EXCHANGE

TM Army and Air Force Exchange Service

PROJECT MANUAL

FOR SOLICITATION

SHOPPETTE / FOOD / CLASS 6 / GAS
TYNDALL AFB
FLORIDA

AAFES PROJECT NUMBER 0941-09-000003

18 January 2012

STATE OF ALABAMA
MONTGOMERY
EDWARD M. BRUMMAL, JR.
1810
ALABAMA
REGISTERED ARCHITECT

23 Aug. 2012

PWBA ARCHITECTS, INC.
529 South Perry Street, Suite 15, Montgomery, Alabama 36104

SET NO. _____

SECTION 00002

PROJECT DIRECTORY

Owner:	**ARMY AND AIR FORCE EXCHANGE SERVICE (AAFES)** AAFES – HQ, Dallas, TX (214) 312-4727 **Mr. Dennis Stevens** Project Manager Real Estate & Construction – Central Region stevensd@aafes.com
Architect:	**PWBA ARCHITECTS, INC.** 529 South Perry Street, Suite 15 Montgomery, AL 36104-4636 (334) 244-4990 FAX (334) 244-4971 **Mr. Edward M. Brummal, Jr., AIA, CCS, CSI** ebrummal@pwba-architects.com
Civil Engineer:	**GONZALEZ-STRENGTH & ASSOCIATES, INC.** 2176 Park Lane Drive Hoover, AL 35244 (205) 942-2486 FAX (205) 942-3033 **Mr. Jon Rasmussen, P.E.** JonR@gonzalez-strength.com
Structural Engineer:	**BLACKBURN & ASSOCIATES, INC.** 8805 Browns Hill Road Lowndesboro, AL 36752 334-265-0206 334-265-0207 FAX **Mr. Lynn Blackburn, P.E.** lynn.ldbinc@mindspring.com
Mechanical Engineer:	**BBG&S ENGINEERING CONSULTANTS INC.** 100 Grandview Place, Suite 130 Birmingham, AL 35243 (205) 969-4550 FAX (205) 837-3886 **Mr. Jack Bowness, P.E.** jbowness@bbgsengineering.com
Electrical Engineer:	**ADVANCED ENGINEERING CONCEPTS, INC.** 3364 Harrison Road Montgomery, AL 36109 (334) 260-0740 FAX (334) 260-0743 **Mr. Mark Redden, P.E.** mredden@aec-net.com

Fuel Systems Engineer:	**JOHNSON SPELLMAN & ASSOCIATES, INC.** 6991 Peachtree Industrial Blvd. Building 700 Norcross, GA 30092 (678) 336-5413 **Mr. Greg Luther** gluther@jsace.com

END OF PROJECT DIRECTORY

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1.01 SUBSURFACE INVESTIGATION REPORT

A. A copy of the geotechnical report with respect to the building site is included with this document:
   1. Title: **Geotechnical Engineering Report**
      Proposed AAFES Shoppette
      Tyndall Air Force Base
      Panama City, Florida
      GAI Project No: EA095004
   2. Date: November 2, 2009
   3. Prepared by: **GALLET & ASSOCIATES, INC.,** 9900 North Davis Highway, Pensacola, Florida 32514. Phone (850) 477-0454, Fax (850) 477-0534
   4. Prepared for: **Gonzalez-Strength and Associates, Inc.,** 2176 Parkway Lake Drive, Hoover, Alabama 35244.

B. The report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect and Structural Engineer.

C. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents.

D. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from those indicated in this report, changes in the design and construction of foundations may be made.

1.02 GROUND PENETRATING RADAR INVESTIGATION

A. A copy of the Ground Penetrating Radar Investigation with respect to the building site is included with this document:
   1. Title: **GROUND PENETRATING RADAR INVESTIGATION OF**
      A Proposed ARMY AND AIR FORCE EXCHANGE
      SERVICE (AAFES) CONSTRUCTION PROJECT,
      TYNDALL AIR FORCE BASE, FLORIDA
      PCI Project No. 30216
   2. Date: June 3, 2010
   3. Prepared by: **PANAMERICAN CONSULTANTS, INC.,** 924 26th Avenue East, Tuscaloosa, Alabama 35404. Phone (205) 556-3096
   4. Prepared for: **GALLET & ASSOCIATES, INC**., 9900 North Davis Highway, Pensacola, Florida 32514. Phone (850) 477-0454, Fax (850) 477-0534

B. The GPR investigation and mapping of subsurface reflectors that may be of concern during construction was prepared primarily for the use of government project planners, the Architect, Civil and Structural Engineer.

C. The subsurface reflectors or GPR anomalies described shall not be construed as components of this Contract, unless specifically referenced in the Contract Documents.

D. This report, by its nature, cannot reveal all conditions that exist on the site. The actual composition of the material creating the anomaly cannot be determined through GPR analysis. Should subsurface conditions be found to vary substantially from those indicated in this report, changes in the design and construction of foundations may be made.

END OF SECTION

Geotechnical Engineering Report
Proposed AAFES Shoppette
Tyndall Air Force Base, Panama City, Florida

November 2, 2009

GAI Project No: EA095004

Prepared For:

Gonzalez-Strength & Associates, Inc.

Hoover, Alabama

Prepared by:

Gallet & Associates, Inc.

A Terracon Company

Pensacola, Florida

Gallet
A Terracon COMPANY

November 2, 2009

Gonzalez-Strength & Associates, Inc.
2176 Parkway Lake Drive
Hoover, Alabama 35244

Attention: Mr. Jon Rasmussen, P.E.
P: [205] 942-2486
F: [205] 942-3033

Regarding: Geotechnical Engineering Report
Proposed AAFES Shoppette
Tyndall Air Force Base, Panama City, Floirda
GAI Project Number: EA095004

Dear Mr. Rasmussen:

Gallet and Associates, Inc. (Gallet) has completed the geotechnical engineering services for the above referenced project. This study was performed in general accordance with our proposal number 09-1455 dated September 9, 2009. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations and floor slabs for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Gallet and Associates, Inc.
A Terracon Company

William A. Singletary, P.E.
Senior Geotechnical Engineer
Florida: 60263

For DPR
David P. Reaves, P.E.
Senior Engineer

Enclosures
cc: 3 – Client
1 – File

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EXECUTIVE SUMMARY

A geotechnical exploration has been performed for a proposed AAFES Shoppette. The project is proposed to be located very near an existing gas station located near Illinois Drive and Mall drive on Tyndall Air Force Base, Panama City, Florida. Nine (9), designated B-1 through B-6, and P-1 through P-3, were performed to a depth of ranging from approximately 6 feet to 20 feet below the existing ground surface in the proposed structure and parking/drive areas.

Based on the information obtained from our subsurface exploration, the site can be developed for the proposed project. The following geotechnical considerations were identified:

- The proposed structures may be supported on shallow footings bearing on the recompacted native soil or on newly placed engineered fill.
- Assuming proper site preparation and any necessary subgrade repair, total and differential settlement should be within anticipated client/owner specifications.
- On-site native soil typically appears suitable for use as general engineered fill provided it meets the structural fill requirement.
- The 2006 International Building Code (IBC), Table 1613.5.2 seismic site classification for this site is D.
- Close monitoring of the construction operations discussed herein will be critical in achieving the design subgrade support. We therefore recommend that Gallet be retained to monitor this portion of the work.
- This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of the report limitations.

GEOTECHNICAL ENGINEERING REPORT
PROPOSED AAFES SHOPPETTE
TYNDAL AIR FORCE BASE, PANAMA CITY, FLORIDA

GAI Project No. EA095004
November 2, 2009

1.0 INTRODUCTION

A geotechnical engineering report has been completed for the proposed AAFES Shoppette and parking/drive areas. The project site is located within Tyndall Air Force Base in Panama City, Florida. Nine (9) borings, designated B-1 through B-6 and P-1 through P-3, were performed to a depth ranging from approximately 6 to 20 feet below the existing ground surface within the area of the proposed shoppette and associated drive areas. Logs of the borings along with a vicinity map and boring location diagrams are included in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- groundwater conditions
- seismic considerations
- stormwater design
- foundation design and construction
- earthwork
- pavement design

2.0 PROJECT INFORMATION

2.1 Project Description

ITEM	DESCRIPTION
Site layout	See Appendix A, Exhibit A-2: Boring Location Diagram
Structure	The project will include a 7,500 Sq.ft. retail structure and fuel island dispenser canopy with associated drive areas.
Building Construction	Slab on grade concrete masonry unit construction
Finished floor elevations	Retail Store: 103.0 ft (provided on site plan)
Maximum loads	Columns: 50 to 150 kips (assumed) Walls: 3 to 5 klf (assumed)
Grading	Minimal fill – estimated at less than 2 feet. Cuts – not anticipated for this structure.

2.2 Site Location and Description

ITEM	DESCRIPTION
Location	The proposed project site is located south of Illinois Avenue and North of Mall Lane near the intersection of the respective roads on Tyndall Air Force Base, Panama City, Florida.
Existing improvements	The site of the new retail store, fuel canopy, and associated parking/drive areas is currently occupied by an existing fueling station. The site was accessible by a trailer mounted drill rig.
Current ground cover	Primarily grassed with some trees and existing pavement.
Existing topography	Relatively level, site (project specific) elevations vary from approximately 98 to 103 feet.

3.0 SUBSURFACE CONDITIONS

3.1 Geology

The site is located within the Gulf Coastal Lowlands physiographic province (USDA, 1986). The province consists of a series of coast-parallel plains or terraces composed of clastics that extend from the coast to successive higher levels in a landward direction. Each terrace is separated from the next by an escarpment or gentle slope.

The area is underlain by sandy soils that grade downward into unconsolidated clastic sediments of the Plio-Pleistocene Citronelle Formation (Miller, 1986; Fernald & Patton, 1984). The sandy to clayey surficial horizons of the Citronelle Formation are time-equivalent to the hydrogeologic Sand & Gravel Aquifer. In this area, the Sand & Gravel Aquifer is approximately 50 to 100 feet thick (Florida Geological Survey, 1991).

Sediments of the Citronelle Formation are comprised of sands, silts, and clays, with minor amounts of gravel. This formation is not of a type associated with radon generation.

3.1 Typical Profile

Based on the results of the borings, subsurface conditions on the project site can be generalized as follows:

Description	Approximate Depth to Bottom of Stratum (feet)	Material Encountered	Consistency/Density
Surface	0.1 to 0.5	Topsoil consisting of fine sand to silty fine sand with some organics	N/A
Stratum 1	Planned termination depth of 20 feet	Native soils consisting primarily of fine sand	Loose to Medium dense to Dense

Conditions encountered at each boring location are indicated on the individual boring logs. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Details for each of the borings can be found on the boring logs in Appendix A of this report.

3.3 Groundwater

The boreholes were observed while drilling for the presence and level of groundwater. Groundwater was observed in each boring at depths ranging from 4 to 6 feet below existing grade. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

Borings for the proposed warehouse addition encountered natural soils consisting of sandy soils with minimal amounts of fines (minus No. 200 sieve-sized particles). These materials will form the subgrade for the proposed retail store foundation. Details regarding the proper preparation of the foundation soils and general earthwork, including engineering fill recommendations, are provided in the **Earthwork** section of this report. Details regarding design recommendations for shallow foundations and floor slabs are provided in the **Foundations** and **Floor Slab** sections of this report, respectively.

Settlement of the shallow foundation system on properly prepared natural soils or engineered fill should be within acceptable limits for the type of structure being considered (1 inch total settlement, 0.5 inches differential settlement). However, we recommend that if the final grading plans are different than that previously given to us, a copy be forwarded to our office in order to evaluate the actual settlement and its impact on the proposed structure.

Groundwater, as encountered in the test borings, is not anticipated to affect the proposed structure foundation construction. However, groundwater may be encountered within deeper utility trenches; therefore, construction dewatering maybe required.

Design and construction recommendations for foundation systems and other earth connected phases of the project are outlined below.

We recommend that the exposed subgrade be thoroughly evaluated after stripping of any topsoil, demolition debris, or other deleterious materials, but prior to the start of fill operations (if any). We recommend that the geotechnical engineer be retained to evaluate the bearing material for the foundations and floor slab subgrade soils. Subsurface conditions, as identified by the field and laboratory testing programs, have been reviewed and evaluated with respect to the proposed building plans known to us at this time.

4.2 Earthwork

4.2.1 Site Preparation

Prior to placing any fill, all vegetation, topsoil, demolition debris, and any otherwise unsuitable material should be removed from the construction areas. Wet or dry material should either be removed or moisture conditioned and recompacted. After stripping and grubbing, the subgrade will require undercutting and recompaction of the loose surficial sandy soils.

The depth of undercut is presented below:

Area [1]	Depth of Undercut
Structure Footprints	2 feet below existing site grades
Pavement	No undercut, compact and proofroll existing soil subgrade

1. Undercut should include designated area plus areas within 10 feet of all building lines.

4.2.2 Material Types

Engineered fill should meet the following material property requirements:

Fill Type [1]	USCS Classification	Acceptable Location for Placement
Off-Site Borrow [2]	SP, SM, SC, CL, ML (LL<40 and PI<15)	All locations and elevations
On-Site Soils	SP, SM, SC (LL<40 and PI<15)	The on-site soils appear suitable for use as fill.

2. Controlled, compacted fill should consist of approved materials that are free of organic matter and debris. A sample of each material type should be submitted to the geotechnical engineer for evaluation.
3. Off-site borrow soils should have a dry unit weight in excess of 100 pcf, and a volumetric free swell of less than 2 percent.

4.2.3 Compaction Requirements

ITEM	DESCRIPTION
Fill Lift Thickness	10-inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used
Compaction Requirements [1]	95% of the materials maximum modified Proctor dry density (ASTM D 1557)
Moisture Content	Within the range 2% below to +3% above the optimum moisture content value as determined by the modified Proctor test at the time of placement and compaction

1. We recommend that engineered fill be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.

4.2.4 Grading and Drainage

Final surrounding grades should be sloped away from the structure on all sides to prevent ponding of water. Gutters and downspouts that drain water a minimum of 10 feet beyond the footprint of the proposed structures are recommended. This can be accomplished through the use of splash-blocks, downspout extensions, and flexible pipes that are designed to attach to the end of the downspout. Flexible pipe should only be used if it is daylighted in such a manner that it gravity-drains collected water. Splash-blocks should also be considered below hose bibs and water spigots.

4.2.5 Construction Considerations

Although the exposed subgrade is anticipated to be relatively stable upon initial exposure, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. The use of light construction equipment would aid in reducing subgrade disturbance. The use of remotely operated equipment, such as a backhoe, would be beneficial to perform cuts and reduce subgrade disturbance. Should unstable subgrade conditions develop, stabilization measures will need to be employed.

Upon completion of undercutting, filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of floor slabs and foundation elements. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompacted prior to floor slab and pavement construction.

Trees or other vegetation whose root systems have the ability to remove excessive moisture from the subgrade and foundation soils should not be planted next to the structure. Trees and shrubbery should be kept away from the exterior edges of the foundation element a distance at least equal to 1.5 times their expected mature height.

As a minimum, all temporary excavations should be sloped or braced as required by Occupational Health and Safety Administration (OSHA) regulations to provide stability and safe working conditions. Temporary excavations will probably be required during grading operations, utility installation, and foundation construction. The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade

preparation; proof-rolling; placement and compaction of controlled compacted fills; backfilling of excavations into the completed subgrade, and just prior to construction of floor slabs.

4.3 Foundations

In our opinion, the proposed structure can be supported by shallow, spread footing foundation systems following a successful proofrolling of the prepared natural soil subgrade. Design recommendations for shallow foundations for the proposed structure are presented in the following paragraphs.

4.3.1 Design Recommendations

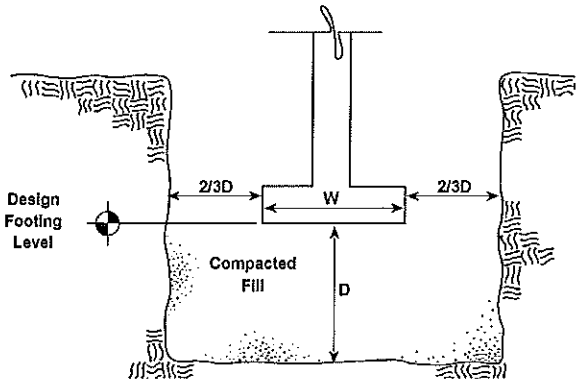
DESCRIPTION	Strip/Ring
Net allowable bearing pressure [1]	2,000 psf
Minimum dimensions	Columns: 24 inches Walls: 18 inches
Minimum embedment below finished grade [2]	18 inches
Approximate total settlement [3]	<1 inch
Estimated differential settlement	<0.5 inches
Ultimate coefficient of sliding friction	0.32

1. The recommended net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. Assumes any unsuitable fill or soft soils, if encountered, will be undercut and replaced with engineered fill. Based upon a Factor of Safety of 3.
2. To reduce the effects of seasonal moisture variations in the subgrade soils. For perimeter footing and footings beneath unheated areas.
3. Acceptable limits settlement limits for this type of structure is typically 1 inch.

4.3.2 Construction Considerations

The base of all foundation excavations should be free of water and loose soil prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Should the soils at bearing level become excessively dry, disturbed or saturated, the affected soil should be removed prior to placing concrete. It is recommended that the geotechnical engineer be retained to observe and test the soil foundation bearing materials.

If unsuitable bearing soils are encountered in footing excavations, the excavation should be extended deeper to suitable soils and the footing could bear directly on these soils at the lower level or on properly compacted backfill extending down to the suitable soils. Overexcavation for compacted backfill placement below footings should extend laterally beyond all edges of the footings at least 8 inches per foot of overexcavation depth below footing base elevation. The overexcavation should then be backfilled up to the footing base elevation with compacted engineered fill material placed in lifts of 9 inches or less in loose thickness and compacted to at least 95 percent of the material's modified effort maximum dry density (ASTM D 1557). See the **Section 4.2 Earthwork** for complete engineered fill and compaction recommendations. The overexcavation and backfill procedure is described in the previous figure.



Note: Excavation in sketch is shown vertical for convenience. Excavations should be sloped as necessary for safety.

4.4 Seismic Considerations

Code Used	Site Classification
2006 International Building Code (IBC) [1]	D[2]

Continued from Page 10

1. In general accordance with the *2006 International Building Code,* Table 1613.5.2.
2. The 2006 International Building Code requires a site soil profile determination extending a depth of 100 feet for seismic site classification. The current scope requested does not include the required 100 foot soil profile determination. Borings for the building extended to a maximum depth of approximately 20 feet and this seismic site class definition considers that natural soil continues below the maximum depth of the subsurface exploration. Additional exploration to deeper depths could be performed to confirm the conditions below the current depth of exploration. Alternatively, a geophysical exploration could be utilized in order to attempt to justify a higher seismic site class.

4.5 Floor Slab

4.5.1 Design Recommendations

ITEM	DESCRIPTION
Floor slab support	recompacted native soils [1]
Modulus of subgrade reaction	100 pounds per square inch per inch (psi/in) for point loading conditions
Aggregate base course/capillary break [2]	6 inches of free draining granular material

1. Floor slabs should be structurally independent of any building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation.

   We recommend subgrades be maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become desiccated prior to construction of floor slabs, the affected material should be removed or the materials scarified, moistened, and recompacted. Upon completion of grading operations in the building areas, care should be taken to maintain the recommended subgrade moisture content and density prior to construction of the building floor slabs.
2. The floor slab design should include a capillary break, comprised of free-draining, compacted, granular material, at least 6 inches. Free-draining granular material should have less than 5 percent fines (material passing the #200 sieve). Other design considerations such as cold temperatures and condensation development could warrant more extensive design provisions.

Where appropriate, saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or any cracks that develop should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

The use of a vapor retarder should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

4.5.2 Construction Considerations

On most project sites, the site grading is generally accomplished early in the construction phase. However as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, rainfall, etc. As a result, the floor slab subgrade may not be suitable for placement of base rock and concrete and corrective action will be required.

We recommend the area underlying the floor slab be rough graded and then thoroughly proofrolled with a loaded tandem axle dump truck prior to final grading and placement of base

rock. Particular attention should be paid to high traffic areas that were rutted and disturbed earlier and to areas where backfilled trenches are located. Areas where unsuitable conditions are located should be repaired by removing and replacing the affected material with properly compacted fill. All floor slab subgrade areas should be moisture conditioned and properly compacted to the recommendations in this report immediately prior to placement of the base rock and concrete.

4.6 Pavement Design

Pavement thickness is dependent upon the anticipated traffic conditions during the life of the pavement, subgrade and paving material characteristics, and climate conditions of the region. The actual pavement performance is highly dependent upon the proper preparation of the subgrade soils, compaction of any fill, and the types of soils used. Following removal of the surface vegetation and prior to placing fill soils required to achieve final grades, the exposed pavement subgrade should be thoroughly undercut, recompacted, and proofrolled.

The following pavement design is based upon the anticipated traffic patterns, a design subgrade LBR value of 10.0 (based on on-site soils with a Modified Proctor maximum dry density of at least 100 pcf, Liquid Limit < 40, and Plasticity Index < 15), a climatic region of I, the anticipated traffic volume and quality control per the State of Florida Department of Transportation Standard Specifications for Road and Bridge Construction, and the American Association of State Highway and Transportation Officials (AASHTO) criteria. The following pavement sections were designed based on a 90.0 percent level of reliability and 0.0 growth rate. The effect of frost heave was considered negligible for the Crestview, Florida area.

The LBR test values used for our analysis are based on our experience with similar soils in the area. Once the pavement areas are brought up to subgrade (entirely or partially), LBR tests should be performed to more accurately represent the actual conditions and characteristics of the subgrade material at the site. The following pavement section may be revised based on the results of these LBR tests.

4.6.1 Standard Duty Pavement

Traffic Volume-	A total of 14,600 EALs for the design life.
Design Life -	20 years, terminal serviceability = 2.5
Subgrade -	Subgrade compacted to 95 percent of the maximum Modified Proctor density value and minimum subgrade LBR=10.0.
Flexible Pavement -	2 inches of an Asphaltic Concrete Surface Course over 6 inches of Limerock Stabilized Base or Sand-Clay Base.
Rigid Pavement -	5 inches of concrete pavement on 4 inches of DGAB material

4.6.2 Heavy Duty Pavement

Traffic Volume -	A total of 50,000 EALs for the design life.
Design Life -	20 years, terminal serviceability = 2.5
Subgrade -	Densified subgrade compacted to 95 percent of the maximum Modified Proctor density value and minimum subgrade LBR=10.0.
Flexible Pavement -	2 inches of an Asphaltic Concrete Surface Course over 2 inches of an Asphaltic Concrete Binder over 6 inches of Limerock Stabilized Base or Sand-Clay Base.
Rigid Pavement -	6 inches of concrete pavement on 4 inches of Limerock Stabilized Base or Sand-Clay Base.

4.6.3 Additional Pavement Recommendations

The following referenced specifications are from the State of Florida Department of Transportation Standard Specifications for Road and Bridge Construction, and may be used for the alternatives listed above:

- Asphaltic Concrete Surface Course; FDOT (337)
- Portland Cement Concrete Pavement; FDOT (346)
- Limerock Stabilized Base; FDOT (230)

We recommend that the Base material in all sections be compacted to 98 percent of its maximum dry density as determined by the AASHTO Compaction Test (T-180). The asphalt layers should be placed in lifts no greater than two (2) inches and compacted with a heavy vibratory roller.

For rigid pavement sections, a maximum joint spacing of about 30 times the thickness of the concrete slab is recommended as per ACI. The concrete pavement should have a minimum 28-day compressive strength of 4,000 pounds per square inch (psi), with a modulus of rupture of 550 psi.

4.7 Stormwater Design

The Northwest Florida Water Management District utilizes an Environmental Resource Permit process that requires stormwater management systems to meet the design and performance criteria set forth by the District. To aid in the design of these systems, various methodologies may be used to determine the unsaturated vertical and saturated lateral flow characteristics of the site. In order to utilize the methodologies, various site and soil parameters must be determined. These parameters include:

- Unsaturated Vertical Hydraulic Conductivity
- Depth to average seasonal high groundwater table
- Fillable porosity
- Average (Weighted) Horizontal Hydraulic Conductivity

To determine the infiltration characteristics of the onsite soils, an infiltration test was performed at the approximate location presented on the attached boring location plan. The measured infiltration rate for the light gray fine SAND was a minimum of 26 inches per hour. Note that these are field measured values and are subject to site conditions, moisture content of the soil, depth of infiltrating stratum, etc. Use of a reduction or 'Safety Factor' is suggested. The double-ring infiltrometer test data is presented in Appendix A.

Based on the information collected during the field investigation, it was determined that the seasonal high groundwater table is anticipated to be at a depth of 2.5 feet below existing grade. This depth was determined through the review of the soils collected through hand auger borings performed at the site during infiltration testing. Based on a ground surface elevation of 99.5 feet, the elevation of the seasonal high groundwater table is estimated to be 97.0 feet.

Fillable porosity is the percent of soil by total volume which is available for storage of groundwater. The value of fillable porosity for poorly graded fine sands in Florida generally ranges from 20 to 30 percent. For the calculation purposes, a conservative fillable porosity value of 25 percent should be used for the sands present at this site. The clayey soils will have a fillable porosity of 15 to 20, depending on the amount of clay in the soil and the in place density.

Horizontal Hydraulic Conductivity can be determined using a variety of tests including: Laboratory testing of undisturbed samples, field testing with cased or uncased auger holes, and pump tests. In addition, studies have been performed with Florida correlating hydraulic permeability values to the amount of fine material (passing the No. 200 sieve) in soils. Based on the fines content of the onsite soils, the hydraulic permeability value at the site is estimated to be 2.5 ft/day.

5.0 GENERAL COMMENTS

Gallet should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Gallet also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or

prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Gallet reviews the changes and either verifies or modifies the conclusions of this report in writing.

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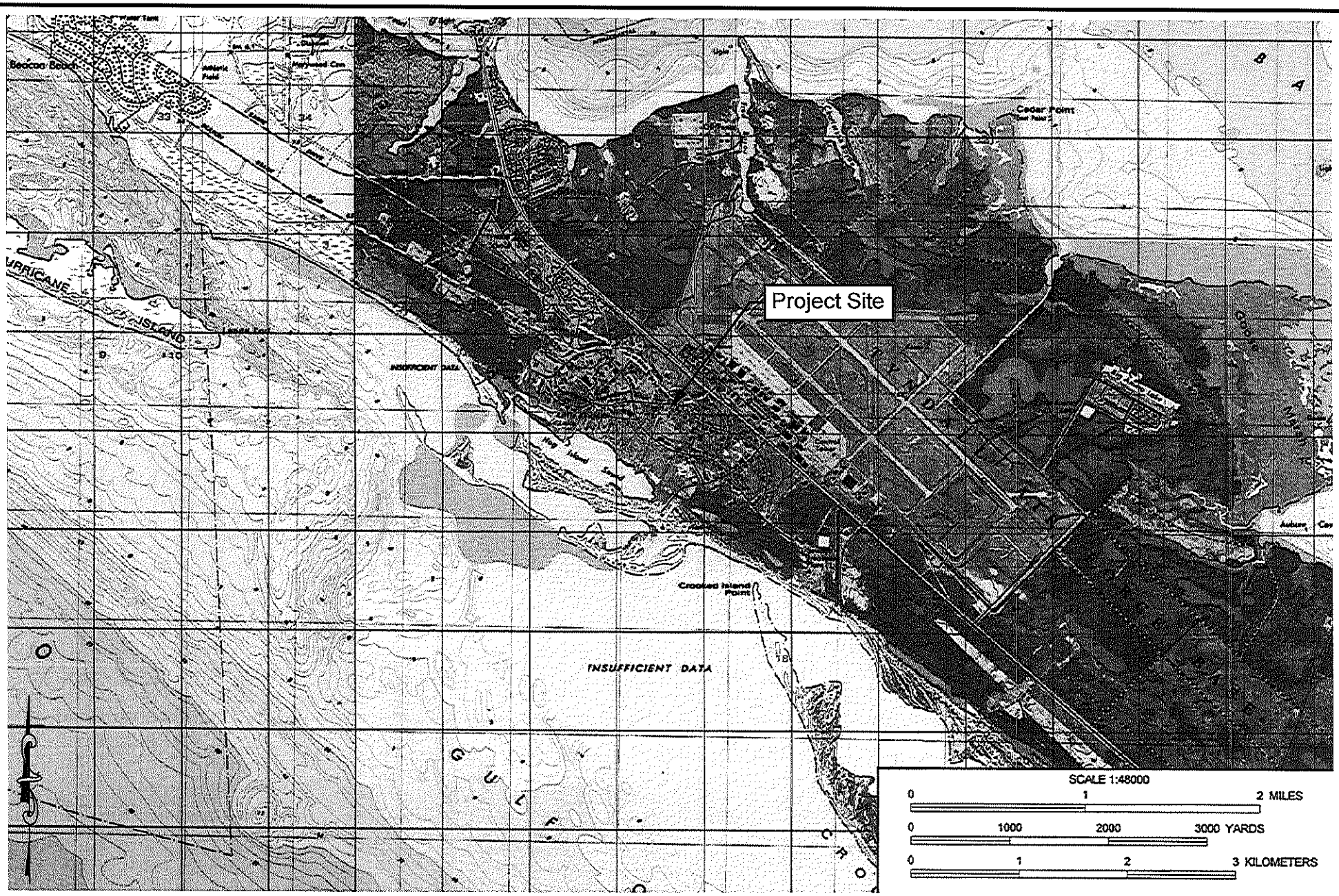
APPENDIX A

FIELD EXPLORATION



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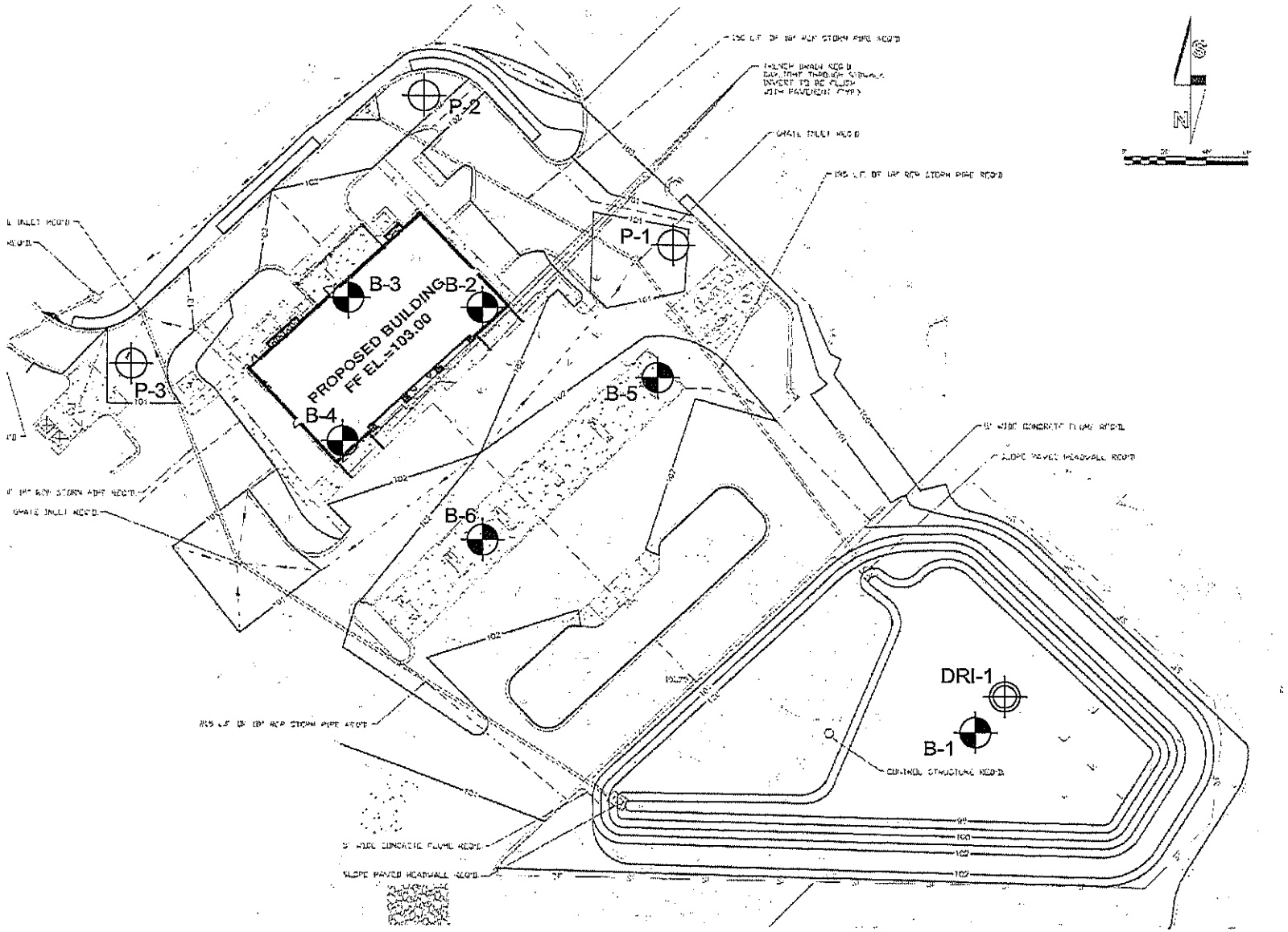
Proposed AAFES Shoppette
Tyndall Air Force Base
Pensacola, Florida
Project No. EA095004

Exhibit A-1

Vicinity Map

SCALE: NTS



Site Plan Provided by Gonzalez-Strength & Associates, Inc.

Gallet A Terracon COMPANY	Proposed AAFES Shoppette Tyndall Air Force Base Pensacola, Florida Project No. EA095004	Exhibit A-2 Boring Locaiton Diagram SCALE: NTS

Gallet & ASSOCIATES

EXHIBIT A-3 LOG OF BORING B-1

Geotechnical Exploration
Tyndall AFB AAFES Shoppette
Tyndall AFB, FL

Project No. EA095004

Date Drilled	: October 21, 2009	Boring Depth	: 15 feet
Engineer	: Andy Singletary	Elevation	: 99.5 (approx)
Driller	: ERG		
Drilling Method	: CFA		
Water Level	: 5.0 feet		

Depth in Feet	Surf. Elev. 99.5	Water Level	GRAPHIC	USCS	DESCRIPTION	Blow Count	N-Value	Moisture Content	Liquid Limits	Plastic Limits	Plasticity Index
0	99			SP	Grey, moist, loose, fine SAND (Minimal topsoil at ground surface with trace roots)	3 2 3	5				
				SP	dark brown, moist to wet, medium dense	5 5 7	12				
				SP	brown to light brown, moist to wet, medium dense	8 10 13	23				
5	94	▼		SP	wet, medium dense to dense	8 12 14	26				
						8 12 15	27				
						4 9 20	29				
10	89			SP		12 25 X	25				
						7 17 30	47				
15	84				Boring terminated at 15 feet below existing grade.						
20											

Gallet & ASSOCIATES

EXHIBIT A-4 LOG OF BORING B-2

Geotechnical Exploration
Tyndall AFB AAFES Shoppette
Tyndall AFB, FL

Project No. EA095004

Date Drilled	: October 21, 2009	Boring Depth	: 20 feet
Engineer	: Andy Singletary	Elevation	: 100.5 (approx)
Driller	: ERG		
Drilling Method	: CFA		
Water Level	: 5.0 feet		

Depth in Feet	Surf. Elev. 100.5	Water Level	GRAPHIC	USCS	DESCRIPTION	Blow Count	N-Value	Moisture Content	Liquid Limits	Plastic Limits	Plasticity Index
0	100			SP	Grey, moist, loose, fine SAND (Minimal topsoil at ground surface with trace roots)	2, 3, 4	7				
				SP	grey to brown, moist to wet	1, 2, 1	3				
				SP	brown to light brown, moist to wet, medium dense	5, 8, 9	17				
5	95	▼		SP	wet, medium dense to dense	5, 8, 10	18				
						5, 5, 9	14				
10	90										
						6, 12, 22	34				
15	85										
						13, 36, X	36				
20											

Boring terminated at 20 feet below existing grade.

Gallet & ASSOCIATES

EXHIBIT A-5 LOG OF BORING B-3

Geotechnical Exploration
Tyndall AFB AAFES Shoppette
Tyndall AFB, FL

Project No. EA095004

Date Drilled	: October 21, 2009	Boring Depth	: 20 feet
Engineer	: Andy Singletary	Elevation	: 100.5 (approx)
Driller	: ERG		
Drilling Method	: CFA		
Water Level	: 6.0 feet		

Depth in Feet	Surf. Elev. 100.5	Water Level	GRAPHIC	USCS	DESCRIPTION	Blow Count	N-Value	Moisture Content	Liquid Limits	Plastic Limits	Plasticity Index
0	100			SP	Grey, moist, loose, fine SAND (Minimal topsoil at ground surface with trace roots)	2 3 2	5				
				SP	grey to brown, moist to wet	1 2 1	3				
5	95	▼		SP	brown to light brown, moist to wet, medium dense	5 8 9	17				
				SP	wet, medium dense to dense	5 8 10	18				
						5 8 11	19				
10	90										
						6 12 24	36				
15	85										
						10 30 X	30				
20											

Boring terminated at 20 feet below existing grade.

Gallet & ASSOCIATES

EXHIBIT A-6 LOG OF BORING B-4

Geotechnical Exploration
Tyndall AFB AAFES Shoppette
Tyndall AFB, FL

Project No. EA095004

Date Drilled	: October 21, 2009	Boring Depth	: 20 feet
Engineer	: Andy Singletary	Elevation	: 100.5 (approx)
Driller	: ERG		
Drilling Method	: CFA		
Water Level	: 6.0 feet		

Depth in Feet	Surf. Elev. 100.5	Water Level	GRAPHIC	USCS	DESCRIPTION	Blow Count	N-Value	Moisture Content	Liquid Limits	Plastic Limits	Plasticity Index
0	100			SP	Grey, moist, loose, fine SAND (Minimal topsoil at ground surface with trace roots)	2, 5, 3	8				
				SP	grey to brown, moist to wet	3, 3, 3	6				
5	95	▼		SP	brown to light brown, moist to wet, medium dense	3, 3, 7	10				
				SP	wet, medium dense to dense	6, 6, 10	16				
						6, 7, 11	18				
10	90										
						10, 16, 26	42				
15	85										
						4, 16, 30	46				
20											

Boring terminated at 20 feet below existing grade.

Gallet & ASSOCIATES

EXHIBIT A-7 LOG OF BORING B-5

Geotechnical Exploration
Tyndall AFB AAFES Shoppette
Tyndall AFB, FL

Project No. EA095004

Date Drilled	: October 21, 2009	Boring Depth	: 20 feet
Engineer	: Andy Singletary	Elevation	: 100.0 (approx)
Driller	: ERG		
Drilling Method	: CFA		
Water Level	: 5.0 feet		

Depth in Feet	Surf. Elev. 100.0	Water Level	GRAPHIC	USCS	DESCRIPTION	Blow Count	N-Value	Moisture Content	Liquid Limits	Plastic Limits	Plasticity Index
0	100			SP	Grey, moist, loose, fine SAND (Minimal topsoil at ground surface with trace roots)	3 3 4	7				
				SP	grey to brown, moist to wet	2 3 2	5				
				SP	brown to light brown, moist to wet, medium dense	3 4 7	11				
5	95	▼		SP	wet, medium dense to dense	7 10 14	24				
						6 10 12	22				
10	90										
						5 11 20	31				
15	85										
						9 33 X	33				
20											

Boring terminated at 20 feet below existing grade.

Gallet & ASSOCIATES

EXHIBIT A-8 LOG OF BORING B-6

Geotechnical Exploration
Tyndall AFB AAFES Shoppette
Tyndall AFB, FL

Project No. EA095004

Date Drilled	: October 21, 2009	Boring Depth	: 20 feet
Engineer	: Andy Singletary	Elevation	: 101.0 (approx)
Driller	: ERG		
Drilling Method	: CFA		
Water Level	: 6.0 feet		

Depth in Feet	Surf. Elev. 101.0	Water Level	GRAPHIC	USCS	DESCRIPTION	Blow Count	N-Value	Moisture Content	Liquid Limits	Plastic Limits	Plasticity Index
0	101				Grey, moist, loose, fine SAND (Minimal topsoil at ground surface with trace roots)	2					
						2	4				
						2					
						2					
				SP		1	3				
						2					
						2					
5	96					3	6				
		▼				3					
					brown to light brown, wet, loose to medium dense	3					
						4	8				
						4					
				SP		3					
						4	9				
						5					
10	91				wet, medium dense to dense						
						6					
						8	17				
						9					
15	86			SP							
						7					
						10	21				
						11					
20											

Boring terminated at 20 feet below existing grade.

Gallet & ASSOCIATES

EXHIBIT A-9 LOG OF BORING P-1

Geotechnical Exploration
Tyndall AFB AAFES Shoppette
Tyndall AFB, FL

Project No. EA095004

Date Drilled	: October 21, 2009	Boring Depth	: 6.0 feet
Engineer	: Andy Singletary	Elevation	: 100.0 (approx)
Driller	: ERG		
Drilling Method	: CFA		
Water Level	: 4.5 feet		

Depth in Feet	Surf. Elev. 100.0	Water Level	GRAPHIC	USCS	DESCRIPTION	Blow Count	N-Value	Moisture Content	Liquid Limits	Plastic Limits	Plasticity Index
0	100			SP	Grey, moist, loose to medium dense, fine SAND (Minimal topsoil at ground surface with trace roots)	3 6 6	12				
				SP	grey to brown, moist to wet, loose	3 3 3	6				
		▼		SP	brown to light brown, moist to wet, medium dense	4 4 6	10				
5	95										
10	90										
15	85										
20											

Boring terminated at 6 feet below existing grade.

Gallet & ASSOCIATES

EXHIBIT A-10 LOG OF BORING P-2

Geotechnical Exploration
Tyndall AFB AAFES Shoppette
Tyndall AFB, FL

Project No. EA095004

Date Drilled	: October 21, 2009	Boring Depth	: 6.0 feet
Engineer	: Andy Singletary	Elevation	: 100.0 (approx)
Driller	: ERG		
Drilling Method	: CFA		
Water Level	: 4.0 feet		

Depth in Feet	Surf. Elev. 100.0	Water Level	GRAPHIC	USCS	DESCRIPTION	Blow Count	N-Value	Moisture Content	Liquid Limits	Plastic Limits	Plasticity Index
0	100			SP	Grey, moist, loose, fine SAND (Minimal topsoil at ground surface with trace roots)	5 3 5	8				
				SP	grey to brown, moist to wet	3 1 2	3				
		▼		SP	brown to light brown, moist to wet	2 3 6	9				
5	95										
10	90										
15	85										
20											

Boring terminated at 6 feet below existing grade.

Gallet & ASSOCIATES

EXHIBIT A-11 LOG OF BORING P-3

Geotechnical Exploration
Tyndall AFB AAFES Shoppette
Tyndall AFB, FL

Project No. EA095004

Date Drilled	: October 21, 2009	Boring Depth	: 6.0 feet
Engineer	: Andy Singletary	Elevation	: 100.5 (approx)
Driller	: ERG		
Drilling Method	: CFA		
Water Level	: 5.0 feet		

Depth in Feet	Surf. Elev. 100.5	Water Level	GRAPHIC	USCS	DESCRIPTION	Blow Count	N-Value	Moisture Content	Liquid Limits	Plastic Limits	Plasticity Index
0	100			SP	Grey, moist, loose to medium dense, fine SAND (Minimal topsoil at ground surface with trace roots)	3 5 9	14				
				SP	grey to brown, moist to wet, loose	3 2 3	5				
5	95	▼		SP	brown to light brown, moist to wet, medium dense	3 5 10	15				
10	90										
15	85										
20											

Boring terminated at 6 feet below existing grade.

Field Exploration Description

The boring locations were laid out on the site by a representative of Gallet utilizing a site plan provided by the client and were marked from available site features. Ground surface elevations indicated on the boring logs were interpolated from a site plan provided by Gonzalez-Strength & Assoc. These elevations are approximate and were rounded to the nearest ½ foot. The locations and elevations of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

The borings were drilled with a trailer-mounted rotary drill rig using continuous flight solid-stem augers to advance the boreholes Samples of the soil encountered in the borings were obtained using the split-barrel sampling procedure.

In the split barrel sampling procedure, the number of blows required to advance a standard 2 inch O.D. split barrel sampler the second and third 6-inch increment of an 18 or 24 inch penetration by means of a 140 pound hammer with a free fall of 30 inches, is the standard penetration resistance value (SPT-N). This value is used to estimate the in-situ relative density of cohesionless soils and consistency of cohesive soils. A rope and cathead operated conventional SPT hammer was used to advance the split-barrel sample in the borings performed on this site.

The samples were tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification. Information provided on the boring logs attached to this report includes soil descriptions, consistency evaluations, boring depths, sampling intervals, and groundwater conditions. The borings were backfilled with auger cuttings prior to the drill crew leaving the site.

A field log of each boring was prepared by the drill crew. These logs included visual classifications of the materials encountered during drilling as well as the driller's interpretation of the subsurface conditions between samples. Final boring logs included with this report represent the engineer's interpretation of the field logs and include modifications based on laboratory observation and tests of the samples.

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APPENDIX B

SUPPORTING INFORMATION

Laboratory Testing

Soil samples were tested in the laboratory to measure their natural water content of some samples. The test results are provided on the boring logs included in Appendix A.

Descriptive classifications of the soils indicated on the boring logs are in accordance with the enclosed General Notes and the Unified Soil Classification System. Also shown are estimated Unified Soil Classification Symbols. A brief description of this classification system is attached to this report. All classification was by visual manual procedures. A selected sample was further classified using the results of Sieve analysis testing. The sieve analysis test results are also provided on the boring logs.

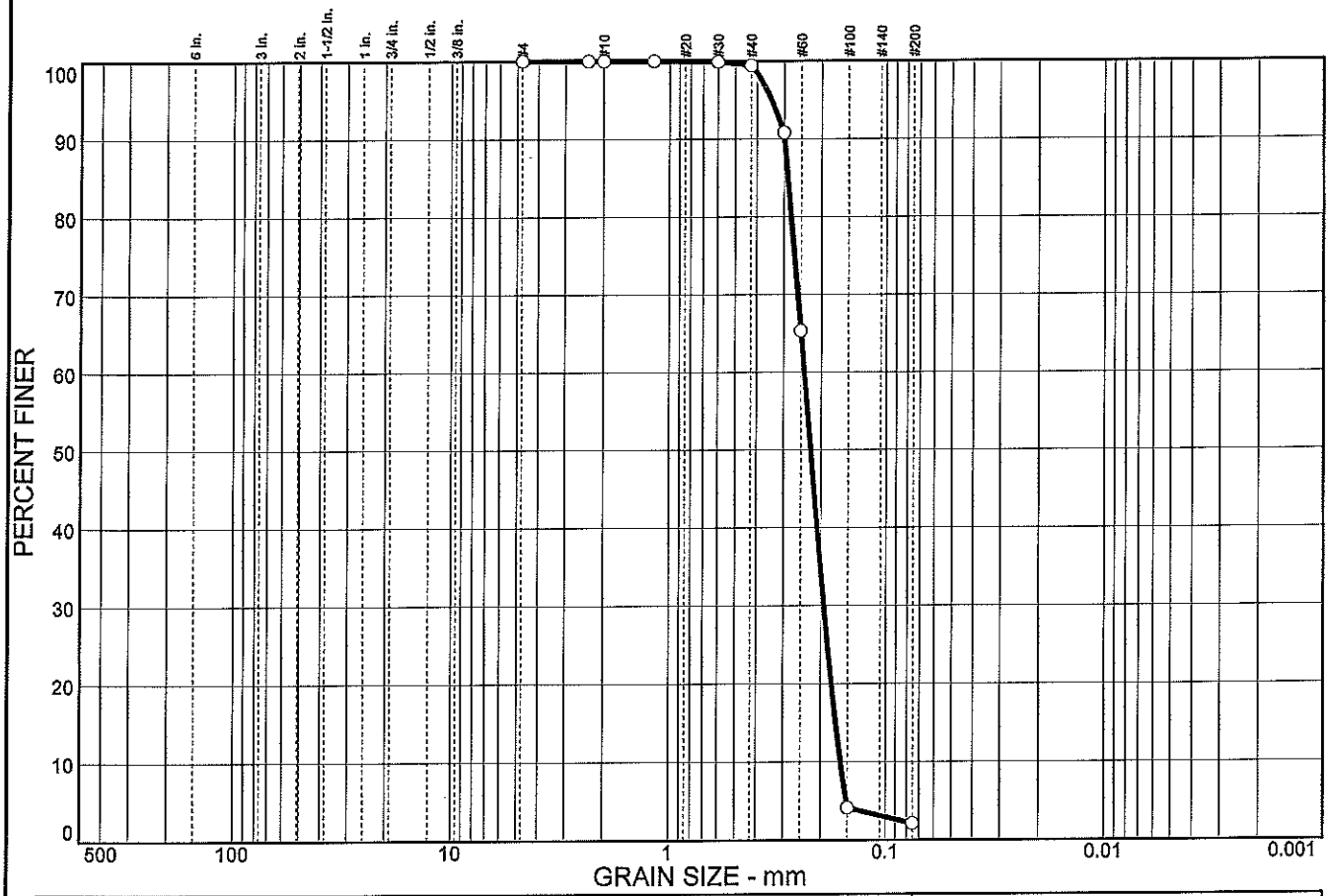
SOIL MOISTURE CONTENT

Project Name: Tyndall AFB Shoppette Project #: EA095004

Atterb(A), sieve(S), wash(W)	(S)					
Boring/Sample	**DRI 1**	**B4 2-4**	**B4 4-6**	**B2 2-4**	**B2 4-6**	**B3 2-4**
Tare name						
Weight of tare+wet soil, g	787.20	74.10	80.00	58.50	93.20	74.30
Weight of tare+dry soil,g	777.30	67.60	68.80	55.20	79.30	69.90
Weight of water,g	9.90	6.50	11.20	3.30	13.90	4.40
Tare weight, g	413.40	8.50	8.40	8.50	8.50	8.30
Weight of dry soil, g	363.90	59.10	60.40	46.70	70.80	61.60
Water content, %	**2.7**	**11.0**	**18.5**	**7.1**	**19.6**	**7.1**
Atterb(A), sieve(S), wash(W)						
Boring/Sample	**B3 4-6**	**B5 2-4**	**B6 2-4**	**P1 2-4**	**P2 2-4**	
Tare name						
Weight of tare+wet soil, g	99.40	56.80	89.60	76.60	76.00	
Weight of tare+dry soil,g	80.90	51.90	86.40	72.40	69.80	
Weight of water,g	18.50	4.90	3.20	4.20	6.20	
Tare weight, g	8.50	8.40	8.60	8.40	8.50	
Weight of dry soil, g	72.40	43.50	77.80	64.00	61.30	
Water content, %	**25.6**	**11.3**	**4.1**	**6.6**	**10.1**	
Atterb(A), sieve(S), wash(W)						
Boring/Sample						
Tare name						
Weight of tare+wet soil, g						
Weight of tare+dry soil,g						
Weight of water,g						
Tare weight, g						
Weight of dry soil, g						
Water content, %						
Atterb(A), sieve(S), wash(W)						
Boring/Sample						
Tare name						
Weight of tare+wet soil, g						
Weight of tare+dry soil,g						
Weight of water,g						
Tare weight, g						
Weight of dry soil, g						
Water content, %						
Atterb(A), sieve(S), wash(W)						
Boring/Sample						
Tare name						
Weight of tare+wet soil, g						
Weight of tare+dry soil,g						
Weight of water,g						
Tare weight, g						
Weight of dry soil, g						
Water content, %						
Comments						

GALLET and ASSOCIATES

Particle Size Distribution Report



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.0	0.6	97.3	2.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	100.0		
#10	100.0		
#16	100.0		
#30	99.9		
#40	99.4		
#50	90.8		
#60	65.3		
#100	4.1		
#200	2.1		

* (no specification provided)

Material Description

Gray, Poorly graded sand

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{85}= 0.288 D_{60}= 0.241 D_{50}= 0.224
D_{30}= 0.193 D_{15}= 0.170 D_{10}= 0.161
C_u= 1.49 C_c= 0.96

Classification

USCS= SP AASHTO= A-3

Remarks

Sample No.: DRI - 1 **Source of Sample:** **Date:** 10/26/09
Location: **Elev./Depth:**

Gallet & Associates, Inc.

Client:
Project: Tyndall AFB Shoppette
Project No: EA095004 **Figure**

Date: 10/8/2009
Project Number: EA095004
Project Name: Tyndall AFB Shoppette
Project Location: Tyndall AFB, Panama City, FL
Depth to GWT (ft): 4.67 feet
Outer Ring Penetration: 2.25 inches
Inner Ring Penetration: 3.25 inches

Test Locaton: DRI-1
Technician W.Holland
Test Depth (inches) 14 inches, BEG

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Supply Tank No. (1, 2, or 3)	Time (hh:mm:ss)	Delta Time (Min)	Tank Reading	Volume Change (cu in)	Infiltration (in/hr)	Notes
1	0:00:00		70			Presoak Started at 10:50 am
1	0:05:11	5.18	115	270.3	27.67	DRI test Started at 12:00 pm
1	0:10:29	5.30	177	372.4	37.28	
1	0:15:03	4.57	219	252.3	29.31	
1	0:20:02	4.98	262	258.3	27.50	
1	0:25:05	5.05	301	234.3	24.61	
1	0:30:02	4.95	352	306.3	32.83	
1	0:35:01	4.98	402	300.3	31.97	
1	0:37:38	2.62	20			Refill Tank
1	0:38:35	0.95	37	102.1	57.02	Minor adjustment to water in ring
1	0:43:00	4.42	74	222.2	26.70	
1	0:48:02	5.03	115	246.3	25.96	
1	0:53:00	4.97	163	288.3	30.80	
1	0:58:04	5.07	212	294.3	30.82	
1	1:03:01	4.95	260	288.3	30.90	
1	1:08:03	5.03	306	276.3	29.12	
1	1:13:05	5.03	352	276.3	29.12	
1	1:18:02	4.95	397	270.3	28.97	
1	1:20:34	2.53	30			Refill Tank
1	1:25:07	4.55	75	270.3	31.52	
1	1:30:02	4.92	127	312.4	33.70	
1	1:35:00	4.97	175	288.3	30.80	
1	1:40:01	5.02	212	222.2	23.50	
1		-				Reset Timer
1	2:04:43	-	267			
1	2:08:41	3.97	300	198.2	26.51	
1	2:13:50	5.15	343	258.3	26.61	
1	2:18:05	4.25	382	234.3	29.24	
1	2:23:00	4.92	430	288.3	31.11	
		-				End Test at 2:10pm
		-				
		-				
		-				
		-				
		-				
		-				
		-				
		-				
		-				
		-				
		-				

Additional Notes:

Supply Tank No.
1 - Large Tank
2 - Medium Tank
3 - Small Tank

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APPENDIX C

SUPPORTING DOCUMENTS

GENERAL NOTES

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DRILLING & SAMPLING SYMBOLS:

SS:	Split Spoon – 1-3/8" I.D., 2" O.D., unless otherwise noted	HS:	Hollow Stem Auger
ST:	Thin-Walled Tube - 2" O.D., unless otherwise noted	PA:	Power Auger
RS:	Ring Sampler - 2.42" I.D., 3" O.D., unless otherwise noted	HA:	Hand Auger
DB:	Diamond Bit Coring - 4", N, B	RB:	Rock Bit
BS:	Bulk Sample or Auger Sample	WB:	Wash Boring or Mud Rotary

The number of blows required to advance a standard 2-inch O.D. split-spoon sampler (SS) the last 12 inches of the total 18-inch penetration with a 140-pound hammer falling 30 inches is considered the "Standard Penetration" or "N-value".

WATER LEVEL MEASUREMENT SYMBOLS:

WL:	Water Level	WS:	While Sampling	N/E:	Not Encountered
WCI:	Wet Cave in	WD:	While Drilling		
DCI:	Dry Cave in	BCR:	Before Casing Removal		
AB:	After Boring	ACR:	After Casing Removal		

Water levels indicated on the boring logs are the levels measured in the borings at the times indicated. Groundwater levels at other times and other locations across the site could vary. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels may not be possible with only short-term observations.

DESCRIPTIVE SOIL CLASSIFICATION: Soil classification is based on the Unified Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

CONSISTENCY OF FINE-GRAINED SOILS

Unconfined Compressive Strength, Qu, psf	Standard Penetration or N-value (SS) Blows/Ft.	Consistency
< 500	0 – 1	Very Soft
500 – 1,000	2 – 4	Soft
1,001 – 2,000	4 – 8	Medium Stiff
2,001 – 4,000	8 – 15	Stiff
4,001 – 8,000	15 – 30	Very Stiff
8,000+	> 30	Hard

RELATIVE DENSITY OF COARSE-GRAINED SOILS

Standard Penetration or N-value (SS) Blows/Ft.	Relative Density
0 – 3	Very Loose
4 – 9	Loose
10 – 29	Medium Dense
30 – 49	Dense
> 50	Very Dense

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other Constituents	Percent of Dry Weight
Trace	< 15
With	15 – 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75 mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm)
Silt or Clay	Passing #200 Sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other Constituents	Percent of Dry Weight
Trace	< 5
With	5 – 12
Modifiers	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 – 10
Medium	11 – 30
High	> 30

Exhibit C-1

UNIFIED SOIL CLASSIFICATION SYSTEM

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Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OL	Organic clay [K,L,M,N]
						Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried / Liquid limit - not dried	< 0.75	OH	Organic clay [K,L,M,P]
						Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.

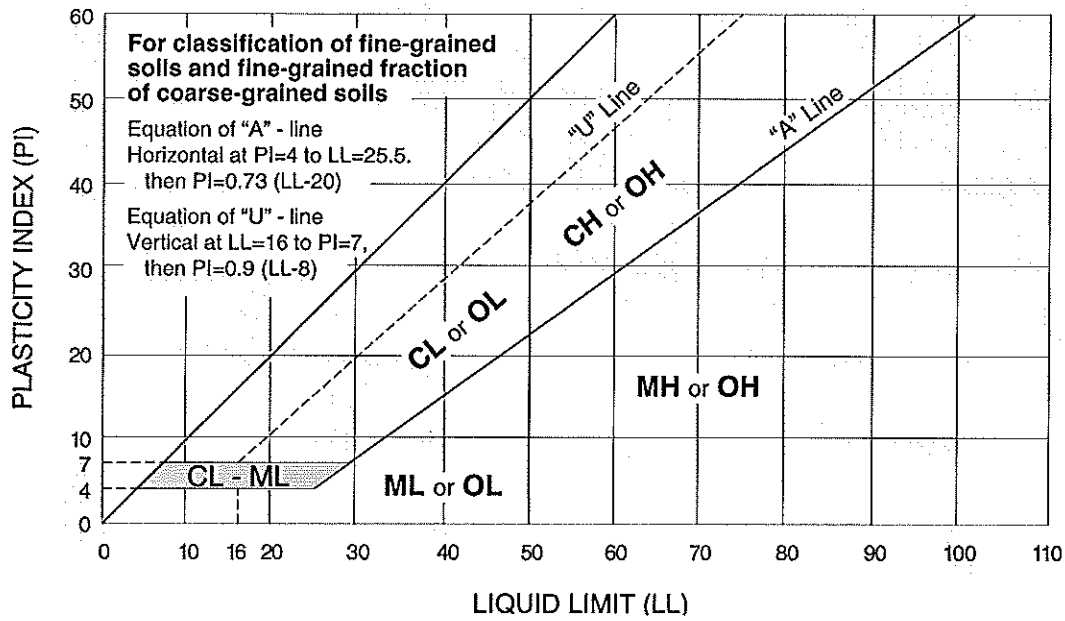

Exhibit C-2

Important Information about Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

ASFE
THE BEST PEOPLE ON EARTH

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

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IIGER06075.0MRP

GROUND PENETRATING RADAR INVESTIGATION OF A PROPOSED ARMY AND AIR FORCE EXCHANGE SERVICE (AAFES) CONSTRUCTION PROJECT, TYNDALL AIR FORCE BASE, FLORIDA

BY

H. LEE HARRISON, JR.

Prepared for:

Gallet & Associates, Inc., a Terracon Company
9900 North Davis Highway
Pensacola, Florida 32514

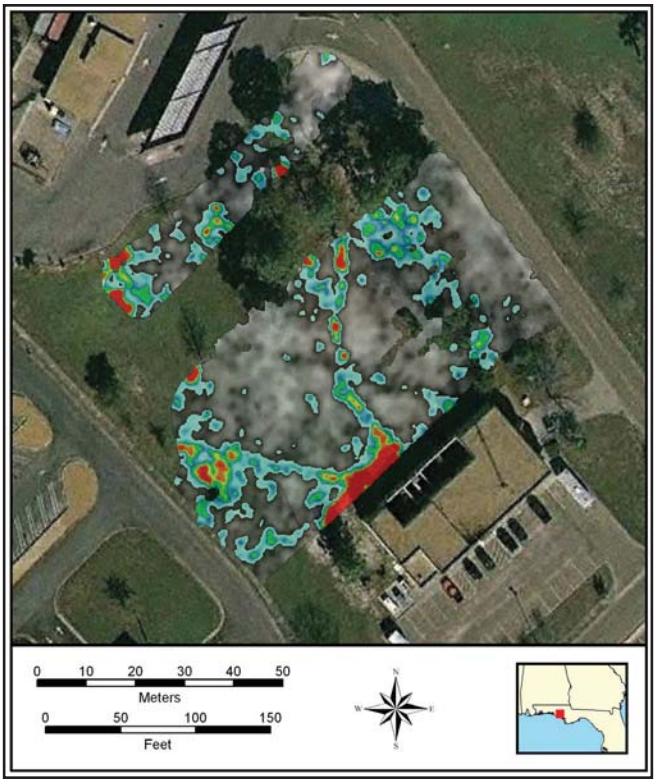
Prepared by:

Panamerican Consultants, Inc.
Geophysical Division

924 26th Avenue East
Tuscaloosa, Alabama 35404
205.556.3096

H. Lee Harrison, Jr.
Principal Investigator

June 3, 2010
PCI Project No. 30216



GPR time slice over aerial image of site, Tyndall AFB, Florida.

Introduction

A Ground Penetrating Radar (GPR) investigation was conducted at the proposed AAFES Mini Mall location, Tyndall Air Force Base (AFB), Florida, May 10-12, 2010, by Panamerican Consultants, Inc. (PCI), under contract with Gallet & Associates, Inc., a Terracon Company from Pensacola, Florida. The GPR fieldwork and analysis was performed by Principal Investigator, H. Lee Harrison, Jr. and Field Director, Steve O'Leary.

Mr. William A. Singletary, P.E., of Gallet & Associates, a Terracon Company, provided measured drawings and a project site overview prior to the GPR investigation. The site was analyzed using aerial photographs and determined favorable for GPR survey. Project goals, GPR field methods, and potential limitations, including tree canopy cover potentially affecting GPS reception and the interference of tree root mass affecting the GPR quality, were discussed with the client. The project area is located within the main base area of Tyndall AFB (Figure 1). A preliminary site visit was conducted on May 10, 2010. GPR survey began on Tuesday, May 11, 2010 and concluded on Wednesday, May 12, 2010.

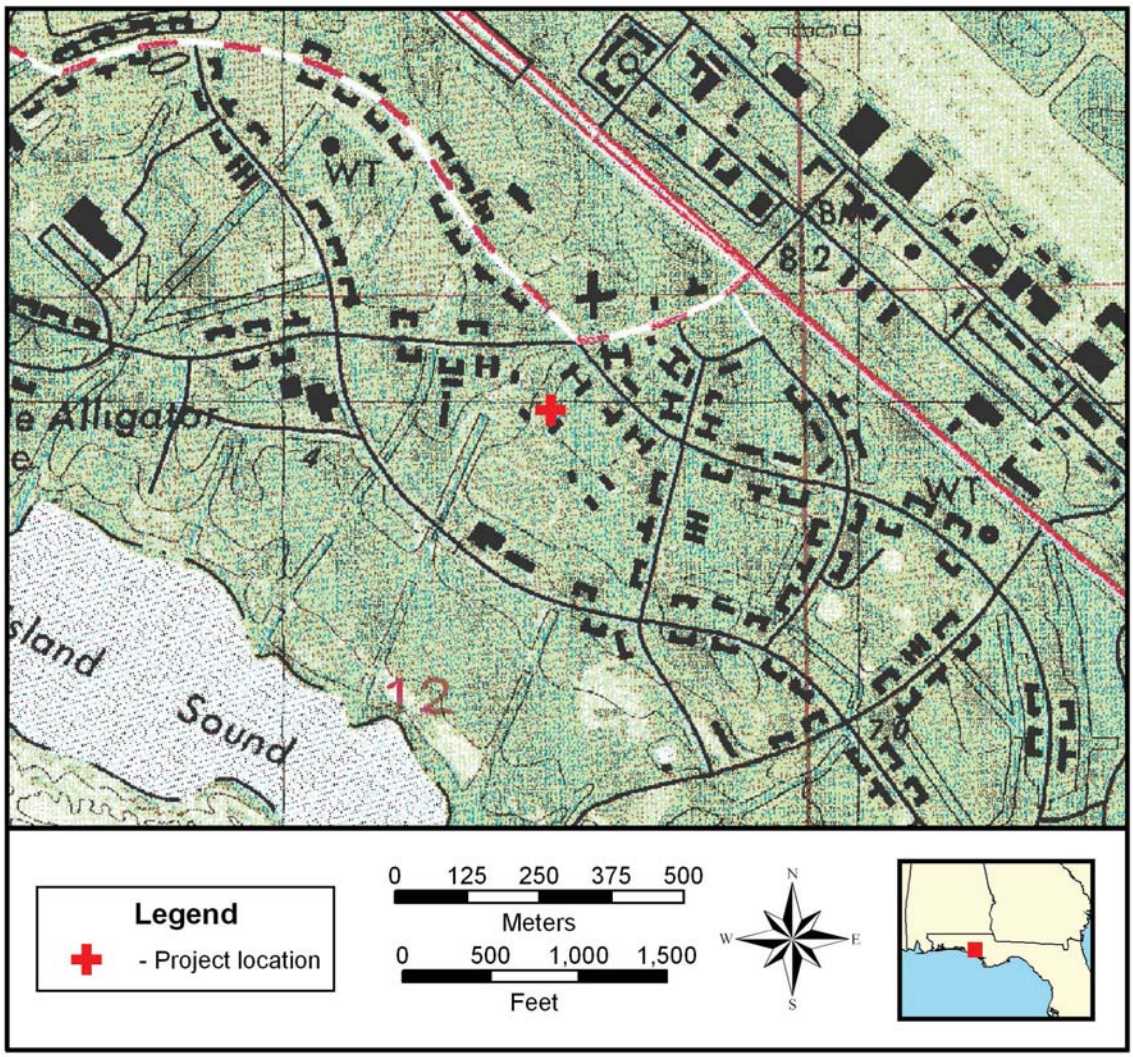


Figure 1. *Survey location (based on the 1982 Long Point, Florida 7.5' USGS topographic quadrangle).*

The objective of the investigation was to identify man-made and geological anomalies including utilities, subsurface voids, breaks in natural soil stratigraphy indicative of previous or potential sinkholes, and any other anomalies that could potentially affect planning or construction of the proposed project.

The proposed project includes construction of a convenience store/shopping center building, underground storage tank (UST) area, and a multi-point fuel dispensing area.

Field Methods

Following telephone consultation with Mr. Singletary, the survey area was established on the ground following a thorough visual site reconnaissance. Evidence of a previous building was observed in the southeastern portion of the survey area adjacent to the west facade of an existing building (Building 909). A storm sewer drop inlet was located along the southeast-northwest oriented street located along the northeast portion of the survey area. A sewer access was located near the center of the survey area. A UST area had recently been constructed in the southwestern portion of the survey area (Figure 2). Several groundwater monitoring wells were located around the project area, however, none were within the area surveyed.

Ground cover consisted of recently sodded sandy soil over the majority of the site. A portion of the surface of the survey area in the north was sandy. A small number of trees were scattered throughout the southern portion of the survey area. A more significant grouping of mature pine and hardwood trees existed in the northern and northwestern portions of the survey area.

Figure 2. *View of project area, facing southeast. A recently constructed UST area (the white concrete) is shown in the right portion of the image. Building 909 is located in the center background.*

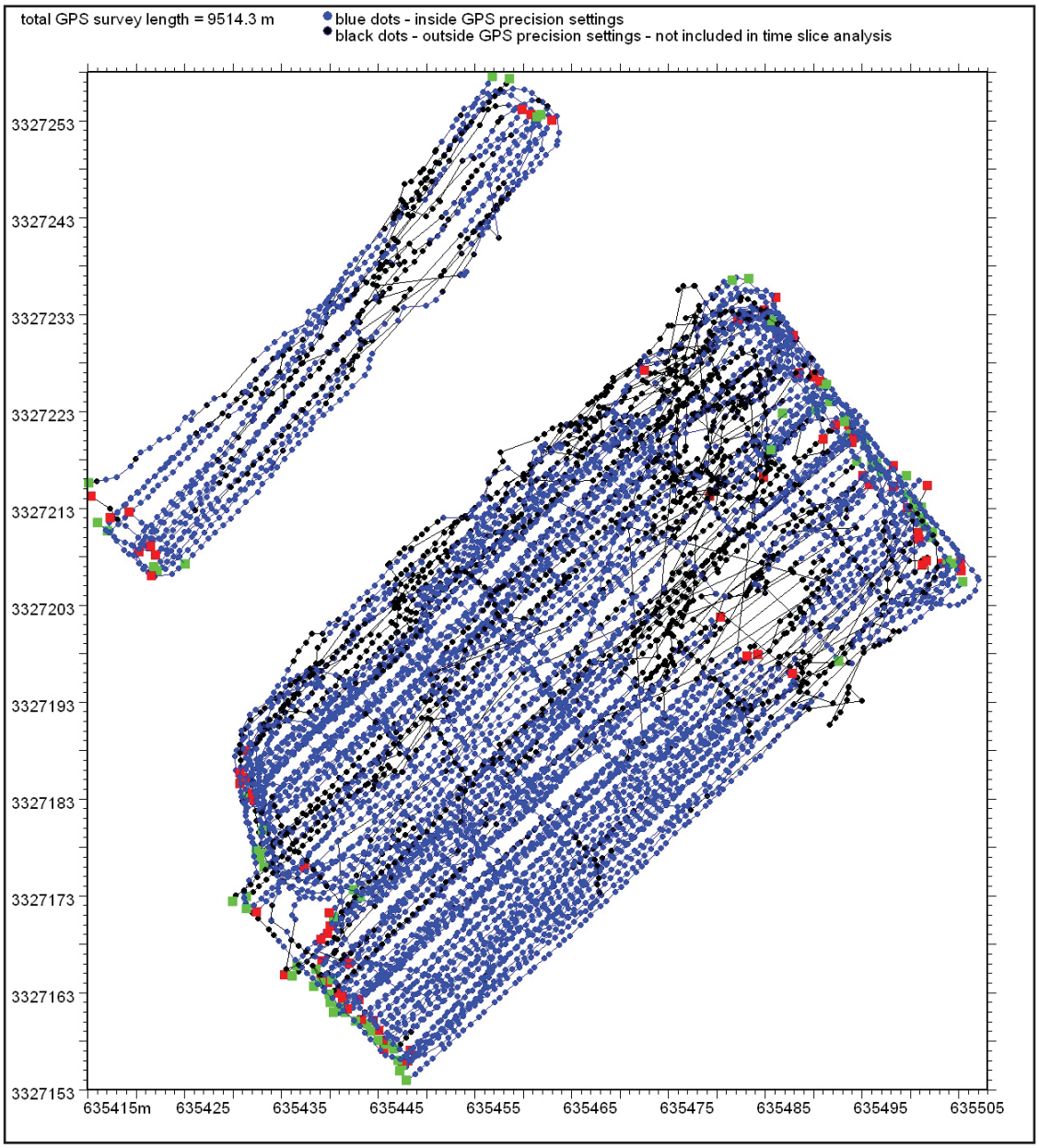


Figure 3. *GPS-derived map showing GPR survey transects. The green dots on the map are staring points for a GPR transect and the red dots are end points of the transect.*

A GPS-based survey method was used during field GPR data collection. This method utilizes survey-grade GPS technology to record the position of the GPR system as it progresses along survey transects. This method is often used when obstacles (e.g., vegetation) preclude the use of a standard Cartesian grid survey. It also allows for GPR data to be collected at variable angles across a site. This allows flexibility in mapping suspected underground linear features, as they are best detected with survey transects perpendicular to their orientation. In general, transects were established in a northeast-southwest orientation between the sidewalk adjacent Mall Lane and the parallel road to the north (Figure 3).

Where able, the survey was conducted using 50 cm transect intervals along northeast-southwest transects. Additional randomly spaced transects in varying orientations were surveyed in specific areas to better detect suspected underground utilities. Trees were the main obstacles to navigation. In total, 9,514.3 m (31,214.90 ft. or 5.91 mi.) were surveyed along transects during the GPR investigation.

GPS coverage, although beneath moderate tree canopy in the northern half of the survey area, was adequate for decimeter positioning along survey transects throughout the majority of the survey area. GPS fallout was minimal in the southern half. The northern half proved slightly less productive due to the amount of tree canopy. Reception of GPS and satellite-based real-time GPS correction signals were affected and fell outside defined acceptable accuracy standards in portions of the northern half of the survey area. As a result, a number of individual points along lines of GPR data were removed from consideration during analysis due to significant GPS fallout. The removal of these did create small gaps within the affected portion of the survey area. These, however, did not significantly effect the resolution of subsurface features.[1]

Two separate areas were surveyed. The main area as indicated by Mr. Singletary to be the proposed construction area constituted the largest portion of the survey (Figure 4). This area is defined by sidewalk adjacent Mall Lane to the southwest (with the western limit being along the recently constructed apron of the UST area), a line parallel and offset approximately one meter west of Building 909 to the east, the curbing of the road to the northeast, and a linear northeast-southwest stand of pine trees to the west.

Figure 4. *View of main project area from Mall Lane, facing northeast.*

1 The area beneath trees typically contain GPR reflectance from root mass and bioturbation that complicates resolution of shallow features. The likelihood of resolving small point-based anomalies would be low in the affected area. Linear features traversing the site would be able to be seen as line segments across the affected area.

A second area, located northwest of the main project area, was surveyed in order to detect any potential underground piping from the existing fuel point that may traverse the proposed construction area defined as the main project area. This smaller area consisted of a series of northeast-southwest transects approximately 10 m in width located adjacent to and east of the paved portion of the existing fuel dispensing area. The southwestern limit of this area was the recently constructed concrete apron of the UST area. The northeastern limit was a line approximately one meter from the paved road there.

GPR-Specific Methods. The GPR survey equipment consisted of a Sensors & Software, Inc. NogginPlus Smart Cart GPR System. A 250MHz center frequency antenna with 3dB bandwidth from 125MHz-375MHz was chosen for the survey based on site conditions and client-requested coverage to approximately 20 ft. (~6.10 m).

A Sensors & Software, Inc. Digital Video Logger III (DVL) control unit/data logger was used for control, real-time data display, and data recording. The DVL was configured to recorded data from the surface to approximately 10 m (~32.81 ft.). GPR station interval (a fixed distance at which data is collected along transects) was set to "normal" or 5.0 cm. GPR data was recorded to a flash memory card for subsequent download, computer processing, and analysis.

A NavCom SF-2050 StarFire™ Global Satellite-Based Augmentation System (GSBAS) real-time differential GPS (dGPS) receiver and antenna connected to the GPR data logger provided decimeter-accuracy position recording throughout the survey area. dGPS positions were recorded at 40-cm intervals along survey transects.[2]

Field notes were created as necessary in order to record visual observations and other factors potentially affecting data quality.

GPR Data Analysis

GPR data is traditionally examined as profile maps of individual transects. Time slicing is a technique for constructing plan-view maps of an area with specific depth ranges isolated. This makes interpretation of the data in the horizontal plane much more intuitive and allows the user to isolate specific depths for examination, or more properly, the two-way travel times of reflected waves.

Collected GPR data was post-processed using GPR-SLICE software. Individual radar profiles were reviewed prior to any advanced processing. Planimetric time slice maps were then created from processed radar profile data. Sixteen individual planimetric time slice maps were created. Each time slice represents approximately 32 cm (1.05 ft.) of soil thickness, with an approximate 25 percent overlap between time slices continuing from the surface to approximately 3.43 m (11.25 ft.). All time slice maps were processed with a GPR-SLICE linear transformation and three standard deviations. Individual radar profiles were re-examined where unknown anomalies occurred in the time slices. All time slice maps were used throughout the analysis and interpretation process. Four specific time slice maps displaying the best end-user anomaly representations and all interpreted features were chosen for inclusion in this report. These consist of time slice numbers 3, 6, 9, and 13 ranging from approximately 43 to 290 centimeters below the surface (cmbs) (~17-114 in [1.4-9.5 ft.]). A single image containing all 16 time slices (surface to 3.43 m [11.25 ft.]) is included as Appendix A.

2 GPS data were filtered during post-processing to remove positions outside of specified horizontal tolerance limits caused by GPS fallout.

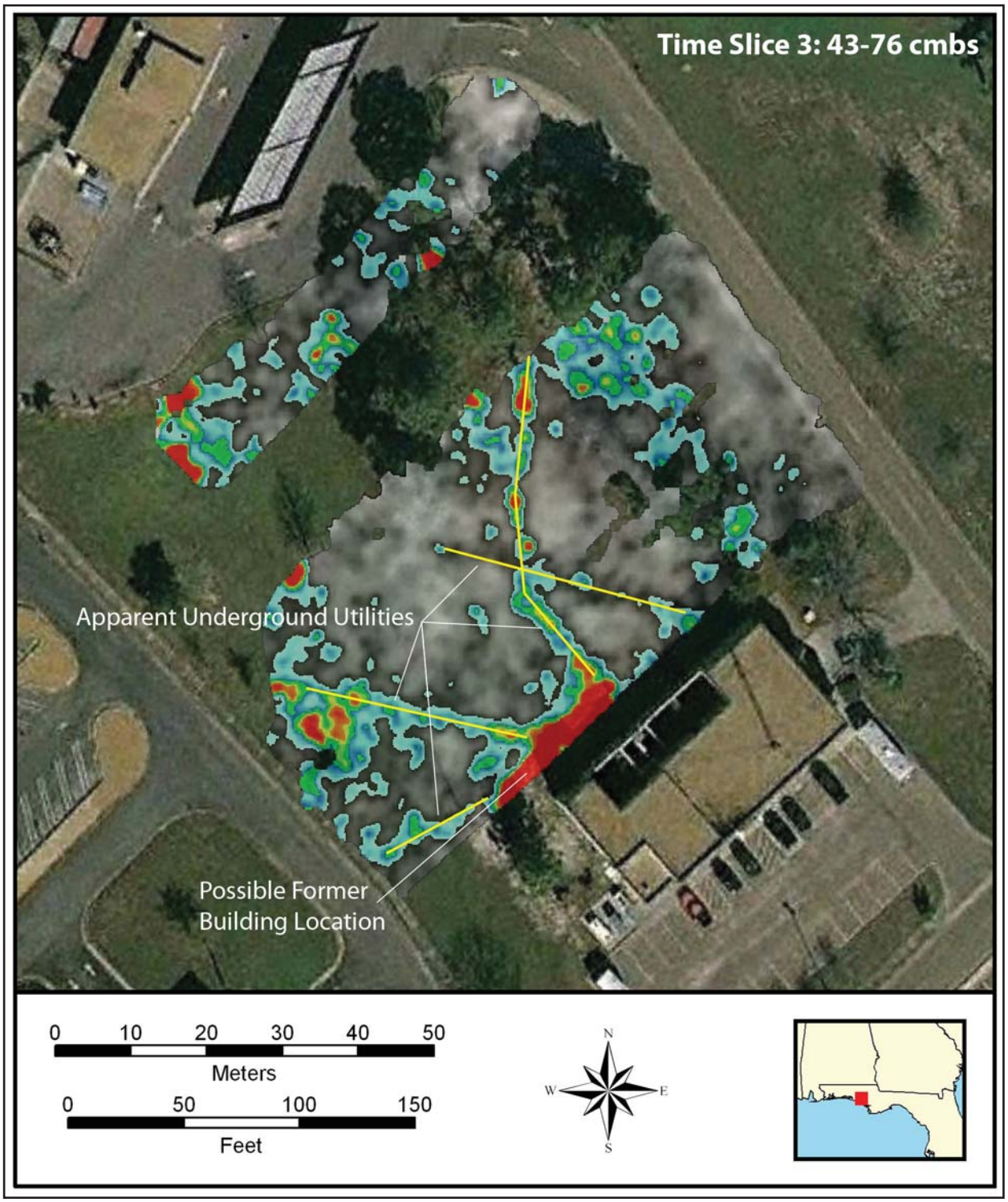


Figure 4. *GPR time slice showing 43 to 76 cmbs (17 to 30 in.).*

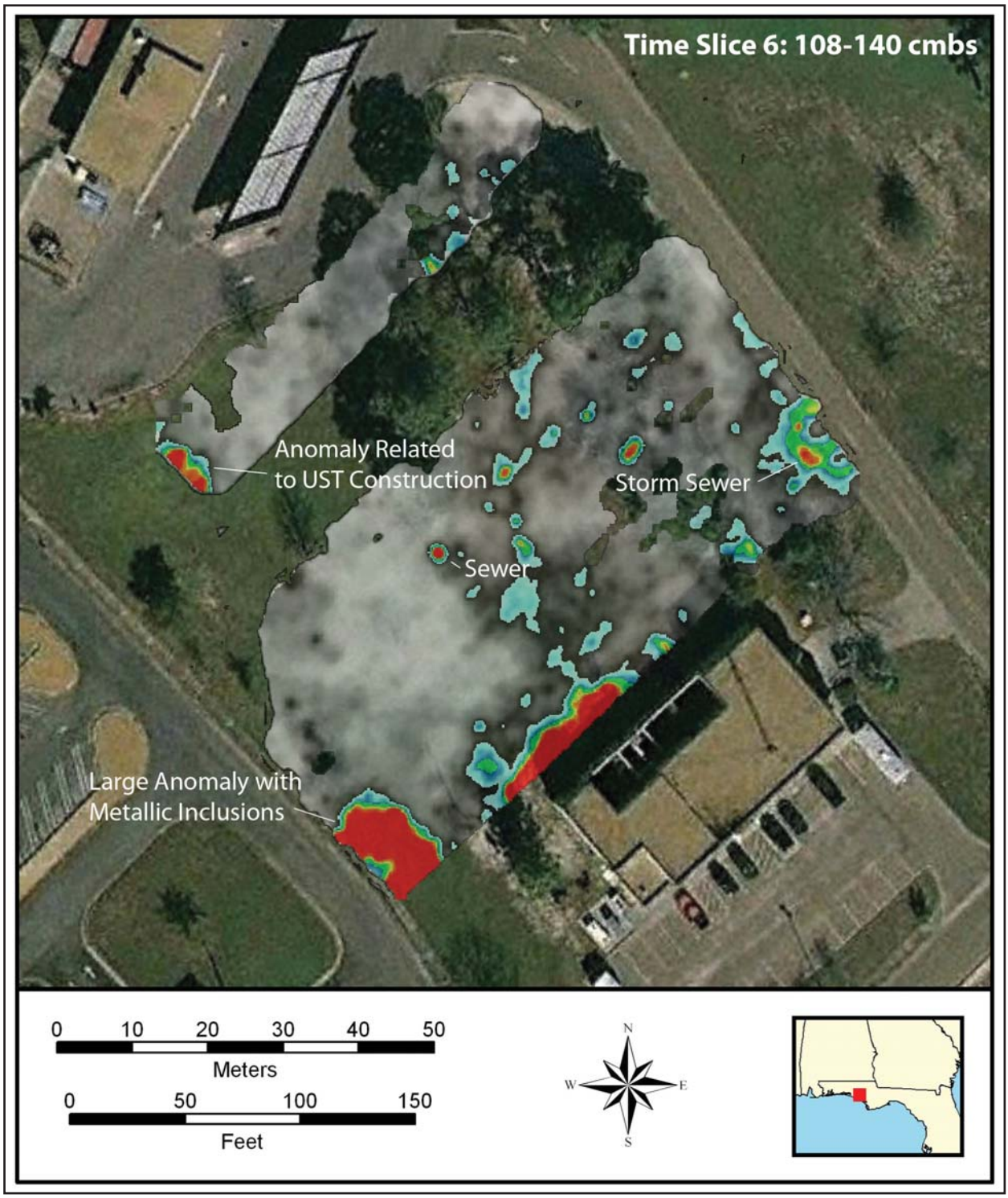


Figure 5. *GPR time slice showing 108 to 140 cmbs (43 to 55 in.).*

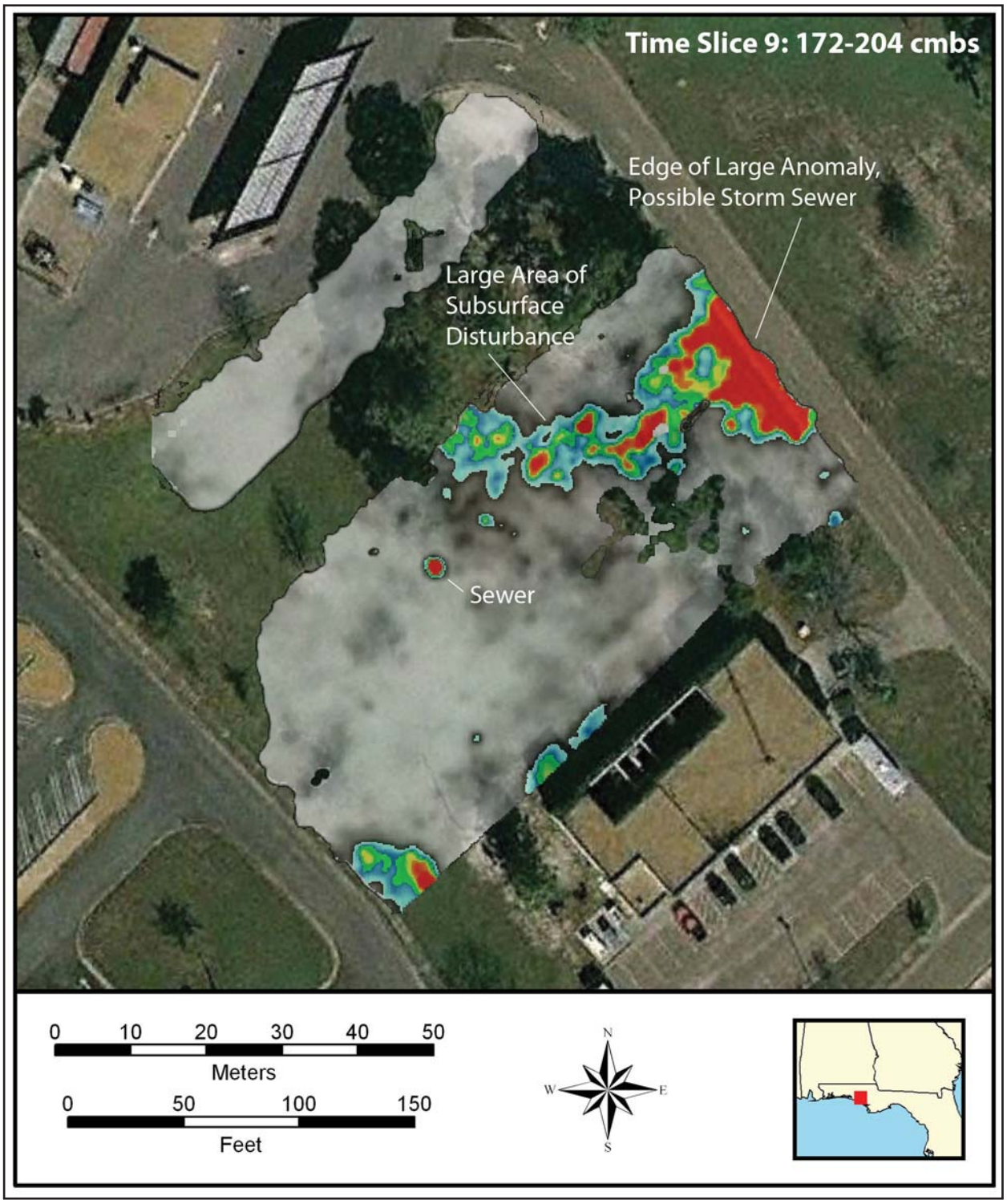


Figure 6. *GPR time slice showing 172 to 204 cmbs (68 to 80 in.).*

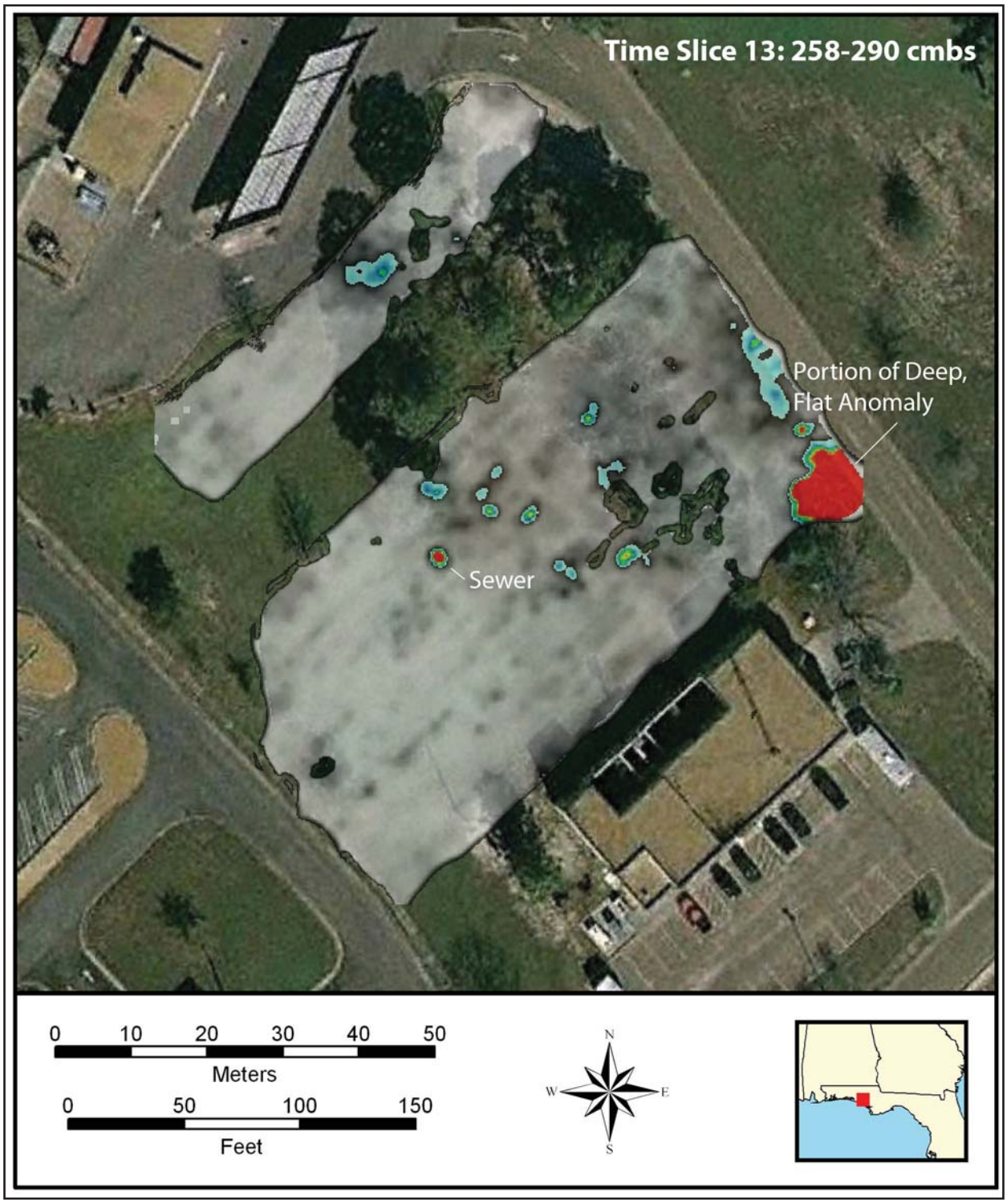


Figure 7. *GPR time slice showing 258 to 290 cmbs (102 to 114 in.).*

GPR Results and Interpretations

GPR functions by sending high-frequency electromagnetic waves into the ground from a transmitter antenna. Some of these waves are reflected back to the surface as they encounter changes in the dielectric permittivity of the matrix through which they are traveling and are detected by a receiver antenna. The amplitude and two-way travel time of these reflections are recorded and used to construct a two-dimensional plot of horizontal distance versus travel time.

To better understand the included GPR time slice maps, an explanation of what each represents is offered here. General background (i.e., local geology and naturally consolidated soils) typically display as low intensity, grayscale returns. More intense colors represent progressive differences from this background data. While these colors indeed represent conditions that are anomalous, they should not be collectively interpreted as significant features, as site conditions including geology, topography, and the unique goals of each investigation often dictate the interpretation of data with specific regard to known and unknown subsurface conditions.

In general, sandy, homogeneous soils favor the use of GPR, and in these conditions it is often the preferred geophysical method. The project area was well-suited to GPR survey. Stratigraphic layering of the subsurface was easily detected and observed on the DVL during field survey. Post-processing utilized raw data with a slight addition of gain in order to provide a balanced signal response and better visualize anomalies at moderate depths.

Throughout the analysis and interpretation phase, all separate survey grid time slice maps were used. The aforementioned selected time slices (see Figures 4-7) are described below.

Time Slice 3: 43-76 cmbs. The site contains a number of linear anomalies interpreted as underground utilities. These most likely include sewer and water lines that connect to Building 909, or connected to a previous building in that location. A large anomaly adjacent to Building 909 may be the remains of a portion of a previous building on the site. Three distinct linear targets seem to originate from this location at approximately 60 cmbs (23.62 in.) and extend to the southwest, west-northwest, and northwest, the latter of which appears to turn north approximately 21 m (~69 ft.) from the northwest facade of Building 909. A separate, weaker linear target appears from the northwestern corner of Building 909 (away from the apparent building anomaly to the southwest). It proceeds west-northwest and appears to terminate at a location near the center of the project area. A sewer manhole cover was observed in this location.

Time Slice 6: 108-140 cmbs. At approximately 123 cmbs (~48 in.) a large target appears in the extreme southern portion of the survey area. The radar profile for this anomaly includes multiple small metallic signatures across its length in a heterogeneous matrix. This suggests that the anomaly may be a section of concrete with imbedded rebar (perhaps a sewer inlet) or a portion of a buried utility run with an aggregate base and fill. Interpretation of the anomaly proved difficult because of its location on the edge of the survey area. The anomaly appears to continue outside the survey area to the southwest and southeast. An anomaly is present in the area of the field-observed sewer manhole cover near the center of the survey area. This anomaly first becomes apparent in shallower time slices and continues through the majority of time slices due to propagation characteristics of the radar signal at increasing depths. Another anomaly observed in shallower time slices and located in the western portion of the survey area is assumed to be ground disturbance related to the recently-constructed UST area there. Evidence of soil disturbance is present from slightly beneath the surface to a target depth of approximately 118 cmbs (~46 in.). Also apparent in this time slice is a storm sewer drop inlet located in the easternmost portion of the GPR survey area. This drop inlet serves the northwest-southeast oriented street serving as the northeastern survey boundary.

Time Slice 9: 172-204 cmbs. This time slice shows an area of ground disturbance that appears through radar profile analysis to be a slight rise in the water table possibly related to the amount of root mass in the immediate area caused by uptake from the mature trees. A larger more significant target area is present to the northeast. It appears to be potentially related to the storm sewer system and is believed to continue beneath the road to the northeast.

Time Slice 13: 258-290 cmbs. At this depth, the site appears relatively uniform with the exception of a strong, flat reflector in the easternmost portion of the survey. This anomaly is uniform in nature and appears free of metallic signatures or other disturbances. Its origin and material is undetermined.

GPR data continued to 343 cmbs (135 in. [11.25 ft.]). Beneath 300 cmbs (~118 in.), no significant anomalies were observed.

Conclusion

The GPR investigation was successful in mapping subsurface reflectors that may be of concern to project planners, engineers, and construction contractors. All GPR anomalies appear to be related to historic land use activities on the site. Beyond those anomalies described previously, the site appears to be stratigraphically intact with no significant anomalies indicative of voids or potential sinkholes. In areas where anomalies are absent, a stable naturally-stratified soil matrix appears to exist.

Anomalies noted and interpreted herein are interpreted through individual radar profiles. The actual composition of the material creating the anomaly cannot be determined through GPR analysis. In areas of proposed construction, invasive testing is recommended to determine the actual source of the radar target.

H. Lee Harrison, Jr.
Principal Investigator

APPENDIX A: GROUND PENETRATING RADAR TIME SLICE MAPS

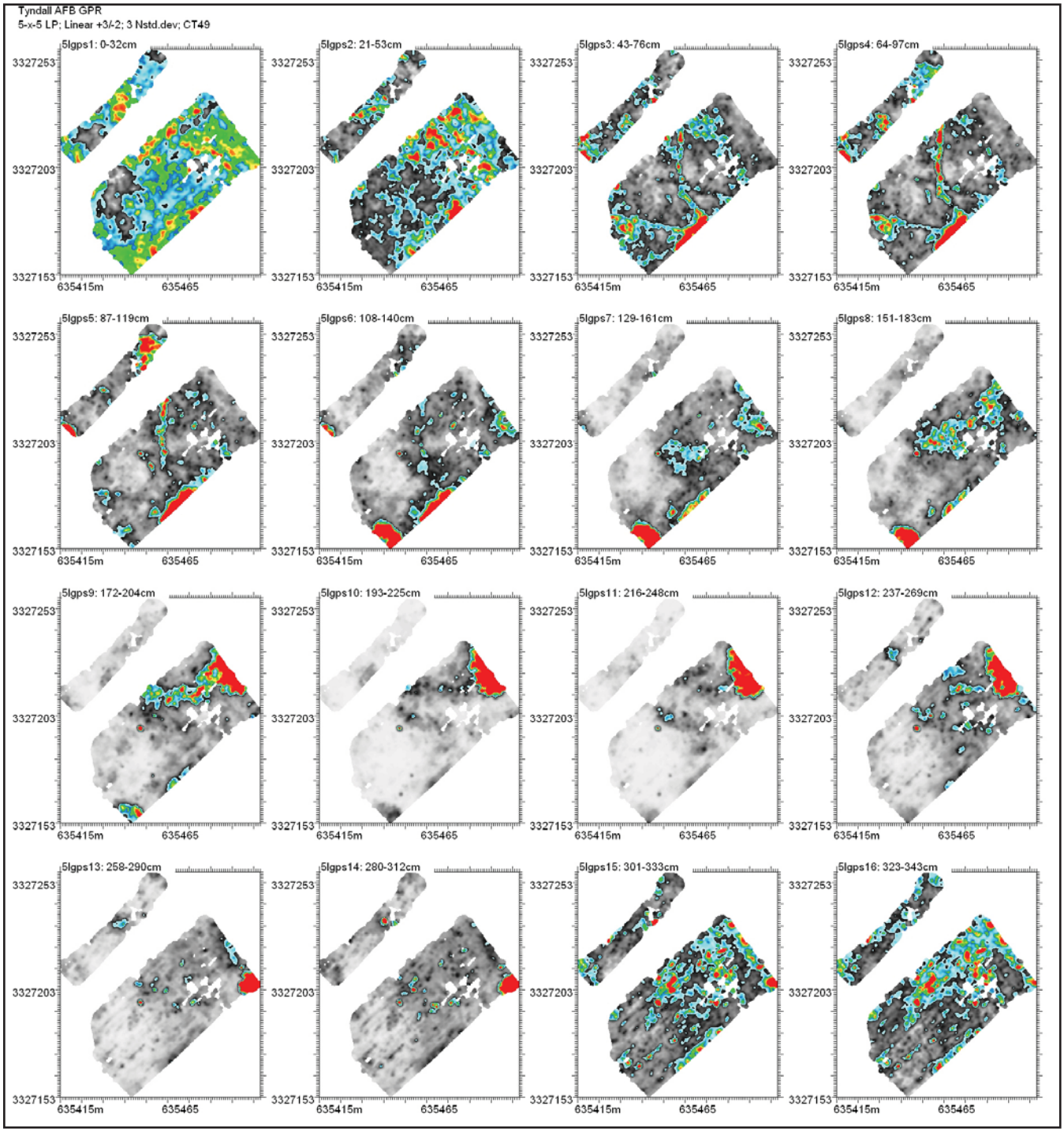


Figure A.1. *Individual GPR time slice maps showing radar reflectance from the surface to 3.43 m (11.25 ft.) below surface.*

SECTION 00311

CONSTRUCTION PHASING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Format.

B. Content.

C. Revisions to schedules.

D. Submittals.

1.02 RELATED SECTIONS

A. Section 01010 -Summary of Project

B. Section 01300 -Submittals: Construction Progress Schedules.

C. Section 01220 -Progress Meetings.

1.03 GENERAL

A. The construction Phasing Plan shall serve as a guide in managing the construction progress.

B. In preparing this system, the scheduling of construction shall be the responsibility of the Contractor.

1.04 COORDINATION

A. Construction shall be phased and coordinated with the Contracting Officer in order to keep to a minimum, any disruption of, or interference with, the operation of the existing retail gasoline sales operation. The Contractor shall notify the Contracting Officer, within 15 days of notice to proceed, if any problems concerning specified construction phasing are anticipated. The gasoline sales will remain in operation, throughout the duration of Phase I until the commencement of Phase II. Contractor shall submit, in accordance with Section 01520, Contractor's prepared progress chart system, a detailed schedule of work utilizing the priority and sequence of work shown on the Construction Phasing Plan. The Contractor shall keep the Contracting Officer advised of any anticipated changes in the work schedule in sufficient time to permit adjustment of gas sales operations, without adversely affecting the ability of the gas sales to function as necessary. Some interruptions due to utility work, connection and disconnection of support services will occur.

B. Schedule: The phasing as shown on the drawings is the required sequence. The Contractor may submit suggested revisions to the schedule, for review, to the Contracting Officer within 15 days after execution of a contract. Items specified herein are complementary to work items shown on the drawings.

1.05 PHASING:

A. The following is an elaboration of sequence of events indicated on the phasing drawings. It also indicates the rationale that establishes which events have preceding, following, or related activities, and which events can proceed independently, of each other.

B. All indicated work shall be accomplished by the Contractor unless specifically identified as an AAFES responsibility.

C. Phase I shall be accomplished within 240 calendar days of Notice to Proceed. Phase II shall commence 45 calendar days prior to the scheduled end of Phase I work and shall be completed concurrently with the completion of Phase I work.

D. PHASE 1:
   1. WORK ITEM 1:
      a. Construction of building pad, storm drainage system and underground utilities in accordance with NPDES permit.
   2. WORK ITEM 2:
      a. Building construction.
   3. WORK ITEM 3:
      a. Construction of proposed drives and paving.

E. PHASE 2
   1. WORK ITEM 1:
      a. Remove existing dispenser islands; remove concrete at tanks, rough grade site.
   2. WORK ITEM 2:
      a. Construction of proposed canopy and dispenser islands including piping and controls.
   3. WORK ITEM 3:
      a. Complete grading and final paving.
   4. WORK ITEM 4:
      a. Activate gasoline sales system. (Implement work required under Section 13050.)

1.06 GENERAL NOTES: All new and existing building construction area Work Items (Phases I-II):

A. Construction Fencing and Barricades
   1. Provide 5 ft. chain link fence at limit of Phase I work as delineated on the drawings. Provide double gate access to project site at location indicated.

   2. Provide complete separation of area to remain accessible to the public until the commencement of Phase II work. Construction traffic during Phase I shall not be allowed within the area accessible to the public. During Phase II no part of the site will be accessible to the public.

END OF SECTION

SECTION 00404

SUBSTITUTION SHEET

PART 1 - GENERAL

1.01 CONTRACTING OFFICER'S APPROVAL

A. The contract is based on materials and methods described in the contract document.

B. The Contracting Officer will consider proposals for substitution of materials, equipment and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Contracting Officer to evaluate the proposed substitution.

C. Do not substitute materials or equipment, unless such substitution has been specifically approved for this Work by the Contracting Officer.

D. Requests for substitution must be made 10 days prior to solicitation closing date, in which case the bidder shall not be liable for costs of the Contracting Officers review, or at any time following award of Contract, in which case, however, the contractor shall be liable for costs described in paragraph 1.03C, below.

1.02 EQUIVALENT OR EQUAL

A. Where the phrase **equivalent or equal** or the phrase **equivalent or equal as approved in advance by the Contracting Officer** occurs in the Contract Documents, **do not assume** that material and equipment will be approved as equal by the Contracting Officer **unless the item has been specifically approved for this work by the Contracting Officer.**

B. The decision of the Contracting Officer shall be final.

1.03 AVAILABILITY OF SPECIFIED ITEMS

A. Verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the Work.

B. In the event specified item or items will not be so available, notify the Contracting Officer prior to receipt of bids.

C. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, will be back-charged as necessary and shall not be borne by the AAFES,

1.04 AFTER THE CONTRACT IS AWARDED, NO FURTHER SUBSTITUTIONS WILL BE PERMITTED

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION

SECTION 01010

SUMMARY OF THE WORK

PART 1 GENERAL

1.01 STATEMENT OF WORK

A. Scope: The work covered by these construction documents consists of furnishing all supervision, labor, equipment, materials, and appliances necessary to perform all operations required to install, alter, construct and complete the work, all in accordance with these specifications and the applicable drawings, and subject to the terms and conditions of the contract.

B. Location: The work to be performed is located at **Tyndall AFB, Florida.**

C. Principal Features: The work to be performed in connection with this project includes, but is not necessarily limited to the following:
   1. New Mini-Mall and Fuel with the following elements:
      a. Food Service Vendor- Blimpie
      b. Shoppette w / Snack Avenue, Class Six, Office and MPA
      c. Walk-in Cooler and Freezer.
      d. Electrical / Communications Room, Riser Room, Janitor Closet, and Restrooms
      e. New Gasoline Fueling System including Fuel Canopy, and connection to existing underground fuel tanks, and providing new fuel lines, and other equipment from the existing tanks to the new dispensers, and Air/Water/Vacuum Station and Dumpster Area.
      f. All other work shown on the drawings and/or miscellaneous incidental work not shown that may be required to complete the project.

1.02 DRAWINGS AND SPECIFICATIONS

A. After Contract award, and for construction purposes only, the General Contractor (GC) will be provided with a record set of drawings and specifications and a reproducible set of drawings and specifications. Additional copies will be the responsibility of the General Contractor.

1.03 SUBSTITUTIONS

A. Refer to specification section: 00404 Substitution Sheet.

1.04 LAYING OUT WORK

A. Dimensions and elevations indicated in layout of work shall be verified by the GC. Discrepancies between drawings, specifications, and existing conditions shall be referred to the Contracting Officer in writing for adjustment before work affected is performed. Failure to make such notifications shall place responsibility upon the GC to carry out work in satisfactory, workmanlike manner without extra costs.

B. The GC shall be held responsible for the location and elevation of all the construction contemplated by the Construction Documents.

C. Prior to commencing work, the GC shall carefully compare and check all Civil, Architectural, Structural, Mechanical, Electrical drawings, and Fuel System and Canopy drawings each with the other, that in any way affect the locations and elevations of the work to be executed by the GC, and should any discrepancy be found, the GC shall immediately report the same to the Contracting Officer for verification and adjustment. Any duplication of work made necessary by failure or neglect on the GC's part to comply with this function shall be done at the GC's sole expense.

D. The drawings accompanying these specifications indicate generally the design and arrangement of all apparatus, fixtures, accessories, etc., necessary to complete the work required. The exact location or arrangement of equipment shall be established by shop

drawings and is subject to minor changes necessitated by field conditions which shall be made as required without additional cost to AAFES. Measurements shall be verified by actual observations at the construction site, and the GC shall be responsible for all work fitting into place in a satisfactory and workmanlike manner meeting the approval of the Contracting Officer.

1.05 HAUL ROUTE AND PROJECT ACCESS AND BORROW SITES

A. Project access shall be as designated by the Installation. Contractor shall use the Gates designated by the Installation. Haul routes and waste area shall be designated by the Installation. Contractor shall assume that there are no borrow or waste sites available on the Installation.

1.06 EXISTING OVERHEAD OR UNDERGROUND WORK

A. All existing overhead and underground work may not be indicated on drawings. Proposers shall make their own investigations of the site prior to submitting their proposals, and shall fully inform themselves regarding all pertinent conditions, including the work being performed under separate contracts for Remediation and Demolition by the Installation.

B. Carefully check the site where this project is to be placed and observe all existing overhead wires and equipment. All such work shall be protected, as required, whether or not shown on the drawings.

C. Attention is directed to the existence of pipe and other underground utility improvements which occur at the site. These include storm sewer, sanitary sewer, water, natural gas electrical, telephone, and fiber optic communications lines. All reasonable precautions shall be taken to preserve and protect all such improvements, whether or not shown on the drawings. Contact line locators and Installation engineering for information on site utilities. An excavation permit, issued by the Installation, is required prior to the Contractor commencing any excavation work. Obtain all required permits from Federal and State agencies having jurisdiction. Include time required to obtain these permits in scheduling activities on site. No extra time will be granted after the Notice to Proceed is issued for obtaining permits.

D. Locations of existing overhead and underground lines shown on the drawings are based on the best available sources, but are to be regarded as approximate only. Exercise extreme care in locating and identifying these lines before beginning any work in adjacent areas.

1.07 INTERRUPTION OF EXISTING UTILITIES SERVICES

A. The GC shall perform the work under this Contract with a minimum of outage time for all utilities. Interruption of service shall be coordinated with the appropriate Utility. In some cases, the GC may be required to perform the work while the existing utility is in service. The existing utilities services may be interrupted only when approved by the Installation. When it is necessary to interrupt the existing utilities, the GC shall notify the Installation Civil Engineering Office in writing at least 14 days in advance of the time the GC desires the existing service to be interrupted. The interruption time shall be kept to a minimum. The amount of time requested by the GC for interruption of existing utility services shall be as approved by the Installation Civil Engineering Office. All interruptions of existing utilities shall be coordinated by the GC through the Installation Civil Engineering Office.

1.08 EXCAVATION

A. Prior to commencing any excavation work, the GC shall obtain a valid excavation permit from the Installation. It shall be the GC's responsibility to obtain the necessary signatures and coordination. Contractor shall submit an application for a digging permit on the Installation before digging/grading operations commence. Contractor shall coordinate through the Installation Civil Engineering Office for location of commercial utilities at least 5 working days prior to beginning excavating. No cutting of existing roads is allowed. Boring and jacking with sleeves shall be used for placing new utility lines under existing pavement. Conform to depths as required by Installation standards, and use materials as required by Installation. Also,

disposal and removal of soil, waste, spoils, ground water, vegetation, etc. shall be disposed of in accordance with spec Section 01420, part 3.

1.09 SAFETY REQUIREMENTS

A. Standards: Maintain project in accordance with the following safety and insurance standards:
   1. The Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, dated October 1992, as referred to in the General Provisions, paragraph 31, "ACCIDENT PREVENTION".

B. O.S.H.A. (OSHA) Standards:
   1. The General Contractor (GC) will be expected to comply with OSHA Standards. The OSHA Standards are subject to change and such changes may affect the GC in his performance under the contract. It is the GC's responsibility to know such changes and effective dates of changes.

C. Hazards Control:
   1. All hazardous waste generated by this construction activity defined by the Resource Conservation and Recovery Act shall remain the property of the Contractor or his subcontractors, and must be stored, transported, and disposed of in accordance with the requirements of all applicable laws and regulations.
   2. Removal or disposal of toxic materials or asbestos is not included in this contract. If the Contractor encounters such materials, he shall stop work and notify the Contracting Officer immediately.

D. Submittals: The General Contractor shall provide a Safety Plan and a Job Hazard Analysis for the Contracting Officer's review prior to beginning construction activities.

1.10 WELDING

A. Prior to commencing any welding, the GC shall obtain an Air Force Form 592, Welding, Cutting and Brazing Permit welding permit from the Installation Fire Department prior to commencing any hot work. This includes the use of chop saws for metal cutting.

1.11 BARRICADES AND WARNING DEVICES

A. The GC shall provide and maintain barricades and lighting devices, in accordance with manual for uniform traffic control devices in the State Department of Transportation Manual, current Edition, at all points of excavation and construction within perimeter of construction site. Conform to all OSHA requirements for personnel safety.

1.12 PROTECTION FOR OPEN FLAME DEVICES

A. When open flame and/or spark producing devices, i.e., acetylene oxygen welding equipment, electric arc welding, etc., are employed for job accomplishment, the following procedures are mandatory:
   1. Inspect all surroundings and equipment to insure that combustible substances are not present in any area where contact of metal at a temperature above the flashpoint of any compound is possible.
   2. Insure that no open containers or spills of combustible substances are present.
   3. Insure that ignition is not possible by conduction, convection, radiation, or dispersion of molten metal.
   4. Proper protection equipment and practices will be used, i.e., fire-resistant blankets, wetting or surrounding area, removal of combustible materials where practicable, earth filled backing, portable fire extinguishers of proper type on hand.
   5. When open flame devices are to be used, a permit is required and notification to the Installation Fire Department is required.

1.13 FIRE PROTECTION

A. The GC shall at all times maintain good housekeeping practices to reduce the risk of the fire

damage. All scrap materials, rubbish, and trash shall be removed daily from in and about the building and shall not be permitted to be scattered on adjacent property.

B. Suitable storage space shall be provided outside the immediate building area for storing flammable materials and paints; no storage will be permitted in the building. Excess flammable liquids being used inside the building shall be kept in closed metal containers and removed from the building when not in use.

C. A fire extinguisher shall be available at each location where cutting and welding is being performed. Where electric or gas welding or cutting is done, interposed shields of incombustible material shall be used to protect against fire damage due to sparks and hot metal. When temporary heating devices are used, a watchman shall be present to cover periods when other workman are not on the premises.

D. The GC shall provide fire extinguishers in accordance with the recommendations of NFPA Nos. 10 and 241. However, a minimum of four fire extinguishers shall be available for the building during the construction period.

E. Fire Codes: The GC shall obey all requirements of the national fire codes, installation fire regulations, and the UFC 3-600-01 manual as they relate to his work on this project.

1.14 WORK BY OTHERS

A. Work Not Included: Except for such auxiliary work as is shown or specified or is necessary as a part of the construction, the following work is not included in the Contract:
   1. All work shown, but marked "NOT IN CONTRACT" (NIC).
   2. All work indicated to be furnished and installed by AAFES (AF/AI).
   3. All work indicated to be furnished and installed by the AAFES Vendors or Concessionaires.
   4. All work of demolition and remediation of hazardous materials.

1.15 AAFES-FURNISHED AND AAFES-INSTALLED EQUIPMENT (AF/AI)

A. Attention is called to the GENERAL PROVISIONS concerning work by others under separate Contract. The following items will be furnished and installed by AAFES under separate contracts during the GC's performance period: Some Food Service Equipment items may be Contractor installed. See paragraph 1.16 following.
   1. Display units, counters, and racks.
   2. Cash registers, Point of Sale counters (Electrical service by GC)
   3. Office equipment and furniture.
   4. Walk-in freezers and coolers: (Electrical service at main panel for units by G.C.).
   5. MPA Shelving / Display / Sales Racks.
   6. Signage designated as “AF/AI”
   7. Food Service Vendor and Snack Avenue Equipment indicated in schedules as AF / AI.

B. At the Contracting Officer's option, additional equipment will be furnished and/or installed.

1.16 AAFES FURNISHED-CONTRACTOR INSTALLED ITEMS (AF/CI)

A. AAFES shall furnish certain items/equipment to the GC for installation under this Contract. The GC shall unload, handle, store, protect, uncrate, assemble, set in final position, align, join, level and make all utility connections to all items of equipment. Installation shall be performed in accordance with the guidance indicated in the specifications and drawings. The following items will be furnished by AAFES and shall be installed by the GC during the GC's performance period:
   1. Plaque (refer to Section 10425-SIGNS).
   2. Ice Maker - including power and water services and condensing unit.
   3. Food Service Equipment as indicated on schedules as AF / CI.
   4. Monument sign – Base for sign and power to sign by G.C. Sign is AF/CI.
   5. Building signage at exterior of building (power by G.C. and mounting by G.C.).
   6. Baler.

7. Carpet.
8. Wall Panels and Banner Assemblies and overhead interior signage..
9. Signage at Snack Avenue is AF/CI.
10. Signage at Blimpies is AF/CI.

B. AAFES-furnished items will be received at the job site by a representative of the local exchange who will jointly with the GC verify conditions and quantities. The representative of the local exchange will then transfer custody of the items to the GC.

C. The GC shall construct all openings, furnish and install required sleeves, and furnish and install all reinforcing miscellaneous supports, angles, plates, anchors, and bolts, cover plates and fitments necessary to secure AAFES-furnished equipment in place.

D. The installation shall be complete in all respects and put into good operating condition.

E. The GC shall include in the Construction Schedule, dates for which the AAFES-furnished items will be required on the site. AAFES requires these dates to be submitted by the G.C. within 30 days of award of contract.

F. If the GC subsequently requests a change to the delivery date, the Contracting Officer will use his reasonable best efforts to effect the change. All requests must be made at least sixty (60) days in advance of the scheduled delivery date, and must be in writing. Failure to provide this notice, or if provided, inability of the Contracting Officer to effect the change for any reason shall not constitute a basis for a claim under the Contract to store, protect, and install the AF/CI equipment.

1.17 LINING OF JOINTS IN FINISHED MATERIALS

A. It shall be the responsibility of the GC to make certain in the installation of jointed floor, wall, and ceiling materials that:
   1. The joints line through in a straight line and in both directions wherever possible.
   2. The joints relate to all openings and breaks in the structure and are symmetrically placed wherever possible. This includes heating registers, light fixtures, paneling, equipment, etc.
   3. If, because of the non-related sizes of the various materials and locations of openings, etc., it is not possible to accomplish the above, the GC shall meet the Contracting Officer to determine the most satisfactory arrangement. The GC shall establish center lines for all trades.

1.18 INTEGRATING EXISTING WORK

A. All existing streets, adjacent buildings, and other improvements shall be protected from damage.

B. The GC's operations shall be confined to the immediate vicinity of the new work and shall not in any way interfere with or obstruct the ingress or egress to and from street or adjacent property.

C. If new work is to be connected to existing work, special care shall be exercised not to disturb or damage the existing work more than necessary. All damaged work shall be replaced, repaired, and restored to its original condition at no cost to AAFES or government.

1.19 HEADROOM UNDER PIPES

A. All horizontal runs of plumbing and heating pipes and/or electrical conduit suspended from ceilings shall provide for a maximum headroom clearance, but in no case shall this clearance be less than 6'-9" without written consent from the Contracting Officer. Where piping or conduit is left exposed within a room, it shall be true to plumb or horizontal and parallel to the walls. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.

1.20 PATCHING GOVERNMENT-OWNED FACILITIES

A. Government-owned structures, facilities, streets, curbs, walks, etc., that are damaged or

removed due to required excavations or other construction work, shall be patched, repaired or replaced by the GC, to the satisfaction of the Contracting Officer and the Installation Civil Engineer Office. All utility lines on under streets shall be jacked and bored, not trenched.

1.21 LOCATION OF EQUIPMENT AND PIPING

A. Drawings showing location of equipment, piping, ductwork, etc., are diagrammatic and job conditions shall not always permit their installation in the location shown. When this situation occurs, it shall be brought to the Contracting Officer's attention immediately and the new location determined in a joint conference. Installation in and between framing members may be required. The GC will be held responsible for any additional cost of installation in a new location. Items relocated without the approval of the Contracting Officer may require relocation. The GC shall remove and relocate such items at his own expense if so directed by the Contracting Officer.

1.22 OVERLOADING

A. The GC shall be responsible for not overloading any part or parts of structures beyond their safe calculated carrying capacities during construction by placing of materials, equipment, tools, machinery, or any other item thereon. No loads shall be placed on floors or roofs before they have attained their permanent and safe strength.

1.23 STANDARDS

A. Any materials specified by reference to the number, symbol, or title of a specific standard such as Commercial Standard, a Federal Specification, a trade association standard, or other national standard, shall comply with the requirements in the latest revision thereof, and any amendment or supplement thereto, in effect on the date of invitation for proposals, except as limited to type, class or grade, or modified in such reference, and except as otherwise indicated.

B. The standard referred to, except as modified in the specifications, shall have full force and effect as though printed in these specifications. These standards are not furnished to bidders for the reason that the manufacturers and trades involved are assumed to be familiar with their requirements.
   1. Where Federal Specifications are referred to as a measure of quality and standard, they refer to Federal Specifications established by the Procurement Division of the United States Government and are available from the Superintendent of Documents, U.S. Government Printing Office.
   2. Where Federal Specification numbers are used, they refer to the latest edition including amendment thereto.
   3. Where Commercial Standards are referred to as a measure of quality, standard, and method of fabrication, they refer to Commercial Standards, and method of fabrication, they refer to Commercial Standards issued by the U.S. Department of Commerce.
   4. Where ASTM Serial Numbers are used, they refer to the latest tentative specifications, standards specifications, standards methods, or standard method of testing issued by the American Society for Testing and Materials.

1.24 CERTIFICATE OF CONFORMANCE

A. Except where tests and/or inspections in connection with structural materials are specified or required by applicable laws, rules and regulations, manufacturer's certificate covering conformance with the requirements of the above mentioned Federal Specifications and Commercial Standards may be acceptable in lieu of test for such items. Such certificates shall be furnished to the Contracting Officer for all items so specified.

1.25 OCCUPANCY BY AAFES

A. AAFES shall reserve the right and privilege of partial occupancy during and prior to the beneficial occupancy of the total work. Access shall be allowed at all times to AAFES and its own Contractors in the endeavor.

1.26 AAFES CONTRACTS

A. The GC's attention is called to General Provision titled, "Other Contracts", and provision titled "Final Inspection and Acceptance", paragraph referring to "use and possession prior to completion", the AAFES plans to install equipment in the following areas as noted below prior to completion date:

DESCRIPTION	DAYS PRIOR TO CONTRACT COMPLETION DATE
AAFES Start Installation of Retail Fixtures	60 Days

1.27 TESTS AND REPORTS

A. See Specification Section 01410 - TESTING AGENCY SERVICES.

1.28 GUARANTEE AND EXTENDED GUARANTEE

A. Upon completion of project, prior to final payment, guarantees required by technical divisions of specifications shall be properly executed in quadruplicate by subcontractors and submitted to the Contracting Officer. Delivery of guarantees shall not relieve the GC from any obligation assumed under the Contract.

B. Submit guarantee covering entire project for one year. In addition, where separate guarantees for certain portions of work are for longer periods, the GC's guarantee shall be extended to cover such longer periods. Copies of the guarantees shall be inserted into the Maintenance Manuals. In cases where the manufacturer's standard commercial warranty (i.e., roofing systems, mechanical components, hardware, etc.) is longer than one year, standard commercial warranty period shall be provided.

C. Guarantee shall become valid and operative upon acceptance by AAFES.

1.29 REFERENCES

A. All references to the word "Government" in the specifications shall mean Army and Air Force Exchange Service (AAFES), except guarantees which shall be "Government".

B. Wherever the term "Not in Mechanical Contract" (NIMC) or the term "Not in Electrical Contract" (NIEC) is used in the specifications and on the drawings, it shall be interpreted to mean that the work is not a part of the particular sub-trade BUT IS INCLUDED under some other trade of the Contract. Wherever the term "Not in Contract" (NIC) is used, it shall be interpreted to mean that the item of work is not a part of the Contract, except as may be otherwise noted.

C. Definitions:
   1. Vendor: Person or persons selling any material item.
   2. Installation: Military facility where the project is being built.
   3. Concessionaire: Person who is directly responsible for operation of the concessions.
   4. Architect-Engineer: That person or firm responsible for preparing the contract drawings and specifications.
   5. AAFES or Exchange: Army and Air Force Exchange Service.
   6. Inspection Agency: Project Inspector contracted by AAFES.
   7. Installation/Facility Engineers: Responsible installation engineer.

1.30 SUBMISSION OF PHOTOGRAPHS

A. The GC shall submit to the Contracting Officer photographs taken on or about the first of every month, showing the general conditions of work as viewed from the north, south, east, west and interior. Photographs (digital) must accompany each Application for Payment. Each picture shall be identified by date of exposure, project title, description of content, and AAFES Project Number.

1.31 NORMAL ACTIVITIES AND ENVIRONMENTAL CONDITIONS FOR TYNDALL AFB, FLORIDA.

A. The Installation does not allow burning. Do not burn anything on site.

B. At times force protection and national security requirements may mean that the Contractor will not be able to access the Installation or that access will be delayed. These are normal activities for the Installation and the Contractor shall expect that construction activities may be impacted as a result of normal Installation activities.

1.32 INFORMATION PROCEDURES DURING CONSTRUCTION (RFI's)

A. It is recognized that technical questions will arise during the course of the construction of this project. Contractor shall endeavor to handle these questions in a logical and consistent manner. The preferred method is with RFI's e-mailed to the A/E for action.

1.33 POSTING OF ADDENDA AND CHANGE ORDERS

A. Contractor shall post all addenda, field orders, and change orders in the Contract drawings and specifications such that they are available for reference at all times on the project site.

1.34 PRICE CHANGES IN MATERIALS AND EQUIPMENT SUBSEQUENT TO BIDDING

A. **No allowance for increases to the Contract Award Amount will be allowed for systems, materials, and equipment after the Bid is received. Credit will be allowed for stored materials provided they are identified specifically for use in this project and are stored on site or in a bonded warehouse. AAFES reserves the right to verify all stored materials.**

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01017

AAFES FURNISHED AND INSTALLED EQUIPMENT

PART 1 - GENERAL

1.01 AAFES FURNISHED AND INSTALLED PROPERTY (AF/AI)

A. Property: Property is indicated on the drawings.

B. Schedule: Contractor shall schedule early completion of designated areas for beneficial occupancy by AAFES usage prior to completion of entire project.

C. AAFES will furnish and install equipment as indicated on Equipment Plan in the drawings.

D. Contractor's Duties:
   1. Provide access for AAFES personnel.
   2. Coordinate work and cooperate with the installers of the AF / AI property so that installation will be accomplished in accordance with construction schedule.
   3. Provide mechanical and electrical connections to AF / AI equipment and building systems where indicated in the contract documents.
   4. Provide security for designated areas.

E. AAFES Duties:
   1. Inspect designated area prior to use and issue statement of acceptance of area for installation of property.
   2. Make final mechanical and electrical connections between AF / AI property and building systems where indicated in the contract documents.
   3. Provide custodial services for designated areas during use after beneficial occupancy.

1.02 DELIVERY DATE CHANGES

A. Requests by Contractor to change designated delivery dates shall be made in writing at least 30 days in advance of the designated delivery date. If the Contractor is not ready to accept delivery of AAFES furnished property the Contractor shall be responsible for storage and redelivery cost. Should AAFES be unable to effect the change or should the Contractor fail to submit Contractor's request within the time stated above, the Contractor's obligation under this contract and as stated herein shall not be relieved and further, the Contractor will have no basis upon which he can file a claim under these conditions.

1.03 AAFES ACTIVITIES AFFECTING PROGRESS OF WORK:

A. Retail sales Areas: Schedule date of installation of fixturing and possession of these areas 60 days prior to completion of project.

B. Serving Areas & Food Preparation Areas: Schedule date of use and possession of food preparation serving areas 60 days prior to completion of project.

C. MPA: Schedule date of installation of storage shelving and equipment 30 days prior to completion of project.

D. Construction in each area at date scheduled for its use and possession by AAFES shall be sufficiently complete, in accordance with Contract Documents, so the AAFES may occupy the area for the use for which it is intended. Comply with Contract Clauses titled Inspection of Construction, and Use and Possession Prior to Completion.

1.04 ACCEPTANCE OF AREAS FOR BENEFICIAL OCCUPANCY

A. Inspection: Prior to acceptance by AAFES of an area for beneficail occupancy. the Contracting Officer will conduct an inspection of the specific area. A list of deficiencies will be provided to the Contractor.

B. Acceptance: If the Contracting Officer determines the specific area is sufficiently complete for

beneficial occupancy by AAFES, the area will be accepted in writing with the exception of the deficiencies listed. The deficiencies will be completed or corrected prior to final acceptance at the completion of the project.

C. Damage: Damage resulting from AAFES' use will not be considered the Contractor's responsibility.

D. Refer to clause entitled "Final Inspection and Acceptance" of the AAFES "General Provisions".

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION

SECTION 01018

AAFES FURNISHED CONTRACTOR INSTALLED EQUIPMENT

PART 1 - GENERAL

1.01 AAFES FURNISHED/ CONTRACTOR INSTALLED EQUIPMENT (AF/CI):

A. AAFES furnished/Contractor installed equipment shall be handled in accordance with the "Army and Air Force Exchange Service General Provisions" clause entitled "AAFES Furnished Property".

B. AAFES Furnished Equipment: AAFES will furnish the equipment indicated for installation by the Contractor, as follows:
   1. AAFES Furnished/Contractor Installed Items:
      a. AAFES furnished / contractor installed equipment is listed in the drawings:
         1) Sheet A401 Snack Avenue Schedule
         2) Sheet A 402 Blimpie Equipment
         3) Sheet EQ 101 Equipment Plan
   2. Refer to individual schedules and notes on each sheet.

C. Contractor's Duties:
   1. Designate required delivery date for each product. Notify the Contracting Officer in writing atleast 60 days in advance of the date that AAFES furnished equipment and furnishings will be needed. Shop drawings indicating dimensional locations of all plumbing and electrical rough-ins will be furnished by AAFES.
   2. The equipment will be received at the job site by a representative of AAFES who will jointly, with the Contractor, verify condition and quantities. The representative will then effect receipted transfer of custody of the equipment to the Contractor.
   3. Unload, handle, store (on-site), protect, uncrate, assemble, install, set in final position, align, join, level, and make all utility connections to all items of equipment. Installation shall be performed in accordance with the specifications, equipment plans, and schedules shown on the Drawings and the rough-in drawings provided by AAFES.
   4. Construct all openings, furnish and install required sleeves and furnish and install all reinforcing, miscellaneous supports, angles, plates, anchors, and bolts necessary to secure AAFES furnished equipment in place.
   5. Repair or replace items damaged as a result of Contractor's operations.
   6. Apply finish indicated, if any.
   7. The installation shall be complete in all respects, including mechanical and electrical hook ups, and put into good operating condition.

D. AAFES Duties:
   1. Deliver all AAFES furnished items to the job site. Schedule delivery date with supplier in accordance with Progress Chart.
   2. Provide Contractor with installation drawings and instructions.
   3. Provide Contractor with shop drawings indicating dimensional locations of all plumbing and electrical rough-ins.

1.02 DELIVERY DATE CHANGES:

A. Requests by Contractor to change designated delivery dates shall be made in writing at least 60 days in advance of the designated delivery date. If the Contractor is not ready to accept delivery of AAFES furnished equipment the Contractor shall be responsible for storage and delivery cost. Should AAFES be unable to effect the change, or should the Contractor fail to submit Contractor's request within the time stated above, the Contractor's obligation under Contractor's contract and as stated herein shall not be relieved and further, the Contractor will have no basis upon which Contractor can file a claim under these conditions.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION

SECTION 01026

UNIT PRICES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section specifies administrative and procedural requirements for unit prices.
   1. A unit price is an amount proposed by Bidders and as a price per unit of measurement for materials and/or services that will be added to or deducted from the Contract Sum by Change Order in the event unforeseeable site conditions are encountered or changes in the scope of work are directed. The extent of anticipated earthwork, utility work, and landscaping are indicated in the Drawings and Specifications and are included in the Base Bid.
      a. Unit prices shall include all necessary material, labor, fees, layout, supervision (field and home office), general expenses, insurance, overhead, profit and applicable taxes.
      b. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of approval, verification, measurement and payment for unit prices are specified in those sections.

B. Related work specified elsewhere includes:
   1. 02200: Earthwork

C. Schedule: A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods described under each unit price.
   1. The Government reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this Work measured by an independent surveyor acceptable to the Contractor at the Government's expense. All quantities are subject to verification by the Testing Agency retained by AAFES at the time they are being removed or replaced.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 UNIT PRICE SCHEDULE

A. Item No. 1 - Unsuitable Materials Removal:
   1. Description: Remove and dispose of unsuitable materials (except concrete foundations) encountered at subgrade or bearing elevations indicated on drawings, in accordance with Section 02200 - EARTHWORK. Pay particular attention to requirements for mudsills and over-excavations and work to be included in the Base Bid.
      a. Note: Removal of unsuitable soils in the building area and replacement/remediation are described in the Drawings and Geotechnical Report and are part of the Base Bid.
   2. Unit of Measure: Cubic yard (CY) of material removed.

B. Item No. 2 – #57 Crushed Stone:
   1. Description: Provide #57 crushed stone as backfill.
   2. Unit of Measure: Cubic yard (CY) of crushed stone.

C. Item No. 3 - Mass Earth Excavation:
   1. Description: Remove and dispose of unsuitable earth encountered in open excavations, in accordance with Section 02200 - EARTHWORK.
   2. Unit of Measure: Cubic yard (CY) of earth excavated.

D. Item No. 4 - Trench Earth Excavation:
   1. Description: Remove and dispose of unsuitable earth encountered in trenches, in accordance with Section 02200 - EARTHWORK.
   2. Unit of Measure: Cubic yard (CY) of earth excavated.

E. Item No. 5 - Hand Earth Excavation:
   1. Description: Remove and dispose of unsuitable earth that must be excavated by hand, in accordance with Section 02200 - EARTHWORK.
   2. Unit of Measure: Cubic yard (CY) of earth excavated.

F. Item No. 6 - Compacted Earth Fill:
   1. Item No. 6a - General or Open Site Areas:
      a. Description: Provide acceptable earth fill in general or open site areas, compacted to meet requirements specified for the affected area, in accordance with Section 02200 - EARTHWORK.
      b. Unit of Measure: Cubic yard (CY) of fill, in place.
   2. Item No. 6b - Trench Backfill:
      a. Description: Provide acceptable backfill in trenches, compacted to meet requirements specified for the affected area, in accordance with Section 02200 - EARTHWORK.
      b. Unit of Measure: Cubic yard (CY) of backfill, in place.
   3. Item No. 6c - Select Fill:
      a. Description: Provide acceptable select fill obtained from off-site locations, compacted to meet the requirements specified for the affected area, in accordance with Section 02200 - EARTHWORK.
      b. Unit of Measure: Cubic yard (CY) of fill, in place.

G. Item No. 7 - Topsoil:
   1. Description: Provide additional topsoil from off-site locations, in accordance with Section 02200 - EARTHWORK, and applicable portions of Section 02900 - LANDSCAPE WORK.
   2. Unit of Measure: Cubic yard (CY) of topsoil, in place.

H. Item No. 8 – Sodding (Turf):
   1. Description: Provide additional sodding from off-site turf farm or supplier.
   2. Unit of Measure: Square yard (SY) of sod, in place.

I. Item No. 9 – Removal of and Storage of Contaminated Ground Water During Dewatering:
   1. Per Section 02200 Earthwork **Part 3.02 DEWATERING** paragraph 11
   2. Unit of Measure: gallons.
   3. Include in the **Contract Base Price** the removal and storage of 30,000 gallons of contaminated ground water. Provide a per gallon sum which may be added to or deducted from the **Contract** for any amount of contaminated groundwater greater than or less than 30,000 gallons.

END OF SECTION

SECTION 01030

OPTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Options submission procedures.

B. Documentation of changes to Contract Sum/Price and Contract Time.

1.02 RELATED SECTIONS

A. AAFES Solicitation/Proposal/Award form, contained in the AAFES solicitation package.

B. AAFES Instructions to Offerors and Conditions of Proposal/Awards form, contained in the AAFES solicitation package.

C. Individual specifications sections relevant to the work required under each alternate.

1.03 SUBMISSION REQUIREMENTS

A. List options, along with price, on the AAFES Proposal option form.

B. Options quoted on the AAFES Proposal Form will be reviewed and accepted or rejected at AAFES's option. Accepted options will be identified in the AAFES Contract Agreement.

C. Coordinate related work and modify surrounding work to integrate the Work of each option.

1.04 SCHEDULE OF OPTIONS

A. Option No. 1 – Early Completion of Project - 180 calendar days after NTP.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01045

CUTTING AND PATCHING

PART 1 GENERAL

1.01 DESCRIPTION

A. Related Requirements Specified Elsewhere:
   1. Summary of the Work: Section 01010.
   2. Mechanical: Division 15.
   3. Electrical: Division 16.

B. Execute cutting (including excavating), fitting or patching, or work required to:
   1. Uncover work to provide for installation of ill-timed work.
   2. Remove and replace defective work.
   3. Remove and replace work not conforming to requirements of Contract Documents.
   4. Remove samples of installed work as specified for testing.

C. In addition to contract requirements, upon written instruction of the Contracting Officer:
   1. Uncover work to provide for Contracting Officer's observation of covered work.
   2. Remove samples of installed materials for testing.
   3. Remove work to provide for alteration of existing work.

D. Do not endanger any work by cutting or altering work or any part of it.

E. Do not cut or alter work of another contractor without written consent of the Contracting Officer.

1.02 SUBMITTALS

A. Prior to cutting which affects structural safety of project, submit written notice to the Contracting Officer, requesting consent to proceed with cutting, including:
   1. Identification of project.
   2. Description of affected work.
   3. Necessity for cutting.
   4. Affect on other work, on structural integrity of project.
   5. Description of proposed work. Designate:
      a. Scope of cutting and patching.
      b. Trades to execute work.
      c. Products proposed to be used.
      d. Extent of refinishing.
   6. Photographs of affected work.

B. Submit written notice to the Contracting Officer designating time-work will be uncovered to provide for observation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials for replacement of work removed: Comply with specifications for type of work to be done.

PART 3 EXECUTION

3.01 INSPECTION

A. Inspect existing conditions of work including elements subject to movement or damage during:
   1. Cutting and patching.
   2. Excavating and backfilling.

B. After uncovering work, inspect conditions affecting installation of new products.

3.02 PREPARATION, PRIOR TO CUTTING

A. Provide shoring, bracing and support as required to maintain structural integrity of the project.

3.03 PERFORMANCE

A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances and finishes.

B. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs and new work.

C. Execute excavating and backfilling as specified in Excavating and Backfilling.

D. Restore work which has been cut or removed; install new products to provide complete work in accordance with requirements of Contract Documents.

E. Refinish entire surfaces as necessary to provide an even finish.
   1. Continuous surfaces: To nearest intersections.
   2. Assembly: entire refinishing.

END OF SECTION

SECTION 01220

PROGRESS MEETINGS

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Summary of the Work: Section 01010.

B. Submittals: Section 01300.

C. Project Record Documents: Section 01720.

1.02 PROGRESS MEETINGS - GENERAL CONTRACTOR'S (GC) RESPONSIBILITY

A. Prepare agendas.

B. Make physical arrangements for meetings.

C. Preside at meetings.

D. Provide protective headgear (hardhats) for all meeting attendees.

E. A/E will record minutes; including significant proceedings and decisions.

F. A/E will distribute copies of minutes to participants, within four (4) days after meetings.

G. A/E will furnish one (1) pdf of minutes to the Contracting Officer.

1.03 ATTENDANCE

A. The Contracting Officer or designed representatives will attend meetings to ascertain that work is expedited consistent with construction schedule and with Contract Documents.

1.04 PRE-CONSTRUCTION MEETING

A. Date will be scheduled by the Contracting Officer .

B. Attendance:
   1. AAFES Representative.
   2. Contracting Officer and his consultants.
      a. Representatives of Governmental or other Regulatory Agencies. This includes representatives of the Installation.
      b. General Contractor and his major subcontractors.

C. Minimum Agenda:
   1. Distribute and discuss:
      a. List of major subcontractors.
      b. Tentative Construction Schedule.
      c. Critical work sequencing.
      d. Designation of responsible personnel.
      e. Processing of field decisions and Change Orders.
      f. Adequacy of distribution of Contract Documents.
      g. Submittal of shop drawings, project data and samples.
      h. Procedures for maintaining Record Documents.
      i. Use of premises:
         1) Office and storage areas.
         2) AAFES requirements.
      j. Major equipment deliveries and priorities.
      k. Safety and first aid procedures.
      l. Security procedures.
      m. Housekeeping procedures.
      n. LEED Plans and Implementation.

1.05 PROGRESS MEETINGS

A. Schedule meetings as determined by the GC and Contracting Officer 's representative.

B. Hold called meetings as progress of work dictates (minimum 1 every month).

C. Location of Meetings: Job Site or as directed in notice.

D. Attendance:
   1. Contracting Officer or his representative.
   2. Subcontractors as pertinent to agenda.
   3. Safety Representative.
   4. Representative of CIVIL ENGINEERING OFFICE at the Installation.
   5. Minimum Agenda.
      a. Review, approve minutes of previous meeting.
      b. Review, work progress since last meeting.
      c. Note field observations, problems, and decisions.
      d. Identify problems which impede planned progress.
      e. Review off-site fabrication problems.
      f. Develop corrective measures and procedures to regain planned schedule.
      g. Revise Construction Schedule as indicated.
      h. Plan progress during next work period.
      i. Review submittal schedules, expedite as required to maintain schedule.
      j. Maintain quality and work standards.
      k. Review changes proposed by AAFES for:
         1) Affect on Construction Schedule.
         2) Affect on completion date.
      l. Complete other current business.
      m. LEED Implementation and Progress **(Note: Failure to provide evidence of progress in accomplishing required LEED Credits will result in withholding of progress payments.)**

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 GENERAL

A. Submit, to the Contracting Officer, shop drawings, project data, and samples required by specification sections.
   1. Exclusive of submittals for exterior submittals, Contractor at his option may elect to make a written statement saying that an item being considered for use on the project meets the Contract requirements and is named specifically and completely identified in lieu of making a formal shop drawing submittal. Use AAFES form 4450-48 for all submittals. A submittal identifying the material or system being proposed, shall be made from each item so named in lieu of a formal submittal

B. Submit, to the Installation copies of all submittals involving exterior materials. Installation has approval authority over all exterior materials. Make the submittals to Installation directly at same time as submittals to Contracting Officer's Representative. Procurement and/or installation of all such materials without written approval by the Installation is at the Contractor's risk and if such materials are rejected by the Installation all costs associated with said materials shall be borne by the G.C.

C. Related Requirements Specified Elsewhere:
   1. General Provisions and Amendments.
   2. Section 01356 - LEED Submittal Forms.
   3. Section 01720 - Project Record and Closeout Documents.
   4. Section 01810 - Commissioning.

D. Prepare and submit with the Construction Schedule a separate schedule listing dates for submission and dates to review shop drawings, project data, and samples that will be needed for each product.

E. By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.
   1. Contractor shall coordinate voltages and other requirements of equipment supplied with requirements of the Work and of the Contract Documents.

1.02 SHOP DRAWINGS

A. Definition: Original drawings, prepared by the general contractor (GC), subcontractor, supplier, or distributor which illustrate some portion of the work; showing fabrication, layout, setting or erection details and coordination with work by others.
   1. Prepared by a qualified detailer.
   2. Identify details by reference to sheet and detail numbers shown on Contract Drawings.
   3. Minimum Sheet Size: 8-1/2 inches by 11 inches
   4. Reproductions for Submittals: Opaque diazo or xerox prints

1.03 PRODUCT DATA

A. Manufacturer's Standard Schematic Drawings:
   1. Modify drawings to delete information which is not applicable to project.
   2. Supplement standard information to provide additional information applicable to project.

B. Manufacturer's catalogue sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.
   1. Clearly mark each copy to identify pertinent materials, products, or models.
   2. Show dimensions and clearances required.
   3. Show performance characteristics and capacities.

C. Asbestos-Free Product/Material: Prior to the approval of the product/material to be used, the manufacturer/supplier shall provide written certifications that the product/material contains no asbestos. These certifications are mandatory before approval will be issued. Submittals furnished without asbestos-free certification will be returned to the Contractor with no action taken until such certification is provided.

D. Lead-Free Paint: Manufacturers/suppliers of paint shall provide written certifications that the products submitted contain no lead. These certifications are mandatory before approval will be issued. Submittals furnished without lead-free certification will be returned to the Contractor with no action taken until such certification is provided.

1.04 SAMPLES

A. Physical examples to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged.

B. Office Samples: Of sufficient size and quantity to clearly illustrate:
   1. Functional characteristics of product or material, with integrally related parts and attachments.
   2. Full range of color samples.
   3. After review, samples may be used in construction of project unless otherwise noted.

1.05 CONTRACTOR RESPONSIBILITIES

A. See: General Conditions and Amendments.

B. The GC is responsible for the timely submittal of all complete and coordinated shop drawings and samples. No allowance will be made for time lost due to delinquent or incomplete submittals by the GC.

C. SPECIAL NOTE: All submittals requiring color selection/coordination for exterior materials shall be submitted at the same time.

D. SUBMITTAL SCHEDULE: The Contractor shall provide a submittal schedule listing submittal requirements for each section of the specifications. List shall indicate what Contractor is to submit to the Contracting Officer for approval and/or concurrence.

1.06 SUBMISSION REQUIREMENTS

A. Schedule submissions at least 14 days before dates reviewed submittals will be needed, but in no case will submittals be made beyond 60 days after award of contract except by permission of Contracting Officer.

B. Submit number of copies of shop drawings, project data, and samples which GC requires for distribution plus two (2) copies which will be retained by the Contracting Officer's Representative. Also, submit one copy of each exterior material submittal directly to the Installation, concurrently with submittal to the Contracting Officer's Representative.

C. Submit number of samples specified in each specifications section or as required by the Contracting Officer .

D. Accompany submittals with transmittal letter, in duplicate, containing:
   1. Date.
   2. Project title and number.

3. GC's name and address.
4. The number of each shop drawing, project data, and sample submitted.
5. Notification of deviations from Contract Documents. If no specific mention of such deviation is made, the GC will not be relieved of the responsibility for completing the work in full accordance with the Contract Documents even though such drawings are approved by the Contracting Officer .
6. Other pertinent data.
7. Utilize Air Force Form 3000 for Submittals
8. Tyndall Air Force Base Fire Department shall review all Fire Systems submittals and is the Authority Having Jurisdiction.

E. Submittals shall include:
1. Date and revision dates.
2. Project title and number.
3. The name of:
   a. Architect/Engineer
   b. Contractor
   c. Subcontractor
   d. Supplier
   e. Manufacturer
   f. Separate detailer when pertinent
4. Identification of product or material.
5. Relation to adjacent structure or materials.
6. Field dimensions, clearly identified as such.
7. Specification section number.
8. Applicable standards, such as ASTM number of Federal Specifications.
9. A blank space, 3 inches x 5 inches, for the A/E's stamp.
10. Identification of deviations from Contract Documents.
11. GC's stamp, initialed or signed, certifying to review of submittal, verification of field measurements, and compliance with Contract Documents.

1.07 RESUBMISSION REQUIREMENTS

A. Shop Drawings:
1. Revise initial drawings as required and resubmit as specified for initial submittal.
2. Indicate on drawings any changes which have been made other than those requested by the Contracting Officer .

B. Project Data and Samples:
1. Submit new data and samples as required for initial submittal.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01331

WEATHER TABLE

PART 1 - GENERAL

1.01 INFORMATION AND DATA

A. Information and data furnished or referred to in the weather table is furnished for the Contractor's information.

1.02 CONTRACT TIME LIMITS

A. The contract time limits include weather conditions that are shown in the table listed herein.

1.03 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

A. This provision specifies the procedure for the determination of time extensions for unusually severe weather affecting exterior work in accordance with the Contract. The following listing defines the monthly anticipated adverse weather for the contract period and is based on NOAA data for the geographic location of the project.

MONTHLY ANTICIPATED ADVERSE WEATHER CALENDAR DAYS

TYNDALL AFB, FLORIDA

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
8	8	8	8	8	8	8	8	8			

B. This listing of anticipated adverse weather will constitute the base line monthly weather time evaluations. Throughout the contract each month, actual adverse weather days will be recorded on a calendar basis (including weekends and holidays) and compared to the monthly anticipated adverse weather in this listing. The term "actual adverse weather days" shall include days impacted by actual adverse weather. The number of actual adverse weather days affecting exterior work shall be calculated chronologically from the first to the last day in each month. Adverse weather days must prevent work for 50 percent or more of the contractor's work day and delay work critical to the timely completion of the project. If the number of actual adverse weather days exceeds the number of days anticipated in the above listing, the Contractor may submit in writing to the Contracting Officer a request for a time extension within 30 days of the adverse weather. Based upon the above NOAA data the Contracting Officer will determine if the time extension for the Contractor is warranted. The Contracting Officer will then convert any qualifying delays to calendar days and issue a modification in accordance with the contract. All time extensions granted under this provision shall be at no cost to AAFES.

PART 2 - PRODUCTS

2.01 Not used.

PART 3 - EXECUTION

3.01 Not used.

END OF SECTION

SECTION 01354

LEED-NC 2009 CREDIT SUMMARY

PART 1 GENERAL

1.01 PROJECT INFORMATION

A. Project Name: Shoppette / Food / Class 6 / Gas.

B. City: Tyndall, Air Force Base.

C. State: Florida.

1.02 DEFINITIONS

A. LEED Rating System: LEED Reference Guide for Green Building Design and Construction, LEED-NC 2009 edition.

B. Required: Achievement of this credit is essential for certification of this project.

C. Preferred: Achievement of this credit would be desirable but is not mandatory.

D. Not Required: Achievement of this credit is not expected or not possible for this project.

E. See Section 01355 - LEED Certification Procedures, for Contractor's responsibilities.

F. This section does not include specific work requirements and is included for Contractor's information only.

PART 2 CREDIT SUMMARY

2.01 CERTIFICATION TO BE ACHIEVED: Silver, requiring minimum of 50 points.

2.02 SUSTAINABLE SITES (SS): 12 Points To Be Achieved.

A. SS Prerequisite 1 - Required - No points - Construction Activity Pollution Prevention.
   1. During Construction:
      a. Preventive measures and remediation are specified in Section 02950
      b. Dust control and basic surface drainage are specified in Section 01420
      c. Preventive measures prescribed by local regulations will be followed.
   2. Permanent erosion and sedimentation prevention features are to be provided:
      a. Grading for sediment traps and retention ponds is specified in Division 2.
      b. Turf (for lawns) is specified in Section 02923 (sodding).
      c. Turf (for lawns) is specified in Section 02921 (seeding).
      d. Plants are specified in Section 02930.
   3. <u>Responsibility</u>: Civil Engineer / General Contractor

B. SS Credit 1 - Required- 1 point - Site Selection.
   1. The project is not located on any of the inappropriate or environmentally sensitive lands defined for this credit.
   2. <u>Responsibility</u>: AAFES / Installation / Architect / Civil Engineer

C. SS Credit 4.3 - Required - 3 points - Alternative Transportation: Low-Emitting & Fuel-Efficient Vehicles.
   1. Preferred parking spaces have been provided, in the quantity required.(Option 1)
   2. <u>Responsibility</u>: AAFES / Architect / Civil Engineer

D. SS Credit 4.4 - Required - 2 points - Alternative Transportation: Parking Capacity.
   1. Parking space is sized to meet this requirement.

2. Preferred parking spaces are to be provided, in the quantity requiredwithout adding additional parking spaces. Minimum parking requirements per local zoning requirements have been met and have not been exceeded.
3. Responsibility: Architect / Civil Engineer

E. SS Credit 5.1 - Required - 1 point - Site Development: Protect or Restore Habitat.
1. The project site is undeveloped:
   a. Limitations on disturbance of vegetation during site clearing are indicated in the drawings.
   b. Additional limitations during construction are specified in Section 01420.
2. Responsibility: Civil Engineer / General Contractor

F. SS Credit 5.2 - Required - 1 point - Site Development: Maximize Open Space.
1. The building footprint and open space are designed to meet this requirement. (Case 2)
2. Responsibility: Civil Engineer /Architect

G. SS Credit 6.1 - Required - 1 point - Stormwater Design: Quantity Control.
1. Existing site imperviousness is less than or equal to 50 percent.
2. The site design does not increase existing runoff rate and quantity.
3. Methods used are:
   a. Using pervious surfacing:
      1) Grading is specified in Section 02200.
   b. Modifying existing stormwater flows:
      1) Grading is specified in Section 02200.
      2) Turf is specified in Section 02923 (sodding).
      3) Turf is specified in Section 02921 (seeding).
      4) Plants are specified in Section 02930.
      5) Storm drainage piping and structures are specified in Section 02690
4. Responsibility: Civil Engineer

H. SS Credit 6.2 - Required - 1 point - Stormwater Design: Quality Control.
1. Natural on-site stormwater treatment to remove sediment is provided:
   a. Grading is specified in Section 02200.
   b. Riprap is specified in Section 02200.
   c. Plants are specified in Section 02930.
2. Responsibility: Civil Engineer

I. SS Credit 7.2 - Required - 1 point - Heat Island Effect: Roof.
1. The roofing design reduces thermal gradient differences by:
   a. Using high reflectance and high emissivity roofing at > 2:12 slope and having a SRI of 29 for at least 75 percent of roof area. (Option 1)
      1) Standing seam metal roof meeting the requirements is specified in Section 13121.
2. Responsibility: Architect

J. SS Credit 8 - Required - 1 point - Light Pollution Reduction.
1. Interior Lighting: Option 1
2. Exterior Lighting requirements for LZ3: Medium as classified by IESNA RP-33.
3. Responsibility: Electrical Engineer

2.03 WATER EFFICIENCY (WE): 10 Points To Be Achieved.

A. WE Prerequisite 1 - Required - No points - Water Use Reduction, 20% Reduction.
1. Appropriate high efficiency and/or waterless fixtures are specified in Section 15400.
2. Responsibility: Mechanical Engineer

B. WE Credit 1.2 - Required - 4 points - Water Efficient Landscaping: No Potable Use or No Irrigation.
1. The landscaping does not require irrigation and no permanent irrigation system is provided.

a. The climate provides adequate rainfall for the landscaping intended without need for irrigation.
b. Plants that do not require irrigation are specified in Section 02930.

2. Responsibility: Civil Engineer

C. WE Credit 2 - Required - 2 points - Innovative Wastewater Technologies.
1. Use of municipal water for sewage conveyance is reduced by at least 50 percent by:
a. Appropriate high efficiency and/or waterless fixtures are specified in Section 15400.
2. Responsibility: Mechanical Engineer

D. WE Credit 3.1 - Required - 4 points - Water Use Reduction, 40% Reduction.
1. Appropriate high efficiency and/or waterless fixtures are specified in Section 15400
2. Responsibility: Mechanical Engineer

2.04 ENERGY & ATMOSPHERE (EA): 15 Points To Be Achieved.

A. EA Prerequisite 1 - Required - No points - Fundamental Commissioning of Building Energy Systems.
1. Commissioning performed by and under the supervision of an independent commissioning authority is included in the Contract Documents.
2. General commissioning requirements are specified in Section 01810.
3. The commissioning authority's responsibilities are specified in Section 01814 for Contractor's information only.
4. Commissioning of HVAC is specified in Section 15012.
5. Detailed demonstration and training for commissioning is specified in Section 01820.
6. Responsibility: AAFES / Commissioning Agent

B. EA Prerequisite 2 - Required - No points - Minimum Energy Performance.
1. The building envelope, HVAC, lighting, etc., have been designed to meet the criteria.
2. The overall design solution is implemented in the drawings and many sections of the specifications.
3. Responsibility: Architect / Mechanical Engineer / Electrical Engineer

C. EA Prerequisite 3 - Required - No points - Fundamental Refrigerant Management.
1. New equipment: No CFC-based refrigerants are used in any equipment. Non-CFC refrigerants are specified in the Division 15000 Mechanical.
a. Division 15000.
2. Responsibility: Mechanical Engineer

D. EA Credit 1 - Required - 10 points - Optimize Energy Performance.
1. Whole building energy simulation (Option1) shows that the design reduces energy cost compared to the specified standard by 30%.
2. The building envelope, HVAC, lighting, etc., have been designed to meet the criteria for the number of points indicated.
3. The overall design solution is implemented in the drawings and many sections of the specifications.
4. Responsibility: Architect / Mechanical Engineer / Electrical

E. EA Credit 4 - Required - 2 points - Enhanced Refrigerant Management.
1. No Halon is used in any equipment or extinguishing system.
2. HVAC:
a. Combined Contribution to Ozone Depletion and Global Warming Potential: has been calculated by Option 2.
3. Responsibility: Mechanical Engineer

F. EA Credit 5 - Required - 3 points - Measurement & Verification.(Option 1)
1. Continuous metering systems that meet the credit criteria are to be provided.
a. Plumbing metering devices are specified in Section 15128.
b. Lighting, motor, and other electrical load metering devices are specified in Section 16215.

2. Responsibility: Mechanical Engineer / Electrical Engineer

2.05 MATERIALS & RESOURCES: 7 Points To Be Achieved.

A. MR Prerequisite 1 - Required - No points - Storage & Collection of Recyclables.
   1. The area designated for collection and storage of recyclables is indicated on the drawings as Recycling.
   2. Bins, waste cans, can crushers, etc., are considered furnishings and are therefore not part of the construction contract.
   3. Responsibility: AAFES.

B. MR Credit 2.2 - Required - 2 points - Construction Waste Management, Divert 75% from Disposal.
   1. Same as for MR Credit 2.1, but increased quantity.
      a. Construction procedures and measurement of diverted waste are specified in Section 01732. This section requires the Contractor to perform the measurement and computation.Waste prevention and disposal procedures specific to certain types of work are specified in many sections.

C. Responsibility: General Contractor

D. MR Credit 4.1 - Required - 1 point - Recycled Content: 10% (post-consumer plus 1/2 pre-consumer).
   1. The definition of recycled content for the purposes of the contract documents is included in Section 01600; qualifying products do not include plumbing, HVAC, electrical, or communications equipment, piping, conduit, ductwork, or wiring.
   2. This project is steel-framed and contains many other steel-containing products; submission of a complete list of all metal-containing products will be required, with documentation showing steel mill source and mill process, allowing computation by using industry-averages for recycled content; the forms are specified in Section 01356.
   3. Other specific products that must contain recycled content are specified in the appropriate section(s).
   4. Contractor's reporting and measurement requirements are specified in Section 01355 and Section 01600; calculation of project totals is not the responsibility of Contractor.
   5. Responsibility: Architect / General Contractor

E. MR Credit 4.2 - Required - 2 point - Recycled Content: 20% (post-consumer plus ½ pre-consumer).
   1. Same as for MR Credit 4.1, but increased quantity.

F. MR Credit 5.1 - Required - 1 point - Regional Materials: 10% Extracted, Processed & Manufactured Regionally.
   1. For the purposes of the contract documents, the term "regionally-sourced" is used instead of "regional materials" and is defined in Section 01600 in the same way as for this credit.
   2. We don't know which products might qualify for this credit but want to pursue it anyway, so we will require the submittal of the Regionally-Sourced Products Form for each product used; this will be done by requiring the submittal of the form along with the first application for payment for the product; the form is specified in Section 01356.
   3. Contractor's reporting and measurement requirements are specified in Section 01355 and Section 01600; calculation of project totals is not the responsibility of Contractor.
   4. Responsibility: Architect / General Contractor

G. MR Credit 5.2 - Required - 2 points - Regional Materials: 20% Extracted, Processed & Manufactured Regionally.
   1. Same as for MR Credit 5.1, but for an additional 10%.
   2. Responsibility: Architect / General Contractor

H. MR Credit 7 - Required - 1 point - Certified Wood.
   1. For the purposes of the contract documents, the term "sustainably harvested wood" is used instead of "certified wood" and is defined in Section 01600 in the same way as for this

credit.

2. Specific wood products that must be sustainably harvested are specified in the appropriate section(s).
   a. Lumber framing, sheathing, blocking, curbing, and miscellaneous carpentry are specified in Section 06100.
   b. Finish woodwork is specified in Section 06200.
   c. Custom cabinets are specified in Section 06410.
3. Contractor's reporting and measurement requirements are specified in Section 01355 and Section 01600; calculation of project totals is not the responsibility of Contractor.
4. Responsibility: Architect / General Contractor

2.06 INDOOR ENVIRONMENTAL QUALITY: 11 Points To Be Achieved.

A. IEQ Prerequisite 1 - Required - No points - Minimum IAQ Performance.
   1. The building ventilation has been designed to meet the minimum requirements of ASHRAE 62.1-2004.
   2. The overall design solution is implemented in the drawings and many sections of the specifications.
   3. Responsibility: Mechanical Engineer

B. IEQ Prerequisite 2 - Required - No points - Environmental Tobacco Smoke (ETS) Control.
   1. Government intends to prohibit smoking in the building.
   2. Exterior smoking areas are located at least 25 feet away from entries, outdoor air intakes, and operable windows.
   3. Responsibility: AAFES

C. IEQ Credit 1 - Required - 1 point - Outdoor Air Delivery Monitoring.
   1. Provide outdoor airflow measurement devices in HVAC system, integrated with HVAC control system.
   2. Provide CO2 sensing and measurement devices in HVAC system, integrated with HVAC control system.
   3. The overall design solution is implemented in the drawings and various sections of the specifications.
   4. Responsibility: Mechanical Engineer

D. IEQ Credit 3.1 - Required - 1 point - Construction IAQ Management Plan, During Construction.
   1. The General Contractor will develop, implement and document, an Indoor Air Quality Plan" during Construction.
   2. Good construction procedures intended to prevent future problems are specified in Section 01734.
   3. Responsibility: General Contractor

E. IEQ Credit 4.1 - Required - 1 point - Low-Emitting Materials, Adhesives & Sealants.
   1. Overall requirements for joint sealers, including duct sealers, with VOC content meeting the credit criteria, are specified in Section 01600.
   2. Firestopping sealants with maximum VOC content meeting the credit criteria are specified in Section 07840.
   3. Architectural joint sealants with maximum VOC content meeting the credit criteria are specified in Section 07900.
   4. Duct sealers and sealants; specified in Division 15.

5. All interior applied adhesives must comply with SCQMD Rule # 1168 for low volatile organic compound content.
6. Overall requirements for adhesives, with VOC content meeting the credit criteria, are specified in Section 1600.
    a. All adhesives used on the project, whether explicitly specified or not, are considered VOC-restricted products.
7. Responsibility: Architect / Mechanical Engineer / General Contractor

F. IEQ Credit 4.2 - Required - 1 point - Low-Emitting Materials, Paints & Coatings.
1. Paints and stains are specified in Section 09900.
    a. All applied paints and coatings must comply with Green Seal Standards GS11 1993 and GC-03 1997 and SCQMD Rule # 1113.
2. Responsibility: Architect / General Contractor

G. IEQ Credit 4.3 - Required - 1 point - Low-Emitting Materials, Flooring Systems.
1. Flooring systems must commust comply with the folllowing:
    a. Carpet: Green Label Plus Program
    b. Hard Surfaces: Floor Score Standard
    c. Adhesives and Grout: SCQMD Rule # 1168
2. Product Criteria and Reporting Requirements are specified in Section 01600.
3. Responsibility: AAFES / Architect / General Contractor

H. IEQ Credit 4.4 - Required - 1 point - Low-Emitting Materials, Composite Wood & Agrifiber Products.
1. Product Criteria and Reporting Requirements are specified in Section 01600.
2. The products covered by this credit include ONLY particleboard, plywood, medium density fiberboard (MDF), wheatboard, strawboard, panel substrates, door cores, and laminating adhesives used on-site or in the shop will not contain added urea-formaldehyde resins.
3. A project-wide prohibition on use of these products if they contain added urea-formaldehyde is specified.
4. Responsibility: Architect / General Contractor

I. IEQ Credit 5 - Required - 1 point - Indoor Chemical & Pollutant Source Control.
1. At High Volume Entryways: Permanent grilles or grates to capture dirt, etc., are provided.
    a. Grilles or grates will extend a minimum of 10' in the direction of travel.
    b. Floor mats and recessed frames are specified in Section 12486.
2. Rooms Where Hazardous Gases or Chemicals May Be Present: Independent exhaust is provided for each room; this is a design solution involving building construction and HVAC.
3. Air Filtration Media: Outside air and return air are to be provided with filtration media meeting the criteria. Merv 13 filters will be provided on HVAC equipment (including fan size increases)
4. Containment area outside of the building will be provided to dispose of hazardous liquids.
5. Responsibility: Architect / Mechanical Engineer

J. IEQ Credit 6.1 - Required - 1 point - Controllability of Systems: Lighting.
1. Provide individual lighting controls for 90% of the building occupants.
2. Provide lighting system controls for all shared mult-occupant spaces to enable adjustments that meet group needs and preferences.
3. Responsibility: Electrical Engineer

K. IEQ Credit 6.2 - Required - 1 point - Controllability of Systems: Thermal Comfort.
1. HVAC Controls: Individual controls are to be provided for at least 50 percent of occupants in regularly occupied areas.
2. Provide comfort system controls for all shared multi-occupant spaces to enable adjustments that meet group needs and preferences.
3. Resposibility: Mechanical Engineer

L. IEQ Credit 7.1 - Required - 1 point - Thermal Comfort: Design.

1. Design the mechanical system and building envelope in accordance with the requirements of ASHRAE Standard 55-2004.
2. The overall design solution is implemented in the drawings and many sections of the specifications.
3. Responsibility: mechanical Engineer

M. IEQ Credit 7.2 - Required - 1 point - Thermal Comfort: Verification.
1. As a followup to Credit IEQ 7.1 a survey of building occupants will be conducted by the Owner within 6 to 18 months after building occupancy to determine level of comfort; Owner will develop a plan for corrective action if more than 20 percent of occupants report dissatisfaction with thermal comfort in building.
2. Responsibility: AAFES

2.07 INNOVATION & DESIGN PROCESS (ID): 1 Point To Be Achieved.

A. ID Credit 2 - Required - 1 point - LEED(tm) Accredited Professional.
1. At least one principal participant of the project team has successfully completed the LEED Accredited Professional exam, including:
   a. the Project Architect.

2.08 REGIONAL PRIORITY (RP): 4 Points To Be Achieved.

A. RP Credit 1.1 - Required - 1 point - Region Specific Environmental Priority : SSc5.1 SSite Development Protect Restore Habitat.

B. RP Credit 1.2 - Required - 1 point - Region Specific Environmental Priority : WEc1 No Potable Water Use Irrigation

C. RP Credit 1.3 - Required - 1 point - Region Specific Environmental Priority : WE2 Innovative Waste Water Treatment.

D. RP Credit 1.4 - Required - 1 point - Region Specific Environmental Priority : EA1 Optimize Energy Performance 30% Reduction

END OF SECTION

SECTION 01355

LEED CERTIFICATION PROCEDURES

PART 1 GENERAL

1.01 PROJECT GOALS

A. This project has been designed to achieve the LEED Silver (minimum 50 points rating as defined in the LEED(r) Green Building Rating System(tm) for New Construction and Major Renovations, 2009 Edition.

B. Contractor is not responsible for the application for LEED certification, nor for determination of methods of achieving LEED credits unless specifically so indicated.

C. Many of the LEED credits can be achieved only through intelligent design of the project and are beyond the control of the Contractor. However, certain credits relate to the products and procedures used for construction. Therefore, the full cooperation of the Contractor and subcontractors is essential to achieving final certification.

D. Contractor shall familiarize himself with the relevant requirements and provide the necessary information and instruction to all subcontractors and installers.

E. Since Contractor and subcontractors may not be familiar with LEED requirements, this section includes a summary of the products and procedures intended to achieve LEED credits.
   1. Some credits are marked PREREQUISITE; these must be achieved regardless of the level of certification; many are dependent on proper performance by Contractor and subcontractors.
   2. Other credits involve quantifying percentages by weight and cost; these require careful recordkeeping and reporting by the Contractor.
   3. See www.usgbc.org for more information.

1.02 RELATED REQUIREMENTS

A. Sections that include requirements intended to achieve LEED credits include, but are not limited to, the following:

B. Section 01354 - LEED Credit Summary: A LEED credit overview for Contractor's information only.

C. Section 01356 - LEED Submittal Forms: Procedures for using the forms.
   1. 01357 - LEED Material Cost Summary; to report material only cost categories for computations necessary for MR Credits 3.1, 3.2, 4.1, 4.2, 5.1, 5.2, 6, and 7.
   2. 01358 - LEED Wood-Containing Product List; for documentation of wood and wood-based products used on project; MR Credit 7.
   3. 01359 - LEED Metal-Containing Product List; for documentation of steel and other metals used on project; MR Credits 4.1 and 4.2.
   4. 01360 - LEED New Product Content Form; for content percentages for recycled, rapidly renewable, and certified wood credits, with material cost; MR Credits 4.1, 4.2, 6, and 7; used in conjunction with Wood-Containing and Metal-Containing Product Lists as well as separately.
   5. 01361 - LEED New Product Source Form; for documenting source of new products; MR Credit 5.1 and 5.2.
   6. 01363 - LEED Prohibited Content Installer Certification; for each installer to certify compliance with VOC requirements for adhesives and sealants, including duct sealers, and to certify no use of urea-formaldehyde-containing wood products; EQ Credits 4.1 and 4.4.

D. Section 01420 - Environmental Protection:

1. Construction activity pollution prevention, dust control and basic surface drainage; SS PREREQUISITE 1.
2. Construction waste management; MR Credits 2.1 and 2.2.

E. Section 01600 - Product Requirements: Overall project requirements for:
1. Recycled content; MR Credits 4.1.
2. Regionally-sourced products; MR Credits 5.1 and 5.2.
   a. Contractor is not required to provide any particular minimum percentage of regionally-sourced products; however, to collect the information necessary to determine whether these credits can be achieved, Contractor is required to submit the LEED New Product Source Form for every product for which application for payment is made.
3. Certified (sustainably harvested) wood; MR Credit 7.

F. Section 01720 - Project Record and Closeout Documents:
1. Maintenance and operation manuals for commissioned systems; EA Credit 3.

G. Section 01732 - Waste Management:
1. Construction and demolition waste management; MR Credit 2.1 and 2.2.

H. Section 01734 - Indoor Air Quality:
1. Contractor's IAQ management plan and construction procedures; EQ Credit 3.1.

I. Section 01810 - Commissioning:
1. Fundamental commissioning; EA PREREQUISITE 1.
2. Enhanced commissioning; EA Credit 3.

J. Section 02200 - Earthwork:
1. For modifying existing stormwater flows; SS Credit 6.1.

K. Section 02690 - Storm Drainage, Storm Manholes, Water Supply, and Sanitary Sewer Systems:
1. For reducing run-off rate and quantity; SS Credit 6.1.

L. Section 02871 - Bicycle Racks:

M. Section 02921 - Seeding:
1. Turf for erosion control; SS PREREQUISITE 1.
2. Turf for modifying existing stormwater flows; SS Credit 6.1.

N. Section 02923 - Sodding:
1. Turf for erosion control; SS PREREQUISITE 1.
2. Turf for modifying existing stormwater flows; SS Credit 6.1.

O. Section 02930 - Exterior Plants:
1. For erosion and sedimentation control; SS PREREQUISITE 1.
2. Restoration of natural vegetation on site; SS Credit 5.1.
3. For modifying existing stormwater flows; SS Credit 6.1.
4. Plants that do not require irrigation; WE Credit 1.1 and 1.2.

P. Section 06100 - Rough Carpentry:
1. Requirement to use sustainably harvested wood; MR Credit 7.

Q. Section 06200 - Finish Carpentry:
1. Requirement to use sustainably harvested wood; MR Credit 7.
2. Requirement to use low-emitting materials: composite wood and agri-fiber products; EQ Credit 4.4.

R. Section 06410 - Custom Cabinets:
1. Requirement to use sustainably harvested wood; MR Credit 7.

2. Requirement to use low-emitting materials: composite wood and agri-fiber products; EQ Credit 4.4.

S. Section 07840 - Firestopping: LEED-VOC-compliant firestopping sealants; EQ Credit 4.1.

T. Section 07900 - Joint Sealers: LEED-VOC-compliant sealants; EQ Credit 4.1.

U. Section 08211 - Flush Wood Doors:
1. Requirement to use low-emitting materials: composite wood and agri-fiber products; EQ Credit 4.4.

V. Section 09650 - Resilient Flooring: Resilient flooring complying with FloorScore standard requirements and installation materials complying with SCAQMD Rule #1168; EQ Credits 4.3 and 4.1.

W. Section 09900 - Paints and Coatings: LEED-VOC-compliant interior opaque paints and coatings; EQ Credit 4.2.

X. Section 10165 - Plastic Laminate Toilet Compartments:
1. Requirement to use low-emitting materials: composite wood and agri-fiber products; EQ Credit 4.4.

Y. Section 10500 - Lockers:
1. Lockers near bicycle entrance; SS Credit 4.B.

Z. All Division 2 through Division 10 Sections:
1. Overall project requirement of 20% recycled materials content, based on total value of project materials (Divisions 2 through 10 only); MR Credits 4.1 and 4.2.
2. Overall project requirement of 20% regionally-sourced materials, based on total value of project materials (Divisions 2 through 10 only); MR Credits 5.1 and 5.2.

AA. Section 12486 - Floor Grates and Frames:

AB. Section 15128 - Gages and Meters:
1. Plumbing metering devices; EA Credit 5.

AC. Section 15400 - Plumbing:
1. High efficiency and dry toilet fixtures; WE Credit 3.1.

AD. Section 15928 - Instruments and Control Elements:
1. Outdoor airflow measurement devices in HVAC system; EQ Credit 1.
2. Carbon dioxide monitoring devices for ventilation control; EQ Credit 1.

AE. Section 15995 - Commissioning of HVAC:
1. Fundamental commissioning; EA PREREQUISITE 1.
2. Enhanced commissioning; EA Credit 3.

AF. Section 16215 - Electrical Sensing and Measurement:
1. Continuous metering of lighting, motor, and other loads; EA Credit 5.

AG. Section 16997 - Commissioning of Electrical Systems:
1. Fundamental commissioning; EA PREREQUISITE 1.
2. Enhanced commissioning; EA Credit 3.

AH. Section 02310 - Grading:
1. For pervious surfacing; SS Credit 6.1.

1.03 SUBMITTALS

A. See Section 01300 - Submittals, for additional submittal procedures.

B. LEED Submittal/Report: For each product with the notation "show quantity on LEED submittal or report," submit a report with the following information:
   1. Submit with each Application for Payment; update the Report each period with latest period shown separately:
   2. Identify each product with:
      a. Name and manufacturer.
      b. Specification section number.
      c. Applicable Credit(s).
      d. Net weight per unit.
      e. Quantity installed.
      f. Material cost per unit.
      g. Total material cost.
      h. Other information specified for specific item.
   3. Attach evidence of compliance from either the manufacturer or an independent agency.

1.04 INFORMATION SOURCES

A. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE); 1791 Tullie Circle, NE, Atlanta, GA 30329. Tel: (404) 636-8400. Fax: (404) 321-5478. www.ashrae.org.

B. Bay Area Air Quality Management District (BAAQMD); 939 Ellis Street, San Francisco, California 94109. Tel: (415) 771-6000. www.baaqmd.gov.

C. Center for Resource Solutions (CRS); Presidio Building, 49 P.O. Box 29512, San Francisco, CA 94129. Tel: (415) 561-2100. Fax: (415) 561-2105. www.resource-solutions.org or www.green-e.org.

D. Green Seal; 1001 Connecticut Avenue, NW, Suite 827, Washington, DC 20036-5525. Tel: (202) 872-6400. Fax: (202) 872-4324. www.greenseal.org.

E. South Coast Air Quality Management District (SCAQMD); 21865 E. Copley Drive, Diamond Bar, CA 91765. Tel: (909) 396-2000. www.aqmd.gov.

F. U.S. Green Building Council (USGBC); 1015 18th Street, NW, Suite 805, Washington, DC 20036. Tel: (202) 82-USGBC or (202) 828-7422. Fax: (202) 828-5110. www.usgbc.org.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01356

LEED SUBMITTAL FORMS

1.01 PURPOSE

A. These forms are for the Contractor's use in submitting documentation to be used to determine whether particular credits have been achieved. The cooperation of subcontractors, suppliers, and manufacturers is required.
   1. The forms indicated in this Section may not be a complete listing of all forms required. It is anticipated that LEED 2009 for New Construction will require at least one more form than is indicated below.
   2. Contractor shall help provide the A/E Team and Owner with information required to complete LEED forms that they must fill out.

B. These forms apply to the following LEED Credits:
   1. SS Prerequisite 1 - Construction Activity Pollution Prevention.
   2. SS Credit 6.1 - Stormwater Design, Quantity Control.
   3. SS Credit 6.2 - Stormwater Design Quality Control.
   4. SS Credit 7.2 Heat Island Effect - Roof
   5. MR Credits 2.1 and 2.2 - Construction Waste Management.
   6. MR Credits 3.1 and 3.2 - Materials Reuse.
   7. MR Credits 4.1 and 4.2 - Recycled Content.
   8. MR Credits 5.1 and 5.2 - Regional Materials.
   9. MR Credit 7 - Certified Wood.
   10. EQ Credit 3.1 - Construction IAQ Management Plan.
   11. EQ Credit 4.1 - Low-Emitting Materials: Adhesives and Sealants.
   12. EQ Credit 4.2 - Low-Emitting Materials: Paints and Coatings.
   13. EQ Credit 4.3 - Low-Emitting Materials: Flooring.
   14. EQ Credit 4.4 - Low-Emitting Materials: Composite Wood & Agrifiber Products.

C. Submittal forms for LEED 2009 for New Construction are available from the USGBC online.

1.02 FORMS

A. USGBC LEED Retail for New Construction Submittal Templates: See attachments at the end of this Section for representative examples.

B. 01357 - LEED Material Cost Summary Form: Certification by Contractor.

C. 01358 - LEED Wood-Containing Product List: Certification by Contractor.

D. 01359 - LEED Metal-Containing Product List: Certification by Contractor.

E. 01360 - LEED New Product Content Form: Including separate reporting of wood, steel, rapidly renewable, and recycled content; data certification by manufacturer of product; cost and quantity certification by Contractor.

F. 01361 - LEED New Product Source Form: Data certification by manufacturer of product; cost and quantity certification by Contractor.

G. 01362 - LEED Reused Product Form: Data certification by manufacturer of product; cost and quantity certification by Contractor.

H. 01363 - LEED Prohibited Content Installer Certification: Certification by each installer working on project regardless of product type.

1.03 PROCEDURES

A. All LEED submittal forms are to be submitted by Contractor; certifications are to be made by

indicated party.

B. Where a LEED Submittal is called for, fill out and submit the appropriate form.
   1. Fill out one form for each different brand name product and each different manufacturer of a lot of commodity products.
   2. Where required attachments are specified, attach the documentation to the back of the form.

C. Each form must be signed by the entity capable of certifying the information.
   1. Certification signatures must be made by an officer of the company.
   2. For products, certification must be made by the manufacturer not the supplier.
   3. For custom fabricated products, certification by the fabricator is acceptable.

D. Submit the completed forms in accordance with the requirements of Section 01300 - Administrative Requirements, as information submittals.
   1. Give each form a unique submittal number.
   2. Do not combine LEED forms with product data or shop drawing submittals.

E. Submit forms applicable to work for which application for payment is being made, either prior to or concurrent with application for payment; payment will not be made until relevant forms have been submitted.

F. For work covered by multiple applications for payment, the initial submittal of a LEED form is sufficient for subsequent applications unless the nature of the product has changed.

END OF SECTION

SECTION 01357

LEED MATERIAL COST SUMMARY FORM

1.01 LEED SUBMITTAL FORM

A. Identification:
   1. Project Name: _____
   2. Project No.: _____
   3. Contracting Officer's Authorized Representative: _____

B. This form applies to the following LEED Credits:
   1. MR Credits 4.1 and 4.2 - Recycled Content.
   2. MR Credits 5.1 and 5.2 - Regional Materials.
   3. MR Credit 7 - Certified Wood.

C. Procedure:
   1. Because the above listed credits require computations based on the material costs for the project, the Contractor is required to submit the following cost breakdown, in addition to any cost breakdown specified elsewhere.
   2. Costs are to be material costs excluding labor, overhead, and profit, but including delivery, storage, and handling charges. Revise cost summary whenever materials actually installed change due to contract modifications or Contractor preference.

1.02 CERTIFICATION

1.03 $ _____ Total Cost of All Materials

1.04 $ _____ Total Cost of Plumbing, HVAC, Electrical, and Communications

1.05 $ _____ Total Cost of Architectural Equipment in Divisions 11 Through 14

1.06 $ _____ Total Cost of Wood and Wood-Based Materials, including temporary construction items that will neither be incorporated into the work nor returned to their supplier for re-use.

1.07 CERTIFIED BY: (Contractor)

A. Print Name: _____

B. Signature: _____

C. Title: _____ (officer of company), Date: _____

END OF SECTION

SECTION 01358

LEED WOOD-CONTAINING PRODUCT LIST

1.01 LEED SUBMITTAL FORM

A. Identification:
   1. Project Name: _____
   2. Project No.: _____
   3. Contracting Officer's Authorized Representative: _____

B. This form applies to LEED MR Credit 7 (certified wood).

1.02 WOOD-CONTAINING PRODUCTS

A. Wood-containing products are those made of solid wood, wood chip, or wood fiber, or containing components made of solid wood, wood chip, or wood fiber.

B. Rationale: Because the computation for this credit is based on the total material costs for all wood and wood-based products on the project, the Contractor is required to submit the following itemization of wood and wood-based products, including materials used during construction but not incorporated into the finished work.

C. Procedure: For each wood-containing product provided for this project, submit "LEED Material Content Form". At minimum, submit for the following products. Initial those for which the material content form is attached.

D. Permanent Wood-Containing Product List:
   1. ___ Wood utility poles
   2. ___ Wood fences and gates
   3. ___ Fixed site furnishings
   4. ___ Wood framing, furring, and supports
   5. ___ Sheathing
   6. ___ Blocking, curbing, and nailers
   7. ___ Decking
   8. ___ Siding
   9. ___ Molding and trim
   10. ___ Paneling
   11. ___ Flooring
   12. ___ Architectural woodwork
   13. ___ Cabinets and casework
   14. ___ Doors and frames, including composite construction
   15. ___ Wood wall covering
   16. ___ Wood signs
   17. ___ Wood shelving

E. Temporary Wood-Containing Product List:
   1. ___ Excavation supports
   2. ___ Concrete formwork and formwork supports
   3. ___ Bracing and shoring
   4. ___ Barricades and enclosures
   5. ___ Field office

1.03 CERTIFICATION

A. ___ All other wood-containing products used on this project are shown on the attached list.

B. ___ I certify that there are no other wood-containing products used on this project that exceed 1 percent of total material cost.

C. ___ I certify that there are no other temporary facilities or construction using wood-containing products that exceed 1 percent of the total material cost.

D. CERTIFIED BY: (Contractor)
   1. Print Name: _____
   2. Signature: _____
   3. Title: _____ (officer of company), Date: _____

END OF SECTION

SECTION 01359

LEED METAL-CONTAINING PRODUCT LIST

1.01 LEED SUBMITTAL FORM

A. Identification:
   1. Project Name: _____
   2. Project No.: _____
   3. Contracting Officer's Authorized Representative: _____

B. This form applies to LEED Credits MR 4.1 and 4.2 (recycled content).

1.02 STEEL-CONTAINING PRODUCTS

A. Rationale: Although all steel contains reused steel, steel products often cannot be traced to a certain mill lot and, even when they can, the mill's certificate usually does not indicate the proportion of new to reused steel.

B. Procedure: Determine recycled steel content by estimating the proportion of reused steel based on trade association surveys of mill practices multiplied by the quantity of steel by weight in the product.
   1. Referenced Mill Practices Survey: See the current edition of Steel Recycling Institute "Steel Takes LEED with Recycled Content," at http://www.recycle-steel.org/PDFs/leed/Steel%20Takes%20LEED_June06.pdf.
   2. If the mill source cannot be identified, the product will be considered to have the lowest reused steel content reported in referenced mill practices survey.
   3. For each steel-containing product provided for this project, submit "LEED New Product Content Form". At minimum, submit for the following products. Initial those for which the material content form is attached.

C. Steel-Containing Product List:
   1. ___ Steel piling and permanent shoring.
   2. ___ Concrete reinforcement (bars, mats, wire, mesh), anchor plates.
   3. ___ Structural steel framing members, plates.
   4. ___ Steel structural components of pre-engineered products.
   5. ___ Miscellaneous steel fabrications made from rolled shapes, including equipment supports.
   6. ___ Bar joists and girders.
   7. ___ Steel decking.
   8. ___ Light gauge steel framing and trusses.
   9. ___ Steel stairs and ladders.
   10. ___ Steel handrails and railings.
   11. ___ Miscellaneous formed steel fabrications.
   12. ___ Steel wall and roof panels.
   13. ___ Steel sheet metal flashing and trim.
   14. ___ Steel doors and frames.
   15. ___ Non-load-bearing steel framing (studs, ceiling framing, shaftwall)
   16. ___ Steel lath for plaster, and trim.
   17. ___ Gypsum board finishing trim.
   18. ___ Suspended ceiling grid.
   19. ___ Steel toilet and shower compartments.
   20. ___ Steel lockers.
   21. ___ Steel storage shelving.
   22. ___ All equipment with steel housings, casings, or boxes, except mechanical and electrical; report housing percentage by weight/mass only.
   23. ___ Steel pipe culverts.

1.03 CAST IRON-CONTAINING PRODUCTS

A. Rationale: Cast iron is considered 100 percent recycled.

B. For each homogeneous cast iron product, report total cost on "LEED New Product Content Form".

C. Cast Iron Product List:
   1. ___ Cast iron pipe.
   2. ___ Cast iron castings.

1.04 CERTIFICATION

A. ___ All other steel- and cast iron-containing products used on this project are shown on the attached list.

B. ___ I certify that there are no other steel-containing products used on this project that exceed 1 percent of total material cost less material cost attributed to mechanical and electrical.

C. ___ I certify that there are no other cast iron-containing products used on this project that exceed 1 percent of total material cost less material cost attributed to mechanical and electrical.

D. CERTIFIED BY: (Contractor)
   1. Print Name: _____
   2. Signature: _____
   3. Title: _____ (officer of company), Date: _____

END OF SECTION

SECTION 01360

LEED NEW PRODUCT CONTENT FORM

1.01 LEED SUBMITTAL FORM

A. Identification:
   1. Project Name: _____
   2. Project No.: _____
   3. Contracting Officer's Authorized Representative: _____
   4. Product Name: _____ (brand name, model number, etc.)
   5. Manufacturer: _____www._____
      a. Contact: _____tel:_____
   6. Supplier/Sub: _____www._____
      a. Contact: _____tel:_____
   7. Applicable Specification Section Number(s) _____

B. This form applies to LEED Credits MR 4.1 and 4.2 (recycled content), MR 6 (rapidly renewable content), and MR 7 (certified wood).

1.02 PRODUCT CERTIFICATION

A. FSC-Certified Solid Wood, Wood Chip, and Wood Fiber Content: _____ percent by weight.
   1. ____ Product is FSC-trademarked.
   2. ____ FSC Chain-of-Custody certificate number is _____
   3. FSC: Forest Stewardship Council Chain-of-Custody number or physical trademark; computation of less than 100 percent certified content in accordance with FSC policy.

B. Steel Content: _____ percent by weight.
   1. ____ Steel Mill Source is: _____
   2. ____ Mill letter describing mill process and typical re-used steel content is attached.

C. Other Content: (Percentages by weight may not add up to more than 100 percent.)
   1. Pre-Consumer/Post-Industrial Recycled Content: _____ percent by weight.
   2. Post-Consumer Recycled Content: _____ percent by weight.
   3. Description of Recycled Content: _____
   4. Definition: Recycled content is defined in accordance with FTC regulations, found in 16 CFR 260.7(e); see www.ftc.gov/bcp/grnrule/guides980427.htm.

D. Total Weight: _____ per _____ (unit).

E. CERTIFIED BY: (Manufacturer)
   1. Print Name: _____
   2. Signature: _____
   3. Title: _____ (officer of company), Date: _____

1.03 COST CERTIFICATION

A. Unit Cost: $ _____ per _____ (same unit as above); No. of Units Installed: _____

B. OR (enter cost either above or below, not both)

C. Total Installed Material Cost of This Product: $ _____

D. CERTIFIED BY: (Contractor)
   1. Print Name: _____
   2. Signature: _____
   3. Title: _____ (officer of company), Date: _____

END OF SECTION

SECTION 01361

LEED NEW PRODUCT SOURCE FORM

1.01 LEED SUBMITTAL FORM

A. Identification:
   1. Project Name: _____
   2. Project No.: _____
   3. Contracting Officer's Authorized Representative: _____
   4. Product Name: _____ (brand name, model number, etc.)
   5. Manufacturer: _____ www._____
      a. Contact: _____ tel:_____
   6. Supplier/Sub: _____ www._____
      a. Contact: _____ tel:_____
   7. Applicable Specification Section Number(s) _____

B. This form applies to LEED MR Credits 5.1 and 5.2 for new products only; see separate form for reused products.

1.02 PRODUCT CERTIFICATION

A. The following percentages of this product were processed in the locations indicated. (Indicate N/A in first column if process is not applicable.)

Percent	Harvest, Extraction, Recovery, or Manufacturing Process	City/County, State, Country	Distance From Project
____ %	Raw Material _____:	_____	_____
____ %	Raw Material _____:	_____	_____
____ %	Raw Material _____:	_____	_____
____ %	Manufactured at: (primary)	_____	_____
____ %	Manufactured at: (primary)	_____	_____
____ %	Manufactured at: (secondary)	_____	_____
____ %	Manufactured at: (secondary)	_____	_____
____ %	Manufactured at: (final)	_____	_____
____ %	Manufactured at: (final)	_____	_____

B. CERTIFIED BY: (Manufacturer)
   1. Print Name: _____
   2. Signature: _____
   3. Title: _____ (officer of company), Date: _____

1.03 COST CERTIFICATION

A. Unit Cost: $ _____ per _____ (unit); No. of Units Installed: _____

B. OR (enter cost either above or below, not both)

C. Total Installed Material Cost: $ _____

D. CERTIFIED BY: (Contractor)

1. Print Name: _____
2. Signature: _____
3. Title: _____ (officer of company), Date: _____

END OF SECTION

SECTION 01363

LEED PROHIBITED CONTENT INSTALLER CERTIFICATION

1.01 LEED SUBMITTAL FORM

A. Identification:
   1. Project Name: _____
   2. Project No.: _____
   3. Contracting Officer's Authorized Representative: _____

B. This form applies to the following LEED credits:
   1. Credit EQ 4.1; VOC content of field-installed adhesives and sealants.
   2. Credit EQ 4.2; VOC content of interior paints and coatings.
   3. Credit EQ 4.3; VOC content of flooring.
   4. Credit EQ 4.4; added-urea-formaldehyde content of composite wood and agrifiber products, defined as particleboard, plywood, medium density fiberboard, wheatboard, strawboard, panel substrates, door cores, and laminating adhesives; applies to manufacturers/suppliers and installers.

C. Procedure:
   1. Because installers are allowed and directed to choose accessory materials suitable for the applicable installation, each installer of work on this project is required to certify that his/their use of these particular materials complies with the contract documents and to provide documentation showing that the products used do not contain the prohibited content.
   2. Volatile organic compounds (VOCs) are defined by the U.S. EPA and state and local regulations applicable to this project. See Contract Documents for minimum criteria.

1.02 PRODUCT CERTIFICATION

A. ____ Adhesives: I certify that my firm has NOT installed any adhesive with VOC content exceeding that specified in Section 01600 on this project; product data and MSDS sheets for all adhesives used, whether specified or not, are attached.

B. ____ Joint Sealants: I certify that my firm has NOT installed any joint sealant with VOC content exceeding that specified in Section 01600 on this project; product data and MSDS sheets for all joint sealants used, whether specified or not, are attached.

C. ____ Interior Paints and Coatings: I certify that my firm has NOT installed any interior paints and coatings with VOC content exceeding that specified in Section 01600 on this project; product data and MSDS sheets for all interior paints and coatings used, whether specified or not, are attached.

D. ____ Flooring: I certify that my firm has NOT installed any flooring with VOC content exceeding that specified in Section 01600 on this project; product data and MSDS sheets for all flooring used, whether specified or not, are attached.

E. ____ Composite Wood and Agrifiber Products: I certify that the composite wood and agrifiber products, as defined above, furnished or installed by my firm DO NOT contain any ADDED urea-formaldehyde binder; product data and MSDS sheets for products used, whether specified or not, are attached.

F. CERTIFIED BY: (Installer/Manufacturer/Supplier Firm)

1. Firm Name: _____
2. Print Name: _____
3. Signature: _____
4. Title: _____ (officer of company), Date: _____

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The General Contractor (GC) shall establish a quality control system to perform sufficient inspection and tests of all items of work, including that of his subcontractor(s) to insure conformation to applicable specifications and drawings with respect to the materials, workmanship, construction, finish and functional performance. GC is responsible for the quality of his work and the work of all his subcontractors. Tests of materials and/or special inspections will be made, when required by these specifications, by applicable law, rules and regulations in accordance with respective Sections of the specifications. Where required, the GC shall employ and pay for the services of an independent agency to perform specific services and testing. Examples of such services are tests of fill materials, concrete materials, concrete mix design, asphalt concrete laboratory testing of materials proposed and calculations for asphalt concrete mixtures, etc.

B. GC shall arrange and pay for all services and testing which are not specifically indicated to be provided by AAFES. All testing laboratories used shall be approved by the Government.

C. If a material is not required to be field tested, the Contracting Officer may require the supplier to furnish with each delivery of such material, a certificate bearing legal signature of said supplier, stating that such material complies with specification requirements.

D. If any work or material requiring tests and inspections is executed, enclosed or covered before tests and inspections are made, or test reports distributed, the GC shall, at his own expense, uncover such part of this work or material and keep it uncovered until such tests and inspections have been made and test reports distributed. If work or material so tested and inspected shall not be found to conform to the requirements of the Construction Documents, it shall be deemed and construed to be defective materials or faulty workmanship and the GC, at his own expense, shall replace work or material removed and repair all work disturbed thereby.

E. The Testing Agency shall report results of all tests in writing simultaneously to the following:
   1. Contracting Officer or authorized reprsentative: 3 copies
   2. Site Inspector: 1 copy
   3. General Contractor: 1 copy
   4. Architect/Engineer: 1 copy

F. Reports shall state that tests were made under responsible charge of a Testing Engineer, holding a license to operate in the state where the project is being constructed, and that material or materials were tested in accordance with provisions of these specifications, and that material and/or materials tested, passed or failed to pass such requirements.

G. AAFES will employ and pay for the services of an Independent Testing Agency to perform specified quality control testing during construction indicated in the following Sections:
   1. Earthwork: Section 02200
   2. Asphalt Paving: Section 02511
   3. Concrete Paving: Section 02513
   4. Cast-in-Place Site Concrete: Section 02515
   5. Concrete Reinforcement: Section 03200
   6. Cast-in-Place Concrete: Section 03300
   7. Mortar and Masonry Grout: Section 04065
   8. Structural Steel: Section 05120

1.02 CONTRACTOR'S RESPONSIBILITES

A. Cooperate with the Contracting Officer and laboratory personnel and provide access to work

and to manufacturer's operations. Provide samples of materials to be tested, in required quantities. Furnish casual labor and facilities required to provide access to work to be tested; to obtain and handle samples at the site; to facilitate inspections and tests; and for Laboratory's exclusive use for storage and curing of test samples. Notify Laboratory sufficiently in advance of operations to allow for its assignment of personnel and scheduling of tests.

B. The use of AFFES' or GC's independent testing services shall in no way relieve the GC of his responsibility to furnish materials and construction in full compliance with the plans and specifications.

C. The GC shall coordinate with both AAFES and his own testing laboratories so that the work will be inspected and tested according to contract requirements. This coordination includes notification of when tests should be taken, easy access to the work, and general cooperation in every way to insure proper control of the work.

D. Upon completion of the project the GC shall submit a signed certificate stating tests for this work were made in accordance with provisions of these specifications and, further, all such tests and reports made were reported as required. This certificate shall list all tests and dates when work was completed.

1.03 RELATED REQUIREMENTS

A. Required Submittals: Section 01300.

B. Related requirements and tests specified in Sections 2 through 16.

END OF SECTION

SECTION 01410

TESTING AGENCY SERVICES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Inspection and testing agency qualifications, duties, and responsibilities.

B. The general contractor (GC) shall directly employ and pay for the services of an Independent Testing Agency to perform all specified services and testing which are not specifically indicated to be provided by AAFES. All testing agencies used shall be approved by the Government.

C. AAFES will employ and pay for the services of an Independent Testing Agency to perform specified testing as indicated in Section 01400 - QUALITY CONTROL of the Specifications.

1.02 RELATED REQUIREMENTS

A. Related Requirements Specified in Other Sections.

1.03 QUALIFICATION OF TESTING AGENCY

A. Meet basic requirements of ASTM E329-77, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction".

B. Authorized to operate in the state in which the project is located.

1.04 TESTING AGENCY DUTIES

A. Cooperate with the Contracting Officer and GC; provide qualified personnel after due notice.

B. Perform specified instructions, sampling and testing of materials and methods of construction.
   1. Comply with specified standards.
   2. Ascertain compliance of materials with requirements of Contract Documents.

C. Promptly notify the Contracting Officer and GC of observed irregularities or deficiencies of work or products.

D. Promptly submit written report of each test and inspection; three copies to the Contracting Officer, one copy to the GC, one copy to the Site Inspector, and one copy to the Architect/Engineer (Contracting Officer's Representative). Each report shall include.
   1. Date issued.
   2. Project title and number.
   3. Testing laboratory name, address and telephone number.
   4. Name and signature of laboratory inspector.
   5. Date and time of sampling or inspection.
   6. Record of temperature.
   7. Date of test.
   8. Identification of product and specification section.
   9. Location of sample or test in the project.
   10. Type of inspection or test.
   11. Results of tests and compliance with Contract Documents.
   12. Interpretation of test results, when requested by the Contracting Officer.

E. Perform additional tests as required by the Contracting Officer.
   1. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Contracting Officer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when

unacceptable concrete is verified.

F. Upon completion of the project, the Testing Agency shall prepare a certificate, certified to in the presence of a Notary Public, stating tests for this work were made in accordance with provisions of these Specifications and, further, all such tests and reports made for job were reported as required.

1.05 LIMITATIONS OF AUTHORITY OF TESTING AGENCY

A. Agency is not authorized to:
   1. Release, revoke, alter or enlarge on requirements of Contract Documents.
   2. Approve or accept any portion of the work.
   3. Perform any duties of the GC.

1.06 GENERAL CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with testing agency and laboratory personnel and provide access to work.

B. Secure and deliver to the testing agency adequate quantities of representative samples of materials proposed to be used and which required testing.

C. Provide to the testing agency the preliminary design mix proposed to be used for concrete, and other materials mixes which require control by the testing laboratory.

D. Furnish copies of products test reports as required.

E. Furnish incidental labor facilities:
   1. To provide access to work to be tested.
   2. To obtain and handle samples at the project site or at the source of the product to be tested.
   3. To facilitate inspections and tests.
   4. For storage and curing of test samples.

F. Notify testing agency sufficiently in advance of operations to allow for agency assignment of personnel and scheduling of tests. When tests or inspections cannot be performed after such notice, reimburse Government for Testing Agency personnel and travel expenses incurred by the Government due to the GC's negligence.

G. Employ and pay for the services of the testing agency to perform additional inspection, sampling and testing required:
   1. For the GC's convenience.
   2. When initial tests indicate work does not comply with Contract Documents.
   3. When, in the opinion of the Contracting Officer, additional tests or inspections are required because of the manner in which the GC executes his work. Examples of such tests and inspections are:
      a. Tests of materials substituted for previously accepted substituted or specified materials.
      b. Re-tests made necessary by failure of material to comply with the requirements of the specifications.
      c. Load tests made necessary because of portions of the structure not fully meeting specifications or plan requirements.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01420

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. The work covered by this section consists of furnishing all labor materials, and equipment and performing all work required for the prevention of environmental degradation during and as a result of construction operations under this contract. These requirements are in addition to any environmental protection requirements elsewhere in these specifications. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents, not naturally occurring at the site, which adversely affect human health or welfare; unfavorably alter ecological balances important to human life; affect other species of importance to humans; or degrade the utility of the environment for aesthetic and recreational purposes. The control of environmental pollution by the contractor requires consideration of air, water, and land, and involves noise control, solid waste management and management of radiant energy and radioactive materials, as well as other pollutants. This section also requires the protection of cultural and historic resources.

B. Contractor shall coordinate the work of this section with the work called for under the various sections of Division 2.

1.02 CONTRACTOR'S GENERAL ENVIRONMENTAL COMPLIANCE OBLIGATIONS

A. Work under this contract is to be performed on a government facility. All environmental rules applying to contractor operations elsewhere will also apply on the government facility. Contractor (and any subcontractor, agent or representative) shall comply with all applicable Federal, State, and local laws and regulations providing for environmental protection and pollution control and abatement. These include but are not limited to: the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act, Toxic Substances Control Act, Federal Insecticide Fungicide and Rodenticide Act, Coastal Zone Management Act, Endangered Species Act, National Historic Preservation Act, Safe Drinking Water Act, Emergency Planning and Community Right-to-Know Act, Oil Pollution Act, Archeological Resources Protection Act, and Pollution Prevention Act. Contractor has the duty to determine for itself where such laws and regulations apply. Although the Contractor may request assistance from the Contracting Officer in delineating applicable environmental laws and regulations. Contractor has an independent responsibility to make its own determination and to do so in a timely fashion.

B. Prior to starting work, the contractor shall complete and submit to the 325 CES/CEAN TAFB Form 81 (Contractor Questionnaire) and TAFB Form 82 (Chemical Inventory) 7-10 days upon issuance of the notice to proceed and prior commencement of work on site. The Contractor should note that Tyndall AFB is required to report chemicals such as (but not limited to) compressed gases, adhesives, aerosol cans, sealants, paints, lubricants, solvents, oils, cleaners, fuel (if added or transferred to equipment and if stored in containers on base) degreasers and pesticides. Copies of manufacturer-specific Material Safety Data Sheets must be attached to TAFB Form 82. After submission, CEAN will notify the Project Manager and/or CONS of the reportable chemicals and of any special instructions. The Contractor is required to submit TAFB Form 83 (Reporting Entry Form) at the end of the project or as indicated by CEAN. CEAN must be notified if anything changes from the original submittal (i.e. new chemical is added, size of container or unit of issue changes or if the manufacturer changes).

C. All proposed HAZMAT usage must be reviewed by Tyndall AFB Bio-Environmental Engineering and Safety, and authorized for use by 325 CES/CEAN. HAZMAT authorizations and tracking are product and process specific, and all changes in products or process must follow the same authorization procedure. Allow two weeks for authorization process.

D. At the end of the project and/or at the end of each calendar year (if applicable), the contractor must provide a report detailing the total amount of Toxic Release Inventory chemicals, by process, used on the installation during the calendar year. All SARA Title III (Emergency Planning & Community Right-to-Know Act) section 313 exemptions will be identified by the Environmental Flight. Reporting frequency & requirements will be identified on the "Short-Term Contractor Hazardous Material Inventory" form, and may differ from material to material.

1.03 FINES OR PENALTIES FOR ENVIRONMENTAL NON-COMPLIANCE

A. The Contractor shall be responsible for paying any fines or penalties assessed against AAFES or the installation or the Army or the Air Force for violations of environmental laws or regulations resulting from acts or omissions of the contractor or its employees, subcontractors, or agents. This obligation is in addition to any fines or penalties that may be assessed against the Contractor for the same conduct. Contractor may either reimburse these fines or penalties through the Contracting Officer, or with the consent of the Contracting Officer, the Contractor may pay such fines or penalties directly to the regulatory agency or agencies concerned.

1.04 CONTRACTOR'S LIABILITY FOR ENVIRONMENTAL DAMAGES

A. Contractor agrees to hold harmless and indemnify AAFES (which includes the Army, Air Force, or other Department of Defense component, as appropriate) for any and all damages of any kind resulting from environmentally harmful activities by the Contractor, Contractor's employees or agents of subcontractors. "Damages" includes but is not limited to personal injury, property damages (including diminution of value), or death, environmental restoration and response costs, natural resource damages, expert witness and attorney's fees, and reimbursement or any and all expenses incurred to obtain permits as a result of Contractor's failure to identify or obtain permits for itself or AAFES.

1.05 CONTACT WITH ENVIRONMENTAL REGULATORY OFFICIALS

A. Contractor shall immediately advise the Contracting Officer and the installation environmental office of the content of all contacts with federal, state, or local environmental regulators, before, during, and after the performance of this contract concerning the performance of this contract.

1.06 PERMITS FOR EQUIPMENT USED BY CONTRACTOR IN PERFORMING AAFES CONTRACTS.

A. For equipment used in the performance of this contract, Contractor shall obtain in Contractor's name and at no additional expense to AAFES, all permits, coordination's, certifications other regulatory authorization necessary to perform and complete the work required by this contract under applicable environmental laws and regulations. "Applicable environmental laws and regulations" includes but is not limited to: the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act, (CERCLA), Toxic Substances Control Act, Federal Insecticide Fungicide and Rodenticide Act, Coastal Zone Management Act, Endangered Species Act, National Historic preservation Act, Safe Drinking Water Act, Emergency Planning and Community Right-to-Know Act, Oil Pollution Act, and Pollution Prevention Act and State, County, and Local laws and regulations on the same subjects.

1.07 PERMITS NEEDED FOR CONSTRUCTION, EXCAVATION, MODIFICTION, RENOVATION, DEMOLITION, INSTALLATION, OR OTHER ALTERATION OF BUILDINGS, STRUCTURES, EQUIPMENT, INSTALLATIONS, REAL PROPERTY OR SYSTEMS

A. Contractor shall identify all Federal, State, County, or local permits, coordinations, certifications or other regulatory authorization requirements under all applicable environmental laws and regulations as defined in (a) above. Contractor shall then prepare and submit in draft all applicable permit applications, coordinations, notices, or other required fillings, together with all supporting data to the Contracting Officer for review. Permit applications or notifications or other documents that must be submitted by AAFES will be submitted by AAFES, and any documents that must be submitted by the Contractor will be returned after review to the Contractor for submission. No work requiring permit or other written authorization shall proceed before the Contractor has the permit or authorization or a copy thereof in its possession.

1.08 BOILER PERMIT

A. Any Boiler equal or > than 1MBTU will require an Air Construction Permit from FDEP

1.09 COOKING OIL

A. Any Cooking Oil container equal or > than 55 gal will require secondary containment.

PART 2 MATERIALS

2.01 RECYCLED MATERIALS

A. Materials used in this contract shall be to the greatest extent practicable and consistent with financial prudence, made of recycled materials or of materials that are recyclable. Where construction debris such as concrete or asphalt or wood can be recycled, this alternative will be considered.

2.02 ASBESTOS

A. Asbestos will not be used or included in this project.

2.03 POLYCHLORINATED BIPHENYLS (PCBs)

A. PCBs will not be used or included in this project.

2.04 LEAD-BASED PAINT

A. Lead-based paint will not be used or included in this project.

2.05 OZONE-DEPLETING SUBSTANCES

A. “Class I substance,” as used in this clause, means any substance designated as class I by the Environmental Protection Agency (EPA)(40 CFR Part 82), including but not limited to chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform.

B. “Class II substance,” as used in this clause, means any substance designated as class II by EPA (40 CFR Part 82), including but not limited to, hydrochlorofluorocarbons.

C. As required by 42 USC 7671 (b), (c), and (d) and 40 CFR Part 82, Subpart E, the Contractor shall label products which contain class I or class II ozone-depleting substances or are manufactured with a process that uses class I or class II ozone-depleting substances, or containers of class I or class II ozone-depleting substances as follows:

WARNING: Contains (or manufactured with, if applicable) _____,* substance(s) which harm(s) public health and the environment by destroying ozone in the upper atmosphere.

***** The Contractor shall insert the name of the substance(s).

D. The Contractor shall comply with the applicable requirements of Sections 608 and 609 of the Clean Air Act (42 USC 7671g, National Recycling and Emission Reduction Program and 7671h, Servicing of Motor Vehicle Air Conditioners) as each or both apply to the contract.

2.06 PESTICIDES

A. Except as may be specified elsewhere in this contract, Contractor will not use or apply pesticides (such as herbicides or weed-killers, insecticides, or rodenticides) without specific written prior approval of the Contracting Officer.

PART 3 EXECUTION (WORK PRACTICES)

3.01 GENERAL: SITE DISTURBANCE DURING CONSTRUCTION ACTIVITIES

A. Contractor shall use industry-recognized best management practices to avoid creation of fugitive dust emissions and to avoid and control storm water runoff from the construction site and any temporary roads that may be used for access to it. Water sprinkling may be used to control dust. Contractor shall perform all work under this contract in such a manner that no pollutants of any kind are released into ditches, storm drains, streams, lakes, or other surface waters on or connected to the site.

3.02 PROTECTION OF WATER RESOURCES

A. General: The General Contractor shall not pollute storm drainage, streams, lakes, or reservoirs with fuels, oils, bitumens, calcium chloride, acids, construction wastes, or other harmful materials or pollutants. It is the responsibility of the General Contractor to determine and comply with all applicable federal, state, regional, municipal, and other regulations.

B. Spillage: The General Contractor shall take special measures to prevent chemical, fuels, oils, greases, bituminous materials, waste washings, herbicides, cement, and surface drainage from entering public waters. In the event of a spill, the Contractor must make all required notifications to federal, state, or local authorities and will notify the Contracting Officer immediately.

C. Washing and Curing Water: Water used in aggregate processing, concrete curing, foundation, and concrete lift clean-up and other waste water shall not be allowed to enter the storm drainage system.

3.03 PROTECTION OF LAND RESOURCES

A. General: It is intended that the land resources within the project boundaries and outside the limits of permanent work performed under this contract be preserved in their present condition or be restored to a condition after completion of construction that will appear to the natural and not detract from the appearance of the project. The General Contractor shall limit his construction activities to areas defined by the Drawings or Specifications.

B. Prevention of Landscape Defacement: Except in areas marked on the plans to be cleared, the General Contractor shall not deface, remove, cut, injure or destroy trees or shrubs without specific written authority. Trees designated to be saved shall be protected from either excavation or filling within the root zone. No ropes, cables, or guys shall be fastened or attached to any existing tree for anchorage unless specifically authorized by the Contracting Officer. The General Contractor shall in any event be responsible for any damage resulting from such use.

C. Restoration of Landscape Damage: Any trees or other landscape features scarred or damaged by the General Contractor's equipment or operations shall be restored as nearly as possible to the original condition at the General Contractor's expense. The Contracting Officer will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of under requirements for clearing and grubbing (Section 02110). All scars made on trees not designated on the plans to be removed by equipment

construction operations, or by the removal of limbs larger than 1-inch in diameter shall be coated immediately with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced landscape personnel. Tree trimming with axes shall not be permitted. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the General Contractor and are beyond saving in the opinion of the Contracting Officer, shall be immediately removed and replaced with a nursery-grown tree of the same species.

3.04 CONTROL OF AIR EMISSIONS

A. Contractor's actions shall conform to all federal, state, and local requirements for the control of air emissions during work under this contract. Trucks leaving the site will be brushed or washed to remove all practicable amounts of dust or other material that may become airborne. Contractor will ensure that all internal construction vehicles and equipment used will have the lowest practicable emissions characteristics and be maintained in optimum operating condition for the reduction of air emissions. Where use of electric motors instead of internal combustion engines is feasible, electric motors will be used during construction.

3.05 POLLUTION PREVENTION & WASTE DISPOSAL

A. The Contractor should use prior planning to find those materials that will minimize the creation of waste in general and hazardous waste in particular. Recycling should be considered and implemented at every practicable stage of the project.

3.06 WASTE DISPOSAL

A. Pollution Prevention: The Contractor should use prior planning to find those materials and work practices that will minimize the creation of waste in general and hazardous waste in particular.

B. Hazardous Waste Generation, Handling, and Disposal: Work done under this contract is to be performed on a government facility. According to rules and procedures of the United States Environmental Protection Agency, the federal facility is required to have a generator identification number under the Resource Conservation and Recovery Act (RCRA) and to be responsible for wastes (as defined under RCRA) produced, managed, stored, disposed on, or transported from the facility. Accordingly, Contractor will, to the greatest extent practicable, use materials, processes, and techniques that will avoid the creation of hazardous waste. Contractor shall prepare and follow a written waste management and disposal plan for all hazardous wastes generated on the site. Prior to generation of any hazardous wastes, contractor will coordinate planned activities regarding hazardous materials and hazardous waste with the Contracting Officer. Contractor shall submit a written waste management plan, through the contracting officer, to installation environmental office. Contractor shall follow this plan once it has been approved by the contracting officer. Under no circumstances will Contractor bring onto the site hazardous waste that has been generated elsewhere. All hazardous waste will be properly disposed of by the Contractor in accordance with all federal, state, and local requirements.

C. Disposal of Non-RCRA Wastes: All non-hazardous wastes generated on the site as a result of this contract must be disposed of properly, in accordance with all federal, state, and local requirements. Materials will be recycled whenever practicable. Prior to creation of such wastes, the Contractor will submit to the installation environmental management function, through the Contracting Officer, a plan for disposal of wastes. Such plan shall include the types of waste to be created, how they shall be stored, managed and disposed. Contractor shall follow this plan once it has been approved by the installation and contracting officer. Such wastes will not be created until approved by the Contracting Officer.

D. Construction Debris:
   1. Debris from demolition of existing structures will ordinarily be removed to a location on the Installation, as designated by the installation authorities.
   2. If a location on the Installation is not available, other sections in this contract may require the Contractor to remove clean construction debris from the site to a location of the

contractor's choosing off the installation. (Site soil or other site media are not covered by this paragraph.) Debris will be recycled or disposed of in accordance with all applicable federal, state, and local rules. Such debris must be free of all contamination, including but not limited to, lead paint, asbestos, and insecticides. Prior to removal of any construction debris, that debris must be certified by the installation to be free of contamination and of no value to the Untied States, and this certification must be provided to the contracting officer. To expedite work, this may be accomplished by a Telecopier or other suitable electronic means, however, the original certification form must be provided to the contracting officer. No form is prescribed for this certification so long as all necessary information if provided and the document is signed by an authorized installation representative. However, an example is provided at the end of this section of the specifications, and this form may be used. All construction debris removed from the installation must be covered by a certification. The Contractor must arrange with installation POC whether all debris will be covered by one certification or it several certifications will be required.

E. Consolidated Waste Disposal Plans: Contractor may, at Contractor's option submit for approval as specified above one consolidated plan for handling hazardous and non-hazardous wastes.

F. Earthwork and Removal of Potentially Contaminated Media:
   1. Unless otherwise specified elsewhere in this contract, the site has been inspected and is, consistent with best professional judgment, fee of environmental contamination or pollution. However, work under this contract will be performed on a military installation, where the history of prior military and industrial activities is not necessarily completely known. The following provisions prohibit the removal from the installation of soil or other materials found on site and are included, in an abundance of caution, for the protection of AAFES, the installation, and the Contractor.
   2. Notwithstanding any another clause in this contract, including but not limited to all standard site work general provisions (Sections 02010 - 02950); no media by-product resulting from site preparation, construction or excavation shall be moved off the post, base, or installation where the construction is occurring. If the construction is off the post, base or installation, no media by-product shall be moved off the construction site.
   3. The Contractor shall: (1) leave the media in place at the site, subject to appropriate erosion control; or (2) haul the media to and place it at a location on the installation that has been designated wither in this contract or in writing by the Contracting Officer; and (3) if unforeseen difficulties arise, such as excessive quantity of media is generated, the Contractor shall advise the Contracting Officer and shall not remove media from the site without written authorization from the Contracting Officer.

3.07 DEFINITONS

A. Media – Any soil, water, or air, moved, disturbed or released from a site.

B. The terms hazardous, waste, pollutant, contaminate, substance have the same means and usage here as they commonly do in the CERCLA, RCRA, FWPCS, CAA, TSCA, and SDWA respectively.

3.08 UNEXPECTED SITE CONDITIONS

A. CONTAMINATED SOIL OR GROUNDWATER:
   1. Unless otherwise specified elsewhere in this contract, site has been inspected and is, consistent with best professional judgment, free of environmental contamination of pollution. However, unexpected conditions can always arise. Contractor or subcontractor personnel may encounter soil or groundwater that is suspected to be contaminated, either because of odors, colors, free liquids, unexpected construction debris, or other suspicious conditions. Should this occur, contractor will immediately notify the Contracting Officer and the installation environmental office and take necessary initial measures to protect workers, the site, and other personnel.

B. UNEXPECTED ARTIFACTS OR RELICS:

1. Should contractor employees in the course of site preparation or other work on this contract find unexpected historic or archeological remains, such as bones, arrow points, pottery remnants, foundations, or other evidence or previous uses of the site, contractor will cease further site-disturbing activity and immediately notify the Contracting Officer and installation environmental office.

INSTALLATION CERTIFICATION FOR CLEAN CONSTRUCTION DEBRIS TO BE REMOVED FROM AAFES PROJECT SITE

As representative of _____(insert name of installation), I am authorized to certify, and hereby do so certify, that the construction debris to be removed from the AAFES project site at:
_____
_ (describe project and list address, for example Main Exchange Project, 111 Road A, X installation) has been inspected and is of no value to the United States and is free of all contamination, including but not limited to: lead paint, asbestos, PCBs, and pesticides.

CERTIFICATION:

Signed:_____
Date:_____

Printed Name, Rank or Grade, and Duty
Title:_____

ORIGINAL OF THIS FORM MUST BE PROVIDED TO CONTRACTING OFFICER

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Field Offices and Storage Sheds: Section 01590.

B. Cleaning: Section 01710

C. Plumbing: Section 15400

D. Electrical: Section 16000.

E. All temporary facilities and controls must comply with NFPA 241 and EM-385-1-1 and UFC 3-600-1, section 1-7.

1.02 ELECTRICAL SYSTEM

A. Furnish and install temporary electric power service for construction needs throughout the construction period. This shall include furnishing, operation and maintenance of a generator by the General Contractor if required.
   1. Electric Services: Provide a complete temporary electric service including all secondary wiring, supports, switches, over-current protection, metering, receptacles, etc., required for a 120/208-volt, 3-phase, 4-wire, 200 amp service for the construction of the building. The electrical contractor shall be responsible to furnish all fused cutouts, transformers, primary and secondary conductors, disconnects, and miscellaneous hardware.
   2. Power center for miscellaneous tools and equipment used in construction work.
      a. Provide 120 volt and 208 volt receptacles for use by all trades. Each outlet shall have a circuit breaker. Outlets shall be located so that no extensions are more than 100 feet long. All outlets shall be grounded.
      b. Users shall provide grounded, Underwriters' Laboratories approved extension cords from power center to point of operations.
   3. Power for temporary light.
      a. Provide and maintain a temporary lighting system with guarded lighting sockets and lamps throughout the building to provide temporary lighting to satisfy construction requirements, in such areas and at such times that day lighting is inadequate. Provide at least 0.7 watts of incandescent lighting per square foot and maintain a socket voltage of at least 100 volts. Use at least 100-watt lamps. In any event, the lighting intensity shall no be less than five (5) foot-candles in the vicinity of work and traffic areas.

B. Capacity
   1. Adequate electrical service for construction use by all trades during construction period.
   2. Unusually heavy loads, such as welding, and other equipment with special power requirements, will not be connected to the system.

C. Maintain strict supervision of use of temporary services.
   1. Enforce conformance with applicable standards.
   2. Enforce safe practices.
   3. Prevent abuse of services.
   4. Use of temporary electrical service for resistance heating is not permitted.

D. The temporary electrical service for construction shall comply with the latest editions of the Occupational Safety and Health Standards and the National Electric Code, NFPA-70.

1.03 WATER SERVICE

A. Water shall be furnished from existing water supply (hose bibb, if available) outside the building as an extension of the permanent service on new construction.

B. Maintain strict supervision of use of existing services.
   1. Enforce conformance with applicable codes and standards.
   2. Enforce sanitary practices.
   3. Prevent abuse of services.
   4. Prevent wasteful use of water.
   5. Protect system from freezing.

1.04 TELEPHONE/COMMUNICATIONS

A. See Section 01590 "FIELD OFFICES AND STORAGE SHEDS".

B. Overhead lines will be acceptable.

1.05 TOILET FACILITIES

A. Furnish and install adequate portable chemical toilets.

B. Provide maintenance service to keep the toilet clean and sanitary.

1.06 HEAT AND VENTILATION

A. Furnish and install temporary heat and ventilation in enclosed new construction areas throughout the construction period to facilitate progress of work, protect work against dampness and cold, prevent moisture condensation on surfaces, and provide suitable ambient temperatures and humidity levels for installation and curing of materials with the following requirements:
   1. Twenty-four (24) hours a day during placing, setting, and curing of cementitious materials with a temperature as required by the specification section for each product (minimum temperature: 40°F).
   2. Twenty-four (24) hours a day, seven days prior to, and during, placing of interior finishes; woodwork, resilient floors, painting and finishing: as required by specification section for each product.
   3. Twenty-four (24) hours a day after application of finishes, and until substantial completion: minimum 65°F, 18°C.
   4. As required in the specifications for each product for storage of materials.

B. Field Offices
   1. As required in specification Section 01590 - FIELD OFFICES AND STORAGE SHEDS.

C. Ventilation Required
   1. General: Prevent hazardous accumulations of dust, fumes, mists, vapors or gases in areas occupied during construction.
      a. Provide local exhaust ventilation to prevent harmful dispersal of hazardous substances into atmosphere of occupied areas.
      b. Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
      c. Ventilate storage spaces containing hazardous or volatile materials.
   2. Provide adequate ventilation for:
      a. Curing installed materials.
      b. Dispersal of humidity.
      c. Ventilation of temporary sanitary facilities.
   3. Duration of operations:
      a. For personnel:
         1) At all times when the general contractor's (GC) personnel and/or AAFES employees or customers occupy an area and are subject to hazardous accumulation of harmful elements.
         2) Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements.
      b. For curing installed materials: as required by specification Section for respective materials.

c. For humidity dispersal: as needed to provide suitable ambient conditions for work.
d. Use of permanent heating and ventilating equipment:
   1) The GC shall take precautions as required to prevent damage to the equipment. All filters must be in place.
   2) The GC shall be responsible for maintaining clean filters in all equipment and shall install new filters when the Government takes occupancy of the building.
e. Beneficial Occupancy: During the period of beneficial occupancy by AAFES, the HVAC systems must be operating under the design and performance standards of the completed permanent design requirements.
f. The GC shall maintain strict supervision of operation of all equipment used for temporary heating and ventilating as follows:
   1) Enforce conformance with applicable codes and standards.
   2) Enforce safe practices.
   3) Prevent abuse of services.
   4) Prevent damage to finishes.

1.07 COSTS OF TEMPORARY UTILITIES (Water and electric power)

A. The GC shall pay all costs involved with the installation, use, maintenance and removal of temporary utilities.

B. The GC shall pay all costs involved with the installation, and maintenance of all permanent building systems until occupancy by AAFES.

C. The GC will be responsible for installation of temporary meters prior to commencing work. Cost for use of utilities will be paid for by the GC. Use of utilities shall be in accordance with General Provisions titled "Availability and use of Utility Services". Fire hydrants will not be used to obtain water for this project. Electricity will not be used for electric resistance heating.

1.08 TEMPORARY CONSTRUCTION, EQUIPMENT AND PROTECTION

A. Provide, maintain and remove upon completion of the work, all temporary rigging, scaffolding, hoisting equipment, ladders to roof, barricades around openings, and all other temporary work as required to complete all work of the Contract. The GC shall coordinate the use and furnishing of scaffolds with his subcontractors.

B. Provide, maintain and remove upon completion of the work, or sooner if authorized by the Contracting Officer, all fences, barricades, lights, shoring, pedestrian walkways, and other protective structures or devices necessary for the safety of workmen, AAFES employees, equipment, the public, and property.

C. All temporary construction and equipment shall conform to all regulations, ordinances, laws and other requirements of the authorities having jurisdiction, including insurance companies, with regard to safety precautions, operation and fire hazard.

D. Pumping: Provide and maintain pumping facilities, including power, for keeping the site, excavations and structures free of accumulations of water at all times, whether from underground seepage, rainfall, drainage or broken lines.

E. Unauthorized Entry: Maintain provision for closing and locking the building as soon as possible. Existing structures to be expanded must remain secure. When exterior work is in process such as concrete finish work, bituminous paving and landscaping work, the GC shall maintain a night watchman on the premises until such time that the work cannot be harmed or damaged.

F. Damage or Theft: Protect the work and material to be used on the project, from damages or loss due to the elements, theft, vandalism, malicious mischief, or other causes. The GC shall be held responsible for such damages, or loss, which he shall remedy at his expense.

G. Temporary Walls, Closures, Security Enclosures and Barricades: Provide and maintain all barricades or enclosures shown on the drawings and described in Section 01010 required to protect the work in progress from outside elements, dust, interior construction dust and noise,

and other disturbances as a result of work under this Contract. Such protection shall be positive, shall meet the approval of the Contracting Officer, and shall be maintained for the duration of the construction period or as required to provide for the protection as specified.

1.09 PROJECT BULLETIN BOARD

A. The GC shall furnish, install, and maintain, during the life of the project, a weathertight bulletin board approximately 3 feet high by 5 feet wide, having not less than two hinged or sliding glass doors with provisions for locking. The bulletin board shall be mounted where and as approved by the C.O., in a prominent place accessible to all employees of the GC and subcontractors, and to applicants for employment. The bulletin board shall remain the property of the GC and shall be removed by him upon completion of the Contract work. The following information which will be furnished by the government to the GC (except safety posters) shall be posted on the bulletin board and shall be maintained by the GC in easily, readable condition at all times for the duration of the Contract:
   1. The Equal Employment Opportunity Post and Notice of Non-discrimination of Employment (Standard Form 38).
   2. Wage Rate Information Poster (Form SOL 155), with the contract schedule of minimum rates as required by the Davis-Bacon Act.
   3. Safety posters.

END OF SECTION

SECTION 01520

CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.01 GENERAL

A. The construction progress schedule shall be prepared by the GC and shall consist of a bar chart utilizing CPM scheduling. In preparing this construction progress schedule, the scheduling of construction shall be the responsibility of the GC and shall be developed in accordance with the phasing plan shown on the construction drawings. The requirement for the schedule is included to assure adequate planning and execution of the work and to assist the Contracting Officer in evaluating progress of the work.

B. Provide projected construction schedules for entire work, updated monthly.

1.02 RELATED SECTIONS

A. Summary of The Work: Section 01010.

B. Progress Meetings: Section 01220.

C. Submittals: Section 01300.

1.03 SCOPE

A. The GC shall prepare a Construction Progress Schedule to serve as a guide in managing the construction progress. Reference General Provisions clause titled, "Schedule and Progress".

B. Schedule format shall be prepared utilizing the Critical Path Method (CPM) such as to enable the Contracting Officer to evaluate the reasonableness of the proposal schedule, and to determine if the actual construction is on schedule.

1.04 CONSTRUCTION PROGRESS SCHEDULE

A. The schedule consists of keeping a record of the time allotted for each activity and the actual progress of the activity.

B. Activities shall be listed vertically and shall include the units of work required for the project.

C. All activities of AAFES which affect progress and Contract required dates for completion shall be shown. Include activities for AAFES - furnished/AAFES - installed items.

D. The selection and number of activities shall be subject to the KO's approval.

E. Activities listed will be the same as those used for progress payments.

1.05 A SCALE OF TIME

A. A scale of time, from date of the beginning of the Contract work to the date of completion of the Contract work, shall be indicated horizontally on the chart. The units of time indicated shall be calendar days.

1.06 ACTIVITY TIMES

A. Activity shall be indicated in the form of scaled time bars. The bars shall indicate the following:
   1. The schedule of time allotted for the activity.
   2. The actual progress of the activity including the actual time of the activity start, the time spent to date or to the finish of the activity.

1.07 SUBMISSION AND APPROVAL

A. Submission and approval of the construction progress schedule shall be as follows:
   1. A preliminary bar chart defining the GC's planned operations during the first thirty (30)

calendar days after notice-to-proceed will be submitted within ten (10) days. The GC's general approach for the balance of the project shall be indicated. Cost of activities expected to be completed or partially completed before submission and approval of the complete bar chart could be included.

1.08 THE COMPLETE CPM BAR CHART

A. The complete CPM bar chart shall be submitted within thirty (30) calendar days after receipt of notice-to-proceed. The chart shall incorporate critical path method (CPM) scheduling with the following minimum features:
   1. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
   2. Tabulate each activity using calendar dates, and identify for each activity:
      a. Preceding and following event numbers.
      b. Activity description.
      c. Estimated duration of activity.
      d. Earliest start date.
      e. Earliest finish date.
      f. Actual start date.
      g. Actual finish date.
      h. Latest start date.
      i. Latest finish date.
      j. Total and free float; float time shall accrue to AAFES and to AAFES's benefit.
      k. Monetary value of activity, keyed to Schedule of Values.
      l. Percentage of activity completed.
      m. Responsibility.

B. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and recomputation of all dates and float.

1.09 GENERAL CONTRACTOR

A. The GC shall submit at intervals of thirty (30) calendar days a copy of the complete CPM bar chart schedule with the current activity progress clearly indicated. Cost of each activity completed and each partially completed shall be included.

B. The GC shall also submit a narrative report with the updated CPM bar chart, including a description of problem areas (current and anticipated), delaying factors and their impact, and an explanation of corrective actions taken or proposed.

C. The GC shall participate in joint review and evaluation of schedule with Contracting Officer's Representative at each submittal.

D. After review, revise as necessary as result of review, and resubmit within 10 days.

1.10 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Contracting Officer, Contracting Officer's Representatives, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01585

PROJECT SIGNS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project identification sign.

B. Provide construction to comply with Air Force Engineering Letter (ETL)02:09 Construction Signs for Military Construction Projects. http://www.wbdg.org/ccb/browse_cat.php?o=33&c=125

1.02 QUALITY ASSURANCE

A. Design sign and structure to withstand American Society of Civil Engineers (ASCE) Standard 7, 140 miles/hr wind velocity @ 3 seconds.

B. Sign Painter: Experienced as a professional sign painter for minimum three years.

C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

1.03 SUBMITTALS

A. See Section 01300 - Submittals for submittal procedures.

B. Attached sign exemplars are current proposed templates from AAFES. Obtain most recent sign template from AFFES prior to producing sign layout.

C. Shop Drawing: Show content, layout, lettering, color, structure, sizes and grades of members.

PART 2 PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: New, wood, structurally adequate.

B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch thick, standard large sizes to minimize joints.

C. Rough Hardware: Galvanized.

D. Paint and Primers: Exterior quality, two coats, colors as selected.

E. Lettering: Exterior quality paint, colors as selected.

2.02 PROJECT IDENTIFICATION SIGN

A. One painted sign of construction, design, and content shown on drawing “S1 - Preferred Sign with rendering of project” as illustrated on following page.

B. Graphic Design, Colors, Style of Lettering: Designated by Contracting Officer's Authorized Representative.

C. FTFA 09-5001

PART 3 EXECUTION

3.01 INSTALLATION

A. Install project identification sign within 30 days after date fixed by Notice to Proceed.

B. Erect at designated location.

C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.

D. Install sign surface plumb and level, with butt joints. Anchor securely.

E. Paint exposed surfaces of sign, supports, and framing.

3.02 MAINTENANCE

A. Maintain signs and supports clean, repair deterioration and damage.

3.03 REMOVAL

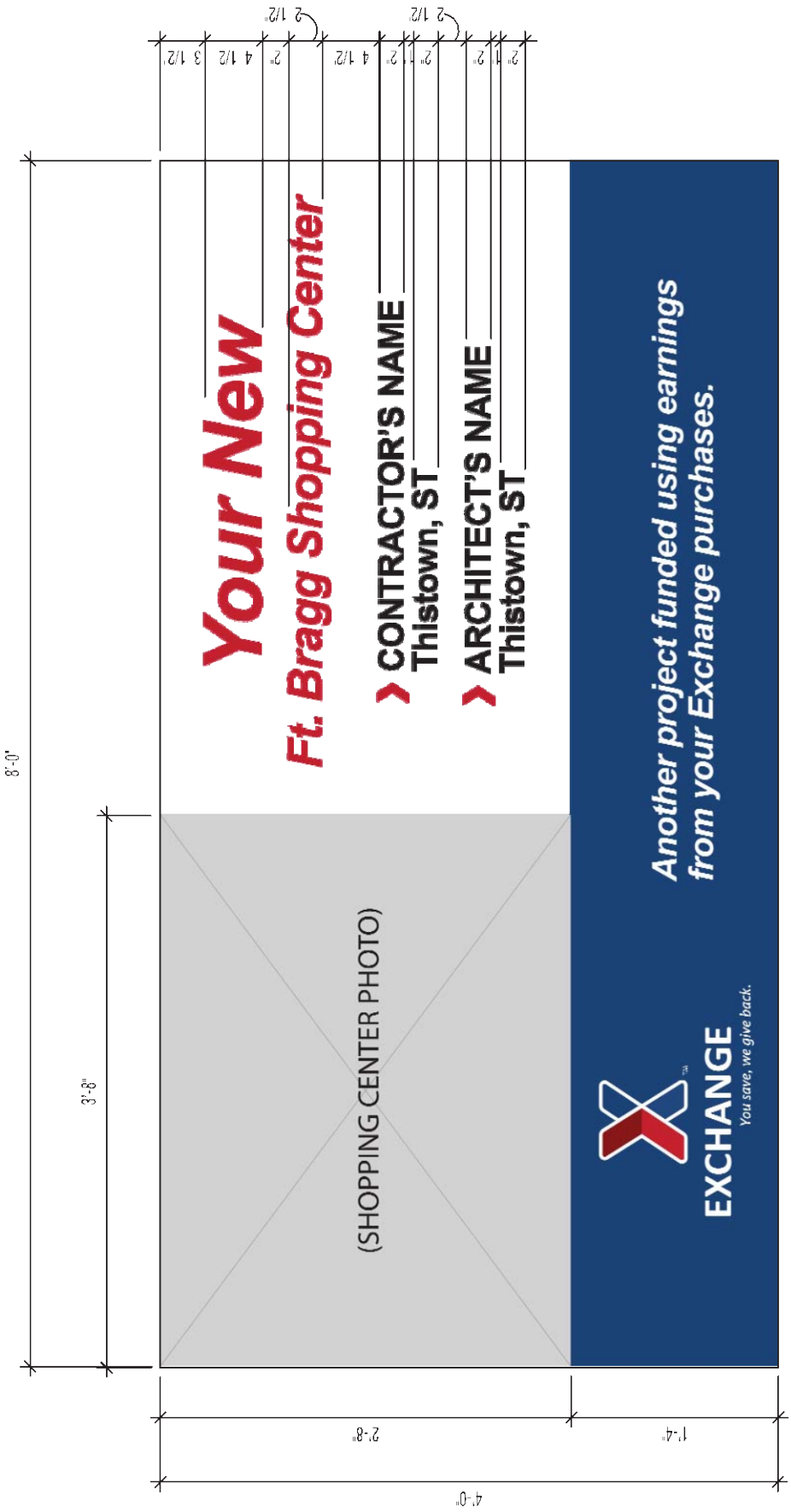
A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

3.04 ATTACHMENT

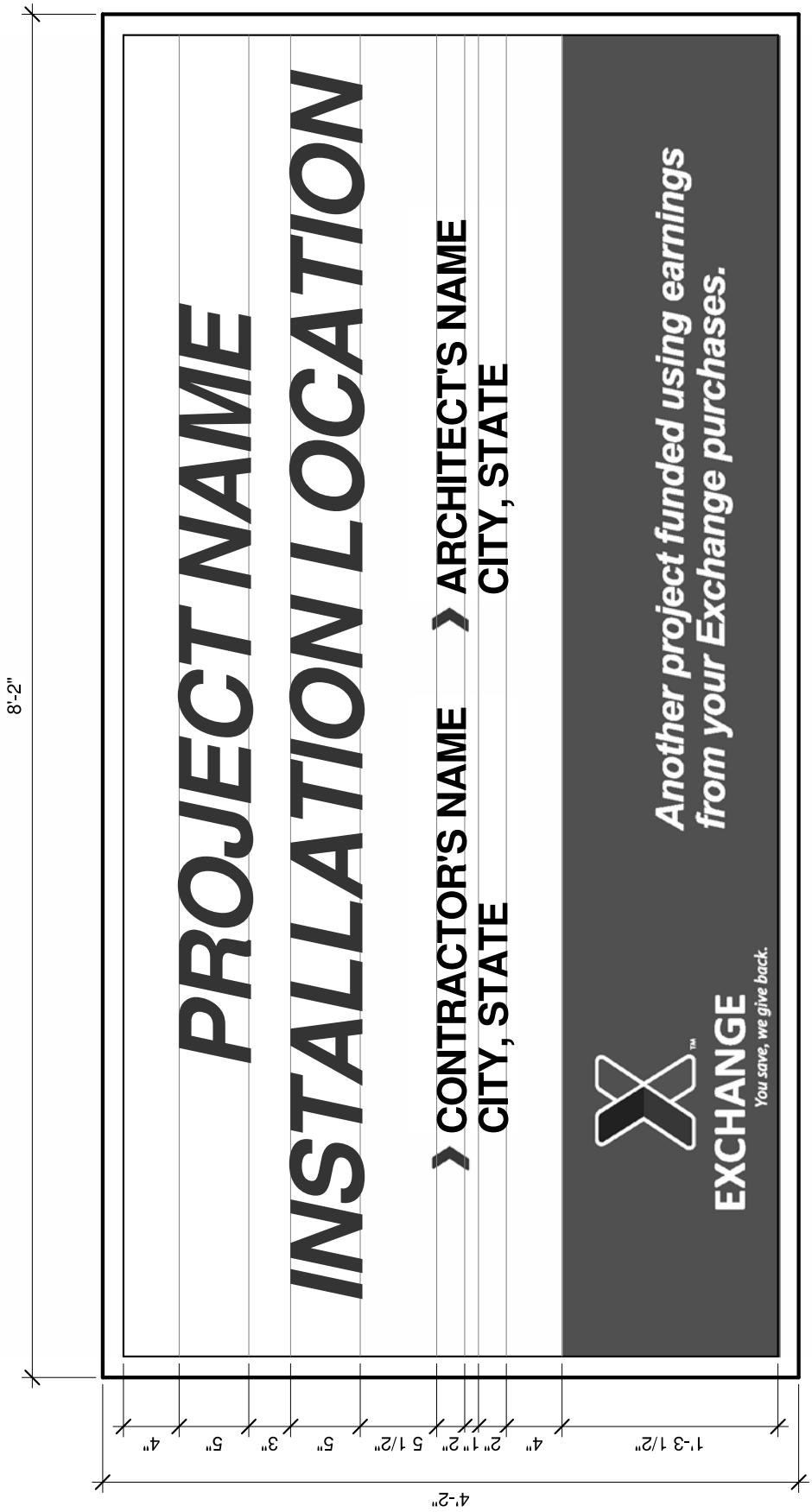
A. S1 - Preferred sign with rendering of project.

B. S2 - Alternate Sign without rendering of project.

END OF SECTION


Your New
Ft. Bragg Shopping Center
CONTRACTOR'S NAME
Thistown, ST
ARCHITECT'S NAME
Thistown, ST
(SHOPPING CENTER PHOTO)
Another project funded using earnings from your Exchange purchases.
EXCHANGE
You save, we give back.
8'-0"
3'-8"
2'-8"
1'-4"
4'-0"
2 1/2"
2 1/2
2"
4 1/2"
2"
4 1/2
3 1/2"
2"
1
2"
2"
1
2"

Preferred


PROJECT NAME
INSTALLATION LOCATION
CONTRACTOR'S NAME
CITY, STATE
ARCHITECT'S NAME
CITY, STATE
EXCHANGE
You save, we give back.
Another project funded using earnings from your Exchange purchases.
8'-2"
4'-2"
1'-3 1/2"
4"
2"
1"
2"
5 1/2"
5"
3"
5"
4"

Alternate

SECTION 01590

FIELD OFFICES AND STORAGE SHEDS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Summary of the Work: Section 01010.

B. Submittals: Section 01300.

C. Cleaning: Section 01710.

1.02 DESCRIPTION

A. General:
   1. Furnish, install and maintain field office; provide specified services, furnishing and equipment for:
      a. General Contractor (GC).
      b. Contracting Officer and/or Architect/Engineer (A/E).
   2. Furnish, install and maintain storage sheds needed for construction.

B. Construction:
   1. Structurally sound foundation and superstructure.
   2. Weathertight, with raised floors; compatible with occupancy and storage requirements.
   3. Temperature transmission resistance; compatible with occupancy and storage requirements.
   4. Exterior finish surfaces; painted or finished in colors acceptable to the Contracting Officer.
   5. Interior finishes of offices:
      a. Walls, ceilings: Sheet-type materials, prefinished or painted.
      b. Floors: Resilient floor covering.
   6. At GC's option, portable buildings or mobile homes may be used for offices:
      a. Mobile homes, if used, shall be modified to convert spaces for office use.
      b. Do not use mobile homes for living quarters.

C. Field Office:
   1. The building shall have a door, at least one window, and a drawing table. Openings shall have suitable locks. Field office shall be maintained for the full time during the operation of the work of the contract. The GC shall provide one 3' 0" x 7' 0" plan table, conference table, eight (8) chairs, plan rack, and file cabinet. Office shall contain not less than 120 square feet of floor space. Locate field office and other temporary structures as directed by Contracting Officer.
   2. Light and Temperature: Automatic heating and cooling to maintain:
      a. 68 degrees F. for heating.
      b. 76 degrees F. for cooling.
   3. Telephone/Communication:
      a. The GC shall provide and pay for telephone installation in field offices described above. The GC shall pay for all telephone billings.
         1) Provide a plain paper FAX machine with G3 capability (similar to X-FAX).
         2) Provide a cellular portable telephone with roam capability.
   4. Other furnishings: The GC's option.
   5. Equipment and Supplies:
      a. First aid equipment.
      b. Hard hats for visitor's use:
         1) 10 adjustable-band protective helmets.

D. Storage Sheds:
   1. As directed by the Contracting Officer.
   2. All storage shall be on the project site.

E. Fire Extinguishers: One standard dry chemical (ABC) type for each office and each storage shed.

F. Identification:
   1. Provide a sign on each office structure to identify occupants and function.
      a. Size: 36 inches (915 mm) x 24 inches (610 mm).
      b. Painted by professional sign painter.
      c. Colors: Acceptable to the Contracting Officer.
   2. "Emergency First Aid" sign.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with requirements of regulatory agencies having jurisdiction.
   1. The location of field offices, office trailers, etc. shall be approved in writing by the Installation prior to installation.

1.04 JOB CONDITIONS

A. Locate temporary structures to avoid interference with work. Location as directed by the Contracting Officer.

PART 2 - PRODUCTS

2.01 MATERIALS, EQUIPMENT & FURNISHINGS

A. May be new or used, but must be serviceable, adequate for required purposes, and must not create unsafe conditions or violate applicable codes.

PART 3 - EXECUTION

3.01 PREPARATION

A. Fill and grade sites if required for temporary structures to provide drainage.

3.02 INSTALLATION

A. Field office must be installed when project construction commences.

B. Construct temporary field office(s) and storage sheds on fixed foundations.
   1. Raise portable buildings or mobile homes, if used; installation on fixed foundations.
   2. Provide steps and landings at entrance doors.

C. Mount fire extinguishers in prominent locations with clear access for use.

D. Mount sign adjacent to entrance doors of appropriate structures in conspicuous location.

3.03 MAINTENANCE AND CLEANING

A. Provide continuous maintenance for temporary structures, services, and furnishings.

B. Repair or refinish damaged or weathered portions of structures as required to maintain in specified condition.

C. Repair or replace defective services and furnishings.

3.04 REMOVAL

A. Remove temporary field office(s), contents, and services at completion of construction operations.

B. Remove storage sheds when they are no longer needed.

C. Remove foundations and debris, grade to required elevations, and clean area.

D. Restore area to condition matching adjacent areas after removal of offices.

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. LEED-related product requirements.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Procedures for Government-supplied products.

F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

A. Section 00404 - Substitution Sheet

B. Section 01355 - LEED Certification Procedures: Requirements for LEED reports.

C. Section 01400 - Quality Control: Product quality monitoring.

1.03 REFERENCE STANDARDS

A. 16 CFR 260 - Guides for the Use of Environmental Marketing Claims; Federal Trade Commission; current edition.

B. GreenSeal GC-03 - Anti-Corrosive Paints; Green Seal, Inc.; 1997.

C. GreenSeal GS-11 - Architectural Paints; Green Seal, Inc.; 1993.

D. GreenSeal GS-36 - Commercial Adhesives; Green Seal, Inc.; 2000.

E. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. SCAQMD 1113 - South Coast Air Quality Management District Rule No.1113, Architectural Coatings; current edition; www.aqmd.gov.

G. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.04 SUBMITTALS

A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
   1. Submit within 15 days after date of Agreement.
   2. For products specified only by reference standards, list applicable reference standards.

B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

E. LEED Submittals: Use forms provided in Section 01356.

F. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. Do not use products having any of the following characteristics:
   1. Made using or containing CFC's or HCFC's.
   2. Made of wood from newly cut old growth timber.
   3. Made using or containing asbestos.

C. Where all other criteria are met, Contractor shall give preference to products that:
   1. Are extracted, harvested, and/or manufactured closer to the location of the project.
   2. Have longer documented life span under normal use.
   3. Result in less construction waste.
   4. Are made of vegetable materials that are rapidly renewable.

D. Regionally-Sourced Products:
   1. Overall Project Requirement: Provide materials amounting to a minimum of 10 percent of the total value of all materials (excluding plumbing, HVAC, electrical, elevators, and other equipment) that have been extracted, harvested, or recovered, as well as manufactured, within a radius of 500 miles from the project site.
      a. This provision is applicable to LEED Credit MR 5.1; show quantity on LEED report.
   2. Overall Project Requirement: Provide materials amounting to a minimum of 20 percent of the total value of all materials (excluding plumbing, HVAC, electrical, elevators, and other equipment) that have been extracted, harvested, or recovered, as well as manufactured, within a radius of 500 miles from the project site.
      a. This provision is applicable to LEED Credits MR 5.1 and 5.2; show quantity on LEED report
   3. Specific Product Categories: Provide regionally-sourced products as specified elsewhere.
      a. Numerous materials and products capable of being regionally-sourced are specified in Divisions 2 through 10 specification sections. Contractor shall endeavor to use a sufficient quantity of such products to enable LEED Credits MR 5.1 and 5.2 to be achieved.
   4. LEED Submittals: Indicate location of manufacture; in all cases indicate location of final assembly; for harvested products, indicate location of harvest; for extracted (i.e. mined) products, indicate location of extraction; for products involving multiple manufacturing steps, indicate all locations of manufacture or assembly; provide manufacturer or supplier certification of location information.

E. Products with Recycled Content:
   1. Overall Project Requirement: Provide products with recycled content such that the sum of post-consumer recycled content plus one-half of the post-industrial recycled content constitutes at least 10 percent of the total value of all products installed, except mechanical and electrical components.

a. This provision is applicable to LEED Credits MR 4.1 and MR 4.2; show quantity and calculations on LEED report.

2. Specific Product Categories: Provide recycled content as specified elsewhere.
   a. Numerous materials and products capable of having recycled content are specified in Divisions 2 through 10 specification sections. Contractor shall endeavor to use a sufficient quantity of such products to enable LEED Credits MR 4.1 and MR 4.2 to be achieved.
3. Calculations: Where information about recycled content is required to be submitted:
   a. Determine percentage of post-consumer and post-industrial content separately, using the guidelines contained in 16 CFR 260.7(e).
   b. Previously used, reused, refurbished, and salvaged products are not considered recycled.
   c. Wood fabricated from timber abandoned in transit to original mill is considered reused, not recycled.
   d. Determine percentage of recycled content of any item by dividing the weight of recycled content in the item by the total weight of all material in the item.
   e. Determine value of recycled content of each item separately, by multiplying the content percentage by the value of the item.
4. LEED Submittals: State unit cost, post-consumer and post-industrial content percentages, quantity installed, total material cost, and total recycled content value; attach evidence of contents from either manufacturer or an independent agency.

F. Sustainably Harvested Wood:
1. Definition: Wood-based materials include but are not limited to structural framing, dimension lumber, flooring, wood doors, finishes, and furnishings that are permanently installed in the project. Wood and wood-based products not permanently installed in the project are not included in the definition.
2. Overall Project Requirement: Provide a minimum of 50 percent of all wood-based materials made of sustainably harvested wood.
   a. This provision is applicable to LEED Credit MR 6/7; show quantity on LEED report and submit certificates.
3. Specific Wood-Based Fabrications: Fabricate of sustainably harvested wood when so specified elsewhere.
4. Certification: Provide wood certified or labeled by an organization accredited by the following:
   a. The Forest Stewardship Council, The Principles for Natural Forest Management; for Canada visit http://www.fsccanada.org, for the USA visit http://www.fscus.org.
5. LEED Submittals: State unit cost of each wood-based item, quantity installed, quantity certified as sustainably harvested, total wood-based material cost, and total sustainably harvested value; provide letter of certification signed by supplier of each item, indicating compliance with the specified requirements and identifying the certifying organization.
   a. Include the certifying organization's certification numbers for each certified product, itemized on a line-item basis.
   b. Attach copies of invoices bearing the certifying organization's certification numbers.

G. Urea-Formaldehyde Prohibition:
1. Overall Project Requirement: Provide composite wood and agrifiber products having no added urea-formaldehyde resins.
   a. This provision is applicable to LEED Credit EQ 4.4; submit LEED Prohibited Content Installer Certification Forms.
   b. Require each installer to certify compliance and submit product data showing product content.
2. Specific Product Categories: Comply with limitations specified elsewhere.

H. Adhesives and Joint Sealants:
1. Definition: This provision applies to gunnable, trowelable, and liquid-applied adhesives,

sealants, and sealant primers used anywhere on the interior of the building inside the weather barrier, including duct sealers.

2. Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
   a. This provision is applicable to LEED Credit EQ 4.1; submit LEED Prohibited Content Installer Certification Forms.
   b. Require each installer to certify compliance and submit product data showing product content.
3. Specific Product Categories: Comply with limitations specified elsewhere.

I. Aerosol Adhesives:
   1. Provide only products having lower volatile organic compound (VOC) content than required by GreenSeal GS-36.
      a. This provision is applicable to LEED Credit EQ 4.1; submit LEED Prohibited Content Installer Certification Forms.
      b. Require each installer to certify compliance and submit product data showing product content.
   2. Specific Product Categories: Comply with limitations specified elsewhere.

J. Paints and Coatings:
   1. Definition: This provision applies to paints and coatings used anywhere on the interior of the building inside the weatherproofing system and applied on-site.
   2. Architectural paints, coatings and primers applied to interior walls and ceilings: Do not exceed the VOC content limits established in Green Seal Standard GS-11.
   3. Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates: Do not exceed VOC content limit of 250 g/L established in Green Seal Standard GC-03.
   4. Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements: Do not exceed the VOC content limits established in SCAQMD Rule 1113.
      a. These provisions are applicable to LEED Credit EQ 4.2; submit LEED Prohibited Content Installer Certification Forms.
      b. Require each installer to certify compliance and submit product data showing product content.
   5. Specific Product Categories: Comply with limitations specified elsewhere.

K. Flooring:
   1. Resilient flooring in the building interior must be certified as compliant with the FloorScore standard by an independent third-party.
   2. Concrete floor finishes such as sealer, stain and finish must meet the requirements of SCAQMD Rule 1113.
   3. Tile setting adhesives and grout must meet the requirements of SCAQMD Rule 1168.
      a. These provisions are applicable to LEED Credit EQ 4.3; submit LEED Prohibited Content Installer Certification Forms.
      b. Require each installer to certify compliance and submit product data showing product content.
   4. Specific Product Categories: Comply with limitations specified elsewhere.

L. Provide interchangeable components of the same manufacture for components being replaced.

M. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.

N. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.03 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver and place in location as directed; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Section 00404 specifies time restrictions for submitting requests for substitutions during the bidding period.
   1. **AFTER THE CONTRACT IS AWARDED, NO FURTHER SUBSTITUTIONS WILL BE PERMITTED.**

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

D. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Government.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:
   1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   3. The Contracting Officer's Authorized Representative will notify Contractor in writing of decision to accept or reject request.

3.02 OWNER-SUPPLIED PRODUCTS

A. See Section 01010 - Summary of the Work for identification of AAFES-supplied products.

B. Government's Responsibilities:
   1. Arrange for and deliver AAFES reviewed shop drawings, product data, and samples, to Contractor.
   2. Arrange and pay for product delivery to site.
   3. On delivery, inspect products jointly with Contractor.
   4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   5. Arrange for manufacturers' warranties, inspections, and service.

C. Contractor's Responsibilities:
   1. Review AAFES reviewed shop drawings, product data, and samples.
   2. Receive and unload products at site; inspect for completeness or damage jointly with Government.
   3. Handle, store, install and finish products.
   4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

H. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01710

CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related Requirements Specified Elsewhere:
   1. Additional General Provisions.
   2. Summary of the Work: Section 01010.
   3. Cutting and Patching: Section 01045.
   4. Field Offices and Storage Sheds: Section 01590.
   5. Cleaning for Specific Products of Work: Specification Section for that work.

B. Maintain premises and public properties free from accumulation of waste, debris, and rubbish caused by operations.

C. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.

1.02 SAFETY REQUIREMENTS

A. Hazards Control:
   1. Store volatile wastes in covered metal containers and remove from premises daily.
   2. Prevent accumulation of wastes which create hazardous conditions.
   3. Provide adequate ventilation during use of volatile or noxious substances.

B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
   1. Do not burn or bury rubbish and waste material on project site.
   2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
   3. Do not dispose of wastes into streams or waterways.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

A. Execute cleaning to ensure that building, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.

B. Wet down dry materials and rubbish to lay dust and prevent blowing dust. Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

C. Remove waste materials, debris, and rubbish from site and legally dispose of at public or private dumping areas off of Government property.

D. Vacuum clean interior building areas when ready to receive finish painting.

E. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

F. Schedule cleaning operations so that dust and other contaminants resulting from cleaning

process will not fall on wet, newly painted surfaces.

3.02 FINAL CLEANING

A. Employ experienced workmen or professional cleaners for final cleaning.

B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces and of concealed surfaces.

C. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine finish.

D. Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.

E. Broom clean paved surfaces; rake clean other surfaces of grounds.

F. Replace air conditioning filters if units were operated during construction.

G. Clean ducts, blowers and coils, if air conditioning units were operated without filters during construction.

H. Maintain cleaning until project, or portion thereof, is occupied by AAFES.

I. Clean out thoroughly all new waste lines to points of connection with main sewers by rodding and power flushing.

END OF SECTION

SECTION 01720

PROJECT RECORD AND CLOSEOUT DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Submittals: Section 01300.

1.02 MAINTENANCE OF DOCUMENTS

A. Maintain at job site, one copy of:
   1. Contract Drawings.
   2. Specifications.
   3. Addenda.
   4. Reviewed Shop Drawings.
   5. Change Orders.
   6. Other Modifications to Contract.
   7. Field Test Records.

B. Store documents in field office apart from documents used for construction.

C. Provide files and racks for storage of documents.

D. File documents in accordance with Project Filing Format of Uniform Construction Index.

E. Maintain documents in clean, dry legible condition.

F. Do not use record documents for construction purposes.

G. Make documents available at all times for inspection by the Contracting Officer.

1.03 MARKING DEVICES

A. Provide red colored pencils for all markings.

1.04 RECORDING

A. Label each document "PROJECT RECORD" in 2-inch high printed letters.

B. Keep record documents current.

C. Do not permanently conceal any work until required information has been recorded.

D. Contract Drawings: Legibly mark to record actual construction.
   1. Depths of various elements of foundation in relation to first floor level.
   2. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
   3. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
   4. Field changes of dimension and detail.
   5. Changes made by Change Order or Field Order.
   6. Details not on original contract drawings.

E. Specification and Addenda: Legibly mark each Section to record:
   1. Changes made by Change Order or Field Order.
   2. Other matters not originally specified.

1.05 SUBMITTAL

A. At the final inspection of the project, deliver record documents to the Contracting Officer.

B. Accompany submittal with transmittal letter, in duplicate, containing:
   1. Date.

2. Project title and number.
3. General contractor's (GC) name and address.
4. Title and number of each record document.
5. Certification that each document as submitted is complete and accurate.
6. Signature of GC, or his authorized representative.

1.06 PROJECT CLOSEOUT

A. Final Inspection, Record Drawings:

B. Maintenance Manual:
1. The GC shall provide operation and maintenance manuals to be used for training, operation, and maintenance of each piece of operating equipment. All material shall be clearly identified, including its location on the project. Sheets shall be 8-1/2 inches x 11 inches, except pull-out sheets may be neatly folded to 8-1/2 inches x 11 inches. Manuals shall be properly indexed, bound in plastic covered, 3-ring, loose-leaf binder with title of project lettered on front and hinge back, and shall contain:
   a. Name, address and trade of all subcontractors.
   b. Complete maintenance instructions; name, address and number of installing GC, manufacturer's local representative, for each piece of operative equipment.
   c. Narrative consisting of instructions for equipment and systems to include:
      1) Description of system and intent.
      2) Start-up procedures.
      3) Emergency procedures.
      4) Shut-down procedures.
      5) Maintenance instructions.
      6) Training attendance rosters.
      7) Warranties.
      8) Valve chart.
   d. Catalogue data on plumbing fixtures, valves, water heaters, heating and cooling equipment, temperature control, fan, electrical panels, service entrance equipment and light fixtures.
   e. Instruction for use in training and operation and maintenance of each item of operating equipment.
   f. Manufacturer's name, type, color designation for ceramic tile, resilient floors, windows, doors, brick, concrete block, paint, roofing and other materials.
2. Submit six copies of all Maintenance Manuals and all other close-out materials, prior to request for substantial completion inspection. These items shall be organized in 3-ring binders.
3. Operation and Maintenance Instructions: The GC shall provide at his own expense competent manufacturer's representatives to completely check out all mechanical and electrical systems and items covered by the drawings and specifications. This requirement shall be scheduled just prior to and during the initial start-up and before requesting the final inspection. After all systems are functioning properly, the representatives shall instruct maintenance personnel of the Installation and the Exchange in the proper operation and maintenance of each item. In addition to instructions given at the project, the Installation personnel shall be given a one-day classroom instruction course on operation and maintenance of the systems. A roster of those attending with name, organization and telephone number shall be furnished.
4. Posted Operating Instructions: All major items of mechanical equipment shall have posted in a convenient and appropriate location operating instructions consisting of typewritten description of system operation, including necessary diagrams keyed to valve and piping identification systems.
5. Preparation of DD Form 1354, "Transfer and Acceptance of Military Real Property." At the conclusion of the project, the GC will compile and furnish to the Contracting Officer all costs and quantity data of materials and systems furnished and installed. A list of items for which the costs and quantity data is required will be furnished to the GC. Such information

will be returned to the Contracting Officer within 10 days from the receipt of the list. It is suggested that this information be provided and updated as the work progresses.

6. Record Drawings: Upon completion of the work, one print of each of the drawings accompanying this specification shall be neatly and clearly marked in red pencil to show variations between the construction actually provided and that indicated or specified in the Contract Documents, and delivered to the Architect/Engineer (A/E). Where a choice of materials and/or methods is permitted or where variations in the scope or character of the work are permitted, drawings shall define the construction actually provided. The representation of such variations shall conform to standard drafting practice and shall include supplementary notes, legends and details which may be necessary for legibility and clear portrayal of the as-built construction. The record drawings shall indicate, in addition, the actual location of all sub-surface utility lines, average depth below the surface and other appurtenances.
7. No Asbestos Statement: Upon completion of the work, the GC and all of his sub-contractors shall provide a written statement that no asbestos-containing material/product was used in the building construction.
8. No Lead Paint Statement: Upon completion of the work, the GC and his painting sub-contractor shall provide a written statement that no paint containing lead was used in the building construction.

C. All project closeout documents not previously submitted will be given to the Contracting Officer at the Beneficial Occupancy Date inspection.

D. Contractor shall provide all information required for filling out Form 1354 (Real Property) as instructed by the Contracting Officer. Copies of this form are available from the Contracting Officer.

END OF SECTION

SECTION 01732

WASTE MANAGEMENT

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Government requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. LEED Certification for this project is dependent on diversion of 75 percent, by weight, of potential landfill trash/waste by recycling and/or salvage (LEED Credits MR 2.1 and 2.2).

E. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.

F. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.

G. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

H. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

A. Section 01300 - Submittals: Additional submittal requirements.

B. Section 01355 - LEED Certification Procedures: LEED credits relating to construction waste management.

C. Section 01420 - Environmental Protection: Additional requirements for waste disposal.

D. Section 01500 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

E. Section 01600 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. LEED Submittals: Submit Landfill Alternatives Proposal, Waste Management Plan, and Waste Disposal Reports in accordance with procedures specified in Section 01355.

C. Submit Waste Management Plan within 10 calendar days after receipt of Notice to Proceed, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.

D. Waste Management Plan: Include the following information:
   1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
   2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
   3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
      a. List each material proposed to be salvaged, reused, or recycled.
      b. List the local market for each material.
      c. State the estimated net cost, versus landfill disposal.
   4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.

5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
7. Recycling Incentives: Describe procedures required to obtain credits, rebates, or similar incentives.

E. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
2. Submit Report on a form acceptable to Government.
3. Landfill Disposal: Include the following information:
   a. Identification of material.
   b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
   c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
4. Incinerator Disposal: Include the following information:
   a. Identification of material.
   b. Amount, in tons or cubic yards, of trash/waste material from the project delivered to incinerators.
   c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
5. Recycled and Salvaged Materials: Include the following information for each:
   a. Identification of material, including those retrieved by installer for use on other projects.
   b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
   c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
   e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
6. Material Reused on Project: Include the following information for each:
   a. Identification of material and how it was used in the project.
   b. Amount, in tons or cubic yards.
   c. Include weight tickets as evidence of quantity.
7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

F. Recycling Incentive Programs:
1. Where revenue accrues to Contractor, submit copies of documentation required to qualify for incentive.
2. Where revenue accrues to Government, submit any additional documentation required by Government in addition to information provided in periodic Waste Disposal Report.

PART 2 PRODUCTS

2.01 PRODUCT SUBSTITUTIONS

A. See Section 01600 - Product Requirements, for substitution submission procedures.

B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01600:
   1. Relative amount of waste produced, compared to specified product.
   2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Sum.
   3. Proposed disposal method for waste product.
   4. Markets for recycled waste product.

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01300 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. See Section 01420 for general pollution prevention and waste disposal procedures.

C. See Section 01500 for additional requirements related to trash/waste collection and removal facilities and services.

D. See Section 01600 for waste prevention requirements related to delivery, storage, and handling.

3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Government, and Contracting Officer's Authorized Representative.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Pre-bid meeting.
   2. Pre-construction meeting.
   3. Regular job-site meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. As a minimum, provide:
      a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
      b. Separate dumpsters for each category of recyclable.
      c. Recycling bins at worker lunch area.
   2. Provide containers as required.
   3. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
   4. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
   5. Locate enclosures out of the way of construction traffic.
   6. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   7. If an enclosed area is not provided, clearly lay out and label a specific area on-site.

8. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01734

INDOOR AIR QUALITY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Construction procedures to promote adequate indoor air quality after construction.

B. Testing indoor air quality after completion of construction.

1.02 PROJECT GOALS

A. See Section 01355 - LEED Certification Procedures, for overall project goals relating to environment and energy.

B. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.
   1. Cleaning of ductwork is not contemplated under this Contract.
   2. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.

C. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
   1. Furnish products meeting the specifications.
   2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

D. Ventilation: HVAC system has been designed to achieve the minimum requirements for ventilation specified in ASHRAE 62.1.

1.03 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to indoor air quality.

B. Section 01400 - Quality Requirements: Testing and inspection services.

1.04 REFERENCE STANDARDS

A. ASHRAE Std 62.1 - Ventilation For Acceptable Indoor Air Quality; 2010.

B. ASHRAE Std 129 - Measuring Air-Change Effectiveness; 1997 (Reaffirmed 2002).

C. SMACNA (OCC) - IAQ Guideline for Occupied Buildings Under Construction; 2007.

1.05 DEFINITIONS

A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.

B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.

C. Particulates: Dust, dirt, and other airborne solid matter.

D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

1.06 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. LEED Submittals: Submit all submittals required in this section in accordance with procedures specified in Section 01355.

C. Indoor Air Quality Management Plan: Describe in detail measures to be taken to promote adequate indoor air quality upon completion; use SMACNA IAQ Guidelines for Occupied Buildings Under Construction as a guide.
   1. Submit not less than 60 days before enclosure of building.
   2. Identify potential sources of odor and dust.
   3. Identify construction activities likely to produce odor or dust.
   4. Identify areas of project potentially affected, especially occupied areas.
   5. Evaluate potential problems by severity and describe methods of control.
   6. Describe construction ventilation to be provided, including type and duration of ventilation, use of permanent HVAC systems, types of filters and schedule for replacement of filters.
   7. Describe cleaning and dust control procedures.
   8. Describe coordination with commissioning procedures.

D. Interior Finishes Installation Schedule: Identify each interior finish that either generates odors, moisture, or vapors or is susceptible to adsorption of odors and vapors, and indicate air handling zone, sequence of application, and curing times.

E. Duct and Terminal Unit Inspection Report.

F. Air Contaminant Test Plan: Identify:
   1. Testing agency qualifications.
   2. Locations and scheduling of air sampling.
   3. Test procedures, in detail.
   4. Test instruments and apparatus.
   5. Sampling methods.

G. Air Contaminant Test Reports: Show:
   1. Location where each sample was taken, and time.
   2. Test values for each air sample; average the values of each set of 3.
   3. HVAC operating conditions.
   4. Certification of test equipment calibration.
   5. Other conditions or discrepancies that might have influenced results.

H. Ventilation Effectiveness Test Plan: Identify:
   1. Testing agency qualifications.
   2. Description of test spaces, including locations of air sampling.
   3. Test procedures, in detail; state whether tracer gas decay or step-up will be used.
   4. Test instruments and apparatus; identify tracer gas to be used.
   5. Sampling methods.

I. Ventilation Effectiveness Test Reports: Show:
   1. Include preliminary tests of instruments and apparatus and of test spaces.
   2. Calculation of ventilation effectiveness, E.
   3. Location where each sample was taken, and time.
   4. Test values for each air sample.
   5. HVAC operating conditions.
   6. Other information specified in ASHRAE 129.
   7. Other conditions or discrepancies that might have influenced results.

1.07 QUALITY ASSURANCE

A. Testing and Inspection Agency Qualifications: Independent testing agency having minimum of 5 years experience in performing the types of testing specified.

PART 2 PRODUCTS

2.01 MATERIALS

A. Low VOC Materials: See other sections for specific requirements for materials with low VOC content.

PART 3 EXECUTION

3.01 CONSTRUCTION PROCEDURES

A. Prevent the absorption of moisture and humidity by adsorptive materials by:
   1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
   2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
   3. Provide sufficient ventilation for drying within reasonable time frame.

B. Begin construction ventilation when building is substantially enclosed.

C. HVAC equipment and ductwork may NOT be used for ventilation during construction:
   1. Provide temporary ventilation equivalent to 1.5 air changes per hour, minimum.
   2. Exhaust directly to outside.
   3. Seal HVAC air inlets and outlets immediately after duct installation.

D. Do not store construction materials or waste in mechanical or electrical rooms.

E. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
   1. Inspect duct intakes, return air grilles, and terminal units for dust.
   2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.
   3. Clean tops of doors and frames.
   4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
   5. Clean return plenums of air handling units.
   6. Remove intake filters last, after cleaning is complete.

F. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.

G. Use other relevant recommendations of SMACNA IAQ Guideline for Occupied Buildings Under Construction for avoiding unnecessary contamination due to construction procedures.

3.02 AIR CONTAMINANT TESTING

A. Contractor's Option: Either full continuous flush-out OR satisfactory air contaminant testing is required, not both.

B. Perform air contaminant testing before occupancy.

C. Do not start air contaminant testing until:
   1. All construction is complete, including interior finishes.
   2. HVAC systems have been tested, adjusted, and balanced for proper operation.
   3. New HVAC filtration media have been installed.

D. Indoor Air Samples: Collect from spaces representative of occupied areas:
   1. Collect samples while operable windows and exterior doors are closed, HVAC system is running normally as if occupied, with design minimum outdoor air, but with the building unoccupied.
   2. Collect samples from spaces in each contiguous floor area in each air handler zone, but not less than one sample per 25,000 square feet; take samples from areas having the least ventilation and those having the greatest presumed source strength.
   3. Collect samples from height from 36 inches to 72 inches above floor.
   4. Collect samples from same locations on 3 consecutive days during normal business hours; average the results of each set of 3 samples.

5. Exception: Areas with normal very high outside air ventilation rates, such as laboratories, do not need to be tested.
6. When retesting the same building areas, take samples from at least the same locations as in first test.

E. Outdoor Air Samples: Collect samples at outside air intake of each air handler at the same time as indoor samples are taken.

F. Analyze air samples and submit report.

G. Air Contaminant Concentration Determination and Limits:
1. Carbon Monoxide: Not more than 9 parts per million and not more than 2 parts per million higher than outdoor air.
2. Airborne Mold and Mildew: Measure in relation to outside air; not higher than outside air.
3. Formaldehyde: Not more than 50 parts per billion.
4. Total Volatile Organic Compounds (TVOC): Not more than 500 micrograms per cubic meter.
5. 4-Phenylcyclohexene (4-PCH): Not more than 6.5 micrograms per cubic meter.
6. Particulates (PM10): Not more than 50 micrograms per cubic meter.
7. Regulated Pollutants: Measure in relation to outside air; not more than contained in outside air.

H. If air samples show concentrations higher than those specified, ventilate with 100 percent outside air and retest at no cost to Owner.

END OF SECTION

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 01300 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Section 01700 - Execution Requirements: Contract closeout procedures.

C. Individual Product Sections: Specific requirements for operation and maintenance data.

D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit two sets of documents to Contracting Officer's Authorized Representative with claim for final Application for Payment.

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Contracting Officer's Authorized Representative will review draft and return one copy with comments.
   2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Contracting Officer's Authorized Representative comments. Revise content of all document sets as required prior to final submission.
   3. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Government's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Government.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests.
   4. Complete nomenclature and model number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

C. Include color coded wiring diagrams as installed.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.

L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

N. Include test and balancing reports.

O. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

B. Prepare data in the form of an instructional manual.

C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

I. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Contracting Officer's Authorized Representative, Contractor, Subcontractors, and major equipment

suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Photocopies of warranties and bonds.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Government's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include photocopies of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION

SECTION 01810

COMMISSIONING

PART 1 GENERAL

1.01 SUMMARY

A. Commissioning is intended to achieve the following specific objectives; this section specifies the Contractor's responsibilities for commissioning:
   1. Verify that the work is installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Pre-functional Checklists executed by Contractor are utilized to achieve this.
   2. Verify and document that functional performance is in accordance with the Contract Documents: Functional Tests executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
   3. Verify that operation and maintenance manuals submitted to AAFES are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve this.
   4. Verify that the Government's operating personnel are adequately trained: Formal training conducted by Contractor is utilized to achieve this.

B. Commissioning, including Functional Tests, O&M documentation review, and training, is to occur after startup and initial checkout and be completed before Substantial Completion

C. The Commissioning Authority directs and coordinates all commissioning activities; this section describes some but not all of the Commissioning Authority's responsibilities.

D. The Commissioning Authority is employed by AAFES.

1.02 SCOPE OF COMMISSIONING

A. The following are to be commissioned:

B. Plumbing Systems:
   1. Water heaters.
   2. Booster pumps.

C. HVAC System, including:
   1. Major and minor equipment items.
   2. Piping systems and equipment.
   3. Ductwork and accessories.
   4. Terminal units.
   5. Control system.
   6. Sound control devices.
   7. Vibration control devices.
   8. Variable frequency drives.

D. Special Ventilation:
   1. Specialty fans.

E. Electrical Systems:
   1. Power quality.
   2. Emergency power systems.
   3. Uninterruptible power systems.
   4. Lighting controls other than manual switches.

F. Electronic Safety and Security:
   1. Security system, including doors and hardware.
   2. Fire and smoke alarms.

G. Communications:
   1. Voice and data systems.
   2. Public address/paging.

H. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

I. Indoor Air Quality Procedures: The Commissioning Authority will coordinate; Contractor will execute; see Section 01734.

1.03 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to commissioning.

B. Section 01720 - Project Record and Closeout Documents: Scope and procedures for operation and maintenance manuals and project record documents.

C. Section 01734 - Indoor Air Quality: Precautions and procedures, ventilation and air quality testing during construction.

D. Section 01820 - Demonstration and Training: Scope and procedures for Government personnel training.

1.04 REFERENCE STANDARDS

A. PECI (Samples) - Sample Forms for Prefunctional Checklists and Functional Performance Tests; Portland Energy Conservation, Inc.; located at http://www.peci.org/library/mcpgs.htm; current edition.

1.05 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures; except:
   1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority, unless they require review by Contracting Officer's Authorized Representative; in that case, submit to Contracting Officer's Authorized Representative first.
   2. Submit one copy to the Commissioning Authority, not to be returned.
   3. Make commissioning submittals on time schedule specified by Commissioning Authority.
   4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of Prefunctional Checklists or Functional Test requirements; submit in editable electronic format, Microsoft Word 2003 preferred.
   5. As soon as possible after submittals made to Contracting Officer's Authorized Representative are approved, submit copy of approved submittal to the Commissioning Authority.
   6. LEED Submittals: Submit approved submittals in accordance with procedures specified in Section 01355.

B. Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.

C. Product Data: If submittals to Contracting Officer's Authorized Representative do not include the following, submit copies as soon as possible:
   1. Manufacturer's product data, cut sheets, and shop drawings.
   2. Manufacturer's installation instructions.
   3. Startup, operating, and troubleshooting procedures.
   4. Fan and pump curves.
   5. Factory test reports.
   6. Warranty information, including details of AAFES's responsibilities in regard to keeping warranties in force.

D. Startup Plans and Reports.

E. Completed Prefunctional Checklists.

F. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of Government.

B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:
   1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5 degree F and resolution of plus/minus 0.1 degree F.
   2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.
   3. Calibration: According to the manufacturer's recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.

C. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Government; such equipment, tools, and instruments are to become the property of Government.

D. Dataloggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.
   1. Dataloggers required to for Functional Tests will be provided by the Commissioning Authority and will not become the property of Government.

PART 3 EXECUTION

3.01 COMMISSIONING PLAN

A. Commissioning Authority will prepare the Commissioning Plan.
   1. Attend meetings called by the Commissioning Authority for purposes of completing the commissioning plan.
   2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives.

B. Contractor is responsible for compliance with the Commissioning Plan.

C. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.

D. Commissioning Schedule:
   1. Submit anticipated dates of startup of each item of equipment and system to Commissioning Authority within 60 days after award of Contract.
   2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.

3. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
4. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.02 DOCUMENTATION IDENTIFICATION SYSTEM

A. Give each submitted form or report a unique identification; use the following scheme.

B. Type of Document: Use the following prefixes:
1. Startup Plan: SP-.
2. Startup Report: SR-.
3. Prefunctional Checklist: PC-.
4. Functional Test Procedure: FTP-.
5. Functional Test Report: FTR-.

C. System Type: Use the first 4 digits from CSI/CSC MasterFormat, 1995 Edition, that are applicable to the system.

D. Component Number: Assign numbers sequentially, using 1, 2, or 3 digits as required to accommodate the number of units in the system.

E. Test, Revision, or Submittal Number: Number each successive iteration sequentially, starting with 1.

3.03 STARTUP PLANS AND REPORTS

A. Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.

B. Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed and dated by responsible entity.

C. Submit directly to the Commissioning Authority.

3.04 PREFUNCTIONAL CHECKLISTS

A. A Prefunctional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.
1. No sampling of identical or near-identical items is allowed.
2. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.
3. Prefunctional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist forms:
   a. Certification by installing contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.
   b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
   c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."
   d. Serial number of installed unit.
   e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer’s start-up checklist items and minor testing.
   f. Sensor and actuator calibration information.

4. Samples of Prefunctional Checklist forms that indicate anticipated level of detail can be found at http://www.peci.org/library/mcpgs.htm.

B. Contractor is responsible for filling out Prefunctional Checklists, after completion of installation and before startup; witnessing by the Commissioning Authority is not required unless otherwise specified.
   1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness; checklists are not complete until all line items are initialed and dated complete without deficiencies.
   2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; re-submission of the Checklist is required upon completion of remaining items.
   3. Individual Checklists may contain line items that are the responsibility of more than one installer; Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.
   4. If any Checklist line item is not relevant, record reasons on the form.
   5. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
   6. Submit completed Checklists to Commissioning Authority within two days of completion.

C. Commissioning Authority is responsible for furnishing the Prefunctional Checklists to Contractor.
   1. Initial Drafts: Contractor is responsible for initial draft of Prefunctional Checklist where so indicated in the Contract Documents.
   2. Provide all additional information requested by Commissioning Authority to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
   3. Commissioning Authority may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in the Contract Documents or not.
   4. When asked to review the proposed Checklists, do so in a timely manner.

D. Commissioning Authority Witnessing: Required for:
   1. Each piece of primary equipment, unless sampling of multiple similar units is allowed by the commissioning plan.
   2. A sampling of non-primary equipment, as allowed by the commissioning plan.

E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Government.
   1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.

3.05 FUNCTIONAL TESTS

A. A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.

B. Contractor is responsible for execution of required Functional Tests, after completion of Prefunctional Checklist and before closeout.

C. Commissioning Authority is responsible for witnessing and reporting results of Functional Tests, including preparation and completion of forms for that purpose.

D. Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Government; if a deficiency is not corrected and re-tested immediately, the Commissioning Authority will document the deficiency and the Contractor's stated intentions regarding correction.

1. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents or does not perform properly.

2. When the deficiency has been corrected, the Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Commissioning Authority; the Commissioning Authority will reschedule the test and the Contractor shall re-test.
3. Identical or Near-Identical Items: If 10 percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will be considered defective; provide a proposal for correction within 2 weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.
4. Contractor shall bear the cost of AAFES and Commissioning Authority personnel time witnessing re-testing.
5. Contractor shall bear the cost of AAFES and Commissioning Authority personnel time witnessing re-testing if the test failed due to failure to execute the relevant Prefunctional Checklist correctly; if the test failed for reasons that would not have been identified in the Prefunctional Checklist process, Contractor shall bear the cost of the second and subsequent re-tests.

E. Functional Test Procedures:
1. Some test procedures are included in the Contract Documents; where Functional Test procedures are not included in the Contract Documents, test procedures will be determined by the Commissioning Authority with input by and coordination with Contractor.
2. Examples of Functional Testing:
   a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
   b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
   c. Systems are run through all the HVAC control system’s sequences of operation and components are verified to be responding as the sequence's state.
   d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Authority is Functional Testing.
3. Samples of Functional Test forms that indicate anticipated level of detail can be found at http://www.peci.org/library/mcpgs.htm.

F. Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions; performance of these tests remains the Contractor's responsibility regardless of timing.

G. Factory Tests: Commissioning Authority and Contractor are responsible for coordinating testing of equipment at the factory by factory personnel, to ensure compliance with commissioning requirements.

3.06 SENSOR AND ACTUATOR CALIBRATION

A. Calibrate all field-installed temperature, relative humidity, carbon monoxide, carbon dioxide, and pressure sensors and gages, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.

B. Calibrate using the methods described below; alternate methods may be used, if approved by Government beforehand. See PART 2 for test instrument requirements. Record methods used on the relevant Prefunctional Checklist or other suitable forms, documenting initial, intermediate and final results.

C. All Sensors:
   1. Verify that sensor location is appropriate and away from potential causes of erratic operation.
   2. Verify that sensors with shielded cable are grounded only at one end.
   3. For sensor pairs that are used to determine a temperature or pressure difference, for temperature make sure they are reading within 0.2 degree F of each other, and for pressure, within tolerance equal to 2 percent of the reading, of each other.
   4. Tolerances for critical applications may be tighter.

D. Sensors Without Transmitters - Standard Application:
   1. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
   2. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.
   3. If not, install offset, calibrate or replace sensor.

E. Sensors With Transmitters - Standard Application.
   1. Disconnect sensor.
   2. Connect a signal generator in place of sensor.
   3. Connect ammeter in series between transmitter and building automation system control panel.
   4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
   5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
   6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
   7. Record all values and recalibrate controller as necessary to conform with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction.
   8. Reconnect sensor.
   9. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
   10. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.
   11. If not, replace sensor and repeat.
   12. For pressure sensors, perform a similar process with a suitable signal generator.

F. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:
   1. Watthour, Voltage, Amperage: 1 percent of design.
   2. Pressure, Air, Water, Gas: 3 percent of design.
   3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.4 degrees F.
   4. Relative Humidity: 4 percent of design.
   5. Barometric Pressure: 0.1 inch of Hg.
   6. Barometric Pressure: 0.1 inch of Hg.
   7. Flow Rate, Air: 10 percent of design.
   8. Flow Rate, Water: 4 percent of design.
   9. AHU Wet Bulb and Dew Point: 2.0 degrees F.
   10. Hot Water Coil and Boiler Water Temperature: 1.5 degrees F.
   11. Cooling Coil, Chilled and Condenser Water Temperatures: 0.4 degrees F.
   12. Combustion Flue Temperature: 5.0 degrees F.
   13. Oxygen and CO2 Monitors: 0.1 percentage points.
   14. CO Monitor: 0.01 percentage points.
   15. Natural Gas and Oil Flow Rate: 1 percent of design.

G. Critical Applications: For some applications more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.

H. Valve/Damper Stroke Setup and Check:
   1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
   2. Set pump/fan to normal operating mode.
   3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
   4. Command valve/damper to open; verify position is full open and adjust output signal as required.
   5. Command valve/damper to a few intermediate positions.
   6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).

I. Isolation Valve or System Valve Leak Check: For valves not associated with coils.
   1. With full pressure in the system, command valve closed.
   2. Use an ultra-sonic flow meter to detect flow or leakage.

3.07 TEST PROCEDURES - GENERAL

A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.

B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.

C. Sampling: Where Functional Testing of fewer than the total number of multiple identical or near-identical items is explicitly permitted, perform sampling as follows:
   1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
   2. Sampling is not allowed for:
      a. Major equipment.
      b. Life-safety-critical equipment.
      c. Prefunctional Checklist execution.
   3. XX = the percent of the group of identical equipment to be included in each sample; defined for specific type of equipment.
   4. YY = the percent of the sample that if failed will require another sample to be tested; defined for specific type of equipment.
   5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the "first sample."
   6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
   7. If YY percent of the units in the second sample fail, test all remaining identical units.
   8. If frequent failures occur, resulting in more troubleshooting than testing, the Commissioning Authority may stop the testing and require Contractor to perform and document a checkout of the remaining units prior to continuing testing.

D. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the “observation”).

E. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example apply hot air to a space sensor using a hair dryer to see the response in a VAV box.

F. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.

G. Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.

H. Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.

I. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems; where monitoring of specific points is called for in Functional Test Procedures:
   1. All points that are monitored by the relevant control system shall be trended by Contractor; at the Commissioning Authority's request, Contractor shall trend up to 20 percent more points than specified at no extra charge.
   2. Other points will be monitored by the Commissioning Authority using dataloggers.
   3. At the option of the Commissioning Authority, some control system monitoring may be replaced with datalogger monitoring.
   4. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.
   5. Graphical output is desirable and is required for all output if the system can produce it.
   6. Monitoring may be used to augment manual testing.

3.08 OPERATION AND MAINTENANCE MANUALS

A. See Section 01720 for additional requirements.

B. Add design intent documentation furnished by Contracting Officer's Authorized Representative to manuals prior to submission to AAFES.

C. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.

D. Commissioning Authority will add commissioning records to manuals after submission to Government.

END OF SECTION

SECTION 01820

DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Demonstration of products and systems to be commissioned and where indicated in specific specification sections.

B. Training of Government personnel in care, cleaning, maintenance, and repair is required for:
   1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
   2. Finishes, including flooring, wall finishes, ceiling finishes.
   3. Fixtures and fittings.
   4. Items specified in individual product Sections.

1.02 RELATED REQUIREMENTS

A. Section 01720 - Project Record and Closeout Documents: Operation and maintenance manuals.

B. Section 01810 - Commissioning: Additional requirements applicable to demonstration and training.

C. Other Specification Sections: Additional requirements for demonstration and training.

1.03 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures; except:
   1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority.
   2. Submit one copy to the Commissioning Authority, not to be returned.
   3. Make commissioning submittals on time schedule specified by Commissioning Authority.
   4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of overall Training Plan; submit in editable electronic format, Microsoft Word 2003 preferred.

B. Draft Training Plans: Government will designate personnel to be trained; tailor training to needs and skill-level of attendees.
   1. Submit to Contracting Officer's Authorized Representative for transmittal to Government.
   2. Submit to Commissioning Authority for review and inclusion in overall training plan.
   3. Submit not less than four weeks prior to start of training.
   4. Revise and resubmit until acceptable.
   5. Provide an overall schedule showing all training sessions.
   6. Include at least the following for each training session:
      a. Identification, date, time, and duration.
      b. Description of products and/or systems to be covered.
      c. Name of firm and person conducting training; include qualifications.
      d. Intended audience, such as job description.
      e. Objectives of training and suggested methods of ensuring adequate training.
      f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
      g. Media to be used, such a slides, hand-outs, etc.
      h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.

C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
   1. Include applicable portion of O&M manuals.

2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
3. Provide one extra copy of each training manual to be included with operation and maintenance data.

D. Training Reports:
1. Identification of each training session, date, time, and duration.
2. Sign-in sheet showing names and job titles of attendees.
3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.
4. Include Commissioning Authority's formal acceptance of training session.

E. Video Recordings: Submit digital video recording of each demonstration and training session for Government's subsequent use.
1. Format: DVD Disc.
2. Label each disc and container with session identification and date.

F. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.04 QUALITY ASSURANCE

A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Government.

B. Demonstrations conducted during Functional Testing need not be repeated unless Government personnel training is specified.

C. Demonstration may be combined with Government personnel training if applicable.

D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
1. Perform demonstrations not less than two weeks prior to Substantial Completion.
2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
1. Perform demonstrations not less than two weeks prior to Substantial Completion.

3.02 TRAINING - GENERAL

A. Commissioning Authority will prepare the Training Plan based on draft plans submitted.

B. Conduct training on-site unless otherwise indicated.

C. Government will provide classroom and seating at no cost to Contractor.

D. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Authority.

E. Provide training in minimum two hour segments.

F. The Commissioning Authority is responsible for determining that the training was satisfactorily completed and will provide approval forms.

G. Training schedule will be subject to availability of Government personnel to be trained; re-schedule training sessions as required by Government; once schedule has been approved by Government failure to conduct sessions according to schedule will be cause for Government to charge Contractor for personnel "show-up" time.

H. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
   1. The location of the O&M manuals and procedures for use and preservation; backup copies.
   2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
   3. Typical uses of the O&M manuals.

I. Product- and System-Specific Training:
   1. Review the applicable O&M manuals.
   2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
   3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
   4. Provide hands-on training on all operational modes possible and preventive maintenance.
   5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
   6. Discuss common troubleshooting problems and solutions.
   7. Discuss any peculiarities of equipment installation or operation.
   8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
   9. Review recommended tools and spare parts inventory suggestions of manufacturers.
   10. Review spare parts and tools required to be furnished by Contractor.
   11. Review spare parts suppliers and sources and procurement procedures.

J. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 02010

SPECIAL SITE CONDITIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. All work indicated, detailed and otherwise shown on the drawings and specifications shall be furnished and installed or be performed by the Contractor.

B. The contractor shall prevent dust and particulate matter from migrating offsite by watering the construction site as necessary.

1.02 OFF-SITE CONSTRUCTION

A. It shall be understood that all work occurring off-site and on adjacent highways, roads, streets, or right-of-ways is to be constructed in accordance with latest edition of Standard Specifications of the Florida Department of Transportation, Tyndall AFB, and Bay County. Also, this work shall be subject to their inspection, regulations, and acceptance.

B. All construction of highways or streets are to have appropriate signage and or barricades in accordance with traffic control manual and/or State Highway Department of Transportation requirements. Peak hour traffic is to be inconvenienced to an absolute minimum.

1.03 PROVIDED BY CONTRACTOR

A. General Contractor is to provide all engineering, surveying, stake-out to properly control work and shall make "As Built" drawings and other required drawings or reports. Contractor will provide certain testing services as provided hereinafter. Contractor is to furnish certification or testing that all materials meet or exceed requirements as specified by plans and specifications.

1.04 MAINTENANCE

A. Any note on plans or drawings shall supersede requirements of specifications if any conflict exists.

B. Notes on the Drawings: The Contractor is responsible for notes on the Drawings that call attention to particular requirements or conditions. The fact that these requirements or conditions are not called out in these specifications does not relieve the Contractor of responsibility for such requirements or conditions.

1.05 EXISTING TOPOGRAPHY & UTILITIES

A. It shall be the obligation of the Contractor to satisfy himself as to the accuracy of the topographic survey and existing utilities furnished on the grading plan by personal examination of the site and the existing conditions. If Contractor disagrees with topographic survey or the existing utility locations, he must notify the Contracting Officer in advance of bidding or it is taken that Contractor accepts topography and utilities.

END OF SECTION

SECTION 02050

DEMOLITION

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Demolition shall, unless otherwise noted on Drawings, include removal of existing objects or improvements, whether indicated on drawings or not, that would in any way prevent or interfere with progress or completion of proposed work.

B. Permits, fees, and licenses shall be secured and paid for by Contractor, including disposal charges as required to ensure progress of work will proceed.

C. Work shall comply with the latest edition of Tyndall AFB regulations and/or requirements of all governing authorities or utility owners in demolition of existing pavement, curbs and gutters, drainage structures, and utilities as may be required.

D. Demolition requires removal and disposal off-site in a legal manner of the following:
   1. Building structures as indicated on Drawings or as required by these Specifications.
   2. Entrance drive, parking structures, and adjacent landscape work to limits indicated on Drawings, or as required by Specifications.
   3. Building foundations and supporting walls to uniform depth of 12” below lowest foundation elevation.
   4. Remove existing above grade and below grade improvements necessary to permit construction and other work including existing utilities.
   5. Remove abandoned underground piping or conduit interfering with construction.

1.02 JOB CONDITIONS

A. Occupancy: Structures to be demolished will be vacated and discontinued in use prior to start of work. Hazardous materials, if any, be demolished shall be removed and/or mitigated prior to the beginning of demolition operations which are a part of this contract.

B. Condition of Structures:
   1. The Government assumes no responsibility for actual condition of structures to be demolished.
   2. Conditions existing at time of inspection for bidding purposes will be maintained by Government insofar as practicable. Variations within structures may occur by reason of the Government’s removal and salvage prior to start of demolition work.

C. Partial Removal:
   1. Items of salvageable value to Contractor may be removed from structure as work progresses. Salvaged items must be transported from site as they are removed.

   2. Storage or sale of removed items on site will not be permitted.

D. Protections:
   1. Ensure safe passage of persons around area of demolition. Conduct operations to prevent damage to adjacent buildings, structures, other facilities, and injury to persons.
   2. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structures to be demolished and adjacent facilities to remain.

E. Damages:
1. Promptly repair damages caused to adjacent facilities by demolition operations at no cost to AAFES or the Government.

F. Utility Services:
1. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
2. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities.
3. Before starting work on site, make arrangements for disconnection, rerouting, abandoning, or similar action as may be required relative to utilities and other underground piping, to permit work to proceed without delay. Arrangements shall be made in accordance with regulations of authorities of utilities concerned, including but not restricting any other services not mentioned, such as overhead and underground power and telephone lines, equipment, gas piping, storm sewers, sanitary sewers, or water piping.
4. Contractor is to exercise care around and over any existing utility and utility must remain in service until relocated. All service lines and existing utilities are to be removed or relocated if present location interferes with construction.
5. Contractor shall contact utility owners and obtain information as to location and condition of existing utilities and service lines. Existing septic tanks are to be removed by Contractor during construction in accordance with state and local codes.
6. All utilities shown are based upon information available. Contractor shall verify location of those shown and determine if others are present before disturbing. Contractor is responsible for any damage to existing utilities whether shown or not shown.

PART 2 PRODUCTS
Not applicable.

PART 3 EXECUTION

3.01 DEMOLITION

A. Pollution Controls
1. Use water sprinkling and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.
2. Do not use water when it may create hazardous or objectionable conditions, such as ice, flooding, and pollution.
3. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to start of work.

B. Below Grade Construction:
1. Demolish and remove from site below grade construction, concrete slabs on grade, on site utilities, wells, etc., if any.

C. Filling Voids:
1. Completely fill and compact below grade areas and voids resulting from demolition of improvements.
2. Use satisfactory soil materials consisting of stone, gravel, and sand, free from debris, trash, frozen materials, roots, and other organic matter.
3. Prior to placement of fill materials, ensure that areas to be filled are free of standing water, frost, frozen material, trash, and debris.
4. Place fill materials in horizontal layers not exceeding 8” in loose depth.

5. Compact each layer at optimum moisture content of fill material to density equal to original adjacent ground, unless subsequent excavation for new work is required.
6. After fill placement and compaction, grade surface to meet adjacent contours and to provide flow to surface drainage structures.

D. Provide temporary drainage as required to keep site in a dry condition. Keep top soil stripping to an absolute minimum. Dewater low areas prior to clearing, grubbing and stripping topsoil.

E. Scaffolding, Barricades, Shoring, etc.
1. Scaffolding, barricades, shoring, etc. as required shall be provided by the Contractor in compliance with all recognized safety rules and prevailing laws, codes or ordinances applicable thereto. All such scaffolding, barricades, shoring, etc., shall remain until construction has been completed. The Contractor, upon completion, shall remove any and all scaffolding, barricades, shoring, etc; and leave site clean from debris and make ready for other construction.

F. Protection
1. Existing walks, curbs, drives, other improvements on or near the site that are to remain, shall be properly protected from damage of any kind by the contractor during the entire construction operation. Improvements that are damaged shall be replaced to the satisfaction of the Architect or Engineer at Contractor's expense.
2. Provide all required fences, barricades, lights, walkways and other protection as may be required by the governing governmental agencies for protection of the public on or near the site.

3.02 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove from site construction debris, rubbish, and other materials resulting from demolition operations. Do not remove soils from project site.

B. No burning of any material, debris, or trash on site or off site will be allowed.

C. Removal: Transport materials removed from demolished improvements and dispose of off site in a legal manner at an approved dump/waste facility.

END OF SECTION

SECTION 02110

SITE CLEARING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Site clearing work includes, but is not limited to:
   1. Removal of trees and other vegetation.
   2. Topsoil stripping.
   3. Clearing and grubbing.
   4. Removing above grade-improvements.
   5. Removing below grade improvements.

B. Work shall comply with the latest requirements of Tyndall AFB and/or regulations and requirements of all governing authorities in clearing of said above items.

1.02 JOB CONDITIONS

A. Traffic:
   Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Improvements:
   1. Provide protection necessary to prevent damage to existing improvements indicated to remain in place.
   2. Protect improvements on adjoining properties and on owner's property.
   3. Restore damaged improvements to original condition as acceptable to parties having jurisdiction.

PART 2 PRODUCTS

2.01 MATERIALS

Topsoil: organic surface soil. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2” in diameter, and without weeds, roots and other objectionable material.

PART 3 EXECUTION

3.01 SITE CLEARING

A. Site clearing contractor shall meet with Base Representative prior to removing any trees and shrubs to verify all removals. No trees shall be removed within tree save areas indicated on drawings.

B. Remove trees, shrubs, grass, other vegetation, all organic material, improvements, or obstructions interfering with installation of new construction as indicated on plans by limits of grading, except where shown to remain.

C. Remove items elsewhere on site or premises as specifically indicated. Removal includes digging out stumps and roots.

D. Strip topsoil to whatever depths encountered to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping.

E. Stockpile topsoil in storage piles in areas shown or where directed. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent windblown dust.

F. Dispose of unsuitable or excess topsoil on site or at a designated location on the Installation.

G. Clearing and Grubbing:
   1. Clear site of trees, shrubs, and other vegetation.
   2. Completely remove stumps, roots, and other debris protruding through ground surface.
   3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
   4. Place fill material in horizontal layers not exceeding 6" loose depth, and thoroughly compact to density equal to adjacent original ground.

3.02 DISPOSAL OF WASTE MATERIALS

A. Burning on Government Property: Burning will not be permitted.

B. Removal from Government Property: Contractor shall remove waste materials and unsuitable material from Government property and dispose of off site in legal manner. Soil materials must be disposed of in accordance with requirements of Section 01420 Environmental Protection.

C. Burial of waste materials on-site will not be allowed.

D. At the Contracting Officer's discretion, excess topsoil shall be stored on-site or disposed of off site, but on the Installation, in a legal manner.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Work on this section includes grading (excavating) and filling as indicated on Drawings and the following:
   1. Installation of utilities or modification of existing utilities may require performing grading operations in stages, so that utilities may be installed and protected during site construction.
   2. Scarifying and compaction of previously graded sites to ensure proper preparation and acceptability.
   3. Excavation and embankment placement to required lines, grades, and elevations.
   4. Preparation of existing low areas for placing of fill, including disposal of muck, silt, wet, or unsuitable material.
   5. The presence of groundwater was consistently found in the geotechnical investigation at the site. Therefore, the Contractor shall be prepared to dewater the site and to implement a dewatering plan during construction. Dewatering design and implementation is a part of the Contractor's basic scope of work. No additional payment will be made for dewatering.
   6. If additional fill material is required the Contractor shall haul in additional suitable material as necessary to provide properly graded site lines and grades.
   7. If excess excavation is encountered and cannot be used to grade site in accordance with Drawings, remove excess material and dispose of material at locations as directed by the Contracting Officer.
   8. Remove materials from grading operations that are determined to be unsuitable by Government and dispose of on site at the locations shown on the plans.
   9. Preparation of embankments to receive fill and preparation of excavation areas.
   10. Removal of high plastic clays and replacement with suitable material within building pad.

B. Work shall comply with the latest edition of Tyndall AFB requirements and/or regulations and requirements of all governing authorities (FDEP, etc.) in earthwork and erosion control of said above items.

1.02 REFERENCE STANDARDS

A. Following most current publications from part of this specification to extent indicated by references thereto.

B. American Association of State Highway and Transportation Officials Standard Specifications (AASHTO): T88 Mechanical Analysis of Soils

C. American Society for Testing and Materials (ASTM):
   1. D 422 Method for Particle Size Analysis of Soil
   2. D 698 Test for Moisture-Density Relations of Soils, Using 5.5 lb. (2.5 Kg) Rammer and 12-inch (304.8mm) Drop (Standard Proctor)
   3. D 1556 Test for Density of Soil in Place by the Sand Cone Method
   4. D 1557 Test for Moisture-Density Relations of Soils Using 10-lb. (4.5 Kg) Rammer and 18-inch (457 mm) Drop (Modified Proctor)
   5. D 1559 Test Method for Resistance to Plastic Flow of Bituminous Mixtures using Marshall Apparatus
   6. D 2167 Test for Density of Soil in Place by the Rubber Balloon Method
   7. D 2216 Laboratory Determination of Moisture Content Of Soil
   8. D 2487 Classification of Soils for Engineering Purpose
   9. D 2922 Tests for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

10. D 3017 Test for Moisture Content of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)
11. D 4318 Test Plastic Limit, Liquid Limit and Plasticity Index of Soils

D. American Association of State Highway and Transportation Officials (AASHTO):
T 88 Mechanical Analysis of Soils

1.03 RELATED DOCUMENTS

A. Refer to the architectural plans and specifications for specific requirements regarding the preparation of the building subgrade pad. Where those requirements for the building pad conflict with those stated herein, the architectural plans and specifications shall govern.

B. Refer to Geotechnical Report for additional information regarding existing site conditions.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: Stockpile existing topsoil and provide additional off-site topsoil at locations shown on the plans and as needed to complete landscape work indicated on drawings and in accordance with specifications for landscaping.

B. Unclassified excavation is defined as any material encountered that is not suitable as structural fill without regard as to type or character; whether wet or dry; dark or light; dirt or rock; hard or soft; humus or non-humus; has a smell or does not smell; and is heavy or light in weight. The Contractor shall refer to the Geotechnical Investigation report provided by Gallet & Associates, Inc.

C. Acceptable Stabilization Fabrics and Geogrids: (required only where indicated on drawings)
1. Mirafi 50OX or 60OX
2. Phillips 66 Supac 6WS
3. Dupont Typar 3401 and 3601
4. Trevira S1114 and S1120
5. Tensar SS-1 and SS-2

D. Filter/Drainage Fabrics: (required only where indicated on drawings or as required by Geotechnical Engineer)
1. 140S
2. Phillips 66 Supac 4NP
3. Dupont Typar 3341

E. Silt Fencing Fabrics:
1. Phillips 66 Supac 5NP (UV)
2. Mirafi 10OX

PART 3 EXECUTION

3.01 PREPARATION

A. Material encountered in grading operation that is <u>unsuitable</u> or <u>undesirable</u> shall be as follows:
1. Unsuitable Materials: Material defined as organic or material that will not provide a stable foundation or material that will not compact to the requirements set forth in these specifications. Contractor's base bid will include accepting all material. No additional payment will be made for improvement or removal of unsuitable material.

2. All unsuitable material that is removed by the Contractor shall be disposed of offsite, but on the Installation, or in a manner satisfactory to the Contracting Officer at no additional cost to the Government.
3. Backfill for these areas will be with material approved by the Independent Testing Agency, with layers of suitable material and compacted to the requirement set forth in these specifications.

B. Prior to placing fill perform following procedures:
1. Drain water out by gravity with ditch having flow line lower than lowest elevation in low area. If drainage cannot be performed by gravity ditch then contractor shall refer to Section 3.02 “Dewatering” for requirements. Contractor shall at all times keep site graded to maximize runoff in case of rain. When rain is predicted, Contractor shall roll graded areas to seal against infiltration. Dewatering is part of the contractor’s basic scope of work. No additional payment will be made for Dewatering.
2. After drainage of area is complete, remove muck, mud, debris, and other material of unsuitable nature by using acceptable equipment and methods that will keep natural soils underlying low area dry and undisturbed.
3. Contractor shall contact the independent testing representative to inspect proof rolling operations. All areas failing proof rolling shall be undercut and replaced in accordance with these specifications.

C. Do not perform grading operations during period of wet weather when it would be impossible to control moisture of soils. All areas that will support floor slabs to ten feet outside the building walls and pavements to five feet beyond the edge of paving shall be properly prepared as controlled fill areas.

D. After grade has been established in cut areas and prior to placement of fill in all fill areas, the exposed subgrade shall be carefully inspected by probing and testing as needed. All topsoil or other organic material still in place, frozen, wet, soft or loose soil and other undesirable materials shall be removed. The exposed subgrade shall furthermore be inspected by proof rolling to check for areas that rut, deflect or fail to tighten up or soft material hidden beneath a thin crust of better soil. All material thus exposed shall be considered unsuitable.

E. Use earth fill to replace undercut in building area and in future expansion area to facilitate placement of utilities and future footings.

3.02 DEWATERING

A. General:
1. Provide dewatering systems as required for excavations. In any event, dewatering should be such that the groundwater level is controlled to a minimum depth of 2 feet below the elevation that is being compacted.
2. Design and provide dewatering system using accepted and professional methods consistent with current industry practice to eliminate water entering the excavation under hydrostatic head from the bottom or sides. Design system to prevent differential hydrostatic head, which would result in floating out soil particles in a manner, termed as a “quick” or “boiling” condition. System shall not be dependent solely upon sumps or pumping water from within the excavation where differential head would result in a quick condition, which would continue to worsen the integrity of the excavation’s stability.
3. Provide dewatering system of sufficient size and capacity to prevent ground and surface water flow into the excavation and to allow Work to be installed in a dry condition.
4. Control, by acceptable means, all water regardless of source. Contractor shall be responsible for disposal of the water (non contaminated water).
5. Confine discharge piping or ditches to available easement or to additional easement obtained by Contractor. Provide necessary permits or easement.

6. Control groundwater in a manner that preserves strength of foundation soils, does not cause instability or raveling of excavation slopes, and does not result in damage to existing structures. Where necessary, lower water level in advance of excavation utilizing wells, wellpoints, jet excavator or similar positive methods. The water level as measured by piezometers shall be maintained a minimum of 3 feet below prevailing excavation level.
7. Commence dewatering prior to any appearance of water in excavation and continue until Work is complete to the extent that no damage results from hydrostatic pressure, flotation, or other causes.
8. Open pumping with sumps and ditches will be allowed provided it does not result in boils, loss of fines, softening of the ground, or instability of slopes.
9. Install wells or well points, if required, with suitable screens and filters so that continuous pumping of fines does not occur. Arrange discharge to facilitate collection of samples by the Owner. During normal pumping and upon development of wells, levels of fine sand or silt in the discharge water shall not exceed 5 ppm. Install sand tester on discharge of each pump during testing to verify that levels are not exceeded.
10. Control grading around excavations to prevent surface water from flowing into excavation areas.
11. All groundwater encountered will be tested for waste characterization by a Florida Department of Environmental Protection (FDEP) certified lab. The sampling and analysis will be performed in compliance with all relevant State of Florida regulations. All test results will be submitted to 325 CES/CEAN (850-283-4780/2493) for waste disposal determination. The General Contractor will pay for all testing cost. If any contaminated water is encountered or suspected, the Contractor will advise 325 CES/CEAN immediately. All contaminated water will be containerized in 55 gallon drums, tanks, or treated through a filtration system depending on the concentrations and/or volume. The General Contractor will provide adequate storage until the impacted water can be properly disposed. Contact the 325 CES/CEAN Hazardous Waste Program Manager at 850-283-4780 for disposal. The installation shall be responsible for removing or treating impacted water from drums and tanks or providing treatment.
12. No additional payment will be made for any supplemental measures to control seepage, groundwater, or artesian head. The contractor shall provide all cost associated with Dewatering design and implementation to construct the proposed improvements to the lines and grades shown on the construction plans. The Contractor shall submit to 325 CES/CEAN a dewatering process plan for review.

B. Design:
1. Designate and obtain the services of a qualified dewatering specialist to provide dewatering plan as may be necessary to complete the Work.
2. Contractor shall be responsible for the accuracy of the drawings, design data, and operational records required.
3. Contractor shall be responsible for the design, installation, operation, maintenance, and any failure of any component of the system.

C. Damages:
1. Contractor shall be responsible for and shall repair any damage to work in place, other contractor's equipment, utilities, residences, highways, roads, railroads, private and municipal well systems, adjacent structures, natural resources, habitat, existing wells, and the excavation. Contractor responsibility shall also include, damage to the bottom due to heave and including but not limited to, removal and pumping out of the excavated area that may result from Contractor's negligence, inadequate or improper design and operation of the dewatering system, and any mechanical or electrical failure of the dewatering system.
2. Remove subgrade materials rendered unsatisfactory by excessive wetting and replace with approved backfill material at no additional cost to the Owner.

D. Maintaining Excavation in Dewatering Condition:
   1. Dewatering shall be a continuous operation. Interruptions due to power outages, or any other reason will not be permitted.
   2. Continuously maintain excavation in a dry condition with positive dewatering methods during preparation of subgrade, installation of pipe, and construction of structures until the critical period of construction or backfill is completed to prevent damage of subgrade support, piping, structure, side slopes, or adjacent facilities from flotation or other hydrostatic pressure imbalance.
   3. Provide standby equipment on site, installed, wired, and available for immediate operation if required to maintain dewatering on a continuous basis in the event any part of the system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, perform such work as may be required to restore damaged structures and foundation soils at no additional cost to Owner.
   4. System maintenance shall include but not be limited to 24-hour supervision by personnel skilled in the operation, maintenance, and replacement of system components, and any other work required to maintain excavation in dewatered condition.

E. System Removal: Upon completion of the work, remove dewatering equipment from the site, including related temporary electrical service.

F. Monitor wells and bio-injection wells shall be treated as described on drawings

3.03 OVEREXCAVATION AND BACKFILL

A. Over excavation which is required to remove unsuitable material shall be immediately reported to the Contracting Officer or his representative and performed as directed by the Contracting Officer, and the theoretical lines and grades will be adjusted accordingly. Material outside the excavation limits which is disturbed due to the fault or negligence of the Contractor, or due to his failure to exercise sound construction practices, shall be replaced by the Contractor with suitable materials (earth) at no cost to the Government.

3.04 PREPARATION OF SUBGRADE IN EMBANKMENTS (FILLS) AND CONTROLLED FILL AREAS

A. The existing soil in fill areas shall be prepared for other phases of work to follow. All fill areas that will support floor slabs to ten feet out side the building walls and pavements to five feet beyond the edge of paving shall be properly prepared as controlled fill areas. This work shall include the following:
   1. Remove all clearing and grubbing and topsoil from area to receive fill. All cavities and irregularities shall be enlarged to permit use of compaction equipment, backfilled, and compacted as required.
   2. Scarify and recompact the top 10” of the area to receive fill and all following fill layers to a minimum level of a 95% Maximum Dry Density based on the Modified Proctor Compaction Test, ASTM D-1557 within +3 to -2 percentage points of optimum moisture content.
   3. Proof roll prepared area in presence of testing representative.
   4. The exposed subgrade shall be inspected by proof rolling to check for areas that rut, deflect or fail to tighten up or soft material hidden beneath a thin crust of better soil. Any material thus exposed shall be considered unsuitable. All areas failing proof rolling shall be undercut and replaced in accordance with these specifications.

3.05 PREPARATION OF SUBGRADES IN EXCAVATION (CUT) AREAS

A. The exposed soil in cut areas shall be prepared for other phases of work to follow. All cut areas that will support floor slabs to ten feet out side the building walls and pavements to three feet beyond the edge of paving shall be properly prepared. This work shall include the following:
   1. After excavations have been cut to subgrade, the subgrade areas shall be scarified to a minimum depth of 8 inches and compacted a 95% Maximum Dry Density based on the

Modified Proctor Compaction Test, ASTM D-698 within -2 to +3 percentage points of optimum moisture content.

2. Proof roll prepared area in presence of testing representative.
3. The exposed subgrade shall be inspected by proof rolling to check for areas that rut, deflect or fail to tighten up or soft material hidden beneath a thin crust of better soil. Any material thus exposed shall be considered unsuitable. All areas failing proof rolling shall be undercut and replaced in accordance with these specifications.

3.06 FILLING AND SUBGRADING

A. Materials:
Offsite borrow fill material shall be used. The Contractor is responsible for locating an offsite adequate borrow source as part of the general scope of work. Borrow fill material is not available on the installation.

B. Off site material to be used in controlled fill areas shall be free of topsoil and other organics. The liquid limit of less than 40 and the Plasticity Index less than 15. The dry density as determined by ASTM D-698 shall exceed 100 LB/CF. The maximum practice size shall be less than four (4") inches. The material must obtain a LBR (Load Bearing Ratio) soaked value of 10 minimum.

C. Fill placement can proceed after the surface densification is accomplished and proof rolling is completed.

D. Immediately prior to any slab construction or paving in areas which are at grade, subgrade should be proof-rolled to further densify the surface soils and detect soft areas. All areas that pump or rut shall be undercut.

E. All controlled fill shall be placed in thin lifts (maximum 8 inches loose measure). Soil should be aerated or moisture conditioned as necessary to maintain the moisture content within –1 to +3 percent of the optimum moisture content and compacted to a minimum of 95% compaction based on the Modified Proctor Test, D-1557

F. Remove areas of finished subgrade found to have soft spots to depth necessary and replace in a manner that will comply with compaction requirements by use of material equal to or better than best subgrade material on site. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and true to grade and cross-section. The surface shall be maintained for the duration of contract or until released by Government.

G. Make acceptance of grades to receive buildings and paving by string line from grade stakes (blue tops) set to grade on not more than 50'0" centers. Tolerance of +0.10' will be permitted. There will be no decrease or loss of thickness, or no deviation from allowable grade tolerances of the higher grade materials to be placed over the subgrade (i.e. base mixes, bituminous paving, crushed stone, concrete slabs, etc.). Provide field staking of work and provide engineering necessary for verification of lines, grades and elevations.

3.07 FINISH GRADING - OTHER THAN PAVED AREAS

A. Grade areas in which elevations or contours are indicated on Drawings, including excavated areas, filled and transition areas, and landscaped areas to uniform and smooth, finished surface, free from rock, debris, or irregular surface changes. Finished surface shall not be more than 0.10' above or below finish grade or grade required for placement of topsoil or other material as noted on drawings or as required in these specifications, and all ground surfaces shall vary uniformly between indicated elevations. Grade ditches and swales to allow for proper drainage without ponding and in a manner that will minimize erosion potential.

B. Cover areas of project that have been disturbed by grading operations and are not to be covered by permanent construction such as pavements or buildings with 4" thickness of topsoil. Remove any excess topsoil from site, likewise, where deficient topsoil exist, import topsoil as needed.

C. Correct settlement in grade within one year after date of completion at no additional expense to Government. Bring grades to proper elevation. Re-planting or replacing any grass, shrubs, bushes, or other vegetation or construction disturbed by corrective measures.

D. All fill shall be placed in thin lifts (maximum 10 inches loose measure). Soil should be aerated or moisture conditioned as necessary to maintain the moisture content within –2 to +3 percent of the optimum moisture content and compacted to a minimum of 95% compaction based on the Modified Proctor Test, D-1557.

E. Contractor shall include in the basic scope of work importing topsoil if none exists on the site.

3.08 FLOOR SLAB, FOOTING BEARING AND PAVED AREA REQUIREMENTS:

A. Floor slabs and paved areas shall be supported on compacted controlled fill or prepared cuts exposed at grade.

B. If high plastic soils or organic materials are encountered in the footings, the high plastic soils shall be undercut to a maximum depth of three feet below the finished grade at the exterior grade of the building. All highly organic material shall be removed completely. All excavations shall be backfilled with compacted controlled fill in accordance with these specifications.

C. If high plastic soils or organic materials are encountered at subgrade below the floor slab, the high plastic soils shall be undercut to a maximum depth of three feet below the subgrade. All highly organic material shall be removed completely. All excavations shall be backfilled with compacted controlled fill in accordance with these specifications.

D. A 4 inch granular drainage layer consisting of clean pea gravel or coarse sand shall be provided under all building slabs. The drainage layer shall have no more than 10% passing the #200 sieve, a maximum particle size of 1½", a plastic Index of 6 maximum, and a liquid limit of 25 maximum. A vapor barrier shall be installed on top of the granular drainage layer. This is not required for parking areas. .

E. Sand fill shall be compacted to a minimum 95% standard density as determined by ASTM D-1557. Gravel fill shall be consolidated use appropriate compaction techniques.

F. Contractor shall remove and replace all material found to be inappropriate for footing bearing. All bearing surfaces consisting of fill are proof-compacted with a manually operated piston type tamper prior to placement of the reinforcing steel.

3.09 RIPRAP

A. Place rip rap in all areas where indicated on the drawings. The stone for rip rap shall consist of field stone or rough unhewn quarry stone as nearly uniform in section as is practical. The stones shall be dense, resistant to the action of air and water, and suitable in all aspects for the purpose intended.

B. Slopes and other areas to be protected shall be dressed to the line and grade shown on the plans prior to the placing of rip rap. Contractor shall then undercut the areas to receive rip rap to an elevation equal to the final elevation less the average diameter of the stones before

placing the rip rap. This will be considered critical around flumes and other drainage structures. Stones shall be placed so that the greater portion of their weight is carried by the earth and not by the adjacent stones. The stones shall be placed in a single layer with close joints. The upright areas of the stone shall make an angle of approximately 90 with the embankment slope. The courses shall be placed from the bottom of the embankment upward, the larger stones being placed in the lower courses. open joints shall be filled with spalls. Stones shall be embedded in the embankment as necessary to present a uniform top surface such that the variation between tops of adjacent stones shall not exceed three inches.

3.10 FIELD QUALITY CONTROL

A. Independent Testing Laboratory shall perform construction testing on site. General Contractor shall request for testing as follows:
   1. Fill Placed in Areas to be Paved: At least one compaction test for every 2,500 square feet of each 10" loose lift or layer.
   2. Fill Placed Under Building and Extending 10’ outside Exterior Building Line: At least one compaction test for every 2,500 square feet of each 10" loose lift or layer, a minimum of 3 test per lift.
   3. Inspect proof rolling operations of all cuts and fills.

B. If compaction requirements are not complied with at any time during construction process, remove and recompact deficient areas until proper compaction is obtained at no additional expense to AAFES.

C. The Independent Testing Laboratory shall prepare test reports that indicate test location, elevation data, and test results. Contracting Officer, Architect/Engineer and Contractor shall be provided with copies of reports within 48 hours of time test was performed.

D. In event that any test performed fails to meet these Specifications, AAFES and Contractor shall be notified immediately by the Independent Testing Laboratory.

E. Foundation excavations shall be inspected and tested for appropriateness of bearing level by the Independent Testing Laboratory.

F. All proof rolling operations shall be performed in the presence of the independent testing laboratory. The independent testing laboratory shall determine if the subgrade passes the proof rolling operation.

END OF SECTION

SECTION 02222

EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Work in this section includes compliance with requirements of Tyndall AFB and/or regulations and requirements of all governing authorities. Work shall be performed in a safe manner and environment by means as prescribed by any local, state, federal or other governing agency in excavation, backfilling, and compacting for utilities.

B. Before excavating over or around existing utilities, the owner of utility shall be notified. Any damage to existing utilities shall be repaired in accordance with owner of utility, at no additional cost to said owner.

C. This section includes excavation, bedding, and backfilling for utilities necessary to perform work indicated on Drawings and in Specifications.

D. Maintain in operating condition existing utilities, active utilities, and drainage systems encountered in utility installation. Repair any damaged surface or subsurface improvements shown on Drawings at no additional cost to owners of utilities.

E. Verify location, size, elevation, and other pertinent data required to make connections to existing utilities and drainage systems as indicated on Drawings. Comply with permits and regulations according to General Conditions.

1.02 SUBMITTALS

A. Shop Drawings or details pertaining to Site Utilities are not required unless use of materials methods, equipment, or procedures contrary to Drawings or these specifications are proposed. Do not perform work until Contracting Officer's representative has accepted required shop drawings.

1.03 JOB CONDITIONS

A. Set all lines, elevations, and grades for utility and drainage system work and control system for duration of work, including careful maintenance of bench marks, property corners, monuments, or other reference points.

PART 2 PRODUCTS

2.01 MATERIALS

A. Bedding Material: Processed sand and gravel free from clay lumps, organic, or other deleterious material, and complying with following gradation requirements:

U. S. Sieve Size	Passing by Weight, Percent
1 Inch	100
3/4 Inch	90-100
3/8 Inch	20-55
No. 4	0-10
No. 8	0-5

PART 3 EXECUTION

3.01 EXCAVATION, TRENCHING AND BACKFILLING

A. Perform all excavation, trenching and backfilling on an unclassified excavation basis.

B. Perform excavation as indicated for specified depths. During excavation, pile materials suitable for backfilling in orderly manner far enough from bank of trench to avoid overloading sides, or causing cave-ins.

C. Remove excavated materials not required or not suitable for backfill or embankments and remove from site at no additional cost to owner.

D. Prevent surface water from flowing into trenches or other excavation by temporary grading or other methods, as required. Remove accumulated water in trenches or other excavations by pumping or other acceptable methods.

E. Open cut excavation with trenching machine or backhoe. When trenching machine is utilized, compaction equipment shall have a width suitable for the trench width. Where machines other than ladder or wheel-type trenching machines are used, do not use clods for backfill. Dispose of unsuitable material on site or on an approved area on the Installation and provide other suitable material at no additional cost to AAFES.

3.02 TRENCH EXCAVATION

A. Dig trench at proper width and depth for laying pipe, conduit, or cable. Cut trench banks as nearly vertical as practical for safe installation of system, and remove stones as necessary to avoid point-bearing. Over excavate wet or unstable soil, if encountered, form trench bottom as necessary to provide suitable base for continuous and uniform bedding.

B. Minimum requirements shall be that all trench excavation side walls greater than 4 feet in depth shall be sloped, shored, sheeted, braced or otherwise supported by means providing sufficient protection for the workmen within them in accordance with the applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances or other governing authorities. Lateral travel distance to an exit ladder or steps shall not be greater than 25 feet in trenches that are 4 feet or deeper.

C. Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on undisturbed soil or bedding material at every point along entire length, except where necessary to excavate for bell holes, proper sealing of pipe joints, or other required connections. At joints, dig no deeper, longer, or wider than needed to make joint connection properly.

D. For pipes or conduit with a vertical height of 48” or less, the bottom of the trench shall not be less than 12” nor more than 1/3 pipe diameter wider than outside surface of any pipe or conduit. All other trench width requirements for pipe, conduit, or cable shall be held to a minimum width that will allow for safe installation, and proper compaction of trench backfill.

E. Trench depth requirements measured from finished grade or paved surface shall be in accordance with the following or any applicable codes and ordinances:
   1. Water Mains: Minimum cover over top of pipe as required by governing agencies or 30”, whichever is greater.
   2. Sanitary Sewer: Depths, elevations, and grades as indicated on Drawings.
   3. Storm Drains: Depths, elevations, and grades as indicated on Drawings.
   4. Electrical Conduits: 24” minimum cover to top of conduit or as required by NEC 300-5 and NEC 710-36 codes, or as directed by electrical specifications or the power company, whichever is deeper.
   5. TV Conduits: 18” minimum cover to top of conduit or as required by the local utility company, or as directed by electrical specifications whichever is deeper.
   6. Telephone Conduits: 18" minimum cover to top of conduit or as required by the local utility company, or as directed by electrical specifications whichever is deeper.
   7. Gas Mains and Service: 30” minimum cover to top of pipe or as required by gas company or mechanical specifications which every is greater.

3.03 SHEETING AND BRACING

Provide sheeting and bracing, where necessary, in trenches and other excavations where protection of workmen is required. Sheeting may be removed after excavation has been backfilled sufficiently to protect workmen or material against damaging or injurious caving in.

3.04 PIPE BEDDING

Accurately cut trenches for pipe or conduit that is to be installed to designated elevations and grades to line and grade 4” below bottom of pipe and to width as specified. Place 4" of bedding material, compact in bottom of trench, and accurately shape to conform to lower portion of pipe barrel. After pipe installation, place select backfill and compact in maximum 6” layers measured loose.

3.05 TRENCH BACKFILLING

A. Criteria: Do not backfill trenches until required tests are performed, utility systems are Inspected as required and are accepted by applicable governing authority. Backfill trenches as specified. If improperly backfilled, reopen to depth required to obtain proper compaction. Backfill and compact, as specified, to properly correct condition in an acceptable manner.

B. Backfilling: After pipe or conduit has been installed, bedded, and tested as specified, backfill trench or structure excavation with specified material placed in lifts or layers not exceeding 6” of loose measurement. Material and compact shall meet the requirements set forth in Section 02200, "Earthwork", except the maximum particle size shall not exceed 1”.

C. Compaction: Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction. Compact in accordance with requirements of Section 02200 “Earthwork”.

D. Compaction Testing: An independent testing laboratory shall perform test at intervals not exceeding 100 of trench for each 6” of compacted trench backfill and furnish copies of test results as specified.

3.06 TESTING

A. Compaction Testing: An independent testing laboratory paid for by the owner shall perform test at intervals not exceeding 200 of trench for each 6” of compacted trench backfill and furnish copies of test results as specified.

END OF SECTION

SECTION 02361

SOIL TREATMENT FOR TERMITE CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Chemical soil treatment.

1.02 REFERENCE STANDARDS

A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; United States Code; 1947 (Revised 2001).

1.03 SUBMITTALS

A. Submit full product data for Approval by Installation Civil Engineering Department prior to purchasing all chemical soil treatment products.

B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.

C. Test Reports: Indicate regulatory agency approval reports when required.

D. Manufacturer's Application Instructions: Indicate caution requirements.

E. Manufacturer's Certificate: Certify that toxicants meet or exceed specified requirements.

F. Record date and rate of application and areas of application.

G. Maintenance Data: Indicate re-treatment schedule.

H. Warranty: Submit warranty and ensure that forms have been completed in Government's name.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing this type of work and:
   1. Having minimum of 2 years documented experience.
   2. Approved by manufacturer of treatment materials.
   3. Licensed in the State where the project is located .

1.05 REGULATORY REQUIREMENTS

A. Conform to applicable code for requirements for application, and comply with EPA regulations.

1.06 SEQUENCING

A. Apply toxicant immediately prior to installation of vapor barrier under slabs-on-grade.

1.07 WARRANTY

A. Provide five year installer's warranty against damage to building caused by termites.
   1. Include coverage for repairs to building and to contents damaged due to building damage. Repair damage and, if required, re-treat.
   2. Inspect annually and report in writing to Government. Provide inspection service for 5 years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MATERIALS

A. Manufacturers:
   1. Bayer Environmental Science Corp: www.nobugs.com.
   2. Dow AgroSciences LLC: www.dowagro.com.

3. FMC Professional Solutions: www.fmcprosolutions.com.
4. Syngenta Professional Products: www.syngentaprofessionalproducts.com.

B. Toxicant Chemical: EPA approved; synthetically color dyed to permit visual identification of treated soil.

C. Diluent: Recommended by toxicant manufacturer.

2.02 MIXES

A. Mix toxicant to manufacturer's instructions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.

B. Verify final grading is complete.

3.02 APPLICATION

A. Comply with requirements of U.S. EPA and applicable state, local codes and the Installation where the project is located.

B. Spray apply or inject toxicant in accordance with manufacturer's instructions.

C. Apply toxicant at following locations:
1. Under Slabs-on-Grade.
2. At Both Sides of Foundation Surfaces (footing and grade beam trenches).
3. Soil Within 5 feet of Building Perimeter For a Depth of 2 feet.

D. Under slabs, apply toxicant immediately prior to installation of vapor barrier.

E. At foundation walls, apply toxicant immediately prior to finish grading work outside foundations.

F. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.

G. Re-treat disturbed treated soil with same toxicant as original treatment.

H. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

3.03 PROTECTION

A. Do not permit soil grading over treated work.

END OF SECTION

SECTION 02511

ASPHALTIC CONCRETE PAVING AND BASE COURSE

PART 1 GENERAL

1.01 SCOPE OF WORK

A. All Florida Department of Transportation specification sections noted on the drawings which pertain to the mix design, materials, preparation, and/or execution of this product shall supersede this section.

B. Work shall comply with the requirements of Tyndall AFB and requirements of all governing authorities on asphaltic concrete paving.

1.02 RELATED DOCUMENTS

A. Drawings, Conditions of the Contract, including General and Supplementary Conditions, and Division 1 Special Conditions sections, apply to work of this Section.

B. Related Work: Prepared subbase as specified in earthwork sections and as noted on site plans.
   1. Section 02200: Earthwork
   2. Section 02580: Pavement Markings

1.03 SUBMITTALS

A. Design Mix: Before any asphalt surface is constructed, submit actual design mix to Contracting Officer's representative for acceptance.

B. Material Certificates: Furnish copies of materials certificates signed by material producer and Contractor, certifying that each material items complies with, or exceeds, specified requirements.

1.04 JOB CONDITIONS

A. Weather Limitations:
   1. Apply prime and tack coats if required when ambient temperature is above 40°, and when temperature has not been below 35° for 12 hours immediately prior to application. Do not apply when base is wet or contains excess moisture.
   2. Construct asphalt concrete surface course when atmospheric temperature is above 40° and when base is dry. Asphalt base course may be placed when air temperature is above 30° and rising.

B. Grade Control: Establish and maintain required lines and elevations.

PART 2 PRODUCTS

2.01 MATERIALS

A. Base Course Aggregate: Sound, angular crushed stone, crushed gravel, or crushed slag, stone, or slag screenings. Uncrushed gravel may be used in base course mixture if required to suit local material availability.

B. Surface Course Aggregate: Crushed stone, crushed gravel, crushed slag, and sharp-edged natural sand. Sand prepared from stone, blast-furnace slag, or gravel, or combinations thereof may be used if required to suit local material availability.

C. Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material complying with AASHTO M-17/ASTM D 242, if recommended by applicable state highway standards.

D. Asphalt Cement: Comply with AASHTO M-226/ASTM D 3381; AC-20, AR-80, viscosity grade.

E. Tack Coat: Emulsified asphalt; AASHTO M-140/ASTM D 997 or M 208/ASTM D 2397, SS-1h, CSS-1, or CSS-1h, diluted with one part water to one part emulsified asphalt.

2.02 BASE COURSE

A. Material: All materials shall be indicated on Drawings and shall comply with applicable state highway specifications regarding source.

B. Thickness:
   1. Aggregate Base: Construct to thickness indicated on Drawings. Apply in lifts or layers not exceeding 6" measured loose, prior to compaction operations.
   2. Asphalt Institute Type IV Mix for Full Depth Asphalt Base: Construct to thickness indicated on Drawings. Apply in lifts or layers not exceeding 3" measured loose, prior to compaction operations.
   3. Asphalt Institute Type VI, VII, or VIII Mixes for Hot-mix Sand Asphalt Bases: Construct to thickness indicated on Drawings or 1.30 times thickness required for previously described Type IV full depth asphalt subbase. Apply in lifts or layers not exceeding 3" measured loose, prior to compaction operations.

C. Construction:
   1. Construction of base course, including equipment and methods shall be in accordance with applicable state highway specifications.
   2. Perform base course construction in a manner that will drain surface properly at all times and at same time prevent runoff from adjacent areas from drainage onto base course construction.
   3. Surface Tolerances: Plus all of thickness shown on drawings.

D. Compaction (If not covered by Highway Specification use following):
   1. Except for full depth asphalt and sand asphalt bases, compact base courses to not less than 100% of optimum density as determined by ASTM D 1557 or AASHTO T-180 (modified proctor).
   2. Compact full depth asphalt and sand asphalt bases to not less than 98% of laboratory compacted density as determined by Marshall Test Method ASTM D 1559, 50 blow, 1500 pound test type.

2.03 EQUIPMENT

Maintain equipment in satisfactory operating condition and correct break-downs in a manner that will not delay or be detrimental to progress of paving operations.

2.04 ASPHALT-AGGREGATE MIXTURE (TO BE USED WHEN DEPARTMENT OF TRANSPORTATION DOES NOT SPECIFY.)

A. Design Mixes: Mix shall be within sieve analysis and bitumen range given below and have minimum stability based on 50-blow Marshall complying with ASTM D 1559 or 3,500 lbs. unless otherwise noted on Drawings.

1. SIEVE ANALYSIS OF MIX

Square Sieve	Total Percent Passing
1/2”	90-100%
3/8”	65-90%
#4	omit
#8	40-55%
#50	12-27%
#200	0-10%

B. Percent bitumen by weight of total mix: 5.0 - 8.5%

C. Density percent of calculated voidless mixture of same material: 94 - 97% for acceptance:

Square Sieve	Total Percent Passing
1/2”	7%
3/8”	5%
#8	4%
#50	4%
#200	2%

D. Percent bitumen by weight of total mix variance: 0.4%.

E. Provide asphalt-aggregate mixture as recommended by local or state paving authorities to suit project conditions. Use locally available materials and gradations which exhibit satisfactory record on previous installations.

PART 3 EXECUTION

3.01 PREPARATION

A. Remove loose material from compacted subbase surface immediately before applying prime coat.

B. Proof roll prepared subbase base surface to check for unstable areas and areas requiring additional compaction.

C. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.

D. Prime Coat: (If required will be indicated on drawings)
   1. Apply bituminous prime coat to base course surfaces where asphaltic concrete paving will be constructed.
   2. Apply bituminous prime coat in accordance with APWA Section 2204 and applicable Department of Transportation.
   3. Apply at minimum rate of 0.20 to 0.50 gal./sq. yd. over compacted subbase. Apply material to penetrate and seal, but not flood, surface.
   4. Cure and dry as long as necessary to attain penetration and evaporation of volatile.

E. Tack Coat:
   1. Apply to contact surfaces of previously constructed asphalt or portland cement concrete and surfaces abutting or projecting into asphalt concrete and surfaces abutting or projecting into asphalt concrete pavement.
   2. Apply tack coat to full depth asphalt and sand asphalt subbase. Apply emulsified asphalt tack coat between each lift or layer of full depth asphalt and sand asphalt bases and on surface of such bases where asphaltic concrete paving will be constructed.
   3. Apply emulsified asphalt tack coat in accordance with APWA Section 2204 and applicable Department of Transportation requirements.

3.02 PLACING MIX

A. Place asphalt concrete mixture on prepared surface, spread, and strike off. Spread mixture at following minimum temperatures:
   1. When ambient temperature is between 40°F and 50°F
   2. When ambient temperature is between 50°F and 60°F
   3. When ambient temperature is higher than 60°F.

B. Place inaccessible and small areas by hand. Place each course to required grade, cross-section, and compacted thickness.

C. Paver Placing:
   Place in strips not less than 10' wide, unless otherwise acceptable to Owner. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for section before placing surface course.

D. Joints:
   Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

E. Curbs:
   1 Construct asphalt curbs over compacted pavement surfaces only when indicated on Drawings. Apply light tack coat unless pavement surface is still tacky and free from dust.
   2. Place curb materials to cross-section indicated by machine or by hand in wood or metal forms. Tamp hand placed materials and screed to smooth finish. Remove forms as soon as material has cooled.

3.03 ROLLING

A. Begin rolling when mixture will bear roller weight without excessive displacement.

B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.

D. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.

F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.04 FIELD QUALITY CONTROL

A. An independent testing laboratory, selected and paid by owner, shall be retained to perform construction testing of in-place asphalt concrete courses for compliance with these requirements as follows.
   1) Asphalt surface and base course shall be randomly cored at a rate of one core for every 20,000 square feet of paving. However, no less than three cores in light duty areas and three cores in heavy duty areas shall be obtained. Asphalt pavement samples shall be tested for aggregate gradation and bitumen content for conformance with the mix design.
   2) Thickness: In-place compacted thickness shall not be less than thickness specified on the drawing. Thickness of core shall be use to determine thickness of asphalt provided
   3) The finished surface of each asphalt concrete course shall be tested for smoothness using a 10 foot straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding following tolerances for smoothness.

   1. Base Course Surface: 1/4”
   2. Wearing Course Surface: 3/16”

B. The contractor shall repair or remove and replace unacceptable paving as determine by the above testing results.

END OF SECTION

SECTION 02513

CONCRETE WALKS, CURBS AND PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work shall comply with Tyndall AFB requirements and all requirements of governing authorities on concrete paving.

B. Traffic Control:
   1. Maintain access for vehicular and pedestrian traffic as required for other construction activities.
   2. Utilize flagmen, barricades, warning signs, and warning lights as required.

C. Related Sections:
   1. Section 02200: Earthwork
   2. Section 02580: Pavement Markings
   3. Section 03300: Cast-In-Place Concrete

PART 2 PRODUCTS

2.01 MATERIALS

A. Forms:
   1. Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.
   2. Use flexible spring steel forms or laminated boards to form radius bends as required.

B. Form Release Agent: Coat forms with non-staining type coating that will not discolor or deface surface of concrete.

C. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A 185. Furnish in flat sheets, not rolls, unless otherwise acceptable by AAFES.

D. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 40.
   Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials, and others as required.

E. Joint Fillers: Resilient premolded bituminous impregnated fiberboard units complying with ASTM D 1751 FS HH-F-341, Type II, Class A; or AASHTO M 153, Type I.

F. Curing and Sealing Compound: FS TT-C-800, with 30% solids content minimum.

G. Epoxy Resin Grout: FS MMM-G-650.

2.02 MIXING

A. Design mix to produce normal weight concrete consisting of grey portland cement, aggregate, water-reducing or high-range water-reducing admixture (super-plasticizer), air-entraining admixture and water to produce following properties. (Concrete shall conform to the requirements of Concrete – Section 03300).

1. Compressive Strength: 3,000 psi, minimum at 28 days.
2. Slump Range: 8" for concrete containing HRWR admixture (super-plasticizer); 3" – 5" for other concrete.
3. Air Content: 5% to 8%.

PART 3 EXECUTION

3.01 PREPARATION

A. Surface Preparation: Remove loose material from compacted subbase surface immediately before placing concrete.

B. Proof-roll prepared subbase surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

3.02 CONCRETE INSTALLATION

A. Form Construction:
   1. Set forms to required grades and lines, rigidly braced and secured. Install\ sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.
   2. Check complete formwork for grade and alignment to following tolerances:
      a. Top of forms not more than 1/8" in 10'0"
      b. Vertical face on longitudinal axis, not more than 1/4" in 10'0"
      c. Sloped sidewalks shall have 1" in 12" maximum grade with 5'-0" landing at 30'-0" interval maximum.
   3. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

B. Reinforcement: Locate, place, and support reinforcement as required to produce section on drawings.

C. Concrete Placement:
   1. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
   2. Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with interval vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
   3. Deposit and spread concrete in continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place construction joint.

D. Curbs and Gutters: Automatic machine may be used for curb and gutter placement at Contractor's option. Machine placement must produce curbs and gutters to required cross section, lines, grades, finish, and joining as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

3.03 JOINT CONSTRUCTION

A. Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

1. Weakened-Plane (Contraction) Joints: Provide weakened plane (contraction) joints, sectioning concrete into areas as indicated on drawings or at 15'0" o.c. maximum each way if not specified on drawings. Lines of joints shall be straight and true and uniform in thickness and depth with an allowable tolerance of 1/4" per 10'01" of joint. Joints shall be a minimum of 1/8″ wide and no more than 3/16" wide. Construct weakened-plane joints for depth equal to at least 1/4 concrete thickness, as follows.
2. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with recommended cutting tool and finishing edges with jointed cove.
3. Sawed Joints: Form weakened-plane joints using powered saws equipped with shatterproof abrasive or diamond rimmed blades. Sawing shall be done within eight hours of pour or as soon as concrete can support weight and provide a smooth cut without spalling.
4. Inserts: Use embedded strips of metal or sealed wood to form weakened-plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened.

B. Construction Joints:
1. Place concrete joints at end of placement and at locations where placement operations are stopped for period of more than 1/2 hour, except where such placements terminate at expansion joints.
2. Construct joints using standard metal keyway-section forms.

C. Expansion Joints:
1. Provide premolded joint filler for expansion joints abutting catch basins, manholes, inlets, structures, walks, and other fixed objects.
2. Locate expansion joints as indicated on drawings at 60'0" o.c. maximum for each pavement lane if not specified on drawings.

D. Joint Fillers:
1. Extend joint fillers full-width and depth of joint, and not less than 1/2" or more than 1" below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surface.
2. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together.

E. Joint Sealants: Exterior pavement joint sealants shall be composed of a non-priming pourable, self-leveling type of a coal tar modified polyurethane, or a polyurethane sealant suitable for use in pavements and sidewalks.

3.04 CONCRETE FINISHING

A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with 10'-0" straight edge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide continuous smooth finish.

C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2" radius. Eliminate tool marks on concrete surface.

D. After completion of floating and trawling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
1. Curbs, Gutters, and Walks: Broom finish by drawing finehair broom across concrete surface perpendicular to line of traffic. Repeat operation if required to provide fine line texture.

2. Inclined Slab Surfaces: Provide coarse, nonslip finish by scoring surface with stiff-bristled broom perpendicular to line of traffic.
3. Paving: Burlap finish by dragging seamless strip of damp burlap across concrete perpendicular to line of traffic. Repeat operation to provide gritty texture.

E. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed.

3.05 CLEANING AND ADJUSTING

A. Repair or replace broken or defective concrete, as directed.

B. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials.

C. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material to the satisfaction of the owner just prior to final inspection.

END OF SECTION

SECTION 02515

CAST IN PLACE SITE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Formwork, shoring, bracing, and anchorage.
   2. Reinforcement and accessories.
   3. Cast-in-place concrete, including sidewalks.
   4. Curing and finishing.
   5. Grout.

B. Related Sections:
   1. Section 04100 - Mortar: Masonry grout fill.
   2. Section 05500 - Metal Fabrications.

1.02 REFERENCES

A. American Concrete Institute (ACI):
   1. ACI 301 - Specifications for Structural Concrete for Buildings.
   2. ACI 315 Details and Detailing of Concrete Reinforcement.
   3. ACI 318 Building Code Requirements for Reinforced Concrete.
   4. ACI 347 - Recommended Practice for Concrete Formwork.

B. American Society for Testing and Materials (ASTM)
   1. ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
   2. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
   3. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
   4. ASTM C31 - Making and Curing Concrete Test Specimens in the Field.
   5. ASTM C33 - Concrete Aggregates.
   6. ASTM C39 -Compressive Strength of Cylindrical Concrete Specimens.
   7. ASTM C78 - Flexural Strength of Concrete.
   8. ASTM C94 - Ready-Mixed Concrete.
   9. ASTM C150 - Portland Cement.
   10. ASTM C192 -Making and Curing Concrete Test Specimens in the Laboratory.
   11. ASTM C260 - Air-Entraining Admixtures for Concrete.
   12. ASTM C494 - Chemical Admixtures for Concrete.

C. American Welding Society (AWS):
   1. AWS Dl.4 - Structural Welding Code Reinforcing Steel.

D. Concrete Reinforcing Steel Institute (CRSI):
   1. CRSI - Manual of Practice.
   2. CRSI 63 Recommended Practice for Placing Reinforcing Bars.
   3. CRSI 65 Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.

E. Product Standard (PS):
   1. PS1 - Construction and Industrial Plywood.

1.03 SUBMITTALS

A. Product Data:
   1. Product List: List product selected for the following:
      a. Form release agent.
      b. Curing compound.
      c. Grout.

B. Shop Drawings:
   1. Formwork: Submit diagram of proposed construction joints not shown on Drawings.
      a. Reproduce concrete notes that concern proper placing of reinforcement and submit with shop drawings for field use. Do not use reproductions of Contract Drawings as shop drawings.
      b. Provide reinforcement placement drawings with bar lists. Comply with Part B, Chapter 3 of ACI 315 for preparation of shop drawings. Include number, grade, size, length, mark, location, splice lengths, and bending diagrams for all reinforcing steel and related products.

C. Quality Control Submittals:
   1. Mix Design: Submit two copies of each mix design proposed in accordance with ACI 301, Chapter 3. Use either Laboratory Trial Mix Procedures or Previous Field Experience Procedure.
      a. Determine or certify proportions of ingredients for mix by independent testing laboratory in accordance with Chapter 4 of ACI 318 to provide characteristics listed on Drawings for each class of concrete.
      b. Determine required average strength for above specified strength in accordance with ACI 318; evaluate compressive strength results of field concrete in accordance with ACI 214.
      c. Include the following information in concrete mix design:
         (1) Proportions of cement, fine and coarse aggregates, and water.
         (2) Water-cement ratio, 28 day compressive and design strength, slump, and air content.
         (3) Type of cement and aggregates.
         (4) Aggregate gradation.
         (5) Type and dosage of admixtures.
         (6) Special requirements for pumping.
         (7) Range of ambient temperature and humidity for which design is valid.
         (8) Special characteristics of mix which require precautions in mixing, placing, or finishing techniques to achieve finished product specified.
   2. Batch Delivery Tickets:
      a. Submit sample ticket indicating information to be supplied.

1.04 TESTS

A. Required testing will be performed by Testing Laboratory employed and paid by AAFES. Notify testing laboratory 24 hours prior to proposed concrete pour.

B. Testing firm will take cylinders and perform slump and air entrainment tests in accordance with ACI 301.

C. Four concrete test cylinders will be taken for every 100 or less cubic yards of each class of concrete placed each day.

D. One slump test will be taken for each set of test cylinders taken.

E. For air-entrained concrete one air content test will be made when slump test is taken.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Placing:
   1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with the requirements of ACI 306 and as herein specified.
   2. When the air temperature has fallen to or is expected to fall below 40°F, provide adequate means to maintain the temperature in the area where concrete is being placed at either 70°F for 3 days or 50°F for 5 days after placing. Provide temporary housings or coverings including tarpaulins or plastic film. Keep protections in place and intact at least 24 hours after artificial heat is discontinued. Avoid rapid dry-out of concrete due to overheating, and avoid thermal shock due to sudden cooling or heating.
   3. When air temperature has fallen or is expected to fall below 40°F, uniformly heat all water and aggregates before mixing as required to obtain a concrete mixture temperature of not less than 50°F and not more than 80°F at point of placement.
   4. Do not use frozen materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Ascertain that forms, reinforcing steel, and adjacent concrete surfaces are entirely free of frost, snow, and ice before placing concrete.
   5. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
   6. Use set-control admixtures when required and accepted in mix designs.

B. Hot Weather Placing:
   1. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
   2. Temperature of concrete at time of placing shall not exceed 95°F. Contractor shall maintain an accurate reading thermometer at the job site to check temperature of concrete. Concrete shall be rejected before placing if temperature of concrete exceeds 90°F.
   3. Special precautions to protect fresh concrete before and during finishing shall be mandatory when the rate of evaporation of surface moisture from concrete exceeds 0. 2 pounds per square foot per hour. Rate of evaporation shall be determined in accordance with ACI 305. Special precautions shall include the following:
      a. Good planning and close coordination between supplier and job site shall be maintained to ensure prompt placement of concrete upon arrival at job site.
      b. Cool ingredients before mixing to reduce concrete temperature at time of placement. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water.
      c. Dampen subgrade and forms.
      d. Erect windbreaks to reduce wind velocity over the concrete.
      e. Erect sunshades to reduce concrete surface temperatures.
      f. Cover reinforcing steel with water-soaked burlap so the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
      g. Utilize fogging to cool and moisten surrounding air. Fog nozzles, specially designed for concrete fogging, which produce a fog blanket shall be used. Common garden hose nozzles or other nozzles which produce an excessive washing spray shall not be allowed
      h. Provide temporary covering such as wet burlap, plastic membrane, curing paper, or other suitable means.
      i. Use set control admixtures when required and accepted in mix design.

PART 2 PRODUCTS

2.01 FORMWORK

A. Engineer forms, shores, bracing, and other temporary supports to support loads imposed construction.
   1. Plywood: Sound, undamaged sheet with straight edges.
   2. Lumber: Construction grade.
   3. Steel: Minimum 16 gage sheet, well matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Accessories:
   1. Shearkey: Galvanized steel with removable top strip exposing sealant trough; knockout holes at six inches on center; 18 gage channel dowels.
   2. Form Ties: Removable or snap-off metal, of fixed or adjustable length as applicable, with cone ends.

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A615; 60 ksi yield grade billet-steel plain bars, uncoated finish.

B. Welded Steel Wire Fabric: ANSI/ASTM A185 plain type. Provide mats for welded wire fabric with wire size of W2.9 or larger.

2.03 REINFORCEMENT ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gauge annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete.

2.04 CONCRETE MATERIALS

A. Cement: ASTM C150, normal - Type I, produced from American made clinker. Fly ash, slag, and pozzolans are not permitted as substitutes for cement.

B. Fine and Coarse Aggregate: ASTM C33. Use maximum coarse aggregate size per ACI 318, but not larger than in inches, except building slabs-on-grade use 1 inch maximum. Meet the following grading requirements of fine aggregates for building slabs-on-grade.

Sieve	Percent Passing
3/8 inch	100%
#4	95 - 100%
#8	80 - 90%
#16	50 - 75%
#30	30 - 50%
#50	10 - 20%
#100	2 - 5%

C. Water: Clean and not detrimental to concrete.

2.05 CHEMICAL ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Chemical Admixtures: ASTM C494; Type A - water reducing; Type B - retarding; Type C - accelerating; Type D - water reducing and retarding.

2.06 RELATED MATERIALS

A. Joint Filler for Non-traffic Joints: one inch preformed type.

B. Sawed Control Joint Filler in Building: MM80 as manufactured by Metzker-McGuire, Contoocook, NH (603/746-4963) at slab sawed control joints not below rack layout. Joints below racks remain unfilled but are to be cleaned out with compressed air. Filler material shall have sufficient strength such that when cured will support all loads and have a durometer Shore A-scale hardness value of approximately 80 in accordance with ASTM D2240 and ASTM D676. Tensile strength shall be comparable to that of concrete slab.

C. Non-shrink Grout: Pre-mixed non-shrinking, high strength grout, COE CRD-621; compressive strength of 5000 psi in 28 days.
   1. Masterflow 713 by Master Builders Co.
   2. Gilco Construction Grout by Gifford-Hill Co.
   3. Crystex by L&M Construction Chemicals, Inc.
   4. Euco-N-S Group by Euclid Chemical Company.
   5. Sonogrout by Sonneborn Building Products.

2.07 CONCRETE MIX

A. Mix concrete in accordance with ASTM C94.

B. Provide concrete with the following characteristics:
   1. For all concrete:
      a. Compressive Strength:
         (1) 7 Days: 1950 psi.
         (2) 28 Days: 3000 psi.
      b. Maximum slump not to exceed 4 inches.

C. Accelerating Admixtures: ASTM C494; Type C. Use in cold weather only when approved by Construction Manager. Use of admixtures will not relax cold weather placement requirements.

D. Set-retarding Admixtures: ASTM C474; Type B. Use during hot weather only when approved by Construction Manager.

E. Air Entraining Admixtures: ASTM C260. Add to concrete mix for concrete work subject to freeze-thaw cycling.

F. Water Reducing Admixtures: ASTM C494, Type A. Use at interior slabs on grade.

2.08 CURING MATERIALS

A. Curing Compound: Kure-N-Seal 0800 by Sonneborn Building Products.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, held securely, and will not cause hardship in placing concrete.

3.02 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's instructions.

B. At locations where new concrete is dowelled to existing, drill holes in existing concrete, insert deformed steel reinforcing dowels, and pack solid with non-shrink grout.

3.03 VAPOR RETARDER INSTALLATION

A. Following leveling and tamping of prepared base for slabs on grade, place vapor retarder sheeting with longest dimension parallel with direction of pour.

B. Lap joints 6 inches minimum and seal with appropriate tape. Do not disturb or damage vapor retarder while placing concrete
reinforcing. If damage occurs, repair before concrete placement.

3.04 PLACING REINFORCEMENT

A. Perform concrete reinforcement work in accordance with CRSI Manual of Standard Practice, and CRSI Documents 63 and 65.
   1. Accurately place and secure saddle ties at every other intersection with 16 gage black annealed wire; hold rigidly in place with metal chairs or spacers during placing of concrete.
   2. Hold bars in beams and slabs to exact location during concrete placement. Use spacers, chairs, or other necessary supports with the following tolerances:
      a. Bars in Slabs and Beams:
         (1) Members 8 Inches Deep or Less:+/- 1”
         (2) Members 8 Inches to 2'0" Deep: +/-1”
         (3) Members More than 2'0" Deep: +/+ 2”
      b. Lengthwise of Member: +/- 2”.
      c. Concrete Cover to All Surfaces: 2”.
      d. Minimum Spacing Between Bars: +/- 1”

3.05 PLACING CONCRETE

A. Notify Testing Laboratory a minimum of 24 hours prior to commencement of concreting operations.

B. Place concrete in accordance with ACI 301; including hot and cold weather placement procedures.

C. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.

D. Place concrete in reasonably uniform layers, approximately horizontal, and not more than 12 inches deep, exercising care to avoid vertical joints or inclined planes. Place concrete continuously between predetermined construction and control joints. Piling up of concrete in forms to cause separation or loss of ingredients is not permitted.

E. Do not deposit concrete which has partially set or hardened. Remove hardened or partially hardened concrete which has accumulated on forms or reinforcement. Do not place concrete on previously deposited concrete which has hardened sufficiently to cause formation of seams or planes of weakness within respective member or section except as specified.

F. Deposit concrete as nearly in final position as practical to avoid rehandling. Exercise care to prevent splashing forms or reinforcing with concrete. Do not permit concrete to drop freely a distance greater than 3 feet. Where longer drops are necessary, use chute, tremie, or other conveyance to help avoid separation.

G. Do not deposit concrete into excavation where water is standing. If place of deposit cannot be successfully pumped dry, pour through tremie with outlet end near bottom of place of deposit.

H. Do not deposit concrete when plasticity, measured by slump test, is outside limits indicated on Structural Drawings or in Specifications.

I. Consolidate and screed concrete by use of vibratory screed of size to allow construction joint pattern as indicated on Structural Drawings.

J. Vibration: As soon as concrete is deposited, thoroughly agitate with mechanical vibrators and suitable hand tools to work mixture into corners of forms and around reinforcing and embedded items. Use mechanical vibrators with minimum frequency of 7000 revolutions/minute. Do not over vibrate or use vibrators to transport concrete within forms. Insert and withdraw vibrators at many points, 18 to 30 inches apart. At each insertion, vibrate generally 5-15 seconds, sufficient to consolidate concrete but not long enough to cause segregation. Keep spare vibrator on job site during concrete placement operations. Do not insert vibrator into lower courses that have begun to set.

K. Saw cut control joints within 12 hours after finishing. Use inch thick blade, cutting 1 inch into slab.

L. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Testing Laboratory upon discovery.

3.06 FORM REMOVAL

A. Do not remove forms until concrete has attained sufficient strength. Clamps or tie rods may be loosened 24 hours after concrete is placed. Ties, except for sufficient number to hold forms in place, may be removed at that time.

B. Minimum Curing Period Prior to Form Removal:
   1. Above 60°F: 3 days.
   2. 50°F to 60°F: 5 days.
   3. 40°F to 50°F: 7 days.
   4. Less than 40°F: See Note below.

C. Observance of minimum curing periods listed above does not relieve Contractor of responsibility for safety of structure during construction.

D. Remove wood forms from under floors, ramps, steps, and similar places (through temporary openings if necessary) so no material will be left to rot or to be infested by termites.

3.07 FINISHING

A. Schedule of Finishes:
   1. Exterior Formed Surfaces: Rough form finish.
   2. Sidewalks: Woodfloat; heavy broom at ramps or steps.

B. Initial Working:
   1. Remove surface irregularities with bull float or darby before water appears on concrete surface.
   2. Do no further working of surface until time for floating; do not work surface while water is present.

C. Floating:
   1. Begin float operations when bleed water sheen has disappeared and concrete has stiffened sufficiently to allow walking on surface without leaving heel prints more than 1 inch deep. Use magnesium or aluminum power float.
   2. Premature finishing brings excessive fines to surface and causes finished slab to have soft surface which will dust.

D. Trowelling:
   1. Delay trowelling as long as possible to prevent working excess fines and water to surface. Do not begin until surface moisture film and shine remaining after floating have disappeared.
   2. Power trowel where possible; use hand trowel in inaccessible areas.
   3. Do not re-wet surface to trowel.

E. Provide ACI Class A tolerance; 1/8 inch variation in 10 feet, measured with straight edge laid in any direction.

F. Pitch to drains 1” inch per foot nominal.

3.08 CURING

A. Chemical Curing:
   1. Apply specified curing compound to damp concrete surfaces as soon as possible after final finishing operations are complete, but no later than 2 hours. Apply uniformly in a continuous operation by power spray equipment in accordance with manufacturer's directions. Do not use hand pump sprayer, apply only with airless sprayer to produce mist.
      a. Do not use membrane curing compounds on surfaces which are to be covered with a coating material applied directly to the concrete or with a covering material bonded to the concrete, such as liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials, unless otherwise acceptable to the Owner. The Contractor shall obtain from the curing compound manufacturer a written guarantee that its compound will not be detrimental to bonding of flooring adhesives or surface materials. This guarantee shall be submitted to the Owner at the time request is made for use of curing compound.

b. Do not use curing compounds on surfaces to which additional concrete or cementitious finishing materials are to be applied. Such areas shall be cured by moist curing method.

B. Moist Cure for Exterior Concrete: Place wet, moisture-containing fabric covering as soon as concrete has hardened sufficiently to prevent surface damage.
   1. Cover entire surface, including edges of slabs such as paving or sidewalks.
   2. Keep coverings continually moist so that a film of water remains on concrete surface throughout curing period.
   3. Maintain concrete in moist conditions for not less than seven days after placement.

3.09 DEFECTIVE CONCRETE

A. Replace concrete not conforming to required levels and lines, details, and elevations.

B. Replace concrete not properly placed or of the specified type.

C. Do not impair appearance or strength of structure in removal or replacement procedures.

3.10 FIELD QUALITY CONTROL

A. Testing laboratory will inspect and control concrete mixing of transit-mix trucks at start of each day's mixing. Prevailing conditions will be compared to criteria indicated on appropriate design mix, including temperature, moisture, and condition of aggregates. Significant deviations will be immediately reported to design mix laboratory, and corresponding adjustment shall be made before materials are discharged.

B. Testing laboratory will control addition of water to concrete at job site and length of time concrete is allowed to remain in truck during pour.

C. Testing laboratory will certify each delivery ticket indicating class of concrete delivered or poured, amount of water added, and time at which cement and aggregate were loaded into truck and time at which concrete was discharged from truck.

D. Provide and pay for the following:
   1. Qualification of proposed materials and establishment of mix designs in accordance with ACI 318.
   2. Testing services needed or desired by Contractor for his purposes.

E. Evaluation and Acceptance:
   1. Strength level of concrete will be considered satisfactory if 90% of strength test results and averages of all sets of three consecutive strength tests results equal or exceed specified strength and no individual test result is below specified compressive strength by more than 500 psi, and flexural strength by 75 psi.
   2. Complete concrete work will not be accepted unless requirements of ACI 301, Chapter 18, have been complied with.
   3. Where average strength of laboratory control cylinders, as shown by tests, falls below minimum ultimate compressive strength specified, Contracting Officer's representative reserves the right to require Contractor to provide improved curing conditions of temperature and moisture to secure required strength. If average strength of laboratory control cylinders should fall so low as to cause portions of structure to be in question by Contracting Officer's representative, Contractor shall follow core procedure set forth in ASTM C42. If results of core test indicate, in load testing, or strengthening as may be ordered by Contracting Officer's representative shall be provided by Contractor without additional cost to AAFES. If core tests are so ordered and results of such tests disclose that strength of structure is as required by provisions of Specifications and Drawings, cost

of test will be borne by Owner. If in the opinion of the Contracting Officer's representative, the strength of structure is inadequate, replacement will be required.

F. Reports:
   1. Testing Laboratory reports will be furnished as follows:
      a. Concrete Supplier: One copy.
      b. Contractor: One copy.
      c. Contracting Officer: One copy.
      d. Architect: One copy.
      e. Engineer: One copy.
   2. Reports will be made and distributed immediately after respective tests or inspections are made.
   3. Where reports indicate deviations from Contract Documents, they will also include determination of probable cause of deviation and, where applicable, recommendation for corrective action.
   4. Wherever testing laboratory recognizes trend of decreasing quality in concrete due to changing seasons, conditions of curing, or other cause, this will be brought to attention of Contracting Officer's representative, along with recommendation for corrective action to be taken before materials fall below requirements of these Specifications.

G. Authority and Responsibilities of Testing Laboratory:
   1. Laboratory representative will immediately notify Contracting Officer's representative and Contractor of deviations from specifications and accepted design mixes observed at mixing plant or job site.
   2. If, in the opinion of laboratory representative, deviation observed will be probable cause for subsequent rejection of material, representative will inform Contractor and Contracting Officer's representative so that timely decision may be made as to whether or not to continue operations.
   3. Subsequent to on-the-spot verbal notification, laboratory will file written report of deficiencies or deviations noted, including summary of conversations and decisions made and actions taken at time.
   4. Testing laboratory will control field adjustment made to concrete mixes to compensate for field conditions and report same.

3.11 PROTECTION

A. Protect finished work.

B. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

3.12 CLEANING

A. Remove forms, equipment, protective coverings, and rubbish resulting from concrete operations. Leave finished concrete surfaces in clean conditions. After sweeping with ordinary broom and removing mortar, concrete droppings, loose dirt and mud, wash concrete with soapy water and rinse with clean water.

END OF SECTION

SECTION 02580

PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Related Sections:
   1. Section 02511: Asphaltic Concrete Paving and Base Course
   2. Section 02513: Concrete Walks, Curbs and Paving

B. Work shall comply with Tyndall AFB regulations and requirements of all governing authorities.

1.02 Project Conditions

Traffic Control:

A. Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Utilize flagmen, barricades, warning signs, and warning lights as required for safe working conditions.

PART 2 PRODUCTS

2.01 MATERIALS

Paint:

A. Type: Chlorinated rubber alkyd, FS TT-P-115, Type III, factory mixed, quick-drying, nonbleeding.

B. Colors: (Unless noted on plan)

1. Lane Striping:	Yellow
2. Handicap Symbols:	Blue or Per Local Code
3. Parking Stall Striping:	White
4. Directional Arrows and Wording at Entrances and Exits:	White
5. Directional Arrows in Parking Lot:	White
6. Stop Bars:	White

PART 3 EXECUTION

3.01 PREPARATION

Sweep and clean surface as necessary to eliminate loose -material, dust, oil, grease or other material or impurities that would hamper bonding of paint to surface.

3.02 APPLICATION

A. Apply paint at manufacturer's recommended rate with total minimum of 100 to 110 sq. ft./gal. Apply with mechanical equipment to produce uniform straight edges.

B. Painting of traffic markings shall consist of two (2) coats, one (1) applied as stated above and the other six (6) to seven (7) months after opening.

END OF SECTION

SECTION 02690

STORM DRAINAGE, STORM MANHOLES, WATER SUPPLY AND SANITARY SEWER SYSTEMS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Related items necessary to perform work:
   1. Storm drainage system.
   2. Sanitary sewers.
   3. Water lines.

B. Work shall comply with Tyndall AFB regulations and requirements of all governing authorities on said above items and shall supersede the lesser specification.

C. Related Section:
   Section 02222: Excavating, Backfilling, and Compacting for Utilities.

1.02 JOB CONDITIONS

A. Set lines, elevations, and grades for utility and drainage system work and control system for duration of work, including careful maintenance of bench marks, property corners, monuments, or other reference points.

B. Coordinate with building contractor utility tie in points at building. Provide a sign indicating service at all building utility stubs until building contractor ties to site utilities.

C. Provide a sign at all utility stubs or other dead ends. Label each sign indicating the utility.

D. Provide appropriate plug, cap or seal to prevent soil, trash or other debris from entering utility line at all building tie-in points or dead ends. Provide in a manner which will allow future tie-in or extension by others.

1.03 MATERIALS

A. Where plans indicate material types, the contractor shall utilize the material indicated on the plans and refer to appropriate portions of these specifications for specific requirements.

PART 2 PRODUCTS

2.01 PERMITS, CODES AND FEES

A. The intent of this section of the specifications is that the Contractor's bid on the work covered herein shall be based upon the drawings and specifications, and that the work shall comply with all applicable codes and regulations. Contractor shall secure and pay for all permits and utility charges including tap or connection fees.

B. Any utility system that will be dedicated to the Installation: All work on existing and new construction will be coordinated by the Contractor and with the Base and the respective utility company. Contractor shall request Tyndall AFB and the respective utility company to inspect the

work and request a letter from them stating the work is completed in accordance with all their requirements. A copy of this letter shall be submitted to the Contracting Officer's representative.

C. Manholes:
   1. Construct manholes of cast in place concrete, precast concrete, concrete block, or brick masonry as indicated on plans and details to size, shape, and depth indicated, but not less than 4'-0" diameter.
   2. Precast Concrete Manhole with Cast-In-Place Bottom:
      a. After complete of excavation, setting, reinforcing steel and placing inlet and outlet pipes, but prior to placing concrete for invert slab, set precast concrete blocks on foundation to support first joint of manhole barrel which shall be lowered into excavation, grooved end first, and set on concrete blocks. Align vertically and adjust to proper grade prior to placing invert slab which shall be poured immediately after setting of first section of manhole barrel.
      b. Prior to setting subsequent manhole barrel sections, paint both tongue and groove ends with factory recommended primer. Allow primer to set in accordance with manufacturer's recommendation. Place "Raiment" or equivalent, plastic rope on tongue end. Lower next section into position, and remove excess material from interior of structure. Add additional material on exterior of joint, if necessary, for completely watertight joint.
   3. Precast Concrete Manhole with Precast Base Section:
      a. Manhole section shall conform to the requirements of ASTM Specification C-478. Joints between the manhole sections shall be "O"ring rubber gaskets and shall meet the requirements of ASTM C-443.
      b. Two lift holes shall be cast into each cone or riser section for purposes of handling and placement.
      c. Openings for inlet and discharge sewer pipes shall be provided in the manhole base section or in the riser section as per details. Openings shall be at positions and elevations as indicated on the plans or predetermined in the field, and may be cast into the manhole wall or mechanically cored on completed sections. Where pipes are to be sealed into the manhole wall with mortar, openings shall be large enough to permit such variations in both horizontal and vertical position as field conditions may dictate. Mortar for sealing pipes into manholes shall be one part Portland cement and two parts sand by volume. The amount of water used in the mixture shall be enough to produce a stiff workable mix but shall in no case exceed five and one half gallons per sack of cement. Sand shall conform to specification M-45 and cement to specification M-85 of the American Association of State Highway and Transportation officials.
      d. After completion of excavation, set precast base section on a foundation of clean crushed stone to support the base section of manhole. Align vertically and adjust to proper grade and elevation Sections prior to placing additional sections; shall be installed per manufacturer's recommendation. Lift holes shall be sealed watertight.

4. Cast-in-place Manholes:
   Cast-in-place manholes shall be constructed of 3500 psi concrete. Forms shall be accurately made of steel sheets or wood and shapes made up of ample strength to form dense watertight walls to true dimensions. Concrete shall be deposited in evenly distributed layers of about eighteen (18) inches, with each layer vibrated to bond it to the preceding layer. Reference Section 02515, "Cast In Place Concrete".

5. Brick Masonry
   a. Brick masonry for manholes, inlets and catch basins shall conform to details shown on the plans. Where shown on the plans the faces of these structures

shall be given a plaster coat. Mortar for this coat shall be of the same mix as used in laying the brick and the coat shall be not less than 1/4 inch in thickness. Before applying the plaster coat, the brick shall be thoroughly wetted and the surface allowed to dry sufficiently to insure proper bond of the plaster coat. Full mortar beds shall be provided for setting castings required by the plans. Castings shall be set carefully to the specified elevations.

b. The foundation shall be constructed firm and dry. All brick shall be damp at the time of laying. Bricks shall be laid in courses in full, close, uniform, joints of mortar. Adjoining courses shall break joints by one-half length as nearly as practicable. The courses shall be level in all places, except where otherwise directed. All exposed surfaces shall be smooth and clean and the tie joints shall not exceed 1/2 inch in width/ broken or chipped bricks shall not be used in the faces of the masonry. The joints shall be cleaned and pointed before the mortar sets. The exposed surfaces of the bricks shall not be smeared with mortar forced out of the joints or that used in pointing, but shall be kept clean and free from mortar stains. For straight walls, every other course shall be a header course. No masonry work shall be done in freezing weather.

D. Inlets:
Construct inlets of cast in place concrete, precast concrete, concrete block or brick masonry as indicated on plans and details and the above requirement under “Manholes” to size, shape, and depth indicated, but not less than 4’0” diameter.

E. Main and Lateral Pipes:
Neatly cut off main and lateral pipes flush with inside of manhole or inlet where they enter structure walls. Fill in all irregularities and rough edges with non-shrinking grout.

F. Inverts:
Shape inverts for smooth flow across structure floor. Use concrete and mortar to obtain proper grade and contour and finish surface with fine textured wood float.

G. Cast Iron Frames, Covers, and Grates:
All covers for manholes shall have cast in place the words “Storm Sewer”. After completion of manhole or inlet, set cast iron frame in full mortar bed after adjusting to required elevation.

H. Manhole and Inlet Adjustment:
1. Manhole covers or gratings shall be adjusted by using precast adjustment rings, brick masonry and grout. All work shall be done in good workmanlike manner by competent workmen and the unit re-established in proper working order at its new elevation.
2. When adjustment to manhole or inlet exceeds a total of 18 inches from the reduced section of manhole to the top of casting, the reduced section shall be removed and manhole or inlet reconstructed to proper elevation. Reconstruction shall be made using the same material as existing or approved by Engineer.
3. Any manhole or inlet cover, grating or other material broken, unfit for reuse or not designed for H-20 loads shall be replaced.

2.02 STORM DRAINAGE SYSTEM (SEE DRAWINGS FOR PRODUCT REQUIREMENT)

A. Reinforced Concrete Pipe: Comply with requirements of ASTM C 76, Class III, unless otherwise indicated on Drawings, installed with flexible plastic (Bitumen) gaskets at all joints. Gaskets shall comply with AASHTO M-198 75I, Type B, and shall be installed in strict accordance with pipe manufacturer's recommendations.

B. Polyvinyl Chloride (PVC) Pipe: Pipe and fittings shall comply with ASTM D 3034, rated SDR 35. Pipe shall be continually marked with manufacturer's name, pipe size, cell classification, SDR rating, and ASTM D 3034 classification. Pipe joints shall be integrally molded bell ends in accordance with ASTM D 3034, with factory supplied elastomeric gaskets and lubricants.

2.03 SANITARY SEWER SYSTEM

A. Where Mechanical drawings and specifications indicate a material type, the mechanical drawings and specifications shall supersede the requirements of this regarding material requirements for sewer systems on site.

B. All current criteria of Tyndall AFB and all authorities having jurisdiction shall be followed.

C. Ductile Iron Sanitary Sewer: Pipe and fittings shall comply with class 52.

D. Manholes:
   1. Construct manholes of precast concrete or brick masonry as indicated on plans and details to size, shape, and depth indicated, but never less than 4'0" inside diameter.
   2. Manhole construction shall comply with precast manhole construction and brick masonry construction described under "STORM DRAINAGE SYSTEM" article.

E. Main and Lateral Pipes: Neatly cut off main and lateral pipes flush with inside of manhole or inlet where they enter structure walls, and point up irregularities and rough edges with non-shrinking grout.

F. Inverts: Shape inverts for smooth flow across structure floor as shown on Drawings. Use concrete mortar to obtain proper grade and contour and finish surface with fine textured wood float.

G. Cast Iron Frame and Cover: All covers shall have cast in place the words "Sanitary Sewer". After completion of manhole or inlet, set cast iron frame in full mortar bed after adjusting to required elevation.

2.04 WATER DISTRIBUTION SYSTEM

A. Where Mechanical drawings and specifications indicate a material type, the mechanical drawings and specifications shall supersede the requirements of this regarding material requirements for sewer systems on site. All other pipes that are installed below grade and outside building shall comply with one or combination of following, as indicated on plans:
   1. Seamless Copper Tubing: Type “K” roll form in accordance with ASTM B 88-62 and installed with wrought copper fittings in accordance with ANSI B16.22. All underground solder joints shall be made using Sel-Fos Silver Solder.
   2. Ductile Iron Water Pipe: In accordance with ANSI A21.51, Fittings shall be either mechanical joint or push-on joint complying with ANSI A21. 10 or ANSI 21. 11. (AWWAC-151) (as indicated on plan or if not indicated on plan use Class 50 for 6" and larger 3" and 4" Class 51).

B. Water pipe accessories, such as tapping sleeves with valves and valve boxes, gate valves with valve boxes, Base indicator. valves, check valves, and fire hydrants, shall have cast iron mechanical joint, 350 lb. working pressure and shall meet or exceed specifications of American Water Works Association.

C. Install gate valves as indicated on Drawings with valve stem vertical and plumb. Install valve

boxes in a manner that will not transmit loads, stress, or shock to valve body.

D. Center valve box over operating nut of valve vertical and plumb. Securely fit valve box together leaving cover flush with finished surface.

E. Install fire hydrant assemblies as indicated on Drawings in vertical and plumb position with steamer nozzle pointed toward building unless otherwise directed by local authorities. Support hydrant assembly on concrete pad and firmly braced on side opposite inlet pipe against undisturbed soil with concrete blocking. Place minimum of 6 cu. ft. of crushed stone or gravel having good drainage characteristics around hydrant weephole, hydrant base and barrel after thrust blocking has cured at least 24 hours. Exercise care when backfilling and compacting so proper vertical position will not be altered.

F. Place thrust blocking consisting of 3,000 psi concrete to provide sufficient bearing area to transmit unbalanced thrust from bends, tees, caps, or plugs to undisturbed soil without loading undisturbed soil in excess of 2,500 lb./sq.ft. when water main pressure is 100 psi.

G. Connections with Existing Pipelines: where connections are made between new work and existing piping, make connection using suitable fittings for conditions encountered. Make each connection with existing pipe at time and under conditions which least interfere with operation of existing pipeline service. Prior to making connection, thoroughly disinfect new fittings and surfaces of an existing line (except where as required by local ordinances, construction necessity or for public convenience) with a solution of sodium hyperchloride (chlorine) in a concentration of not less than 50 parts per million for a period of not less than 24 hours. After disinfection, thoroughly flush the new fittings and existing lines. Exercise care during installation so as to not contaminate the disinfected surfaces. Provide facilities for proper dewatering and for disposal of water removed from dewatered lines and excavations without damage to adjacent property.

H. Fire Hydrants shall comply with AWWA Standard Specifications C502 and shall meet local standards and requirements, particularly as to nozzle diameters and threads direction of openings and cap nuts. Fire hydrants shall have three (3) hose nozzles, a valve opening not less than 5 1/4" the length of hydrant barrel shall be determined by the specified cover over the piping and additional length to bring fire hydrant to proper finish grade. Fire hydrants are to be traffic type unless otherwise noted on plans or required by local standards.

2.05 RELATION OF WATER MAINS TO SEWERS

Whenever a water main crosses over a sewer with less than an 18-inch vertical separation or crosses under a sewer, both the water main and the sewer shall be constructed of Ductile Iron Pipe or PVC Pipe with joints equivalent to water main standards for a distance of 10 feet (10') on each side of the point of crossing. A full section of water main pipe shall be centered at the point of crossing.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL FOR STORM DRAINAGE SYSTEM

A. Flushing Sewers.
Flush all storm sewers with water in sufficient volume to obtain free flow through each line. Remove all obstructions and correct all defects discovered. Remove all silt and trash from catch basins and inlets just prior to final acceptance of the work.

B. Light Test (Storm Sewer).
After backfilling to at least one (1) foot depth over any section of sewer (except building

connection) which should have uniform and straight alignment, flash a light from manhole to manhole, or to manhole of cleanout location. If the view through the lines does not show a vertical axis in full pipe diameter and the horizontal axis in at least 3/4 pipe diameter, remove and relay pipe as necessary to meet such requirements.

3.02 FIELD QUALITY CONTROL FOR SANITARY SEWER SYSTEM

A. Watertight Construction.
It is imperative that all sewers and manholes be built practically watertight and that the Contractor adhere rigidly to the specifications for material and workmanship. After completion, the sewers or section thereof will be tested and gauged, and if filtration is above allowable limits specified, the sewer will be rejected.

B. Inspection.
On completion of each block or section of sewer, or such other time as the Contracting Officer's representative may direct, the block or section of sewer is to be cleaned, tested and inspected. All repairs shown necessary by the test are to be made, broken or cracked pipe replaced, all deposits removed, the sewers lift true to line and grade as herein specified or shown on plans, entirely clean, free from dirt, etc., ready for use. Each section of sewer between manholes is to show from either end on examination a full circle of light.

C. Perform all testing as required by Tyndall AFB Department of Public Works.

D. Limits of Infiltration Methods of Testing.
Measurement of the infiltration will be made before sewage flows are allowed in the sewer and shall be made by means of a V-notch weir, or by measuring the volume direct. All infiltration tests shall be made by the Contractor in presence of the Contracting Officer's representative. All expense of the tests shall be borne by the Contractor. The allowable limit of groundwater infiltration for the entire system of new sewers or any one truck interceptor or outfall following limit of infiltration rates for full acceptance. In case the leakage exceeds the specified rates, the sewer will not be accepted until so repaired that it will comply with these requirements. 50 gallons per inch of diameter per mile day for any stretch of sewer or system of sewer in conjunction with the proposed improvements.

E. Air Testing.
Sewer shall be air tested in accordance with the procedures and requirements of ASTM C828-75T. In the event the pressure drop exceeds the specified rates, the sewer will not be accepted until so repaired that it will comply with the requirements.

F. Schedule inspections by appropriate regulatory authority as not to interfere with construction progress.

3.03 FIELD QUALITY CONTROL FOR WATER SYSTEM

A. Test water distribution system pipe sizes installed below grade and outside building tested in accordance with following procedures:

B. After any section of pipe, fittings, hydrants, valves, etc., has been completed, a hydrostatic and leakage test shall be performed. Test shall be conducted in accordance with NFPA form "Contractor's Material and Test Certificate for Underground Piping" on all fire main or combination fire and domestic mains. Water mains used for domestic service only shall be tested in accordance with AWWA and form "Water Pressure Test Report". Contractor shall conduct test in accordance with instructions on form, arrange for signature as specified and submit completed and acceptable form to Contracting Officer's representative.

C. Slowly fill each valved section of pipe with water, vent air as necessary, and apply specified test pressure by means of pump connected to pipe. Furnish, install, and operate the necessary connections, pump, meter, and gauges. Prior to running any field test, meter shall be tested, sealed, and approved be applicable governing authority at Contractor's expense.

D. Examine exposed pipe, fittings, valves, hydrants, and joints during open-trench test. Repair visible leaks. remove cracked or defective pipes, fittings, valves, or hydrants discovered on consequence of this pressure test. Replace with sound material. Repeat test until no visible leaks are present and there is no loss of pressure shown on test gauge.

E. Unless otherwise required by other governing authority, test gage shall have a face diameter not less than 3½". The gage scale shall not exceed 1½ times the test pressure or be less than 25 psi above test pressure. .

F. Test pipe lines before backfilling at joints, except where otherwise required by construction necessity, local ordinances or for public convenience.

G. Duration of test shall not be less than two hours when joints are exposed, and not less than eight hours when joints are covered.

H. Repair visible leaks that are evident on surface whether joints are covered or not, to eliminate leakage.

I. Furnish copy of results of meter test and hydrostatic pressure test to Contracting Officer's representative within 24 hours of tests.

J. Sterilization:
Sterilize distribution system with sodium hyperchloride(chlorine) before acceptance for domestic operation. Chlorinating materials shall be introduced in liquid form. Amount of chlorine shall be such as to provide dosage of not less than 50 parts per million for 24 hours, system shall be flushed with clean water until residual chlorine content is not greater than 1.0 part/million open and close valves in lines being sterilized several times during contact period. After sterilization, take water and bacteriologically test in accordance with AWWA specifications. Submit to Contracting Officer's representative copies of bacteriological test results. Do not place distribution system in service until approval is obtained from applicable governing authorities.

K. Contractor will furnish Contracting Officer's representative certified "As Built" drawings on all underground utilities showing size, valves, pressure reducers, fire plugs, fittings and other appurtenances, invert elevations, top of manhole elevation and all other horizontal and vertical control with dimensions.

3.04 FINAL ACCEPTANCE

A. At the time of final acceptance of the work performed under the Contract the utilities covered by this Section shall be completed in every respect and in perfect operating condition. All surplus materials of every character resulting from the work of this section shall have been removed. Sanitary and storm sewers shall be free from sand, silt or any other obstructions.

B. Any defects discovered in the utilities subsequent to this inspection shall have been corrected. Final acceptance of water system shall not be complete until total system has been inspected and accepted by local fire department. A letter by Contractor of acceptance shall be obtained from

Local fire department with original being submitted to Contracting Officer's representative. All other utilities to be maintained by local authorities shall be accepted by letter with original being submitted to Contracting Officer's representative.

C. Contractor will furnish Contracting Officer's representative certified "As Built" drawings on all underground utilities showing size, valves, pressure reducers, fire plugs, fittings and other appurtenances, invert elevations, top of manhole elevation and all other horizontal and vertical control with dimensions.

D. As-Built drawings will consist of marked up utility prints showing actual location signed by Contractor. As-built drawings are not as-built survey. .

E. All testing required by this section of these specifications shall be preformed and paid by the contractor. The Contractor shall provide the owner with copies of all test results.

END OF SECTION

SECTION 02821

CHAIN LINK FENCE AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Chain link fence surround and gates at Dumpster Enclosure and at Recycling Enclosure.

B. Fence framework, fabric, and accessories.

C. Excavation for post bases; concrete foundation for posts.

D. Manual gates and related hardware.

1.02 RELATED REQUIREMENTS

A. Section 03300 - Cast-in-Place Concrete: Concrete anchorage for posts.

1.03 REFERENCE STANDARDS

A. ASTM A 392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric; 2007.

B. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2009a.

C. CLFMI CLF 2445 - Product Manual; Chain Link Fence Manufacturers Institute; 1997.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

C. Samples: Submit two samples of fence fabric, and slat infill, illustrating construction and colored finish.

D. Project Record Documents: Accurately record actual locations of perimeter posts relative to property lines and easements.

1.05 QUALITY ASSURANCE

A. Chain link fabric, posts, and components, and installation shall conform to the requirements of the CLFMI Product Manual unless otherwise shown or specified.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

PART 2 PRODUCTS

2.01 MATERIALS AND COMPONENTS

A. Materials and Components: Conform to CLFMI Product Manual. Provide finished height as indicated on plans.

B. Steel Posts: Type IA steel conforming to CLFMI and as specified hereinafter.

C. Fabric size: No. 9 gage (0.148 nominal) galvanized in 2" mesh; ASTM A 392, top and bottom selvages twisted and barbed, height as shown. Furnish vision / privacy slats or inserts in 1 piece widths, vinyl coated dark brown color approved by Installation.

D. End, Corner, and Pull Posts: Minimum sizes and weights as follows refer to drawing details for dimensions
   1. Up to 12 Foot Fabric Height: Type IA in accordance with CLFMI Product Manual.
      a. Type I Posts: Round; 4.0 inch outside diameter pipe, 9.10 lbs/lin ft.

E. Line (Intermediate) Posts: Minimum sizes and weights as follows.

1. Over 8 Foot Fabric Height:
   a. Type I Posts:
      1) Round: 4 inch outside diameter pipe, 9.10 lbs/lin ft.

F. Gate Posts: Type I in accordance with CLFMI Product Manual.

G. Top, Bottom, and Intermediate Rails: Type I in accordance with CLFMI Product Manual.
   1. Manufacture's longest lengths.
   2. Couplings. Expansion type, approximately 6 inches long.
   3. Attaching Devices: Means of attaching top rail securely to each gate, corner, pull and end post.

H. Sleeves: Galvanized steel pipe not less than 6-inches long with inside diameter not less than ½ inch greater than outside diameter of pipe. Provide steel plate closure welded to bottom of sleeve of width and length not less than 1 inch greater than outside diameter of sleeve.

I. Tension Wire: 7 gage galvanized steel conforming to CLFMI, Laced at bottom of fabric.

J. Wire Ties: Class 1 galvanized steel, no less than 9 gage.

K. Post Brace Assembly: Manufacturer's standard adjustable brace at end of gate posts and at both sides of corner and pull posts, with horizontal brace located at mid height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375-inch diameter rod and adjustable tightener.

L. Post Tops: Galvanized steel, weather tight closure cap for each tubular post. Furnish caps with openings to permit passage of top rail.

M. Stretch Bar Bands: Manufacturer's standard

N. Gate Cross bracing: 3/8-inch diameter galvanized steel adjustable length truss rods.

O. Ready Mix Concrete: ASTM C94, mix design as follows:
   1. Design mix to produce normal weight concrete consisting of Portland cement, aggregate, water-reducing admixture, air-entraining admixture, and water to produce following:
      a. Compressive Strength: 3,000 psi, minimum at 28 days, unless otherwise indicated on Construction Drawings.
      b. Slump Range: 1 to 3 inches at time of placement
      c. Air Entrainment: 5 to 8 percent

P. Water: Clean

Q. Swinging Gate Hardware:
   1. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit full 180-degree gate opening. Provide a pair of 1 1/2-inch hinges for each leaf over 6'-0" nominal height.
   2. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.

R. Double Gates Hardware: Provide gate stops for double gates, consisting of mushroom type of flush plate with anchors set in concrete, to engage center drop rod or plunger bar. Include locking device and padlock eye as integral part of latch, using 1 padlock for locking both gate leaves.

2.02 ACCESSORIES

A. Privacy Slats: Vinyl strips, sized to fit fabric weave, dark brown color as approved by Installation.

2.03 FINISHES

A. Components and Fabric: Vinyl coating, AAFES color as selected over coating of 1.8 oz/sq ft galvanizing.

B. Accessories: Same finish as framing.

C. Color(s):dark brown as selected by Contracting Officer's Representative and as approved by the Installation.

2.04 GATE FABRICATION

A. Fabricate swing gate perimeter frames of 1.90-inch OD pipe, galvanized steel. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members maximum of 8' 0" apart.

B. Assemble gate frames by welding or special fittings and rivets, for rigid connections. Install same fabric as for fence with stretcher bars at vertical edges. Install diagonal cross bracing on gates as required ensuring rigid frame without sag or twist. Bars may be used at top and bottom edges. Attach stretchers to gate frame at 15 inches o.c. maximum.

C. Attach hardware to provide security against removal or breakage.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install chain link fence in accordance with CLFMI Product Manual unless otherwise specified herein.

B. Comply with recommended procedures and instructions of fencing manufacturer. Provide secure, aligned installation with line posts spaced at 10' 0" o.c. maximum.

C. Methods for Setting Posts:
   1. Grade-Set Posts:
      a. Drill or hand excavate to a depth approximately 3 inches lower than post bottom. Set post bottom not less than 36 inches below finish grade.
      b. Excavate each post hole to 12 inch diameter, or not less than four times diameter of post.
      c. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations. Extend concrete footing 2-inches above grade and trowel crown to shed water. Post shall be set plumb within 1/4" in 10 feet.
   2. Sleeve Set Posts: Anchor posts by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.

D. Top Rails: Run rail continuously, bending to form radius for curved runs. Provide expansion couplings as recommended by manufacturer.

E. Center Rails: Provide center rails where indicated. Install in 1 piece between posts and flush with post on fabric side, using special offset fittings where necessary.

F. Brace Assemblies: Install braces so posts are plumb when diagonal rod are under proper tension.

G. Tension Wire: Install tension wires through post cap loops before stretching fabric and tie to each post cap with not less than 6 gauge galvanized wire. Fasten fabric to tension wire using 11 gauge galvanized steel hog rings spaced 24-inches o.c.

H. Fabric: Leave approximately 2 inches between finish grade and bottom selvage. Pull

fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

I. Stretcher Bars: Secure at end, corner, pull, and gate posts by threading through or clamping to fabric at 4 inches o.c. and secure to posts with metal bands spaced at 15 inches o.c.

J. Tie Wires:
   1. Use U-shaped wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly when ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.
   2. Tie fabric to line posts with wire ties spaced 12 inches o.c. Tie fabric to rails and braces with wire ties spaced 24 inches o.c. Tie fabric to tension wires with hog rings spaced 24-inches o.c.
   3. Manufacturer's standard procedure will be accepted if of equal strength and durability.

K. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

L. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground set items in concrete for anchorage. Adjust hardware for smooth operation and lubrication.

3.02 ADDITIONAL INSTALLATION PROVISIONS

A. Use U -shape tie wires, conforming to the diameters of pipe, that clasp the pipe and fabric firmly with ends twisted at least 2 full turns.

B. Bend ends of exposed wires to minimize hazards to persons or clothing.

C. Install nuts for fasteners on tension bands and hardware bolts on the side of the fence opposite the fabric. The ends of bolts, once secure and checked for smooth operation, shall be pined to prevent removal of nuts.

D. Repair coatings damaged in the field with methods and techniques as recommended by the manufacturer.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Position: 1 inch.

END OF SECTION

SECTION 02822

CHAIN LINK FENCES AND GATES (SITE RELATED)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Chain link fences and gates associated with sitework.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)
   1. ASTM A 392 - Zinc-Coated Steel Chain-Link Fence Fabric
   2. ASTM C 94 - Ready-Mixed Concrete

B. Chain Link Fence Manufacturers Institute (CLFMI) latest edition Product Manual

1.03 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines and easements.

1.04 QUALITY ASSURANCE

A. Chain link fabric, posts, and components, and installation shall conform to the requirements of the CLFMI Product Manual unless otherwise shown or specified.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum 3 years documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Posts: Type I or II or roll formed "C" Section steel conforming to CLFMI and as specified hereinafter.

B. Fabric: No. 9 gage (0.148 nominal) galvanized steel wire in 2 inch mesh; ASTM A 392, top and bottom selvages twisted and barbed, height as shown. Furnish 1-piece fabric widths.

C. End, Corner, and Pull Posts: Minimum sizes and weights as follows.
   1. Up to 13 Foot Fabric Height: Type I or II in accordance with CLFMI Product Manual.
   2. 13 foot and over Fabric Height (If required):
      a. Type I Posts: Round; 4.0 inch outside diameter pipe, 9.10 lbs/lin ft.
      b. Type II Posts: 4.0 inch outside diameter pipe, 6.56 lbs/lin.ft.

D. Line (Intermediate) Posts: Minimum sizes and weights as follows.
   1. Up to 8 Foot Fabric Height: Type I, II, or "C" Section in accordance with CLFMI Product Manual.
   2. Over 8 Foot Fabric Height:
      a. Type I Posts:
         1) Round: 2.875 inch outside diameter pipe, 5.79 lbs/lin ft.
         2) Square: 2.5” x 2.5” outside dimension, 5.10 lbs/lin ft.
      b. Type II Posts: 2.875 inch outside diameter pipe, 4.64 lbs/lin ft.

E. Gate Posts: Type I or II in accordance with CLFMI Product Manual.

F. Top, Bottom, and Intermediate Rails: Type I or II in accordance with CLFMI Product Manual
   1. Manufacture’s longest lengths.
   2. Couplings. Expansion type, approximately 6 inches long.
   3. Attaching Devices: Means of attaching top rail securely to each gate, corner, pull and end post.

G. Sleeves: Galvanized steel pipe not less than 6-inches long with inside diameter not less than ½ inch greater than outside diameter of pipe. Provide steel plate closure welded to bottom of sleeve of width and length not less than 1 inch greater than outside diameter of sleeve.

H. Tension Wire: 7 gage galvanized steel conforming to CLFMI, Marcelled, located at bottom of fabric.

I. Wire Ties: Class 1 galvanized steel, no less than 9 gage.

J. Post Brace Assembly: Manufacturer's standard adjustable brace at end of gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375-inch diameter rod and adjustable tightener.

K. Post Tops: Galvanized steel, weather tight closure cap for each tubular post. Furnish caps with openings to permit passage of top rail.

L. Stretcher Bars: Galvanized steel, 1 piece lengths equal to full height of fabric, with minimum cross-section of 3/16-inch x 3/4-inch. Provide one stretch bar for each gate and end post, and two for each corner and pull post.

M. Stretch Bar Bands: Manufacturer's standard

N. Gate Cross-bracing: 3/8-inch diameter galvanized steel adjustable length truss rods.

O. Ready Mix Concrete: ASTM C94, mix design as follows:
   1. Design mix to produce normal weight concrete consisting of Portland cement, aggregate, water-reducing admixture, air-entraining admixture, and water to produce following:
      a. Compressive Strength: 3,500 psi, minimum at 28 days, unless otherwise indicated on Construction Drawings.
      b. Slump Range: 1 to 3 inches at time of placement
      c. Air Entrainment: 5 to 8 percent

P. Water: Clean

Q. Swinging Gate Hardware:
   1. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit full 180-degree gate opening. Provide a pair of 1 1/2-inch hinges for each leaf over 6'-0" nominal height.
   2. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.

R. Double Gates Hardware: Provide gate stops for double gates, consisting of mushroom type of flush plate with anchors set in concrete, to engage center drop rod or plunger bar. Include locking device and padlock eye as integral part of latch, using 1 padlock for locking both gate leaves.

2.02 GATE FABRICATION

A. Fabricate swing gate perimeter frames of 1.90-inch OD pipe, galvanized steel. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members maximum of 8'-0" apart.

B. Assemble gate frames by welding or special fittings and rivets, for rigid connections. Install same fabric as for fence with stretcher bars at vertical edges. Install diagonal cross-bracing on gates as required ensuring rigid frame without sag or twist. Bars may be used at top and bottom edges. Attach stretchers to gate frame at 15 inches o.c. maximum.

C. Attach hardware to provide security against removal or breakage.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install chain link fence in accordance with CLFMI Product Manual unless otherwise specified herein.

B. Comply with recommended procedures and instructions of fencing manufacturer. Provide secure, aligned installation with line posts spaced at 10'-0" o.c. maximum.

C. Methods for Setting Posts:
   1. Grade-Set Posts:
      a. Drill or hand excavate to a depth approximately 3 inches lower than post bottom. Set post bottom not less than 36 inches below finish grade.
      b. Excavate each post hole to 12 inch diameter, or not less than four times diameter of post.
      c. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations. Extend concrete footing 2-inches above grade and trowel crown to shed water.

      d. Post shall be set plumb within 1/4" in 10 feet.

2. Sleeve Set Posts: Anchor posts by means of pipe sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with nonshrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.

D. Top Rails: Run rail continuously, bending to form radius for curved runs. Provide expansion couplings as recommended by manufacturer.

E. Center Rails: Provide center rails where indicated. Install in 1 piece between posts and flush with post on fabric side, using special offset fittings where necessary.

F. Brace Assemblies: Install braces so posts are plumb when diagonal rod are under proper tension.

G. Tension Wire: Install tension wires through post cap loops before stretching fabric and tie to each post cap with not less than 6 gauge galvanized wire. Fasten fabric to tension wire using 11 gauge galvanized steel hog rings spaced 24-inches o.c.

H. Fabric: Leave approximately 2 inches between finish grade and bottom selvage. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

I. Stretcher Bars: Secure at end, corner, pull, and gate posts by threading through or clamping to fabric at 4 inches o.c. and secure to posts with metal bands spaced at 15 inches o.c.

J. Tie Wires:
   1. Use U-shaped wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly when ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.
   2. Tie fabric to line posts with wire ties spaced 12 inches o.c. Tie fabric to rails and braces with wire ties spaced 24 inches o.c. Tie fabric to tension wires with hog rings spaced 24-inches o.c.
   3. Manufacturer's standard procedure will be accepted if of equal strength and durability.

K. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite f fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

L. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubrication.

3.02 ADDITIONAL INSTALLATION PROVISIONS

A. Use U –shape tie wires, conforming to the diameters of pipe, that clasp the pipe and fabric firmly with ends twisted at least 2 full turns.

B. Bend ends of exposed wires to minimize hazards to persons or clothing.

C. Install nuts for fasteners on tension bands and hardware bolts on the side of the fence opposite the fabric. The ends of bolts, once secure and checked for smooth operation, shall be pined to prevent removal of nuts.

D. Repair coatings damaged in the field with methods and techniques as recommended by the manufacturer.

END OF SECTION

SECTION 02846

SITE REGULATORY SIGNS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Provide traffic control signs complying with Florida Department of Transportation, Federal Highway Administration's Manual "Uniform Traffic Control Devices" and as required by other local ordinances or regulations or other governing authorities and as specified herein. See Drawings for type and quantity of signs required.

B. Work shall comply with Tyndall AFB requirements and requirements of all governing authorities on site graphics.

1.02 SUBMITTALS

Submit manufacturer's mounting instructions to Contracting Officer's representative.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

Signs shall be equivalent to those manufactured by SA-SO, Inc., 1185 - 108th Street, Grand Prairie, Texas.

2.02 SIGNS (SEE DRAWINGS FOR SIGNS REQUIRED)

A. "STOP" Signs: 24"x24" octagon, reflectorized copy and border.

B. "HANDICAPPED SYMBOL" Signs: 18"x24", blue legend on white reflective or baked enamel background.

2.03 POSTS

Provide #3 galvanized channel posts (3 lbs./ft.) with sign mounting hardware for each sign.

2.04 MOUNTING HARDWARE

Provide stainless steel nuts, bolts and washers.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install posts in 18" round and 24" deep concrete foundations. Set posts vertical and plumb with bottom of sign at 5'-0" above finish grade.

B. Mount signs in accordance with manufacturer's instructions.

END OF SECTION

SECTION 02921

SEEDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hydroseeding, mulching and fertilizer.

B. Maintenance.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to erosion and sedimentation control and stormwater design quantity control.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 02200 - Earthwork: Topsoil material.

D. Section 02923 - Sodding.

1.03 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 PRODUCTS

2.01 SEED MIXTURE

A. Seed Mixture:
   1. Centipede Grass(Eremhochloa Ophivroides), selected to result in a permanent planting.

2.02 SOIL MATERIALS

A. Topsoil: Excavated from site and free of weeds.

2.03 ACCESSORIES

A. Mulching Material:

1. Use wood cellulose fiber or natural wood fiber suitable for hydraulic application as part of the hydroseeding mixture.
2. Apply oat or wheat straw or hay mulch after the hydroseeding operation.
   a. Mulch shall be free from weeds, foreign matter detrimental to plant life, and dry.

B. Fertilizer: Recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated by analysis.

C. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

D. Erosion Fabric: Jute matting, open weave.

E. Herbicide: As recommended by manufacturer for conditions encountered.

F. Stakes: Softwood lumber, chisel pointed.

G. String: Inorganic fiber.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this Section.

3.02 PREPARATION

A. Prepare subgrade in accordance with Section 02200.

B. Place topsoil in accordance with Section 02200.

3.03 FERTILIZING

A. Fertilizer may be applied either before the hydroseeding operation or incorporated in and applied with the water-seed-mulch mixture.

B. Apply fertilizer in accordance with manufacturer's instructions.

C. If fertilizer is applied before the hydroseeding operation:
   1. Apply after smooth raking of topsoil.
   2. Mix thoroughly into upper 2 inches of topsoil.
   3. Lightly water to aid the dissipation of fertilizer.

3.04 HYDROSEEDING

A. Apply seeded slurry with a hydraulic seeder evenly in two intersecting directions.

B. Do not hydroseed area in excess of that which can be mulched on same day.

C. Immediately following seeding, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.

D. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

E. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.05 PROTECTION

A. Identify seeded areas with stakes and string around area periphery.

B. Cover seeded slopes where grade is 4 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

C. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Provide 12 inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.

D. Secure outside edges and overlaps at 36 inch intervals with stakes.

E. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

F. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6 inches.

3.06 MAINTENANCE

A. Provide maintenance at no extra cost to GovernmentGovernment; Government will pay for water.

B. See Section 01700 - Execution Requirements, for additional requirements relating to maintenance service.

C. Maintain seeded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

D. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

E. Neatly trim edges and hand clip where necessary.

F. Immediately remove clippings after mowing and trimming.

G. Water to prevent grass and soil from drying out.

H. Roll surface to remove minor depressions or irregularities.

I. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

J. Immediately reseed areas that show bare spots.

K. Protect seeded areas with warning signs during maintenance period.

END OF SECTION

SECTION 02923

SODDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fertilizing.

B. Sod installation.

C. Maintenance.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to erosion and sedimentation control and stormwater design quantity control.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 02200 - Earthwork: Topsoil material.

D. Section 02921 - Seeding.

1.03 REFERENCE STANDARDS

A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding; Turfgrass Producers International; 2006.

1.04 DEFINITIONS

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.05 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Certification: Submit certification of grass species and location of sod source.

C. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.06 QUALITY ASSURANCE

A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State in which the project is located.

1.07 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver sod on pallets. Protect exposed roots from dehydration.

B. Do not deliver more sod than can be laid within 24 hours.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sod: TPI, Certified Turfgrass Sod quality; cultivated grass sod; type indicated below; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft. Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.
   1. Centipede Grass (Eremochloa ophiuroides).

B. Topsoil: Excavated from site and free of weeds.

C. Fertilizer:Recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated by analysis.

D. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

2.02 ACCESSORIES

A. Wood Pegs: Softwood, sufficient size and length to ensure anchorage of sod on slope.

B. Herbicide: As recommended by sod producer.

2.03 SOURCE QUALITY CONTROL

A. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this section.

3.02 PREPARATION

A. Prepare subgrade in accordance with Section 02200.

B. Place topsoil in accordance with Section 02200.

3.03 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after smooth raking of topsoil and prior to installation of sod.

C. Apply fertilizer no more than 48 hours before laying sod.

D. Mix thoroughly into upper 2 inches of topsoil.

E. Lightly water to aid the dissipation of fertilizer.

3.04 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod.

B. Lay sod within 24 hours after harvesting to prevent deterioration.

C. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

D. Lay smooth. Align with adjoining grass areas.

E. Place top elevation of sod 1/2 inch below adjoining curbs, sidewalks, or edging.

F. On slopes 6 inches per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.

G. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.

H. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

3.05 MAINTENANCE

A. Proivde maintenance at no extra cost to Government; Government will pay for water.

B. Maintain sodded areas immediately after placement until grass is well established and exhibits a vigorous growing condition.

C. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

D. Neatly trim edges and hand clip where necessary.

E. Immediately remove clippings after mowing and trimming.

F. Water to prevent grass and soil from drying out.

G. Roll surface to remove irregularities.

H. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

I. Immediately replace sod to areas that show deterioration or bare spots.

J. Protect sodded areas with warning signs during maintenance period.

END OF SECTION

SECTION 02950

LAND DISTURBING AND EROSION CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This section shall be done as a part of Section 02110 - Site Clearing.

B. Work of this section includes the installation of devices to collect or trap silt from leaving the site as indicated on drawings, permanent vegetation, temporary vegetation, etc.

C. Work shall comply with Tyndall AFB regulations and requirements of all governing authorities in clearing and erosion control.

D. It is the intent of these specifications for the Contractor to control the erosion produced by this site development using this section as minimum standards. Do not allow silt or erosion to leave the site

E. An NPDES is required for this site; the Contractor shall file for an NOI with Florida Department of Environmental Protection (FDEP) and shall be responsible for filing fees and compliance with the requirements of the permit. Contractor shall contact FDEP at 850-245-8336 for requirements.

F. All areas disturbed which are not paved or otherwise occupied by buildings shall be stabilized as indicated on drawings. If the drawings do not indicate a specific treatment the area shall be stabilized with a minimum of seed and mulch or hydro seed with mulch.

1.02 REFERENCES

A. Florida Department of Transportation-Standard Specifications for Road and Bridge Construction Section 570 Grassing (By Seeding), Section 162 Prepared Soil Layer, Section 104 Prevention, Control and Abatement of Erosion and Water Pollution, Section 580 Landscape Installation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Solid Sod: As indicated on landscape plans and as warranted by site conditions, or where no landscape requirements are provided refer to applicable FDOT sections.

B. Temporary Cover: Rapidly growing plants, such as annual rye grass, small grain, sudangrass and millet and approved by Contracting Officer's representative.

C. Fibrous Materials: An open mesh, web-like material such as jute netting, cotton and paper netting, fiber grass or plastic, that will allow surface drainage to seep through and approved by Contracting Officer's representative.

D. Rip Rap: As per drawings meeting the requirements of Florida Department of Transportation Standard Specification Section 530. Also, see Section 02200 "Earthwork".

E. Crushed Stone: As per drawings and/or a stone ranging in size from one half inch to two inches.

F. Silt Fence: A porous netting on steel or wood post designed for sediment control and approved by Engineer.

G. Topsoil: Topsoil shall meet the requirements of the Florida Department of Transportation Standard Specification Section 162.

PART 3 EXECUTION

3.01 PREPARATION

A. Clearing and grubbing shall be kept to a minimum until erosion control devices are in place.

B. Erosion control devices shown on plans shall be installed as a minimum that will not let silt leave the project confines due to unseen conditions or accidents. Additional measures may be necessary to prevent silt or erosion from leaving site and it shall be contractor's responsibility to insure that erosionable material remains on site at no additional cost to owner.

C. Erosion control devices shall be installed before any grading operations begin. Devices shall be maintained daily during rough site grading.

D. A blanket of clean crushed stone shall be installed at construction entrances and any area used for parking. Stone shall be maintained during all phases of grading.

E. Temporary rip rap shall be installed at exits of all stormwater structures or outlets to prevent erosion.

F. Filter traps shall be installed at all inlet structures to keep piping systems free of siltation, as indicated on plans and details. If not shown on plans, install as a minimum straw bales around inlets with stakes to hold in place. Bales shall be placed end to end around inlet as not to allow silt to pass through. Traps shall remain in place and good working condition until pavement is in place.

G. All disturbed areas shall be seeded and mulched as soon as possible to stabilize soils temporary seeding and mulching is required in disturbed areas that will remain unfinished on extended periods.

H. Any temporary or permanent stockpiles of topsoil, unsuitable material, excess material, etc. stored on site shall be protected with silt fence and vegetation.

I. Contractor shall obtain any erosion control permits required for any work on other sites where borrow and/or waste material may be hauled.

J. The Contractor is responsible for control of dust, runoff from grading operations that cause siltation or pollution of streams. Necessary signs, flagmen, barricades and lights to protect the public are to be provided by the Contractor. All traffic control, markings, signs shall be in accordance with the National Manual of Uniform Traffic Control. Any road or street damaged that is used by the Contractor’s equipment is the responsibility of the Contractor.

3.02 TEMPORARY ACCESS ROAD AND STAGING AREA (ALL WEATHER)

A. Lump sum price will include access road and staging area. Access and staging will be all weather surface maintained by site contractor. “All weather” means site contractor is responsible for all maintenance resulting from roadway use by building contractors and acts of weather. All weather material will be crushed stone. This material will be placed 6” thick above finish subgrade. As site contractor prepares an area for final base and paving they will remove excess material to top of subgrade. Clean uncontaminated material may be used for base material.

B. Areas beyond limits of work shall be protected and remain undisturbed. No trees or underbrush shall be disturbed or scarred. No siltation or erosion beyond limits of work will be permitted. Contractor shall use brush barriers, settling ponds, silt fences, bales of hay, or other methods to

prevent sedimentation, siltation, or erosion beyond limits of clearing. All work shall be in accordance with site plans, details and site specifications. No stream shall be polluted with oils, asphalt or greases. Any damage to area beyond limits of work damaged by Contractor shall be repaired to Government's satisfaction at no cost to AAFES. .

3.03 SLOPE PROTECTION

A. The installation of diversion dikes shall be installed and maintained until curb have been installed. Dikes shall be installed at top of slopes and channel water to discharge points, where temporary rip rap shall be installed to carry water down slopes.

B. Temporary vegetation shall be applied to slopes and drainage areas, following completion of any phase of grading. Refer to landscape specifications for seeding requirements, if applicable. Otherwise refer to section 3.4 A & B.

3.04 VEGETATION

A. Temporary vegetation shall be installed within thirty (30) working days following completion of any phase of grading. Temporary vegetation shall be per the Florida Department of Environmental Protection (FDEP) specifications. Temporary vegetation is not permanent vegetation. All areas to receive vegetation shall have a permanent grass stand prior to closing the FDEP permit for erosion control.

B. Permanent vegetation shall be installed within thirty (30) working days following completion of grading. Permanent vegetation shall be per the FDEP seeding schedule. The contractor is required to seed in accordance to the specific time of year the completion of the construction activity. Contractor shall place four inches (4") of topsoil in all areas to be landscaped.

3.05 MAINTENANCE

A. Erosion control devices and vegetation shall be inspected daily. Any damage will be repaired by the end of that day.

B. Cleaning out of sediment from pipe and structures shall be maintained throughout construction. Silt shall be placed or removed from site per this specification.

C. Sediment devices shall remain in good working conditions and in place until erosion control has been established. Devices can then be removed and vegetation of these areas and/or damaged areas shall be completed.

D. Any silt or soil that leaves the site shall be removed and repaired to the land owner's satisfaction.

3.06 NPDES

A. Comply with all criteria of the NPDES permit issued for this project to include monitoring, testing, installation and maintenance until the permit is terminated at no additional cost to the owner. The contractor may call Gonzalez-Strength & Associates for assistance.

END OF SECTION

STORM WATER POLLUTION PREVENTION PLAN

FOR

CONSTRUCTION ACTIVITIES

AT

Tyndall AFB Construct Shoppette/ Food/Class6/Gas Tyndall AFB, Florida

Prepared For: Parsons Wibel Brummal Alkire/Architects, Inc.
529 South Perry Street
Suite 15
Montgomery, Alabama 36104

Prepared By: Gonzalez-Strength & Associates, Inc.
2176 Parkway Lake Drive
Hoover, Alabama 35244

Feb. 15, 2012

I. SUMMARY OF PERMIT AND PROGRAM REQUIREMENTS

The Stormwater Pollution Prevention Plan (SWPPP) includes, but is not limited to, Specification Section 02950 (which includes the SWPPP), the Erosion and Sedimentation Control Plan included in the Construction Drawings with the Detail Sheet, the Notice of Intent, Generic Permit, Notice of Termination, all records of inspections and activities which are created during the course of the project, and other documents as may be included by reference to this SWPPP. Changes, modifications, revisions, additions, or deletions shall become part of this SWPPP as they occur.

The Operator/Permittee (herein referred to as the AAFES General Contractor) shall amend the plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to surface waters of the State or an MS4, including the addition of or change in location of stormwater discharge points, and which has not otherwise been addressed in the plan. The permittee also shall amend the plan if it proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified under Part V.D.1. of this permit, or in otherwise achieving the Generic objectives of controlling pollutants in stormwater discharge associated with construction activity. In addition, the plan shall be amended to identify any new contractor and/or subcontractor that will implement a measure of the stormwater pollution prevention plan (see Part V.D.6.). Amendments to the plan shall be prepared, signed, dated and kept as attachments to the original plan.

The General Contractor and all subcontractors involved with a construction activity that disturbs site soil or who implement a pollutant control measure identified in the SWPPP must comply with the following requirements of the National Pollutant Discharge Elimination System (NPDES) Generic Permit ("Generic Permit") and any local governing agency having jurisdiction concerning NPDES, stormwater, erosion and sedimentation control:

II. NOTICE OF INTENT REQUIREMENTS

A. Deadlines for Notification.

1. Operators seeking coverage under this generic permit to authorize stormwater discharge associated with construction activity for new large or small construction activities, for which commencement of construction begins after the effective date of this permit, shall file an NOI for coverage under this permit at least two (2) days before commencement of construction.

2. For construction activities where the operator changes, the new operator shall file an NOI for coverage under this permit at least two (2) days before assuming control of the project and the previous operator shall file an NOT to terminate permit coverage in accordance with Part VIII of this permit.

B. Contents of Notice of Intent.

1. In order to obtain coverage under this permit, the operator of the construction activity having an associated stormwater discharge shall submit a completed Notice of Intent to Use Generic Permit for Stormwater Discharge from Large and Small Construction Activities, DEP Form 62-621.300(4)(b), including the applicable permit processing fee as specified in paragraph 62-4.050(4)(d), F.A.C. By completing, signing, and submitting an NOI, the operator is certifying that they meet all eligibility requirements of this permit and are informing the Department of their intent to be covered by, and comply with, the terms and conditions of this generic permit. The Notice of Intent shall be signed in accordance with Part VII.C. of this permit by the operator. The total disturbance area per plan is calculated at 4.1 acres. Based on a disturbance area of 4.1 acres a fee of $_____ is required for the NOI permit. The contractor is responsible for paying the permit fee.

C. Where to Submit.

1. NOIs shall be submitted either electronically or by paper copy. A partially completed copy of the NOI is provided in this SWPPP.

a. The Department encourages the electronic submission of NOIs through the NPDES Stormwater Program's electronic permitting application available at http://www.dep.state.fl.us/water/stormwater/npdes/ .

b. If the operator chooses to submit the NOI by paper copy, the NOI shall be submitted to the following address:

NPDES Stormwater Notices Center, MS# 2510
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

2. A copy of the NOI or letter from DEP confirming coverage under this permit shall be posted at the construction site in a prominent place for public viewing (such as alongside a building permit). Copy to 96 CEG/CEV, 501 Deleon Street, Suite 100, Eglin AFB, FL 32542-5133.

D. Additional Notification.
1. Projects that discharge stormwater associated with construction activity to a municipal separate stormwater system (MS4) shall submit a copy of the NOI to the operator of the MS4.

E. Period of Coverage.
1. Coverage under this generic permit is effective two (2) days after the date of submittal of a complete NOI to the Department.
2. Coverage under this generic permit is limited to a term not to exceed five years from the effective date of coverage.

F. Permit Coverage Renewal.
1. If the project will continue to have stormwater discharge associated with construction activity beyond the initial five year term of coverage, the operator shall submit a new NOI at least two (2) days before expiration of the current term of coverage under this permit.

III. SPECIAL CONDITIONS, MANAGEMENT PRACTICES AND OTHER NON-NUMERIC LIMITATIONS

A. Prohibition of Non-Stormwater Discharges.
1. Except as provided in paragraphs I.B.2 and IV.A.3., all discharges covered by this permit shall be composed entirely of stormwater associated with construction activity.
2. Except as specified in IV.A.3. below, discharges of material other than stormwater associated with construction activity must be in compliance with a Department permit (other than this permit) issued for the discharge, or be exempt therefrom.
3. The following non-stormwater discharges are authorized by this permit provided the non-stormwater component of the discharge is in compliance with paragraph V.D.5.: discharges from fire fighting activities; fire hydrant flushings; waters used to spray off loose solids from vehicles (wastewaters from a more thorough cleaning, including the use of detergents or other cleaners is not authorized by this part) or control dust in accordance with Part V.D.2.c.(2); potable water sources including waterline flushings; irrigation drainage; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; and foundation or footing drains where flows are not contaminated with process materials such as solvents.
4. Discharges resulting from ground water dewatering activities at construction sites are not covered by this permit. Applicants for these discharges must obtain coverage under the Department's Generic Permit for the Discharge of Produced Ground Water from any Non-contaminated Site Activity pursuant to subsection 62-621.300(2), F.A.C.

B. Releases in Excess of Reportable Quantities.

1. The discharge of hazardous substances or oil in the stormwater discharge(s) from a facility or activity shall be prevented or minimized in accordance with the applicable stormwater pollution prevention plan for the facility or activity. This permit does not relieve the operator of the reporting requirements of 40 CFR part 117 and 40 CFR part 302. Where a release containing a hazardous substance in an amount equal to or in excess of a reporting quantity established under either 40 CFR 117 or 40 CFR 302, occurs during a 24 hour period:

a. The operator is required to notify the State Warning Point (800-320-0519 or 850-413-9911) as soon as he or she has knowledge of the discharge;

b. The operator shall submit, within 14 calendar days of knowledge of the release, a written description of: the release (including the type and estimate of the amount of material released), the date that such release occurred, the circumstances leading to the release, and remedial steps to be taken, to the Florida Department of Environmental Protection, NPDES Stormwater Section, Mail Station 2500, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and

c. The stormwater pollution prevention plan required under Part V of this permit must be modified within 14 calendar days of knowledge of the release to: provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the recurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

2. This permit does not authorize the discharge of hazardous substances or oil resulting from an on-site spill.

IV. RETENTION OF RECORDS

A. The Contractor shall retain copies of stormwater pollution prevention plans and all reports required by this permit, and records of all data used to complete the Notice of Intent to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized.

B. The Contractor shall retain a copy of the stormwater pollution prevention plan and all reports, records and documentation required by this permit at the construction site, or an appropriate alternative location as specified in the NOI, from the date of project initiation to the date of final stabilization.

V. TERMINATION OF COVERAGE

A. Notice of Termination.

1. Where a site has been finally stabilized (see Part II for the definition of final stabilization) and all stormwater discharges authorized by this permit are eliminated, the permittee shall submit a completed Notice of Termination (DEP Form 62-621.300(6)), signed in accordance with Part VII.C. of this

permit, within 14 days of final stabilization of the site to terminate coverage under this permit.
2. Elimination of stormwater discharges associated with construction activity means that all disturbed soils at the site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all stormwater discharges associated with construction activity from the site that are authorized by this generic permit have otherwise been eliminated.
3. For construction activities where the operator changes, the existing operator shall file an NOT in accordance with this Part within 14 days of relinquishing control of the project to a new operator.

B. Where to Submit.

1. The contractor is responsible for completing and filing the NOT. The contracto shall submit a Notice of Termination either electronically or by paper copy. A copy of the NOT is provided in this SWPPP.

a. The Department encourages the electronic submission of NOTs through the NPDES Stormwater Program's electronic permitting application available at http://www.dep.state.fl.us/water/stormwater/npdes/ .

b. If the operator chooses to submit the NOT by paper copy, the NOT shall be submitted to the following address:

NPDES Stormwater Notices Center, MS# 2510
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

2. Projects that discharged stormwater associated with construction activity to a municipal separate storm sewer system (MS4) shall submit a copy of the NOT to the operator of the MS4. Copy to 96 CEG/CEV, 501 Deleon Street, Suite 100, Eglin AFB, FL 32542-5133.

VI. STORMWATER POLLUTION PREVENTION MEASURES AND CONTROLS

Site Description

Nature of the construction activity:	This will be an Army & Air Force Exchange Services (AAFES) development with an approximate 7,360 sq ft mini mall with various tenants and a gas station.
Intended sequence of major soil disturbing	• 0-7 days, site prep and stabilized

activities:	construction entrance; • 7-14 days, install perimeter sediment and erosion controls; • 14-30 days, clearing/grubbing over all areas except those that are designated as buffers/conservation easements; • 30-60 days, site grading • 60-90 days, install storm sewer and utilities; • 90-120 days, concrete slab; • 120-150 days, frame structure; • 150-240 days, finish building; • 240-360 days, stabilize site To be completed by Contractor/ Subcontractor(s):
Total area of the site:	4.7 Acres
Total area of the site to be disturbed:	4.1 Acres
Existing data describing the soil or quality of any stormwater discharge from the site:	Existing soil types are Hurricane Sands-soil Drainage Class C, Mandarin Sand – Drainage Class C, Resota Fine Sand – 0 to 5% slopes, DrainageClass A
Receiving Waters	Tyndall AFB MS4, Saint Andrew Bay
Drainage area size for each discharge point:	3.8 acres at the detention pond drainage structure leaving the site.
Latitude and longitude of each discharge point and identify the receiving water or MS4 for each discharge point:	Lat:30°04'08" Lon:85°35'44" Discharges to existing MS4; Conveyed to Saint Andrew Bay

Below is a detailed description of all controls, Best Management Practices (BMPs) and measures that will be implemented at the construction site for each activity identified in

the intended sequence of major soil disturbing activities section. Provide time frames in which the controls will be implemented. NOTE: All controls shall be consistent with performance standards for erosion and sediment control and stormwater treatment set forth in s. 62-40.432, F.A.C., the applicable Stormwater or Environmental Resource Permitting requirements of the Department or a Water Management District, and the guidelines contained in the Florida Development Manual: A Guide to Sound Land and Water Management (DEP, 1988) and any subsequent amendments.

- As a first order of business a stone construction entrance that is a minimum of 50ft long with a 6" depth of FDOT #1 stone and lined with filter fabric shall be constructed to minimize the effects of truck traffic and sedimentation tracking both on and off of the site. There shall be only one construction entrance at this site.

- Prior to clearing, a silt fence shall be installed around the perimeter of the site. Silt fence shall not exceed 36 inches in height. Post shall be a minimum of 2"x 2" wood stakes or metal stakes spaced at a maximum of 10 feet apart and driven a minimum of 12" into the ground. (When extra strength fabric is used spacing shall not exceed 6 feet.) A trench shall be excavated approximately 4 inches wide and 4 inches deep along the line of post and upslope from barrier. When standard strength filter fabric is used, a wire mesh support fence shall be fastened securely to the upslope side of the posts using heavy duty wire staples at least 1 inch long, tie wires or hog rings. The wire shall extend into the trench a minimum of 2 inches and shall not extend more than 36 inches above the original ground surface.The standard strength filter fabric shall be stapled or wired to the fence, and 8 inches of the fabric shall be extended into the trench. When extra strength filter fabric and closer post spacing are used, the wire mesh support fence may be eliminated. In such a case, the filter fabric is stapled or wired directly to the posts with all other provisions staying the same as above. The trench shall be backfilled and the soil compacted over the filter fabric.

- During the clearing, grubbing and site grading stages, areas that are disturbed more than 7 days shall be stabilized with rye grass applied at manufacture's recommendations. After seeding, mulch shall be applied at a rate of 2 tons per acre.
  - Begin clearing, grubbing, and site grading in retention pond area before disturbing entire site.
  - Construct retention ponds and outlet devices as shown on the plans.
  - Clean out accumulated sediment when sediment has reach ¼ the overall depth of the pond. Dispose of the sediment offsite.

- After initial site grading work, all proposed outfalls, once installed, shall be protected from erosion and sediment runoff by the use solid sod/lapped sod aprons or riprap aprons underlain by filter fabric. Disturbed areas of the site where construction activities have permanently ceased shall be stabilized with permanent seed or other permanent stabilization methods (if other methods are utilized, this SWPPP will be modified) no later than 14 days after the last

construction activity. Seeding shall be the same as in temporary seeding.

- All installation shall be commenced as depicted on the erosion, sedimentation, & pollution control plans and details.

To be completed by Contractor/Subcontractor(s):

Described below are temporary and permanent stabilization practices. Stabilization practices include temporary seeding, mulching, permanent seeding, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, vegetative preservations, etc.

- Temporary seeding shall be rye grass applied at manufacture's recommendations to any disturbed areas that are inactive more than 7 days.
- Mulch and sod shall be applied as shown on erosion control plans.
- Sod shall be used to stabilize the sides of the retention pond.
- Filter fabric shall be placed under the stone entrance/exit, the riprap outfalls, and the stormwater retention pond outfall.
- Permanent vegetation shall be applied according to the erosion control plans, landscape plan, and manufacturers specifications.

To be completed by Contractor/Subcontractor(s):

The following are structural controls to be implemented to divert stormwater flow from exposed soils and structural practices to store flows, retain sediment on-site or in any other way limit stormwater runoff. These controls include silt fences, earth dikes, diversions, swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, coagulating agents and temporary or permanent sediment basins.

- Silt fence shall be placed around perimeter of site as shown on erosion control plans and/or as required.
- Detention pond will be utilized for a temporary sediment basin. Care shall be taken to assure the removal of accumulated fine sediments and that excessive compaction of soil by construction machinery be avoided.
- Sod aprons or stone outlet protection lined with filter fabric shall be installed at all outfall points.

To be completed by Contractor/Subcontractor(s):

Described below are sediment basins (if any) to be implemented for areas that will disturb 10 or more acres at one time. The sediment basins (or an equivalent alternative) should be able to provide 3,600 cubic feet of storage for each acre drained. Temporary

sediment basins (or an equivalent alternative) are recommended for drainage areas under 10 acres.
Not Applicable, since site disturbance is less than 10 acres. However, the detention ponds will be utilized for temporary sediment storage.
Describe all permanent stormwater management controls such as, but not limited to, detention or retention systems or vegetated swales that will be installed during the construction process.
• A stormwater retention pond and associated devices shall be constructed per the plans approved by Northwest Florida Water Management District. • A permanent vegetated flat bottom ditch conveying parking lot drainage to the detention pond. To be completed by Contractor/Subcontractor(s):

Pollutant Controls

Waste disposal, this may include construction debris, chemicals, litter, and sanitary wastes:	All construction materials and debris will be placed in a dumpster and hauled off site to a landfill or other proper disposal site. No materials shall be buried on site. To be completed by Contractor/Subcontractors(s):
Offsite vehicle tracking from construction entrances/exits:	Off site vehicle tracking of sediments and dust generation will be minimized via a stone construction entrance, daily street sweeping and the use of water to keep dust down. To be completed by Contractor/Subcontractors(s):

The proper application rates of all fertilizers, herbicides and pesticides used at the construction site:	Fertilizers and pesticides will be used at a minimum and in accordance with the manufacture's suggested application rates. The fertilizers and pesticides will be stored in a covered shed. To be completed by Contractor/Subcontractor(s):
The storage, application, generation and migration of all toxic substances:	If petroleum products are to be stored onsite a spill prevention plan shall be in place. A double walled fuel tank (if required) shall be placed on a drip pan to contain and prevent any drips or leaks from being discharged in stormwater runoff. All paints and other chemicals will be stored in a locked covered shed or equivalent structure. To be completed by Contractor/Subcontractor(s):
Other:	Port-o-lets shall be placed away from storm sewer systems, storm inlets, surface waters and wetlands and shall be serviced on a weekly basis. No vehicle maintenance shall be conducted onsite. A washdown area shall be designated at all times and will not be located in any area that will allow for the discharge of polluted runoff. A NWFWMD approved concrete washout device shall be utilized for concrete washout waste. To be completed by Contractors/Subcontractor(s):

Provided below is a detailed description of the maintenance plan for all structural and non-structural controls to assure that they remain in good and effective operating condition.

- Silt fence shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately. Should the silt fence decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promply. Sediment shall be removed when it reaches approximately one-half the height of the barrier. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform with the existing grade, prepared and seeded.
- Maintenance shall be performed on the stone construction entrance when any void spaces are full of sediment.
- Bare areas of the site that were previously seeded shall be reseeded per manufactures' instructions.
- Mulch and sod that has been washed out shall be replaced immediately.
- Maintain all other areas of the site with proper controls as necessary.

To be completed by Contractor/Subcontractor(s):

Inspections: Inspections and inspection documentation procedures, as required by Part V.D.4. of the permit. Inspections must occur at least once a week and within 24 hours of the end of a storm event that is 0.50 inches or greater (see attached form). Inspections shall be performed by a qualified inspector (provided by the contractor) and shall inspect all points of discharge into surface waters of the State or an MS4; disturbed areas of the construction site that have not been finally stabilized; areas used for storage of materials that are exposed to precipitation; structural controls; and locations where vehicles enter or exit the site as follows:

a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the storm water system. The storm water management system and erosion and sediment control measures identified in the plan shall be observed to ensure they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion and sediment control and stormwater treatment measures are effective in preventing or minimizing the discharge of pollutants, including retaining sediment onsite pursuant to Rule 62-40.432, F.A.C. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.
b. Based on the results of the inspection, all maintenance operations needed to assure proper operation of al controls, BMP's, practices or measures identified in the stormwater pollution prevention plan shall be done in a timely manner, but in no case later than 7 calendar days following the inspection. If needed, pollution prevention controls, BMP's and measures identified in the plan shall be revised as appropriate, but in no case later than 7 calendar days following the inspection. Such modifications shall provide for timely implementation of any changes to the

plan within 7 calendar days following the inspection.

c. A report summarizing the scope of the inspection; name(s) and qualifications of personnel making the inspection; date(s) of the inspection; rainfall data, major observations relating to the implementation of the stormwater pollution prevention plan; and actions taken in accordance with paragraph V.D.4.b of the Generic permit, shall be made and retained, in accordance with Part VII.C. of the Generic permit.

Qualified personnel will inspect all points of discharges, all disturbed areas of construction that have not been stabilized, constructed areas and locations where vehicles enter and exit the site at least once every 7 calender days or within 24 hours of the end of a rainfall event that is 0.5 inches or greater. Where sites have been finally stabilized, said inspections shall be conducted at least once every month until the Notice of Termination is filed.

To be completed by Contractor/Subcontractor(s):

Identified and described below are all sources of non-stormwater discharges as allowed in Part IV.A.3. of the permit. Flows from fire fighting activities do not have to be listed or described.

It is expected that the following non-stormwater discharges may occur from the site during construction period:

a. water from water line flushing;
b. pavement wash water (where no spills or leaks of toxic or hazardous materials have occurred).

If said discharges do occur, they will be directed to the temporary sediment basin prior to discharge. Turbid water from the retention pond shall not be pumped directly into the receiving waters.

To be completed by Contractor/Subcontractors(s):

VII. CONTRACTOR/SUB-CONTRACTOR CERTIFICATION FORM

This SWPPP must clearly identify, for each measure identified within the SWPPP, the contractor(s) or subcontractor(s) that will implement each measure. All contractor(s) and subcontractor(s) identified in the SWPPP must sign the following certification:

"I certify under penalty of law that I understand, and shall comply with, the terms and conditions of the State of Florida Permit for Stormwater Discharge from Large and Small Construction Activities and this Stormwater Pollution Prevention Plan prepared thereunder."

Name	Title	Company Name, Address and Phone Number	Date

Retention Pond Maintenance and Operation Schedule

General Conditions

1. Once project construction has been deemed complete, including the re-stabilization of all side slopes, embankments, and other disturbed areas, and before the transfer to the Operation and Maintenance phase, all obsolete erosion control materials shall be removed.
2. Record-keeping. The permittee shall be responsible for keeping records documents that relevant permit conditions are met. This document shall include, at a minimum, the date of each inspection, the name and qualifications of the inspector, any maintenance actions taken, and a determination by the inspector as to whether the system is operating as intended.

Retention Pond Maintenance

3. Quarterly Maintenance Inspections. The retention facility shall be inspected on at least a quarterly basis. Permittee shall remove any deposited sediment or debris within the pond. Inspect the overflow weir and confirm that it is free-flowing and clear of debris.
4. Percolation performance shall be evaluated at least every third year. In the event that evidence of inadequate percolation is discovered, the exfiltration system shall be renovated or replaced.
5. The stormwater management system shall be inspected by a registered professional at least every third year after the completion of construction and conversion of this permit to the Operation and Maintenance phase, to ensure that the system is functioning as designed and permitted. The Permittee shall submit to the District a completed inspection report on Form No 62-346.900(8) Operation and Maintenance Inspection Certification. The report must be submitted within 30 days of the third anniversary date of conversion to the Operation and Maintenance phase, and at 3 year intervals thereafter. However, a Report shall be submitted to the District within 30 days of any system failure or non-compliance with permit conditions.

Stormwater Pond Inspection and Maintenance Log

Facility Name:

Address:

Begin Date: End Date:

Date	Inspection Type	Inspected By	Inspection Assessment	Maintenance performed

Stormwater Pollution Prevention Plan Inspection Report Form

Inspections must occur at least once a week and within 24 hours of the end of a storm event that is 0.50 inches or greater.

Project Name:_____ FDEP NPDES Stormwater Identification Number: FLR10_____

Location	Rain data	Type of control (see below)	Date installed / modified	Current Condition (see below)	Corrective Action / Other Remarks

Condition Code:

G = Good M = Marginal, needs maintenance or replacement soon P = Poor, needs immediate maintenance or replacement

C = Needs to be cleaned O = Other

Control Type Codes

1. Silt Fence	10. Storm drain inlet protection	19. Reinforced soil retaining system	28. Tree protection
2. Earth dikes	11. Vegetative buffer strip	20. Gabion	29. Detention pond
3. Structural diversion	12. Vegetative preservation area	21. Sediment Basin	30. Retention pond
4. Swale	13. Retention Pond	22. Temporary seed / sod	31. Waste disposal / housekeeping
5. Sediment Trap	14. Construction entrance stabilization	23. Permanent seed / sod	32. Dam
6. Check dam	15. Perimeter ditch	24. Mulch	33. Sand Bag
7. Subsurface drain	16. Curb and gutter	25. Hay Bales	34. Other
8. Pipe slope drain	17. Paved road surface	26. Geotextile	
9. Level spreaders	18. Rock outlet protection	27. Rip-rap	

Inspector Information:

_____ _____

Name Qualification

Date

The above signature also shall certify that this facility is in compliance with the Stormwater Pollution Prevention Plan and the State of Florida Generic Permit for Stormwater Discharge from Large and Small Construction Activities if there are not any incidents of non-compliance identified above.

* * * * * *

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

_____ _____

Name (Responsible Authority) Date

NOTICE OF INTENT TO USE GENERIC PERMIT FOR STORMWATER DISCHARGE FROM LARGE AND SMALL CONSTRUCTION ACTIVITIES (RULE 62-621.300(4), F.A.C.)

This Notice of Intent (NOI) form is to be completed and submitted to the Department before use of the Generic Permit for Stormwater Discharge From Large and Small Construction Activities provided in subsection 62-621.300(4), F.A.C. The type of project or activity that qualifies for use of the generic permit, the conditions of the permit and additional requirements to request coverage are specified in the generic permit document [DEP Document 62-621.300(4)(a)]. **The appropriate generic permit fee, as specified in paragraph 62-4.050(4)(d), F.A.C., shall be submitted with this NOI in order to obtain permit coverage. Permit coverage will not be granted without submittal of the appropriate generic permit fee.** You should familiarize yourself with the generic permit document and the attached instructions before completing this NOI form. **Please print or type information in the appropriate areas below.**

I. IDENTIFICATION NUMBER: Project ID: _____

II. APPLICANT INFORMATION:

A. Operator Name:		B. Operator Status:
C. Address:		
D. City:	E. State:	F. Zip Code:
G. Responsible Authority:		
H. Responsible Authority's Phone No.:		
I. Responsible Authority's Fax No.:		
J. Responsible Authority's E-mail Address:		

III. PROJECT/SITE LOCATION INFORMATION:

A. Project Name: Army Air Force Exchange Service (AAFES) Shoppette			
B. Project Address/Location: 7th Special Forces Complex, Eglin AFB			
C. City: Eglin		D. State: FL	E. Zip Code: 32542
F. County: Okaloosa	G. Latitude: 30 ° 38 ′ 55 ″	Longitude: 86 ° 36 ′ 30 ″	
H. Is the site located on Indian Country Lands? ☐ Yes ☒ No		I. Water Management District: NWFWMD	

J. Project Contact:
K. Project Contact's Phone No.:
L. Project Contact's Fax No.:
M. Project Contact's E-mail Address:

IV. PROJECT/SITE ACTIVITY INFORMATION:

A. Indicate whether the project is Large or Small Construction (check only one):	☐ Large Construction (Project will disturb five or more acres of land.) ☒ Small Construction (Project will disturb one or more acres but less than five acres of land.)		
B. Approximate total area of land disturbance from commencement through completion of construction: _____ acres			
C. SWPPP Location:	☐ Address in Part II above ☒ Address in Part III above ☐ Other address (specify below)		
D. SWPPP Address:			
E. City:		F. State:	G. Zip Code:
H. Construction Period:	Start Date:	Completion Date:	

V. DISCHARGE INFORMATION:

A. MS4 Operator Name (if applicable): 7th Special Forces Complex, Eglin AFB
B. Receiving Water Name: Un-named tributary to Gobbler Creek

VI. CERTIFICATION[1]:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Responsible Authority Name and Official Title (Type or Print):

Responsible Authority Signature: _____ Date Signed: _____

[1] Signatory requirements are contained in Rule 62-620.305, F.A.C.

INSTRUCTIONS – DEP FORM 62-621.300(4)(b)
NOTICE OF INTENT (NOI) TO USE GENERIC PERMIT FOR STORMWATER DISCHARGE FROM LARGE AND SMALL CONSTRUCTION ACTIVITIES

Who Must File an NOI?:

Federal law at 40 CFR Part 122 prohibits the point source discharge of pollutants, including the discharge of stormwater associated with large construction activities as defined at 40 CFR 122.26(b)(14)(x) or small construction activities as defined at 40 CFR 122.26(b)(15), to waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit. Under the State of Florida's authority to administer the NPDES stormwater program at 403.0885, F.S., operators that have stormwater discharge associated with large or small construction activities to surface waters of the State, including through a Municipal Separate Storm Sewer System (MS4), must obtain coverage either under a generic permit issued pursuant to Chapter 62-621, F.A.C., or an individual permit issued pursuant to Chapter 62-620, F.A.C.

Where to File NOI:

The Department encourages the electronic submission of NOIs using the Department's Interactive Notice of Intent (iNOI) available at http://www.dep.state.fl.us/water/stormwater/npdes/. As an alternative, NOIs may be submitted by paper copy to the following address:

NPDES Stormwater Notices Center, MS #2510
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Permit Fee:

Permit fees for large and small construction activities to be covered under the generic permit are specified in paragraph 62-4.050(4)(d), F.A.C. The appropriate generic permit fee (either for large or small construction activities) must be submitted along with the completed NOI in order to obtain coverage under the generic permit. **Generic permit coverage will not be granted without payment of the appropriate permit fee.**

If the NOI is submitted electronically, the permit fee shall be paid on-line by credit card. If the NOI is submitted using a paper copy, the permit fee shall be paid by either check or money order made payable to: "Florida Department of Environmental Protection".

Part I – Identification Number:

Enter the project's DEP identification number (generic permit coverage number) if known. If an ID number has not yet been assigned to this project (i.e., if this is a new project), leave this item blank.

Part II – Applicant Information:

Item A.: Provide the legal name of the person, firm, contractor, public organization or other legal entity that owns or operates the construction activity described in this NOI. The operator is the legal entity that has authority to control those activities at the project necessary to ensure compliance with the terms and conditions of the generic permit.

Item B.: Enter the appropriate one letter code from the list below to indicate the legal status of the operator:

F = Federal; S = State; P = Private; M = Public (other than federal or state); O = Other

Items C. – F.: Provide the complete mailing address of the operator, including city, state and zip code.

Items G. – J.: Provide the name, telephone and fax number (including area code) and E-mail address of the person authorized to submit this NOI on behalf of the operator (e.g., Jane Smith, President of Smith Construction Company on behalf of the operator, Smith Construction Company; John Doe, Public Works Director on behalf of the operator, City of Townsville; etc.). This should be the same person as indicated in the certification in Part VI.

Part III – Project/Site Location Information:

Items A. – E.: Enter the official or legal name and complete street address, including city, state and zip code of the project. Do not provide a P.O. Box number as the street address. If it lacks a street address, describe the project site location (e.g., intersection of State Road 1 and Smith Street).

Item F.: Enter the county in which the project is located.

Item G.: Enter the latitude and longitude, **in degrees-minutes-seconds format**, of the approximate center of the project.

Item H.: Indicate whether the project is located on Indian Country Lands.

Item I.: Enter the appropriate five or six letter code from the list below to indicate the Water Management District the project is located within:

NWFWMD = Northwest Florida Water Management District
SRWMD = Suwannee River Water Management District
SFWMD = South Florida Water Management District
SWFWMD = Southwest Florida Water Management District
SJRWMD = St. John's River Water Management District

Items J. – M.: Give the name, telephone and fax number (including area code) and E-mail address of the project contact person. The project contact is the person who is thoroughly familiar with the project, the facts reported in this NOI and who can be contacted by the Department if necessary.

Part IV – Project/Site Activity Information:

Item A.: Check the appropriate box to indicate whether the project involves large construction activity or small construction activity. **Check one box only.**

"Large Construction Activity" means construction activity that results in the disturbance of five (5) or more acres of total land area. Large construction activity also includes the disturbance of less than five acres of total land area that is part of a larger common plan of development or that will ultimately disturb five acres or more.

"Small Construction Activity" means construction activity that results in the disturbance of equal to or greater than one (1) acre and less than five (5) acres of total land area. Small construction activity also includes the disturbance of less than one acre of total land area that is part of a larger common plan of development or sale that will ultimately disturb equal to or greater than one acre and less than five acres.

Item B.: Provide the approximate total area of land disturbance, in acres, that the project will involve from commencement of construction through completion.

Items C. - G.: Indicate the location where the Stormwater Pollution Prevention Plan (SWPPP) can be viewed. Provide the address where the SWPPP can be viewed if other than as provided in Parts II or III of the NOI. **Note that to be eligible for coverage under the generic permit, the SWPPP must have been prepared prior to filing this NOI.**

Item H.: Enter the estimated construction start and completion dates in the MM/DD/YY format.

Part V – Discharge Information:

To be covered under a CGP, the facility must have the potential to discharge stormwater associated with construction activity to a MS4, a surface water body or both. NOIs submitted without discharge information cannot be processed.

Item A.: If stormwater from the project discharges to a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4 (e.g., City of Tallahassee MS4, Orange County MS4, FDOT District 5 MS4, etc.). If stormwater from the project does not discharge to an MS4 but to surface waters of the State, leave this item blank or indicate "N/A" and skip to Item B. of this part. **Please note that if the project discharges stormwater to an MS4, you must provide the MS4 operator with a copy of the completed NOI.**

Item B.: If the project discharges stormwater to surface waters of the State, and not to an MS4, enter the name of the receiving water body to which the stormwater is discharged. Please provide the first named water body to which the stormwater from the project is discharged (e.g., Cypress Creek, Tampa Bay, unnamed ditch to St. Johns River, Tate's Hell Swamp, etc.).

In certain cases, stormwater from the project will discharge to both an MS4 and surface waters of the State. In this case, complete both Item A. and Item B.

Part VI – Certification:

Type or print the name and official title of the Responsible Authority signing the certification. Please note that this must be the same person indicated in Item II.G. as the Responsible Authority. Sign and date the certification.

Section 403.161, F.S., provides severe penalties for submitting false information on this application (NOI) or any reports or records required by a permit. There are both civil and criminal penalties, in addition to the revocation of permit coverage for submitting false information.

Rule 62-620.305, F.A.C., requires that the NOI and any reports required by the permit be signed as follows:

A. For a corporation, by a responsible corporate officer as described in Rule 62-620.305, F.A.C.;
B. For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or
C. For a municipality, state, federal or other public facility, by a principal executive officer or elected official.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORMWATER NOTICE OF TERMINATION
(RULE 62-621.300(6), F.A.C.)

This form is to be completed and submitted to the Department to terminate coverage under the Generic Permit for Stormwater Discharge from Large and Small Construction Activities provided in subsection 62-621.300(4), F.A.C., the Multi-Sector Generic Permit for Stormwater Discharge Associated with Industrial Activity provided in subsection 62-621.300(5), F.A.C. as well as the conditional exclusion for "no exposure" of industrial activities and materials to stormwater provided in paragraph 62-620.100(2)(o), F.A.C.

All information provided on this form shall be typed or printed in ink.

I. TERMINATION INFORMATION:

A. Facility ID/Project Number:	
B. Reason for Termination:	
☐	No longer operator of the facility/project.
☐	Final stabilization criteria is met and all stormwater discharges associated with construction activity have ceased **(for construction activity only).**
☐	All stormwater discharges associated with industrial activity have ceased **(for industrial activity only).**
☐	No longer meet the condition of "no exposure" **(for industrial activity only).**

II. OPERATOR INFORMATION:

A. Operator Name:		
B. Address:		
C. City:	D. State:	E. Zip Code:
F. Responsible Authority:		G. Responsible Authority's Phone No.:
H. Responsible Authority's E-mail Address:		I. Responsible Authority's Fax No.:

III. FACILITY/PROJECT INFORMATION:

A. Name:		
B. Address/Location:		
C. City:	D. State:	E. Zip Code:
F. County:		

DEP Form 62-621.300(6)
Effective February 17, 2009

IV. CERTIFICATION[1]:

I certify under penalty of law that all stormwater discharges associated with industrial or construction activity from the identified facility or project that are authorized by the referenced State of Florida generic permit have been eliminated; the facility no longer meets the conditional exclusion for "no exposure" outlined in paragraph 62-620.100(2)(o), F.A.C.; or that I am no longer the operator of the facility or project. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge stormwater associated with industrial or construction activity under a generic permit, and that discharging pollutants in stormwater associated with industrial or construction activity to surface waters of the State is unlawful unless authorized by a permit issued pursuant to Section 403.0885, F.S. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of their generic permit or conditional exclusion for "no exposure" from NPDES stormwater permitting for industrial activities.

Responsible Authority Name and Official Title (Type or Print):

Responsible Authority Signature: _____

Date Signed: _____

[1] Signatory requirements are contained in Rule 62-620.305, F.A.C.

INSTRUCTIONS – DEP FORM 62-621.300(6)
NPDES STORMWATER NOTICE OF TERMINATION (NOT)

Who May File an NOT:

Permittees who presently are covered under the Generic Permit for Stormwater Discharge from Large and Small Construction Activities provided in subsection 62-621.300(4), F.A.C., the Multi-Sector Generic Permit for Stormwater Discharge Associated with Industrial Activity provided in subsection 62-621.300(5), F.A.C. or the conditional exclusion for "no exposure" of industrial activities and materials to stormwater provided in paragraph 62-620.100(2)(o), F.A.C. shall submit a Notice of Termination (NOT) when their facility or project no longer has any stormwater discharges associated with industrial activity as defined in Rule 62-620.200 F.A.C.; stormwater discharge associated with construction activity as defined in DEP Document 62-621.300(4)(a); no longer meets the condition of "no exposure" defined in paragraph 62-620.100(2)(o), F.A.C.; or when they are no longer the operator of the facility or project.

For construction activities, elimination of all stormwater discharges associated with industrial activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, and all stormwater discharges associated with construction activity from the construction site that are authorized under the generic permit have been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed and that a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of at least 70% for all unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (e.g., geotextiles) have been employed.

Where to File an NOT:

The Department encourages the electronic submission of NOTs through the NPDES Stormwater Program's electronic permitting application, available at http://www.dep.state.fl.us/water/stormwater/npdes/. As an alternative, NOTs may be submitted by paper copy to the following address:

NPDES Stormwater Notices Center, MS #2510
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

NOT Application Fee:

There is no application fee for submitting an NOT.

Additional Notification:

If stormwater associated with industrial or construction activity discharged to a Municipal Separate Storm Sewer System (MS4), a copy of the completed NOT shall be provided to the operator of the MS4.

For construction activities, if other contractors/subcontractors are covered under the permittee's Notice of Intent (NOI) and/or Stormwater Pollution Prevention Plan (SWPPP), a copy of the completed NOT shall be provided to each additional contractor/subcontractor known to the permittee to be covered or claiming coverage under the permittee's NOI and/or SWPPP. Contractors/subcontractors claiming coverage under a permittee's NOI must assure proper permit coverage for the duration of their regulated activity. Failure of the permittee to provide a copy of the NOT as provided herein shall not relieve the contractor/subcontractor relying upon the permittee's NOI from the required permit coverage or any potential enforcement action arising from the regulated activity.

Part I – Termination Information:

Item A.: Enter the DEP Facility ID/Project Number for the facility/project.

Item B.: Indicate the reason for termination of coverage.

Part II – Operator Information:

Item A.: Provide the legal name of the entity (operator) to which coverage was granted.

Items B. – E.: Provide the complete mailing address of the operator, including city, state and zip code.

Items F. – G.: Provide the name and telephone number (including area code) of the person authorized to submit this NOT on behalf of the operator. This should be the same person as indicated in the certification in Part IV.

Items H.-I.: Provide the email address and fax number (including area code) of the person authorized to submit this NOT on behalf of the operator.

Part III – Facility/Project Information:

Items A. – E.: Enter the official or legal name and complete street address, including city, state and zip code of the facility/project site. Do not provide a P.O. Box number as the street address. If the facility/project lacks a street address, describe the location (e.g., intersection of State Road 1 and Smith Street).

Item F.: Enter the county in which the facility/project site is located.

Part IV – Certification:

Type or print the name and official title of the person signing the certification. Sign and date the certification.

Section 403.161, F.S., provides severe penalties for submitting false information on this NOT or any reports or records required by a permit. There are both civil and criminal penalties for submitting false information.

Rule 62-620.305, F.A.C., requires that the NOT be signed as follows:

A. For a corporation, by a responsible corporate officer as described in Rule 62-620.305, F.A.C.;
B. For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or
C. For a municipality, state, federal or other public facility, by a principal executive officer or elected official.

Form # 62-346.900(2)
Title: Notice of Intent to Use An Environmental Resource Noticed General Permit in Northwest Florida
Effective Date: November 1, 2010
Incorporated by reference in 62-346.070(2), F.A.C.

NOTICE OF INTENT TO USE AN ENVIRONMENTAL RESOURCE NOTICED GENERAL PERMIT IN NORTHWEST FLORIDA

A. General Information

1. Applicant Information

Name:_____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: _____ Fax: _____ E-mail: _____

2. Agent Information

Name: _____

Corporate or Agency Name: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: _____ Fax: _____ E-mail: _____

3. Rule section number of the NGP for which you are applying: 62-341._____, F.A.C.

4. Location of proposed activities:

Address: _____
City: _____ Zip Code: _____ County(ies): _____
In (name of waterway): _____
Latitude (DMS) _____° _____' _____" Longitude (DMS) _____° _____' _____"
Datum _____(Taken from Central Location)
Tax Parcel Identification Number:_____

5. Date activity is proposed: To Commence: _____ To be Completed: _____

6. Total Extent of Work in Wetlands and Other Surface Waters: (Use additional sheets and provide breakdown of each category if more space is needed.)

a. Within Federal Jurisdiction:
Fill - _____Sq. Ft.;_____Acres; _____ Cu. Yds.
Excavation -_____Sq. Ft.;_____Acres; _____Cu. Yds.

b. Within State Jurisdiction:
Fill - _____Sq. Ft. or_____Acres;_____Cu. Yds.
Excavation - _____Sq. Ft. or_____Acres;_____Cu. Yds.
Fill Waterward of Mean or Ordinary High Water - _____ Cu. Yds.
Excavation Waterward of Mean or Ordinary High Water -_____ Cu. Yds.

c. State Jurisdictional Area that will be Severed Landward of Any Fill: _____Sq. Ft. or _____ Acres

d. State Jurisdictional Area to be Created from Uplands, Excluding Mitigation: _____Sq. Ft. or_____ Acres

e. Docks, Piers, and Over Water Structures:
Total Number of Slips _____ Total number of mooring pilings _____
Length _____ Width _____ Height above MHW _____
Length _____ Width _____ Height above MHW _____

Number of Finger Piers_____ Length_____ Width_____ Height _____
Number of Finger Piers _____ Length_____ Width_____ Height _____

Total area of structure over waters & wetlands _____ sq. ft.
Use of structure _____

Will the docking facility provide:	No	Yes	Number
Liveaboard Slips	☐	☐	_____
Fueling Facilities	☐	☐	_____
Sewage Pump-out Facilities	☐	☐	_____
Other Supplies or Services	☐	☐	_____
Other Supplies or Services Required for Boating (Excluding refreshments, bait and tackle)	☐	☐	_____

f. Seawall length:_____ft. Seawall material:_____
Riprap revetment length: _____ft. Slope_____H: _____V Toe width_____ ft.
Riprap at toe of seawall length_____ft. Slope_____ H:_____ V Toe width_____ ft.
Size of riprap _____ Type of material _____

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7. Stormwater Information

a. Project area: _____ ac. Total applicant-owned area contiguous to project: _____ ac.
b. Total area served by system: _____ ac.
c. Impervious area excluding wetlands and other surface waters: _____ ac.
d. Volume of water that the system is capable of impounding: _____ ac. ft.
e. Name of project, including phase if applicable: _____
f. Is this application for part of a multi-phase project? ☐yes ☐no. If you answered yes, please provide permit numbers for other authorized phases:

Agency	Date	No.\Application Type
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

g. Treatment type proposed: _____.
h. Current site conditions and land uses:_____
i. Proposed Land Use:_____
j. Names and classifications of all receiving waters (if available):_____ _____

8. **All Proposed Activities—Describe Proposed Activities (be specific; use additional sheets as necessary).**

a. What is proposed?_____

b. Describe wetland and aquatic habitats to be affected:_____

c. Construction methods and schedule:_____

d. Additional information that demonstrates that you qualify for the general permit, addressing all the parameters, thresholds, and conditions required in the general permit._____

9. **Permanent and Temporary Turbidity, Erosion, and Sedimentation Controls Proposed:** _____

10. **Previous Applications for this Project have been:**

	Date(s) mm/dd/yyyy	By:			
a.	Issued _____/_____/_____	**DEP/DER No.**	_____	**Corps No.**	_____
b.	Denied _____/_____/_____	**DEP/DER No.**	_____	**Corps No.**	_____
c.	Other (please explain):_____				

B. Drawings

Please provide scaled or fully dimensioned plan (overhead) and profile (side-view) drawings that clearly delineate and identify the extent of the proposed activities on drawings of an appropriate size. If the work involves activities located within federal or state wetlands or other surface waters, submit an additional set of drawings on 8 ½" x 11" paper. All drawings must include the following, clearly and accurately depicted:

a. Existing approximate mean high water (MHW/OHW) shoreline.
b. Applicant's property boundaries and dimensions.
c. North arrow.
d. Location and dimensions of all existing structures.
e. Location and dimensions of proposed activities.
f. Boundaries of wetlands and other surface waters, identifying open water areas. Cross-hatch limits of proposed excavation in wetlands and other surface waters, and hatch limits of proposed fill in wetlands and other surface waters.
g. Boundary area and volume of all temporary and permanent earthwork, including pre- and post-construction grades.
h. Label all impervious and pervious areas, and indicate their size (area).
i. Drainage and flow patterns on the property.

j. Distances of project in relation to permanent landmarks (i.e. trees, buildings, etc.) as appropriate,
k. Location map(s), clearly locating the proposed project location in relation to streets and roads, which should be clearly labeled. Provide directions to get to site if necessary.
l. Note: Plans, drawings, and supporting calculations must be signed, sealed, and dated by a registered professional, as required by the relevant statutory provisions when the design of the system requires the services of a registered professional.

C. Certification

I hereby certify I have read and will conduct the above activities in accordance with the criteria, limitations, and Specific Conditions of the general permit identified in Item 3, and in accordance with the General Conditions of Rule 62-341.215, F.A.C. Unless otherwise provided in Chapter 62-341, F.A.C., activities conducted pursuant to the above general permit may commence thirty (30) days after receiving written acknowledgment that notice has been provided to the Department of Environmental Protection or the Northwest Florida Water Management District, along with any required additional documentation which may be required to fulfill the requirements of the general permit, unless the Department or Northwest Florida Water Management District responds that the proposed work does not qualify for a general permit. Written acknowledgment may include certified mail return receipt.

I understand I may have to provide any additional information/data that may be necessary to provide reasonable assurance or evidence that the proposed project will comply with the applicable State Water Quality Standards or other environmental standards both before construction and after the process is completed.

I further acknowledge that work done under this general permit may also require the review and approval of other Federal, State, or local agencies, and that commencement of construction before such Federal, State, or local agency approvals or permits are obtained may subject me to enforcement action and fines or penalties by such agencies. Further, the work shall be conducted in a manner that does not violate applicable water quality standards.

In addition, I agree to provide entry to the project site for inspectors with proper identification or documents as required by law from the environmental agencies for the purpose of inspecting the site. Further, I agree to provide entry to the project site for such inspectors to monitor permitted work.

Typed/Printed Name of Applicant or Agent	Signature of Applicant or Agent	Date

An Agent May Sign Above If Applicant Completes the Following:
I hereby designate and authorize the agent listed in Item 2 to act on my behalf as my agent in the processing of this permit application and to furnish on request, supplemental information in support of the application.

Typed/Printed Name of Applicant (and Corporate Title, if applicable)	Signature of Applicant	Date

D. For systems that require the certification of a registered professional:

This is to certify that the features of the system that are the subject of this application have been designed by me or my designee under my direct supervision and have been examined by me and found to be in conformity the laws and other requirements of my professional practice act. I further certify that the system has been designed in accordance with the applicable criteria and specifications required by the "Department of Environmental Protection and Northwest Florida Water Management District Environmental Resource Permit Applicant's Handbook—Volume I (General and Environmental) and Volume II (Design Requirements for Stormwater Treatment and Management Systems — Water Quality and Water Quantity)" effective November 1, 2010.

Name of Registered Professional:_____

Florida Registration Number:_____

Company Name:_____

Mailing Address:_____ (Affix Seal)

City:_____State:_____Zip Code:_____

Telephone:_____Fax:_____E-mail:_____

_____ _____
Signature of Registered Professional Date

E. Submittal

Submit this completed form, with attached drawings and with the noticed general permit processing fee of $250, made payable to the "Florida Department of Environmental Protection," or the "Northwest Florida Water Management District (WMD)," in accordance with the responsibilities of these agencies as provided in Chapter 62-346, F.A.C.

State of Florida
Department of Environmental Protection
Generic Permit
For Stormwater discharge from Large and Small Construction Activities

DEP Document No. 62-621-300(4)(a)

State of Florida

Department of Environmental Protection

Generic Permit

For

Stormwater Discharge from Large and Small Construction Activities

February 2009

This permit is issued under the provisions of Section 403.0885, Florida Statutes, and applicable rules of the Florida Administrative Code pursuant to the Department's federally-approved National Pollutant Discharge Elimination System (NPDES) stormwater regulatory program. Stormwater discharge associated with large construction activity, as defined at 40 CFR Part 122.26(b)(14)(x) and herein, is regulated pursuant to Section 402(p)(2) of the federal Clean Water Act (CWA). Stormwater discharge associated with small construction activity, as defined at 40 CFR 122.26(b)(15) and herein, is regulated pursuant to Section 402(p)(6) of the CWA. This permit constitutes authorization to discharge stormwater associated with large and small construction activities to surface waters of the State, including through a Municipal Separate Storm Sewer System (MS4). Until this permit is terminated, modified, or revoked, permittees that have properly obtained coverage under this permit are authorized to discharge to surface waters of the State, including through an MS4, in accordance with the terms and conditions of this permit.

Part I. General Provisions

A. Applicability and Coverage

1. Federal law prohibits the point source discharge of pollutants, including the discharge of stormwater associated with large or small construction activities pursuant to 40 CFR Part 122 and as defined in Part II of this permit, to waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit. The State of Florida has authority to administer the NPDES stormwater program pursuant to Section 403.0885, F.S. Operators that have stormwater discharge associated with large or small construction activities to surface waters of the State, including through a Municipal Separate Storm Sewer System (MS4), must obtain coverage either under a generic permit issued pursuant to Chapter 62-621, F.A.C., or an individual permit issued pursuant to Chapter 62-620, F.A.C.

2. Coverage under this generic permit is available for stormwater discharges from large and small construction activities to surface waters of the State as defined in Section 403.031, F.S., including stormwater discharges associated with construction activity to surface waters of the State through an MS4.

3. This generic permit does not constitute authorization under Part IV of Chapter 373, F.S., for the construction, alteration, operation, maintenance, abandonment, or removal of any stormwater management system, dam, impoundment, reservoir, or appurtenant work or works, including dredging or filling in, on or over wetlands and other surface waters, as determined by the methodology authorized in Subsection 373.421(1), F.S.

4. This generic permit authorizes the discharge of stormwater associated with construction activity under the State's federally-approved NPDES stormwater program only and does not supersede the requirement to obtain a stormwater discharge authorization pursuant to an environmental resource permit (ERP) under Part IV, Chapter 373, F.S.; an environmental resource permit from a Department-approved delegated local government; or any other required federal, state, or local government permit.

B. Eligibility

1. This permit authorizes the discharge of stormwater associated with large and small construction activity, as defined in Part II of this permit, occurring after the effective date of this permit.

2. This permit authorizes stormwater discharge associated with construction activity that is mixed with stormwater discharges associated with industrial activity other than construction, where:

a. the industrial source other than construction is located on the same site as the construction activity;

b. stormwater discharges associated with industrial activity from the areas of the site where construction activities are occurring are in compliance with the terms of this permit; and

c. stormwater discharges associated with industrial activity from the areas of the site where industrial activity other than construction are occurring are in compliance with the terms of a different generic permit (e.g., Multi-Sector Generic Permit for Stormwater Discharge Associated with Industrial Activity) or individual permit authorizing such discharges.

3. Limitations on Coverage. The following stormwater discharges from construction sites are not authorized by this permit:

a. stormwater discharges that originate from the site after construction activities have been completed and the site has undergone final stabilization;

b. discharges that are mixed with sources of non-stormwater, other than discharges identified in Part IV.A.3. of this permit;

c. stormwater discharge associated with construction activity that is covered under an existing generic or individual permit. Such discharges may be authorized under this permit after the existing individual permit or generic permit term of coverage expires, provided the existing permit did not establish numeric limitations for such discharges; or

d. stormwater discharge associated with construction activity that the Department has determined to be or may reasonably be expected to be causing or contributing to a violation of a surface water quality standard.

C. Obtaining Authorization

1. In order for stormwater discharge associated with construction activity to be authorized under this generic permit, an operator must:

a. Meet the eligibility requirements in Part I.B. of this permit;

b. Develop and implement a stormwater pollution prevention plan (SWPPP) in accordance with the requirements of Part V of this permit; and

c. Submit a completed Notice of Intent (NOI) in accordance with the requirements of Part III of this permit, including submittal of the appropriate processing fee as established in paragraph 62-4.050(4)(d), F.A.C.

2. The Department may deny coverage under this permit or require submittal of a revised NOI based on the Department's determination that the NOI is incomplete, the permit fee has not been paid, or the submittal otherwise is not in accordance with the requirements of this generic permit.

Part II. Definitions

For the purposes of this generic permit, the following definitions shall apply, unless otherwise indicated:

1. "Best Management Practices" or "BMPs" means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of surface waters. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

2. "Construction Activity" means the act or process of developing or improving land which involves the disturbance of soils and includes clearing, grading, and excavation.

3. "Commencement of Construction" means the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.

4. "Department" or "DEP" means the Florida Department of Environmental Protection.

5. "Final Stabilization" means that all soil disturbing activities at the site have been completed, and that a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of at least 70% for all unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures (e.g., geotextiles) have been employed.

6. "Large Construction Activity" means construction activity that results in the disturbance of five (5) or more acres of total land area. Large construction activity also includes the disturbance of less than five acres of total land area that is part of a larger common plan of development or sale that will ultimately disturb five acres or more.

7. "Municipal Separate Storm Sewer System" or "MS4" means a large, medium, or small MS4 as defined in Chapter 62-624, F.A.C.

8. "NOI" means notice of intent to be covered by this permit (see Part III of this permit).

9. "NOT" means notice of termination (see Part VIII of this permit).

10. "NPDES" means the Department's federally-approved National Pollutant Discharge Elimination System program.

11. "Operator" means the person, firm, contractor, public organization or other legal entity that owns or operates the construction activity and that has authority to control those activities at the project necessary to ensure compliance with the terms and conditions of this permit.

12. "Qualified Inspector" means a person that:

a. has successfully completed and met all requirements necessary to be fully certified through the DEP Stormwater Erosion and Sedimentation Control Inspector Training Program;

b. has successfully completed an equivalent formal training program; or

c. is qualified by other training or practical experience in the field of stormwater pollution prevention and erosion and sedimentation control.

13. "Small Construction Activity" means construction activity that results in the disturbance of equal to or greater than one (1) acre and less than five (5) acres of total land area. Small construction activity also includes the disturbance of less than one acre of total land area that is part of a larger common plan of development or sale that will ultimately disturb equal to or greater than one acre and less than five acres.

14. "Stormwater" means the flow of water which results from, and which occurs immediately following, a rainfall event.

15. "Stormwater discharge associated with construction activity" means the discharge of stormwater from large or small construction activities, including areas where soil disturbing activities, construction materials handling or storage, equipment storage or maintenance are located.

16. "Surface Waters of the State" means those surface waters that are defined in section 403.031, F.S.

17. "Water Management District" or "WMD" means the Northwest Florida Water Management District, the Suwannee River Water Management District, the St. Johns River Water Management District, the Southwest Florida Water Management District or the South Florida Water Management District.

Part III. Notice of Intent Requirements

A. Deadlines for Notification.

1. Operators seeking coverage under this generic permit to authorize stormwater discharge associated with construction activity for new large or small construction activities, for which commencement of construction begins after the effective date of this permit, shall file an NOI for coverage under this permit at least two (2) days before commencement of construction.

2. For construction activities where the operator changes, the new operator shall file an NOI for coverage under this permit at least two (2) days before assuming control of the project and the previous operator shall file an NOT to terminate permit coverage in accordance with Part VIII of this permit.

B. Contents of Notice of Intent.

1. In order to obtain coverage under this permit, the operator of the construction activity having an associated stormwater discharge shall submit a completed Notice of Intent to Use Generic Permit for Stormwater Discharge from Large and Small Construction Activities, DEP Form 62-621.300(4)(b), including the applicable permit processing fee as specified in paragraph 62-4.050(4)(d), F.A.C. By completing, signing, and submitting an NOI, the operator is certifying that they meet all eligibility requirements of this permit and are informing the Department of their intent to be covered by, and comply with, the terms and conditions of this generic permit. The Notice of Intent shall be signed in accordance with Part VII.C. of this permit by the operator.

C. Where to Submit.

1. NOIs shall be submitted either electronically or by paper copy.

a. The Department encourages the electronic submission of NOIs through the NPDES Stormwater Program's electronic permitting application available at http://www.dep.state.fl.us/water/stormwater/npdes/.

b. If the operator chooses to submit the NOI by paper copy, the NOI shall be submitted to the following address:

NPDES Stormwater Notices Center, MS# 2510
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

2. A copy of the NOI or letter from DEP confirming coverage under this generic permit shall be posted at the construction site in a prominent place for public viewing (such as alongside a building permit).

D. Additional Notification.

1. Projects that discharge stormwater associated with construction activity to a municipal separate stormwater system (MS4) shall submit a copy of the NOI to the operator of the MS4.

E. Period of Coverage.

1. Coverage under this generic permit is effective two (2) days after the date of submittal of a complete NOI to the Department.

2. Coverage under this generic permit is limited to a term not to exceed five years from the effective date of coverage.

F. Permit Coverage Renewal.

1. If the project will continue to have stormwater discharge associated with construction activity beyond the initial five year term of coverage, the operator shall submit a new NOI at least two (2) days before expiration of the current term of coverage under this permit.

Part IV. Special Conditions, Management Practices and Other Non-numeric Limitations

A. Prohibition of Non-Stormwater Discharges.

1. Except as provided in paragraphs I.B.2. and IV.A.3., all discharges covered by this permit shall be composed entirely of stormwater associated with construction activity.

2. Except as specified in IV.A.3. below, discharges of material other than stormwater associated with construction activity must be in compliance with a Department permit (other than this permit) issued for the discharge, or be exempt therefrom.

3. The following non-stormwater discharges are authorized by this permit provided the non-stormwater component of the discharge is in compliance with paragraph V.D.5.: discharges from fire fighting activities; fire hydrant flushings; waters used to spray off loose solids from vehicles (wastewaters from a more thorough cleaning, including the use of detergents or other cleaners is not authorized by this part) or control dust in accordance with Part V.D.2.c.(2); potable water sources including waterline flushings; irrigation drainage; routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning condensate; springs; and foundation or footing drains where flows are not contaminated with process materials such as solvents.

4. Discharges resulting from ground water dewatering activities at construction sites are not covered by this permit. Applicants for these discharges must obtain coverage under the Department's Generic Permit for the Discharge of Produced Ground Water from any Non-contaminated Site Activity pursuant to subsection 62-621.300(2), F.A.C.

B. Releases in Excess of Reportable Quantities.

1. The discharge of hazardous substances or oil in the stormwater discharge(s) from a facility or activity shall be prevented or minimized in accordance with the applicable stormwater pollution prevention plan for the facility or activity. This permit does not relieve the operator of the reporting requirements of 40 CFR part 117 and 40 CFR part 302. Where a release containing a hazardous substance in an amount equal to or in excess of a reporting quantity established under either 40 CFR 117 or 40 CFR 302, occurs during a 24 hour period:

a. The operator is required to notify the State Warning Point (800-320-0519 or 850-413-9911) as soon as he or she has knowledge of the discharge;

b. The operator shall submit, within 14 calendar days of knowledge of the release, a written description of: the release (including the type and estimate of the amount of material released), the date that such release occurred, the circumstances leading to the release, and remedial steps to be taken, to the Florida Department of Environmental Protection, NPDES Stormwater Section, Mail Station 2500, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and

c. The stormwater pollution prevention plan required under Part V of this permit must be modified within 14 calendar days of knowledge of the release to: provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the recurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

2. This permit does not authorize the discharge of hazardous substances or oil resulting from an on-site spill.

Part V. Stormwater Pollution Prevention Plan

A. A stormwater pollution prevention plan shall be developed and implemented for each construction site covered by this permit. Stormwater pollution prevention plans shall be prepared in accordance with good engineering practices. Equivalent erosion and sediment control plans prepared as an

environmental resource permit requirement under Part IV, Chapter 373, F.S., may serve as the pollution prevention plan provided all of the elements of this section are included in such an alternative plan. The plan shall identify potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharge associated with construction activity. In addition, the plan shall describe and ensure the implementation of best management practices which will be used to reduce the pollutants in stormwater discharge associated with construction activity and to assure compliance with the terms and conditions of this permit. Facilities must implement the provisions of the stormwater pollution prevention plan required under this part as a condition of this permit. Failure to develop and implement a stormwater pollution prevention plan in accordance with the requirements of this part shall be deemed a violation of this permit and the permittee shall be subject to enforcement action.

B. Deadlines for Plan Preparation and Compliance.

1. The pollution prevention plan shall:

a. Be completed (including certification by the operator in accordance with Part VII.C.) prior to the submittal of an NOI to be covered under this permit and updated as appropriate;

b. The plan shall provide for compliance with the terms and schedule of the plan beginning with the initiation of construction activities.

C. Keeping Plans Current.

1. The permittee shall amend the plan whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to surface waters of the State or an MS4, including the addition of or change in location of stormwater discharge points, and which has not otherwise been addressed in the plan. The permittee also shall amend the plan if it proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified under Part V.D.1. of this permit, or in otherwise achieving the general objectives of controlling pollutants in stormwater discharge associated with construction activity. In addition, the plan shall be amended to identify any new contractor and/or subcontractor that will implement a measure of the stormwater pollution prevention plan (see Part V.D.6.). Amendments to the plan shall be prepared, signed, dated and kept as attachments to the original plan.

D. Contents of Plan.

1. Site Description. Each plan shall provide a description of pollutant sources and other information as indicated:

a. A description of the nature of the construction activity;

b. A description of the intended sequence of major activities which disturb soils for major portions of the site (e.g., grubbing, excavation, grading);

c. Estimates of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other construction activities;

d. Existing data describing the soil or the quality of any discharge from the site and an estimate of the size of the drainage area for each discharge point;

e. A site map indicating drainage patterns and approximate slopes anticipated after major grading activities, areas of soil disturbance, an outline of areas which may not be disturbed, the location of major structural and nonstructural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters, wetlands and locations where stormwater is discharged to a surface water or MS4; and

f. The latitude and longitude of each discharge point and the name of the receiving water(s) for each discharge point.

2. Controls. Each plan shall include a description of appropriate controls, BMPs and measures that will be implemented at the construction site. The plan shall clearly describe for each major activity identified in Part V.D.1.b. appropriate control measures and the timing during the construction process that the measures will be implemented. For example, perimeter controls for one portion of the site will be installed after the clearing and grubbing necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site. Perimeter controls shall be actively maintained until final stabilization of those portions of the site upward of the perimeter control. Temporary perimeter controls shall be removed after final stabilization. All controls shall be consistent with the performance standards for erosion and sediment control and stormwater treatment as set forth in Rule 62-40.432, F.A.C., the applicable environmental resource permitting requirements of the DEP or appropriate WMD relating to performance standards for erosion and sediment control and stormwater treatment and the guidelines contained in the State of Florida Erosion and Sediment Control Designer and Reviewer Manual, FDOT, FDEP (2007), incorporated by reference in Rule 62-621.300(4)(a), F.A.C., and available on the Department's website at http://www.dep.state.fl.us/water/stormwater/npdes.

a. Erosion and Sediment Controls.

(1) Stabilization Practices. Each plan shall provide a description of interim and permanent stabilization practices, including site-specific scheduling of the implementation of the practices. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized. Stabilization practices may include: temporary seeding, permanent seeding, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation and other appropriate measures. A record of the dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site and when stabilization measures are initiated shall be included in the plan. Stabilization measures shall be initiated as soon as practicable, but in no case more than 7 days, in portions of the site where construction activities have temporarily or permanently ceased.

(2) Structural Practices. Each plan shall include a description of structural practices to divert flows from exposed soils, store flows, retain sediment on-site or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices may include silt fences, earth dikes, diversions, swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, coagulating agents and temporary or permanent sediment basins. Structural BMPs shall be placed on upland soils unless a State of Florida wetland resource management permit or environmental resource permit issued pursuant to Chapter 373, F.S., and applicable regulations of the DEP or WMD authorize otherwise.

(3) Sediment Basins.

(a) For drainage basins with 10 or more disturbed acres at one time, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. The 3,600 cubic feet of storage area per acre drained does not apply to flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin. For drainage basins with 10 or more disturbed acres at one time and where a temporary sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent controls is not attainable, a combination of smaller sediment basins and/or sediment traps and other BMPs should be used. At a minimum, silt fences or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area.

(b) For drainage basins of less than 10 acres, sediment basins and/or sediment traps are recommended but not required. At a minimum, silt fences or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area.

(c) Areas that will be used for permanent stormwater infiltration treatment (e.g., stormwater retention ponds) should not be used for temporary sediment basins unless appropriate measures are taken to assure removal of accumulated fine sediments, which may cause premature clogging and loss of infiltration capacity, and to avoid excessive compaction of soils by construction machinery or equipment.

b. Permanent Stormwater Management Controls.

Each plan shall include a description of stormwater management controls or BMPs (e.g., stormwater detention or retention systems, vegetated swales, velocity dissipation devices at discharge points) that will be installed during the construction process to control pollutants in stormwater discharges that will occur during construction and after construction operations have been completed. This generic permit only addresses the installation of stormwater management controls and not the ultimate operation and maintenance of such controls after the construction activities have been completed and the site has undergone final stabilization. Under this generic permit, permittees are only responsible for the installation and maintenance of stormwater management BMPs prior to final stabilization of the site, and are not responsible for maintenance after stormwater discharges associated with construction activity have been eliminated from the site. However, all stormwater management systems and BMPs shall be operated and maintained in perpetuity after final stabilization in accordance with requirements set forth in the State of Florida environmental resource permit issued under Part IV, Chapter 373, F.S.

c. Controls for Other Potential Pollutants.

(1) Waste Disposal. The plan shall assure that waste, such as discarded building materials, chemicals, litter and sanitary waste are properly controlled in accordance with all applicable state, local and federal regulations. This permit does not authorize the discharge of solid materials, including building materials, to surface waters of the State or an MS4.

(2) The plan shall assure that off-site vehicle tracking of sediments and the generation of dust is minimized.

(3) The plan shall be consistent with applicable State and local waste disposal, sanitary sewer or septic system regulations.

(4) The plan shall address the proper application rates and methods for the use of fertilizers, herbicides and pesticides at the construction site and set forth how these procedures will be implemented and enforced. Nutrients shall be applied only at rates necessary to establish and maintain vegetation.

(5) The plan shall ensure that the application, generation and migration of toxic substances are limited and that toxic materials are properly stored and disposed.

3. Maintenance. The plan shall include a description of procedures that will be followed to ensure the timely maintenance of vegetation, erosion and sediment controls, stormwater management practices and other protective measures and BMPs so they will remain in good and effective operating condition.

4. Inspections. At least once every seven calendar days and within 24 hours of the end of a storm that is 0.50 inches or greater, a qualified inspector (provided by the operator) shall inspect all points of discharge into surface waters of the State or an MS4; disturbed areas of the construction site that have not been finally stabilized; areas used for storage of materials that are exposed to precipitation; structural controls; and locations where vehicles enter or exit the site as follows:

a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the stormwater system. The stormwater management system and erosion and sediment control measures identified in the plan

shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether erosion and sediment control and stormwater treatment measures are effective in preventing or minimizing the discharge of pollutants, including retaining sediment onsite pursuant to Rule 62-40.432, F.A.C. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

b. Based on the results of the inspection, all maintenance operations needed to assure proper operation of all controls, BMPs, practices or measures identified in the stormwater pollution prevention plan shall be done in a timely manner, but in no case later than 7 calendar days following the inspection. If needed, pollution prevention controls, BMPs and measures identified in the plan shall be revised as appropriate, but in no case later than 7 calendar days following the inspection. Such modifications shall provide for timely implementation of any changes to the plan within 7 calendar days following the inspection.

c. A report summarizing the scope of the inspection; name(s) and qualifications of personnel making the inspection; the date(s) of the inspection; rainfall data; major observations relating to the implementation of the stormwater pollution prevention plan; and actions taken in accordance with paragraph V.D.4.b. of this permit, shall be made and retained, in accordance with Part VI of this permit, as part of the stormwater pollution prevention plan. Such reports shall identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report shall contain a certification that the facility is in compliance with the stormwater pollution prevention plan and this permit. The report shall be signed in accordance with Part VII.C. of this permit.

5. Non-Stormwater Discharges. Except for flows from fire fighting activities, sources of non-stormwater listed in Part IV.A.3. of this permit that are combined with stormwater discharges associated with construction activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention and treatment measures for the non-stormwater component(s) of the discharge.

6. Contractor/Subcontractor Certification.

a. The stormwater pollution prevention plan must clearly identify, for each measure identified in the plan, the contractor(s) and/or subcontractor(s) that will implement the measure. All contractors and subcontractors identified in the plan must sign a copy of the certification statement in Part V.D.6.b. of this permit. All certifications must be included in the stormwater pollution prevention plan.

b. Certification Statement for Contractors/Subcontractors. All contractors and subcontractors identified in a stormwater pollution prevention plan in accordance with Part V.D.6.a. of this permit shall sign a copy of the following certification statement before conducting any activities at the site:

"I certify under penalty of law that I understand, and shall comply with, the terms and conditions of the State of Florida Generic Permit for Stormwater Discharge from Large and Small Construction Activities and this Stormwater Pollution Prevention Plan prepared thereunder."

The certification must include the name and title of the person providing the signature in accordance with Part VII.C. of this permit; the name, address and telephone number of the contracting firm; and the date the certification is made.

Part VI. Retention of Records

A. The permittee shall retain copies of stormwater pollution prevention plans and all reports required by this permit, and records of all data used to complete the Notice of Intent to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized.

B. The permittee shall retain a copy of the stormwater pollution prevention plan and all reports, records and documentation required by this permit at the construction site, or an appropriate alternative location as specified in the NOI, from the date of project initiation to the date of final stabilization.

Part VII. Standard Permit Conditions

A. Any permit noncompliance constitutes a violation of Section 403.161, F. S. and is grounds for enforcement action; for permit coverage termination, or revocation; or for denial of permit coverage renewal.

B. All of the general conditions listed in Rule 62-621.250, F.A.C., are adopted herein by reference.

C. Signatory Requirements.

1. All Notices of Intent, Notices of Termination, stormwater pollution prevention plans, reports, certifications or information either submitted to the Department or the operator of a municipal separate storm sewer system, or that this permit requires be maintained by the permittee, shall be signed as set forth in Rule 62-620.305, F.A.C.
2. Inspection reports prepared pursuant to Part V.D.4.c. of this permit shall be signed by the qualified inspector that prepared them as well as by a responsible authority for the operator as specified in Part VII.C.1. above.
3. Any person signing documents under this permit, except contractor/subcontractor certifications under Part V.D.6., shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Part VIII. Termination of Coverage

A. Notice of Termination.

1. Where a site has been finally stabilized (see Part II for the definition of final stabilization) and all stormwater discharges authorized by this permit are eliminated, the permittee shall submit a completed Notice of Termination (DEP Form 62-621.300(6)), signed in accordance with Part VII.C. of this permit, within 14 days of final stabilization of the site to terminate coverage under this permit.
2. Elimination of stormwater discharges associated with construction activity means that all disturbed soils at the site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all stormwater discharges associated with construction activity from the site that are authorized by this generic permit have otherwise been eliminated.

3. For construction activities where the operator changes, the existing operator shall file an NOT in accordance with this Part within 14 days of relinquishing control of the project to a new operator.

B. Where to Submit.

1. A permittee shall submit a Notice of Termination either electronically or by paper copy.
a. The Department encourages the electronic submission of NOTs through the NPDES Stormwater Program's electronic permitting application available at http://www.dep.state.fl.us/water/stormwater/npdes/.
b. If the operator chooses to submit the NOT by paper copy, the NOT shall be submitted to the following address:

NPDES Stormwater Notices Center, MS# 2510
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

2. Projects that discharged stormwater associated with construction activity to a municipal separate storm sewer system (MS4) shall submit a copy of the NOT to the operator of the MS4.

Form #62-346.900(3)
Form Title: Construction Commencement Notice
Effective Date: November 1, 2010
Incorporated by reference in 62-346.381(1)(f), F.A.C.

Construction Commencement Notice

Permit No. _____ Date Issued _____ Expiration Date _____

Identification or Name of Surface Water Management System: _____

Phase of Surface Water Management System (if applicable): _____

Name of Permit Holder: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: _____ Fax: _____ E-mail: _____

The undersigned hereby notifies the agency below that the construction of this surface water management system is expected to commence on _____ (mm/dd/yyyy) and is expected to be completed by _____ (mm/dd/yyyy).

_____ _____
Signature of Permit Holder or Authorized Agent Date

_____
Title (if any)

Complete the following if an authorized agent signs above:

Name of Authorized Agent: _____

Agent Mailing Address: _____

Agent City: _____ State: _____ Zip Code: _____

Agent Telephone: _____ Fax: _____ E-mail: _____

Submit this form to the following office:

Department of Environmental Protection	Northwest Florida Water Management District

Form #62-346.900(4)
Form Title: As-Built Certification by a Registered Professional
Effective Date: November 1, 2010
Incorporated by reference in 62-346.095(2), F.A.C.

AS-BUILT CERTIFICATION BY A REGISTERED PROFESSIONAL

Permit No. _____

Identification or Name of Surface Water Management System: _____

Phase of Surface Water Management System (if applicable): _____

☐ The undersigned hereby certifies that all components of this surface water management system, including areas of dredging and filling, have been built or conducted substantially in accordance with the permit, that the system is functioning as permitted, and that the system is ready for inspection. Any minor deviations (noted below) from the permit will not prevent the system from functioning as designed when properly maintained and operated. This certification is based upon on-site observation of the system conducted by me or my designee under my direct supervision and my review of as-built plans certified by a registered professional.

Minor deviations from the permit (attach additional pages if needed):

_____

_____

_____

_____

Attach a copy of as-built plans, with deviations, if any, noted to reflect the changes made during construction or performance of the work. See paragraph 62-346.381(1)(g), F.A.C., for additional information. Deviation of the permitted plans may require a modification of the permit.

☐ The undersigned hereby certifies that I or my designee under my direct supervision has inspected this surface water management system, including areas of dredging and filling, and the system does not appear to have been built or conducted substantially in accordance with the permit or is not functioning in accordance with the requirements of the permit. One of the following applies:

☐ The system was constructed or conducted with substantial design changes that are not in conformance with the permit (attach description and as-built drawings showing all changes).

☐ I am aware that additional work is required to bring the system into compliance with the terms and conditions of the permit. As appropriate, I have informed the permittee of the following:
(a) That the system does not appear to be functioning properly; and
(b) That additional work is required to bring the system into compliance.

The following components of the system do not appear to be functioning properly (attach additional pages if needed):

_____

_____

_____

Any components of the system that are not in substantial conformance with the permit require a modification of the permit in accordance with Rule 62-346.100, F.A.C. If the modification request is not approved, the components of the system that are not in conformance with the permit are subject to enforcement action under Sections 373.119, .129, .136, and .430, F.S. If modifications are approved and implemented by the permittee, this form shall be resubmitted to the agency below, together with a completed Form 62-346.900(6).

Name of Registered Professional: _____

Company Name: _____ Florida Registration Number: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____ (Affix Seal)

Telephone: _____ Fax: _____ E-mail: _____

_____ _____

Signature of Registered Professional Date

If more than one registered professional performed the inspection, the other professional(s) must also complete the following:

Name of Registered Professional: _____

Company Name: _____ Florida Registration Number: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____ (Affix Seal)

Telephone: _____ Fax: _____ E-mail: _____

_____ _____

Signature of Registered Professional Date

Submit this certification to the following agency within 30 days of completion of the system:

Department of Environmental Protection	Northwest Florida Water Management District

AS-BUILT DRAWINGS AND INFORMATION CHECKLIST

Following is a list of information that is to be verified and submitted by the registered professional in support of the "As-Built Certification."

1. As-built drawings are to be based on the construction drawings permitted by the Department or NWFWMD, and revised as necessary to reflect any changes made during construction. Both the original design and constructed condition must be clearly shown. The plans need to be clearly labeled as "as-built" or "record" drawings. All surveyed dimensions and elevations shall be verified and signed, dated, and sealed by a registered professional.

2. Submit the final subdivision plat or other legal documents, as recorded in the county public records, showing dedicated rights-of-way, easement locations, and special use areas that are reserved for water management purposes and continuing operation and maintenance;

3. Additional information will be shown on the as-built drawings otherwise provided as needed to verify and support the As-Built Certification (example: homeowner's association final documents and other items required by permit conditions).

Form #62-346.900(6)
Form Title: Request for Conversion of Environmental Resource Individual Permit Construction Phase to Operation and Maintenance Phase
Effective Date: November 1, 2010
Incorporated by reference in 62-346.095(2), F.A.C.

Request for Conversion of Environmental Resource Individual Permit Construction Phase to Operation and Maintenance Phase

Permit No.: _____ Date Issued: _____ Expiration Date of Construction Phase: _____

Identification or Name of Surface Water Management System: _____

Phase of Surface Water Management System (if applicable): _____

Name of Current Construction Phase Permittee: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: _____ Fax: _____ E-mail: _____

The undersigned hereby requests that this permit, issued by the agency below, be converted from the construction phase to the operation and maintenance phase.

_____ _____
Signature of Current Construction Phase Permittee Date

The surface water management facilities are hereby accepted by the undersigned for operation and maintenance in accordance with the provisions of Rule 62-346.095, F.A.C. Enclosed is a copy of the documentation supporting the conversion as required by that rule and the provisions in section 12.2 of the "Department of Environmental Protection/Northwest Florida Water Management District Environmental Resource Permit Applicant's Handbook Volume I (General)."

The undersigned hereby agrees that all terms and conditions of the permit and subsequent modifications, if any, have been reviewed, are understood and are hereby accepted. Any proposed modifications shall be applied for and obtained prior to such modification.

Operating Entity: _____ _____
(Signature) Date

Name of Operation and Maintenance Phase Permittee: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: _____ Fax: _____ E-mail: _____

This form should ONLY be used to convert a permit from the construction phase to the operation and maintenance phase when the operation and maintenance entity: 1) is the same as the construction phase permittee; or 2) was previously identified and approved as part of the issuance of the permit. In either of these cases, no fee is required for this transfer. Transfer of the permit to any other operation and maintenance entity will require submittal of a "Notification of Transfer of Permit," Form 62-346.900(7), and payment of the applicable processing fee for modification of a permit, as provided in Rules 62-346.071, 62-346.100, and 62-346.130, F.A.C.

Enclosures:

☐ Copy of recorded transfer of title for stormwater water management system
☐ Copy of plat(s)
☐ Copy of recorded restrictive covenants, articles of incorporation, and certificate of incorporation
☐ Other _____.

Submit this form to the following office within 30 days following completion of construction:

Department of Environmental Protection	Northwest Florida Water Management District

Form #62-346.900(8)
Form Title: Operation and Maintenance Inspection Certification
Effective Date: November 1, 2010
Incorporated by reference in 62-346.095(6), F.A.C.

OPERATION AND MAINTENANCE INSPECTION CERTIFICATION

Permit Number: _____

Identification or Name of Surface Water Management System: _____

Phase of Surface Water Management System (if applicable): _____

Inspection Date(s): _____

Inspection results: (check all that apply)

☐ The undersigned hereby certifies that the surface water management system is functioning in substantial conformance with the permit. This certification is based upon on-site observation of the system conducted by me or my designee under my direct supervision and my review of as-built plans certified by an appropriate registered professional.

☐ The following maintenance was conducted since the last inspection (attach additional pages if needed):

_____
_____
_____
_____
_____
_____

☐ The undersigned hereby certifies that I or my designee under my direct supervision has inspected this surface water management system and the system does not appear to be functioning in substantial conformance with the permit. I am aware that maintenance or alteration is required to bring the system into substantial compliance with the terms and conditions of the permit. As appropriate, I have informed the owner of the following:

(a) The system does not appear to be functioning properly;
(b) That maintenance or repair is required to bring the system into compliance; and
(c) If maintenance or repair measures are not adequate to bring the system into compliance, the system may have to be replaced or an alternative design constructed subsequent to approval by the agency below.

The following components of the system do not appear to be functioning properly (attach additional pages if needed):

_____
_____
_____
_____
_____
_____

Any components of the constructed system that are not in substantial conformance with the permitted system shall require a written request to modify the permit in accordance with the provisions of Rule 62-346.100, F.A.C. If such modification request is not approved by the agency below, the components of the system that are not in conformance with the permit are subject to enforcement action under Sections 373.119, .129, .136, and .430, F.S. If such modifications are approved by the Department and implemented by the permittee, this form shall be resubmitted to the Department upon completion of modification.

Name of Appropriate Registered Professional: _____

Company Name: _____ Florida Registration Number: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: _____ Fax: _____ E-mail: _____

_____ _____

Signature of Appropriate Registered Professional Date

Report Reviewed by Permittee:

Name of Permittee: _____

_____ _____

Signature of Permittee Date

_____

Title (if any)

Submit this certification to the following agency within 30 days of completion of the inspection:

Department of Environmental Protection	Northwest Florida Water Management District

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to concrete forms and accessories.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 03200 - Concrete Reinforcement.

D. Section 03300 - Cast-in-Place Concrete.

E. Section 03390 - Concrete Curing.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.

B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute; 2010.

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute; 2008.

D. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute; 2004.

1.04 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to code requirements; resultant concrete to conform to required shape, line and dimension.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 347, ACI 301, and ACI 318.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.

2.02 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the Contractor, selected to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

2.03 FORMWORK ACCESSORIES

A. Form Ties: Removable or snap-off type, galvanized metal or glass-fiber-reinforced plastic, adjustable length, cone type, with waterproofing washer, 1-1/2 inch back break dimension, free of defects that could leave holes larger than 1 inch diameter in concrete surface.

B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

C. Form Release Agent: Provide commercial formulation form-coating compounds with a maximum VOC of 350 mg/l that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

D. Corners: Chamfered, rigid plastic or wood strip type; 3/4 x 3/4 inch size; maximum possible lengths.

E. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

F. Flashing Reglets: Galvanized steel, 22 gage thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

G. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members that are not indicated on drawings.

F. Provide chamfer strips on external corners of beams, joists, and columns.

G. Coordinate this section with other sections of work that require attachment of components to formwork.

H. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Contracting Officer's Authorized Representative before proceeding.

I. Use new forms on exposed concrete if possible.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be embedded.

D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement. Heat seal joints so they are watertight.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.
   1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
   2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117.

B. Construct and align formwork for elevator hoistway in accordance with ASME A17.1.

C. Camber slabs and beams in accordance with ACI 301.

3.08 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Reinforcing steel for reinforced unit masonry assemblies.

C. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 03100 - Concrete Forms and Accessories.

D. Section 03300 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2010.

B. ACI SP-66 - ACI Detailing Manual; American Concrete Institute International; 2004.

C. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.

D. ASTM A184/A184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement; 2006.

E. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.

F. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2009b.

G. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; American Welding Society; 2005.

H. CRSI (P1) - Placing Reinforcing Bars; Concrete Reinforcing Steel Institute; Eighth Edition.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
   1. Prepare shop drawings under seal of a Professional Structural Engineer experienced in design of work of this type and licensed in the State where the Installation is located.

C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

E. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with CRSI (P1), ACI 301, and ACI SP-66.

B. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M Grade 60 (420).
   1. Deformed billet-steel bars.
   2. Unfinished.

B. Stirrup Steel: ASTM A82/A82M steel wire, unfinished.

C. Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain type.
   1. Flat Sheets.
   2. Mesh Size and Wire Gage: As indicated on drawings.

D. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel or galvanized components for placement within 1-1/2 inches of weathering surfaces.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with ACI SP-66 - ACI Detailing Manual and ASTM A 184/A 184M.

B. Welding of reinforcement is permitted only when specifically noted on drawings. Perform welding in accordance with AWS D1.4.

C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Maintain concrete cover around reinforcing as indicated on drawings.

3.02 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01400, will inspect installed reinforcement for conformance to contract documents before concrete placement.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Floors and slabs on grade.

B. Concrete footings and grade beams.

C. Integrally Colored Concrete slabs on grade (Concrete sections marked CIC on plan & finish schedule)

D. Joint devices associated with concrete work.

E. Miscellaneous concrete elements, including equipment pads, light pole bases, thrust blocks, and manholes.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01410 - Testing Agency Services.

C. Section 01600 - Product Requirements: LEED-related product requirements.

D. Section 03100 - Concrete Forms and Accessories: Forms and accessories for formwork.

E. Section 03200 - Concrete Reinforcement.

F. Section 03354 - Interior Concrete Slab Repairs

G. Section 03356 - Concrete Floor Finishing.

H. Section 03357 - Polished Concrete Floor Finishing

I. Section 03390 - Concrete Curing.

J. Section 07212 - Board and Batt Insulation.

K. Section 07900 - Joint Sealers: Sealants for saw cut joints and isolation joints in slabs.

L. Section 15400 - Plumbing: Mechanical items for casting into concrete.

M. Section 16000 - Electrical Work - General: Electrical items for casting into concrete.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).

B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2010.

C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (errata 2007).

D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.

E. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.

F. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 2010.

G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American

Concrete Institute International; 2008.

H. ASTM C 31 - Making and Curing Concrete Test Specimens in the Field; 2003a.

I. ASTM C33 - Standard Specification for Concrete Aggregates; 2011.

J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2010.

K. ASTM C 42 - Obtaining and Testing Drilled Cores and Sawed Beams of Concrete; 2003.

L. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2011.

M. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2010a.

N. ASTM C150 - Standard Specification for Portland Cement; 2011.

O. ASTM C 172 - Standard Practice for Sampling Freshly Mixed Concrete; 1999.

P. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2010b.

Q. ASTM C 231 - Air Content of Freshly Mixed Concrete by the Pressure Method; 2003.

R. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

S. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2010a.

T. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2008a.

U. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2010.

V. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2010.

W. ASTM C979 - Standard Specification for Pigments for Integrally Colored Concrete; 2010.

X. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 1999 (Reapproved 2008).

Y. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2011.

Z. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2010a.

AA. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2008).

AB. ASTM E 1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 1998.

AC. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2009.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

C. Samples for Pigment Color Selection: Submit manufacturer's complete sample chip set, including pigment number and required dosage rate for each color.

D. Verification Samples: Submit sample chips of specified colors indicating pigment numbers and required dosage rates, for subsequent comparison to installed concrete.

E. Concrete Mix Designs: Include the following information:
   1. Proportions of cement, fine and coarse aggregate, and water.
   2. Water/cement ratio, design strength, slump, and air content.
   3. Type of cement and aggregates.
   4. Type and dosage of all admixtures.
   5. Special requirements for pumping.
   6. Any special characteristics of the mix which require precautions in the mixing, placing, or finishing techniques to achieve the finished product specified.

F. Testing Laboratory Reports: Report test results in writing to Contracting Officer's Representative, Structural Engineer, Ready-Mix Producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain:
   1. Project identification name and number.
   2. Date of concrete placement.
   3. Name of concrete testing service.
   4. Concrete type and class.
   5. Location of concrete placed in structure.
   6. Design compressive strength at 28 days.
   7. Concrete mix proportions and materials.
   8. Compressive breaking strength.
   9. Type of break for both 7-day and 28-day tests.

G. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

H. LEED Submittals: If wood form materials, including supports, are used, submit relevant LEED Submittal Forms showing content of sustainably harvested wood, salvaged and reused wood, wood fabricated from recovered timber, and locally-sourced wood, as specified in Section 01355.

I. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

J. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

1.06 MOCK-UP

A. Construct and erect 100 SF mock-up panel of integrally colored cast concrete slab.
   1. Panel to illustrate full range of color and finish level.
   2. Locate where directed.

B. If requested by Contracting Officer's Authorized Representative, cast concrete against mock-up panel. Obtain acceptance of resulting surface color and finish by Contracting officer's Representative prior to beginning integrally colored concrete placement.

C. Accepted mock-up panel is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.

D. Mock-up may not remain as part of the Work.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03100.

2.02 REINFORCEMENT

A. Comply with requirements of Section 03200.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C 150, Type I - Normal or Type II - Moderate Portland type.
   1. Acquire all cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C 33.
   1. Acquire all aggregates for entire project from same source.

C. Fly Ash: ASTM C618, Class C or F.

D. Calcined Pozzolan: ASTM C618, Class N.

E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.

F. Color Additives: Pure, concentrated mineral pigments specifically intended for mixing into concrete and complying with ASTM C979.
   1. Concentration: Base dosage rates on weight of Portland cement, fly ash, silica fume, and other cementitious materials but not aggregate or sand.
   2. Packaging: If pigments are to be added to mix at site, furnish pigments in premeasured disintegrating bags to minimize job site waste.
   3. Color(s): As selected by Contracting Officer's Authorized Representative from manufacturer's full range.
   4. Manufacturers:
      a. Butterfield Color: www.butterfieldcolor.com.
      b. Davis Colors: www.daviscolors.com.
      c. Lambert Corporation: www.lambertusa.com.
      d. Substitutions: See Section 01600 - Product Requirements.

G. Water: Clean and not detrimental to concrete.

2.04 CHEMICAL ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260.

C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

G. Accelerating Admixture: ASTM C494/C494M Type C.

H. Retarding Admixture: ASTM C494/C494M Type B.

I. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 ACCESSORY MATERIALS

A. Underslab Vapor Barrier: Comply with ASTM E 1745, Class A. Equivalent to Stego Wrap 15-mil Vapor Barrier by Stego Industries LLC, San Juan Capistrano, CA, (877) 464-7834, www.stegoindustries.com. Provide seam tape, pipe boots, mastic, and other accessories as recommended by manufacturer.

B. Non-Shrink Cementitious Grout: ASTM C1107/C1107M; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Minimum Compressive Strength at 48 Hours: 2,400 psi.
   2. Minimum Compressive Strength at 28 Days: 7,000 psi.

C. Curing Materials: Comply with requirements of Section 03390.

2.06 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059 Type II.

B. Epoxy Bonding System: Complying with ASTM C881/C881M and of Type required for specific application.

C. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1751, 1/2 inch thick unless otherwise indicated, full depth of slab less 1/2 inch, installed with expansion joint cap.
   1. Expansion Joint Cap: Equivalent to W.R. Meadows "Snap-Cap;" www.wrmeadows.com.
      a. Sealant Joint Size: 1/2" wide x 1/2" deep.

D. Sealant and Primer: As specified in Section 07900.

2.07 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Contracting Officer's Authorized Representative for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
   1. Use water-reducing admixture or high-range water-reducing admixture (Superplasticizer) in concrete as required for placement and workability.
   2. Use nonchloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees F.
   3. Use air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having the total air content as shown on the drawings.
   4. Use admixtures for water reduction and set control in strict compliance with manufacturer's directions.

D. Normal Weight Concrete: For use in all locations, unless otherwise noted.
   1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 4000 psi.
   2. Fly Ash Content: Maximum 20 percent of cementitious materials by weight.
   3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
   4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
   5. Water-Cement Ratio: Maximum 53 percent by weight.
   6. Total Air Content: 4 - 6 percent, determined in accordance with ASTM C 173/C 173M.
   7. Maximum Slump: 4 inches.

2.08 MIXING

A. Integrally Colored Concrete: Add pigments in strict accordance with manufacturer's instructions to achieve consistent color from batch to batch.

B. Transit Mixers: Comply with ASTM C94/C94M.
   1. Addition of water to batch for material with insufficient slump will be permitted in accordance with ACI 301, except no water shall be added on site without approval of the Testing Lab Representative on site..
   2. When air temperature is between 85 degrees F and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; and when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
   1. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as otherwise indicated.

B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.

C. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

D. Install vapor barrier under interior slabs on grade. Comply with requirements of ASTM E 1643. Lap joints minimum 6 inches and seal watertight by taping edges and ends.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Contracting Officer's Authorized Representative not less than 24 hours prior to commencement of placement operations.

D. Ensure reinforcement, inserts, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.04 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive,

not more than 24 hours after form removal.

D. Concrete Slabs: Finish to requirements of Section 03356.

E. Decorative Exposed Surfaces: "Steel trowel" as described in ACI 302.1R; use steel-reinforced plastic trowel blades instead of steel blades to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, and surfaces to be polished.

F. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

G. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

3.05 CURING AND PROTECTION

A. Comply with requirements of Section 03390.

3.06 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01400.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

E. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
   1. Slump: ASTM C 143; one slump test at point of discharge for each set of test cylinders taken; additional tests when concrete consistency seems to have changed.
   2. Air Content: ASTM C 231, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
   3. Concrete Temperature: Test hourly when air temperature is 40 degrees F and below, when 80 degrees F and above, and each time a set of compression test specimens is made.
   4. Compression Test Specimens: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise indicated. Mold and store cylinders for laboratory-cured test specimens except when field-cure test specimens are required.
      a. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
   5. Compressive Strength Tests: ASTM C 39; one set for each 50 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed (slabs and walls). One specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required. Any additional cylinders required by the Contractor for early strength gain tests for form stripping are the Contractor's responsibility and shall be paid for by Contractor.
      a. When frequency of testing will provide fewer than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.

F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

G. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Contracting Officer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

H. Comply with requirements of Section 01410 for additional testing and inspection services required.

3.07 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Contracting Officer's Authorized Representative, and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Contracting Officer's Authorized Representative. The cost of additional testing, repair or replacement shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Contracting Officer's Authorized Representative for each individual area.

END OF SECTION

SECTION 03345

CAST IN PLACE - INTEGRAL COLORED CONCRETE

PART 1 - GENERAL

1.01 Scope of Work

A. Include all labor, materials and appliances, and perform all operations in connection with the installation of full depth integral colored concrete and related work incidental to the completion thereof, as shown on the structural drawings and as specified herein.

B. Work includes:
   1. Base preparation
   2. Formwork
   3. Reinforcing
   4. Accessories
   5. Cast-in-place integral colored concrete]
   6. Placing, finishing and curing.
   7. Testing and Inspection by Owner.

C. Related Sections:
   1. Section 03353 New Integral Colored Polished Concrete Floor Finish

1.02 REFERENCES

A. American Concrete Institute (ACI):
   1. ACI 117 - Tolerances for Concrete Construction and Materials and Commentary.
   2. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
   3. ACI 301 - Specifications for Structural Concrete.
   4. ACI 305.1 - Standard Specification for Hot Weather Concreting.
   5. ACI 306.1 - Standard Specification Cold Weather Concreting.
   6. ACI 308.1 - Standard Specification for Curing Concrete.
   7. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary.
   8. ACI 347 - Formwork For Concrete
   9. ACI SP66 - ACI Detailing Manual

B. ASTM International (ASTM):
   1. ASTM C 31 - Making and Curing Concrete Test Specimens in the Field.
   2. ASTM C 33 - Concrete Aggregates.
   3. ASTM C 39 - Compressive Strength of Cylindrical Concrete Specimens.
   4. ASTM C 94 - Ready-Mixed Concrete.
   5. ASTM C 150 - Portland cement.
   6. ASTM C 494 - Chemical Admixtures for Concrete.
   7. ASTM E 1155 - Determining Floor Flatness and Levelness Using the F-Number System (Inch-Pound Units).

C. Concrete Reinforcing Steel Institute (CRSI):
   1. CRSI Manual of Standard Practice.
   2. CRSI Placing Reinforcing Bars.

1.03 SUBMITTALS

A. Concrete Supplier
   1. Submit State Department of Transportation and/or National Ready Mixed Concrete Association Plant Certification.

B. Concrete Contractor's Certification
   1. Submit ACI floor finisher current certification document for at least one (1) finisher who will be installing slab placements.

C. Concrete Mix Design
   1. Submit attached Concrete Mix Design Submittal Form for interior slabs.

a. Fill out completely all information indicated on the form
b. Submit only one mixture design form indicating same mix design for all interior slabs.

2. Attachments to Concrete Mix Design:
   a. Cementitious materials mill test reports and other test reports for the following:
      1) Portland cement
      2) Fly Ash
      3) Ground Granulated Blast Furnace Slag
   b. Designation, type, quality, geological description, and source (natural or manufactured) of coarse and fine aggregate materials.
   c. Sieve Analysis Reports
      1) Provide separate sieve analysis of percentages passing for coarse and fine aggregate. Show values for each sieve size shown on the mix design form. Do not leave any line blank. Sieve analysis sampling and testing for each aggregate source shall be conducted within 60 days of concrete submittal date.
   d. Aggregate Supplier Statement:
      1) Stating if aggregate is possibly alkali-reactive, based on tests or past service
      2) Stating if aggregate can possibly cause pop-outs, “D” cracking, hexagonal cracking, or other disruptions due to moisture gain, freezing, or other mechanisms, based on tests or past service.
   e. Product data for the following concrete materials admixtures:
      1) Liquid color
      2) Water reducing
      3) Set retarding
      4) Set accelerating
      5) Data indicating chloride ion content information for each admixture
   f. Concrete compressive strength data as required by ACI 318.

D. Slab Joint and Placement Plan:
   1. Submit pour plan identifying the following:
      a. Interior and exterior walls and column grid locations.
      b. Extent of pours including width, length, slab placement area and volume.
      c. Locations of sawn contraction joints
      d. Location of construction joints.

E. Delivery Tickets:
   1. Submit copies of delivery tickets for each load of concrete delivered to site.
   2. Indicate information required by ASTM C 94 on each ticket.

1.04 TESTING

A. Owner Independent Testing Company (ITC) will perform concrete testing and inspection specified at no cost to the Contractor.

B. ITC is neither authorized to change any specified requirement nor to approve any portion of the work.

C. Failure to detect defective material or work will neither prevent rejection when defects are discovered later nor will it obligate Owner to make final acceptance.

D. Responsibilities and Duties of Contractor Relative to Owner Testing:
   1. Notify Owner's agency in advance of concrete placement to allow sufficient time to prepare for required testing.
   2. Assist Owner's agency in securing field specimens
   3. Provide and maintain for sole use of ITC, facilities for safe storage and proper curing of concrete test cylinders at project site as required by ASTM C31.

1.05 QUALITY ASSURANCE

A. Tolerances:
   1. Conform to the requirements of ACI 117 and ACI 301 except as specified herein.
   2. Formwork
      a. Comply with ACI 347 for vertical and horizontal alignment of edge forms.
   3. Finished Surface Flatness and Levelness:
      a. The minimum local area shall be bound on each side by column lines.
      b. Interior Floor Slabs
         1) Specified Overall Value (SOV) FF 30 / FL 20 and Minimum Local Value (MLV) FF 20 / FL 13 tolerance for troweled floors in accordance with ACI 117.
      c. Remedies for Out-of -Tolerance Work
         1) Remove and replace slabs-on-grade measuring below either (or both) of specified minimum local F-numbers.
         2) At option of Owner, Contractor may be allowed to submit alternatives for remediation.
      d. Costs for corrective work, remedies for out-of-tolerance work, and extra testing as required by defective work shall be borne by Contractor.

1.06 MOCK-UP

A. Provide Cast-In-Place Integral Colored Concrete mock-up, 100 square feet, illustrating completed finish for color. Mock-Up will include slab joints and slab edge treatments including complementary edge banding.

B. Locate mock-up where directed by AAFES Project Manager.

C. Accepted mock-up will serve as standard to judge quality and workmanship.

D. Accepted mock-up panel is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original, unopened, undamaged containers with labels identifying manufacturers name, product name and batch numbers. Keep containers closed and upright to prevent leakage.

B. Mark reinforcing, accessories and embedded items for proper identification and placement location.

C. Store materials off ground in dry area and in manner to prevent damage. Protect liquid materials from freezing.

D. Stockpile concrete aggregates in manner to prevent contamination with other materials or with other sizes of aggregates. Conduct tests for determining conformance to requirements at point of batching.

E. Store admixtures in manner to prevent contamination. Protect admixtures from extreme temperatures which would adversely affect their characteristics.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Concreting in Hot, Dry or Windy Weather:
   1. Employ precautions to avoid cracking when the concrete rate of evaporation exceeds 0.1 pounds per square foot per hour or when any combination of concrete materials and weather conditions are favorable for the formation of plastic shrinkage cracks.
   2. Maintain an accurate reading thermometer at the job site to check temperature of concrete
   3. Reject concrete if more than one slump adjustment, as defined in ASTM C 94, is required.
   4. Do not place concrete when forms, substrate or reinforcing bars are more than 120 F or the temperature differential between the forms, substrate or reinforcing bars and concrete will create conditions favorable for settlement cracks or thermal cracking.

B. Concreting in Cold Weather:
   1. Conform to ACI 306.1 when temperature and other environmental conditions are as noted therein.
   2. Minimum substrate surface temperature and ambient building air temperature shall be 55°-F during placement and maintained through curing period.
   3. Do not place slabs on substrate that is more than 20°-F cooler than concrete. Warm substrate

to decrease temperature differential to 20°-F or less.
4. Minimum concrete temperature as measured at the point of discharge shall be 65°-F.
5. Do not use unvented combustion heaters during concrete placement so as to prevent exposure of concrete to excessive exhaust gases containing carbon dioxide (CO2) or carbon monoxide (CO).
6. During slab placement and curing periods, maximum CO2 levels shall be 4,500 parts per million and maximum CO levels shall be 15 parts per million at concrete surface within 5 feet of any source of exhaust gases to minimize potential damage to concrete.

C. Precipitation Protection:
1. Concrete shall be placed under watertight roof membrane
2. Concrete shall be protected from precipitation until adequate strength is gained to prevent damage.

1.09 PROJECT CONDITIONS

A. Protect concrete slabs from staining, gouges and scratching.
1. Do not permit foot traffic on slabs from time of placement until 24 hours after application of wet curing blankets.
2. Do not permit wheeled traffic (scissor lifts, dolly's, wheeled carts, etc) on slabs from time of placement until wet curing blankets have been removed and the floor slab has been cleaned by floor scrubber and is dry.
3. Locate at least 2-spill kits adjacent to work.
4. Diaper hydraulic powered equipment.
5. Do not charge battery powered equipment over integral colored concrete.
6. Place drop cloths or other breathable slab protection under parked vehicles.
7. Do not store structural steel or metal fabrications on slab.
8. Do not allow pipe cutting machine on slab.

PART 2 - PRODUCTS

2.01 FORMWORK

A. Forms:
1. Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces.
2. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on the drawings.
3. Provide lumber dressed on at least two edges and one side for tight fit.
4. Bevel top outside edge of form.

2.02 REINFORCEMENT

A. Reinforcing Bars:
1. ASTM A615, deformed, Grade 60.
2. ASTM A706, deformed, Grade 60.

B. Tie Wire:
1. Minimum 16 gage annealed type.

C. Reinforcing Support Devices:
1. Manufacturer support devices of metal (wire bar), concrete, or recycled plastic devices conforming to CRSI Manual of Standard Practice.
2. Precast concrete bar supports shall have minimum compressive strength of 3500 psi.
3. Do not use wood, clay brick, and other devices that can expand due to moisture gain.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150, Type [I, II] or V. Use only one brand and source throughout project. Fly ash or slag not permitted except where noted below, where concrete is in contact with soils having severe or very severe sulfate content and Type V cement is not readily available, or to mitigate concrete against potential aggregate reactivity.

B. Class F or C fly ash (or Class N pozzolan) per ASTM C 618, except loss on ignition to be 3%

maximum.

1. Use of fly ash only permitted for the following conditions:
    a. If Type V cement is unavailable or is insufficient to mitigate by itself, then fly ash can be used to mitigate sulfate exposure or as a means of mitigation of potential aggregate reactivity. To mitigate potential aggregate reactivity, the fly ash is to have the following properties.
        1) Maximum 1.5% available alkali
        2) Maximum 8% CaO (up to 10% CaO if a minimum replacement of 30% by weight of Type F fly ash is used)

C. Ground-Granulated-Blast-Furnace Slag (GGBF) per ASTM C 989.
1. Use of slag only permitted for the following conditions:
    a. If Type V cement is unavailable or is insufficient to mitigate by itself, then slag can be used to mitigate sulfate exposure or as a means of mitigation of potential aggregate reactivity.
    b. Slag to have the following properties: Grade 100 or 120

D. Aggregates
1. ASTM C33 with following requirements:
    a. No coal or lignite in concrete that will not be covered by building materials or soil.
    b. Fine aggregate grading requirements as defined in section 6.1 of ASTM C 33 shall be strictly met without deviation unless approved by the Structural Engineer.
2. If manufactured sand is used, blend with minimum 25% natural sand unless otherwise approved by Structural Engineer.
3. Coarse Aggregate Size:
    a. Nominal maximum coarse aggregate size shall be size #67 (3/4 inch) maximum for slabs ? 4 inch thick.
    b. The nominal maximum size of an aggregate is the smallest sieve size through which the major portion of the aggregate must pass, with a minimal amount retained on the maximum sieve size. Maximum 4% shall be retained on the nominal maximum size sieve.]

E. Water: ASTM C 1602 Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.

2.04 CHEMICAL ADMIXTURES

A. Provide admixture products as specified below. Within each product listing, provide one of the products specified. When specifically allowed within each product listing, equivalent admixture products by other manufacturers meeting the specified ASTM standards may be used upon submittal of product data and approval by the engineer.

B. Water Reducing Admixture: ASTM C494, Type A.

C. Water Reducing and Retarding Admixture: ASTM C494, Type B or D.

D. Accelerating Admixture: ASTM C494, Type C or E.

E. Integral Color Admixture (Liquid Coloring Agent):
1. Davis Colors: Sequoia Sandstone #5237.
2. The same manufacturer and integral color shall be used throughout entire integrally colored concrete floor.]

2.05 RELATED MATERIALS

A. Evaporation Retardant: Water-based polymer, sprayable.
1. Euco-Bar, by Euclid
2. Confilm, by BASF Admixtures (Master Builders).
3. Aquafilm, by Dayton Superior.

2.06 CONCRETE CURING MATERIALS

A. Sheet Materials: Natural fiber / plastic sheet, ASTM C171. White natural fiber matting securely attached to plastic sheet backing.
1. UltraCure by McDonald Technology.
2. HydraCure S16.1, by PNA Construction Technologies.

2.07 CONCRETE MIX

A. General:
   1. Use only materials and their proportions included on Concrete Mix Design Submittal Forms included at the end of this section.
   2. Maintain same source of cement, fly ash, slag, chemical admixtures, coarse and fine aggregates for entire colored floor slab. Do not change mix proportions of integral color admixture and cementitious materials.
   3. Measure and mix ingredients in accordance with most stringent requirements of ASTM C94 except where stated herein.
   4. Ready Mix supplier may proportion materials by field experience or proportion concrete materials by laboratory trial batches per ACI 318 for strength compliance.

B. Strength: 3,500 psi minimum

C. Workability: Concrete shall be of a consistency to be worked readily into forms and around reinforcement without segregation, voids, or excessive bleeding.

D. Minimum Cementitious Materials Content (Portland Cement and SCM): Use 520 pounds cementitious minimum for all full depth integral colored concrete mixes.]

E. Supplementary Cementitious Materials (SCM), if required:
   1. Fly Ash: Substitute fly ash for Portland cement at a minimum of 15% to a maximum of 20% of the total cementitious content.
      a. If used to mitigate potential aggregate reactivity, only Type F fly ash may be used and shall have the following maximum properties: 1.5% available alkali and 8.0% CaO.
   2. Ground Granulated Blast Furnace Slag (GGBFS): Substitute GGBFS for Portland cement at a minimum of 25% to a maximum of 30% of the total cementitious content. If required to mitigate potential sulfate exposure or aggregate reactivity, up to 50% GGBFS substitution for Portland cement may be used.

F. Water/Cementitious Materials Ratio: Interior Floor Slabs: 0.55 maximum.

G. Air-Entraining Admixture: Do not air-entrain interior floor slabs with troweled finish.

H. Slump: Slump at the point of placement shall not exceed 6 inches subject to the requirement that concrete shall be of a consistency to be worked readily into forms and around reinforcement without segregation, voids, or excessive bleeding. Maximum slump variance shall be 2 inches.

I. Admixtures:
   1. Water-reducing admixture may be added to improve workability for minimal water content.
   2. Use admixtures in accordance with manufacturer's recommendation.

2.08 BATCHING AND MIXING

A. Ready-Mixed Concrete: Mix and transport in accordance with ASTM C 94 and ACI 211.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Conform to manufacturer's printed instructions for materials and equipment.

3.02 PREPARATION

A. Notify AFFES Construction Manager, ITC and SSI a minimum of 48 hours prior to commencement of concreting operations.

B. Ensure that all work is properly coordinated:
   1. Structural Drawings and Specifications with those of other disciplines.
   2. Use final corrected Shop Drawings, placing Drawings and material / equipment Drawings

C. Verify anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, held securely, and will not cause difficulty in placing concrete.

D. Roof construction, RTUs, overhead painting, and roof drainage system shall be complete and

weather tight prior to placement integral color floor slabs.

3.03 AGGREGATE BASE PLACEMENT

A. Unless otherwise specified on the Drawings, place aggregate base as specified herein.

B. Aggregate Base:
   1. Install aggregate base where shown on Drawings.
   2. Compact to final thickness shown in layers not to exceed 6 inches with minimum of 2 passes per layer with vibratory compactor.
   3. Compact fill to 98% of aggregate's Standard Proctor as determined by Method D of ASTM D698.

C. Aggregate Base Fine Grading:
   1. Compact to final thickness noted with 2 passes minimum vibratory compactor to produce smooth, flat, dense surface.
   2. Do not allow excess moisture or soft soil beneath vapor retarder at time of placing concrete.
   3. Level off aggregate base top surface with aggregate choker material as necessary as follows:
      a. To reduce surface friction and to meet specified fine grade tolerances specified below
      b. Where aggregate base material does not have sufficient fine particles to produce a surface that is free of exposed aggregate or surface voids greater than 3/8” in wise at time of slab installation.
   4. Use laser guided equipment to establish specified base elevation
   5. Provide dry, smooth, flat, dense surface.
   6. Proof-roll 48 hours maximum prior to concrete placement. Depression under fully loaded ready mix truck shall not exceed 1/2".

D. Slab on Ground Aggregate Base Fine Grade Tolerance: +1/2 inch, -1/2 inch with transition no greater than 3/4 inch vertically to 8 inches horizontally for level slab.

3.04 FORMWORK

A. Form vertical surfaces of concrete work.

B. Design, construct, and remove formwork and related items in accordance with most stringent requirements of ACI 117 and 347.

C. Form Preparation
   1. Clean formwork.
   2. Remove rust from steel formwork.

D. Erecting Forms:
   1. Butt joints and provide backup splice at joints as required to prevent faulting at form.
   2. Do not tape formwork joints.
   3. Just before placing concrete, clean forms and adjacent surfaces again as necessary. Remove wood, sawdust, chips, dirt, sunflower seeds and other debris from work area.

E. Provide slab side forms such that by placing a 10-foot straightedge, form does not exceed 1/8 inch variation.

3.05 VAPOR RETARDER INSTALLATION

A. Install vapor retarder directly under slabs where shown on drawings

B. Lap vapor retarder not less than 6 inches with top lap placed in direction of placing concrete.

C. Seal laps continuously with specified tape.

D. Seal punctures and tears in membrane caused by reinforcement bar feet, screed anchors, formwork stakes, or utility penetrations with specified tape.

3.06 PLACING REINFORCEMENT

A. Place reinforcing in accordance with most stringent requirements of ACI 117, 301 and 318 and CRSI Manual of Standard Practice and Placing Reinforcing Bars. See Structural Details for reinforcement specifications.

B. Accurately place and secure reinforcement against displacement by firmly wiring at intersections and splices with not less than No. 18 U.S. Standard Gauge annealed wire.

C. Ensure reinforcing is clean, free from defects and kinks, loose mill or rust scale or coatings that will reduce bond.

D. Protect exposed reinforcing bars, inserts and plates intended for bonding with future expansion from corrosion.

E. When welding of reinforcement is specified, comply with AWS D1.4. Do not tack weld crossing bars for assembly of reinforcement, supports or embedded items.

3.07 EMBEDMENTS

A. Install anchor bolts and embedded bearing devices provided by others.

B. Provide other anchor bolts and bearing devices shown on Drawings or anchor bolt setting plans or required equipment installation.

C. Use templates as required for spacing between anchor bolts and set elevations with surveying equipment.

D. Position and anchor steel shapes, anchor bolts, casings, conduit sleeves, masonry anchorages and other materials embedded in concrete.

E. Place and secure against displacement miscellaneous steel, pipe sleeves, inserts, anchors, stair abrasive nosings, preformed joint fillers, and miscellaneous embedded items.

F. Secure embedments to formwork when possible.

G. Install clean embedments. After concrete placement, clean embedment exposed surfaces of concrete splatter and other foreign substances.

H. Unless noted otherwise on the Drawings, ensure corner protection angles, bars and other similar embedded metal items are continuous between concrete joints. If shorter lengths are required for metal items, connect the ends by butt-welding entire joint and grinding smooth exposed surface. Ensure embedded metal items are discontinued at construction, contraction and isolation joints.

I. Temporarily fill voids in sleeves and inserts with easily removable materials.

J. Allow sufficient time between erection of forms and placing concrete for other trades to install and test their work.

K. Before placing concrete on substrate, piping and other utilities within concrete shall be inspected and tested.

3.08 JOINTS

A. Joints
   1. Provide construction, isolation and contraction joints as indicated on Drawings and as noted below.
   2. Bulkheads for construction joints shall be 1-1/2 inch minimum lumber with top outside edge beveled 30 degrees minimum, leaving 1/4 to 3/8 inch level surface.
   3. Provide full depth wood bulkheads
   4. Maximum length to width ratio for concrete panels defined by construction or contraction joints shall not exceed 1-1/2:1.
   5. Do not locate longitudinal construction joints in action alleys.

3.09 CONVEYING

A. Handle concrete from mixer to place of final deposit as rapidly as practicable and in manner which will assure obtaining specified quality of concrete.

B. Re-tempering: Discard concrete which has already begun to set. Do not re-temper with water.

C. Equipment: Provide mixing and conveying equipment of proper size and design to ensure a continuous flow of concrete to delivery end. Do not use aluminum pipe or equipment in contact with concrete.

1. Mixers, agitators and non-agitating units: Conform to ASTM C94 and current certification requirements of Department of Transportation in state where concrete plant is located.

3.10 PLACING CONCRETE

A. Unless otherwise specified, place concrete in accordance with the requirements of ACI 301.

B. Ensure concrete supplier has a quality control representative at site for concrete placements.

C. Ensure General Contractor and/or the Concrete Floor Subcontractor representative is on site during placement of the concrete.

D. Depositing
   1. Do not deposit concrete which has partially hardened or has been contaminated by foreign matter.
   2. Deposit concrete continuously in layers of such thickness that no concrete will be deposited which has hardened sufficiently to cause seams or planes of weakness.
   3. Between construction joints, place concrete in a continuous operation such that concrete is plastic at all times and flows readily into spaces between reinforcement.
   4. Use placement procedures to avoid segregation.
   5. Deposit concrete as near as possible to its final position.
   6. Integral color concrete floor slabs:
      a. Clean tools to prevent contamination.
      b. Clean and bag boots when working on surface.
      c. Employ methods to prevent dust, efface and air-born debris from entering building and settling on slab surface during finishing operations.]
   7. Do not place concrete over standing water, mud, frost, ice or snow.

E. Consolidation:
   1. Consolidate concrete complying with ACI 301 by vibrating, spading or rodding so that concrete is thoroughly worked around reinforcing, embedded items and into the corner of forms.
   2. Consolidate each layer of concrete with previously placed layers in manner that will eliminate air or stone pockets which may cause honeycombing, pitting or places of weakness.
   3. Do not insert vibrator into portions of concrete that have begun to set.
   4. Do not use vibrators to transport concrete.
   5. Keep spare vibrator on job site during concrete operations.
   6. Use internal vibrator for formed elements, not form vibrators.
   7. Slabs:
      a. Consolidate slabs with vibrating laser screed, truss screed, bridge screed or utility screed.
      b. Use internal vibration along construction joints at both formed and slab abutments.
      c. Mark forms before concreting to properly locate sawn construction joints.
      d. Do not use grate tampers, jitterbugs, or mesh rollers.

F. After concrete placement, adjust forms and bracing as necessary to maintain proper alignment and eliminate leakage of cement paste.

3.11 FLOOR SLAB AND PAVEMENT FINISHING PROCEDURES

A. General:
   1. Do not add water to any slab surface during finishing operations.
   2. Do not add cement to any slab surface during finishing operations.
   3. Perform no finishing operation while water is present on slab surface.

B. Initial Leveling:
   1. Complete bull floating, darbying and straight-edging before any bleed water is present on slab surface.
   2. Use a checkrod or highway straightedge 10 feet wide minimum for initial and later leveling instead of short bull float where overall floor tolerances specified are greater than FF 20 / FL15.

C. Hand and Power Floating:
   1. Do not start floating until following conditions are met:
      a. Bleeding is complete and water is gone, including water sheen on slab surface.
      b. Concrete will sustain the weight of finishers without creating more than 1/8 to 1/4 inch

indentations.
c. Mortar is not thrown by rotating blades of power float.

2. The finisher shall determine the proper time to start finishing procedures for interior slab placements on the basis the above conditions. It is noted for advisory purposes, however, that typical setting characteristics of concrete materials will allow for initial power floating to begin 3-1/2 hour's ± 1 hour after initial strike-off (screeding), at which time the concrete should support a finisher on foot without more than approximately a 1/4 inch indentation in the slab surface. Variations in concrete materials, nature and proportion of supplementary cementing materials, and concrete temperature will cause setting behavior to vary.
3. Float three times minimum with each floating at right angles to previous floating, and final pass at 45 degrees to previous pass.

D. Troweling for Interior Slabs:
1. Hand or power float floor before starting troweling.
2. For first troweling, keep blade as flat as possible and use low speed, minimizing “washboard” or “chatter marks” and “pitting”.
3. Trowel two times minimum with first two trowelings at right angles. Some burn marks are acceptable. Cease troweling before trowel blades scratch surface.
4. Allow time between trowelings for concrete to stiffen and water sheen to disappear.
5. Do not add water to slab surface during troweling.
6. Do not ride trowels on existing hardened concrete slabs. Trowels shall be carried off of slab surfaces. When parking power trowels on fresh concrete, place on top of plywood or other protective material.

E. Additional Integral Colored Floor Troweling Requirements:
1. Use steel reinforced plastic finish blades for the final passes and after such time as slab surface exhibits some degree of sheen from steel blades.
2. Trowel as many times as possible to enhance surface sheen, without scratching the slab surface.
3. Ensure lead finisher/foreman who finished the field sample is present for entire fresh concrete finishing process until final troweling is completed.]

3.12 CONCRETE FINISHES

A. Troweled Finish:
1. After floating, as specified, power trowel or hand trowel surface.
2. Ensure kneeboard impressions, trowel marks or chattered areas are not evident after floor is finished.
3. Finish surface to produce maximum sheen free of scratches and trowel marks.

3.13 FLOOR SLAB CONTRACTION JOINTS

A. General:
1. Provide slab joints as indicated on Drawings.
2. Immediately clean slab surface of all sawing residues.]
3. Employ sufficient number of saws and workers to complete cutting saw joints before shrinkage produces cracking.
4. Saw cut to width of 1/8 inch by 1” in depth, unless noted otherwise on drawings.

B. Sawed Contraction Joints:
1. Use saws, blades, skid plates, and accessories by Soff-Cut International, Inc. or approved equal
2. Start cutting sawed joints as soon as concrete has hardened sufficiently to prevent raveling or dislodging of aggregates. This will typically be from 1 hour in hot weather to 4 hours in cold weather after completing finishing of slab in that joint location.
3. Provide at least two “Soff-Cut” saws on site with blades capable of achieving the required depth of saw cut.
4. Extend sawed joint to the slab boundaries and abutments, including columns, drains, and other penetrations in the path of a defined joint using off-set grinder or Soff-Cut X-50. Implement methods and timing of the saw cut beyond the limits of the Soff-Cut saw reach to provide a consistent depth of cut with minimal raveling of joint edges.

C. Saw-Cut Control Joint Dust Collection
   1. Attach dust collection system directly to each Soff-Cut saw being used.
   2. Dust Collection System:
      a. ProVac Dust Collection System by Glad Tech Inc.
      b. SoffVac by Soff-Cut International, Inc.
      c. PulseVac by The PulseVac Company
   3. Remove all saw debris, either loose or compacted, from slab surface and joints prior to curing cover installation.

3.14 CONCRETE CURING

A. Application Instructions
   1. Clean up saw cut residue from the surface using vacuums, sweepers, blowers, brooms or water.
   2. Wet surface of slab-on-grade with 1/8" to 1/4" inch of water to cover entire surface area of slab.
   3. Unroll the specified wet curing blanket onto slab using the roller squeegee applicator.
   4. No portion of this product shall be reused once it has been put into use on a slab on grade or other concrete application.
   5. Place wet cure covering in widest practical width as soon as concrete has hardened sufficiently to prevent surface damage. Sides and end shall be lapped at least 3".
   6. Repair any holes or tears during curing period using wet cure material and water.
   7. Cover entire surface area including edges.

B. Removal and Cleaning
   1. After 72-HRS of wet curing, use appropriate scrubber equipment with soft finishing pads or brushes and potable water to clean surface.

3.15 FORM REMOVAL

A. Do not remove forms until concrete has hardened sufficiently to support its own weight and imposed construction loads.

B. Remove forms in manner to avoid damage to concrete.

C. Formwork for slabs and pavements, curbs and other parts not supporting vertical load of concrete may be removed as soon as concrete has hardened sufficiently to resist damage from removal operations, but in no case sooner than 12 hours.

3.16 JOINT FILLING

A. Joint filling and sealing of concrete floors is specified in Section 03 35 36.

3.17 CONCRETE FLOOR POLISHING & SEALING

A. Polishing concrete floor slabs which have received Hardener/Densifier is specified in Section 03 35 40.

3.18 CONCRETE PROTECTION

A. Adequately protect concrete inserts and other embedded items from movement, mechanical injury, or from damage by elements.

B. Protect wet cured or impervious sheet cured surfaces as follows:
   1. Barricade concrete surfaces immediately after finishing.
   2. Barricades may be removed 24 hours after installation of wet curing blankets.
   3. Do not allow heavy traffic on concrete surface until concrete has obtained, by test, its design strength as noted on drawings.

C. General Contractor shall provide a “Concrete Floor Protection Plan” to AAFES Construction Manager prior to placement of interior slabs that addresses how the following tasks will be implemented:
   1. Communication of protection plan to subcontractors and vendors, including those directly contracted by the Owner.
   2. Keeping the slab clean of dirt and grime.
   3. Prevention of stored materials in exposed floor areas until completion of construction.

4. When and how floor covering protection will be provided in high traffic areas.
5. Condition, inspection, and operational procedures for construction equipment allowed on the slab surface, including but not limited to:
   a. Diapering to contain any potential fluid leaks.
   b. Use of non-marking tires
   c. Inspection of tire treads for any debris that may mar the slab surface.
6. Procedures for cleaning up slab spills, including use of and availability of cleaning chemicals and absorptive materials at the site.

D. Provide access ramps of compacted earth or other means along exposed concrete edges of floor slabs to prevent equipment and machinery from impacting edges. Barricade other exposed edges to vehicular traffic which may damage edges.

END OF SECTION

AAFES

CONCRETE SLAB MIX DESIGN SUBMITTAL FORM

(Section 03 34 50 – Cast-in-Place Integral Colored Concrete) Date

SUBMITTED MIX DESIGN

Interior Building Slabs

☐ 03 34 50 Integrally **Colored** Concrete

Mix ID # _____

STORE INFORMATION

STORE # _____

ADDRESS _____

CITY, ST _____

GENERAL CONTRACTOR

COMPANY _____

JOBSITE PHONE _____

A. CONCRETE INFORMATION

Design Strength (f'c) _____ psi

Water / Cementitious Ratio _____

Total Air Content _____ %

Mix Developed From

☐ Trial Mix Test Data (*attach test data*)

☐ Field Experience (*attach data*)

Density

Wet _____ pcf Dry _____ pcf

Slump

_____ " (± 1") **WITHOUT** WR Admixture

_____ " (± 1") **WITH** WR Admixture

B. ADMIXTURE INFORMATION

	ASTM Designation	**Product** (Manufacturer/Brand)	**Dosage (ounces)** oz / cy	oz / cwt
Water Reducing				
Accelerating				
Retarding				
Liquid Color				

C. MIX DESIGN

Mix Proportions (per cubic yard)

	Identification (Type, size, source, geology, etc.)	**Weight** (pounds)	**Density** (SSD)	**Volume** (cubic feet)	**% Aggregate Absorption**
Cement					
Fly Ash					
Slag (GGBFS)					
Coarse Aggregate					
Fine Aggregate #1					
Water					
Air Content					
Liquid Color					
	TOTALS				

Coarse & Fine Aggregate Gradation Information

Sieve Size	**% Passing Each Sieve** (All Sieve Sizes must be entered)					**Combined % Passing**	**Combined % Retained**	
	Coarse Agg. # 1	**Coarse Agg. # 2**	**Coarse Agg. # 3**	**Fine Agg. # 1**	**Fine Agg. # 2**		**Cumulative**	**Individual**
1-1/2"								
1"								
3/4"								
1/2"								
3/8"								
# 4								
# 8								
# 16								
# 30								
# 50								
# 100								
# 200								
% of Vol								

D. ATTACHMENTS: Include the following with this Mix Design Report.

☐ Mill test reports for Portland cement, fly ash, and ground granulated blast furnace slag materials

☐ Designation, type, quality, and source (natural or manufactured) of coarse and fine aggregate materials

☐ Separate aggregate gradation reports including all required sieve sizes

- Gradation sieve report tests dated within 60 days of this report
- Report for each coarse and fine aggregate material in mix

☐ Statement if possible reactivity of aggregate, based on tests or past service

☐ Statement if possible aggregate pop-outs or their disruptions, based on tests or past service

☐ Product data for the following admixtures:

- Liquid color
- Water reducing, set retarding, set accelerating, etc.

☐ Concrete compressive strength data used for standard deviation calculations

☐ Measured water-soluble chloride ion content. (percent by weight of cement)

E. CONCRETE SUPPLIER INFORMATION

Company Name _____ **Tel. #** **( )** _____

Address _____

City, ST Zip _____

Technical Contact _____ **Cell #** **( )** _____

e-mail _____

Sales Contact _____ **Cell #** **( )** _____

	PRIMARY PLANT	SECONDARY PLANT
Plant Location:		
Miles from Site:		
Travel Time to Site:		
NRMCA Certified:	☐ YES ☐ NO	☐ YES ☐ NO
State DOT Certified:	☐ YES ☐ NO	☐ YES ☐ NO
Batch Mixing Type:	☐ DRY ☐ CENTRAL MIX	☐ DRY ☐ CENTRAL MIX

CONCRETE CONTRACTOR'S QUALIFICATION STATEMENT OF CONFORMANCE
SECTION 03 34 50
CAST-IN-PLACE INTEGRAL COLORED CONCRETE

Project Location:_____Date: _____

Project Number:_____

By signing below as approved, the Contractor hereby confirms that the qualifications of the concrete finishing subcontractor conforms to the qualifications as follows:

The concrete floor finishing subcontractor Lead Finisher is currently certified under the Concrete Flatwork Finisher Training and Certification Program as granted by the American Concrete Institute. (Attach Current Certificates)

The concrete floor finisher subcontractor has experience in finishing interior floors of similar size and scope in at least 5 previous projects. Projects name and location are identified as follows

1. _____

2. _____

3. _____

4. _____

5. _____

Concrete Finishing Contractor Company Name and Address:

_____

_____

_____

Signature of Responsible Officer: _____

Typed Name and Title of Officer: _____

Telephone Number: (_____) _____

General Contractor Company Name and Address:

_____

_____

Signed by: _____ Date:_____

Work experience to be confirmed by the General Contractor.

Submit one copy of this Statement to the Architect

SECTION 03354

INTERIOR CONCRETE SLAB REPAIRS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Joint filler removal and replacement.

B. Joint edge spall repair.

C. Crack repair.

D. Surface defect repair, including pop-outs, chips, spalls, and pitting.

E. Removal and replacement of previously completed repairs not in compliance with this section.

1.02 RELATED REQUIREMENTS

A. Section 03300 Cast-In-Place Concrete

B. Section 03356 Concrete Floor Finishing

C. Section 03357 Polished Concrete Floor Finishing

1.03 SUBMITTALS

A. Section 01330 - Submittal Procedures: Procedures for Submittals.

B. Joint Filler Installer Qualification Certification:
   1. Company branch or regional office shall provide a list of five projects minimum performed within the last three years of similar type, size and complexity as this contract. Provide project names, addresses, contact names and phone numbers for each project.
   2. Submit letter of certification, identifying specific individuals that are currently certified installers of the specified materials and are familiar with proper procedures and installation methods as required by the specified product manufacturers.

C. Product data for:
   1. All products and primary equipment used for repair of existing concrete slab defects.

1.04 QUALITY ASSURANCE

A. AAFES reserves the right to engage the services of a Concrete Consultant to review, observe and inspect the work in progress.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Limit and control damage from excessive dust caused by demolition, preparation, and installation of all Work.

B. Limit and control damage from moisture.

C. All replaced concrete shall be cured a minimum of 8 days prior to joint filler installation.

D. Concrete repair area shall be closed to traffic during preparation and repair for a time as recommended by manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS

A. Subject to compliance with project requirements, provide products as manufactured by the following to the extent as specified hereinafter:
   1. Metzger/McGuire (800) 223-6680.
   2. Roadware (800) 522-7623

B. Polyurea Joint Filler: Rapid setting, two-component polyurea polymer liquid of 100% solids content, Shore hardness 85-90, compatible with construction materials in contact.
   1. Spal-Pro RS 88 in “Curry” by Metzger/McGuire.
   2. Match color of adjacent exposed concrete slab surface.

C. Joint Filler Stain Preventing Film:
   1. SPF by Metzger/McGuire.

D. Low Viscosity Rigid Urethane:
   1. Rapid ReFloor in “Curry” by Metzger/McGuire.
   2. 10 Minute Mender or Matchcrete by Roadware
   3. Match color of adjacent exposed concrete slab surface.

E. Silica Sand
   1. Dry 00 Sandblasting sand.

2.02 EQUIPMENT

A. Subject to compliance with project requirements, provide equipment manufactured by the following:
   1. HTC (877) 482-8700, www.htc-america.com <http://www.htc-america.com>
   2. Joe Due Blades and Equipment, Mauston, WI, (877) 563-383.
   3. Pulman-Ermator (800) 232-2635, www.pullman-ermator.com <http://www.pullman-ermator.com>
      a. SASE Company, Inc, Kent, WA (800) 522-2606
      b. U.S. Saws, Santa Ana, CA (866) 987-7297.

B. Dust extraction system for grinding/sawing:
   1. HEPA filtration vacuum, designed for use with all hand tools when grinding or sawing concrete (minimum 125CFM air flow).
   2. Provide one of the following:
      a. 26D, by HTC.
      b. S2400, by Pullman-Ermator.
      c. Bull 50, by SASE Company, Inc.
      d. Approved equal.

C. Joint Filler Removal and Preparation
   1. Humpback Cutter Complete, by Joe Due.
   2. Dust Buggy, by U.S. Saws.
   3. Approved equal.

D. Crack Repair:
   1. 5” Dustmizer 007, by Joe Due.
   2. 5” Crack Attacker, by Joe Due.
   3. 7” Handheld Crack Chaser, by Joe Due.
   4. SawTec 5” Tile Vac, by U.S. Saws.
   5. SawTec 7” Crac-Vac, by U.S.Saws.
   6. Approved equal.

E. Surface Grinder: Handheld 5”-7” electric surface grinder with dustless shroud/housing.
   1. Dust Avenger 5, by Joe Due.
   2. Dust Avenger 7, by Joe Due.
   3. SawTec 5” Grinder Vac, by U.S. Saws.
   4. SawTec 7” Grinder Vac, by U.S. Saws.
   5. Approved equal.

PART 3 EXECUTION

3.01 EXAMINATION

A. An evaluation of the existing floor slab shall be conducted, identifying all defects. Scope of

repairs shall be confirmed by the AAFES Contracting Officer, prior to commencement of work. Identify scope of work on Floor Polishing Plan specified in other section(s) of Division 3 - Concrete.

B. Repairs are not acceptable unless specifically approved on a case-by-case basis by the AAFES Contracting Officer.

3.02 PREPARATION

A. Protect surface of slab immediately adjacent to defect under repair.

3.03 JOINT MILLING AND CAP FILLER REPLACEMENT (See Figure1 at end of Section)

A. If existing joint filler is sound and resting on top of saw cut shelf, mill top 1/2" of material and refill with specified polyurea joint filler:

B. Re-saw the joint to a minimum depth of 1/2” with a dry-cut, vacuum-equipped saw using a slightly oversized blade. The blade width should be sufficient to encapsulate the widest spall along a given contraction joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through the joint.

C. Refill with polyurea joint filler material from the bottom up, taking care not to entrap large air bubbles per manufacturer's recommendation. Slightly overfill and shave flush to the surface, prior to grinding process.

D. Ensure that after grinding, the joint is cut smooth and flush with the finish floor surface, without concave or intermittent, darkened profile.

3.04 FULL DEPTH JOINT FILLER REPLACEMENT (See Figure 2 at end of Section)

A. If existing joint filler is loose, easily removed, or able to be forced downward with a hand tool, remove all filler material from joint and refill.

B. Re-saw joint full depth with a dry-cut, vacuum-equipped saw using a slightly oversized blade. The blade width should be sufficient to encapsulate the widest spall along a given contraction joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through the joint. Remove all filler material, debris, and laitance.

C. Refill with polyurea joint filler material from the bottom up, taking care not to entrap large air bubbles per manufacturer's recommendation. Slightly overfill and shave flush to the surface prior to grinding process.

D. Ensure that after grinding, the joint is cut smooth and flush with the finish floor surface, without concave or intermittent, darkened profile.

3.05 SPALLED JOINT REPAIR (LESS THAN 1”) (See Figures 3 and 4 at end of Section)

A. For joints that are spalled or have radius tooled edges not exceeding 1” in width at slab surface.

B. Re-saw the joint edge to a minimum depth of 3/4” with a dry-cut, vacuum-equipped saw allowing removal of the widest spall (or top of radius) along a given joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through joint.

C. Clean joint of loose concrete, joint filler, laitance, dirt, debris, backer rod, etc.

D. Joints must be free of all visible moisture.

E. Ensure filler penetrates the irregular aggregate interlock portion of the sawn contraction joint as shown below, re-establishing the aggregate interlock that may have been lost due to shrinkage, curling, and lack of reinforcement.

F. Gravity feed a trace amount (1/8”) of silica sand into joint to prevent 3-sided bonding of joint filler.

G. Fill joint cavity per manufacturer's instructions, taking care not to entrap large air bubbles. Overfill joint slightly and shave flush to slab surface prior to grinding process.

3.06 SPALLED JOINT REPAIR (GREATER THAN 1”) (See Figure 5 at end of Section)

A. For joints that are spalled and exceeding 1” in width at slab surface.

B. Re-saw the joint edge to a minimum depth of 3/4” with a dry-cut, vacuum-equipped saw allowing removal of the widest spall along a given joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through joint. Maintain consistent width of repair to within 1/2 inch in 10 feet.

C. Overfill repair cavity with 10 Minute Mender or Matchcrete per manufacturer's instructions and grind flush to slab surface.

D. After urethane repair has cured, and prior to any traffic on patched surface, re-saw original slab joint(s) and fill with polyurea joint filler per manufacturer's instructions.

3.07 CRACK REPAIR (See Figure 6 at end of Section)

A. Crack width less than 1/32” without surface spalling.
   1. Do not repair.

B. Cracks from 1/32” to 1/4” in width.
   1. Clean crack cavity.
      a. Remove loose concrete, dirt and debris from crack with a wire brush or hand grinder with twisted wire wheel attachment, 1/2’” minimum depth, insuring crack sidewall is clean.
      b. Remove any loose segments, including islands formed by crack, with sharp tool.
      c. Use methods that will not widen existing crack.
      d. Vacuum crack to remove all dirt, debris and other laitance.
      e. Mask slab surface along crack as necessary to minimize overfill.
      f. Choose material color that closely matches the adjacent floor.
      g. Install low viscosity rigid urethane repair material in accordance with manufacturer's instructions.
      h. Repeat until all voids are filled and material crowns slab surface.
         1) Do not flood area around crack.
         2) Watch for bubble formation and out gassing.
         3) Do not allow material to gel before adding additional material.
      i. Shave or grind material flush to surface as stipulated by manufacturer.

C. Cracks from 1/4" to 1” in width
   1. Saw top or edge of crack to provide square edge, minimum ¾” in depth.
      a. Use small hand grinder with maximum 5” diameter blade, minimizing eventual crack width while maintaining uniformity of shape.
      b. Clean crack cavity.
         1) Vacuum crack to remove all dirt, debris and other laitance.
         2) Remove all visible moisture.
      c. Mask slab surface along crack as necessary to minimize overfill.
      d. Install polyurea joint filler.
         1) Dispense sample into small bucket to test blending of material.
         2) Prime crack with repair material.

3) Dispense material, dragging dispenser tip along crack, until it flows over the slab.

e. Wait approximately 10 minutes, periodically checking for material cure.
   1) Check condition of material by shaving with razor scraper.
   2) Material will shave smooth when cured.
   3) Proper timing is crucial.
      (a) Too long and material will be difficult to shave
      (b) Too soon and material will ravel.

f. Shave material flush to slab surface per manufacturer's instructions.

3.08 SURFACE SPALLING REPAIR (See Figure 7 at end of Section)

A. Route edge of spall to provide 1/2” deep square edge.
   1. Use small hand grinder with maximum 5” diameter dry diamond blade and vacuum system attachment.
   2. Do not overcut slots into existing slab surface.

B. Clean and prep spalled cavity.
   1. Wire brush spalled surface to remove all dirt and laitance.
   2. Mask slab at perimeter of spall with tape.

C. Install low viscosity rigid urethane repair material using tube cartridge without flow restrictor.

D. Polish over repair area with diamond disks to blend surface.
   1. Feather filler material into the adjacent concrete floor surface.
   2. With 2000 grit disk and firm pressure, add a few burn marks to mottle surface to blend with adjacent floor surface.

E. NOTE: For spalled joints, a form material may be needed to temporarily support vertical face of spalled joint edge. Ensure that the repair material will not adhere to the form.

3.09 HIGH RACK BOLT HOLE/SPALL REPAIR

A. Recess steel bolt a minimum of 1/2” below finish floor by either punching or cutting.

B. For spall fracture edge less than 30 degrees, square edge to a minimum 3/8” depth with either a drill bit or chisel.

C. Clean cavity of all debris and laitance with drill activated, brass wire wheel. Vacuum hole to remove all dirt, debris and other laitance.

D. Dispense low viscosity rigid urethane at moderate pace using steady pressure. Dispense material into void, refilling as necessary to produce slight crown.

E. Grind material flush to slab surface per manufacturer's instructions.

3.10 LARGE SURFACE REPAIR

A. Edge perimeter with diamond masonry wheel to produce sharp edge, at least 3/8” deep.

B. Roughen base surface and vacuum clean. Wire brush to remove any small loose material and vacuum again.

C. Protect adjacent slab surface with tape at perimeter of repair area, width as required to prevent scratching during troweling operations.

D. Pre-wet void with urethane repair material.

E. Prepare slurry of urethane repair material mixed with equal parts of 70 or 80-mesh dry silica sand.

F. Mix repair material in accordance with manufacturer's instructions.

G. Place repair material in floor surface defect and float level.

H. Keep surface clean during troweling operations to prevent any laitance from coming in contact

with the repair material and marring surface.

I. Check material set after 30 minutes to 1 hour. Surface should not dent with fingernail under hard hand pressure.

J. Remove tape and clean area of all particles on repair surface and adjacent floor surface.

K. Re-establish original concrete slab joints by sawing completely through patch and re-filling with polyurea joint filler prior to exposure to traffic.

3.11 SURFACE PITTING REPAIR (See Figure 8 at end of Section)

A. Clean pitted sections with 90-degree angle grinder equipped with wire wheel to remove all dirt/laitance. Wheel should be run over defect in multiple directions to ensure proper cleaning.

B. Vacuum prepared pitted sections.

C. Dispense low viscosity rigid urethane repair material generously in and around pitted areas.

D. Immediately trowel repair material flush with slab surface and repeat troweling in opposite directions until material begins to thicken (approximately 2 minutes). If material sticks to trowel, wipe with denatured alcohol.
   1. Ensure a thin, uniform layer of repair material covers the pitted areas. Refill any low spots as needed.

E. Allow repair material to fully cure (approximately 90-120 minutes for thin film).

F. Grind overfill with 80-grit metal-bond pads, ensuring repair material is flush with slab surface.

G. Repeat repairs in areas as required if repair material pulls out of defects. Allowing a longer curing time typically minimizes material pull out.

3.12 PROTECTION

A. Protect surfaces of finished floor.

B. Prohibit traffic until floor repairs have received final approval by Owner.

Figure 1

JOINT MILLING AND CAP FILLER REPLACEMENT

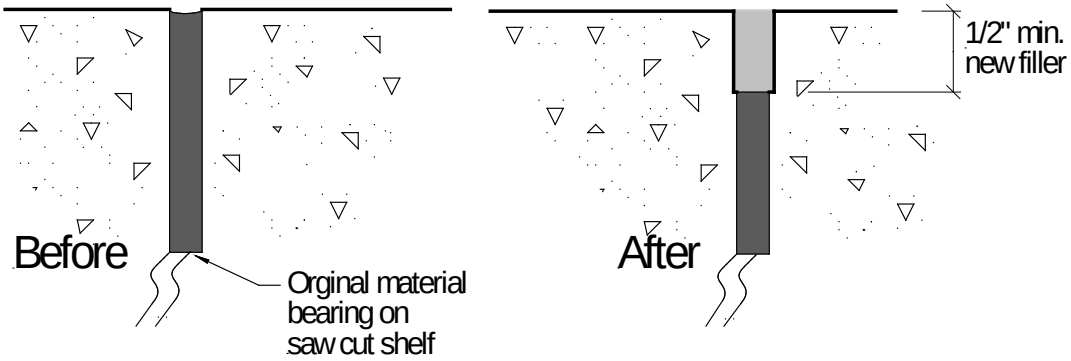
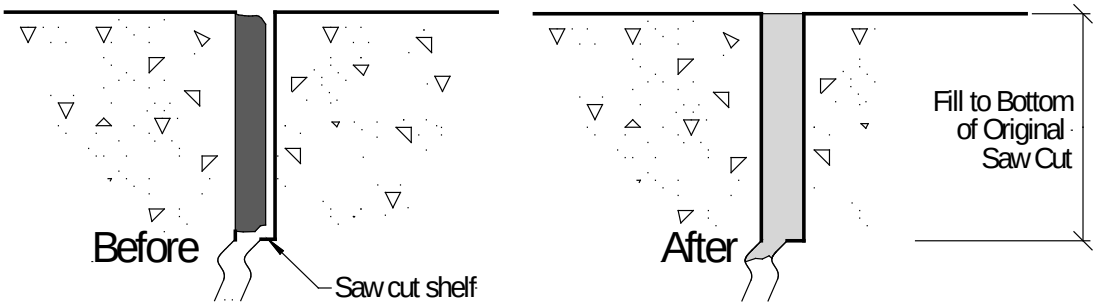


Figure 2

FULL DEPTH JOINT FILLER REPLACEMENT



Note: if shelf width at base of saw cut is less than 1/4" on either side of joint, minimum required filler depth is 2" placed over compressibel backer rod or bagged silica sand.

Figure 3

SPALLED JOINT REPAIR (LESS THAN 1”)

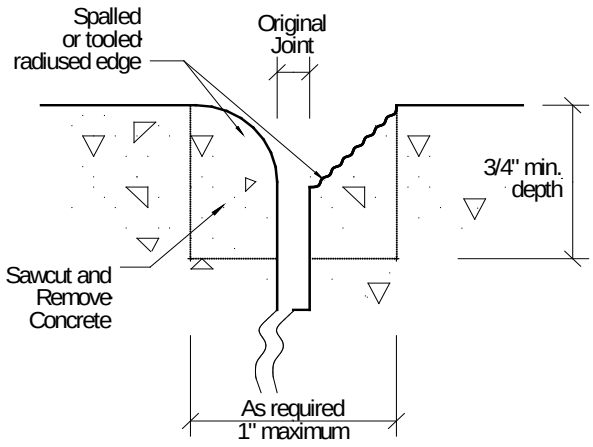


Figure 4

SPALLED JOINT REPAIR (LESS THAN 1”)

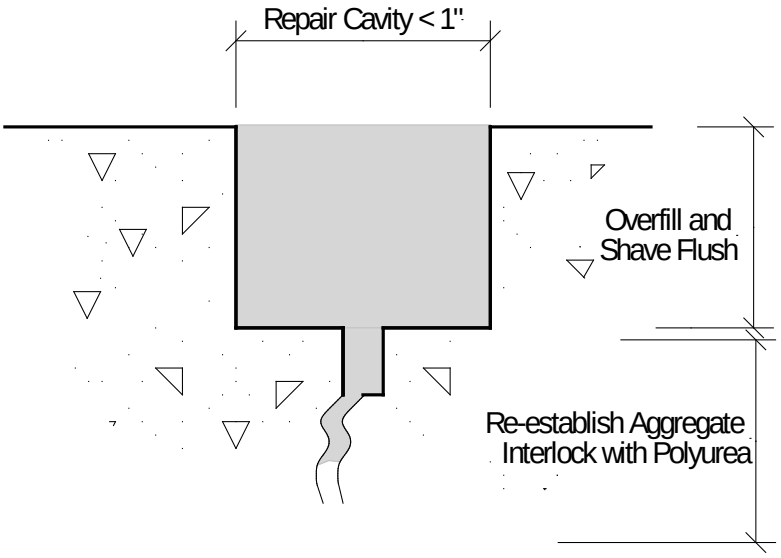


Figure 5

SPALLED JOINT REPAIR (GREATER THAN 1”)

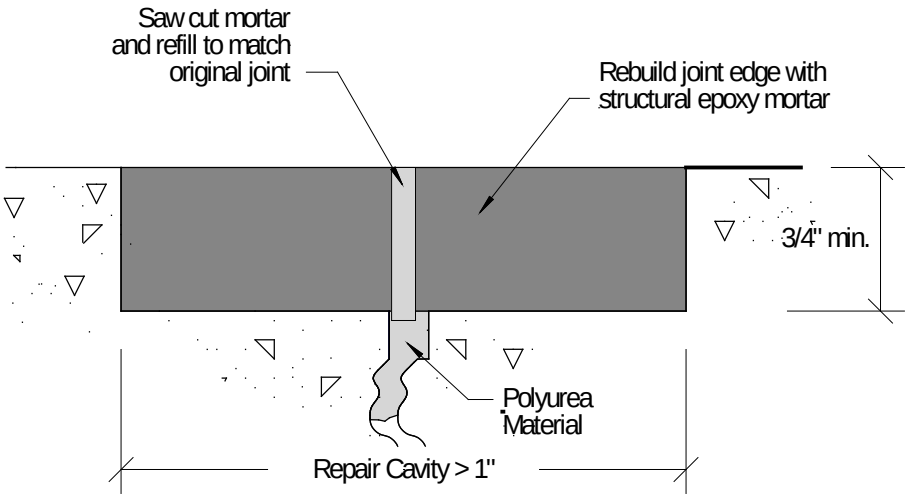


Figure 6

CRACK REPAIR

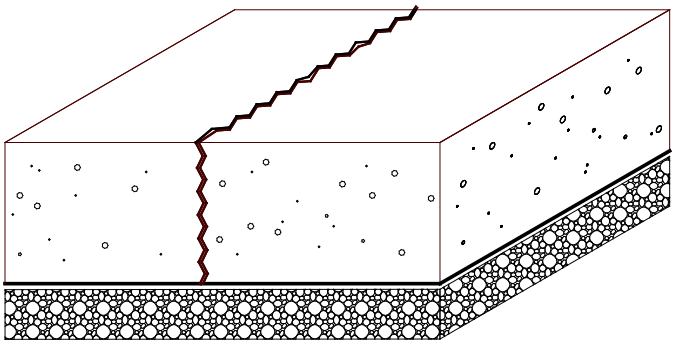


Figure 7

SURFACE SPALLING REPAIR

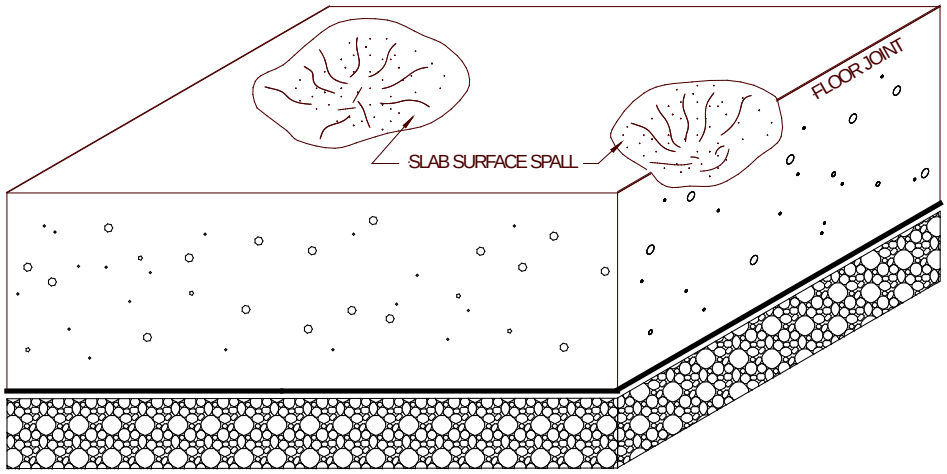
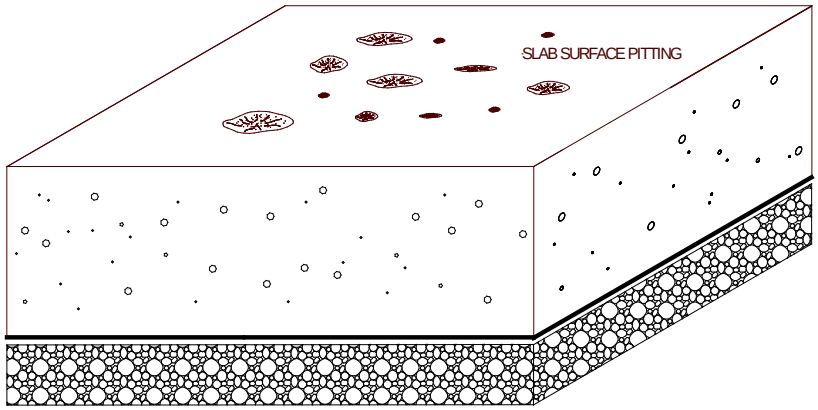


Figure 8

SURFACE SPALLING REPAIR



END OF SECTION

SECTION 03356

CONCRETE FLOOR FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finishing slabs on grade and monolithic floor slabs.

B. Surface treatment with concrete hardener.

C. Surface treatment with concrete floor sealer.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to low-emitting coatings.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 03300 - Cast-in-Place Concrete: Prepared concrete floors ready to receive finish.

D. Section 3357 - Polished Concrete Floor Finishing

E. Section 03390 - Concrete Curing.

F. Section 07900 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2010.

B. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (errata 2007) .

C. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 1996 (Reapproved 2008).

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data on concrete hardener, including information on compatibility of different products and limitations.

C. Maintenance Data: Provide data on maintenance renewal of applied coatings.

D. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's sealed packaging, including application instructions.

1.06 PROJECT CONDITIONS

A. Coordinate the work with concrete floor placement and concrete floor curing.

1.07 FIELD CONDITIONS

A. Maintain light level equivalent to minimum 200 W light source, placed 8 feet above the floor surface, for each 425 sq ft of floor being finished.

B. Temporary Heat: Ambient temperature of 55 degrees F minimum.

C. Provide ventilation sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

PART 2 PRODUCTS

2.01 COMPOUNDS - HARDENERS AND SEALERS

A. Chemical Hardener: Magnesium silicofluoride, liquid type.
   1. Product: Equivalent to "Surfhard" manufactured by The Euclid Chemical Company, 800-321-7628, www.euclidchemical.com.

B. Floor Sealer: Acrylic water-based urethane type.
   1. Product: Equivalent to "Kemiko Stone Tone Sealer" manufactured by Kemiko Concrete Products, 903-587-3708, www.kemiko.com.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that floor surfaces are acceptable to receive the work of this section.

3.02 FLOOR FINISHING

A. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1R.

B. Trowel Finish: Apply trowel finish using a power-driven trowel to the following surfaces:
   1. Surfaces that are scheduled to be exposed.
   2. Surfaces to be painted.
   3. Surfaces to receive carpeting.
   4. Surfaces to receive resilient flooring.

C. Trowel and Fine Broom Finish: Apply trowel finish then immediately follow with slightly scarifying surface by fine brooming at the following locations:
   1. Surfaces to receive thin-set tile.

D. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains at 1/8 inch per foot nominal.

3.03 FLOOR SURFACE TREATMENT

A. Apply hardener in accordance with manufacturer's instructions to scheduled concrete floor surfaces as well as all interior concrete floor surfaces not scheduled to receive an applied finish.

B. Apply sealer in accordance with manufacturer's instructions to concrete floor surfaces that do not receive an applied finish.

3.04 TOLERANCES

A. An independent testing agency, as specified in Section 01400, will inspect finished slabs for flatness.

B. Measure for F(F) and F(L) tolerances for floors in accordance with ASTM E1155, within 48 hours after slab installation.

C. Finish concrete to achieve the following tolerances:
   1. Under Thin-Set Tile:
      a. Specified Overall Values of Flatness (SOV): F(F) 35 and F(L) 25.
      b. Minimum Local Values of Flatness (MLV): F(F) 24 and F(L) 17.
   2. Under Resilient Finishes:
      a. Specified Overall Values of Flatness (SOV): F(F) 35 and F(L) 25.
      b. Minimum Local Values of Flatness (MLV): F(F) 24 and F(L) 17.
   3. All Other Locations:
      a. Specified Overall Values of Flatness (SOV): F(F) 25 and F(L) 20.
      b. Minimum Local Values of Flatness (MLV): F(F) 17 and F(L) 15.
      c. For Elevated Slabs: 80 percent of the elevation points measured using ASTM procedures after deflection has occurred shall fall within a 3/4-inch envelope.

D. Correct the slab surface if tolerances are less than specified.

E. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

END OF SECTION

SECTION 03357

POLISHED CONCRETE FLOOR FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Installation of polished concrete floor system for new and/or existing interior concrete floors by dry grinding, application of concrete densifier, and polishing with various size grit metal-bonded and resin-bonded diamonds to the scheduled specified minimum local and overall gloss values.

B. Application of chemical dye and complementary edge band treatment.

1.02 RELATED SECTIONS

A. Section 01300 - Submittal Procedures.

B. Section 01410 - Testing Agency Services: Procedures for inspection, testing, and documentation.

C. Section 033000 - Cast-in-Place Concrete.

D. Section 033540 - Interior Concrete Slab Repairs

E. Division 09 - Finishes

1.03 REFERENCE STANDARDS

A. ASTM C 1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.

B. ASTM D 523 - Standard Test Method for Specular Gloss.

C. NFSA - National Floor Safety Institute; Test Method 101A; current edition.

1.04 SUBMITTALS

A. Comply with Section 01300 - Submittal Procedures.

B. Product Data:
   1. Provide manufacturer's equipment product data sheets for:
      a. Planetary grinder polishing equipment
      b. Planetary grinder HEPA dust collection equipment
      c. Hand tools
      d. Hand tool dust collection equipment
      e. Diamond tooling
      f. High speed propane burnisher
      g. Polyurea pump
      h. Joint cutting saw
   2. Manufacturer's chemical and product data sheets for:
      a. Specified dye
      b. Liquid reactive surface densifier
      c. Liquid stain guard treatment
      d. Joint filler
      e. Crack and spall repair product
      f. Self leveling, dye-able, overlay product
      g. Grout coat, pin hole and small defect surface treatment

C. Installer's Certification:
   1. Provide list of 5 projects performed with last three years of similar type, size and complexity. Submit project names, addresses, contacts and phone numbers for each project. General Contractor is to validate references and polisher's capabilities prior to submitting bid to AAFES.
   2. Applicator Qualifications: Submit letter of certification from manufacturers of all products and equipment specified herein, stating that the applicator is a certified applicator of the system and is familiar with proper procedures and installation methods as required by the manufacturer.
      a. Planetary grinder system
      b. Liquid reactive surface densifier and stain guard treatment
      c. Joint filler, crack and spall repair products

1.05 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Accessibility Requirements: Comply with applicable requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAGs) for Buildings and Facilities; Final Guidelines, revisions, and updates for static coefficient of friction for walkway surfaces.
   2. Environmental Requirements: Comply with current Federal and local toxicity and air quality regulations and with Federal requirements on content of lead, mercury, and other heavy metals. Do not use solvents in floor polish products that contribute to air pollution or impact food quality.

B. Pre-installation Meeting:
   1. Convene pre-installation meeting at the project site before start of installation of polished concrete floor system. Meeting to occur only after review and approval of required Sub-contractor submittals, and completion of test panel mock-up, including specified grinding, polishing and dye, joint filling, spall and crack repairs and specified gloss values.
   2. Require attendance of parties directly affecting work of this section, including:
      a. AAFES Project Manager
      b. AAFES Store Manager of Assistant Manager
      c. Project Architect
      d. Owner's Polishing Consultant
      e. General Contractor
      f. Polishing Subcontractor including Project Manager and Foreman
   3. Meeting agenda to include (but not limited to): Review of existing conditions, surface preparation, system installations, field quality control, protection, environmental requirements, coordination with other work, controls to limit damage from moisture and field quality control methods and reporting.

1.06 MOCK-UP

A. Provide polished concrete floor finish mock-up, a minimum of 250 square feet, illustrating completed finish including dye, all specified liquid surface treatments and specified gloss levels. Mock-up will include properly repaired surface spalls, slab joints and slab edge treatments including complementary edge banding.

B. Locate mock-up where directed by AAFES Project Manager.

C. Accepted mock-up will serve as standard to judge quality and workmanship of completed polished concrete floor finish.

D. Accepted mock-up shall remain as part of finished product.

1.07 PROJECT CONDITIONS

A. Sequence application of concrete polishing after completion of other construction activities that would be damaging to completed polished finish.

B. Close areas to traffic during and after floor application for time period recommended in writing by manufacturer.

PART 2 PRODUCTS

2.01 PRE-CERTIFIED INSTALLERS

A. All bidding contractors must have completed our in house certification for this project. Below is a list of pre-approved applicators.

	Company Name	Number	Region Covered
1.	American Concrete Inc.	877-775-0030	U.S.A
2.	Avalon Corporation	425-643-5667	Northwest
3.	Bomanite of North Texas	800-492-2524	Southwest
4.	Budget Maintenance Concrete	610-323-7702	Northeast
5.	Diama-Shield	888-730-4075	North
6.	Final Touch	614-751-0606	Midwest
7.	Jeffco Concrete Contractors	800-226-2668	Southeast
8.	K & J Concrete Polishing	865-971-1760	Southeast
9.	Kote It Inc	260-637-7051	Midwest
10.	Pacific Decorative Concrete	916-725-9269	West
11.	Perfect Polish Inc.	877-917-4463	U.S.A
12.	Questmark	888-922-4346	U.S.A
13.	Stone Care of Texas	210-656-8019	South
14.	Total Polish Solutions	865-633-5051	U.S.A.
15.	Wholesale Floors	602-248-7878	Southwest

B. Refer to specifications Division 1 for substitution qualifications. Any substitutions must be submitted in writing a minimum of 10 days prior to bid date to the AAFES project manager for approval.

2.02 EQUIPMENT TO BE USED FOR INSTALLATION

A. Floor Grinder:
   1. Machinery manufacturer will be HTC, SASE, Concrete Polishing Solutions, Husqvarna, Diamatic or PrepMaster
   2. Type: Multi-orbital, planetary-action, opposing-rotational, 3 or 4 diamond-headed floor grinders.
   3. Weight: 850 pounds.
   4. Grinding Pressure: 600 pounds minimum.

B. Dust Extraction System and pre-separator for grinding/polishing:
   1. Heavy-duty industrial HEPA filtration vacuum system, suitable for extracting and containing large quantities of fine concrete dust (minimum 350 CFM air flow) in conjunction with manufacturer recommended pre-separator:
   2. HTC 86D
   3. Pullman-Ermator T8600
   4. SASE Bull 1250
   5. Approved equal

C. Diamond Tooling for Coating Removal, Initial Grinding, and Preparing Floor for Polishing:
   1. Metal Bonded Diamonds
      a. Grit Size: 40, 80, and 150.

D. Diamond Tooling for Polishing Concrete:
   1. Resin Bonded, Phenolic Diamonds
      a. Grit Size: Transitional diamond equal to Raptor L3 by VMC, 100, 200, 400, 800 and 1500 or equivalent.

E. Grinding / Polishing Pads for Edges
   1. Grit Size: 80, 100, 120, 200, 400, 800, 1500 and 3000.

F. Hand Grinder with dust extraction attachment and pads.

G. Joint cutting saw with dust extraction attachment
   1. Hump Back, by Joe Due
   2. Dust Buggy, by US Saws
   3. The Mongoose, by Engrave-a-Crete

H. Self-propelled shaver/leveler for slab surface demolition and leveling.
   1. ShaveMaster, by VIC International Corporation
   2. SuperShaver, by CPS
   3. BMC 335 Shaver, by Diamatic

I. High speed propane burnisher
   1. Minimum 27 inch head generating pad speeds of 1,500 RPM or higher

J. Diamond Impregnated Burnisher Pads
   1. Twister Diamond Cleaning System Pads, by HTC
   2. Diamond Polishing Pads, by Norton
   3. SpinFlex Diamond Polishing Pads, by CPS

K. Applicator Pads and Equipment
   1. Professional Mighty Mop 077, by Quickie
   2. 24” Microfiber Wet Room Mop, by Rubbermaid
   3. Fas-Trak Chemical Application System, by Fas-Trak Industries
   4. Humm'V II, by Tuffy Systems, Inc.

2.03 MATERIALS

A. Penetrating Hardener/Densifier: Clear liquid reactive lithium-silicate based.
   1. RetroPlate 99 by Advanced Floor Products.
   2. FGS Permashine by L&M Construction Chemicals.
   3. Consolideck LS, by Prosoco.
   4. SureLock Densifier by Ameripolish
   5. No Substitutions

B. Protective Surface Treatment (Stain Guard):
   1. SureLock Stain Protector by Ameripolish.
   2. Consolideck LS Guard, by Prosoco.
   3. No Substitutions

C. Joint Filler
   1. RS 88 Polyurea in complementary darker color to match Dyed Polished Concrete, by Metzger McGuire
   2. HT-PE85 Polyurea in complementary darker color to match Dyed Polished Concrete, by Hi-Tech Systems
   3. SL/85 Polyurea in complementary darker color to match Dyed Polished Concrete, by VersaFlex Incorporated
   4. Colors to be matched as closely as possible using a Sherwin Williams color chart. Manufacturer to produce product to match this color selection.

D. Crack and Spall Repair

E. Rapid Refloor in complementary matching color, by Metzger McGuire

1. HT Spall-FX2 in complementary matching color, by Hi-Tech Systems
2. Quick-Mender in complementary matching color, by VersaFlex Incorporated
3. 10 Minute Mender or Matchcrete in complementary color, by Roadware
4. Colors to be reviewed and approved by AAFES Project Manager in mock-up.

F. Wide Area Surface Repairs
1. TRU Self Leveling, by CTS Cement Manufacturing Corporation
2. Grout Coat
a. GM 3000 by Husqvarna Construction Products
b. Diama-Fill, by Ardex Engineered Cements

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine floor to receive polished concrete floor system.

B. Notify the Contracting Officer of conditions that would adversely affect installation or subsequent use.

C. Do not begin surface preparation or installation until conditions are corrected and approved.

D. Verify the Following for New Integral Color Overlays in Mud Beds
1. Floor Finish: Wide channel floated, smooth, pan, combination blade and plastic blade finished floor from edge to edge, with no rough areas.
2. Floor and Joints:
a. Free of debris and excessive dirt, dust, clay, and mud.
b. Dry.
3. Concrete Curing: Minimum 7 days disposable wet curing blankets or removable curing compound applied. Concrete shall be cured for 14-days minimum before start of grinding process.
a. Concrete Adjacent to Floor Penetrations: Troweled flat and level with surrounding concrete.

3.02 SURFACE PREPARATION

A. Protection: Protect surrounding areas and adjacent surfaces from the following:
1. Minimal accumulation of dust from grinding and polishing.
2. Contact with overspray of penetrating hardener / densifier.
3. Contact with overspray of protective surface treatment (stain guard)
4. Contact with joint filler, crack or spall repair materials

B. On existing concrete floors, completely remove existing flooring, mastics, adhesives, self leveling fillers and other foreign matter.

C. On existing concrete floors, completely remove and replace existing joint filler and crack repair products.

D. Clean Surfaces: Remove dirt, dust, debris, oil, grease, curing agents, bond breakers, paint, coatings, and other surface contaminants which could adversely affect installation of polished concrete floor system.

E. Refill new concrete joints in accordance with Section 07900.

F. Repair all slab defects and joints in accordance with Section 03354

3.03 INSTALLATION

A. Install polished concrete floor system in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Aggregate Exposure:
1. Fine Aggregate: Mottled salt-and-pepper aggregate exposure.

C. Polished Concrete Floor System

1. Open Slab Surface:
   a. As required to provide a uniform final polish or removal of existing floor coatings, begin grinding with 40, 60 or 80-grit metal bond. Do not expose coarse concrete aggregate.
   b. Review condition of floor with AAFES Contracting Officer. Obtain approval from AAFES Contracting Officer if large coarse aggregate is required to be exposed to remove existing coatings, floor underlayment or slab deficiencies. Variations to the precise grinding, densifying, polishing, dying and stain guard application are anticipated, but must be discussed and approved in the pre-polish meeting.
   c. For new concrete floors, open-up concrete by grinding with 80-grit metal-bonded.
   d. Progressive edge grinding will be necessary with ½" of all vertical abutments, including walls, cases, columns, posts and racking systems.
   e. Joint filler and spall repairs shall be flush with surface after grinding and polishing steps. Additional passes along curled joints may be necessary to remove joint filler chatter.
2. Remove metal-bonded diamond scratches by grinding with progressively finer metal-bonded diamonds, up to metal bond 150-grit.
3. Apply densifier per manufacturer's recommendations and the concrete's acceptance of the product.
4. Floor Polishing:
   a. Remove 150-grit metal-bonded diamond scratches by grinding with a transitional diamond per manufacturers recommendation
   b. Remove transitional resin-bonded diamond scratches by grinding with 100-grit resin-bonded diamonds.
   c. Remove 100-grit resin-bonded diamond scratches by grinding with 200-grit resin-bonded diamonds.
   d. Remove 200-grit resin-bonded diamond scratches by grinding with 400-grit resin-bonded diamonds.
   e. Remove 400-grit resin-bonded diamond scratches by grinding with 800-grit resin-bonded diamonds.
   f. Remove 800-grit resin-bonded diamond scratches by grinding with 1500-grit resin-bonded diamonds.
5. Apply stain guard
   a. Apply in accordance with manufacturer's published instructions.
   b. Apply first coat per manufacturer's recommendation (DO NOT OVER APPLY).
   c. Use applicator pad, pre-wetted with stain guard, to pull material out to create a thin film prior to drying.
   d. Remove product completely from areas of over application, as evidenced by surface streaking, and replace with unused stain guard.
   e. Apply second coat of stain guard at all high traffic areas identified on the drawings per manufacturers instructions.
6. High speed burnish:
   a. After each application of stain guard is dry, burnish surface.
   b. Burnish at a slow movement pace using high speed machine with 400 or 800 grit diamond impregnated pads as required to achieve specified gloss requirements. (For approved pads see paragraph 2.02 J)
   c. Burnish with several passes. Make each progressive pass at 90 degrees from previous pass.

d. Burnishing, pad type, and pace of forward movement shall combine to develop a minimum floor surface temperature of 91-degrees F directly below the burnishing pad as continuously measured by the operator during installation.

D.

3.04 FIELD QUALITY CONTROL

A. Inspect completed polished concrete floor system with the Contracting Officer, Contractor, and Installer.

B. Review procedures with Contracting Officer to correct unacceptable areas of completed polished concrete floor system.

C. Specular Gloss/Reflectance, ASTM D 523:
   1. Perform polishing and burnishing work necessary to produce a Specified Overall Gloss Value (SOGV) ? 50 prior to applying protective surface treatment, SOGV ? 60 after applying protective surface treatment, Minimum Local Gloss Value (MLGV) ? 40 after applying protective surface treatment as measured using a Horiba IG-320 60 Degree Gloss Checker.
   2. Gloss shall be considered as a quantitative value that expresses the degree of reflection when light hits the concrete floor surface. Gloss measurements will be taken independent of ambient lighting and will be taken within a sealed measurement window located beneath the test unit.
   3. Collects 12 readings minimum, throw out low and high measurements and average remaining measurements. Average shall exceed SOGV. No single measurement shall be less than MLGV.

3.05 PROTECTION

A. Protect completed polished concrete floor system from damage until Substantial Completion.
   1. Do not allow vehicle and pedestrian traffic on unprotected floor.
   2. Do not allow construction materials, equipment, and tools on unprotected floor.
   3. Prohibit parking of vehicles on concrete slab.
   4. If construction equipment must be used for application, diaper components that might drip oil, hydraulic fluid, or other liquids.
   5. No tire embedments (rocks, nails, screws, etc.) that will scratch or pit slab surface.
   6. Prohibit pipe cutting using pipe cutting machinery on concrete slab.
   7. Prohibit temporary placement and storage of steel members on concrete slab.
   8. Prohibit acids and acidic detergents from contacting concrete surfaces.
   9. Cover concrete floors with drop cloths or use breathable drop cloths during painting. If paint is spilled on concrete floor, remove paint immediately.
   10. Protect slab surface from moisture for 72 hours to prevent re-emulsification of surface treatment prior to cure

B. Immediately remove mortar splatter, spilled liquids, oil, grease, paint, coatings, and other surface contaminants which could adversely affect completed polished concrete floor system.

C. Repair damaged areas of completed polished concrete floor system to satisfaction of Contracting Officer.

END OF SECTION

SECTION 03390

CONCRETE CURING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Initial and final curing of horizontal and vertical concrete surfaces.

1.02 RELATED REQUIREMENTS

A. Section 03300 - Cast-in-Place Concrete.

B. Section 03356 - Concrete Floor Finishing.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2010.

B. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (errata 2007) .

C. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).

D. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2007.

E. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2007.

F. ASTM D 2103 - Standard Specification for Polyethylene Film and Sheeting; 2008.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data on curing compounds, moisture-retaining sheet, and polyethylene film, including compatibility of different products and limitations.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 302.1R.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver curing materials in manufacturer's sealed packaging, including application instructions.

PART 2 PRODUCTS

2.01 MATERIALS

A. Membrane Curing Compound: ASTM C 309 Type 1-D - Clear or translucent with fugitive dye, Class B, certified by the curing compound manufacturer to not interfere with bonding of floor covering.
   1. Acrylic type.

B. Moisture-Retaining Sheet: ASTM C171.
   1. Curing paper, regular.
   2. Polyethylene film, white opaque, minimum nominal thickness of 0.0040 in..
   3. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd, 40 inches wide.

C. Polyethylene Film: ASTM D2103, 4 mil thick, white opaque color.

D. Water: Potable, not detrimental to concrete.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to be cured.

3.02 EXECUTION - HORIZONTAL SURFACES

A. Cure floor surfaces in accordance with ACI 308R.

B. Cure floor surfaces in accordance with ACI 308. Use one or more of the following methods.

C. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.

D. Spraying: Spray water over floor slab areas and maintain wet for 7 days.

E. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges; maintain in place for not less than 4 days.

F. Absorptive Moisture-Retaining Sheet: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.

G. Membrane Curing Compound: Apply curing compound in accordance with manufacturer's instructions in two coats, with second coat applied at right angles to first. Do not use membrane curing compound on surfaces to receive applied floor coverings unless manufacturer certifies curing compound will not interfere with bonding of floor covering.

3.03 EXECUTION - VERTICAL SURFACES

A. Cure surfaces in accordance with ACI 308R.

B. Cure surfaces in accordance with ACI 308.

C. Spraying: Spray water over surfaces and maintain wet for 7 days.

D. Membrane Curing Compound: Apply compound in accordance with manufacturer's instructions in two coats, with second coat applied at right angles to first.

3.04 PROTECTION

A. Do not permit traffic over unprotected floor surface.

END OF SECTION

SECTION 04065

MORTAR AND MASONRY GROUT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mortar for masonry.

B. Grout for masonry.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 04816 - Masonry Veneer: Installation of mortar.

D. Section 08110 - Steel Doors and Frames: Products and execution for grouting steel door frames installed in masonry.

1.03 REFERENCE STANDARDS

A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures; American Concrete Institute International; 2009.

B. ASTM C91 - Standard Specification for Masonry Cement; 2005.

C. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2011.

D. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2004.

E. ASTM C150 - Standard Specification for Portland Cement; 2011.

F. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006.

G. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2010.

H. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2007.

I. ASTM C476 - Standard Specification for Grout for Masonry; 2010.

J. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2010.

K. ASTM C979 - Standard Specification for Pigments for Integrally Colored Concrete; 2010.

L. ASTM C1019 - Standard Test Method for Sampling and Testing Grout; 2011.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.

C. Samples: Submit two samples of mortar, illustrating mortar color and color range.

D. Reports: Submit reports on mortar indicating conformance of mortar to property requirements of ASTM C 270 and test and evaluation reports per ASTM C 780.

E. Reports: Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C476 and test and evaluation reports to requirements of ASTM C 1019.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Manufacturer's Instructions: Submit packaged dry mortar manufacturer's installation instructions.

H. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/ASCE 5/TMS 402, except where exceeded by requirements of the contract documents.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.07 FIELD CONDITIONS

A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.01 MATERIALS

A. Masonry Cement: ASTM C 91, types as scheduled in this section.
   1. Colored mortar: Premixed cement as required to match Contracting Officer's Authorized Representative's color sample.
      a. All unit masonry shall have colored mortar.
   2. Acceptable products:.
      a. Essroc, Italcementi Group; flamingo-BRIXMENT.
      b. Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
      c. Lafarge North America Inc.; U.S. Cement Color Masonry Cement.
      d. Lehigh Cement Company; Lehigh Custom Color Masonry Cement.
      e. National Cement Company; Coosa Masonry Cement.
   3. Substitutions: See Section 01600 - Product Requirements.

B. Portland Cement: ASTM C150, Type I - Normal; standard gray color.

C. Hydrated Lime: ASTM C207, Type SA.

D. Mortar Aggregate: ASTM C144.

E. Grout Aggregate: ASTM C404.

F. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979.
   1. Color(s): As selected by Contracting Officer's Authorized Representative from manufacturer's full range.

G. Water: Clean and potable.

H. Moisture-Resistant Admixture: Water repellent compound designed to reduce capillarity.

I. Bonding Agent: Latex type.

2.02 MORTAR MIXES

A. Mortar for Unit Masonry: ASTM C270, Property Specification.
   1. Masonry below grade and in contact with earth: Type S.
   2. Exterior, loadbearing masonry: Type N.
   3. Exterior, non-loadbearing masonry: Type N.
   4. Interior, loadbearing masonry: Type N.
   5. Interior, non-loadbearing masonry: Type O.

B. Colored Mortar: Proportion selected pigments and other ingredients to match Contracting Officer's Authorized Representative's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

2.03 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Add mortar color and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

D. Do not use anti-freeze compounds to lower the freezing point of mortar.

E. If water is lost by evaporation, re-temper only within two hours of mixing.

F. Use mortar within two hours after mixing at temperatures of 90 degrees F, or two-and-one-half hours at temperatures under 40 degrees F.

2.04 GROUT MIXES

A. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 94/C 94M.
   1. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.
   2. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

B. Engineered Masonry: 3,000 psi strength at 28 days; 8-10 inches slump; provide premixed type in accordance with ASTM C 94/C 94M.
   1. Fine grout for spaces with smallest horizontal dimension of 2 inches or less.
   2. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

2.05 GROUT MIXING

A. Mix grout in accordance with ASTM C94/C94M.

B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.

C. Add admixtures in accordance with manufacturer's instructions; mix uniformly.

D. Do not use anti-freeze compounds to lower the freezing point of grout.

2.06 PRECONSTRUCTION TESTING

A. Testing will be conducted by an independent test agency, in accordance with provisions of Section 01400.

B. Mortar Mixes: Test mortars prebatched by weight in accordance with ASTM C780 recommendations for preconstruction testing.
   1. Test results will be used to establish optimum mortar proportions and establish quality control values for construction testing.

C. Grout Mixes: Test grout batches in accordance with ASTM C1019 procedures.

1. Test results will be used to establish optimum grout proportions and establish quality control values for construction testing.

PART 3 EXECUTION

3.01 PREPARATION

A. Apply bonding agent to existing concrete surfaces.

B. Plug clean-out holes for grouted masonry with block masonry units. Brace masonry to resist wet grout pressure.

3.02 INSTALLATION

A. Install mortar and grout to requirements of section(s) in which masonry is specified.

B. Work grout into masonry cores and cavities to eliminate voids.

C. Do not install grout in lifts greater than 16 inches without consolidating grout by rodding.

D. Do not displace reinforcement while placing grout.

E. Remove excess mortar from grout spaces.

3.03 GROUTING

A. Use either high-lift or low-lift grouting techniques, at Contractor's option, subject to other limitations of contract documents.

B. Low-Lift Grouting:
   1. Limit height of pours to 12 inches.
   2. Limit height of masonry to 16 inches above each pour.
   3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
   4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.

C. High-Lift Grouting:
   1. Verify that horizontal and vertical reinforcement is in proper position and adequately secured before beginning pours.
   2. Hollow Masonry: Limit lifts to maximum 4 feet and pours to maximum height of 24 feet.
   3. Place grout for spanning elements in single, continuous pour.

3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field tests, in accordance with provisions of Section 01400.

B. Test and evaluate mortar in accordance with ASTM C780 procedures.
   1. Test with same frequency as specified for masonry units.

C. Test and evaluate grout in accordance with ASTM C1019 procedures.
   1. Test with same frequency as specified for masonry units.

END OF SECTION

SECTION 04816

MASONRY VENEER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete Block.

B. Reinforcement and Anchorage.

C. Flashings.

D. Installation of Lintels.

E. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 03100 - Concrete Forms and Accessories: Dovetail anchor slots.

D. Section 04065 - Mortar and Masonry Grout.

E. Section 05400 - Cold Formed Metal Framing: Steel stud backup for masonry veneer.

F. Section 05500 - Metal Fabrications: Loose steel lintels.

G. Section 07900 - Joint Sealers: Backing rod and sealant at control and expansion joints.

1.03 REFERENCE STANDARDS

A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures; American Concrete Institute International; 2009.

B. ASTM C 90 - Standard Specification for Loadbearing Concrete Masonry Units; 2009.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data for masonry units, masonry veneer anchors, flashing and accessories.

C. Samples: Submit manufacturer's sample brick panel to illustrate color, texture, and extremes of color range.

D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

E. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.

1.06 MOCK-UP

A. Construct a masonry wall as a mock-up panel sized 4 feet long by 4 feet high; include mortar and accessories, structural backup, wall openings, and flashings in mock-up.

B. Locate where directed.

C. Mock-up may not remain as part of the Work.

D. Mock-up shall be removed when all masonry work has been completed and the masonry work has been accepted by the government.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

1.08 FIELD CONDITIONS

A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 x 8 inches and nominal depths as indicated on the drawings for specific locations.
   2. Special Shapes: Provide non-standard blocks configured for corners, headers, control joint edges, and other detailed conditions.
   3. Load-Bearing Units: ASTM C90, normal weight.
      a. Solid block.
      b. Exposed faces: Ground face, integral color.
         1) Provide color to match installation standards.
      c. Exposed faces: Smooth face, integral color.
         1) Provide color to match installation standards.

2.02 MORTAR AND GROUT MATERIALS

A. Mortar and Grout: As specified in Section 04065.

2.03 REINFORCEMENT AND ANCHORAGE

A. Masonry Veneer Anchors: 2-piece anchor system that permits differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
   1. At Metal Stud Backup: "#362-CX Gripstay Channel System" as manufactured by Hohmann & Barnard, 1-800-645-0616, www.h-b.com, or approved equivalent.
      a. Channels: Provide continuous design for fastening to structural backup with legs that penetrate insulation to provide positive anchorage. Provide legs of proper length to accommodate insulation thickness.
      b. Sealant Tape: Equivalent to Hohmann & Barnard "X-Seal Tape." Tape shall be 3 inches wide, adhesive-backed, cross-linked polyethylene foam.
      c. Wire Ties: Trapezoidal shape, 0.1875 inch thick, with integral track for continuous joint reinforcing wire. Equivalent to Hohmann & Barnard "#363-BT" Wire Tie, provided with continuous horizontal joint reinforcement wires of 0.1875 inch diameter hot-dip galvanized steel.

B. Fasteners: Self-drilling, self-tapping, hot-dip galvanized steel, #10-16 x lengths as required, hex washer head with neoprene sealing washer.

2.04 FLASHINGS

A. Copper/Kraft Paper Flashings: 5 oz/sq ft sheet copper bonded to fiber reinforced asphalt treated Kraft paper. Provide "Copper Fabric Flashing" manufactured by Advanced Building Products Inc., 800-252-2306, www.advancedflashing.com, or approved equivalent.

B. Lap Sealant: Butyl type as specified in Section 07900.

2.05 ACCESSORIES

A. Joint Filler: Closed cell neoprene; oversized 50 percent to joint width; self expanding; 3 inch wide x by maximum lengths available. Equivalent to Hohmann & Barnard #NS Closed Cell Neoprene Sponge.

B. Weeps: Molded PVC grilles, insect resistant.

C. Cavity Vents: Molded PVC grilles, insect resistant.

D. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.Panels to extend full heighth and width of masonry work.

E. Weep/Cavity Vents: Equivalent to "Mortar Maze Weep Vents" manufactured by Advanced Building Products Inc. 800-252-2306, www.advancedflashing.com.

F. Drip Plates: Type 304 stainless steel, with a smooth factory-formed hemmed edge and a continuous 1/8 inch thick strip of compressible foam factory installed to the underside of the drip plate. Equivalent to Hohmann & Barnard #FTS Foam-Tite Seal Drip Plate for Flashing.

G. Termination Bars: Type 304 stainless steel, 1/8 inch x 1 inch, with 1/4 inch holes spaced 16 inches on center. Equivalent to #T1 Termination Bar as manufactured by Hohmann & Barnard. Equivalent products fabricated of aluminum or galvanized steel will be acceptable.

H. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.
   3. Mortar Joints: Concave.

3.03 PLACING AND BONDING

A. Lay masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar as work progresses.

E. Interlock intersections and external corners.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Isolate top joint of masonry veneer from horizontal structural framing members or support angles with compressible joint filler.

3.04 WEEPS/CAVITY VENTS

A. Install weeps in veneer walls at 32 inches on center horizontally above through-wall flashing and above shelf angles and lintels.

B. Install cavity vents in veneer walls at 32 inches on center horizontally at top of walls.

C. Install continuous cavity mortar diverter from base of cavity to top of wall as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents or creating mortar dams..

D. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

3.05 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Install masonry veneer anchor systems in compliance with manufacturer's recommendations.

B. Stud Backup: Secure anchor channels through insulation (and sheathing, where applicable) to stud-framed, back-up and embed wire ties into masonry veneer at maximum 16 inches on center vertically and 16 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center. Install channels over sealant tape applied vertically in continuous lengths extending the full height of the back-up wall.

3.06 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry, and turn up at least 8 inches to form watertight pan.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Install drip plate at base of through-wall flashing, and adhere flashing to top surface of drip plate. Angled drip edge of drip plate shall extend beyond exterior face plane of masonry wall. Install in compliance with manufacturer's recommendations.
   4. Install termination bar to secure top edge of flashings, and seal top edge of termination bar with sealant recommended by flashing manufacturer.
   5. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Extend laminated flashings to within 1/4 inch of exterior face of masonry.

C. Lap end joints of flashings at least 4 inches and seal watertight with mastic or elastic sealant.

3.07 LINTELS

A. Install loose steel lintels over openings.

B. Maintain minimum 8 inch bearing on each side of opening.

3.08 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control and expansion joints.

B. Size control joint in accordance with Section 07900 for sealant performance.

C. Form expansion joint as detailed.

3.09 TOLERANCES

A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

E. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

3.10 CUTTING AND FITTING

A. Cut and fit for pipes and conduit. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.11 CLEANING

A. Remove excess mortar and mortar smears as work progresses.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.12 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

SECTION 05120

STRUCTURAL STEEL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. **Incidental structural steel framing members, support members and struts not included in Pre-Engineered Buildings Section 13121.**

B. Base plates.

C. Grouting under base plates.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 03100 - Concrete Forms and Accessories: Anchor bolt installation in concrete.

D. Section 05400 - Cold-Formed Metal Framing.

E. Section 05500 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.03 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; American Institute of Steel Construction, Inc.; 2005.

B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.; 2005.

C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2004.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2009.

F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

G. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength; 2010.

H. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2009a.

I. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2010a.

J. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2006a.

K. ASTM B 695 - Coatings of Zinc Mechanically Deposited on Iron and Steel; 2000.

L. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2011.

M. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments; 2008.

N. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2008.

O. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners; 2009.

P. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2007.

Q. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.

R. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

S. SSPC-Paint 25.1 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel; Society for Protective Coatings; 1997 (Ed. 2000).

T. SSPC-PS Guide 7.00 - Guide for Selecting One-Coat Shop Painting Systems; 1982 (Ed. 2000).

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Shop Drawings: Submit shop drawings prepared under supervision of a licensed Structural Engineer, including details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.
   1. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS A2.4 welding symbols and show size, length, and type of each weld.
   2. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.
   3. Contract documents shall not be used for shop drawings, including erection plans or details.
   4. All shop drawings which are resubmitted for any reason shall have all revised items clouded or identified for each submittal.
   5. All structural steel connections not specifically detailed on the drawings shall be designed to resist forces indicated, by the Contractor, under the direct supervision of a professional engineer registered in the state where the project is located..
   6. Design calculations for the connections designed by the Contractor shall be submitted for the files of the Architect and Engineer. Calculations shall bear the seal of a professional engineer registered in the state where the project is located.. Shop drawings containing connections for which calculations have not been received will be returned unchecked as an incomplete submittal.
   7. Shop drawings shall be sealed by the professional engineer registered in the state where the project is located, that provided the connection design to confirm that the connections shown on the shop drawings are in accordance with the submitted design calculations.
   8. For each connection, the following shall be noted on the shop drawings:
      a. Required design reaction.
      b. Calculation sheet number for design.
      c. Capacity of detailed connection.

C. Product Data:
   1. Structural steel (each type), including certified copies of mill test reports covering chemical and physical properties.
   2. High-strength bolts (each type), including nuts and washers.
   3. Structural steel primer paint.
   4. Shrinkage-resistant grout.

D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

E. Test reports conducted on shop- and field-bolted and welded connections. Include data on types(s) of tests conducted and test results.

F. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC "Steel Construction Manual."

B. Fabricator: Company specializing in performing the work of this section with minimum 3 years of experience.

C. Erector: Company specializing in performing the work of this section with minimum 3 years of experience.

D. Design connections not detailed on the drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in.

1.06 DELIVERY, STORAGE & HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration. If bolts and nuts become dry or rusty, clean and relubricate before use.

PART 2 PRODUCTS

2.01 MATERIALS

A. Steel Wide Flange Beams and Columns: ASTM A 992/A 992M, Grade 50.

B. Steel Base Plates, Stiffener Plates, Column Cap Plates, Beam Connections, Miscellaneous Steel Channels and Angles: ASTM A 36/A 36M.

C. Cold-Formed Structural Tubing: ASTM A500, Grade B.

D. Connection Material: Unless otherwise noted on the drawings, stiffener plates, doubler plates, gusset plates and the connecting plates shall be the same grade of steel as members being connected.
   1. Finish: Black, except where indicated to be galvanized.

E. Anchor Rods: ASTM A 307, Grade A headed anchor with supplementary requirement S1.

F. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts.
   1. Provide hexagonal heads and nuts for all connections.

G. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:
   1. Quenched and tempered medium-carbon steel bolts, nuts, and washers, complying with ASTM A 325.
      a. Where indicted as galvanized, provide units that are zinc coated, either mechanically deposited complying with ASTM B 695, Class 50, or hot-dip galvanized complying with ASTM A 153.

H. Headed Anchor Rods: ASTM A 307, Grade C.

I. Load Indicator Washers: Provide washers complying with ASTM F959 at all connections requiring high-strength bolts.

J. Welding Materials: AWS D1.1; type required for materials being welded.

K. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C1107/C1107M and capable of developing a minimum compressive strength of 7,000 psi at 28 days.

L. Shop and Touch-Up Primer: "10-99 Primer" manufactured by Tnemec Company, Inc., or approved equivalent.

M. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type II - Organic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

C. Fabricate connections for bolt, nut, and washer connectors.

D. Simple Beam Connections: Standard double angle framed beam connections using bolts as specified.
   1. Seated beam connections and stiffened seated beam connections shall not be used unless indicated on the drawings or unless Engineer approval is obtained to verify capacity of supporting member for the resulting eccentricity. The fabricator must verify and bear responsibility that the use of such connections does not interfere with Architectural or MEP requirements.

E. Develop required camber for members.

F. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.03 FINISH

A. Surface Preparation and Painting: Prepare surface according to SSPC-PS Guide 7.00 and apply one coat of specified primer to provide a dry film thickness of not less than 1.5 mils.

B. Shop prime structural steel members, except those indicated to be galvanized. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
   1. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

C. Galvanize structural steel members, where indicated, to comply with ASTM A 123/A 123M. Provide minimum 2.0 oz/sq ft galvanized coating.

2.04 SOURCE QUALITY CONTROL

A. An independent testing agency will perform source quality control tests, as specified in Section 01400.

B. Testing agency may inspect structural steel at plant before shipment.

C. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

D. High-Strength Bolts: Provide testing and verification of shop-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
   1. All bolted connections shall be visually observed to assure that all bolts, nuts and washers are in place and that all plies of connection material have been drawn together.
   2. All bolts shall be verified to be fully tensioned connections.

E. Welded Connections: Visually inspect all shop-welded connections and test as follows:

1. Ultrasonic testing performed in accordance with ASTM E 164. Perform on all full and partial penetration welds.
2. Magnetic particle inspection performed in accordance with ASTM E 709. Perform on root pass and on finished weld. Inspect 20 percent of all fillet welds. Cracks or zones of incomplete fusion or penetration are not acceptable. Rejection of any portion of weld inspected on less than 100 percent basis shall require inspection of 100 percent of that weld.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION

A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges".

B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Field weld components indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts".

E. Do not field cut or alter structural members without approval of Contracting Officer's Authorized Representative.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01400.

B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
   1. All bolted connections shall be visually observed to assure that all bolts, nuts and washers are in place and that all plies of connection material have been drawn together.
   2. All bolts shall be verified to be fully tensioned connections.

C. Welded Connections: Visually inspect all field-welded connections and test as follows:
   1. Ultrasonic testing performed in accordance with ASTM E 164. Perform on all full and partial penetration welds.
   2. Magnetic particle inspection performed in accordance with ASTM E 709. Perform on root pass and on finished weld. Inspect 20 percent of all fillet welds. Cracks or zones of incomplete fusion or penetration are not acceptable. Rejection of any portion of weld inspected on less than 100 percent basis shall require inspection of 100 percent of that weld.

D. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.

END OF SECTION

SECTION 05400

COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formed steel stud exterior wall framing.

B. Exterior wall sheathing and soffit board.

C. Formed steel purlin framing and bridging.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 04816 - Masonry Veneer: Veneer masonry supported by wall stud metal framing.

D. Section 05120 - Structural Steel: Structural building framing.

E. Section 05310 - Steel Deck.

F. Section 09260 - Gypsum Board Assemblies: Lightweight, non-load bearing metal stud framing.

G. Section 09511 - Suspended Acoustical Ceilings: Ceiling suspension system.

1.03 REFERENCE STANDARDS

A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)

B. AISI SG-971 - Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 1996, with 2000 supplement.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2009a.

E. ASTM C 955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases; 2009a.

F. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2008.

G. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.

H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

1.04 SYSTEM DESCRIPTION

A. Horizontal Deflection: Design to permit maximum deflection of 1/600 of span.

B. Vertical Deflection: Design non-axial loadbearing framing to accommodate not less than 1/2 inch vertical deflection.

C. Design wall system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

D. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

1.05 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.

C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.

D. Product Data: Provide manufacturer's data on wall sheathing materials.

E. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
   1. Indicate stud and purlin layouts.
   2. Describe method for securing studs to tracks and for welded framing connections.
   3. Provide calculations for loadings and stresses of specially fabricated framing, stamped by a Professional Structural Engineer.
   4. Provide details and calculations for factory-made framing connectors, stamped by a Professional Structural Engineer licensed in the state where the project will be built.

F. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

G. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.06 QUALITY ASSURANCE

A. Calculate structural properties of framing members in accordance with requirements of AISI North American Specification for the Design of Cold-Formed Steel Structural Members.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of documented experience.

D. Design structural elements under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the state where the installation is located.

E. Metal stud manufacturer shall be responsible for detailing all connections.

1.07 PROJECT CONDITIONS

A. Verify that field measurements are as indicated on the drawings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Framing, Connectors, and Accessories:
   1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
   2. Marino\Ware: www.marinoware.com.
   3. The Steel Network, Inc: www.SteelNetwork.com.
   4. MiTek Industries, Inc: www.mii.com.

5. Telling Industries: www.tellingindustries.com.
6. Substitutions: See Section 01600 - Product Requirements.

2.02 FRAMING SYSTEM

A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

2.03 FRAMING MATERIALS

A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
   1. Gage and Depth: As indicated on the drawings, unless heavier gauge required to meet specified performance levels. As a minimum, provide the following:
      a. Gage: 16 gage.
      b. Stud Depth: 6 inch.
   2. Galvanized in accordance with ASTM A653/A653M G90/Z275 coating.

B. Joists and Purlins: Fabricated from ASTM A653/A653M steel sheet, with G90/Z275 hot dipped galvanized coating.
   1. Base Metal: As required to meet specified performance levels within maximum depths indicated.
   2. Gage and depth: As indicated on the drawings.

C. Framing Connectors: Factory-made formed steel sheet, ASTM A653/A653M SS Grade 50, with G60/Z180 hot dipped galvanized coating and factory punched holes.
   1. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold Formed Steel Structural Members; minimum 16 gage, 0.06 inch thickness.
   2. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, screws and anti-friction bushings, while maintaining structural performance of framing. Provide movement connections at the following locations:
      a. Where continuous studs bypass elevated floor slab, connect stud to slab in manner allowing vertical movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
      b. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical movement of structure without affecting studs; allow for minimum movement of 1/2 inch.
      c. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.
      d. Acceptable Products: Equivalent to VertiClip(r) manufactured by The Steel Network Inc.
   3. Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.

2.04 WALL SHEATHING

A. Wall Sheathing, and soffit board: Glass mat faced gypsum; ASTM C 1177/C 1177M, square long edges, 5/8 inch Type X fire-resistant. G-P Gypsum Dens-Glass Gold Fireguard Sheathing, or approved equivalent.

2.05 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.06 FASTENERS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.

B. Anchorage Devices: Power actuated.

C. Welding: In conformance with AWS D1.1.

2.07 SHOP FABRICATED ASSEMBLIES

A. Shop fabricate metal framing to the greatest extent possible.

B. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.

C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION OF STUDS

A. Install components in accordance with manufacturers' instructions.

B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 16 inches on center. Coordinate installation of sealant with floor and ceiling tracks.

C. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.

D. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.

E. Install load bearing studs full length in one piece. Splicing of studs is not permitted.

F. Install load bearing studs, brace, and reinforce to develop full strength and achieve design requirements.

G. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

H. Install intermediate studs above and below openings to align with wall stud spacing.

I. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

J. Attach cross studs to studs for attachment of fixtures anchored to walls.

K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

L. Install horizontal bridging in stud walls at maximum spacing of 48 inches o.c.

M. Touch-up field welds and damaged galvanized surfaces with primer.

3.03 INSTALLATION OF JOISTS AND PURLINS

A. Install framing components in accordance with manufacturer's instructions.

B. Make provisions for erection stresses. Provide temporary alignment and bracing.

C. Place joists at spacings as indicated, and not more than 2 inches from abutting walls. Connect joists to supports using fastener method indicated.

D. Set floor and ceiling joists parallel and level, with lateral bracing and bridging.

E. Locate joist end bearing directly over load bearing studs or provide load distributing member to top of stud track.

F. Provide web stiffeners at reaction points.

G. Touch-up field welds and damaged galvanized surfaces with primer.

3.04 WALL SHEATHING

A. Wall Sheathing: Install in accordance with manufacturer's instructions. Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.

3.05 TOLERANCES

A. Maximum Variation from True Position: 1/4 inch.

B. Maximum Variation of any Member from Plane: 1/8 inch.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 03300 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

D. Section 04816 - Masonry Veneer: Placement of metal fabrications in masonry.

E. Section 04820 - Reinforced Unit Masonry Assemblies: Placement of metal fabrications in masonry.

F. Section 05120 - Structural Steel.

G. Section 09900 - Paints and Coatings: Paint finish.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2009.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

D. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2003 (Reapproved 2007).

E. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2009a.

F. ASTM A 500/A 500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2010.

G. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2007.

H. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2010.

I. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).

J. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

K. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

D. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500, Grade B cold-formed structural tubing.

C. Plates: ASTM A 283.

D. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

E. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; galvanized finish.

B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking, joists, and masonry; prime paint finish, except provide galvanized finish when occurring in exterior walls.

C. Lintels: As detailed; galvanized finish.

2.04 FINISHES - STEEL

A. Prime paint all steel items, except as follows:
   1. Galvanize items specified for galvanized finish.
   2. Galvanize items to be embedded in concrete or masonry.
   3. Do not prime surfaces in direct contact with concrete.
   4. Do not prime surfaces where field welding is required.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: Two coats.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on shop drawings.

D. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Obtain approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preservative treated wood materials.

B. Fire retardant treated wood materials.

C. Communications and electrical room mounting boards.

D. Concealed wood blocking, nailers, and supports.

E. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and sustainably-harvested wood materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 05400 - Cold Formed Metal Fabrications: Wall sheathing.

D. Section 06200 - Finish Carpentry.

E. Section 09260 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

A. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2001.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

C. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010.

D. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood Protection Association; 2003.

E. AWPA C9 - Plywood -- Preservative Treatment by Pressure Processes; American Wood Protection Association; 2003.

F. AWPA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Protection Association; 2003.

G. AWPA C27 - Plywood -- Fire-Retardant Treatment by Pressure Processes; American Wood-Protection Association; 2002.

H. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood Protection Association; 2010.

I. PS 1 - Structural Plywood; 2007.

J. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.

K. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.; 2002.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

D. LEED Submittals: Submit applicable LEED Submittal Form for each different product made of sustainably harvested wood, salvaged and reused wood, wood fabricated from recovered timber, as well as locally-sourced wood, as specified in Section 01355.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Southern Pine, unless otherwise indicated.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
   4. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

B. Lumber fabricated from old growth timber is not permitted.

C. Provide sustainably harvested wood; see Section 01600 for requirements.

D. Provide wood harvested within a 500 mile radius of the project site; see Section 01600 for requirements for locally-sourced products.

E. Lumber salvaged from deconstruction or demolition of existing buildings or structures is permitted in lieu of sustainably harvested lumber provided it is clean, denailed, and free of paint and finish materials, and other contamination; identify source; see Section 01600 for requirements for reused products.
   1. Where salvaged lumber is used for structural applications, provide lumber re-graded by an inspection service accredited by the American Lumber Standard Committee, Inc; www.alsc.org.

F. Lumber fabricated from recovered timber (abandoned in transit) is permitted in lieu of sustainably harvested lumber, unless otherwise noted, provided it meets the specified requirements for new lumber and is free of contamination; identify source.

2.02 DIMENSION LUMBER

A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.

2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

B. Miscellaneous Panels:
   1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.

2.04 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, corrosion-resistant coated steel elsewhere.
   2. Drywall Screws: Bugle head, hardened steel, power driven type, length to achieve full penetration of sheathing substrate.
   3. Anchors: Bolt or ballistic fastener for anchorages to steel.

2.05 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
   2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Fire Retardant Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc: www.wolmanizedwood.com.
      b. Hoover Treated Wood Products, Inc: www.frtw.com.
      c. Osmose, Inc: www.osmose.com.
      d. Substitutions: See Section 01600 - Product Requirements.
   2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
      b. Treat rough carpentry items as indicated .
      c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc: www.wolmanizedwood.com.
      b. Chemical Specialties, Inc; Product : www.treatedwood.com.
      c. Osmose, Inc; Product : www.osmose.com.
      d. Substitutions: See Section 01600 - Product Requirements.

D. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention.
   1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   2. Treat lumber in contact with roofing, flashing, or waterproofing.

3. Treat lumber in contact with masonry or concrete.
4. Treat lumber less than 18 inches above grade.
   a. Treat lumber in other locations as indicated.
5. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
   a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
   b. Treat plywood in contact with roofing, flashing, or waterproofing.
   c. Treat plywood in contact with masonry or concrete.
   d. Treat plywood less than 18 inches above grade.
   e. Treat plywood in other locations as indicated.

E. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.4 lb/cu ft retention.
   1. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.
   2. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.

E. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

F. Specifically, provide the following non-structural framing and blocking:
   1. Cabinets and shelf supports.
   2. Wall brackets.
   3. Handrails.
   4. Grab bars.
   5. Towel and bath accessories.
   6. Wall-mounted door stops.
   7. Marker board.
   8. Wall paneling and trim.
   9. Joints of rigid wall coverings that occur between studs.

3.05 INSTALLATION OF CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.
   4. Size and Location: As indicated on drawings.

3.06 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.

B. Allow preservative to dry prior to erecting members.

3.07 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane: 1/4 inch in 10 feet maximum, and 1/2 inch in 30 feet maximum.

3.08 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01732.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.

4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06200

FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Finish carpentry items.

B. Wood shelving.

C. Hardware and attachment accessories.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced, recycled-content, sustainably-harvested wood, and low-emitting materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 06100 - Rough Carpentry: Concealed wood blocking and shims.

D. Section 06410 - Custom Cabinets: Shop fabricated custom cabinet work.

E. Section 08211 - Flush Wood Doors.

F. Section 09900 - Paints and Coatings: Painting and finishing of finish carpentry items.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.

B. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; Hardwood Plywood & Veneer Association; 2004.

C. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2007.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data:
   1. Provide instructions for attachment hardware and finish hardware.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, to a minimum scale of 1-1/2 inch to 1 ft.

D. Samples: Submit two samples of wood trim 12 inch long. Submit two samples of shelf brackets.

E. LEED Submittals/Reports: Submit for wood products made from sustainably harvested wood, salvaged and reused wood, wood fabricated from recovered timber, and locally-sourced wood, as specified in Section 01355. Provide additional LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Custom grade.

B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect work from moisture damage.

1.07 PROJECT CONDITIONS

A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

B. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI Architectural Woodwork Standards for Premium Grade.

2.02 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

B. Provide sustainably harvested wood, certified or labeled as specified in Section 01600.

C. Provide wood harvested within a 500 mile radius of the project site.

D. Wood fabricated from timber recovered from riverbeds or otherwise abandoned is permitted, unless otherwise noted, provided it is clean and free of contamination; identify source; provide lumber re-graded by an inspection service accredited by the American Lumber Standard Committee, Inc.

E. Provide composite wood and agrifiber products having no added urea-formaldehyde resins.

2.03 LUMBER MATERIALS

A. Softwood or Hardwood Lumber for Opaque Finish: Any species meeting AWI Grade II requirements for Opaque finish, maximum moisture content of 13 percent.

B. Hardwood Lumber for Stained Finish: Poplar species, plain sawn, maximum moisture content of 11 percent, of quality suitable for stained finish.

2.04 SHEET MATERIALS

A. Hardwood Plywood: HPVA HP-1, Grade A, Type II; Veneer core, type of glue recommended for application; Birch face species, plain sliced cut.
   1. Minimum Thickness: 3/4 inch at shelving, 1/2 inch elsewhere.
   2. Face: "B" veneer or medium density overlay.
   3. Glue: Type as recommended for application.

2.05 FASTENINGS

A. Fasteners: Of size and type to suit application; cadmium-plated finish.

B. Concealed Joint Fasteners: Threaded steel.

2.06 ACCESSORIES

A. Primer: Alkyd primer sealer.

B. Wood Filler: Solvent base, tinted to match surface finish color.

2.07 HARDWARE

A. Shelf Brackets: Equivalent to Style 111BC 12" Super Strength Shelf Brackets with white powder-coated finish, manufactured by National Manufacturing Co: www:natman.com.

2.08 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. Fit exposed sheet material edges with 3/8 inch matching hardwood edging. Use one piece for full length only.

C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.09 SHOP FINISHING

A. Sand work smooth and set exposed nails and screws.

B. Apply wood filler in exposed nail and screw indentations.

C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.

D. Back prime woodwork items to be field finished, prior to installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

A. Install work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards requirements for grade indicated.

B. Set and secure materials and components in place, plumb and level.

C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

D. Install hardware in accordance with manufacturer's instructions.

3.03 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 09900.

C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.04 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 06410

CUSTOM CABINETS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Countertops.

C. Cabinet hardware.

D. Preparation for installing utilities.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced, recycled-content, sustainably-harvested wood, and low-emitting materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

1.03 REFERENCE STANDARDS

A. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.

B. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.

C. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; Hardwood Plywood & Veneer Association; 2004 (ANSI/HPVA HP-1).

D. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

E. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2007.

F. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.

C. Product Data: Provide data for hardware accessories.

D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.

E. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.

F. LEED Report: Submit for wood products made from sustainably harvested wood, salvaged and reused wood, wood fabricated from recovered timber, and locally-sourced wood, as specified in Section 01355. Provide additional LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Custom quality, unless other quality is indicated for specific items.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.06 MOCK-UP

A. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, and finishes.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

1.08 FIELD CONDITIONS

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

B. Provide sustainably harvested wood, certified or labeled as specified in Section 01600.

C. Provide wood harvested within a 500 mile radius of the project site.

D. Wood fabricated from timber recovered from riverbeds or otherwise abandoned is permitted, unless otherwise noted, provided it is clean and free of contamination; identify source; provide lumber re-graded by an inspection service accredited by the American Lumber Standard Committee, Inc.

E. Provide composite wood and agrifiber products having no urea-formaldehyde resins.

2.02 LUMBER MATERIALS

A. Softwood Lumber: NIST PS 20; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 8-13 percent; species as recommended by manufacturer.

B. Hardwood Lumber: NHLA; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 8-13 percent; species as recommended by manufacturer.

2.03 PANEL MATERIALS

A. Hardwood Faced Plywood: HPVA HP-1; graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, veneer (wood plies) core; exterior glue; thickness as indicated; face veneer as follows:
   1. Concealed Surfaces: Grade C, Birch, rotary cut, random-matched.
      a. Use as backing for countertops.
      b. Use as backing for plastic laminate at wet areas.

B. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as indicated.
   1. Use for components not indicated as another material.

2. Use as backing for plastic laminate unless otherwise indicated.

2.04 LAMINATE MATERIALS

A. Manufacturers:
   1. Formica Corporation: www.formica.com.
   2. Panolam Industries International, Inc\Nevamar: www.nevamar.com.
   3. Wilsonart International, Inc: www.wilsonart.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications and as follows:
   1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, colors as indicated, finish as selected.
   2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, colors as indicated, finish as selected.
   3. Cabinet Liner: CLS, 0.020 inch nominal thickness, color as selected, finish as selected.
   4. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

2.05 COUNTERTOPS

A. Plastic Laminate Countertops: Plywood substrate covered with HPDL, conventionally fabricated and self-edge banded.

2.06 ACCESSORIES

A. Adhesive: Type recommended by AWI/AWMAC to suit application.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and satin chrome finish in exposed locations.

D. Concealed Joint Fasteners: Threaded steel.

E. Grommets: Standard plastic or rubber grommets for cut-outs, in color as selected by Architect.

2.07 HARDWARE

A. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards and coordinated self rests, satin chrome finish, for nominal 1 inch spacing adjustments.

B. Drawer and Door Pulls: "U" shaped wire pull, steel with satin finish, 4 inch centers.

C. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with satin finish.

D. Drawer Slides:
   1. Type: Full extension.
   2. Static Load Capacity: Heavy Duty grade.
   3. Mounting: Side mounted.
   4. Stops: Integral type.
   5. Features: Provide self closing/stay closed type.
   6. Manufacturers:
      a. Accuride International, Inc: www.accuride.com.
      b. Grass America Inc: www.grassusa.com.
      c. Knape & Vogt Manufacturing Company: www.knapeandvogt.com.
      d. Substitutions: See Section 01600 - Product Requirements.

E. Hinges: European style concealed self-closing type, steel with satin finish.
   1. Manufacturers:
      a. Grass America Inc: www.grassusa.com.

b. Hardware Resources: www.hardwareresources.com.
c. Julius Blum, Inc: www.blum.com.
d. Substitutions: See Section 01600 - Product Requirements.

2.08 FABRICATION

A. Cabinet Style: Flush overlay.

B. Cabinet Doors and Drawer Fronts: Flush style.

C. Drawer Construction Technique: Dovetail joints.

D. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

E. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

F. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
2. Cap exposed plastic laminate finish edges with material of same finish and pattern.

G. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units and countertops.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

E. Secure cabinets and counter bases to floor using appropriate angles and anchorages.

3.03 ADJUSTING

A. Test installed work for rigidity and ability to support loads.

B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 07190

WATER REPELLENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water repellents for above grade surfaces of Architectural CMU Veneer.

B. Water repellents for above grade surfaces of stucco.

1.02 RELATED SECTIONS

A. Section 04816 - Masonry Veneer.

1.03 REFERENCES

A. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials; 2000.

B. ASTM E 514 - Standard Test Method for Water Penetration and Leakage Through Masonry; 2002.

C. ASTM G 154 - Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials; 2000a.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Manufacturer's technical literature, specifications and application instructions for specified products.

C. Certification that the applicator has the specified experience, and operates and maintains the proper equipment in accordance with the water repellent manufacturer's recommendations; include a list of the names of several recent projects, locations, names of architects, and methods of application.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: A firm with not less than 3 years of experience in the application of the products specified in this section.

B. Mock-Up: Apply specified products to sample panels as directed by Contracting Officer's Authorized Representative to determine acceptability of appearance and optimum coverage rate required for application.
   1. Install in accordance with manufacturer's instructions.
   2. After materials have cured in accordance with manufacturer's recommendations, water test surface to determine that sufficient water repellent has been applied to repel liquid water.
   3. Do not begin application of water repellents to the work until the mock-up has been approved by Contracting Officer's Authorized Representative.

C. Pre-Installation Meeting: Prior to application of water repellents, hold a meeting at the job site with representatives of the manufacturer and the applicator. Notify Contracting Officer's Authorized Representative at least 3 days in advance of the time of the meeting.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Packaging and Shipping: Deliver materials in original sealed containers, clearly marked with manufacturer's name, brand name, and type of material.

B. Acceptance at Site: Verify that the product delivered matches the product applied to the approved mock-up.

C. Storage and Protection:

1. Store and handle materials in accordance with manufacturer's written instructions.
2. Store materials indoors and away from sparks and open flame in a secure area to prevent tampering and contamination. Do not allow water-based materials to freeze.

1.07 SCHEDULING

A. Notify Contracting Officer's Authorized Representative not less than 48 hours before each application of water repellent.

1.08 WARRANTY

A. Installer's Warranty: Contractor and the installer shall jointly and severally warrant water repellents against failure in material and workmanship for a period of 5 years from the date of Substantial Completion.

B. Manufacturer's Warranty: Provide manufacturer's written 5-year warranty.
   1. Submit completed manufacturer's written Request for Warranty Form to manufacturer 10 days prior to application.
   2. After Substantial Completion, submit Warranty Application to manufacturer for processing.
   3. Submit executed copy of warranty to Contracting Officer's Authorized Representative.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Chemprobe Coating Systems, LP: www.chemprobe.com.

B. Other Acceptable Manufacturers:
   1. PROSOCO, Inc; www.prosoco.com.

C. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Water Repellents - General: Siloxane- or silane- or siloxane-silane blend, without fillers, stearates, or paraffins.
   1. Products Containing Only Siloxane or Modified Siloxane: From 5 to 7 percent solids.
   2. Products Containing Silane: Minimum 40 percent solids.
   3. Silane-Siloxane Blend Products: Minimum 10 percent solids.
   4. Provide products that comply with federal, state, and local volatile organic compounds (VOC) regulations.
   5. Provide water repellents with the following properties based on testing manufacturer's standard products, according to test methods indicated, applied to substrates simulating project conditions using same materials and application methods to be used for project.
   6. Properties of Water Repellent for Vertical Surfaces:
      a. Water-Vapor Transmission: At least 8 percent reduction in rate of vapor transmission by comparison of treated and untreated specimens, when tested in accordance with ASTM E 96.
      b. Water Penetration and Leakage Through Masonry: At least 90 percent reduction in leakage rate by comparison of treated and untreated specimens, when tested in accordance with ASTM E 514.
      c. Durability: Maximum 5 percent loss of water repellency after 2500 hours of weathering using ASTM G 154 (or G53) cycles, by comparison to specimens before weathering.

B. Water Repellent for Concrete Masonry Veneer Surfaces: Comply with requirements specified above and use one of the following, as recommended by the manufacturer:
   1. Solvent based siloxane; Prime A Pell 200.
   2. Solvent based silane-siloxane blend; Prime A Pell Plus.
   3. Water based siloxane; Prime A Pell H2O Block Formula.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that new masonry, mortar, and stucco have cured for at least 21 days.

B. Verify that all sealants have been installed.

3.02 PREPARATION

A. Protection:
   1. Prevent water repellent fumes from entering the building being treated, turn off ventilation system and close fresh air intakes.
   2. Protect shrubs, metal, wood trim, glass, asphalt, and hardware during application of water repellents.
   3. Do not permit spray mist or liquid to drift onto adjacent properties.

B. Surface Preparation: Prepare surface so that it is free of cracks, dirt, oils, paint, and other contaminants that may affect the appearance and performance of the water repellents.

3.03 APPLICATION

A. Apply water repellents in accordance with manufacturer's printed instructions.
   1. Do not apply water repellents to surfaces below 40 degrees F or above 95 degrees F unless recommended by the manufacturer.
   2. Do not apply to wet substrate or substrate containing frozen water.
   3. Do not apply water repellents when rain is predicted within 48 hours or less than 5 days after surface has been wet.
   4. Do not apply water repellents in high or gusty winds.

B. Apply water repellents using low pressure spray equipment designed for water repellent application.

C. Apply water repellents as shipped by the manufacturer; do not dilute.

D. Apply water repellents evenly until surface is totally saturated. Coverage rates are dependent on surface material. Only one saturation coat is required.

3.04 FIELD QUALITY CONTROL

A. After water repellent has dried for 24 hours at low humidity and a temperature between 70 and 90 degrees F or for 48 hours at high humidity and a temperature between 50 and 69 degrees F, test all surfaces with a water spray. Recoat areas that indicate water absorption.

3.05 CLEANING

A. Remove excess material and waste resulting from the work from the project site.

B. Dispose of water repellent containers in accordance with state and local regulations.

END OF SECTION

SECTION 07212

BOARD AND BATT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation and integral vapor retarder at exterior wall behind masonry veneer wall finish and applied to exterior side of building sheathing.

B. Board insulation and integral vapor barrier applied to bottom of roof purlins.

C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

D. Batt insulation used for sound suppression, (Sound Batts)

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced, recycled-content, and low-emitting materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 05400 - Cold Formed Metal Framing: Supporting construction for batt insulation.

D. Section 09260 - Gypsum Board Assemblies: Acoustic insulation.

1.03 REFERENCE STANDARDS

A. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2006.

B. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2008.

C. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010.

D. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2009b.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

D. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Insulation board at exterior wall: 2.5 inch foil faced (both sides) polyisocyanurate board

B. Insulation board applied to bottom of roof purlins: 2 inch foil faced (both sides) polyisocyanurate board

C. Unfaced sound batts at restroom walls and at office.

2.02 FOAM BOARD INSULATION MATERIALS

A. Polyisocyanurate Board Insulation at Exterior Walls: Rigid cellular foam, complying with ASTM C 1289; Type I, aluminum foil both faces; Class 2, glass fiber-reinforced core.
   1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
   3. Blowing agent: none halogenated (no HCFCs).
   4. Compressive Strength: 16 psi
   5. Board Size: 48 x 96 inch.
   6. Board Thickness: 2.5 inch.
   7. Board Edges: Square.
   8. Surface Facing: 1.0 mil smooth aluminum foil on both sides.
   9. Product: "Thermax" Sheathing manufactured by Dow Chemical Company: www.thermaxbydow.com, or equivalent performing material as approved by Contracting Officer.

B. Polyisocyanurate Board Insulation Beneath Roof Purlins: Rigid cellular foam, complying with ASTM C 1289; Type I, aluminum foil both faces; Class 2, glass fiber-reinforced core.
   1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E 84.
   2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
   3. Blowing agent: none halogenated (no HCFCs).
   4. Compressive Strength: 16 psi
   5. Board Size: 48x120 inch.
   6. Board Thickness: 2.0 inch.
   7. Thermal Resistance: Aged R-value of 13.0.
   8. Board Edges: Square.
   9. Surface Facing: 1.25 mil embossed aluminum foil on both sides.
   10. Product: "Thermax" Metal Building Board manufactured by Dow Chemical Company: www.thermaxbydow.com, or equivalent performing material as approved by Contracting Officer.
   11. Manufacturers:
      a. Atlas Roofing Corporation: www.atlasroofing.com.
      b. Dow Chemical Co: www.dow.com.
      c. GAF Materials Corporation: www.gaf.com.
      d. Substitutions: See Section 01600 - Product Requirements.

2.03 BATT INSULATION MATERIALS

A. Sound Batts: ASTM C 665; preformed batt; friction fit, conforming to the following:
   1. Material: Glass or mineral fiber.
   2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
   3. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
   4. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
   5. Formaldehyde Content: Zero.
   6. Thickness: 3.5 inch.
   7. Facing: Unfaced.
   8. Manufacturers:
      a. CertainTeed Corporation: www.certainteed.com.

b. Johns Manville Corporation: www.jm.com.
c. Knauf Insulation: www.knaufusa.com.
d. Owens Corning Corp: www.owenscorning.com.
e. Substitutions: See Section 01600 - Product Requirements.

2.04 ACCESSORIES

A. Joint Tape: Bright aluminum self-adhering vapor retarder type, mesh reinforced, 3 inch wide, 2.0 mil thick, with flame spread index of 25 or less, smoke developed index of 50 or less.
   1. Product: "Thermax Aluminum Foil Tape manufactured by Dow Chemical Company: www.thermaxbydow.com.

B. Bottom-of-roof Purlin Mounting System for Board Insulation: Equivalent to the following joint closure system provided by Dell Chemical Company:www.thermaxbydow.com.
   1. Joint Closure: "Thermax Clip Strip" PVC closure sized to accommodate board insulation thickeness.
   2. Fasteners: Equivalent to Buildex Multi-Diameter Insulation Teks, with minimum 1-1/4" poly washers;length as required to penetrate metal framing 1".
   3. Sealant: Provide one of the following:
      a. Vulkem 116.
      b. Sikaflex 201.
      c. Dow Corning 790.

C. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of irregularities.

3.02 BOARD INSTALLATION AT EXTERIOR WALLS

A. Install board insulation in compliance with manufacturer's recommendations.

B. Adhere a 6 inch wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
   1. Tape seal joints between sheets.
   2. Extend sheet full height of joint.

C. Apply manufacturer's recommended adhesive to back of boards:
   1. Comply with adhesive manufacturer's instructions for each type of substrate encountered.

D. Install boards horizontally over wall sheathing.
   1. Place boards to maximize adhesive contact.
   2. Install in running bond pattern.
   3. Butt edges and ends tightly to adjacent boards and to protrusions.

E. Extend boards over expansion joints, unbonded to wall on one side of joint.

F. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

G. Place 6 inch wide polyethylene sheet at perimeter of wall openings, wrap to window and door frames. Tape seal in place to ensure continuity of vapor retarder and air seal.

H. Tape insulation board joints.

3.03 BOARD INSTALLATION AT ROOF PURLINS

A. Install board insulation and joint closure system in compliance with manufacturer's recommendations.

B. Install insulation boards perpendicular to framing, spaning at least three framing members. The maximum span shall be 5 feet

C. Penetrate metal framing 1 inch with approved fasteners (use 3 inch long fasteners for 2 inch thick or boards).

D. Space fasteners 12 inches o. c. space in three rows (of five fasteners) per board.

E. Apply continuous application of approved sealant to both sides of "Clip Strip".

F. Slide insulation into place, ensuring good contact with sealant on all edges, in order to produce continuous air-and moisture-vapor seal.

3.04 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions and as indicated on drawings.

B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

C. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.05 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07214

FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Foamed-in-place insulation at exterior framed walls.
   1. In exterior framed walls.
   2. In exterior wall crevices.
   3. At junctions of dissimilar wall and roof materials.

1.02 RELATED REQUIREMENTS

A. Section 01355 LEED certification procedures: LEED credits relating to regionally-sourced recycled-content and low-emitting materials

B. Section 01600-Product Requirements: LEED-related product requirements

1.03 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.

B. ASTM C 1029 - Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation; 2009.

C. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2010.

D. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics; 2008.

E. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2006.

F. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010.

G. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.

C. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.

D. Certificates: Certify that products of this section meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum 3 years of experience.

1.06 MOCK-UP

A. Provide mock-up, 4 feet long by 4 feet wide; include insulation and wall construction in mock-up.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.07 FIELD CONDITIONS

A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Foamed-In-Place Insulation:
   1. Dow Chemical Company; Product Styrofoam Spray Polyurethane Foam (CM series) www.dowbuildingsolutions.com or equivalent materials as approved by the Contracting Officer.
   2. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Foamed-In-Place Insulation: Two component closed cell spray polyurethane celluar plastic foam complying with ASTM C 1029, with the following physical properties: Achieved thickness, 1 1/2 inches. Medium-density, rigid, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
   1. Aged Thermal Resistance (R-value): Minimum 6.1 (deg F hr sq ft)/Btu, per inch when tested at 1 inch thickness in accordance with ASTM C518 after aging for 90 days at 75 degrees F mean temperature.
   2. Core Density: Minimum 2 pcf, per ASTM D1622.
   3. Compressive Strength: Minimum 20 psi, per ASTM D1621.
   4. Water Vapor Permeability: Vapor retarder; 2.2 perm inch, when tested in accordance with ASTM E96/E96.
   5. Water Absorption: 5.0 percent maximum, when tested in accordance with ASTM D2842.
   6. Surface Burning Characteristics: Class A; Flame Spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.

2.03 ACCESSORIES

A. Primer: As required by insulation manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify work within construction spaces or crevices is complete prior to insulation application.

B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

3.02 PREPARATION

A. Mask and protect adjacent surfaces from over spray or dusting.

B. Apply primer in accordance with manufacturer's instructions.

3.03 APPLICATION

A. Apply insulation in accordance with manufacturer's instructions.

B. Apply to a minimum cured thickness of 1.5 inch.

C. Patch damaged areas.

D. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.

E. Trim excess away for applied trim or remove as required for continuous sealant bead.

3.04 PROTECTION

A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION

SECTION 07413

METAL WALL PANELS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Pre-insulated metal panel cladding system fastened to wall framing where indicated on the drawings.

B. Fastening system.

C. Factory finishing.

D. Accessories and miscellaneous components

1.02 RELATED SECTIONS

A. Section 05400 - Cold-Formed Metal Framing

B. Section 07620 - Sheet Metal Flashing and Trim

C. Section 07900 - Joint Sealants

1.03 REFERENCES

A. ASCE 7- Minimum Design Loads for Buildings and Other Structures.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Gavanneled) by the Hot-Dip Process.

C. ASTM A 792 - Standard Specification for Steel Sheet, Aluminum-Zinc Alloy Coated Steel by the Hot-Dip Process.

D. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

E. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Samples: Submit samples illustrating full range of metal finish color for approval by Contracting Officer's Representative.

D. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing factory foamed-in-place insulated metal panels with a minimum documented experience of ten (10) years.

B. Installer Qualifications: Company specializing in installation of the products specified for projects of similar size and scope with minimum five (5) years documented experience.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products off the ground, with panels sloped for drainage and covered to protect factory finishes from damage.

1.07 WARRANTY

A. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal wall panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 20 year period from date of Substantial Completion.

B. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of wall panel system, including agreement to repair or replace panels that fail to keep out water within specified warranty period of 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers are:
   1. Metalspan Commercial / Industrial Wall Systems: www.metlspan.com.
   2. ATAS Commercial / Industrial Wall Systems: www. atas.com
   3. Kingspan Insulated Panels: www.metecnousa.com

2.02 PRE-INSULATED METAL WALL PANELS

A. General Requirements: Roll-formed exterior and interior steel sheet faces chemically bonded to continuously foamed-in-place polyurethane core.
   1. Wall Panel: Concealed fastener wall panels with tongue and groove joinery.
      a. Exterior Face: G-90 galvanized stucco embossed steel, minimum Grade 33 and/or AZ-50 Aluminum-Zinc stucco embossed steel, minimum Grade 33 in 26ga (0.0187"),
      b. Interior Face: G-90 galvanized stucco embossed painted steel, minimum Grade 33 and/or AZ-50 Aluminum-Zinc stucco embossed painted steel, minimum Grade 33 in 26ga (0.0187"), 24ga (0.0250"), 22ga (0.0312"), unless otherwise indicated.
      c. Thickness: 2",
      d. Width 42"
   2. Foam core shall be continuously foamed-in-place, Non-CFC polyurethane.
   3. Flashing and trim shall be brake-formed sheet metal in the same thickness and finish to match the panels.
   4. Manufacturer's standard extruded aluminum trim painted to match the panel.

B. Performance Requirements:
   1. Structural Tests: The design load/deflection criteria shall be verified from tests per ASTM E 72 "Air Bag Method" using a 20 psf (.96 kPa) simulated wind load. A deflection limit of L/180 shall apply to wall panel.
   2. Thermal Transmission: Testing in accordance with ASTM C 518, "measurement of steady state thermal transmission", the panels shall provide a K-factor of .140 btu/sf/hr/deg. F at 73º F. (23º C) mean temperature (air films are not included).
   3. Air Infiltration: Air infiltration shall not exceed .06 cfm per square foot of wall area when tested per ASTM E 283 at a static pressure of 12.0 psf (.576 kPa).
   4. Static Water Penetration: There shall be no uncontrolled water penetration through the panel joints at a static pressure of 20.0 psf (.96 kPa) when tested per ASTM E 331.

5. Dynamic Water Penetration: There shall be no uncontrolled water penetration through the panel joints when subjected to a 95 mph (153 kph) slipstream airflow and application of water for a 15 minute period in accordance with AAMA 501.1.
6. Surface Burning Characteristics: The insulated core shall have been tested in accordance with ASTM E 84 for surface burning characteristics. The core shall have a maximum flame spread of 25 and a maximum smoke developed rating of 450.

2.03 ATTACHMENT SYSTEM

A. Concealed System: Provide manufacturer's standard satinless steel or nylon-coated alluminum concealed anchor clips designed for wall panel system and engineered to meet performance requirements, including anticipated thermal movement.

2.04 PANEL FINISH

A. Manfucturer's standard multi-coat thermocured coating system.

B. Color to be selected by Contracting Officer's Authorized Representative.

2.05 ACCESSORIES AND MISCELLANEOUS ITEMS

A. Miscellaneous Sheet Metal Items: Provide trim, moldings, and closure strips of the same material, thickness, and finish as used for the wall panels. Items completely concealed after installation may optionally be made of stainless steel.

B. Sealants: Elastomeric type containing no oil or asphalt.
1. Exposed sealant must cure to rubber-like consistency.
2. Concealed sealant must be non-hardening type.
3. Seam sealant must be factory-applied, non-skinning, non-drying type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Panel installer shall examine all structural steel before beginning installation to ensure that all supporting members are straight, level, plumb, properly braced and satisfactory for panel installation.

B. Do not begin installation until unsatisfactory conditions are corrected.

C. Start of installation shall signify structure and adjacent conditions as being proper and acceptable.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations including approved shop drawings, installation guidebook and manufacturer's handbook of construction details.

B. Install panel as indicated on drawings, accurate in size, square, and free from distortion or defects.

C. Install flashing and trim true and in proper alignment.

D. Install sealants where indicated to clean dry surfaces only without skips or voids, to ensure weathertightness and integrity of the vapor barrier.

3.03 DAMAGED MATERIAL

A. Damage caused by the manufacturer or wall panel contractor shall be replaced or repaired to as new construction.

B. The panel installer shall inspect and approve each completed wall area and shall be responsible for protection of completed work from damage by other trades.

3.04 CLEANING

A. Replace damaged panels and other components of work, which cannot be repaired by finish touch-up or similar minor repair.

B. Wipe finished surfaces clean of any filings caused by drilling or cutting to prevent rust staining.

END OF SECTION

SECTION 07426

METAL COMPOSITE MATERIAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior cladding consisting of formed metal composite material (MCM) sheet, secondary supports, and anchors to structure, attached to solid backup.

B. Matching flashing and trim.

1.02 RELATED REQUIREMENTS

A. Section 05400 - Cold Framed Metal Framing: Panel support framing.

B. Section 07190 – Water Repellents: Weather barrier behind wall system.

C. Section 07 9005 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes; 2008a.

B. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2009b.

C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.

D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2008.

F. ASTM D523 - Standard Test Method for Specular Gloss; 2008.

G. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives; 1998 (Reapproved 2004).

H. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 1996 (Reapproved 2001).

I. ASTM D2244 - Standard Practice for Calculation of Color Differences from Instrumentally Measured Color Coordinates; 2009b.

J. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2007.

K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010.

L. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002 (Reapproved 2010).

M. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors By Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
   1. Finish manufacturer's data sheet showing physical and performance characteristics.
   2. Storage and handling requirements and recommendations.
   3. Fabrication instructions and recommendations.
   4. Specimen warranty for finish, as specified herein.

C. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:

1. Physical characteristics of components shown on shop drawings.
2. Storage and handling requirements and recommendations.
3. Installation instructions and recommendations.
4. Specimen warranty for wall system, as specified herein.

D. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, and accessories.
1. Indicate panel numbering system.
2. Differentiate between shop and field fabrication.
3. Indicate substrates and adjacent work with which the wall system must be coordinated.
4. Include large-scale details of anchorages and connecting elements.
5. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.

E. Verification Samples: For each finish product specified, minimum size 12 inches square, representing actual product in color and texture.

F. Installer’s Qualifications.

G. Certificate: Certify that the work results of this section meet or exceed specified requirements.

H. Manufacturer's Field Reports: Provide within 48 hours of field review. State what was observed and what changes, if any, were requested or required.

I. Maintenance Data: Care of finishes and warranty requirements.

J. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section.
1. With minimum 3 years of documented experience.
2. Approved by wall system manufacturer.
3. Submit contact names and phone numbers for at least three references connected with successful past projects.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
1. Protect finishes by applying heavy duty removable plastic film during production.
2. Package for protection against transportation damage.
3. Provide markings to identify components consistently with drawings.
4. Exercise care in unloading, storing and installing panels to prevent bending, warping, twisting and surface damage.

B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
1. Store in well ventilated space out of direct sunlight.
2. Protect from moisture and condensation with tarpaulins or other suitable weather tight covering installed to provide ventilation.
3. Store at a slope to ensure positive drainage of any accumulated water.
4. Do not store in any enclosed space where ambient temperature can exceed 120 degrees F.
5. Avoid contact with any other materials that might cause staining, denting, or other surface damage.

1.07 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Wall System Warranty: Provide joint written warranty by manufacturer and installer, agreeing to correct defects in manufacturing or installation within a two year period after Date of Substantial Completion.

C. MCM Sheet Manufacturer's Finish Warranty: Provide manufacturer's written warranty stating that the finish will perform as follows for minimum of 10 years:
   1. Chalking: No more than that represented by a No.8 rating based on ASTM D4214.
   2. Color Retention: No fading or color change in excess of 5 Hunter color difference units, calculated in accordance with ASTM D2244.
   3. Gloss Retention: Minimum of 30 percent gloss retention, when tested in accordance with ASTM D523.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Composite Material Sheet Manufacturers:
   1. 3A Composites USA; "Alucobond": www.alucobondusa.com.
   2. Alcoa, Inc; "Reynobond": www.alcoa.com.
   3. Mitsubishi Plastics Composites America, Inc; "Alpolic": www.alpolic-usa.com (Basis of Design).

2.02 WALL PANEL SYSTEM

A. Wall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage or failure.
   1. Provide panel jointing and weatherseal using reveal joints and gaskets but no sealant.
      a. Basis of Design: Alpolic "Rain Screen" System.
   2. Anchor panels to supporting framing without exposed fasteners.

B. Performance Requirements:
   1. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of 0 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
   2. Wind Performance: Provide system tested in accordance with ASTM E 330 without permanent deformation or failures of structural members under the following conditions:
      a. Design Wind Pressure: As specified in IBC 2009.
      b. Inward Design Wind Pressure: 25 psf.
      c. Outward Design Wind Pressure: 25 psf.
      d. Maximum deflection of perimeter framing member of L/175 normal to plane of the wall; maximum deflection of individual panels of L/60.
      e. Maximum anchor deflection in any direction of 1/16 inch at connection points of framing members to anchors.
   3. Water Penetration: No water penetration under static pressure when tested in accordance with ASTM E331 at a differential of 10 percent of inward acting design load, 6.24 psf minimum, after 15 minutes.
      a. Water penetration is defined as the appearance of uncontrolled water on the interior face of the wall.
      b. Design to drain leakage and condensation to the exterior face of the wall.

C. Panels: Two inch deep pans formed of metal composite material sheet by routing back edges of sheet, removing corners, and folding edges.
   1. Provide concealed attachment to supporting structure by fastening or adhering attachment members to back of panel; attachment members may also function as stiffeners.

2. Maintain maximum panel bow of 0.8 percent of panel dimension in width and length; provide stiffeners of sufficient size and strength to maintain panel flatness without showing local stresses or read-through on panel face.
3. Metallic Finished Panels: Maintain consistent grain of MCM sheet; specifically, do not rotate sheet purely to avoid waste.
4. Fabricate panels under controlled shop conditions.
5. Where final dimensions cannot be established by field measurement before commencement of manufacturing, make allowance for field adjustments without requiring field fabrication of panels.
6. Fabricate as indicated on drawings and as recommended by MCM sheet manufacturer.
   a. Make panel lines, breaks, curves and angles sharp and true.
   b. Keep plane surfaces free from warp or buckle.
   c. Keep panel surfaces free of scratches or marks caused during fabrication.
7. Provide joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on inside face of panel system.
8. For "dry" jointing, secure extrusions to returned pan edges with manufacturer's standard fastening method; provide means of concealed drainage with baffles and weeps for water that might accumulate in members of system.

2.03 MATERIALS

A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a solid core of extruded thermoplastic material formed in a continuous process with no glues or adhesives between dissimilar materials; core material free of voids and spaces; no foamed insulation material content.
   1. Overall Sheet Thickness: 4 mm.
   2. Face Sheet Thickness: 0.019 inches, minimum.
   3. Alloy: Manufacturer's standard, selected for best appearance and finish durability.
   4. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.
   5. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
   6. Flammability: Self-ignition temperature of 650 degrees F or greater, when tested in accordance with ASTM D1929.
   7. Factory Finish: Two or three coat fluoropolymer resin coating, approved by the coating manufacturer for the length of warranty specified for the project, and applied by coil manufacturing facility that specializes in coil applied finishes.
      a. Basis of Design: "Lumiflon FEVE" fluoropolymer resin coating in the following finishes and colors:
         1) ACM1: Alpolic TBX Bright Aluminum Metallic: Exterior at Main Showroom Structure.
         2) ACM2: Alpolic CVB Blue (color to match PMS 300 Chevrolet Blue): Entry Element.
         3) ACM3: Alpolic DM HLZ Brushed Hairline Aluminum: Entry Element.
      b. Long-Term Performance: Not less than that specified under WARRANTY in PART 1.

B. Metal Framing Members: Include all aluminum extrusion joint members required for complete installation.
   1. Provide material strength, dimensions, configuration as required to meet the applied loads applied and in compliance with applicable building code.
   2. Aluminum Components: ASTM B209 or B 221.

C. Flashing: Sheet aluminum; 0.040 inch thick, minimum; finish and color to match MCM sheet.

D. Anchors, Clips and Accessories:

1. Stainless steel complying with ASTM A480/A480M, ASTM A276 or ASTM A666.

E. Fasteners:
   1. Exposed Fasteners: Stainless steel; permitted only where absolutely unavoidable and subject to prior approval of the Architect.
   2. Screws: Self-drilling or self-tapping Type 410 stainless steel or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal wall panels.
   3. Bolts: Stainless steel.
   4. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.

F. Joint Sealer: As specified in Section 07 9005, subject to MCM sheet manufacturer's approval.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and interfaces with other work.

B. Verify substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturers written instructions.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

D. Notify Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protect adjacent work areas and finish surfaces from damage during installation.

3.03 INSTALLATION

A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.

B. Comply with instructions and recommendations of MCM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.

C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.

D. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.

E. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with MCM sheet manufacturer's instructions and recommendations for field forming.

F. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.

G. Where joints are designed for field applied sealant, seal joints completely with specified sealant.

H. Install flashings as indicated on shop drawings At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.

I. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
   1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.
   2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet run, maximum.
   3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet run, maximum.

4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.

J. Replace damaged products.

3.04 FIELD QUALITY CONTROL

A. Wall System Manufacturer's Field Services: Provide field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with instructions.

B. Site Visits: Schedule two site visits during execution of installation.

3.05 CLEANING

A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.

B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.

C. Remove temporary coverings and protection of adjacent work areas.

D. Clean installed products in accordance with manufacturer's instructions.

3.06 PROTECTION

A. Protect installed panel system from damage during construction.

END OF SECTION

SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings and counterflashings.

B. Reglets and accessories.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 04816 - Masonry Veneer: Through-wall flashings in masonry.

D. Section 06100 - Rough Carpentry: Wood blocking and nailers.

E. Section 07411 - Preformed Metal Roof Panels: Flashings, gutters and downspouts associated with metal roofing.

F. Section 07710 - Manufactured Roof Specialties: Copings and fascias.

G. Section 07900 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2005.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2009a.

C. ASTM D4479 - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007.

D. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007.

E. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Samples: Submit two samples illustrating metal finish color.

D. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Pre-Finished Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum 0.0239 inch (24 gage) thick base metal, shop pre-coated with PVDF coating.
   1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
   2. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as selected from manufacturer's standard colors.

2.02 ACCESSORIES

A. Fasteners: Stainless steel, with soft neoprene washers.

B. Protective Backing Paint: Asphaltic mastic, ASTM D 4479 Type I.

C. Sealant: Type specified in Section 07900.

D. Plastic Cement: ASTM D4586, Type I.

E. Reglets and Counterflashing: Surface mounted type, 0.0239 inch (24 gage) galvanized steel; Equivalent to "SM" Surface Mounted Reglet with 24 gage galvanized steel Springlock Flashing System, manufactured by Fry Reglet; www.fryreglet.com. Provide factory-manufactured mitered and sealed inside and outside corners. Reglets and flashing shall have a factory applied Kynar 500/Hylar 500 finish in color as selected to match roofing panels.

2.03 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate hold-down cleats of same material as counterflashing, in continuous lengths matching counterflashing lengths.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. At moving joints, use sealed lapped seams.

F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets in accordance with manufacturer's instructions true to lines and levels. Seal at top and in recess with silicone sealant as specified in Section 07900.

C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

A. Install flashings into reglets in accordance with manufacturer's instructions. Use factory-prefabricated inside and outside corners.

B. Secure flashings in place using concealed fasteners.

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Seal metal joints watertight.

END OF SECTION

SECTION 07840

FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all penetrations and interruptions to fire rated assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS

A. Section 01045 - Cutting and Patching.

B. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and low-emitting materials.

C. Section 01600 - Product Requirements: LEED-related product requirements.

D. Section 09260 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.03 REFERENCE STANDARDS

A. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

B. FM 4991 - Approval of Firestop Contractors; Factory Mutual Research Corporation; 2001.

C. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.

D. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

E. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.

C. Product Data: Provide data on product characteristics, performance ratings, and limitations.

D. LEED Report: Submit VOC content documentation for all non-preformed materials. Provide additional LEED-related product information as required to support LEED certification goals of Project.

E. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Certificate from authority having jurisdiction indicating approval of materials used.

H. Qualification statements for installing mechanics.

1.05 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.

2. Current evaluation reports published by CABO, ICBO, or BOCA will be considered as constituting an acceptable test report.
3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and:
1. Approved by Factory Mutual Research under FM Standard 4991, Approval of Firestop Contractors, or meeting any two of the following requirements:.
2. With minimum 3 years documented experience installing work of this type.
3. Able to show at least 5 satisfactorily completed projects of comparable size and type.
4. Licensed by authority having jurisdiction.
5. Approved by firestopping manufacturer.

D. Installing Mechanic's Qualifications: Trained by firestopping manufacturer and able to provide evidence thereof.

1.06 MOCK-UP

A. Install one firestopping assembly representative of each fire rating design required on project.
1. Where one design may be used for different penetrating items or in different wall or floor constructions, install one assembly for each different combination.
2. Where firestopping is intended to fill a linear opening, install minimum of 1 linear ft.

B. Obtain approval of authority having jurisdiction before proceeding.

C. If accepted, mock-up will represent minimum standard for the Work.

D. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

1.07 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.
1. Fire Ratings: See Drawings for required systems and ratings.

2.02 MATERIALS

A. Firestopping Sealants: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing or damming materials to arrest liquid material leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authority having jurisdiction.

C. Install labelling required by code.

3.04 PROTECTION

A. Clean adjacent surfaces of firestopping materials.

B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07900

JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and low-emitting materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 08800 - Glazing: Glazing sealants and accessories.

D. Section 09260 - Gypsum Board Assemblies: Acoustic sealant.

E. Section 09511 - Suspended Acoustical Ceilings.

1.03 REFERENCE STANDARDS

A. ASTM C834 - Standard Specification for Latex Sealants; 2010.

B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2008.

C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2010.

D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2009.

E. ASTM D 1667 - Standard Specification for Flexible Cellular Materials--Poly(Vinyl Chloride) Foam (Closed-Cell); 2005.

F. BAAQMD 8-51 - Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; www.baaqmd.gov; current edition.

G. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

C. LEED Report: Submit VOC content documentation for all non-preformed sealants and primers. Provide additional LEED-related product information as required to support LEED certification goals of Project.

D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the work of this section with minimum 3 years experience.

1.06 MOCK-UP

A. Provide mock-up of sealant joints in conjunction with window and wall under provisions of Section 01400.

B. Construct mock-up with specified sealant types and with other components noted.

C. Locate where directed.

D. Mock-up may remain as part of the Work.

1.07 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.08 COORDINATION

A. Coordinate the work with all sections referencing this section.

1.09 WARRANTY

A. Correct defective work within a five year period after Date of Substantial Completion.

B. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 SEALANTS

A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
   1. Product: Equivalent to one of the following:
      a. "BC-158" Butyl Rubber Sealant manufactured by Pecora Corporation: www.pecora.com.
      b. "Butyl Sealant" manufactured by Tremco, Inc: www.tremcosealants.com.
   2. Applications: Use for:
      a. Concealed sealant bead in sheet metal work.
      b. Under exterior door thresholds.

C. General Purpose Interior Sealant: Pure acrylic latex with a silicone additive; ASTM C 834, Type OP, Grade NF single component, paintable.
   1. Color: Colors as selected.
   2. Product: Provide one of the following:
      a. "AC-20+Silicone" AcrylicLatex Caulking Compound manufactured by Pecora Corporation: www.pecora.com.
      b. "Sonolac" Siliconized Acrylic Latex Caulk manufactured by Sonneborn Building Products, ChemRex, Inc: www.chemrex.com.
      c. "Tremflex 834" Siliconized Acrylic Latex Sealant manufactured by Tremco, Inc: www.tremcosealants.com.
   3. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall surfaces.
      c. Other interior joints for which no other type of sealant is indicated.

D. Bathtub/Tile Sealant: White silicone; ASTM C920, Uses M and A; single component, mildew resistant.
   1. Product: Provide one of the following:
      a. "Pecora 898" Sanitary Mildew Resistant Silicone Sealant manufactured by Pecora

Corporation: www.pecora.com.
b. "Tremsil 200" Silicone Sealant manufactured by Tremco, Inc: www.tremcosealants.com."
c. "786" Mildew Resistant Silicone Sealant manufactured by Dow Corning Corp: www.dowcorning.com.
2. Applications: Use for:
a. Joints between plumbing fixtures and floor and wall surfaces.
b. Joints between kitchen and bath countertops and wall surfaces.

E. Acoustical Sealant for Concealed Locations: Permanently tacky non-hardening butyl sealant.
1. Applications: Use for concealed locations only:
a. Sealant bead between top stud runner and structure and between bottom stud track and floor.
b. Sealant bead behind suspended acoustical ceiling perimeter moldings.

F. Interior Floor Joint Sealant: Polyurethane, non-sag, traffic grade; ASTM C 920, Type M, Grade NS, Class 25, Uses T, M, A and O; multi-component.
1. Color: Colors as selected.
2. Product: Equivalent to "DynaTred" manufactured by Pecora Corporation: www.pecora.com.
3. Applications: Use for:
a. Expansion joints in floors.
b. Horizontal and vertical expansion and control joints in hard tile surfaces.
c. Horizontal exterior joints where the slope may exceed five percent.

G. Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Class 25, Uses T, I, M, O and A; single component.
1. Color: Color as selected.
2. Product: Provide one of the following:
a. "Urexpan NR-201" Self-Leveling, Traffic Grade Polyurethane Sealant manufactured by Pecora Corporation: www.pecora.com.
b. "Vulkem 45" One-Part Pourable Polyurethane Sealant manufactured by Tremco, Inc: www.tremcosealants.com.
c. "Sonolastic SL 1" One-Part Self-Leveling Polyurethane Sealant, manufactured by Sonneborn Building Products, ChemRex, Inc: www.chemrex.com.
3. Applications: Use for:
a. Joints in sidewalks and vehicular paving.

H. Silicone Sealant: ASTM C920, Grade NS, Class 25, Uses NT, A, G, M, O; single component, neutral curing, non-sagging, non-staining, non-bleeding.
1. Color: Standard colors matching finished surfaces.
2. Product: Provide one of the following:
a. "790" Silicone Building Sealant manufactured by Dow Corning Corp: www.dowcorning.com.
b. "890" Architectural Silicone Sealant manufactured by Pecora Corporation: www.pecora.com..
c. "Spectrem 1" Ultra Low Modulus Silicone Joint Sealant manufactured by Tremco, Inc: www.tremcosealants.com.
3. Movement Capability: Plus 100 percent, minus 50 percent.
4. Shore A Hardness Range: 15-20.
5. Applications: Use for:
a. Exterior joints in vertical or overhead surfaces.

2.02 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.

D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

END OF SECTION

SECTION 08110

STEEL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated steel doors and frames.

B. Thermally insulated steel doors.

C. Steel glazing frames.

D. Accessories, including glazing.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 08211 - Flush Wood Doors

D. Section 08710 - Door Hardware.

E. Section 08800 - Glazing: Glass for doors and borrowed lites.

F. Section 09900 - Paints and Coatings: Field painting.

1.03 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.

B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003.

C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2004).

D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2009a.

E. ASTM C236 - Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box; 1989 (Reapproved 1993).

F. ASTM C1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus; 2005.

G. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.

H. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

E. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

F. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with NAAMM HMMA 840.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames:
   1. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
   2. Windsor Republic Doors: www.republicdoor.com.
   3. Steelcraft: www.steelcraft.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   1. Accessibility: Comply with ANSI/ICC A117.1.
   2. Door Top Closures: Flush with top of faces and edges.
   3. Door Edge Profile: Beveled on both edges.
   4. Door Texture: Smooth faces.
   5. Door Thickness: 1-3/4 inches.
   6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
   7. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
   8. Galvanizing for Exterior Doors and Frames: All components hot-dipped zinc-iron alloy-coated (galvannealed), A60/ZF180.
   9. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL DOORS

A. Exterior Doors:
   1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 2, seamless.
   2. Core: Polyurethane.

3. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
4. Insulating Value: U-value of 0.50, when tested in accordance with ASTM C1363 or ASTM C 236.

2.04 STEEL FRAMES

A. General:
1. Comply with the requirements of grade specified for corresponding door.
   a. ANSI A250.8 Level 1 Doors: 16 gage frames.
2. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
3. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
4. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
5. Frames Installed Back-to-Back: Reinforce with steel channels anchored to floor and overhead structure.

B. Exterior Door Frames: Fully welded.
1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
2. Weatherstripping: Integral, recessed into frame edge.

C. Interior Door Frames, Non-Fire-Rated: Fully welded type.

D. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

E. Transom Bars: Fixed, of profile same as jamb and head.

2.05 ACCESSORY MATERIALS

A. Glazing: As specified in Section 08800.

B. Removable Stops: Formed sheet steel, mitered or butted corners; prepared for countersink style tamper proof screws.

C. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.

D. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

E. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.06 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

B. Coordinate frame anchor placement with wall construction.

C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

D. Coordinate installation of hardware.

E. Coordinate installation of glazing.

F. Coordinate installation of electrical connections to electrical hardware items.

G. Touch up damaged factory finishes.

3.04 TOLERANCES

A. Clearances Between Door and Frame: As specified in ANSI A250.8.

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

3.06 SCHEDULE

A. Refer to Door and Frame Schedules on the drawings.

END OF SECTION

SECTION 08211

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush and flush glazed configuration; non-rated.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced, recycled-content, sustainably-harvested wood, and low-emitting materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 08110 - Steel Doors and Frames.

D. Section 08710 - Door Hardware.

E. Section 08800 - Glazing.

1.03 REFERENCE STANDARDS

A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2009.

B. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.

C. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Specimen warranty.

D. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, identify cutouts for glazing.

E. Samples: Submit two samples of door construction, 12 x 12 inch in size cut from top corner of door.

F. Samples: Submit two samples of door veneer illustrating plastic laminate pattern and color.

G. Manufacturer's Installation Instructions: Indicate special installation instructions.

H. Warranty, executed in Government's name.

I. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges if stored more than one week. Break seal on site to permit ventilation.

1.07 PROJECT CONDITIONS

A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.08 WARRANTY

A. Interior Doors: Provide manufacturer's warranty for the life of the installation.

B. Provide warranty for the following term:
   1. Interior Doors: Life of installation.

C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

D. Manufacturer shall bear the cost of installing replacement doors. Replacement doors shall be factory finished.

PART 2 PRODUCTS

2.01 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

B. Provide sustainably harvested wood, certified or labeled as specified in Section 01600.

C. Provide wood harvested within a 500 mile radius of the project site.

D. Wood fabricated from timber recovered from riverbeds or otherwise abandoned is permitted, unless otherwise noted, provided it is clean and free of contamination; identify source; provide lumber re-graded by an inspection service accredited by the American Lumber Standard Committee, Inc.

E. Provide composite wood and agrifiber products having no added urea-formaldehyde resins.

2.02 MANUFACTURERS

A. High Pressure Decorative Laminate Faced Doors:

B. High Pressure Decorative Laminate Faced Doors:
   1. Algoma Hardwoods, Inc: www.algomahardwoods.com.
   2. Ampco Products, Inc: www.ampco.com.
   3. Eggers Industries; www.eggersindustries.com.
   4. Marshfield DoorSystems, Inc: www.marshfielddoors.com.
   5. Poncraft Door Co: www.poncraft.com.
   6. VT Industries, Inc: www.vtindustries.com.
   7. Substitutions: See Section 01600 - Product Requirements.

2.03 DOORS

A. All Doors:.
   1. Quality Level: Premium Grade, in accordance with AWI/AWMAC/WI Architectural Woodwork Standards.

2. Quality Level: Custom Grade, in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1300.
3. High Pressure Decorative Laminate Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
1. Provide solid core doors at all locations.
2. High pressure decorative laminate finish.

2.04 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type SCLC-5, bonded structural composite lumber core, plies and faces as indicated above.

2.05 DOOR FACINGS

A. High Pressure Decorative Laminate Facing for Non-Fire-Rated Doors: NEMA LD 3, HGS; color as selected; textured, low gloss finish.

B. Cross Banding Behind High Pressure Laminate Finish: 1 ply; of mat-formed one-piece industry standard crossband material.

C. Facing Adhesive: Type II - water resistant.

2.06 ACCESSORIES

A. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamper proof screws.

2.07 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
1. Provide solid blocking for other throughbolted hardware.

C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.

D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

F. Provide edge clearances in accordance with the quality standard specified.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions and specified quality standard.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

3.03 TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

3.05 SCHEDULE

A. Refer to Door and Frame Schedules on the drawings.

END OF SECTION

SECTION 08385

DOUBLE-ACTING TRAFFIC DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Double-acting self-closing swinging traffic doors.

B. Door accessories.

C. Door frames.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 08710 - Door Hardware: Wall-mounted door stops.

1.03 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Manufacturer's technical information for each type of door specified, including details about materials, components, profiles, gaskets, and finishes; include:
   1. Preparation and installation instructions and methods.
   2. Storage and handling requirements and recommendations.
   3. Operation and maintenance data.

C. Shop Drawings: Show installation details of doors and frames, including elevations and attachment.

D. Selection Samples: For each finish requiring color selection, submit color samples indicating full line of available colors and finishes.

E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Government's name and registered with manufacturer.

F. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing type of work specified in this section with not less than three years of documented experience and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver product in manufacturer's original unopened packages with label legible and intact.

B. Store doors at project site on edge or in upright position, under cover and elevated above grade, following manufacturer's instructions.

1.06 WARRANTY

A. See Section 01720 - Project Record and Closeout Documents, for additional warranty requirements.

B. Provide two year manufacturer warranty for molded polyethylene doors against damage due to worker-ridden vehicle traffic; state limitations in executed warranty.

PART 2 PRODUCTS

2.01 RIGID AND SEMI-RIGID TRAFFIC DOORS

A. Thermoplastic Double-Acting Traffic Doors: Hollow core thermoplastic with or without urethane foam fill.
   1. Thickness: 1-1/2 inches.
   2. Faces: 1/8 inch minimum thickness; textured or pebble finish.
   3. Construction: Manufacturer's standard construction with faces bonded to thermoplastic or aluminum subframe or molded in one piece, reinforced for durability and rigidity, with all edges, cut-outs, and hardware preparations factory fabricated; provide view window cut-outs with joints sealed independently of glazing or trim.
   4. Hardware Preparations: Factory reinforce, machine, and prepare for all hardware including field installed items; provide solid blocking for each hardware item; make field cutting, drilling or tapping unnecessary.
   5. Gaskets: Replaceable rubber gaskets in key on edge of door.
   6. Impact Plates: Provide scuff plates on both sides of doors.
   7. Color: As selected by Contracting Officer's Authorized Representative from manufacturer’s standard selection.
   8. Manufacturers:
      a. Chase Doors: www.chasedoors.com.
      b. Eliason Corporation: www.eliasoncorp.com.
      c. Rubbair Door, Inc: www.rubbair.com.
      d. Substitutions: See Section 01600 - Product Requirements.

B. Door Assemblies: Provide double-acting, self-closing pairs of doors; factory fabricated and finished, complete with hinges and specified accessories.
   1. Door Swing: Minimum of 120 degrees each direction.
   2. Hinges: V-cam gravity hinges at top and pivots at bottom; mounted on bottom of header and on top of floor; maximum rise 1-1/2 inches; vertical and horizontal adjustment in the field; manufacturer's standard lower hinge guards.
   3. Hinge Guards: Manufacturer's standard material and configuration, to protect lower hinges from damage.
   4. Exposed Metal Parts: Either stainless steel, extruded aluminum, or powder coated.
   5. Where gaskets are specified, provide on all four edges of door.
   6. View Windows: Provide view window in each door panel unless otherwise indicated, centered in door width, and 48 inches, maximum, from finish floor to bottom of viewing area.
   7. Dimensional Tolerances: Plus or minus 1/4 inch in width and height of each panel.

C. View Windows: Factory installed glazing in molded or extruded black thermoplastic or rubber gasket; centered in door width; use single glazing unless otherwise indicated.
   1. Square-Shaped Window Size: 12 inches by 16 inches.
   2. Single Glazing: Acrylic glazing sheet, 1/4 inch thick, clear.

D. Door Gaskets: Manufacturer's standard configuration.
   1. Thermal Gaskets: 55 to 70 durometer extruded black santoprene.
   2. Other Gaskets: Santoprene or PVC.

E. Impact Plates: Surface applied; factory installed.
   1. Scuff Plates: 30 inches high by full width of door panel, mounted at bottom of door.
   2. Push Plates: 12 inches high by 12 inches wide, mounted at leading edge of door with centerline at 48 inches above floor.
   3. Stainless Steel: Type 304, with No.4 brushed satin finish; 18 gage 0.05 inch thick.

2.02 ACCESSORY COMPONENTS

A. Frames: Provide doors pre-hung in frames by door manufacturer; tubular steel welded frame.

B. Swing Limiting Posts: Manufacturer's standard construction; color as selected by Contracting Officer's Authorized Representative from manufacturer's standard selection; provide wherever potential door swing exceeds maximum swing for which hinges are designed unless door stop is specified elsewhere.

C. Provide tamper proof fasteners and other hardware as recommended by manufacturer for complete installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that jambs and frames are square and plumb.

B. Verify that opening is ready to receive work and opening dimensions and clearances are as indicated on drawings.

C. If substrate preparation is responsibility of another installer, notify Contracting Officer's Authorized Representative of unsatisfactory conditions before proceeding.

D. Commencement of work by installer is acceptance of opening conditions.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

3.03 INSTALLATION

A. Install doors with clearances, anchors, hardware, and accessories according to the manufacturer's instructions and as specified.

B. Install doors plumb, level, and properly aligned.

3.04 ADJUSTING

A. Clean and lubricate operating parts.

B. Adjust doors to open and close smoothly and freely without binding and for proper fit of seals.

3.05 PROTECTION

A. Clean surfaces soiled by work as recommended by manufacturer.

B. Protect installed products until completion of project.

C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 08460

AUTOMATIC ENTRANCE DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Automatic sliding doors, with frames.

B. Actuators and safety devices.

C. Maintenance.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 07900 - Joint Sealers.

D. Section 08800 - Glazing.

E. Section 08910 - Metal-Framed Curtain Wall.

F. Division 16 - Electrical.

1.03 REFERENCE STANDARDS

A. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.

B. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002.

C. ASTM E 1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2008.

D. ASTM F 588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact; 2004.

E. BHMA A156.10 - American National Standard for Power Operated Pedestrian Doors; Builders Hardware Manufacturers Association; 2005 (ANSI/BHMA A156.10).

F. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2009, Revision 1 - 2010.

G. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. UL (ECMD) - Electrical Construction Materials Directory; Underwriters Laboratories Inc.; current edition.

I. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

J. UFC 4-010-01, Standard 10

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Shop Drawings:
   1. Indicate layout and dimensions; head, jamb, and sill conditions; elevations; components, anchorage, recesses, materials, and finishes, electrical characteristics and connection requirements.
   2. Identify installation tolerances required, assembly conditions, routing of service lines and conduit, and locations of operating components and boxes.

C. Product Data: Provide data on system components, sizes, features, and finishes.

D. Samples: Submit two samples of exposed to view hardware, and attachment hardware.

E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and manufacturer's hardware and component templates.

F. Maintenance Contract.

G. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

H. Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.

I. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Government's name and registered with manufacturer.

J. Maintenance Materials: Furnish the following for Government's use in maintenance of project.
   1. See Section 01600 - Product Requirements, for additional provisions.
   2. Wrenches and other tools required for maintenance of equipment.

K. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.

1.06 PROJECT CONDITIONS

A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.07 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty for motor and compressor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Automatic Sliding Entrance Doors:
   1. Besam Entrance Solutions: www.besam.com.
   2. DORMA Automatics: www.dorma-usa.com.
   3. Horton Automatics: www.hortondoors.com.

2.02 AUTOMATIC ENTRANCE DOORS

A. Automatic Sliding Door: Bi-parting double leaf track-mounted, electric operation, extruded aluminum glazed door, with frame, and operator concealed overhead.
   1. Design Criteria: Provide hurricane-rated entrances meeting the following requirements:
      a. Full breakout and fixed sidelight panels shall withstand not less than 70 psf wind load (167 mph), per ASTM E 330.
      b. Air Infiltration, per ASTM E 283:
         1) Fixed Sidelights: Not more than 0.54 cfm/sq ft at 1.57 psf (25 mph).
         2) Full Breakout: Not more than 0.72 cfm/sq ft at 1.57 psf (25 mph).
      c. Forced Entry Resistance, per ASTM F 842 and ASTM F 588: Pass.
      d. Cyclic Pressure Loading, per ASTM E 1996: Pass.
   2. Operation: Power open, power close operation.
   3. "Outside" Side Actuator: Motion sensor.
   4. "Inside" Side Actuator: Motion sensor.
   5. Hold Open: Toggle switch at inside head of doors.
   6. Door and Frame Finish: Anodized, as indicated on drawings.

2.03 DOOR OPERATORS

A. Door Operators - General Requirements: Comply with BHMA A156.10 and UL 325, as applicable.
   1. Select equipment to accommodate heavy pedestrian traffic and weight of doors.
   2. Provide equipment capable of operating, holding open, and closing doors under positive and negative wind pressures calculated in accordance with applicable code.
   3. Operating Temperature Range: Minus 20 to plus 130 degrees F ambient.
   4. Provide operators that are fully adjustable for opening and closing speeds, checking speeds, and hold-open time.
   5. Sliding Door Operators: Provide for manual open, close, and break-away operation of door leaves in the event of power failure.
   6. Conform to applicable code for automatic release of control drive unit to permit manual opening of doors.
   7. Finish exposed components to match door and door hardware finish.

2.04 ACTUATORS

A. Motion and Presence Detection System: Provide the following in a single housing:
   1. Motion Detection: Planar K-band microwave technology.
   2. Presence Detection: Focused active infrared technology.

2.05 ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Provide shielded electrical devices at all locations.

B. Motors: NEMA MG 1.

C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

D. Disconnect Switch: Factory mount disconnect switch in control panel.

2.06 ACCESSORIES

A. Handrails: by entance Manufacturer.
   1. Anchors: embedded anchor bolt at base. Manufacturer's standard connector at entrance system.
   2. Finish: to match doors.

B. Steel Clips, Supports, and Steel Anchors: Galvanized to 1.25 oz/sq ft.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and openings and recesses are ready to receive work and dimensions are as indicated on shop drawings.

B. Verify that electric power is available and is of the correct characteristics.

3.02 INSTALLATION

A. Install equipment in accordance with manufacturer's instructions.

B. Provide for thermal expansion and contraction of door and frame units and live and dead loads that may be transmitted to operating equipment.

C. Provide for dimensional distortion of components during operation.

D. Coordinate installation of components with related and adjacent work; level and plumb.

3.03 ADJUSTING

A. Adjust door equipment for correct function and smooth operation.

3.04 CLEANING

A. Remove temporary protection, clean exposed surfaces.

3.05 CLOSEOUT ACTIVITIES

A. Demonstrate operation, operating components, adjustment features, and lubrication requirements.

3.06 MAINTENANCE

A. See Section 01700 - Execution Requirements, for additional requirements relating to maintenance service.

B. Provide a separate maintenance contract for specified maintenance service.

C. Provide service and maintenance of operating equipment for one year from Date of Substantial Completion, at no extra charge to Government.

END OF SECTION

SECTION 08710

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work in this Section includes furnishing all items of finish hardware as hereinafter specified or obviously necessary for all swinging, sliding, folding and other doors; except items which are specifically excluded from this section or specified in the same sections as the doors and frames on which they are installed.

1.02 RELATED SECTIONS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 08110 – Steel Doors and Frames.

D. Section 08211 – Flush Wood Doors.

E. Section - 08460- Automatic Entrance Doors

F. Section 08910 - Metal Framed Curtain Wall

G. Division 16 – Electrical.

1.03 REFERENCES

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; 2003.

B. BHMA A156.1 - American National Standard for Butts and Hinges; 2006 (ANSI/BHMA A156.1).

C. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; 2003 (ANSI/BHMA A156.2).

D. BHMA A156.3 - American National Standard for Exit Devices; 2001 (ANSI/BHMA A156.3).

E. BHMA A156.4 - American National Standard for Door Controls - Closers; 2000 (ANSI/BHMA A156.4).

F. BHMA A156.5 - American National Standard for Auxiliary Locks & Associated Products; 2001 (ANSI/BHMA A156.5).

G. BHMA A156.6 - American National Standard for Architectural Door Trim; 2005 (ANSI/BHMA A156.6).

H. BHMA A156.7 - American National Standard for Template Hinge Dimensions; 2003 (ANSI/BHMA A156.7).

I. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2005 (ANSI/BHMA A156.8).

J. BHMA A156.13 - American National Standard for Mortise Locks & Latches; 2005 (ANSI/BHMA A156.13).

K. BHMA A156.15 - American National Standard for Release Devices - Closer Holder, Electromagnetic and Electromechanical; 2006 (ANSI/BHMA A156.15).

L. BHMA A156.16 - American National Standard for Auxiliary Hardware; 2002 (ANSI/BHMA A156.16).

M. BHMA A156.18 - American National Standard for Materials and Finishes; 2006 (ANSI/BHMA A156.18).

N. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; current edition; (ADAAG - Americans with Disabilities Act, Accessibility Guidelines).

O. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; 2004.

P. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; 1993; also in WDHS-1/WDHS-5 Series, 1996.

Q. ICC (IBC) - International Building Code; 2006.

R. UL (BMD) - Building Materials Directory; current edition.

1.04 SUBMITTALS

A. GENERAL REQUIREMENTS
   1. See Section 01300 - Submittals, for submittal procedures.

B. SCHEDULES AND PRODUCT DATA
   1. Schedules shall be in vertical format, listing each door opening, and organized into “hardware sets” indicating complete designations of every item required for each door opening to function as intended. Hardware schedule shall be submitted within two (2) weeks from date the purchase order is received by the finish hardware supplier. Furnish four (4) copies of revised schedules after approval for field and file use. Note any special mounting instructions or requirements with the hardware schedule. Schedules to include the following information:
      a. Location of each hardware set cross-referenced to indications on drawings, both on floor plans and in door and frame schedule.
      b. Handing and degree of swing of each door.
      c. Door and frame sizes and materials.
      d. Keying information.
      e. Type, style, function, size, and finish of each hardware item.
      f. Elevation drawings and operational descriptions for all electronic openings.
      g. Name and manufacturer of each hardware item.
      h. Fastenings and other pertinent information.
      i. Explanation of all abbreviations, symbols and codes contained in schedule
      j. Mounting locations for hardware when varies from standard.
   2. Submit catalog cuts and/or product data sheets for all scheduled finish hardware.
   3. Submit separate detailed keying schedule for approval indicating clearly how the owner’s final instructions on keying of locks has been fulfilled.

C. SAMPLES
   1. Upon request, samples of each type of hardware in finish indicated shall be submitted. Samples are to remain undamaged and in working condition through submittal and review process. Items will be returned to the supplier or incorporated into the work within limitations of keying coordination requirements.

D. TEMPLATES
   1. Furnish a complete list and suitable templates, together with finish hardware schedule to contractor, for distribution to necessary trades supplying materials to be prepped for finish hardware.

E. ELECTRONIC HARDWARE SYSTEMS

1. Provide complete wiring diagrams prepared by an authorized factory employee for each opening requiring electronic hardware, except openings where only magnetic hold-open devices are specified. Provide a copy with each hardware schedule submitted after approval.
2. Provide complete operational descriptions of electronic components listed by opening in the hardware submittals. Operational descriptions to detail how each electrical component functions within the opening incorporating all conditions of ingress and egress. Provide a copy with each hardware schedule submitted for approval.
3. Provide elevation drawings of electronic hardware and systems identifying locations of the system components with respect to their placement in the door opening. Provide a copy with each hardware schedule submitted for approval.
4. Prior to installation of electronic hardware, arrange conference between supplier, installers and related trades to review materials, procedures and coordinating related work.
5. The electrical products contained within this specification represent a complete engineered system. If alternate electrical products are submitted, it is the responsibility of the distributor to bear the cost of providing a complete and working system including re-engineering of electrical diagrams and system layout, as well as power supplies, power transfers and all required electrical components. Coordinate with Electrical Engineer and Electrician to ensure that line voltage and low voltage wiring is coordinated to provide a complete and working system.
6. For each item of electrified hardware specified, provide ElectroLynx standardized plug connectors to accommodate up to twelve (12) wires. Plug connectors shall plug directly into ElectroLynx through-door wiring harnesses, frame wiring harnesses, electric locking devices and power supplies.
7. Provide internal conduit for wiring to electric strikes occurring in inactive leaves of pairs of doors. Coordinate with door supplier.
8. Electric strikes shall be supplied and installed by the Card Reader supplier.

F. OPERATIONS AND MAINTENANCE MANUALS

1. Upon completion of construction and building turnover, furnish two (2) complete maintenance manuals to the owner. Manuals to include the following items:
   a. Approved hardware schedule, catalog cuts and keying schedule.
   b. Hardware installation and adjustment instructions.
   c. Manufacturer's written warranty information.
   d. Wiring diagrams, elevation drawings and operational descriptions for all electronic openings.

1.05 QUALITY ASSURANCE

A. SUBSTITUTIONS

1. All substitution requests must be submitted before bidding and within the procedures and time frame as outlined in Division 1, General Requirements. Approval of products is at the discretion of the Contracting Officer and his hardware consultant.

B. SUPPLIER QUALIFICATIONS

1. A recognized architectural door hardware supplier who has maintained an office and has been furnishing hardware in the project's vicinity for a period of at least two (2) years.
2. Hardware supplier shall have office and warehouse facilities to accommodate this project.
3. Hardware supplier shall have in his employment at least one (1) Architectural Hardware Consultant (AHC) who is available at reasonable times during business hours for consultation about the project's hardware and requirements to the Contracting Officer and Contractor.
4. Hardware supplier must be an authorized factory distributor of all products specified herein.

1.06 DELIVERY, STORAGE AND HANDLING

A. MARKING AND PACKAGING
   1. Properly package and mark items according to the approved hardware schedule, complete with necessary screws and accessories, instructions and installation templates for spotting mortising tools. Contractor shall check deliveries against accepted list and provide receipt for them, after which he is responsible for storage and care. Any shortage or damaged good shall be made without cost to the owner.
   2. Packaging of door hardware is the responsibility of the supplier. As hardware supplier receives material from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set and door numbers to match the approved hardware schedule. Two or more identical sets may be packed in same container.

B. DELIVERY
   1. The supplier shall deliver all hardware to the project site; direct factory shipments are not allowed unless agreed upon beforehand. Hardware supplier shall coordinate delivery times and schedules with the Contractor. Inventory door hardware jointly with representatives of hardware supplier and hardware installer/contractor until each is satisfied that count is correct.
   2. No keys, other than construction master keys and/or temporary keys are to be packed in boxes with the locks.
   3. At time of hardware delivery, door openings supplier in conjunction with the Contractor shall check in all hardware and set up a hardware storage room.

C. STORAGE
   1. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of work will not be delayed by hardware losses both before and after installation.

1.07 WARRANTY

A. All items, except as noted below, shall be warranted in writing by the manufacturer against failure due to defective materials and workmanship for a minimum period of one (1) year commencing on the date of final completion and acceptance. In the event of product failure, promptly repair or replace item with no additional cost to the owner.
   1. Cylindrical locksets – Heavy Duty: Seven (7) years
   2. Mortise locksets: Five (5) years
   3. Exit Devices: Five (5) years
   4. Door closers: Ten (10) years

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Only manufacturers as listed below shall be accepted. Obtain each type of finish hardware (hinges, latch and locksets, exit devices, door closers, etc.) from a single manufacturer.

2.02 MATERIALS

A. SCREWS AND FASTENERS
   1. All required screws shall be supplied as necessary for securing finish hardware in the appropriate manner. Thru-bolts shall be supplied for exit devices and door closers where required by code and the appropriate blocking or reinforcing is not present in the door to preclude their use.

B. HANGING DEVICES
   1. HINGES
      a. Hinges shall conform to ANSI A156.1 and be five-knuckle design, ball bearing as

specified with NRP (non-removable pin) feature, at all exterior reverse bevel doors. Unless otherwise scheduled, supply one (1) hinge for every 30” of door height. Hinges shall generally be 4 ½” x 4 ½”, except at doors exceeding 36” in width where 5” x 4 ½” hinges shall be provided. Heavy weight hinges (.180) shall be supplied at all high traffic doors where specified. Provide hinges with Phillips flat-head screws unless specified otherwise.

1) Specified Manufacturer: McKinney
2) Approved Substitutes: Hager, Stanley

2. PIVOTS
   a. All pivots shall conform to ANSI 156.4 Grade 1 and shall have oil impregnated bronze bearing in the top pivot and a radial roller and thrust bearing in the bottom pivot. The bottom pivot shall carry the full weight of the door.
      1) Specified Manufacturer: Rixson
      2) Approved Substitutes: Dorma, Ives

C. FLUSH BOLTS AND ACCESSORIES
1. All manual and automatic flush bolts to be furnished as specified.
   a. Specified Manufacturer: McKinney
   b. Approved Substitutes: Rockwood, Trimco

D. CYLINDERS AND KEYING
1. CYLINDERS
   a. Specified Manufacturer: BEST - NO SUBSTITUTION
2. KEYING
   a. All locks and cylinders shall be prepped to fit the BEST 7 pin cylinder cores without field modification. Hardware supplier is to provide temporary, disposable construction cores. Coordination between the Contracting Officer and the hardware supplier shall be made in advance to ensure the proper brass construction cores for exterior doors are on site when needed.
3. KEY CABINET
   a. Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall expansion capacity of 150% of the number of locks required for the project.
      1) Specified Manufacturer: Telkee
      2) Approved Substitutes: Lund, MMF

E. LOCKING DEVICES
1. MORTISE LOCKSETS
   a. All locksets shall be ANSI 156.13 Series 1000 Grade 1. All functions shall be manufactured in a single sized case formed from 12 gauge steel minimum. The lockset shall have a field-adjustable, beveled armored front, with a .125” minimum thickness and shall be reversible without opening the lock body. The lockset shall be 2 3/4” backset with a one-piece 3/4” anti-friction stainless steel latchbolt. The deadbolt shall be a full 1” throw made of stainless steel and have 2 hardened steel roller inserts. All strikes shall be non-handed with a curved lip. To insure proper alignment, all trim, shall be thru-bolted and fully interchangeable between rose and escutcheon designs.
      1) Specified Manufacturer: Sargent
      2) Approved Substitutes: Corbin Russwin, Yale, Best
2. CYLINDRICAL LOCKSETS – HEAVY DUTY
   a. All locksets shall exceed the requirements of ANSI 156.2 Series 4000, Grade 1 with all standard trim. Locks shall comply with UL10C and UBC 7-2 positive pressure requirements. Furnished with standard 2 3/4” backset. Lock housing shall be fabricated of steel zinc dichromate and stainless steel. Latchbolt shall be brass or stainless steel with a minimum 1/2” throw. Locks shall be non-handed and fully field reversible.

1) Specified Manufacturer: Sargent
2) Approved Substitutes: Corbin Russwin, Yale, Best

F. EXIT DEVICES
1. CONVENTIONAL DEVICES
a. All exit devices shall be certified to meet ANSI/BHMA A156.3 Grade 1 requirements and shall be listed by Underwriters Laboratories and bear the UL label for life safety in full compliance with NFPA 80 and NFPA 101. Mounting rails shall be formed from a solid single piece of stainless steel, brass or bronze no less than 0.072" thick. Push rails shall be constructed of 0.062" thick material. Painted or anodized aluminum shall not be considered heavy duty and are not acceptable. Hex key dogging shall be standard for all life safety panic hardware. Lever trim shall be available in finishes and designs to match that of the specified locksets. Glass bead shim kits shall be provided where exit device mounting interferes with door lite kits
1) Specified Manufacturer: Sargent
2) Approved Substitutes: Corbin Russwin, Yale, Precision, Von Duprin

G. DOOR CLOSERS
1. SURFACE MOUNTED CLOSERS – HEAVY DUTY
a. All closers shall have non-ferrous covers, aluminum alloy bodies, forged steel arms, and separate valves for adjusting backcheck, closing and latching cycles and adjustable spring to provide up to 50% increase in spring power. Closers shall be constructed with a one-piece body. Closers shall be furnished with parallel arms mounting on all doors opening into corridors or other public spaces and shall be mounted to permit 180 degrees door swing wherever wall conditions permit. Furnish with non-hold open arms unless otherwise indicated. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics. Door closer mounting plates and brackets shall be provided at all openings where there is insufficient room for standard closer installation.
1) Specified Manufacturer: Sargent
2) Approved Substitutes: Corbin Russwin, Yale, Norton

H. DOOR TRIM AND PROTECTIVE PLATES
1. Kick plates shall be .050 gauge and two (2) inches less full width of door, or as specified. Push plates, pull plates, door pulls and miscellaneous door trim shall be as shown in the hardware schedule.
a. Specified Manufacturer: McKinney
b. Approved Substitutes: Rockwood, Trimco

I. DOOR STOPS AND HOLDERS
1. WALL MOUNTED DOOR STOPS
a. Where a door is indicated on the plans to strike flush against a wall, wall bumpers shall be provided. Provide convex or concave design as indicated.
1) Specified Manufacturers: McKinney
2) Approved Substitutes: Rockwood, Trimco
2. OVERHEAD STOPS/HOLDERS
a. Where specified, overhead stops as shown in the hardware sets are to be provided. Track, slide, arm and jamb bracket shall be constructed of extruded bronze and shock absorber spring shall be of heavy tempered steel. Overhead stops shall be of non-handed design.
1) Specified Manufacturer: Rixson
2) Approved Substitutes: Sargent, ABH

J. DOOR VIEWERS
1. Door viewers (peepholes) shall be manufactured of brass with finish indicated, and shall have a minimum 180 degree field of view.
a. Specified Manufacturer: McKinney
b. Approved Substitutes: Rockwood, Trimco

K. GASKETING AND THRESHOLDS
   1. Provide continuous weatherseal on exterior doors and smoke, light, or sound seals on interior doors where indicated or scheduled. Provide intumescent seals as required to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies. Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.
   2. Provide threshold units not less than 4” wide, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames. All threshold units shall comply with the Americans with Disabilities Act (ADA.)
      a. Specified Manufacturers: McKinney
      b. Approved Substitutes: National Guard, Pemko

L. SILENCERS
   1. Furnish rubber door silencers all hollow metal frames; two (2) per pair and three (3) per single door frame.

2.03 FINISHES

A. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

PART 3 EXECUTION

3.01 EXAMINATION

A. Contractor shall ensure that the building is secured and free from weather elements prior to installing interior door hardware. Examine hardware before installation to ensure it is free of defects.

3.02 INSTALLATION

A. Mount hardware units at heights indicated in the following applicable publications, except as specifically indicated or required to comply with the governing regulations.
   1. “Recommended Locations for Builders Hardware for Standard Steel Doors and Frames” by the Door and Hardware Institute (DHI).
   2. "Recommended Locations for Architectural Hardware for Wood Flush Doors" by the Door and Hardware Institute (DHI).

B. All hardware shall be applied and installed in accordance with best trade practice by an experienced hardware installer. Care shall be exercised not to mar or damage adjacent work.

C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

D. Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.03 FIELD QUALITY CONTROL

A. The hardware supplier shall do a final inspection prior to building completion to ensure that all hardware was correctly installed and is in proper working order.

B. Prior to the installation of hardware, manufacturer's representatives for locksets, closers, and exit devices shall arrange and hold a jobsite meeting to instruct the installing contractor's personnel on the proper installation of their respective products. A letter of compliance, indicating when this meeting is held and who is in attendance, shall be sent to the Contracting Officer.

3.04 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

B. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore to proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

C. Instruct government personnel in the proper adjustment and maintenance of door hardware and hardware finishes and usage of any electronic devices.

3.05 PROTECTION

A. Contractor shall protect all hardware, as it is stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

3.06 HARDWARE SCHEDULE - ATTACHED

END OF SECTION

HARDWARE SCHEDULE

HW SET #01

Doors: 100a (Automatic Sliding Door)

Each to have:
1 Power Cylinder As Required

NOTE: BALANCE OF HARDWARE BY D0OR MANFACTURER

HW SET #2

Door: 105 (Office)

Each to have:

3 Hinges	TA2714	US26D	MC
1 Entry Lock	10G05 LL	US26D	SA
1 Storeroom Lock	10G04 LL	US26D	SA
1 Door Stop	WS02/FS01 as required	US26D	MC
3 Door Silencers	S1M		

HW SET #3

Doors: 109 and 110 (Toilet Rooms)

Each to have:

3 Hinges TA2714		US26D	MC
1 Privacy Set	10U65 LL	US26D	SA
1 Door Stop	WS02/FS01 as req.	US26D	MC
1 Set Sound Seal	MCKS88D		MW

HW SET #4

Door: 100b (Double swing impact doors)
Note: All hardware by door manufacturer

HW SET #5

Door: 104:

Each to have:

2 Continuous Hinges	FM-3500	US32D	MAR
1 Mortise Exit Device	8904 x ELT	US32D	SA
1 Electric Strike	6223 Inactive Door Leaf	US32D	VD
1 Closer	351 CPS	EN	SA
2 Armor Plates	KP50 36” H”x 2” LDW	US32D	MC
I Weather-stripping (Head)	MCK2891 APK		MW
2 Weather-stripping (Jambs)	MCK290 APK		MW

2 Door Bottoms	MCK3452 AV		MW
1 Threshold	MCKR50 SA with end returns		MW
1 Rain Drip	MCK346C		MW
1 Astragal	MCK18061 CNB		MW
2 Door Viewers	DV3	626	MC
1 Latch Guard	LP01	US32D	VD
1 Electric Power Transfer	EPT-10		VD
1 Power Supply	BPS-24-1		SN
1 Power Controller	2005 Smart Pak II		HS
2 Surface Bolts	SB12F -12”	US32D	MC
1 Card Reader	By Others		

HW SET #6

Door: 103 (Ext Door w/ Day Alarm)

Each to have:

3 Hinges	T4A3386 NRP	US32D	MC
1 Rim Alarmed Exit Device	AL8810	US32D	SA
1 Closer	351 CPS	EN	SA
1 Kick Plate	KP 8”x2” LWD	US32D	MC
1 Weather-stripping (Head)	MCK2891APK		MW
2 Weather-stripping (Jamb)	MCK290APK		MW
1 Door Bottom	MC452AV		MW
1 Threshold	MCKR50SA w/End Returns		MW
1 Rain Drip	MCK346C		MW
1 Door Viewer	DV3	626	MC

HW SET #7

Door: 113 (Ext. door @ Blimpie Kitchen)

Each to have:

3 Hinges	T4A3386 NRP	US32D	MC
1 Rim Exit Device	8804xETL	US32D	SA
1 Electric Strike	6113	US32D	VD
1 Closer	351 CPS	EN	SA
1 Kick Plate	KP 8”x2” LWD	US32D	MC
1 Weather-stripping (Head)	MCK2891APK		MW
2 Weather-stripping (Jamb)	MCK290APK		MW
1 Door Bottom	MC452AV		MW
1 Threshold	MCKR50SA w/End Returns		MW
1 Rain Drip	MCK346C		MW
1 Door Viewer	DV3	626	MC
1 Power Supply	BPS-24-1		SN
1 Power Controller	2005 Smart Pak II		HS
1 Card Reader	By Others		

HW SET #8

Door: 114 (COMM. / ELECTRICAL)

Each to have:

3 Hinges	T4A3386 NRP	S32D	MC
1 Storeroom Lock	10G04 LL	US26D	SA
1 Door Closer	351 CPSH	EN	SA
1 Weather-stripping (Head)	MCK2891 APK		MW
2 Weather-stripping (Jamb)	MCK290 APK		MW
1 Door Bottom	MCK3452	AV	MW
1 Threshold	MCKR50 SA w/End Returns	SAS	MW
1 Rain Drip	MCK346C		MW
1 Latch Guard	LP01	US32D	VD

HW SET #9

Door: 111a (Int. Door @ Blimpie Kitchen)

Each to have:

3 Hinges	TA2714	US26D	MC
1 Entry Lock	10G05 LL	US26D	SA
1 Door Closer	351	EN	SA
1 Kick Plate	KP 8 x2” LDW	US26D	MC
1 Wall Stop	WS01	US26D	MC
3 Door Silencers	S1M		

END OF SECTION

SECTION 08800

GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass.

B. Laminated glass.

C. Insulating glass units.

D. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 08110 - Steel Doors and Frames: Glazed doors and frames.

D. Section 08460 - Automatic Entrance Doors.

E. Section 08910 - Metal Framed Curtain Wall.

F. Section 10800 - Toilet, Bath, and Laundry Accessories: Mirrors.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005.

C. ASTM C1036 - Standard Specification for Flat Glass; 2006.

D. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 2004.

E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2009.

F. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

G. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2009.

H. GANA (SM) - FGMA Sealant Manual; Glass Association of North America; 2008.

I. SIGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units; Sealed Insulating Glass Manufacturers Association; 2004.

J. Department of Defense (DoD), Unified Facilities Criteria (UFC) 4-010-01, Para B-3.1, Standard 10

K. ASCE, Standard 7; 140 MPH @ 3-Second Gust

L. UFC 4-010-01 - Department of Defense (DoD) Unified Facilities Criteria (UFC) - Minimum Antiterrorism Standards for Buildings; 2007.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics,

size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual, FGMA Sealant Manual, and SIGMA TM-3000 Glazing Guidelines for glazing installation methods.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

1.06 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY

A. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

B. Laminated Glass: Provide a five (5) year warranty to include coverage for delamination, including replacement of failed units.

PART 2 PRODUCTS

2.01 GLAZING TYPES

2.02 GLASS MATERIALS

A. Float Glass Manufacturers:
   1. Zeledyne: www.versaluxglass.com.
   2. AGC Flat Glass North America, Inc: www.afgglass.com.
   3. Pilkington North America Inc: www.pilkington.com/na.
   4. PPG Industries, Inc: www.ppgglazing.com.
   5. Visteon Glass Systems: www.visteon.com/floatglass.
   6. Substitutions: Refer to Section 01600 - Product Requirements.

B. Float Glass: All glazing is to be float glass unless otherwise indicated.
   1. Annealed Type: ASTM C1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
   2. Heat-Strengthened and Fully Tempered Types: ASTM C1048.
   3. Tinted Types: Color and performance characteristics as indicated.
   4. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

C. Safety Glass (Glazing Type 2): Clear; fully tempered.
   1. Comply with ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select) and ASTM C 1048.
   2. Comply with 16 CFR 1201 test requirements for Category II.
   3. Where glazing is to be installed in fire-rated partition, provide glazing that is also fire-protection rated in accordance with applicable code.
   4. 6 mm minimum thick.
   5. Provide this type of glazing in the locations required by code.
   6. Visible light transmittance of 69 percent, shading coefficient of 0.44.
   7. Product: Equivalent to "Solarban 60 Low E" as manufactured by PPG Industries, Inc.

D. Laminated Glass: Comply with ASTM C 1172. Department of Defense (DoD), United Facilities Criteria (UFC) 40010-01, Paragraph B-3.1, Standard 10.
   1. Outer pane: 1/8 inch thick, clear heat-strengthened glass.
   2. Inner pane: 1/8 inch thick, clear heat-strengthened glass.
   3. Laminated with 0.060 inch thick clear plastic interlayer.
   4. Overall Thickness: 5/16 inch.

2.03 SEALED INSULATING GLASS UNITS

A. Manufacturers:
   1. Any of the manufacturers specified for float glass.
   2. Guardian Industries Corporation: www.guardian.com.
   3. Interpane Glass Company: www.interpane.com.
   4. Viracon, Apogee Enterprises, Inc: www.viracon.com.
   5. Substitutions: Refer to Section 01600 - Product Requirements.

B. Insulated Glass Units: Double pane with glass to elastomer edge seal.
   1. Clear Units: Outer pane of Bronze low E glass, inner pane of clear glass.
   2. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
   3. Clear Units (Glazing Type 1):
      a. Outer Panel: 1/4 inch thick tempered clear glass.
      b. Inner Panel: 5/16 inch thick clear laminated glass.
      c. U factor = .27
      d. SHGC = .25
   4. Purge interpane space with dry hermetic air.
   5. Total unit thickness of 1 inch minimum.

C. Edge Seal Construction: Aluminum, bent and soldered corners.

D. Edge Seal Material: Clear anodized aluminum color.

2.04 GLAZING COMPOUNDS

A. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C 920, Type S, Grade NS, Class 25 with additional movement capability of 100 percent in extension and 50 percent in compression (total 150 percent); Uses M, A, G and O as applicable; cured Shore A hardness of 15 to 25; color as selected.
   1. Product: Equivalent to Dow Corning 790.

2.05 GLAZING ACCESSORIES

A. Setting Blocks: EPDM, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Elastomeric, Shore A durometer hardness required by glass manufacturer to maintain glass lites for installation method used, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape: Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapor retarder seal; size as required.

D. Glazing Gaskets: Resilient EPDM rubber extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; black color.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealants in accordance with ASTM C1193 and FGMA Sealant Manual.

E. Install sealant in accordance with manufacturer's instructions.

3.03 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

A. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.04 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

D. Place glazing tape on free perimeter of glazing in same manner described above.

E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

F. Knife trim protruding tape.

3.05 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.06 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

SECTION 08830

MIRRORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Glass mirrors.

1.02 RELATED REQUIREMENTS

A. Section 10800 - Toilet Accessories: Metal-framed mirrors.

1.03 REFERENCE STANDARDS

A. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2009.

B. GANA (TIPS) - Mirrors Handle with Extreme Care: Tips For the Professional on the Care and Handling of Mirrors; National Association of Mirror Manufacturers; 2004 (http://www.mirrorlink.org/members/technical.htm).

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data on Mirror Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Government's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual for glazing installation methods.

B. Fabricate, store, transport, receive, install, and clean mirrors in accordance with recommendations of GANA (TIPS) "Mirrors Handle with Extreme Care: Tips For the Professional on the Care and Handling of Mirrors."

1.06 WARRANTY

A. See Section 01780 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for reflective coating on mirrors and replacement of same.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Mirrors:
   1. Arch Aluminum & Glass Co., Inc: www.arch.amarlite.com.
   2. Binswanger Mirror/ACI Distribution: www.binswangerglass.com.
   3. Lenoir Mirror Co: www.lenoirmirror.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Mirror Glass - General: Select materials and/or provide supports as required to limit mirrored glass deflection to 1/200 or flexure limit of glass with full recovery of glazing materials, whichever is less.

B. Mirror Glass: Clear float type with copper and silver coating, organic overcoating, arrised edges, 6 mm thick minimum.
   1. Sizes as indicated on Drawings.

2.03 GLAZING ACCESSORIES

A. Mirror Attachment Accessories: Stainless steel clips.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for mirrored glazing are correctly sized and within tolerance.

3.02 INSTALLATION - GENERAL

A. Install mirrors in accordance with GANA recommendations.

B. Set mirrors plumb and level, free of optical distortion.

C. Set mirrors with edge clearance free of surrounding construction including countertops or backsplashes.

D. Frameless Mirrors: Set mirrors with clips. Anchor rigidly to wall construction.

3.03 CLEANING

A. Remove labels after work is complete.

B. Clean mirrors and adjacent surfaces.

END OF SECTION

SECTION 08910

METAL-FRAMED CURTAIN WALL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed glazed curtain wall designed for blast resistance.

B. Perimeter sealant.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 05120 - Structural Steel: Steel attachment members.

D. Section 05500 - Metal Fabrications: Steel attachment devices.

E. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.

F. Section 08460 - Automatic Entrance Doors.

G. Section 08800 - Glazing.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; American Architectural Manufacturers Association; 2004.

B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 1998.

C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; American Architectural Manufacturers Association; 2009.

D. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 2010. ASCE Standard 7: 140 MPH, 3 Second Gust.

E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.

F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2008.

G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2007.

H. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.

I. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002 (Reapproved 2010).

J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

K. IBC 2003 - International Building Code; 2009.

L. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type

I and Type II; Society for Protective Coatings; 1997 (Ed. 2004).

M. UFC 4-010-01 - Department of Defense (DoD) Unified Facilities Criteria (UFC) - Minimum Antiterrorism Standards for Buildings; 2007.

1.04 PERFORMANCE REQUIREMENTS

A. Design and size components to withstand the following load requirements without damage or permanent set:
   1. Design Blast Loads: Comply with requirements of ASCE 7 and UFC 4-010-01 - Department of Defense (DoD) Unified Facilities Criteria (UFC) - Minimum Antiterrorism Standards for Buildings; 2007.
      a. Uniform Positive Blast Load: 144 lbf/sq ft.
      b. Uniform Negative Blast Load: 144 lbf/sq ft.
   2. Member Deflection: Limit member deflection to 1/160 in any direction, and maximum of 1/2 inch, with full recovery of glazing materials.
   3. Measure performance by testing in accordance with ASTM E 330, using test loads equal to 1.5 times the design wind loads and 10 second duration of maximum pressure.

B. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with IBC 2006 code.

C. Movement: Accommodate the following movement without damage to components or deterioration of seals:
   1. Movement of curtain wall relative to perimeter framing.
   2. Deflection of structural support framing, under permanent and dynamic loads.

D. Thermal Resistance of Framing: R of 2.44.

E. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at a reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E 283.

F. Condensation Resistance Factor: CRF of 78 (frame) when measured in accordance with AAMA 1503.1.

G. Water Leakage: None, when measured in accordance with ASTM E 331 at a test pressure difference of 12 lbf/sq ft.

H. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

I. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

J. Design system to eliminate noises caused by wind and thermal movement, to prevent vibration harmonics, and to prevent "stack effect" in internal spaces.

K. ASCE Standard 7: 140 MPH, 3 Second Gust.

1.05 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glazing and infill, internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

D. Samples: Submit two samples illustrating finished aluminum surface and glazing materials.

E. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations.
   1. Curtainwall supplier shall provide a current copy of the DOD standard along with all pertinent engineering design calculations indicating compliance.

F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

G. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the state where this installation is located..

B. Manufacturer: Company specializing in manufacturing aluminum glazing systems with minimum three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Design Basis: Kawneer North America; www.kawneer.com; Product "1600 Wall System3".

B. Other Acceptable Manufacturers:
   1. United States Aluminum Corp: www.usalum.com.
   2. Vistawall Architectural Products www.oldcastlebe.com.
   3. YKK AP America Inc.: www.ykkap.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 CURTAIN WALL

A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Finish: Class I natural anodized.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
      b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
   2. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   3. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration

harmonics, and prevent "stack effect" in internal spaces.

4. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
   1. Design Wind Loads: Comply with requirements of the requirements of ASCE 7.
   2. Movement: Accommodate the following movement without damage to components or deterioration of seals:
      a. Expansion and contraction caused by 180 degrees F surface temperature.
      b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
      c. Movement of curtain wall relative to perimeter framing.
      d. Deflection of structural support framing, under permanent and dynamic loads.

C. Water Penetration Performance Requirements: No uncontrolled water on indoor face when tested as follows:

D. Air Infiltration Performance Requirements:
   1. Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area or less, measured in accordance with ASTM E283.
   2. Air Infiltration Test Pressure Differential: 6.24 pounds per square inch.

E. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.

F. Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
   1. Movement: Accommodate the following movement without damage to components or deterioration of seals:
      a. Movement of curtain wall relative to perimeter framing.
      b. Deflection of structural support framing, under permanent and dynamic loads.
   2. Water Leakage: None, when measured in accordance with ASTM E 331 at a test pressure difference of 2.86 lbf/sq ft.
   3. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   4. Design system to eliminate noises caused by wind and thermal movement, to prevent vibration harmonics, and to prevent "stack effect" in internal spaces.

2.03 COMPONENTS

A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Inside/outside glazed, with pressure plate and mullion cover.
   2. Finish: Class I color anodized.
   3. Color: Light bronze.

B. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Framing members for interior applications need not be thermally broken.
   2. Cross-Section: 2-1/2 x 7-1/2 inch nominal dimension.
   3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.

2.04 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Structural Steel Sections: ASTM A36/A36M; shop primed.

C. Structural Supporting Anchors Attached to Structural Steel: Design for bolted or welded attachment.

D. Fasteners: Galvanized steel.

E. Concealed Flashings: 0.018 inch thick stainless steel.

F. Perimeter Sealant: Type specified in Section 07900.

G. Glazing: As specified in Section 08800.
   1. Glass in Exterior Framing: 1 inch insulating glass as scheduled.
   2. Glass in Interior Framing: 1/4 inch tempered glass.
   3. UFC 4-010-01, Standard 10

H. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

I. Glazing Accessories: As specified in Section 08800.

J. Shop and Touch-Up Primer for Steel Components: SSPC-Paint 25, zinc oxide, alkyd, linseed oil primer.

2.05 FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating or AAMA 612 electrolytically deposited colored anodic coating with electrolytically deposited organic seal; not less than 0.7 mils thick.

B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.06 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

C. Prepare components to receive anchor devices. Fabricate anchors.

D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

E. Arrange fasteners and attachments to conceal from view.

F. Reinforce framing members for imposed loads.

G. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
   1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Comply with Department of Defense Antiterrorism Construction Standards, current edition.

C. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

D. Provide alignment attachments and shims to permanently fasten system to building structure.

E. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

F. Provide thermal isolation where components penetrate or disrupt building insulation.

G. Install sill and head flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Pressure Plate Framing: Install glazing in accordance with Section 08800, using glazing method required to achieve performance criteria.

J. Install perimeter sealant in accordance with Section 07900.

K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 1/2 inch and minimum of 1/4 inch.

3.04 MANUFACTURER'S FIELD SERVICES

A. See Section 01400 for general requirements for manufacturer observation of installation.

B. Provide curtain wall manufacturer's field surveillance of the installation. Monitor and report installation procedures, unacceptable conditions.

3.05 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

END OF SECTION

SECTION 09206

METAL LATH

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal lath for Portland cement and gypsum plaster.

B. Metal lath for portland cement plaster (Stucco).

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 05400 - Cold Formed Metal Framing: Metal studs and wall sheathing.

D. Section 09220 - Portland Cement Plaster (Stucco).

1.03 REFERENCE STANDARDS

A. ASTM C 847 - Standard Specification for Metal Lath; 2010.

B. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007.

C. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster; 2008.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data on metal lath and accessories, material limitations, and finish.

C. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Lath:
   1. Alabama Metal Industries Corporation: www.amico-online.com.
   2. Clark Western Building Systems: www.clarkwestern.com.
   3. Dietrich Metal Framing: www.dietrichindustries.com.
   4. United States Gypsum Company: www.usg.com.
   5. Substitutions: See Section 01600 - Product Requirements.

2.02 LATH

A. Diamond Mesh Metal Lath: ASTM C847, galvanized; self-furring.
   1. Weight: 3.4 lb/sq yd.
   2. Backed with treated paper.

B. Corner Mesh: Formed sheet steel, minimum 0.018 inch thick, perforated flanges shaped to

permit complete embedding in plaster, minimum 2 inch size; same finish as lath.

C. Strip Mesh: Expanded metal lath, same weight as lath, 2 inch wide x 24 inch long; same finish as lath.

D. Beads, Screeds, Joint Accessories, and Other Trim: Depth governed by plaster thickness, maximum possible lengths.
   1. Material: Formed galvanized sheet steel or zinc, expanded metal flanges.
   2. Casing Beads: Square edges.
   3. Corner Beads: Square corners.
   4. Base Screeds: Reveal-type as indicated.
   5. Control Joints: Accordion profile with protective tape, 2 inch flanges.

2.03 ACCESSORIES

A. Fasteners: ASTM C1002 self-piercing tapping screws.

B. Building Paper: No. 30 asphalt felt.

C. Tie Wire: Annealed galvanized steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that substrates are ready to receive work and conditions are suitable for application.

C. Do not begin until unacceptable conditions have been corrected.

D. If substrate preparation is the responsibility of another installer, notify Contracting Officer's Authorized Representative of unsatisfactory preparation before proceeding.

3.02 INSTALLATION - GENERAL

A. Install interior lath and furring in accordance with ASTM C841.

B. Install lath for plaster work in accordance with ASTM C 1063.

C. Install paper-backed lath over one layer of building paper.

3.03 CONTROL JOINTS

A. Control Joint Spacing: Maximum 10 feet on center and as indicated on drawings.

B. Install control joints.

3.04 LATH INSTALLATION

A. Apply metal lath taut, with long dimension perpendicular to supports.

B. Lap ends minimum 1 inch. Secure end laps with tie wire where they occur between supports.

C. Lap sides of diamond mesh lath minimum 1-1/2 inches.

D. Attach metal lath to metal supports using screws at maximum 6 inches on center.

E. Continuously reinforce internal angles with corner mesh, except where the metal lath returns 3 inches from corner to form the angle reinforcement; fasten at perimeter edges only.

F. Place corner bead at external wall corners; fasten at outer edges of lath only.

G. Place reveal-type base screeds at termination of plaster areas; secure rigidly in place.

H. Place 4 inch wide strips of metal lath centered over junctions of dissimilar backing materials. Secure rigidly in place.

I. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.

J. Place additional strip mesh diagonally at corners of lathed openings. Secure rigidly in place.

3.05 TOLERANCES

A. Maximum Variation from True Lines and Levels: 1/8 inch in 10 feet.

B. Maximum Variation from True Position: 1/8 inch.

END OF SECTION

SECTION 09220

PORTLAND CEMENT PLASTER (STUCCO)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Portland cement plaster (stucco) for installation over metal lath.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 05400 - Cold Formed Metal Framing: Structural metal framing and wall sheathing.

D. Section 07900 - Joint Sealers: Sealing of control joints.

E. Section 09206 - Metal Lath: Metal lath and accessories for portland cement plaster.

F. Section 09900 - Paints and Coatings: Paint finish for stucco.

1.03 REFERENCE STANDARDS

A. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster; 2006.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittals procedures.

B. Product Data: Provide data on plaster materials, characteristics and limitations of products specified.

C. Samples: Submit two samples, 12 x 12 inch in size illustrating finish color and texture.

D. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years of experience.

B. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.06 MOCK-UP

A. Construct mock-up of exterior wall surface, minimum size 4'-0" x 4'-0", illustrating surface finish.

B. Locate where directed.

C. Mock-up may not remain as part of the Work.

1.07 FIELD CONDITIONS

A. Do not apply plaster when substrate or ambient air temperature is under 50 degrees F or over 80 degrees F.

B. Maintain minimum ambient temperature of 50 degrees F during installation of plaster and until cured.

PART 2 PRODUCTS

2.01 PLASTER MATERIALS

A. Portland Cement, Aggregates, and Other Materials: In accordance with ASTM C 926, except as indicated below.

B. Premixed Base Coat: Equivalent to "Portland Cement-Lime Plaster" manufactured by United States Gypsum Company: www.usg.com.

C. Premixed Finish Coat: Equivalent to "BONSAL Marblesil Stucco Mix" manufactured by Bonsal American: www.bonsalamerican.com.

D. Water: Clean, fresh, potable and free of mineral or organic matter that could adversely affect plaster.

E. Admixture: Equivalent to "BONSAL 118 Primer/Admixture" manufactured by Bonsal American: www.bonsalamerican.com.

2.02 METAL LATH

A. Metal Lath and Accessories: As specified in Section 09206.

B. Beads, Screeds, and Joint Accessories: As specified in Section 09206.

2.03 PLASTER MIXES

A. Over Metal Lath: Three-coat application, mixed and proportioned in accordance with manufacturer's instructions.

B. Premixed Plaster Materials: Mix in accordance with manufacturer's instructions.

C. Mix only as much plaster as can be used prior to initial set.

D. Add admixture to all coats to increase bond strength and water resistance.
   1. Dilute admixture for each coat in accordance with manufacturer's recommendations.

E. Protect mixtures from freezing, frost, contamination, and excessive evaporation.

F. Do not retemper mixes after initial set has occurred.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify the suitability of existing conditions before starting work.

B. Metal Lath and Accessories: Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are in place.

C. Mechanical and Electrical: Verify services within walls have been tested and approved.

3.02 PLASTERING

A. Apply premixed plaster in accordance with manufacturer's instructions.

B. Apply plaster in accordance with ASTM C926.

C. Three-Coat Application Over Metal Lath:
   1. Apply first coat to a nominal thickness of 5/16 inch.
   2. Apply second coat to a nominal thickness of 5/16 inch.
   3. Apply finish coat to a nominal thickness of 1/8 inch.

D. Apply second coat immediately following initial set of first coat.

E. Cure base coats in accordance with admixture manufacturer's recommendations.

F. After curing, dampen previous coat prior to applying finish coat.

G. Finish Texture: Float to a consistent "sand-float texture" finish.
   1. Use wood floats.

H. Avoid excessive working of surface.

I. Cure finish coat in accordance with admixture manufacturer's recommendations.

3.03 TOLERANCES

A. Maximum Variation from True Flatness: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09260

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Metal channel ceiling framing.

D. Gypsum sheathing.

E. Gypsum wallboard.

F. Glass-mat-faced gypsum wallboard.

G. Coated glass-mat-faced gypsum backing board.

H. Joint treatment and accessories.

I. Textured finish system.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 05400 - Cold Formed Metal Framing: Exterior wind-load-bearing metal stud framing and glass-mat-faced exterior wall sheathing and soffit board.

D. Section 06100 - Rough Carpentry: Wood blocking product and execution requirements.

E. Section -07214 Foamed-in-Place Insulation: Applied in stud cavities.

F. Section 07840 - Firestopping

G. Section 07900 - Joint Sealers: Acoustic sealant.

H. Section 09300 - Tile.

I. Section 09900 - Paints and Coatings.

1.03 REFERENCE STANDARDS

A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2009a.

C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2002 (Reapproved 2007).

D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2009a.

E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2006.

F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2009a.

G. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2008.

H. ASTM C 954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2007.

I. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007.

J. ASTM C 1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2009.

K. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2009a.

L. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction; 2005.

M. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

N. ASTM E 413 - Classification for Rating Sound Insulation; 2004.

O. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2010.

P. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association; 2008.

Q. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data on metal framing, gypsum board, accessories, joint finishing system, glass mat faced gypsum board, accessories, and joint finishing system.

C. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

D. Test Reports: For all stud framing products that do not comply with ASTM C645 or C 754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

E. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches in size, illustrating finish color and texture.

F. LEED Submittals:
   1. For gypsum wallboard, submit documentation of recycled content and location of manufacture.
   2. For steel products, submit documentation of steel mill process, location of mill, and location of manufacture.

G. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 3 years of documented experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
   1. See PART 3 for finishing requirements.

B. Interior Partitions Indicated as Acoustic: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

C. Fire Rated Assemblies: Provide completed assemblies complying with applicable code.
   1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

2.02 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
   2. Dietrich Metal Framing: www.dietrichindustries.com.
   3. Marino\Ware: www.marinoware.com.
   4. The Steel Network, Inc: www.SteelNetwork.com.
   5. Telling Industries: www.tellingindustries.com.
   6. Substitutions: See Section 01600 - Product Requirements.

B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
   1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
      a. Acceptable Products:
         1) Dietrich Metal Framing; UltraSteel (tm): www.dietrichindustries.com.
         2) Clark Western Building Systems; UltraSteel (tm): www.clarkwestern.com.
   2. Studs: "C" shaped with flat or formed webs with knurled faces.
   3. Runners: U shaped, sized to match studs.
   4. Ceiling Channels: C shaped.
   5. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
   6. Resilient Furring: 1/2-inch deep, 0.020-inch thick, asymmetrical, with face attached to single flange by a slotted leg; designed to reduce sound transmission.
   7. Drywall Grid Hanging and Framing Systems: Equivalent to Armstrong "Drywall Grid System," with HD8906 main beams (flange width: 1-1/2 inches; web height: 1-11/16 inches).

C. Loadbearing Studs for Application of Gypsum Board: As specified in Section 05400.

D. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

E. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
   2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.
   3. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems of fire rating and movement required.
   4. Deflection and Firestop Track:
      a. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-rating of the wall assembly.
   5. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet.

6. Acceptable Products: VertiClip(r) or VertiTrack(tm) manufactured by The Steel Network Inc.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. CertainTeed Corporation: www.certainteed.com.
   2. Georgia-Pacific Gypsum LLC: www.gp.com/gypsum.
   3. National Gypsum Company: www.nationalgypsum.com.
   4. USG Corporation: www.usg.com.
   5. Substitutions: See Section 01600 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces, unless otherwise indicated.
      a. Glass-mat-faced gypsum panels shall be used at interior faces of exterior walls, except where coated glass-mat-faced gypsum backing board is required beneath tile finishes.
   2. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   3. Thickness:
      a. Vertical Surfaces: 5/8 inch.
      b. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
   4. Paper-Faced Products:
      a. CertainTeed Corporation; ProRoc Brand Gypsum Board.
      b. Georgia-Pacific Gypsum LLC; ToughRock Gypsum Wallboard.
      c. National Gypsum Company; Gold Bond Brand Gypsum Wallboard.
      d. USG Corporation; Sheetrock Brand Gypsum Panels.
      e. Substitutions: See Section 01600 - Product Requirements.
   5. Glass-Mat-Faced Products:
      a. Georgia-Pacific Gypsum LLC; DensArmor Plus.
      b. Substitutions: See Section 01600 - Product Requirements.

C. Backing Board For Wet Areas:
   1. Application: Surfaces behind tile.
   2. Glass-Mat-Faced Board: Coated glass-mat water-resistant gypsum backing panel as defined in ASTM C 1178.
      a. Standard Type: Thickness 5/8 inch.
      b. Fire-Resistant Type: Type X core, thickness 5/8 inch.
      c. Products:
         1) Georgia-Pacific Gypsum LLC; DensShield Tile Backer.
         2) Substitutions: See Section 01600 - Product Requirements.

D. Ceiling Board: Special sag-resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Ceilings, unless otherwise indicated.
   2. Thickness: 1/2 inch.
   3. Edges: Tapered.
   4. Products:
      a. CertainTeed Corporation; ProRoc Interior Ceiling.
      b. Georgia-Pacific Gypsum LLC; ToughRock CD Ceiling Board.
      c. National Gypsum Company; High Strength Brand Ceiling Board.
      d. USG Corporation; Sheetrock Brand Sag-Resistant Interior Gypsum Ceiling Board.
      e. Substitutions: See Section 01600 - Product Requirements.

E. Exterior Sheathing Board: As specified in Section 05400.

F. Exterior Soffit Board: As specified in Section 05400.
   1. Application: Ceilings and soffits in protected exterior areas, unless otherwise indicated.

2. Types: Regular, in locations indicated.
3. Regular Type Thickness: 1/2 inch.
4. Edges: Tapered.
5. Products:
   a. CertainTeed Corporation; ProRoc Brand Exterior Soffit Board.
   b. Georgia-Pacific Gypsum LLC; ToughRock Soffit Board.
   c. National Gypsum Company; Gold Bond Brand Exterior Soffit Board.
   d. USG Corporation; Sheetrock Exterior Gypsum Ceiling Board.
   e. Substitutions: See Section 01600 - Product Requirements.

2.04 ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.

B. Acoustic Sealant: As specified in Section 07900.

C. Finishing Accessories: ASTM C 1047, galvanized steel or rolled zinc, unless otherwise indicated, with either knurled and perforated or expanded flanges, and beaded for concealment of flanges in joint compound.
   1. Types: Provide corner beads, L-type edge-trim beads, LC-type edge-trim beads, and one-piece control joint beads.
   2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.

D. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, for use on glass-mat-faced substrates.
   2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
   3. Ready-mixed vinyl-based joint compound.
   4. Chemical hardening type compound.

E. Textured Finish Materials: Vinyl-based compound; capable of producing a moderate-to-bold orange peel texture. Use on all visible interior gypsum board wall surfaces.
   1. Product: Equivalent to Sheetrock Brand Wall and Ceiling Spray Texture manufactured by United States Gypsum Company: www.usg.com.

F. Textured Finish Substrate Primer: Low VOC latex, equivalent to Sherwin-Williams ProGreen 200 Interior Latex Primer.

G. Screws for Attachment to Steel Members Less Than 0.03 inch In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.

H. Screws for Attachment to Steel Members From 0.033 to 0.112 Inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

I. Anchorage to Substrate: Tie wire, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as permitted by standard.
   1. Level ceiling system to a tolerance of 1/600.
   2. Laterally brace entire suspension system.
   3. Install bracing as required at exterior locations to resist wind uplift.

C. Studs: Space studs at 16 inches on center.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
   3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Acoustic Furring: Install resilient channels at maximum 24 inches on center. Locate joints over framing members.

F. Blocking: Install wood blocking for support of:
   1. Framed openings.
   2. Wall mounted cabinets.
   3. Plumbing fixtures.
   4. Toilet partitions.
   5. Toilet accessories.
   6. Wall mounted door hardware.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install as follows:
   1. Place one bead continuously on substrate before installation of perimeter framing members.
   2. Place continuous bead at perimeter of each layer of gypsum board.
   3. In non-fire-rated construction, seal around all penetrations by conduit, pipe, ducts, and rough-in boxes.

3.04 BOARD AND GLASS MAT FACED BOARD INSTALLATION

A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing

or furring members. Offset joints of second layer from joints of first layer.

D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

E. Glass-Mat-Faced Gypsum Board: Use glass-mat-faced gypsum board at exterior walls and at other locations as indicated.

F. Glass-Mat-Faced Soffit Board: Install perpendicular to framing, with staggered end joints over framing members or other solid backing.

G. Installation on Metal Framing: Use screws for attachment of all gypsum board.

H. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

I. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum soffit board with sealant.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints at locations indicated, or if not indicated, consistent with lines of building spaces and as follows:
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where edge of gypsum board would otherwise be exposed or semi-exposed. Provide type with face flange to receive joint compound.
   1. Install "L" bead where work is tightly abutted to other construction.
   2. Install "LC" bead where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).
   3. Semi-finishing edge trim will not be allowed.

3.06 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 3: Walls to receive textured wall finish.
   3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   4. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
   3. Taping, filling and sanding is not required at base layer of double layer applications.

3.07 TEXTURE FINISH

A. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.
   1. Texture Required: Orange peel.
   2. Location: All vertical surfaces.
   3. Substrate Priming: Prior to application of textured finish, prime prepared drywall surfaces with a low-VOC latex primer.

4. Painting: After textured finish has dried, it shall be overpainted with a low-VOC latex paint system specified in Section 09900 - Paints and Coatings.

3.08 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09300

TILE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Tile for wall applications.

C. Tile for wall base applications.

D. Coated glass mat backer board as tile substrate.

E. Stone thresholds.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED certification Procedures: Leed credits relating to regionally-sourced and recycled-content materials.

B. Section 1600 - Product Requirements: LEED-related product requirements.

C. Section 07900 - Joint Sealers.

D. Section 09260 - Gypsum Board Assemblies: Installation of light gage metal framing and coated glass-mat-faced gypsum backing board used as a wall tile substrate.

1.03 REFERENCE STANDARDS

A. ANSI A108 Series/A118 Series/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2009.
   1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2005.
   2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar; 1999 (R2005).
   3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex Portland Cement Mortar; 1999 (R2005).
   4. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 1999 (R2005).
   5. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (R2005).
   6. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999 (R2005).
   7. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (R2005).
   8. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (R2005).
   9. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (R2005).
   10. ANSI A118.4 - American National Standard Specifications for Latex-Portland Cement Mortar; 1999 (R2005).
   11. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 1999 (R2005).
   12. ANSI A118.7 - American National Standard Specifications for Polymer Modified Cement Grouts for Tile Installation; 1999 (R2005).

B. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2008.

C. TCNA (HB) - Handbook for Ceramic Tile Installation; Tile Council of North America, Inc.; 2010.

1.04 SUBMITTALS

A. See Section 01300 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout.

D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 x 18 inches in size illustrating pattern, color variations, and grout joint size variations.

E. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

F. LEED Submittal: Documentation of recycled content and location of manufacture.

1.05 QUALITY ASSURANCE

A. Maintain one copy of The Tile Council of North America Handbook and ANSI A108 Series/A118 Series on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum 5 years of documented experience.

C. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.

1.06 FIELD CONDITIONS

A. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.01 TILE

A. Manufacturers: All products of each type by the same manufacturer.
   1. Design Basis: Refer to drawings for acceptable manufacturers.
   2. Substitutions: See Section 01600 - Product Requirements.

B. Tile: Provide types as indicated on drawings.
   1. Size and Shape: As indicated on drawings.
   2. Finish: As indicated on drawings.
   3. Colors: As indicated on drawings.
   4. Trim Units: Matching bullnose, cove, and base shapes in sizes coordinated with field tile.

2.02 TRIM AND ACCESSORIES

A. Thresholds: Marble, white, honed finish; 2 inches wide by full width of wall or frame opening; 1/2 inch thick; beveled one long edge with radiused corners on top side; without holes, cracks, or open seams.
   1. Applications: Provide at the following locations:
      a. At doorways where tile terminates.
      b. At open edges of floor tile where adjacent finish is a different height.

2.03 MORTAR MATERIALS

A. Manufacturers:
   1. ProSpec, an Oldcastle brand; Permalastic System: www.prospec.com.

2. Bonsal American, Inc; Permalastic System: www.prospec.com
3. Bostik Inc: www.bostik-us.com.
4. Custom Building Products: www.custombuildingproducts.com.
5. Mapei Corporation: www.mapei.com.
6. Substitutions: See Section 01600 - Product Requirements.

B. Mortar Bond Coat Materials:
1. Latex-Portland Cement type: ANSI A118.4.

2.04 GROUT MATERIALS

A. Standard Grout: Any type specified in ANSI A118.6 or A118.7.

B. Epoxy Grout: ANSI A118.3
1. Design Basis: "Kerapoxy" premium-grade, water-cleanable, 100% solids, high-strength epoxy mortar and chemical-resistant non-sagging grout system, manufactured by Mapei Corp: www.mapei.com.
2. Colors: As indicated on drawings.

2.05 ACCESSORY MATERIALS

A. Thin-Set Waterproofing/Crack Isolation Sheet: Composite sheet membrane manufactured from Chlorinated Polyethylene (CPE), with non-woven polyester laminated to both sides with a nominal thickness of 0.8 mm (.030 inch).
1. Acceptable Product: "Noble Seal TS" as manufactured by The Noble Company, www.noblecompany.com; or approved equivalent
2. Accessories: As recommended by manufacturer of waterproofing membrane, equivalent to the following:
a. Sealant: "NobleSealant 150"
b. Preformed Outside (Dam) Corners: Special CPE pieces designed to flash outside corners.

B. Coated Glass-Mat-Faced Gypsum Backing Board: As specified in Section 09260.

C. Uncoupling Membrane: 1/8 inch thick polyurethane matting with three-dimensional grid structure with dovetail shaped cavities and fleece webbing laminated to the underside to provide a mechanical bond to the substrate adhesive (DITRA).

D. Coated Glass Mat Backer Board: ASTM C1178/C1178M, with coated inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.

E. Mesh Tape: 2-inch wide self-adhesive fiberglass mesh tape.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Install tile backer board in strict accordance with manufacturer's instructions, using galvanized roofing nails or corrosion-resistant bugle head drywall screws. Bed fiberglass self-adhesive tape at all joints and corners with material used to set tiles.

3.03 INSTALLATION - GENERAL

A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and The Tile Council of North America Handbook recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

E. Form internal angles square and external angles bullnosed.

F. Install thresholds where indicated.

G. Sound tile after setting. Replace hollow sounding units.

H. Keep expansion joints free of adhesive or grout. Apply sealant to joints.

I. Allow tile to set for a minimum of 48 hours prior to grouting.

J. Grout tile joints. Use standard grout unless otherwise indicated.

K. Apply sealant to grout joints and to junction of tile and dissimilar materials and junction of dissimilar planes.

3.04 INSTALLATION - FLOORS - THIN-SET METHODS

A. Over interior concrete substrates, install in accordance with The Tile Council of North America Handbook Method F113, dry-set or latex-Portland cement bond coat, with standard grout.
   1. Use uncoupling membrane under all tiles
   2. Turn waterproofing/crack isolation membrane up 4 inches at adjacent walls scheduled to receive tile wall base, and embed it in latex-portland cement mortar. Use membrane manufacturer's standard preformed outside corners, and seal all joints in membrane.

3.05 INSTALLATION - WALL TILE

A. Over coated glass mat gypsum board on studs, install in accordance with The Tile Council of North America Handbook Method W245.

3.06 CLEANING

A. Clean tile and grout surfaces.

3.07 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09511

SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical units.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 07900 - Joint Sealers: Acoustical sealant.

1.03 REFERENCE STANDARDS

A. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2009b.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2008.

C. ASTM E 580/E 580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2009a.

D. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products; 2008.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data on suspension system components and acoustical units.

C. Samples: Submit two samples at least 4 x 8 inch in size illustrating material and finish of acoustical units.

D. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner, and perimeter molding.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

F. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.07 PROJECT CONDITIONS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustical units after interior wet work is dry.

1.08 EXTRA MATERIALS

A. Provide 100 sq ft of each type of acoustical unit for Owner's use in maintenance of project.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

A. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Acoustical Units - General: ASTM E1264, Class A.

C. Acoustical Panels (Type LT-1): As indicated on drawings
   1. Design Basis: "USG Interiors, 562 Fissured" manufactured by USG: www.usg.com.
   2. Size: 24' x 48' x 5/8".
   3. Edge: Square.
   4. NRC: 0.55.
   5. Ceiling Attenuation Class (CAC): 35.
   6. Light Reflectance: 0.81.
   7. Color: White

2.02 SUSPENSION SYSTEM(S)

A. Manufacturers:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. Chicago Metallic Corporation: www.chicagometallic.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01600 - Product Requirements.

B. Suspension Systems - General: ASTM C635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Exposed Steel Suspension System: Formed hot-dipped galvanized steel, commercial quality cold rolled; intermediate-duty.
   1. Profile: Tee; 15/16 inch wide face.
   2. Construction: Double web.
   3. Finish: White painted.
   4. Design Basis: "Donn-DX Grid" manufactured by USG: www.usg.com.

2.03 ACCESSORIES

A. Support Channels and Hangers: Hot-dipped Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

C. Acoustical Sealant For Perimeter Moldings: Specified in Section 07900.

D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Locate system on room axis according to reflected plan.

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

I. Do not eccentrically load system or induce rotation of runners.

J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Install in bed of acoustical sealant.
   2. Use longest practical lengths.
   3. Overlap and rivet corners.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.

G. Where round obstructions and bullnose concrete block corners occur, provide preformed closures to match perimeter molding.

H. Install hold-down clips on panels within 10 ft of an exterior door.

3.04 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09900

PAINTS AND COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, varnishes, and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Exposed surfaces of steel lintels and ledge angles.
   3. Prime surfaces to receive wall coverings.
   4. Mechanical and Electrical:
      a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Non-metallic roofing and flashing.
   6. Stainless steel, anodized aluminum, bronze, terne, and lead items.
   7. Floors, unless specifically so indicated.
   8. Ceramic and other tiles.
   9. Glass.
   10. Concealed pipes, ducts, and conduits.

E. See Schedule - Surfaces to be Finished, at end of Section.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED rating system definition.

B. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced, recycled-content, and low-emitting materials.

C. Section 01600 - Product Requirements: LEED-related product requirements.

D. Section 03356 - Concrete Floor Finishing: Concrete floor sealer.

E. Section 05500 - Metal Fabrications: Shop-primed items.

F. Section 06200 - Finish Carpentry: Wood trim.

G. Section 08110 - Steel Doors and Frames: Shop-primed items.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2008.

C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

D. GreenSeal GS-11 - Paints; 1993.

E. USGBC LEED-NC - LEED Green Building Rating System for New Construction and Major Renovations; U.S. Green Building Council; 2009.

1.04 DEFINITIONS

A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.05 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data on all finishing products, including VOC content.

C. Samples: Submit two paper chip samples illustrating range of colors available for each surface finishing product scheduled.

D. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.

E. Certification: By manufacturer that all paints and coatings do not contain any of the prohibited chemicals specified; GreenSeal GS-11 certification is not required but if provided shall constitute acceptable certification.

F. LEED Submittals/Reports: VOC content of all interior opaque coatings actually used. Provide additional LEED-related product information as required to support LEED certification goals of Project.

G. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.

H. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints, Primer Sealers, and Block Fillers:
   1. Glidden Professional: www.gliddenprofessional.com.
   2. Benjamin Moore & Co: www.benjaminmoore.com.
   3. PPG Architectural Finishes, Inc: www.ppgaf.com.
   4. The Sherwin-Williams Company; www.sherwin-williams.com.

C. Substitutions: See Section 01600 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each coating material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
   1. Provide coatings that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
      b. USGBC LEED-NC Rating System, Version 2.2, EQ Credit 4.2; for interior wall and ceiling finish (all coats), anti-corrosive paints on interior ferrous metal, clear wood stains and finishes, sanding sealers, other sealers, shellac, and floor coatings.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

2.03 PAINT SYSTEMS - EXTERIOR

A. Portland Cement Plaster (Stucco), Opaque, 100% Acrylic, Elastomeric, Waterproof Coating, 2 Coat:
   1. Two coats of Thorolastic "Fine" Texture Elastomeric Coating as manufactured by BASF Building Systems: www.basfbuildingsystems.com, or approved equivalent; applied to achieve a total dry-film thickness (DFT) of 16-20 mils.

B. Ferrous Metals, Primed, Latex, 2 Coat:
   1. Touch-up with waterborne acrylic metal primer; Devflex 4020PF.
   2. Semi-gloss: Two coats of waterborne 100% acrylic latex, Dulux Professional 2406.

C. Galvanized Metals and Aluminum, Latex, 3 Coat:
   1. One coat 100% acrylic latex primer; Dulux Professional 2000.
   2. Semi-gloss: Two coats of waterborne 100% acrylic latex; Dulux Professional 2406.

D. Pavement Marking Paint:
   1. White or Yellow: One coat; Permanent Traffic Paint complying with Florida DOT requirements.
      a. Use white on asphalt surfaces, yellow on concrete surfaces.

2.04 PAINT SYSTEMS - INTERIOR

A. Wood, Opaque, Latex, 3 Coat:
   1. One coat of latex primer sealer; S-W PrepRite Classic Interior Latex Primer.
   2. Semi-gloss: Two coats of low-VOC latex; S-W ProGreen 200.

B. Wood, Transparent, Varnish, Stain:
   1. Filler coat.
   2. One coat of stain; Woodpride Interior Wood Finishing Stain 1700 Series.
   3. Satin: Two coats of varnish; Woodpride Interior Waterborne Satin Varnish 1802-0000.

C. Ferrous Metals, Primed, Latex, 2 Coat:
   1. Touch-up with latex primer sealer; S-W PrepRite Classic Interior Latex Primer.
   2. Semi-gloss: Two coats of low-VOC latex; S-W ProGreen 200.

D. Galvanized Metals and Aluminum, Latex, 3 Coat:
   1. One coat of latex primer sealer; S-W PrepRite Classic Interior Latex Primer.
   2. Semi-gloss: Two coats of low-VOC latex; S-W ProGreen 200.

E. Gypsum Board/Glass Mat Faced Gypsum Board/Plaster/Textured Finishes, Low-VOC Latex-Acrylic, 3 Coat:
   1. One coat of low-VOC latex primer sealer; S-W ProGreen 200 Interior Latex Primer.
   2. Orange peel : Two coats of low-VOC latex; S-W ProGreen 200.
      a. Provide orange peel finish at all vertical surface, except where otherwise noted.
   3. Satin: Two coats of low-VOC latex; S-W ProGreen 200.

F. Fire-Retardant Coating, Intumescent:
   1. One coat of fire-retardant primer sealer.
   2. Gloss: Two coats of intumescent coating, flame/smoke rating of 25/50.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.
   3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

H. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

I. Asphalt or Bituminous Surfaces to be Painted: Remove foreign particles to permit adhesion of finishng materials.

J. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

K. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

L. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

M. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

N. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

O. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

P. Metal Doors to be Painted: Prime and paint metal door top and bottom edge surfaces to match face of door.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's instructions.

C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance.

F. Number of coats indicated is the minimum number of coats to be provided. Full coverage is required for each coat. Provide additional coats as necessary to provide full coverage or dry film thicknesses indicated.

G. Sand wood and metal surfaces lightly between coats to achieve required finish.

H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 SCHEDULE - SURFACES TO BE FINISHED

A. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically noted.
   2. Fire rating labels, equipment serial number and capacity labels.
   3. Stainless steel items.
   4. Insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports occurring in mechanical or electrical rooms or other utilitarian spaces.

B. Paint the surfaces described in PART 2, Paint Systems Articles.

C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
   1. Paint all equipment, including that which is factory-finished, exposed to weather or to view on the roof and outdoors.
   2. Paint shop-primed items occurring in finished areas.

3. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
4. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

D. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

END OF SECTION

SECTION 10100

VISUAL DISPLAY BOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Markerboards.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

1.03 REFERENCE STANDARDS

A. ANSI A135.4 - American National Standard for Basic Hardboard; 2004.

B. ASTM A424 - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2009a.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.

C. Shop Drawings: Indicate wall elevations, dimensions, joint locations, special anchor details.

D. Samples: Submit color charts for selection of color and texture of markerboard, tackboard, tackboard surface covering, and trim.

E. Manufacturer's printed installation instructions.

F. Maintenance Data: Include data on regular cleaning, stain removal.

G. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years experience.

1.06 WARRANTY

A. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining; and any other material or labor defects.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Visual Display Boards:
   1. MooreCo, Inc\Best-Rite: www.moorecoinc.com.
   2. Claridge Products and Equipment, Inc: www.claridgeproducts.com.
   3. Polyvision Corporation (Nelson Adams): www.polyvision.com.
   4. Substitutions: See Section 01600 - Product Requirements.

2.02 VISUAL DISPLAY BOARDS

A. Markerboards: Porcelain enamel on steel, laminated to core.
   1. Color: White.
   2. Metal Face Sheet Thickness: 0.024 inch (24 gage).

3. Core: Particleboard, manufacturer's standard thickness, laminated to face sheet.
4. Backing: Aluminum foil, laminated to core.
5. Size: As indicated on drawings.
6. Frame: Extruded aluminum, with concealed fasteners.
7. Frame Finish: Anodized, natural.

2.03 MATERIALS

A. Porcelain Enameled Steel Sheet: ASTM A424, Type I, Commercial Steel, with fired-on vitreous finish.

B. Hardboard for Cores: AHA A135.4, Class 1 - Tempered, S2S (smooth two sides).

C. Foil Backing: Aluminum foil sheet, 0.005 inch thick.

D. Aluminum Sheet Backing: 0.015 inch thick.

E. Adhesives: Type used by manufacturer.

2.04 ACCESSORIES

A. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.

B. Cleaning Instruction Plate: Provide instructions for chalkboard cleaning on a metal plate fastened to perimeter frame near chalkrail.

C. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install boards in accordance with manufacturer's instructions.

B. Secure units level and plumb.

C. Butt Joints: Install with tight hairline joints.

3.02 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.

B. Cover with protective cover, taped to frame.

C. Remove temporary protective cover at date of Substantial Completion.

END OF SECTION

SECTION 10170

PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Urinal screen.

1.02 RELATED REQUIREMENTS

A. Section 06100 - Rough Carpentry: Blocking and supports.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.04 SUBMITTALS

A. Shop Drawings: Indicate partition plan, elevation views, dimensions, & details of wall supports.

B. Product Data: Provide data on panel construction, hardware, and accessories.

C. Samples: Submit two samples of partition panels, 6 x 6 inch in size illustrating panel finish, color, and sheen.

D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Urinal Screen:
   1. Ampco Products, Inc: www.ampco.com.
   2. Metpar Corp: www.metpar.com.
   3. Scranton Products (Santana/Comtec/Capital): www.scrantonproducts.com.

2.02 COMPONENTS

A. Urinal Screen: Solid molded high density polyethylene (HDPE) plastic panel. Wall mounted with two panel brackets.

2.03 ACCESSORIES

A. Wall Brackets: (2), polished stainless steel.

B. Attachments, Screws, and Bolts: Stainless steel, tamper proof type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install panel secure, rigid, plumb, and level in accordance with manufacturer's instructions.

B. Attach panel brackets securely to walls using anchor devices fastened into solid blocking.

3.03 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

A. Adjust components for consistency of line or plane.

END OF SECTION

SECTION 10210

WALL LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 07900 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2005.

B. AMCA 511 - Certified Ratings Program for Air Control Devices; Air Movement and Control Association International, Inc.; 2010.

C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2008.

D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2007.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.

D. Samples: Submit two samples illustrating finish and color of exterior surfaces.

E. Test Reports: Independent agency reports showing compliance with specified performance criteria.

F. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.06 PROJECT CONDITIONS

A. Coordinate work of this section with installation of masonry flashings.

B. Coordinate work of this section with installation of mechanical ductwork.

1.07 WARRANTY

A. Provide twenty year manufacturer warranty against distortion, metal degradation, and failure of connections.
   1. Finish: Include coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wall Louvers:
   1. Airolite Company, LLC: www.airolite.com.
   2. American Warming and Ventilating: www.awv.com.
   3. Arrow United Industries: www.arrowunited.com.
   4. Construction Specialties, Inc: www.c-sgroup.com.
   5. Industrial Louvers Inc.: www.industriallouvers.com.
   6. Substitutions: See Section 01600 - Product Requirements.

2.02 LOUVERS

A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified under AMCA 511.
   1. Wind Load Resistance: Design to resist positive and negative wind load as required by code without damage or permanent deformation.
   2. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
   3. Screens: Provide bird screens at louvers.

B. Functional Stationary Louvers at Walls: Horizontal blade, extruded aluminum construction, with concealed intermediate mullions.
   1. Free Area: 50 percent, minimum.
   2. Blades: Drainable.
   3. Frame: 8 inches deep, channel profile; corner joints mitered and welded, with continuous recessed caulking channel each side.
   4. Metal Thickness: Frame 0.081 inch; front blade 0.081 inch; back blade 0.063 inch..
   5. Finish: Fluoropolymer coating, finished after fabrication.
   6. Color: Color to match adjacent exterior wall color.
   7. Product: Equivalent to Airolite Model SCH8 Storm Class Louver.

2.03 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T5 temper,.

B. Bird Screen: Interwoven wire mesh of steel, 0.063 inch diameter wire, 1/2 inch open weave, diagonal design.

C. Polyvinylidene Fluoride Coating: Minimum 70 percent Kynar 500/Hylar 500 resin, two coat finish, complying with AAMA 2605.

2.04 ACCESSORIES

A. Blank-Off Panels: Aluminum face and back sheets, polyisocyanurate foam core, 2 inch thick; provide where duct connected to louver is smaller than louver frame, sealing off louver area outside duct. Finish exterior side of blank-off panels to match louver color.

B. Screens: Frame of same material as louver, with mitered and welded corners; removable, screw attached; installed on inside face of louver frame.

C. Fasteners and Anchors: Stainless steel.

D. Flashings: Of same material as louver frame, extruded to required shape, single length in one piece per location.

E. Sealant: Type as specified in Section 07900.

F. Bituminous Paint: Cold-applied asphalt emulsion.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive work and opening dimensions are as indicated on shop drawings.

B. Verify that field measurements are as indicated.

3.02 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.

B. Install louvers level and plumb.

C. Protect aluminum surfaces from corrosion or galvanic action by applying a heavy coat of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

D. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

E. Secure louver frames in openings with concealed fasteners.

F. Install perimeter sealant and backing rod in accordance with Section 07900.

3.03 CLEANING

A. Strip protective finish coverings.

B. Clean surfaces and components.

END OF SECTION

SECTION 10260

WALL AND CORNER GUARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Corner guards.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

1.03 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Indicate physical dimensions, features, anchorage details, and rough-in measurements.

C. Samples: Submit two sections of corner guard, 12 inch long, illustrating component design, configuration, color and finish.

D. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

E. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.04 PROJECT CONDITIONS

A. Coordinate the work with wall or partition sections for installation of concealed blocking or anchor devices.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wall and Corner Guards:
   1. Arden Architectural Specialties, Inc: www.ardenarch.com.
   2. Boston Retail: www.bostonretail.com.
   3. Construction Specialties, Inc: www.c-sgroup.com.
   4. InPro Corporation: www.inprocorp.com.
   5. Pawling Corporation: www.pawling.com.
   6. Substitutions: See Section 01600 - Product Requirements.

2.02 COMPONENTS

A. Corner Guard - Surface Mounted: One-piece unit, installed with adhesive.
   1. Material: Type 304 stainless steel, No. 4 finish, 16 gage.
      a. Size: 3-1/2 inches wide, 5'-0" length.
      b. Location: Provide at all outside corners of interior walls in Food Service areas and elsewhere as indicated.
   2. Material: Polycarbonate, minimum thickness 0.080 inch.
      a. Size: 2 inches wide, 5'-0" length.
      b. Finish: Embossed matte finish.
      c. Color: Gray (exact color to be selected by Contracting Officer's Representative).
      d. Location: Provide at all outside corners of interior walls except for walls in Food Service areas or where otherwise indicated.

B. Attachment Hardware: Appropriate to component and substrate.

2.03 FABRICATION

A. Fabricate components with tight joints, corners and seams.

B. Pre-drill holes for attachment.

C. Form end trim closure by capping and finishing smooth.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.

3.02 TOLERANCES

A. Maximum Variation From Required Height: 1/4 inch.

B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

END OF SECTION

SECTION 10425

SIGNS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Engraved door signage.

B. Cast bronze plaque (AF/CI).

C. Flat aluminum plaques (for building numbers).

D. Building and site signage (AF/CI).

1.02 RELATED SECTIONS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

1.03 QUALITY ASSURANCE

A. Uniformity of Manufacturer: For each sign form and graphic image process indicated, furnish products of a single manufacturer.

B. Design Criteria: The specifications and/or drawings indicate sizes and styles of signs and are based on the specific types and models indicated. Signs by other manufacturers may be considered provided that deviations in dimensions and profiles are minor and do not change the design concept as judged by the Contracting Officer. The burden of proof of equality is on the proposer.
   1. AAFES signage standards will be the design criteria, unless indicated otherwise.
   2. Comply with DoD Unified Facilities Criteria (UFC) 3-120-01 Sign Standard.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.

C. Samples: Submit samples of each sign form and material showing finishes, colors, surface textures and qualities of manufacture and design of each sign component including graphics.

D. Shop Drawings: Submit shop drawings for fabrication and erection of signs. Include plans, elevations, message list for each sign required, and large scale details of sign wording and lettering layout. Show anchorages and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.

E. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

PART 2 - PRODUCTS

2.01 ENGRAVED DOOR SIGNAGE

A. General: Door signage shall be equivalent to the following types as manufactured by Andco Industries Corp., Greensboro, NC. phone 1-800-476-8900. All engraving shall be incised 1/32" minimum. All signage shall also have Grade 2 Braille messages.

1. Types H, & T: 1400 Series, manufactured from 1/16" thick plastic engraving stock with message engraved through first layer to expose contrasting color of the inner core of the engraving stock, and with raised Braille message.
    a. Size: 6" x 6" with square edges.
    b. Colors: As selected from manufacturer's standards. Submit actual samples of signage units with samples of color selections.
    c. Mounting Method: Screw-mounted, 4 per sign.
    d. Locations: Locate "Toilet Symbol" signage at each Toilet Room. Locate "Woman Symbol" signage at each Womens Toilet. Locate "Handicap Symbol" signage at each toilet accessible to the handicapped, beneath “Toilet” symbol. Provide identification for “Men” at men’s toilets and for “Women” at women’s toilets.

2.02 CAST METAL PLAQUES (AF/CI)

A. Product/Manufacturer: AAFES will furnish and Contractor shall install one cast bronze plaque at location as directed by Contracting Officer. Cast plaque will be equal to "Standard Plaque" as manufactured by Andco Industries, Inc., Greensboro, NC, phone 1-800-476-8900, and shall have the following features:
    1. Size: 8 inches high x 15 inches wide x 3/8 inch thick. Mount 60” a.f.f.
    2. Mounting Method: Concealed fasteners.

2.03 FLAT ALUMINUM PLAQUE

A. Provide a 1/8” thick aluminum plaque, 8” x 16”, with bottom 5’-4” above finish grade located as shown on drawings. 4” numerals in Helvetica Medium style (white) shall be cut vinyl applied on a brown background. Numerals will be centered vertically and horizontally on the sign. Brown background color shall be Fed. Spec. 595b, color no. 20122. The building number will be assigned by the installation. Mounting of the sign (on masonry wall) shall be with non-staining, non-corrosive fasteners. Mounting hardware shall be stainless steel.

2.04 BUILDING & SITE SIGNAGE (AF/CI)

A. Exterior lighted signage including the lighted monument sign, logos, and lettering for the building will be provided by AAFES and its vendors for installation by the General Contractor. Contractor shall be responsible for foundations for the monument sign and other signs, mounting the building mounted signs, and for bringing electrical power to sign locations and hooking up power to the signs.
    1. Provide exterior grade plywood sheathing at all wall locations where building signs will be mounted for the purpose of sign attachment (except when sign is mounted on a solid masonry or concrete substrate).
    2. Buried conduit and cabling shall be provided by the General Contractor.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Locate sign units and accessories where shown or scheduled, or as directed by Contracting Officer if not otherwise indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
    1. Install sign units level and plumb, with sign surfaces free from distortion or other defects in appearance.

B. Wall-Mounted Panel Signs: Attach panel signs to wall surfaces using round-head screw fasteners appropriate for the various substrates on which they occur.
    1. Mounting Location and Height: Door signage shall be located alongside the door on the latch side and shall be mounted at a height of 60 inches above the finished floor to the bottom of the sign. Where two signs are indicated for one door, the second sign shall be mounted directly beneath and in contact with the first sign.

C. Cast Metal Plaques: Mount cast metal plaques using the standard method recommended by the plaque manufacturer for the type of wall surface indicated.
   1. Semi-Concealed Mounting: Mount the plaques by inserting threaded studs through tapped lugs on the back of the plaque; Set in pre-drilled holes filled with lead wall plugs or quick-setting cement, as appropriate. Anchor to studs with rosette heads.
   2. If not installed prior to delivery, attach "date plate" to plaque with two fastening bolts furnished.

3.02 CLEANING AND PROTECTION

A. At completion of installation, clean soiled sign surfaces in accordance with manufacturer's instructions. Protect units from damage until acceptance by AAFES.

END OF SECTION

SECTION 10500

LOCKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Locker units with hinged doors, including:
   1. Multi-tier wardrobe lockers at MPA (furnished and installed by the Contractor).

B. Metal bases and tops.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials and alternative transportation.

B. Section 01600 - Product Requirements: LEED-related product requirements.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2010.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data on locker types, sizes and accessories.

C. Shop Drawings: Indicate locker plan layout, numbering plan.

D. Samples: Submit two samples 3 x 6 inches in size, of each color scheduled; applied to specified base metal.

E. Manufacturer's Installation Instructions: Indicate component installation assembly.

F. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect locker finish and adjacent surfaces from damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Lockers:
   1. Art Metal Products: www.artmetalproducts.com.
   2. Lyon Workspace Products: www.lyonworkspace.com.
   3. Penco Products, Inc: www.pencoproducts.com.
   4. Republic Storage Systems Co: www.republicstorage.com.
   5. Substitutions: See Section 01600 - Product Requirements.

2.02 MATERIALS

A. Sheet Steel: ASTM A653/A653M SS Grade 33/230, with G60/Z180 coating, stretcher leveled; to the following minimum thicknesses:
   1. Body and Shelf: 24 gage, 0.024 inch.
   2. Doors: 16 gage, 0.060 inch.
   3. Door Frame: 16 gage, 0.060 inch.
   4. Hinges: 14 gage, 0.075 inch.
   5. Base: 20 gage, 0.036 inch.

6. Sloping Top: 20 gage, 0.036 inch.
7. Trim: 20 gage, 0.036 inch.

2.03 LOCKER UNITS

A. Width: 12 inches.

B. Depth: 15 inches.

C. Height: 12 inches.

D. Configuration: multi tier.

E. Mounting: Free standing.

F. Base: Metal base.
   1. Base Height: 4 inch.

G. Locking: Equipped for padlock hasps.

H. Ventilation Method: Door louvers.

I. Class: Quiet.

J. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.

K. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.

L. Doors: Hollow channel edge construction, 1-3/16 inch thick; welded construction, channel reinforced top and bottom with intermediate stiffener ribs, grind and finish edges smooth.

M. Hinges: Two for doors under 42 inches high; three for doors over 42 inches high; weld securely to locker body and door.

N. Locking device supplied by AAFES.

O. Number Plates: Provide oval shaped aluminum plates. Form numbers 1 inch high of block font style with ADA designation, in contrasting color.

P. Provide ventilation openings at top and bottom of each locker.

Q. Form recess for operating handle and locking device.

R. Finish edges smooth without burrs.

S. Fabricate sloped metal tops, ends and closure pieces.

2.04 FINISHING

A. Clean, degrease, and neutralize metal; prime and finish with one coat of baked enamel.

B. Paint locker units 1 color, as selected.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install lockers plumb and square.

C. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lb.

D. Bolt adjoining locker units together to provide rigid installation.

E. Install perimeter trim.

F. Install accessories.

G. Replace components that do not operate smoothly.

3.02 CLEANING

A. Clean locker interiors and exterior surfaces.

END OF SECTION

SECTION 10523

FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

C. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 06100 - Rough Carpentry: Wood blocking and shims.

D. Section 09260 - Gypsum Board Assemblies: Roughed-in wall openings.

1.03 REFERENCE STANDARDS

A. NFPA 10 - Standard for Portable Fire Extinguishers; 2010.

B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.04 PERFORMANCE REQUIREMENTS

A. Conform to NFPA 10 and UFC 3-600-01.

B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

1.05 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements, and location.

C. Product Data: Provide extinguisher operational features, color and finish, and anchorage details.

D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

F. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

1.06 FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Extinguisher Cabinets and Accessories:
   1. JL Industries, Inc: www.jlindustries.com.
   2. Larsen's Manufacturing Co: www.larsensmfg.com.

3. Potter-Roemer: www.potterroemer.com.
4. Substitutions: See Section 01600 - Product Requirements.

2.02 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and UFC 3-600-01.

B. Multi-Purpose Dry Chemical Type: Steel tank, with pressure gage, equivalent to Larsen's Manufacturing Company MP10 Multi-Purpose Dry Chemical Fire Extinguisher.
   1. UL Rating: 4A-80B:C.
   2. Nominal Capacity: 10 lbs.
   3. Finish: Baked enamel, glossy red color.

2.03 FIRE EXTINGUISHER CABINETS

A. Fire Extinguisher Cabinets: Equivalent to Larsen's Manufacturing Company Architectural Series Model No. AL-2409-6R.
   1. Tub: White baked enamel steel.
      a. Tub I.D.: 9-1/2 inches wide x 24 inches high x 6 inches deep.
   2. Trim: 2-1/2 inch semi-recessed rolled-edge design fabricated of extruded or formed aluminum with mitered corners and clear satin anodized finish.
   3. Door: Vertical Duo door style with clear satin anodized finish and laminated safety glazing.
   4. Rough Wall Opening Size: 10-1/2 inches wide x 25 inches high x 4 inches deep.
   5. Graphic Identification: Die cut lettering in style and color as selected from manufacturer's standard options.

2.04 ACCESSORIES

A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.

B. Graphic Identification: Provide code-compliant identifying signage at each fire extinguisher location.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings.

C. Secure rigidly in place.

D. Place extinguishers in cabinets. Where no wall cabinet is indicated, place extinguisher on wall-mounted bracket.

END OF SECTION

SECTION 10532

METAL CANOPIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roll-formed aluminum, freestanding, canopy at dumpster enclosure.

1.02 RELATED SECTIONS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 07900 - Joint Sealers.

1.03 REFERENCES

A. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2009.

B. ICC (IBC) - International Building Code; 2009.

1.04 DESIGN REQUIREMENTS

A. Canopy materials, assembly and attachments shall resist applicable ASCE 7 and IBC 2009 code-mandated loads and positive and negative wind design loads at any point without damage or permanent set.

1.05 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide manufacturer's standard literature and specifications for canopies.

C. Shop Drawings: Indicate structural component locations/positions, material dimensions and details of construction and assembly.

D. Samples: Submit samples of each type and color of finish available, for selection by Contracting Officer's Representative.

E. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Freesstanding Canopies:
   1. Mapes Industries, Inc; Product "Lumishade Canopy": www.mapes.com; or approved equivalent.
   2. Substitutions: See Section 01600 - Product Requirements.

2.02 FREESTANDING CANOPY SYSTEM

A. Decking: Extruded aluminum alloy 6063-T6, configured as 6-inch wide pans and 6-inch wide caps roll-locked together to form decking 3 inches in depth.

B. Canopy Columns: Extruded aluminum alloy 6063-T6, minimum size 4" x 4" x 0.125".

C. Canopy Beams: Extruded aluminum alloy 6063-T6. Provide C-beams and drain beams of sizes recommended by manufacturer to meet performance requirements.

D. Fascia/Gutter: Full perimeter extruded aluminum alloy 6063-T6 fascia/gutter with a height of 7 inches, a depth of 4 inches, and a thickness of 0.094 inches.

2.03 FINISH

A. Provide manufacturer's standard baked enamel finish in color as selected by Contracting Officer's Representative.

2.04 FABRICATION - FRAMING

A. Fit and shop assemble components in largest practical sizes, for delivery to site.

B. Fabricate components with joints tightly fitted and secured. Corners shall be mitered and secured by means of internal aluminum corner angles.

C. Concealed Drainage:
   1. Freestanding Canopy Systems: Water shall drain internally, from fascia/gutter to columns, and be discharged at or near finished grade level. Cantilevered canopies shall be down-spouted from fascia/gutter to columns via extruded aluminum drain beams and shall discharge at or near finished grade level.

D. Exposed Fastenings: Unobtrusively located; consistent with design of component, except where specifically noted otherwise.

E. Supply components required for anchorage of framing. Fabricate anchors and related components of same material and finish as framing, except where specifically noted otherwise.

PART 3 EXECUTION

3.01 EXAMINATION

A. Confirm that surrounding area is ready for the canopy installation.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions after all concrete, masonry and roofing work in the area is completed.

B. Install components plumb and level, accurately fitted, free from distortion or defects.

C. Provide anchors required for connecting framing to structure. Anchor framing to structure.

D. Protect finish during handling and erection.

3.03 CLEANING

A. Clean metal canopy surfaces in accordance with manufacturer's instructions.

END OF SECTION

SECTION 10800

TOILET ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Accessories for toilet rooms and janitor rooms.

B. Grab bars.

1.02 RELATED REQUIREMENTS

A. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced and recycled-content materials.

B. Section 01600 - Product Requirements: LEED-related product requirements.

C. Section 06100 - Rough Carpentry: Concealed supports for accessories, including in wall framing and plates.

D. Division 16 - Electrical.

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2009.

B. ASTM A 269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2008.

C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2009a.

D. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.

E. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2003 (Reapproved 2009).

F. ASTM C1036 - Standard Specification for Flat Glass; 2006.

G. ASTM C 1503 - Standard Specification for Silvered Flat Glass Mirror; 2001.

H. ASTM F 2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2004.

I. GSA CID A-A-3002 - Mirrors, Glass; U.S. General Services Administration; 1996.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement to receive anchor attachments.

1.05 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

D. LEED Submittals/Reports: Provide LEED-related product information as required to support LEED certification goals of Project.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Design Basis: Products listed are made by Bobrick Washroom Equipment, Inc: www.bobrick.com; unless otherwise indicated.

B. Toilet Accessories:
   1. American Specialties, Inc: www.americanspecialties.com.
   2. Bobrick Washroom Equipment, Inc: www.bobrick.com.
   3. Bradley Corporation: www.bradleycorp.com.
   4. Gamco (General Accessories Mfg. Co.): www.gamcousa.com.
   5. Koala Kare Products (A Division of Bobrick): www.koalabear.com.
   6. Substitutions: Section 01600 - Product Requirements.

C. All items of each type to be made by the same manufacturer.

2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.
   2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Keys: Provide 2 keys for each accessory to Government; master key all lockable accessories.

C. Stainless Steel Sheet: ASTM A666, Type 304.

D. Stainless Steel Tubing: ASTM A269, Type 304 or 316.

E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

F. Mirror Glass: Float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

G. Adhesive: Two component epoxy type, waterproof.

H. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.

I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

B. Chrome/Nickel Plating: ASTM B456, SC 2, satin finish, unless otherwise noted.

C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

D. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

E. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

F. Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 TOILET ROOM ACCESSORIES

A. Semi-Recessed Toilet Tissue Dispenser: Double roll, semi-recessed, stainless steel, tumbler lock. Extra roll drops in place when bottom roll is depleted.
   1. Capacity: Holds two standard core toilet tissue rolls up to 5-1/8-inch diameter.
   2. Spindles: Theft-resistant, heavy-duty.

3. Product: Bobrick B-3888.

B. Combination Towel Dispenser/Waste Receptacle: Recessed with projecting waste receptacle and roll-paper-towel dispenser, stainless steel; seamless beveled wall flanges, continuous piano hinges, tumbler locks on upper and lower doors.
   1. Towel dispenser capacity: Accommodates 8-inch wide, 800-foot-long rolls.
   2. Waste receptacle capacity: 12 gallons.
   3. Product: Bobrick B-3961.

C. Surface-Mounted Soap Dispenser: Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gage refill indicator, hinged filler-top opens with special key.
   1. Minimum Capacity: 40 ounces.
   2. Product: Bobrick B-2112.

D. Framed Mirrors: Stainless steel framed, 6 mm thick float glass mirror.
   1. Size: 18 inches wide x 36 inches high.
   2. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; No.4 finish.
   3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
   4. Product: Bobrick B-290 1836.

E. Toilet Seat Cover Dispenser: Stainless steel, recessed, reloading by hinged access door, tumbler lock.
   1. Minimum capacity: 500 seat covers.
   2. Product: Bobrick B-3013 TrimLine Series.

F. Grab Bars: Stainless steel, 1-1/4 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
   1. Grab Bar "A":
      a. Configuration and Length: Two-wall style, 54 x 36 inches.
      b. Product: Bobrick B-5837.

G. Recessed Feminine Napkin Disposal Unit: Stainless steel; recessed; self-closing door; removable, leak-proof plastic receptacle.
   1. Product: Bobrick B-4353.

H. Baby Changing Station: Wall-mounted folding baby changing station for use in commercial toilet facilities, meeting or exceeding ASTM F 2285.
   1. Style: Horizontal.
   2. Material: Stainless steel shell with polyethylene body.
   3. Mounting: Recessed.
   4. Product: Koala Kare KB110-SSRE.

I. Hat and Coat Hook: Stainless steel, 2 x 2 inch flange with concealed wall plate.
   1. Product: Bobrick B-6827.

2.05 UTILITY ACCESSORIES

A. Mop and Broom Holders:
   1. Mop Holders: 3, anti-slip, with spring-loaded rubber cams sized to grip handles 7/8-inch to 1-1/4-inch diameter.
   2. Product: Bobrick B-223.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

C. Verify that field measurements are as indicated on drawings.

D. See Section 06100 - Rough Carpentry for installation of blocking, reinforcing plates, and concealed anchors in walls.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

3.04 SCHEDULE

A. Refer to Toilet Accessories Schedule on Drawings.

END OF SECTION

SECTION 11400

FOOD SERVICE EQUIPMENT INSTALLATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Food service equipment setup

B. Connections to utilities.

1.02 RELATED REQUIREMENTS

A. Section 07900 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.

B. ASTM C1036 - Standard Specification for Flat Glass; 2006.

C. UL (EAUED) - Electrical Appliance and Utilization Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, and utility service connection locations, service characteristics, and wiring diagrams.

C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

D. Certificates: Certify that products of this section meet or exceed specified requirements.

E. Operation Data: Provide operating data for the specified equipment.

F. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.

G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Government's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture of standard products of the type specified.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for utility requirements.

B. Products Requiring Electrical Connection: Listed and classified by UL (EAUED) as suitable for the purpose specified and indicated.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store products clear of floor in a manner to prevent damage.

B. Coordinate size of access and route to place of installation.

1.08 PROJECT CONDITIONS

A. Coordinate the work with location and placement of utilities. Coordinate characteristics of utilities with requirements of food service equipment.

B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Equipment Schedule: Refer to schedule on drawings.
   1. Cooler and Freezer Units: Listed by UL standards..
   2. Electrical Wiring and Components and Self-Contained Refrigeration Systems: Conform to UL standards.

B. Installation Accessories: Provide all rough-in hardware, supports and connections, attachment devices, closure trim, and accessories required for complete installation.

2.02 MATERIALS

A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

B. Stainless Steel Sheet: ASTM A666 Type 304 commercial grade, No. 4 finish.

C. Glass: ASTM C 1036, annealed and laminated, 4 mm thick; exposed edges ground; cut or drilled to receive hardware.

D. Finish Hardware: Manufacturer's standard.

E. Work Surfaces: Stainless steel.

F. Fittings: Sink drains with crumb cup and waste fittings, faucets, and electrical outlets.

G. Service Outlet Covers and Escutcheons: Stainless Steel.

H. Sealants: Sanitary silicone type, as specified in Section 07900.

2.03 FINISHES

A. Metal (Except Stainless Steel): Degrease and phosphate etch, prime and apply minimum two coats factory baked epoxy, color as selected.

B. Stainless Steel: No. 4 finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify ventilation outlets, service connections, and supports are correct and in required location.

B. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

A. Install items in accordance with manufacturers' instructions.

B. Insulate to prevent electrolysis between dissimilar metals.

C. Weld and grind joints in steel work tight, without open seams, where necessary due to limitations of sheet sizes or installation requirements.

D. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.

E. Use anchoring devices appropriate for equipment and expected usage.

F. Provide sealant to achieve clean joint with adjacent building finishes and between abutting components.

3.03 ADJUSTING

A. Adjust equipment and apparatus to ensure proper working order and conditions.

B. Remove and replace equipment creating excessive noise or vibration.

3.04 CLEANING

A. Remove masking or protective covering from stainless steel and other finished surfaces.

B. Wash and clean equipment.

C. Polish glass, plastic, hardware, accessories, fixtures, and fittings.

3.05 CLOSEOUT ACTIVITIES

A. Test equipment prior to demonstration. Demonstrate operation of components scheduled.

B. At completion of work, provide qualified and trained personnel to demonstrate operation of each item of equipment and instruct Government in operating procedures and maintenance.
   1. Test equipment prior to demonstration.
   2. Individual Performing Demonstration: Fully knowledgeable of all operating and service aspects of equipment.

3.06 PROTECTION

A. Remove protective coverings from prefinished work.

B. Protect finished work from damage.

3.07 FOOD SERVICE EQUIPMENT SCHEDULE: See Drawings.

END OF SECTION

SECTION 12486

FLOOR GRATES AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Recessed aluminum floor grates and frames.

1.02 RELATED SECTIONS

A. Section 01354 - LEED Credit Summary (Credits MR 4.1 & EQ 5).

B. Section 01355 - LEED Certification Procedures: LEED credits relating to regionally-sourced, recycled-content, and indoor pollutant source control materials.

C. Section 01600 - Product Requirements: LEED-related product requirements.

D. Section 03300 - Cast-In-Place Concrete: Concrete floor slab recess, and grouting frames into recess.

E. Section 03356 - Concrete Floor Finishing: Floor flatness tolerances.

1.03 REFERENCES

A. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004.

B. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes; 1993.

1.04 PERFORMANCE REQUIREMENTS

A. Loading: 1500-pounds per wheel rolling load.

1.05 SUBMITTALS

A. See Section 01300 - Submittals, for submittal procedures.

B. Product Data: Provide data indicating properties of floor grate, component dimensions and recessed frame characteristics.

C. LEED Submittals/Reports: Submit manufacturer's certification of pre-consumer and post-consumer recycled content percentage by weight, and list the recycled content information source (LEED MR 4.1). Provide additional LEED-related product information as required to support LEED certification goals of Project.

D. Shop Drawings: Indicate dimensions and details for recessed frame.

E. Samples: Submit two samples each of the following, in selected colors and finishes:
   1. Not less than 6 inch square sections of grate material.
   2. Not less than 6 inch length frame material

F. Maintenance Data: Include cleaning instructions, stain removal procedures.

1.06 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain floor grates and frames from one source and from a single manufacturer.

1.07 SEQUENCING AND SCHEDULING

A. Recessed Frames: Coordinate with concrete work so that products are available for placing integrally with floor slabs.

1.08 PROJECT CONDITIONS

A. Verify that field measurements are as indicated.

1.09 WARRANTY

A. Floor grates and frames shall be fabricated free of defects in materials and workmanship in accordance with the General Conditions, and the manufacturer shall provide a 5-year warranty against defects in materials and workmanship.

PART 2 PRODUCTS

2.01 ENTRANCE GRATE SYSTEM

A. Recessed Floor Grate and Frame: Equivalent to Model G-218D EnvIRONtread II grate with double tread and Type F-11 aluminum recessed frame manufactured by Arden Architectural Specialties, Inc., St. Paul, MN, www.ardenarch.com.

2.02 MATS

A. Tread Inserts: Recycled, nylon-reinforced buffed rubber mechanically secured to tread rails.
   1. Tread Color: Grey.

B. Aluminum Tread Rails: Extruded aluminum, ASTM B 221, alloy 6063-T5.
   1. Finish: Mill.

C. Aluminum Frames: Extruded aluminum, ASTM B 221, alloy 6063-T5, with butted corners.

D. Rail Spacing: 1-11/16 inches.

E. Fasteners: Non-corrosive screws and anchors for securing frames together and to floors.

2.03 FABRICATION

A. Construct recessed grate frames square, tight joints at corners, rigid. Coat surfaces with protective coating where in contact with cementitious materials.

B. Floor Grate Construction: Two tread strips alternating with aluminum divider bars assembled with 0.105-inch diameter galvanized steel wire, 1-1/2 inches o.c.

C. Shop fabricate grates and frames to greatest extent possible in sizes shown. Where not otherwise shown, provide single unit for each installation, but do not exceed manufacturer's maximum size recommendations for units intended for removal and cleaning.

D. Where joints are necessary, space symmetrically and away from normal traffic lanes. Butt corners of framing elements with hairline joints or provide prefabricated corner units without joints.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that floor openings for grates and frames are ready to receive work.

B. Verify that substrates are flat and level. Substrate shall meet a flatness tolerance of 1/8-inch over 10 feet in accordance with ACI 302.1R.

3.02 PREPARATION

A. Verify size of floor recess before fabricating frames and grates.

B. Vacuum clean floor recess.

3.03 INSTALLATION

A. Install products in accordance with manufacturer's instructions, at location shown.

B. Install grate frames to achieve flush plane with finished floor surface.

C. Install grates in floor recess flush with finish floor after cleaning of finish flooring.

3.04 TOLERANCES

A. Maximum Gap Formed at Recessed Frame From Mat Size: 1/4 inch.

3.05 PROTECTION

A. Upon completion of frame installations, provide temporary filler of plywood or fiberboard in grate recesses, and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near time of Substantial Completion.

B. Install grates when no further wheeled construction traffic will occur and wet type operations including painting and decorating are complete.

END OF SECTION

SECTION 13048

FUEL SALES CANOPY

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. All labor, equipment and material and incidentals to design, furnish and install a prefabricated metal canopy to include footings and lighting where shown on the drawings and described herein:

1.2 RELATED SECTIONS (IF APPLICABLE)

A. Section 03300 - Cast-in-Place Concrete.

B. Section 09900 -Painting:

C. Section 05120 – Structural Steel

D. Division 16: Electrical

1.3 QUALITY ASSURANCE

A. Structures shall be the product of a manufacturer with a minimum of 10 years documented experience in the design and fabrication of metal canopies.

B. Electrical devices factory installed within the prefabricated canopy shall be UL listed. Factory installed wiring system shall bear UL Classification label certifying compliance with the National Electric Code.

C. A professional engineer licensed in the state where the project is occurring shall accomplish structural design. Design shall be accomplished in accordance with State and local building codes.

D. Verify all dimensions shown on drawings by taking field measurements to insure proper fit and attachment of all component parts.

1.4 SUBMITTALS

A. Furnish complete literature and installation and assembly drawings to the Contracting Officer for approval prior to fabrication and installation to include:

1. Manufacturer's data
2. Drawings shall indicate materials, finish size and methods of fabrication, assembly, and installation.
3. Calculations for design of the canopy structure and footings shall be submitted for approval prior to fabrication. A professional engineer licensed in the State the project is occurring shall seal design calculations for the entire canopy structure and footings. If a subsurface investigation is not presented, all investigations required for the design of the canopy and footings shall be acquired by and at the expense of the Contractor.

B. Submit color charts illustrating all finish colors and patterns. Color selections must be approved by the installation. Provide custom color if required by Installation.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver items in manufacturer's original protective packaging.

B. Handle to prevent damage to finished surface.

C. Maintain protective covers on all items until installation is complete.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. AMERICAN WALKWAY COVERS www.americanwalkway.com, or approved equivalent.

B. AMERICANA BUILDING PRODUCTS www.americana.com, or approved equivalent.

2.1 STRUCTURAL METAL FRAMING

A. Columns shall be fabricated from hollow structural sections conforming to ASTM A500 Grade B, with minimum yield strength of 46 ksi. ASTM A36 structural steel plate with minimum yield strength of 36 ksi with pre-punched or pre-drilled boltholes shall be used for column top and base plates. Columns shall be provided with electrical access openings, cover plates, conduits and drains per Owner requirements.

B. Wide flange beams conforming to ASTM A572 Grade 50 with minimum yield strength of 50 ksi shall be used as the primary roof-framing members. Other roof-framing members (channel, angle, or tees), if used, shall conform to ASTM A36 with minimum yield strength of 36 ksi. Bracing shall be designed as required by design.

C. Structural steel plate shall conform to ASTM A36 with minimum yield strength of 36 ksi.

D. Structural bolts shall conform to ASTM A325 Specification for High Strength Bolts for Structural Metal Joints. All structural steel framing members shall be shop fabricated for field bolted assembly, unless otherwise specified on drawing.

E. Anchor bolts shall conform to ASTM A36 with minimum yield strength of 36 ksi. Double nuts and washers shall be provided with each anchor bolt, with one set to be used for leveling column.

F. All structural steel framing members shall be cleaned to remove loose mill scale and other foreign matter.

G. After cleaning, all members shall be given one shop coat of rust-inhibitive primer. The primer coat thickness shall be a minimum of 1 mil.

2.2 DECK PANEL

A. Roof deck panels shall conform to ASTM A653 Grade 40 steel with minimum yield strength of 40 ksi, with a G60 galvanized surface per ASTM A924.

B. Panel profile shall have a minimum thickness of 24 gauge.

C. Panels shall have a finish side coated with a full coat of polyester paint baked on over an epoxy primer. A white wash coat baked on over an epoxy primer shall protect the interior

side of the panel.

D. Panels shall be fastened to the bottom flange of the wide flange purlin beams with a system, which requires no "through the panel" fasteners.

E. Deck panels shall not be spliced.

2.3 FASCIA SYSTEM

A. Smooth vertical 24 gauge preformed metal panels shall conform to ASTM A653 Grade CS with minimum yield strength of 25 ksi, with a G90 galvanized surface per ASTM A924. Panel shall be provided with a powder coat paint finish, in a size and color per AAFES requirements. Color shall be as approved by the Installation.

B. Fascia outriggers shall be cold formed 1 1/2” x 1 1/2” x 18 gauge metal angles conforming to ASTM A653 Grade CS with minimum yield strength of 25 ksi, with a G90 galvanized surface per ASTM A924. 2” x 2” x 18 gauge or 2” x 2” x 1/8 inch structural angle shall be used as required by design. Outrigger spacing per design requirements.

C. There shall be no exposed fasteners on exterior or bottom face of fascia panels.

D. Vertical seams shall be sealed from backside.

E. 24 gauge flashing shall be used as required by design.

2.4 GUTTER / INTERNAL GUTTER POST SYSEM

A. Gutter shall conform to ASTM A653 Grade 40 metal with minimum yield strength of 40 ksi, with a G60 galvanized surface per ASTM A924.

B. Profile shall be at a minimum be 12-inch wide x 4-inch deep, 20 gauge thick.

C. Gutters shall have a finish side coated with a full coat of polyester paint baked on over an epoxy primer. A white wash coat baked on over an epoxy primer shall protect the interior side of the gutter.

D. Gutter leaders to column drain shall be one of the following options: 3 inch diameter PVC pipe with a 24 gauge leader cover (dry leader) or an 8 inch wide tapered (4 inch to 6 inches deep) 24 gauge metal leader (wet leader). Larger gutters shall be used where required for proper drainage.

2.5 DOWNSPOUTS

A. Internal downspouts shall be 3 inch diameter PVC with couplings provided at gutter leader attachment location and at base of column where attachment to site drainage system is required. Larger drains shall be used where required for proper drainage.

2.6 LIGHTS

A. Lighting layout and fixtures shall be per requirements shown in the plans.

2.7 SIGNS

A. Signs and logos shown in the drawings will be furnished and installed by AAFES. Signs and logos are shown for information only.

2.8 SEALANTS

A. Exposed joints shall be sealed with a high-quality silicone caulk color to match.

B. Non-exposed joints shall be sealed with white or bronze polyurethane sealant.

C. Other sealant such as Black Mastic, strip caulk or double-sided tape shall be used as required by design.

2.9 FOOTINGS

A. Footings shall be designed and installed by the fabricator. Designs shall conform to the State and local building codes. A professional engineer in the State where the project is occurring shall seal design calculations. Calculations shall be submitted for approval prior to placing the footings. Footings shall be reinforced concrete. Subsurface investigations shall be the responsibility of the fabricator.

B. Concrete shall conform to ACI 301.

C. Reinforcement shall conform to ASTM A615.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Footings shall be placed in conformance with CRSI 63 and 67. Anchor bolts and templates shall be shipped to Contractor prior to pouring canopy footings.

B. Structural metal shall be set plumb, square and level in accordance with Erection drawings provided by the fabricator. Erection of structural metal shall be in accordance with the latest AISC Specifications and Code of Standard Practice. All structural bolts shall be tightened by the turn-of-the-nut method as specified in the latest RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts.

C. Deck, fascia, and gutter systems, as well as other accessories shall be assembled in accordance with by the fabricator.

3.2 ADJUST AND CLEAN

A. After installation, make final adjustments to ensure all members fit and are aligned properly.

B. After final adjustment, all metal surfaces shall be cleaned in accordance with the manufacturer's recommendations.

C. Leave work area clean and free of debris.

END OF SECTION

SECTION 13050

GASOLINE DISPENSING AND UNDERGROUND STORAGE TANK SYSTEMS

PART 1: GENERAL

1.1 DESCRIPTION OF WORK:

A. **The underground fuel storage tanks (two tanks, one 20,000 gallon containing "regular", and a second 15,000 gallon tank containing "premium") are existing. The contractor shall provide new submerged turbine pump (STP)/piping sumps, fill/spill bucket assemblies, surface manholes, fuel piping, and fuel system accessories as shown and described on/in the documents for this project, and coordinate the connection of the piping and accessories with the existing fuel storage tanks/existing conditions.**

B. Provide a complete gasoline fueling system, including but not limited to underground storage tanks, submersible turbine pumps, electrical wiring, electronic control/monitoring/leak detection system, product piping, fittings, valves, caps, unions and necessary appurtenances, as specified, shown on the drawings, and as required for a complete and operating system. The complete fueling system shall include AAFES-furnished, Contractor-installed gasoline dispensers, and electrical controls as shown on drawings.

C. The complete operational gasoline dispensing system must be successfully tested, certified, and registered, and shall have all necessary permits to conduct sales of gasoline. Contractor shall obtain and pay for all required testing, certifications and registrations. Testing requiring FDEP presence on site will be identified as work initiates.

D. Provide complete double-wall product piping system, including secondary containment and accessories as specified, shown on the drawings, and as required to prevent the possibility of contamination of air, soil, water, or groundwater.

E. Provide fiberglass-reinforced plastic (FRP) sealed turbine pump/piping sumps/enclosures as specified and shown on the drawings, as required for a complete and operating system.

F. Install AAFES-furnished electronic gasoline dispensing system including dispensers, control consoles, interconnecting devices and accessories furnished by AAFES and as required for a complete and operating system.

G. **The existing Veeder Root TLS 450 console, fuel inventory probes, tank sump leak sensors, tank interstitial sensors, and three dispenser sump sensors shall be re-used. The TLS 450 console must be removed and re-located.** Provide tank monitoring/inventory control/release detection system including console with alarm capability, automatic tank gauging equipment, electronic line leak detectors for primary piping of double-walled product piping, sensors for all secondary containment (including tank, piping and dispenser sumps), an overfill alarm with acknowledgement switch, and accessories as specified, shown on the drawings, and required for a complete and operating system.

H. Provide the excavation, trenching, and backfilling required for installation of the fuel system.

I. Contractor shall prepare and pay for all required State, County, and Local permits, applications and registrations or other documents required for the installation and operation of gasoline storage and dispensing facilities. Coordinate the preparation and submission of documents with the Air Force Base Environmental Office.

J. Coordinate installation construction with applicable sections within Division 16 - Electrical work.

K. Related work specified elsewhere (as applicable to the project):

1. Utility Excavating - Section 02219.
2. Cast-in-Place Concrete - Section 03300.
3. Mechanical Work - Division 15.
4. Electrical work - Division 16.

1.2 QUALITY ASSURANCE:

A. Comply with the following codes and standards (use the most recent version):

1. NFPA No. 30, Flammable and Combustible Liquids Code.
2. NFPA No. 30A, Automotive and Marine Service Station Code.
3. NFPA No. 70, National Electrical Code
4. NFPA No. 329, Handling Underground Release of Flammable and Combustible Liquids
5. EPA 40 CFR Part 280, Technical Standards and Corrective Action Requirements for Contracting Officers and Operators of Underground Storage.
6. OSHA 29 CFR Part 1910.106, Flammable and Combustible Liquids.
7. ASTM D2310-80, Standard Classification for Machine-Made Reinforced Thermosetting-Resin Pipe.
8. ASTM D2517-81, Standard Specification for Reinforced Epoxy Resin Gas Pressure Pipe and Fittings.
9. ASTM D2996-88, Standard Specification for Filament-Wound "Fiberglass" (Glass Fiber-Reinforced Thermosetting Resin) Pipe.
10. ASTM D4021-86, Standard Specification for Glass-Fiber-Reinforced Polyester Underground Petroleum Storage Tanks.
11. UL 79, Power-Operated Pumps for Petroleum Product Dispensing Systems.
12. UL 87, Power-Operated Dispensing Devices for Petroleum Products.
13. UL 567, Pipe Connections for Flammable and Combustible Liquids and LP-Gas.
14. UL 842, Valves for Flammable Fluids.
15. UL 860, Pipe Unions for Flammable and Combustible Fluids and Fire Protection Service.
16. UL 1238, Control Equipment for Use with Flammable Liquid Dispensing Devices.
17. UL 1316, Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products.
18. API 1615 (1996) Installation of Underground Petroleum Storage Systems.
19. API 1628 (1996) A Guide to the Assessment and Remediation of Underground Petroleum Releases (if a release is expected).
20. California Air Resources Board (CARB) Executive Orders applicable to system.
21. California Air Resources Board (CARB) Test Procedures applicable to system.
22. PEI RP 100-05 Recommended Practices for Installation of Underground Storage Systems.
23. PEI RP 300-04 Recommended Practices for Installation and Testing of Vapor Recovery Systems at Vehicle Fueling Sites.
24. PEI 400-02 Recommended Procedures for Testing Electrical Continuity of Fuel-Dispensing.
25. All other applicable ASTM and UL standards.
26. All applicable EPA requirements relating to release detection, spill and overfill prevention, and corrosion protection.
27. All other applicable Local, County, State, and Federal codes, standards, licensing and registration requirements.

B. Contractor Experience and Licensing:

1. Contractor shall certify that (or installation sub-contractor) has at least four years experience installing underground gasoline storage tanks and dispensing equipment and is certified by the State in which the project is to be constructed. Contractor shall also assure that the designed gasoline fuel system shall be installed by skilled workmen, licensed by the State in which the project is constructed (if required by the State of Florida regulations) or certified by the equipment manufacturers. Contractor's installer and electrician shall

have prior experience with fuel systems and related equipment. As evidence of this experience, a list of the most recent three fuel system installations performed by this contractor with complete descriptions of the location, the project name, and the equipment installed and date of project shall be submitted to the Contracting Officer before construction begins.

2. Contractor Certification of Licensing and Experience. Contractor shall certify that (or installation subcontractor) is a certified installer and/or Authorized Service Contractor for the following equipment manufacturers, as applicable to the system being installed:

   a. Dresser Wayne.
   b. Veeder-Root
   c. Red Jacket
   d. OPW / Flexworks
   e. Xerxes
   f. Containment Solutions
   g. F.E. Petro
   h. Ameron International

3. Contractor shall also certify that he (or his installation subcontractor) holds all necessary licenses for construction and installation required under this contract at the project location. These certifications shall be submitted in writing to the Contracting Officer before construction begins. Changing of subcontractors after this certification will require re-certification of the new subcontractor, showing requisite experience.
4. Contractor shall certify that the installation of the petroleum system related electrical components will be done by an experienced contractor of subcontractor. This contractor shall have experience with fuel systems similar to those installed under this contract. Petroleum system related components are those essential to the legal operation of the petroleum storage, dispensing, leak detection, and emergency equipment. They include, but are not limited to: dispensers, submersible pumps, pump controllers, leak detection equipment, vapor recovery systems, emergency shut-off switches, and all conduit and wiring related to these systems. As evidence of this experience, a list of the most recent five (5) fuel system installations performed by this contractor with complete descriptions of the location, the project name, the equipment installed, and date of the project shall be submitted to the Contracting Officer before construction begins. NOTE: It is preferred, but not mandatory that the petroleum electrical subcontractor be a subcontractor to the petroleum system installer. If the petroleum electrical installer is a subcontractor to the petroleum system installer as described in 1 above, and worked on the projects submitted under that paragraph, the contractor shall so certify and no additional projects need to be reported.

C. Detailed drawings of proposed departures due to actual field conditions or other causes shall be submitted to the Contracting Officer for coordination of approval. The contractor shall carefully examine the drawings and shall be responsible for the proper fitting of materials and equipment without substantial alteration. Materials and equipment installed in the system shall be suitable for the pressures and temperatures expected to be encountered and suitable to the climate and environmental conditions of the location of the project.

D. Contractor's responsibilities under this quality assurance section include, but are not limited to, the following:

   1. Receipt and storage of all items of equipment in a location protected from theft, vandalism, inclement weather, or other damage.
   2. Providing required interconnections to product pumps and emergency disconnect systems.
   3. Construction of openings, depressions, and sleeves for mechanical and electrical piping and conduit as required.

4. Providing hardware and related items as required to assure that equipment components are properly mounted, securely anchored, adequately ventilated, or where required, are adequately sealed from vapors.
5. Verifying size of components to assure space required for dispensers, consoles and interconnecting devices does not exceed designated space available as indicated on drawings.
6. Determining if unusual conditions or circumstances exist at the site (or in the vicinity of the installation) which could damage the electronic components or circuitry, or otherwise impair the proper function of the system, and incorporating, in such event, the necessary protective devices into the installation.

1.3 SUBMITTALS

A. Submit shop drawings for the following in accordance with Section 01300 requirements:

1. Dispenser sumps
2. Tank-STP sumps
3. Surface manholes
4. Spill Containers/Fill bucket assemblies
5. Product piping and fittings
6. Sump penetration fittings
7. Piping termination boots

B. No work shall be performed without the shop drawing having been approved by Contracting Officer or his designated agent.

C. Contractor shall provide a proposed schedule of the phases of the work for the installation of the gasoline storage tanks, piping and dispensing systems.

D. Other underground fuel storage tank submittals shall include:

1. Fuel System Environmental Compliance Documentation and Records. The following documents or the State/location equivalent of these records will be furnished in two copies, one left at AAFES facilities manager office and one furnished to the contracting officer for delivery to the installation environmental office.

Fuel System Environmental Compliance Documentation and Records

1. _____ UST registration for each tank including any changes to registration (“owner” is the Installation). (May be USEPA Form 7530 or extension of it.)

2. _____ Other permits (such as Air Operation Permit).

3. _____ As-built plans or site map with layout of tanks and piping.

4. _____ Third Party Certifications of leak detection systems (equipment or methods).

5. _____ Documentation of corrosion protection, if part of the system.

6. _____ Manufacturer’s manuals (owner’s operator’s and maintenance manuals) for all system components and equipment (including tanks, lines, leak detection components, dispensers, nozzles, etc.). CARB Executive Order for Stage II Vapor Recovery System, if installed.

7. _____ Manufacturer’s warranty documentation for all system components and equipment (including tanks, lines, leak detection components, dispensers, nozzles, etc.)

8. _____ Initial Compliance Test Records (if not included with Installer Certification above).

   a. ____ Tanks

   b. ____ Lines

c. ____ Stage I (CARB TP 201.1E and TP 201.3)

d. ____ Stage II Vapor Recovery System (if required in the area)

e. ____ Dispenser Calibration and continuity test.

9. _____ Training Roster for O & M Training given to AAFES associates.

10. _____ Fuel System Final Inspection Report.

2. Digital photographs of main stages of tank installation and other construction activities, as shown below. Sufficient photographs to adequately document and represent the activity will be taken. Any problems encountered or authorized deviations from the drawings or specifications will be documented with appropriate photographs. The contractor will submit the photographs via the internet to the AAFES Constructware website as soon as possible but not later than 5 business days prior to any scheduled AAFES technical inspection (or 5 business days prior to the final inspection, if documenting work done between the last AAFES technical inspection by the AAFES A-E inspection and the final inspection).
3. Four copies of a chronological Installation Report of the complete tank system installation construction documenting all major activities related to the installation of the underground storage tanks, piping, dispensing and release detection equipment and Stage II Vapor recovery system (if required) shall be provided to AAFES Contracting Officer. Contractor's Installation Report shall include documentation of construction activities and photographs of the construction work in progress. Documentation of specific construction activities shall include, at a minimum the following:

	CONSTRUCTION ACTIVITIES	**DOCUMENTED BY**	**REMARKS**
1	Excavation of Tank Sump	Photographs Installation Report	Report shall include measured dimensions of the excavation and details about shoring and site conditions.
2	Final Tank Hole Excavation (with fabric liner as applicable under site specific conditions)	Photographs Installation Report	Report shall include final measured dimensions of the excavation and details about preparation for tank placement.
3	Tank Sump Excavation Backfilling Operations	Photographs, Field notes in Installation report	Report shall indicate how manufacturer's recommended procedures were followed
4	Installing the Product Lines	Photographs	Follow piping manufacturer's procedures
5	Air / Soap Testing of All Piping	Photographs Field notes (signed)	Air test must follow manufacturer's procedures (air gauge must be equipped with a pressure relief valve set @ 60 PSIG)
6	Placement of Electrical Conduit	Photographs	
7	Forming / Pouring Concrete for Canopy Footings	Photographs	
8	Backfilling the Pipechase	Photographs	Document proper installation of piping
9	Installation of Dispensers	Photographs	
10	Purging of Product Piping with Air	Field notes (signed)	
11	Notification of System Testing to Regulators	Copy of Notification	Presence of regulator may be required
12	Calibration of Dispensers	Field Notes (signed)	Verify proper calibration tolerances
13	Flow Rate Determination	Field Notes (signed)	Verify flow rate not to exceed 10 GPM
14	Certification of Fueling System: Tank & Line Tightness Tests	Test Reports, copy of the Performance Criteria for the Test	Using an EPA third-party certified method
15	Certification of Vapor Recovery System: Stage I and Stage II (as required)	Test Reports	Following CARB Test Procedures
16	Certification of the Fueling Facility	Outline of Course Content &	

	Operators (Training Documentation)	Rosters	
17	Installer Certification of UST Installation	Affidavit/Oath	Signed EPA Form 7530 or State Form
18	Registration of Tank System	Copy of Registration	Signed EPA Form 7530 or State Form
19	Registration of Vapor Recovery System (as required)	Copy of Registration	Signed State Form
20	Warranty/Registration Paperwork for Equipment	Copy of Warranty and Registration	

E. Certification of Experience and Qualifications

1. Contractor shall submit Documentation of contractor or installer sub-contractor and of petroleum systems electrician's experience as required in B.1. of this section.
2. Contractor shall provide for approval the name of the testing company he will use to perform pressure testing of tanks and piping, and startup compliance testing of the Vapor Recovery system per manufacturers' instruction and as specified in this specification. Contractor-retained testing company shall have a minimum of three years of experience in performing such tests for retail gasoline stations and shall be responsible for notifying AAFES of the schedule for testing, following proper testing protocol, and prompt notification of test results.

   Note: AAFES may retain another independent testing agency to observe and monitor the tanks and piping installation and testing performed by the contractor and his testing agency. AAFES-retained testing agency shall have access to the site, work area, shop drawings and results of testing during the construction period. Any changes or comments recommended by AAFES-retained agency must be approved by the Contracting Officer prior to implementation by the contractor. Any testing conducted by AAFES-retained testing agency is separate and independent of the contractor's requirements and SHALL NOT be considered a substitute for any tests required to be performed by contractor. The General Contractor's site superintendent must be notified of any independent testing schedule so that the General Contractor may ensure his representative's presence during any such test procedure.

F. Contractor shall provide six copies of an Operations and Maintenance (O&M) Manual. This manual will describe all systems and equipment installed by the contractor, including but not limited to: underground storage tanks, piping and distribution lines, tank monitoring and release detection systems, vapor recovery systems, dispensers, and alarms. O&M Manual will list the manufacturers (including addresses and telephone numbers), make, model and serial numbers of all equipment and systems. Photocopies of equipment warranty registrations shall be included in the O&M Manual. The O&M Manual will be written in simple language and will give the operator information necessary to operate and maintain the system. Maintenance that is required but not normally performed by the operator will be so noted. The requirement for an O&M Manual may be met by compiling copies of materials provided by the manufacturers of the systems or equipment. However, if the manufacturer's materials do not explain how the system or equipment works as installed, Contractor will provide necessary supplemental information

G. Six copies of the release detection system operation and maintenance manuals shall be provided as follows:

1. The AAFES Service Station Manager.
2. The Local General Manager.
3. The Installation Environmental Office, 96 CEG/CEVC.
4. Three copies to the Contracting Officer for internal distribution.

H. Copies of all documents, permits, applications and registrations required State, County, and Local shall be submitted to the AAFES Contracting Officer and the Base Environmental Office in a report documenting details of the installation.

I. **GENERAL CONTRACTOR TO PROVIDE RECORD DRAWINGS OF COMPLETE FUELING SYSTEM TO AAFES PROJECT MANAGER AND CONTRACTING OFFICER PRIOR TO TURNING OVER OF PROJECT.**

1.4 UNATTENDED OPERATION:

A. Contractor is on notice that the facility to be constructed may be used for 24-hour unattended self-service operation if customer service conditions warrant and all appropriate approvals are obtained.

B. Contractor will use best professional judgment to suggest any other items that may be required by law at the project site for unattended operation or that may facilitate safe and environmentally sound, unattended operation and should identify those items to the Contracting Officer as soon as they are known.

1.5 DRAWINGS: Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings and accessories that may be required. The contractor shall carefully investigate the site and job conditions affecting all work and shall arrange work accordingly, furnishing such fittings, valves and accessories as may be required to meet such conditions, at no additional cost.

1.6 PROTECTION OF MATERIALS AND EQUIPMENT: Pipe openings shall be closed and protected with caps or plugs (not tape) during installation. Equipment shall be tightly covered and protected against dirt, water, chemical or mechanical injury. Backfill material shall be kept clear of all trash and debris. Dispenser and tank sumps shall be closed or covered to prevent water and construction debris from accumulating within. Underground storage tanks and piping system shall be protected by barricades and construction fencing. Upon completion of all work, the materials and equipment shall be thoroughly cleaned, adjusted and operated. Belts, pulleys, gears, couplings, projecting setscrews, keys and other rotating parts shall be fully enclosed or properly guarded.

1.7 WARRANTIES: Contractor shall warrant the work specified according to the terms of the General Provisions. In addition, upon acceptance of the gasoline dispensing system for beneficial use by AAFES, he shall provide to the Contracting Officer the manufacturer's standard equipment warranty or warranties covering both parts and labor for a minimum period of one year. Warranty service shall be provided promptly upon request within 12 hours on weekdays and 24 hours on weekends. Contractor shall be responsible for the warranty of the equipment he furnished. Contractor is responsible for defects in installation of AAFES-furnished equipment.

PART 2: PRODUCTS

2.1 GENERAL: Contractor-furnished materials and equipment shall be as specified and/or as shown on the drawings. Equipment shall be the product of manufacturers regularly engaged in the manufacture of such products and shall be of the best quality used for the purpose in commercial practice. Each major component of equipment shall have the manufacturer's name, address and catalog number on a durable plate securely affixed in a conspicuous place. The nameplate of the distributing agent only will not be acceptable. Substitution of the specified equipment is acceptable upon review and approval by the Contracting Officer or his authorized agent. To obtain approval, Contractor shall make a written request to the Contracting Officer. Contractor’s request will include or attach all data and information available on the equipment including warranties, guarantees, and UL certifications (if applicable).

2.2 PIPING, FITTINGS AND SPECIALTIES:

A. All pipes, fittings, appurtenances, manways, accessories, and valves shall be provided by the Contractor after submittal to the Contracting Officer of shop drawings showing manufacturer and model number of each.

B. All-metal flex connectors shall be used in all dispenser containment sumps, and be as shown in the drawings with all-metal tubes (no Teflon), hose ends, galvanized malleable iron nipples at both ends affixed with crimped fittings, maximum overall length 24".

C. Aboveground vent piping shall be schedule 40 galvanized steel pipe with 150 lb. malleable iron screw fittings and couplings. Joints shall be connected using appropriate adhesive/sealant compatible with gasoline, alcohol-gasoline blended, and reformulated fuels. Vents shall be a minimum of 12 feet above finished grade or 24 inches above the building exterior wall. Vents shall be mounted (as shown on the drawings) to the building exterior wall or braced to stainless steel or galvanized steel pole which shall extend to 12 inches below the top of the vent. Vents shall be primed and painted with two coats of rust inhibiting paint in a CARB approved color that has also been approved by both AAFES and the installation.

D. Underground vent and vapor recovery piping shall be Underwriters Laboratory, Incorporated approved rigid fiberglass-reinforced plastic (FRP) pipe with molded fittings and adapters. Manufacturer for vent and vapor recovery piping is A.O. Smith Inland, Inc. “Red Thread II” or equivalent by Ameron International.

E. Provide buried warning tape or line markers for all underground piping to allow for verification of the piping location in the future. Fill piping and vapor recovery risers shall be schedule 40 galvanized steel piping. As a minimum, couplings and fittings should be 150-pound malleable iron. A thread sealant certified for petroleum service should be used for all fittings. Sealants certified for methanol and other fuels (for example, ethanol and MTBE blends) should be used when these substances are to be placed in the UST system. Projects being built where there are containment requirements for fill risers shall comply with that requirement.

F. Contractor shall provide fiberglass (FRP) tank sumps as shown/noted, and manway covers as shown on the drawings and identified in the Bill of Materials. Each manway cover will be API color-coded with matching skirt, stabilizer kit and locking mechanism. Lifting tools will be supplied for each manway by contractor. An FRP ID plate will be provided by the manufacturer for each manway. The ID plates will specify the tank number, tank capacity, and product type. The manway cover assembly shall be as shown on the drawings.

G. Contractor shall provide manway covers as shown on the drawings and identified in the Bill of Materials. Each manway cover will be API color-coded with matching skirt, stabilizer kit and locking mechanism. Lifting tools will be supplied for each manway by contractor. An FRP ID plate will be provided by the manufacturer for each manway. The ID plates will specify the tank number, tank capacity, and product type. The manway cover assembly shall be as shown on the drawings.

H. Contractor shall provide and install multi-product, dual-hose type, blending dispensers to the contractor for installation and a Wayne control data distribution box as well as an Allied Equipment isolation board.

2.3 DOUBLE-WALL PRODUCT PIPING AND SECONDARY CONTAINMENT SYSTEM:

A. All underground product piping shall be AO Smith Red Thread 2 inch fiberglass primary pipe with AO Smith Red Thread pipe fittings, or equivalent by Ameron International.

B. All underground containment piping shall be AO Smith Red Thread fiberglass containment pipe with AO Smith Red Thread pipe fittings, sizes as shown on the drawings or equivalent by Ameron International. The piping installation shall strictly follow the recommended installation practices described by the manufacturer. The secondary containment pipe shall contain product leaked from the product pipe and drain to a tank piping sump or dispenser sump for leak detection and recovery of the released product.

1. The primary piping shall be capable of successfully passing an air pressure test at fifty pounds per square inch after bleed back pressure stabilization, which shall be established by bringing the line pressure to fifty pounds per square inch for a minimum of three hours. During the pressurizing period all fittings shall be observed for leaks by applying a soapy

water solution. The secondary piping shall be capable of maintaining ten pounds per square inch for a one hour period during integrity testing.

2. The contractor shall follow the manufacturer's recommendation that after the primary piping has passed a 50 psig pressure test, the product line pressure should be reduced and maintained at a pressure of 25 psig until all paving has been completed, with OPW pressure gauge assemblies in place on each line for daily observation and verification that the pipe is holding pressure.
3. Pressure gauge assemblies for testing shall be calibrated prior to use and be equipped with the proper pressure safety valve as recommended by piping manufacturer's testing procedures.

C. Termination of product lines shall be within containment sumps with proper sealing of the ends to prevent water, liquid and debris from entering the sumps.

D. All containment sumps shall be capable of passing a hydrostatic water test conducted to ensure that the sumps are liquid tight.

2.4 ELECTRONIC FUEL DISPENSING SYSTEM: AAFES - FURNISHED/ CONTRACTOR - INSTALLED:

A. AAFES shall furnish multi-product, dual-hose type, blending dispensers to the contractor for installation. A Wayne control data distribution box as well as an Allied Equipment isolation board shall be furnished by AAFES and installed by contractor to connect the dispensers as indicated on the drawings. The dispensers shall be delivered directly to the contractor on site. The contractor is responsible for receiving, verifying, storing, uncrating and protecting the equipment. Contractor shall coordinate the delivery and installation dates with contracting officer in advance to meet the construction schedule.

B. AAFES-furnished dispensers will be Dresser Wayne "Ovation" as shown on the drawings. All hoses, nozzles, swivels and safety breakaways shall be provided by the Contractor.

C. A Dresser Wayne service representative under AAFES equipment contract will review and assist the contractor during installation and will perform initial start-up of each dispenser. Actual installation of the dispenser is not the responsibility of this service representative. The general contractor is responsible for providing knowledgeable Wayne equipment installers as well as coordinating the assistance of the Dresser Wayne service representative.

2.5 SUBMERSIBLE TURBINE PUMPS: **The existing submersible turbine pumps shall be re-used.**

2.6 UNDERGROUND FUEL STORAGE TANKS - DOUBLE-WALL FRP: **The existing underground tanks shall be re-used.**

2.7 TANK INVENTORY CONTROL AND RELEASE DETECTION SYSTEM:

A. Provide Veeder-Root TLS-450 (860090-100) with integral printer and full VGA LCD display with SiteFax (332818-001) **AND** USB/Ethernet dual interface module (332913-001) as required and CSLD (332972-006) UST monitoring system. The Veeder-Root system consists of tank inventory control, release detection system (for tank, piping, and all sumps), control console, integral printer, tank probes, hydrostatic interstitial tank monitoring probes, sump sensors, fittings, etc., for a complete and operating system.

B. Tank monitor and inventory control system shall have the following features:

1. Console – 8247 Microprocessor-based, 66MHZ system clock, 128MB RAM on Central Processing Unit. Standard model console provided with RS232 abd RS422 communication interface ports with external communication capability for automatic inventory control.

Approximate console size 18.5" x 11.5" x 8.5". The console shall be wall mounted using external mounting tabs, at a height of not more than 5 feet from the floor.

2. Inventory/Leak Detection Probe: Veeder-Root Series 846390-109-MAG Plus magnetostrictive probe.
3. Mag Sump Sensor: Veeder-Root Series 857080-112.
4. Digital Pressure Line Leak Detector: Complete assemblies for detecting leaks in product piping. Veeder-Root Series DPLLD 859080-001 for TRJ Red Jacket Pumps connected to controller in the building.
5. Hydrostatic Reservoir Sensor (dual-point): Veeder-Root Series 794380-303 to be incorporated into the integral tank reservoir.
6. Dispenser Mag Sump/Pan Sensor: Veeder-Root Series 857080-111.
7. Overfill Alarm and Acknowledgement Switch: Veeder-Root Series 790091-001 for the alarm and Series 790095-001 for the acknowledgement switch.
8. Modules:

    a. One SiteFax Interface Module #332818-001.
    b. One RS-232/RS-485 Dual Interface Module #332870-001.
    c. One CSLD Software Enhancement Module #332972-006.
    d. One Sixteen-Input Universal Probe/Sensor Interface Module #332812-001.
    e. One Universal Input/Output Interface Module #332813-001.
    f. One Risk Management Software Enhancement for DPLLD #332972-008.
    g. One USB/Ethernet Dual Interface Module #332913-001.
    h. One 'L2 Three Year Extended Storage Module #332971-003.

9. Console Features:

    a. Printer: The console shall be equipped with an integral, thermal printer for hard-copy documentation of reports. Reports shall be printed in rows/columns format.
    b. Display: The console shall be equipped with 7.4 inch full VGA LCD touch screen display for on-site viewing of information, programming, operating and reporting functions.
    c. Modem: Internal 300/115200 baud capability for future expansion. (SiteFax Modem 332818-001).
    d. Remote Access/Control: Direct Access TM.

C. Rated Cracking Pressure Vent Cap.

2.8 DISPENSER, TANK AND PIPING SUMPS:

A. The contractor shall furnish and install pump and piping sump/enclosure as shown on the drawings. Depending upon the burial depth of the tanks, the contractor shall furnish and install the appropriate sump with the required extension as directed by the manufacturer. Depending on the presence of high groundwater, the contractor shall ensure the selection of a sump that is designed for keeping water out of the sumps under such high groundwater conditions. The contractor shall furnish and install tank sump accessories including, but not limited to, manway adapter kit, tank fitting adapters, collar adapter kit, sump access covers, and flexible entry boots for sump as manufactured and designed by the piping manufacturer selected.

B. The sumps and accessories shall be chemically comparable with products to be stored (gasoline, gasoline with 9.5% oxinol, gasoline with 5% methanol and cosolvent, gasoline with 10% ethanol, and gasoline with 20% MTBE).

C. All joints, connections, covers, pipe and conduit entries (including angular entries) shall be liquid-tight.

D. Sumps shall not be deformed by backfill pressure or backfilling operations.

E. The contractor shall furnish and install liquid-tight dispenser containment sumps under the product dispensers, to prevent any leaks or spills from escaping into the environment. The dispenser sumps shall be made of non-corrosive material and shall be compatible with the product being dispensed and with the chemicals and conditions found naturally in the underground environment.

F. Dispenser sumps shall be specifically designed for installation with Wayne dispensers. All required stabilizers for shear valves and pipe entry conduits shall be factory-furnished. All sumps shall be liquid-tight to ground and surface water.

G. Dispenser containment sumps shall be as compatible with the piping system selected.

PART 3: EXECUTION

3.1 UPGRADE OF EXISTING UNDERGROUND FUEL TANKS - BALLASTING:

A. During construction/upgrade, existing underground fuel tanks shall be ballasted with water. Any gasoline or fuel in an existing tank shall be removed immediately by AAFES prior to beginning the upgrade of the tank (prior to removal of the cover pad and overburden). Contact Mickey Parks 850-286-2400 for fuel removal. At no point after the cover pad and overburden has been removed, shall the level of liquid in a tank be lower than the level of groundwater immediately surrounding the tank. At no point shall a tank be empty overnight or unattended by the Contractor when empty. All ballast water shall be removed and disposed of (as hazardous waste - disposing of the ballast material in an environmentally safe manner) by the Contractor prior to filling the tank with fuel.

3.2 INSTALLATION OF DOUBLE-WALL PIPING SYSTEM WITH SECONDARY CONTAINMENT:

A. The Contractor shall install the double-wall piping system in strict accordance with manufacturer's recommended installation practices and instructions. Particular attention will be paid to connection of fittings according to manufacturer’s specifications. If the piping manufacturer specifies the use of particular tools to avoid over-tightening of fittings and damage to O-rings, contractor shall obtain and use recommended tools. Hanging hardware for dispensers shall be tested for continuity by experienced and knowledgeable personnel in accordance with PEI/RP-400-02.

B. The interstitial space of the double-wall product line shall be air tested at the pressure recommended by the manufacturer and not to exceed 10 psig and the primary product line shall be tested at 1-1/2 times the operating pressure. The test pressure shall be held for one hour. The contractor shall conduct at least two tests, one at the time of installation, and the other during system startup. The Contractor shall furnish written reports of the test results to the Contracting Officer.

C. Based on criteria available from manufacturer, contractor shall follow allowable minimum bending radii for pipe.

3.3 INSTALLATION OF ALL-METAL FLEXIBLE CONNECTORS:

A. All-Metal flexible connectors (flex connectors) are to be installed as indicated on the drawings.

B. Flexible connectors shall be installed so that there is no radial stress or twist in the hose when joints are assembled. Follow manufacturer’s installation instructions.

C. Flex connectors shall be UL-listed for such application and meet the requirements of NFPA 30A for being fire-safe. Teflon-lined flex connectors will not be permitted.

3.4 INSTALLATION OF TANK FITTINGS, MANWAYS AND APPURTENANCES:

A. Requirements for Tank Fittings, Manways, and Appurtenances:

1. Contractor shall be responsible to provide proper clearance between tank shell and submerged pumps or fill tubes. Contractor shall check the tank diameter at the pump and fill pipe opening and make necessary adjustments to maintain the specified minimum clearance of six inches from the bottom of the tank.
2. When installing spill containment basins at the fill points and Stage I vapor recovery adapters, contractor shall provide a minimum of 3" and a maximum of 6" clearance between the top of the cap and bottom of the manway cover. Proper clearance shall be provided between the top of the automatic tank gauge and its cover, and the interstitial monitoring probe and its cover.
3. Pump and fill manways and/or connecting piping shall be self-supporting and shall not contact the tank. No spacing materials shall be allowed on the top of the tank.
4. All manway covers and lids will be API color-coded according to the following: Regular unleaded covers will be white with a black cross, mid-grade unleaded covers will be blue with a white cross, and high-grade (premium) will be red with a white cross. Vapor Recovery covers will be orange. Observation well covers will be white with a black triangle. If applicable to the project, used oil covers will be marked with a purple square.

3.5 TRENCHING AND PIPE CHASES: Pipe trenches must be large enough to accommodate the piping, together with sufficient spacing and backfill material to provide protection from damage that might be caused by settlement, abrasion, vibration, expansion, contraction, or foreign materials. Vapor-return piping will be separated from product piping by at least twice the largest nominal pipe diameter, with at least six inches of distance between the piping and the trench excavation walls. Trenching width shall be sufficient to maintain the clearance between the pipes and side walls as shown on the drawings and of a depth sufficient to provide the proper bed and cover, and pitch of the lines. Note that the minimum cover to finish grade over product lines in paved areas is 12 inches and 18 inches in non-paved areas**.** Pipe chase in the concrete or asphalt paving shall be constructed as detailed on the drawings and as located on the plot plan. The minimum spacing between adjacent pipes is twice the pipe diameter between pipes; however, piping runs shall not be layered. Piping crossover must be minimized, but where piping runs must cross, the manufacturer's crossover fittings shall be used. Piping will be installed in a manner that will facilitate testing, resist corrosion, and prevent damage and movement of system components.

3.6 SLOPING OF VENT LINES AND VAPOR RETURN PIPING

A. A minimum slope of 1/8" per foot (sloping downward toward the tanks) is required for all underground vent and vapor return piping. No less than this minimum slope shall be used within requirements for cover over piping and depth of tanks. Only rigid FRP piping compatible with the fuel stored shall be permitted for vent and vapor return piping. Pipe cover requirements are detailed on the drawings. Piping shall be installed on pre-graded compacted bed material. No support or spacing material other than the bed and backfill will be left in contact with the piping. This method of installation should prevent the possibility of any sags or sumps which might cause a liquid trap in the lines and which will not be permitted.

B. If a uniform minimum slope of 1/8" per foot in the vapor lines (from the dispenser islands to the storage tanks) results in the line being deeper than the tank connection, a condensate trap and thief port (which automatically evacuates any accumulated gasoline condensation) shall be installed in the line just outside the tank excavation.

3.7 BEDDING AND BACKFILL MATERIAL:

A. Backfill around fiberglass tanks and piping shall be pea gravel and shall strictly follow manufacturer instructions and recommendations: Standard bedding and backfill material shall be a naturally-rounded aggregate, clean and free flowing, with particle size not less than 1/8" or

more than 1/2" in diameter. Prior to tank installation, Contractor shall furnish the pea gravel sieve analysis from the supplier to the Contracting Officer. Backfill around tanks and piping shall strictly follow manufacturer instructions and recommendations. Backfill material sieve analysis shall be furnished to the Contracting Officer by the contractor from the supplier.

B. Storage and Handling of Bed/Backfill Material on Site:

1. Contractor shall store these materials so as not to allow bed/backfill material to intermix with any excavated soil or other material on site. Contamination of self-compacting gravel could result in need for mechanical compaction, as the minimum/maximum particle sizes specified are critical for self-compaction.
2. In freezing conditions, material must be kept dry and free of ice.
3. Do not intermix gravel, stone or gravel crushing, or sand in the same excavation or connected excavations.

C. Poor Soil Conditions/Soils Stabilization and Filter Fabric:

1. Where soils of low bearing capacity are found such as plastic clays or where sand/sand-gravel may be of a free-flowing nature, a separation is necessary between the pea gravel backfill and the soil to prevent penetration or migration.
2. Contractor shall line the excavation completely with an inert filter fabric, as per manufacturer's recommendations.
3. Approved manufacturers are:

   a. DuPont "Typar" Style 3401 - 4 oz./Sq. Yd.
   b. Monsanto "Bidim" C-22 - 4 oz./Sq. Yd.
   c. Phillips "Supac" Fabric - 4.1 oz./Sq. Yd.
   d. Celanese "Mirafi" 140 Fabric - 4.1 oz./Sq. Yd.

4. Material shall be cut to an appropriate width for the depth and width of the excavation so that there is sufficient material to overlay the top edges of the excavation during installation. Laps of material along the excavation should be a minimum of 2 feet.

D. Bedding of Product Lines: A minimum of six inches deep compacted bed, graded to give the proper slope of depth of pipe runs, shall be laid in the trench before pipe runs are installed. Pipe runs shall be fabricated at grade and installed and properly spaced on the completed bed. After making necessary connections of runs, branches or fittings which shall be made up in the trench, bed material should be placed back under the piping and properly compacted.

3.8 BACKFILLING OF PIPING: After satisfactory completion of required testing and observation of piping, backfilling of trenches to subgrade elevation shall be completed. A minimum of six inches of backfill shall be bedded under the piping and minimum of 18 inches of combined cover (including surface paving and backfill material) over the piping is required. Ensure that marking tape or wire (for future location of piping) has been placed in the backfill at this time.

3.9 INSTALLATION OF FUEL DISPENSING EQUIPMENT: Dispensers will be mounted on islands that are protected from damage from vehicle collisions by posts, bollards or concrete bumpers as denoted on the plans. Installation shall be in strict compliance with manufacturer's written instructions. If unusual conditions or circumstances exist which could damage or impair the system and the special protective measures required are not covered in these instructions, their installation shall be coordinated directly with the manufacturer. Actual installation of equipment and related components shall be under direct supervision at all times to assure compliance with specified requirements. Shear valves or breakaway devices will be installed on each product line and on each vapor return line and carefully tested for functioning. Actuation must be free and unobstructed. Shear valves for the product line must be double-poppetted. Dispenser sumps shall be placed such that the sump edge sets ½ inch above the finished surface of the dispenser island. Dispensers

will be securely bolted to their mounting surface according to the manufacturer's instructions to ensure proper functioning of the shear valves

3.10 INSTALLATION OF INVENTORY/LEAK DETECTION SYSTEM:

A. Installation of Veeder-Root tank inventory control and release detection system shall be in strict accordance with manufacturer's recommendations. The Contractor shall retain the services of the nearest authorized Veeder-Root distributor/installer. Name of the nearest distributor can be obtained by contacting Veeder-Root. This distributor shall be responsible for receiving and storing equipment, helping contractor to locate the conduits as shown on the drawings and installing the entire system excluding conduits and power wiring. At the completion of the installation, the contractor and installer shall test and shall certify the entire system. This distributor shall provide warranty for his work excluding hardware failure.

B. Programming shall be in accordance with local operational conditions and applicable regulations. The program shall include, but not limited to, tank and line tightness monitoring, tank level monitoring, interstitial monitoring, tank overfill alarms, tank low level alarms, and tank/dispenser sump monitoring. The contractor shall print a complete Veeder-Root program report and leave with the manager. Programming and operations of the Veeder-Root system shall be documented by a certified Veeder-Root technician. A TLS-450 system and data backup is also recommended at the initial startup and on a regular schedule if a USB communication port is installed on the console. The backup is possible using the USB FLASH drive provided with the 450 console.

C. All circuits shall be run in rigid conduit. Conduit shall be sealed off and jointed in explosion proof boxes. Conductor runs between all inventory and leak detection equipment, and the Veeder-Root system shall be made with continuous conductors (no splices). Inventory and leak detection circuits shall be in separate conduits for dispenser and pump power runs.

3.11 EMERGENCY SHUT-OFF SWITCH:

A. Install the master emergency shut-off switch inside the building at the register areas. Add additional emergency shut-off switches outside at a well-lighted location that is not less than 20 feet from the nearest dispenser nor more than 100 feet from the farthest dispenser. The switch shall be visible from all dispenser locations; if this requires more than one switch, the appropriate number of duplicate switches will be provided and installed. Each switch will be identified by an all weather sign with letters at least 1 inch high with text as shown in the drawings. Lettering shall be reflective and will be in contrasting color to sign background, and the sign will be mounted at least 5 feet above ground level. The switch shall be installed in such a manner this it is clearly visible from the dispensers and meets ADA requirements.

B. The emergency shut-off switch shall terminate electric power to all dispensers, pumps, and dispenser control devices. Power for the illumination of all dispensing areas will not be affected by the activation of the switch. The switch shall be of such a design or installed in such a way that it cannot be reset by customers. Unless a fire alarm box or automatically self-dialing telephone is located adjacent to the emergency shut-off, activation of the emergency shut-off switch shall transmit an alarm to the fire station or 24 hour security desk or other emergency agency. Contractor shall coordinate with facility officials regarding the final location of the alarm transmittal.

3.12 SYSTEM CHECKING:

A. In addition to normal construction observation, three formal system checks shall be conducted. The Contractor shall inform the Contracting Officer and the Architect/Engineer one week in advance of the day and time of each test. Each test shall be performed in the presence of the Contracting Officer and the Architect/Engineer. The Contractor is cautioned that all components of the system being tested shall be installed, prepared for testing, exposed and in proper

operating condition for each test. All costs associated with retesting or additional visits by the Contracting Officer, Architect/Engineer or other third-party technicians shall be at the expense of the Contractor.

B. The manufacturer's recommendations for installation, in addition to the codes and standards listed in paragraph 1.02, A of this specification shall be referenced to determine proper installation and procedures for each system check. Documentation of each test (including copies of field notes) shall be provided to Contracting Officer and the Architect/Engineer. AAFES and the Architect/Engineer assume no responsibility or liability for the consequences of any testing practice.

C. The Contractor shall provide labors and technicians to assist the Contracting Officer and the Architect/Engineer in the system operation and testing. All testing procedures shall be conducted by the Contactor for observation by the Contracting Officer and the Architect/Engineer. At the preconstruction meeting, the Contractor will be provided a copy of the checklist used by the Contracting Officer and the Architect/Engineer for each test. The following system checks shall be conducted:

1. Product/Vent Lines and Sumps. Observed for proper installation and use of materials in conformance with plans and specifications. Observation of proper line placement, bedding and slope. Pressure test of the complete piping system prior to backfilling of piping. Soap test all pipe runs including fittings and joints. Water test all dispenser and tank pump sumps.
2. Final System Check: Observed for proper installation and use of materials in conformance with plans and specifications. Observation of dispenser sumps and sensors. Observation of tank pump, fill, vent and hydrostatic systems, sumps and sensors. Observation of Veeder-Root system programming and detection of sensors floats.

D. At the end of the each system check, all results shall be noted. The Contractor shall provide copies of the manufactures certifications indicating designation as a certified installer, authorized service contractor and technician shall be provided during final system check. Copies of the technician's certifications (i.e. Veeder-Root) provided shall be from the individuals responsible for installation of the appropriate system component. Full documentation of test results, including the test procedure used (and a copy of the test procedure's third-party certification) shall be provided to the Contracting Officer and the Architect/Engineer.

E. System checks listed above are not intended to be exhaustive checks or detailed inspections of the work. Therefore, AAFES and the Architect/Engineer assume no responsibility or liability for the completeness or proper installation of the work. The system checks listed above do not relieve the Contractor of responsibilities under this Contract or relieve him of any portion of the system warranty.

3.13 FINAL ITEMS:

A. All product piping (including dispensers) shall be bled completely of all trapped air as submerged pumps are tested. System shall be tested for tightness and proper operation of leak detectors and impact valves. At least 300 gallons (100 gallons of each product) of fuel shall be pumped through each nozzle of each dispenser to insure that all trapped air is purged from the product lines.

B. After meter calibration of each dispenser, filters shall be removed and replaced.

C. Flow restriction devices must be installed if the system is determined to dispense fuel at more than 10 gallons per minute (GPM).

D. Projects constructed where rules require Stage I Vapor Recovery Systems to meet efficiency standards, shall be successfully tested by the contractor according to CARB Test Procedures. This project is in an Stage I area, so testing is required.

E. Only projects in which the entire Stage II Vapor Recovery System is installed, shall have appropriate compliance testing conducted by the contractor prior to gasoline being offered for commercial sale. Such testing shall include a Pressure Decay test, Dynamic Backpressure (or liquid blockage) test, a Flow Rate Determination, and either a Liquid Removal Device Performance test (for balance systems) or Air/Liquid Ratio test or Vapor/Liquid Ratio test for vacuum assist systems. Any other testing or monitoring required by the California Air Resources Board (CARB) Executive Order for that system shall be conducted or be provided in accordance with the test procedure or monitoring described therein.

3.14 TESTING: During installation and upon completion of installation, the UST system shall be tested in the presence of the Contracting Officer representative. This testing shall be conducted using EPA third-party and CARB certified methods as applicable. (Where applicable, contractor shall perform and report the results of a full start-up compliance test of the Stage I and Stage II vapor recovery systems as noted below.) At a minimum, tank and line tightness tests, pressure decay and dynamic backpressure (liquid blockage) tests of the vapor recovery system shall be performed by the contractor's tester and a written report documenting all the results shall be provided to the Contracting Officer Following testing and certification, the system shall be shown to function under simulated actual use conditions, demonstrating the function and operation of the equipment. Hydrostatic testing of the piping sumps and fill/spill bucket assemblies shall be performed. Pressure testing of the primary and secondary piping shall be performed. As a condition of acceptance, written certification shall be furnished to the Contracting Officer in evidence of full compliance with the requirements specified herein.

3.15 TRAINING OF AAFES PERSONNEL: Contractor shall provide total 8 hours of training of AAFES employees on the operation and maintenance of all equipment and systems. Training shall not be conducted during final testing and testing of the tank system, so that the quality of instruction is not compromised. A training attendance roster shall be completed for each training session held. The roster shall indicate the training subject, training date, length of the training class, the name, phone number and signature of the instructor, the name of the company he represents, as well as the full name, office symbol and complete telephone number of each attendee. A copy of class rosters and accompanying photograph of the class attending each session and instructor will be placed in each copy of the O&M manual.

END OF SECTION

SECTION 13121

PRE-ENGINEERED BUILDINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pre-engineered, shop-fabricated structural steel building frame.

B. Metal roof panels and roof insulation.

C. Metal soffit panels.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete.

B. Section 05120 - Structural Steel.

C. Section 05500 - Metal Fabrications.

D. Section 07900 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. AISC 360 - Specification for Structural Steel Buildings; American Institute of Steel Construction, Inc.; 2005.

B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.

C. ASTM A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength; 2007b.

D. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2009.

E. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2009.

F. ASTM A 500/A 500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2007.

G. ASTM A 529/A 529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2005.

H. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2006a.

I. ASTM A 992/A 992M - Standard Specification for Structural Steel Shapes; 2006a.

J. ASTM C 991 - Standard Specification for Flexible Glass Fiber Insulation for Metal Buildings; 2008.

K. ASTM C 1107/C 1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2008.

L. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.

M. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.

N. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society; 2007.

O. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2008.

P. MBMA (LR) - Low Rise Building Systems Manual; Metal Building Manufacturers Association; 2006.

Q. NAIMA 202-96 (Rev. 2000) - (North American Insulation Manufacturers Association) Standard for Flexible Fiber Glass Insulation to be Laminated for Use in Metal Buildings; 1996 (Rev. 2000).

R. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

S. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Underwriters Laboratories Inc.; 2006.

1.04 DESIGN REQUIREMENTS

A. Installed Thermal Resistance of Roof System Flexible Fiber Glass Insulation: R value of 19 minimum.

B. Design members to withstand dead load, and design loads due to pressure and suction of wind calculated in accordance with ASCE-7 latest edition and applicable code. Coordinate with Structural drawings for occupancy category, wind, and seismic requirements.

C. Design roof system members and roof panel attahment to withstand UL 580 Uplift Class 90.

D. Exterior roof system shall withstand imposed loads with maximum allowable deflection of 1/180 of span.

E. The building's structural columns, beams, girts, angles, etc., shall withstand imposed wall system loads with maximum allowable deflection of 1/600 of span. These loads will be imposed by metal stud/concrete masonry unit veneer walls that will be built by others but that will be attached to the structural framework provided under this Section.

F. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.

G. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 120 degrees F.

H. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

1.05 SUBMITTALS

A. Product Data: Provide data on profiles, component dimensions, fasteners and insulation/vapor retarder.

B. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections, attachments, openings, cambers, and loads; roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, installation; framing anchor bolt settings, sizes, and locations from datum, foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.

C. Samples: Submit two samples of precoated metal panels for each color selected, 3 x 5 inch in size illustrating color and texture of finish.

D. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement.

E. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

F. LEED Submittals/Reports:
   1. Construction Waste Management (LEED MR 2.1 & 2.2 - Divert 75% from Disposal): Provide the following:
      a. General description of each type/category of waste generated.
      b. Location of receiving agent (recycler/landfill) for waste.
      c. Quantity of waste diverted (by category) in tons, or cubic yards.
   2. Recycled Content (LEED MR 4.2 - 20% Recycled Content): Provide the following:
      a. Total cost of materials supplied.
      b. Pre-consumer and/or post-consumer recycled content percentage of materials supplied.
      c. Source of the recycled content data.
   3. Regional Materials (LEED MR 5.2 - 20% Extracted, Processed & Manufactured Regionally): Provide the following:
      a. Total materials cost.
      b. Provide information for each tracked material:
         1) Product name.
         2) Material manufacturer.
         3) Total product cost.
         4) Percentage of product, by weight, that meets both the extraction and manufacture criteria.
         5) Distance between the project site and extraction/harvest/recovery site.
         6) Distance between the project site and the final manufacturing location.
   4. Low-Emitting Paints & Coatings (LEED IEQ 4.2 - Low Emitting Materials: Paints & Coatings): Provide the following:
      a. Listing of each indoor paint and coating used. Include for each product:
         1) Manufacturer's name.
         2) Product name.
         3) Specific VOC data (in g/L).
   5. Provide additional LEED-related product information as required to support LEED certification goals of Project.

1.06 QUALITY ASSURANCE

A. Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this Work.
   1. Design Engineer Qualifications: Licensed in state where project is located.
   2. Conform to applicable code for submission of design calculations and reviewed shop and erection drawings as required for acquiring permits.
   3. Cooperate with regulatory agency or authority and provide data as requested.

B. Perform work in accordance with AISC 360 - Specification for Structural Steel Buildings and MBMA "Low Rise Building Systems Manual".

C. Perform welding in accordance with AWS D1.1.

D. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

E. Erector Qualifications: Company specializing in performing the work of this section with minimum three years experience.

1.07 WARRANTY

A. Correct defective Work within a five year period after Date of Substantial Completion.

B. Provide five year manufacturer warranty for roof system.

1. Include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Include coverage for weather tightness of building enclosure elements after installation.

PART 2 PRODUCTS

2.01 LEED PROJECT GOALS

A. General: To help meet the Owner's LEED Certification goals for this Project, the Contractor will be expected to meet or exceed the following targets for materials supplied under this Section:
   1. Construction Waste Management (MR 2.1 & 2.2): Divert 75%, by weight, of potential landfill trash/waste by recycling and/or salvage.
   2. Recycled Content of Steel (MR 4.2): 90%.
   3. Regional Materials (MR 5.2): 20% of building materials shall be extracted or recovered, as well as manufactured, within 500 miles of the project site.
   4. Low-Emitting Paints & Coatings (IEQ 4.2): Do not exceed VOC content limit of 250 g/L for any anti-corrosive or anti-rust paint applied to ferrous metal substrates.

2.02 MANUFACTURERS

A. Pre-Engineered Buildings:
   1. Base Bid Manufacturer: Gulf States Manufacturers, Inc: www.gulfstatesmanufacturers.com.
   2. Voluntary Alternates: Contractor's Base Bid shall be based on using the manufacturer named above. The Bidder may propose a Voluntary Alternate utilizing another pre-engineered building manufacturer, but will be required to demonstrate proof of equivalency to the Contracting Officer's satisfaction for the Voluntary Alternate to be considered.
      a. Butler Manufacturing Company: www.butlermfg.com.
      b. Ceco Building Systems: www.cecobuildings.com.
      c. Varco Pruden Buildings: www.vp.com
      d. Kirby Building Systems: www.kirbybuildingsystems.com.

2.03 PRE-ENGINEERED BUILDING

A. Single span rigid frame.

B. Primary Framing: Rigid frame of rafter beams and columns, canopy beams, braced end frames, and end wall columns, wind bracing, and other items as detailed.

C. Secondary Framing: Purlins, Girts, and Clips, and other items detailed.

D. Wall System: Not required.

E. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing/anchorage assembly and insulation, and accessory components.
   1. Basis of Design: Equivalent to Gulf States Manufacturers "Roof-Lok " Roof Panel System and "Traditional" Soffit Panel System.

2.04 MATERIALS - FRAMING

A. Structural Steel Members: ASTM ASTM A 992/A 992M.

B. Structural Tubing: ASTM A 500, Grade B cold-formed.

C. Plate or Bar Stock: ASTM A 529/A 529M, Grade 50.

D. Anchor Bolts: ASTM A 307, galvanized to ASTM A 153/A 153M.

E. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M, Class C.

F. Welding Materials: Type required for materials being welded.

G. Primer: SSPC-Paint 20, zinc rich, with maximum VOC content of 250g/L.

H. Grout: ASTM C 1107/C 1107M, Non-shrink type, premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents, capable of developing minimum compressive strength of 2400 psi in two days and 7000 psi in 28 days.

2.05 MATERIALS - ROOF

A. Steel Sheet: ASTM A 792/A 792M aluminum-zinc alloy coated to AZ50/AZM150.

B. Roof Insulation: Certified to comply with North American Insulation Manufacturing Association (NAIMA) Standard 202-96 (Rev. 2000).
   1. Fiber Glass Insulation: ASTM C 991 Type II.
      a. R-Value: 19 (approximately 6-inches thick).
   2. Facing: Polypropylene/scrim/foil, 0.008 inches thick, white; laminated to one side of fiberglass.
      a. Permeance (WVTR): 0.02 perm, per ASTM E96 Procedure A.
      b. Fire Hazard Classification: 25 flame spread / 50 smoke developed, or less, per ASTM E 84.
   3. Thermal Blocks: Polystyrene; 3-inch wide x 1-inch thick x 1'-11-3/4" long.

C. Joint Seal Gaskets: Manufacturer's standard type.

D. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A 153/A 153M, finish to match adjacent surfaces when exterior exposed.

E. Bituminous Paint: Asphaltic type.

F. Sealant: Manufacturer's standard type.

G. Trim, Closure Pieces, Caps, Flashings, Rain Water Diverter, Facias, and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

2.06 FABRICATION - FRAMING

A. Fabricate members in accordance with AISC Specification for plate, bar, tube, or rolled structural shapes.

B. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.

2.07 FABRICATION ROOF PANELS

A. Roofing: 16-inch wide panels, minimum 24 gage thickness, with 2-inch-high rib seam at 16" inches on center. Seams shall be "mechanically seamed" type and shall utilize manufacturer's standard factory sidelap sealant and seam locking tool. Fasteners shall be concealed.
   1. Sliding Connection Clips: Equivalent to "Roof-Lok" sliding connection clips manufactured by Gulf States Manufacturers, Inc. Each unit shall consist of a 12-gage (minimum) stainless steel or nylon coated galvanized base clip which connects to the purlin and a 24-gage upper clip which is seamed into the roofing panel side lap. Clips shall be factory assembled to allow the upper portion to move 1-inch in either direction (relative to the base) to compensate for the thermal expansion and contraction of the roof panels.

B. Soffit Panels: 12-inch wide x 1-1/2-inch depth flat-profile panels with pencil ribs, minimum 24 gage thickness, perforated for ventilation. Fasteners shall be concealed.

C. Girts/Purlins: Rolled formed structural shape to receive roofing.

D. Internal and External Corners: Same material thickness and finish as adjacent material, profile brake formed to required angles. Back brace mitered internal corners as recommended by manufacturer.

E. Flashings, Closure Pieces, Fascia, Infills, and Caps: Same material and finish as adjacent material, profile to suit system.

F. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type.

2.08 FABRICATION - GUTTERS AND DOWNSPOUTS

A. Fabricate of same material and finish as roofing metal color to Match Installation Standards.

B. Form gutters and downspouts of profile and size indicated to collect and remove water. Fabricate with connection pieces.

C. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.

D. Fabricate support straps of same material and finish as roofing metal, color as selected to match Installation Standards..

2.09 FINISHES

A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.

B. Roof Panels, Wall Panels, Soffit Panels, Gutters, Downspouts, Accessories & Trim: All items shall have a full-strength, 70 percent Kynar 500 fluoropolymer coating finish, in color(s) as selected to match Installation Standards from manufacturer's standard offerings.
   1. Colors must match installation requirements and may require custom matching.
   2. Roof coating must have a SRI of 29 The roof design reduces thermal gradient differences by:

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.02 ERECTION - FRAMING

A. Erect framing in accordance with AISC 360 - Specification for Structural Steel Buildings.

B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing.

C. Set column base plates with non-shrink grout to achieve full plate bearing.

D. Do not field cut or alter structural members without approval.

E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.03 ERECTION ROOF PANELS

A. Install in accordance with manufacturer's instructions.

B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

C. Install insulation in accordance with NAIMA "Recommendations for Installing Fiber Glass Insulation in Metal Buildings."
   1. Installation Method: Single layer, with thermal spacer blocks.
   2. Vapor retarder shall face towards the interior of the building.

D. Fasten cladding system to structural supports, aligned level and plumb.

E. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.

F. Provide expansion joints where indicated.

G. Use concealed fasteners.

H. Install sealant and gaskets to prevent weather penetration.

3.04 ERECTION - GUTTERS AND DOWNSPOUTS

A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

B. Apply bituminous paint on surfaces in contact with cementitious materials.

C. Slope gutters minimum 1/8 inch/ft.

D. Connect downspouts to drainage as indicated on drawings.

3.05 INSTALLATION - ACCESSORIES

A. Seal wall and roof accessories watertight and weather tight with sealant.

3.06 TOLERANCES

A. Framing Members: 1/4 inch from level; 1/8 inch from plumb.

B. Siding and Roofing: 1/8 inch from true position.

END OF SECTION

SECTION 15010

GENERAL MECHANICAL PROVISIONS

PART 1. GENERAL

1.1. General Requirements: Division One is applicable in full hereto. For the purpose of this specification the word "provide" shall mean, "furnish and install, complete and ready for use". **Note that no building material or products which contain asbestos, formaldehyde, lead or mercury as defined by OSHA and/or EPA shall be utilized**. The facility is seeking LEED Silver Certification. All materials and methods shall be as required to obtain this certification. The Contractor is required to familiarize himself with ALL project documents and not just his specific specifications and plan section for requirements and coordination required with other trades to obtain the LEED Silver Certification. This Contractor is required to assist the General Contractor and the Contracting Officer in the completion of all LEED certification forms as it pertains to his respective discipline. All materials, sealants, coatings, adhesives, paints, etc. shall be low VOC and comply with Green Building Council requirements for LEED certification. The facility is being commissioned by an independent commissioning agent. Refer to various specifications and in general assist the commissioning agent as specified.

1.2. Codes: Comply with applicable NFPA, ASME, OSHA, IBC, ASHRAE, SMACNA and ANSI requirements, with current local Building Codes, Mechanical Codes, Gas Codes, Plumbing Codes, ASHRAE Standard 90.1 2007 and with other local ordinances and codes. All pressure vessels shall be constructed and tested in accordance with applicable ASME Codes and shall bear ASME stamps. Where conflicts occur between a code and contract drawings or specifications, the most stringent requirements shall apply.

1.3. Permits: Provide all permits, pay all fees and arrange for inspections as required by local and state authorities. Furnish certificate of final inspection and approval from local building inspectors. Provide additional materials, parts, etc. and modify the work as required by Government Inspections and Regulations.

1.4. Drawings: In the interest of clearness, the work is not always shown to scale or exact location. Check all measurements, location of pipe, ducts, and equipment with the detail architectural, structural and electrical drawings and lay out work so as to fit in with ceiling grids, lighting and other parts. Make minor adjustments in the field as required to provide the optimum result to facilitate ease of service, efficient operation and best appearance. Where doubt arises as to the meaning of the plans and specifications, obtain the Contracting Officer's decision before proceeding with parts affected; otherwise assume liability for damage to other work and for making necessary corrections to work in question. **DO NOT SCALE** Plumbing and HVAC drawings. The various scales used on the drawings do not allow for all fittings, offsets and accessories that may be required to complete the work. The contractor shall carefully investigate the conditions that would affect the work to be performed and shall arrange such work as necessary to comply with the intent of the construction documents. Refer to Architectural drawings for dimensions and verify scale shown on the drawings. All drawings are diagrammatic and are intended to quantify the materials specified and indicate their intended relationship to each other.

1.5. Conflicts, Coordinations and Changes: In the event that interferences or conflicts occur, the

Contracting Officer shall decide which equipment shall be relocated regardless of which was first installed. In the interest of avoiding such conflicts, each sub-contractor who is using common space, etc., shall coordinate his work with all other trades and other parts of his own work. If, during this coordination, it is discovered that necessary or desirable changes should be made, advise the Contracting Officer and secure his decision in writing. The drawings and specifications are complementary. Work shown, but not specified, or specified, but not shown, shall be the same as though required by both.

Do not fabricate any duct nor install any pipe until all coordination has been accomplished.

1.6. Warranty: Guarantee in writing to make good without cost any defects in materials and workmanship for one year following the date of acceptance of the project. Provide free maintenance and service during the guarantee period to **include furnishing and replacing of filters. Filter changes shall be done quarterly**. See other Sections for special guarantee of air conditioning compressors, water heaters, heat exchangers, etc. All air conditioning units' compressors shall have extended, 4-year, non-prorated replacement warranties.

1.7. Submittal Data: Within 30 days after award of the contract, submit for approval a complete schedule of material and equipment proposed. Partial lists will not be considered. Include catalog data, scheduled capacities, fan curves, etc. Where substitutions are proposed, unless the Contractor states in writing the differences of the substituted equipment or material, he shall be held responsible to replace such items any time discrepancies are found. All submittals shall be bound into a notebook, indexed and tabbed. A cover sheet shall be provided which states, as a minimum, the project name and location, the name of the owner, the Contracting Officer, the general contractor, the mechanical contractor (plumbing contractor for plumbing submittals) and the contractor's point of contact with phone number. A summary sheet shall be inserted at the beginning of each tabbed section stating specifics of the items (manufacturer, capacities, etc.) within the particular tabbed section. HVAC items shall follow the same format as shown on the equipment schedules. Plumbing submittal items shall be provided in the same manner. **This requirement will be strictly adhered to. Failure to provide the submittals in the format specified will be cause for rejection without review.** Also, follow procedures set forth in Division One. **The General Contractor shall review and approve all submittals prior to submitting same to the Contracting Officer. Submittals without the General Contractor's approval will be rejected without review.**

Before starting work, submit for approval, shop drawings showing proposed arrangement of equipment, duct work, detailed plan sections and isometric of mechanical room piping, floor drains, power requirements, and controls. As a minimum, submit detail layouts of potential conflicts at plumbing risers, equipment rooms, limited ceiling space, etc. Refer to subsequent Sections for additional specific requirements. Failure to submit shop drawings will make the Contractor responsible for changes required to facilitate installation of all systems.

1.8. Existing Conditions: Bidders shall visit the site and become acquainted with all job conditions. Report to the Contracting Officer, prior to bid, any conditions that are required to accomplish the installation of all systems. Provide for required adjustments to complete the intent of the work. No consideration will be given after bid opening for alleged misunderstanding regarding job conditions, utility connections, permits, fees, etc.

1.9. Line Locators: Before proceeding with excavating or trenching, arrange with various utility

companies, owners or line locating firm(s) to describe and mark any and all of their systems which might be damaged by construction operations.

1.10. Phasing: N.A.

1.11. Record Drawings: Provide in such detail, as is set forth under General and Supplemental Conditions.

Keep an accurate record of changes made during construction.

Transfer these changes to a set of reproducible copies of original drawings that Contracting Officer will provide to Contractor at printing cost. Sheet metal drawings may be a set of reproducible copies of the final corrected sheet metal shop drawings. When work is completed submit corrected reproducible drawings to Contracting Officer for record. Also, provide to the Contracting Officer, as-built drawing files on CD-R type CD. Drawing files shall be provided (as a minimum) in ACAD (AutoCAD) 2006 format. Verify ACAD Release version required by the owner, with the owner, and provide as required. DXF files are **not** acceptable. The contractor may obtain CAD files from the engineer for a fee of $150 per sheet. The contractor will also be required to sign a letter of agreement pertaining to the use of the electronic files and the contractor's responsibilities for the use of those electronic files, prior to the Engineer sending the electronic files. The drawings will be provided to the contractor "as is". The contractor is responsible for providing and showing all changes to the drawings that are different from the original contract drawings, including but not limited to addendums, change-orders, etc.

PART 2. WORK RELATED TO OTHER TRADES

2.1. Foundations: Applicable mechanical contractor shall provide foundations, supports, etc. not specified under other Divisions and as required to mount equipment in a workmanlike and structurally sound manner. Consult drawings pertaining to other trades to determine extent of their work. Roof curbs and equipment supports for roof mounted equipment shall be provided by the Roofer. Applicable mechanical contractor shall provide stands, etc.; and all sub-framing extending from typical structural members to supported items. Concrete pads for outside equipment are specified under other Sections. Concrete work shall meet requirements of Division 3. All support items used on the roof shall be coordinated with the Roofing Contractor and shall not void roofing warranty.

2.2. Roof Flashing: Built-up base flashing and other related roofing work is specified under Roofing Section but with reservation that roofer be advised of requirements and furnished items to be installed before roofing is in place. Flashing cones, counter flashing hoods, storm collars, and lead flashing for vent stacks and roof drains are to be provided by applicable mechanical or plumbing contractor.

2.3. Electrical Work and Coordination between Mechanical / Plumbing Trades: Refer to subsequent Sections.

2.4. Pipe Sleeves: Fit all pipes passing through walls, partitions and floors (except slabs on grade construction) with sleeves. Sleeves shall be built-in as work progresses. Sleeves in new construction shall be set before concrete is poured or masonry is erected. Sleeves through

concrete joists and beams shall be of Schedule 40 galvanized steel pipe. Sleeves for pipe passing through interior walls or partitions shall be 20 gage galvanized steel, 1/2" larger in diameter than pipe or piping covering. Sleeves for pipe passing through exterior walls or partitions that contain refrigerant piping shall be Schedule 40 PVC pipe, 1/2" larger in diameter than pipe or piping covering.

Sleeves in new construction shall be set before concrete is poured or masonry is erected.

Sleeves for ducts: See fire dampers.

2.5. Access Panels and Doors: Provide as specified below. Access panels required for items in finished ceilings shall be furnished to general contractor for installation wherever required. Provide access panels or doors for access to HVAC controls sensors, valves, motorized dampers, air vent, cleanout, smoke detector or similar device. Doors shall be suitable for wall or ceiling finish involved, 16" x 16" unless otherwise indicated or as required to permit removal of equipment and/or provide acceptable maintenance access, fire rated where rated assemblies are penetrated. Identify all access panels and doors to indicate item for which access is provided for. Ex. Motorized damper, fire damper, etc.. Additionally, add the following to each access panel identifier: “DO NOT BLOCK” . See section identification for materials and methods required. Access panels and doors shall be as manufactured by Milcor, Philip Carey, Zurn or other approved equal. The Contracting Officer must approve proposed type before installing.

Where device occurs above a lift-out acoustical ceiling panel, provide engraved plastic labels of type specified in “Miscellaneous Requirements, Identification “, below. Engraved plastic labels shall match ceiling grid color and be neatly glued to the ceiling grid adjacent to the ceiling tile that should be removed for access to the item. The label shall have engraved on it the item being identified and its identifier as shown on the plans, valve chart, etc.

2.6. Cutting and Patching: Openings are to be laid out and built-in. Furnish detailed layout drawings to other trades in advance of their work. Failure to furnish layout shop drawings to General Contractor shall make the applicable mechanical / plumbing contractor responsible to rebuild openings as directed by the Contracting Officer. Piping within or behind walls must be installed before wall is erected. Otherwise walls, etc. affected must be reworked by trade which erected same at expense of Mechanical / Plumbing Contractor. Chasing and cutting of new work will not be accepted.

The millwork contractor, upon receipt of proper templates, shall make cutouts in countertops. Openings in existing walls shall be made by trade requiring same, with repairing and patching required thereby done by the respective trade whose work is damaged.

2.7. Painting and Finishing: Clean and paint with two coats of black latex paint all exposed ferrous metal parts of mechanical equipment located in mechanical rooms, above ceilings, etc. Include black steel pipe, uncoated cast iron pipe, hangers, brackets, etc. Also, see specification section, "Identification".

Painting of ducts, piping and other surfaces in finished areas is specified under Section "Painting". Where factory finished items are marred or scratched, replace the item, or upon approval from the Contracting Officer or owner, refinish or touch-up as required to bring to a like-new condition.

PART 3. EXCAVATION, TRENCHING & BACKFILLING

3.1. Excavating: Insure that walls and footings and adjacent load bearing soils are not disturbed in any way, except where lines must cross under a footing. Where a line must pass under a footing, make crossing with the smallest possible trench to accommodate the pipe. Where a line must pass adjacent to and below the bottom of a column footing, or the corner of a continuous footing, backfill the trench with concrete up to the level of the footing bottom, for a distance away from the footing equal to the depth of the fill.

Keep excavation free from water by pumping if necessary. Dig trenches true to line and with a flat, even bottom. Form bell-holes to allow proper bedding of the pipe sections. Top of all piping must be at least 24 inches below finish grade. Remove and relocate existing obstructions as directed.

3.2. Pipe Trenches: Make true to grade using string and batter-boards. Place pipe on undisturbed earth where possible; otherwise provide concrete pads or mortar laid masonry piers at all joints and no further than 8' on centers.

3.3. Shoring, Sub-Soil Assumptions and Data, Work Around Trees, Surplus Earth: Refer to Section "Earthwork".

3.4. Backfilling: Immediately after testing and/or inspection, carefully backfill trenches with earth free from clods, brick, etc., to a depth one-half the pipe diameter. Then firmly puddle and tamp as not to disturb the alignment or joints of the pipe. Thereafter, puddle and tamp every vertical foot. Do not place clods, brick, stones, etc., in the trench until the pipe has one-foot cover, and not in trenches under the building slab in any case.

Backfill within the building and under paved areas shall meet compaction requirements established under Division 2. Fill material shall be pit run gravel or similar granular material.

3.5. Broken Pavement: In public streets, backfill and repair to satisfaction of authorities having jurisdiction.

PART 4. PIPE HANGERS AND SUPPORTS

4.1. General: Provide factory fabricated pipe hangers and supports for all piping of type and size specified bolts, washers, etc. as required for a complete functional installation. Material items, methods and general requirements not covered in this specification shall be provided in strict accordance with Manufacturer's Standardization Society Specification MSS SP-58, MSS SP-69 and Manufacturer's Published Product Information.

4.2. Spacing: Install supports as required to prevent sags, bends or vibration. In all cases, provide within 6 inches of elbows, take-off fittings, valves, any change in direction of item supported and at ends of branches over 5 feet long and on centers not exceeding the following:

steel pipe	up to 1 ¼", 6 feet; over 1 ½" and 2", 8 feet
	2" through 3 ½", 10 feet; over 3 ½", 12 feet

Provide additional building attachments where support is required for additional concentrated loads, including valves, in-line pumps, flange guides, strainers, expansion joints and at all changes in direction of piping.

Support cast iron pipe adjacent to each fitting and on centers not exceeding five feet.

At no-hub pipe, support as above, and in addition provide adequate sway bracing to stabilize all components of the system. Provide special support for fixture arms, closet bends, etc.

4.3. At Typical Suspended Horizontal Pipe: Adjustable clevis or split-ring type equal to Elsen Fig. 12 or 10c.

4.4. On Insulated Lines: Size hanger loops to fit **over** insulation and provide 12" long, 22 ga. Galvanized sheet metal, half round saddles, to protect all piping up to 1 ¼". Provide for piping over 1 ¼" a preformed, pre-insulated saddle assembly consisting of an **integral metal saddle and insulation**. The assembly shall be a 360 degree section of 3.0 pcf density polyisocyanurate pipe insulation. The assembly shall have a 6-mil thickness, .01 perm rated industrial grade vapor retarder film. The insulation shield shall be a G-90 galvanized steel, 360 degree self-clamping and be **integral with the insulation**. The assembly shall also be provided with an insulation lock joint longitudal seam. The assembly shall meet the requirements of ASTM D1622 for insulation density, ASTM C518 for thermal conductivity, ASTM D1621 for 50 PSI compressive resistance, and ASTM D374. The insulation jacket shall have a hazard rating not to exceed 25 flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E-84, NFPA 255 and UL 723. The assembly shall be equal to Buckaroos, Inc, Model 3300E of Indianapolis, IN.

4.5. Manifolds and Parallel Runs: At his option, Contractor may provide a Unistrut system complete with standard fittings, clamps and accessories required. Furnish for approval proposed system components.

4.6. Where in Contact with Copper Pipe: Same as above except hangers shall be copper plated.

4.7. Hanger Rods: Shall be mild steel, threaded as required. Use not smaller than 3/8" rods for pipe 2" and under, ½" rods for pipes 2 ½" through 4", ¾" rods for 5" through 12" and 1" rods for piping over 12", but generally as standard for the hanger selected. Support rods with threaded Underwriters' listed inserts, expansion shields or beam clamps, shall be all galvanized. Beam clamps shall be equal to Elsen Fig. 34 or 36 with rod and eye end.

At bar joists support from bottom chord at panel points. For piping over 6" provide supplemental steel angle supports and welding to span 3 joists when running parallel to joists and welded angle between two panel points for piping running perpendicular to joists. Concrete inserts shall be equal to Grinnell Figure 282.

4.8. Spring Type Pipe Hangers: Provide as required to isolate pipe vibration from the building.

4.9. Approved Equivalents: By Grinnell, Elsen, Stockham or Crane will be accepted.

4.10. Supports for Water Supply Piping in Spaces Behind Plumbing Fixtures: ABS brackets and U-

bolts. Secure the 2-piece brackets to cast iron stacks. U-bolts shall be sized to bear on the pipe. Brackets shall be P&M Bracket Co. or equal.

4.11. Lateral Movement Supports: Support piping as required to control lateral movement without affecting expansion and construction movement. Install cushion clamp assemblies of type as manufactured by Hydra-Zorb Company.

4.12. Bracing: Where hanger rods height exceed 16" provide diagonal bracing at every fourth hanger and attach to the building structural system.

PART 5. MISCELLANEOUS REQUIREMENTS

5.1. Materials and Equipment: New and of best quality in every respect. Pipe and fittings shall conform to the ASTM Standard designated for pipe of each material. Equipment shall be UL approved where commercially available. Where two or more units of the same class of equipment are required, these units shall be products of a single manufacturer, however, the component parts of each unit need not be. All pressure vessels shall be constructed and tested in accordance with applicable ASME Codes and shall bear ASME stamps unless specified otherwise. Minimum pressure rating shall satisfy job conditions. Submit to the Contracting Officer certificates of inspection and approval. All equipment that is not covered by the U.S. National Appliance Energy Conservation Act (NAECA) of 1987 shall carry a label installed by the manufacturer stating that the equipment complies with the requirements of ASHRAE/IESNA Standard 90.1-2007. All HVAC equipment shown in ASHRAE/IESNA Standard 90.1-2007, Tables 6.8.1A through 6.8.1G shall have minimum performance at the specified rating conditions when tested in accordance with the specified test procedure. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements, unless otherwise exempted in the aforementioned tables.

5.2. Workmanship: First class, premium and in accordance with best practice. Pipe shall be cut clean, properly reamed, threaded or soldered, erected plumb and secure. Make changes in pipe size with reducing fittings without the use of bushings. Work shall be executed by experienced mechanics and shall present a neat appearance. Install equipment in accordance with manufacturer's recommendations.

At all stages of installation, protect pipe openings, fixtures, ductwork, and equipment against the entrance of foreign materials, and from damage by the elements, mortar, paint, etc. Absolute coordination is required with the other contractors on the project before proceeding with installation of any system or item.

5.3. Factory Finishes: Manufacturer's standard unless otherwise stated. Submit color cards to the Architect for selection where choice exists.

5.4. Expansion: Provide for expansion and contraction of all piping and make proper provisions so that excessive strain will not occur on piping or other parts.

5.5. Safety Provisions: Provide covers or guards on all hot, moving and projecting items that could be a hazard to occupants of the building or to service personnel.

5.6. Cleaning and Adjusting: Upon completion of work, clear all drains, traps, fixtures, ducts and

pipe. Adjust all valves, remove rubbish and leave work in clean and excellent operating condition. Install final permanent type filters only after cleaning of building is completed.

5.7. Escutcheons: Where pipes pass through floors, walls and ceilings of finished rooms, provide pressed chrome-plated brass or steel plates securely fastened in place. Caulk pipe opening behind escutcheons to prevent passage of smoke and make vermin proof.

5.8. Identification: Identify all piping and jacket of insulated pipe exposed to view and/or accessible through removable ceilings or access panels, with Seton "Snap-Around" pipe line markers, Marking Services Inc (MSI) Series MS-970 or approved equivalent. The markers shall be color-coded in accordance with ANSI Standard A13.1. Identification shall bear name of pipe contents and show direction of flow. "**Stick-on" type markers are unacceptable**. Install markers at each valve, fitting, change in direction, branch take-off and along runs of pipe as required for proper identification but not further apart than 10 feet. Provide piping identification in small (closets, storage rooms, etc.) areas above ceilings where partition walls go to the structure above. Plumbing system piping identification shall comply with IBC requirements.

Paint all piping and jacket of insulated pipe in Mechanical Equipment Rooms and Fan Rooms with two coats of enamel paint. Colors to be in accordance with ANSI A-13.1 standard. The Contractor shall obtain ANSI A-13.1 and comply with all requirements.

All equipment, motor starters, disconnects, thermostats, humidistats, other control systems components, control switches, and related devices shall be equipped with engraved laminated plastic nameplates, as described below, but not less than 1/4" high.

Labels shall be a minimum of 2" x 3" x 1/16" thick, laminated plastic labels (larger if needed) with 1/2" high x 1/8" stroke numerals and letters to identify all equipment furnished under this Section. Red with white lettering or white with red lettering as required for maximum contrast with color of the equipment. **Screw** tag(s) to equipment in easy to read locations. Engrave equipment designation and numbers as shown on plan and drawings on upper half of tag, leaving lower half of tag for tag for future engraving by Owner. Where equipment is typed (HP-A, HP-B, EF-A, etc.) rather than numbered (HP-1, HP-2, EF-1, etc.) the tag shall include the room number(s) of the area served. Room numbers indicated on the architectural plans shall be used as the reference. Additionally, permanently affixed warning labels shall be attached to all equipment, on a highly visible location on the equipment, that can be automatically started. The warning label shall read as follows: "CAUTION !! This equipment is operating under automatic control and may start or stop at any time without warning, follow lock out tag out procedure without exception when working equipment. Switch disconnect switch to "OFF" position before servicing or attempting to work on equipment." Permanently affixed warning labels shall be attached to all motor starters and all control panels which are connected to multiple power sources utilizing separate disconnect switches. The warning labels shall read as follows: " This equipment is fed from more than one power source with separate disconnects. Disconnect all power sources utilizing proper lockout tag out procedures before servicing or working on this item."

Fit all valves (except equipment service valves and sprinkler valves) with engraved laminated plastic valve tags firmly secured with brass jack-chain and s-hooks to valve yoke or stem (not handles) or adjacent pipe. Fabricate tags as 2" x 3" x 1/16" white plastic with beveled corners,

engraved both sides with ½" high x 1/8" stroke red letters and numerals. Locate numbers at one edge of tag leaving room for future engraving by others. Number tags in sequence starting with number 1. Also, for each valve identified above the ceiling, provide an engraved laminated label, of the type specified above, and glue to the ceiling tile grid below the valve. In each equipment room provide a valve chart framed under glass or plastic which shows the number and location of each valve and type of service.

Where the tag, label or marker occurs in a plenum (return air) space, the plastic employed shall carry a Class A Flame Spread Rating per ASTM E-84, and shall meet ASTM D-635 (such as Westinghouse Micarta engraving stock).

Identify location of equipment, valves, etc. above ceilings is specified under Par. 15010-2.6.

Access openings to fire dampers shall be permanently identified on the exterior of the access panel by a label having letters not less than 3/4" in height and reading: " SMOKE DAMPER – DO NOT OBSTRUCT ACCESS " or " FIRE DAMPER – DO NOT OBSTRUCT ACCESS ".

5.9. Firestopping**:** Whenever pipes, ducts, etc. penetrate fire rated construction (walls, partitions, floors), the space between the penetrating member and the building construction shall be sealed with a fire stop that provides an effective barrier against the spread of fire, smoke and gas. See Architectural specification for approved fire caulk manufacturers. Carefully coordinate work with types of construction encountered and with Par. Pipe Sleeves above.

5.10. Soundproofing: Where ducts, pipes, etc. penetrate walls, floors and ceilings and other partitions, close openings as specified for firestopping. i.e., **all** penetrations shall be sealed.

5.11. Delivery and Storage: All equipment and materials delivered and placed in storage shall be protected from the weather, humidity and temperature variations, dirt and dust, and other contaminants in accordance with manufacturer's instructions and guidelines. See other sections of the specification for LEED requirements that pertain to equipment and material storage.

5.12. Dielectric Isolation: Provide dielectric isolation where dissimilar metals are joined, at supports, etc. For pipe sizes 2" through 6", copper piping flanges shall be drilled to ANSI B 16.5 150/125 Standard and powder coated, with an EPDM insulator adhered to the plate steel flange protruding inside of the steel flange to prevent contact with the copper flange adapter. The copper component of the flange adapter shall be Third Party Classified by Underwriters Laboratories, Inc. Minimum working pressure shall be 300 psi at 272°F.

END OF SECTION

SECTION 15400

PLUMBING

PART 1 - GENERAL & MISCELLANEOUS

1.01 GENERAL

A. General Provisions: Section 15010 is applicable in full hereto. **Note that no building material or products which contain asbestos, formaldehyde, lead or mercury as defined by OSHA and/or EPA shall be utilized**.. The facility is seeking LEED Silver Certification. All materials and methods shall be as required to obtain this certification. The Contractor is required to familiarize himself with ALL project documents and not just his specific specifications and plan section for requirements and coordination required with other trades to obtain the LEED Silver Certification. This Contractor is required to assist the General Contractor and the Contracting Officer in the completion of all LEED certification forms as it pertains to his respective discipline. The facility is being commisioned by an independent commissioning agent. Refer to various specifications and in general assist the commissioning agent as specified.

B. Scope: Include all equipment, material, and labor required for a complete operating plumbing system, even though every item involved is not indicated. Provide and coordinate required drain lines for recessed floor mats where indicated at building entry.

C. Qualifications: Sub-contractor shall be an established licensed plumber with satisfactory experience in at least 3 equivalent projects.

D. Electrical Work: All electric power wiring and conduit required for installation of equipment and systems under this Section is specified under Electrical Divisions, and installed by the electrical contractor. The plumbing Contractor shall furnish and install all control wiring and conduits as specified or required for operationally complete plumbing systems. The control contractor shall furnish and install all control wiring and conduits as specified or required for operationally complete mechanical systems. All control wiring and conduit work for plumbing and mechanical systems performed under this Section shall meet the requirements set forth in the Electrical Divisions 16000.

1.02 TESTS

A. General: Perform all tests in the presence of the Contracting Officer. Refer to Division One for fuel, water and power required therefor. In absence of specific testing procedure comply with code requirements and/or nationally acceptable industry standards.

B. Drainage and Vent System: Plug all openings, fill entire system with water to point of overflow and hold for at least one hour before inspection. System must remain full during the test without leakage. Each vertical stack with its branches may be tested separately, but any portion tested must have minimum ten foot head.

C. Water Supply System: Test and secure acceptance of entire system before the piping or hot water storage heaters are insulated or otherwise concealed. Test as follows: disconnect and cap all outlets to plumbing fixtures and all other equipment not designed for the full test pressure. Fill the system with water; apply 150 psi hydrostatic pressure and hold until inspection is completed. All piping throughout shall be tight under test. Water piping shall remain under

normal water pressure during construction (except when freezing weather is expected).

D. Fixtures: Test for soundness, stability of support and satisfactory operation.

PART 2 - PRODUCTS AND EXECUTION

2.01 SANITARY PIPING

A. Scope: Provide a system of soil, waste and vent piping connecting all plumbing fixtures, equipment, etc. to the house sewer, with consolidated vent connections extending through the building roof, all as shown on the drawings. Also, refer to roof plan.

B. Utility Connection: Refer to Division 2 connect to site utility.

C. Soil, Waste and Vent Piping: Provide solid wall Schedule 40 DWV, PVC pipe and fittings meeting ASTM Standard D2665 and 1785 with solvent joints except in spaces used as return air plenum. <u>All piping in spaces used as return air plenums and serving back-of-house and food court tenants, use cast iron pipe and fittings</u>. Cast iron pipe and fittings shall be hubless meeting ASTM A-888 with heavy duty couplings of 304 stainless steel, equal to Husky Series 4000.

D. Laying Out Work: Vents from any fixture, when connected to a vent line serving other fixtures, shall be extended at least 6 inches above flood level (rim) of the highest of such fixtures to prevent use of vent lines as a waste. Make changes in direction by appropriate use of 45 degree Y's, 1/2 Y's, or long sweep 1/4, 1/6, 1/8 or 1/16 bends. Sanitary T's or short 1/4 bends may be used on vertical stacks or drainage lines where change in direction of flow is from horizontal to vertical; except that long-turn Tees shall be used when two fixtures are installed back to back with common drain. Straight T's, Ells, and Crosses may be used on vent lines. Make no change in direction of flow greater than 90 degrees. Where different sizes of drainage pipes or fittings are connected use standard increasers and reducers of proper size. Do not reduce size of drainage piping in direction of flow. Drilling and tapping of house drains, soil, waste or vent pipes, and use of saddle hubs and bands, are prohibited.
   1. Do not begin work until elevation of final connection point is verified and grading of entire system can be determined (even if final connection is specified under another Section). NOTE: Minimum depth/cover for all piping outside the building shall be 24”.

E. Hangers: Support cast iron pipe adjacent to each fitting and on centers not exceeding five feet with hangers as specified hereinafter. Rigidly support base of vertical runs with solid masonry or concrete.

F. Grading: Uniform and not less than 1/8" plf for pipe 4" and over, and not less than 1/4" plf for 2" and 3" piping.

G. Roof Flashing: Flash vents extending through roof with materials approved by the roofing supplier. Coordinate work with Roofing Contractor. Offset vents as required to clear edges of roofs. Extend vents 6" to 8" above roof level.

H. Waste Arms: Schedule 40 PVC Pipe.

I. Condensate Drainage Piping: Provide Schedule 40 PVC Pipe. Conduct to drain as shown on plans.

J. Test Fittings: Not shown on the drawings; provide where required for partial tests.

2.02 DRAINAGE SPECIALTIES

A. Equivalent Products: Specialties by J. R. Smith, Josam, Zurn or Wade.

B. Cleanouts: Provide in cast iron sanitary piping at all changes in direction, at ends of branches, at intervals not exceeding 40 feet on straight runs, and elsewhere as shown. Cleanouts shall be full opening type, completely accessible. Size same as lines in which they occur, but not larger than 4". Tees and extensions shall be of same weight as soil pipe. Plugs countersunk or raised head type with lead seals. Except as noted, catalog numbers are from J. R. Smith.
   1. In Tile Floors: 4040, adjustable, cast iron body with cadmium plug and satin finished square scoriated Nikaloy top; where soft tile occurs provide 4160 recessed square nikaloy cover designed to receive VCT insert.
   2. In Concrete Floors: 4240, adjustable head, cast iron head and ferrule with cadmium plug, round loose-set scoriated tractor cover.
   3. In Outside Lines: 4280 cast iron head and ferrule with cadmium plug. Terminate at grade or pavement in 18" x 18" x 6" concrete pad with tooled edges.
   4. In Accessible Unfinished Spaces: 4405 or 4515 cast iron with cadmium plug, as appropriate.
   5. In Finished Walls: 4530 cast iron cleanout tee with cadmium plug and stainless steel wall plate cover. Where distance from plug to finish wall will exceed 4" provide 4407 extended over from sanitary tee to bring plug within 4".

C. Floor Drains: Size outlets same as pipe to which they connect. Install temporary closures during construction. Each drain connected to sanitary sewer shall have deep seal cast iron P-trap. Provide types as scheduled below. Where indicated on the drawings and elsewhere required by local and/or state Codes, provide readily accessible trap seal primer, complete with all accessories including water supply.
   1. Where drains occur above finished spaces, furnish with clamping collar to secure waterproof membrane.
   2. Typical Floor Drains: Series 2010B two piece cast iron drains with caulk type outlet and adjustable Nikaloy strainer and rim. Strainer tops for 2" drains 5" x 5", for 3" drains 6" x 6", for 4" drains 8" x 8".
   3. Food Area Floor Sinks: Series 3120 with Nikaloy strainer clamp. Aluminum dome, acid-resisting enameled inside finish. Provide ¾ grate for sinks receiving single waste and no grate when under equipment.
   4. Condensate Floor Sinks: Same as Food Area floor sinks without enamel finish.

2.03 WATER PIPING

A. Scope: Connect to the main as indicated and extend to all plumbing fixtures, hose bibbs, water heaters, etc.; and to special equipment as indicated or required.

B. General Workmanship: Cut accurately to measurements established at site and work into place without springing or forcing, properly clearing all openings, finished ceilings, etc. Route through previously built-in sleeves and avoid excessive cutting or other weakening of the structure. Ream all pipe to remove burrs. Make changes in direction and size with fittings. Cap or plug open pipe ends during installation to keep out foreign material. Make connections carefully to insure unrestricted flow, eliminate air pockets, and to permit complete drainage of

the systems. Install all buried piping outside the building with at least 48" of earth cover.

C. Grading: Grade pipe upward from source to facilitate drainage and air relief. Where low points are required because of long runs or where sections may be valved off, provide with 3/4" globe valve and hose nipple for drainage at low point. Make all connections to risers and fixtures from top of mains.

D. Nipples: Provide copper stub out nipples with transition to PEX tubing at each fixture connection.

E. Piping: Type "A" Cross Linked Polyethylene(PEX) as manufactured by Uponor with fittings and connection/joint system.

F. Utility Connection: Refer to Division 2. Connect to Site Utilities.

2.04 DISINFECTION OF DOMESTIC WATER SYSTEMS WITHIN THE BUILDING

A. General:

1. Before being placed in service and after testing is completed, all new potable water piping shall be chlorinated as specified herein, in accordance with AWWA Standard C601-54 and as required by the applicable US Army Medical Department Technical Bulletin.
2. Chlorine may be applied by the use of chlorine gas-water mixture, direct chlorine-gas feed or a mixture of calcium hypochlorite and water. If calcium hypochlorite is used, it shall be equivalent to commercial products such as Perchloron, HTH or Maxochlor. The powder shall be mixed with water to form a paste thinned to a slurry and pumped or injected into the lines.
3. If direct chlorine-gas feed is used, it shall be fed with either a solution-feed chlorinator or by a pressure-feed chlorinator.
4. The lines and fixtures shall be flushed thoroughly prior to chlorination to remove dirt.
5. Injection shall start only when all fixtures are connected and ready for operation.
6. A service cock or riser (3/4" to at least 1-1/4") shall be provided by the Contractor and located at the point of connection to water service. The disinfecting agent shall be injected into and through the system from this cock or riser only.
7. Chlorine, either gas or liquid, shall be used as a disinfecting agent. Calcium or Sodium Hypochlorite (liquid or powered) as approved in federal and AWWA procedures may be used.
8. The disinfecting agent shall be injected by a proportioning pump or device through the service cock or riser slowly and continuously at an even rate.
9. All outlets shall be fully opened at least four times during injection and the residual checked with orthotolidine solution.
10. When the chlorine residual concentration indicated not less than 50 parts per million at all outlets, all fixtures and water supply valves shall be closed.
11. The residual shall then be retained for a period of not less than eight hours.
12. After retention, the residual upon checking at most outlets, shall not be less than ten parts per million. If less, the disinfection must be repeated as described above.
13. If satisfactory, all fixtures shall be flushed until residual or orthotolidine tests are not greater than the water supply.
14. Contractor shall furnish Contracting Officer or his authorized representative with sterilization report indicating potable water to be safe from contamination.

2.05 WATER PIPING SPECIALTIES

A. Valves: Provide where shown and/or specified, including all fixtures or equipment not furnished with stops. All valves of each type shall be the product of one manufacturer, Stockham units as indicated below, or equals by Crane, Jenkins or Nibco. All valves shall be rated equivalent to Stockham Figure numbers.
   1. Check Valves 2" and smaller #B-345 bronze threaded, Y-pattern swing check, 200 WSP.
   2. Ball Valves for Water Piping in Sizes 1/2" through 2": Apollo series 82-100/200 with 2-1/4" extended stems, bronze body, ASTM B-21 alloy C hard brass ball, BUNA-N seat, BUNA-N seals and lever type operating handle.

B. Strainers: 2" and smaller shall be Crane No. 988-1/2, iron body screwed, Y-pattern, 125 WSP sediment separators with a 20 mesh model screen. Larger than 2" shall be Crane No. 989-1/2 of same construction as above. Equal strainers by Mueller, Chase, Nibco, Watts or Jenkins will be approved. Gauge with valve on each side will be piped across strainer.

C. Shock Absorbers: Certified by Plumbing and Drainage Institute Standard PDI-WH201. Provide where indicated.
   1. Note: Use of air chambers is not acceptable.

D. Thermometers: Weiss Veri-Angle with 9” scale and 30 degrees to 240 degrees range.

E. Pressure Gages: Bourden tube type, equal to Trerice No. 600, each complete with cast aluminum case, #870 vibration or pulsation snubber, #735 needle valve. Gage dials shall be not less than 4-1/2" and cases shall be of aluminum alloy. Furnish with suitable pressure ranges for each application. Equal products by Weskler, Marsh or Trerice will be accepted.

F. Wall Hydrants (typical): Freezeproof 3/4" box type bronze hose bibb. J. R. Smith 5709 or approved equal, with integral vacuum breaker and key. Install approximately 18" above finished grade.

G. Wall Hydrants Inside the Building: Compression lockshield type, NIBCO #663 with handle, 3/4" chromium plated with watts #8 vacuum breaker.

H.. Domestic Water: Backflow Preventer shall be double check valve assembly complying with AWWA Standard C510-89, designed to prevent reverse flow in water lines and to prevent non-potable water from entering into the safe drinking water system. Valve assembly shall be equal to Watts Series 709 S double check valve assembly with strainer, and shall be installed inside the building as shown on the drawings. Furnish and install union or flanges in each side of backflow preventer for maintenance purposes.

2.06 PIPE HANGERS AND SUPPORTS

A. Spacing: Install supports as required to prevent sags, bends or vibration; in any case provide within 6" of elbows and valves, at ends of branches over 4 feet, and on centers not exceeding the following:
   1. Plastic pipe up to 1” - 3 feet max.; larger than 1” - 5 feet.
   3. Steel pipe - up to 1-1/4" - 8 feet; 1-1/2" and 2" - 10 feet; 2" thru 3-1/2" - 12 feet; over 3-1/2" - 16 feet. Provide additional pipe hangers and inserts where maximum load of pipe exceeds loading of hanger or insert. All support components shall conform to

manufacturer's standardization Society Specification SP-69 for plastic pipe hangers shall be plastic coated.

4. Cast iron pipe - refer to sanitary piping.

B. Equal Products: Equivalent devices by Grinnell, Elsen, Stockham, or Crane will be accepted.

G. Hanger Rods: Of mild steel, threaded as required. Use not smaller than 3/8" rods for pipe 2" and smaller, 1/2" rods for pipes 2-1/2" through 6', but generally as standard for the hanger selected. Support rods with threaded inserts, expansion shields, or beam clamps, all galvanized. At bar joists, suspend rods only from top chord members. Nothing shall be supported from roof deck.

H. At Typical Suspended Horizontal Pipe: Adjustable clevis or split-ring type, equal to Fee & Mason 239 or 215.

I. Where in Contact with Copper Pipe: Same as above except hangers copper plated.

J. Vertical Piping Along Wall: Fee & Mason #241 riser clamps at floors and #366 stand-off brackets toggle bolted to wall. Place under hubs or couplings where at all possible.

K. On Insulated Lines: Size hanger loops to fit over insulation, and provide 12" long, 22 ga. galvanized sheet metal half-round saddles to protect insulation. For all piping sizes larger than 2" provide factory fabricated thermal hanger shields, equal to Pipe Shields, Inc. utilizing insulation thickness and vapor barrier jacket specified.

L. Supports for Water Supply Piping in Spaces Behind Plumbing Fixtures: ABS brackets and U-bolts. Secure the 2-piece brackets to cast iron stacks. U-bolts shall be sized to bear on the pipe. Brackets shall be P & M Bracket Co. or equal.

M. Manifolds and Parallel Runs: At his option Contractor may provide Unistrut system complete with standard fittings and accessories. Furnish for approval proposed system components.

N. Anchors: Anchor piping as required to control lateral movement without affecting expansion and contraction movement. Utilizing cushion - clamp assemblies as manufactured by Hydra-Zorb Company.

O. Bracing: Where hanger rods height exceed 18", provide diagonal bracing at every fourth hanger and attach to the building structural system as directed by the Contracting Officer.

2.07 PIPE INSULATION

A. General Provisions: All work by experienced insulation subcontractor in accordance with manufacturer's recommendations. Piping must be clean, dry and pressure tested before covering is applied. Size pipe hangers to fit insulated pipe size see Paragraph "Pipe Hangers and Supports." Cover fittings, valves and flanges with insulation material as hereinafter specified to same thickness as adjacent pipe covering except screwed unions in hot piping and other specifically named items. Neatly bevel covering edges adjacent to unions and other points of termination. All insulation materials including coatings and mastics shall have a composite rating for insulation, jacket or facing including adhesives not to exceed a flame spread index of 25 and 50 fuel contributed and smoke developed as determined by ASTM E-84, NFPA 255 and UL 723.

B. Scopes: Insulate all hot and cold water piping except that below grade, and excluding plated brass fixture connections. Also, insulate all above the slab condensate drain lines same as cold water piping.

C. Insulation: Glass fiber insulation, certainteed snap-on, ASJ-SSL with kraft-foil laminated jacket, or equivalent by Owens-Corning or JM. Apply by sealing longitudinal jacket flaps and jacket bands (butt strips) with adhesive and with insulation staples on 4" centers. Provide 3" wide jacket material butt strips at joints and at mid-points of lengths. Seal staples on cold piping with Foster 30-35 mastic. All horizontal piping shall have seams on the bottom where exposed to the weather.

1. Insulation thickness shall be 1 inch thick.

D. Fittings: Insulate with Fiberglas low pressure pipe covering mitered to fit snugly, or fiberglass inserts of the same thickness as the pipe covering, finished with premolded PVC covers.

E. Exposed Ends: Finish open ends of sectional covering by rounding off with cement, and sizing with fiberglass cloth jacket around the pipe and finish with Foster 30-36 mastic.

F. At Walls and Floors: Refer to Section 15010 - PIPE SLEEVES. In any case insulation shall extend through floors, partitions and walls.

G. Electric Water Coolers: Insulate drain connections and traps with 1/8" thick insulating tape by Presstite Engineering Company, St. Louis, Missouri, or 1/2” thickness armaflex.

H. At Hangers: Protect covering with 10 inch long section of 22 ga. galvanized steel formed in a half circle to fit the insulation. Provide pipe hanger shields equal to Pipe Shields, Inc. for all piping larger than 2" as specified hereinbefore.

I. Sub-Subcontractor: Pipe insulation shall be installed by an established insulation contractor.

2.08 WATER HEATING EQUIPMENT (Natural Gas)

A. General: Commercial heavy-duty heater, minimum 4” tall legs, circulating pump,, controls, piping, accessories, shall bear an ASME stamp and arranged as shown on the drawings.

B. Tank: Shall be 300-lb. test, 150-lb. wwp, glass lined with 1.315 minimum diameter magnesium anode (tank saver). Storage capacity as indicated on plans.

C. Insulation: Tank shall be fully insulated on top and on sides all covered with steel jacket with enamel finish.

D. Guarantee: Heater shall be covered with a full 3-year guarantee from manufacturer.

E. Relief Valve: Install (in accordance with USA Standard Z21.22) properly sized ASME approved T&P relief valve with copper overflow line to floor drain as indicated.

F. Heater Manufacturer: Lochinvar SNR200-199 or approved equal by Ruud or A.O. Smith.

G. Circulation Pump: ¾” all-bronze pipe-mounted B&G #LR-12, or approved equal by Thrush or Taco, 115v/1p/60c. Provide strap-on aquastat and wire to control the pump. Provide required

control wiring.

H. Expansion Tank: Provide diaphragm type designed for 150 PSIG working pressure. Tank shall have a minimum acceptance required by system manufacturer/supplier and shall bear an ASME stamp.

2.10 MISCELLANEOUS EQUIPMENT FURNISHED UNDER OTHER SECTIONS

A. General: Equipment indicated is to be furnished and set in place under another Section of the Specifications (or is to be so provided under a separate contract). Verify exact size and locations of vents, waste and supply connections from approved rough-in drawings and/or catalog data sheets. Allow for modifications required by the shop drawings without additional cost to the Owner. All water connections are to be complete with stop valves.

B. Food Area Equipment and Fixtures: provide supplies with stops and drains as required for a complete functional installation.

2.11 SCHEDULED FIXTURES AND MISCELLANEOUS ITEMS

A. Acceptable Manufacturers: Fixtures listed are from American Standard and Elkay Catalogs. Equal products of Crane, Kohler, Eljer, Beneke, Olsonite, Zurn, EBC, Just, Church or Sperzel will be accepted.

B. Fixture Trim: Exposed metal parts to be of heavy weight polished brass, heavily chromium plated, of best quality as regularly furnished by the plumbing fixture manufacturer. Provide stop valve in supply to all fixtures and equipment.

C. Compliance with Americans Disabilities Act: All handicapped fixtures, faucets, flush valves, clearances, and installation shall comply with requirements of the Americans Disabilities Act.

D. Scheduled Items: See plans for fixture description/specifications.

P-1Handicapped Floor Mounted Water Closet: Zurn 5665 with Z6000EV sensor flush valve, vitreous china, elongated bowl closet with 1½" top spud, , Beneke 527 CH-SS-HPSS white open-front seat with self sustaining stainless steel hinge. Provide Sloan J312A chrome plated wall bracket for supply pipe. Mounting height top of seat shall be 17" to 19". Coordinate grab bar installation.

P – 2 Handicapped Lavatory: Kohler 2005, 21" x 18" vitreous china lavatory with Zurn #Z6913-CP4-TMV-F sensor operated battery powered with .5GPM aerator. 4" cover plate, thermostatic mixing valve, McGuire #2165 supplies with stops, and McGuire 8872 1¼" chromium plated cast brass p-trap with cleanout and chromium plated 17 gauge tubing drain to wall with escutcheon. Provide JR Smith Series 700 carrier at set with rim at 34" AFF. Include Plumberex #427 trap and supply covers.

P – 3 Handicapped Urinal: Sloan Model WES-1000 wall hung, wall outlet, waterfree, vitreous china urinal complete with housing, cartridge kit, (2) wall hangers and uni-coupler. Mount 17" rim to floor.

P-4 Three Compartment Sink: Elkay RNSF83584, 16gauge stainless steel with two Elkay Lk566-SPL9AE3 faucets and LK 24RT drain fittings. Provide ball valve stops on water supplies and extend drain to floor sink.

P – 5 Sink: Elkay LR 2522 with Lk-35 waste strainers and LKE4101 faucet. Provide McGuire 165stops/supplies and 8912 p-trap. Include Symmons 5-210-CK mixing valve.

P-6 Janitors Sink: Stern Williams MTB-2424 pre-cast terrazzo with T&S B-667-RGh faucet. Provide aluminum guards on exposed sides.

P-7 Ice Machine: Furnished by others. Provide ball valve stop on cold water supply and extend drains to floor sink. Rough and connect complete.

P-8 Hot & Cold Water Hydrant: J.R. Smith #5560QT with bronze box and chrome plated face.

2.13 WATER FILTERS SYSTEM FOR ALL FOUNTAIN FIXTURES

A. Water filter system furnished by AAFES and installed by Contractor. Provide all required piping connections.

2.14 GREASE TRAP

A. See detail on drawings for size and connection requirements.

2.15 Back-of-House, Food Court Tenants and Drink Stations

A. Work shall be roughed-in and installation made in accordance with drawings included in the contract documents and prototype data. Allow for modification to accomplish all work. NOTE: Refer to Back-of-House plans, Food Service Large Scale Plans, Elevations and Details.

END OF SECTION

SECTION 15510

FIRE PROTECTION SYSTEM

PART 1 - GENERAL

1.01 GENERAL

A. General Provisions: Section 15010 is applicable in full hereto.

B. Qualifications of Contractor: The system shall be installed by an approved contractor, holding a current and valid State of Florida Fire Marshall's Permit as a Certified Fire Protection Sprinkler Contractor, and with satisfactory experience on at least three equivalent projects.

1.02 SUMMARY

A. Scope: Furnish all labor, material, equipment, design, service and supervision for and incidental to the installation of a sprinkler system complete as shown on the drawings and as specified herein. The system shall be installed complete, satisfactorily tested and left ready for operation.

B. The work includes, but is not necessarily limited to, the following:
   1. Connection to the site fire line at a point 5' from the building, and extension of line into the building, including all necessary excavation, backfill, cutting, patching, thrust blocking, etc.
   2. Installation of a complete sprinkler system throughout all areas of the building.
   3. Installation of all other piping, fittings, hangers, braces, sprinklers, valves, backflow preventers, drains, sleeves, escutcheons, devices and accessories required for a complete system.

C. Work Not Included:
   1. Painting of pipe. Painting of pipe shall be under Section 09900.
   2. Electrical wiring, unless specified herein.

1.03 QUALITY ASSURANCE

A. Codes, ordinances and regulations: All work shall be in accordance with local, state and federal laws, codes, rules, regulations, and standards applicable to this particular class of work. Work shall also comply with the requirements of AAFES, Unified Facilities Criteria (UFC) 3-600-01, the State of Florida Fire Marshal and National Fire Protection Association Standards No. 13 (2002), 24 (2002), 72 (2002) and 101 (2003). Where later published editions of these referenced standards contain more stringent requirements, then the more stringent requirement shall apply. In each of the NFPA standards referred to, the advisory provisions contained in the appendices shall be considered to be mandatory, as though the word shall had been substituted for the word should . Should there be a conflict in requirements, the UFC 3-600-01 will take precedence. Should there be a conflict in requirements from NFPA versus those from AAFES, the NFPA standards will take precedence.

1.04 SUBMITTALS

A. Shop Drawings: Within 45 days after award of the contract, submit 6 blueline sets of shop drawings and calculations, and 6 sets manufacturer's descriptive literature on all equipment and materials for approval. Submit shop drawings and calculations concurrently for review by the post fire department which shall furnish its review comments to the Contracting Officer within 14 days of receipt of the submittal. The contractor shall make all modifications and/or additions required to obtain the approval of shop drawings without extra cost to the Owner. The contractor shall deliver reviewed drawings and/or letters of comment from all above authorities to the Contracting Officer and obtain final written approval of drawings and calculations from the post fire department before any work is begun.

1. Shop Drawings (minimum 1/8 scale) shall show in detail dimensioned piping, sprinkler heads, valves, alarms, drains, underground piping, hangers, standpipes, etc., and all items as required by NFPA-13, NFPA-24, and this section of the specifications. Outline all lights, ductwork, structure, and other obstructions on shop drawings to show proper coordination of all sprinkler work. Locations of lines and rows of sprinkler heads shall be indicated by dimensions to walls and the relationship to ceiling tiles, unit heaters, diffusers, lights, speakers, etc., indicated. Provide (a) separate reflected ceiling plans showing all ceiling sprinkler locations and ceiling elements; (b) separate piping plans showing piping, hangers, sprinklers, HVAC ducts, structural, etc.; and (c) separate seismic-type bracing drawings showing piping, structural, brace locations with types and calculations. As the work progresses, the drawings shall be coordinated with other trades and dimensions at the site verified. Drawings shall be revised as required by conditions at no additional cost to the Owner. System designer shall be either a registered FPE or NICET (National Institute for Certification in Engineering Technologies) level IV in Sprinkler Systems.

B. Record Drawings: The Contractor shall maintain at the job site two sets of full size contract drawings, marking them in red to show all variations between the construction actually provided and that indicated or specified in the contract documents, including buried or concealed construction. Record the horizontal and vertical locations of all buried utilities that differ from the location indicated on the contract drawings. Where a choice of materials or methods is permitted herein, or where variations in scope or character of work from that of the original contract are authorized, mark the drawings to define the construction actually provided. Show on the record drawings the size, manufacturer's name, model number and power input or output characteristics of the equipment installed. The representations of such changes shall conform to standard drafting practice and shall include such supplementary notes, legends, and details as necessary to clearly portray the as-built construction. Update drawings on a daily basis. On completion of the work, both sets of marked-up drawings shall be delivered to the Contracting Officer, and shall be subject to his approval before acceptance.

1.05 SITE CONDITIONS

A. Site Inspection: Bidders shall visit the site of the work before submitting bids and satisfy themselves as to the nature and scope of the work to be done. The submission of a bid shall be taken as evidence that the bidder is aware of all site conditions. Later claims for additional labor, materials or equipment required for any difficulties or obstructions encountered shall not be recognized. Contractor is cautioned that space above ceiling in some areas of existing building is extremely limited.

1.06 MISCELLANEOUS REQUIREMENTS

A. General Workmanship: In general, all piping shall be concealed above all ceilings. Exposed piping shall be permitted only in mechanical areas, pipe chases, and attics. Cut all piping accurately to measurements established at site and work into place without springing or forcing properly clearing all windows, doors, and other openings. Cutting structural members for passage of pipe will not be permitted. Route all pipe through previously built-in sleeves. Ream all pipes to remove burrs. Make changes in direction and size with reducing fittings. Cap or plug open ends of pipe during installation to keep out foreign materials.

1. Refer to and carefully check the installation against all drawings and existing conditions, and note where walls, ceilings, beams, and pipe shafts are furred or enclosed. Refer to and check with the contract drawings and existing conditions for the HVAC, plumbing and electrical work and work of other trades.
2. Install all piping to be concealed in ceiling or wall construction so as not to cause delay to other work, and to allow ample time for the necessary tests and approvals.
3. Install swing joints or expansion loops wherever necessary to allow for pipe expansion. Securely anchor pipes so that expansion can occur at these points.
4. All equipment shall be installed in strict accordance with the manufacturer's recommendations and with NFPA requirements.

B. Coordination: It shall be the responsibility of this contractor to install the system in such a manner as to conform to the structure, avoid obstructions, and observe proper clearances without extra cost to the Owner. Prefabricated piping does not preclude coordination with other trades. It shall be this contractor's responsibility to request and obtain all drawings of other trades work in areas where the contractor is involved, and to field check all work prior to any shop fabrication.

1. Piping shall be offset, relocated or resized or other piping and/or sprinklers shall be furnished as necessary to provide space for and coordination with other trades. The Owner does not assume responsibility for coordination by approval of shop drawings. Ceiling heights shall not be lowered because of space limitations for mechanical equipment.

C. Field Supervision: The contractor shall have a responsible representative of his organization at the site of the work for coordination of the system installation with other trades as early as is required by the progress of the work. Details of proposed departures from approved shop drawings due to field conditions shall be submitted to and receive written approval of the Contracting Officer prior to installation. The installation shall be under the direct supervision of a NICET (National Institute for Certification in Engineering Technologies) level II or higher in Sprinkler Systems.

E. Joining of Pipe and Fittings: Schedule 40 steel pipe shall be joined by screw joints in accordance with ANSI B2.1, by flanged joints, by shop welded joints in accordance with the requirements of AWS D10.9, level AR-3, or by mechanical grooved fittings or couplings. Grooves may be rolled or cut and they shall be dimensionally compatible with the coupling.

F. Underground Installation: All underground piping shall be installed in accordance with NFPA 24. Depth of cover over piping shall be a minimum of 36 . Joints shall be left exposed until all inspections and test have been made.

1. Bends, plugs, tees and hydrants shall be retained or blocked in accordance with the requirements of NFPA 24. Bearing surface of thrust blocks shall be sized to match soil conditions encountered and all thrust blocks shall bear against undisturbed soil. The connection between the underground piping and the base of the riser shall be securely anchored with rods and clamps. Excavation, backfill, cutting and patching shall be as specified in Division 2. Coordinate all crossings of other lines, new or existing with the respective utility or contractor involved.

G. Drains and Test Connections: Provided valved drain lines throughout the sprinkler system to permit complete system drainage; furnish plugged or valved and plugged drain outlets on all trapped sections of piping. Provide system test pipes and flushing connections. All of the above to be as shown on the drawings and/or as required by codes and authorities. Discharge location of all drain and test lines required but not indicated on the contract drawings shall be subject to specific approval of the Contracting Officer.

H. Layout of Heads: Within practical limited, locate ceiling heads symmetrically about at least one axis of the room or area. Alignment of heads in any finished room or area shall be within 1/2 and lines shall be parallel with or perpendicular to building walls and/or ceiling lines. Line of heads in corridors shall be as close as possible to the corridor centerline. Layout heads so that they do not occur in the same ceiling board as light fixtures, HVAC diffusers, etc. All sprinkler heads shall be centered in ceiling tile.

I. Pipe Hangers / Braces: Hanger installation methods to be per NFPA-13 and as called for herein. Provide intermediate supports and pipe support stands where necessary and as called for herein. Provide seismic bracing in accordance with NFPA-13 designed to resist forces of 0.5 times the equipment weight in any direction. Note: this is a requirement of UFC 4-010-01 (DoD Minimum AntiTerrorism Standards for Buildings) and is independent of geographic seismic zone.

J. Electric Switches: Provide switches as indicated on drawings. Coordinate with electrical contractor to insure that switch contacts and voltages are compatible with fire alarm system.

K. Sleeves and Openings: Pipes passing through plaster, masonry, fire-rated, or concrete walls, floors or partitions shall be provided with sleeves.
   1. Openings required for pipe passage in existing masonry or precast core slabs shall be neatly drilled. Openings in core slabs shall be drilled only in cored (hollow) areas of slab.
   2. Seal all openings in rated walls, floors and ceilings with a UL listed through-penetration fire stop sealant. Depth or sealant shall be sufficient to provide a fire rating equal to that of the penetrated structure. See Section 15010 - GENERAL MECHANCIAL PROVISIONS, for additional requirements.

L. Escutcheons: Provide pipe escutcheons where exposed piping passes through walls, floors or ceilings in finished areas. Inside diameter shall fit around pipe, outside diameter shall cover sleeve. Provide sprinkler escutcheons where sprinkler heads occur on walls or ceilings. Sprinkler escutcheons shall be compatible with the particular type or brand of sprinkler used. Escutcheons shall have permanent attachment device and shall be none friction type.

M. Identification Signs: Provide all control, drain and test valves, and at other locations as suggested by NFPA and the authorities having jurisdiction, signs of approved design identifying function and noting special cautions. Submit for Contracting Officer's review and approval a list of all signs, noting sizes, materials, nomenclature and colors.

N. Spare Head Cabinet: Provide where indicated a spare sprinkler cabinet. Cabinet shall contain no less than two of each type, finish and temperature rating of sprinkler used on the project, along with a wrench as required for each style. Total number of spare sprinklers provided shall be not less than the minimum set forth in NFPA 13.

O. Flushing and Sterilization: All sections of the fire protection system including all site piping shall be thoroughly flushed at flow rates and for a period of time as prescribed in NFPA 13 and NFPA 24.

P. Tests: All completed work shall remain uncovered if at all possible until required tests have been completed. However, in the event the project construction schedule requires it, the contractor shall make arrangements for prior tests on the portions of the work involved. The Contracting Officer and all inspection authorities shall be notified of tests five days in advance and shall be represented at such tests if they so desire.
   1. All portions of the system shall be hydrostatically tested at 200 psi for 2 hours. Tests shall be repeated until work is proved tight at this pressure. Repair all defects disclosed by tests and replace defective materials. Caulking of screw joints will not be permitted. Test pressure is to be maintained by a small capacity pump to minimize water damage in the event of a break. Tests are to conform to the requirements of NFPA 13 and 24, with leakage from underground piping not to exceed the quantities listed therein.
   2. Operational tests of all signal initiating and alarm devices shall be conducted. Tests shall be preformed by actual operation of the equipment, to which the device is attached, and devices shall be adjusted and tests repeated until performance is satisfactory and acceptable.
   3. Records of all tests are to be made available for Contracting Officer's inspection as required. Contractor is to provide all labor and materials required for the tests, and assume all costs, including those for repair of damage performed only at such times that the ambient temperature throughout the test period will be high enough to prevent freezing in any portion of the system and to assure complete drainage afterward.

Q. Inspections: Upon completion of work, or at any time theretofore, inspection shall be made by the contracting officer or his representative and any corrections, changes, or removal of defective work required by them shall be made by the contractor. Final acceptance will not be made until all such required changes are accomplished.

R. Acceptance: The operation of the equipment and the fire protection installation by the Owner does not constitute an acceptance of the work. The final acceptance is to be made only after the contractor has adjusted his equipment, demonstrated that it fulfills the requirements of the specs, drawings, and all applicable authorities, and has furnished all the required certificates.

S. Service and Maintenance Instructions: Provide detailed instructions and demonstrations covering the necessary and recommended testing, operating, and maintenance procedures for each type of system to the building maintenance personnel as directed by the Contracting Officer. Provide six (6) sets of bound manuals containing for each piece of equipment the following materials:
   1. Manufacturer's descriptive literature
   2. Operating and maintenance instructions
   3. Parts list.

4. As-installed control diagrams, including color-coded wiring diagrams for all electrical motor controller connections and interlock connection with other mechanical equipment.
5. Provide roster names of all attendees, telephone numbers, office symbols, date, etc.

T. Clean-Up: All refuse and debris accumulated from the system installation shall be removed by the Contractor on a regular basis.

U. Guarantees: The contractor shall guarantee the system and all components for a period of one year from the date of final acceptance against defects due to faulty materials or workmanship. Such defects arising shall be immediately corrected at no cost to the Owner. Consult general requirements for detailed form and requirements.

PART 2 - PRODUCTS AND EXECUTION

2.01 MATERIALS AND PRODUCTS

A. General: All materials and equipment shall be the standard cataloged products of manufacturers regularly engaged in the manufacture of such products. Similar types and items of equipment shall be produced by the same manufacturer. Unless otherwise noted, all materials and equipment shall be listed in the January 2008 Underwriter's Labs, Inc. Fire Protection Equipment Directory and shall be the latest design of the manufacturer. All materials and equipment shall be of domestic manufacture.

B. Piping: Above ground piping shall be steel, ASTM-A795, A-53 or ASTM A-135, black or galvanized as required, in accordance with NFPA, standards. Pipe 2-1/2 and larger shall be schedule 40, pipe 2 and smaller shall be schedule 40. Dry system piping shall be galvanized. Underground piping shall be ductile iron, Class 52, Cement-lined, centrifugally cast in metal or sand-lined molds, meeting the requirements of AWWA C-151. Joints shall be rubber gasket, slip-joint or mechanical joint type.

C. Fittings: Fittings for above ground piping shall be screwed, flanged, shop-welded, mechanical grooved or any combination thereof. Exterior dry system fittings shall be galvanized.
1. Screwed fittings shall be cast iron, 125 lb. class, black, or galvanized as required, in accordance with ANSI B16.4; or malleable iron, 150 lb. class, black or galvanized as required, in accordance with ANSI B16.3. Flanged fittings shall be cast iron, short body, 125 lb., class, black, or galvanized as required in accordance with ANSI B16.1. Gaskets shall have a full face of 1/8 minium thickness red sheet rubber. Flange bolts shall be hex head machine bolts with heavy semi-finished cadmium plated hex head nuts, having dimensions in accordance with ANSI B18.2. .
2. Shop-welded fittings shall be steel, standard weight, black, in accordance with ANSI B16.9, ANSI B16.25, ASTM A-234, ANSI B16.5 or ANSI B16.11.
3. Mechanical grooved couplings or hole-cut branch connections shall be cast or malleable iron, 175 psi minimum working pressure with matching gasket.
4. Underground fittings shall be cast iron, Class 150, mechanical joint, in accordance with AWWA C-110 and C-111.

D. Valves:
1. Gate valves 2 and smaller shall be bronze body, 175 psi working pressure, screwed ends, wedge disc, OS&Y pattern, Nibco T-104-0 or approved equal.
2. Gate valves 2-1/2 and larger shall be iron body, 175 psi working pressure flanged ends, solid wedge or double disc, OS&Y pattern, Nibco F-607-0 or approved equal.

3. Check valves 2-1/2 and larger shall be iron body, bronze mounted, 175 psi working pressure, flanged ends, rubber-faced disc, Nibco F-908-W or approved equal.
4. Drain and test valves shall be bronze, globe or angle type, 300 psi, renewable rubber disc, United brass Works figure 455 or 465 or approved equal.
5. Backflow preventers shall be double-check type matching Local Water Authority requirements.

E. Electric Switches:
1. Water flow switch shall be vane-type with an instantly recycling retard adjustable from 0 to 60 seconds. Unit shall contain 2 SPDT circuit switches which transfer upon a minimum water flow rate of 10 gpm. Switches shall have a minimum rated capacity of 7 amp., 125 volt, A.C-.25 amp and 24 volt D.C. notifier series WFD or approved equal. Unit shall be compatible with piping as regards to piping wall thickness.
2. Tamper switches shall be OS&Y type as required, containing at least one SPDT circuit switch set to operate within two revolutions of the valve control wheel or when the stem has moved no more than one-fifth of the distance from its normal position. Switch shall have a minimum rated capacity of 1 amp 125 volt, AC-.25 amp 24 volt D.C. The unit shall be arranged to cause a switch operation if the housing cover is removed or if the unit is removed from its mounting. Mounting shall not interfere with the normal operation of the valve.
3. Pressure alarm switch shall be pressure-type without retard, set to operate between 4 and 8 PSI, on rise, with one SPDT switch, Potter Model PS-10, or approved equal.
4. Air pressure supervisory switch shall be high-low type, 20 psi to 225 psi adjustable, with two SPDT switches, one set operating on pressure decrease, one set operating on pressure increase. Potter model PS40-2, or approved equal.

F. Sprinklers: Sprinkler heads shall be of the approved automatic spray-type, upright, or pendent, as application requires. Orifice size shall be as required by hydraulic calculations; Temperature rating shall be as required by thermal conditions at the individual head location. Unless otherwise noted, types shall conform with the following requirements:
1. Suspended ceilings with white finish: Viking model M pendent with model E-1 recessed escutcheon, or approved equal. Sprinkler and escutcheon to have factory-applied white finish.
2. Suspended ceilings with colored (other than white) finish: Viking model M pendant with model E-1 recessed escutcheon, or approved equal. Sprinkler and escutcheon to have factory chrome-plated finish.
3. Areas without suspended ceilings: Viking model M brass, or approved equal.
4. Coolers & Freezers: Viking Model M Dry Pendent.

G. Hangers:
1. Hanger rings shall be zinc plated, adjustable swivel ring band-type, Gem F730 or approved equal.
2. Beam clamps shall be malleable iron with cup-pointed set screw and jam nut, Gem F740 series or approved equal.
3. Drop-in anchors shall be zinc-plated steel, threaded to match rod size, Hilti HDI-3/8 or HDI-1/2 or approved equal.

H. Sleeves and Openings Sealants: As specified in Section 15010 - GENERAL MECHANICAL PROVISIONS.

I. Escutcheons: Pipe escutcheons shall be one-piece chrome plated heavy brass or steel, minimum 18 gauge, with retaining set screw.

K. Fire Department Connection: Fire department connections shall be free-standing type, polished chrome-plated, with matching pin-lug plugs and chains. For sprinkler: Potter-Roemer model 5763-D, lettered AUTO.SPKR. .

L. Alarm Check Valve: Shall be variable pressure and equipped with all standard trim and accessories required.

2.02 DESIGN CRITERIA

A. General: The entire building shall be protected by sprinkler system. System types and areas shall be as shown on plans. Sprinkler system design shall comply with UFC 3-600-01 and NFPA-13, 2002.

B. Piping Sizing: Pipe shall be sized by hydraulic calculations. Detailed hydraulic calculations shall be required. Calculations shall include allowances for valves, changes in direction of piping, elevation changes, and hose stream allowances per the appropriate occupancy hazard class. The form of the calculations shall be in accordance with NFPA requirements and shall contain all information requested therein. All calculations shall include a minimum 5 psi or 10 percent (whichever is greater) safety margin below the water supply curve.

C. Water Supply: Hydraulic design shall be based on the available supply at the lead-in.

END OF SECTION

SECTION 15700

HVAC

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. General Provisions: Section 15010 is applicable in full hereto.

B. Qualifications of Sub-Contractor: Must be properly licensed and established as a Heating and Air Conditioning Contractor at location of the work and shall maintain locally adequate service facilities. He shall have had previous experience in the satisfactory installation of at least three systems of this type and size.

C. Scope: Include all equipment, material, and labor required for complete and satisfactory operation of HVAC systems, even though every item involved is not indicated.

D. Warranty: Guarantee work as set forth in Section 15010.

E. Service, Charges, Grease, Filters, etc.: Furnish first charges of refrigerant, grease, oils, etc., and be responsible for such full charges for the guarantee period. Provide service and maintenance for all equipment and systems during the guarantee period, including complete filter changes. Make last service call two weeks prior to year end inspection and include lubrication of all motors, bearings, etc., calibration and adjustment of all controls, and new filters.

   1. The Contractor shall furnish to the Contracting Officer individual written service reports for all work done under this warranty. As a minimum, quarterly reports are required.

F. Field Instructions: After completion of the work the Contractor shall operate all systems for a period of five days. During this time provide competent personnel to thoroughly instruct representatives of the Government and appropriate military service personnel in the proper operation and care of all equipment and control systems. Secure written acknowledgement of such training from the Contracting Officer. Include roster identifying signatures of attendants, office symbols, training subject, date, telephone numbers, etc.

G. Bound and Framed Instructions: One week before final inspection, furnish 6 complete sets of operating and maintenance instructions, bound in hard cover, indexed and tabbed. Include wiring and control diagrams with explanatory data; control sequence describing start-up, operation and shutdown; operating and maintenance instructions for each major piece of equipment; manufacturer's bulletins and catalog data; parts list and recommended spare parts. Fold in large sheets of drawings.

   1. Provide prints of system control and wiring diagrams, condensed operating instructions, and lubricating schedule; all components shall be numbered and identified on diagram. Submit for approval. After approval, frame under glass or plastic and mount on wall of each mechanical area where directed by the Contracting Officer.

1.02 ELECTRICAL WORK AND EQUIPMENT

A. Power: All power wiring required for installation of equipment is specified under Electrical Division. Electrical equipment shall be compatible with the electrical characteristics shown on electrical drawings. Verify electrical characteristics before ordering equipment.

B. Motors: 1750 RPM open drip proof construction unless otherwise shown or specified. Load on motors shall not exceed 100% nominal horsepower. Motors shall be of energy efficient design with apparent efficiency (power factor x efficiency) not less than 75%, Allis Chalmers, General Electric, Goulds, Louis Allis, Westinghouse, or equal.

   1. All motors shall be provided with overload protection.

   2. Do not run motors until correct overload elements are installed in starters. Trading overload elements for elements of correct size for motors actually furnished shall be included in this Section.

   3. Motors 3/4 H.P. and larger shall be 3 phase unless directed otherwise.

C. Fusing: Provide factory installed fuses in all equipment requiring fusing for branch circuit protection.

D. Motor Starters: To be furnished under this Section; installation thereof is specified under Electrical Division, except for those which are specified to be factory assembled. Starters shall be Cutler-Hammer, Allen-Bradley, Square D or G. E. Starters shall be U.L. and NEMA approved.

   1. Provide for each motor or group of motors requiring a single control (and not controlled from a motor-control center), a suitable controller and devices that will function as specified for the respective motors. Provide overload protection for each ungrounded conductor to each motor 1/8 HP or larger (manual reset type unless indicated otherwise). The overload-protection device shall be integral with the motor or controller. Unless indicated otherwise, furnish pilot lights with all remote starters. Where auxiliary control devices are connected into control circuit, these devices shall not bypass safety controls (motor-overload protective devices, high pressure cutouts, low pressure cutouts, etc.). Provide "Hand Off-Auto" switches, auxiliary contacts, etc. for all starters.

E. Controls: HVAC Contractor shall furnish and install all controls, and control and interlock wiring, as specified or required to properly complete the installation. All control conduits shall be provided under this Section. All electrical work performed under this Section shall conform to requirements set forth in the Electrical Division. All control wiring shall be installed in conduit.

F. Wiring Diagrams: Furnish to the Electrical Contractor for the specific makes and models of electric-motor operated equipment to be installed.

G. Modifications: The cost of any modifications for the electrical power wiring required by heating, air conditioning or ventilation equipment having electrical power requirements differing from that shown on the electrical drawings and/or as specified, shall be the responsibility of the Mechanical Contractor.

H. Grounding: Provide braided copper jumpers around all flexible connectors taking care that dampers do not bind flexible connections. Do not use dissimilar metals.

1.03 PLUMBING WORK

A. Condensate Drains: HVAC Contractor shall provide drains from all air conditioning equipment drains, to the hub drains.

1.04 VIBRATION AND NOISE CONTROL

A. General: Eliminate transmission of perceptible vibration, structure-borne noise, or objectionable air-borne noise to occupied area by HVAC equipment.

1.05 TESTING

A. General: Conduct tests upon completion of the heating, air conditioning and ventilation installations, and at times as designated by the Contracting Officer. Furnish all necessary personnel and test instruments. Power and fuel are specified under Division 1.

B. Ductwork Low Pressure: Test all supply, return and exhaust ducts, plenums, and casings and make airtight before covering with external insulation or concealing in masonry. Test supply ductwork under the positive pressure for the respective system 1.5" W.C. minimum. Test return ducts, plenum and casing under a positive pressure of 3/4" W.C. Vacuum clean ducts, plenum, casing and coils. Demonstrate operation of fire dampers before testing and starting. Check that flexible connections are loose and not transmitting vibration.

1.06 TESTING, ADJUSTING, AND BALANCING OF HVAC SYSTEMS

A. Scope:

The HVAC systems will be tested and balanced by an independent AABC or NEBB certified agency.

B. Testing, Adjusting, and Balancing of HVAC Systems:

The HVAC systems will be tested and balanced by an independent agency.

1. The independent air testing and balancing agency (TAB) shall be AABC or NEBB certified to perform the balancing and testing of the HVAC in accordance with the procedures of AABC or NEBB to analyze, balance, adjust and test air moving equipment, air distribution system. Two weeks prior to the start of test adjust and balance work the TAB contractor shall visit the site and inspect all mechanical systems to balanced. The TAB contractor shall provide a written report to the Contracting officer indicating any deficiencies that would prevent or hinder proper TAB work. Deficiencies shall be corrected by the responsible contractor prior to the start of TAB work. Provide for commissioning of all systems to ASHRAE Standards.

2. The HVAC Contractor shall put all heating, ventilating and air conditioning systems and equipment into operation and shall continue the operation of same during each working day of testing and balancing and shall place the automatic temperature control system in satisfactory operation before the TAB agency shall begin work.

3. Prior to the final acceptance of the HVAC system by the Contracting Officer, the Contractor shall allow the TAB agency to schedule this work in cooperation with other trades involved and comply with the completion date of the project.

4. The Contractor shall make available to the TAB agency a complete copy of shop drawing submittal data on mechanical equipment including performance curves for all HVAC equipment and air distribution devices, etc. necessary to test and balance the HVAC system.

5. The Contractor shall schedule the following necessary personnel:

   a. Automatic Temperature Control Manufacturer's Service Representative - to set adjustments of automatic operated damper and devices to operate as specified, and/or noted, including setting of all controls for proper calibrations.

   b. Mechanics - To operate, adjust, replace or repair any HVAC equipment that is found requiring any change/replacement in the pulleys, belts, dampers, valves, etc., of Contractors furnished and installed equipment.

   c. Electrician - to assist in any problems resulting from any of the power or control wiring installation, including replacement of starters & heater elements.

   The Contractor shall make any changes in pulleys, belts, and dampers or the addition of dampers as required for correct balance of the system as recommended by TAB agency, at no cost to Owner/Government.

6. The Contractor shall make all necessary corrections within 48 hours upon notification of TAB agency of the deficiencies requiring adjustment, (piece-meal correction is not acceptable) and within 10 working days for items that require replacement or installation.

7. The Contractor shall replace all air filters prior to the start of testing and balancing activity.

PART 2 - PRODUCTS AND EXECUTION

2.01 SHEET METAL DUCT WORK (LOW PRESSURE 2" S.P.)

A. Scope: Provide as shown and as required for the air conditioning, heating and ventilation systems. Make changes in dimensions (maintain area and do not exceed 0.1"/100 ft pressure loss), offsets or crossovers as necessary to clear piping, lights and structural members, and to maintain scheduled headroom. Provide all accessories required. Refer to architectural drawings and specifications.

B. Sizes: Take measurements at job and fit work into available space; report to the Contracting Officer any unworkable conditions encountered and alter layout or duct sizes as directed without additional cost to the Owner. Unless otherwise approved, conform to dimensions indicated. Duct dimensions shown indicate NET FREE AREA after installation of duct liner; increase sizes indicated to allow therefor.

C. Sheet Metal: ARMCO, or equal, prime quality galvanized sheet steel unless otherwise indicated on plans shall be gages as recommended in the latest edition of SMACNA "Duct Construction Standards", with long dimension or diameter not less than the following in any case:

   Up to 12 inches - 26 ga.
   13 to 30 inches - 24 ga.
   31 to 54 inches - 22 ga.
   55 to 84 inches - 20 ga.
   85 to 96 inches - 18 ga.

1. Where galvanized metal joins aluminum or copper, separate sheets with lead or chromate impregnated felt gaskets.

D. General Fabrication: Construct and erect in a workman-like manner, meeting requirements of the latest SMACNA "Duct Construction Standards" and NFPA Code 90A. Form straight and smooth on the inside, with joints neatly finished. Make up in sections of such length that mechanic can reach thru open end to seal insulation at previous joint. Assemble and anchor so as to be completely free from vibration and drumming under all conditions of operation. Make takeoffs at round ducts with prefabricated round-to-rectangular and rectangular-to-round transitions. Break so that manufacturer's quality stamp is exposed to view. Fabricate system for 2.0" S.P.

E. Exposed Ductwork: Install tight against the wall and/or ceiling with drive slip joints.

1. Where exposed ducts pass through walls and partitions, provide 4" wide 20 gage galvanized steel closure plates except at grilles and registers. Closure plates shall fit snugly to duct and shall be secured to wall.

F. Cross Joint, Seams and Stiffening: Join and stiffen with combination of joint types and areas over 18 inches wide. Install internal ends of slip joints in the direction of flow. Non-galvanized pieces must be painted before assembling with Tnemec or Rust-Oleum metal primer. All transverse joints with long dimension over 24" shall be made with Ductmate joints system as manufactured by Ductmate Industries, Inc., or approved equal.

1. Make all cross joints and all branch, grille and diffuser take-offs air tight by applying United duct sealer or 3M EC-800 caulking cement.

G. Turns and Transitions: Fabricate turns with an inside radius equal to width of duct. At 90 degree turns, Contractor may substitute square elbows with standard factory-made, multiple, double-blade constructed vanes. Avoid abrupt changes in shape, with a slope of 5:1, the minimum allowed.

H. Balancing Dampers: Provide at all points where branch ducts take off from trunks, and where ducts divide as detailed on the drawings.

I. Not used.

J. Volume Dampers (for all round): Single leaf type with locking type control quadrant and pivot rod extending through opposite side of duct with nylon end bearings at both ends. Provide stand-off mounting brackets as specified below under paragraph K.

Construct of 16 gauge min. metal with stand-off mounting brackets as specified hereinafter.

K. Volume Dampers: Opposed blade type with blades of 16 ga. galvanized steel mounted in steel frames by steel trunions riding in bronze or nylon sleeve bearings. Blade width shall not exceed 10 inches and individual blade length shall not exceed 48 inches. Extend one trunion to permit operation from outside the duct. Provide manually operated dampers with cadmium plated steel locking quadrant similar to "Duro-Dyne", "UNXLD" or "Wedge-Loc". Dampers opening to the outside shall have felted edges.

L. Stand-Off Mounting Brackets: Locking-type quadrant operators for dampers when installed on ducts to be externally insulated, shall be provided with stand-off mounting brackets, bases or adapters to provide

clearance between the duct surface and the operator not less than the thickness of the insulation. Stand-off mounting items shall be integral with the operator or standard accessory of the damper manufacturer.

M. Duct Instrument Test Holes: Provide for each system four test holes with screw caps (two in supply duct and two in return air plenum) at opposite ends near air rooftop units.

N. Flexible Connections: Connect all ducts to air handling units and fans (excepting dome type fans) with preassembled flexible connection of fire-resistant, neoprene coated glass fiber cloth (3" fabric width), as manufactured by Ventfabrics, Wiremold or Thermoflex. Install so that cloth is in folds (not drawn tight). Also, provide at building expansion joints.

O. Register and Grille Connections: Where take-offs are in side of a duct, clinch lock short tee surfaces set collars exactly flush with plaster surface (mechanic must be on job to make adjustments during plaster application). Set flange face so as to receive register gasket, and be concealed by register flange. Collars may be deleted where mounting frames are furnished with registers.

1. Install boots above lay-in ceilings simultaneously with ceiling work; mechanic must be on job during this phase of construction work.

2. At return relief and exhaust grilles 48" or more in either dimension, collars shall be 1 x 2 x 1/8 inch steel angle frames with corners mitered, welded and ground smooth. Frames in ceilings shall be independently suspended from the ceiling structure, or the duct shall have special reinforcing to prevent sagging of the boot.

P. Hangers and Supports: Supports small horizontal ducts with 1-1/4" x 20 ga. band hangers (1-1/2" x 16 ga. at ducts larger than 70 united inches). Provide in pairs close to each transverse joint and in no case more than six feet apart. Bands shall pass completely under round ducts. At rectangular ducts bands shall be turned 2" under the lower corner and fastened with self-tapping screws into the bottom surface and at 6" intervals (not less than 2) up the side. Loop top end of hangers over steel structural members above and fasten with galvanized bolts; where concrete joists occur overhead secure straps to side of joist with galvanized expansion bolts. Nothing will be hung from the metal roof deck

1. Support horizontal ducts larger than 100 united inches on trapeze type hangers, with structural supporting angle, 3/8 inch threaded rods and inserts or clamps as required to accommodate overhead construction. Spacing shall not exceed 8 feet.

2. Support small vertical runs with 1/8" steel bands screwed to 3 sides of duct and expansion bolted to adjacent structural elements; spacing shall not exceed 12 feet. Support vertical runs larger than 24 inches in either dimension with structural brackets with welded joints.

2.02 DUCT INSULATION WORK (INTERNAL)

A. General: Duct liner, mastics and materials shall comply with all requirements and other standard building code requirements. All insulation materials (coatings and mastics) shall be fire resistive per NFPA Pamphlet No. 90A and shall be UL listed and shall have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. NFPA No. 255 or UL 723.

B. Material: Liner shall be 1.5 lb. minimum density, flexible, impregnated glass fiber, water repellent, vermin proof, fire-proof and mold resistant with surface in air stream coated. Thermal conductivity shall

be not more than .27 BTU per hour, per inch thickness, per square foot, per degree F temperature difference at 75° F mean temperature. Acceptable material Schuller “Tuf Skin” or Certainteed “Tough Guard”.

C. Thickness: 1.0 inches.

D. Ducts and Equipment to be Insulated: Exposed supply air ducts in areas without ceilings outside air ducts, make-up air ducts, return air ducts, return air plenums, transfer air (jumper) ducts and relief air ducts.

E. Application: Adhere insulation to the entire surface of the sheet metal with fire resistive UL labeled adhesive before the metal is broken. In addition, secure all sheets wider than 25 inches with sheet metal screws and washers or stud pins and clips 16 inches on center, each way. Joints shall be straight and smooth and shall be buttered with adhesive to prevent erosion and improve air flow. All leading and trailing edges shall be secured with sheet metal air flow.

F. Metal Nosings: Provide metal nosings on upstream edge of liner at connections to equipment. Fans, coils, dampers, AC units, etc.

2.03 DUCT INSULATION WORK (EXTERNAL)

A. General: All work shall be performed by experienced applicators and in accordance with insulation manufacturer's recommendations. Duct must be clean, dry and pressure tested before covering is applied. Cover flexible connections with insulation material as hereinafter specified to same thickness as adjacent duct. All insulation materials (coatings and mastics) shall be fire resistive per NFPA Pamphlet No. 90 and shall be UL listed and shall have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84, NFPA No. 255 or UL 723.

B. Material: In concealed locations provide 3" thickness, ¾ lb. density glass fiber duct insulation with FSK reinforced foilkraft laminate jacket, Manville Spinglass board, or equal material by Knauf, Pittsburgh or CSG.

1. Thermal conductivity shall be not less than 0.27 BTU per hour, per inch thickness per square foot, per degree F. temperature difference at 75 F. mean temperature.

C. Ducts to be Insulated Externally: All concealed supply air ducts above ceilings.

D. Application: Wrap insulation tightly on the duct work with all circumferential joints butted and longitudinal joints overlapped a minimum of 2". Adhere insulation to metal with 4" strips of insulation bonding adhesive at 8" o.c. Additionally secure insulation to the bottom of rectangular duck work over 24" wide with mechanical fasteners at not more than 18" o.c. On circumferential joints, the 2" flange of the facing shall be secured using 9/16" flare-door staples applied 6" o.c. and taped as specified hereinafter. On longitudinal joints, the overlap shall be secured using 9/16" flare-door staples applied 6" o.c. and taped as specified hereinafter. For rectangular ducts wider than 18” additionally support insulation with weld pins and speed clips on 16” center.

1. All circumferential and longitudinal joints and all pin penetrations or punctures in vapor barrier facing shall be taped with pre-sized glass cloth adhered and finished with white vapor barrier coating equal to Foster 30-35. Ducts exposed to weather shall be finished as specified above.

2.04 REGISTERS, GRILLES, AND DIFFUSERS

A. General: All registers and grilles shall be product of a single manufacturer; shall be constructed of extruded aluminum with baked enamel finish to match adjacent surfaces, except as otherwise specified. Where lay-in type panels and frames are specified, check ceiling suspension system and coordinate interfacing. All grilles, diffusers and registers shall be mounted with aluminum countersunk screws with finish to match respective items.

B. Wall Supply Air Register: (S3)Titus Model 300-F-S-5-D-65, all aluminum adjustable 4-way deflection type. Provide with AG-35B opposed blade damper with worm gear Allen Key operators and AG-150 extractors with No. 1 operator, auxiliary mounting frame and baked enamel finish color to be selected by the Contracting Officer.

C. Square and Rectangular Neck Ceiling Diffusers: (S1- Layin; S2- Surface mounted) Titus Model TDCA-AA 6-95-125-25 removable core type, extruded aluminum construction, with baked off-white enamel finish, designed for one, two, three and four-way diffusion as indicated in plans, complete with AG-95 opposed blade damper, AG-125 Dua-Trol and adjustable vanes. Where lay-in ceiling occurs, diffusers shall have integral 2’ x 2’ aluminum modular lay-in ceiling panel with finish to match diffuser. The Contractor may use round flex connection (max 5 ft.) If rounded ducts are used provide factory fabricated plenum above a diffuser and metal 90º elbow. Insulate plenum same as duct.

D. Ceiling Mounted Exhaust and Return Register: (R1; E1; T1) Titus Model 50-F-0-5-D-25, all aluminum fabricated egg-crate type with baked off-white enamel finish, with Allen Key operated opposed blade damper and lay-in type frame.

1. Where lay-in ceilings occurs, each register shall have integral 2' x 2' or 2' x 4’ aluminum modular lay-in ceiling panel with finish to match diffuser.

E. Wall transfer Grille: (R2; E2; T2) Titus 355 ZRL; al aluminum, with horizontal bars set at 30° deflection.

F. Door Louvers: Titus Series CT-800-BFL steel constructed with channel frame and finish to match doors. Installation by General Contractor including cutting opening.

G. Brick Vents: Equal to reliable metal co. #RVB cast aluminum with #4 mesh aluminum screen.

I. Equal Products by Titus, Tuttle & Bailey, Carnes, J and J, and Barber-Coleman will be accepted.

2.05 PACKAGED AIR CONDITIONING UNITS

A. Warranty: Manufacturer’s standard 1-year with 5-year parts only compressor warranty.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carrier Corp.
2. Lennox Industries Inc.
3. Trane Company (The); North American Commercial Group.

C. Description: Factory assembled and tested; designed for exterior installation; consisting of compressor, indoor and outside refrigerant coils, indoor fan and outside coil fan, refrigeration and temperature controls, filters, and dampers.

D. Casing: Manufacturer's standard galvanized sheet metal construction with exterior enamel paint finish, hinged access doors with neoprene gaskets for inspection and access to internal parts, minimum 1/2-inch- thick thermal insulation, knockouts for electrical and piping connections, exterior condensate drain connection, and lifting lugs.

E. Indoor Fan: Forward curved, centrifugal, belt driven with adjustable motor sheaves, grease-lubricated ball bearings, and motor; or direct driven by multi-speed motor, (as scheduled). Mount fan and motor assembly on base with rubber isolators.

F. Outside Coil Fan: Propeller type, directly driven by permanently lubricated motor.

G. Refrigerant Coils: Aluminum-plate fin and seamless copper tube in galvanized-steel casing with equalizing-type vertical distributor and thermal expansion valve; tested to 450 psig (3105 kPa) and leak tested to 300 psig (2070 kPa) with air under water. Insulate coil section. Provide phenolic epoxy corrosion-protection coating to outdoor coils. Provide galvanized double slope drain pan under indoor coil.

H. Compressor(s): Hermetic reciprocating or scroll compressors with integral vibration isolators, internal overcurrent and overtemperature protection, internal pressure relief, and crankcase heater(s). Units 7-1/2 tons (26Kw) and larger to have minimum of two compressors.

I. Refrigeration System:

1. Compressor(s).
2. Outside coil and fan.
3. Indoor coil and fan.
4. Loss of phase monitor with auto-reset.
5. High-pressure switches.
6. Low-pressure switches.
7. Charge of refrigerant.
8. Refrigerant Circuits: Interlaced refrigerant-coil circuiting with circuit for each compressor.
9. Capacity Control: Compressor cycling with steps as scheduled.
10. Compressor Motor Overload Protection: Manual reset.
11. Antirecycling Timing Device: Prevents compressor restart for five minutes after shutdown.
12. Low-Ambient, Head-Pressure Control: Designed to operate at temperatures to 0 deg F (minus 18 deg C) by cycling outside coil fans and controlling speed of last fan of each circuit.
13. Oil-Pressure Switch: Designed to shut down compressors on low oil pressure.

J. Filters: 2-inch- (50-mm-) thick, fiberglass, pleated, throwaway filters in filter rack.

K. Heat Exchanger: Tubular Stainless-steel construction for natural gas-fired burners (as scheduled) with the following controls:

1. Dual gas valve with manual shutoff.
2. Stages of capacity as scheduled.
3. Direct-spark pilot ignition.
4. Electronic flame sensor.

5. Induced-draft blower with providing switch.
6. Flame rollout switch.

L. Outside-Air Damper (provide where scheduled): Linked damper blades, for 0 to 50 percent outside air, with manual adjustment slide and spring-return damper motor and hood.

M. Power Connection: Provide for single connection of power to unit with control-circuit transformer with built-in circuit breaker.

N. Unit Controls: Solid-state control board and components contain at least the following features:

1. Indoor fan on/off delay.
2. Default control to ensure proper operation after power interruption.
3. Unit diagnostics and diagnostic code storage.
4. Field-adjustable control parameters.
5. Gas valve delay between first- and second-stage firing.
6. Low-ambient control, allowing operation down to 0 deg F (minus 18 deg C) (where scheduled).
7. Low-refrigerant pressure control.

O. Dehumidification Control (provide where scheduled):

1. Factory installed hot gas reheat to control humidity with reheat coil, solenoid valve, humidity controller and remote mounted humidity sensor. Cooling or heating demand terminates dehumification mode.
2. Accuracy: +/- 3% from 20 to 95% RH.
   a. Drift: Max of 2% RH per 5 years.

P. Optional Accessories (provide where scheduled):

1. Coil guards of painted, galvanized-steel wire.

Q. Motors: Premium efficiency for belt drive, 3-phase motors.

R. Installation:

1. Install units level and plumb, maintaining manufacturer's recommended clearances. Any slope must be toward side where condensate drain is connected.
2. Unit Support: Install unit level on concrete pad. Coordinate wall penetrations and flashing with wall construction. Secure units to structural support with anchor bolts.

S. Connections:

1. Gas piping installation requirements are specified in other Division 15 Sections.
2. Duct installation requirements are specified in other Division 15 Sections. Drawings indicate the general arrangement of ducts. The following are specific connection requirements:
   a. Install ducts to termination at unit horizontal connections.
   b. Connect supply ducts to rooftop unit with flexible duct connectors specified in Division 15 Section "Duct Accessories."

3. Electrical System Connections: Comply with applicable requirements in Division 16 for power wiring, switches, and motor controls.

T. Field Quality Control

1. After installing rooftop air conditioners and after electrical circuitry has been energized, test units for compliance with requirements.
2. Inspect for and remove shipping bolts, blocks, and tie-down straps.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
5. Remove malfunctioning units, replace with new units, and retest as specified above.

U. Startup Service

1. Complete installation and startup checks according to manufacturer's written instructions and do the following:
    a. Inspect for visible damage to unit casing.
    b. Inspect for visible damage to furnace combustion chamber.
    c. Inspect for visible damage to compressor, air-cooled outside coil, and fans.
    d. Inspect internal insulation.
    e. Verify that labels are clearly visible.
    f. Verify that clearances have been provided for servicing.
    g. Verify that controls are connected and operable.
    h. Verify that clean filters are installed.
    i. Clean outside coil and inspect for construction debris.
    j. Clean furnace flue and inspect for construction debris.
    k. Connect and purge gas line.
    l. Adjust vibration isolators.
    m. Inspect operation of barometric dampers.
    n. Lubricate bearings on fan.
    o. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
    p. Adjust fan belts to proper alignment and tension.
    q. Start unit according to manufacturer's written instructions.
    r. Inspect and record performance of interlocks and protective devices; verify sequences.
    s. Operate unit for an initial period as recommended or required by manufacturer.
    t. Adjust and inspect high-temperature limits.
    u. Inspect outside-air dampers for proper stroke and interlock with return-air dampers.
    v. Inspect controls for correct sequencing of heating, mixing dampers, refrigeration, and normal and emergency shutdown.
    w. After startup and performance testing, change filters, vacuum heat exchanger and cooling and outside coils, lubricate bearings, adjust belt tension, and inspect operation of power vents.

V. Adjusting

1. Adjust initial temperature and humidity set points.

2. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

2.06 VENTILATION

A. General: Provide all fans complete with ducts, grilles and accessories. Roof fans and curbs shall be painted with two coats of non-reflective paint. Paint type and color as directed by architect. All fans shall be AMCA certified in accordance with Standards #210 and 300. Furnish for approval capacity and sound power ratings. All motors ½ HP and smaller shall have built-in overload protection.

For belt driven units provide adjustable v-belt drives sized for 50% overload and adjustable motor base.

Provide motor side fan guards, fan wall housing collar and variable pitch belt drive. Motor for discharge louvers shall be designer for same power as fan motor. Where required provide transformer and control wiring for a complete functional installation.

B. Fly Fans: Mars Series "CH" complete with all accessories including mounting frame, guards, cabinet with inlet and discharge grille and other accessories required for a complete installation.

C. Ceiling Mounted Cabinet Fans: Greenheck SP Series, or equal, complete with all accessories, including ceiling grille, centrifugal fan, backdraft damper and cast aluminum brick vent as shown on the drawings.

2.07 CONDENSATE DRAIN LINES

A. General: Provide condensate drain line from each HVAC unit to a dry well located at grade. Piping shall be type "M" cooper.

2.08 ICE MACHINE INSTALLATION

A. General: The ice machine will be furnished by AAFES. The Contractor shall install the machine complete with remote air cooled condenser, refrigerant piping, refrigerant, oil, control wiring and in general provide a complete functional installation ready for operation. Water and drain piping connection by plumbing contractor under division 15400.

END OF SECTION

SECTION 15920

AUTOMATIC TEMPERATURE CONTROLS

PART 1 - GENERAL

1.01 GENERAL

A. General Requirements: Section 15010 and 15700 are applicable hereto.

B. Scope: Furnish and install a complete system of automatic temperature controls, as specified herein and as shown on the drawings and as required for a complete installation. All temperature control equipment shall be of the electric/electronic type as manufactured by Trane, Carrier, York, Honeywell, Johnson Controls, or Siebe. All work shall be performed by the control subcontractor.

C. Guarantee: The temperature control system shall be guaranteed free of defects in material and workmanship for a period of twelve months from date of acceptance. If, within this period, any of the material or workmanship proves defective, it shall be repaired or replaced at no additional charge to the Owner.

D. Adjustments and Service: After completion of the installation, regulate and adjust all thermostats, dampers, and other devices furnished, and place them in complete operating condition. Provide all service and maintenance for the temperature control system during the guarantee period. Last service call shall be made two weeks prior to year-end inspection. Adjust, calibrate and in general provide complete service for the control system.

E. Personnel Instructions: Upon completion of the work and acceptance by the Owner, factory representatives under direct employ of the temperature control manufacturer shall provide two 3 hour periods of instruction for the Owner's operating personnel who have responsibility for the mechanical system. An additional 2-hour instruction period will be given at the beginning of the next heating or cooling season. Provide complete field instructions as specified in paragraph 1.01.F "Field Instructions" of Section 15700 - HEATING, VENTILATING AND AIR CONDITIONING."

1. Provide six sets of complete operating and maintenance instructions and drawings, typewritten instructions and operating sequences, and descriptive data sheets. Assemble each set in a hard cover binder. One set in each O&M manual plus a set under plastic in an appropriate mechanical equipment room. Also, provide attendance roster with signatures as specified under 15700 1.01 F.

   A copy of Training Attendance Roster shall be provided in each O&M Manual.

F. Electrical: All wiring incidental to the control system shall be provided and installed by the control sub-contractor including all interlock control wiring between the various components of the air conditioning system, and all smoke detection system interlock electrical wiring. All control wiring shall be installed in conduit and in accordance with the NEC, NFPA, and applicable Building codes. Where indicated on the drawings provide override switches, pilot lights, miscellaneous devices, etc.

1.02 EQUIPMENT

A. The custom application controller equal to Trane (MP-581) shall be microprocessor based, consisting of analog and binary input and output points, and programmable logic, designed for monitoring and control applications. The controllers shall be capable of operating as completely independent units and/or as part of a facility-wide building control system.

B. Controllers shall be certified by a nationally recognized testing laboratory to company with the requirements of the UL-916 Energy Management Equipment standard. Controllers shall meet all requirements of FCC regulations, Part 15, Class A, for radio frequency emissions. Controller shall be in compliance with European Directive CE for electrical immunity (directive 89/336/EEC EN) and CE for electrical emissions, and include the CE Mark.

C. Custom application controllers shall be mounted in enclosures appropriate to the project environmental conditions.

1. Controllers used in conditioned ambient shall be mounted in NEMA type-1 enclosures, and shall be rated for operation at 0 C to 50 C (32 F to 120 F).

2. Controllers used outdoors and/or in wet ambient shall be mounted within NEMA type-4 waterproof enclosures, and shall be rated for operation at –40 C to 70 C (-40 F to 158 F).

D. Enclosures shall include a line voltage to 24 VAC transformer. Transformer shall be fused or circuit breaker protected within the enclosure.

E. Enclosures shall have multiple access locations for wire and conduit to enter the cabinet, and an isolated high voltage section. All control wiring shall be electrically terminated inside the cabinet. The controller in enclosure shall be UL-listed.

F. The controllers shall be software configurable for the types of input/output points required per the points list, and for future expansion.

G. The controllers shall receive signals from industry standard sensors and input devices and directly control analog and binary control devices. The controllers shall have the capability to monitor and control the following types of inputs and outputs:

1. Analog Inputs:
   Current: 0 to 20 mA, Voltage: 0 to 10 Vdc, Thermistor, Linear resistance, or Resistance temperature detectors (RTD)

2. Binary Inputs:
   Isolated dry contact closure or Pulse inputs for metering

3. Analog Outputs:
   Current: 0 to 20 mA, or Voltage: 0 to 10 Vdc

4. Binary Outputs:
   24 VAC, relay controlled.

H. Each controller enclosure shall include a 18-24 Vdc power supply capable of supplying sufficient dc power for all transmitting (e.g. 4-20 mA) sensors connected as specified, and for all unused analog inputs.

I. All binary and analog output points shall be provided with a manual override, with local feedback indication that an output is presently overridden. Each output shall include an indicator light providing on/off status of the associated binary output.

J. Each controller shall have a real-time clock which shall remain active during power failure for up to seven (7) days under normal operating conditions. When the controller is used with a higher level system, the time clock shall be automatically synchronized with the system controller.

K. Custom application controllers shall communicate using LonTalk. Controllers shall use FTT-10 transceivers. All communications shall be with the use of LonMark-approved standard network variable types (SNVT).

L. The custom application controller shall include an operator display allowing the user to perform basic daily operations tasks. At a minimum this operator display shall:

1. Consist of a one-quarter VGA touch screen with 320 x 240-pixel resolution. The touch screen shall be backlit. The brightness and contrast shall be adjustable to allow for easy reading of information on the screen.

2. Provide on-screen graphical icons to identify common user functions including viewing point data, alarms, scheduling, output overrides, and controller setup.

3. Be capable of having unique user identification and passwords that can be programmed to limit access to the system and operator functions.

4. Display the current state of all input/output points connected to the controller.

5. Allow for up to 24 individual custom display screens that allow 24-character English descriptions of controller data.

6. Give the operator the ability to override the current state of all binary and analog output points connected to the controller. The controller shall have this capability prior to any on-site programming.

7. Include a time clock which shall maintain correct time for at least 7 days during a power loss to the controller.

8. Allow the operator to modify the start and stop times of the time-of-day schedule within the controller. Scheduling function shall provide the 7-day control, with 2 start and stop events per day.

9. Provide a unique visual alarm indicator such as a flashing LED, separate from the display screen.

10. Automatically update displayed system information every 10 seconds.

M. The controller operating system and programming shall be stored in non-volatile memory.

N. Each controller shall monitor all analog inputs and control analog outputs, utilizing 12-bit analog-to-digital and digital-to-analog conversion.

O. Each controller shall be capable of executing proportional, integral, and derivative (PID) control loops and custom logic control routines. PID loops shall be programmable to operate at user-defined intervals, as frequently as one second.

P. The custom application controllers shall include a communications data port for connection to a personal computer for upload, download, and editing of data and programs.

1.03 CUSTOM APPLICATION CONTROLLER PROGRAMMING TOOL

A. BAS/ATC contractor shall provide a software-programming tool to be used for set-up, programming, and editing of the controller functions.

B. Edit Software shall run on a laptop computer with the following minimum requirements: Microsoft Windows 98, CD-ROM drive, 64 MB RAM, 20 MB hard drive space, 800 x 600 screen resolution, and PCMCIA slot for a network interface card.

C. Edit software shall incorporate graphical function and logic blocks linked pictorially to create custom application programs meeting the sequence(s) of operation.

D. Edit software shall include PID control loop setup functions.

E. Edit software shall facilitate controller database save and restore functions.

F. Edit software shall have a print function to provide pictorial printed representations of the graphical programs.

G. The service tool using the edit software, and connected to one local controller shall have full access to all local controllers on the same communications link.

H. Provide one copy of the edit software and any hardware devices or manuals required to operate software. A laptop or PC will be provided by the Owner.

1.04 SEQUENCE OF OPERATIONS

A. The drawings indicate control sequences and unit operation. Include all necessary control devices to provide the operation indicated on the control diagrams and sequence of operation. The specifications, diagrams, and sequence are all meant to provide a complete picture of unit operation. All control points indicated in either one or all of the above mentioned, shall be provided.

END OF SECTION

SECTION 16000

ELECTRICAL WORK - GENERAL

PART 1 - GENERAL

1.01. WORKMANSHIP AND MATERIALS : All work shall be executed in a workmanlike manner so as to insure a high quality job and to present a neat and mechanical appearance when completed. All materials used shall be new and UL approved for their intended use where such standards have been established.

1.02. CODES, PERMITS AND INSPECTIONS : Work included in this section shall comply with all applicable laws of the community and with the latest edition of the National Electrical Code where it is not in conflict with those laws. The contractor shall obtain and pay for all necessary permits required to perform the work outlined herein and on the drawings. Upon completion of the work the contractor shall submit a certificate of final inspection and approval from the local Electrical Inspector's office (or the authority having jurisdiction, certifying that the installation complies all applicable regulations governing the same. Once bids are taken, changes to the drawings and/or specifications made necessary by code requirements shall be performed at no additional cost.

1.03. DRAWINGS AND SPECIFICATIONS : The contract drawings and these specifications shall be considered as complimentary each to the other. What is called for by one shall be considered binding as if called for by both. Where conflicts occur, secure clarification from the Architect/ Engineer prior to submitting bids; otherwise, provide for the more costly quality or quantity. The drawings are diagrammatic and dimension figures should be followed in preference to scaling; verify dimensions with the architectural drawings and with field conditions.

1.04. SITE CONDITIONS : Before submitting a bid the contractor shall visit the project site and ascertain all existing conditions. Adjustment to the work made necessary by actual field conditions shall be made at no additional cost. Routing of underground feeders and circuits may be adjusted to suit actual conditions encountered.

1.05. COORDINATION WITH OTHER TRADES : Coordinate the work in this section so as to conform with the progress of the work of the other trades. Phasing of the work shall be done as soon as possible with the entire installation completed as soon as the condition of the building permits.

1.06. WORK INCLUDED IN OTHER SECTIONS : Portions of work related to this section to be done by others include: finished painting of conduits, equipment, etc. (except wood backboards), furnishing and setting in place of all motors, furnishing and installation of all control devices and circuits (except for control devices in power circuits which are to be included as a part of this section).

1.07. CUTTING AND PATCHING : Where possible, all work shall be built in as the job progresses. Where this is not possible, secure the Architect's approval for any cutting, chasing, etc. that is required. All cut surfaces shall be repaired by skilled mechanics of the trade involved.

1.08. TRENCHING AND BACKFILLING : Perform all excavation necessary for installation of the work shown; do not backfill until all work is completed and inspected. Backfill within the building and under paved areas shall meet compaction requirements established under other sections of these specifications; fill material shall be pit run gravel or similar granular material. Avoid all existing utilities; any existing utilities damaged shall be repaired as directed by the Architect. Restore any damaged paving to match existing.

1.09. TESTING : Upon completion of the work, conduct a thorough test in the Architect's presence to show the entire system to be in perfect working condition.

End of Section 16000

SECTION 16100

CONDUIT AND RACEWAY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Metal conduit.

B. Flexible metal conduit.

C. Liquidtight flexible metal conduit.

D. Electrical metallic tubing.

E. Nonmetallic conduit.

F. Flexible nonmetallic conduit.

G. Fittings and conduit bodies.

1.02 RELATED SECTIONS

A. Section 07270 - Firestopping.

B. Section 16112 - Surface Raceways.

C. Section 16118 - Duct Bank.

D. Section 16130 - Boxes.

E. Section 16170 - Grounding and Bonding.

F. Section 16190 - Supporting Devices.

G. Section 16195 - Electrical Identification.

1.03 REFERENCES

A. Conduit and tubing shall meet the requirements of the latest editions of following standards:

1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
2. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
3. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
4. ANSI/NFPA 70 - National Electrical Code.
5. NECA "Standard of Installation."
6. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.04 DESIGN REQUIREMENTS

A. Conduit Size: ANSI/NFPA 70. Limit conductor cross sectional area to no more than 40% of conduit cross sectional area.

1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide for metallic conduit, flexible metal conduit, liquidtight flexible metal conduit, metallic tubing, nonmetallic conduit, flexible nonmetallic conduit, fittings, conduit bodies.

1.06 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01720.

B. Accurately record actual routing of interior conduits larger than 2 inches on project record documents and of all underground conduits regardless of size.

1.07 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Accept conduit on site. Inspect for damage.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.09 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown schematically on Drawings unless dimensioned. Route as required to complete wiring system.

PART 2 - PRODUCTS

2.01 CONDUIT REQUIREMENTS

A. Minimum Size: 1/2 inch unless otherwise specified.

B. Non-Hazardous Underground Installations:

1. More than Five Feet outside Foundation Wall: Use rigid steel conduit, intermediate metal conduit, plastic coated rigid steel conduit or thickwall nonmetallic (Schedule 40 PVC) conduit.

2. Within Five Feet inside Foundation Wall: Use rigid steel conduit, intermediate metal conduit, plastic coated rigid steel conduit or thickwall nonmetallic (Schedule 40 PVC) conduit.

3. In or Under Slab on Grade: Use rigid steel conduit, intermediate metal conduit, plastic coated rigid steel conduit or thickwall nonmetallic (Schedule 40 PVC) conduit.

4. Minimum Size: 3/4 inch.

C. Non-Hazardous Outdoor Locations, Above Grade: Use rigid steel or intermediate metal conduit.

D. In Slab Above Grade and Poured Concrete Walls:

1. Use rigid steel conduit, intermediate metallic conduit or thickwall nonmetallic (Schedule 40 PVC) conduit.

2. Maximum Size Conduit in Slab: 3/4 inch; 1 inch for conduits crossing each other.

E. Wet and Damp Interior Locations Above Floor Slab: Use rigid steel conduit, intermediate metal conduit or electrical metallic tubing.

F. Dry Interior Locations Above Floor Slab (Including Hollow Stud Partitions):

1. Concealed: Use rigid steel, intermediate metal conduit or electrical metallic tubing.
2. Exposed: Use rigid steel, intermediate metal conduit or electrical metallic tubing.

G. Aboveground and Underground Raceways Serving Gasoline Dispenser Islands and Underground Gasoline Storage Tanks:

1. Use rigid steel conduit, intermediate metallic conduit, or plastic coated rigid steel conduit.

2. Use explosion-proof seal fittings at both ends of conduit. Fill seal fittings with U.L. listed sealing materials.

2.02 METAL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Intermediate Metal Conduit (IMC): Rigid steel.

C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match conduit; aluminum fittings may be used with steel conduit. Use explosion-proof fittings and bodies for raceways serving gasoline dispenser islands and underground fuel storage tanks.

2.03 PVC COATED METAL CONDUIT

A. Description: NEMA RN 1; rigid steel conduit with external PVC coating, 40 mil thick.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel fittings with external PVC coating to match conduit. Use explosion-proof fittings and bodies for raceways serving gasoline dispenser islands and underground fuel storage tanks.

2.04 FLEXIBLE METAL CONDUIT

A. Description: Interlocked steel construction.

B. Fittings: ANSI/NEMA FB 1.

2.05 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Description: Interlocked steel construction with PVC jacket.

B. Fittings: ANSI/NEMA FB 1.

2.06 ELECTRICAL METALLIC TUBING (EMT)

A. Description: ANSI C80.3; galvanized tubing.

B. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel compression type. Set screw or indent type fittings are not acceptable.

2.07 NONMETALLIC CONDUIT

A. Description: NEMA TC 2; Schedule 40 PVC.

B. Fittings and Conduit Bodies: NEMA TC 3.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install conduit in accordance with NECA "Standard of Installation."

B. Install nonmetallic conduit in accordance with manufacturer's instructions.

C. Arrange supports to prevent misalignment during wiring installation.

D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers. Where possible, support conduits in ceiling cavity space at the level of structural roof joists.

E. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.

F. Fasten conduit supports to building structure and surfaces under provisions of Section 16190. DO NOT SUPPORT CONDUITS DIRECTLY FROM ROOF DECK.

G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

H. Do not attach conduit to ceiling support wires.

I. Arrange conduit to maintain headroom and present neat appearance.

J. Route exposed conduit parallel and perpendicular to walls.

K. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

L. Route conduit in and under slab directly from point-to-point where possible. Avoid conduit crossovers where possible.

M. Do not cross conduits larger than 1 inch diameter in slab.

N. Maintain adequate clearance between conduit and piping.

O. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.

P. Cut conduit square using saw or pipecutter; de-burr cut ends.

Q. Bring conduit to shoulder of fittings; fasten securely.

R. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum. Use only an approved hotbox bender to make bends in nonmetallic conduit.

S. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

T. Install no more than equivalent of three 90-degree bends between boxes (no more than two 90-degree bends for conduits containing telephone cables, fire alarm cables, intrusions system cables, local area network (LAN) cables, etc.). Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate factory elbows for bends in metal conduit larger than 2 inch size.

U. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

V. Provide expansion/deflection couplings to accommodate expansion and deflection where conduit crosses seismic joints or expansion joints. Such couplings shall have braided copper bonding jumpers.

W. Provide suitable pull string in each empty conduit except sleeves less than 20 feet long and nipples.

X. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

Y. Ground and bond conduit under provisions of Section 16170.

Z. Identify conduit under provisions of Section 16195.

AA. Where conduits for telephone cables, cash register cables, etc. are stubbed from wall boxes or cabinets to above accessible ceilings, turn conduits out of wall approximately 12 inches below roof joist in an accessible location. Coordinate location with other trades. Provide bushing or coupling on end of conduit to prevent signal cable contact with sharp metal. Provide tag on end of conduit indicating type and location of utilization outlet (example: TELEPHONE - BREAK ROOM).

BB. In interior locations, turn nonmetallic conduits out of floor slab using rigid steel elbows. Continue raceway above floor slab using metallic conduit.

CC. Where conduits turn up into switchboard, padmount transformer, or large equipment enclosures, provide grounding bushings on ends of conduits, and bond to equipment grounding terminal strip or lugs using bonding jumper sized according to NFPA 70, Table 250-95.

DD. Where conduits enter boxes and cabinets, provide bushings with plastic insulated throat for conduits 1 inch and larger.

3.02 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Section 07270.

B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

END OF SECTION

SECTION 16112

SURFACE RACEWAY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surface metal raceways.

B. Surface nonmetal raceways.

C. Multi-outlet assemblies.

D. Wireways.

1.02 RELATED SECTIONS

A. Section 16113 - Underfloor Ducts.

B. Section 16141 - Wiring Devices: Receptacles.

1.03 REFERENCES

A. NECA (National Electrical Contractor's Association) Standard of Installation.

B. NEMA WD 6 - Wiring Device Configurations.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide dimensions, knockout sizes and locations, materials, fabrication details, finishes, and accessories.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with NECA Standard of Installation.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years documented experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2 - PRODUCTS

2.01 SURFACE METAL RACEWAY

C. Manufacturers:

1. Wiremold.
2. Mono Systems Inc.

D. Description: Sheet metal channel with fitted cover, suitable for use as surface metal raceway.

E. Size: As shown on Drawings.

D. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories.

2.02 MULTIOUTLET ASSEMBLY

A. Multioutlet Assembly: Sheet metal channel with fitted cover, with pre-wired receptacles, suitable for use as multioutlet assembly.

B. Size: As indicated on Drawings.

C. Receptacles: NEMA WD 6, type 5-15R, single receptacle. Provide isolated ground receptacles where noted.

F. Receptacle Spacing: 12 inches.

G. Receptacle Color: Brown.

H. Channel Finish: Buff enamel.

I. Fittings: Furnish manufacturer's standard couplings, elbows, outlet and device boxes, and connectors.

2.04 WIREWAY

A. Manufacturers:

3. Square D.
4. General Electric.
5. Siemens.

B. Description: NEMA 1 for interior use; NEMA 3R for exterior use.

C. Knockouts: Manufacturer's standard.

J. Size: As indicated on Drawings.

K. Cover: Screw cover. Provide full gasketing and stainless steel fasteners, clips, and straps for exterior use.

F. Finish: Rust inhibiting primer coating with gray enamel finish.

PART 3 - EXECUTION

3.01 INSTALLATION

L. Install Products in accordance with manufacturer's instructions.

M. Use flat-head screws, clips, and straps to fasten raceway channel to surfaces. Mount plumb and level.

N. Use suitable insulating bushings and inserts at connections to outlets and corner fittings.

O. Wireway Supports: Provide steel channel as specified in Section 16190.

P. Close ends of wireway and unused conduit openings.

Q. Ground and bond raceway and wireway under provisions of Section 16450.

END OF SECTION

SECTION 16118

DUCT BANK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Metal conduit.

B. Duct.

C. Manholes.

1.02 RELATED SECTIONS

A. Section 02219 - Utility Excavation.

B. Section 02223 - Backfilling.

C. Section 03100 - Concrete Formwork.

D. Section 03200 - Concrete Reinforcement.

E. Section 03300 - Cast-In-Place Concrete.

F. Section 15430 - Plumbing Specialties.

1.03 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Ductbank:

1. Basis of Measurement: By the lineal foot, for each configuration.
2. Basis of Payment: Includes purchase, delivery, and installation of duct, fittings, supports, and accessories, and for trenching, concrete encasement, and backfill.

B. Manhole:

1. Basis of Measurement: Per unit.
2. Basis of Payment: Includes purchase, delivery, and installation of manhole.

1.04 REFERENCES

A.. ANSI C80.1 - Rigid Steel Conduit, Zinc-Coated.

B. ASTM A48 - Gray Iron Castings.

C. ASTM C857 - Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.

D. ASTM C858 - Underground Precast Concrete Utility Structures.

E. ASTM C891 - Installation of Underground Precast Utility Structures.

F. ASTM C1037 - Inspection of Underground Precast Utility Structures.

G. IEEE C2 - National Electrical Safety Code.

H. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

I. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).

J. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

K. NEMA TC 6 - PVC and ABS Plastic Utilities Duct for Underground Installation.

L. NEMA TC 9 - Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation.

M. NEMA TC 10 - PVC and ABS Plastic Communications Duct and Fittings for Underground Installation.

N. NEMA TC 14 - Filament-Wound Reinforced Thermosetting Resin Conduit and Fittings.

O. NFPA 70 - National Electrical Code.

P. UL 651A - Type EB and A PVC Conduit and HDPE Conduit.

1.05 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide for metallic conduit, nonmetallic conduit, manholes, handholes, manhole accessories and warning tape.

C. Shop Drawings: Indicate dimensions, reinforcement, size and locations of openings, and accessory locations for precast manholes.

1.06 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Submittals for information.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.07 SUBMITTALS FOR CLOSEOUT

A. Section 01700 - Project Closeout.

B. Project Record Documents: Record actual routing and elevations of underground conduit and duct, and locations and sizes of manholes.

1.08 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.09 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70 and IEEE C2.

B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

1.10 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated.

B. Verify routing and termination locations of duct bank prior to excavation for rough-in.

C. Verify locations of manholes prior to excavating for installation.

D. Duct bank routing is shown in approximate locations unless dimensions are indicated. Route as required to complete duct system.

E. Manhole locations are shown in approximate locations unless dimensions are indicated. Locate as required to complete ductbank system.

PART 2 - PRODUCTS

2.01 RIGID STEEL CONDUIT

Q. Rigid Steel Conduit: ANSI C80.1.

R. Fittings: NEMA FB 1, steel.

2.02 PLASTIC CONDUIT

A. Rigid Plastic Conduit: NEMA TC 2, Schedule 40 PVC, with fittings and conduit bodies to NEMA TC 3.

B. Rigid Plastic Underground Conduit: UL 651A, Type A PVC.

2.03 PLASTIC DUCT

A. Plastic Utilities Duct: NEMA TC 6; PVC Type DB.

B. Plastic Utility Duct Fittings: NEMA TC 9.

S. Plastic Communications Duct and Fittings: NEMA TC 10, Type DB.

2.04 PRECAST CONCRETE MANHOLES

A. Description: Precast manhole designed in accordance with ASTM C858, comprising modular, interlocking sections complete with accessories.

B. Loading: ASTM C857, Class A-0.3.

C. Shape: Rectangular with truncated corners.

D. Nominal Dimensions: As Indicated on drawings.

E. Base Section: Include 3 inch deep x 14 inch round sump with cast sleeve, and two 1 inch ground rod openings.

F. Top Section: Include 39 inch diameter grooved opening for frame and cover.

G. Riser Casting: 12 inch, with manhole step cast into frame.

H. Frames and Covers: ASTM A48; Class 30B gray cast iron, 30 inch size, machine finished with flat bearing surfaces. Provide cover marked to indicate utility TELEPHONE.

I. Duct Entry Provisions: Window knockouts.

J. Duct Entry Locations: As indicated on drawings.

K. Duct Entry Size: As indicated on drawings.

L. Cable Pulling Irons: Use galvanized rod and hardware. Locate opposite each duct entry. Provide watertight seal.

M. Cable Rack Inserts: Minimum load rating of 800 pounds. Locate at 2 feet on center.

N. Cable Rack Mounting Channel: 1-1/2 x 3/4 inch steel channel, 48 inch length. Provide cable rack arm mounting slots on 1-1/2 inch centers.

O. Cable Racks: Steel channel, 1-1/2 x 3/4 x 14 inches, with fastener to match mounting channel.

P. Cable Supports: Porcelain clamps and saddles.

Q. Manhole Steps: Cast steps at 12 inches on center vertically.

R. Sump Covers: ASTM A48; Class 30B gray cast iron.

S. Source Quality Control: Inspect manholes in accordance with ASTM C1037.

2.05 ACCESSORIES

A. Underground Warning Tape: 4 inch wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines.

PART 3 - EXECUTION

3.01 DUCT BANK INSTALLATION

A. Install power and communications duct to locate top of ductbank minimum 36 inches below finished grade.

T. Install duct with minimum slope of 4 inches per 100 feet (0.33 percent). Slope duct away from building entrances.

U. Cut duct square using saw or pipe cutter; de-burr cut ends.

V. Insert duct to shoulder of fittings; fasten securely.

W. Join nonmetallic duct using adhesive as recommended by manufacturer.

X. Wipe nonmetallic duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

Y. Install no more than equivalent of three 90-degree bends between pull points.

Z. Provide suitable fittings to accommodate expansion and deflection where required.

AA. Terminate duct at manhole entries using end bell.

BB. Stagger duct joints vertically in concrete encasement 6 inches minimum.

CC. Use suitable separators and chairs installed not greater than 4 feet on centers.

DD. Band ducts together before backfilling or placing concrete.

EE. Securely anchor duct to prevent movement during concrete placement.

FF. Place concrete under provisions of Section 03300. Use mineral pigment to color concrete red.

GG. Provide minimum 3-inch concrete cover at bottom, top, and sides of ductbank.

HH. Provide two No. 4 steel reinforcing bars in top of bank under paved areas.

II. Connect to existing concrete encasement using dowels.
JJ. Connect to manhole wall using dowels.

KK. Provide suitable nylon pull string in each empty duct except sleeves and nipples.

LL. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.

MM. Backfill trenches under provisions of Sections 02219 and 02223.

NN. Interface installation of underground warning tape with backfilling specified in Section 02219. Install tape 6 inches below finished surface.

3.02 PRE-CAST MANHOLE INSTALLATION

A. Section 01300: Manufacturer's instructions.

B. Excavate for manhole installation under the provisions of Section 02219.

C. Install and seal precast sections in accordance with ASTM C891.

D. Install manholes plumb.

E. Use precast neck and shaft sections to bring manhole cover to finished elevation.

F. Attach cable racks to inserts after manhole installation is complete.

G. Install drains in manholes and connect to 4 inch (DN100) pipe terminating in 1/3 cu yd crushed gravel bed under provisions of Section 15430.

H. Backfill manhole excavation under the provisions of Section 02223.

END OF SECTION

SECTION 16120

CONDUCTORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Building wire and cable.

B. Wiring connectors and connections.

1.02 RELATED SECTIONS

A. Section 02219 - Utilities Excavation: Trenching and backfilling for direct burial cable installation.

B. Section 16100 - Conduit and Raceway.

C. Section 16112 - Surface Raceway.

D. Section 16130 - Boxes.

E. Section 16195 - Electrical Identification.

1.03 REFERENCES

A. NECA Standard of Installation (National Electrical Contractors Association).

B. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems (International Electrical Testing Association).

C. NFPA 70 - National Electrical Code.

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide for each cable type.

1.05 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Procedures for submittals.

B. Test Reports: Indicate procedures and values obtained.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

1.06 SUBMITTALS AT PROJECT CLOSEOUT

A. Section 01700 - Project Closeout.

B. Project Record Documents: Record actual locations of components and circuits.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with

minimum three years documented experience.

1.08 REGULATORY REQUIREMENTS

A. Conform to NFPA 70.

B. Furnish building wire and wiring connectors listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.09 PROJECT CONDITIONS

A. Verify that field measurements are as indicated.

B. Conductor sizes are based on copper.

C. Wire and cable routing indicated is schematic unless dimensioned.

1.10. COORDINATION

A. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.

PART 2 - PRODUCTS

2.01 BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

E. Insulation: NFPA 70, Interior: Type THHN/THWN; Exterior: Type THWN-2/XHHW-2.

F. Use standard color coding for phase A, phase B, phase C, neutral and ground: Insulation:

1. 120/208 volt circuits: black, red, blue, white, green.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B Verify that mechanical work likely to damage wire and cable has been completed.

C. Verify that raceway installation is complete and supported.

3.02 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.03 WIRING METHODS

A. Use wiring methods indicated.

B. All branch circuit and feeder wiring shall be installed in raceways.

3.04 INSTALLATION

A. Route wire and cable as required to meet Project Conditions.

B. Install cable in accordance with the NECA "Standard of Installation."

C. Use solid conductor for feeders and branch circuits 10 AWG and smaller. Use stranded conductor for larger sizes.

D. Use stranded conductors for control circuits.

E. Use conductor not smaller than 12 AWG for power and lighting circuits.

F. Use conductor not smaller than 14 AWG for fused control circuits.

G. Unless a larger size is indicated on plans, use 10 AWG conductors for 20 ampere, 120 volt branch circuits with homeruns longer than 75 feet.

H. Unless a larger size is indicated on plans, use 10 AWG conductors for 20 ampere, 277 volt branch circuits with homeruns longer than 200 feet.

I. Pull all conductors into raceway at same time.

J. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

K. Neatly train and lace wiring inside boxes, equipment, and panelboards.

L. Clean conductor surfaces before installing lugs and connectors.

M. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

N. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

O. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.

P. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

Q. Identify and color code wire and cable under provisions of Section 16195. Identify each conductor with its circuit number or other designation indicated.

3.05 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

3.06 INSULATION RESISTANCE TESTS

A. Perform tests after cables have been installed raceways, but before connection to lugs. Notify Contracting Officer at least 14 days prior to cable tests.

B. Measure resistance line-to-ground using a commercial megger tester. Apply 1000 volts DC to cables 2 AWG and larger and record DC insulation resistance for each circuit conductor. Minimum acceptable level is 50 megohms.

END OF SECTION

SECTION 16130

BOXES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Wall and ceiling outlet boxes.

B. Floor boxes.

C. Pull and junction boxes.

1.02 RELATED SECTIONS

A. Section 07270 - Firestopping.

B. Section 08305 - Access Doors.

C. Section 16141 - Wiring Devices: Wall plates in finished areas, floor box service fittings.

D. Section 16160 - Cabinets and Enclosures.

1.03 REFERENCES

A. NECA - Standard of Installation.

B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.

C. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

D. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

F. NFPA 70 - National Electrical Code.

1.04 SUBMITTALS FOR CLOSEOUT

A. Section 01700 - Project Closeout.

B. Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.05 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.01 OUTLET BOXES

G. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.

1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include ☐ inch male fixture studs where required.

2. Concrete Ceiling Boxes: Concrete type.

H. Cast Boxes: NEMA FB 1, Type FD, cast feralloy. Provide gasketed cover by box manufacturer. Provide threaded hubs.

I. Wall Plates for Finished Areas: As specified in Section 16141.

D. Weatherproof exterior boxes to house receptacles: Provide surface box with cover to allow weatherproof integrity to be maintained with a UL listed plugcap inserted into receptacle. See NEC Section 410-57(b). Taymac Masque or equal.

2.02 FLOOR BOXES

A. Floor Boxes: NEMA OS 1, fully adjustable 1-1/2 inches deep.

B. Material: Cast metal.

C. Shape: Rectangular.

D. Service Fittings: As specified in Section 16141.

2.03 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Hinged Enclosures: As specified in Section 16160.

C. Surface Mounted Cast Metal Box: NEMA 250, Type 6; flat-flanged, surface mounted junction box:

3. Material: Galvanized cast iron.
4. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

D. In-Ground Cast Metal Box: NEMA 250, Type 6, inside flanged, recessed cover box for flush mounting:

1. Material: Galvanized cast iron.
2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.
5. Cover Legend: "ELECTRIC" or "TELEPHONE" as appropriate.

E. Precast Concrete Handholes:

1. Four inch reinforced concrete walls.
2. Precast 6 inch x 6 inch cable entrance at bottom center on each side.
3. Cast iron frame.
4. Cast iron tread type lid with cast letters reading "ELECTRIC" or "TELEPHONE" as appropriate.

PART 3 - EXECUTION

3.01 EXAMINATION

J. Verify locations of floor boxes and outlets in prior to rough-in. Where available, use dimensional data to locate boxes.

3.02 INSTALLATION

A. Install boxes in accordance with NECA "Standard of Installation."

K. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling,

equipment connections and compliance with regulatory requirements.

L. Set wall mounted boxes at elevations to accommodate mounting heights indicated.

M. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose.

N. Orient boxes to accommodate wiring devices as specified in Section 16141.

O. Maintain headroom and present neat mechanical appearance.

P. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

Q. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

R. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07270.

S. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

T. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

U. Unless otherwise indicated on plans, align adjacent wall mounted outlet boxes for switches, manual starters, interval timers, thermostats, and similar devices. Align wall mounted boxes for receptacles, telephone jacks, local area network outlets, cash register outlets, television antenna outlets, and the like. Where such devices are shown in close proximity on plans, locate adjacent outlets with no more than 4 inch space between adjacent boxes.

V. Use flush mounting outlet boxes in all areas except mechanical rooms and electrical closets.

W. Unless otherwise indicated on plans, locate flush mounting boxes in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

X. Do not install flush mounting boxes back-to-back in walls; provide minimum 6 inches separation.

Y. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness. After finished wall material is applied, provide box extensions for all boxes with setback more than 1/8 inch.

Z. Use stamped steel bridges to fasten flush mounting outlet box between studs.

AA. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

BB. Use adjustable steel channel fasteners for hung ceiling outlet box.

CC. **DO NOT FASTEN BOXES TO CEILING SUPPORT WIRES NOR DIRECTLY TO ROOF DECK.**

DD. Support boxes independently of conduit.

EE. Use gang box where more than one device is mounted together. Do not use sectional box. Provide metal barrier plates between gangs to separate line voltage from low voltage systems and where voltage between adjacent light switches exceeds 300 volts.

FF. Use gang box with plaster ring for single device outlets.

GG. Use cast outlet box in exterior locations exposed to the weather , interiors of walk-in refrigeration equipment, and wet locations. Provide vapor seals at conduit entrances to these boxes. Use U.L. listed sealing compound.

HH. Use cast floor boxes for installations in slab on grade.

II. Set floor boxes level. Recheck level and elevation immediately after concrete pour and rough finish. Where floor boxes for power, telephone, cash register data, and intrusion detection system occur together, insure these boxes are spaced so as to be completely covered by store fixtures.

JJ. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

BB. All boxes located below 5ft AFF and within 20ft of gasoline dispenser islands, in pits below dispensers, or within 20 ft horizontally of underground storage tanks shall be U.L. listed and labeled for use in Class I Division 1 hazardous locations as defined by NFPA 70, Article 500.

3.03 INTERFACE WITH OTHER PRODUCTS

A. Coordinate installation of outlet box for equipment connected to allow accessibility of box and proper operation of equipment.

3.04 ADJUSTING

A. Adjust floor box flush with finish flooring material.

B. Adjust flush-mounting outlets to make front flush with finished wall material.

C. Install knockout closures in unused box openings.

3.05 CLEANING

A. Section 01710 - Cleaning: Cleaning installed work.

B. Clean interior of boxes to remove dust, debris, and other material.

C. Clean exposed surfaces and restore finish.

D. Check boxes for the presence of drywall screws, concrete residue, and sharp other objects. Remove all sharp objects.

END OF SECTION

SECTION 16140

WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall switches.

B. Receptacles.

C. Device plates and decorative box covers.

D. Floor box service fittings.

1.02 RELATED SECTIONS

A. Section 16112 - Surface Raceways

B. Section 16130 - Boxes.

C. Section 16741 - Telephone Service, Raceways and Wiring.

1.03 REFERENCES

A. NECA - Standard of Installation.

B. NEMA WD 1 - General Requirements for Wiring Devices.

C. NEMA WD 6 - Wiring Device -- Dimensional Requirements.

D. NFPA 70 - National Electrical Code.

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

1.05 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Submittals for information.

B. Submit manufacturer's installation instructions.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 WALL SWITCHES

A. Manufacturers:

1. Hubbell.
2. Leviton.
3. Cooper.

B. Description: NEMA WD 1, Heavy-Duty, AC only general-use snap switch. Provide single pole, double pole, three-way, four way, pilot light, or momentary contact type as indicated.

C. Body and Handle: Ivory plastic with toggle handle.

D. Indicator Light: Separate pilot strap; red lens.

E. Ratings:

1. Voltage: 120-277 volts, AC.
2. Current: 20 amperes.

F. For control of mechanically held contactors or relays; provide three position, momentary contact switches with spring return to center off position. Momentary contact switches shall be rated 120/277 volt, 20 amperes.

2.02 RECEPTACLES

A. Manufacturers:

1. Hubbell.
2. Leviton.
3. Cooper.

B. Description: NEMA WD 1, heavy duty, specification grade receptacle.

C. Device Body: Ivory nylon.

D. Configuration: NEMA WD 6, type as specified and indicated.

E. Convenience Receptacle: Type 5-20R.

F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

G. Isolated Ground Receptacle: Type 5-20R. Provide with orange body and plate.

H. Telephone Jack: See Section 16700 for requirements.

2.03 WALL PLATES

A. Decorative Cover Plate: Ivory, smooth nylon.

B. Weatherproof Receptacle Cover: Gasketed metal with hinged gasketed device cover. Provide surface mounting assembly. Construction shall be such that the weatherproof integrity of the assembly shall not be compromised by the insertion of a plugcap and cord. Taymac Masque

Tempe, Arizona.

2.04 FLOOR MOUNTED SERVICE FITTINGS

A. Manufacturers:

1. Hubbell.
2. Leviton.
3. Cooper.

B. Flush Cover Convenience Receptacle:

1. Material: Brass.
2. Configuration: Duplex flap opening.

C. Flush Cover Communication Outlet:

1. Material: Brass.
2. Configuration: 2-1/8 x 1 inch combination threaded opening.

D. Flush Cover Combination Fitting:

1. Material: Brass.
2. Configuration: Duplex flap opening with 2-1/8 x 1 inch combination threaded opening.

E. Protective Ring: Brass finish.

F. Split Nozzle: Brass finish.

G. Carpet Ring: Brass.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that outlet boxes are installed at proper height.

B. Verify that wall openings are neatly cut and will be completely covered by wall plates.

C. Verify that floor boxes are adjusted properly.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean debris from outlet boxes.

3.03 INSTALLATION

A. Install in accordance with NECA "Standard of Installation."

B. Install devices plumb and level.

C. Install switches with OFF position down.

D. Install receptacles with grounding pole on top.

E. After connecting wires to GFCI receptacles, wrap terminals with four layers of electrician□s tape.

F. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

G. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

H. Connect wiring devices by wrapping conductor around screw terminal.

I. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

J. Install protective rings on active flush cover service fittings.

3.04 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 16130 to obtain mounting heights indicated on drawings.

3.05 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Verify that each receptacle device is energized.

D. Test each receptacle device for proper polarity.

E. Test each GFCI receptacle device for proper operation.

F. Verify that each telephone jack is properly connected and circuit is operational.

3.06 CLEANING

A. Section 01710 - Cleaning: Cleaning installed work.

B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 16160

CABINETS AND ENCLOSURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hinged cover enclosures.

B. Cabinets.

C. Terminal blocks.

D. Accessories.

1.02 RELATED SECTIONS

A. Section 16190 - Supporting Devices.

1.03 REFERENCES

A. NECA Standard of Installation (National Electrical Contractors Association).

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

C. NEMA ICS 4 - Terminal Blocks for Industrial Control Equipment and Systems.

D. NFPA 70 - National Electrical Code.

1.04 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide manufacturer's standard data for enclosures and cabinets.

1.05 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Submittals for information.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.06 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories, Inc.

1.07 MAINTENANCE MATERIALS

A. Section 01700 - Contract Closeout.

B. Furnish two of each key. Cabinets and enclosures shall be keyed to same key as panel boards.

PART 2 PRODUCTS

2.01 MANUFACTURERS

E. Square D.

F. General Electric.

G. Siemens.

2.02 HINGED COVER ENCLOSURES

A. Construction: NEMA 250, Type 1 steel enclosure.

B. Covers: Continuous hinge, held closed by flush latch operable by key. Covers in damp and wet locations shall have continuous gasket.

C. Provide removable interior metal panel for mounting terminal blocks and electrical components; finish with white enamel. Provide standoff devices for separation of equipment mounting panel from enclosure.

D. Enclosure Finish: Manufacturer's standard enamel.

2.03 CABINETS

A. Boxes: Galvanized steel.

B. Backboard: Provide white enamel finished metal backboard for mounting terminal blocks or devices.

C. Fronts: Steel, surface type with door with concealed hinge, and flush lock keyed to match branch circuit panelboard.

H. Provide metal barriers to form separate compartments wiring of different systems and voltages.

I. Provide accessory feet for free-standing equipment.

PART 3 EXECUTION

3.01 INSTALLATION

J. Install in accordance with NECA "Standard of Installation."

K. Install enclosures and boxes plumb. Anchor securely to wall and structural supports at each corner under the provisions of Section 16190.

L. Install cabinet fronts plumb.

3.02 CLEANING

A. Section 01710 - Cleaning: Cleaning installed work.

B. Clean electrical parts to remove conductive and harmful materials.

C. Remove dirt and debris from enclosure.

D. Clean finishes and touch up damage.

END OF SECTION

SECTION 16190

SUPPORTING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Conduit and equipment supports.

B. Anchors and fasteners.

1.02 REFERENCES

A. NECA - National Electrical Contractors Association.

B. ANSI/NFPA 70 - National Electrical Code.

1.03 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide manufacturer's catalog data for fastening systems.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.04 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc.

PART 2 PRODUCTS

2.01 PRODUCT REQUIREMENTS

D. Materials and Finishes: Provide adequate corrosion resistance.

E. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.

F. Anchors and Fasteners:

1. Concrete Structural Elements: Use precast insert system or expansion anchors and preset inserts.
2. Steel Structural Elements: Use beam clamps or welded fasteners.
3. Concrete Surfaces: Use self-drilling anchors and expansion anchors.
4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.
5. Solid Masonry Walls: Use expansion anchors and preset inserts.
6. Sheet Metal: Use sheet metal screws.
7. Wood Elements: Use wood screws.

2.02 STEEL CHANNEL

A. Manufacturer: Unistrut (P1000 unless otherwise noted) or approved equal.

B. Description: Galvanized steel.

PART 3 EXECUTION

3.01 INSTALLATION

G. Install products in accordance with manufacturer's instructions.

H. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".

I. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.

J. Do not use spring steel clips and clamps.

K. Do not use powder-actuated anchors.

L. Do not drill or cut structural members.

M. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

N. Install surface-mounted cabinets and panelboards with minimum of four anchors.

O. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall.

P. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

SECTION 16195

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates.

B. Wire and cable markers.

C. Conduit markers.

1.02 RELATED SECTIONS

A. Section 09900 - Painting.

1.03 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Provide catalog data for nameplates, labels, and markers.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under regulatory requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.05 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.06 SAMPLES

A. Furnish under provisions of Section 01300.

B Provide two of each size and type nameplate and warning tape.

PART 2 PRODUCTS

2.01 NAMEPLATES

D. Nameplates: Engraved three-layer laminated plastic, white letters on black background. Screw on type with two self tapping screws. Mastic type nameplates not allowed.

E. Locations:
1. Each switch in switchboard.
2. Each lighting and appliance panelboard.
3. Each breaker in distribution panel.
4. Each safety switch not in sight of utilization equipment.
5. Relays and contactors. Indicate loads controlled.
6. Time switches. Indicate load controlled.

7. Fire alarm annunciators.
8. Where noted on plans.

F. Letter Size:

4. Use 1/8 inch letters for identifying individual equipment and loads such as safety switches, motor starters, and relays.
5. Use 1/4 inch letters for identifying grouped equipment and loads such as panelboards, switchboards, motor control centers.

2.02 WIRE MARKERS

A. Description: Cloth, tape, split sleeve, or tubing type wire markers.

B. Locations: Each conductor at distribution equipment panelboard gutters, pull boxes, outlet and junction boxes, and each load connection.

C. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder circuit number.
2. Control Circuits: Control wire number corresponding to applicable control schematics.

2.03 CONDUIT MARKERS

A. Location: Furnish markers for each conduit longer than 6 feet.

B. Spacing: 20 feet on center.

C. Color:

1. 208 Volt System: Gray
2. Fire Alarm System: Red.
3. Security System: Black

2.04 UNDERGROUND WARNING TAPE

A. Description: 4 inch wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines. Detection shall be by means of continuous integral metal conductor factory installed in warning tape.

PART 3 EXECUTION

3.01 PREPARATION

G. Degrease and clean surfaces to receive nameplates.

3.02 APPLICATION

A. Install nameplate parallel to equipment lines.

H. Secure nameplate to equipment front using screws.

I. Identify conduit using field painting under provisions of Section 09900.

J. Paint colored band on each conduit longer than 6 feet.

K. Paint bands 20 feet on center.

L. Color:

1. 208 Volt System: Gray
2. Fire Alarm System: Red.
3. Security System: Black

M. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches below finished grade.

END OF SECTION

SECTION 16400

ELECTRICAL SERVICE

PART 1 - GENERAL : Electrical service to the building shall be underground from a pad-mounted transformer located as shown on the plans. The secondary service configuration shall be 208Y/120 volts, 3 phase, 4 wire with a grounded, solid neutral. The service transformer and metering shall be provided by the post exterior electrical utility company. See the drawings for further detail and verify all requirements with the electrical utility. Coordinate all costs associated with services and work to be provided by the base electrical utility and include these costs in the contract bid.

PART 2 - PRODUCTS : Equipment used to provide entrance for the electrical service into the facility shall be UL labeled for such use.

2.01. PAD-MOUNTED TRANSFORMER : The service transformer shall be a three-phase pad-mounted type furnished and set by the base utility company. Coordinate all contractor responsibilities for pad, conduits, duct, cables, etc. with the utility company.

2.02. UNDERGROUND MEDIUM-VOLTAGE CABLE : Cable (conductor) sizes are designated by American Wire Gauge (AWG) and Thousand Circular Mils (Kcmil). Conductor and conduit sizes indicated are for copper conductors unless otherwise noted. Insulated conductors shall have the date of manufacture and other identification imprinted on the outer surface of each cable at regular intervals throughout cable length. Cable shall be manufactured not more than 24 months prior to date of delivery to the project site.

PART 3 - EXECUTION : All portions of the electrical service to the facility shall be coordinated with post utility contractor and the contract documents to provide a complete and working installation meeting all applicable code requirements. All costs associated with services and work to be provided by the base electrical utility shall be included in the contract bid

End of Section 16400

SECTION 16450

GROUNDING AND BONDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding electrodes and conductors.

B. Equipment grounding conductors.

C. Bonding.

1.02 RELATED SECTIONS

A. Section 03200 - Concrete Reinforcement.

B. Section 03300 - Cast-In-Place Concrete.

1.03 REFERENCES

A. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems (International Electrical Testing Association).

B. NFPA 70 - National Electrical Code.

1.04 GROUNDING SYSTEM DESCRIPTION

A. Metal underground water pipe.

B. Effectively grounded metal frame of the building.

C. Rod electrode.

1.05 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms.

1.06 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide for grounding electrodes and connections.

1.07 SUBMITTALS FOR INFORMATION

A. Section 01300 - Submittals: Submittals for information.

B. Test Reports: Indicate overall resistance to ground.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.08 SUBMITTALS FOR CLOSEOUT

A. Section 01700 - Project Closeout: Procedures for submittals.

B. Section 01710 - Project Record Documents: Record actual locations of components and

grounding electrodes.

1.09 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

2.10 REGULATORY REQUIREMENTS

D. Conform to requirements of NFPA 70.

E. Products: Listed and classified by Underwriters Laboratories, Inc.

PART 3 PRODUCTS

2.01 ROD ELECTRODES

F. Material: Copper-clad steel.

G. Diameter: 3/4 inch.

H. Length: 10 feet.

2.02 MECHANICAL CONNECTORS

A. Manufacturers: Burndy or approved equal.

B. Material: Bronze.

2.03 EXOTHERMIC CONNECTIONS

A. Manufacturers: Cadweld or approved equal.

2.04 WIRE

A. Material: Stranded copper. Unless noted otherwise, provide with green insulation.

PART 4 EXECUTION

3.01 EXAMINATION

I. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.02 INSTALLATION

A. Install rod electrodes at exterior of building near service equipment. Install additional rod electrodes as required to achieve specified resistance to ground.

B. Provide 3/0 AWG bare copper grounding electrode conductor and connect to reinforcing steel in foundation footing. Bond steel together using tie wires so there is a minimum of 40 feet of continuous bar to which to bond grounding electrode conductor.

C. Provide bonding to meet Regulatory Requirements.

D. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

3.03 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.13.

END OF SECTION

SECTION 16500

PANELBOARDS

PART 1 - GENERAL

1.01. GENERAL : The contractor shall provide and install all distribution panelboards and lighting and appliance panelboards as shown on the drawings.

1.02. IDENTIFICATION : All panelboards shall be identified with engraved nameplates designating the panel name and voltage characteristics. See Section 16000 par. 1.08 for nameplate requirements. Each panelboard with a hinged door shall contain a typewritten circuit directory card indicating equipment and/or areas controlled by each circuit; directory cards shall be placed in protective, permanently mounted holders inside the door. Circuits on panels without doors shall be identified with individual circuit nameplates.

PART 2 - PRODUCTS

2.01. CONSTRUCTION : All panelboards shall be deadfront construction, surface or recessed mounted as called for by the panelboard schedule. Lighting and appliance panelboards shall have a hinged door cover with a flush combination latch and keyed lock; all locks shall be keyed alike. All covers shall be finished with a factory applied, standard gray enamel. Backboxes shall be constructed of galvanized sheet steel and be a minimum of 20 inches wide.

2.02. INTERIOR : All interiors shall be factory assembled with copper bussing and bolt-on molded case circuit breakers. Circuit numbering shall be as indicated on the drawings. Multi-pole circuit breakers shall have a common internal trip action and shall be inter-changeable with single-pole breakers. Where 'bussed space' is indicated, include all necessary provisions for adding additional breakers; no additional parts or modifications to the bussing or panel structure shall be required. See the Panelboard Schedule for individual panelboard bus ratings, circuit breaker and space requirements.

2.03. MANUFACTURERS : Lighting and appliance panelboards shall be type NQOD as manufactured by Square D or equivalent by General Electric or Siemens. Distribution and power panelboards shall be I-Line type as manufactured by Square D or equivalent by General Electric or Siemens.

PART 3 - EXECUTION

3.01. MOUNTING : Lighting and appliance panelboards shall be mounted with the center of the top circuit breaker 6'-0" above finished floor. Covers which occur side by side in finished areas shall be carefully aligned and leveled to present a neat appearance. Observe NEC clearance requirements when mounting all panels.

3.02. DURING CONSTRUCTION : Do not install panelboard interiors until the building has been sealed to the weather. Once interiors are installed, protect the panels with temporary cardboard covers until work in the immediate area which is potentially damaging to them is completed (especially plastering and masonry operations around flush mounted panels).

End of Section 16500

SECTION 16520

SWITCHBOARDS

PART 1 - SCOPE

1.01. GENERAL : The contractor shall provide and install all switchboards as shown on the drawings.

1.02. IDENTIFICATION : Switchboards shall be identified with engraved nameplates designating the switchboard name and voltage characteristics. Circuits shall be identified with individual circuit nameplates showing the load served. See Section 16195 for identification requirements.

PART 2 - PRODUCTS

2.01. CONSTRUCTION : All switchboards shall be deadfront construction, in a front-accessible, free-standing NEMA 1 enclosure. The housing shall be fabricated from 12 gauge minimum cold-rolled steel and mounted on a welded steel angle and channel frame. The entire assembly shall be primed and finished with the manufacturers standard grey enamel inside and out and baked on. Sections shall be designed to have adequate natural draft ventilation without the use of fans or forced air cooling.

2.02. INTERIOR : All interiors shall be factory assembled with tin-plated copper bussing and silver-plated joints. Joints shall be assembled with bolts and Belleville type washers. Where 'bussed space' is indicated, include all necessary provisions for adding additional breakers; no additional parts or modifications to the bussing or panel structure shall be required. See the Panelboard Schedule for bus ratings, circuit breaker and space requirements.

2.03. NAMEPLATE : The manufacturers metal nameplate shall be securely and permanently fastened to the assembly in a place where it is readable without requiring disassembly or de-energizing. This nameplate shall contain the manufacturers name, voltage and ampacity of the equipment, manufacturers type designation, order and serial numbers, date of manufacture and interrupting capacity.

2.04. MANUFACTURERS : Switchboards shall be manufactured by Square D, General Electric or Siemens.

PART 3 - EXECUTION

3.01. INSTALLATION : Switchboards shall be carefully set into position using only manufacturer approved lifting and jacking points. This equipment shall be mounted free-standing on a 3" concrete housekeeping pad. Observe NEC clearance requirements. After installation, minor scratches shall be touched-up with manufacturer supplied touch-up paint.

3.02. DURING CONSTRUCTION : Do not install switchboards until the building has been sealed to the weather. Prior to installation the equipment shall be kept clean and dry in a warehouse type environment. Rain or water damaged equipment shall not be installed.

End of Section 16520

SECTION 16550

SAFETY SWITCHES

PART 1 - GENERAL

1.01. SAFETY SWITCHES : Safety disconnect switches shall be provided for all motors and other equipment as indicated on the drawings or as required by code.

1.02. WIRING TROUGHS AND GUTTERS : Provide and install wiring gutters of the sizes and types shown on the drawings.

PART 2 - PRODUCTS

2.01. CONSTRUCTION :

A. Safety Switches : Switches shall be heavy duty type, quick-make, quick-break in NEMA 1 general purpose enclosures with interlocking doors. Where exposed to the weather, moisture or where so noted, furnish switches in NEMA 3R enclosures. Switches used in motor circuits shall be horsepower rated.

B. Gutters : Wiring gutters shall be constructed of code gauge galvanized steel and painted to match the panelboards and safety switches. Covers shall be screw fastened or hinged and secured by screws. Where gutters are mounted exposed to weather or wet conditions they shall be NEMA 3R construction.

2.02. MANUFACTURERS : Safety switches shall be type HD by General Electric, Square D or Siemens. Gutters shall be manufactured by Square D, B & C or General Switch.

PART 3 - EXECUTION : Safety switches and wiring gutters shall be installed in accordance with the NEC and applicable local codes. Observe working clearance requirements when mounting switches. Where fusible switches are indicated or required they shall be equipped with rejection type fuse clips, furnish complete with fuses.

End of Section 16550

SECTION 16570

FUSES

PART 1 - SCOPE

1.01. GENERAL : Provide a complete set of fuses for each fusible switch of the proper size and voltage rating required. All fuses installed shall be new and a product of the same manufacturer. Fuses installed in 120/208 or 120/240 volt systems shall be rated for 250VAC minimum.

PART 2 - PRODUCTS

2.01. GENERAL PURPOSE FUSES : General purpose fuses shall be used for heating, lighting and other non-motor loads where heavy start-up currents are not encountered. General purpose fuses shall be Class H, K5 or RK5.

2.02. TIME DELAY FUSES : Time delay fuses shall utilize a dual-element design to allow sustained heavy start-up currents, such as for motors, without blowing the fuse. Time delay fuses shall be Class J, RK1, or RK5.

2.03. FAST ACTING FUSES : Fast acting fuses shall be used for feeder protection, circuit breaker back-up or increased equipment protection. These fuses shall be listed as current-limiting and shall be Class J, RK1, L or T.

2.04. MANUFACTURERS : Fuses shall be manufactured by Bussman, General Electric or Gould-Shawmut.

PART 3 - EXECUTION

3.01. INSTALLATION : Coordinate fuse sizes and types with the fuse holders of the individual switches, starters, etc. Fuse ampacities shall be coordinated with the manufacturer of the actual equipment being installed. Provide one set of spare fuses of each type and ampacity.

3.02. COORDINATION : The use of fuses in any part of the power distribution system shall be coordinated with the panelboards, switchboards and circuit breakers selected for use.

End of Section 16570

SECTION 16600

LIGHTING SYSTEM

PART 1 - GENERAL:

The contractor shall furnish and install all lighting fixtures and lamps as indicated in the Lighting Fixture Schedule and as shown on the plans. All hangers, brackets and accessories needed for a complete and working installation shall be furnished as required. See the Lighting Fixture Schedule on the drawings for a description of each fixture and the manufacturer and catalog number that was used as a basis of design. Equivalent fixtures of similar form, function, and performance to those listed will be considered as substitutes for those listed in the fixture schedule.

PART 2 - PRODUCTS

2.01. LAMPS : All lamps shall be new. Incandescent lamps shall be 130V extended service lamps. Fluorescent lamps shall be the energy saving type with lowest mercury levels, Phillips ALTO T8, 3500°K in color unless otherwise indicated. H.I.D. lamps shall be constant color super metal-halide, of the latest technology and design and shall be of the size and type recommended by the fixture manufacturer. All lamps shall be of the size and type indicated and shall be manufactured by Phillips, General Electric or Osram-Sylvania.

2.02. BALLASTS : All ballasts shall be UL labeled and shall contain no P.C.B.s. Fluorescent ballasts shall be the energy saving electronic type with 10% or less total harmonic distortion and shall have a sound classification of "A". Low temperature ballasts for starting down to 0 degrees F. shall be furnished for fixtures located outside or in unconditioned areas and where so indicated. Ballasts for metal halide fixtures shall be the constant wattage type. Ballasts shall be manufactured by Advance, Magnetek or Universal.

2.03. EMERGENCY BATTERY PACKS: Emergency battery packs for 4 ft. fluorescent fixtures shall be rated for 1100 lumen output minimum. Battery packs shall be designd for mounting inside the fixture ballast compartment. Generally, the battery pack should be furnished by the fixture manufacturer unless the manufacturer has no standard unit available that will meet the project requirements.

2.04. LIGHTING CONTACTORS: Contactors for lighting control shall be the electrically held type with 120 VAC coils and 30 amp rated contacts. The configuration and number of poles shal be as noted on the drawings. Contactors shall be furnished with NEMA 1 enclosures where located indoors and NEMA 3R rainproof enclosures where located exposed to weather. Lighting contactors shall be Type L as manufactured by Square D company or equivalent by General Electric or Siemens.

2.05. TIMECLOCK: The lighting control timeclock shall be an electronic type, 7-day or 365 day programmable for control of six independent circuits minimum. The timeclock shall have a digital display for system status and programming and manual override switches for each channel. Timeclock shall have built-in battery backup to maintain program memory and correct time in the event of a power outage. Unit shall be capable of restoring all loads to their correct ON/OFF state upon restoration of power. Timeclock shall be a Tork K600 or equivalent by Paragon Electric or Intermatic.

PART 3 - EXECUTION:

All fixtures shall be furnished with necessary backboxes, frames, hangers and other hardware required for a complete installation. Coordinate recessed fixture clearances with the air conditioning trade to avoid conflicts with duct work. Prior to final inspection, all fixtures shall be lamped and cleaned with a soft cloth or sponge and a mild detergent (not soap) solution.

End of Section 16600

SECTION 16700

TELEPHONE and DATA SYSTEMS

PART 1 GENERAL

1.01 SCOPE:

A. Furnish and install a complete Telephone and Data Distribution System including raceways for outside plant cable, backboards, termination devices, cabling, raceways and outlets as shown on the drawings and as specified. Telephone instruments, unless specified otherwise, and switching equipment will be furnished and installed by others.

1.02 STANDARDS:

A. All material, installation practices, testing and documentation shall comply to EIA/TIA 568B Commercial Buildings Telecommunications Standards, EIA/TIA 569 Commercial Buildings Standard for Telecommunications for Pathways and Spaces, EIA/TIA 607 Commercial Building Grounding and Bonding Requirements for Telecommunications and ANSI/TIA 758A 2004 Customer Owned Outside Plant Telecommunications Infrastructure Standard and BICSI Customer Owned Outside Plant Design Manual (Third Edition). Completed system shall meet all requirements of Category 6e, Bonded Pair per EIA/TIA 568B. Completed system shall be tested and certified as required by EIA/TIA 67. System shall be labeled and documented as required by EIA/TIA 606 Administration Standard for Telecommunications Infrastructure of Commercial Buildings.

PART 2 PRODUCTS

2.01 BACKBOARDS:

A. Telephone backboards shall be 3/4" fire-retardant plywood, smooth sanded and free of knots, sized as shown on drawings and painted with two coats of fire retardant grey enamel on both sides and installed with finished side out.

2.02 TERMINATIONS:

A. Outside plant cable shall be terminated on gas protected punch-down blocks. Termination shall be Siemon F100M1-100 Pico Protector module and ground kit. Ground telephone cable metallic sheath and protected terminal to TMGB.

B. The contractor shall provide a category 6, 110 style patch panel with T568A connectors, similar to Leviton 49484-B48. Premise wiring shall terminate on the patch panel. All outside pairs shall be wired from the punch block to the patch panel. Provide 50 category 6 patch cords.

2.03 PREMISE CABLE:

A. Wiring from the backboard to the station devices shall be Category 6, bonded pair, plenum rated cable with outer jacket colors of white, blue and yellow as specified. Cable shall be Belden 1701A.

B. All voice circuits shall have white outer jackets. Data circuits shall have blue or yellow jackets to denote primary and secondary circuits.

2.04 DEVICES:

A. Standard Voice/Data System wall outlet shall be a single gang plate, Panduit Mini-com modular faceplate and Mini-com TX6 jack modules.

B. Patch panels shall be Panduit part no. CPPL48WBL with labeling strips. Patch cords shall be equivalent to Siemon MC6-8T-(XX)-B(XX).

PART 3 EXECUTION

3.01 INSTALLATION:

A. All exposed Voice/Data circuits shall be run in raceways. Voice/Data wiring may be run without racew apart. Installation and support methods shall comply with EIA/TIA Standards.

B. All Voice/Data wiring shall be identified at each termination and in each junction where accessible.

3.02 CABLE TERMINATIONS:

A. Voice circuits shall be identified with WHITE jacketed cable. Circuit shall connect to the left port of the to drawings for further detail.

B. Data circuits shall be identified with BLUE jackets for primary circuits and YELLOW jackets for secondary circuits. Not all locations will have both primary and secondary circuits; where only one data circuit is required, it shall be a primary blue circuit. Data cables shall connect to the bottom angled duplex coupler in the wall plate assembly; primary blue cables shall be connected to the left port and secondary yellow cables shall be connected to the right port. Data circuits shall originate from HD5-24 patch panels inside the CPI Mega Frame located in the Manager's Office; primary blue circuits from the upper panel and secondary yellow circuits from the lower panel. Wall outlets shall be numbered according to the port number of the primary blue circuit connection to the upper patch panel. If a secondary circuit is present, it shall connect to a port on the secondary patch panel corresponding to the associated primary port.

3.03 TESTING:

A. Completed system shall be tested in accordance with EIA/TIA 67. Testing shall be performed by technician with minimum qualifications of a "Technician BICSI Certification". Test reports shall be printed out and turned over to the owner at completion of the work.

3.04 MARKING:

A. Each outlet device shall be permanently identified with a unique number determined as stated above under CABLE TERMINATIONS. Number shall be displayed on face of outlet.

3.05 RACEWAYS:

A. All telephone conduits shall be terminated with an insulating bushing above accessible lay-in ceilings. All empty conduits shall be furnished with a pull string.

B. Bond all raceways together at backboards and provide a 1 # 6 copper grounding conductor in 3/4" non-metallic conduit to building ground.

C. All conduit and innerduct from manhole to building service entrance shall have pull tape installed.

D. The fiber optic cable installation route must be coordinated with the local base Cable Maintenance Shop located in Building 649.

END OF SECTION

SECTION 16720

SECURITY SYSTEM

PART 1 GENERAL

1.01 SCOPE:

A. Furnish all materials, equipment, labor and services required to support the installation of a complete and properly working security system as shown on the drawings and described herein. Security system requires fiber optic connection, provide 12 strand single-mode (SM) fiber optic cable to facility.

B. All equipment shall be furnished and installed by the base security system contractor. Major components shall be of the same manufacturer. Contractor shall furnish and install all raceways, supports, hardware and accessories as required to produce a complete working system.

C. All security equipment shall be installed by a qualified technician, familiar with the installation of similar systems.

D. Any additional equipment, hardware, conduit, installation material, wiring and labor required for a complete operating system conforming to the intent of the drawings and these specifications shall be furnished and installed as a part of this system at no additional cost to the Owner.

E. Model numbers and designations, which appear herein, indicate design, quality, and type of material as well as operating characteristics. References in these specifications to a particular manufacturer or model number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.

1.02 SUBMITTALS:

A. Shop drawings shall be complete with detailed information on all system components as well as system wiring diagrams. Wiring diagrams shall include both plan and riser diagrams indicating all devices. Plan drawings shall be no smaller than 1/16 inch scale. Wiring diagrams shall indicate the number and function of the wires to be installed. Shop drawings shall include elevations of all terminal cabinets and the supervisory control panel. Wire color coding and numerical marking shall be indicated. Terminal block diagrams for terminal cabinets shall be included. Provide one set of reproducible as-built drawings at project completion.

PART 2 PRODUCTS

2.01 SYSTEM COMPONENTS:

A. All security system equipment and components shall be as recommended and furnished by this contractor.

B. The security alarm system products shall be built modular in construction for ease of expansion and service. Functions shall be on replaceable panels or modules to accommodate functional changes when required. All critical wiring and connectors shall be supervised so as to give a trouble signal if removed or disconnected.

C. Components list:

ACU-05209-0	INTERIOR 12 V 8 POINT RADC w/ battery and PS
ACU-04692-0	LEDA 8/3 unit

ACU-04889-0	STARPIN KEYPAD w/ changeable firmware
DP-2/S	DURESS SWITCH
PA-7100E	MOTION DETECTOR 360 Degree ceiling mount
PROX-WATCH II	CAPACITANCE SENSOR

PART 3 EXECUTION

3.01 INSTALLATION:

A. All security system wiring shall be installed in metal raceways where installed in walls. Wiring may run exposed above lay-in ceilings. Junction boxes shall be sized in accordance with the number of wires and terminations to be installed.

B. All connections at terminal strips are to be made with crimped insulated spade lugs.

END OF SECTION

SECTION 16723

MASS NOTIFICATION SYSTEM

PART 1 GENERAL

1.1 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1.02 REGULATIONS

A. DOD UFC 4-021-01 Design and O&M: Mass Notification Systems INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) IEEE C62.41 Surge Voltages in Low-Voltage AC Power Circuits (ANSI/IEEE) NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA) NEMA ICS 6 Industrial Control and Systems Enclosures NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) NFPA 70 National Electric Code NFPA 72 National Fire Alarm Code UNDERWRITERS LABORATORIES (UL) UL 467 Grounding and Bonding Equipment

B. UFC 4-010-01 B-4.6.

1.3 SYSTEM DESCRIPTION

A. The Mass Notification System shall be a complete operational system that is capable of providing real-time information via pre-recorded messages, tones, and live-voice transmissions to all building occupants and to personnel outside of building during emergency situations. The system shall provide sufficient speakers for personnel within these areas to discern the message transmitted. Strobes and displays shall be provided to annunciate the emergency condition to hearing impaired personnel. The system shall be monitored and controlled through a central control unit. Individual Building Mass Notification Systems shall be controlled through the central control unit and shall be capable of local control. The Individual Building Mass Notification Systems shall be capable of receiving live-voice via radio with hardwire communication as a backup. Security provisions shall be made to prevent unauthorized live voice override.

1.4 REQUIREMENTS

A. The Individual Building Mass Notification system shall consist of a Monaco BT-XM Transceiver with Antenna within building mass notification panel and speaker/strobe units. The system shall communicate with the existing Tyndall AFB Central Station.

1.05 SUBMITTALS

A. SD-03 Product Data

In-building Control Unit
In-building Control Unit Transceiver
Individual Building System Speakers
Individual Building System Displays
Individual Building System Strobes
Antennas and cables
Static Discharge Units (Lightning Arresters)

B. Design Data Substantiating battery calculations, including ampere-hour requirements, shall be submitted for supervisory and alarm power requirements for In-building Control Units, In-building

Control Unit Transceivers.

Detail drawings shall be submitted and shall consist of a complete list of equipment and materials, including manufacturer's descriptive and technical literature, catalog cut sheets and installation instructions along with: layout drawings of the entire system, showing location of all mass notification equipment and devices, including but not limited to all audio and visual signaling devices and speakers; wiring diagrams showing points of connection and terminals to be used; and interior wiring diagrams of each major system component.

Manufacturer's technical data shall be provided as required to demonstrate that the system has been coordinated and will properly function as a unit. Data describing more than one type of item shall be clearly marked to indicate which type the Contractor intends to provide. Partial submittals will not be accepted. Submit data for: Interface devices, unless integral with transceivers; antennas and cables; Individual Building Mass Notification System; and lightning protection devices.

C. Test Reports

Final acceptance test.

D. Certificates

Name of system designer with signature and professional engineer or NICET certification number included on final design documents.

FCC narrowband type accepted. Qualifications of technician who supervises installation drawings, shop drawings, and as-builts.

Name(s) of personnel who will supervise installation and testing of the system, and who will provide instruction to user personnel, with the manufacturer's certification of the qualifications of the named individual(s).

Name(s) of personnel who will install the system with the manufacturer's certification of the qualifications of the named individual(s).

E. Operation and Maintenance Data

In-building Control Unit
In-building Control Unit Transceiver

1.04 QUALITY ASSURANCE

A. Technician

Installation drawings, shop drawings and as-built drawings shall be prepared by, or under the supervision of, a qualified technician. Qualified technician is an individual who is experienced in installing similar equipment. Contractor shall submit data showing the names and certification of the technician when drawings are submitted.

B. Installers

Provide the services of a qualified manufacturer's representative or technician, experienced in the installation and operation of the type of system being provided to supervise the installation, testing (including final testing), and adjustment of the system.

C. Installation Supervisors

Submit names of personnel who will supervise installation and testing of the system, and who will provide instruction to government personnel, along with the manufacturer's certification of the qualifications of the named supervisors.

D. Regulatory Requirements Mass Notification Systems shall be installed in buildings as specified by UFC 4-021-01.

PART 2 PRODUCTS

2.01 GENERAL PRODUCT REQUIREMENTS

A. Nameplates

Major components of equipment shall have the manufacturer's name, catalog number, and technical data as applicable on a non-corrosive and non-heat sensitive label affixed to the equipment.

B. Tags

Keys will be tagged or stamped with identification numbers. Any other critical electrical information will be identified with tags.

C. Enclosure Keys and Locks

Enclosure locks shall be keyed alike.

D. Verification of Dimensions

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work.

E. COTS

Installed systems shall consist of Commercial, off-the-shelf units.

F. Backup Power

Installed systems shall be provided with either an uninterruptible power supply (UPS) or secondary (standby) power for all loads.

G. Power Supplies

Power supplies shall be capable of accepting 110 or 240 V, alternating current (Vac); 50 or 60 Hz.

H. Antenna Systems

Mass Notification System equipment that communicates via radio shall be provided with an antenna system consisting of an antenna, a coaxial static discharge unit, and an antenna grounding system. The antennas shall be omni-directional or directional, as appropriate, minimum 3dB gain, vertically polarized and shall be provided with all necessary mounting brackets and supports for installation. The antennas shall be installed with a 36-inch minimum vertical separation from the installed unit and shall be located well away from overhead power circuits. Antennas shall be installed and

grounded in accordance with the applicable portions of NFPA 70. Antenna supporting structures shall comply with applicable portions of EIA 222-E. Antennas for remote transceivers shall be vertically polarized with a driving point impedance of 50 ohms. All antennas shall be installed external to buildings and shall be located in accordance with manufacturer recommendations.

a. Antenna Frequency Requirement Antennas shall be adjusted or designed to operate on the specified radio frequency.

b. Environmental Requirements All complete antenna assemblies shall be of corrosion-resistant materials and designed for reliable operation under adverse conditions including 100-mph winds, ice, snow, and rain.

c. Antenna Cables Coaxial cables shall be 50 ohm RG type (or equivalent) with minimum 95% shield and shall include PL and BNC type fittings or connectors as appropriate.

I. Grounding of Antenna Systems

Antenna masts and static discharge unit ground terminals shall be grounded in accordance with the requirements of NFPA 70, Article 810-21 and the manufacturer's instructions. Static discharge units and their enclosures shall be located inside the buildings as close as practical to the antenna lead-in point of entry. Ground rods shall not be used except where a suitable grounding electrode system does not exist. Where used, ground rods shall be of copper-clad steel conforming to UL 4561 not less than 5/8 inch in diameter by ten feet in length. Ground rods shall not protrude more than six inches above grade. Non-current-carrying metallic parts associated with mass notification equipment shall have maximum resistance to solid earth ground not to exceed the following values:

Antennas/static discharge units 10 ohms
Radio alarm transceivers 10 ohms

J. Electrical Supervision

All means of interconnecting equipment, devices and appliances, and wiring connections shall be monitored for the integrity of the interconnecting conductors or equivalent path, so that the occurrence of a single open or a single ground-fault condition in the installation conductors or a fault on a signaling channel that prevents transmission of alarm signals, and the restoration of such a condition to normal, shall be automatically indicated within 200 seconds. The Central Control Unit shall continuously poll connected equipment so that it can detect and report on these conditions.

K. Telephone interfaces

System shall have a 600 ohm telephone input for public address function.

2.02 INDIVIDUAL BUILDING MASS NOTIFICATION SYSTEM

A. Each Individual Building Mass Notification System shall consist of an In-building Control Unit with backup batteries, an In-building Control Unit Transceiver, and a notification appliance network with speakers and strobes as defined herein and as specified on the contract drawings.

B. Notification Appliance Network

C. Notification Appliances

Notification appliances shall be located in accordance with NFPA 72 notification appliance placement standards.

2.03 Displays and Speakers

A. Displays and speakers shall be suitable for installation in commercial and industrial applications with consideration of electrically hazardous (classified) locations and suitable for the intended climatic and environmental conditions. Display options shall satisfy all Uniform Federal Accessibility Standards (UFAS) and Americans with Disabilities Act Accessibility Guidelines (ADA). Speakers shall be placed as indicated on the contract drawings.

2.04 Sync-Rated Strobes

A. Sync-rated strobes shall be used to alert the hearing-impaired. Strobes shall meet strobe visibility and synchronization requirements listed in NFPA 72.

2.05 Strobe Marking

A. Strobes used for mass notification shall be unmarked, amber in color. 2.2.1.5 Textual Display for Hearing-Impaired Personnel. Textual displays shall be provided for notification of the emergency for hearing-impaired personnel.

2.06 SCIF Speakers

A. Speakers shall be installed within SCIFs compliant with Director of Central Intelligence Directive (DCID 1/21), Manual for Physical Security Standards for Sensitive Compartmented Information Facilities.

2.07 In-building Control Unit

A. An In-building Control Unit shall be installed in each facility or building as indicated on the contract drawings and shall meet these requirements.

2.08 Enclosure

A. The In-building Control Unit enclosure shall be fabricated from sheet steel conforming, as a minimum, to NEMA ICS 6 NEMA standard 1 for indoor locations. Provisions shall be made for conduit (minimum 3/4 inch) entry and attachment to no fewer than two places on the housing. Switches and other controls shall not be accessible without the use of a key.

2.09 Power Requirements

A. Each In-building Control Unit shall be powered by a combination of locally available 120 Vac power, and spill-proof, sealed lead acid or lead calcium battery requiring no addition of water or electrolyte. Operating power shall be obtained from a single connection to a dedicated, fused branch circuit of the building's regular 60 ac service. In the event of loss of ac power, the In-building Control Unit shall automatically and instantaneously switch to a secondary power source. Loss of ac power shall also activate an indicator and cause an ac failure message to be transmitted if power is not restored within 60 seconds. Power supply filtering shall prevent nuisance message transmissions caused by transient or steady state electrical disturbances. Upon restoration of ac power, transfer back to ac operation shall be automatic. Depending upon backup battery requirements, the battery and converter/battery charger can be installed within the unit housing or can be in a separate enclosure. The transceiver power supply shall be provided with suitable transient protection that meets the requirements of ANSI C 62.41. The battery shall

be capable of supplying all power requirements of unit and connected devices. The standby battery capacity shall provide sufficient power to operate the unit in normal standby status for 24 hours, shall support an alarm condition for 15 minutes, and shall be capable of initiating a message the end of the period.

2.10 Battery Supervision

A. Each In-building Control Unit shall constantly monitor and supervise its battery power supply. A battery fault message shall be transmitted upon disconnection or removal of the battery supply.

2.11 On-board Microphone

A. Each In-building Control Unit shall have an on-board push-to-talk (PTT) microphone for live, emergency voice announcements and instructions. The microphone shall override (mute) any voice message or tones in progress.

2.12 Remote Operating Station

A. A remote operating station shall be provided for each In-building Control Unit that includes a handheld PPT microphone with a pre-amplifier and associated LEDs. The microphone shall override any voice message or tones in prograss. The remote operating station shall also provide activation switches to manually activate pre-recorded messages and tones that are resident on the In-building Control Unit[s].

2.13 Local Operation

A. Each In-building Control Unit shall provide a mechanism to locally activate locally stored prerecorded tones and messages.

2.14 Prerecorded Tones and Messages

A. Each In-building Control Unit shall be capable of storing a minimum of four pre-recorded messages that are programmed into the unit at the factory. These messages can include tones followed by a voice message that shall be automatically repeated until terminated by the Central Control Unit operator, at the In-building Control Unit, or until a user-defined timeout period is reached.

2.15 Live-Voice Messages

A. Each In-building Control Unit shall be capable of playing live-voice messages sent from the Central Control Unit or from the on-board microphone [or from a remote microphone].

2.16 Channels and Amplifier Power

A. The In-building Control Unit shall provide adequate channels and amplification power to meet intelligibility requirements as specified on the contract drawings.

2.17 Supervision and Diagnostics

A. Each In-building Control Unit shall be fully supervised with on-board diagnostics and trouble reporting for the following:

a. Audio NAC wiring shall be supervised for open and short conditions.

b. Strobe NAC wiring shall be supervised for open and short conditions.

c. Self amplified power output circuit wiring shall be supervised for open and short conditions.

d. Microphone shall be supervised for an open condition.

e. Amplifier shall be supervised for communication.

f. Input voltage/low battery shall be supervised.

g. Remote microphone station shall be supervised. Any supervision loss shall be noted through the sounding of a built-in audible alert and shall signal (via relay contact closure) this condition to the In-building Control Unit Transceiver, which will transmit that information to the Central Control Unit.

2.18 Remote Reporting

A. The In-building Control Unit shall provide the capacity for remote reporting of system troubles to the In-building Control Unit Transceiver via output contacts.

2.19 Communication Network

A. The communication network shall provide In-building Control Units in each facility or building as indicated on the contract drawings and shall communicate with the base-wide control system for mass notification through a transceiver as specified herein.

B. In-building Control Unit Transceiver

The transceivers shall be a commercial product completely assembled, wired, and tested at the factory and delivered ready for installation and operation.

2.20 Enclosure

A. The transceiver enclosures shall be manufactured of sheet steel with sufficient strength to limit physical damage normally expected from vandalism. The enclosure shall be corrosion-resistant and sealed against the entry of dust, dirt, insects, and other foreign objects. The In-building Control Unit Transciver enclosure shall meet the requirements of NEMA ICS 6 NEMA Standard 1 for indoor locations; Outside Speaker Station enclosure shall meet NEMA 4 and 4X requirements.

2.21 Communication Mechanisms

A. The transceivers shall include a radio transmitter and receiver (transceiver) as its primary communication mechanism to allow two-way communication over a single channel with the Central Control Unit and shall be capable of backup hardwire communication with the Central Control Unit if so wired. The In-building Control Unit Transceiver shall meet the following:

a. The transceivers shall fully comply with all applicable portions of the FCC Volume V, Part 90, governing Type Acceptance of such transmitters/receivers for the application in any operational spectrum stipulated in this specifications.

b. The transceivers shall be NTIA narrowband compliant and UL listed or FM approved as a radio transmitting device.

c. The transceivers shall be all solid-state and operate under microprocessor/ operating program control.

d. The transceivers' operating program and transceiver configuration/status shall be

stored in memory that is not affected by loss of power to the transceiver.

e. The transceivers shall be capable of communicating via radio with hardwire as a backup communication mechanism, if so wired. When switchover to hardwire communication occurs, there shall be no loss of capability.

2.22 Indicators and Controls

A. Each transceiver shall be furnished complete with the following LEDs:

a. Power LEDs shall indicate the power source (primary or battery) and if the power supply is charging the battery, LEDs shall indicate the stage of charging: float or boost.

b. Unit status LEDs shall indicate when the unit is in alarm, trouble, communication with the Central Control Unit, carrier detect, transmissions are occurring, and if the unit is operating.

c. Communication mechanism LEDs shall indicate if primary [or secondary] communication is active.

d. Power Supply LED shall indicate if the power supply is operational.

B. Each transceiver shall be furnished complete with the following switches:

a. Acknowledge switch shall silence the onboard audible alert.

b. Test switch shall test the unit and perform a radio test.

c. Reset switch shall perform a hard reset of the unit.

2.23 Electronics Package

A. The transceivers' electronics package shall be incorporated within a rugged physical housing as an integral, removable assembly to facilitate testing, servicing, and replacement.

2.24 Interface to In-building Control Unit

A. The transceivers shall connect to the In-building Control Unit through one of the transceiver's on-board RS-232, open collector, or isolated dry contact outputs to initiate prerecorded messages that reside in the In-building Control Unit. The transceiver shall connect to the microphone input of the In-building Control Unit to transmit live voice messages. The In-building Control Unit Transceiver shall provide electrically supervised connections to the In-building Control Unit.

2.25 Operation

A. The transceivers shall immediately transmit all initiated signals from the Central Control Unit to the In-building Control Unit and shall respond to commands and polls from the Central Control Unit.

2.26 Protected Indicators and Controls

A. All indicators and pushbutton switches shall be located inside the transceiver enclosure and shall be protected from unauthorized use by a key lock[and an enclosure tamper switch].

2.27 Transmission Identity Code

A. All transceiver transmissions shall include a distinct identity code. The identity code shall allow for identification of up to 2047 In-building Control Unit Transceivers and Wide-Area Speaker Station Transceivers combined. This identity code shall be programmed in the field. All messages are transmitted until the Central Control Unit confirms receipt of the messages.

2.28 Output Power

A. The transceivers shall provide nominal 4 watts RF power to the antenna system. Frequencies between 450 to 470 MHz are limited to 2 watts of RF power in compliance with FCC regulations.

2.29 Power Sources and Switchover to Backup

A. The transceivers shall be powered by 115 or 230 Vac 50/60 Hz power and, in case of ac power failure, sealed lead-calcium type batteries requiring no maintenance or water addition. In the event of loss of primary ac power, the unit shall automatically switch to battery operation. The switchover shall be accomplished with no interruptions and a specific ac Fail message including the unit identity code shall be transmitted to the Central Control Unit. Transfer to normal ac power shall be automatic and activates the internal battery charger causing automatic battery recharging. All transceiver power supplies shall contain surge protection meeting the requirements of IEEE C62.41. The battery supply shall provide sufficient power to operate the unit in a normal standby status for a minimum of 60 hours and shall be capable of providing power for continuous polling, and transmitting alarm and status changes throughout the standby period. Restoration of ac power shall initiate a battery recharge operation with no loss of status. Each unit shall constantly monitor and supervise its own battery charger and battery. A specifically identified Battery Fault message shall be transmitted by the transceiver when the battery voltage falls below 85% of the rated capacity. During normal ac power operation, a specifically identified Battery Fault message shall be transmitted by the transceiver if the battery is disconnected, or if the battery charger fails.

2.30 Communication Channels

A. The transceivers shall be equipped with four serial ports using RS-232, RS-485, RS-422, and balanced-line tone signaling interfaces, allowing the support of the following communication mediums:

a· Primary Communication via Narrowband Radio: NTIA narrowband re-farming compliant synthesized, multi-channel radios using a frequency allocation number assigned for specific frequencies in the 132 - 174 MHZ, 406 - 430 MHz, and 450 - 470 MHz range.

b Secondary Communication via Hardwire Lines if Lines are Provided: Point-to-Point, and Point-to-MultiPoint wiring topologies shall be fully supported on hardwire communication lines (provided by others).

2.31 Communication Validation

A. The transceivers shall use error checking algorhythms such as CRC and checksum and shall require receipt of a validation message from the Central Control Unit to ensure that the message received is from an authorized Central Control Unit. This ensures only valid messages are received and acted upon.

2.32 Self Diagnostics

A. The transceivers shall monitor its functions for the following and transmit an independent message indicating any failure to the Central Control Unit:

a. Enclosure tamper activation.

b. Battery fault indicating if the battery has been disconnected or the charger circuitry output is greater than expected.

c. ac power failure.

d. Low battery.

2.33 On-board Relay Drivers

A. The transceivers shall provide eight on-board relay driver outputs that can be connected to relays that trigger up to eight pre-recorded messages or tones.

2.34 Response to Commands from the Central Control Unit

A. The transceivers shall respond to the Central Control Unit commands as follows:

a. Polling Response: The transceivers are monitored for communication, unit, and zone status.

b. Status Change Reporting: The In-building Control Unit Transceiver shall report exception changes. Status changes are reported within 90 seconds.

c. Download Zone State To In-building Control Unit Transceiver: The Central Control Unit shall be capable of transmitting the configuration to the transceivers after transceiver information is saved.

2.35 Deactivation of the Fire Alarm Control Panel

A. Deactivation of the fire alarm system shall function only when both the fire alarm panel is in an alarm condition and a mass notification message or tone is transmitted by the mass notification system. Only the fire alarm system audible notification appliances shall be deactivated; operation of visual notification devices shall remain unaffected where practical.

2.36 Supervisory Signal

A. Deactivation of the fire alarm audible notification appliance shall initiate a supervisory signal. This supervisory signal shall be separate from other fire alarm system supervisory signals and shall be transmitted to the Central Control Unit.

2.37 Fire Alarm Message Delay

A. Where a mass notification system and a local fire alarm system are operating on the same frequency, a live-voice message is in process, and the local fire alarm control panel is in an alarm condition, the fire alarm message transmission shall be delayed until the mass notification

message ends and the system has returned to normal operation.

2.38 Disconnect Switch

A. A disconnect switch shall be provided for use by emergency response personnel to manually override the deactivation function and permit the fire alarm audible notification appliances to operate independently of the mass notification system. Use of the manual override feature shall cause a supervisory signal to be transmitted to the Central Control Unit.

END OF SECTION 16723

SECTION 16750

SOUND SYSTEM

PART 1 GENERAL

1.01 SCOPE:

A. Furnish all materials, labor and services required for the installation of a complete and properly working sound system as shown on the drawings and described herein.

B. All electronic equipment shall be furnished by AFFES to the Contractor for installation. All speakers and associated enclosures and mounting hardware shall be AFFES furnished and contractor installed. Verify with AAFES that the system will have a 600 ohm telephone input for public address. Contractor shall furnish and install all raceways, supports, hardware and speaker wire.

C. All sound equipment shall be installed by a qualified technician with a minimum of three years experience installing systems of similar size, functionality and complexity.

D. Any additional equipment, hardware, conduit, mounting components, wiring or labor required for a complete operating system conforming to the intent of the drawings and these specifications shall be furnished by the Contractor and installed at no additional cost to the Owner.

PART 2 PRODUCTS

2.01 WIRING:

A. Cable for microphone and line input circuits shall be shielded, twisted pair, 18AWG stranded copper, plenum rated; West Penn #25293B or equivalent.

B. Cable for speaker wiring shall be unshielded, twisted pair, 18AWG stranded copper, plenum rated; West Penn 25224B or equivalent.

C. Cable terminations shall be crimped, insulated spade lugs.

PART 3 EXECUTION

3.01 INSTALLATION:

A. Install recessed speakers using proper ceiling support frames in lay in and gypsum board ceilings. Set recessed speaker taps at 1 watt each.

B. Install speakers in exposed ceiling areas using beam clamps and speaker enclosures provided. Set exposed mounted speaker taps at 3 watts each.

C. Install wall mounted horns in exterior locations. Set horn speaker taps at 5 watts each.

D. Install speakers in large areas on not greater than 20 ft. by 20 ft. centers.

E. Provide conduit raceways from all wall outlets to an accessible point above the ceiling. Wiring shall be run open above the ceiling, neatly laid out in the joist space. Cables shall be run a minimum of 3 ft. away from light fixtures, power wiring, hot pipes and surfaces, electrical equipment, and duct work. Do NOT lay cables on ceiling grid or tiles.

F. Install no more than 50 watts of speaker load on a single home run.

G. Cables shall be run with 10% slack between speakers and 15 ft. pigtail at amplifiers. Contractor shall tag, terminate and test all cables; final connection to amplifiers shall be by AAFES sound

technician.

H. Contractor shall assist AAFES sound technician in trouble-shooting and correction of problems. Replace any bad cables and re-test. Contractor shall certify that the system is functioning properly upon completion.

END OF SECTION

SECTION 16800

FIRE DETECTION & ALARM SYSTEM

PART 1 - SCOPE

1.01. INSTALLATION : The work covered by this section of the specifications includes the furnishing of all labor, equipment, materials, and performance of all operations associated with the installation of the Fire Alarm System as shown on the drawings and as herein specified. The complete installation shall conform to the applicable sections of NFPA 71, NFPA 72, NFPA 101, Local Code Requirements and National Electrical Code with particular attention to Article 760.

1.02. EQUIPMENT : Each and all items of the Fire Alarm System shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label. All control equipment shall be listed under UL category UOJZ as a single control unit. All control equipment must have transient protection to comply with UL864 requirements. Devices must be UL listed under standard #497B (Isolated Loop Circuit Protectors). In addition to the UL-UOJZ requirement, the system controls shall be UL listed for Power Limited Applications and all circuits must be marked in accordance with NEC article 760-23.

1.03. GENERAL : Furnish and install a complete addressable device fire alarm system as described herein and as shown on the plans; to be wired, connected, and left in first class operating condition. Include necessary control panels, annunciators, manual stations, automatic fire detectors, smoke detectors, alarm indicating appliances, alarm transmitters, wiring, terminations, electrical boxes, and all other material for a complete operating system. The system shall be capable of on site programming to accommodate system expansion and facilitate changes in operation. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control panel. Resident software shall allow for full configuration of initiating circuits and indicating appliance and control circuits. The system shall have the capability of recalling alarms and trouble conditions in chronological order for the purpose of recreating an event history.

1.04. SEQUENCE OF OPERATION

1.04.1. Alarm Condition : The system alarm operation subsequent to the alarm activation of any manual station, automatic detection device, ANSUL hood suppression system or sprinkler flow switch shall be as follows:

> All audible alarm indicating appliances shall sound a continuous fire alarm signal until silenced by the alarm silence switch at the control panel or at the remote annunciator, all visible alarm indicating appliances shall flash continuously until the system is reset, all doors normally held open by door control devices shall release after a 15 second time delay, a radio signal to notify the base fire department shall be activated, the mechanical controls shall activate the air handling control relays in accordance with NFPA 90.

If the ANSUL hood suppression system activates, the following additional actions shall occur:

> All shunt-trip breakers feeding equipment under the hoods shall be tripped OFF, hood exhaust fans shall be activated, hood supply fans shall be tripped OFF, and gas solenoid valves, if present, shall be CLOSED.

Any subsequent zone alarm shall reactivate the alarm indicating appliances.

1.04.2. Alarm Verification : The activation of any system smoke detector shall initiate an alarm verification operation whereby the panel will reset the activated detector and wait for a second alarm activation. If, within one (1) minute after resetting, a second alarm is reported from the same or any other smoke detector, the system shall process the alarm as described previously. If no second alarm occurs within one minute the system shall resume normal operation. The alarm verification shall operate only on smoke detector alarms. Other activated initiating devices shall be processed immediately. The alarm verification operation shall be selectable by zone. The control panel shall have the capability to display the number of times a zone has gone into a verification mode. Should this smoke verification tally reach a pre-programmed number, a trouble

condition shall occur.

1.04.3. Sprinkler Supervision : The control panel shall have a dedicated supervisory service LED and a dedicated supervisory service acknowledge switch. The activation of any standpipe or sprinkler valve supervisory (tamper) switch shall activate the system supervisory service audible signal and illuminate the LED at the control panel and the remote annunciator. Differentiation between valve tamper activation and opens and/or grounds on the initiation circuit wiring shall be provided. Pressing the Supervisory Service Acknowledge Key will silence the supervisory audible signal while maintaining the Supervisory Service LED "on" indicating the off-normal condition. Restoring the valve to the normal position shall cause the Supervisory Service LED to extinguish, indicating restoration to normal.

1.04.4. Manual Drill : A manual evacuation (drill) switch shall be provided to operate the alarm indicating appliances without causing other control circuits to be activated. However, should a true alarm occur, all alarm functions would occur as described previously.

1.04.5. Bypass Functions : The system shall be capable of overriding selected automatic functions by activating an auxiliary bypass switch.

1.04.6. Automatic Door Releases : All doors normally held open by door control devices shall release upon AC power failure.

1.04.7. Walk Test Mode : The actuation of the "enable walk test" program at the control panel shall activate the "Walk Test" mode of the system which shall cause the following to occur:

> The radio transmitter circuit connection shall be bypassed, control relay functions shall be bypassed, the control panel shall show a trouble condition, the alarm activation of any initiation device shall cause the audible signals to code a number of pulses to match the zone number, the panel shall automatically reset itself after signaling is complete, any momentary opening of an initiating or indicating appliance circuit wiring shall cause the audible signals to sound indicating a trouble condition.

The system shall be capable of performing walk tests in groups so that only a portion of the system needs be disabled during testing.

1.05. SUPERVISION : The system shall contain 8 Class 'B' independently supervised initiating device circuits. The alarm activation of any initiation circuit shall not prevent the subsequent alarm operation of any other initiation circuit. There shall be supervisory service initiation device circuits for connection of all sprinkler valve supervisory (tamper). Device activation shall cause a supervisory alarm at the control panel.

There shall be 2 independently supervised indicating appliance circuits for alarm chimes and flashing alarm lamps. Disarrangement conditions of any circuit shall not affect the operation of other circuits.

The incoming power to the system shall be supervised so that any power failure must be indicated at the control panel and the remote annunciator. A green "power on" LED shall be displayed continuously while incoming power is present.

The system batteries shall be supervised so that a low battery condition or disconnection of the battery shall be indicated at the control panel and the remote annunciator.

The system shall have provisions for disabling and enabling all circuits individually for maintenance or testing purposes.

1.06. POWER REQUIREMENTS : The control panel shall receive 120 VAC power via a dedicated circuit. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of twenty-four (24) hours with 5 minutes of alarm operation at the end of this period. The system shall automatically transfer to the standby batteries upon power failure. All battery charging and recharging operations shall be automatic.

1.07. SUBMITTALS: System equipment submittals shall first be routed to and approved by the base Fire Marshall for approval of manufacturer and components selected for use. Once the system components are accepted by the Fire Marshall, the submittals shall be forwarded to the Architect/Engineer for review of compliance with system layout and performance requirements set forth in the construction documents. Do not purchase or install any equipment until it is approved for use on this facility.

1.08. INSTALLER QUALIFICATIONS: The fire alarm system installing technician shall have minimum

qualifications of being a manufacturer certified installer with at least three years experience in installing systems of similar size and complexity. The technician shall install and test the system per NFPA guidelines and shall complete all necessary forms per NFPA-72 and submit forms to the base Fire Department.

1.07. MANUFACTURERS : Descriptions were written based on Simplex equipment. Equal products by Edwards or Gamewell will be considered for approval subject to meeting all plan and specification requirements.

PART 2 - PRODUCTS

2.01. CONTROL PANEL : Control Panel construction shall be modular with solid state, microprocessor based electronics. The system shall utilize addressable initiating devices and shall be provided with alarm transmission capabilities. A local audible device shall sound during Alarm, Trouble or Supervisory conditions. The control panel shall provide the following:

Setting of time and date
LED testing
Alarm, trouble, and abnormal condition listing
Enabling and disabling of each monitor point separately
Activation/deactivation of each control point separately
Walk Test enable
Diagnostic functions
Point listing

The system shall be furnished with battery capacity sufficient to support 30% growth. The control panel furnished shall be capable of supporting 50% growth either inherently or by installing additional modules; no part of the initially installed system shall be required to be replaced.

2.02. FRONT PANEL OPERATION AND CAPABILITIES

2.02.1 Front Panel : Under normal condition the front panel shall display a "System is Normal" message and the current time and date. Should an abnormal condition be detected the appropriate LED (Alarm, Supervisory or Trouble) shall flash. The panel audible signal shall pulse for alarm conditions and sound steady for trouble and supervisory conditions. The LCD shall display the following information relative to the abnormal condition of a point in the system.

40 character custom location label
Type of device (i.e. smoke, pull station, waterflow)
Point status (i.e. alarm, trouble)

Pressing the appropriate acknowledge button shall globally acknowledge every point in the list. Acknowledge functions may be passcode protected. After all points have been acknowledged, the LEDs shall glow steady and the audible tone will be silenced. The total number of alarms, supervisory and trouble conditions shall be displayed along with a prompt to review each list chronologically. The SYSTEM RESET button shall be used to return the system to its normal state after an alarm condition has been remedied.
Should the "Alarm Silence" button be pressed all alarm signals shall cease operation unless the "alarm silence inhibit" mode is active. Should the Alarm Silence Inhibit function be active, the (SYSTEM RESET) key press will be ignored. The message, "SYSTEM RESET INHIBITED", will be displayed for a short time to indicate the action was not taken.

2.02.2. Function Keys : Additional function keys shall be provided to access status data for the following points:

Initiating device circuits
Indicating appliance circuits
Auxiliary relays
Feedback points
All other input/output points

2.02.3. History Logging : The system shall be capable of logging and storing 300 events in an alarm log and 300 events in a trouble log. These events shall be stored in a battery protected memory. Each recorded event shall include the time and date of that event's occurrence.

2.02.4. Walktest Log : The system shall be capable of being tested by one person. While in testing mode the alarm activation of an initiating device circuit shall be silently logged as an alarm condition in the historical data file. The panel shall automatically reset itself after logging the alarm.
The momentary disconnection of an initiating or indicating device circuit shall be silently logged as a trouble condition in the historical data file. The panel shall automatically reset itself after logging the trouble condition.
Should the walktest feature be on for an inappropriate amount of time it shall revert to the normal mode automatically. The control panel shall be capable of supporting up to 8 separate testing groups whereby one group of points may be in a testing mode and the other (non-testing) groups may be active and operate as programmed per normal system operation. After testing is considered complete, testing data may be retrieved from the system in chronological order to ensure device/circuit activation. Should an alarm condition occur from an active point, not in walk test mode, it shall perform operations described in section 1.04.

2.02.5. LED Supervision : All slave module LEDs shall be supervised for burnout or disarrangement. Should a problem occur the LCD shall display the module and LED location numbers to facilitate location of that LED.

2.02.6. System Trouble Reminder : Should a trouble condition be present within the system and the audible trouble signal silenced, the trouble signal shall resound at preprogrammed time intervals to act as reminder that the fire alarm system is not 100% operational. Both the time interval and the trouble reminder signal shall be programmable.

2.02.7. Access Levels : There shall be four (4) access levels with level 4 being the highest level. Level 1 actions shall not require a passcode. Passcodes shall consist of up to ten (10) digits. Changes to passcodes shall only be made by authorized personnel. Access to a level will only allow the operator to perform all actions within that level plus all actions of lower levels, not higher levels.

2.02.8. Equipment Enclosures : Provide cabinets of sufficient size to accommodate the aforementioned equipment. Cabinet shall be equipped with locks and transparent door panel.

2.03. REMOTE ANNUNCIATOR : Where shown on the plans, provide and install an LCD annunciator. The annunciator shall have a beige finish and shall provide a 40 character by 2 line display similar to the display on the control panel. Control functions shall include ALARM, SUPERVISORY & TROUBLE ACKNOWLEDGE, ALARM SILENCE, SYSTEM RESET, and four programmable CONTROL switches. The annunciator shall communicate to the control panel over one twisted shielded pair of wire and operating power shall be 24VDC and be fused at the control panel. Point-wired annunciators are not acceptable.
The annunciator shall provide a common alarm and trouble circuit consisting of:

Control push-button switches - for; alarm silence, trouble silence, system reset and manual evacuation duplicating the control panel switches. A key "enable" switch shall be provided to activate or deactivate the control switches.

Duplicates the control panel tone alerts during alarm & trouble conditions.

System trouble LED.

Power on LED.

To accommodate and facilitate job site changes the control switches shall have the capability to be programmed on site to provide for manual switch input operation other than their standard purpose.

2.04. COMMUNICATION WITH ADDRESSABLE DEVICES
2.04.1. General : The system must provide communication with initiating and control devices individually. All of these devices will be individually annunciated at the control panel. Annunciation shall include the following conditions for each point:

Alarm
Trouble

Open
Short
Device missing/failed

All addressable devices shall have the capability of being disabled or enabled individually. Up to 127 addressable devices may be multidropped from a single pair of wires. Systems that require factory reprogramming to add or delete devices are unacceptable.

2.04.2. Communication Format : The communication format must be a completely digital poll/response protocol to allow t-tapping of the circuit wiring. Communication reliability must be maintained by using parity data bit error checking routines for address codes and check sum routines for data transmission.

2.04.3. Address Identification : Each addressable device must be uniquely identified by an address code entered on each device at time of installation.

2.04.4. Wiring Types and Configuration : Wiring types shall be approved by the equipment manufacturer. The system shall allow a line distance of up to 2,500 feet to the furthest addressable device on a Class B circuit. To minimize wire routing and to facilitate future additions, t-tapping of the communications channel will be supported.

2.04.5. Device Types :

2.04.5.1. General : The system control panel, must be capable of communicating with the types of addressable devices specified below. Addressable devices will be located as shown on the drawings. The location of addressable devices will be selected along with conventional devices to optimize the system layout in order to provide the level of protection, zone identification and control as shown on the drawings.

2.04.5.2. Analog Smoke Sensor Operation : The smoke sensor shall be a smoke density measuring device having no self contained alarm set-point. The alarm decision for each sensor shall be determined by the control panel. The control panel shall determine the condition of each sensor by comparing the sensor value to stored values. The control panel shall maintain a moving average of the sensors smoke chamber value. The system shall automatically indicate when an individual sensor needs cleaning. When a sensor's average value reaches a predetermined value, a "Dirty Sensor" trouble condition shall be indicated at the control panel for the individual sensor. Additionally, the LED on the sensor base shall glow steady giving a visible indication at the sensor location. If a "Dirty Sensor" is left unattended, and its average value increases to a second predetermined value, a trouble condition shall be indicated at the control panel for the individual sensor. The control panel shall automatically perform a daily self-test on each sensor.

2.04.5.3. Photoelectric Smoke Sensor : The addressable smoke sensors shall be of the photoelectric type and shall communicate actual smoke chamber values to the system control panel. The sensors shall be listed to UL Standard 268 and shall be documented compatible with the control equipment to which they are connected. The sensors shall be listed for both ceiling and wall mount applications. Each sensor base shall contain a LED that will flash each time it is scanned by the control panel. Each sensor shall be scanned by the control panel for its type identification to prevent inadvertent substitution of another sensor type. The control panel shall operate with the installed device but shall initiate a "Wrong Device" trouble condition until the proper type is installed or the programmed sensor type is changed. The sensor's electronics shall be immune from false alarms caused by EMI and RFI. Cover all smoke detection devices with plastic bags immediately after installation to maintain cleanliness, if field conditions so require.
Provide a U.L. listed sensor guard for sensors in areas subject to tampering. The guard shall be suitable for ceiling or sidewall mounting and hinged for easy access. The guard shall be securely mounted with tamper-proof screws.

2.04.5.4. Addressable Thermal Detector Heads : Thermal detector heads must be UL listed. They will be a combination rate-of-rise and fixed temperature (135 F) type, automatically restorable.

2.04.5.5. Addressable Pull Stations : Addressable pull stations shall contain electronics that communicate the station's status (alarm, normal) to the control panel over two wires which also provide power to the pull station. The address will be set on the station. They will be manufactured from high impact red Lexan. Station will mechanically latch upon operation and remain so until manually reset by opening with a key common to all system locks. Pull stations shall be UL listed, single action. The front of the station is to be hinged to a

backplate assembly and must be opened with a key to reset the station. The key shall be common with the control panels. The addressable manual station shall be capable of field programming of its "address" location on an addressable initiating circuit. The manual station shall be fitted with screw terminals for field wire attachment.

2.04.5.6. Addressable Photoelectric Duct Detector : The detector shall be a non polarized 24VDC type which is compatible with the Fire Alarm Panel and, obtains its operating power from the supervisory current in the fire alarm detection loop. It shall be of the same analog type as the ceiling smoke detectors. Detectors shall be of the solid state photoelectric type and shall operate on the light scattering, photo-diode principle. To minimize nuisance alarms, detectors shall have an insect screen and be designed to ignore invisible airborne particles or smoke densities that are below the factory set alarm point. The detector head shall be directly interchangeable with an ionization detector type. The 24VDC detector may be reset by actuating the control panel reset switch.

Detector construction shall have a mounting base with a twist-lock detecting head that is lockable. The locking feature must be field removable when not required. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control panel.

Detector design shall provide compatibility with other normally open fire alarm detection loop devices (heat detectors, pull stations, etc.) It shall be possible to alarm the duct housing by using a test switch. For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housing front cover.

To minimize false alarms, voltage and RF transient suppression techniques shall be employed as-well-as smoke signal verification circuit and an insect screen.

Auxiliary SPDT relays and or remote LED alarm indicators and key operated test stations shall be installed where indicated or required.

2.04.5.7. Zone Adaptor Module : Zone adapter modules shall be used for monitoring of waterflow, valve tamper, non-addressable detectors, and for control of AHU systems. An addressable interface module shall be provided for interfacing normally open direct contact devices to an addressable initiating circuit. Zone adapter modules shall be capable of mounting in a standard electric outlet box and shall include cover plates to allow surface or flush mounting. Zone adapter modules will receive their 24VDC power from a separate two wire pair running from an appropriate power supply. Zone adapter modules shall be supervised and uniquely identified by the control panel. Device identification shall be transmitted to the control panel for processing according to the program instructions. Should a module become non-operational, tampered with, or removed, a discrete trouble signal, unique to the device, shall be transmitted to, and annunciated at, the control panel.

Each zone adapter module shall be capable of being programmed for its "address" location on the addressable device initiating circuit. The module shall be compatible with addressable manual stations and addressable detectors on the same initiating circuit. There shall be two types of devices: Type 1 - Monitor Modules, and Type 2 - Control Modules

2.04.5.7.1. Type 1 Modules : Monitor modules shall be used for conventional 2-wire smoke detector and/or contact device monitoring with class B or class A wiring supervision. This type of addressable device module will provide power to and monitor the status of a zone consisting of conventional 2-wire smoke detectors and/or N/O contact devices as specified elsewhere. The supervision of the zone wiring will be Class B. These modules will communicate the zone's status (normal, alarm, trouble) to the control panel.

2.04.5.7.2. Type 2 Modules : Control modules shall be used for non- supervised control. This type of addressable device will provide double pole double throw relay switching for loads up to 120VAC. It will contain easily replaceable 2 amp fuses, one on each common leg of the relay.

2.04.5.8. Addressable Device Supervision : All devices shall be supervised for trouble conditions. The system control panel will be capable of displaying the type of trouble condition (open, short, device missing/failed). Should a device fail it will not hinder the operation of other system devices.

2.04.5.9. Alarm Signals : Provide Audio/Visual Units with Flush Trims and Backboxes for all wall mount audio-visual unit locations as shown on the plans. Provide combination type horns with strobe lights. Strobes shall be synchronized throughout the facility. Visual units shall comply with A.D.A. (AMERICANS WITH DISABILITIES ACT) standards.

PART 3 - EXECUTION

3.01. INSTALLATION : Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be installed in strict compliance with all the provisions of NEC - Article 760 A and C, Power-Limited Fire Protective Signaling Circuits. Coordinate telephone line connection requirements with local telephone company. Upon completion, the contractor shall so certify in writing to the owner and general contractor. All junction boxes shall be painted red and labeled "Fire Alarm". Wiring color code shall be maintained throughout the installation.

Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors. The contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of the installation. The manufacturer's authorized representative shall provide on site supervision of installation.

3.02. TESTING : The completed fire alarm system shall be fully tested in accordance with NFPA-72 by the contractor in the presence of the owner's representative and the Local Fire Marshal. Upon completion of a successful test, the contractor shall so certify in writing to the owner and general contractor.

3.03. WARRANTY : The contractor shall warrant the completed fire alarm system wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the completed and certified test or from the date of first beneficial use.

The equipment manufacturer shall make available to the owner a maintenance contract proposal to provide a minimum of two (2) inspections and tests per year in compliance with NFPA guidelines.

3.04. CERTIFICATION & ACCEPTANCE : The installing technician shall supervise final testing of the system. It shall be subject to the approval and acceptance of the base fire department. On completion of the acceptance tests, the installer shall obtain a certificate of acceptance from the base fire department and the fire department and the Owner or his representative shall be instructed in the operation and testing of the system.

The fire alarm system shall be free from defects in workmanship and materials, under normal use and service, for a period of one year from the date of acceptance or beneficial occupancy whichever is earlier. Any equipment shown to be defective in workmanship or material shall be repaired, replaced, or adjusted free of charge.

The equipment manufacturer shall be represented by a service organization, and the name of this organization shall be furnished to the base fire department and the Owner. The service organization shall furnish, gratis to the Owner, a one year maintenance and inspection contract, effective from the date of final acceptance. The contract shall provide for two inspections during the contract year.

End of Section16800