foundations, and footings shall have a minimum flexural strength of 650 psi.

E. Concrete floor slabs shall be reinforced with a minimum 6x6 welded wire fabric, furnished in flat sheets only, conforming to the requirements of ASTM A1064, or bar mats conforming to the requirements of ASTM A184 or A704.

F. Refer to Division 32, Exterior Improvements Section 2.1 C, for floor slab thickness, stone base thickness, and joint spacing.

G. 6 mil vapor barrier shall be placed beneath stone base under concrete slab.

H. The Developer's building manufacturer or structural engineer shall be responsible for the design of concrete footings.

I. Corporate and T-hangar hangar floor finish shall be polished concrete, approved by the owner. Polished concrete shall include grinding installation of silicate sealer, polishing, and a stain repellant. The polished floor shall have medium reflectivity, 800 grit. Other methods of finishing concrete floors may be submitted to the Owner for review and approval.

PART 3 - EXECUTION

3.1 PREPARATION

A. Concrete placement operations must adhere to the weather limitations detailed in the applicable specifications listed above.

B. Stone base shall not be placed until underlying subgrade has been reviewed and accepted

by the Owner and/or the Owner's Consulting Engineer.

C. Concrete may not be placed until Owner and/or Owner's Consulting Engineer has reviewed and accepted the preparation of the underlying subgrade and stone base.

3.2 CONCRETE SLAB CONSTRUCTION

A. Owner will conduct acceptance sampling and testing as outlined in the above specifications. If testing reveals that construction does not meet the applicable specifications, construction activities shall stop until a mutually acceptable solution can be reached.

B. Corporate hangar floor slab shall be constructed to flow to floor drain. Slope shall be approximately 0.5%.

C. T-hangar floors shall be sloped to drain towards doors.

D. No abrupt change in grade will be allowed between concrete hangar floor and adjacent asphalt or concrete apron. A smooth transition is required.

END OF DIVISION 03

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DIVISION 09 – FINISHES

PART 1- GENERAL

1.1 SUMMARY

A. This division specifies the general requirements for interior and exterior painting for T-Hangars and Corporate Hangars constructed on airport property. All colors shall be reviewed and approved by the Owner prior to construction.

1.2 SUBMITTALS

A. Submit manufacturer's Product Data Sheets for each product to be used in the work.

B. Submit label analysis of each paint product to be used in the work.

C. Certificates: Submit letters of certification from the paint manufacturer certifying that top coats are compatible and appropriate with undercoats when undercoats and topcoats are of a different manufacturer.

1.3 DELIVERY, STORAGE AND HANDLING

A. Deliver all materials to the job site in original, unopened containers with labels and tags attached. Store paint materials and tools in an assigned room. Furnish galvanized drip pans in the paint mixing space, and do all mixing and handling of paint on these pans. Keep paint cans closed when not in use, and keep the room clear of oily rags and other waste that might create a fire hazard.

1.4 JOB CONDITIONS

A. Refer to the paint manufacturer's Product Data Sheets for paint application job condition.

B. Spaces to be painted shall be broom clean and dust free.

1.5 RELATED WORK SPECIFIED ELSEWHERE

A. Factory Finished Items.

B. Shop Coats.

C. Division 13 Special Construction - Pre-Engineered Hangar Building.

PART 2 - PRODUCTS

2.1 PAINTING

A. Structural Painting: All uncoated structural steel shall be cleaned of all foreign matter and loose scales in accordance and given a one mil coat of red oxide primer. Primer shall be applied by the use of airless handguns. Primer shall meet or exceed the performance requirements of Federal Specification TT-P0636D. Light gauge steel members shall be shot blasted and pre-coated with one coat of red oxide primer. Some hand sprayed shop touch up may be employed. Primer shall be furnished to touch up abrasions caused by handling. All members (if required) shall be touched up prior to field assembly.

Prime Coat: The base metal shall be pre-treated and then primed with an epoxy type primer for superior adhesion and superior resistance to corrosion.

2.2 PAINT SELECTION

A. Materials selected for each painting system shall be the product of a single manufacturer.

B. Thinners, solvents, and tinting colors shall be as specified on the manufacturer's Product Data Sheets.

C. All paint shall be factory mixed except tinting necessary to distinguish undercoats.

D. Exterior colors shall be selected by the Owner.

2.3 ACCEPTED PAINT PRODUCTS

A. Alkyd Rust Inhibitive Primer:
PPG 6-208
Glidden 4570
Porter 297

B. Alkyd Universal Steel Primer:
PPG 97-682
Glidden 5210
Porter 284

C. A8046 Alkyd-Zinc Dust Primer:
PPG 6-215/6-216
Porter 299

D. Alkyd-Portland Cement Primer:
PPG 6-209

Glidden 5229
Porter 290

E. Phosphoric Acid Treatment:
Porter 99

F. Alkyd Interior Wood Undercoater:
PPG 6-6
Glidden 555
Porter 429

G. Latex Block Filler:
PPG 6-7
Glidden 5320
Porter 896

H. Cementitious Block Filler:
Glidden 1971
Porter 895

I. Alkyd Gloss Enamel:
PPG 6-252 Series
Glidden 4500 Series
Porter I.A. 24

J. Alkyd Interior S.G. Enamel:
PPG 6-90
Glidden
Porter I.A. 24 S.G.

K. Polyamide Epoxy Gloss Coating:
PPG 97 Line
Glidden 5240/5242
Porter MCR 43

L. Polyamide Epoxy High Build Intermediate Coat:
PPG 97-150 Series
Glidden 5555/5556
Porter MCR 43 High Build

Alternative, equivalent paint products may be submitted to the Owner for review and approval.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. All Surfaces: Before starting work, examine all surfaces which are to be painted. Do not apply paint on dirty, dusty, or otherwise contaminated surfaces, nor on surfaces of materials having more than 15% moisture content. Do not start work on any surface requiring corrective work. Start of work constitutes acceptance of surface as suitable for painting.

B. Ferrous Metals: Remove all oil, grease, dirt, salts, loose rust, loose mill scale, and loose paint. Remove shop crayon marks.

C. Galvanized Steel:

1. Remove oil and grease by wiping with clean rags soaked in xylol.
2. Remove white rust with soap and water and rinse clean.
3. Remove red rust by power tool cleaning.
4. Deactivate fresh zinc surfaces and remove passivating compounds by weathering six months or by applying phosphoric Acid Etch.

D. Concrete Block: Let the concrete unit masonry cure for 30 days before painting. Fill all minor holes and cracks. Rub to remove mortar burrs from surface of joints and block.

E. Wood: Sand to remove raised grain, tool marks and similar imperfections. After prime coat has dried, putty nail holes, cracks, open joints and other defects. At the same time, seal knots, pitch and resinous.

3.2 PAINT APPLICATION SCHEDULE

A. Paint the following:

1. Paint exposed steel pipe, brackets, hangers, valve bodies, electrical conduits, outlet boxes and junction boxes.
2. Paint exposed pipe insulation.

B. Do not paint the following:

1. Steel to be embedded in concrete.
2. Factory items fully finished.
3. Exterior formed concrete foundation walls, steps or slabs on grade, unless noted otherwise.

4. Interior concrete floor slabs, unless noted otherwise.
5. Aluminum, brass, cadmium plated surfaces, and stainless steel.
6. Interior air handling ductwork.
7. Acoustical ceiling board.
8. Plastic pipe and plastic conduit.
9. Plastic pipe insulation covers.
10. Code required labels.

C. Paint shall be tinted, reduced, mixed and applied according to the manufacturer's Product Data Sheets.

D. Flow all paint evenly and fully over surfaces being painted. Leave each coat free of brush marks, voids, sags, runs or other defects. Each coat shall be applied as a film of uniform thickness. Hiding shall be complete.

E. Do not thin the paint for any coat to a degree that reduces the finished dry film thickness below that specified.

F. Remove hardware, accessories, fixtures, switch plates and similar items and replace after painting. Remove paint from all surfaces not intended to be painted.

G. Paint sharp clean edges at perimeter of painted surfaces and at changes of color.

H. Paint primed grilles, access panels, ducts, etc., to match adjacent wall or ceiling surface.

I. Apply all paint with brush or roller except where spraying is recommended for ceilings and/or epoxy wall finishes. Overspray on surfaces scheduled to be unfinished shall be repaired by removing the overspray or by painting the entire surface at the Owner's option.

END OF DIVISION 09

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DIVISION 13 – SPECIAL CONSTRUCTION
PRE-ENGINEERED HANGAR BUILDINGS

PART 1- GENERAL

1.1 SUMMARY

A. This section includes requirements for pre-engineered hangar buildings. Hangars shall be a single story, rigid frame, metal building with eave heights, roof slopes and configuration to be specified by the Developer and approved by the Owner.

B. These specifications cover the materials and fabrication of metal buildings designed, fabricated and readily erected to be weather tight. These specifications are an outline of performance to insure the basis for design, manufacture and application of all the manufacturer's metal building systems.

C. Hangar building shall be supplied by a manufacturer who is regularly engaged in the manufacture of aircraft hangar buildings and hangar doors. The hangar package shall be supplied as a complete system and furnished by a manufacturer who provides hangar doors and hangar building as an integral hangar building package. The hangar manufacturer shall have been engaged in the manufacture for a minimum of five years and upon request from Owner provide a list of completed hangar projects.

D. Hangar sizes must be approved by Owner.

E. Hangar buildings and doors shall be designed to withstand 115 MPH wind loading.

F. Single Source Responsibility for Pre-engineered building system: Obtain pre-engineered building from a single source for the entire building system as described in this section. Corporate hangar doors may be provided by a separate manufacturer. If a different manufacturer is used, Developer must provide evidence that the design and construction of the hangar building and the hangar doors has been coordinated by both manufacturers.

G. Erector's Qualifications: Pre-engineered building shall be erected by a firm that has no less than 5-years successful experience in the erection of pre-engineered buildings similar to those required for this project.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Surface treatment for concrete is detailed in Division 03 Concrete.

B. Field painting or primed metal members are specified in Division 09 Finishes.

C. Information concerning the concrete foundation and footings can be found in Division 32

Exterior Improvements.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product information, specifications and installation instructions for building components and accessories.

B. Calculations: Submit calculations for all structural elements indicating compliance with specified design requirements.

C. Manufacturer shall furnish complete erection drawings for the proper identification and assembly of all building components. These drawings will show anchor bolt settings, transverse cross sections, sidewall, endwall, roof framing, flashing, sheeting and accessory installation details.

D. Shop Drawings: Submit complete erection drawings showing anchor bolt settings, foundation drawings, electrical drawings, mechanical drawings, sidewall, endwall, and roof framing, frame bracing, transverse cross section, covering and trim details, and accessory installation details to clearly indicate proper assembly of building components.

E. Certification: Standard drawings and design analysis shall bear the seal of a registered professional engineer licensed in the state of North Carolina. Design analysis shall be furnished to the Owner. The Manufacturer shall furnish a sealed letter of certification stating that the building design and fabrication will meet all design specifications and loads as required by applicable codes. This letter must be furnished prior to delivery of building.

1.4 STRUCTURAL STEEL DESIGN

A. General: The building manufacturer shall use standards, specifications, recommendations, findings, and/or interpretations of professionally recognized groups (AISC, AISI, AAMA, AWS, ASTM, MBMA), Federal Specifications and unpublished research by MBMA as the basis for establishing design, drafting, fabrication and quality criteria, practices and tolerances. For convenience, one or more sources may be referenced in a particular portion of these specifications.

B. Structural Steel: For design of structural steel members, comply with requirements of the American Institute of Steel Construction's (AISC) "Specifications for the Design, Fabrications and Erection of Structural Steel for Buildings" for design requirements and allowable stresses.

C. In all instances, however, the manufacturer's design, drafting, fabrication, quality criteria, practices and tolerances shall govern, unless specifically countermanded by the Contract Documents. Structural mill sections or welded up plate sections will be designed in

accordance with AISC's "Specification of the Design, Fabrication, and Erection of Structural Steel for Buildings" (latest edition).

D. Cold-formed steel structural members will be designed in accordance with AISI's "Specification for the Design of Cold-formed Steel Structural members" (latest edition)

1. Design Loads: Design loads will include dead load, roof live loads, wind load, seismic loads, collateral loads, auxiliary equipment loads, and/or other applied or specified loads.

2. Dead Loads: The actual weight of the building system supported by a member.

3. Roof Live Loads: Loads produced by maintenance activities, rain, erection activities and other movable or moving loads, but not including wind, snow, seismic, crane, or dead loads.

4. Roof Snow Loads: Gravity load induced by weight of snow or ice on the roof, assume to act on horizontal projection of the roof.

5. Winds Loads: The loads on a structure induced by the forces of wind blowing from any horizontal direction.

6. Collateral Loads: The weight of any non-moving equipment of material, such as ceilings, electrical or mechanical equipment, sprinkler systems or plumbing. Purlins and frames shall support electrical, including lighting. Add purlins as required.

7. Seismic Loads: Horizontal loads acting in any direction on a structural system due to action of an earthquake.

8. Floor Live Loads: Loads induced on a floor system by occupants of a building and their furniture, equipment, etc.

9. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for Class 90.

E. Design of all members shall be in accordance with the latest international building code with North Carolina amendments.

F. The pre-engineered metal building shall be designed for all loads as required by the governing building code. The metal building engineer shall determine these required loads and clearly note them in calculations and on building drawings. They shall contact the local authorities for verification of governing codes. The metal building engineer shall also account for all superimposed loads from building accessories and systems such as but not limited to mechanical equipment, suspended ceilings, fixtures, piping, operable

doors, etc. Building accessories may or may not be noted on the contract drawings. It is up to the Contractor to coordinate all materials from other trades to ensure they are accounted for.

1.5 BASIC MATERIAL SPECIFICATIONS

A. Primary Framing Steel: Steel for hot rolled shapes shall conform to the requirements of ASTM Specification A36, with minimum yield of 36,000, 42,000, or 50,000 psi.

B. Steel for built up sections shall conform to the physical requirements of ASTM A570, ASTM 572 or ASTM A36 as applicable, with minimum yield of 42,000 or 50,000 psi as indicated by the design requirements.

C. Steel for endwall "C" sections shall conform to the physical requirements of Republic Steel's P-55 or equivalent and have a minimum yield of 55,000 psi.

D. Secondary Framing Steel: Steel used to form purlins, girts, eave struts and "C" sections shall be Republic Steel's P-55 or equivalent of ASTM A607 Grade 55. Minimum yield shall be 55,000 psi.

1.6 STRUCTURAL FRAMING

A. General: All framing members shall be shop fabricated for field bolted assembly. The surfaces of the bolted connections shall be smooth and free from burrs or distortions.

B. Primary Framing:

1. Primary structural framing shall be main load carrying structural members. They shall include door trusses, rafters, interior columns and exterior columns.

2. Rigid Frame: All rigid frames shall be connected to webs by means of a continuous fillet weld on one side.

3. Endwall Frame: All endwall roof beams and endwall columns shall be cold-formed "C" sections, mill rolled sections or built up "I" sections depending on design requirements.

4. Plate, Stiffeners, etc.: All base plates, splice and flanges shall be shop fabricated to include bolt connections holes. Webs shall be shop fabricated to include bracing holes.

5. Connections for secondary structural (purlins and girts) shall be by means of welded clips.

C. Secondary Framing:

1. Secondary framing shall be the structural members which carry the loads to the primary framing systems; and shall include the purlins, girts, wind bracing and miscellaneous structural members.

2. Purlins and Girts: Purlins and girts shall be cold-formed "Z" sections with stiffened flanges. They shall be pre-punched at the factory to provide for field bolting to the rigid frames. They shall be simple or continuous span as required by design. Connection bolts will install through the webs, not flanges.

3. Eave Struts: Eave struts shall be unequal flange cold-formed "C" sections.

D. Bracing:

1. Provide wind bracing, rafter bracing, sheeting angles where required.

2. Diagonal Bracing: Diagonal bracing in the roof shall be used to remove longitudinal loads from the structure. This bracing will be furnished to length and equipped with bevel washers and nuts at each end. It may consist of rods threaded each end or galvanized cable with suitable threaded end anchors. If load requirements so dictate bracing may be of structural angle and/or pipe, bolted in place.

3. Flange Braces: The compression flange of all primary framing shall be braced laterally with angles connecting to the webs of purlins or girts so that the flange compressive stress is within allowable limits for any combination of loading.

1.7 FIRE SUPPRESSION

A. Fire suppression and fire rated construction for hangars shall be provided in accordance with State and local Building Codes and the requirements of the local Fire Marshal.

B. Construction of fire lines and fire hydrants shall be in accordance with State and local Building Codes and the requirements of the local Fire Marshal.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store prefabricated components, sheets, panels, and other manufactured items so they will not be damaged or deformed. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weather-tight ventilated covering. Store metal sheets or panels so that water accumulations will drain freely. Do not store sheets or panels in contact with other materials which might cause staining.

PART 2 – T-HANGAR REQUIREMENTS

2.1 GENERAL

A. Hangar building shall be a 10-unit, nested T configuration conforming to the layout as shown on the Airport Layout Plan.

2.2 MANUFACTURERS

A. T-hangar Available Manufacturer's: Based on the history of installation and years of manufacturing experience in pre-engineered hangar building construction, T-Hangars should be manufactured by one of the following, or an approved equal:

1.	Erect-a-Tube (800) 624-9217	P.O. Box 100, Harvard, Illinois 60030-0100
2.	Ful-Fab Aircraft Hangars (330) 477-7211	1525 Whipple Ave. S.W. Canton, Ohio 44710
3.	OSI Building Systems (334) 834-3500	P.O. Box 5230, Montgomery, AL 36103

2.3 MATERIALS

A. Sheeting Materials:

1. Roof sheets shall be 26 gauge galvalume coating conforming to ASTM specification A-792 with panel configuration with 1-1/8" min. high major ribs 12" on center. Panel coverage shall be 36" and shall be furnished full length from building eave to ridge purlin. A pre-formed ridge cap shall be provided.

2. Wall sheet shall be 26 ga. galvalume coating conforming to ASTM specification A446 Panel configuration shall be 1-1/8" min. major ribs 12" on center. Wall sheet shall be furnished full height.

3. Interior walls shall be 26 ga. galvalume metal extending from floor to ceiling.

4. Building trim shall include eave trim, gable trim, corner trim, service door trim, and hangar door trim. All trim shall be 26 ga. and manufactured of flat stock material equal in quality to wall sheets and color as selected from manufacturer's standard color chart, and approved by the Owner. Trim pieces shall be packaged for shipment at factory.

5. All standard exterior gutters, rake flashing, and downspouts shall be 26 ga. galvalume steel, with painted finish to match.

B. Sealants and Closures:

1. All gutter and downspout joints, rake flashing laps, and ridge flashing laps, shall be sealed with pigmented caulk of butyl rubber base to match the color.

2. Factory applied sealant used in panel side laps shall be a hot melt, foamable mastic.

3. Field applied sealant used at the end laps, ridge assembly, and gable flashings shall be 100% solids, butyl-based elastomeric tape sealer, furnished in roll form or pre-cut to length. Sealant used to the eave shall be pre-compressed expanding foam sealant tape.

4. Joint sealant material shall be as recommended by manufacturer to seal all side and end laps in metal sheets and panels, at ridges, bolt holes before inserting fasteners, for all flashings and corner closure sheets and elsewhere as necessary to provide watertight construction.

5. Closures: Inside and outside semi-rigid cross-linked polyethylene foam closure shall be provided as required to provide a bird proof building. Inside closure shall be self-adhesive.

6. 3" x 9" x 11 gauge galvanized gas curb angle at the curb of EVERY interior partition wall with fuel resistant sealant on all sides.

C. Gutter, Flashing, and Downspouts:

1. Metal gutter and downspouts sizes and spacing to be determined by building manufacturer. Unless otherwise approved by the Owner, downspouts shall be connected to storm drainage system. If downspouts cannot be connected to storm drainage system, adequate splash pads must be provided at each outlet to prevent erosion. Proposed splash pad must be approved by the Owner.

2. Gutters and Flashing: All standard exterior gutters, rake flashing and downspouts are 26 gauge galvalume steel, with painted finish to match.

3. Flashing and Trim: Flashing at the rake (parallel to roof panels) and high eave shall not compromise the integrity of the roof system by constricting movement due to thermal expansion and contraction. The panel manufacturer shall supply the flexible membranes if applicable.

4. Installation: Erection of the roof system shall be in complete accordance with the

manufacturer's erection manual.

D. Finishes:

1. Painting: All interior exposed structural steel shall receive two coats shop primer. All exterior surfaces of the hangars and hangar doors for all exterior wall and roof sheeting shall be factory-painted with a Thermoset coating system composed of polyester resin which has been modified with a silicon resin equal to MS Color Fast 30. All interior surfaces of metal siding, hangar doors, and panels shall be galvanized. All interior divider wall panels shall be galvanized, both sides.

2. Colors shall be as selected by the Owner from the manufacturers' standard selection. Developer shall submit color swatches to Owner for selection.

E. Insulation:

1. Insulation for conditioned spaces shall be in accordance with current building code and energy conservation code regulations.

2. Exterior walls, doors, and roof shall be insulated.

3. Insulation shall be glass fiber blanket insulation, complying with ASTM C991, of 0.5 lbs. per cu.ft. density, R-13 minimum insulation value, with UL flame spread classification of 25 or less and 2 inches wide continuous vapor-tight edge tabs.

4. Insulation shall have scrim reinforced white vinyl facing.

5. Vapor barrier shall be vinyl film.

6. Retainer strips for insulation shall be 26-gauge formed galvanized steel retainer clips, colored to match the insulation facing.

7. Insulation shall be installed tightly, without sagging. Install insulation concurrently with installation of roof panels in accordance with manufacturer's directions. Install blankets straight and true in one-piece lengths with both sets of tabs sealed to provide a complete vapor barrier. Locate insulation on underside of roof sheets, extending across the top flange of purlin members and held taut and snug to roofing panels with retainer clips. Install retainer strips at each longitudinal joint, straight and taut, nesting with roof rib to hold insulation in place.

F. Hangar Doors: Provide a flush-mounted, electrically operated bi-folding or single-panel hydraulic hangar door.

1. Each T shall have a door with a 14'-0" high by 44'-0" wide clear opening, minimum.

2. Each hangar door panel shall be provided with a 3'-0" x 6'-8" steel entry door for personnel use. Provide keying of locks as directed by Owner.

3. Doors shall have a rubber seals to provide a water tight door.

4. The hangar doors shall be coordinated for design and furnished by the manufacturer of the building structural system for complete integration.

5. The door framing shall be designed to carry its own dead load and resist horizontal wind pressure as specified by code.

6. Door insulation shall be the same as wall panel insulation.

7. Sliding doors and manually operated hangar doors are prohibited.

G. Hollow Metal Doors and Frames:

1. Where indicated in these specifications, provide exterior hollow metal door, frames and hardware (see below) with aluminum threshold. The door dimensions are as follows:

Width:	3'-0"
Height:	6'-8"
Thickness:	1-3/4"

2. Hardware to include 1-1/2 pair ball bearing butts, overhead closer, weather stripping, and heavy-duty cylinder lock set. Provide keying of locks as directed by Owner.

3. Hollow metal doors and frames shall conform to SDI 100-76, Recommended Specifications, Standard Steel Doors and Frames, for minimum requirements.

4. Personnel doors shall have fire exit signs with battery backups above each door, per the requirements of State and Federal building and fire code.

H. Electrical:

1. A locking, electric panel board shall be installed inside one of the end hangar units. The location of the panel board shall be coordinated with local building inspections department and is subject to the approval of the Owner. Distribution panel shall be appropriately sized for the loads (200 amp minimum).

2. Interior lighting in each T-hangar bay shall consist of a minimum of three (3) 4 ft. long, LED, linear light fixtures designed for low-bay installation, meeting the following requirements:

a. Maximum of 40 watts rating per fixture

b. Suitable for damp locations

c. 80+ CRI rating at 4,000K

d. 120° beam angle or wider

e. Minimum 2700 lumens

f. Lighting configuration should provide illuminance of approximately 10 foot-candles

g. Lights shall be instant-on and provide flicker free lighting

h. Switch shall be located adjacent to personnel door and shall be in accordance with State, Local, and Federal requirements.

Alternate lighting fixtures which provide equal or better illumination may be submitted to Owner for review and approval.

3. Each T-hangar bay shall be equipped with a minimum of three (3) 110V receptacles. Receptacles shall be evenly spaced throughout the bay.

4. Exterior lighting shall consist of building-mounted flood lights. Lights shall be 250 watt high pressure sodium flood lights. Each light is to include a fixed hood/visor, white finish, and shall be equipped with motion detectors adjustable up to a one-hour delayed "off". All exterior lighting power shall be activated by one single photocell oriented to northern sky and mounted on exterior of the building. Alternate lighting fixtures which provide equal or better illumination may be submitted to Owner for review and approval. A minimum of one light fixture for every two units/bays shall be provided. In addition, one exterior fixture shall be provided on each end of the T-hangar building.

I. Plumbing: T-hangar building shall be equipped with one hose bib on each end of the building.

J. Signage: Exterior signage will not be allowed on T-hangar buildings.

PART 3 – CORPORATE HANGAR REQUIREMENTS

3.1 GENERAL

A. This section shall apply to any size box or corporate hangar to be constructed on the Airport.

3.2 MANUFACTURERS

A. Corporate hangar shall be supplied by a manufacturer meeting the requirements of Section 1.1 C, of this specification.

3.3 MATERIALS

A. Sheeting Materials:

1. Roof sheets shall be 26 gauge galvalume coating conforming to ASTM specification A-792 with panel configuration with 1-1/8" min. high major ribs 12" on center. Panel coverage shall be 36" and shall be furnished full length from building eave to ridge purlin. A pre-formed ridge cap shall be provided.

2. Wall sheet shall be 26 ga. galvalume coating conforming to ASTM specification A446 Panel configuration shall be 1-1/8" min. major ribs 12" on center. Wall sheet shall be furnished full height.

3. Building trim shall include eave trim, gable trim, corner trim, service door trim, bi-parting hangar door trim. All trim shall be 26 ga. and manufactured of flat stock material equal in quality to wall sheets and color as selected from manufacturer's standard color chart. Trim pieces shall be packaged for shipment at factory.

4. All standard exterior gutters, rake flashing, and downspouts shall be 26 gauge galvalume steel, with painted finish to match.

5. Interior walls shall have liner panels a minimum of 8 feet high. Liner panels shall be 29 gauge steel or shall be clad with fiberglass panels. Panels shall be provided from the manufacturer in white, unless otherwise approved by Owner.

B. Sealants and Closures:

1. All gutter and downspout joints, rake flashing laps, and ridge flashing laps, shall be sealed with pigmented caulk of butyl rubber base to match the color.

2. Factory applied sealant used in panel side laps shall be a hot melt, foamable mastic.

3. Field applied sealant used at the end laps, ridge assembly, and gable flashings shall

be 100% solids, butyl-based elastomeric tape sealer, furnished in roll form or pre-cut to length. Sealant used to the eave shall be pre-compressed expanding foam sealant tape.

4. Joint sealant material shall be as recommended by manufacturer to seal all side and end laps in metal sheets and panels, at ridges, bolt holes before inserting fasteners, for all flashings and corner closure sheets and elsewhere as necessary to provide watertight construction.

5. Closures: Inside and outside semi-rigid cross-linked polyethylene foam closure shall be provided as required to provide a bird proof building. Inside closure shall be self-adhesive.

C. Gutter, Flashing, and Downspouts:

1. Metal gutter and downspouts sizes and spacing to be determined by building manufacturer. Unless otherwise approved by the Owner, downspouts shall be connected to storm drainage system. If downspouts cannot be connected to storm drainage system, adequate splash pads must be provided at each outlet to prevent erosion. Proposed splash pad must be approved by the Owner.

2. Gutters and Flashing: All standard exterior gutters, rake flashing and downspouts are 26 gauge galvalume steel, with painted finish to match.

3. Flashing and Trim: Flashing at the rake (parallel to roof panels) and high eave shall not compromise the integrity of the roof system by constricting movement due to thermal expansion and contraction. The panel manufacturer shall supply the flexible membranes if applicable.

4. Installation: Erection of the roof system shall be in complete accordance with the manufacturer's erection manual.

D. Finishes:

1. Painting: All interior exposed structural steel shall receive two coats shop primer. All exterior surfaces of the hangars and hangar doors for all exterior wall and roof sheeting shall be factory-painted with a Thermoset coating system composed of polyester resin which has been modified with a silicon resin equal to MS Color Fast 30. All interior surfaces of metal siding, hangar doors, and panels shall be galvanized. All interior divider wall panels shall be galvanized, both sides.

2. Colors shall be as selected by the Owner from the manufacturers' standard selection. Developer shall submit color swatches to Owner for selection.

3. Any façade or wainscoting proposed by the Developer shall be reviewed and approved by the Owner. Owner reserves the right to reject the use of a façade other than the standard metal sheeting.

E. Insulation:

1. Exterior walls, doors, and roof shall be insulated.

2. Insulation shall be glass fiber blanket insulation, complying with ASTM C991, of 0.5 lbs. per cu.ft. density, R-13 minimum insulation value, with UL flame spread classification of 25 or less and 2 inches wide continuous vapor-tight edge tabs.

3. Insulation shall have scrim reinforced white vinyl facing.

4. Vapor barrier shall have a permeance of not greater than 0.10 perms.

5. Retainer strips for insulation shall be 26-gauge formed galvanized steel retainer clips, colored to match the insulation facing.

6. Insulation shall be installed tightly, without sagging. Install insulation concurrently with installation of roof panels in accordance with manufacturer's directions. Install blankets straight and true in one-piece lengths with both sets of tabs sealed to provide a complete vapor barrier. Locate insulation on underside of roof sheets, extending across the top flange of purlin members and held taut and snug to roofing panels with retainer clips. Install retainer strips at each longitudinal joint, straight and taut, nesting with roof rib to hold insulation in place.

7. Insulation for conditioned spaces, including offices and restrooms, shall be in accordance with current building code and energy conservation code regulations. Insulation rating shall meet the requirements identified in Table 502.1.2 or Table 502.2(1) of the North Carolina Energy Conservation Code.

F. Bottom Rolling Hangar Doors:

1. The hangar doors shall be designed for complete integration with the building.

2. The door framing shall be designed to carry its own dead load and resist horizontal wind pressure as specified by code.

3. Main members both vertical and horizontal shall be of continuous sections of new hot rolled structural steel equal to or exceeding ASTM A-36 and comply with AISC specifications. Cold-formed C and Z shapes shall be used only for girts and interior bracing and not as structural framing members. All framing members shall be true to dimension and square in all directions. Diagonal bracing shall be provided so that

the completed door section assembly will be adequately braced to withstand design loads.

4. Top guides shall be either the fixed type or the telescoping type depending on the amount of specified building vertical deflection. Fixed type shall have permanently lubricated rollers that engage both sides of the web of the top track wide flange beam and allow for vertical deflection between the flanges. Telescoping type shall have both vertical and horizontal permanently lubricated rollers that engage both sides of the web of the top track wide flange beam and have the predetermined amount of vertical travel built into the telescoping design of the guide assembly

5. Bottom rail system shall consist of 25 lb/yard ASCE rail with rail supports of hot or cold rolled angles with a minimum yield strength yield of 36,000 psi supported during erection by A307 anchor bolts with double nuts intended for leveling. Anchor bolts specified by manufacturer and furnished by contractor.

6. Bottom wheels: Each door section shall have two double flange solid steel wheels of a diameter capable to handle the load of the door. Each wheel shall be equipped with tapered roller bearings capable of transmitting both vertical and horizontal loads. Bearings shall be provided with grease seals. Wheels shall be removable from the housing without the need to remove the door from its position on the rail.

7. Provide weather stripping that is easily replaceable on the horizontal bottom and vertical edges of the door. Material shall be EPDM with cloth insertion and be attached 12" O.C

8. Exterior door paneling and trim shall match the building wall panels.

9. Door insulation shall be the same as wall panel insulation.

10. Fasteners shall be A-325 for all door framing connections.

11. All door framing shall be stop primed the same as the structural framing members.

12. Door system shall include rail drains.

G. Hollow Metal Doors and Frames:

1. Where indicated in these specifications, provide exterior hollow metal door, frames and hardware (see below) with aluminum threshold. The doors dimensions are as follows:

Width:	3'-0"
Height:	6'-8"

Thickness: 1-3/4"

2. Hardware to include 1-1/2 pair ball bearing butts, overhead closer, weather stripping, and heavy-duty cylinder lock set. Provide keying of locks as directed by Owner.

3. Hollow metal doors and frames shall conform to SDI 100 for minimum requirements.

4. Personnel doors shall have fire exit signs with battery backups above each door, per the requirements of State and Federal building and fire code.

5. Exact location of personnel doors for egress shall be per Code requirements.

H. Utility Doors:

1. Provide a slide-up or roll-up metal utility door, frames and hardware. The utility door should be installed on the back wall of the hangar, opposite of the main hangar door. The minimum door dimensions are as follows:

Width:	10'-0"
Height:	10'-0"
Thickness:	26 gauge galvanized steel

2. Mechanically or manually operated utility doors will be acceptable.

3. A minimum 10'x 10' concrete pad shall be installed adjacent to the utility door.

I. Electrical:

1. All electrical work must be performed by a contractor licensed to perform electrical work in the State of North Carolina.

2. Interior lighting in corporate hangar shall consist of LED light fixtures designed for high-bay installation, meeting the following requirements:

   a. Maximum of 300 watts rating per fixture

   b. Suitable for damp locations

   c. 70+ CRI rating at 4,000K

   d. 120° beam angle or wider

   e. Minimum 20,000 lumens

   f. Lighting configuration should provide illuminance of approximately 50 foot-candles

   g. Lights shall be instant-on and provide flicker free lighting

h. Switches shall be located adjacent to all personnel doors and shall be in accordance with State, Local, and Federal requirements. Lights shall be configured on a minimum of 2 circuits.

Alternate lighting fixtures which provide equal or better illumination may be submitted to Owner for review and approval.

3. 110V duplex receptacles shall be provided on each wall of the hangar. Receptacles shall be spaced not more than 30 feet apart.

4. Exterior lighting shall consist of building-mounted flood lights, meeting the following requirements:

   a. Lights shall be 250 watt high pressure sodium flood lights.

   b. Each light is to include a fixed hood/visor.

   c. Finish of fixtures shall be reviewed and approved by the Owner.

   d. All exterior lighting power shall be activated by one single photocell oriented to northern sky and mounted on exterior of the building.

   e. Alternate lighting fixtures which provide equal or better illumination may be submitted to Owner for review and approval.

   f. A minimum of two fixtures shall be provided on the front of the hangar, facing the aircraft apron. In addition, an exterior light shall be provided over each personnel door and adjacent to each utility door.

5. Hangars 6,400 sq.ft. or larger shall be provided with a minimum of 2 electrical outlets for use in charging a Ground Power Unit (GPU) capable of delivering a minimum of 28 volts of DC.

6. See section K below for restroom electrical requirements.

7. See section L below for office space electrical requirements.

8. One, double, steady-burning, red obstruction light (L-810) meeting the requirements of FAA Advisory Circular 70/7460-1L Obstruction Lighting and Marking, and FAA Advisory Circular 150/5345-43G Specification for Obstruction Lighting Equipment, shall be installed on the hangar roof. Light shall be installed on the airside face of the hangar at the highest point of the roof line.

J. Plumbing:

1. Hangars larger than 3,600 sq.ft. shall be provided with two utility sinks located on opposite walls on the interior of the building. Sinks shall be equipped with hot and cold water. An interior hose bibb shall be installed adjacent to each sink.

2. Two hose bibbs shall be installed on the exterior of the building. Hose bibbs shall be located on opposite walls.

K. Restroom: All corporate hangars shall be provided with one restroom space. Restroom shall meet the following requirements, at a minimum:

1. Restrooms are considered conditioned spaces and must meet all applicable code requirements. Developer must provide heating and air conditioning for restroom.
2. Restroom facility shall meet North Carolina Handicap Code and ADA requirements.
3. Walls and ceiling of restroom shall be minimum 5/8" gypsum wall board or as required by code official, finished and painted with primer and two coats of latex enamel, semi-gloss paint. All interior walls shall have a 4" rubber base.
4. Flooring shall be polished concrete. Use of vinyl composition tile or other materials may be submitted to Owner for review and approval.
5. Toilet shall be enclosed in a handicap accessible restroom stall.
6. Sink shall be standalone adjacent to restroom stall.
7. Electric, 1.5 GPM point-of-use tankless water heater shall be installed at the restroom sink.
8. Shower facilities are optional. Any shower facility provided shall meet the North Carolina Handicap Code and ADA requirements. If shower facilities are provided, additional water heater capacity shall be provided.
9. All restroom fixtures shall be American Standard or Kohler commercial grade fixtures, or approved equal.
10. Ceiling vent fan vented to the exterior of the building.
11. Restroom lighting shall consist of 40 W florescent light fixtures above the sink and other ceiling florescent lighting necessary for a 10 footcandle illumination level in the restroom area. Florescent fixtures shall not have exposed tubes. Light switch shall be located adjacent to the entry door.
12. One 110V duplex GFCI outlet shall be provided in the restroom.
13. Ceiling vent fan and lights shall be controlled by a single switch located adjacent to the restroom door.
14. Door shall be 3'-0" x 6'-8" interior type as required for use and location. Hardware

shall be locking and keyed.

15. All waterline construction shall be in accordance with State, Local, and Federal requirements.
16. All sanitary sewer line construction shall be in accordance with State, Local, and Federal requirements.
17. Restroom shall have floor drain connecting to oil/water separator.

L. Office: Inclusion of office space in corporate hangars is optional. Office space shall meet the following requirements, at a minimum:

1. Offices are considered conditioned spaces and must meet all applicable code requirements. Developer must provide heating and air conditioning for offices.
2. Office space shall meet North Carolina Handicap Code and ADA requirements.
3. Walls and ceiling of office shall be minimum 5/8" gypsum wall board or as required by code official, finished and painted with primer and two coats of latex enamel, eggshell or satin paint.
4. All interior walls shall have a 4" rubber base. Use of other baseboard materials may be submitted to the Owner for review and approval.
5. Flooring shall be polished concrete. Use of vinyl composition tile or other materials may be submitted to Owner for review and approval.
6. Office lighting shall consist of 40 W florescent light fixtures necessary for a 30 foot candle illumination level in each room of the office area. Florescent fixtures shall not have exposed tubes. Light switch shall be located adjacent to the entrance to each room.
7. A minimum of one 110V duplex receptacle shall be provided on each wall of each individual room within the office space.
8. Door shall be interior type as required for use and location. Hardware shall be locking and keyed.
9. Office space shall have a door leading to the exterior of the building. Door shall be situated to open onto existing or proposed parking area, as shown on Airport's Terminal Area Development Plan.

M. HVAC: Hangar shall be equipped with a minimum of two power wall louvers and overhead fans to promote air circulation.

N. Signage:

1. Exterior signage is optional. All signage plans must be reviewed and approved by the Owner.

2. Exterior sign will consist of one building-mounted sign facing the landside and/or one building mounted sign facing the airside. Height of individual letters in the sign shall be not more than 1/12 the height of the building. The total sign height shall be no more than 1/6 of the building's elevation and the sign width no more than ¾ of the width of the entire side. Wording of these signs shall be restricted to recognized company signatures. Other inscriptions of an informational nature may be approved.

3. Only wall mounted signs will be allowed. Signs shall not extend above the eaves of the building.

4. Proposed illumination of signs will be reviewed and approved on a case-by-case basis.

5. The following types of signs are prohibited:

    a. Freestanding signs

    b. Roof signs

    c. Flashing, moving, animated, digital, or fluttering signs

    d. Neon signs

    e. Portable signs

    f. Inflatable signs

    g. Exterior signs containing excessive product or service advertising or trade names.

    h. Flags, banners and pennants

    i. Billboards

O. Miscellaneous Appurtenances:

1. Outdoor trash areas shall be visually screened. Trash enclosures shall be designed and located so as not to be highly visible from adjacent streets and property.

PART 4 — EXECUTION

4.1 FABRICATION

A. General: Design prefabricated components and necessary field connections required for erection to permit easy assembly and disassembly. Fabricate components in such a manner that once assembled, they may be disassembled, repackaged and reassembled with a minimum amount of labor.

1. Clearly and legibly mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams and instruction manuals.

B. Structural Framing: Shop fabricate structural framing components to the indicated size and section complete with base plates, bearing plates and other plates required for erection, welded in place. Provide required holes for anchoring or connections either shop drilled or punched to template dimensions.

C. Shop Connections: Provide power riveted, bolted or welded shop connections.

D. Field Connections: Provide bolted field connections.

4.2 EXAMINATION

A. Examine substrates, areas, and conditions, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer's tolerances.

C. Proceed with erection only after unsatisfactory conditions have been corrected.

4.3 PREPARATION

A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place, unless otherwise indicated.

4.4 ERECTION

A. Framing: Erect structural framing true to line, level and plumb, rigid and secure. Level base plates to a true even plan with full bearing to supporting structures, set with double-nutted anchor bolts. Use a non-shrinking grout to obtain uniform bearing and to maintain a level base line elevation. Moist cure grout for not less than 7 days after placement.

B. Purlins and Girts: Provide rake or gable purlins with tight fitting closure channels and fascias. Secure structural framing and hold rigidly to a straight line by sag rods.

C. Bracing: Provide angle bracing in both roof and sidewalls as required to meet design criteria. Movement resisting frames may be used in lieu of sidewall rod bracing, to suit manufacturer's standards.

D. Where aluminum surfaces come in contact with ferrous metal or other incompatible metals, paint the incompatible metal with a coating of heavy-bodied bituminous paint.

E. Apply sheets or panels for exterior wall construction with the ribs or corrugations in a vertical position. All side and end laps shall be sealed with joint sealant as specified in this section. The placement of closure strips, flashing and sealing materials shall be accomplished in an approved manner which will assure complete weather-tightness.

F. All roofing sheets or panels shall be applied with the corrugations or ribs parallel to the slope of the roof. Roofing sheets or panels shall be supplied in the longest lengths obtainable with the end laps occurring only at the structural members, with no transverse joints. All side laps shall be laid away from the prevailing wind, and all side and end laps shall be sealed with the joint sealing specified in this section.

G. Apply sheets or panels for interior wall construction with the ribs or corrugations in a vertical position.

H. Minimum side laps for all types of sheets or panels shall be one or more corrugation or rib. Minimum end laps for all types of sheets or panels shall be 2-1/2".

I. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual". Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

    1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.

    2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

    3. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

J. Doors:

1. Hollow Metal Doors and Frames: Install doors and frames straight, plumb, and level. Securely anchor frames to building structure. Set units with 1/8" maximum clearance between door and frame at jambs and head 3/4" maximum between door and floor. Adjust for proper operation.

2. Hangar Doors: Erect doors in accordance with manufacturer's recommendations and approved trade practice. Doors shall be hung plumb and true to building and shall open in a smooth continuous motion without binding and warping. Adjust all rollers, cables, shafts, hinges, locks, cane bolts, etc., for proper operation.

3. Electrically Operated Bi-fold Doors: Erect doors in accordance with manufacturer's recommendations and approved trade practice. Doors shall be hung plumb and true to building and shall open in a smooth continuous motion without binding and warping. Adjust all rollers, cables, shafts, hinges, locks, cane bolts, etc., for proper operation.

4. After completing installation of doors, test and adjust doors to operate easily, free of warp, twist, or distortion.

K. All OSHA safety requirements shall be adhered to including 100% fall protection when above 6'-0" working height.

4.5 CLEANING AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing and accessories.

C. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

D. Doors and Frames: Immediately after installation, sand smooth rusted or damaged areas or prime coat and apply touchup of compatible air-drying primer. Immediately before final inspection, remove protective wrappings from doors and frames.

END OF DIVISION 13

DIVISION 31 – EARTHWORK

PART 1- GENERAL

1.1 SUMMARY

A. This section includes earthwork required to construct hangar buildings, airside pavement, parking lots, and access roads.

B. Grading shall be in conformance with the Airport's Terminal Area Development Plan.

C. The contractor will be responsible for all site safety and for following the appropriate OSHA guidelines.

1.2 REFERENCES

A. FAA Advisory Circular 150/5370-10 (current edition) - Standards for Specifying Construction of Airports.

B. See Appendix A, Geotechnical Exploration Report.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Division 32 Exterior Improvements

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. All earthwork shall be completed in accordance with Item P-152 of FAA AC 150/5370-10.

B. Grades shall be maintained so that the surface is well drained at all times.

C. Developer shall be prepared to provide dewatering to maintain groundwater levels below bottom of excavation areas.

D. The existing soils onsite are suitable for use as structural fill only when dry. When wet, the contractor shall be required to disk, or use other approved methods, to dry the soils prior to use as fill material.

E. All excess material generated from grading operations shall be disposed of off airport

property, unless otherwise approved by the Owner.

F. All areas to be graded shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled temporarily for future use.

3.2 COMPACTION REQUIREMENTS

A. The subgrade under areas to be paved or areas where buildings are to be constructed shall be compacted to the depth and density as shown in the table below. The material to be compacted shall be within +/- 2% of optimum moisture content before beginning rolling to obtain the prescribed compaction.

Table 1: Minimum Subgrade Compaction Requirements

Pavement Location	Pavement Type	Aircraft Weight (lbs.)	Proctor	Compaction Depth*	Compaction Density*
Landside	Asphalt	-	Standard (ASTM D698)	12"	98%
Airside	Asphalt or PCC	30,000	Standard (ASTM D698)	12"	98%
	Asphalt or PCC	50,000	Standard (ASTM D698)	12"	98%
	Asphalt or PCC	60,000	Standard (ASTM D698)	12"	98%
	PCC	75,000	Modified (ASTM D1557)	12"	100%
	PCC	100,000	Modified (ASTM D1557)	12"	100%

*Minimum Requirement

B. Owner will conduct acceptance sampling and testing as outlined in FAA Item P-152. If testing reveals that construction does not meet the applicable specifications, construction activities shall stop until a mutually acceptable solution can be reached.

3.3 STRUCTURAL FILL

A. Off-site borrow for structural fill should consist of soils having USCS designations of SC, SM, SP, or SW. The material should also have a maximum plasticity index of 15 percent, be free of debris, and must have less than 3% organics. The material should have a modified Proctor maximum dry density (MDD) of at least 115 pcf. These soils should have a CBR value of at least 15 percent when compacted to at least 95% of their modified Proctor MDD at their optimum moisture content.

3.4 EMBANKMENT

A. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6" and shall then be compacted as indicated in paragraph 3.2, above.

B. Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12" and compacted as specified for the adjacent fill.

C. Embankments shall be formed in successive horizontal layers of not more than 8" in loose depth. The material in each layer shall be within +/- 2% of optimum moisture content before rolling to obtain the prescribed compaction.

END OF DIVISION 31

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DIVISION 32 – EXTERIOR IMPROVEMENTS

PART 1- GENERAL

1.1 SUMMARY

A. Section Includes:

1. Asphalt Paving
2. Concrete Paving
3. Concrete Sidewalks
4. Seeding and Mulching
5. Site Restoration

1.2 REFERENCES

A. NCDOT Standard Specifications for Roads and Structures (current edition) published by the North Carolina Department of Transportation.

B. FAA Advisory Circular 150/5370-10 (current edition) - Standards for Specifying Construction of Airports.

1.3 SUBMITTALS

A. Submit product information and mix design for asphalt and concrete pavements.

B. Product Data:

1. Aggregate certifications
2. Asphalt binder certifications
3. Joint materials, admixtures, and curing compounds
4. Grass seed mixture

1.4 RELATED WORK SPECIFIED ELSEWHERE

A. Division 03 Concrete

B. Division 31 Earthwork

PART 2 - PRODUCTS

2.1 PAVEMENT SECTIONS AND MATERIALS

A. Parking Lots and Access Roads

1. Access roads and parking lots shall be asphalt pavement. Use Superpave mix design conforming to Section 610 of NCDOT Standard Specifications.

2. The pavement section for access roads and parking lots shall consist of the following minimum thicknesses:

   a. Surface Course - 3" NCDOT Asphalt Pavement (SF-9.5A), placed in two 1.5" lifts, with tack coat between lifts.

   b. Base Course – 6" NCDOT Crushed Aggregate Base Course (CABC)

   c. Compacted subgrade

B. Airside Pavement (T-Hangars)

1. Airfield pavement in the T-Hangar area shall be either asphalt concrete or Portland cement concrete (PCC) pavement. Pavement shall be designed and constructed in accordance with FAA Items designated below, as defined in AC 150/5370-10.

2. Reclaimed asphalt pavement (RAP) will not be allowed in airside pavement.

3. Asphalt pavement sections shall consist of the following minimum thicknesses:

   a. Surface Course – 4" FAA Bituminous Surface Course (FAA P-401), placed in two 2" lifts, with tack coat (FAA P-603) between lifts.

   b. Base Course – 8" FAA Crushed Aggregate Base Course (FAA P-209)

   c. Compacted subgrade

4. Concrete for T-hangar areas shall meet the requirements outlined in Section C, below.

C. Airside Pavement (Corporate Hangars)

1. Airfield pavement in the Corporate Hangar area must be PCC, constructed in accordance with FAA P-501.

2. Concrete aprons designed for aircraft weighing 30,000 lbs. or less shall have a minimum 28-day compressive strength of 4,400 psi.

3. Concrete aprons designed for aircraft weighing over 30,000 lbs. shall have a minimum flexural strength of 650 psi.

4. Cement shall conform to the requirements of ASTM C150 Type I.

5. See table below for minimum PCC pavement thicknesses based on aircraft design weights:

Pavement Design Weight (lbs.)	P-501 (Inches)	P-209 (Inches)	k-Value Subgrade	Max. Joint Spacing (feet)
30k	6	4	195	12.5
45k	7	4	195	15
60k	9	4	195	15
75k	10	4	195	20

6. Concrete floor slabs shall be reinforced with a minimum 6x6 welded wire fabric, furnished in flat sheets only, conforming to the requirements of ASTM A1064, or bar mats conforming to the requirements of ASTM A184 or A704.

7. The ratio of the longest side of a slab to the shortest side of a slab shall not exceed 1.25.

8. Pavement joints shall be constructed in accordance with FAA AC 150/5320-6.

9. Concrete joint sealer shall meet the requirements of FAA Item P-605. Joint sealants shall be Dow Corning 888-SL, or 890-SL, as applicable, or approved equal.

10. The Owner shall review the Developer's selected pavement design weight in relation to the dimensions of the proposed hangar building. At the Owner's discretion, the Developer may be required to provide concrete pavement designed for a heavier aircraft.

11. Expansion of the main concrete aircraft apron, required to accommodate hangar construction, as shown on the Airport's Terminal Area Development Plan, shall be constructed for a minimum aircraft weight of 75,000 lbs.

D. Sidewalks

1. Sidewalks shall be constructed of PCC in accordance with FAA P-610.

2. Concrete for sidewalks shall have a minimum 28-day compressive strength of 3,000 psi.

3. Concrete sidewalk shall be a minimum 4" thick and shall be constructed 5' wide.

4. A 5'x5' concrete pad shall be constructed outside of any personnel door which does not exit onto a turfed area.

2.2 SEEDING AND MULCHING

A. Seeding, lime, fertilizer, and mulch shall be in accordance with Items T-901 and T-908 of FAA AC 5370-10.

B. The use of Bahiagrass is not permitted.

C. Temporary Seed for December 1- April 15 shall meet the following requirements:

1. Rye (grain) applied at 120 lbs/acre.
2. Annual Kobe Lespedeza applied at 50 lbs/acre
3. Apply 2,000 lbs/acre ground agricultural limestone and 750 lbs/acre of 10-10-10 fertilizer.

D. Temporary Seed for April 15 – August 15 shall meet the following requirements:

1. German Millet applied at 40 lbs/acre
2. Apply 2,000 lbs/acre ground agricultural limestone and 750 lbs/acre of 10-10-10 fertilizer.

E. Temporary Seed for August 15 – December 30

1. Rye (grain) applied at 120 lbs/acre
2. Apply 2,000 lbs/acre ground agricultural limestone and 1,000 lbs/acre of 10-10-10 fertilizer.

F. Permanent Seed for April 15 – June 30 shall meet the following requirements:

1. Common Bermuda Grass applied at 80 lbs/acre
2. Apply 4,000 lbs/acre ground agricultural limestone and 1,000 lbs/acre of 10-10-10 fertilizer.

G. Permanent Seed for August 25 – September 15 shall meet the following requirements:

1. Blend of two turf-type tall Fescues (90%) and two or more Kentucky Bluegrass varieties (10%) applied at 250 lbs/acre.
2. Apply 4,000 lbs/acre ground agricultural limestone and 1,000 lbs/acre of 10-10-10 fertilizer.

H. Apply 4,000 lbs/acre of straw mulch. Anchor straw by tacking with asphalt, netting, or mulch anchoring tool.

2.3 LANDSCAPING

A. Landscaping of the premises is required for corporate hangars. A plan for landscaping the premises shall be submitted to the Owner for its review and approval.

B. Careful review will be placed on the plant material selection. Plant materials that attract birds and other wildlife are prohibited.

C. Developer shall be responsible for maintaining the landscaping.

PART 3 - EXECUTION

3.1 PAVEMENT PREPARATION

A. Asphalt and concrete paving operations must adhere to the weather limitations detailed in the applicable specifications listed above.

B. Stone base shall not be placed until underlying subgrade has been reviewed and accepted by the Owner and/or the Owner's Consulting Engineer.

C. Asphalt and concrete pavements may not be placed until Owner and/or Owner's Consulting Engineer has reviewed and accepted the preparation of the underlying subgrade and stone base.

3.2 PAVEMENT CONSTRUCTION

A. Owner will conduct acceptance sampling and testing as outlined in the above specifications. If testing reveals that construction does not meet the applicable specifications, construction activities shall stop until a mutually acceptable solution can be reached.

B. No abrupt change in grade will be allowed between concrete hangar floor and adjacent asphalt or concrete pavement. A smooth transition is required.

C. All pavements shall be constructed to drain away from hangar building.

3.3 SITE RESTORATION

A. All disturbed areas, including haul routes, staging areas, and stockpiles shall be restored to a smooth line and grade with positive drainage. Disturbed areas shall be smooth graded to allow for ease of mowing.

B. All disturbed areas shall be seeded and mulched.

C. All disturbed areas shall be seeded and stabilized within 14 calendar days of completion of grading operations.

D. Cover seeded slopes where grade is greater than 4H: 1V with erosion control fabric. Lay fabric smoothly on surface, bury top end of each section in 6" deep excavated topsoil trench. Overlay edges and ends of adjacent rolls minimum 12 inches. Backfill trenches and rake smooth, level with adjacent soil. Secure outside edges and overlaps at 36" intervals with stakes.

E. Refertilize if growth is not fully adequate. Developer shall be responsible for achieving a vigorous stand of permanent grass.

F. Reseed, refertilize, and mulch immediately following erosion or other damage.

END OF DIVISION 32

DIVISION 33 – UTILITIES

PART 1- GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stormwater drainage
2. Sanitary sewer
3. Waterline service
4. Power service
5. Data / telephone

B. Developer shall be responsible for individual connection to all utilities and shall have meters for water and electricity for each hangar building.

C. All utility layouts must conform to the Airport's Terminal Area Development Plan and be approved by the Owner and the Owner's Consulting Engineer.

D. Developer shall be responsible for coordination with utility companies and shall be responsible for any costs associated with permits, taps, meters, transformers, or other costs associated with establishing service.

E. All development on airport property must follow the Owner's Rules & Regulations, Stormwater Pollution Prevention Plan (SWPPP), and Spill Prevention Control and Countermeasure Plan (SPCC).

1.2 REFERENCES

A. FAA Advisory Circular 150/5370-10 (current edition) - Standards for Specifying Construction of Airports.

1.3 SUBMITTALS

A. Submit manufacturer's Product Data Sheets for each product to be used in the work.

B. Submit product information and construction and installation details for proposed oil/water separator.

C. Submit product information and installation details for grinder pump.

1.4 RELATED WORK SPECIFIED ELSEWHERE

A. Division 13 – Special Construction – Pre-Engineering Hangar Buildings

PART 2 - PRODUCTS

2.1 STORMWATER DRAINAGE SYSTEM

A. Stormwater pipes shall be sized and installed per the Owner's adopted Terminal Area Development Plan.

B. Developer shall submit proposed stormwater drainage plan to Owner for review and approval for any proposed development in the T-hangar area.

C. All stormwater pipe shall be constructed in conformance with the requirements of Item D-701 of FAA AC 150/5370-10.

1. Reinforced concrete pipe shall meet the requirements of ASTM C76. Pipe installed under pavements to be used by aircraft shall be Class IV. Pipe installed under parking lots, access roads, and in turfed areas shall be Class III.
2. Corrugated polyethylene pipe shall meet the requirements of AASHTO M294.
3. Rigid pipe shall have Class B bedding.

D. All stormwater structures shall be installed in conformance with the requirements of Items D-751 and D-752 of FAA AC 150/5370-10.

E. Unless otherwise approved by the Owner, downspouts shall be connected to the storm drainage system. If downspouts cannot be connected to storm drainage system, adequate splash pads must be provided at each outlet to prevent erosion. Proposed splash pad must be approved by the Owner.

2.2 SANITARY SEWER SYSTEM

A. Sanitary sewer service shall include force main, gravity lines, wyes, saddles, bends, and appurtenances required for proper installation and complete and approved system.

B. All materials shall meet the requirements of the local utility.

C. Maintain 3-foot minimum depth of cover over pipe. Sanitary sewer lines shall have a minimum separation of 18" vertical and 10' horizontal from water lines. Sanitary sewer lines shall have a minimum separation of 12" vertical from storm sewers.

D. Sanitary sewer manholes, if necessary, shall be reinforced, precast manholes meeting the requirements of ASTM C478.

E. Plastic ribbon and trace wire tape shall be installed over water lines. Ribbon shall be brightly colored green continuously printed with "Sanitary Sewer" in large letters, minimum 6 inches wide by 4 mils thick, with magnetic detectable conductor manufactured for direct burial service.

F. Each corporate hangar shall have a dedicated oil/water separator as shown on the Owner's Terminal Area Development Plan.

G. All corporate hangars must have a minimum of one appropriately sized trench drain in the main hangar bay, which drains to the oil/water separator. Trench drain system shall be HDPE or fiberglass, 4" inner diameter, drain system with frame and grate rated for aircraft loading. Trench drain systems shall be one of the following, or approved equal:

1. Zurn Z886 Perma-Trench System with DGE or FGF grate.

2. Eric'sons DuraTrench DTPF-HDBP

H. All restrooms must have a floor drain which drains to the oil/water separator.

I. Oil/water separator shall be, at a minimum, Proceptor OMC 300 without a coalescer, or Proceptor OMC 150 with a coalescer, or approved equal. A larger oil/water separator may be required based on actual use and activities proposed for the hangar by the Developer.

J. Each corporate hangar shall have a grinder pump station to pump wastewater to the sewer main.

K. Minimum grinder pump shall be model DH151-74, manufactured by E-ONE, or approved equal. A larger pump may be required based on actual usage proposed by Developer.

L. Force main discharge pipe from grinder pump shall be 1 ¼" diameter, for use with DH151-74 pump. If a larger grinder pump is necessary, force main discharge pipe shall be sized to meet the requirements of the grinder pump.

2.3 WATER SERVICE

A. Water service connections shall include tapping the main line and providing all saddles, corporation stops, fittings, service lines, copper setters, meters, meter boxes, backflow preventers, and other incidentals required for proper installation and complete and approved system.

B. All materials shall meet the requirements of the local utility company.

C. Water service pipe sizes shown on the Airport's Terminal Area Development Plan are minimum requirements. Developer may need larger pipe sizes depending on the expected water usage for the hangar.

D. Developer shall be required to install fire line and fire hydrant as required per the Airport's Terminal Area Development plan and the local Fire Marshall.

E. Maintain 3-foot minimum depth of cover over pipe.

F. Plastic ribbon and trace wire tape shall be installed over water lines. Ribbon shall be brightly colored blue continuously printed with "Water Service" in large letters, minimum 6 inches wide by 4 mils thick, with magnetic detectable conductor manufactured for direct burial service.

2.4 POWER SERVICE

A. The Developer shall provide and coordinate electric power supply to all buildings with the local utility. Existing power supply at the airport is 3-phase, 208 V. Developer will be responsible for any cost associated with extending power service or installation of any required transformers.

B. All permanent power lines shall be installed underground.

C. Temporary overhead power shall only be permitted during construction.

2.5 DATA/TELEPHONE SERVICE

A. The Developer shall provide and coordinate data/telephone service to all corporate hangars.

B. Data/telephone service shall be provided to each office space incorporated into a corporate hangar.

C. T-hangar buildings will not require data/telephone service.

D. All data/telephone lines shall be installed underground.

PART 3 – EXECUTION

3.1 STORMWATER SYSTEM

A. Stormwater pipe and structures shall be installed in accordance with Items D-701, D-751, and D-752 of FAA AC 150/5370-10.

3.2 TRENCHING

A. Excavate subsoil required for utilities. Remove lumped subsoil, boulders, and rock.

B. Perform excavation within 48 inches of existing utility service in accordance with utility's requirements.

C. Remove water or materials that interfere with pipe installation.

D. Trench Width: Excavate bottom of trenches maximum 16 inches wider than outside diameter of pipe.

E. Excavate trenches to depth required for installation of pipe as shown on the Airport's Terminal Area Development Plan. Provide uniform and continuous bearing and support for bedding material and pipe.

F. Maintain vertical faces to an elevation equal to 12 inches above top of pipe.

1. When Project conditions permit, side walls may be sloped or benched above this elevation.

2. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this Section.

G. Support Utilities and Structures:

1. Keep trench width at top of trench to practical minimum to protect adjacent or crossing utility lines.

2. Support utilities crossing trench by means acceptable to utility company.

3. Do not interfere with 45-degree bearing splay of foundations.

4. Provide temporary support for structures above and below ground.

H. When subsurface materials at bottom of trench are loose or soft, excavate to firm subgrade or to depth directed by Engineer.

1. Cut out soft areas of subgrade not capable of compaction in place.

2. Backfill with foundation stone and compact to density equal to or greater than requirements for subsequent backfill material.

I. Trim Excavation: Hand trim for bell and spigot pipe joints where required. Remove loose matter.

3.3 SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures, and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

C. Design sheeting and shoring to be removed at completion of excavation work unless approved by Engineer.

D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.

E. Repair damage to new and existing Work from settlement, water, or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.4 SURFACE WATER CONTROL

A. Control and remove unanticipated water seepage into excavation.

B. Provide ditches, berms, and other devices to divert and drain surface water from excavation area as indicated on drawings.

C. Divert surface water and seepage water within excavation areas into sumps or settling basins prior to pumping water into drainage channels and storm drains.

3.5 DEWATERING

A. Design and provide dewatering system to permit Work to be completed on dry and stable subgrade.

B. Operate dewatering system continuously until backfill is minimum 2 feet above normal ground water table elevation.

C. Modify dewatering systems when operation causes or threatens to cause damage to new construction, existing site improvements, adjacent property, or adjacent water wells.

D. Discharge ground water and seepage water within excavation areas into sumps or settling basins prior to pumping water into drainage channels and storm drains.

3.6 BEDDING AND BACKFILL

A. Place No. 57 pipe bedding material full width of trench to a depth of 6" and compact to 95 percent maximum density. Excavate for pipe bells.

B. Install utility pipe and conduit in accordance with the utility company requirements.

C. Support pipe uniformly along entire length of pipe.

D. Backfill trenches to contours and elevations with unfrozen fill materials. Backfill shall be compacted to 95% of maximum density.

E. Place fill material in continuous 8" loose layers and compact.

F. Employ placement method that does not disturb or damage utilities in trench or foundation perimeter drainage.

G. Maintain optimum moisture content of fill materials to attain required compaction density.

H. Protect open trench to prevent danger to the public.

3.7 OIL/WATER SEPARATORS AND GRINDER PUMPS

A. Oil/water separators and grinder pump stations shall be installed per manufacturer's recommendations.

3.8 MAINTENANCE

A. Maintenance of oil/water separators and grinder pumps shall be the responsibility of Developer.

B. Developer shall be responsible for costs associated with annual testing of backflow preventers, as required by Duplin County.

END OF DIVISION 33

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Geotechnical Exploration Report
Duplin County Airport
Terminal Area Development
Duplin County, North Carolina
S&ME Project No. 1305-15-082

S&ME

Prepared for:
W.K. Dickson & Company, Inc.
720 Corporate Center Drive
Raleigh, North Carolina 27613

Prepared by:
S&ME, Inc.
3201 Spring Forest Road
Raleigh, NC 27616

September 2, 2015

S&ME

September 2, 2015

W.K. Dickson & Company, Inc.
720 Corporate Center Drive
Raleigh, North Carolina 27613

Attention: Ms. Brigid Williams, P.E.

Reference: **Geotechnical Exploration Report**
Duplin County Airport - Terminal Area Development
Duplin County, North Carolina
S&ME Project No. 1305-15-082
NC PE Firm License No. F-0176

Dear Ms. Williams:

S&ME, Inc. (S&ME) is pleased to submit this geotechnical exploration report prepared for the referenced project. Work was conducted in accordance with S&ME's Revised Proposal 13-1500395 dated July 22, 2015. The purpose of the exploration was to evaluate subsurface conditions as they relate to site grading and subgrade support for potential future development. This report presents a summary of pertinent project information, a description of our exploration program, results of field and laboratory testing, and our geotechnical conclusions and recommendations regarding potential future development. A Boring Location Plan, Generalized Subsurface Profile, boring logs, and laboratory test records are included in the Appendix.

S&ME appreciates the opportunity to provide our professional engineering services on this project. Should you have any questions concerning this report or if we may be of further assistance, please contact us at your convenience.

Sincerely,

S&ME, Inc.

J. Adam Browning, P.E.
Sep 2 2015 8:37 AM

J. Adam Browning, P.E.
Project Manager
N.C. Registration No. 034984

John R. Browning, P.E.
Senior Engineer

Table of Contents

Appendices

1.0 PROJECT AND SITE DESCRIPTION

We understand that new development is planned at the Duplin County Airport in Duplin County, North Carolina. We understand that initial development will include preliminary grading and drainage improvements for future apron expansions, hangar construction, and vehicular access and parking in the terminal area. We understand W.K. Dickson will develop minimum construction standards for the airport that could be provided to a private developer, including minimum concrete slab requirements for a variety of hangar sizes and aircraft loading.

You provided us with ten boring locations on a Google Earth aerial image that you requested S&ME drill to a depth of 15 feet below existing grade. We understand that future proposed grades may be as much as 5 to 8 feet below existing grade.

The site is currently an open, relatively flat, grassed area. Broken asphalt was observed at the ground surface in the north portion of the site near boring location B-10. Possible fill may exist in the area of borings B-8 through B-10. We estimate possible fill depths may be on the order of 2 to 3 feet based on a visual evaluation of existing site elevations during our site reconnaissance. A drainage ditch exists along the south and west sides of the existing concrete apron. Water was observed in the ditch with the banks showing signs of erosion. Based on a conversation with on-site personnel, we understand the concrete apron was built approximately 25 years ago above a low-lying, wet area.

2.0 EXPLORATION PROGRAM

The field exploration program for this project included a site reconnaissance by an S&ME representative along with the performance of ten soil test borings. The boring locations were provided by W.K. Dickson and marked in the field by an S&ME representative estimating distances off existing site features. The approximate boring locations are shown on Figure 1 in the Appendix.

The soil borings were advanced to depths of 15 feet below the existing ground surface using hollow stem auger drilling procedures with a CME-45D drill rig. Within each of the soil test borings, samples of subsurface soils were obtained at approximately 2-1/2 foot intervals to a depth of 10 feet and 5 feet intervals below 10 feet using a split-spoon sampler. Standard penetration tests were conducted in conjunction with split-spoon sampling in general accordance with ASTM D 1586 -11.

The boreholes were observed for groundwater at completion of drilling. Boreholes were then backfilled up to the original ground surface with auger cuttings.

A Generalized Subsurface Profile drawing (Figure 2) and Boring Logs presenting subsurface information from the borings are included in the Appendix. Stratification lines shown on the Test Boring Records are intended to represent approximate depths of changes in soil types. Naturally, transitional changes in soil types are often gradual and cannot be defined at a particular depth.

3.0 SUBSURFACE CONDITIONS

Approximately 4 inches of grass/topsoil was encountered at the ground surface at the boring locations. Fill/possible fill soils were encountered below the surface materials in borings B-8, B-9, and B-10. Fill soils consisted of clayey sands (Unified Soil Classification System classification SC). Asphalt fragments were encountered in the split-split spoon sample obtained from 1 to 2.5 feet in B-10. Standard Penetration Test (SPT) N-values in fill soils ranged from 4 to 11 blows per foot (bpf). Well-compacted fill soils typically exhibit SPT N-values on the order of 10 bpf or greater. Thus, existing fill soils appear poorly to moderately compacted. The lower consistency existing fill was encountered in B-8 (SPT N-value of 4 bpf) and B-10 (SPT N-value of 7 bpf). The fill soils were visually observed as moist to wet.

Natural, Coastal Plain soils were encountered below the surface and fill materials to boring termination depths. Natural soils consisted of low plasticity clays (CL), clayey sands (SC), silty sands (SM), slightly clayey sands (SP-SC), slightly silty sands (SP-SM), and relatively clean sands (SP). SPT N-values in natural soils ranged from 4 to 50 blows per foot. These values are indicative of soft to very stiff consistencies for the clays and very loss to dense consistencies for the sands. Relatively low consistency natural soils (having SPT N-values of 4 to 7 bpf) were encountered near the existing ground surface in borings B-1, B-3, and B-6. Low consistency clays and clayey sands (having SPT N-values of 4 to 6 bpf) were encountered from about 3 to 6 feet in borings B-4, B-6, B-7, and B-9. Natural soils were visually observed as moist to wet. Wet soils were encountered in the split-spoon driven from 1 to 2.5 feet at B-1, B-3, and B-5.

Water levels were measured within the boreholes at the termination of drilling. Water levels measured ranged from approximately 5 feet (B-1) to 13 feet (B-10) below the existing ground surface. Please note that these groundwater levels were recorded at the termination of drilling and may not represent more stabilized water levels that may exist after an extended period of time. Stabilized water levels could be slightly higher. Groundwater elevations can be expected to fluctuate due to seasonal variations in rainfall, evaporation, and other factors.

4.0 LABORATORY TESTING

Laboratory testing consisted of natural moisture content, grain size analysis, modified Proctor, and California Bearing Ratio (CBR) testing. The modified Proctor was used per FAA guidelines for airports servicing aircraft having gross weights of 60,000 pounds or greater.

Grain size analysis testing was performed on bulk samples of near-surface soils obtained from B-2 and B-9. Testing indicated the soils were mostly fine sand (about 67 to 70 percent) with about 23 to 25 percent fines (silt and clay).

Modified Proctor tests were performed on the bulk samples of near-surface soils obtained from borings B-2 and B-9. Testing indicated maximum dry densities of about 118 to 125 pounds per cubic foot with corresponding optimum moisture contents of about 9.1 to 9.4 percent. Natural moisture content tests performed on near surface soils indicated moisture contents ranging from 7.2 to 22.7 percent. These values indicate the near-surface soils range from about 2 percent dry to more than 13 percent wet of their optimum moisture content.

California Bearing Ratio (CBR) tests were also performed on recompacted specimens from the bulk samples obtained from borings B-2 and B-9. The test specimens were recompacted to approximately 95 percent of their modified Proctor maximum dry density near their optimum moisture content. The test specimens were then soaked for 96 hours. California Bearing Ratios of 33 to 47 percent were measured. No swelling was observed in the specimens during soaking.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The subsurface exploration indicates that the future development areas are adaptable for the proposed construction. Geotechnical issues that should be taken into consideration in development of the site include near surface very loose to loose natural sands, poorly compacted near surface fill, near surface wet soils, and water tables that may impact deeper excavations. The following paragraphs present more detailed conclusions and recommendations regarding these issues.

5.1 Site Preparation

Site grading will be difficult during wet periods of the year. Most near surface soils are moisture sensitive, and when wet, will tend to rut and pump under rubber-tired traffic and provide poor subgrade support for structures and pavements. As stated above wet near surface soils were encountered at several of the borings. To reduce potential earthwork problems, we recommend that site preparation and grading be conducted during the typically drier summer and fall months. If grading is attempted during wet conditions, more extensive repair of near surface soils and use of select off-site borrow will be necessary to adequately prepare subgrades for new construction. Heavy rubber-tired construction equipment should not be allowed to operate on exposed subgrades during wet conditions. Even during drier periods of the year, we recommend that exposed subgrades be sloped and sealed at the end of each day to promote runoff and reduce infiltration from rainfall.

Site preparation should begin with stripping of existing vegetation and topsoil. Existing asphalt debris should also be removed where encountered near boring location B-10. Approximately 4 inches of topsoil was encountered in borings. We recommend that this site be stripped with wide track dozers to reduce subgrade disturbance and prevent mixing of topsoil with underling clean soils. Topsoil may be stockpiled on site and reused in landscaped areas. Topsoil should not be used for construction of permanent slopes. It should be noted that stained (black) sands are present near the existing ground surface. These materials should not be considered topsoil unless organic contents are greater than 5%.

Following stripping, areas at planned grades and areas that will receive fill should be proofrolled with a loaded, tandem-axle dump truck or equivalent. Any areas that are observed to rut, pump, or deflect excessively during the proofrolling process should be repaired as recommended by the geotechnical engineer. It is anticipated that some repair of low consistency near-surface soils will likely be required in the area of borings B-1, B-6, and B-8. Possible repair measures may include undercutting to stable soils (estimated undercutting depths of 2 to 3 feet, based on the borings) and backfilling with well compacted, low-plasticity sandy soils, discing/drying/compacting existing soils, in-place densification using a large vibratory steel drum roller, placement of a geotextile stabilization fabric and crushed stone, or some combination of these. The most practical repair measure will be influenced by the degree of instability which exists and weather conditions. As such, actual repair measures must be determined in the field at time of construction.

Existing fill materials encountered in B-8, B-9, and B-10 (to approximate depths of 3 feet below the existing ground surface) should be further evaluated during construction by the performance of shallow test pits. Fill materials containing debris or organic contents greater than 5% should be removed and replaced with suitable, compacted structural fill.

5.2 Excavations

Based on results of borings, low to moderate consistency soils are present at the site. Past experience indicates that these materials can be excavated by routine earth-moving equipment such as scrapers pushed by dozers, backhoes, front end loaders, etc. Where wet and lower consistency soils exist heavy rubber tired equipment will cause subgrade disturbance. Local excavations for shallow utility trenches and foundations can likely be accomplished by a conventional backhoe.

Groundwater was encountered at depths of approximately 5 (B-1) to 13 feet (B-10) below the existing ground surface at time of drilling. Please note that more stabilized groundwater levels may exist at higher elevations and groundwater levels will fluctuate with rainfall amounts and seasonal conditions. The contractor should be prepared to maintain groundwater levels below excavation bottoms by appropriate means (i.e. pumping from sumps, well points, etc.).

For confined excavations, trench safety must be evaluated on a case-by-case basis. The contractor will be responsible for all site safety, including the determination of appropriate trench safety measures according to OSHA guidelines.

5.3 Structural Fill

The soils at this site having a Unified Soil Classification designation of CL, SC, SM, SP-SC, SP-SM, and SP are suitable for reuse as structural fill provided that the moisture content is properly controlled during placement and compaction. The moisture condition of near surface soils will be influenced by prevailing weather conditions. At the time our borings were performed, some of the near surface soils were wet and would require drying prior to use as fill.

Off-site borrow for structural fill should consist of soils having USCS designations of SC, SM, SP, or SW, have a maximum plasticity index of 15 percent, be free of debris and have less than 3% organics, and have a modified Proctor maximum dry density (MDD) of at least 115 pcf. These soils when compacted to at least 95% of their modified Proctor MDD at their optimum moisture content should have a CBR value of at least 15 percent.

Fill should be placed in 8 to 10-inch loose lifts and compacted to the following compaction requirements . Moisture contents should be maintained within +/-2% of their optimum moisture content:

- Pavements Not Subjected to Aircraft Loading
    - At least 95% of standard Proctor Below Top 12 inches
    - At least 98% of standard Proctor within Top 12 inches

- Pavements Subjected to Aircraft Loading Greater than 60,000 pounds (per FAA requirements)
  - At least 95% of modified Proctor Below Top 12 inches
  - At least 100% of modified Proctor within Top 12 inches

In-place density testing should be performed during fill placement to confirm that the recommended degree of compaction is achieved.

5.4 Recommendations for Drainage Improvements

Groundwater was encountered at depths of approximately 5 (B-1) to 13 feet (B-10) below the existing ground surface at time of drilling. Please note that more stabilized groundwater levels may exist at higher elevations and groundwater levels will fluctuate with rainfall amounts and seasonal conditions. If excavations are required such that final subgrades are within 3 feet of groundwater elevations, then we recommend that permanent drainage be established. Permanent drainage may include French drains, blanket/edge drains, perimeter ditching, or some combination of the above draining by gravity to low points. If gravity drainage is not possible, installation of sumps and permanent pumping will be required. Once development plans are further along, S&ME can further evaluate the groundwater conditions and how they may affect proposed construction.

5.5 California Bearing Ratio and Subgrade Reaction Modulus Recommendations

Based on laboratory CBR testing along with past experience in this area with similar soils, we recommend a design CBR of 15 percent used for pavement design.

We recommend a design subgrade reaction modulus (k-value) of 195 pci based on the CBR value recommended above. This value is based on FAA's recommended conversion from CBR to k-value using the following formula:

$$K = [(1500 \times CBR) / 26] \text{ ^ } 0.7788 \text{ (in pci)}$$

Please note that the design CBR and k-value assume the subgrade is compacted in accordance with the structural fill recommendations provided in section 5.3.

6.0 QUALIFICATIONS OF REPORT

This report has been prepared in accordance with generally accepted engineering practice for specific application to this project. Any wetland, environmental, or contaminant assessment efforts are beyond the scope of this geotechnical exploration; and therefore, those issues are not addressed in this geotechnical exploration report. The recommendations contained in this report are based on the applicable standards of our profession at the time this report was prepared. No other warranty, express or implied, is made.

Conclusions and recommendations submitted in this report are based, in part, upon the data obtained from the geotechnical exploration. The nature and extent of variations between and outside of the borings may not become evident until construction. If variations appear evident, then it will be necessary to re-evaluate the recommendations of this report. In the event that any changes in the grades, nature,

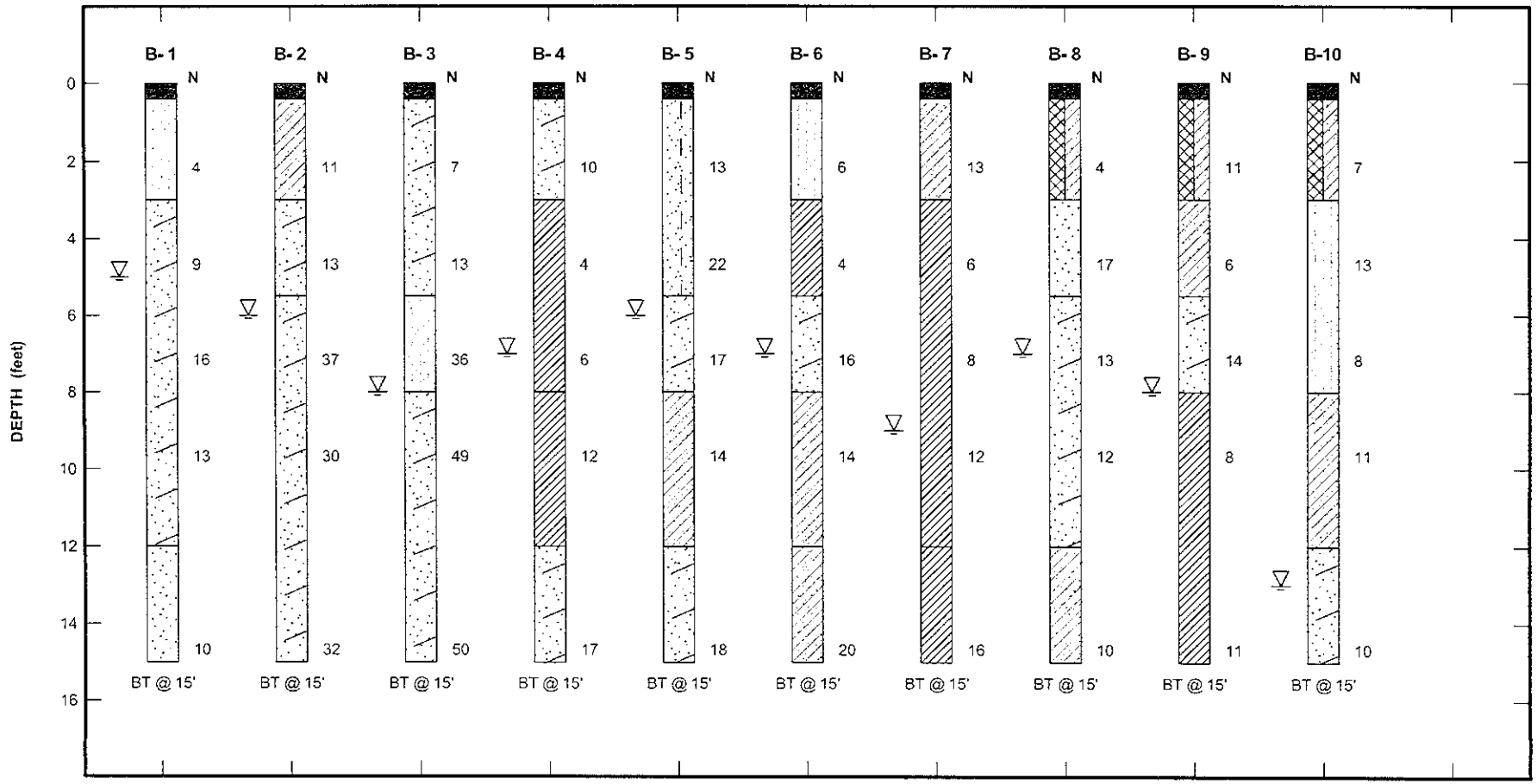
design, or location of the proposed development are planned, the recommendations contained in this report should be reviewed and modified or verified in writing. We recommend that our firm be provided the opportunity for general review of final design plans and specifications to confirm that our recommendations are properly interpreted and implemented.

Appendices

Appendix I –Figures

Note: Base figure from Google Earth, prepared by W.K. Dickson.

SCALE: AS SHOWN	S&ME	BORING LOCATION PLAN DUPLIN COUNTY AIRPORT EXPANSION DUPLIN COUNTY, NORTH CAROLINA	FIGURE NUMBER 1
CHECKED BY: JRB			
DRAWN BY: JAB			
DATE: AUG. 2015		S&ME PROJECT NUMBER: 1305-15-082	



Topsoil
SC, Clayey Sand
Water Level at Termination of Drilling
SM, Silty Sand
CL, Low Plasticity Clay
Fill
SP/SC, Poorly-graded Sand with Clay
SP/SM, Poorly-graded Sand with Silt
SP, Poorly-graded Sand

N = Standard Penetration Test resistance value (blows per foot). The depicted stratigraphy is shown for illustrative purposes only. The actual subsurface conditions will vary between boring locations.

JOB NO: 1305-15-082	S&ME	Diagram: GENERALIZED SUBSURFACE CONDITIONS	Figure 2
DATE: 8/24/15		Project: Duplin County Airport	
		Location: Kenansville, NC	

Appendix II – Boring Logs

LEGEND TO SOIL CLASSIFICATION AND SYMBOLS

SOIL TYPES

(Shown in Graphic Log)


Fill


Asphalt


Concrete


Topsoil


Partially Weathered Rock


Cored Rock


GW WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES


GP POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES


GM SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES


GC CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES


SW WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES


SP POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES


SM SILTY SANDS, SAND - SILT MIXTURES


SC CLAYEY SANDS, SAND - CLAY MIXTURES


ML INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY


CL INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS


OL ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY


MH INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS


CH INORGANIC CLAYS OF HIGH PLASTICITY


OH ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS

WATER LEVELS

(Shown in Water Level Column)

▽ = Water Level At Termination of Boring
▼ = Water Level Taken After 24 Hours
◄ = Loss of Drilling Water
HC = Hole Cave

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Soft	0 to 2
Soft	3 to 4
Firm	5 to 8
Stiff	9 to 15
Very Stiff	16 to 30
Hard	31 to 50
Very Hard	Over 50

RELATIVE DENSITY OF COHESIONLESS SOILS

RELATIVE DENSITY	STD. PENETRATION RESISTANCE BLOWS/FOOT
Very Loose	0 to 4
Loose	5 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	Over 50

SAMPLER TYPES

(Shown in Samples Column)

■ Shelby Tube

☒ Split Spoon

I Rock Core

□ No Recovery

TERMS

Standard Penetration Resistance - The Number of Blows of 140 lb. Hammer Falling 30 in. Required to Drive 1.4 in. I.D. Split Spoon Sampler 1 Foot. As Specified in ASTM D-1586.

REC - Total Length of Rock Recovered in the Core Barrel Divided by the Total Length of the Core Run Times 100%.

RQD - Total Length of Sound Rock Segments Recovered that are Longer Than or Equal to 4" (mechanical breaks excluded) Divided by the Total Length of the Core Run Times 100%.

S&ME
ENGINEERING • TESTING
ENVIRONMENTAL SERVICES

PROJECT:	Duplin County Airport Kenansville, NC S&ME Project No. 1305-15-082	BORING LOG	B- 1
DATE DRILLED: 8/14/15	ELEVATION:	NOTES: Boring location is approximate.	
DRILL RIG: CME 45-D	BORING DEPTH: 15.0 ft		
DRILLER: Carolina Drilling	WATER LEVEL: 5' ATD		
HAMMER TYPE: Automatic	LOGGED BY: A. Browning		
SAMPLING METHOD: Split spoon		NORTHING:	EASTING:
DRILLING METHOD: 3¼" H.S.A.			

DEPTH (feet)	MATERIAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	TOPSOIL (4 inches)						
	SILTY SAND (SM) very loose, brown, fine, wet	SS-1		3	2	2	4
	SLIGHTLY CLAYEY SAND (SP-SC) loose to medium dense, gray, fine, wet			3	4	5	9
5				5	7	9	16
10				4	6	7	13
	SAND (SP) loose, tan, medium to fine, wet			3	5	5	10
15	Boring terminated at 15 ft						

WATER LEVEL ▽

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS

10 20 30 60 80

S&ME BORING LOG 15-082.GPJ S&ME.GDT 8/24/15

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT:	Duplin County Airport Kenansville, NC S&ME Project No. 1305-15-082	BORING LOG	B- 2
DATE DRILLED: 8/14/15	ELEVATION:	NOTES: Boring location is approximate.	
DRILL RIG: CME 45-D	BORING DEPTH: 15.0 ft	*Bulk sample collected from 1 to 5 feet.	
DRILLER: Carolina Drilling	WATER LEVEL: 6' ATD		
HAMMER TYPE: Automatic	LOGGED BY: A. Browning		
SAMPLING METHOD: Split spoon		NORTHING:	EASTING:
DRILLING METHOD: 3¼" H.S.A.			

DEPTH (feet)	MATERIAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	TOPSOIL (4 inches)						
	CLAYEY SAND (SC) medium dense, black, fine, moist			3	5	6	11
	SLIGHTLY CLAYEY SAND (SP-SC) medium dense, gray tan, fine, wet			3	6	7	13
5	**SLIGHTLY CLAYEY SAND (SP-SC)** dense, gray, fine, wet			13	18	19	37
				10	12	18	30
10							
				13	15	17	32
15	Boring terminated at 15 ft						

WATER LEVEL ▽

STANDARD PENETRATION TEST DATA (blows/ft) /REMARKS
10 20 30 60 80

S&ME BORING LOG 15-082.GPJ S&ME.GDT 8/24/15

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
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3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT:	Duplin County Airport Kenansville, NC S&ME Project No. 1305-15-082	BORING LOG	B- 3
DATE DRILLED: 8/14/15	ELEVATION:	NOTES: Boring location is approximate.	
DRILL RIG: CME 45-D	BORING DEPTH: 15.0 ft		
DRILLER: Carolina Drilling	WATER LEVEL: 8' ATD		
HAMMER TYPE: Automatic	LOGGED BY: A. Browning		
SAMPLING METHOD: Split spoon		NORTHING:	EASTING:
DRILLING METHOD: 3¼" H.S.A.			

DEPTH (feet)	MATERIAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
0	**TOPSOIL** (4 inches)						
	SLIGHTLY CLAYEY SAND (SP-SC) loose to medium dense, gray, fine, wet	SS-1		4	3	4	7
				6	5	8	13
5	**SILTY SAND (SM)** dense, black, fine, wet			10	19	17	36
	SLIGHTLY CLAYEY SAND (SP-SC) dense, dark gray, fine, wet			13	27	22	49
10				19	24	26	50
15	Boring terminated at 15 ft						

WATER LEVEL ▽

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS
10 20 30 6080

S&ME BORING LOG 15-082.GPJ S&ME.GDT 8/24/15

NOTES:

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2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT:	Duplin County Airport Kenansville, NC S&ME Project No. 1305-15-082	BORING LOG	B- 4
DATE DRILLED: 8/14/15	ELEVATION:	NOTES: Boring location is approximate.	
DRILL RIG: CME 45-D	BORING DEPTH: 15.0 ft		
DRILLER: Carolina Drilling	WATER LEVEL: 7' ATD		
HAMMER TYPE: Automatic	LOGGED BY: A. Browning		
SAMPLING METHOD: Split spoon		NORTHING:	EASTING:
DRILLING METHOD: 3¼" H.S.A.			

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	STANDARD PENETRATION TEST DATA (blows/ft) /REMARKS	N VALUE
		TOPSOIL (4 inches)									
		SLIGHTLY CLAYEY SAND (SP-SC) loose, gray, fine, moist					2	5	5		10
		SANDY CLAY (CL) soft to firm, tan gray, wet					2	2	2		4
5			▽				2	3	3		6
		SANDY CLAY (CL) stiff, tan gray, wet					4	5	7		12
10											
		SLIGHTLY CLAYEY SAND (SP-SC) medium dense, orange, fine, wet					5	8	9		17
15		Boring terminated at 15 ft									

S&ME BORING LOG 15-082.GPJ S&ME.GDT 8/24/15

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT:	Duplin County Airport Kenansville, NC S&ME Project No. 1305-15-082	BORING LOG	B- 5
DATE DRILLED: 8/14/15	ELEVATION:	NOTES: Boring location is approximate.	
DRILL RIG: CME 45-D	BORING DEPTH: 15.0 ft		
DRILLER: Carolina Drilling	WATER LEVEL: 6' ATD		
HAMMER TYPE: Automatic	LOGGED BY: A. Browning		
SAMPLING METHOD: Split spoon		NORTHING:	EASTING:
DRILLING METHOD: 3¼" H.S.A.			

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	STANDARD PENETRATION TEST DATA (blows/ft) /REMARKS	N VALUE
		TOPSOIL (4 inches)									
		SLIGHTLY SILTY SAND (SP-SM) medium dense, black gray brown, fine, wet					4	6	7		13
							6	9	13		22
5		**SLIGHTLY CLAYEY SAND (SP-SC)** medium dense, gray, fine, wet	▽				5	8	9		17
		CLAYEY SAND (SC) medium dense, tan gray, fine, wet					6	6	8		14
10		**SLIGHTLY CLAYEY SAND (SP-SC)** medium dense, pink tan, fine, wet					5	7	11		18
15		Boring terminated at 15 ft									

STANDARD PENETRATION TEST DATA (blows/ft) /REMARKS: 10 20 30 60 80

S&ME BORING LOG 15-082.GPJ S&ME.GDT 8/24/15

NOTES:

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3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT:	Duplin County Airport Kenansville, NC S&ME Project No. 1305-15-082	BORING LOG	B- 6
DATE DRILLED: 8/14/15	ELEVATION:	NOTES: Boring location is approximate.	
DRILL RIG: CME 45-D	BORING DEPTH: 15.0 ft		
DRILLER: Carolina Drilling	WATER LEVEL: 7' ATD		
HAMMER TYPE: Automatic	LOGGED BY: A. Browning		
SAMPLING METHOD: Split spoon		NORTHING:	EASTING:
DRILLING METHOD: 3¼" H.S.A.			

DEPTH (feet)	MATERIAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	TOPSOIL (4 inches)						
	SILTY SAND (SM) loose, black, with clay, fine, moist	SS-1		4	3	3	6
	SANDY CLAY (CL) soft, red gray, moist			1	1	3	4
5	**SLIGHTLY CLAYEY SAND (SP-SC)** medium dense, tan, fine, wet ▽			5	7	9	16
	CLAYEY SAND (SC) medium dense, pink tan, fine, wet			7	7	7	14
10	**SLIGHTLY CLAYEY SAND (SC)** medium dense, pink tan, fine, wet			7	9	11	20
15	Boring terminated at 15 ft						

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS

10 20 30 60 80

S&ME BORING LOG 15-082.GPJ S&ME.GDT 8/24/15

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
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3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT:	Duplin County Airport Kenansville, NC S&ME Project No. 1305-15-082	BORING LOG	B- 7
DATE DRILLED: 8/14/15	ELEVATION:	NOTES: Boring location is approximate.	
DRILL RIG: CME 45-D	BORING DEPTH: 15.0 ft		
DRILLER: Carolina Drilling	WATER LEVEL: 9' ATD		
HAMMER TYPE: Automatic	LOGGED BY: A. Browning		
SAMPLING METHOD: Split spoon		NORTHING:	EASTING:
DRILLING METHOD: 3¼" H.S.A.			

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / ROD	STANDARD PENETRATION TEST DATA (blows/ft) /REMARKS 10 20 30 60 80	N VALUE
		TOPSOIL (4 inches)									
		CLAYEY SAND (SC) medium dense, orange brown, fine, moist					5	6	7		13
		SANDY CLAY (CL) firm to stiff, brown, moist to wet					5	3	3		6
5							4	4	4		8
			▽				3	5	7		12
10											
		SANDY CLAY (CL) very stiff, gray brown, wet					5	8	8		16
15		Boring terminated at 15 ft									

S&ME BORING LOG 15-082.GPJ S&ME.GDT 8/24/15

NOTES:

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2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT:	Duplin County Airport Kenansville, NC S&ME Project No. 1305-15-082	BORING LOG	B- 8
DATE DRILLED: 8/14/15	ELEVATION:	NOTES: Boring location is approximate.	
DRILL RIG: CME 45-D	BORING DEPTH: 15.0 ft		
DRILLER: Carolina Drilling	WATER LEVEL: 7' ATD		
HAMMER TYPE: Automatic	LOGGED BY: A. Browning		
SAMPLING METHOD: Split spoon		NORTHING:	EASTING:
DRILLING METHOD: 3¼" H.S.A.			

DEPTH (feet)	MATERIAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / RQD	N VALUE
	TOPSOIL (4 inches)						
	FILL: CLAYEY SAND (SC) very loose, brown, fine, moist	SS-1		2	2	2	4
	SAND (SP) medium dense, white tan, fine, wet			3	7	10	17
5							
	SLIGHTLY CLAYEY SAND (SP-SC) medium dense, gray, fine, wet			4	6	7	13
				5	5	7	12
10							
	CLAYEY SAND (SC) loose, gray, fine, wet			4	6	4	10
15	Boring terminated at 15 ft						

WATER LEVEL: ▽

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS — 10 20 30 60 80

S&ME BORING LOG 15-082.GPJ S&ME.GDT 8/24/15

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT:	Duplin County Airport Kenansville, NC S&ME Project No. 1305-15-082	BORING LOG	B- 9
DATE DRILLED: 8/14/15	ELEVATION:	NOTES: Boring location is approximate.	
DRILL RIG: CME 45-D	BORING DEPTH: 15.0 ft	*Bulk sample obtained from 1 to 5 feet.	
DRILLER: Carolina Drilling	WATER LEVEL: 8' ATD		
HAMMER TYPE: Automatic	LOGGED BY: A. Browning		
SAMPLING METHOD: Split spoon		NORTHING:	EASTING:
DRILLING METHOD: 3¼" H.S.A.			

DEPTH (feet)	MATERIAL DESCRIPTION	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / ROD	N VALUE
	TOPSOIL (4 inches)						
	FILL; CLAYEY SAND (SC) medium dense, brown, fine, moist			8	6	5	11
	CLAYEY SAND (SC) loose, brown, fine, wet			2	3	3	6
5	**SLIGHTLY CLAYEY SAND (SP-SC)** medium dense, gray, fine, wet			3	7	7	14
	▽						
	SANDY CLAY (CL) firm to stiff, gray brown, wet			2	2	6	8
10							
				3	4	7	11
15	Boring terminated at 15 ft						

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS

10 20 30 60 80

S&ME BORING LOG 15-082.GPJ S&ME.GDT 8/24/15

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

PROJECT:	Duplin County Airport Kenansville, NC S&ME Project No. 1305-15-082	BORING LOG	B-10
DATE DRILLED: 8/14/15	ELEVATION:	NOTES: Boring location is approximate.	
DRILL RIG: CME 45-D	BORING DEPTH: 15.0 ft		
DRILLER: Carolina Drilling	WATER LEVEL: 13' ATD		
HAMMER TYPE: Automatic	LOGGED BY: A. Browning		
SAMPLING METHOD: Split spoon		NORTHING:	EASTING:
DRILLING METHOD: 3¼" H.S.A.			

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	WATER LEVEL	ELEVATION (feet)	SAMPLE NO.	SAMPLE TYPE	BLOW COUNT / CORE DATA 1st 6in / RUN #	2nd 6in / REC	3rd 6in / ROD	STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS	N VALUE
		TOPSOIL (4 inches)									
		FILL: CLAYEY SAND (SC) loose, black tan, with asphalt fragments, medium to fine, wet					7	4	3		7
		SILTY SAND (SM) medium dense to loose, tan black, fine, wet					7	6	7		13
5							4	4	4		8
		CLAYEY SAND (SC) medium dense, black, fine, wet					3	4	7		11
10											
		SLIGHTLY CLAYEY SAND (SP-SC) loose, tan, fine, wet	▽				3	5	5		10
15		Boring terminated at 15 ft									

STANDARD PENETRATION TEST DATA (blows/ft) / REMARKS: 10 20 30 60 80

S&ME BORING LOG 15-082.GPJ S&ME.GDT 8/24/15

NOTES:

1. *THIS LOG IS ONLY A PORTION OF A REPORT PREPARED FOR THE NAMED PROJECT AND MUST ONLY BE USED TOGETHER WITH THAT REPORT.*
2. *BORING, SAMPLING AND PENETRATION TEST DATA IN GENERAL ACCORDANCE WITH ASTM D-1586.*
3. *STRATIFICATION AND GROUNDWATER DEPTHS ARE NOT EXACT.*
4. *WATER LEVEL IS AT TIME OF EXPLORATION AND WILL VARY.*

S&ME

Appendix III – Laboratory Test Records

Form No: TR-D2216-T265-2
Revision No. 0
Revision Date: 02/22/08

Laboratory Determination of Water Content

S&ME

ASTM D 2216 ☑ *AASHTO T 265* ☐ *Quality Assurance*

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

Project #: 1305-15-082 Report Date: 8/27/15

Project Name: Duplin Co. Airport Test Date(s): 8/21 - 8/25/15

Client Name:

Client Address:

Sample by: Sample Date(s): 8/14/15

Sampling Method: Borehole Drill Rig : N/A

Method: **A (1%)** ☐ **B (0.1%)** ☑ *Balance ID.* ***1024*** *Calibration Date:* ***11/4/14***

Boring No.	Sample No.	Sample Depth	Tare #	Tare Weight	Tare Wt.+ Wet Wt	Tare Wt. + Dry Wt	Water Weight	Percent Moisture
		ft.		grams	grams	grams	grams	%
B-2	Bulk	1 - 5	1202	122.86	478.55	446.56	31.99	**9.9%**
B-9	Bulk	1 - 5	8003	121.02	428.89	408.10	20.79	**7.2%**
B-3	SS-1	1 - 2.5	10	49.07	263.85	238.23	25.62	**13.5%**
B-6	SS-1	1 - 2.5	64	49.11	232.02	198.22	33.80	**22.7%**
B-8	SS-1	1 - 2.5	31	49.61	244.96	217.21	27.75	**16.6%**

Notes / Deviations / References

AASHTO T 265: Laboratory Determination of Moisture Content of Soils

ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

Mal Krajan, ET — *Technical Responsibility*

Signature

Laboratory Manager — *Position*

8/27/2015 — *Date*

Sieve Analysis of Soils

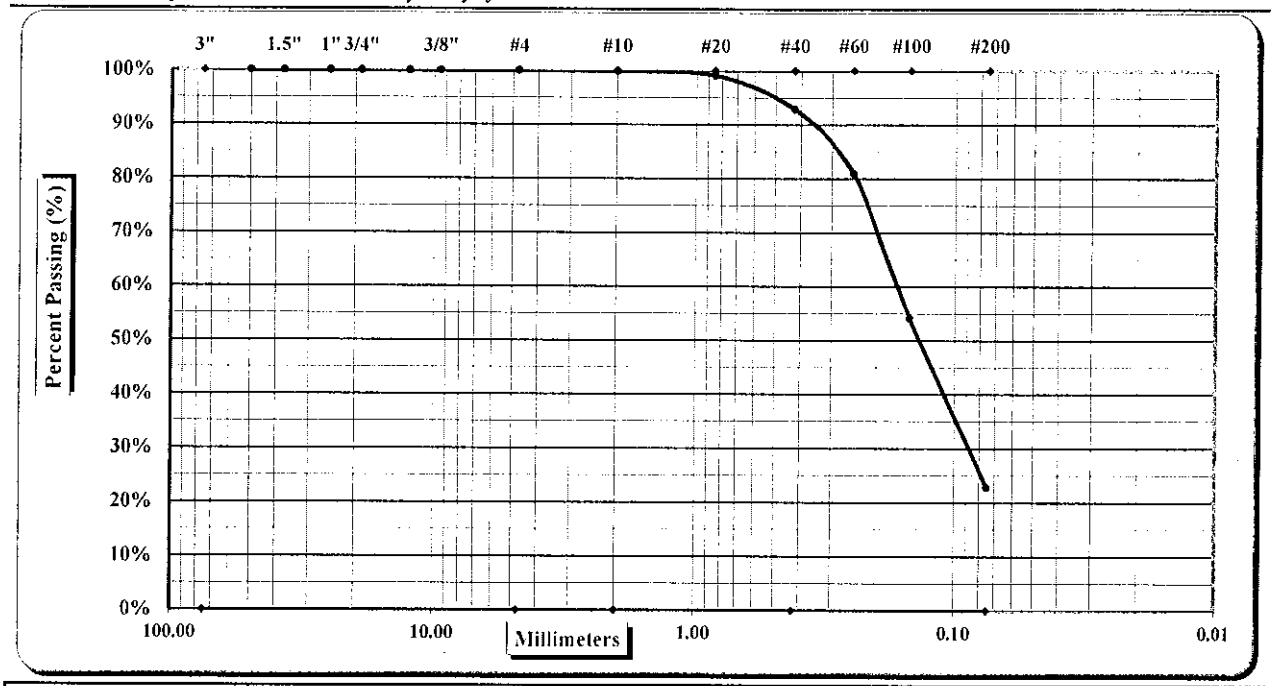
ASTM D 6913

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

Project #:	**1305-15-082**	Report Date:	8/24/15
Project Name:	Duplin Co. Airport	Test Date(s):	8/21 - 8/24/15
Client Name:			
Client Address:			
Boring No.: B-2	Sample: Bag	Sample Date:	8/14/15
Location: Site-Borehole	Offset: N/A	Depth (ft):	1 - 5 ft.

Sample Description: Dark Gray Clayey SAND



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	#4	Coarse Sand	0.1%	Fine Sand	70.1%
Gravel	0.0%	Medium Sand	7.0%	Silt & Clay	22.8%
Liquid Limit	ND	Plastic Limit	ND	Plastic Index	ND
Specific Gravity	ND			Moisture Content	9.9%
Coarse Sand	0.1%	Medium Sand	7.0%	Fine Sand	70.1%

Description of Sand & Gravel Particles: Rounded ☒ Angular ☐

Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References: ND=Not Determined.

ASTM D 4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

ASTM D 2487: Classification of Soils for Engineering Purposes (Unified Soil Classification System)

Mal Krajan, ET		Laboratory Manager	8/24/2015
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

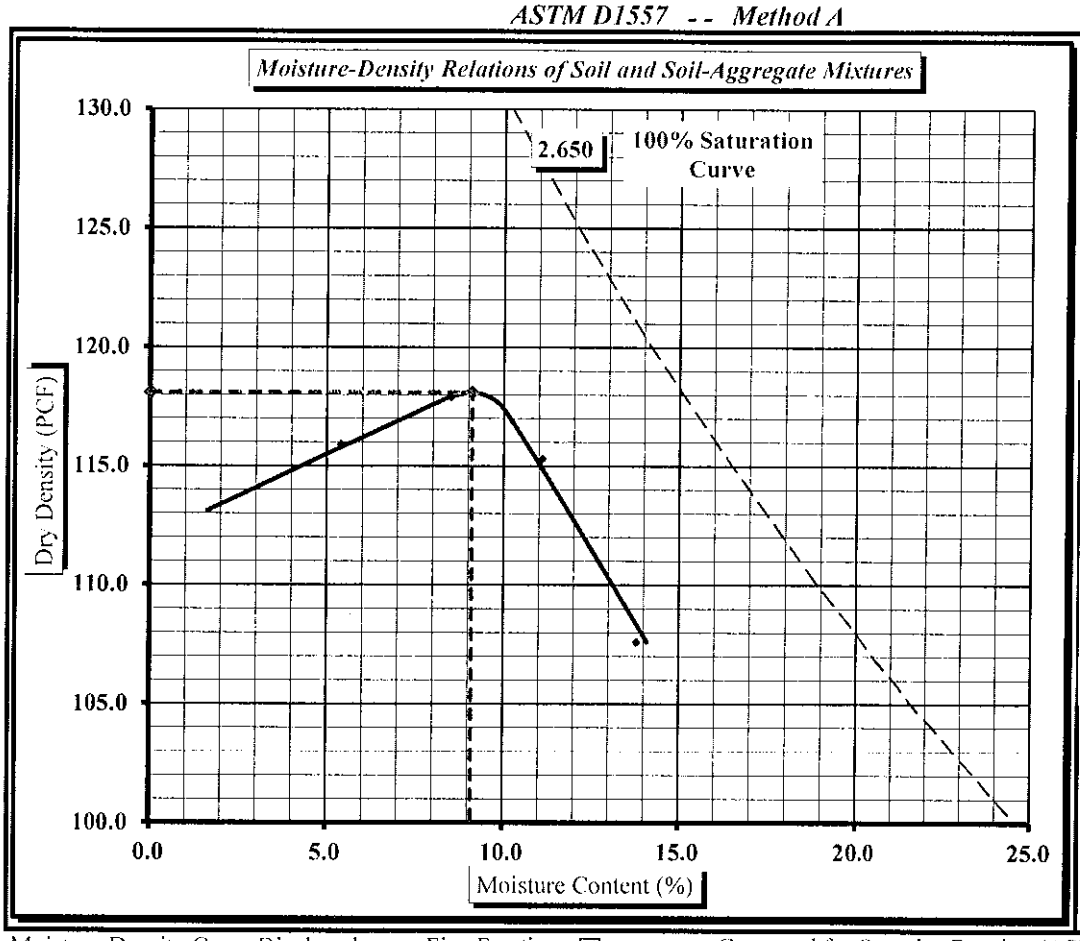
S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	**1305-15-082**	Report Date:	8/25/15
Project Name:	Duplin Co. Airport	Test Date(s):	8/21 - 8/25/15
Client Name:			
Client Address:			

Boring #:	B-2	Sample #:	Bag	Sample Date:	8/14/2015
Location:	Site-Borehole	Offset:	N/A	Depth:	1 - 5 ft.
Sample Description:	Dark Gray Clayey SAND				

Maximum Dry Density 118.1 PCF. **Optimum Moisture Content 9.1%**

ASTM D1557 -- Method A



Soil Properties

Natural Moisture Content	**9.9%**
Assumed Specific Gravity	**2.650**
Liquid Limit	**ND**
Plastic Limit	**ND**
Plastic Index	**ND**

% Passing

3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.9%
#40	92.9%
#60	81.0%
#200	22.8%

Oversize Fraction

Bulk Gravity	
% Moisture	
% Oversize	
MDD	
Opt. MC	

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: ND=Not Determined.

ASTM D 422: Particle Size Analysis of Soils

ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

ASTM D 1557: Laboratory Compaction Characteristics of Soil Using Modified Effort

Mal Krajan, ET		Laboratory Manager	8/27/2015
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-D1883-T193-3
Revision No. 0
Revision Date: 2/6/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

ASTM D 1883

S&ME

Quality Assurance

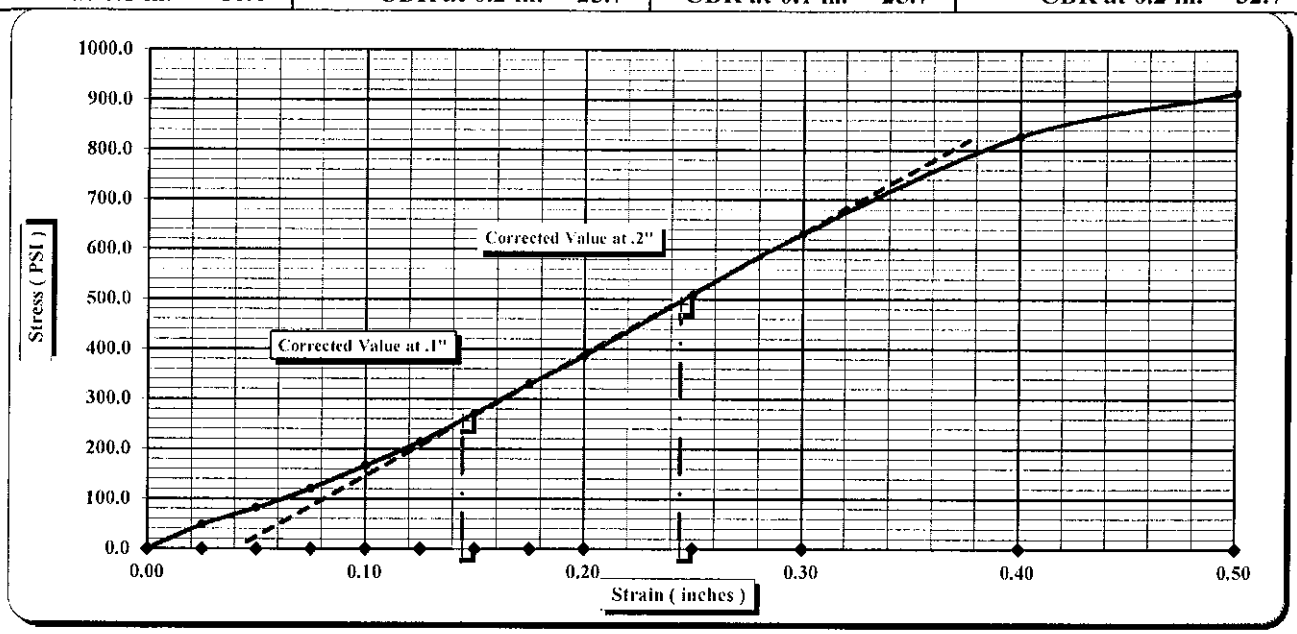
S&ME, Inc.Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

Project #:	**1305-15-082**	Report Date:	8/29/15
Project Name:	Duplin Co. Airport	Test Date(s)	8/21 - 8/29/15
Client Name:			
Client Address:			
Boring #:	B-2	Sample #: Bag	Sample Date: 8/14/15
Location:	Borehole	Offset: N/A	Depth (ft): 1 - 5 ft.
Sample Description:	Dark Gray Clayey SAND		

ASTM D1557 *Method A* Maximum Dry Density: **118.1 PCF** Optimum Moisture Content: **9.1%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 16.6	**CBR at 0.2 in. 25.7**	**CBR at 0.1 in. 25.7**	**CBR at 0.2 in. 32.7**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with ASTM D1883, Section 7.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	40	Final Dry Density (PCF)	110.1
Initial Dry Density (PCF)	112.0	Average Final Moisture Content	11.3%
Moisture Content of the Compacted Specimen	9.3%	Moisture Content (top 1" after soaking)	11.8%
Percent Compaction	94.8%	Percent Swell	0.0%

Soak Time: 96-hr Surcharge Weight 20.0 Surcharge Wt. per sq. Ft. 101.9

Liquid Limit ND Plastic Index ND

Notes/Deviations/References: ND=Not Determined.

Test specimen was compacted to 95% at optimum moisture.

Mal Krajan, ET		Laboratory Manager	8/29/2015
Technical Responsibility	*Signature*	*Position*	*Date*

Sieve Analysis of Soils

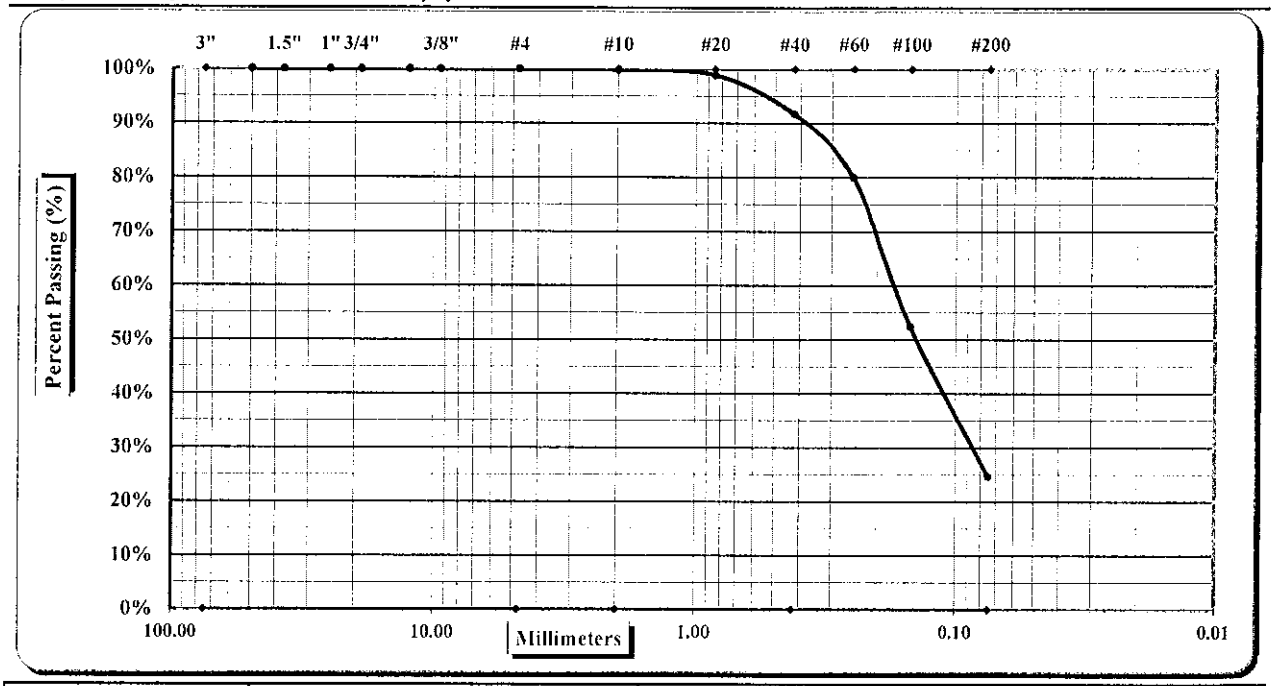
ASTM D 6913

Quality Assurance

S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

Project #:	**1305-15-082**	Report Date:	8/24/15
Project Name:	Duplin Co. Airport	Test Date(s):	8/21 - 8/24/15
Client Name:			
Client Address:			
Boring No.:	B-9	Sample: Bag	Sample Date: 8/14/15
Location:	Site-Borehole	Offset: N/A	Depth (ft): 1 - 5 ft.

Sample Description: Brown Clayey SAND



Cobbles	< 300 mm (12") and > 75 mm (3")	Fine Sand	< 0.425 mm and > 0.075 mm (#200)
Gravel	< 75 mm and > 4.75 mm (#4)	Silt	< 0.075 and > 0.005 mm
Coarse Sand	< 4.75 mm and >2.00 mm (#10)	Clay	< 0.005 mm
Medium Sand	< 2.00 mm and > 0.425 mm (#40)	Colloids	< 0.001 mm

Maximum Particle Size	#4	Coarse Sand	0.1%	Fine Sand	67.0%
Gravel	0.0%	Medium Sand	8.2%	Silt & Clay	24.7%
Liquid Limit	ND	Plastic Limit	ND	Plastic Index	ND
Specific Gravity	ND			Moisture Content	7.2%
Coarse Sand	0.1%	Medium Sand	8.2%	Fine Sand	67.0%

Description of Sand & Gravel Particles: Rounded ☒ Angular ☐

Hard & Durable ☒ Soft ☐ Weathered & Friable ☐

Notes / Deviations / References: ND=Not Determined.

ASTM D 4318: Liquid Limit, Plastic Limit, & Plastic Index of Soils

ASTM D 2487: Classification of Soils for Engineering Purposes (Unified Soil Classification System)

Mal Krajan, ET		Laboratory Manager	8/24/2015
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-D698-2
Revision No. : 0
Revision Date: 11/21/07

Moisture - Density Report

S&ME

Quality Assurance

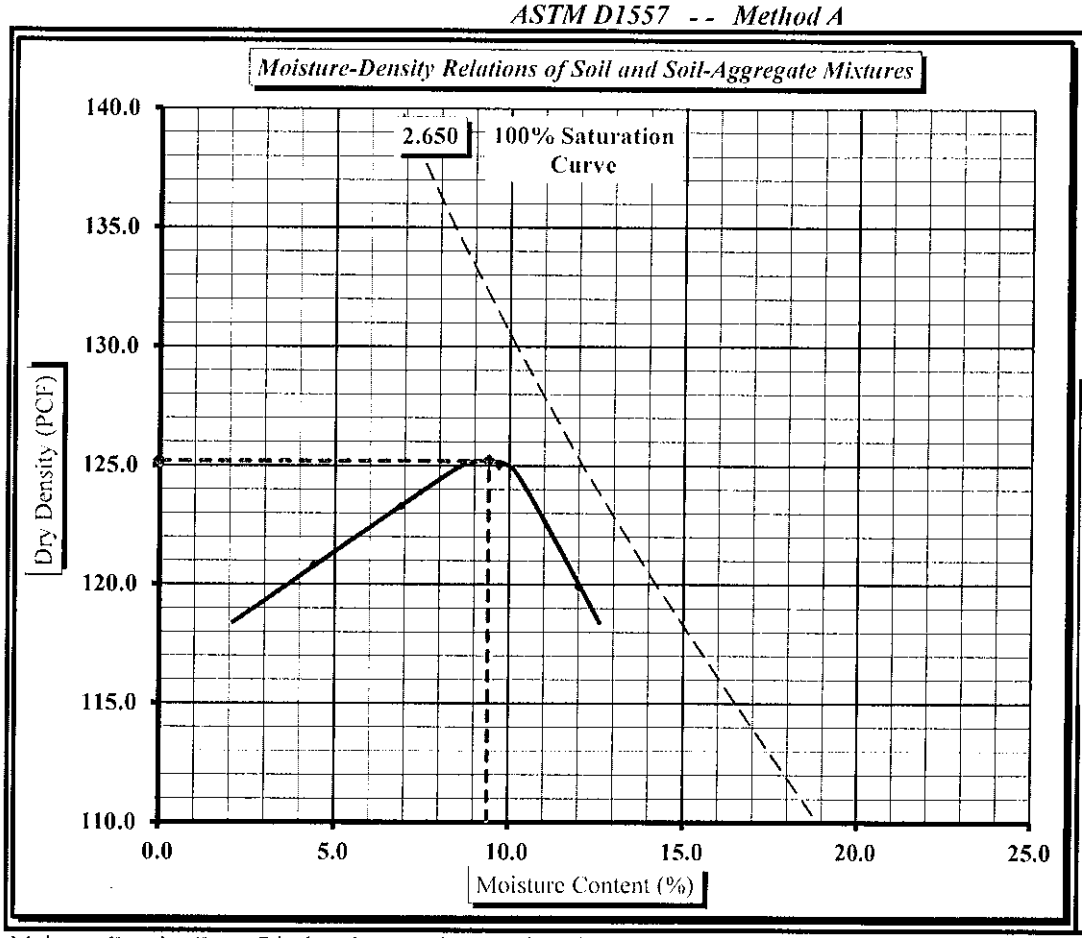
S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

S&ME Project #:	**1305-15-082**	Report Date:	8/25/15
Project Name:	Duplin Co. Airport	Test Date(s):	8/21 - 8/25/15
Client Name:			
Client Address:			

Boring #:	B-9	Sample #:	Bag	Sample Date:	8/14/2015
Location:	Site-Borehole	Offset:	N/A	Depth:	1 - 5 ft.
Sample Description:	Brown Clayey SAND				

Maximum Dry Density 125.2 PCF. **Optimum Moisture Content 9.4%**

ASTM D1557 -- Method A



Soil Properties

Natural Moisture Content	**7.2%**
Assumed Specific Gravity	**2.650**
Liquid Limit	**ND**
Plastic Limit	**ND**
Plastic Index	**ND**

% Passing

3/4"	100.0%
3/8"	100.0%
#4	100.0%
#10	99.9%
#40	91.7%
#60	80.0%
#200	24.7%

Oversize Fraction

Bulk Gravity	
% Moisture	
% Oversize	
MDD	
Opt. MC	

Moisture-Density Curve Displayed: Fine Fraction ☒ Corrected for Oversize Fraction (ASTM D 4718) ☐

Sieve Size used to separate the Oversize Fraction: #4 Sieve ☒ 3/8 inch Sieve ☐ 3/4 inch Sieve ☐

Mechanical Rammer ☐ Manual Rammer ☒ Moist Preparation ☐ Dry Preparation ☒

References / Comments / Deviations: ND=Not Determined.

ASTM D 422: Particle Size Analysis of Soils

ASTM D 2216: Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

ASTM D 1557: Laboratory Compaction Characteristics of Soil Using Modified Effort

Mal Krajan, ET		Laboratory Manager	8/27/2015
Technical Responsibility	*Signature*	*Position*	*Date*

Form No. TR-D1883-T193-3
Revision No. 0
Revision Date: 2/6/08

CBR (California Bearing Ratio) of Laboratory Compacted Soil

ASTM D 1883

S&ME

Quality Assurance

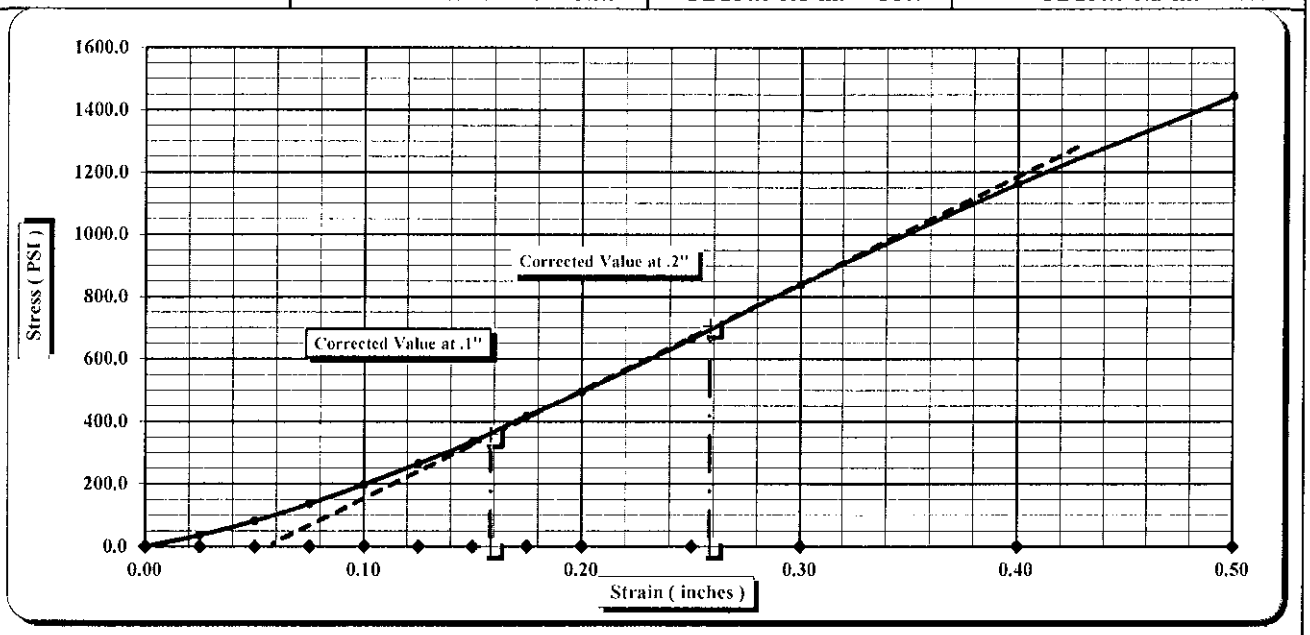
S&ME, Inc.Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616

Project #:	**1305-15-082**	Report Date:	8/29/15
Project Name:	Duplin Co. Airport	Test Date(s)	8/21 - 8/29/15
Client Name:			
Client Address:			
Boring #:	B-9	Sample #: Bag	Sample Date: 8/14/15
Location:	Borehole	Offset: N/A	Depth (ft): 1 - 5 ft.
Sample Description:	Brown Clayey SAND		

ASTM D1557 *Method A* Maximum Dry Density: **125.2 PCF** Optimum Moisture Content: **9.4%**

Compaction Test performed on grading complying with CBR spec. % Retained on the 3/4" sieve: **0.0%**

Uncorrected CBR Values		Corrected CBR Values	
CBR at 0.1 in. 19.8	**CBR at 0.2 in. 32.9**	**CBR at 0.1 in. 35.7**	**CBR at 0.2 in. 47.1**



CBR Sample Preparation:

The entire gradation was used and compacted in a 6" CBR mold in accordance with ASTM D1883, Section 7.1.1

Before Soaking		*After Soaking*	
Compactive Effort (Blows per Layer)	40	Final Dry Density (PCF)	118.7
Initial Dry Density (PCF)	119.2	Average Final Moisture Content	10.4%
Moisture Content of the Compacted Specimen	9.7%	Moisture Content (top 1" after soaking)	10.8%
Percent Compaction	95.2%	Percent Swell	-0.2%

Soak Time: 96-hr Surcharge Weight 20.0 Surcharge Wt. per sq. Ft. 101.9

Liquid Limit ND Plastic Index ND

Notes/Deviations/References: ND=Not Determined.

Test specimen was compacted to 95% at optimum moisture.

Mal Krajan, ET		Laboratory Manager	8/29/2015
Technical Responsibility	*Signature*	*Position*	*Date*

Appendix D

AirPark Permit Application

DUPLIN COUNTY
AIRPARK PERMIT APPLICATION

Applicant Contact Information

Name: _____

Mailing Address: _____

_____

Phone No.: _____ Cell Phone No.: _____

Email Address: _____

Describe Proposed Use: _____

_____

_____

A site plan must accompany this application.
The site plan should show a scale (*ex. 1" = 100'*) and include all existing and proposed site features as outlined on the Design Review Checklist (Appendix B of the Duplin County AirPark Development Ordinance).

_____ _____
Signature of Applicant Date

_____
Print Name and Title

Official Use Only – AirPark Review Committee

Site Plan Permit

☐ Site Plan Approved

☐ Site Plan Not Approved - Reason: _____

_____ _____
AirPark Review Committee Representative Date