Project Manual (Specifications)

Northeast Corner of Krentel Road and Krentel Road (STPCD 9-1-1)
St. Tammany Parish, Louisiana

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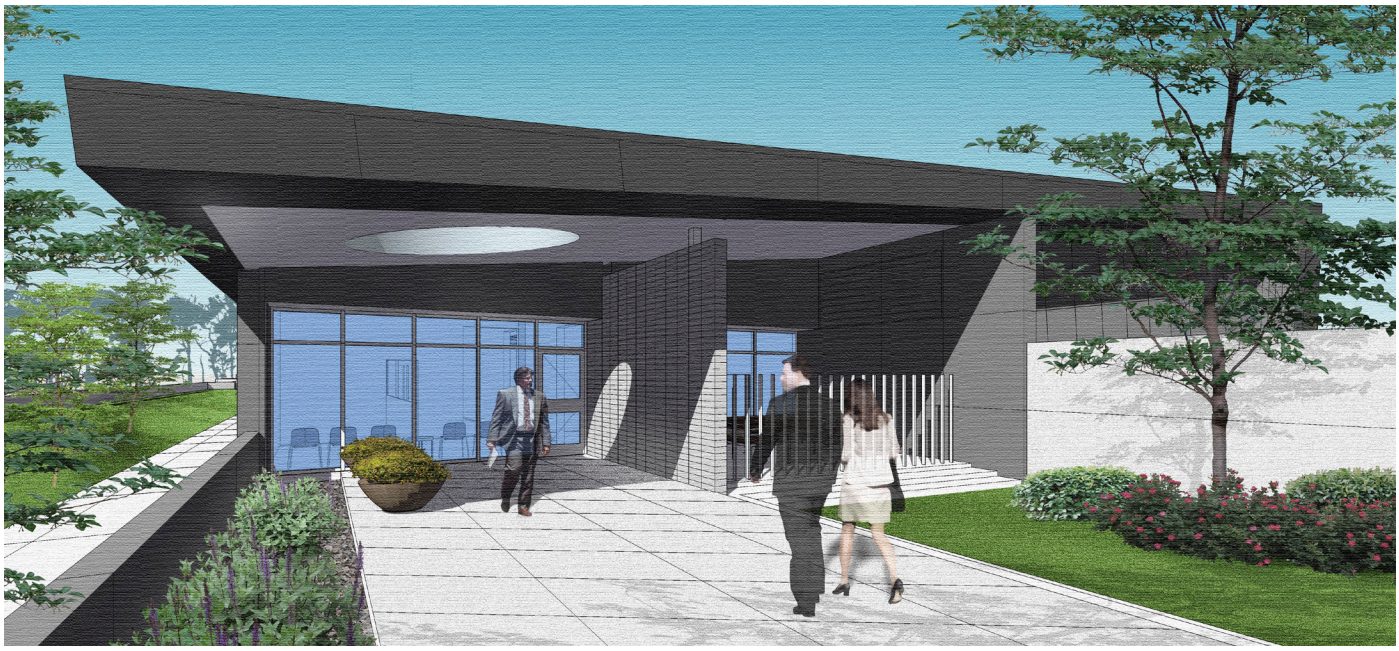

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15 June 2016

St. Tammany Parish Communications District (STPCD)
Covington, LA
New 911 Dispatch Center - Lacombe, LA
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SECTION 02111

CLEARING AND GRUBBING

PART 1: GENERAL

1.1 Related Documents: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Scope of Work: Furnish all labor, materials, equipment, and incidentals required for clearing, grubbing, removing, and disposing of vegetation and debris within the limits of construction.

1.3 Rules and Regulations:

A. State and local code requirements shall control the disposal of trees and shrubs.

B. The Contractor's attention is directed to any Soil Erosion and Sediment Control Ordinances in force by the local governing body. The Contractor shall comply with all existing ordinances.

1.4 Protection: Protect trees and shrubs, streets, roads, adjacent property, survey markers, and other features to remain throughout the Work.

PART 2: PRODUCTS

2.1 Materials: At the Contractor's option.

PART 3: EXECUTION

3.1 Clearing:

A. Limits of clearing shall be as indicated on the Drawings or if not indicated, as directed by the A/E.

B. Remove trees, saplings, shrubs, bushes, vines, and undergrowth within the limits of clearing.

C. If shown on drawings, selectively clear certain areas. A/E, in company of Contractor, will select trees to remain in these areas. If necessary to save selected trees, modify utility lines, walk, fence, etc. slightly from positions indicated; verify all with A/E.

D. Remove stumps to a depth of 8 inches minimum below ground elevation.

E. Carefully and cleanly cut roots and branches of trees to remain, where such roots and branches obstruct new construction.

3.2 Grubbing:

A. Limits of grubbing shall coincide with the limits of clearing.

B. Remove all stumps, roots over 4 inches in diameter, and matted roots within the limits of grubbing to the following depths.

1. Footings, 18 inches.
2. Paving and slabs, 12 inches.
3. Lawn Areas, 8 inches.
4. In the case of footings, slabs, or other construction on fills, the greater depth

shall apply.

3.3 Damage: Promptly repair damage caused to adjacent facilities by clearing and grubbing operations as directed by the A/E at no cost to the Owner.

3.4 Disposal: Burning of materials on the site will not be permitted. Remove material from the site daily as it accumulates.

END OF SECTION

SECTION 02210

GRADING

PART 1: GENERAL

1.1 Related Documents: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division O) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Scope of Work: Furnish all materials, labor and equipment for the installation of fill, grading, excavation, compacting, disposal of surplus materials and restoration of existing surfaces as indicated on the Drawings or specified elsewhere herein. Provide all necessary supplementary items for a complete installation intended by documents.

1.3 Protection:

A. Maintain carefully all benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed. If found at variance with the Drawings, notify the A/E before proceeding to lie out Work.

B. Protect as may be necessary any existing vegetation, trees, or the like immediately adjacent to the limits of Work which are not stated or directed to be removed. Any such damaged plant shall be replaced at no cost to Owner with like species and size.

C. In the event any excavation must be made immediately adjacent to the existing portion of buildings, covered walks or other Work, which is to remain, thoroughly crib and shore. Any settling or damage to that portion of the existing Work which is to remain, as a direct result of excavation Work, will be the responsibility of Contractor who shall repair the damage at no cost to Owner.

D. Restore all existing curbs and paving damaged in performance of this Work without extra cost to Owner in the manner prescribed by authorities having jurisdiction.

E. Protect all existing fencing and other work to remain, from damage. If damaged, restore or replace at no additional cost to Owner.

F. Where trees are to be left in place in areas to be graded, adequately protect from damage. Natural surface of ground shall be left undisturbed to the drip line of the existing trees.

1.4 Existing Utilities:

A. Follow rules and regulations of the authority having jurisdiction in executing all Work under this article. Adequately protect active utilities shown on the Drawings from damage and remove or relocate only as indicated or specified. Where active utilities are encountered, but are not shown on the Drawings, advise the A/E.

B. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

C. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities operation. Repair damaged utilities to satisfaction of utility owner.

D. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, except when permitted in writing by A/E and then only after acceptable temporary utility services have been provided.

E. Provide minimum of 48-hour notice to A/E, and receive written notice to proceed

before interrupting any utility. Contractor shall be responsible for notifying applicable agency.

F. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

G. Remove, plug or cap inactive and abandoned utilities encountered in excavating and grading operations as directed.

1.5 Compaction Standards:

A. Densities: Required densities of compaction are expressed hereinafter in terms of percentages. Such terms shall mean percentages of maximum density at optimum moisture content, as determined and controlled in accordance with the American Society of Testing and Materials, "Standard Test Methods for Moisture - Density Relationships of Soils and Soil - Aggregate Mixtures" using 5.5 lb. (2.49 kg) Rammer and 12 inch (305mm) Drop.

B. Field density determinations shall be made at locations as directed by the A/E.

C. If tests indicate insufficient density, compact as required and have additional testing performed until required densities are met. The Contractor shall pay for all such additional testing.

1.6 Quality Assurance:

A. Testing Agency: In-place soil compaction tests to be performed by the designated testing laboratory.

B. Reference Standards:

1. Granular Material Reference Standards:
   a. American Society for Testing and Materials (ASTM) D698-78, Moisture-Density Relations of "Soils Using 5.5-lb. (2.49-kg) Hammer and 12-in. (305-mm) Drop.
   b. ASTM D 2487, Classification of Soils for Engineering Purpose.

2. Bedding Material Reference Standards:
   a. American Society for Testing and Materials (ASTM) D4253 for Moisture-Density Relations.
   b. ASTM D4254 for calculation of relative density.

C. Contractor is responsible for the payment of all retests.

1.7 Job Conditions: Existing conditions are generally shown on the Drawings. Contractor shall visit the site, familiarize himself with actual conditions and verify existing conditions in the field. The Contractor is required to accept actual conditions at the site and do the Work specified without additional compensation for possible variation from grades and conditions shown, whether surface or sub-surface.

PART 2: PRODUCTS

2.1 Granular Material: Fill shall be AASHTO A-2-4 or better or clean sand well graded from fine to coarse, free of debris, organic or other deleterious matter and approved by A/E. A/E shall approve all fill materials. Legally remove from site, stockpile on site, or waste over lawn areas as directed any material found unsuitable by A/E.

2.2 Topsoil: For final grading of areas adjacent to structure, use existing. When on site topsoil is not sufficient to complete the work, or when existing topsoil is deemed unsuitable by A/E, provide topsoil from off-site borrows. Borrow topsoil shall be loose soil consisting of a friable mixture of clay, silt, and sand (maximum sand content 45%, minimum clay content 30%), with

a varying content of fine, friable, organic matter. All topsoil shall be free of roots, stones, debris, and other materials detrimental to lawn maintenance and shall be approved by A/E before use. Pump sand may not be used for topsoil under any circumstances.

2.3 Red Clay: Red clay free of roots, plants, and debris shall contain a minimum of 50% clay and a maximum of 30% sand and remainder silt.

PART 3: EXECUTION

3.1 Preparation:

A. Lay out and maintain grade stakes as required. Reference layout work to base lines, property lines, easements, and/or rights-of-way as indicated.

B. Where new grades tie into existing grades, verify existing grades. If existing conditions are at variance with the Drawings, notify A/E before proceeding with the Work and make adjustments only as directed by the A/E.

C. The Contractor shall verify that preceding work affecting work of this section has been satisfactorily completed.

D. Correct conditions adversely affecting work of this section.

3.2 Stripping and Stockpiling of Topsoil: Carry out this Work when dry weather exists and the topsoil is reasonably loose and dry. Remove topsoil a minimum of four (4") inches to remove all vegetation, roots, and foreign matter, from areas to receive fill. Pile topsoil in designated or approved locations where it will not interfere with construction operations. Stockpiles shall be of such size and shape as will keep loss of topsoil by erosion and wind to a minimum.

3.3 Disposal of Materials:

A. Excavated material shall be stacked without excessive surcharge on the excavation or obstructing free access to street, drives, walks, utility appurtenances, and private property. Excessive inconvenience to traffic and adjacent property owners shall not be allowed. Excavated material shall be segregated for use in topsoil as specified below.

B. All excavated material which is either unsuitable for topsoil or which will not be used for topsoil in the same location shall be legally removed from the site by the Contractor.

3.4 Excavation:

A. Excavated areas shall be cleared of all debris, water, slush, muck, and soft or loose earth and shall be conditioned to the entire satisfaction of the A/E.

B. All material excavated shall be placed so as to minimize interference with public travel and to permit proper access for inspection of the work.

C. Stumps, roots, and logs, which are encountered within the excavated area, shall be cut to a depth of one (1') foot below the required excavation. The Contractor shall fill this excavated space with granular material.

D. The Contractor shall probe one (1') foot below the established bottom on the excavation. If this probing discovers any stump, roots, logs, etc., the Contractor shall cut them out just as if they had been visible in the trench.

E. Blasting will not be allowed for the removal of stumps.

3.5 Site Grading:

A. Execute all Work in an orderly and careful manner with due consideration for any and all surroundings areas and planting which are to remain. Periodically water as required to allay dust and dirt. Protect any adjacent property and improvements from damage and replace any portions damaged through this operation.

B. Finish grade all areas affected by Work of this project. Accomplish proper and positive surface drainage with no areas that pond water. Provide a sloping earth berm around all construction of this project and swales as required for positive drainage.

C. Do all cutting, filling, compaction of fills, and rough grading to bring the entire project area outside of construction to grades indicated on the Drawings and as required to provide proper and positive drainage away from construction.

D. Where fill is required to rise the existing grades outside of construction to the new elevation required or indicated, place and compact such fill as specified.

E. Remove all debris subject to termite attack, rot, or corrosion, and all other deleterious materials from areas to be filled. The moisture content of the loosened material shall be such that it will readily bond with the first layer of fill material.

F. Place the material in successive horizontal layers in loose depth for the full width of the cross section. Deposit fill in layers not more than nine (9") inches thick under lawn and planted areas. If necessary, moisten soil, or allow to dry to the correct moisture content, before compaction. Do not deposit any fill on a subgrade that is muddy, frozen, or that contains frost.

G. Compact fills under lawns and planting areas to 95% density unless otherwise specified.

3.6 Distribution of Topsoil: Spread stockpiled topsoil that is acceptable to A/E to a depth of four (4") inches over open graded areas to be planted with grass, seeded, or where required elsewhere. After topsoil is spread, remove all hard lumps of clay, stones over one (1") inch in diameter, roots, limbs, and other deleterious matter, which would be harmful, or prevent proper establishment or maintenance of lawn and planting areas.

3.7 Field Quality Control:

A. Rough grading of all areas within the project, including excavated and filled sections and adjacent transition areas, shall be reasonably smooth, compacted, and free from irregular surface changes.

B. Finish all swales and gutters to drain readily, unless otherwise indicated, evenly slope the grade to provide drainage toward public drainage system or as indicated elsewhere at a grade not less than 1/2" to 3/4" per foot nor more than two (2") inches per foot.

C. Tolerances of topsoil shall be within 1/2" of grades required.

3.8 Repair: Where any existing lawn areas are damaged, rutted, or otherwise disturbed, repair to original condition.

3.9 Disposal: Burning of materials on the site will not be permitted. Legally remove rubbish and debris from the site as it accumulates.

END OF SECTION

SECTION 02220

EXCAVATING, BACKFILLING, AND COMPACTING FOR STRUCTURES AND MINOR UTILITIES AND PAVING

PART 1: GENERAL

1.1 Related Documents: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division O) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Scope of Work: Furnish all necessary materials, labor and equipment for the complete earthwork for construction of foundations for structures, paving, utilities and appurtenances, including excavation, backfilling, filling, compacting, disposal of surplus material and restoration of ground surfaces, as shown on the drawings and specified herein. Provide all necessary supplementary items for a complete installation intended by documents.

1.3 Provisions:

A. Existing conditions are generally shown on the Drawings. Contractor shall visit the site, familiarize himself with actual conditions and verify existing conditions in the field. The Contractor is required to accept actual conditions at the site and do the Work specified without additional compensation for possible variation from grades and conditions shown, whether surface or sub-surface.

B. Execute all Work in an orderly and careful manner with due consideration for any and all surroundings areas and planting which are to remain. Periodically water as required to allay dust and dirt. Protect any adjacent property and improvements from damage and replace any portions damaged through this operation.

C. Finish grade all areas affected by Work of this project. Accomplish proper and positive surface drainage with no areas that pond water. Provide a sloping earth berm around all construction of this project and swales as required for positive drainage.

1.4 Protection:

A. Maintain carefully all benchmarks, monuments, and other reference points. If disturbed or destroyed, replace as directed. If found at variance with the Drawings, notify the A/E before proceeding to lie out Work.

B. Protect as may be necessary any existing vegetation, trees, or the like immediately adjacent to the limits of Work which are not stated or directed to be removed. Any such damaged plant shall be replaced at no cost to Owner with like species and size.

C. In the event any excavation must be made immediately adjacent to the existing portion of buildings, covered walks or other Work, which is to remain, thoroughly crib and shore. Any settling or damage to that portion of the existing Work which is to remain, as a direct result of excavation Work, will be the responsibility of Contractor who shall repair the damage at no cost to Owner.

D. Restore all existing curbs and paving damaged in performance of this Work without extra cost to Owner in the manner prescribed by authorities having jurisdiction.

E. Protect all existing fencing and other work to remain, from damage. If damaged, restore or replace at no additional cost to Owner.

F. Where trees are to be left in place in areas to be graded, adequately protect from damage. Natural surface of ground shall be left undisturbed for a distance of eight feet from tree on all sides except as approved or directed by A/E.

1.5 Existing Utilities:

A. Follow rules and regulations of the authority having jurisdiction in executing all Work under this article. Adequately protect active utilities shown on the drawings from damage and remove or relocate only as indicated or specified. Where active utilities are encountered, but are not shown on the drawings, advise the A/E.

B. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

C. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities operational. Repair damaged utilities to satisfaction of utility owner.

D. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, except when permitted in writing by A/E and then only after acceptable temporary utility services have been provided.

E. Provide minimum of 48-hour notice to A/E, and receive written notice to proceed before interrupting any utility. Contractor shall be responsible for notifying applicable agency.

F. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

G. Remove, plug or cap inactive and abandoned utilities encountered in excavating and grading operations as directed.

1.6 Compaction Standards:

A. Densities for Granular Material, Topsoil and Excavation Material:

1. Required densities of compaction are expressed hereinafter in terms of percentages. Such terms shall mean percentages of maximum density at optimum moisture content, as determined and controlled in accordance with the American Society For Testing and Materials, "Standard Test Methods for Moisture - Density Relationships of Soils and Soil - Aggregate Mixtures" using 5.5 lb. (2.49kg) Hammer and 12 inch (305mm) Drop. Use relative density test for the bedding material.

2. Densities for Bedding Material: Standard test methods for moisture density relationships of soils and soil-aggregate mixtures.

B. Field density determinations shall be made at locations as directed by the A/E.

C. If tests indicate insufficient density, compact as required and have additional testing performed until required densities are met. The Contractor shall pay for all such additional testing.

1.7 Quality Assurance:

A. Testing Agency: In place soil compaction tests to be performed by the designated testing laboratory.

B. Reference Standards:

1. American Society for Testing and Materials (ASTM):

a. ASTM D698-78, Moisture-Density Relations of Soils Using 5.5-lb. (2.49-kg) Rammer and 12-in 305-mm) Drop.

b. ASTM D 2487, Classification of Soils for Engineering Purpose.

C. Contractor is responsible for the payment of all retests.

1.8 Job Conditions:

A. Time of construction should be kept to a minimum.

B. Sheeting, shoring, and dewatering during construction should be properly designed to keep a stable excavation at all times and to prevent disturbance of the in place soils.

C. As specified in these Specifications, the Contractor shall provide, operate, and maintain all necessary pumps, discharge lines, well points, etc., in sufficient number and capacity to keep all excavation, bases, pits, etc. in conformance with the indicated foundation construction condition at each structure at all times throughout the period of construction.

D. As specified in these Specifications, the Contractor shall assume all responsibility for security of the excavation required, employing bracing, lining, or other accepted means necessary to accomplish same.

E. Excavated areas shall be cleared of all debris, water, slush, muck, and soft or loose earth and shall be conditioned to the entire satisfaction of the A/E.

F. All excavated material unsuitable for use, or which will not be used, shall be disposed of as specified.

G. All excavations encountering stumps, roots, logs, etc. shall be removed of such items by the Contractor and refilled with proper material, as specified.

PART 2: PRODUCTS

2.1 Granular Material: Fill shall be AASHTO A-2-4 or better or clean sand well graded from fine to coarse, free of debris, organic or other deleterious matter and approved by A/E.

2.2 Topsoil: For final grading of areas adjacent to structure, use existing. When on-site topsoil is not sufficient to complete the work, or when existing topsoil is deemed unsuitable by A/E, provide topsoil from off-site borrows. Borrow topsoil shall be loose soil consisting of a friable mixture of clay, silt, and sand (maximum sand content 45 percent, minimum clay content 30 percent), with a varying content of fine, friable, organic matter. All topsoil shall be free of roots, stones, debris, and other materials detrimental to lawn maintenance and shall be approved by A/E before use. Pump sand may not be used for topsoil under any circumstances.

2.3 Bedding Material: Material shall be limestone and from a source approved by the Owner. Graded aggregate for 16 inch or less pipes shall be No. 67. Graded aggregate for 18 inch or greater pipes shall be No. 57.

The limestone shall meet the following gradations when tested in accordance with DOTD TR 113:

	#57	#67
U.S. Sieve	Percent	Percent
1 1/2"	100	---
1"	95 - 100	100
3/4"	---	90 - 100
1/2"	25 - 60	---
3/8"	C	20 - 55
#4	0 - 10	0 - 10
#8	0 – 5	0 – 5

The limestone shall have an absorption rate of not more than 1.5 percent and an abrasion loss of not more than 30 percent when tested in accordance with test method AASHTO T96.

2.4 Select Backfill Material (for Utility Trenching):

A. Composition: Only approved material shall be used for backfill, free from organic matter. Excavated earth free from debris or organic material may be used for backfilling, as specified.

B. Excavated clay soils free of debris, organic material, or large lumps of clay shall be used only when indicated by geotechnical recommendations, when available.

PART 3: EXECUTION

3.1 Preparation:

A. Lay out and maintain grade stakes as required. Reference layout work to base lines, property lines, easements, and/or rights-of-way as indicated.

B. Where new grades tie into existing grades, verify existing grades. If existing conditions are at variance with the Drawings, notify A/E before proceeding with the Work and make adjustments only as directed by the A/E.

C. The Contractor shall verify that preceding work affecting work of this section has been satisfactorily completed.

D. Correct conditions adversely affecting work of this section.

3.2 Stripping and Stockpiling of Topsoil: Carry out this Work when dry weather exists and the topsoil is reasonably loose and dry. Remove topsoil a minimum of four (4) inches to remove all vegetation, roots, foreign matter, from areas to receive fill. Pile topsoil in designated or approved locations where it will not interfere with construction operations. Stockpiles shall be of such size and shape as will keep loss of topsoil by erosion and wind to a minimum.

3.3 Disposal of Materials:

A. Excavated material shall be stacked without excessive surcharge on the excavation or obstructing free access to street, drives, walks, utility appurtenances, and private property. Excessive inconvenience to traffic and adjacent property owners shall not be allowed. Excavated material shall be segregated for use in topsoil as specified below.

B. All excavated material which is either unsuitable for topsoil or which will not be used for topsoil in the same location shall be removed from the site by the Contractor.

C. Should conditions make it impractical or unsafe to stack material adjacent to the excavation, the material shall be hauled and stored at a location provided by the Contractor. When required, it shall be rehandled and used in backfilling the excavation.

3.4 Excavation:

A. Excavation shall extend to the width and depth shown on the drawings or as specified. Where not specified, Contractor shall confine his excavation to the least width practicable and shall provide suitable room for installing structures and appurtenances.

B. The Contractor shall furnish and place all sheeting, bracing, and supports and shall remove from the excavation all materials which are unsuitable for backfill or which the A/E may deem unsuitable for backfilling. The bottom of the excavation shall be firm, dry, and in all respects, acceptable. The Contractor shall deposit bedding, or refill for excavation below grade, directly on the bottom of the excavation, immediately after excavation has reached the proper depth, and before the bottom has become softened or disturbed by any cause whatever. It shall also include the

wasting or disposal of surplus excavated material in a manner and in locations approved by the A/E. If the bottom of the excavation is carried below the level called for by the Drawings, or made mucky or unstable due to the Contractor's operations or carelessness, the excavation shall be deepened to undisturbed soil. Also, the thickness of bedding material or depth of fill material, as determined by the A/E, shall be increased accordingly, without additional compensation to the Contractor.

C. Shore, sheet-pile, and brace excavations as required to maintain them secure and to safeguard life. Remove shoring as the backfilling progresses, but only when banks are safe against caving or collapse and backfill meets required densities.

D. Control the grading so that ground is etched to prevent water from running into the excavated areas or damaging the structures. Maintain all pits and trenches free of water at all times.

E. Pumping: The Contractor shall keep all excavations free from water, at his own expense, while work is in progress. He shall provide for the disposal of the water removed from excavations in such a manner as not to cause injury to the public health, to public or private property, or to any portion of the work completed or in progress, or shall he cause any impediment to the use of the streets by the public.

F. All material excavated shall be placed so as to minimize interference with public travel and to permit proper access for inspection of the work.

G. All excavation shall be made within an area bounded by lines 5 feet outside of, and parallel to, exterior walls of the structure to allow for correct forming, shoring, and inspection of foundation work. Pouring of concrete against earth sidewalls will not be permitted.

H. Where soil conditions permit, footing trenches may be excavated to the exact dimensions of the concrete footing and side form omitted.

I. When bedding material is to rest on an excavated surface, care shall be taken not to disturb the bottom of the excavation. Final removal and replacement of the foundation material and sub base compaction to grade shall not be made until just before the structure is placed.

J. When any excavation is completed, the contractor shall notify the A/E who will make an inspection of the excavation. No concrete or masonry shall be placed until the excavation has been approved by the A/E.

K. The elevation of the bottoms of footings and base slabs, as shown on the drawings, shall be considered as approximate only and the A/E may order, in writing, such changes in dimensions or elevation of footings as may be necessary to secure a satisfactory foundation.

L. Stumps, roots, and logs, which are encountered within the trench area, shall be cut to a depth of one (1) foot below the bottom of the excavation. The Contractor shall fill this excavated space with bedding material.

M. When so required by the A/E, the contractor shall probe one (1) foot below the established bottom on the excavation. If this probing discovers any stump, roots, logs, etc., the Contractor shall cut them out just as if they had been visible in the excavation.

N. Blasting will not be allowed for the removal of stumps.

3.5 Fill Under Slabs and Paving:

A. Where fill is required to raise the subgrade for concrete placement to the elevations indicated, place and compact as specified.

B. Before depositing fill, remove all loam, vegetation and other unsuitable material from areas to receive fill. In no case shall fill be placed on a subgrade that is muddy, frozen, or that contains frost. Compact subgrade by rolling with spreading equipment uniformly over entire area.

C. Deposit fill material in horizontal layers not exceeding nine (9) inches in depth before

compacting. Spread fill evenly and compact each layer by uniformly rolling, pneumatic tamping or other approved equipment over the entire area. If necessary, moisten fill or allow to dry to the correct moisture content before compaction.

D. Bring the finished compacted areas to a reasonably true and even plane at the required elevations.

E. Compact all fill to 95 percent density unless otherwise specified.

3.6 Utility Trench Backfilling:

A. As soon as practicable after the utilities have been laid, jointed, and tested (if required), backfilling shall begin and completed expeditiously. Bedding shall conform to the details on the Drawings. When laying pipe, the groove for the pipe and bell hole must be accurately shaped, and the backfill must be closely packed adjacent to the pipe.

B. Bedding material shall be placed and compacted as shown on the Drawings. All foundation lumber (i.e., planking, sills, and stringers in the trench bottom) shall be suitable for the purpose. Installation of foundation lumber and piling shall be in accordance with the Drawings.

C. Bedding compaction shall consist of the placement in lifts not exceeding 12 inches and compacted by a drum roller or plate vibrating compactor. This mechanical compactor must make a minimum of two passes over every area of the bedding. Compacted bedding shall be enclosed in a filter fabric in areas that require a granular material backfill.

D. Backfill around manholes, catch basins, area drains, and other structures shall be compacted by flooding. All backfill shall be compacted, especially under and over pipes connected to the manholes.

E. All paved surfaces adjacent to backfilling operations shall be broomed and hose-cleaned immediately after backfilling. Dust control measures shall be employed at all times.

F. Compact all bedding material to 75 percent relative density and granular material backfill to 95 percent density. Compact all select backfill material to 90 percent of maximum density.

3.7 Restoring Trench Surface:

A. Where the trench occurs adjacent to paved streets, in shoulders or sidewalks, the Contractor shall thoroughly consolidate the backfill and shall maintain the surface as the work progresses. If settlement takes place, he shall immediately deposit additional fill to restore the level of the ground.

B. The surface of any driveway, paving or other area which is disturbed by the trench excavation shall be restored by the Contractor to a condition at least equal to that existing before work began

C. In sections where the pipeline passes through grassed areas, the Contractor shall regrade and reseed all disturbed areas to a condition at least equal to that existing before work began.

3.8 Site Grading:

A. Do all cutting, filling, compaction of fills, and rough grading to bring the entire project area outside of construction to grades indicated on Drawings and as required to provide proper and positive drainage away from construction.

B. Where fill is required to rise the existing grades outside of construction to the new elevation required or indicated, place and compact such fill as specified.

C. Remove all debris subject to termite attack, rot, or corrosion, and all other deleterious materials from areas to be filled. The moisture content of the loosened material shall be such that it will readily bond with the first layer of fill material.

D. Place the material in successive horizontal layers in loose depth for the full width of the cross section. Deposit fill in layers not more than nine (9) inches thick under lawn and planted areas. If necessary, moisten soil, or allow to dry to the correct moisture content, before compaction. Do not deposit any fill on a subgrade that is muddy, frozen, or that contains frost.

E. Compact fills under lawns and planting areas to 95 percent density unless otherwise specified.

3.9 Distribution of Topsoil: Spread stockpiled topsoil that is acceptable to A/E to a depth of four (4) inches over open graded areas to be planted with grass. After topsoil is spread, remove all hard lumps of clay, stones over one (1) inch in diameter, roots, limbs, and other deleterious matter which would be harmful, or prevent proper establishment or maintenance of lawn and planting areas.

3.10 Field Quality Control:

A. Rough grading of all areas within the project, including excavated and filled sections and adjacent transition areas, shall be reasonably smooth, compacted, and free from irregular surface changes.

B. Finish all swales and gutters to drain readily.

3.11 Repair: Where any existing lawn areas are damaged, rutted, or otherwise disturbed, repair to original condition.

3.12 Disposal: Burning of materials on the site will not be permitted. Remove rubbish and debris from the site as it accumulates.

3.13 Barricades and Flares: The Contractor shall provide temporary fencing, barricades, flares, signs, etc., as necessary, to protect vehicles and pedestrians at locations where there exists an open excavation, trench, or any other obstacle. Barricades shall bear the Contractor's name and any other information required by the A/E or public authorities. Where on public roadways all barricade signs and flares shall be of a type and located in a manner that conforms to recommendations of the Louisiana Manual on Uniform Traffic Control Devices, latest edition as revised, or as specified herein, subject to the approval of the A/E.

END OF SECTION

SECTION 02622A

POLYVINYL CHLORIDE PIPE (PVC) (A)

PART 1: GENERAL

1.1 Related Documents: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Scope of Work: Furnish all necessary materials and equipment for PVC pipe and fitting for water mains, gravity sewerage systems, and storm drainage, as shown on the drawings and specified herein.

PART 2: PRODUCTS

2.1 Materials:

A. Waste Water Gravity Lines

1. Pipe: All PVC pipe shall be specifically designed to carry domestic sewage by gravity flow and shall meet the requirements of ASTM D-3034 (latest revision) with a maximum SDR of 26 and a minimum F/ Y stiffness of 115 psi as tested in conformance with ASTM D-2412 (latest revision) for sizes up to and including 15". Pipes 18" and larger shall meet requirements of ASTM F-679-80.
2. Joints: All joints shall consist of an integral bell with a factory installed "locked in" gasket. The spigot end of each joint shall be factory beveled.
3. Fittings: All fittings shall be standard manufacturer fittings approved by the pipe manufacturer for use on his pipe. All fittings shall meet the requirements of the pipe. All fittings shall be of the same or greater strength as the pipe.
4. Caps and Permanent Plugs: Caps and permanent plugs for sewerage service line shall be as manufactured by Vassalko or approved equal; and shall meet the requirements set forth in ASTM D-3034.

B. Water Lines:

1. 4" thru 12": PVC pipe 4" and greater shall be AWWA C-900 DR18 integral bell with locked gaskets and ductile iron O.D.
2. Smaller than 4":
   a. PVC pipe shall be Schedule 40, conforming to the requirements ASTM D1784, Type I, Grade I and ASTM D1785.
   b. PVC fittings shall be Schedule 40 socket type, conforming to the requirements of ASTM D1784, Type I, Grade 1 and ASTM D2466.

C. Storm Water Lines:

1. Pipe: All PVC pipe (plastic yard drain pipe) for sizes up to and including 12” in diameter shall be in accordance with Section 1006.07 of Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, as amended.
2. Joints: Joints shall be in accordance with Section 1006.07 of Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, as amended.

D. Restrained Joints:

1. Polyvinyl chloride (PVC) pipe (4" to 10") shall be restrained using the Series

5500 mechanical joint thrust restraint as manufactured by EBAA Iron, Inc., or approved equal.

E. Transition Couplings: Long body transition couplings, 12" minimum length, shall be used to connect new pipe to old pipe.

PART 3: EXECUTION

Reference appropriate sections elsewhere herein.

END OF SECTION

SECTION 02623

POLYETHYLENE PIPE

PART 1: GENERAL

1.1 Related Documents: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Scope of Work: This section covers materials for high-density polyethylene pipe and fittings.

1.3 Quality Assurance: The pipe manufacturer shall provide, upon request, an outline of quality control procedures performed on polyethylene system components. Each length of pipe shall also be clearly marked at intervals not to exceed 5 feet with the following:

A. Name and/or trademark of the pipe manufacturer.
B. Nominal pipe size.
C. Dimension ratio.
D. The letters PE followed by the polyethylene grade per ASTM D1248, followed by Hydrostatic Design basis in 100's of psi, e.g., PE 3408.
E. Manufacturing Standard Reference, e.g., ASTM F714-81.
F. A production code from which the date and place of manufacture can be determined.

PART 2: PRODUCTS

2.1 Pipe and Fittings: Reference Specifications:

A. ASTM F714-81 polyethelene (PE) plastic pipe SDR 17, 100 psi based on inside diameter.
B. ASTM D-1248-78 Polyethylene Plastics Molding and Extrusion Compounds.
C. CGSB-41-GP-25M Pipe, Polyethylene for the Transport of Liquids.
D. CSA B137.1 Polyethylene Pipe for Cold Water Services.

2.2 Materials:

A. The pipe shall be made from polyethylene resin compound qualified as Type III, Category 5, Class C, Grade P34 in ASTM D-1248-78. This material shall have Long Term Hydrostatic Strength of 1450 psi or 1600 psi when tested and analyzed by ASTM D2837.
B. The raw material shall contain a minimum of 2% carbon black, well dispersed. Additives, which can be conclusively proven not to be detrimental to the pipe may also be used, provided the pipe produced meets the requirements of this standard.
C. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material supplier.
D. Compliance with the requirements of this paragraph shall be certified in writing by the pipe supplier, upon request.
E. The cell classification shall be PE 345534C for PE 3408 materials, per ASTM D3350/F 714-81.

2.3 Pipe Design:

A. The pipe shall be designed in accordance with the relationships of the ISO-modified formula (see ASTM F 14-81, CGSB 41-GP-25M).
B. The design pressure rating shall be derived using the ISO-modified formula above, and shall be its normal working pressure in pounds per square inch in temperatures up to 73 degrees F.
C. The Hydrostatic Design Stress shall be 725 psi for PE 3407 materials or 800 psi for PE 3408 materials.
D. Pipe diameter shall be inside pipe dimensions as called out on plans.

2.4 Fittings: Fittings to be made from the same Class and Schedule as pipe and be fully pressure rated.

2.5 Jointing Methods:

A. Wherever possible the polyethylene pipe should be joined by the method of thermal butt-fusion, as outlined in ASTM-D2657, Heat Joining Polyethylene Pipe and Fittings. Butt-fusion joining of pipe and fittings shall be performed in accordance with the procedures recommended by the manufacturer. The temperature of the heater plate should not exceed 170 degrees C +/- 5 degrees C (340 degrees F + 10 degrees F) and the joining pressure should not exceed 23 pounds per square inch of projected end area, excluding an allowance for friction.
B. The polyethylene pipe may be adapted to fittings or other systems by means of an assembly consisting of a polyethylene stub-end, butt-fused to the pipe, a back-up flange of ductile iron, made to Class 150, ANSI B16.5 dimensional standards with exceptions, bolts of stainless steel and a gasket of suitable red rubber or asbestos-rubber compound cut to fit the joint. In all cases, the bolts shall be drawn up evenly and in line.
C. Polyethylene pipes of the same outside diameter but different wall thicknesses shall be joined by means of a flange assembly as designated above.
D. The pipe supplier shall be consulted to obtain machinery and expertise for the joining by butt-fusion of polyethylene pipe and fittings. No pipe or fittings shall be joined by fusion by any Contractor unless he is adequately trained and has manufacturer certified technicians to perform the work.

PART 3: EXECUTION

NONE

END OF SECTION

SECTION 02650

PRESSURE PIPING TESTING

PART 1: GENERAL

1.1 Related Documents: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division O) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Scope of work: This section covers field hydrostatic and leakage testing of all force mains, waterlines, and pump station piping.

1.3 Governing Standard: Except as modified or otherwise provided herein, the pressure and leakage testing of all force mains, waterlines, and pump station piping shall conform to the requirements of AWWA C600, Section 4.

1.4 General Requirements:

A. Force Mains: The entire pipeline utilized for force mains shall be subjected to a hydrostatic pressure test and a leakage test along with all pump station piping. The line may be tested in sections but testing of the completed pipeline system will be required. The line shall be tested at 75 pounds per square inch for a period of at least four (4) hours. Tests shall not be made until at least 36 hours after the last joint to be tested has been made.

B. Waterlines: The waterlines shall be tested at 100 psi. Testing of waterlines shall be done as specified herein unless required otherwise by the Local Department or Agency having jurisdiction.

1.5 Testing Plan: A testing plan shall be submitted to the A/E in accordance with Division 1. The plan shall include a complete description of the methods to be used for the pressure and leakage tests and the equipment to be used to measure leakage. Furthermore, the Contractor will supply a copy of the pressure records and charts to the A/E after the tests have been made.

PART 2: PRODUCTS

2.1 Testing Equipment and Materials:

A. The Contractor shall provide all necessary equipment for the pressure test. The Contractor is responsible for providing all pumping equipment, water, meters, pressure recorders, charts, stopwatches, all necessary piping connections, gauges, and all other equipment, materials, facilities, and personnel required to complete the tests.

B. The Contractor shall provide and install all temporary sectionizing devices, bulkheads, bracing, and flanges needed to withstand test pressures. All temporary devices will be removed after completion of the test. The installation of all bracing, bulkheads, and sectionizing devices shall be placed such that they do not exert concentrated loads or horizontal thrusts on the pipe.

C. Water meters and pressure gauges shall be accurately calibrated and shall be subject to review and acceptance by the A/E. All testing equipment and other

materials found to be defective shall be removed immediately and replaced with new and acceptable materials, by and at the expense of the Contractor.

PART 3: EXECUTION

3.1 Testing Procedures:

A. The contractor shall adequately vent the line to remove air as it is being filled. Sufficient backfill placed as specified in the Excavating, Backfilling and Compacting for Utilities section, shall be placed around the pipeline to prevent movement under test pressures.

B. The line to be tested shall be slowly filled to prevent water hammer. Care shall be taken to ensure that all air valves and other venting facilities are open and all air is expelled from the pipeline. A record of the numbers of gallons needed to fill the test sections will be accurately maintained and furnished to the A/E prior to testing.

C. Pipe trenches shall be backfilled, but all valves shall be left uncovered during the tests.

3.2 Pressure Testing:

A. The pipelines shall be subjected to a pressure test for the purpose of testing the line for stability and for defective materials or workmanship. The test may be applied to individual sections of line isolated between successive access manholes or may be applied to shorter sections of lines at the Contractor's option and concurrent acceptance of the A/E.

B. After the section of line or segment of pipe to be tested has been filled with water, the specified test pressure shall be applied and maintained for a period of not less than four (4) hours and for whatever longer period as may be necessary for inspection of the line and for the Contractor to locate any and all defective joints and pipeline materials.

C. If any pipes, fittings, valves, and joints prove to be cracked or defective, each such unit shall be removed and replaced by the Contractor with sound material as directed by the A/E. The test shall then be repeated to the satisfaction of the A/E.

D. The test pressure shall be held consistently during the test period and monitored with pressure gauges and recorders to be installed at points specified by the A/E. All tests shall be scheduled 24 hours in advance with the A/E.

E. Discharge of Water. All water used in the test shall be discharged in a manner to prevent flooding of the trench or adjacent property. All water discharged shall be routed into the existing storm drainage systems. Water shall not be allowed to discharge into any sanitary sewer systems. Before the Contractor can begin discharging water he shall receive permission from the A/E regarding the location and amount of discharge.

F. All thrust blocks shall be permanent and constructed to withstand test pressures, and temporary bracing must not be resorted to, except at test ends.

G. If test ends are used, the open end can be sealed with a line cap and shall be adequately braced with a temporary thrust block.

H. Where any section of a main is provided with concrete reaction backing, the hydrostatic pressure test shall not be made until at least five (5) days have elapsed after the concrete reaction backing was installed. If high-early-strength cement is used in the concrete reaction backing, the hydrostatic pressure test shall not be made until at least two (2) days have elapsed.

3.3 Leakage:

A. All joints shall be watertight and free from leaks. Each leak which is discovered within the correction period stipulated in the General Conditions shall be repaired by and at the expense of the Contractor.

B. The line shall then be re-tested after the leaks are located and repaired by the Contractor. All leaks shall be repaired working from the outside of the pipe using methods that have been approved, in advance, by the A/E.

END OF SECTION

SECTION 02660

WATER DISTRIBUTION

PART 1: GENERAL

1.1 Related Documents: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the work specified in this section.

1.2 Scope of Work: This section covers the removal, replacement, relocation and repair of all existing waterlines, known and unknown, and installation of new waterline. Waterlines, generally, are the property of the Owner and shall be installed, removed, replaced, relocated and/or repaired by and at the expense of the Contractor.

1.3 General: Material and Equipment

A. Conform to applicable specifications and standards.

B. Comply with size, make, type, and quality specified, or as specifically approved in writing by the A/E.

C. Manufactured and Fabricated Products:

1. Design and fabricate, and assemble in accord with the best engineering and shop practices.
2. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
3. Two or more items of the same kind shall be identical, by the same manufacturer.
4. Products shall be suitable for service conditions.

D. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

E. Comply with all local, state and federal laws and regulations.

F. Furnish all necessary labor, material or equipment necessary for compliance with all requirements of this contract.

1.4 Governing Standards: Installation shall conform to the latest standards of the governing authority. In the event of a conflict between these specifications and the latest standards of the Owner and/or governing authority, the latest standards of the Owner and/or governing authority shall govern.

1.5 Notification: The Contractor shall be responsible for immediately notifying the Owner and A/E of existing water mains that interfere with his work. The Contractor is responsible for conducting operations in the vicinity of water mains that do not interfere with the work such that main breaks and disruption of water service is avoided.

PART 2: PRODUCTS

See other sections.

PART 3: EXECUTION

3.1 Unknown Utilities:

A. The drawings attempt to indicate the location of all known underground facilities within the limits of the work. However, the Contractor shall be responsible to inspect the entire project to verify all underground facilities and determine the existence of any additional facilities conflicting with his work. In addition the Contractor shall be required to prospect ahead of the work to locate and verify all underground facilities.

B. In the event the Contractor encounters an unknown underground facility in his operations and such an item will interfere with his work and will require removal and replacement or relocation, the Contractor shall immediately notify the A/E and Owner and/or appropriate governing authority and arrange for relocation.

3.2 Coordination: Removal and replacement of other utility facilities shall be done in close coordination with the Owner and/or governing authority. Removal and replacement or relocation work shall be planned in advance so the inconvenience to the Owner and utility users caused by the disruption of service is minimized. The Contractor shall perform work on utilities in off-peak hours of usage as required by the A/E and Owner.

3.3 Handling: Pipe, fittings, and accessories shall be handled in a manner that will insure installation in sound, undamaged condition. Equipment, tools, and methods used in handling and installing pipe and fittings shall not damage the pipe and fittings. Hooks inserted in ends of pipe shall have broad, well-padded contact surfaces. All pipe coating, which has been damaged, shall be repaired by the Contractor before installing the pipe.

3.4 Cutting Pipe:

A. Pipe to be installed shall be done with sections and fittings such that pipe cutting is not required. Should pipe cutting be required, cutting shall be done in a neat manner, without damage to the pipe or to the lining. Cuts shall be smooth, straight, and at right angles to the pipe axis. After cutting, the end of the pipe shall be dressed with a file to remove all roughness and sharp corners.

B. All cutting of cast iron pipe shall be done with mechanical pipe cutters except where the use of mechanical cutters would be difficult or impracticable. Ends of ductile iron pipe shall be cut with a saw, abrasive wheel, or oxyacetylene torch. Field cut holes for saddles shall be cut with mechanical cutters; oxyacetylene cutting will not be permitted.

3.5 Cleaning:

A. The interior of all pipe and fittings shall be thoroughly cleaned of foreign matter before being installed and shall be kept clean until the work has been accepted. Before jointing, all joint contact surfaces shall be wire brushed if necessary, wiped clean, and kept clean until jointing is completed.

B. Precautions shall be taken to prevent foreign material from entering the pipe during installation. Debris, tools, clothing, or other materials shall not be placed in or allowed to enter the pipe.

3.6 Inspection: Pipe and fittings shall be carefully examined for cracks and other defects immediately before installation; spigot ends shall be examined with particular care. All defective pipe and fittings shall be removed from the site of the work.

3.7 Laying Pipe:

A. Pipe shall be protected from lateral displacement by placing the specified pipe embedment material. Under no circumstances shall pipe be laid in water and no pipe shall be laid under unsuitable weather or trench conditions.

B. Pipe shall be laid with the bell ends facing the direction of laying except when reverse laying is specifically authorized by the A/E.

C. Alignment and grade shall be as existed in removed pipe, unless otherwise indicated on the drawings or directed by the A/E.

3.8 Connections with Existing Piping: Connections between new work and existing piping shall be made using fittings suitable for the conditions encountered and as indicated on the drawings. Each connection with an existing pipe shall be made at a time and under conditions which will least interfere with service to customers, and as authorized by the A/E. Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatered lines and excavations without damage to adjacent property.

3.9 Flanged Joints:

A. Pipe shall extend completely through screwed-on flanges. The pipe and flange face shall be finish machined in a single operation. Flange faces shall be flat and perpendicular to the pipe centerline.

B. When bolting flanged joints, care shall be taken to avoid restraint on the opposite end of the pipe or fitting which would prevent uniform gasket compression or which would cause unnecessary stress in the flanges. One flange shall be free to move in any direction while the flange bolts are being tightened. Bolts shall be tightened gradually and at a uniform rate so that gasket compression is uniform.

3.10 Valves: All valves such as gate valves, check valves, fire hydrants, butterfly valves, air release or combination air-vacuum valves or valve boxes to be relocated or replaced shall be of the same or better quality than the valve being replaced. They shall conform to AWWA standards if not specified in piped utility materials section.

3.11 Bulkhead or Closure for Connections: Connections between new work and existing piping shall be made using fittings suitable for the conditions encountered and as indicated on the drawings. Each connection with an existing pipe shall be made at a time and under conditions which will least interfere with service to customers and as authorized by the A/E. Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatered lines and excavations without damage to adjacent property. Bulkhead shall be provided at the end of new piping for future connections as indicated on the drawings.

3.12 Field Joints: Joints in buried locations shall be mechanical joint or push-on type unless otherwise indicated on the drawing or directed by the A/E. Restrained push on joints shall be used to resist thrust forces. All joints shall be watertight and free from leaks.

3.13 Mechanical Joints:

A. Mechanical joints shall be carefully assembled in accordance with the manufacturer's recommendations. If effective sealing is not obtained, the joint shall be disassembled, thoroughly cleaned and reassembled. Over-tightening bolts to compensate for poor installation practice will not be permitted.

B. The holes in mechanical joints with tie rods shall be carefully aligned to permit installation of the tie rods. In flange and mechanical joint pieces, holes in the

mechanical joint bells and the flanges shall straddle the top (or side for vertical piping) centerline. The top (or side) centerline shall be marked on each flange and mechanical joint piece at the foundry.

3.14 Push-On Joints: The pipe manufacturer's instructions and recommendations for proper jointing operations shall be followed. All joint surfaces shall be lubricated with heavy vegetable soap solution immediately before the joint is completed. Lubricant shall be suitable for use in potable water, shall be stored in closed containers, and shall be kept clean. Each spigot end shall be suitably beveled to facilitate assembly.

3.15 Leakage: All joints shall be watertight and free from leaks. Each leak which is discovered within the correction period stipulated in the General Conditions shall be repaired by and at the expense of the Contractor.

END OF SECTION

SECTION 02670

WATER WELL

PART 1 - GENERAL

1.1 SCOPE. The work covered by this section consists of furnishing all equipment, labor, and materials necessary for the construction of a water well as shown on the drawings and specified herein.

A. Quality Assurance:

1. The CONTRACTOR shall employ only competent workmen for this contract, and all applicable work shall be performed by or under the supervision of an experienced well driller.

2. A qualified ground water Hydrologist, retained by the CONTRACTOR, shall review the driller's log, laboratory test data, electric logs and pump tests to determine the most probable formation(s) that will meet the intent and purpose of the water supply project. The Hydrologist shall recommend to the ENGINEER, in writing, all major production well characteristics as described herein.

1.2 APPLICABLE PUBLICATIONS. The following publications referred to thereafter by basic designation only, form a part of this specification to the extent indicated: The publications are referred to in the text by basic designation only.

A. American Society for Testing and Materials (ASTM).

ASTM A 53-98	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
ASTM C 150-97a	Portland Cement

B. American Water Works Association (AWWA).

AWWA-10062JU(1992)	Standard Methods for the Examination of Water and Wastewater
AWWA A100(1990)	Water Wells
AWWA B300(1992)	Hypochlorites
AWWA B301(1992)	Liquid Chlorine
AWWA C206(1991)	Field Welding of Steel Water Pipe

1.3 SUBMITTALS.

A. Work Plan. Proposed plan for drilling test holes and constructing production wells, before beginning work. The plan shall include, but not be limited to, the proposed method of drilling and equipment to be used, details on proposed casing, well screen, grouting materials, gravel pack material and method for placing gravel pack, and methods and equipment proposed for developing the well and for performing pump tests. No work shall be performed until the

drilling plan has been approved and no deviation from the approved drilling plan will be permitted without approval of the Project Engineer. Details of specific methods to be employed to control potential contamination or pollution arising from well installation activities, shall also be included.

B. Tests. Reports shall be made within 24 hours following the conclusion of each test.

C. Permits. A copy of all permits, licenses, or other requirements is necessary for execution of the work. Before beginning work, the local United States Geological Survey office (USGS), the Louisiana Department of Transportation and Development (LADOTD), and the Louisiana Department of Environmental Quality (LDEQ) shall be notified of the type and location of wells to be constructed, the method of construction and anticipated schedule for construction of the well. Also, the water well shall be registered with LADOTD. A copy of all such correspondence shall be furnished.

D. Boring Log. During the drilling of the test hole an accurate log shall be maintained. As a minimum, the log shall include depths, elevations, and descriptions of all formations encountered; identification of each stratum according to the Unified Soil Classification System; and depths at which groundwater is encountered. Soil samples shall be taken each 10 feet with a split-spoon sampler. The Contractor shall prepare a graphic boring log to scale showing the required details. Five prints of the boring log drawing shall be submitted. This drawing shall be used for determining the well design, design of the gravel filter, well screen location and screen openings.

E. Submersible Pump. Submit manufacturer=s descriptive data and technical literature, performance charts and curves, catalog cuts, and installation instructions.

F. Name, address and telephone number of a competent ground water hydrologist who shall evaluate the test data for the CONTRACTOR and shall supply a professional experience resume showing evaluation of similar ground water supply systems.

G. Name, address and telephone number of an independent laboratory which is to be employed by CONTRACTOR to perform chemical analysis of all water samples. The independent laboratory employed to perform the required chemical analysis must be certified in drinking water analysis by the U.S. Environmental Protection Agency and the Louisiana Department of Health and Hospitals.

H. Contractor’s Report.

1.4 ENVIRONMENTAL PROTECTION. The Contractor shall take all precautions as may be required to prevent contaminated water or water having undesirable physical or chemical characteristics from entering the water supply stratum through the well bore or by seepage from the ground surface. The Contractor also shall take all precautions necessary to prevent contamination of the ground surface or of surface waters resulting from drilling of the test-hole or well.

1.5 TEST HOLES

A. Test Holes. Before starting construction of the well, a test hole of at least 6 inches in diameter shall be drilled at the location of the well into the target water bearing stratum(s). The estimated depth of this test hole shall be as shown on the plans'. The test hole shall be used to determine the expected yield from the well, water quality, optimum depth, and to log the strata encountered. Testing of the well is required at several different depths. A

temporary casing may be used. If used, the temporary casing shall be seated at the top of the stratum being tested. The test hole may be converted to the permanent well. If the test hole is not used for the permanent well, the test hole shall be filled with sand-cement grout placed by tremie or pumped through the drill pipe.

B. Contractor's Report. The Contractor shall review the test data by appropriate analysis techniques and provide the following information:
1. Project the water production well specific capability,
2. Project the pump setting for the design yield,
3. Project the estimated yield capacity in GPM for the water supply production well, if applicable.
4. Recommend strata to be screened and developed into a production well.
5. Recommend the screen slot size to be used should the permanent well be construction.
6. Provide comparison of the results of the laboratory analysis described in Paragraph 3.6 Water Collection and Analysis, against E.P.A. Drinking Water Standards.

1.6 ABANDONMENT OF WELLS. In the event that the Contractor fails to construct a well of the required capacity, or should the well be abandoned because of loss of tools or for any other cause, the Contractor shall fill the abandoned hole with sand-cement grout and remove the casing.

PART 2 - PRODUCTS

2.1 CASING. The casing shall be of sufficient size for the maximum yield as specified. All casing, screen, and other well materials shall be of compatible materials to prevent galvanic reaction between components of the completed well. The well casing shall be furnished in interchangeable sections of not more than 21' in length. The casing shall be provided with plain ends for threaded or field welding.

A. Steel Casing and Couplings. Steel casing shall be standard weight black steel pipe, conforming to ASTM A 53. Joints shall be either threaded and coupled, or field welded in accordance with AWWA C206.
B. Inner Casing. The inner casing shall be sized based on the pump required in paragraph 11 for maximum required yield, and shall be constructed of the same materials as the outer casing. The inner casing shall be connected directly to the top of the well screen by an approved method.

2.2 WELL SCREENS. Well Screens shall be a minimum of 4 inches nominal diameter, and shall be directly connected to the bottom of the inner casing by an approved method. The screen shall be of sufficient length and shall provide an intake area capable of passing not less than the minimum required yield of the well at an entrance velocity not exceeding 0.1 fps. The opening size shall be compatible with the material surrounding the screen and shall be submitted for approval as part of the drilling plan. The well screen shall be of sufficient size and design to hold back and support the gravel used in the gravel envelope and in-situ material surrounding the screen. The screen and all accessories required for satisfactory operation shall be essentially standard products of reliable manufacturers regularly engaged in the production of such equipment. Field constructed screen is not acceptable. "Blanks" in the well screen may be utilized in nonproductive zones and shall be considered "casing."

A. Metal Screen. Metal screen shall be of an approved wire-wound type with wire not less than No. 7 AWG and the supporting bars not less than 1/4 -inch thickness. Both wire and supporting bars shall be type 304 stainless steel, conforming to the applicable requirements

of AWWA A100. A wire-wound screen manufactured with supporting bars or core of material different from the wire will not be acceptable. Joints shall be made of threaded couplings of the same material as the screens or by brazing or welding in accordance with AWWA C206.

2.3 GRAVEL PACK. Gravel pack shall be a product of a commercial sand and gravel manufacturer, shall be properly sized and graded for the surrounding soil and water encountered, and shall be composed of round, hard, waterworn siliceous gravel, free of flat or elongated pieces, organic matter, or other foreign matter. The gravel shall be of such size as will allow the maximum flow of water into the well and prevent the infiltration of sand and silt. The gradation of the filter gravel shall be such that the uniformity coefficient is not more than 2.5. (NOT REQUIRED ON THIS PROJECT)

2.4. CEMENT GROUT. Cement grout shall consist of portland cement conforming to ASTM C 150, Type I or II, sand and water. Cement grout shall be proportioned not to exceed 6 gallons of water per cubic foot of cement, with a mixture of such consistency that the well can be properly grouted. Not more than 3 percent by weight of bentonite powder may be added to reduce shrinkage.

2.5 PUMPING EQUIPMENT - SUBMERSIBLE

A. Materials of Construction:

1. Pump: The pump bowl assembly shall be similar or equal to those manufactured by the Goulds Pump Corporation of New York. All end bells, bowls, housing and shaft shall be stainless steel. The pump assembly shall have a built-in all stainless steel check valve. The pump shall be Model No. 33GS50.

2. Motor: The submersible motor shall be manufactured by the Franklin Electric Corporation of Blufton, Indiana or its equivalent. The stator shall be hermetically sealed. The rotor shall be built onto a stainless steel shaft. The thrust bearing shall be the Kingsberry type and shall be adequate to support the weight of the rotating element and the column of water above it. The motor shall be water lubricated. The motor shall have a replaceable, water tight, motor lead provided by the factory. The motor shall be 5 horsepower, 208 volt, 3 phase.

3. Electrical Conductor: The electrical conductors used shall be of an adequate gauge to insure no less than a 5% voltage drop from the transformer to the motor. The pump cable shall be of the three conductor jacketed type with an insulated ground wire. The minimum size wire allowable shall be as per manufacturer's recommendations.

4. Control Panel: The control panel shall be a combination magnetic starter/fuseable disconnect in a NEMA 3R outdoor enclosure. Control panel shall also provide for a pressure switch that will allow the irrigation system to operate automatically. Supply well contractor shall run all wiring from the control panel to the pumping equipment.

5. Pump Column: The pump column shall be the size and weight as shown in the table below. Four inch and smaller pump column shall be galvanized. Larger than four inch column shall be black. All columns shall be schedule 40, standard weight, threaded and coupled, single random lengths. The pipe shall be 2" and 220 feet are required.

Pipe Size	Wall Thickness	Weight per foot
2”	0.154”	3.65
2½”	0.203”	5.79
3”	0.216”	7.58
4”	0.237”	10.79
5”	0.258”	14.62
6”	0.280”	18.97
8”	0.280”	28.55

6. Well Seal: An approved sanitary well seal shall be used to seal between the pump column and the well casing. The well seal shall facilitate the removal of the column pipe and shall provide for a water tight seal. The vent shall be turned down and screened with bug proof screen. The well seal shall also facilitate the passage of the electrical conductors from the motor in the casing to pass outside of the casing into a NEMA 3R junction box. The well seal shall be the type and size as shown on the drawing.

7. Altitude Gauge: A ¼” pvc jacketed copper altitude line shall in installed in the well and attached to the column pipe. An altitude gauge shall be installed above the well seal that will read the elevation of the water level in the well, measured in feet. All necessary fittings, such as the snifter valve, gauge and mount shall be provided. (NOT NEEDED ON THIS PROJECT)

8. Pressure Tanks: The pressure tanks shall be similar or equal to those manufactured by Amtrol, Inc. The contractor shall provide two (2)-WX350, 119 gallon Well-X-Trol tanks with all the necessary piping, pressure sensors/switches on a concrete base of adequate size for each well. Tanks shall have a steel shell, heavy duty Butyl diaphragm and virgin polypropylene liner. Tanks shall be anchored as required by the manufacturer. Switches shall be submitted to the engineer for approval. (NOT NEEDED ON THIS PROJECT)

B. Data on the characteristics and performance of each pump. Data shall include guaranteed performance curves, based on actual shop tests, which show they meet specific requirements for head, capacity, efficiency, NPSHR, brake horsepower and input KW. Curves shall be submitted on 8 ½” x 11” sheets, at as large a scale as is practical. Curves shall be plotted from no flow at shut off head to pump capacity at minimum specified TDH. Catalog sheets showing a family of curves will not be acceptable. Complete motor data including certified motor curves.

PART 3 - EXECUTION

3.1 WELL CONSTRUCTION.

A. General Requirements. The well shall be located as shown on the drawings. The well shall be to such depth as may be necessary to penetrate a desirable water-bearing stratum and produce a continuous yield of 85 gpm of commercially sand free water. The water will need to be "Potable". "Potable" is defined to mean water that is suitable for public consumption, i.e., water free from objectionable amounts of harmful bacteria, chemical and physical substances as established by 40 CFR 141. The method of drill shall conform to all state and local standards for water well construction. The execution of the work shall be by competent

workmen and performed under the direct supervision of an experienced well driller. Casing pipe, well screens, and joint couplings shall be of compatible materials throughout each well. The well shall be a gravel pack well developed in stratum based on test hole data. The well shall be drilled straight, plumb, and circular from top to bottom. The well shall be initially drilled from the ground surface to the uppermost level of the water bearing strata and the bottom of the outer casing set at this elevation. The hole below the outer casing shall fully penetrate the water bearing stratum a sufficient depth to produce the required amount of water without causing excessive velocities through the aquifer.

B. Setting Conductor Casing. The conductor casing shall not be less than 16 inches in diameter. The hole shall be of sufficient size to leave a concentric annular space of not less than 2-1/2 inches between the outside of the outer casing and the walls of the hole. The annular space between the outer casing and the walls of the holes shall be filled with cement grout. Acceptable methods of grouting are detailed in AWWA A100. No method will be approved that does not specify the forcing of grout from the bottom of the space to be grouted towards the surface. A suitable grout retainer, packer, or plug shall be provided at the bottom of the inner casing so that grout will not leak into the bottom of the well. Grouting shall be done continuously in such a manner as will ensure that the entire annular space is filled in one operation. After grouting is completed, drilling operations shall not be resumed for at least 24 hours to allow proper setting of the grout.

C. Setting Outer Casing. The outer casing shall not be less than 10 inches in diameter. The hole shall be of sufficient size to leave a concentric annular space of not less than 2 inches between the outside of the outer casing and the walls of the hole. The annular space between the outer casing and the walls of the holes shall be filled with cement grout. Acceptable methods of grouting are detailed in AWWA A100. No method will be approved that does not specify the forcing of grout from the bottom of the space to be grouted towards the surface. A suitable grout retainer, packer, or plug shall be provided at the bottom of the inner casing so that grout will not leak into the bottom of the well. Grouting shall be done continuously in such a manner as will ensure that the entire annular space is filled in one operation. After grouting is completed, drilling operations shall not be resumed for at least 24 hours to allow proper setting of the grout.

D. Construction of Inner Casing and Screen. After the grout has set, the hole below the outer casing shall be underreamed at the required diameter to the required depth by an approved method which will prevent caving of the hole before or during installation of the gravel pack, well screen and inner casing. In lieu of underreaming, the entire well may be drilled to the diameter of the gravel pack with an annular space between the inner casing and outer casing equal to the thickness of the gravel pack. The outer casing shall be increased in size to provide for this space, if this option is elected. The well screen and inner casing shall be lowered into the hole by a method which will allow for control of the rate of fall of the well screen and inner casing at all times. Well screen and inner casing shall not be dropped or allowed to fall uncontrolled into the hole. The inner casing shall extend up into the outer casing a distance of 16 feet. Approved centering devices shall be installed at a spacing of 120 degrees between the outer casing and inner casing prior to well construction at the top of the inner casing and the bottom of the outer casing.

E. Construction of Gravel Pack. After the screen and inner casing have been concentrically set in the hole below the outer casing, the approved gravel pack shall be constructed around the screen by filling the entire space between the screen and the wall of the hole in the water bearing stratum with filter gravel. Well screen and inner casing used for gravel pack wells shall have approved centering devices spaced 120 degrees apart at intervals not exceeding

25 feet along the length of the screen and inner casing. Gravel conductor pipe having an inside nominal diameter of not less than1-1/2 inches shall be lowered to the bottom of the well between the hole and screen. Gravel conductor pipe shall be arranged and connected at the surface of the ground to water pumping and graveling equipment so that water and gravel fed at uniform rates are discharged as the gravel fills the hole from the bottom up. The gravel and water conductor shall be raised at a rate that will keep the bottom of the pipe between 1 and 3 feet under the gravel level at all times. If the Contractor desires to use methods of placing gravel other than those specified, he shall submit to the Project Engineer, for approval, details of the method and equipment proposed, before gravel placing is begun. The gravel pack shall be installed continuously and without interruption until the gravel has been placed to within 4 feet above the top of the screen. (NOT NEEDED ON THIS PROJECT)

F. Placing Packer. After the inner casing and well screen and gravel pack have been installed, the annular space between the inner and outer casings shall be sealed by use of an approved packer.

3.2 WELL DEVELOPMENT. After construction, the well shall be developed in accordance with the drilling plan. The Contractor shall develop the well by such methods as approved until the water pumped from the well is substantially free from sand and until the turbidity is less than 5 on the Jackson Turbidity Scale specified in AWWA-10062JU. Developing equipment shall be of an approved type and of sufficient capacity to remove all cutting fluids, sand, rock cuttings, and any other foreign material. The well shall be thoroughly cleaned from top to bottom before beginning the well tests.

3.3 TESTS. During construction of the well, whenever sufficient water is found to indicate that a well of required capacity may be developed, or when directed, a capacity test shall be performed. If the capacity test indicates that the required capacity can be obtained, the tests for quality of water shall be made. If the capacity and quality tests indicate that the required capacity and quality can be obtained, the permanent well, as specified, shall be completed at that depth. Prior to making quality tests, drilling equipment, tools and pumps contacting well water shall be cleaned with live steam.

A. Capacity Test. The Contractor shall furnish and install an approved temporary test pump, with discharge piping of sufficient size and length to conduct the water being pumped to point of discharge, and equipment necessary for measuring the rate of flow and water level in the well. A continuous 8 hour capacity test shall be run with the pumping rate and drawdown at the pump well recorded every 1/2 minute during the first 5 minutes after starting the pump; then every 5 minutes for an hour; then every 20 minutes for 2 hours. From this point on, readings taken at hourly intervals are sufficient. The test shall begin at the rate of the expected capacity of well and at least that rate maintained throughout the duration of the test. If this capacity cannot be maintained for the test period, the capacity test shall be terminated and the test hole drilled deeper or relocated as directed. The record of the test, in triplicate, shall be delivered to the Project Engineer.

B. Test for Plumbness and Alignment. Upon completion of the permanent well, plumbness and alignment shall be tested by lowering into the well, to the total depth of the well, a plumb 40 feet long or a dummy of the same length. The outer diameter of the plumb shall not be more than 1/2 inch smaller than the diameter of that part of the hole being tested. If a dummy is used, it shall consist of a rigid spindle with three rings, each ring being 12 inches wide. The rings shall be cylindrical and shall be spaced one at each end of the dummy and one in the center thereof. The central member of the dummy shall be rigid so that it will maintain the alignment of the axis of the rings. Should the plumb or dummy fail to move freely throughout the length of the casing or well screen for the depth of well or should the well vary from the

vertical in excess of two-thirds the inside diameter of that part of the well being tested for each 100 feet of depth, the plumbness and alignment of the well shall be corrected by the Contractor. Should the faulty alignment and plumbness not be correctable, as determined by the Project Engineer, the well shall be abandoned as specified in paragraph 6 and a new well drilled at no additional cost to the Government.

C. Water Sample Collection and Analysis:

1. After the test well has been properly developed and has been flowing at least twelve (12) hours, at least two (2) water samples per screened interval shall be collected. These samples shall be collected, preserved and labeled by a representative of the laboratory employed by the CONTRACTOR to perform the water quality testing. Documentation of the chain of custody shall be provided with each sample. All water samples shall be placed in appropriate containers, securely closed to avoid spillage and contamination, clearly labeled with the following information.
   a. Owner and address
   b. Name or number and location of well
   c. Depth interval represented by the sample
   d. Date taken
   e. Time taken
   f. Capacity of pump and time pumped before sample
   g. Name, address, and telephone number of CONTRACTOR

2. All water samples shall be sent to the EPA certified laboratory identified by CONTRACTOR during the submittal process for analysis. Each sample shall be tested for all "EPA National Primary Drinking Water Standards" excluding Disinfectant, Disinfection Byproducts and Microorganisms. Each sample will also be tested for all "National Secondary Drinking Water Standards." See attached Appendix A to Specification Section 02670 for EPA National Primary and National Secondary Drinking Water Standards.

3. In addition to the Primary and Secondary Drinking Water Standards, the following testings shall also be performed:

a.	Alkalinity (Total)	h.	Calcium (Ca)
b.	Taste	i.	Carbon Dioxide (CO_2)*
c.	Temperature*	j.	Hydrogen Sulfide (H_2S)*
d.	Conductivity	k.	Magnesium (Ma)
e.	Dissolved Oxygen*	l.	Color*
f.	Hardness (as CaCo3)	m.	Odor*
g.	Aluminum (Al)	n.	pH*

* TO BE RECORDED IN THE FIELD BY THE CONTRATOR IMMEDIATELY UPON COLLECTION OF SAMPLES AND ALSO DETERMINED IN LAB. THE RESULTS OF THE LAB ANALYSIS WILL BE MADE AVAILABLE TO THE ENGINEER UPON RECEIPT BY THE CONTRACTOR.

3.4. INSTALLATION OF PERMANENT PUMP. The permanent well pump shall be installed in the well at a minimum depth of 25 feet below the maximum drawdown groundwater level after the drawdown test has been completed. The pump shall be secured at the required elevation as recommended by the pump manufacturer.

3.5 DISINFECTING. After completion of tests of well, or installation of permanent pump, or at time of

tests for yield and drawdown test, whichever is later, the wells shall be disinfected by adding chlorine, conforming to AWWA B301, or hypochlorite, conforming to AWWA B300, in sufficient quantity that a concentration of at least 50 ppm of chlorine shall be obtained in all parts of the well. Chlorine solution shall be prepared and introduced into the well in an approved manner and shall remain in the well for period of at least 24 hours. Disinfection of well shall be in accordance with any method described in Sections A1 thru A10 of AWWA A100. After the contact period, the well shall be pumped until the residual chlorine content is not greater than 1.0 ppm. The well shall be disinfected and redisinfected as may be required until two consecutive samples of water are found upon test to be free from Coli Acrogenes group of organisms.

3.6 SLAB. Slab shall be constructed so as to prohibit the infiltration of surface water or precipitation into the well. The slab shall be as shown on the drawings and constructed of reinforced concrete. The top of the outer casing shall extend 24 inches above the top of the slab.

3.7 CLEAN-UP. Upon completion of the well construction and other incidentals, all debris and surplus materials resulting from the work shall be removed from the jobsite.

3.8 MEASUREMENT.

A. Waterwell. Waterwell work shall include a complete well, accepted and tested, including the permits, test hole, conductor casing, 6" casing, 4" inner casing, 4" screen, well screens, gravel pack, packer, grouting, developing, testing, foundation, casing seal, discharge pipe and the permanent pump. No payment shall be made for abandoned holes.

END OF SECTION

SECTION 02721

CATCH BASINS, GRATES & FRAMES

PART 1: GENERAL

1.1 Related Documents: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division O) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Scope of Work: Furnish all necessary materials, labor and equipment for the complete installation of catch basins, paved area drainage, site surface drainage and accessories, as shown on the Drawings and specified herein. Provide all necessary supplementary items for a complete installation intended by documents. Make revisions and tie-ins to existing lines, catch basins, grates, etc. as required to produce a complete drainage system and as shown on the Drawings. Modify existing catch basins to lower the top of casting elevation as shown on the Drawings. Clean and flush all existing drainage structures.

1.3 Submittals:
- A. Submit Manufacturer's Literature and Installation Instructions.
- B. Submit in accordance with requirements of Division 1.

1.4 Product Handling: Protect materials during transportation, storage, and installation to avoid physical damage.

PART 2: PRODUCTS

2.1 Brick: ASTM C 62, Grade SW, common building brick.

2.2 Mortar: ASTM C 270, Type S, cement and mortar.

2.3 Gratings, Curb Inlets, Manhole Covers: Vulcan, Neenah, or approved equal, ASTM A 48, Class 30 iron castings. Provide type and sizes with frames as indicated on the Drawings.

2.4 Concrete: As specified elsewhere herein.

2.5 Substitutions: Equivalent equipment and materials of other manufacturers may be substituted on approval of the A/E. Request for substitution shall include manufacturer's descriptive information and evidence of satisfactory past performance. Substitutions shall meet or exceed the specified item in all respects. Submittals shall include comparison of the manufacturer's literature of both the specified item and the proposed substitution; all differences from the specified item shall be annotated. Substitutions, which change the generic type of material or equipment or fail to meet the performance criteria of the specified item, will not be approved.

PART 3: EXECUTION

3.1 Trenching:

A. Verify with A/E exact position of lines and catch basins. Re-route lines if necessary to protect trees, planting, other items to remain.

B. Trenches shall be not less than 1% true to grade shown. Remove unsuitable material and replace with sand or gravel properly compacted.

3.2 Drainage Structures, Headwalls, Catch Basins:

A. Construct in accordance with the requirements of R & B, and with the locations, designs, and dimensions as indicated on the Drawings.

B. Lay bricks in full, close, shove joints of mortar.

C. Plaster inside and outside of structure with a coat or mortar 1/4 inch thick. Surface inverts and benches in structures with a 14 inch thick coat of mortar.

D. Set grates and frames in a full bed of mortar. Extend inlet and outlet pipes through the wall for sufficient distance beyond the outside surface to allow for connections. Construct concrete around them neatly, so as to prevent leakages along the outer surface.

E. No pipes, cables, or other structures shall be built into or through these structures except the attendant drainage pipes, indicated.

3.3 Examination: Notify the A/E in ample time to permit examination of completed underground piping before backfilling is commenced.

3.4 Backfilling: Take necessary precautions in backfilling to prevent disalignment of pipe, longitudinally, laterally, or vertically. Replace pipe damaged during backfilling and compacting. Conform to requirements for fill and backfill.

END OF SECTION

SECTION 02722

MANHOLES, JUNCTION BOXES AND CATCH BASINS

PART 1: GENERAL

1.1 Related Documents: All work shall be in accordance with the requirements of Section 702 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, as amended.

PART 2: PRODUCTS

2.1 Material shall be in accordance with the requirements of Section 702 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, as amended.

2.2 Bedding material shall be Stone, Sand/Stone, or Sand/Gravel, and be in accordance with the requirements of Section 726 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, as amended. Compact all bedding material to 75% of relative density.

PART 3: EXECUTION

N/A

END OF SECTION

SECTION 02725

CULVERTS AND STORM DRAINS

PART 1: GENERAL

1.1 Related Documents: All work shall be in accordance with the requirements of Section 701 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, as amended.

PART 2: PRODUCTS

2.1 Materials:

A. Reinforced Concrete Pipe shall conform to ASTM Designation C-76, Class III, pipe, Type 3 joint, as per Section 1006.03 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, as amended.

B. Reinforced Concrete Pipe Arch in accordance with Section 1006.04 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, as amended. Concrete pipe arch shall conform to ASTM C-506. All joints of pipe greater than 43 inch round and equivalent arch pipe shall be banded with metal straps on three sides in accordance with manufacturers requirements.

C. Corrugated Metal Pipe 24 inch or larger diameter shall have 12 gauge thickness and 18 inch or smaller diameter shall have 14 gauge thickness. All corrugated metal pipe shall have Type 2 joints and be bituminous coated or polymer coated. If work is in Jefferson Parish, corrugated metal pipe shall be polymer coated unless otherwise noted. Binding shall be in accordance with ASTM A-885-88.

D. Filter Cloth, Joint Wrapping shall conform to requirements of Section 1019 of the Louisiana Standard Specifications noted in Part 1 above.

E. Lumber shall conform to requirements of Section 1014 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, as amended.

F. PVC Pipe 15” or larger diameter shall be in accordance with Section 1006.07 of the Louisiana Standard Specifications for Roads and Bridges, 2000 Edition, as amended.

G. Concrete Joints - A pipe puller device shall be used to seat concrete pipe joints. Joints that are not seated a minimum of 75% of the depth of the joint will not be acceptable.

PART 3: EXECUTION

N/A

END OF SECTION

SECTION 02830:

CHAIN LINK FENCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

A. Chain-Link Fences: Industrial.
B. Gates: swing.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide chain-link fences and gates capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

A. Minimum Post Size and Maximum Spacing for Wind Velocity Pressure: Determine based on mesh size and pattern specified, and on the following minimum design wind pressures and according to CLFMI WLG 2445:

1. Wind Speed: 140 mph.
2. Fence Height: As indicated.
3. Line Post Group: IA, ASTM F 1043, Schedule 40 steel pipe.
4. Wind Exposure Category: B.

B. Determine minimum post size, group, and section according to ASTM F 1043 for framework up to 20 feet high, and post spacing not to exceed 10 feet.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.

A. Fence and gate posts, rails, and fittings.
B. Chain-link fabric, reinforcements, and attachments.
C. Gates and hardware.
D. Accessories: As indicated on drawings.

B. Shop Drawings: Show locations of fences, gates, posts, rails, tension wires, details of extended posts, extension arms, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post anchorage, attachment, bracing, and other required installation and operational clearances.

A. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Delete paragraph above if colors and other characteristics are preselected and specified or scheduled. Retain first paragraph and subparagraphs below with or without above.

D. Samples for Verification: For each type of chain-link fence and gate indicated.

1. Polymer coating, in 6-inch lengths on shapes for posts, rails, wires.

E. Maintenance Data: For the following to include in maintenance manuals:

1. Polymer finishes.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

A. Engineering Responsibility: Preparation of data for chain-link fences and gates, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

B. Interruption of Existing Utility Service: Do not interrupt utility services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

A. Notify Architect no fewer than two days in advance of proposed interruption of utility services.

B. Do not proceed with interruption of utility services without Architect's written permission.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

A. General: Height indicated on Drawings. Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with ASTM A 392, CLFMI CLF 2445, and requirements indicated below:

1. Wire Fabric: Metallic-coated wire.

1. Mesh Size: 2 inches.
2. Weight of Metallic (Zinc) Coating: ASTM A 392, Type II, Class 1, 1.2 oz./sq. ft. with zinc coating applied before weaving.

B. Selvage: Twisted top and knuckled bottom.

2.2 INDUSTRIAL FENCE FRAMING

A. Posts and Rails: Comply with ASTM F 1043 for framing and the following:

A. Group: IA, round steel pipe, Schedule 40.
B. Fence Height: As indicated.
C. Strength Requirement: Light industrial according to ASTM F 1043.
D. Post Diameter and Thickness: According to ASTM F 1043.

a. Line Post: As indicated.
b. End, Corner and Pull Post: As indicated.
c. Swing Gate Post: According to ASTM F 900.

E. Coating for Steel Framing:

1. Metallic Coating:

1) Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film.
2) External, Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film. Internal, Type D, consisting of 81 percent, not less than 0.3-mil- thick, zinc pigmented coating.
3) Coatings: Any coating above.

2.3 TENSION WIRE

A. General: Provide horizontal tension wire at the following locations:

A. Location: As indicated.

B. Metallic-Coated Steel Wire: 6-gauge, marcelled tension wire complying with ASTM A 817, ASTM A 824, and the following:

A. Metallic Coating: Type II, zinc coated (galvanized) by with the following minimum coating weight:

1. Matching chain-link fabric coating weight.

2.4 INDUSTRIAL SWING GATES

A. General: Comply with ASTM F 900 for single and double swing gate types.

A. Metal Pipe and Tubing: Galvanized steel. Comply with ASTM F 1043 and ASTM F 1083 for materials and protective coatings.

B. Frames and Bracing: Fabricate members from round galvanized steel tubing with outside dimension and weight according to ASTM F 900 and the following:

1. Gate Fabric Height: As indicated.
2. Leaf Width: As indicated.
3. Frame Members:

1. Tubular Steel: As indicated.

C. Frame Corner Construction:

1. Welded or assembled with corner fittings.

D. Hardware: Latches permitting operation from both sides of gate, hinges, center gate stops and keepers for each gate leaf more than 5 feet wide. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.

2.5 FITTINGS

A. General: Comply with ASTM F 626.

B. Rail Fittings: Provide the following:

A. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.

C. Tie Wires, Clips, and Fasteners: According to ASTM F 626.

1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:

1. Hot-Dip Galvanized Steel: 0.148-inch- diameter wire and galvanized coating thickness to match size and coating thickness of chain-link fence fabric.

D. Finish:

1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. zinc.

2.6 BARBED WIRE (IF REQUIRED ON PLAN)

A. Barbed wire: ASTM A 121, Class 3, zinc coated steel wire double-strand, 12-1/2 gauge twisted line wire with galvanized steel, 4 point barbs spaced approximately 5” on center.

B. Barbed wire supporting arms: Pressed steel arms with provisions for attaching 3 rows of barbed wire. Arms shall withstand 250 lb. Downward pull at the outermost end of arm without failure.

1. Provide 45-degree, 3 strands, single arm and/or 6 strands double “V” arms as indicated on plans.

2. Provide intermediate arms with hole for passage of top rail.

2.7 CAST-IN-PLACE CONCRETE

A. Materials: Portland cement complying with ASTM C 150, Type I aggregates complying with ASTM C 33, and potable water for ready-mixed concrete complying with ASTM C 94/C 94M. Measure, batch, and mix Project-site-mixed concrete according to ASTM C 94/C 94M.

1. Concrete Mixes: Normal-weight concrete air entrained with not less than 3000-psi compressive strength (28 days), 3-inch slump, and 1-inch maximum size aggregate.

2.8 POLYMER FINISHES

A. Supplemental Color Coating: provide fence components with polymer coating.

B. Metallic-Coated Steel Tension Wire: PVC-coated wire complying with ASTM F 1664, Class 1.

C. Color: As selected by Architect from manufacturer's full range, complying with ASTM F 934.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance.

B. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.

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

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.

B. Install fencing on established boundary lines inside property line.

3.4 CHAIN-LINK FENCE INSTALLATION

A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.

2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

a. Exposed Concrete: Extend 1 inch above grade; shape and smooth to shed water.

C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.

D. Line Posts: Space line posts uniformly at 10 feet maximum o.c.

E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts.

1. Locate horizontal braces at midheight of fabric 6 feet or higher, on fences with top rail and at 2/3 fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

F. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- diameter hog rings of same material and finish as fabric wire, spaced a

maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric.

G. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

H. Bottom Rails: Install, spanning between posts.

I. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2 inches] between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.

K. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at 1 end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.

1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.

L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

M. Barbed Wire: Uniformly space parallel rows of barbed wire on security side of fence. Pull wire taut and attach in clips or slots of each extension.

3.5 INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.6 ADJUSTING

A. Gate: Adjust gate to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Lubricate hardware and other moving parts.

END OF SECTION

SECTION 02932:

SEEDING & SODDING

PART 1: GENERAL

1.1 Related Documents: The general provisions of the Contract, including the Conditions of the Contract (General, Supplementary, and other Conditions, Division 0) and Division 1 as appropriate, apply to the Work specified in this Section.

1.2 Scope of Work: Furnish all necessary materials, labor and equipment for the complete installation of seeding and sodding materials at all lawn areas of the site disturbed by work of this contract and over areas to be graded where soil is uncovered or new fill added, as shown on the drawings and specified herein. Existing areas of site with total stand of grass and that are not affected by work of this contract need not be re-seeded or sodded. Provide all necessary supplementary items for a complete installation intended by documents.

1.3 Job Conditions:

A. Existing Conditions: Perform seeding and sodding only after preceding work affecting ground surface is completed.

B. Environmental Requirements: Do not perform seeding when wind exceeds 15 mph. Arrange planting schedule to suit seed/s specified.

C. Protection: Restrict foot and vehicular traffic from seeded and sodded areas after planting or placement until lawn areas are established.

1.4 Standards: Meet requirements and recommendations of the applicable portions of the latest editions of Standards listed below:

A. U.S. Department of Agriculture (USDA)

B. Federal Seed Act (FSA)

1.5 Quality Assurance: Conform to all requirements of La. Seed Commission, La. Seed Law Rules and Regulations of the La. Revised Statutes.

PART 2: PRODUCTS

2.1 Materials

A. Grass Seed (between March 31 & September 15): Seed shall be Bermuda Grass (Cynodon dactylon) (Hulled) minimum 82% by weight of pure live seed, maximum 1% by weight weed seed. Seed shall be labeled in accordance with the latest U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act.

B. Grass Seed (between September 15 & March 31): Seed shall be half (50%) Fescue, Turf-type tall Fescue (Festuca arundinacea) variety “Winning Colors” minimum 82% by weight of live seed, maximum .05% by weight weed seed. Only if the variety “Winning Colors” becomes temporarily unavailable, another variety of turf type tall Fescue will be selected by the Owner’s Representative. “Winning Colors” is the recommended hybrid variety for use in this area, since it is the best acclimated to this area. The seed shall be a minimum 85% by weight of pure live seed with a maximum of 1% by weight weed seed. The second half (50%) shall be Bermuda Grass (Cynodon dactylon) Non Hulled Seed. It shall be 82% by weight of pure live seed, maximum 1% by weight weed seed. Seeds shall be labeled in accordance with the latest U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act.

C. The Owner's Representative reserves the right to reject at or after delivery any seed which does not, in his opinion, meet requirements of these specifications.

D. Sod: Sod shall be 100% Bermuda Grass (Cynodon dactylon). It shall be field grown. It shall be at least two (2) years old, well rooted, and cut to a depth of 3/4" to 1". The sod shall be cut in rectangular strips twelve (12") inches wide and of a size which will permit the strip to be lifted without breaking. Sources of the sod shall be made known to the Consultant at least five (5) days prior to cutting. Delivered sod shall be approved by the Owner's Representative prior to installation.

E. Fertilizer and Herbicide: Provide Agriform CRF 16-7-12 (+ Iron), or approved equal, Sierra Chemical Company (local distributor) Burlap Sales Company. New Orleans, Louisiana 70124. These chemicals are necessary to complete the establishment of a healthy dense turf. The following list is a list of the exact chemical names, and concentrations, and the possible vendors.

1. Only M.S.M.A. 6 Selections Post Emergent Weed Control to contain 6.0 pounds M.S.M.A. per gallon with surfactant. 3 Gallons per acre.

   Source:

   Van Water & Rogers
   5229-A Salmen Ave.
   Harahan, LA 70127

   Pennington Seed, Inc.
   1100 Edwards Ave.
   Harahan, LA 70127

   Chembro, Inc.
   P.O. Box 702
   Marrero, LA 70073

   Jefferson Feed& Garden
   4421 Jefferson Hwy.
   Jefferson, LA 70121

2. P.B.I. Trimec Broadleaf Herbicide. 3 Gallons per acre.

   Source:

   Van Water & Rogers
   5229-A Salmen Ave.
   Harahan, La 70127

   Pennington Seed, Inc.
   1100 Edwards Ave.
   Harahan, La 70127

   Chembro, Inc.
   P.O. Box 702
   Marrero, La 70073

   Jefferson Feed & Garden
   4421 Jefferson Hwy.
   Jefferson, La 70121

3. Turf Spray Dye (blue) Blazon or Regal Blue Turf colorant in one or five gallon containers. 1 Gallon per gallon of mixture.

   Source:

   Gulf Shore Turf Supply
   P. O. Box 7185
   Pensacola, Fl 32504

   Chembro, Inc.
   P. O. Box 702
   Marrero, La 70073

   Van Water & Rogers
   5229-A Salmen Ave.
   Harahan, La 70127

F. Additional Earth Fill: If required for proper seed or sod bed preparation and finish grading operations shall be top soil, clean and free from clay, roots, muck or other objectionable material. See paragraph F. for description of Top Soil.

G. Soil Mixture: Shall be fertile, friable, natural surface soil obtained from a well-drained area and free of all stones, shells, brush, weeds, shale, stumps, roots and other organic litter. The soil shall have at least six (6%) percent organic matter and an acidity range between pH 5.0 and 7.0 inclusive, and not more than 20% clay.

H. Water: Free of matter harmful to plant growth.

PART 3: EXECUTION

3.1 Methods

A. General:

1. The Contractor shall, prior to seeding or sodding operations, repair all ruts, depressions, eroded areas, etc., to the satisfaction of the Owner's Representative.
2. Grade changes within the dripline of trees shall not exceed two inches.

B. Bed Preparation:

1. Any area, within areas to be seeded where existing areas of weeds remain, shall be mowed with blades set to a depth of 1" to 1-1/2."
2. Fertilizer shall be distributed evenly, by mechanical spreader over all areas to be seeded. The rate of application shall be twenty (20) pounds per 1,000 square feet. Fertilizer shall be applied not more than one week prior to seeding. Fertilizer to be uniformly distributed in the top 2" to 4" inches of seed bed, or sodded area.

C. Finish Grading

1. Immediately prior to seeding or sodding the bed shall be prepared by breaking, disking, harrowing, blading, dragging or other approved methods. The soil shall be thoroughly pulverized to a minimum depth of approximately four (4") inches and smoothed by means of raking or other approved methods. Each area shall then be rolled in two directions perpendicular to each other with a light roller then finely raked. Raking shall be done by hand adjacent to structures, walks, curbing, and trees.
2. The finished surface shall be smooth, finely textured, free of all sticks, debris, rubbish, etc. and shall conform to the lines and grades indicated on the drawings and/or as directed by the Landscape Architect. All humps, depressions or other irregularities shall be corrected prior to seeding.

D. Seeding

1. On the same day that the finish grading operations are performed (with no rain between operations) and after approved by the Owner's Representative of the seed bed, the grass seed shall be applied at the rate of ten (10) pounds each of the specified seed types per 1,000 square feet of seed bed by means of an approved mechanical seed spreader which will provide a depth of 1/8" to 1/4".
2. Seeding shall be done in two (2) directions perpendicular to each other, using half of the specified amount in each application.
3. Immediately after seeding, roll seeded areas with a hand roller weighing not less than 150 pounds nor more than 200 pounds. Care should be exercised to prevent foot prints or other disturbances to the finished surface.

E. Sodding

1. Prior to sodding, the finished surface shall be free of all sticks, debris and rubbish and shall conform to the lines and grades shown on the drawings or as directed by

the Engineer.

2. Upon delivery, slab sod shall be transferred and laid properly to avoid gaps and over onto the surface of the soil, rolled or tamped and watered as directed.
3. Inspection of the work to determine its final acceptance will be made by the Owner's Representative. No grass will be accepted unless it is alive and healthy.
4. In the event that sod is laid in place after September 15 and before March 31, the Contractor is required to overseed the sod with the required Hybrid Fescue seed only as stated in Part 2 Products Section 2.01 Materials B, and all other related horticultural requirements.

3.2 Maintenance and Protection

A. Watering shall be required for all areas which have been seeded except when natural precipitation has provided the necessary moisture as determined by the Landscape Architect. Watering shall be done in a manner which will prevent erosion due to the application of excessive quantities, and the watering equipment shall be of a type that will prevent damage to the finished surface. A minimum amount of rainfall would be two (2) one (1) inch rains per week. If more water is needed, it is the responsibility of the Contractor to provide it.

B. The seeded areas shall be protected against traffic or other use by placing warning signs of a type approved by the Owner's Representative on the various areas where seeding or sodding has been completed or by other means, such as protective fencing, as may be required.

C. The Contractor shall produce dense, vigorous, well-established lawns and shall maintain lawn areas until final acceptance of the work by the Owner. Maintenance shall include, but not be limited to, preparation and reseeding or resodding of all bare areas, proper watering refilling of rain-washed gullies and rutted areas, refertilizing and mowing. At the time of the first cutting, mower blades shall be set 2½" high. At least three (3) mowings shall be completed before the work will be accepted. Any areas which fail to show a uniform stand of grass shall be reworked, and reseeded at the Contractor's expense with the same seed as originally used thereon, and such reseeding shall be replaced until all required areas are covered with a satisfactory stand of grass. A satisfactory stand of grass is defined as a cover of living grass in which gaps larger than 4" do not occur at the time of acceptance by the Owner.

D. The Contractor shall refertilize the lawn areas after eight (8) weeks and the first two grass cuttings have been made, or as otherwise directed by the Owner's Representative.

3.2 Inspection and Guarantees

A. Final Inspection

1. Inspection of work to determine its final acceptance will be made by the Owner's Representative. No plant material, turf included, will be accepted unless they are alive and healthy and all related work conforms to the drawings and specifications, at the conclusion of the one (1) year guarantee period.
2. Should any portion of the work be unacceptable, Contractor shall make all work acceptable and request a reinspection by Owner within five (5) working days.
3. The Contractor will be notified by letter of acceptance within five (5) days after reinspection should the latter be necessary.
4.

END OF SECTION

SECTION 15131

HYDROPNEUMATIC PUMP TANK

PART 1: GENERAL

1.1 SCOPE: Provide all labor, tools, material, equipment, and incidentals required to provide a 1468 gallon horizontal hydro pneumatic pump tank and single air compressor system. The vessel shall be manufactured by Dixie Tank Company or approved equal and include all of the specified openings. All equipment supplied shall meet or exceed the following specifications.

PART 2: PRODUCTS

2.1 HYDROPNEUMATIC PUMP TANK: Tank shall be 1,468 gallon horizontal hydropneumatic pump tank as manufactured by Dixie Tank Company, Model #1468/60" HPT-100WP-E-ASME or approved equivalent.

2.2 AIR COMPRESSOR: The tank mounted air compressor shall be as manufactured by Air Rite, Model 610 or approved equivalent.

PART 3: EXECUTION

3.1 WORKMANSHIP AND MATERIALS: All materials furnished shall be new and suitable for the conditions of service to which they will be subject and equal to the best of their respective classes. Grade and quality of materials shall meet the applicable cited specifications and standards of the ASME Code. Workmanship shall be of the highest quality and shall be carried out by competent and experienced workmen. A one (1) year warranty shall be given on all equipment and workmanship once equipment is accepted.

3.2 EXPERIENCE QUALIFICATIONS: All equipment furnished shall be made by a manufacturer regularly engaged in such work, which has furnished similar equipment and has said equipment in successful and continuous operation. Data on service history and operation of submitted equipment shall be made available, if requested, for use in determining that the equipment offered meets the intent of this contract by the successful bidder.

3.3 SHOP DRAWINGS: Detailed dimensioned shop drawings conforming to the requirements these specifications shall be submitted and approved prior to fabrication.

3.4 CONSTRUCTION: The vessel shall be designed and constructed from carbon steel in accordance with the latest edition of the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1 for a working pressure of 100 psig. The vessel shall be stamped and certified as required by the ASME Code and a copy of the Data Report shall be sent to the owner, upon request. All structural and plate components shall be connected by welding in compliance with American Society of Mechanical Engineers (ASME), and American Welding Society (AWS) specifications. The vessel shall have a capacity of 1468 gallons and openings as on the drawings. After fabrication the vessel is to be hydrostatically tested for leaks at 1.3 times the designed working pressure.

3.5 PAINTING: After fabrication and testing the interior surface shall be blasted to SSPC-SP10 or near white surface prior to lining. The interior shall receive a minimum of two (2) coats of NSF approved Tnemec Series N140F epoxy (7-13mdft). The exterior shall be

blasted to an SSPC-SP6 or commercial blast and shop primed only. Final top coat to be field applied by others.

END OF SECTION

SECTION S001

WSB TREATMENT SYSTEM FOR THE 911 CALL CENTER (1,300 GPD)

1.1 GENERAL

The biological treatment plant will be sized to treat the equalized daily design flow of 1,300 gpd as specified. The design is based on a BOD5 concentration of 306 mg/L which gives a design loading of 3.3 lb BOD5/d. Effluent specifications are 5 mg/L CBOD5, 5 mg/L TSS, and 2 mg/L total ammonia nitrogen on a monthly average basis. Peak hourly design flow with equalization is assumed to be the maximum daily flow of 83.3 gal/h (1.39 gpm average).The WSB® clean process consists of a seven stage process as follows:

A. Flow Equalization: Wastewater will travel from the collection system and enter a flow equalization tank complete with pumps that will dose the wastewater at the daily design flow rate (continuously or metered in equal increments on15 minute minimum cycles) over a 24 hour period into the sludge storage tank. The recommended equalization sizing is minimum 520 gal based on expected influent flow profile (peak and average conditions).

B. Sludge Storage: Wastewater is pumped from the flow equalization tank to the sludge storage tank. The sludge storage stage allows coarse particles to settle and be stored here along with return sludge from the final clarifier.

   Sludge storage design is based on a manufacturer recommended sizing of approximately 200 gal/lb BOD5/d to achieve > 100 days sludge storage; therefore, the minimum requirement = 200 gal/lb x 3.3 lb/d = 660 gal. The proposed configuration provides 1,000 gal. Based on manufacturer experience, the actual sludge storage is estimated to be approximately 6 months to 1 year. The total working volume of the sludge storage is also designed to provide > 2 hours of retention time at peak flow. The retention time is calculated by taking the volume for sludge storage and dividing it by the maximum hourly design flow inclusive of recirculation (HRT = 1,000 gal / 83.3 gal/h = 12 h). Sludge depth inspection will determine when pump outs are required and will be referenced in the owner's manual.

C. Primary Clarification: The primary clarification or pretreatment stage will provide some additional settling and conditioning of the wastewater. Primary clarification (pre-treatment) design is based on a requirement of 2 hours of retention time. The hydraulic retention time of primary clarification is calculated by taking the volume of the pre-treatment and dividing it by the maximum design flow inclusive of recirculation (350 gal / 83.3 gal/h = 4.2 h). The combination of sludge storage and primary settling volume is expected to result in raw influent BOD5 reduction of approximately 33% (1/3) into the biological stage (LBOD = 3.3 lb/d x 0.67 = 2.2 lb/d or 205 mg/L BOD5 concentration). From here the wastewater will flow by gravity into the biological stage

D. Bioreactor #1: Biological treatment will be accomplished through the WSB® clean system which uses a fluidized floating bed biofilm process. The biological stage will consist of two

reactor stages each containing specially designed plastic carrier media. Microorganisms settle on the media and consume the organic material in the wastewater.

Oxygen is needed for the treatment process and is supplied by a compressor and distributed in the biological stage by fine bubble diffusers.

The process differs from suspended growth processes such as extended aeration in that an overall biomass equivalent on the order of 6,000 - 10,000 mg/L is established. This is largely because the biomass is predominantly retained in the reactor on the media, resulting in very long sludge age and an efficient, high viability biomass. This allows significantly higher loading rates per unit tank volume and significant reductions in process vessel capacity. Experience with the WSB® systems has shown that BOD5 loadings of 19 – 32.5 lb/1000 ft3 of aerobic bioreactor volume (accounting for 33% BOD5 reduction in primary treatment) are optimal, but must be varied to account for minimum hydraulic retention of 3 hours. It also has the advantage that return of sludge to the process vessel to maintain the bacterial culture is not required so reducing the capital and operating costs of the process as well as the operational complexity of a return sludge system. Actual specific sludge production for the fluidized floating bed biofilm process is typically much less than conventional or extended air processes at 0.02 – 0.15 lb/lb COD removed vs. 0.15 – 0.38 lb/lb COD removed.

The biological process is accomplished in two stages, each using the proprietary fluidized floating bed biofilm process – also known as moving bed biofilm reactors (MBBR) developed by Kaldnes of Norway. The first stage is for carbon removal while the second stage is for nitrification and further carbon removal. BOD5 removal in each stage is expected to be on the order of 90 - 95%. The basis of this process is the addition to the reactor tanks of freefloating, neutral-buoyancy polyethylene media designed to maximize surface area for submerged biofilm growth, while allowing for flow-through and self-cleaning by the mixed liquor. The carrier media to be used is Kaldnes® K3 or equivalent having a specific surface area of 500 m2/m3 (152 ft2/ft3).

Based on the preconditioning of the wastewater, the BOD value will be reduced by one third (to 2.2 lb/d or 1,000 g/d) entering the first biological stage. The Kaldnes® K1 media can handle a loading rate of 4 to 6 g/m2*d; however, based on experience, we recommend using a loading rate not exceeding 2 g/m2*d. The fluidized biofilm process requires a filling degree of media between 30 and 60% with a typical target of approximately 40% filling degree in each bioreactor. Actual media volume is specified at 42.5 ft3 (6,460 ft2) or 1.2 m3 (600 m2), which results in a specific loading of 1.67 g/m2*d and a filling degree of 32.4% on the total reactor volume of 475 gal + 490 gal = 965 gal (3.7 m3). Total hydraulic retention in both bioreactors at peak flow inclusive of recirculation = 965 gal / 83.3 gal/h = 11.6 h. Additional safety factors can be accomplished through increased aeration times in the bioreactors or additional media should any problems arise from increased organic loading.

Side channel air compressors will be used to provide air for the bioreactors and should be protected from the elements in an enclosure. One air compressor is required for each bioreactor (minimum two total). Typical aeration time is < 12 hours/day. Maximum aeration rate is specified at 15.3 scfm for 14.9 hours/d. This aeration rate is intended to provide adequate mixing (rollover of the media), as well as maintain dissolved oxygen between 4 and 6 mg/L. The specified blowers are Hiblow model HP200 (0.5 HP, 120 VAC/1-phase), each rated at 8 scfm at 2.4 psi. Control of the blowers is set via control panel timer, recommended 9 min on, 6 min off schedule. Air distribution and mixing in the bioreactors shall be provided

by fine bubble diffusers. A screen is installed in each bioreactor to ensure media cannot transfer into other chambers.

E. Intermediate Clarifier: The first bioreactor stage will be followed by an intermediate clarifier tank having sloped wall hoppers. Fine particles will settle to the bottom of the hoppers and be returned backed into the sludge storage. A surface skimmer will be used in each clarifier tank to remove any floating sludge.

F. The intermediate clarifier will have a retention time of over 2.5 hours and a surface flow rate < 19.6 gal/ft2*h. The retention time is calculated by taking volume in the clarifier (minus volume of hopper) and dividing it by the hourly flow rate inclusive of recirculation (310 gal / 83.3 gal/h = 3.7 h). Surface overflow rate is calculated by taking the hourly flow rate and dividing by the surface area of the clarifier (83.3 gal/h / 16.5 ft2 = 5 gal/ft2*h). Settled sludge is returned to the sludge storage chamber using a solids pump installed at the bottom of each hopper in the clarifier. Sludge return rate is set based on operational experience at the site to maintain sludge depth less than approximately 12". Estimated settings are 7.5 gal/h or 0.27 min/h on time at 27 gpm for intermediate clarification as set on the control panel timer. The specified sludge return pump is a Goulds model LSP0311F rated for 27 gpm at 12' TDH. Floating sludge is returned to the sludge storage chamber using a floating sludge (skimmer) pump installed at the bottom of each hopper in the clarifier and having a skimming nozzle at the liquid surface. Estimated settings are 7.5 gal/h or 0.5 min/2 h on time at 30 gpm for intermediate clarification as set on the control panel timer. The specified skimmer pump is an Ebara model Optima 3MS1 rated for 30 gpm at 12' TDH.

G. Bioreactor #2: From the intermediate clarifier, the wastewater travels by gravity into the second bioreactor stage. The design parameters for the second bioreactor stage are defined above for both stages, with each stage being designed as equivalent, although often lower blower on time settings are used to optimize treatment.

H. Final Clarifier: The second biological stage is followed by a final clarifier tank having sloped wall hoppers. Fine particles will settle to the bottom of the hoppers and be returned backed into the sludge storage. A surface skimmer will be used in the clarifier tank to remove any floating sludge. From here, the treated wastewater is ready to be discharged to the environment following any other required processes (e.g., final disinfection, pumping, etc.).

The final clarifier will have a retention time of over 3 hours and a surface flow rate < 19.6 gal/ft2*h. The retention time is calculated by taking volume in the clarifier (minus volume of hopper) and dividing it by the hourly flow rate (320 gal / 83.3 gal/h = 3.8 h). Surface overflow rate is calculated by taking the hourly flow rate and dividing by the surface area of the clarifier (83.3 gal/h / 16.5 ft2 = 5.0 gal/ft2*h). Settled sludge is returned to the sludge storage chamber using a solids pump installed at the bottom of each hopper in the clarifier. Sludge return rate is set based on operational experience at the site to maintain sludge depth less than approximately 12". Estimated settings are 3.8 gal/h or 0.27 min/2 h on time at 27 gpm for intermediate clarification as set on the control panel timer. The specified sludge return pump is a Goulds model LSP0311F rated for 27 gpm at 12' TDH. Floating sludge is returned to the sludge storage chamber using a floating sludge (skimmer) pump installed at the bottom of each hopper in the clarifier and having a skimming nozzle at the liquid surface. Estimated settings are 1.9 gal/h or 0.5 min/4 h on time at 30 gpm for intermediate clarification as set on the control panel timer. The specified skimmer pump is an Ebara model Optima 3MS1 rated for 30 gpm at 12' TDH.

END OF SECTION

A. An airlift surface skimming system shall be installed in the settling zone of the clarification chamber(s). The airlift skimmer(s) shall be constructed of schedule forty galvanized pipe and fittings.

B. The skimmer inlet(s) shall be equipped with an adjustable cone. The inlet cone(s) shall be provided with attached flexible connector for installation and adjustment of the cone(s) on the airlift assembly. A removable galvanized clean-out plug shall be provided at the top of the skimmer airlift pipe where it joins the horizontal discharge line. The discharge line shall run on top of the plant and return back to the aeration chamber for final discharge. The skimmer air supply connected to the main air header of the treatment plant. Air adjustment/shut-off valves will be installed in the skimmer air manifold supply lines.

3.7 DISINFECTION – CHLORINE CONTACT CHAMBER:

A. Disinfection of treatment plant effluent shall be done by a Norweco Mode **LF2000 2-**Tube chlorinator and a chlorine contact chamber. The chlorine contact chamber will have the volume of **150** gallons with the retention time of 15 minutes at peak hourly flow. The chamber shall be constructed of the same specified concrete material as the main plant and shall have galvanized grated opening(s) on top for maintenance and operation.

PART 4: EQUIPMENT

4.1 MECHANICAL EQUIPMENT

A. Air required for the treatment process and operation of airlifts in the clarifier shall be provided by two ROOTS **22-URAI** blowers. The blowers shall be of the rotary positive displacement type and shall provide **30** CFM of free air at the rated operating pressure of **2.1** PSI. The blower units shall be provided with inlet air filter silencers, discharge flexible coupling connector to air header assembly. If more than one blower is provided, check calves shall be included in the discharge piping. Blower connection to the drive motor(s) shall be with conventional v-belts power transmission drive assembly.

B. Two: seventeen hundred fifty RPM **Choose Voltage** volt **Choose Phase** phase, 60 hertz **1** horsepower, shielded, drip-proof electric motors shall be used to drive the blowers. When operation at the rated horsepower the motors shall reach maximum speed that shall exceed ninety-seven percent of the reference synchronous speed. The motors for the facility shall be designed and rated for continuous duty applications and shall not overload or exceed motor nameplate ratings when operating as outlined for this facility.

4.2 WELDED ALUMINUM EQUIPMENT HOUSING

A. Frame shall be 2" X 2" X 1/2" aluminum with brackets in front for electrical panel. Mounting plate shall be 1/4" reinforced aluminum with rubber mounts, to absorb shock and noise. Adjustment slide base for ease of motor alignment and belt tension adjustment shall be furnished. Cabinet shall be eighty thousands gauge aluminum, mounted to frame with heavy duty aluminum piano hinge. (3" Width - 1/8" thick with 3/8" Pin)

4.3 ELECTRICAL CONTROLS

A. Electrical controls shall be mounted in a separate weatherproof and dust proof PVC cabinet, attached to the front of the motor and blower unit housing. The cabinet shall be equipped with a locking device to restrict access to the controls to authorized persons. Controls shall include: **Choose Voltage** volt, **Choose Phase** phase motor control center with across-the-line manual type motor starter, motor circuit breaker and thermal overload protection. The motor control center shall be factory-wired to the motor with a resilient power cable and tested under actual operating conditions prior to shipment to the jobsite.

4.4 TIME CLOCK

A. Electrical controls shall include a fifteen minute multiple, twenty-four hour time clock to permit cyclic automatic operation of the treatment facility throughout the day. A three-position "hand-off-auto" selector switch shall be installed to allow the treatment plant aeration unit to operate either on a continuous run basis or according to the cycle established on the time clock.

4.5 GALVANIZED METAL GRATING

A. Tank openings shall be protected with heavy duty 14 gauge galvanized metal grating bolted in position. Individual bolted bar assemblies shall be provided for each tank opening. The galvanized safety grating shall also be used as a leaf screen to prevent entry of leaves and discarded debris into the tankage. Therefore maximum width of individual openings within the grating proper shall not exceed one-half of an inch.

PART 5: WARRANTY

A. The manufacture shall warrant the equipment being supplied to the owner against defects in workmanship and materials for a period of one year under normal use and service.

B. The warranty shall not cover any item which has been subjected to external damage, disassembled and/or repaired by unauthorized persons, flooded or otherwise mistreated. The manufacturer shall not be held liable for any consequential damages or contingent liabilities which are directly or indirectly a result of any failures in materials or equipment, or from delivery or installation delays. Items normally consumed in service such as grease, oil, v-belts, fuses, filters, seals, etc., shall not be warranted.

END OF SECTION

SECTION S-002

ENVIRONMENTAL PROTECTION

PART 1: DESCRIPTION

The work required by this Section shall consist of constructing and maintaining temporary erosion control features that satisfy the terms and conditions of the Storm Water Pollution Prevention Plan (SWPPP) and the National Pollution Discharge Elimination System (NPDES) General Permit. The SWPPP shall be comprised of Section 204 of the Louisiana Standard Specifications for Roads and Bridges, 2006 Edition, and latest revisions, or as amended herein. In addition, the Contractor shall obtain and maintain a Louisiana Department of Environmental Quality Storm Water General Permit for Construction Activities (Permit No. LAR 100000) for the life of the project.

PART 2: GENERAL

The Contractor, by signing this contract, certifies under penalty of law that he understands and will abide by the terms and conditions of the Storm Water Pollution Prevention Plan (SWPPP) and the National Pollution Discharge Elimination System (NPDES) General Permit that required the discharges from entering waters of the United States in accordance with the Environmental Protection Agency (EPA) regulations for storm water discharges with respect 33 U.S.C. 1342 (Sections 402(p) and 405 of Public Law 100-4).

Temporary erosion control will ensure economical, effective and continuous control of erosion and water pollution throughout the life of the contract. The Contractor shall prevent the transmission of soil particles and pollutants into streams, canals, lakes, reservoirs or other waterways. In addition, the Contractor shall note that work may be simultaneously in progress on adjacent sites of other components of the project site. The Contractor shall be responsible for coordinating his SWPPP with the SWPPP for adjacent sites.

The Contractor will submit an erosion control plan to the Owner before beginning clearing or earthwork operations. The plan shall indicate the items to be used and the coordination of this work with the scheduling of clearing and earthwork.

PART 3: PERMIT

The Contractor will be responsible for devising a satisfactory Storm Water Pollution Prevention Plan for the project prior to applying for the Storm Water General Permit for Construction Activities (Permit No. LAR 100000) from the Louisiana Department of Environmental Quality. The LPDES NOTICE OF INTENT (NOI) TO DISCHARGE STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITY application must be completed by the Contractor, approved by the Owner and submitted by the Contractor at least two (2) days prior to the initiation of construction to:

STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
Permits Division
Post Office Box 82135
Baton Rouge, Louisiana 70884-2135

All implementation duties to comply with the SWPPP and maintain the Storm Water General Permit will be the responsibility of the Contractor.

The Contractor will be required to submit a Notice of Termination (NOT) to the Louisiana Department of Environmental Quality upon acceptance of the project by the Owner.

PART 4: MATERIALS

The Contractor shall provide all labor, equipment and materials necessary to complete all work associated with this item.

END OF SECTION

SECTION S-003

Porous Flexible Paving

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included
1. Provide and install sub-base material as shown on drawings or per recommended sub-base alternatives as provided from additional manufacturer's information. See 2.2 Materials

2. Provide all TRUEGRID Permeable Paver products and installation per the manufacturer's instructions provided on this specification sheet and other available specification material.

3. Provide and install specified fill material for TRUEGRID gravel fill options and provide and install specified fill material for TRUEGRID grass fill options.

B. Related Work
1. Subgrade preparation under Section 31 20 00 Earth Moving.

2. Subsurface drainage materials – Section 33 46 00 Sub Drainage, when needed.

3. Irrigation installation – Section 32 80 00 Irrigation, when needed.

1.2 QUALITY ASSURANCE

A. Follow Section 01 33 00 Submittal Procedures requirements.

B. Installation performed to provided specification or accepted alternative specification

C. Certificates: Manufacturer signed certificate stating the product is MADE IN THE USA.

D. Substitutions: No material will be considered as an equivalent to TRUEGRID unless it meets all areas of available specifications.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Protect TRUEGRID Permeable Paver units from damage during delivery and unloading.

1.4 PROJECT CONDITIONS

A. Review installation and coordinate TRUEGRID Permeable Paver work with other work affected.

B. All hard surface paving adjacent to TRUEGRID Permeable Paver areas, including concrete walks and asphalt paving should be completed prior to installation of TRUEGRID Permeable Pavers.

C. For TRUEGRID's grass fill application, install turf when ambient air temperatures is at least 55 degrees.

D. In cold weather, do not use on frozen materials or materials mixed or coated with ice or frost, and do not build on a frozen base or wet, saturated or muddy subgrade

E. Protect partially completed paving against damage from other construction traffic when work is in progress.

1.5 WARRANTY

A. TRUEGRID Permeable Paver warrants to its purchasers that all products furnished will be free from defects in material and/or workmanship.

B. This warranty shall extend for a period of (5) years following the date of shipment.

C. Providing a written claim is presented TRUEGRID within the warranty period and after inspection by TRUEGRID showing the materials have failed under the warranty, all defective materials shall be refurnished under the warrant at no charge, excluding re-installation costs.

D. Our liability under this warranty is limited to the refurnishing of materials and does not include any responsibility for incidental consequential, or other damages of any nature.

PART 2 – PRODUCTS

2.1 AVAILABILITY

A. Acceptable Manufacturer: TRUEGRID Pavers, 2500 Summer St., Suite 3225, Houston, TX 77007 Phone: 1-713-443-8880. Email: tneville@TrueGridPaver.com. Website: www.truegridpaver.com

2.2 MATERIALS

A. Base Course: TRUEGRID was developed for multiple acceptable base materials. Locally sourced angular stone/clean for base material. Crushed granite, sandy gravel material, crushed concrete, limerock, and crushed lava are acceptable materials. Variations in permeability of aggregates should be considered.

1. Conforming to the following sieve analysis and requirements:

% Passing	**Sieve Size**
100	¾“ - 1”
85	3/8”
60	#4
30	#40
<3	#200

2. Sources of the material may include “pit run” or “crusher run”. Crusher run material will typically require sand to be added (20 to 30 percent by volume) for long term high porosity. Should local sources not be available an alternative mixture can be created by mixing 2/3 crushed stone (.75 dia) with 1/3 sand as available.

3. Geo grid or Geo fabric may be required for soil stabilization between sub grade and base material. Consult with site engineer or TRUEGRID for specifics or recommendation.

B. TRUEGRID Permeable Pavers: Injection molded, highly durable, plastic grid structure with unique design components for high load capacity, high traffic applications. Produced from 100% Post Consumer Plastic. 1.8” cell height. Pre-assembled in 4’ x 4’ sheets for quick installation. Sheets can be reconfigured if needed. (See TRUEGRID Specifications Sheet for more specifications and information.)

C. *Gravel Fill:* Obtain clean, washed angular rock to fill the 1.8” tall TRUEGRID cells and spaces between. TRUEGRID can be filled to top of cells and exposed or overfilled to hide cells. Maximum rock should be 3/4” in diameter and below.

1. TRUEGRID’s design does not require anchors on level ground or slopes up to 15 degrees. TRUEGRID is designed for slopes above 15 degrees. However, as a precaution, anchors/staking may

need to be considered per each sloped install above 8 degrees.

D. *Grass Fill:* A sandy loam or loam soil should be used to fill the empty grass paver cells. The selection of sandy loam or loam soil should be made based upon the soil requirements of the turf variety selected for the project. Other soils if compatible with type of seed or sod are acceptable.

PART 3 – EXECUTION

3.1 LIMITED WARRANTY

A. Examine sub-grade course installed conditions. Do not start TRUEGRID Permeable Paver installation until unsatisfactory conditions are corrected. Check for improperly compacted trenches, debris, and improper gradients.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact Quality Control Manager for resolution.

3.2 PREPARATION

A. Place base course material over prepared sub base to grades shown on plans or from TRUEGRID's recommended depths per application type, in lifts not to exceed 6", compacting each lift separately to 95% Modified Proctor for non-open grade material. Open grade base material to be leveled and compacted to settle and lock in angular stone. Leave minimum 1.8" for TRUEGRID Permeable Paver unit for final elevation.

3.3 INSTALLATION

A. Install TRUEGRID Permeable Paver units by placing cells face up. Sheets come preassembled in 4'x4' sheets and connect with friction fit interlocking connectors. No tooling required to connect or disconnect TRUEGRID units. (9) Individual 16"x16" pieces can be disconnected from each 4'x4' sheet and reconfigured as needed. Units can be cut around curves and organic shapes on the job site with any electrical handsaw. Maintain 1" clearance to any pre-installed object or surface structure. Top of cells shall be between .25" to .5" below the surface of adjacent hard-surface pavements.

B. Rock or soil fill aggregate can be driven directly on pre-filled TRUEGRID to be dumped and spread

3.4 INSTALLATION OF GRAVEL FILL: TRUEGRID gravel fill applications only

A. Install Gravel into TRUEGRID cavities by back dumping directly from dump truck or from buckets mounted to tractors. Hand shoveling fill gravel into the cells is also acceptable for smaller jobs. Direct exit the site by driving forward. While TRUEGRID Permeable Pavers can handle high load capacities while empty, avoid sharp turns over unfilled rings.
The gravel fill can then be spread from the pile using steer loaders, power brooms, blades, flat bottomed shovels, and/or wide "asphalt rakes" to fill the cells. The gravel should then be compacted when the cells are at capacity by using a roller for larger areas or a vibrating plate for smaller areas. If fully covering TRUEGRID cells, typical coverage is .25" - .5" above cells.

3.5 INSTALLATION OF GRASS FILL: TRUEGRID grass fill applications only – See Section 32 92 19 Seeding and 32 91 13 Soil Preparation. Choose either seed or sod.

A. Hydroseeding/hydro-mulching – A combination of water, seed and fertilizer are homogeneously mixed in a truck mounted tank. The seed mixture is sprayed onto the site at rates shown in specification section 32 92 19.16 Hydraulic Seeding. Coverage should be uniform and complete. Following germination of the seed, areas lacking germination larger than 8"x 8" must be reseeded immediately. Seeded areas must be fertilized and kept moist during development of the turf.

B. Sod – Use 0.5” thick (soil thickness) rolled sod from a reputable grower. Species should be wear resistant, free from disease, and in excellent condition.
C.

3.6 PROTECTION

A. Gravel fill: Avoid sharp turns or “jack knifes” in trailered vehicles when cells are empty. Damage due to buckling can occur.

B. Grass Fill / Seeded: Seeded areas must be protected from any traffic, other than emergency vehicles, for a period of 4 – 6 weeks, or until the grass is mature to handle traffic. Avoid sharp turns or “jack knifes” in trailered vehicles when cells are empty. Damage due to buckling can occur.

C. Grass Fill / Sodded: Seeded areas must be protected from any traffic, other than emergency vehicles, for a period of 3 – 4 weeks, or until root system has been established.

3.7 FIELD QUALITY CONTROL

A. Any damaged sections of TRUEGRID Permeable Pavers during install can be removed and replaced with no evidence of replacement apparent.

B. Remove all excess materials, debris, and equipment from site upon completion of install.

3.8 MAINTENANCE

A. Grass Fill: Normal turf care procedures should be followed including as specified in Section 32 92 00 Manufacturers of Turfs and Grasses.

B. Gravel Fill: If the install is one that is initially a cell covered install, raking gravel back over exposed cell tops may be necessary if over fill aggregate migrates.

C. When snow removal is required, keep edged plow blade a minimum of 1” above the TRUEGRID surface to avoid damage to the TRUEGRID Permeable Paver Surface.

END OF SECTION

SECTION 03 05 05

FLY ASH

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Fly ash admixture for incorporation into concrete mixes specified in the Following specification sections and Drawings:

1. Section 03 30 00 – Cast-In Place Concrete.

2. Section 04 05 15 – Mortar and Masonry Grout.

3. Section 04 22 00 – Concrete Masonry Units.

4. Section 32 16 00 - Concrete Curbs Gutters, Sidewalks and Driveways.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General

1. Recycled Content:

a. Provide recycled materials in accordance with Recycled Content provisions of Section 01 60 00.

b. Concrete Foundations: Minimum 5% pre-consumer recycled content using high fly ash cementitious materials replacement (9 - 10% fly ash)

c. Other Concrete: Minimum 4% pre-consumer recycled content using high fly ash cementitious materials replacement (8% fly ash)

2. Regional Materials:

a. Provide local/regional materials in accordance with Local/Regional Materials provisions of Section 01 60 00.

b. Concrete and Hardscape: Minimum 95% regional content

B. Coal Fly Ash and Raw or Calcined Natural Pozzolan

1. Sampled and tested in accordance with the current edition of ASTM C 311, Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete.

2. Conform to the requirements of the current edition of ASTM C 618, Standard Specification of Coal Fly Ash and Raw and Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete, as follows:

    a. Meet the requirements of ASTM C 618, Table 1 Chemical Requirements and Table 1A Supplementary Optional Chemical Requirements.

    b. Meet the requirements of ASTM C 618, Table 2 Physical Requirements and Table 2A Supplementary Optional Physical Requirements in the following areas:

        1) Effectiveness in Controlling Alkali-Silica Reaction.

        2) Effectiveness in Contributing to Sulfate Resistance, Procedure A.

        3) Uniformity Requirements when air-entraining concrete is specified:

    c. Air-entrained concrete is not recommended in locations at elevations below 3000 ft. above sea level.

3. Source Quality Control:

    a. Fly ash shall come from sources with an established quality control program to demonstrate that the fly ash consistently conforms to ASTM C 618 specification and uniformity requirements. The quality history shall include a minimum of 40 test results representing a minimum of the previous 6 months production of fly ash.

    b. Per the current edition of ACI 232, Use of Fly Ash in Concrete, section 5.6, the fly ash quality history shall be available that demonstrates at least monthly ASTM C 618 certification results from a Cement and Concrete Reference Laboratory (CCRL) accredited laboratory. A minimum of 20 reports representing at least 6 months of fly ash production is required.

2.2 MIXES

A. Provide fly ash admixture for incorporation into concrete mixes as specified in the following specification sections and Drawings:

1. Section 03 30 00 – Cast-In Place Concrete.

2. Section 04 05 15 – Mortar and Masonry Grout.

3. Section 04 22 00 – Concrete Masonry Units.

4. Section 32 16 00 - Concrete Curbs Gutters, Sidewalks and Driveways.

B. Proportioning:

1. Per ACI 232, Use of Fly Ash in Concrete, section 4.1, the most effective method for proper proportioning of concrete for a specific application is by use of a trial batch and testing program per ACI 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete. When necessary, a series of mixtures shall be prepared and tested to determine the proper proportions for the specific project requirements.

2. Fly ash shall not be proportioned at less than percentage specified above under the paragraph “Recycled Content”.

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Formwork for cast-in-place concrete, including, but not limited to:
   1. Shoring, Bracing and Anchorage, including openings for other Work
   2. Form Accessories
   3. Form Stripping.

1.2 DESIGN REQUIREMENTS

A. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.3 SUBMITTALS

A. Shop Drawings: Submit Drawings showing dimensions, materials, bracing, tie-hole layouts for exposed tie holes, and arrangement of joints and reveals for concrete exposed to view in the final work.

B. Product Data: Provide data on accessory materials and installation requirements.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 347R - Guide to Formwork for Concrete.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site to prevent deterioration and damage.

B. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.6 COORDINATION

A. Coordinate this Section with other Sections of Work which require attachment of components to formwork.

B. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

PART 2 - PRODUCTS

2.1 MATERIALS – GENERAL

A. Provide recycled materials in accordance with Recycled Content provisions of Section 01 60 00.

B. Provide local/regional materials in accordance with Local/Regional Materials provisions of Section 01 60 00.

2.2 FORM MATERIALS

A. General: Wood forms shall be limited to three uses.

B. Plywood: Douglas Fir Species; APA grade-trademarked; BB Plyform, Class 1, Exterior Grade as per PS1.

C. Lumber: Spruce, Pine or Fir species; construction grade; with grade stamp clearly visible.

D. Fiber: Seamless Sonotube as manufactured by Sonoco Products Co., or as approved, for round columns.

2.3 FORMWORK ACCESSORIES

A. Form Ties: Removable or snap-off type, free of defects that could leave holes larger than one inch in concrete surface. Fiberglass grip form ties shall not be allowed.

B. Form Release Agent: Colorless, which will not stain concrete, or impair natural bonding or color characteristics of coating intended for use on concrete.
   1. General Requirements:
      a. Vegetable-based, do not use petroleum-based agents. Paraffin and waxes shall not be used when a concrete finish is required.
      b. 100 percent biodegradable zero VOC.
   2. Acceptable Products and Manufacturers:
      a. Enviroform as manufactured by Conspec® Marketing and Mfg. Co., Inc., Kansas City, KS (800) 348-7351, www.conspecmkt.com
      b. Bio-Form as manufactured by Leahy-Wolf Company, Franklin Park, IL (888) 873-5327
      c. Greenplus Form Release Agent ES as manufactured by M.J. Doud, Inc., Ennis, MT (888) 682-6040.
      d. Soy Form Away as manufactured by Natural Soy, LLC, Watkins, IA (888) 655-0039, www.soysolv.com.

C. Corners: Chamfered wood strip type or vinyl bead; one x one inch size; maximum possible lengths.

D. Flashing Reglets: Galvanized steel 22 gauge thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

E. 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

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings.

3.2 EARTH FORMS

A. Hand trim sides and bottom of earth forms. Remove loose soil in pour cavity prior to placing concrete.

3.3 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.

D. Consider the joint placement on formwork that will result in exposed concrete. Joint placement on formwork in exposed concrete shall be in accordance with Architect's directions. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval from Architect before framing openings in structural members which are not indicated on Drawings.

F. Formwork for concrete elements installed over or adjacent to waterproofing membranes shall not be anchored through membrane. Use sandbags or other devices to hold formwork in place over or adjacent to waterproofing membranes.

3.4 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 applied coverings which are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in or passing through concrete work.

B. Locate and set in place items which will be cast directly into concrete.

C. Coordinate Work of other Sections in forming and placing openings, slots, reglets, recesses, chases, sleeves, bolts, anchors, and other inserts.

D. Install accessories in accordance with Manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed during concrete placement.

E. 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.

F. 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.

3.6 FORM CLEANING

A. Clean and remove foreign matter within forms as erection proceeds.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

3.7 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

3.8 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that Work is in accordance with formwork design, and that support, fastenings, wedges, ties and items are secure.

B. Do not reuse wood formwork more than 3 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.9 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads. Forms shall be removed in accordance with the requirements of the General Structural Notes.

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 in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

D. Forms for vertical elements such as walls, columns, and pilasters shall not be removed or disturbed for at least 7 days from the date of last pouring.

E. Forms for slabs, girders, beams and the like and retaining walls shall not be removed or disturbed for at least 14 days from date of last pouring. It may be required that such forms be left in place longer than the above specified period. The length of time they shall remain in place will depend on the system of forming and shoring, and the length of time shall in accordance with the requirements of the General Structural Notes.

F. Formwork for stem walls and other parts not supporting the weight of the concrete may be removed as soon as the concrete has hardened sufficiently to resist damage.

G. Cure exposed concrete in accordance with 03 30 00 whenever the formwork is removed during the curing period.

3.10 REMOVAL STRENGTH

A. When formwork removal is based on the concrete reaching its specified 28 day strength (or a specified percentage thereof), the concrete shall be presumed to have strength when either of the following conditions has been met:
   1. When test cylinders, field cured under the most unfavorable conditions prevailing for any portion of the concrete represented, have reached the required strength.
   2. When the concrete has been cured for the same length of time as the age, at test, of laboratory cured cylinders which reach the required strength. The length of time concrete has been cured in the field shall be determined by the cumulative number of days or fractions thereof, not necessarily consecutive, during which the temperature of the air in contact with the concrete is above 50 degrees F. and the concrete has been damp or thoroughly sealed from evaporation and loss of moisture.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Comply with ACI-301, Chapter 5, except where more exacting requirements are specified.

B. Comply with requirements in AWS-D12.1, except where more exacting requirements are specified in the Contract Documents.

1.2 SUBMITTALS

A. Shop Drawings: Prepare shop drawings in accordance with Chapter 6, ACI 301 & Chapter 3, Part B, ACI SP66 and as follows
   1. Submit Drawings showing bending and placing of reinforcing.
   2. Include diagrammatic elevations of walls at a scale sufficiently large to show clearly the position and erection marks of marginal bars and their dowels and splices and bar arrangement for more than one layer of reinforcing steel in concrete sections.

B. Certificates: Submit certified mill test reports for review prior to fabrication.

1.3 DELIVERY, STORAGE AND HANDLING

A. Shipping: Deliver reinforcement to the Project site bundled, tagged and marked to facilitate sorting and placing. Tags shall indicate bar sizes, lengths, grade and other information corresponding to markings shown on placement diagrams.

B. Storage and Protection: Store reinforcement at the site off the ground and in a manner to prevent damage to the materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reinforcing Steel: New billet-steel, deformed bars conforming to ASTM A615, Grade 60, with a minimum yield of 60,000 psi for all reinforcing except:
   1. No. 2 bars: ASTM A615, Grade 40, with a minimum yield of 40,000 psi.
   2. Welded Wire Fabric: ASTM A185 using bright steel wire meeting the requirements of ASTM A82. Gauges and dimensions as noted on the Drawings. Provide flat sheets.
   3. Welded bars: ASTM A706.
   4. Welded anchors: ASTM A-108, Grade 60. See AWS specifications for welding without preheat.
   5. All reinforcing bars shall be deformed except #2 bars and wire mesh.

B. Welded Wire Fabric: ASTM A185 using bright steel wire meeting the requirements of ASTM A82. Gauges and dimensions as noted on the Structural Drawings.

C. Chairs: Galvanized steel or plastic tipped.

D. Tie Wire: ASTM A82, 16 gauge or heavier, black annealed.

E. Welding Rods: E-70 Series for A615 Grade 40 (ASTM A615M, Grade 300) reinforcing, and E-90 Series for A706 reinforcing; low hydrogen conforming to AWS A-5.1.

2.2 FABRICATION

A. Shop fabricate bars as far as is practical. Bend bars cold. Make bends for stirrups and tires around pins having diameters at least 2 times the thickness of the bars; for other bars 1 inch diameter and smaller, 6 times the thickness; for larger bars 8 times the thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Determine weldability of reinforcing steel by laboratory chemical analysis of steel. Only steel conforming to chemical requirements specified in AWS D12.1 may be welded.

3.2 PLACING REINFORCEMENT

A. General:
1. Place in accordance with AC1318 and as shown
2. Accurately place reinforcement and securely tie at intersections with 16 gauge black annealed wire.
3. Maintain reinforcing in proper position by chairs, bar supports or other approved devices.
4. Bars in footings shall be supported on precast concrete blocks.
5. The bending or field cutting of bars around openings or sleeves will not be permitted.
6. Reinforcing steel in beams and slabs shall not be placed until after concrete in walls and columns has been poured.

B. Bars shall lap in accordance with General Structural Notes.

C. Concrete protection of reinforcing shall be in accordance with General Structural Notes.

D. Clear distance between bars shall be not less than 1-1/2 times the maximum size of coarse aggregate unless noted otherwise.

E. Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter or enough to exceed code tolerances, resulting arrangements of bars shall be subjected to review of Architect.

F. Bars with kinks or bends not indicated shall not be used. Reinforcement shall not be bent or be straightened in a manner that will weaken the material, or be bent after being partially embedded in hardened concrete.

G. Wire mesh in slabs:
   1. Lap welded wire fabric at least 1-1/2 meshes plus end extension of wires but not less than 12 inches in structural slabs.
   2. Lap fabrics at least 1/2 mesh plus end extension of wires but not less than 6 inches in slabs on ground.
   3. Extend mesh across supporting beams and walls.

3.3 CLEANING

A. During the course of the Work and on completion, remove excess materials, equipment and debris and dispose of off premises. Leave Work in clean condition.

END OF SECTION

SECTION 03 30 00.13

UNDER-SLAB VAPOR BARRIER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Vapor Barrier, seam tape, pipe boots, and detail strip for installation under concrete slabs.

B. Related Sections: Section 03 30 00 - Cast-in-Place Concrete.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)
   1. ASTM E 1745-97 (2004) Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs
   2. ASTM E 154-88 (2005) Standard Test Methods for Water Vapor Retarders Used in Contact with Earth under Concrete Slabs
   3. ASTM E 96-95 Standard Test Methods for Water Vapor Transmission of Materials
   4. ASTM E 1643-98 (2005) Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

B. American Concrete Institute (ACI): ACI 302.2R-06 Vapor Barrier Component (plastic membrane) is not less than 10 mils thick

1.3 SUBMITTALS

A. Quality Control / Assurance:
   1. Independent laboratory test results from an accredited lab showing compliance with ASTM & ACI Standards. (All testing to be done from production size rolls, not from manufacturer's sample material).
   2. Manufacturer's samples, literature.
   3. Manufacturer's installation instructions for placement, seaming and pipe boot installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Vapor Barrier Membrane: Conform to the following requirements.
   1. Manufactured from prime virgin resins.
   2. Water Vapor Barrier (ASTM E-1745): Meets or exceeds Class A.
   3. Permeance Rating:
      a. New material (ASTM E-96 or ASTM F-1249): Less than 0.01 perms (gr/ft2/hr/in-Hg).
      b. After mandatory conditioning (ASTM E 154 Sections 8, 11, 12, 13): Less than 0.01 perms (gr/ft2/hr/in-Hg).
   4. Minimum thickness (ACI 302.2R-06): 15 mils.

5. Puncture Resistance (ASTM D-1709): Minimum 2200 grams.
6. Tensile Strength (ASTM D-882): Minimum 45.0 lbf/in.
7. Basis of Design: Stego Wrap 15- mil Vapor Barrier by Stego Industries LLC
8. Acceptable alternatives:
    a. W.R. Meadows Pre-moulded Membrane with Plasmatic Core.
    b. VaporGuard by Reef Industries, Inc.
    c. Zero-Perm by Alumiseal.

2.2 ACCESSORIES

A. Seam Tape:
    1. High Density Polyethylene Tape with pressure sensitive adhesive.
    2. Water Vapor Transition Rate (ASTM E96): 0.3 perms or lower.
    3. Minimum width 4 inches.
    4. Acceptable product: Stego Tape by Stego Industries LLC

B. Vapor Proofing Mastic
    1. Water Vapor Transmission Rate (ASTM E 96): 0.3 perms or lower
    2. Acceptable product: Stego Mastic by Stego Industries LLC

C. Pipe Boots: Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure that subsoil is approved by architect.

B. Level and tamp or roll aggregate, sand or tamped earth base.

3.2 INSTALLATION

A. Vapor Barrier: Place vapor barrier over subbase immediately prior to placing of floor slab. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643–98. Vapor barrier shall be continuous over entire floor area and turned up a minimum of 2 inches at perimeter walls and penetrations. Tears, punctures and penetrations shall be taped to maintain the moisture vapor resistance integrity of vapor barrier.
    1. Unroll Vapor Barrier with the longest dimension parallel with the direction of the pour.
    2. Lap Vapor Barrier over footings and seal to foundation walls.
    3. Overlap joints 6 inches and seal with manufacturer's tape.
    4. Seal all penetrations (including pipes) with manufacturer's pipe boot.
    5. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
    6. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with tape.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Cast-in-place concrete including, but not limited to, the following:
   1. Building foundations and slabs on grade.
   2. Site structures including, but not limited to, site lighting supports, electrical and mechanical equipment support pads, and other site furnishing (benches) and equipment requiring cast-in-place concrete items.
   3. Cast-in-place concrete floor, wall and roof structures.
   4. Concrete fill for metal pan steel stairs as specified in Section 05 51 00.

B. Related Sections:
   1. Section 03 05 05 – Fly Ash
   2. Section 03 10 00 – Concrete Formwork
   3. Section 03 20 00 – Concrete Reinforcement
   4. Section 03 30 00.13 – Under-Slab Vapor Barrier
   5. Section 07 26 53 – Vapor Reduction Floor Coatings
   6. Section 32 16 00 – Concrete Curbs, Gutters, Sidewalks and Driveways.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements: Interior slabs on grade scheduled to receive applied floor finishes (VCT, carpet, etc.) shall be tested as specified herein under Field Quality Control Calcium chloride test requirements. Moisture vapor from the floor must be less than 3 pounds per 1,000 square feet per 24 hours. Floor slabs that exceed this requirement shall be treated with a Vapor Reduction Floor Coating as specified in Section 07 26 53 as required to provide a satisfactory substrate for applied floor finish at no additional cost to Owner.

1.3 SUBMITTALS

A. Mix Design: Submit mix design for each class of concrete to the Architect for review. Review of mix designs by Architect and/or Engineer shall in no way relieve the Contractor of responsibility for the performance of the concrete.

B. Product Data: Submit Manufacturer's Specifications and performance data for accessory products.

C. Shop Drawings: Submit shop drawing showing proposed location of construction joints, expansion/contraction joints, control joints and special reinforcement required at openings. Obtain approval of same from Architect prior to construction.

D. Samples: Submit 4 inch long samples of expansion/contraction joint and control joint.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
   2. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Standards:
   1. Standard for measuring, mixing, transporting and placing of concrete shall be ACI-301 and ACI-304.
   2. Standard for measuring, mixing and delivery of ready mixed shall be ASTM C94, except that time in mixer after water has been added at batch plant is limited to 1-1/2 hours.
   3. Job-mixed concrete shall be subject to Architect's review of design, mixing and handling procedures.

C. Field Samples:
   1. Provide on-site sample(s) of each type of exposed flatwork concrete finish showing texture and color before proceeding with finish to be used on this Project.
   2. Sample(s) shall be minimum 4'-0" square and have at least one longitudinal and one transverse joint.
   3. Construct sample panels in ample time to allow for finishing and curing before requesting Architect to review.
   4. Construct where directed by Architect and prepare successive sample panels as required until finish acceptable to Architect is produced.
   5. Field samples shall not be incorporated into final work.
   6. Since sample panels will constitute a basis of acceptance or rejection of the completed Work, do not remove sample panels until authorized in writing by the Architect. Dispose of sample panels in a legal manner when authorized.

D. Pre-Installation Conference:
   1. Contractor shall conduct a meeting at Project site to review proposed mix designs and discuss required methods and procedures to achieve required concrete construction.
   2. Contractor shall distribute meeting agenda to all attendees a minimum of 7 days prior to the scheduled date meeting.
   3. Attendees: Responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:
      a. Contractor's superintendent.
      b. Laboratory responsible for concrete design mix.
      c. Laboratory responsible for field quality control.
      d. Concrete subcontractor.
      e. Ready-mix concrete producer.
      f. Admixture manufacturer(s).
      g. Concrete placement equipment manufacturer(s).
   4. Meeting minutes will be taken by the Contractor for distribution to all attendees within 5 days of meeting. Contractor shall also distribute copy of meeting minutes to Owner, Structural Engineer, and Architect.
   5. Minutes shall include statement by concrete subcontractor indicating proposed mix design, placement, finishing and curing procedures can produce the concrete quality required by these specifications.

1.5 PROJECT CONDITIONS

A. Rain protection: Do not place concrete during rain unless adequate protection has been provided.

B. Cold weather protection: Comply with ACI-306R.

C. Hot weather protection: Comply with ACI-305R.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland Cement: ASTM C150, Type II, alkali content not to exceed 0.6 percent. Use one brand and type of cement throughout Project unless otherwise specified.

B. Aggregate:
   1. Structural Concrete: Clean, coarse aggregate and gravel, free from foreign matter, conforming to ASTM C33. Aggregate shall be graded from coarse to fine in accordance with ASTM C33, Size 67.
   2. Aggregate for lightweight structural concrete: ASTM C 330 except use only shale, slate or clay prepared in a rotary kiln. Test results from an acceptable testing laboratory shall show compliance with the performance requirements of this Specification. Soundness shall have a maximum 15% loss when tested in accordance with ASTM C 88. Absorption shall have a maximum 15% when tested in accordance with ASTM C 127.

C. Admixtures:
   1. Air-Entraining Admixture: ASTM C260, certified by manufacturer to be compatible with other required admixtures. Provide one of the following:
      a. AEA-92 and Air 40, Euclid Chemical Co. www.euclidchemical.com
      b. Sika AER, Sika Corp. www.sikaconstruction.com
      c. Master Builders MB-VR or MB-AE, BASFAdmixtures www.basfadmixtures. com
   2. Water-Reducing Admixture: ASTM C494, Type A, and containing not more than 0.05 percent chloride ions. Provide one of the following:
      a. Eucon NW or Eucon WR 91, Euclid Chemical Co.
      b. Master Builders Pozzolith 322N, BASF Admixtures
      c. Plastocrete 160, Sika Chemical Corp.
   3. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C494, Type F or Type G and containing not more than 0.05 percent chloride ions. Provide one of the following:
      a. Eucon 37/Eucon 1037, or Plastol Series, Euclid Chemical Co.
      b. Daracem 100 or ADVA Flow, W.R. Grace & Co.
      c. Master Builders Rheobuild 1000 or Glenium 3030, BASF Admixtures.
   4. High-Range, Water-Reducing, and Retarding (Superplasticizer): ASTM C 494, Type G. Provide one of the following:
      a. Eucon 537, Euclid Chemical Company
      b. Daracem 100, W.R. Grace & Co.
      c. Master Builders Rheobuild 916, BASF Admixtures
   5. Non-Chloride, Non-Corrosive Accelerating Admixture: The admixture shall conform to ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Provide one of the following:
      a. Accelguard 80, 90 or NCA, Euclid Chemical Co.
   6. Water-Reducing, Retarding Admixture: ASTM C494, Type D, and contain not more than 0.05 percent chloride ions. Provide one of the following:
      a. Eucon NR or Eucon Retarder 100, Euclid Chemical Co.
      b. Master Builders Pozzolith Retarder, BASF Admixtures.

c. Plastiment, Sika Chemical Co.
7. Fly ash admixture: In accordance with Section 03 05 05.
8. Use set-retarding admixtures during hot weather only when approved by Architect.
9. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.

D. Water: Potable.

E. Coloring Agent:
1. ASTM C979.
2. As manufactured by Frank Davis Company or L.M. Scofield Company or Solomon Grind-Chem Service, Inc. . Provide colors as selected by Architect.
3. Color weight shall not exceed 10% of the weight of the cement.
4. Colors: As indicated on Drawings or as selected by Architect.

2.2 ACCESSORIES

A. Bonding Agents and Repair Products:
1. Interior Only (PVA): L&M Construction Chemicals EVERWELD www.lmcc.com; EucoWeld, Euclid Chemical Company www.euclidchemical.com; US Spec Bondcoat PVA www.usspec.com; or Larsens' Weld Crete www.larsenproducts.com
2. Interior Only for Bonding Existing Concrete to Fresh Concrete (Epoxy): Sikadur 32, Hi-Mod, Sika www.sikausa.com; Euco 452 Series, Euclid Chemical Company www.euclidchemical.com; Maxi-Bond 2500, US Spec www.usspec.com; or Rezi-Weld, W.R. Meadows www.wrmeadows.com.
3. Exterior and Interior Bonding Admixture (acrylic latex): SBR Latex or Flexcon Euclid Chemical Company www.euclidchemical.com; Intralok, W.R. Meadows www.wrmeadows.com; Acylcoat, US Spec www.usspec.com; or Dayton Bond J40, Dayton Superior www.daytonsuperior.com
4. Polymer Repair Compounds: Polymer and microsilica modified cementitious based compounds.
a. Horizontal Locations:
1) Sikatop 121 or 122, Sika Chemical www.sikausa.com
2) Thin Top Supreme, Concrete Top Supreme, Euclid Chemical Company www.euclidchemical.com
3) TP Mortar, US Spec www.usspec.com
b. Vertical or Overhead Locations:
1) Sikatop 123, Sika Chemical
2) V/O Patch, US Spec
3) Verticoat, Verticoat Supreme, Concrete Top Supreme, Euclid Chemical Company
5. Underlayment Topping: Free-flowing, self-leveling, pumpable cementitious base compound.
a. Acceptable Products: Subject to compliance with requirements, provide one of the following:
1) Ardex K-15, Ardex Inc.
2) Flo-Top or Super Flo-Top, Euclid Chemical Company
3) Self-Leveling Underlayment, US Spec
4) Underlayment 110, BASF
6. Repair Topping: Latex modified, sandless cementitious mortar topping with bond strength meeting or exceeding requirements of ASTM C1059.
a. Acceptable Products: Subject to compliance with requirements, provide one of the following:
1) Thin Top Supreme, Euclid Chemical Company

2) TP Mortar, US Spec
3) As approved by Architect.

B. Non-Shrink Grout:
   1. Premixed or prepackaged, non-metallic, non-gaseous, bleed free compound; non-shrink when tested in accordance with ASTM C 1107, Grade B at a fluid (flow cone) consistency of 20 to 30 seconds.
   2. Attain minimum compressive strength of 7,000 psi in 28 days at above fluid consistency.
   3. Fluid grouts: Remain workable, flow through flow cone after 20 minutes with slight agitation, in temperatures from 40 to 70 degrees F.
      a. Acceptable manufacturer and products: Suregrip High Performance, Dayton Superior, www.daytonsuperior.com; Sikagrout 212, Sika www.sikausa.com, Master Builders (Masterflow 713) www.masterbuilders.com, W.R. Meadows No. 588 Grout www.wrmeadows.com, L&M Construction Chemicals (DURAGROUT) www.lmcc.com, US Spec "GP Grout" www.usspec.com, and Euclid N-S Grout www.euclidchemical.com.
   4. High Flow Fluid Grouts: High flow grout shall achieve 95 percent contact when placed under an 18 inch x 36 inch base plate, remain workable, and flow through cone after 60 minutes in temperature from 70 to 90 degrees F.
      a. Acceptable manufacturers and products: Hi-Flo Grout, Euclid Chemical Company www.euclidchemical.com; US Spec "MP Grout" www.usspec.com; or Chemrex Masterflow 928, BASF www.chemrex.com

C. Epoxy Anchoring Adhesive: 2-component, high modulus, 100 percent solids epoxy gel adhesive complying with ASTM C881.
   1. Acceptable manufacturer's and products: Dayton Superior, Sure-Anchor Epoxy J-50 www.daytonsuperiorchemical.com; W.R. Meadows Rezi-Weld 1000 State www.wrmeadows.com; Sika, Sikadur 31, Hi-Mod Gel www.sikausa.com; Simpson Set-XP www.strongtie.com

D. Formed Construction Joint: Standard design plastikey, tongue and groove key joint; 3-1/2 inch vertical dimension for 4 inch slabs. For use only in slabs not exposed to vehicular traffic.

E. Preformed Expansion Joint Filler: ASTM D1751.

F. Liquid Curing and Sealing Compound: Not applicable.

G. Sealer: VOC compliant, acrylic copolymer type. Penetrating sealers on exposed interior concrete floors shall be compatible with Waxie "Floorstar" products.
   1. Interior: ASTM C1315, Class B. Provide one of the following:
      a. VOCOMP-30, W. R. Meadows.
      b. Euclid Super Aqua Cure VOX, Euclid Chemical Company.
      c. Dress & Seal WB #30, L&M Construction Chemicals.
      d. J-19, Dayton Superior.
   2. Exterior: ASTM C1315, Class A. Provide one of the following:
      a. Euclid Super Diamond Clear VOX, Euclid Chemical Company.
      b. Lumiseal WB, L&M Construction Chemicals.
      c. VOCOMP-30, W. R. Meadows.
      d. Radiance UV-25, US Spec.

H. Light-Duty Dust-Proofer:
   1. Magnesium fluosilicate: Burk-O-Lith, L&M Construction Chemicals FluoHard, Sonneborn Lapidolith, Euclid Surfhard, Dayton-Superior J-15 Day Chem Hardener or W.R. Meadows Penalith.

2. Sodium silicate: L&M Construction Chemicals Chem Hard, W.R. Meadows Dustgard or Cure-Hard, Dayton-Superior J-13, Sonneborn Sonosil, Euclid Eucosil, or US Spec Permasil.

I. Leveling Agent: Sonneborn Sonoflow, Euclid Flo-Top, Ardex K-15, L&M Construction Chemicals Levelex, US Spec "Self-Leveling Underlayment or Dayton-Superior Levelayer 1 is acceptable products.

J. Vapor Barrier/Retarder: In accordance with Section 03 30 00.13 Under-Slab Vapor Barrier.

K. Concrete Accessories: Gateway Engineering Company, Dayton-Superior Corporation, or Burke Concrete Accessories.

L. Evaporation Retarder:
1. Type: Monomolecular film, compatible with subsequent coatings and floor finishes.
2. Acceptable Manufacturer and Products: L&M Construction Chemicals (E-Con), Master Builders (Confilm), Sika (Sika Film), W.R. Meadows (Evapre), US Spec (Monofilm ER), or Dayton Superior (Surefilm J-74). U.S. Spec “Top-Etch.”

2.3 MIXES

A. Design of Mixes: All mix designs shall be prepared in accordance with ACI 318-05, “Building Code Requirements for Structural Concrete”, Section 5.3, “Proportioning on the Basis of Field Experience or Trial Mixtures”.

B. Selection of proportions for normal weight concrete: ACI 301.

C. Mix and deliver ready-mixed concrete in accordance with requirements of ASTM C94, Option A.
1. Not more than 90 minutes shall elapse from time water is introduced into the concrete mixture until completion of placement.
2. Do not add water to mix that has stiffened to increase its workability.
3. At no time shall concrete mix exceed a bulb thermometer reading of 90 degrees F. or over.
4. Use ice or other method as reviewed by Architect, to keep concrete below 90 degrees F. temperature.

D. All concrete must contain the specified water-reducing admixture or the specified high range water-reducing admixture (superplasticizer). All thin concrete slabs, less than 8 inches in thickness placed at air temperatures below 50 degrees F shall contain the specified non-corrosive, non-chloride accelerator. All concrete slabs placed at air temperatures above 90 degrees F may require the use of water reducing retarding admixtures.

E. All concrete required to be air entrained shall contain an approved air entraining admixture. All pumped concrete, concrete for industrial slabs, architectural concrete, self-consolidating concrete, concrete required to be watertight or concrete with a water/cement ratio below 0.50 shall contain the specified high-range water-reducing admixture (superplasticizer).

F. Durability Requirements - Water/Cementitious Ratio:
1. All concrete subject to freezing and thawing shall have a maximum water/cementitious ratio of 0.50 (4000 psi at 28 days or more).
2. All concrete subjected to deicers, sulfates, and/or required to be watertight shall have a maximum water/cementitious ratio of 0.45 (4500 psi at 28 days or more).

3. All reinforced concrete subjected to brackish water, salt spray or deicers shall have a maximum water/cementitious ratio of 0.40 (5000 psi at 28 days or more).
4. Water-cement ratio for concrete used for interior slab on grade construction: 0.40 to 0.45.

G. Air Entraining Admixture: All concrete exposed to freezing and thawing and/or required to be watertight shall have an air content of 4.5 to 7.5 percent in accordance with ACI 212.3R. All interior, slabs subject to vehicular abrasion, shall have a maximum air content of 3 percent.
1. Limit air content for lightweight concrete to 4-6 percent.

H. Compressive strength (28 day): As shown on Drawings.

I. Slump (For consolidation by vibration): As shown on Drawings.

J. Mix coloring agent for integrally colored concrete in strict compliance with the Manufacturer's printed instructions

K. Lightweight concrete:
1. 100-115 lbs per cubic foot dryweight.
2. Splitting tensile strength, when tested in accordance with ASTM C 496, shall be the minimum as follows for given compressive strength:
   a. 4,000 psi, fct equals 425 psi;
   b. 5,000 psi, fct equals 475 psi.
3. Modulus of elasticity shall be a minimum of 2,400,000 lbs per square inch.
4. Drying shrinkage, when tested in accordance with ASTM C 330, shall be a maximum 0.06% at age 1 year or 0.035% at 28 days.
5. Base cement factor and water-cement ratio on degree of saturation and absorption characteristics of the lightweight aggregates stockpiled for use.
6. Shrinkage reducing admixture or a shrinkage compensating admixture may be used to control drying shrinkage if acceptable to the Architect.
7. Substitute natural sand for lightweight fines.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to placing concrete:
1. Clean equipment involved.
2. Remove debris and foreign material from the forms.
3. Remove concrete laitance from reinforcing steel.
4. Wet wood forms and masonry units in contact with concrete.

B. No wood other than built-in bucks or nailing blocks will be permitted to remain permanently inside the forms.

C. Coordinate the necessary Trades as required to provide the sleeves, bolts, anchors, holes, etc., to be built in. Provide sleeves for plumbing and electrical openings in concrete before placing. PVC sleeves shall not be used.

D. Place vapor barrier/retarder over subbase immediately prior to placing of floor slab in accordance with Section 03 30 00.13.

3.2 PLACING OF CONCRETE

A. Concrete Work shall be performed in accordance with ACI-301 except as amended by this Section.

B. Convey concrete from the mixer to place of final deposit by methods which will prevent segregation of aggregate or loss of material. Place concrete at such a rate that concrete is at all times plastic and to insure a practically continuous flow of concrete. Concrete not in place 1-1/2 hours after water has been added at batch plant may be rejected by Architect.

C. Place concrete as nearly as practicable in its final position to avoid segregation due to re-handling or flowing. Do not deposit concrete that has partially hardened or been re-tempered.

D. Do not place concrete during rain unless adequate protection has been provided.

E. Thoroughly compact concrete by suitable means during the placing, and work around the reinforcement and embedded items into the corners of the forms.
   1. Use vibrators to aid in the placement of the concrete, operated by experienced personnel.
   2. Keep at least one spare operating vibrator on the job at all times during the concrete operations.

F. Self-Consolidation concrete does not require vibration.

G. Set reinforcing dowels connecting new concrete construction to existing with epoxy anchoring adhesive as indicated on Structural Drawings.

H. Column penetrations through slabs shall be initially blocked out in a diamond shape and infilled afterwards.

3.3 CONSTRUCTION JOINTS, EXPANSION/CONTRACTION JOINTS AND CONTROL JOINTS

A. Construction Joints: Provide as required to facilitate construction in accordance with reviewed shop drawings.

B. Expansion and Contraction Joints: Place expansion and contraction joints where required to ensure that undesirable thermal and shrinkage cracking of slabs is minimized.
   1. See Drawings for locations of expansion and contraction joints in slabs-on-grade and in topping pours.
   2. If drawings do not indicate locations, verify with Architect prior to placement of slabs-on-grade and topping pours.
   3. Utilize early entry saw-cutting techniques using specialized equipment and procedures in accordance with the manufacturer of the saw-cutting equipment to saw-cut all joints in interior and exterior slabs within 2 hours of final finishing of the floor slabs while the concrete is still in its early green state.
      a. Acceptable Equipment: Soff-Cut International, Inc., Corona, CA 1-800-776-3328 www.soffcut.com
   4. At exterior slabs-on-grade provide a 1/2 inch wide expansion joint wherever slabs abut vertical construction elements whether indicated or not.

C. Additional reinforcing may be required at some construction, expansion/contraction and control joints, and shall be supplied and installed at no additional cost.

D. Reinforcing shall be continuous through construction joints of reinforced slabs, unless otherwise indicated on Drawings. Placement schedule shall be submitted for approval.

E. No concrete pour shall be longer than 100 feet or more than 4,000 square feet in area, unless early entry saw-cutting techniques are utilized for placement of joints in the slab while the concrete is still in a green state and prior to the slab developing expansion/contraction cracking at random location. Provide shear keys as detailed.

F. Provide support of formed construction joint materials by means that does not puncture or otherwise damage under floor vapor retarder at interior floor slabs on grade.

3.4 CONCRETE FINISHES – GENERAL

A. Concrete Finish:
   1. Exposed floor: Hard steel trowel finish in compliance with Class 5 requirements per Table 3.14.2(a) of ACI 301 without topping.
   2. Under carpet, thin set ceramic tile, and resilient tile: Steel trowel finish.
   3. External concrete ramps, driveways and parking lots: Stiff broom finish. Provide truncated dome surface at ADA accessible ramps.
   4. Stair treads and all other paving: Light broom finish.
   5. Hardscape to have integral color with light acid wash finish.
   6. Concrete Columns (exposed to view in final work): Class A Finish.

3.5 FINISHING VERTICAL (FORMED) SURFACES

A. Formed surface finishes:
   1. Pits, tunnels, mechanical rooms and concealed surfaces: Remove fins, patch tie holes.
   2. Interior exposed surfaces and exterior exposed surfaces: Remove fins, patch tie holes, stone joint marks and out-of-plane surfaces to within 1/16 inch of flush, to produce uniformity, dense and smooth concrete.
   3. Exposed elements: Removal all scale. Make ready and provide preparation as required for acceptance of finish primer, paint, and/or seal.

3.6 FINISHING HORIZONTAL SURFACES

A. Rake concrete into place, screed and compact with a light tamp, except do not tamp topping and slabs not on grade. Screed with sawing motion and float surface to bring fines to the top.

B. Mix and apply evaporation retarder in accordance with manufacturer's printed instructions immediately after floating. In extreme drying conditions, apply additional material as needed. Apply lightly on hard to trowel floor areas.

C. When concrete has hardened sufficiently so that excess fines will not be brought to the surface, trowel slab with a steel trowel to a smooth surface free of pinholes and other imperfections. A mechanical trowel with rotating steel blades, approved by Architect, may be used for this operation.

D. After the surface has hardened sufficiently to ring under a trowel, trowel again with a steel trowel to a hard, burnished surface free of blemishes. A mechanical rotating trowel will not be permitted for this operation.

E. Concrete slabs scheduled to receive ceramic tile or similar finishes shall have a screeded finish but true and even to plane with no sharp projections or ridges.

F. Use a small radius edger on edges of exposed Work. Use a deep cutting, scoring tool or saw cutting to provide scoring for control joints as indicated unless otherwise noted or directed.

G. Exterior flatwork to receive medium broom finishes and exposed aggregate finish as indicated on the Drawings.

H. Finished floors to meet 1/4 inch in 10 feet tolerance unless noted otherwise. Floors scheduled to receive thin-set tile applications shall meet 1/8 inch in 10'-0" tolerance.

3.7 SLABS

A. Saw cut or score control joint pattern indicated on Drawings. Use 3/16 inch thick blade or scoring tool, cutting 1/4 of depth of slab thickness.

B. Slabs shall be depressed (dished) ½" deep around all floor drains for a minimum radius of 3'-0".

C. Slope to drains 1/4 inch per foot nominal across entire room or area to be drained.

3.8 SPECIAL FINISHES

A. General:
   1. Obtain cement and aggregates from a single source for specialty concrete finishes to provide uniformity in appearance and color.
   2. Place concrete at a maximum slump of 5 inches. Rake concrete into place, screed and float. Do not tamp.

B. Integral Colored Concrete
   1. Provide cement, aggregate, and pigment as required to produce consistent colors matching approved mock-up using the materials specified.
   2. Plant-Mixed Concrete: Schedule delivery of concrete to provide consistent mix times from batching until discharge.
   3. Concrete Paving: Schedule placement to minimize exposure to wind and hot sun before curing process is initiated. Avoid placing concrete if rain, snow or frost is forecast within 24 hours. Protect fresh concrete from moisture and freezing.
   4. Formed Surfaces
      a. Stripping: Leave forms in place as long as practical. Remove forms when concrete has reached a consistent age to maintain uniformity of curing conditions throughout Project.
      b. Sandblasted Finish (if noted on drawings): Allow concrete to cure to sufficient strength that it will not be damaged by blasting but not less than seven days.
   5. Floors and Paving
      a. Broomed Finish: Do not dampen brooms.
      b. Trowel Finish: Do not over-trowel or start troweling late.
   6. Patching Concrete
      a. Fill holes and defects in concrete surface within 48 hours of form removal.
      b. Use the same patching materials and techniques that were approved on mock-up.
      c. Make patches with a stiff mortar made with materials from the same sources as the concrete. Adjust mortar mix proportions so dry patch matches dry adjacent concrete. Add white cement to mortar mix if necessary to lighten it.

7. Curing
    a. Maintain concrete between 65 and 85 F degrees during curing.
    b. Cure concrete as specified elsewhere herein.
8. Minor variations in appearance of colored concrete, which are similar to natural variations in color and appearance of unpigmented concrete, are acceptable.

C. Protection: Protect specially finished concrete slabs from damage, by covering with a one inch layer of clear, dry sand. Provide planking whenever scaffolding or wheeled equipment may be required to be erected over slabs. Damage to slabs prior to acceptance of the Work will be cause for rejection of slabs and replacement will be required.

3.9 REPAIR OF SURFACE DEFECTS

A. Modify or replace concrete not conforming to required lines, detail and elevations.

B. Repair or replace concrete not properly placed, resulting in excessive honeycombing and other defects. Do not patch, repair or replace exposed architectural concrete except upon express direction of Architect.

C. After forms are removed, fill tie rod holes, correct honeycomb spots, remove fins and clean and finish damaged surfaces. Wipe off excess mortar and rub to match adjoining surfaces.

D. When excessive honeycombing is revealed, remove the defective material immediately after stripping forms to a depth of 3/4 inch to 1 inch. Cut edge of area perpendicular to surface to avoid feathered edges. Saturate with water for several inches beyond cutout and brush-in a grout consisting of equal parts Portland cement and sand. Follow immediately with the patching mortar. Leave the patch slightly higher than the surrounding surface. After an hour or two, finish flush with the adjoining surface. Wipe and rub patch to match adjoining surfaces. Keep patches moist for 7 days.

E. Patching mortar shall consist of the same materials and proportions as the original concrete except that the coarse aggregate shall be omitted. When color match is required, adjust mixture to produce a finished color to match the adjoining concrete surfaces.

F. Cracks caused by expansion, shrinkage and the like that occur in natural color concrete up through final acceptance of building shall be carefully patched with floor stone, epoxy grouting mortar or other method acceptable to the Architect.

3.10 CURING

A. Protect freshly deposited concrete from premature drying and maintain without drying at a relatively constant temperature for the period of time necessary for the hydration of the cement and proper hardening of the concrete.

B. Curing Timing and Method:
1. Cure concrete surfaces receiving finish materials, including, but not limited to; cementitious toppings, paint, and flooring, immediately after finishing operations.
2. Keep concrete continuously moist for at least 7 days using a sheet membrane conforming to ASTM C171.

C. Prevent rapid drying of the concrete at the end of the curing period.

D. During the curing period, protect the concrete from damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibrations. Protect finished concrete surfaces from damage caused by construction equipment, materials or methods.

3.11 UNDERLAYMENT OR REPAIR TOPPING

A. Apply underlayment or repair topping to correct unsatisfactory floor surface due to undue settlement or failure to meet tolerance requirements.

B. Slab surface preparation and placing procedures shall be approved by the underlayment and/or repair topping manufacturer and Architect prior to start of installation.

C. Installation: Install underlayment and/or repair topping materials in accordance with Manufacturer’s published instructions and recommendations.

3.12 FLOOR SEALER

A. At areas indicated on Drawings, provide 2 coats of sealer.

B. Sealer or finish should be applied immediately upon completion of curing in order to protect floors during construction and then cleaned and reapplied prior to final acceptance.

C. Prior to application of sealer, floors shall be cleaned with a “side by side” machine, wet vacuum and rinsed. Surface must be clean, dry and free of loose dirt, oil, wax, parting compounds and other foreign matter.

D. Apply each coat in accordance with Manufacturer's printed instructions.

3.13 FLOOR HARDENER

A. Where indicated on Drawings, provide one coat of hardener, unless otherwise recommended by manufacturer.

B. Surface must be clean, dry and free of loose dirt, oil, wax, sealers, parting compounds, and other foreign matter.

C. Apply each coat in strict accordance with Manufacturer's instructions.

3.14 FIELD QUALITY CONTROL

A. Tests: Inspection and testing of concrete mix will be performed by a testing laboratory in accordance with Section 01 45 00.
   1. Provide free access to Work and cooperate with appointed firm.
   2. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.
   3. Four concrete test cylinders shall be taken for every 100 or less cubic yards of concrete placed. One cylinder shall be tested after 7 days for information. Test two cylinders after 28 days. Hold one cylinder for additional information, as required.
   4. Take one additional test cylinder during cold weather concreting, and cure on job site under same conditions as concrete it represents.

5. Take one slump test for each set of test cylinders taken.
6. Concrete which does not meet the compressive strength requirement at 28 days will be rejected and removed from the Project, and disposed of in a legal manner.

B. Calcium chloride test requirements:
1. Two weeks before installation of the ceramic tile, VCT, vinyl, wood, carpet, epoxy flooring and/or other finish flooring systems over the interior concrete slabs, provide calcium chloride test to determine the level of water vapor transmission in the slab.
2. Conduct testing in accordance with ASTM F1869 or ASTM E1907 (quantitative anhydrous calcium chloride test).
3. Conduct calcium chloride tests after HVAC system has been in continuous use for 36 hours with a minimum ambient temperature of 72 degrees F. Water vapor transmission levels are directly affected by ambient room temperature and readings conducted without a sustained ambient temperature is NOT acceptable.
4. Document test results and provide copy to Architect with a marked up floor finish plan showing test results.
5. Provide a written clarification on status of HVAC system before and during the test and the length of time the ambient air temperature was maintained before the tests.

3.15 PROTECTION

A. Protect finished surfaces from stains or abrasions. Protect surfaces or edges by leaving forms in place or by providing temporary covers. Protect concrete from rain, flowing water or mechanical injury.

B. Protect floor slabs from the droppings of plaster, paint, dirt, and other marring by covering with acceptable floor protection covering, well lapped and sealed. Polyethylene plastic sheet may create condensation and/or alkali staining of concrete surface and its use shall be carefully considered.
1. Method used to hold protective sheets and coverings in place where slabs comprise the finished surface shall not leave permanent discoloration. Duct tape (and other similar adhesive tapes) shall not be used to hold coverings in place on floor slabs that will remain exposed in the final work.
2. Where concrete slabs are scheduled to be the finished floor surface, or where slab is treated with a special concrete finish serving as the finished floor surface, provide a continuous covering of 1/2 inch particle board, joints tightly butted and cut to sizes tight to wall construction, over entire floor area with Owner approved acceptable floor protection sheeting.
    a. Particle board (wood and agrifiber products) must contain no added urea-formaldehyde resins in accordance with the requirements of "Low Emitting Materials" as specified in Section 01 60 00 - Materials and Equipment.
    b. Maintain covering (protective sheeting and particleboard) in good condition until danger of damage is past.

3.16 CLEANING

A. During the course of the Work and on completion of the Work, remove and dispose of excess materials, equipment and debris away from premises.

B. Construction Waste: In accordance with Section 01 74 19.

END OF SECTION

SECTION 03 41 00

ARCH. PRECAST CONCRETE

(PLANT CAST)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide precast wall panels including; but not limited to:
   1. Structural design and detailing of panels.
   2. Plant fabrication of architectural precast concrete panel.
   3. Transportation of precast panels to job site.
   4. Installation (erection) of precast panels.

1.2 SYSTEM DESCRIPTION

A. Design and Fabrication Requirements:
   1. Provide plan fabricated precast panels consisting of architectural concrete, steel reinforcement, steel connections for panel attachment to structure, and other inclusions for attachments to panels. Panels are transported to the job site for installation.
   2. Precast panel fabrication shall include labor, materials and equipment necessary for the installation of the panels as shown on the Contract Documents.
   3. Precast panel installation shall include labor, materials and equipment necessary for the installation of the panels as shown on the Contract Documents.
   4. The Precast Manufacturer shall design and furnish precast connection hardware to be attached to or embedded in the panels. Furnish loose connection hardware and concrete for connection of the precast panels. Provide for placement of hardware in cast-in-place concrete.
   5. Embeds and hardware which are to be cast into the recast panels for other trades shall be provided to the Precast Manufacturer, with instructions, in a timely manner in order not to disrupt or delay production. Embeds and hardware to be indicated in general on Contract Documents and fully defined on Shop Drawings.
   6. Provide reveals, openings and other cutouts as indicated on Drawings.
   7. The Precast Manufacturer shall design, furnish and install steel pre-weld required (such as outriggers and downriggers) to carry the loads from the precast panels to the structural Include additional bracing or stiffening of the structure required to support the loads from the precast panels as per Structural Calculations and shop drawings.

B. Structural Performance:
   1. Provide precast architectural concrete units and connections capable of withstanding design loads and temporary loads due to manufacturing, storage, shipping, handling and erection within limits and under conditions indicated.
   2. The design loads shall include applicable loads in accordance with applicable building codes and erection forces, including loads transferred from the structure to the precast shear wall panels.
   3. Design units to accommodate construction tolerances, deflection of building structural members and clearances of intended openings.

4. Design component connections to accommodate building movement and thermal movement. Provide adjustment to accommodate misalignment of structure without unit distortion or damage.

1.3 SUBMITTALS

A. Shop Drawings: Submit drawings indicating layout, unit locations, unit identification marks, reinforcement, connection details, support items, dimensions, openings, and relationship to adjacent materials, sealed by a Structural Engineer registered in the State in which project is located. Provide the following:
   1. Site plans identifying location of panels.
   2. Site plans identifying location of pre-erection attachments (i.e. cast-in-place embeds and pre-welds) to support structure.
   3. Elevations identifying location of panels and their connections.
   4. Details as necessary to describe relationship of panels to adjacent material.
   5. Details of panel connections.
   6. Description of hardware cast into panels, sent loose to the job site, and cast into or attached to supporting structure.
   7. Elevations and sections of typical panels showing:
      a. Geometry and finish.
      b. Thickness of face and back-up mixes (if applicable).
      c. Reinforcement layout.
      d. Stripping, lifting, and erection inserts sizes and locations.
      e. Embeds with piece marks and their location.

B. Calculations: Submit comprehensive engineering analysis signed and sealed by the qualified professional engineer registered in the State of Louisiana and responsible for preparation of calculations.

C. Mix Designs: Submit precast mix designs for review. Mix designs shall be prepared by an independent testing facility or qualified employee of the Precast Manufacturer. Include material specifications.

D. Samples: Prior to providing panels for mockups, provide the following.
   1. Submit preliminary samples of each finish type required, approximately 12 inches by 12 inches, representative of finished exposed face.
   2. Submit two panels, 48 inches by 48 inches in size illustrating color and surface finish treatments. Samples shall remain on jobsite until final acceptance of concrete work by Owner.

E. Weld Procedure Specifications: Submit Welding Procedure Specifications in accordance with AWS D1.1 and D1.4 requirements for welding which will be performed under this Section.

F. Design Modification:
   1. Submit design modifications necessary to meet performance requirements and field conditions.
   2. Variations in details or materials shall not adversely affect the appearance, durability or strength of panels.
   3. Maintain general design concept without altering size of members, profiles and alignment unless otherwise approved by the Architect/Engineer.

G. Certificates: Provide welding and material certificates.

1.4 QUALITY ASSURANCE

A. Standards:
   1. Design: Comply with ACI 318 and the design recommendation in PCI MNL 120, “PCI Design Handbook – Precast Concrete Products.”
   2. Quality Control: Comply with PCI MNL 117, “Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.”
   3. Welding: ANSI/AWS D1.1.

B. Qualifications:
   1. Fabricator:
      a. Company specializing in performing the work of this Section with minimum 5 years documented experience.
      b. A qualified fabricator who assumes responsibility for engineering precast architectural concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
      c. Participates in PCI’s Plant Certification program and is designated a PCI certified plan for Group A, Category A1 – Architectural Cladding and Load Bearing Units and in APA’s Plant Certification Program for the Production of Architectural Precast Products and is designated as an APA-certified plant.
   2. Welder: Qualified within previous 12 months in accordance with ANSI/AWS D1.1 and ANSI/AWS D1.4.

C. Mockups: In accordance with Section 01 33 00.

D. Design units under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State where the project is located.

1.5 DELIVERY, STORAGE AND HANDLING

A. Handle precast units to position, consistent with their shape and design. Lift and support only from support points. Lift or support panels only at the points indicated on Shop Drawings.

B. Lifting or Handling Equipment: Capable of maintaining units during manufacture, storage, transportation, erection, and in position for fastening.

C. Blocking and Lateral Support During Transport and Storage: Clean, non-staining, without causing harm to exposed surfaces. Provide temporary lateral support to prevent bowing and warping.

D. Store units at Project site to prevent cracking, distorting, warping, staining, or other physical damage, and so that markings are visible.

E. Protect units to prevent staining, shipping, or spalling of concrete.

F. Mark units with date of production in location not visible to view when in final position in structure.

1.6 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. As approved by Architect for work on projects of a similar scope.

2.2 CONCRETE MATERIALS

A. Cement: ASTM C150, Portland Type I, II or III - Alkali Resistant or III as applicable, white or gray color as per selected samples. Use same type, brand and source throughout.

B. Aggregate: Except as modified by PCI MNL 117, ASTM C33 with coarse aggregates complying with Class 5S

C. Admixtures:
   1. Integral Color: ASTM C979, synthetic mineral-oxide pigments or colored water reducing admixtures, temperature stable, nonfading, and alkali resistant.
   2. Air-entraining: ASTM C260, as recommended by the precast manufacturer.
   3. Use of fly ash is permitted per ASTM C618, Class C or F.
   4. Metakaolin Admixture: ASTM C618, Class N.
   5. Silica Fume Admixture: ASTM C1240.

D. Water: Potable.

2.3 STEEL REINFORCING

A. Reinforcing Bars: ASTM A615, Grade 60 deformed steel bars.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A706, deformed

C. Plain-Steel Wire: ASTM A82 as drawn.

D. Deformed- Steel Wire: ASTM A496.

E. Plain-Steel Welded Wire Fabric: ASTM A185, fabricated from as-drawn steel wire info flat sheets.

F. Deformed-Steel Welded Wire Fabric: ASTM A497, flat sheet

G. Supports: Manufacturer’s bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place according to PCI MNL 117.

H. Pre-stressing Strand: ASTM A416, Grade 250 or 270, uncoated, 7-wire, low-relaxation strand.

2.4 STEEL CONNECTIONS

A. Carbon-Steel Shapes and Plates: ASTM A36.

B. Carbon-Steel Headed Studs: ASTM A108, AISI 1018 through AISI 1020, cold finished; AWS D1.1, Type A or B with arc shields.

C. High-Strength, Low-Alloy Structural Steel: ASTM A572

D. Carbon-Steel Structural Tubin: ASTM A500, Grade B

E. Carbon-Steel Bolts and Studs: ASTM A307, Grade A (ASTM F568M, Property Class 4.6); carbon-steel, hex head bolts and studs, carbon-steel nuts, and flat, unhardened steel washers.

F. Shop-Primed Finish: Prepare surfaces of non-galvanized steel items, except those surfaces to be embedded in concrete, according to require in SPC-SP3 and shop-apply lead- and chromate-free, rust inhibitive primer, complying with performance requirements in FS TT-664 according to SSPC-PA1.

2.5 ACCESSORIES

A. Recessed Reglets: Galvanized steel, Stainless steel or Plastic as applicable, shaped and flanged to remain in place once cast, foam plastic filled or taped closed to eliminate wet concrete intrusion.

B. Embedded sockets for engagement of fence posts. Coordinate embedded-socket spacing with final aluminum fence layout.

2.6 MIXES

A. Normal-Weight Concrete Face and Backup Mixes:
   1. Proportion mixes by either laboratory trial batch or field test data methods according to ACI 211.1 with materials to be used on Project, to provide normal weight concrete with the following properties:
      a. Compressive Strength (28 days): Minimum 5000 psi.
      b. Maximum Water-Cementitious Materials Ratio: 0.45
   2. Mix concrete according to PCI MNL 117 and requirements in this Section. After concrete batching, no additional water may be added.

B. Sand-Cement Grout: Portland cement, ASTM C150, Type I and clean, natural sand, ASTM C144. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

2.7 FABRICATION

A. Anchorage Hardware:
   1. Fabricate with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during pre-casting operations.
   2. Furnish loose steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers and other hardware shapes for securing precast architectural concrete units to supporting and adjacent construction.

B. Cast-in reglets, slots, holes, and other accessories in precast architectural concrete units to receive windows, cramps, dowels, reglets, water-stops, flashings, and other similar work as indicated.

C. Reinforcement:

1. Comply with recommendations in CRSI's Manual of Standard Practice and PCI MNL 117 for fabricating, placing and supporting reinforcement.
2. Reinforce precast architectural concrete units to resist handling, transportation, and erection stresses.
3. Pre-stress tendons for architectural concrete units by either pre-tensioning of post-tensioning methods. Comply with PCI MNL 117.
4. Exposed Ends at Stressing Tendons: Fill recess with non-shrink epoxy grout, trowel flush.

D. Concrete Placement and Curing:
1. Place face mix to a minimum thickness after consolidation of the grater of one inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover.
2. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units. Comply with requirement in PCI MNL 117 for measuring, mixing, transporting and placing concrete.
3. Place backup concrete to ensure bond with face mix concrete.
4. Thoroughly consolidate place concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items. Use equipment and procedures complying with PCI MNL 117.
5. Comply with ACI 306.1 procedures for cold-weather concrete placement.
6. Comply with ACI 305R recommendation for hot-weather concrete placement.
7. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or accelerated heat curing using low-pressure live steam or radiant head and moisture.
8. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

E. Identify pickup points of precast architectural concrete units and orientation in structure with permanent markings, complying with marking indicated on Shop Drawings. Imprint or permanently mark casting date on each precast architectural concrete unit on a surface that will not show in finished structure.

F. Discard precast architectural concrete units that are warped, cracked, broken, spalled, stained or otherwise defective unless repairs are approved by Architect.

G. Fabricate precast architectural concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished panel complies with PCI MNL 117 product tolerances as well as position tolerance for cast-in items.
1. Precast architectural concrete units shall conform to the reviewed and accepted mock-up.
2. Use rigid molds, constructed to maintain precast unit uniform in shape, size and finish. Maintain consistent quality during manufacture.

H. Maintain plant records and quality control program during production of precast units. Make records available upon request.

I. Provide and maintain temporary bracing in place until final support is provided. Provide temporary lateral support to prevent bowing, twisting or warping of members.

2.8 FINISHING

A. Ensure exposed-to-view finish surfaces of precast concrete members are uniform in color and appearance.

B. Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

C. Refer to Architectural Drawings for finish requirements.
   1. Finish shall be integrally colored concrete as indicated on the Drawings.
      a. Bottom Panels: Acid wash finish.
      b. Top Panels: Form liner finish as noted on Drawings with acid wash finish.
   2. Match approved sample located in Architect's office.

D. Clean surfaces of rust, scale, grease, and foreign matter.

2.9 SOURCE QUALITY CONTROL

A. Plant Quality Control Program: Sampling, testing and inspections shall be conducted by the precast concrete manufacturer's plant and personnel currently certified by the PCI, Plant Certification Program.

B. Testing shall be in compliance with applicable testing provisions in PCI MNL-117.

2.10 TESTS

A. Provide testing and analysis of stressing tendons under provisions of Section 01 45 00.

B. Test samples in accordance with applicable ASTM standard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that building structure, anchors, devices, and openings are ready to receive work of this Section.

3.2 PREPARATION

A. Provide for erection procedures and induced loads during erection. Maintain temporary bracing in place until final support is provided.

B. Provide necessary hoisting equipment.

C. Unloading Areas and Access: Provide clear all-weather unloading areas and access roadways around building (and within the building where appropriate).

3.3 ERECTION

A. Setting:
   1. Erect units without damage to shape or finish. Replace or repair damaged panels.
   2. Precast panels shall be lifted with suitable lifting devices at points provided by Precast Manufacturer to prevent excessive stresses which might cause damage to the panels.

B. Temporary Supports and Bracing: The erector shall provide temporary supports and bracing as required to maintain position, stability and alignment until panels are permanently connected

C. Tolerance of Erected Panels: Tolerances for location of precast panels shall be as listed below:
   1. Plan location from building grid datum: .....+ 1/2"
   2. Top elevation from nominal top elevation:
      a. Exposed individual panel: .....+ 1/4"
      b. Non-exposed individual panel: ..... + 1/2"
      c. Exposed relative to adjacent panel .....1/4"
      d. Non-exposed relative to adjacent panel .....1/2"
   3. Maximum plumb variation over height of structure or 100 ft. whichever is less ..... one inch
   4. Plumb in any 10 ft. of element height: .....1/4”
   5. Maximum job in alignment of matching faces: ..... 1/4"
   6. Joint which (governs over joint taper):
      a. Panel dimension less than 20’..... + 1/4"
      b. Panel dimension over 20’ ..... + 3/8"
   7. Joint taper Maximum: ..... 3/8”
   8. Joint taper in 10 ft. ..... 1/4"
   9. Maximum jog in alignment of matching faces ..... 1/4"
   10. Differential bowing as erected between adjacent Member of same design: .....1/4"

D. Align and maintain uniform horizontal and vertical joints as erection progresses.

E. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect.

F. Connection Verification: The Erector shall verify that each connection has been made per reviewed connection details.

3.4 PROTECTION

A. Protect units from damage.

B. Provide non-combustible shields during welding operations.

3.5 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

B. Clean weld marks, dirt, or blemishes from surface of exposed members.

C. Remove stains in accordance with Precast Manufacturer's recommendations.

END OF SECTION

SECTION 04 01 20.52

MASONRY CLEANING

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

A. Performance Requirements: The application of chemical cleaner to new masonry wall construction which leaves the finished surfaces uniform in color and shall not alter the natural texture of the masonry units.

1.2 SUBMITTALS

A. Submit samples and manufacturer's instructions for masonry cleaning chemicals for approval prior to delivering materials to the site or commencing the work in this Section.
   1. Cleaning compound manufacturer shall procure and apply cleaning solutions to samples of the masonry units to be used in the structure which will be reviewed by the Architect for both aesthetics and effectiveness.
   2. Cleaning compound manufacturer's instructions: Submit current method of application for cleaning chemicals stating the actual application rates.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Engaged in producing materials with a satisfactory performance record for at least 5 years.
   2. Applicator: Trained, approved and accepted by the cleaning compound manufacturer. Application personnel shall have at least 2 years' experience with the particular materials being applied.

B. Field Samples:
   1. A test area of wall surface from 10 to 20 square feet in size shall be cleaned with the chemical cleaner recommended by the cleaning compound manufacturer for acceptance by the Architect.
   2. Test samples of adjacent non-masonry materials for possible reaction with the diluted cleaning materials. Samples to be available for review by the Architect

1.4 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Delivery shall be made to the job site in manufacturer's original containers with seals unbroken and labeled with manufacturer's batch number.

B. Storage and Protection:
   1. Store materials in original, unopened containers in compliance with manufacturer's printed instructions.

2. Do not store in areas where temperature will fall below 20 degrees F. or rise above 100 degrees F.

1.5 PROJECT/SITE CONDITIONS

A. Physical Requirements for Proper Installation or Application: Temperature and relative humidity conditions for a period before, during and after application shall be as recommended by the manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chemical Cleaner:
   1. Cleaner shall be a solution of blended liquid acids, heavily inhibited and emulsified and in combination with special wetting systems.
   2. Specific product selection shall be dependent upon substrate as recommended by the chemical cleaner manufacturer.
   3. Cleaner shall be acceptable to the masonry unit manufacturer.
   4. Muriatic acid shall not be acceptable as a chemical cleaner for new masonry.
   5. Acceptable Manufacturers and Products:
      a. Sure-Klean Vana Trol and Sure-Klean No. 600 Detergent as manufactured by ProSoCo, Inc., www.prosoco.com
      b. 202V Vana-Stop and 202 New Masonry Detergent as manufactured by Diedrich Technologies www.diedrichtechnologies.com are acceptable products.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Prior to start of work, carefully inspect the installed work of other trades, and verify that such work is complete to the point where this work may commence.
   2. The chemical cleaner manufacturer's representative shall verify that the chemical cleaner may be applied in accordance with the manufacturer's recommended methods.
   3. In the event of discrepancy, immediately notify the Architect.
   4. Commencement of system application constitutes acceptance of surfaces by applicator.

3.2 PREPARATION

A. Protection:
   1. Use all means necessary to protect the installed work of other trades.
   2. Concrete sidewalks shall be protected from runoff by soaking with water immediately prior to application on adjacent walls.
   3. Adjoining glass, metal and painted surfaces shall be protected from overspray and splash of chemical cleaner. Inadvertent splashes shall be removed in an approved manner before the solution has damaged the surface.

4. In the event of damage, immediately make all repairs and replacements necessary to the approval of Architect and at no additional cost to Owner.

B. Surface Preparation for Chemical Cleaner:
   1. In strict accordance with manufacturer's printed instructions.
      a. Masonry walls shall be cleaned within 14 to 28 days after installation.
      b. Walls shall be free of excess mortar.
      c. Cracks, other than hairline cracks, shall be pointed up.
      d. Defective mortar joints shall be routed out, pointed with mortar and tooled.
   2. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

C. C. Presoaking Hoses:
   1. Adequate water supply shall be made available to assure thorough pre-soaking and thorough rinsing of the wall before undertaking general cleaning.
   2. Two water hoses shall be used by the cleaning crew.
   3. One hose shall be attached to a length of lawn soaker hose placed along the top of the wall to provide a uniform and complete saturation of the entire wall area.
   4. The second hose shall provide a copious flow of water for thorough flushing of excess mortar and dirt from the scrubbed areas.
   5. The lawn soaker hose is later to be placed at the face of the scaffold or stage to provide a continuous spray of wall areas below the working area.

3.3 3.03 APPLICATION

A. Chemical Cleaner: Application to be in strict accordance with manufacturer's printed instructions and as follows:
   1. Surfaces shall be thoroughly pre-soaked with clean water to prevent the absorption of the cleaning solution within the pores of the masonry.
   2. Cleaning solution shall be diluted with clear water and applied to pre-soaked wall areas with a long handled stiff fibered masonry wall washing brush, or other brush as recommended by the cleaning compound manufacturer. The cleaning solution may also be applied with a garden-type low pressure sprayer having a maximum nozzle pressure of 50 psi (3.5kg/cm2). Allow the solution to remain on the wall 5 to 10 minutes, or as recommended by the cleaning solution manufacturer. Wooden paddles or other non-metallic tools may be used to remove stubborn particles. Cleaning shall be restricted to small areas of up to 20 square feet at a time.
   3. After washing a given area, the wall shall be flushed with a copious amount of working from top to bottom, before the solution dries on the wall surface. All of the cleaning solution shall be completely rinsed off of the wall.
   4. Rinsing water may be applied with a high-pressure hose system with a maximum nozzle pressure of 700 psi. The high-pressure nozzle tips shall have a fan spray angle of from 15 to 45 degrees. The high-pressure system shall have a water flow rate of 3 to 8 gallons per minute. Care shall be taken to avoid damaging the brick unit or the mortar joints with the high-pressure water spray.
   5. Repeat the procedure on spots which require additional cleaning.

END OF SECTION

SECTION 04 05 15

MORTAR AND MASONRY GROUT

PART 1 - GENERAL

1.1 SUBMITTALS

A. Mix Designs: Submit mix designs and samples to the Architect for review prior to delivering materials to the site or commencing the Work.
   1. Mortar Mix Design: Furnish in accordance with ASTM C270.
   2. Grout Mix Design: Furnished by either the grout supplier or an independent testing laboratory. Submit comprehensive strength data with mix design submittals when pozzolans are used.

B. Product Data: If alternative mortar materials are to be provided, submit current instructions stating the actual quantities and mixing instructions for alternative mortar materials to conform to specified requirements.
   1. Submit test report data substantiating compliance with specified performance requirements.
   2. Submit current ICC Evaluation Report.QUALITY ASSURANCE

1.2 DELIVERY, STORAGE AND HANDLING

A. Storage and Protection: Cementitious materials shall be stored off the ground, under cover and shall be kept dry.Storage and Protection:

B. Pre-blended Mortar Mix Delivery System: The use of dry pre-blended mortar silos and bulk bags shall be acceptable. Bulk bags and silos shall be sealed to prohibit contamination of the ingredients and to keep the materials dry until mixed

1.3 PROJECT/SITE CONDITIONS

A. Physical Requirements for Proper Installation or Application:
   1. Hot Weather Requirements: Wet mortar board before loading and cover mortar to retard drying when not being used.
   2. Cold Weather Requirements: In accordance with "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction" by IMIAC; provide adequate equipment for heating the mortar and grout materials, when air temperature is below 40 degrees F. Temperatures of the separate materials, including water, shall not exceed 140 degrees F. when placed in the mixer. When air temperature is below 32 degrees F., maintain mortar temperature on boards above freezing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General
   1. Recycled Content:
      a. Masonry: Minimum 10% pre-consumer recycled content.
   2. Regional Materials:
      a. Provide local/regional materials
      b. Masonry: Minimum 100% regional content

B. Mortar:
   1. Cement: Type I-II or Type II Portland cement conforming to ASTM C150.
   2. Aggregate: Clean, sharp and well graded and free from injurious amounts of dust, lumps, shale, alkali, surface coatings and organic matter, conforming to ASTM C144, except that no less than 3 percent nor more than 10 percent shall pass a No. 100 sieve.
   3. Hydrated Lime: ASTM C207, Type S.
   4. Water: Clean and potable.
   5. Admixtures:
      a. Chemical: The use of accelerator admixtures, water reducing plasticizers and other chemical admixtures shall not be allowed.
      b. Mineral: In accordance with Section 03 05 05
      c. Water Repellent Admixture: In accordance with Section 04 05 26.
      d. Alternative Plasticizer: Pozzolanic formulation consisting of a combination of hydroxyl aluminum silicates and diatomite:
         1) Alternative Plasticizer Manufacturer: Engaged in producing materials with a satisfactory performance record for at least 5 years.
         2) Mortar mix design shall be in accordance with ICC Evaluation Report, in accordance with the mortar type specified elsewhere in this specification.
         3) Provide alternative plasticizer in accordance with manufacturer's printed instructions, including specific mixing instruction.
         4) No other admixtures shall be used in conjunction with the alternative plasticizer unless approved in writing by the alternative plasticizer manufacturer.
         5) Packing and Shipping: Mortar admixture(s) shall be delivered to the job site in manufacturer's original containers with seals to unbroken and labeled with manufacturer's batch number.

C. Grout:
   1. Cement: Type I-II or Type II Portland cement conforming to ASTM C150.
   2. Aggregate: ASTM C404 and as follows:
      a. Sand: Size No. 1 for fine aggregate.
      b. Pea Gravel: Size No. 8 for coarse aggregate.
   3. Water: Clean and potable.

2.2 MIXES

A. Mortar: ASTM C 270, Type S.
   1. Measurement: Accurately measure materials by ASTM C270 by the Property Method per Table 2.
   2. Mix cementitious materials and aggregates 3 to 5 minutes in a mechanical mixer. Small amounts of mortar may be mixed by hand. Adjust consistency of the mortar depending on the absorptive quality of the units being laid, and to the satisfaction of the mason.
   3. If mortar begins to stiffen, it may be re-tempered by adding water within a basin formed by the mortar, and remixing.

4. Use within 2-1/2 hours of initial mixing and no mortar shall be used after it has begun to set or after it has become harsh or non-plastic.
5. Water-Repellent Admixture: In accordance with Section 04 05 26.
6. Pre-blended Mortar Mix: Provide mortar as specified herein, except that dry ingredients may be pre-blended and bulk packaged for delivery to a jobsite silo (which loads into batch mixer) or bagged for hand loading into mixer. Moisture shall be extracted from sands. Digital printouts displaying the proportions of each batch shall be submitted to the Architect upon request. Mixing shall be accomplished by mechanical mixer in accordance with instructions provided by Pre-Blended Mortar Mix Distributor.

B. Grout:
1. Job-Site Mixed: In accordance with ASTM C476.
2. Transit-Mixed:
   a. Designed by the supplier or an independent testing laboratory with a minimum compressive strength of 2000 psi (140mPa) in 28 days, unless higher strength is required by the Structural Drawings and Notes.
   b. Slump: Not to exceed 9 inches, unless otherwise noted on Drawings.
   c. Use within 1-1/2 hours of initial mixing and use no grout after it has begun to set or after it has become harsh or non-plastic.
   d. Course grout may be used in cavity walls with a horizontal dimension of 2 inches or more, and in hollow cell construction 4 inches or more in both horizontal directions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation of mortar and grout shall be as specified under Section 04 22 00 – Concrete Unit Masonry.

B. Temperature: Mortar and grout shall have a temperature between 50 degrees F. and 90 degrees F. while being used.

C. Grout may be poured by hand bucket, concrete hopper or through a grout pump. Grout spaces shall not be wet down prior to pouring grout.

D. Provide water repellent to exterior of masonry as specified under Section 07 19 00.

3.2 FIELD QUALITY CONTROL

A. General: Tests and inspections as necessary to verify quality and strength of mortar and grout. Laboratory tests shall conform to applicable ASTM standards and tests.

B. Tests:
1. Frequency: As determined by the Architect based upon total time for construction of masonry with not less than two tests per each level of masonry construction, foundation to roof or floors.
2. Testing Laboratory: Inspection and testing of concrete mix will be performed by a testing laboratory in accordance with Section 01 45 00. The testing laboratory, in addition to meeting requirements of ASTM E329, must be an approved laboratory competent to perform cement physical testing.

3. Distribution of Results of Tests: Within 24 hours of results of tests, copies of the results shall be submitted to the Architect, Contractor, masonry contractor, and the grout supplier if applicable.

C. Mortar:
   1. Property Specification (ASTM C270): Testing in accordance with ASTM C 780.
   2. For determining hardened mortar properties, prepare 3 test specimens for each test age and property. A strength test shall be the average of the strengths of the specimens tested at the age specified. Specimens shall be tested at 7 and 28 days.

D. Grout:
   1. Testing per ASTM C1019.
   2. Three test specimens shall constitute one sample. A strength test shall be the average of the strengths of the specimen tested at the age specified.
   3. Specimens shall be tested at 7 and 28 days.
   4. The compression strength will be considered satisfactory if the average of three consecutive tests of the grout is equal to or greater than the specified strength and no individual strength test falls below the specified strength by more than 500 psi.

3.3 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION

SECTION 04 05 23

MASONRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Furnishing the following items for installation under Section 04 22 00:
   1. Ties.
   2. Anchors.
   3. Control joints.

1.2 SUBMITTALS

A. Product Data: Submit Manufacturer's brochures depicting each of the masonry accessories which will be used prior to delivering materials to the site or commencing the Work in this Section.

1.3 DELIVERY, STORAGE AND HANDLING

A. Storage and Protection: Store metal items at the site off the ground and in a manner to prevent damage to the materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, subject to compliance with Specification requirements.
   1. Dur-O-Wall Inc. www.dur-o-wall.com
   2. Heckmann Building Products, Inc. www.heckmannbuildingprods.com
   3. Hohmann and Barnard, Inc. www.h-b.com

2.2 MATERIALS

A. General
   1. Recycled Content
      a. Other Steel: Minimum 26% post-consumer and 7% pre-consumer recycled content.

B. Steel Wire: ASTM A82, diameter as specified for accessory.

C. Flat and Corrugated Sheet Steel: ASTM A653 or ASTM A568.

D. Bar Anchor Material: ASTM A36.

E. Galvanized Finish: ASTM A641, Class 1, mill galvanized for interior walls, or ASTM A153, Class B-2, hot dip galvanized for exterior walls.

F. Reinforcing Steel: As specified in Section 03 20 00.

2.3 ACCESSORIES

A. General: Anchors and ties shall be steel with zinc coated finish or shall be of other non-corrosive metal.

B. Veneer Ties:
   1. Provide anchoring systems that comply with ACI 530.1/ASCE 6/TMS 602.
   2. Masonry Anchors:
      a. Anchors to Concrete: No. 75: Heckmann "Pos-I-Tie®" Tapcon® Screw.
      b. Anchors to Masonry Backup: No. 75: Heckmann "Pos-ITie ®" Tapcon® Screw.
      c. Anchors to Metal Stud Backup: No. 75: Heckmann "Pos-I-Tie®" Self- Drilling Screw.
      d. Anchors to Structural Steel: No. 75: Heckmann "Pos-ITie ®" Dril-It® Screw.
      e. Anchors to Wood Stud Backup: No. 75: Heckmann "Pos-ITie ®" Tapcon® Screw.
   3. Masonry Ties:
      a. Masonry Veneer Ties: Provide minimum 2 inches embedment in mortar.
         1) Wire 3/16 inch diameter x [Length]
         2) Provide the following type as applicable and in accordance with requirements of General Structural Notes.
            a) No. 75 Pos-I-Tie® Triangle Wire Tie
            b) No. 75 Pos-I-Tie® Single Wire Tie
            c) No. 75 Pos-I-Tie® Double-J Wire Tie
         3) Other Applications: Where details or installation conditions require, provide ties fabricated of shape and size to suit conditions and provide adequate anchorage.
      b. Masonry Veneer Seismic Ties: Continuous wire in mortar joint, anchored to Pos-I-Tie® Triangle Tie with welded No. 370 Seismic clip.
   4. Material for Ties in Exterior Walls: Hot-dip galvanized.
   5. Material for Ties Exposed to Air in Exterior Walls: Hotdip galvanized.
   6. Material for Ties Completely Embedded in Mortar Joints: Mill galvanized.
   7. Materials
      a. Barrel Materials: Heckmann "No. 75 Pos-I-Tie®": One-Piece ScrewNconsisting of a 92% Zamac 2 Zinc barrel, washer, flanged head and eye to receive Pos-I-Tie® wire tie; designed to seat barrel directly on structural portion of backup, with flanged head covering fastener hole. Provide barrel shaft length to match thickness of materials applied over metal stud.
      b. Wire Tie Materials
         1) Hot-Dip Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A 153/A 153M, Class B-2.
            a) Wire: 3/16 inch diameter.
         2) Mill Galvanized Steel:
            a) Wire: ASTM A 641, regular coating; 3/16 inch diameter.

C. Joint Reinforcing: Ladder type, galvanized steel rods of width 2 inches less than wall thickness conforming to ASTM A951, corrosion protective finish with longitudinal wires not less than 0.148 inch (3.75mm) or more than one half the mortar joint thickness and cross wires not less than 0.148 inch (3.75mm) nor more than the diameter of the longitudinal wires with cross wires projecting nor more than 1/8 inch (3.2mm) beyond the outside longitudinal wires. Joint reinforcing shall be in accordance with requirements of IBC 2006, Chapter 21. and the Structural Drawings.

D. Anchors:
   1. Dovetail Anchor: 16 gage flat sheet steel, one inch wide, 5-1/2 inch length, designed for use with embedded slot or inserts.
   2. Bar Anchors: Machine made corrosion protected metal with cross section area not less than .25 square inch with ends turned up 2 inches, not less than 16 inches long for 8 inch walls nor less than 24 inches long for 12 inch walls.

E. Control Joints:
   1. Rubber: Extruded, solid section, ASTM D2000 2AA-805 with a durometer hardness of 70 or 80 when tested per ASTM D2240.
   2. Polyvinyl Chloride (PVC): ASTM D2287, Type PVC 654-4 with a durometer hardness of 85 (+5) when tested per ASTM D2240, minimum tensile strength of 1750 psi with minimum 300 percent elongation per ASTM D638, and cold crack brittleness of 50 degrees F per ASTM D746.
   3. Sizes and Profiles: As indicated on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Installation of masonry accessories shall be as specified under Section 04 22 00 – Concrete Masonry Units.

B. Veneer Ties:
   1. Pos-I-Tie® Screws:
      a. Self-Drilling Screw: Use a standard drill with a variable clutch adjustment and a Pos-I-Tie® Chuck Adapter. Place the barrel end of the screw inN the chuck adapter, drill through the gypsum board and into the metal stud.
      b. Tapcon® Screw: Use a standard hammer drill and a Pos-I-Tie® Sleeve Tool with a Pos-I-Tie Chuck Adapter on the end. Set Drill to Hammer, slide off the chuck adapter sleeve and drill a 2" deep hole into the backup with a 3/16" (4.76 mm) masonry drillbit. Replace the sleeve/chuck adapter, switch the hammer mode off, and place the barrel end of the screw in the chuck adapter. Drill the screw into the hole.
      c. Dril-It® Screw: Use a standard drill with a variable clutch adjustment and a Pos-I-Tie® Chuck Adapter. Place the barrel end of the screw in the chuck adapter, and drill the screw into the structural member. (Some structural steel may require predrilling a pilot hole)
   2. Pos-I-Tie® Wires: Configure ties to prevent flow of water to anchor and to transfer lateral loads without excess mechanical play or deformation.

C. Control Joints: Provide control joints 24'-0” minimum in run as indicated on Drawings and in accordance with the requirements of Specification Section for the masonry units.

3.2 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION

SECTION 04 05 26

INTEGRAL WATER REPELLENT

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

A. Performance Requirements: Water repellent admixture shall be provided in both the masonry units and mortar used in all above grade exterior CMU wall construction, including parapets, and shall constitute a complete integral water repellent system for exterior above grade walls meeting the following requirements:
   1. Admixture shall leave the finished surfaces water repellent and shall not alter the natural texture or color of the masonry units.
   2. Admixture shall provide wind driven rain resistance equivalent to Class E Rating as measured by ASTM E514-74.
   3. Bond strength as determined by ASTM E72 shall not be reduces by the use of the water repellent admixture

1.2 SUBMITTALS

A. Integrally Water Repellent Concrete Masonry Unit Samples: Unit manufacturer shall submit 3 samples of the masonry units to be used in the structure which will be reviewed by the Architect for both aesthetics and effectiveness.

B. Product Data: Indicate methods of fabrication and installation for the following materials:
   1. Submit current instructions stating the actual quantities of water repellent material required to meet the guarantee requirements.
   2. Submit test report data substantiating compliance with specified performance requirements.
   3. Detail Drawings (Water Repellent Units): Submit manufacturer's flashing and weep hole diagrams

C. Submit warranties for integral water repellent concrete masonry wall system as specified herein.

D. Unit manufacturer shall submit copy of current Certificate of Qualification issued by water repellent manufacturer.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Water repellent Manufacturer: Engaged in producing materials with a satisfactory performance for at least 5 years.
   2. Masonry Unit Fabricator/Manufacturer: Trained, approved and accepted by the manufacturer.

B. Mock-Ups: In accordance with Section 04 22 00 and as follows:

1. Admixture shall be used in materials used to construct the masonry sample wall mock-up located at the job site.
2. The purpose of this sample will be to observe color uniformity and intensity in the mortar, methods used to incorporate admixture into mortar, and workmanship techniques.

C. Regulatory Requirements: Use of water repellent admixtures shall be in strict accordance with applicable Federal, State, and local requirements, including, but no limited to, environmental regulations.

D. Preconstruction Meeting:
1. Prior to fabrication or installation of components of the masonry wall system, a jobsite meeting shall be conducted with the Architect, Contractor, masonry subcontractor, installer of related work, and other involved entities as required.
2. The purpose of this meeting is to ensure that individuals involved in the erection of masonry understand the procedures of erection to achieve a water-repellent masonry assembly system.

1.4 DELIVERY, STORAGE AND HANDLING

A. Mortar admixture shall be delivered to the job site in manufacturer's original containers with seals unbroken and labeled with manufacturer's batch number.

B. Do not store in areas where temperature will fall below 20 degrees F.

1.5 WARRANTY

A. Water Repellent Manufacturer: Water Repellent shall be warranted by admixture manufacturer to be free of defects and to meet manufacturer's published physical and chemical properties.

B. CMU producer shall warrant that Integral Polymeric CMU Water-repellent has been provided at appropriate dosage rate in all units shipped to this project for use in exterior walls.

C. Masonry installer shall warrant the only CMU's and mortar containing Integral Polymeric CMU water-repellent have been placed in exterior walls and that admixture was included in the mortar mix in accordance with water repellent manufacturer's printed instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Water Repellent Admixture: The following shall be included in exterior masonry units.
1. Liquid polymeric admixtures formulated for mixing with mortar mix and formulated for mixing with concrete during production of concrete masonry units to cross link and provide resistance to water penetration to achieve a Class E rating when tested in accordance with ASTM E514.
2. Admixture shall not reduce flexural and compressive strength of mortar when tested in accordance with ASTM C1072 and C780.

3. Concrete Masonry Unit Manufacturer: Acceptable to integral water repellent manufacturer and qualified by integral water repellent manufacturer to comply with ASTM E514 for water permeance testing.
4. Acceptable Product and Manufacture: Dry Block Mortar Admixture as manufactured by W.R. Grace & Co. or equal as approved by Architect.

PART 3 - EXECUTION

3.1 ERECTION, INSTALLATION, APPLICATION

A. In accordance with 04 22 00

END OF SECTION

SECTION 04 22 00

CONCRETE MASONRY UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Concrete masonry unit work as noted on Drawings and as specified herein.

1.2 SUBMITTALS

A. Test Reports:
   1. Submit test results for concrete masonry units for exterior building wall construction to be used to Architect in accordance with Section 01 45 00.
   2. Test results shall clearly indicate:
      a. Types of materials and composition.
      b. Classification of concrete masonry unit in accordance with ASTM C90 requirements.
   3. Testing laboratory shall notify Architect of non-conforming material submittals.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements: Masonry materials and workmanship shall meet requirements of building codes which are applicable to jurisdiction in which Project is located.

B. Certifications:
   1. Concrete masonry units shall be supplied by a certified manufacturer.
   2. The Masonry Subcontractor shall have a supervisor on the jobsite, whenever masonry work is being performed, who is certified by the jurisdictional Masonry Association. Proof of certification shall be submitted to the Architect prior to start of masonry work.

1.4 DELIVERY, STORAGE AND HANDLING

A. Transport and handle masonry units in such a manner as to prevent chipping and breakage.

B. Deliver and store materials in dry, protected areas.

C. Keep free of stain or other damage.

D. Locate storage piles, pallets, stacks, or bins to avoid or protect material from heavy or unnecessary traffic.

E. Segregate storage piles, pallets, stacks, or bins of fire-rated units from non-rated units and maintain clear identification of the rating of the units.

F. Replace damaged material at no cost to Owner.

1.5 PROJECT/SITE CONDITIONS

A. Hot Weather Requirements:
   1. When ambient air temperature exceeds 100 degrees F., or when ambient air temperature exceeds 90 degrees F. and wind velocity is greater than 8 mph, Masonry Contractor shall implement hot weather protection procedures as submitted to Architect.
   2. Do not spread mortar beds more than 4 feet ahead of placing block units.
   3. Place block units within one minute of spreading mortar.

B. Cold Weather Requirements:
   1. Fully protect concrete masonry units against freezing by a weather-tight covering which shall also prevent accumulation of ice.
   2. Do not lay concrete masonry units when temperature of surrounding atmosphere is below 40 degrees F. or is likely to fall below 40 degrees F period after lying, unless adequate protection is provided.

C. Field Measurements:
   1. Verify measurements shown on Drawings by taking field measurements.
   2. Proper fit and attachment of concrete masonry units is required.

1.6 SCHEDULING AND SEQUENCING

A. Coordination: Coordinate with other Trades whose Work relates to concrete masonry unit installation for placing required blocking, backing, furring, conduits and other items.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General Requirements for Concrete Masonry Units:
   1. Concrete masonry units shall meet ASTM C90 requirements except that when CMU will be exposed in final construction, ASTM C90, paragraph 7.2.1 shall be modified to read: "Three percent of a shipment containing chips not larger than 1/2 inch in any dimension, or cracks not wider than 0.02 in. and no longer than 10% of the nominal height of the unit is permitted." Linear shrinkage of units of units shall not exceed 0.065 percent. Allowable design strength shall be F'm=1500 psi, except as otherwise noted on drawings.
   2. Units shall be in the same condition in wall as they were upon delivery.
   3. Unit sizes shall be as shown on Drawings.
   4. Texture and color shall be consistent for all units provided for exposed walls. Range of texture and color shall be within that shown by samples reviewed by Architect.
   5. Surface of units shall be clean and free from dirt when laid in walls
   6. Units not complying with the appropriate ASTM Standards shall not be laid in the wall where exposed to view. Any unit that is chipped in excess of the requirements specified herein will be rejected and shall be removed and replaced.
   7. Provide special block sizes and shapes required or as shown on Drawings.
   8. Recycled Content:
      a. Masonry: Minimum 10% pre-consumer recycled content.
   9. Regional Materials:
      a. Masonry: Minimum 100% regional content.

B. Hollow CMU Classifications: The following requirements shall apply to all shapes, colors, textures and sizes of CMU provided.
   1. Normal weight units: Weighing 125 lbs. per cubic foot or more and manufactured with sand conforming to ASTM C33.

C. Standard Smooth Faced CMU:
   1. Manufacturer's standard smooth faced units.
   2. Integral Color: As noted on Drawings and to match samples accepted by Architect. Standard grey units to be used at locations where units will not be exposed in the final work.

D. Accessory Units: Provide units as required for window sills and jambs, doors, control joints, bond beams, lintels, pilaster, caps and other locations as indicated on Drawings with a minimum of block cutting. Accessory units shall match adjacent unit color and texture unless noted otherwise.

2.2 ACCESSORIES

A. Joint Reinforcing: In accordance with Section 04 05 23

B. Reinforcing Steel: As specified under Section 03 20 00.

C. Control Joint, Strap Anchors, Wall Ties, Dovetail Anchors: See Section 04 05 23.

D. Mortar and Grout: As specified under Section 04 05 15.

E. Sheet Metal Flashings: See Section 07 60 00. Furnish shapes in accordance with project requirements and NCMA TEK 19-2A, 19-4A and 19-5A.

F. Steel Lintels: As indicated or scheduled on Structural Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Installer shall examine supporting structure and conditions under which unit masonry is to be installed, and notify Contractor, in writing, conditions detrimental to proper and timely completion of Work. Do not proceed with the installation of unit masonry Work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

B. Do not use units with chips, cracks, or other defects which might be visible in the finished Work unless otherwise acceptable to the Architect.

C. Do not build on frozen Work; remove and replace unit masonry Work damaged by frost or freezing.

D. Do not use frozen materials or materials mixed or coated with ice or frost. Do not lower freezing point of mortar by use of admixtures or anti-freeze agents, and do not use calcium chloride in mortar or grout.

3.2 PREPARATION

A. Protection: Protect sills, ledges, offsets and other projections from dropping of mortar and grout.

3.3 ERECTION, INSTALLATION, APPLICATION

A. General Requirements for Concrete Masonry Walls:
   1. Workmanship:
      a. Provide Custom Level workmanship as defined by AMG Standard 107 for all CMU exposed to view in the final work. Comply with tolerances specified herein.
      b. Concrete masonry units which will be exposed in the finished work shall be treated as an architectural finish and shall be handled carefully to ensure that chippages do not occur during handling and laying. Handling shall be minimized on the jobsite to eliminate chances for chippage.
   2. Lay units in uniform and true courses, level and plumb to height indicated on Drawings.
   3. Lay concrete unit masonry in such a way that cracks are not formed at time unit is placed in wall.
   4. Units shall not be wetted before being used and shall be laid dry.
   5. Adjusting Units:
      a. Units shall be adjusted to be level, plumb and straightened into final position in wall while mortar is still soft and plastic enough to ensure a good bond.
      b. Avoid over-plumbing and pounding of corners and jambs to fit stretcher units after they are set in position.
      c. If position of unit is shifted after mortar has stiffened, or bond is broken or cracks are formed, re-lay unit in new mortar.
   6. Bearings on Walls: Provide 3 courses of solid units or grouted hollow masonry units below steel bearing plates or beams bearing on walls. Extend bearings each side of contact with load as required to properly transfer loads into wall.
   7. Openings: Provide openings in masonry walls where required or indicated. Steel lintels shall be provided unless otherwise noted.
   8. Cutting of masonry: When required, exposed block units shall be cut with a power driven Carborundum or diamond disc blade saw. When using "wet" cutting methods, clean water shall be used on exposed units.

B. Bonding:
   1. Bond pattern shall be as indicated on the drawings and directed by Architect.
   2. Bond shall be plumb throughout face of wall.

C. Bearing Wall Intersections:
   1. Intersecting block bearing walls shall not be tied together in a masonry bond, except at corners.
   2. One wall shall terminate at face of other wall with a control joint at intersection.
   3. Tie intersecting wall together with a metal tie bar, 1/4 inch x 1-1/4 inches x 2'-4" long with a 2 inch right angle bend at each end of bar, spaced vertically at 2 feet on center.
   4. Bends at ends of tie bars shall be embedded in grouted cells.
   5. Rake out vertical joint between intersecting walls to a depth of 3/4 inch after mortar has stiffened.
   6. Provide sealing of control joint as specified in Section 07 92 00.

D. Non-Bearing Wall Intersections:
   1. Tie non-bearing wall together with strips of metal lath or galvanized 1/4 inch mesh hardware cloth placed across joint between 2 walls placed in alternate horizontal block courses.

2. Rake out vertical joint between intersecting walls to a depth of 3/4 inch after mortar has stiffened.
3. Provide sealing of control joint as specified in Section 07 92 00.

E. Joining of Work:
1. Where fresh masonry joins partially set masonry the exposed surface of the set masonry shall be cleaned and lightly wetted so as to obtain the best possible bond.
2. Remove loose concrete block and mortar.
3. Stop-off a horizontal run of masonry by racking back 1/2 brick length in each course and, if grout is used, stopping the grout 4 inches back of the rack.
4. Toothing will not be permitted, except upon written approval of the Architect.

F. Mortar Joints:
1. Joints shall be straight, clean and a uniform 3/8 inch thickness on exposed wall face and in accordance with NCMA TEK 19-2A.
2. Exposed vertical and horizontal joints shall be tooled when mortar is “thumbprint” hard with round or other approved jointer, slightly larger than the width of the joints to produce a dense, tooled surface which is well bonded to block at edges.
3. Where exposed in the final work, joints shall be deeply struck for horizontal (bed) joints and flush for vertical (head) joints. All joints exposed to the weather shall be "tooled".
4. Joints shall be tooled flush at:
    a. Below grade and planter surfaces to receive dampproofing or waterproofing,
    b. Interior or exterior surfaces to receive ceramic tile, stucco, plaster or other finishes requiring flush joints that are to be concealed.
5. Solidly fill joints from face of unit to depth of face shell, except where specified otherwise.
6. Full bedding to be provided for first course on foundation and wherever maximum strength is required.
7. Butter vertical head joints well and shove these joints tight so that mortar bonds well to both units.
8. Full coverage to be provided on bed of face shells and webs surrounding cells to be filled.
9. Bee-holes or other open joints shall be filled and tooled with mortar while mortar is still fresh.

G. Control Joints:
1. Provide control joints, as detailed, at vertical masonry walls where such walls exceed 40 feet in length. In long length of walls, provide joints at approximately 24 feet on center or as detailed.
2. Control joints shall be continuous full height of walls.
3. At bond beams, control joints shall separate both block and grout; however, steel reinforcing shall be continuous.
4. Horizontal wire reinforcing shall not run through control joint.
5. Control joints shall not occur at wall corners, intersections, ends, within 24 inches of concentrated points of bearing or jambs or over openings unless specifically indicated on Structural Drawings.
6. Control joint materials shall be held back from finished surface as required to allow for sealant and back-up materials.

H. Horizontal Joint Reinforcing:
1. Place horizontal joint reinforcing every 16 inches vertically throughout wall construction.
2. Continuously reinforce first bed joint immediately above and below openings. Provide reinforcing in second bed joint above and below openings which extends 2 feet beyond each side of opening.
3. Lap reinforcement a minimum of 6 inches at splices.
4. Cut and bend reinforcing at corners.

I. Vertical Reinforcing and Bond Beam Reinforcing:
   1. Place in accordance with requirements of Drawings.
   2. Vertical Reinforcement: Provide continuous reinforcing full height of wall at wall ends, corners, intersections, jambs of openings and each side of control joints. Vertical reinforcing shall match and lap dowels which are at top of foundation walls and precast concrete beams.
   3. Bond Beams: Provide horizontal reinforcing of 2 bars in minimum 8 inch deep grouted continuous bond beam at roof and elevated floor lines.
   4. Parapets: Provide horizontal reinforcing of 1 bar in minimum 8 inch deep grouted continuous bond beam at top of parapets.
   5. Bond Beam and Parapet Reinforcing at Vertical Control Joints: See Structural Drawings.
   6. Bond Beam and Parapet Reinforcing at Corners and Wall Intersections: Provide bent bars to match reinforcing at corners and wall intersections. See Structural Drawings.
   7. Lap splices in reinforcing per Structural Drawings.
   8. Use spacers to position reinforcing steel in center of grout at center of wall as required by code.

J. Grouting:
   1. Reinforcing steel is to be in place and inspected before grouting starts.
   2. Vertical cells to be filled shall have vertical alignment to maintain a continuous cell area.
   3. Keep cell to be grouted free from mortar.
   4. Fill cells solidly with grout in lifts not to exceed 4 feet.
   5. Grout may be poured by hand bucket, concrete hopper or through a grout pump.
   6. Do not wet down grout space prior to pouring of grout.
   7. Stop pours 1-1/2 inches below top of cell to form a key at pour points.
   8. Grout shall be consolidated by mechanical vibration during placing before loss of plasticity in a manner to fill grout space. Grout pours greater than 12 inches shall be reconsolidated by mechanical vibration to minimize voids due to water loss. Grout pours 12 inches or less in height shall be mechanically vibrated or rodded.
   9. Grout barrier below bond beams shall be continuous wire lath or other approved material.
   10. Grout beams over openings and bond beams in a continuous operation.
   11. Solidly grout in place bolts, anchors, and other items within wall construction.
   12. Fully grout jambs and head of metal door frames connected to masonry. Filling of frames shall be done as each 2 feet of masonry is laid.
   13. Use extreme care to prevent grout or mortar from staining face of the masonry.
   14. Immediately remove grout or mortar which is visible on face of masonry.

K. Provisions for Other Trades and Built-in Items:
   1. Build in items required and indicated, including; but not limited to, reinforcing steel, anchors, flashings, sleeves, frames, structural steel, loose lintels, anchor bolts, nailing blocks, door and window frames and miscellaneous iron.
   2. Enclosures for pipes, stacks, ducts and conduits:
      a. Construct slots, chases, cavities, and similar spaces as required.
      b. Where masonry is to enclose conduit or piping, bring it to proper level indicated and as directed.
      c. Cover no pipe, conduit chases, or enclosures until advised that Work has been inspected and approved.

L. Tolerances: Masonry work that does not conform to the following tolerances shall be repaired or replaced as directed by the Architect. Tolerances are based on actual dimensions.
   1. External corners and other conspicuous lines and levels: +/- 1/4 inch in any 10’-0”section.
   2. Line of sealant filled movement joints (allowable deviation from specified or indicated): +/- 3/8 inch in any 10’-0” section.

3. Actual cross sectional dimension of columns and walls (allowable deviation from specified or indicated): - 1/4 inch, + 1/2 inch.
4. Adjacent unit faces in plane (allowable deviation from specified or indicated): +/- 1/8 inch.
5. Mortar bed joint thickness (allowable deviation from specified or indicated): -1/8 inch, +1/8 inch.
6. Mortar head joint thickness (allowable deviation from specified or indicated): - 1/8 inch, + 1/4 inch.
7. Vertical alignment of the centerline of corresponding head joints in alternate courses when using other than stack bond (allowable deviation from specified or indicated): +/- 3/8 inch.
8. Vertical alignment of the centerline of all head joints in a total wall height not to exceed 30'-0" when using other than stack bond (allowable deviation from specified or indicated): +/- one inch.
9. Vertical alignment of the centerline of all head joints in total wall height not to exceed 30'-0" when using stack bond: (allowable deviation from specified or indicated): +/- 1/2 inch.

3.4 FIELD QUALITY CONTROL

A. Masonry Tests: Inspection and testing of masonry will be performed by a testing laboratory in accordance with Section 01 45 00.
   1. Provide free access to Work and cooperate with appointed firm.
   2. A set of 3 masonry prisms shall be built and tested in accordance with ASTM C1314 (formerly E447) Method B for each 5,000 square feet of wall area, but not less than one set of 3 masonry prisms for the Project.

3.5 ADJUSTING

A. Pointing of Mortar Joints:
   1. Point and fill holes and cracks in exposed mortar joints.
   2. Cut out defective mortar joints to a depth of at least 1/4 inch.
   3. When cutting is complete, remove dust and loose material by brushing or vacuuming.
   4. Prehydrate mortar for pointing by mixing dry ingredients with only sufficient water to produce a damp mass of such consistency that it will retain its form when it is pressed into a ball with hands, but will not flow under trowel.
   5. Allow mortar to stand for a period of not less than one hour nor more than 2 hours, after which remix with addition of sufficient water to produce satisfactory workability.
   6. Pointing mortars shall be identical to adjacent mortar in similar joints and finish results shall match and be indistinguishable from original mortar used.
   7. Premoisten joint and apply mortar tightly.
   8. Tool to match adjacent joints.
   9. Moist cure for 72 hours.

B. Patching: If approved by Architect, patching of exposed masonry walls shall be done at conclusion of general Work and shall conform as closely as possible to similar surrounding or adjoining Work.

3.6 CLEANING

A. Daily Cleaning: Keep walls clean. Soiled masonry from mortar and grout spills which will be exposed to view at completion of Project shall be cleaned immediately with stiff fiber brushes until wall is free of dropped or spattered mortar.

B. Remove scaffolding and equipment used in Work.

C. Clean up debris, refuse and surplus material and remove from premises.

3.7 PROTECTION

A. Furnish temporary protection for exposed masonry corners subject to injury.

B. Carefully cover tops of walls left incomplete at conclusion of day's Work with tarpaulins or other approved covering.

C. In hot and dry weather, protect masonry against too rapid drying.

D. Protect finished Work against freezing for a period of not less than 48 hours by means of enclosures, artificial heat, or such other protective methods as may be required.

END OF SECTION

SECTION 04 73 10

QUARTZ SURFACE FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Quartz fabrications, as indicated on Drawings and as specified, including, but not limited to Vanity tops, counter tops.

1.2 SUBMITTALS

A. Product Data: Indicate product description, fabrication information and compliance with specified performance requirements.

B. Shop Drawings: Indicate dimensions, component sizes, fabrication details, attachment provisions and coordination requirements with adjacent work.

C. Samples: Submit minimum 6 inches x 6 inches samples. Indicate full range of color and pattern variation. Approved samples will be retained as a standard for work.

D. Maintenance Data: Submit manufacturer's care and maintenance data, including repair and cleaning instructions.

1.3 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications:
   1. Certified or approved by the Manufacturer.
   2. Subject to approval by Architect.
   3. Have adequate physical facilities and sufficient production capacity to produce, transport, deliver, and install the required units without causing delay in the work.
   4. Have a minimum of 2 years of fabrication experience.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver no components to project site until areas are ready for installation. Store indoors in a dry area and away from extreme temperatures.

B. Deliver materials and accessory products in manufacturer's unopened containers.

C. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.5 WARRANTY

A. Provide manufacturer's ten year limited warranty against visible defects and failure due to manufacturing defects. Damage caused by physical or chemical abuse or damage from excessive heat is excluded from warranty. Warranty shall provide material and labor to repair or replace defective materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish plastic products of one of the following manufacturers, except as approved by the Architect, subject to compliance with Specification requirements.
   1. Zodiaq ® quartz surfaces from DuPont (basis of design).

2.2 MATERIALS

A. General
   1. Provide recycled materials
   2. Provide local/regional materials

B. Homogeneous quartz surface material.

C. Provide edge details as shown on the Drawings.

D. Exposed joints shall be in locations shown on the Drawings. Seams not indicated on the Drawings shall be unexposed and adhesively joined.

E. Thickness: 2cm (3/4”).

F. Finish and Color: As indicated on drawings or selected by Architect.

G. Seam Width <1/8” unless otherwise specified

2.3 ACCESSORY PRODUCTS

A. Adhesives: Solvent free, zero VOC, nonflammable, nontoxic and acceptable to Architect for application
   1. Joint Adhesive: DuPont-approved adhesive to create color-matched seam.
   2. Adhesive: ANSI A136.1-1967 and UL(R) listed.

B. Sink/bowl mounting hardware:
   1. Manufacturer’s approved bowl clips, brass inserts, and fasteners for attachment of under mount sinks/bowls.

2.4 FACTORY ABRICATION

A. Factory fabricate components to greatest extent practicable to sizes and shapes indicated, in accordance with approved shop drawings.

B. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.

C. Cut and finish component edges with clean, sharp returns. Route radii and contours to template. Repair or reject defective and inaccurate work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Install components plumb and level, scribed to adjacent finishes, in accordance with approved shop drawings and manufacturer's installation instructions.

B. Form field joints using manufacturer's recommended adhesive with joints inconspicuous in finished work. Keep components and hands clean when making joints.

C. Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Keep clean until Date of Final Completion. Replace stained components.

3.3 PROTECTION

A. Protect surfaces from damage until Date of Final Completion. Repair work or replace damaged work that cannot be repaired to Architect's satisfaction.

3.4 CLEANING

A. During the course of the Work and on completion of the Work, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 05 10 00

STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Structural steel framing including, but not limited to:
   1. Columns
   2. Beams
   3. Lintels
   4. Anchor Bolts
   5. Shelf Angles
   6. Bearing Plates,
   7. Miscellaneous Structural steel items.

1.2 SUBMITTALS

A. Shop Drawings: Submit shop and erection Drawings clearly showing each piece required for fabrication and erection. Drawings shall include material grade, camber, holes and other pertinent data. Indicate welds by standard AWS symbols showing size, length, and type of each weld.

B. Test Reports: Submit reports for welded connection tests.

C. Submit anchor setting drawings clearly showing location of all anchor bolts and embedded plates to be anchored in concrete and masonry construction. Provide templates for anchor bolts.

1.3 QUALITY ASSURANCE

A. Welding:
   1. Performed by certified welders in compliance with AWS D.1 Structural WeldingCode.
   2. Welders shall be duly qualified within the last 12 months in the position in which they are to weld and the qualifications and Specifications for workmanship shall comply with the AWS requirements "AWS Structural Welding Code - Steel."

B. Certifications:
   1. Prior to fabrication or shipment of material to the job site, furnish certification of the Manufacturer of the structural steel that material furnished meets or exceeds requirements of ASTM standards specified or noted on Drawings, for each type of material.
   2. Prior to site welding operation, submit welders' written certifications and qualifications.

C. Tolerances: All steel exposed to view shall be architectural steel, and tolerances as a minimum shall comply with section 10 of AISC code of standard practice. Steel beams and girders will be exposed, both interior and exterior.

1.4 DELIVERY, STORAGE AND HANDLING

A. Exercise care during unloading, storage and erection to avoid damage. Dumping on the ground is not permitted.

B. Support material stored at the site completely free of the ground, and cover to avoid damage from the elements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Materials shall be new, of uniform quality, suitable and without defects affecting the strength or service of the structure.

B. Structural Steel: ASTM A572 or A992, except angles, and channels shall be ASTM A36 (Fy = 36ksi), unless noted otherwise on Drawings.

C. Steel Pipe Columns: ASTM A53 Grade B or ASTM A500 (Fy = 42,000 psi).

D. Steel Tube Columns: ASTM A500, Grade B.

E. Bolts:
   1. Machine Bolts: ASTM A307, unless otherwise indicated.
   2. High Strength Bolts: ASTM A325.

F. Welded Anchors and Shear Connectors: ICC approved, as manufactured by KSM or Nelson.

G. Welding Rods: AWS A5.0, E70 series, low hydrogen type.

H. Metal Primer: VOC compliant.
   1. Interior Steel: Tnemec FD88-559 Gray www.tnemec.com.
   2. Exterior Steel:
      a. Exposed to view: Compatible with high performance coating specified in Section 09 96 00.
      b. Other Locations: Tnemec Tneme-Zinc 90-97 (organic).

2.2 FABRICATION

A. Workmanship and details of construction (except as otherwise indicated or specified) shall be in conformity with applicable articles of the latest AISC Manual, Parts 1 through 4; AISC Specifications; except Section A7 (Design Documents) and Chapter N (Plastic Design); and the applicable building codes. Sections 3.1, 3.4 and 4.2 of AISC code of Standard Practice are specifically excluded from this work.
   1. Sections shall be of dimensions, weight and design as indicated, assembled complete at the shop, with base plates and other detailed materials attached.
   2. Furnish 1/4-inch-thick leveling plates at columns where base plates are shop fabricated to columns.
   3. Make connections as indicated or detailed, on the Drawings and the reviewed shop and erection Drawings.
   4. Exposed steel shall have smooth, clean surfaces with no identifying trademarks, names etc., exposed to view.

5. Leave in condition for finish painting.

B. Bolted connections shall be as detailed or shall conform to AISC standard bolted connections with maximum number of 3/4-inch diameter (or diameter specified on Drawings) bolts. See Framed Beam Connections Tables II, III, or IV of AISC Manual of Steel Construction.

C. No slotted holes permitted at steel connections unless shown on Drawings or approved by Structural Engineer.

D. Where bolt holes in steel members are enlarged to more than 1/16-inch diameter oversize, provide 3/16-inch x 2-1/2-inch x 2-1/2-inch plate washers to steel members with 3/16-inch fillet weld all around.

E. Loose Steel Lintels: Provide loose structural steel shape lintels for openings and recesses in masonry walls and partitions, as shown. Weld adjoining members together to form a single unit. Provide not less than 4 inch bearing at each side of openings, unless otherwise shown.

F. Shelf Angles: Provide structural steel shelf angles of sizes shown for attachment to concrete framing. Provide slotted holes to receive 3/4 inch bolts, spaced not more than 6 inches from ends and not more than 24 inches o.c., unless otherwise shown.

G. Loose Bearing Plates: Provide loose bearing plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.

2.3 SHOP FABRICATION FOR USE OF HIGH STRENGTH BOLTS

A. Joint surfaces, including those adjacent to the bolt heads, nuts or washers, shall be free of loose mill scale, burrs, or any foreign material (including paint). Field paint these areas with the specific shop paint after erection and completion.

B. Joints using high strength bolts shall be inspected by a representative of an independent testing laboratory acceptable to the Owner's Representative.
   1. Inspection shall be accomplished by the use of a properly calibrated torque wrench.
   2. Calibration shall be by the procedure specified in the Specifications for structural joints using ASTM A325 or A490 bolts, under Section 9, inspections (pp. 6-276) Ninth Edition, AISC Manual of Steel Construction.
   3. Check a minimum of 20 percent of the bolts in each connection.
   4. If one or more of the bolts checked in any connection is below the minimum tension, check all of the bolts in that connection.
   5. Bolts which cannot be properly tensioned will be rejected.

C. Check calibrated wrenches individually for accuracy at least once daily for actual conditions of application.

D. The Inspector shall check to insure that bolt threads are eliminated from the shear planes. Submit copies of the torque reading for each connection directly to the Architect in the form of a report, along with the minimum torque values required to reach the specified tensions and the calibration procedures.

E. The use of load indicator washers or twist-off spline type of fastener requires specific prior approval of the Architect.

2.4 SHOP WELDING

A. Make welds by the electric-arc process.

B. Grind exposed welds smooth.

C. Where weld size is not indicated, it shall develop full strength of member and connection.

2.5 PAINTING - SHOP COAT

A. Items of steel and iron Work indicated or specified to be encased in concrete shall not be painted.

B. Primer applied to members to receive spray fireproofing shall have been tested and certified as acceptable for application and shall be approved by fireproofing manufacturer.

C. Clean steel Work by wire brushing, or by other means selected by the fabricator, of loose mill scale, loose rust, accessible weld slag, or flux deposit, dirt and other matter. Remove oil and grease deposits by solvent. Solvents used shall be low toxic and meet the standards of Section 01 60 00.

D. After cleaning, give steel Work one coat of metal primer.
   1. Apply primer thoroughly and evenly to dry surfaces by brush, spray, roller coating, flow coating or dipping at the selection of the fabricator.
   2. See also Section 09 91 00 for requirements regarding paints for compliance with LEED™ requirements.

E. Apply primer at a rate of 350 sq. ft. per gallon to provide a wet film of 4.5 mils.

F. Paint erection marks on painted surfaces. Touch-up surfaces where welding, grinding of welds, joints, etc. are done in the field.

G. The paint shall be thoroughly dry before the members are handled or loaded.

2.6 SOURCE QUALITY CONTROL

A. Tests: Where a welded splice is fabricated in beams or columns other than those detailed, fabricator shall have splice connection tested using one of the following methods: magnetic particle, radiographic, or ultrasonic. Testing shall be conducted by an independent testing laboratory and a report submitted to the Architect. The costs of this testing shall be borne by the fabricator.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Verify anchor bolt locations, grouting and elevation of base and setting plates, and other material set by other Trades before commencing Work.
   2. Notify Architect of Work set by others which does not comply with specified tolerances. Do not erect material upon such Work until it has been satisfactorily corrected.

3. Start of Work implies acceptance of Work of other Trades affecting structural frame erection.

3.2 ERECTION

A. Erect Work to the proper lines and levels, plumb and true, and in correct relation to other Work maintain this condition to completion.

B. Connections:
   1. Machine Bolting:
      a. Fair-up holes with pins to align holes before bolting.
      b. Ream unfair holes to obtain alignment or drill new holes.
      c. Enlargement of holes with drift pins or burning of new holes is not permitted.
      d. Draw bolts up tight after members are aligned and leveled, and set or deform threads to prevent loosening.
   2. Welding:
      a. Weld by shielding arc method per AWS standard code for arc and gas welding in building construction.
      b. Submit certification that welders have passed AWS code qualification tests.
      c. Refer to Shop Drawings for weld size and dimensions.
      d. Close joints exposed to weathering with continuous 1/8-inch weather welds.
      e. Grind smooth exposed welds, but grinding shall not reduce weld strength or required cross section.
      f. Protect finish material from damage due to welding.
      g. Remove unsatisfactory welds by chipping or arc air method.
   3. Connect members temporarily and align completely before making permanent connections.
      a. Temporary conditions shall consist of bolts in no less than 1/3 of the holes and in no case less than 3 bolts in any single connection.
      b. Surfaces in contact shall be thoroughly clean when assembled.
      c. Provide necessary temporary bracing and guying to align the structure properly for permanent connections, and safely resist erection, dead load and wind stress.
      d. Take particular care to have the Work plumb and level (maximum slope ratio tolerance 1 to 500 for interior members, 0 to 1000 for exterior members) before making permanent connections.
      e. Remove bracing and guys only after permanent alignment and assembly and structure is capable of completely sustaining design and temporary construction loads.

C. Exposed Steel:
   1. Verify the condition of exposed steel after erection.
   2. Exert particular care to provide a neat, accurate installation with members straight and true, corners and edges square, sharp and free from burrs and irregularities, adjacent members perfectly matched and no bolts or rivets exposed.
   3. Remove erection bolts and seats and plug weld and grind holes smooth.

D. Touch-up Painting:
   1. Remove temporary guys, bracing and bracing clips, and grind flush remaining burrs, before painting. Remove welding slag, spatter, rust and burnt paint and wire brush clean welds before touch-up.
   2. Touch-up Painting: Touch-up welds, abrasions, bolted connections, and other areas where shop prime paint has been removed or is damaged with specified prime paint or galvanizing repair paint.

3.3 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises.

END OF SECTION

SECTION 05 31 00

STEEL DECK

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

A. Design Requirements:
   1. Increase S and I properties for simple or two span continuous to achieve equivalent load capacity. Minimum allowable diaphragm shear furnished, per ICC report, shall be 435 pounds per foot.
   2. Sections and properties shall meet AISC Specifications.

1.2 SUBMITTALS

A. Shop Drawings: Submit shop and erection Drawings showing layout, material and fastening methods and each piece to be erected. Note deck welding pattern and physical properties of decking.

B. Report: Submit ICC report showing diaphragm shear test.

1.3 QUALITY ASSURANCE

A. Welding: Performed by certified welders in compliance with AWS D.1.3 requirements and procedures for manual shielded metal arc welding.

B. Certifications:
   1. Prior to fabrication or shipment of material to the job site, furnish certification of the manufacturer of the steel decking that material furnished meets or exceeds requirements of ASTM standards specified or noted on Drawings, for each type of material.
   2. Prior to site welding operation, submit welders' written certifications and qualifications.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle metal decking in manner which will prevent damage or deformation.

B. Stack decking stored at the site before erection on platforms or pallets, and suitably protect from the weather.

C. Exercise special care so as not to damage or overload the decking during the construction period.

D. Do not use metal decking for storage or as a working platform until the sheets have been welded in position.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, except as approved by Architect, subject to conformance with Specification requirements:
   1. Consolidated Systems, Inc. www.csisteel.com
   2. Metal Deck, Inc.
   3. United Steel Deck, Inc. www.njb-united.com/usd.htm
   4. Verco Manufacturing, Inc. www.vercodeck.com
   5. Vulcraft Division, Nucor Corp. www.vulcraft.com/sc
   6. Wheeling Corrugating Division www.wheelingcorrugating.com
   7. Approved equal subject to conformance with specifications and General Structural Notes for the project in accordance with Section 01 60 00.

2.2 MATERIALS – GENERAL

A. Recycled Content:
   1. Structural Steel: Minimum 75% post-consumer and 15% pre-consumer recycled content.
   2. Steel Decking: Minimum 75% post-consumer and 15% pre-consumer recycled content.
   3. Other Steel: Minimum 26% post-consumer and 7% pre-consumer recycled content..

2.3 2.03 RIBBED DECK

A. Steel Deck and Finish: General Requirements: In accordance with General Structural Notes on Structural Drawings.

2.4 2.04 ACCESSORIES

A. Provide ridge and valley plates, closures, can't strips, roof sump pans and other accessories where required or as shown on Drawings and of same material and finish as steel deck.

B. Furnish miscellaneous supporting members at openings and edges, as shown on Drawings and as required.

C. Galvanizing Repair Paint: High zinc-dust content paint complying with SSPC Paint 20 (94 percent minimum zinc dust content, dry film, by weight).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Erector shall examine subsurfaces to receive Work and report detrimental conditions, in writing, with a copy to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Before proceeding, verify that required inspections of existing conditions have been completed.

3.2 ERECTION - RIBBED DECK

A. Place deck sheets in accordance with approved erection layout Drawings and in accordance with requirements of General Structural Notes on Drawings.

B. Deck units shall be fabricated to span three or more support spacing, with end laps of at least two inches which shall occur over supports. Male joint of side laps shall engage female joint by at least 5/8 inch.

C. Openings shown on the erection layout Drawings shall be cut by the deck erector. Openings not shown on the erection diagram, such as those required for stacks, conduits, plumbing vents, etc. shall be cut and reinforced if necessary, by the Trade requiring the openings.

D. Attach deck to supporting members by fusion welding. Care shall be exercised by the welder in the selection of electrodes and amperage to provide positive welds and prevent high amperage blow holes. Welds shall be made from the top side of the deck with the welder following close behind the placement crew.

E. Ridge and valley plates, closures, can't strips, roof sump pans and other accessories shall be attached directly to the deck to provide a suitable surface for the application of insulation and/or roofing.

F. Welding washers are not necessary for ribbed deck of 22 gauge or heavier, or when the bottom rib width equals or exceeds 5/8 inch.

G. Where washers are required, weld deck to steel framing through 16-gauge welding washers with 1-inch x 3/8-inch puddle welds. Maximum weld spacing shall be as follows unless noted otherwise on the Structural Drawings:
   1. End and end laps: 6 inches o.c.
   2. Intermediate supports: 6 inches o.c.
   3. Edges, perimeter beams and angles parallel to deck flutes: 12 inches on center
   4. Opening edges: 6 inches on center

H. Weld sheets to each other with side seam welds at 12 inches on center.

3.3 FIELD QUALITY CONTROL

A. Tests: When required by the Architect, installation of metal decking and welding shall be subject to inspection by a qualified Testing Agency acceptable to Architect, the cost of which will be paid out of the Testing Allowance.

B. The Testing Agency shall:
   1. Test and inspect metal decking and workmanship to verify compliance with Contract Documents.
   2. Check material, equipment, procedures, welds, ability of welders.
   3. Furnish Architect with a verified report that completed Work conforms with Contract Documents.

3.4 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 05 41 00

STRUCTURAL METAL STUD FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Load-bearing metal stud system for interior framing and load-bearing and non-load bearing exterior framing as shown on Drawings and as specified.
   2. Interior walls shall be non-load bearing studs (as specified in Section 09 22 00) for walls going to ceiling and load bearing steel studs for walls going to structure.

1.2 SYSTEM DESCRIPTION

A. Provide metal stud framing, minimum 18 gauge in accordance with General Structural Notes and sizes in accordance with structural drawings shall be used for exterior wall construction and exterior/interior ceiling/soffit assemblies as indicated on Drawings. Exterior metal stud framed wall construction shall:
   1. Resist wind loading up to 30 lbs./sq. ft. (minimum).
   2. Be braced as required to accommodate a maximum deflection of L/360.

B. Design Requirements: Design structural members in accordance with AISI "Specification for the Design of Cold-formed Structural Steel."
   1. Maximum allowable deflection:
      a. Walls receiving gypsum wallboard finishes: L/240.
      b. Walls receiving plaster and brittle finishes, including EIFS and stucco: L/240.
      c. Walls receiving ceramic tile finishes: L/360.
   2. Design 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.
   3. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

1.3 SUBMITTALS

A. Product Data: Submit Manufacturer's Specifications, design data and installation instructions.

B. Shop Drawings: Submit Drawings showing layout, dimensions and construction details.
   1. Shop drawings and calculation developed by General Contractor shall be used for exterior wall construction as indicated on Drawings.
   2. Submit Drawings showing layout, dimensions and construction details. Provide calculations sealed by a Professional Engineer registered in the State of Arizona.

C. Certificates:
   1. Submit Mill Certification with shipment to verify chemical composition, yield strength, tensile strength, elongation and coating thickness. Include listing of applicable ASTM

standards specified in this section and comparison of ASTM requirements to actual materials provided to jobsite.
2. Submit Manufacturer's certification that products furnished meet or exceed the specified design requirements.

1.4 QUALITY ASSURANCE

A. Welding: Performed by certified welders in compliance with AWS D1.3 Structural Welding Code Sheet Steel.

B. Regulatory Requirements: Manufacturers shall have current ICC or CABO evaluation report.

1.5 DELIVERY, STORAGE AND HANDLING

A. Exercise care during unloading, storage and erection to avoid damage. Dumping on the ground is not permitted.

B. Support material stored at the site completely free of the ground, and cover to avoid damage from the elements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products as manufactured by a manufacturing member of the Steel Stud Manufacturers Association (SSMA) www.ssma.com, subject to compliance with Specification requirements.

2.2 MATERIALS

A. Studs, Track, Bracing and Bridging: Conform to ASTM C955.
1. ASTM A653, G60 hot-dip galvanized coating.
2. Minimum structural properties: In accordance with General Structural Notes.

B. Track: Channel shaped; same width as studs, for tight fit; 16 gage solid web, galvanized or painted to match studs.

C. Bracing, Furring, Bridging: Formed galvanized sheet steel; channel shaped. Provide CRC - 1-1/2-inch x 16 gage bridging.

D. Plates, Gussets, Clips:
1. Galvanized formed steel, thickness determined for conditions encountered, Manufacturer's standard shapes.
2. Connector devices (VertiClip, DriftClip and StiffClip) as manufactured by the STEEL Network, Inc. (TSN), Raleigh, NC (888) 474-4876 www.steelnetwork.com are acceptable.

E. Fasteners and Attachments:
1. Sheet metal: Self-drilling self-tapping screws, type appropriate for attachment detail requirements with penetration through joined materials not less than 3 exposed threads.

2. Anchorage devices to structural components: Power driven or powder actuated, drilled expansion bolts, or screws, with sleeves.

F. Welding Electrodes: Comply with AWS standards and as indicated on General Structural Notes on Drawings.

2.3 FABRICATION

A. Fabricate assemblies of framed sections of sizes and profiles required, with framing

B. Fasten metal studs by welding or screw-fastening as indicated. Do not fasten framing members by wire tying.

C. Fit and assemble in largest practical sections for delivery to site, ready for installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine sub-surfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of sub-surfaces.

B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 ERECTION

A. Install components in accordance with Manufacturer's instructions.

B. Align floor and ceiling tracks; locate to wall and partition layout. Secure in place with fasteners or welding at maximum 24 inches. Coordinate installation of sealant with floor and ceiling tracks.

C. Place studs at 16 inches o.c.; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method unless noted otherwise.

D. Construct corners using minimum three studs. Double stud at wall opening, door and window jambs.

E. Erect load bearing studs one-piece full length. Splicing of studs is not permitted.

F. Erect load bearing studs, brace and reinforce to develop full strength to meet design requirements.

G. Extend stud framing to underside of floor or roof structure above.

H. Fasten metal studs by welding or screw-fastening as indicated. Do not fasten framing members by wire tying.

I. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

J. Install intermediate studs above and below openings to match wall stud spacing.

K. Provide deflection allowance in stud track, directly below horizontal building framing for non-load bearing framing.

L. Attach cross studs or furring channels to studs for attachment of fixtures anchored to walls.

M. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

N. Touch-up field welds and damaged galvanized surfaces with primer.

3.3 FIELD QUALITY CONTROL

A. Testing: At Owner's request, Contractor shall provide spot testing of actual properties of steel framing to verify compliance with specifications.

3.4 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Metal fabrications, including items fabricated from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems in other Sections of these Specifications. Types of metal items include, but are not limited to, the following:
   1. Carpenter's ironwork (anchor bolts, tie down straps, etc.).
   2. Steel gratings and frames.
   3. Steel pipe guards.
   4. Steel pipe bollards.
   5. Ladders at roof access.
   6. Miscellaneous framing and supports.
   7. Miscellaneous steel trim.
   8. Enclosure gates and hardware.
   9. Exterior canopies and awnings.
   10. Fabricated steel accents and ornamentation.
   11. Metal architectural molding.
   12. Metal countertop bracket.
   13. Other items as indicated.

1.2 SYSTEM DESCRIPTION

A. Structural design requirements of anchorages and tie-back above roof: Anchorage shall be capable of sustaining a minimum ultimate load of 5,000 lbs., in any direction the load may be applied, without fracture or failure.

1.3 SUBMITTALS

A. Shop Drawings: Submit Drawings for the fabrication and erection of assemblies of items which are not completely shown by the Manufacturer's data sheets.
   1. Include plans and elevations at not less than 1 inch to 1'-0" scale, and include details of sections and connections at not less than 3 inches to 1'-0" scale.
   2. Show anchorage and accessory items.
   3. Shop drawings for window wash support shall be prepared under supervision of a registered professional engineer and shall bear engineer’s seal and signature. Professional engineer shall be licensed in jurisdiction where project is located. Include P.E. certified report of tested equipment.

1.4 QUALITY ASSURANCE

A. Standards: Comply with the following, except as otherwise shown and specified:
   1. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings."

2. AISI "Specifications for the Design of Cold-Formed Steel Structural Members."
3. AWS "Structural Welding Code-Steel."
4. ASTM A6 "General Requirements for Rolled Steel Plates Shapes, Sheet Piping and Bars for Structural Use."

B. Qualifications: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."

1.5 DELIVERY, STORAGE AND HANDLING

A. Exercise care during unloading, storage and erection to avoid damage. Dumping on the ground is not permitted.

B. Support material stored at the site completely free of the ground, and cover to avoid damage from the elements.

1.6 PROJECT/SITE CONDITIONS

A. Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication, where possible, to ensure proper fitting of the Work. Allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General
1. Recycled Content:
a. Structural Steel: Minimum 75% post-consumer and 15% pre-consumer recycled content
b. Steel Decking: Minimum 75% post-consumer and 15% pre-consumer recycled content.
c. Other Steel: Minimum 26% post-consumer and 7% pre-consumer recycled content.

B. Wide Flange Steel Sections: ASTM A572 or A992 (Fy = 50 ksi).

C. Steel Shapes, Plates, Rod, Bars and Bar-size Shapes: ASTM A36.

D. Steel Tubing (Cold-formed Welded and Seamless): ASTM A500, Grade b (Fy = 42 ksi).

E. Steel Tubing (Hot Formed Welded and Seamless): ASTM A501, (Fy = 36ksi).

F. Cold-Finished Carbon Steel Bars: ASTM A108, Grade as selected by fabricator.

G. Perforated Steel Sheet: Perforated steel sheet as manufactured by by ATAS International, Inc. www.atas.com, McNichols Co. www.mcnichols.com, or McMaster Carr www.mcmaster.com.
1. Gauge: As indicated on Drawings.
2. Type: As indicated on Drawings.

H. Cold-drawn Steel Tubing: ASTM A512, sunk drawn, butt welded, cold-finished and stress-relieved.

I. Steel Pipe: ASTM A53, type as selected; Grade A. Black finish unless galvanizing is required. Standard weight, Schedule 40, unless otherwise shown or specified.

J. Anchors:
   1. Masonry Anchorage Devices: Expansion shield, FS FF-S-325.
   2. Toggle bolts: Tumble-wing type, FS FF-B-588; type, class and style as required.
   3. Chemical Type Anchors: 2-component chemically curing anchors for concrete or masonry construction, capsule or injection type, designed to accept manufacturer's galvanized anchor rod.

K. Fasteners: Provide zinc-coated fasteners with galvanizing complying with ASTM A153 for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required for the installation of miscellaneous metal items.
   1. Bolts and nuts: ASTM A307, Grade A, regular hexagon head.
   2. Bolts, hexagon and square: ANSI B-18.2.1.
   3. Bolts, round head: ANSI B-18.5.
   4. Lag bolts: Square head type.
   5. Wood screws: ANSI B-18.6.1, flat head carbon steel.
   6. Plain washers: ASTM F844 helical spring type carbon steel.

L. Gratings: Grating shall be electro-pressure welded construction type as shown on Drawings. Exterior gratings shall be hot-dipped galvanized, after fabrication. Furnish perimeter support angles with welded anchors as detailed.

M. Galvanizing: ASTM A123 for steel plates bars and strips.

N. Metal Primer: VOC compliant.
   1. Exterior exposed metal fabrications shall have a spray applied epoxy-polymide type primer, with finish paint coat(s) as described in 09 91 00.
   2. Interior exposed metal fabrications shall have spray applied epoxy-polymide type primer paint with finish paint as described in 09 91 00.
   3. See also Section 09 91 00 for requirements regarding paints for compliance with LEED™ requirements.

2.2 ACCESSORIES

A. Inserts and Anchorages: Furnish inserts and anchoring devices to be set in concrete or built into masonry for installation of Miscellaneous Metal Work. Provide setting Drawings, templates, instructions and directions for installation of anchorage devices.

B. Concrete Fill (for concrete filled pipe bollards): Comply with requirements of Section 03 30 00 for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi.

2.3 FABRICATION

A. General: For fabrication of Miscellaneous Metal Work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding or by

welding and grinding, prior to cleaning, treating, and application of surface finishes, including zinc coatings.

B. Shop Assembly: Preassemble items in shop, when possible, to minimize field splicing and assembly of units at the site. Disassemble units only to extent necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

C. Workmanship:
   1. Use materials of the size and thickness shown, or if not shown, of the required thickness to produce adequate strength and durability of the finished product for the intended use. Work to the dimensions of fabrication and support. Use type of materials shown or specified for various components of Work.
   2. Form exposed Work true to line and level with accurate angles, surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 inch unless otherwise shown. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing the Work.
   3. Weld corners and seam continuously and in accordance with the recommendations of AWS. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.
      a. Welds should be smoothly ground to match surface texture of parent metal.
      b. All gaps, holes, and gouges should be filled with a permanent material (solder or brazing).
      c. Design limitations of grinders, files, etc., dictate that adjoining metal tubing pieces at angles less than 125 degrees generally need a minimum of 1/4 inch radius butt weld in order to grind smooth.
   4. Form exposed connections with hairline joints which are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of the type shown, or if not shown, use Phillips flat-head (countersunk) screws or bolts.
   5. Provide for anchorage of type shown, coordinated with supporting structure and the progress schedule. Fabricate as required to provide adequate support for the intended use of the Work.
   6. Cut, reinforce, drill, and tap Miscellaneous Metal Work as may be required to receive finish hardware and similar items of Work.
   7. Use hot-rolled steel bars for Work fabricated from bar stock, unless Work is indicated to be fabricated from cold-rolled or cold-finished stock.

D. Carpenter's Iron Work:
   1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware are specified in Division 6 Sections.
   2. Manufacture or fabricate items of sizes, shapes, and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

E. Prefabricated Aluminum Ladder: Ladders shall be a minimum width of 18 inches, ¾ inch diameter rungs spaced 12 inches o.c., braced a minimum of 5'-0" o.c. Rungs should have a non-slip type finish.
   1. Provide Type 531 Cage Ladder of type indicated on Drawings, as manufactured by O'Keefe's, Inc. www.okeefes.com, San Francisco, CA (800) 227-3305, or as approved.
   2. Comply with requirements of ANSI A-14.3.
   3. Finish: Mill.

F. Ladder extension (for roof hatches): As specified in Section 07 72 00 – Roof Accessories.

G. Loose Bearing Plates: Provide loose bearing plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required.

H. Loose Steel Lintels: provide loose structural steel shape lintels for openings and recesses in masonry walls and partitions, as shown. Weld adjoining members together to form a single unit. Provide not less than 4 inch bearing at each side of openings, unless otherwise shown.

I. Miscellaneous Framing and Supports (including metal countertop bracket):
   1. Provide miscellaneous steel framing and supports which are not a part of the structural steel framework, as required to complete Work.
   2. Fabricate miscellaneous units to sizes, shapes and profiles shown, or if not shown, of the dimensions required to receive adjacent grating, plates, doors or other Work to be retained by the framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars of all welded construction using mitered corners, welded brackets and splice plates, and a minimum number of joints for field connection. Cut, drill, and tap units to receive hardware and similar items to be anchored to the Work.
   3. Equip units with integrally welded anchor straps for casting into concrete or building into masonry wherever possible. Furnish inserts if units must be installed after concrete is poured. Except as otherwise shown, space anchors 24 inches o.c., and provide minimum anchor units of 1-1/4 inch x 1/3 inch x 8 inch steel straps.

J. Enclosure Gates: Fabricate to sizes and shapes indicated using steel tubing and shapes as detailed. Fabricate with continuously welded joints, and smooth exposed edges. Miter corners and use concealed field splices wherever possible.
   1. Hinges (Swinging Gates): Provide heavy duty galvanized steel butt hinges sized as required for weight of gate. Weld hinges to frame.
   2. Latching Mechanism (Swinging Gates): Provide plunger style cane-bolts with pipe receiver set into paving, size as indicated.

K. Exterior Canopies, Awnings, Accents and Ornamentation (including metal screen wall and metal architectural molding):
   1. Fabricate to sizes, configurations and shapes indicated using steel tubing, shapes, plate, and rod as detailed.
   2. Continuously weld all joints and grind smooth.
   3. Provide exposed surfaces smooth, square, and free of surface blemishes, including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness, except where these features are a design feature of the ornamental item.
   4. Comply with fabrication requirements, including tolerance limits, of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.

L. Fabricate pipe bollards from steel pipe of diameter indicated on Drawings. Metal bollards shall be a minimum of 6 inches in diameter, round or square and be directly or sleeve set a minimum of 1/3 the exposed height below the finished adjacent surface.

M. Miscellaneous Steel Trim: Provide shapes and sizes as required for the profiles shown. Except as otherwise noted, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Provide cutouts, fittings, and anchorages as required for coordination of assembly and installation with other Work. Metal trim in continuous runs shall have concealed splices and be of sufficient gauge that natural distortions are not visually apparent. All exposed edges to the public shall be radiused or sharp edges eased.

2.4 FINISHING

A. Shop Painting:
   1. Shop paint Miscellaneous Metal Work, except those members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise indicated.
   2. Remove scale, rust and other deleterious materials before shop coat of paint is applied. Clean in accordance with SSPC SP-2, SP-3, or SP-7, as required. Remove oil, grease, and similar contaminants in accordance with SSPC SP-1.
   3. Apply one shop coat of metal primer paint to fabricated metal items, except apply 2 coats of paint to surfaces which are inaccessible after assembly or erection.
   4. Immediately after surface preparation, brush or spray on metal primer paint in accordance with Manufacturer's instructions, and to provide a uniform dry film thickness of 2 mils for each coat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates to appropriate Trades.

C. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow 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.

E. Install pipe bollards in concrete footings plumb and level, accurately fitted, free from distortion or defects. Provide adequate bracing as required to hold bollard in position until concrete has been placed and cured.
   1. Fill bollards solidly with concrete and mound top surface to shed water.

F. Obtain Architect approval prior to site cutting or making adjustments not scheduled.

G. Touch-up Painting: Touch-up welds, abrasions, and other areas where shop prime paint has been removed or is damaged with specified prime paint or galvanizing repair paint. Comply with low-emitting material requirements as specified in Section 01 60 00 for field applied paint within building envelope.

3.4 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset from True Alignment: 1/4 inch

3.5 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION

SECTION 06 10 53

MISCELLANEOUS CARPENTRY

GENERAL

1.1 SUMMARY

A. Section Includes: Rough carpentry including, but not limited to:
   1. Fire retardant treated plywood telephone and electrical backer boards
   2. Fire retardant treated miscellaneous backing, blocking, nailers and curb, including wood construction related to roofing.
   3. Blocking and backing.

1.2 SUBMITTALS

A. Product Data: Submit technical data for wood preservative and fire retardant products.

1.3 QUALITY ASSURANCE

A. Identify each piece of lumber or plywood used for structural framing with grade and trade mark of a lumber grading organization. Trade mark of manufacturer shall also appear on each piece.

B. Grading Rules: Conform with applicable requirements of American Lumber Standards "Simplified Practice Recommendation R-16" and to grading rules of manufacturer's association under whose rules the lumber is produced.

C. Standards: Conform to requirements of American Plywood Association, U. S. Dept. of Commerce Commercial Standards and American Wood Preservers Association Standards, as they apply.

1.4 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.

B. Storage: Store off ground to assure adequate ventilation, and protect against damage while stored at the site.

C. Handling: Comply with manufacturer's instructions.

1.5 PROJECT CONDITIONS

A. Environmental Requirements: Store materials for which maximum moisture is specified in areas where humidity can be controlled.

PRODUCTS

1.6 MATERIALS AND ACCESSORIES – GENERAL

A. Provide wood in accordance with the requirements of Section 06 05 13 - FSC Certified Wood

1.7 LUMBER MATERIALS

A. Species: Douglas Fir – Larch, Hem Fir graded in accordance with Standard Grading and Dressing Rules of WCLIB. Framing lumber shall be stress grade. All sides shall be surfaced.

B. Lumber Grades: As follows unless noted differently on the Drawings:
   1. Misc. blocking, bridging, etc.; including nailers at roofing: Utility.
   2. Grounds and furring: Construction Grade Douglas Fire or No. 2 White Pine.

C. Moisture Content:
   1. Lumber shall be air-dried or kiln-dried.
   2. At time of installation, moisture content, expressed as a percentage of the weight of the oven-dry wood, shall not exceed 19 percent for lumber of up to two inches' nominal thickness and 15 percent for exterior trim and siding.
   3. Moisture content of lumber over two inches' nominal thickness shall conform to the rules of the association under which it is graded.

D. Blocking and nailers at roofing: Furnish wood blocking and nailers, sizes as detailed and as required by Section 07 53 16. Provide longest lengths possible for blocking and nailers to eliminate joints.

1.8 SHEATHING MATERIALS

A. Plywood Backing Panels:
   1. For mounting of telephone and electrical equipment, provide Grade C-D Exposure 1 plywood panels, 15/16 inch thick, unless otherwise indicated.
   2. For roofing: 1/2-inch thickness, fire treated Douglas Fir, C-D Exterior glue and shall be stamped with grade trademark of the American Plywood Association and shall meet the requirements of the latest edition of U.S. Product Standard PS-1 for softwood plywood.

1.9 FACTORY WOOD TREATMENT

A. Preservative Treatment:
   1. Materials:
      a. Chromated copper arsenate (CCA) shall not be allowed.
      b. Provide ammoniacal copper quaternary (ACQ) or copper boron azole(CBA) as produced by the following manufacturers:
         1) Arch Wood Protection, Inc., Smyrna, GA (866) 789-4567, www.wolmanizedwood.com or www.naturalselect.com.
         2) Chemical Specialties, Inc., Charlotte, NC (800) 421-8661, www.treatedwood.com
         3) Osmose, Inc., Wood Preserving Division, Griffin, GA (800) 241- 0240, www.osmose.com.

2. Locations Required:
   a. Wood sill plates and ledgers bolted in direct contact with concrete or masonry, located at or below grade only shall be pressure treated lumber.
   b. Blocking and nailers occurring on top of or above the roof deck, including the nailer beneath the flashing at parapet caps, shall be treated lumber.
   c. Other locations as required by Code.

B. Fire-Retardant Treatment: Hickson Corp. Dricon FRTW in accordance with UL label.
   1. All wood studs, plates, sheathing, blocking, etc. shall be fire retardant treated.
   2. Dimensioned lumber shall be kiln dried to a maximum moisture content of 18 percent before and after milling and fire protective treatment.

1.10 ACCESSORIES

A. Nails: Common wire, galvanized for exterior Work, meeting ASTM F1667 of the sizes indicated on the Drawings.

B. Screws: Standard domestic manufacture, bright steel, except galvanized for exterior use and of brass, bronze, aluminum or stainless steel when used to attach items made of those materials. Screws used for attaching interior trim and finish to drywall partitions shall be Type S self-drilling, self-tapping corrosion resistant coated steel drywall screws of required lengths as specified in Section 09 29 00.
   1. Screws used for attaching preservative and fire treated wood shall be Type S self-drilling, self-tapping corrosion resistant coated steel screws. Acceptable products include the following:
      a. DEC-KING Exterior Wood Screw with Climacoat.
      b. Tapcon Concrete Anchor with Blue Climaseal or White UltraShield.
      c. Wood-To-Metal TEKS with Grey Spex.
      d. Roofgrip with Spex or Blue Climaseal.
      e. GY-FAST Nail with Climacoat.
      f. Maxi-Set Tapcon White UltraShield

C. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers as indicated. Bolts, nuts, and washers, wholly or partially exposed on exterior shall be galvanized.

D. Lag screws, shear plates and split ring connectors: Conform to requirements of the "National Design Specifications for Stress Grade Lumber and its Fastenings" of National Forest Products Association.

E. Power driven inserts for attachment of wood blocking and nailers (including blocking and nailers at roofing): Ramset, or as approved by Structural Engineer through Architect meeting FS GGG-D-777a. Install as per manufacturer's printed directions. Charge shall be powerful enough to prevent spalling of concrete.

F. Galvanizing: ASTM A653.

G. Toggle Bolts: FS FF-B-588.

EXECUTION

1.11 INSTALLATION

A. Wood Backing: Provide wood backing, furring, stripping or blocking indicated or required for installation and attachment of work of other trades. Provide fire-proofed wood backing approved by Building Official at roofing and where required by Code in noncombustible or fire-rated construction.

B. Plywood Backing Panels: Install with the “C” or best face on exposed side.

C. Connections: Subdrill where necessary to avoid splitting.

D. Bolts: Drill bolt holes 1/32 inch larger than bolt diameter. Use square plate or malleable iron washers under heads and nut where they bear against wood. Re-tighten bolts immediately prior to concealing with finish materials. Re-tighten exposed bolts immediately prior to final inspection by Building Official.

E. Lag Screws and Screws: Subdrill, use square plate or malleable iron washer under lag screw heads when they bear on wood.

F. Blocking and nailers at roofing: Install with mechanical fasteners at locations as detailed and as required by Section 07 52 13, including; but not limited to edge conditions, penetrations, curbs, and parapets.
   1. Where indicated on Drawings, or where required by roofing manufacturer, install one layer of 1/2-inch treated plywood mechanically fastened to wall.

1.12 CLEANING

A. During the course of the Work and on completion, remove excess materials, equipment and debris and dispose of away from premises.

END OF SECTION

SECTION 06 40 00

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUBMITTALS

A. Shop Drawings: Submit Drawings showing layout, elevations, dimensions, hardware, construction details, and schedule of finishes.

B. Samples:
   1. Submit two 12 inch x 12 inch samples of each wood species to receive transparent finish at job site and at mill.
   2. Submit two 6 inch x 6 inch samples of type or color of plastic laminate.

C. Product Data: Provide data on fire retardant treatment materials and application instructions

1.2 REFERENCES

A. Reference Standards: Comply with the following:
   1. Architectural Woodwork Standards (AWS), Edition 1.
   2. ANSI/NEMA LD3 for laminates.

1.3 QUALITY ASSURANCES

A. Applicable Standard: Perform work in accordance with Referenced Standards for the following Grades of Work.
   1. Provide Premium when not otherwise indicated.
   2. Affix Quality Grade Stamp to each unit of product (e.g. each case; each panel; each bundle of trim, etc.).

B. Mockups: Prior to start of Work, construct full scale field samples illustrating casework construction items as noted below, in accordance with Section 01 33 00.
   1. Provide mock-up of full size base cabinet and upper cabinet for approval.
      a. Provide units with specified counter top, with hardware installed.
      b. Units will be examined to ascertain quality and conformity to AWI quality level standards and Specification requirements.
      c. Mock-up may not remain as part of the Work.
   2. Provide full scale plastic laminate rail at the mezzanine jogging track.
   3. Construct successive mockups until approved.
   4. Mockup shall be reviewed by the Architect's contract administrator for acceptance. Do not proceed with installation of casework items until mock-ups have been inspected and accepted by Architect. These samples, when accepted by the Architect, will function as a reference base for acceptance or rejection of final work.
   5. Upon acceptance of final work at completion of Project, remove mockup from site and dispose of in a legal manner.

1.4 1.04 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.

B. Storage: Adequately protect against damage and moisture while stored at the site.

C. Handling: Comply with Manufacturer's instructions.

1.5 1.05 PROJECT CONDITIONS

A. Physical Requirements for Proper Installation or Application: Provide humidity conditions which will prevent damage to woodwork.

B. Verify that field measurements are as indicated on Shop Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS AND ACCESSORIES – GENERAL

A. Wood and agrifiber products must contain no added urea-formaldehyde resins

2.2 WOOD MATERIALS

A. Hardwood Lumber: Premium Grade in accordance with applicable standard specified herein under "Quality Assurance," average moisture content of 6 percent; species and cut to match wood veneer used for hardwood plywood, unless otherwise indicated on Drawings.

2.3 SHEET MATERIALS

A. Hardwood Plywood: Core materials of particleboard, type of glue recommended for application; face veneer and cuts as indicated on Drawings.

B. Softwood Plywood: DOC PS 1, MDO (Medium Density Overlay), or other overlay plywood product suitable for application of plastic laminate as approved by the Architect. Provide 3/4 inch thick Marine Grade plywood for underlayment at counters.

C. Wood Particleboard:
1. Standard in accordance with applicable standard specified herein under "Quality Assurance," for grade of work specified, composed of wood chips, 45 lb. density, made with water resistant adhesive; of grade to suit application; sanded faces for drawer construction and shelving.
2. Wood and agrifiber products must contain no added urea-formaldehyde resins..

D. Hardboard:
1. Wood fiber with resin binder, tempered grade, 1/4 inch thick, smooth one side, for drawer bottoms, gables and backs.
2. Wood and agrifiber products must contain no added urea-formaldehyde resins

E. Medium Density Fiberboard (MDF): Medite II (or Medite FR as applicable) as manufactured by SierraPine, Roseville, CA, 800-676-3339 www.sierrapine.com , complying with the following:

1. Fabricate from 90% pre-consumer wood residuals
2. Fabricate without formaldehyde.
3. Provide Medex in lieu of Medite II at all wet areas or within 2 feet of any sink or source of water.
4. MDF may be used in lieu of wood particleboard where acceptable to Architect.

F. Strawboard: In conformance with ANSI-M3 composite panel boards standard and fabricated using formaldehyde-free MDI binder. Strawboard may be used in lieu of wood particleboard where acceptable to Architect [to achieve LEED Credit MR6 as specified in Section 01 60 00].
1. WoodStalk as manufactured by Dow BioProducts, Elie, MB Canada (800) 441- 4DOW www.dow-bioproducts.com
2. PUREKOR as manufactured by Panel Source International, St. Alberta, Canada (877) 464-7246 www.panelsource.net.
3. PrimeBoard as manufactured by PrimeBoard, Wahpeton, ND (701) 642-1152 www.primeboard.com

2.4 LAMINATE MATERIALS

A. Plastic Laminate: High pressure decorative type.
1. Finishes, Colors and Patterns: As selected by Architect and as noted on Drawings.
2. Horizontal Grade: NEMA LD-3, Grade GP50, .050 inch thickness.
3. Horizontal Grade (Color-Thru): NEMA LD-3, Grade GP50 with color extending through material thickness.
4. Horizontal Grade (High Wear): Exceeding NEMA LD-3, Grade GP50, 0.048 inch thickness. Wear resistance: 3.1 at 3500 cycles in accordance with NEMA LD-3 test method.
5. Vertical Grade: NEMA LD-3, Grade GP28, (.028 inch thickness). This grade of laminate shall be counterbalanced.
6. Fire-Rated Horizontal Grade: NEMA LD-3, Grade FR50; 0.050 inch thickness.
7. Fire Rated Vertical Grade: NEMA LD-3, Grade FR32, 0.032 inch thickness.
8. Post Forming Grade: NEMA LD-3, Grade PF 42.
9. Cabinet Liner Grade: NEMA LD-3, Grade CL-20, (.020 inch thickness). This grade of laminate shall be counterbalanced.
10. Backer: NEMA LD-3, Grade BK-20 (.020 inch thickness).
11. Plastic laminate manufacturers and colors: Nevamar premium grade
    a. PL 1: Breakrooms Base, uppers and countertops.
    b. PL 2: Copy Rooms, Mail Room, PC Lab/staging – Base and Upper Cabinets
    c. PL 3: Copy Rooms, Mail Room, PC Lab/Staging – Countertops

2.5 WALL BOARD MATERIALS

A. Thermofused Composite Panels: Metro Collection by Cleaf. Distributed by EB Bradley. Color: Aspen Oak LM67.
1. Hardware mounting system for wall mounting
    a. Sugatsune
    b. Panelclip
    c. Starhanger
    d. Monarchmetal

2.6 WOOD VENEER

A. Samples required (2 minimum each color) for Architect review.
   1. Species: as available from selected manufacturer(s)
   2. Cut: Plain Sliced
   3. Edge banding and Base to be same veneer material.

2.7 ACCESSORIES

A. Adhesive: Type recommended by Laminate Manufacturer to suit application.
   1. PVA (polyvinyl acetate) or MDI (polyisocyanurate) adhesive shall be used.

B. Wall Adhesive:
   1. Cartridge type compatible with paneling and wall substrate.
   2. In accordance with the low-emitting materials requirements of Section 01 60 00 - Materials and Equipment.

C. Edge Trim: Extruded convex or flat shaped plastic as indicated on Drawings; smooth finish; self-locking serrated tongue; of width to match component thickness; color as selected or noted on Drawings.

D. Glass: As specified in Section 08 80 00

E. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application. Threaded steel for concealed joints.

2.8 HARDWARE

A. Drawers
   1. For each drawer:
      a. 1 set full extension drawer slides, ball bearing, side mount, lever disconnect:
         1) For drawers up to 24 inches wide (75-pound class) – Accuride 2601.
         2) For drawers over 24 inches wide (100-pound class) - Knape & Vogt No. 1429, Grant No. 5632 or Accuride 3832.
      b. 1 pull – As indicated on Drawings or as directed by Architect.
   2. For each drawer to be locked: 1 lock – Pin tumbler, half mortise, dead bolt x flat strike, as manufactured by National Cabinet Lock, MK US26D.

B. Doors: For each 3/4-inch-thick single door - flush overlay design:
   1. 1 pair hinges - 2-3/4 inch half overlay hinges, five knuckle, .095 Steel, adjustable screw holes, 11/32 inch overlay. Catalog # C848 26D, Dull Chrome, per Woodworker's Hardware.
   2. 1 pull – As indicated on Drawings or as directed by Architect.

C. Shelves: For each set of adjustable wood shelves:
   1. 4 standards - Knape & Vogt No. 255, Garcy No. S373 or Parker No. 67.
   2. 4 support each shelf – Knape & Vogt No. 256, Garcy No. Y73 or Parker No. 076.

D. Grommets: ABS plastic, 2-inch cutout diameter unless otherwise indicated, with removable cap, Doug Mockett & Co., Inc. "Series TG" or as approved, color as selected by the Architect.

E. Wall Panel Clip System:

F. Finishes: As selected by Architect, unless otherwise specified.

2.9 FABRICATION

A. Fabricate architectural woodwork and cabinets in conformance with Premium Grade Standards in accordance with applicable standard specified herein under "Quality Assurance."

B. Exposed fasteners are not allowed in the finish Work on exposed and semi-exposed surfaces.

C. Shops assemble casework for delivery to site in units easily handled and to permit passage through building openings.

D. Cap shelves, doors, and other exposed edges with 3/8 inch matching hardwood or matching plastic laminate edging as applicable. Use one piece for full length only.

E. Cap semi-exposed edges with 3/8 inch matching hardwood or matching plastic laminate edging as applicable. Use one piece for full length only.

F. Door and Drawer Fronts: European Overlay with concealed hinges.

G. Drawer Boxes: Fabricate drawer boxes from Baltic Birch plywood.
   1. Fabricate sides and back from minimum 1/2 inch (9-ply) plywood.
   2. Fabricate bottoms from minimum 3/8 inch (7-ply) plywood.

H. Shelves: Fabricate shelves with 3/4 inch thick wood particleboard cores with plastic laminate finish, all sides and edges, unless otherwise indicated.

I. Shelf Standards within Casework: Set shelf standards within recessed groove of same width and depth as shelf standard.

J. Plastic Laminate Faced Countertops: Fabricated plastic laminate faced countertops with separate back splash and separate side splashes with integral scribe for fitting to wall.
   1. Countertop Edge Treatment: Square self-edge.

K. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

L. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arrises. Locate counter butt joints minimum 2 feet from sink cut-outs.

M. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

N. Provide cutouts for appliances, outlet boxes, fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal contact surfaces of cut edges.

2.10 SHOP FINISHING

A. Sand Work smooth and set exposed fasteners; apply wood filler.

B. Seal surfaces in contact with cementitious materials.

C. Seal internal surfaces of cabinets with two coats of sealer, except where cabinets are constructed of prefinished plywood or finished internally with cabinet liner,

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 3.02 INSTALLATION

A. Set and secure cabinetry and other woodwork in place; rigid, plumb and level, and in accordance with applicable standard specified herein under "Quality Assurance" for grade of work specified.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Secure and align adjoining cabinet units and counter tops with concealed joint fasteners.

D. Scribe casework abutting other components, with maximum gaps of 1/32 inch (0.03125 inch). Do not use additional overlay trim for this purpose.

E. Secure cabinet and bases to floor using appropriate angles and anchorages

F. Where exposed anchors or fasteners are unavoidable in the finish Work, countersink anchorage devices at exposed locations and conceal with plastic or laminate faced plugs to match surrounding plastic laminate; finish flush with surrounding surfaces.

G. Install trim in single lengths without splices where possible. Miter external corners and cope internal corners.

3.3 FIELD FINISHING

A. Sand Work smooth and set exposed fasteners.

B. Prime, fill, and finish Work of this Section in accordance with Section 09 91 00.

3.4 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 06 01 16

SOLID POLYMER FABRICATIONS

GENERAL

1.1 SUMMARY

A. Section Includes
   1. Solid polymer fabrications, as indicated on Drawings and as specified, including, but not limited to Exterior Site Benches and Locker Seats.

1.2 SUBMITTALS

A. Product Data: Indicate product description, fabrication information, and compliance with specified performance requirements.

B. Shop Drawings: Indicate dimensions, component sizes, fabrication details, attachment provisions, and coordination requirements with adjacent work.

C. Samples: Submit minimum 6 inches' x 6 inches' samples. Indicate full range of color and pattern variation. Approved samples will be retained as a standard for work.

D. Maintenance Data: Submit manufacturer's care and maintenance data, including repair and cleaning instructions.

1.3 QUALITY ASSURANCE

A. Fabricator/Installer Qualifications:
   1. Certified or approved by the Manufacturer.
   2. Subject to approval by Architect.
   3. Have adequate physical facilities and sufficient production capacity to produce, transport, deliver, and install the required units without causing delay in the work.
   4. Have a minimum of 2 years of fabrication experience

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver no components to project site until areas are ready for installation. Store indoors in a dry area and away from extreme temperatures.

B. Deliver materials and accessory products in manufacturer's unopened containers.

C. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.5 WARRANTY

A. Provide manufacturer's ten year limited warranty against visible defects and failure due to manufacturing defects. Damage caused by physical or chemical abuse or damage from excessive heat is excluded from warranty. Warranty shall provide material and labor to repair or replace defective materials.

PRODUCTS

1.6 MANUFACTURERS

A. Furnish plastic products of one of the following manufacturers, except as approved by the Architect, subject to compliance with Specification requirements.
   1. Corian® /surfaces from the DuPont company (basis of design).
   2. HI-Macs® surfaces from the LG Company.

1.7 MATERIALS

A. General
   1. Provide edge details as shown on the Drawings

B. Exposed joints shall be in locations shown on the Drawings. Seams not indicated on the Drawings shall be unexposed and adhesively joined.

C. Finish and Color: As indicated on drawings or selected by Architect.

1.8 ACCESSORY PRODUCTS

A. Adhesives: Solvent free, zero VOC, nonflammable, nontoxic and acceptable to Architect.
   1. Joint Adhesive: To create inconspicuous, non-porous joints. Color to match fabrication material.
   2. Panel Adhesive: ANSI A136.1-1967 and UL(R) listed.

B. Sealant:
   1. For conditions exposed to moisture; Manufacturer's standard mildew-resistant, FDA/UL(R) recognized silicone sealant in colors matching components.
   2. For conditions not exposed to moisture; Manufacturer's standard silicone sealant in colors matching polymer material.

C. Mounting Hardware: Manufacturer's clips, panel inserts and fasteners for attachment.

1.9 FABRICATION

A. Factories fabricate components to greatest extent practicable to sizes and shapes indicated, in accordance with approved shop drawings.

B. Form joints between components using manufacturer's standard joint adhesive.

C. Provide skate guard clips in locations determined by the Architect.

D. Cut and finish component edges with clean, sharp returns. Route radii and contours to template. Repair or reject defective and inaccurate work.

EXECUTION

1.10 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

1.11 INSTALLATION

A. Install components plumb and level, scribed to adjacent finishes, in accordance with approved shop drawings and manufacturer's installation instructions.

B. Form field joints using manufacturer's recommended adhesive (compliant with the low emitting materials requirements of Section 01 60 00 - Materials and Equipment), with joints inconspicuous in finished work. Keep components and hands clean when making joints.

C. Keep components and hands clean during installation. Remove adhesives, sealants and Mother stains. Keep clean until Date of Final Completion. Replace stained components.

1.12 PROTECTION

A. Protect surfaces from damage until Date of Final Completion. Repair work or replace damaged work that cannot be repaired to Architect's satisfaction.

1.13 CLEANING

A. During the course of the Work and on completion of the Work, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 07 11 13

BITUMINOUS DAMPROOFING

PART 1 - GENERAL

1.1 SUBMITTAL

A. Product Data: Submit Manufacturer's data, installation instructions, limitations and recommendations. Include certification of data indicating VOC content of components.

B. Samples: Submit samples of membrane and protection board.

1.2 QUALITY ASSURANCE

A. Applicator Qualifications: Minimum 3 years' experience with Projects of similar scope and complexity. Applicator shall be approved by Manufacturer.

B. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this Work with related and adjacent Work. Agenda for meeting shall include review of special details and flashing.

C. Manufacturer's Representative: Make arrangements necessary to have a trained employee of the Manufacturer on-site periodically during dampproofing work to review installation procedures.

1.3 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered in Manufacturer's original unopened packages with Manufacturer's labels intact.

B. Material shall be protected from rain and physical damage. Store materials away from sparks or flames. Store membrane where it will not exceed 90 degrees F. for extended periods.

C. Outdoors, place cartons on raised pallets and cover completely. Follow Manufacturer's directions.

1.4 PROJECT/SITE CONDITIONS

A. Perform Work only when existing and forecasted weather conditions are within the limits established by the Manufacturer of the materials and products used.

B. Proceed with installation only when substrate construction and preparation Work is complete and in condition to receive dampproofing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Dampproofing Membrane: Cold-applied, emulsified-asphalt damproofing complying with ASTM D1227, Type III, Class 1, spray applied. Provide one of the products by one of the following manufacturers, subject to compliance with specification requirements:
   1. HE788 - Non-Fbr Asph Emul Dmpprfng, Henry Company www.henry.com
   2. Karnak #100 Non-Fibered Emulsion Dampproofing, Karnak Corporation www.karnakcorp.com
   3. Hydrocide 600, Sonneborn, Div. Of ChemRex, Inc. www.masterbuilders.com
   4. Dehydratine 75, Tamms Industries www.tamms.com
   5. Sealmastic Emulsion Type I, W.R. Meadows, Inc. www.wrmeadows.com

B. Protection Material: One inch thick expanded polystyrene.

PART 3 - EXECUTION

3.1 EXAMINATION

A. The installer shall examine conditions of substrates and other conditions under which this Work is to be performed and notify Contractor, in writing, of circumstances detrimental to the proper completion of the Work. Do not proceed with Work until unsatisfactory conditions are corrected.

3.2 PREPARATION OF SUBSTRATES

A. Surface Preparation: All surfaces to be coated shall be structural sound, clean, free of dust, dirt, mortar, residue, curing and parting compounds, and other contaminates.
   1. Clean surfaces by use of wire brush, sandblasting or mechanical means as recommended by the dampproofing manufacturer.
   2. Seal voids and cracks in surface as recommended by dampproofing manufacturer. Use cement mortar, Fibered emulsion mastic, or other fillers and sealants compatible with asphalt emulsion dampproofing and approved by dampproofing manufacturer.
   3. Dampen dry surfaces with water and keep damp prior to application as recommended by dampproofing manufacturer.
   4. Dampproofing may be applied to damp or green concrete surfaces as approved by the manufacturer.
   5. Masonry Substrates: Assure mortar joints are smooth and flush with masonry surface. Apply parge coat as recommended by dampproofing manufacturer to achieve smooth acceptable surface and forming a cove at the joint between wall and footing.

B. Related Materials: Treat joints and install flashings as recommended by Dampproofing Manufacturer.

3.3 INSTALLATION

A. Application, General: Comply with Manufacturer's literature for recommendations on installation, including but not limited to, the following:
   1. Apply by spray application at rate recommended by manufacturer in continuous unbroken film, free of pinholes, filling and spreading around all joints, slots, and grooves and penetrating into all crevices, chases, reveals, soffits, and corners.
   2. Carry coating over exposed footing's top and outside edges and up vertical wall to finished grade line.
   3. Recoat areas not dampproofed if contaminated by dust.
   4. Mask and protect adjoining exposed finish surfaces.

B. Concrete and Other Dense Surfaces: Apply dampproofing in single coat application at rate recommended by manufacturer.

C. Concrete Masonry Surfaces: Apply dampproofing in two coat application.
   1. Apply prime coat of asphalt emulsion dampproofing diluted with clean, cool water at rate recommended by manufacturer.
   2. Allow prime coat to dry to the point where it is tacky to the touch prior to application of second coat.
   3. Apply dampproofing top or second coat at rate recommended by manufacturer.

D. Protection Materials: Apply protection board or sheet and related materials in accordance with Manufacturer's recommendations.

E. Allow dampproofing to cure minimum time as recommended by manufacturer prior to backfilling.

3.4 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION

SECTION 07 13 13

BITUMINOUS SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Sheet waterproofing applied where indicated on Drawings at building walls below grade

1.2 SUBMITTALS

A. Product Data: Submit Manufacturer's data, installation instructions, limitations and recommendations. Include certification of data indicating VOC content of components

B. Samples: Submit samples of membrane, protection board and composite drainage material.

1.3 QUALITY ASSURANCE

A. Applicator Qualifications:
   1. Minimum 3 years' experience with Projects of similar scope and complexity.
   2. Applicator shall be approved by Membrane Manufacturer.
   3. Applicator shall furnish written evidence that applicator is currently approved by manufacturer to install the products required or specified for this project.

B. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this Work with related and adjacent Work. Agenda for meeting shall include review of special details and flashing.

C. Manufacturer's Representative: Make arrangements necessary to have a trained employee of the Manufacturer on-site periodically to review waterproofing installation procedures

1.4 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered in Manufacturer's original unopened packages with Manufacturer's labels intact.

B. Material shall be protected from rain and physical damage. Store materials away from sparks or flames. Store membrane where it will not receive high temperature exposure for extended periods of time.

C. Outdoors, place cartons on raised pallets and cover completely. Follow Manufacturer's directions.

1.5 WARRANTY

A. Provide Manufacturer's written warranty for a period of 5 years, against failure of waterproofing system to perform in accordance with the terms expressed in the manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements:
   1. W. R. Grace Bituthene www.grace.com (basis of design)
   2. W. R. Meadows Sealtight Mel-Rol www.wrmeadows.com
   3. Carlisle CCW-860 www.carlisle-ccw.com

B. Specifications are based upon Bituthene as manufactured by W. R. Grace Construction Products Division.

2.2 MATERIALS

A. General
   1. Provide recycled materials in accordance with Recycled Content provisions of Section 01 60 00.
   2. Provide local/regional materials in accordance with Local/Regional Materials provisions of Section 01 60 00.

B. Waterproof Membrane: Bituthene 3000 or 4000 membrane (as required by prevailing VOC requirements); minimum self-adhering membrane of 56 mils of rubberized asphalt integrally bonded to 4 mils of polyethylene sheeting.

C. Primer, Elastomeric Mastic and Protection Board Adhesive: As furnished by Membrane Manufacturer.

D. Protection Material - Vertical: One inch thick expanded polystyrene.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 PREPARATION OF SUBSTRATES

A. Refer to Manufacturer's literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, and loose aggregate and sharp protrusions. Remove contaminants such as grease, oil, and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods which are acceptable to Manufacturer of sheet membrane waterproofing.

B. Cast-in-Place Concrete Substrates:
   1. Do not proceed with installation until concrete has properly cured and dried, minimum 7 days for normal structural concrete and minimum 14 days for lightweight structural concrete.
   2. Fill form tie rod holes with concrete and finish flush with surrounding surface.
   3. Repair bug holes over 1/2 inch in length and 1/4 inch deep and finish flush with surrounding surface.
   4. Remove scaling to sound, unaffected concrete, and repair exposed area.
   5. Grind irregular construction joints to suitable flush surface.

C. Related Materials: Treat joints and install flashings as recommended by Waterproofing Manufacturer.

3.3 INSTALLATION

A. Refer to Manufacturer's literature for recommendations on installation, including but not limited to, the following:
   1. Apply primer at the rate recommended by Manufacturer. Recoat areas not waterproofed if contaminated by dust. Mask and protect adjoining exposed finish surfaces to protect those surfaces from excessive application of primer.
   2. Delay application of membrane until primer is completely dry. Dry time will vary with weather conditions.
   3. Seal daily terminations with troweled bead of mastic.
   4. Apply protection board and related materials in accordance with Manufacturer's recommendations.

B. At the end of each working day, water cut-offs must be installed to protect against water penetration under installed membrane. Temporary water cut-offs shall be removed before Work is resumed. Seal daily terminations with a troweled bead of elastomeric membrane.

C. Where metal edging occurs, set flanges in mastic and secure as shown on Drawings. Strip in with membrane.

D. Install protection material the same day the membrane is applied. Secure protection material in place by an approved method until concrete or backfill is placed. Nails or other fasteners shall not penetrate through the membrane

3.4 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 07 19 00

WATER REPELLENTS

GENERAL

1.1 SUMMARY

A. Section Includes: Water repellent coating for masonry CMU walls.

1.2 DEFINITIONS

A. Water Repellent: Resistant to penetration of water from rainfall.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: The application of water repellent shall provide finished surfaces uniform in color without altering the natural texture of the substrate, and shall resist water penetration from rainfall.

1.4 SUBMITTALS

A. Product Data: Submit recommended method of application and coverage rate.

B. Samples: Submit samples of coating applied to materials used in the Project for review of the aesthetics, and effectiveness, accompanied with a letter stating the actual application rates required.
   1. Manufacturer shall procure and apply system to samples of the masonry units to be used in the structure which will be reviewed by the Architect for both aesthetics and effectiveness.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be able to show evidence that the firm has been engaged in producing such material for at least 5 years and that the product has a satisfactory field performance record of at least 5 years.

B. Applicator Qualifications: Applicators shall be trained, approved, and accepted by the Manufacturer and have a minimum of 2 years' experience spraying specialty coatings.

C. Regulatory Requirements: Comply with volatile organic compound (VOC) regulations in effect within the jurisdiction of the Project site.

D. Mock-ups:
   1. Apply water repellent to sample wall located at the job site using the identical procedures which will be used in making application of material on the remainder of the Project.

2. The purpose of this sample will be to observe color uniformity and intensity, the method of application, including workmanship techniques and to water test surface after a 30 day period.
3. Equipment to be used for actual application to building walls shall be used to apply materials to sample wall.
4. The sample, when approved by the Architect, will function as a reference base for acceptance or rejection of color.

E. Pre-Installation Conference: A representative of the manufacturer shall be present prior to and at the beginning of job application to review the work with the Architect and the Contractor. At this conference the manufacturer's representative shall also approve the wall and the suitability of the weather.

1.6 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Delivery shall be made to the job site in Manufacturer's original containers with seals unbroken and labeled with Manufacturer's batch number.

B. Storage and Protection: Store materials in original, unopened containers in compliance urer's printed instructions and protect from damage.

1.7 PROJECT CONDITIONS

A. Physical Requirements for Proper Installation or Application: Temperature and relative humidity conditions for a period before, during, and after application shall be as recommended by the Manufacturer. If rain occurs, allow surfaces to dry a minimum of 5 days.

1.8 WARRANTY

A. Manufacturer shall provide a written warranty for a period of 5 years from date of project completion.
1. Written warranty shall include the following provisions:
a. Coating will act as a water repellent for the full warranty period.
b. Coating will not peel or flake for the full warranty period.
2. Upon satisfactory completion of the installation, and as a condition of its acceptance, the warranty shall be delivered to the Owner.
3. If at any time during the warranty period, any such failure occurs resulting from ordinary weather conditions in any area to which the coating has been properly applied, the manufacturer shall agree to supply all material needed to repair such affected areas at no additional cost.

B. The applicator shall guarantee the installation against poor workmanship for a period of 2 years from the date of Substantial Completion. Applicator shall make necessary repairs without charge to Owner during that period. Manufacturer shall guarantee material against moisture penetration for 5 years.

PRODUCTS

1.9 MATERIALS

A. Furnish products of one of the following Manufacturers, subject to compliance with Specification requirements:
   1. Chemprobe Coating Systems, L.P.; Division of Tnemec Co., Inc. (represented by Teri Hand, (480) 951-8686) www.tnemec.com
   2. Diedrich Technologies, Inc. (represented by Lanton Associates, Anthony Evans (480) 303-9182. www.diedrichtechnologies.com
   3. Degussa Corporation, (represented by PCI Services, (480) 343-3030, (480) 828-8827) (800) (800) 828-0919 www.degussa.com
   4. ProSoCo., Inc. www.prosoco.com
   5. Rainguard Products Company (represented by Syd Bell (480) 893-3252 or (800) 898-3252). www.rainguard.com
   6. Tamms Industries, Inc. (represented by Lisa Zeller (602) 431-0292. .tamms.com

1.10 MATERIALS AND ACCESSORIES

A. Water Repellent Sealer: Provide either silane or siloxane compounds (not a combination). The following are acceptable.
   1. Silanes:
      a. Weather Seal SL100; ProSoCo, Inc.
      b. Regular or Super, Rainguard Products Company.
      c. Blok-Lok, Rainguard Products Company.
      d. Aqua-Trete EM, Degussa Corporation.
      e. Or approved equal.
   2. Siloxanes:
      a. Prime A Pell H2O; Chemprobe Technologies, Inc.
      b. WeatherSeal Siloxane WB; ProSoCo, Inc.
      c. Baracade ME; Tamms Industries Co.
      d. Diedrich 300-C, Diedrich Technologies, Inc.
      e. Micro-Seal Concentrate, Rainguard Products Company.
      f. Or approved equal.

EXECUTION

1.11 EXAMINATION

A. Verification of Conditions:
   1. Carefully inspect the installed Work of other Trades, and verify that such Work is complete to the point where water repellent application may commence.
   2. The Manufacturer's representative shall verify that the water repellent can be applied in accordance with the Manufacturer's recommendations.
   3. Verify that cracks which exceed 1/64 inch (0.40mm) wide have been filled with pointing mortar or caulking material. Defective mortar joints shall be routed out, pointed with mortar, and tooled.
   4. Verify that flashing and caulking materials have been installed properly.
   5. Verify that masonry has been cleaned as specified in Section 04 01 20.52.

B. Surface Preparation:
   1. Allow walls to cure at least 30 days before clear water repellent is applied.

2. Walls shall be free of excess mortar.
3. Follow Manufacturer's instructions regarding allowable moisture level.

1.12 APPLICATION

A. Water Repellent: Apply in accordance with Manufacturer's printed directions.

B. Coverage:
1. At no time shall rate of coverage be less than required by Manufacturer's directions.
2. Applicator shall make proper material allowance based upon substrate when determining quantities of material.

1.13 SURFACES TO BE COATED

A. Exterior exposed masonry and concrete surfaces. – VERTICAL WALLS.

B. Exposed tops of masonry and concrete walls including parapets, fence/screen walls, planter walls, etc. - HORIZONTAL SURFACES.

C. Roof side of exposed masonry and concrete parapet walls, lapping flashing – VERTICAL WALLS.

D. Planter side of planter walls, lapping waterproofing (07 14 16) and soil – VERTICAL SURFACES.

E. Other locations as indicated on Drawings.

1.14 FIELD QUALITY CONTROL

A. Tests:
1. Twenty days after completion of this portion of the Work, and as a condition of its acceptance, demonstrate by running water test that the Work of this Section will successfully repel water.
2. Notify the Architect and Manufacturer at least 72 hours in advance and conduct the test in the presence of Architect and manufacturer's representative.
3. By means of an outrigger or similar acceptable equipment, place 3/4 inch garden hose with garden type spray nozzle, at a point designated by the Architect, 8 feet to 10 feet away from the wall, aiming the nozzle so that water will strike the wall at a 45 degree downward angle.
4. Run the water onto the wall at full available force for not less than 4 hours. Provisions shall be made to collect the run-off water into a container, and if possible to reuse it in the test
5. Upon completion of the four hour period, inspect the interior surface of the wall for evidence of moisture penetration.
6. If evidence of moisture penetration is discovered, apply an additional coat of the repellent material to the areas where leakage occurred.
7. An additional area or areas designated by the Architect shall be tested and corrected if leakage occurs.
8. Architect may require additional tests until no leakage occurs.

1.15 CLEANING

A. Clean spillage and overspray as recommended by the Manufacturer.

B. During the course of the Work and on completion, remove excess materials, equipment and debris and dispose of away from premises.

END OF SECTION

SECTION 07 21 00

BUILDING INSULATION

GENERAL

1.1 SUBMITTALS

A. Product Data: Submit Manufacturer's data, installation instructions, limitations and recommendations. Include certification and test data substantiating R-Values and combustibility of each type of insulation.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Conform to applicable code for fire resistance ratings and surface burning characteristics.

B. Provide certificate of compliance acceptable to authorities having jurisdiction indicating conformance to fire-resistance requirements.

1.3 DELIVERY, STORAGE AND HANDLING

A. Delivery and Storage: Deliver materials to job in Manufacturer's original unopened packaging. Adequately protect against damage while stored at the site. Deliver so that stocks of materials on the site will permit uninterrupted progress of the Work.

B. Materials shall be properly identified on each package with the Manufacturer's name and R value.

PRODUCTS

1.4 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements:
   1. Batt Insulation
      a. Johns-Manville
      b. Owens-Corning Fiberglas Corp.
      c. CertainTeed
      d. BMCA Insulation Product Inc.
      e. Soprema, Inc.
      f. Roxul, Inc.
   2. Rigid Insulation
      a. Dow Chemical
      b. Pittsburgh Corning Corp.
      c. Atlas Roofing Corp.

d. Johns Manville

B. Materials designated for a specific application shall be the products of one Manufacturer.

1.5 MATERIALS

A. Batt Insulation (Fiberglass):
1. ASTM C665, Type I, un-faced glass fiber batts. Batts shall be a single thickness to meet the required R value; multiple layers of batts will not be accepted.
2. Thickness: Provide minimum thickness as required to provide the resistance values as indicated on Drawings, for various locations.
3. Roofs or other exposed horizontal surfaces shall attain a minimum composite R value of 30.
4. Exterior walls or other exposed vertical surfaces shall attain a minimum R value of 20.

B. Fire Safing Insulation: ASTM C24, E119 and E136. Thickness shall be as required by the Manufacturer to provide a fire rating equal to that of the assembly of which it is a part. Where smoke stop protection also is required, install Thermafiber Smoke Seal Caulking Compound as needed to meet UL Standard 1479 and ASTM E814 procedure.

C. Acoustical Batt Insulation: As specified in Section 09 81 00

D. Separate Vapor Barrier/Cover Sheet:
1. Construction:
a. Typical: Aluminum Foil, Elastomeric Polymer Barrier Coating, Tridirectionally fiberglass and polyester reinforcing, 14# natural kraft
b. Where exposed to view in final work: Provide black polypropylene film, metallization, fiberglass and polyester scrim, 14# black kraft
2. WVTR Perm: 0.02
3. Tensile Strength (lbs/in)
a. Machine Direction:
1) Typical: 55
2) Exposed to view (black): 40
b. Cross Direction: 35
4. Beach Puncture:
a. Typical: 85
b. Exposed to view (black): 125
5. NRC: 0.85
6. Comply with the following standards:
a. UL-723
b. ASTM E-84
c. Factory Mutual
7. Acceptable Manufacturer and Product:
a. Typical: Lamtec R03035 HD or approved equal.
b. Exposed to view (black): Lamtec WMP-10 or approved equal.

EXECUTION

1.6 EXAMINATION

A. Verification of Conditions: Examine sub-surfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of sub-surfaces.

B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

1.7 INSTALLATION

A. Batt Insulation
1. Apply no insulation until such time as the Construction has progressed to the point that inclement weather will not damage or wet the insulation material.
2. Fully insulate small areas between closely spaced framing members, pipes, conduits or other obstruction by cutting and fitting insulation material as required to maintain the integrity of the insulation.
3. Batt insulation at metal studs, concrete tees, and other non-nailable members shall be installed continuously tight against framing members. Secure in place with string wire or other method as approved by Architect.
4. Place insulation tight to exterior wall or roof substrate without voids.
5. Insulation shall not be laid directly on accessible ceilings. Provide horizontal insulation at the top of the cavity, and extend vertical insulation up to that level.
6. Provide mechanical attachment for all insulation. Insulation shall not be adhesive applied or installed loose.
7. Insulation is to be free of gaps, holes, tears, and loose insulation.
8. End match neatly with ends fitting snugly

B. Fire Safing Insulation: Install in proper sizes on safing clips as needed but not to exceed 24 inches O.C. Leave no voids between walls and edges of slabs.

C. Separate Vapor Barrier/Cover Sheet:
1. Adhesive apply over exposed surfaces of insulation with joints lapped and glued. Adhesive shall be compliant with the low-emitting materials requirements of Section 01 60 -00 - Materials and Equipment.
2. No insulation shall be left exposed.
3. Membrane shall be closely fitted around pipes, conduits, columns, and other protrusions."

1.8 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition.

B. Protection: Take precautions to protect insulation, both during and after installation, from damage of any kind until covered.

END OF SECTION

SECTION 07 25 00

WATERPROOFING UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Wall membrane system for above grade vertical wall applications over sheathing beneath exterior finishes (metal wall panels and EIFS) as noted on Drawings.

B. The design intent is that the exterior sheathing for vertical and sloping wall application shall have membrane applied continuously prior to the application of the finish.

1.2 SUBMITTALS

A. Product Data: Submit Manufacture's data, installation instructions, limitations and recommendations. Include certification of data indicating VOC content of components.

B. Samples: Submit samples of membrane, protection board and composite drainage material.

1.3 QUALITY ASSURANCE

A. Applicator Qualifications:
1. Minimum 3 years experience with Projects of similar scope and complexity.
2. Applicator shall be approved by Membrane Manufacturer.
3. Applicator shall furnish written evidence that applicator is currently approved by manufacturer to install the products required or specified for this project.

B. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this Work with related and adjacent Work. Agenda for meeting shall include review of special details and flashing.

C. Manufacturer's Representative: Make arrangements necessary to have a trained employee of the Manufacturer on site periodically to review waterproofing installation procedures.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered in Manufacturer's original unopened packages with Manufacturer's labels intact.

B. Material shall be protected from rain and physical damage. Store materials away from sparks or flames. Store membrane where it will not receive high temperature exposure for extended periods of time.

C. Outdoors, place cartons on raised pallets and cover completely. Follow Manufacturer's directions.

1.5 PROJECT/SITE CONDITIONS

A. Perform Work only when existing and forecasted weather conditions are within the limits established by the Manufacturer of the materials and products used.

B. Proceed with installation only when substrate construction and preparation Work is complete and in condition to receive sheet membrane waterproofing.

1.6 WARRANTY

A. Provide Manufacturer's written warranty for a period of 2 years, against failure of waterproofing system to perform in accordance with the terms expressed in the manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Moisture Membrane:
1. Description: .9mm (36 mils) of self-adhesive rubberized asphalt integrally bonded to .1mm (4 mils) of cross-laminated, high-density polyethylene film to provide a min. 1 mm (40 mil) thick membrane. Membrane shall be interleaved with a disposable silicone-coated release paper until installed.
2. Performance Requirements:
    a. Water Vapor Transmission: ASTM E 96, Method B – 2.9 ng/m2sPa (0.05 perms) maximum.
    b. Water Absorption: ASTM D 570 – Max. 0.1% by weight.
    c. Puncture Resistance: ASTM E 154 – 178 N (40 lbs)
    d. Tear Resistance:
    e. Initiation – ASTM D 1004 – min. 58 N (7.0 lbs.) M.D.
    f. Propagation – ASTM D 1938 – min. 40 N (4.0 lbs) M.D.
    g. Lap Adhesion at -4˚C (25˚F): ASTM D 1876 – 880 N/m (5.0 lbs/in.) of width.
    h. Low Temperature Flexibility – ASTM D 1970 – Unaffected to -43˚C (-45˚F).
    i. Tensile Strength: ASTM D 412, Die C Modified – Min. 2.7 MPa(400 psi)
    j. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D 412 – Die C – Min. 200%.
3. Acceptable Product: Perm-A-Barrier Wall Membrane manufactured by Grace Construction Products.

B. Accessories:
1. Surface Conditioner:
    a. Description: Water-based latex liquid for substrate preparation
        1) Flash Point: No flash to boiling point
        2) Solvent Type: Water.
        3) VOC Content: Not to exceed 125 g/l
        4) Application Temperature: -4˚C (25˚F) and above

5) Freeze/Thaw stability: 5 cycles min.
6) Freezing point (as packaged): -10˚C (14˚F)

b. Acceptable Product: Perm-A-Barrier Surface Conditioner manufactured by Grace Construction Products.

2. Termination Mastic:
   a. Description: Rubberized asphalt-based mastic with 200 g/l max. VOC Content
   b. Acceptable Product: Bituthene® Mastic manufactured by Grace Construction Products.
3. Optional Primer:
   a. Description: Water-based latex primer
      1) Specially designed for glass mat surfaced exterior gypsum boards
      2) VOC Content: No to exceed 10 g/l
   b. Acceptable Product: Perm-A-Barrier WB Primer by Grace Construction Products.

C. Protection Material: Not applicable. Final finish shall provide protection.

D. Other materials: Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other work that affects, connects with, or will be concealed by this Work. Coordinate interface with roof underlayment to provide continuous moisture barrier at building envelope.

3.2 SURFACE PREPARATION

A. Substrate to be smooth and free of voids, spalled areas, loose aggregate and sharp protrusions that would hinder the adhesion or regularity of the weather resistive barrier membrane.

B. Remove all deleterious materials from surfaces to be covered.

3.3 INSTALLATION

A. General: Install weather resistive barrier to dry surfaces at air and surface temperatures of 25˚F and above in accordance with manufacturer's recommendations, at locations indicated on Construction Documents.

B. Weather Resistive Barrier Membrane:
   1. Precut pieces of weather resistive barrier into easily-handled lengths.
   2. Remove silicone-coated release paper and position membrane carefully before placing length horizontally against the surface.

3. Begin installation at the base of the wall placing top edge of membrane immediately below any masonry reinforcement or ties protruding from substrate.
4. When properly positioned, place against surface by pressing firmly into place. Roll membrane with extension-handled countertop roller immediately after placement.
5. Overlap horizontally-adjacent pieces 50 mm (2 in.) and roll seams.
6. Subsequent sheets of membrane applied above shall be positioned immediately below masonry reinforcement or ties. Bottom edge shall be slit to fit around reinforcing wires or ties, and membrane shall overlap the membrane sheet below by 50 mm (2 in.). Roll firmly into place.
7. Seal around masonry reinforcing or ties and all penetrations with termination mastic.
8. Continue the membrane into all openings in the wall, such as doors, windows, etc., and terminate at points that will prevent visibility from interior.
9. At end of each working day seal top edge of weather resistive barrier to substrate with termination mastic.
10. Do not allow the rubberized asphalt surface of the weather resistive barrier membrane to come into contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.
11. Do not expose weather resistive barrier membrane to sunlight for more than thirty days prior to enclosure.
12. Inspect installation prior to enclosing and repair punctures, damaged areas and inadequately lapped seams with a patch of the membrane sized to extend 150 mm (6in.) in all directions from the perimeter of the affected area.

C. Accessories:
   1. When required by dirty or dusty site conditions or by surfaces having irregular or rough texture or if it becomes difficult to adhere the weather resistive barrier to the substrate, apply surface conditioner by spray, brush, or roller at the rate recommended by manufacturer, prior to membrane installation. Allow surface conditioner to dry completely before membrane application.
   2. Apply a bead or trowel coat of mastic along membrane edges, seams, cuts, and penetrations.
   3. Apply primer by brush or heavy nap, natural-material roller at a rate recommended by manufacturer prior to membrane installation. Allow primer to dry completely before membrane application.

D. Install final finish material the same day the membrane is applied. Secure finish material in place by an approved method. Nails or other fasteners which penetrate through the membrane shall be treated in a manner acceptable to the waterproofing manufacturer.

END OF SECTION

SECTION 07 26 53

VAPOR REDUCTION FLOOR COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Text Section Includes: Furnishing, testing, and application of floor coatings for the reduction of water vapor transmission for interior concrete slabs requiring the installation of ceramic tile, VCT, vinyl, wood, carpet, and/or epoxy flooring.

B. Related Sections - Coordinate work of this Section with work of other Sections to properly execute the work requirements and maintain satisfactory progress of work of other Sections.
1. Section 03 30 00 - Cast-In Place Concrete: Installation and curing requirements.
2. Section 09 30 00 - Tile: Installation requirements for tile floors.
3. Section 09 65 19 - Resilient Flooring: Installation requirements for resilient flooring.

1.2 SYSTEM DESCRIPTION

A. Provide one, or both, of the following systems as required reducing the moisture vapor emissions from concrete floor slabs to that amount acceptable to meet finish floor manufacturer requirements. The initial calcium chloride tests performed for interior concrete slab areas receiving ceramic tile, VCT, vinyl, wood, carpet, and/or epoxy flooring systems will determine the location where each system shall be required.
1. Koester VAP 1 System:
    a. System shall be comprised of the full VAP 1 System which is 2 coats of VAP Primer followed by one coat of VAP Top Coat and a final coat of VAP Primer.
    b. This system is required on concrete floors with a water vapor transmission level greater than 8 lbs./24 hrs per 1,000 sf.
2. Koester VAP Primer System:
    a. System shall consist of 3 coats of VAP Primer only.
    b. This system is required on concrete floors with a water vapor transmission level less than 8 lbs./24 hrs per 1,000 sf.

B. Areas Not Requiring Vapor Reduction Floor Coating
1. Vapor Reduction Floor Coating is not required on interior concrete slabs without floor finish materials.
2. Vapor Reduction Floor Coating is not required on interior slabs which will receive Terrazzo finish.
3. The initial calcium chloride tests for interior concrete slab areas receiving ceramic tile, VCT, and carpet, will determine where this system will not be required. Vapor Reduction Floor Coating is not required on concrete floors with water vapor transmission level less than 3 lbs./24 hrs. per 1,000 sf. This is only acceptable if the ceramic tile, VCT, and carpet flooring Manufacturer and Owner approve.

1.3 SUBMITTALS

A. Product Data: For each type of product and process specified, which shall include:
   1. Manufacturer's Specification.
   2. Installation Instructions.

B. Provide a list of 10 similar projects with a minimum of 3 years performance history. Similar projects shall be installations with initial vapor transmission rates of 15 lbs./ per 1,000 sf./ per 24 hrs. Minimum having maintained vapor reduction rates of 3 lbs./ per 1,000 sf. / per 24 hrs. or less.

C. Submit calcium chloride test results (prior to and after installation of vapor reduction floor coating) to the Architect, Owner, Contractor, and Vapor Reduction Floor Coating Manufacturer's Representative.

1.4 QUALITY ASSURANCE

A. Qualifications of applicator
   1. Manufacturer shall have no less than 5 years' experience in the manufacturing of epoxy based water Vapor Reduction Floor Coating.
   2. Manufacturer must provide independent lab test reports documenting performance per the following:
      a. ASTM E96, Water Vapor Transmission (dry and wet methods).
      b. ASTM D4541 Adhesion Properties (after ASTM E96).
      c. ASTM C309, Liquid Membrane-Forming Compounds for Curing Concrete.
      d. ASTM C156, Water Retention by Concrete Curing Materials

B. Manufacturer's Qualification
   1. Manufacturer shall have no less than 5 years' experience in the manufacturing of epoxy based water Vapor Reduction Floor Coating.
   2. Manufacturer must provide independent lab test reports documenting performance per the following:
      a. ASTM E96, Water Vapor Transmission (dry and wet methods).
      b. ASTM D4541 Adhesion Properties (after ASTM E96).
      c. ASTM C309, Liquid Membrane-Forming Compounds for Curing Concrete.
      d. ASTM C156, Water Retention by Concrete Curing Materials.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the job site in their original unopened containers, clearly labeled with the manufacturer's name and brand designation.

B. Store products in an approved ventilated dry area; protect from dampness, freezing, and direct sun light. Product should not be stored in areas with temperatures in excess of 90 F or below 50 degrees F.

C. Handle product in a manner that will prevent breakage of containers and damage products.

1.6 PROJECT/SITE CONDITIONS

A. Environmental Conditions
   1. Do not apply Vapor Reduction Floor Coating to unprotected surfaces in wet weather or to surfaces on which ice, frost, or water is visible.

2. Do not apply the Vapor Reduction Floor Coatings when the ambient/surface temperatures are below 50 degrees F (or expected to fall below this temperature within 24 hours from time of application) or above 90 degrees F
3. Do not apply Vapor Reduction Floor Coating in rain, fog, snow, or mist.
4. Never apply Vapor Reduction Floor Coatings to surfaces exposed to the sun.

B. Protection: Protect Vapor Reduction Floor Coating to prevent damage from active rain or topical water for a minimum period of 24 hours from time of application.

1.7 SCHEDULING

A. Two weeks before the installation of the ceramic tile, VCT, and carpet flooring systems over the interior concrete slabs, provide Initial calcium chloride tests as specified herein to determine the level of water vapor transmission in the slab and the type of Vapor Reduction Floor Coating required.

B. Contractor shall coordinate scheduling Vapor Reduction Floor Coating installation and allowing enough time to test, submit and apply the Vapor Reduction Floor Coating before installation of floor finish.

C. Contractor shall allow for as much time as is reasonable for the concrete slab to dry before testing the Vapor Reduction Floor Coating performance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Koester American Corporation, 1206 Laskin Road, Sute 201 E, Virginia Beach, VA 23451 (757) 425-1206 locally distributed by PCI Services, Tempe, AZ (480) 829-8827, www.koester.com.

B. Other, as approved by Architect.

2.2 MATERIALS

A. General:
1. Use specified materials of one manufacturer throughout project.
2. Provide recycled materials in accordance with Recycled Content provisions of Section 01 60 00.
3. Provide local/regional materials in accordance with Local/Regional Materials provisions of Section 01 60 00.
4. Provide materials in accordance with the low-emitting materials requirements of Section 01 60 00 - Materials and Equipment.

B. VAP Primer and VAP Top Coat: Water-based primer/curing agents containing epoxy resins and other specifically formulated chemicals to provide the following characteristics and properties.
1. Adhesion: Minimum 375 psi in accordance with ASTM D4541.

2. Water Vapor Transmission Reduction: Performance documented at no less than 90% water vapor transmission reduction compared to the untreated concrete slab by independent testing company when tested in accordance to ASTM E96 wet method.
3. VOC Content: No more than 0.1 lbs./gallon, mixed.
4. Conform to ASTM C309, Liquid Membrane-Forming Compounds for Curing Concrete and ASTM C156, Water Retention by Concrete Curing Materials

C. Cementitious underlayment system (if required to level the floor over the VAP Systems): As required by vapor reduction floor coating manufacturer and in accordance with Section 03 01 30.
1. Tested and approved by Koester American prior to installation.
2. No underlayment system with gypsum will be allowed.

2.3 MIXING

A. Use clean containers, mix thoroughly as per Manufacturer's requirements to obtain a homogeneous mixture using a low speed motor (below 400 rpm) and a Jiffy two blade type mixer. DO NOT AERATE.

B. VAP Primer Mix Ratio: Mix Component A and B at a ratio of 3:2.

C. VAP 1 Top Coat Mix Ratio: Mix Component A and B at a ratio of 4:1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect surfaces with regard to their suitability to receive Vapor Reduction Floor Coating with the Manufacturer's Representative.

B. Verify that surfaces to be treated with Vapor Reduction Floor Coatings have NOT previously been treated with other materials like underlayment's, screeds, penetrating sealants, etc. If this is the case, consult with the Vapor Reduction Floor Coating Manufacturers Representative prior to any application of Vapor Reduction Floor Coatings.

C. Calcium chloride test requirements:
1. Two weeks before installation of the ceramic tile, VCT, vinyl, wood, carpet, and/or epoxy flooring systems over the interior concrete slabs provide calcium chloride test to determine the level of water vapor transmission in the slab.
2. Conduct testing in accordance with ASTM F1869 or ASTM E1907 (quantitative anhydrous calcium chloride test).
3. Conduct calcium chloride tests after HVAC system has been in continuous use for 36 hours with a minimum ambient temperature of 72 degrees F. Water vapor transmission levels are directly affected by ambient room temperature and readings conducted without a sustained ambient temperature is NOT acceptable.
4. Document test results and provide recommendations on the type of Vapor Reduction Floor Coating to be used by area.
5. Provide test results with a marked up floor finish plan showing test results.
6. Provide a written clarification on status of HVAC system before and during the test and the length of time the ambient air temperature was maintained before the tests.

7. Provide a marked up floor plan showing areas with Vapor Reduction Floor Coating recommendations.

3.2 PREPARATION

A. Clean surfaces to receive Vapor Reduction Floor Coatings.
1. Shotblast floors to receive system.
2. Remove defective materials, and foreign matter such as dust, adhesives, leveling compounds, paint, dirt, grease, curing agents, form release agents, efflorescence, laitance, Shotblast beebees, etc.
3. Repair cracks, expansion joint, control joints, and open surface honeycombs and fill in accordance with Manufacturers recommendations.
4. Acid etching or grinding is not acceptable for surface preparation.
5. Provide uncontaminated surface.

B. Dampen, Surface Saturated Dry (SSD), uncontaminated concrete, leaving NO standing water. Surfaces shall be damp, not wet to the touch. Use clean potable water to predampen concrete surfaces. Only pre-dampen concrete prior to first VAP Primer coat. Do NOT pre-dampen between subsequent coats of VAP Systems.

3.3 APPLICATION

A. VAP Primer coat application:
1. Spray VAP Primer leaving no areas untreated.
2. Avoid puddling and pinholes when back brushing.
3. Provide continuous ventilation during cure.
4. Apply VAP Primer coats at a coverage rate of 300 sf. per gallon per coat.

B. VAP Top Coat application:
1. Apply VAP Top Coat using a squeegee and 3/8” nap roller leaving NO areas untreated.
2. Avoid pin holes. To minimize air bubbles, use a spiked roller immediately after application of Top Coat.
3. Provide continuous ventilation during cure.
4. Apply VAP Top Coat at a coverage rate of 80 to 100 sf. per gallon unless otherwise directed by Manufacturer.
5. Top coat shall be homogenous and no less than 15 dry mils in thickness, particularly over high points on floors.

C. The VAP Primer System shall require a minimum of 6 hours drying time for the first Primer coat (based upon project conditions), a minimum of 6 hours of drying time for the second Primer coat (based upon project conditions), and 24 hours of drying time for the final Primer coat before the floor covering system can be installed.

D. The VAP 1 System shall require 6 hours drying time for the first Primer coat, 24 hours of drying time for the second Primer coat, 1 2 hours of drying time for the Top Coat, 24 hours of drying time for the final Primer coat before the floor covering system can be installed.

3.4 FIELD QUALITY CONTROL

A. Floor treatment calcium chloride tests:

1. After drying of the final coat of the Vapor Reduction Floor Coating, provide calcium chloride tests to determine if the level of water vapor transmission has been reduced below 3 lbs./ per 1,000 sf./ per 24 hrs.
2. Contact Architect, Owner, and Vapor Reduction Floor Coating Manufacturer's Representative concerning any areas with a water vapor transmission level greater than 3 lbs./24 hrs. per 1,000 sf.

B. Adhesion tests:
1. Test adhesion of flooring adhesives, coatings, and leveling compounds to the final VAP Primer Coat.
2. Contact flooring Manufacturer for recommendations.

3.5 PROTECTION

A. Protect each coat during specified cure period from any kind of traffic, topical water, and contaminants.

END OF SECTION

SECTION 07 43 13

METAL WALL PANELS

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

A. Design Requirements:
   1. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with applicable code.
   2. Maximum Allowable Deflection of Panel: 1/180.

B. Performance Requirements (aluminum metal wall panels):
   1. Structural performance: provide exterior/interior wall cladding assemblies capable of withstanding the effects of load and stresses from dead loads, wind loads, snow loads and normal thermal movement without evidence of permanent defects of assemblies or components.
      a. Dead load: As required by applicable building code.
      b. Live Load: As required by applicable building code.
      c. Wind Load: uniform pressure (velocity pressure) acting inward of outward as noted on General Structural Notes.
      d. Thermal Movements:
         1) Provide assemblies that allow for thermal movements resulting from the following maximum changes (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components and other detrimental effects:
         2) Temperature Change (range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
   2. Sealed joints shall allow free and silent movement of panels during expansion and contraction while preventing uncontrolled penetration of moisture.
   3. Manufacturing, installation, and sealing shall prevent deformation of exposed surfaces.
   4. Design panel system to accommodate substructure tolerance of +0 to -1/8 inch.
   5. Panel support system shall allow for free-floating panel installation.
   6. Design the system to affect a positive mechanically fastened assembly to substructure, not dependent on adhesives.
   7. Not Permitted: Vibration harmonics; wind whistles; noises caused by thermal movement; thermal movement transmitted to other building elements; loosening, weakening or fracturing of attachments or components of system.
   8. Preformed metal panel system to withstand code imposed design loads. Maximum allowable deflection of span: L/180.
   9. Air infiltration: Panel system shall not have air infiltration rate more than 0.06 cfm per sq. ft. of fixed wall area when tested in accordance with ASTM E283 at static air pressure differential of 1.57 psf.
   10. Water Penetration: Panel system shall have no water penetration as defined by in test method when tested in accordance with ASTM E331 at inward static pressure differential of not less than 6.24 psf and not more than 12.0 psf.

1.2 SUBMITTALS

A. Product Data: Manufacturer's product literature for the panel specified.

B. Shop Drawings:
   1. Submit drawings showing layouts, sizes, gauges, methods of constructions and installation, including sizes and types of fastening devices, and other details as necessary to erect a weathertight assembly.
   2. Include plans; elevations; sections and details.

C. Structural Calculations: Submit a comprehensive analysis of design loads, including dead loads, live loads, wind loads and thermal movement.

D. Certificates: Product certificates signed by manufacturer certifying materials comply with the specified performance characteristics and criteria, and physical requirements.

E. Samples: Provide color samples of specified color(s). Samples shall involve normal color and texture variations, include sample sets showing the full range of variations expected.

1.3 QUALITY ASSURANCE

A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practive in the jurisdiction where the project is located and who is experienced in providing engineering services of kind indicated.

B. Manufacturer Qualifications: Minimum of 5 years' experience in manufacturing exterior wall panels similar to those specified.

C. Installer Qualifications: Acceptable to manufacturer.

D. Mockups: Prior to start of Work, construct a full scale field sample panel illustrating construction method for Aluminum Composite Wall Panel System (ACWPS) and adjacent construction in accordance with Section 01 33 00.
   1. Sample panels shall provide a standard of workmanship.
   2. Provide concrete slab as mock-up base.
   3. Mock-up shall be wall segment with corner and intersection with adjacent construction.
      a. Construct with all anchors, fasteners, sealants, and other components proposed for actual installation.
   4. Approximate size: 6'-0" wide by 8'-0" tall.
   5. Construct successive sample panels until standard is approved.
   6. When accepted, sample panel shall be standard of comparison for remainder of Work.
   7. Submit report describing tests, results, and any modifications made to correct deficiencies or to improve performance.
   8. Sample panel shall be reviewed by the Architects' contract administrator for acceptance.Do not proceed with installation of ACWPS on building until mock-up has been inspected and accepted by Architect.
   9. This sample, when accepted by the Architect, will function as a reference base for acceptance or rejection of final work.
   10. Upon acceptance of final work at completion of Project, remove sample panel from site and dispose of in a legal manner.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.

B. Storage: Adequately protect against damage while stored at the site.

C. Handling: Comply with manufacturer's instructions.

1.5 PROJECT CONDITIONS

A. Field Measurements:
   1. Verify actual supporting and adjoining construction by field measurements before fabrication, and indicate recorded measurements on final shop drawings. Coordinate construction to ensure that wall panel assemblies fit properly to supporting and adjoining construction and coordinate schedule with construction progress to avoid delaying the work. Proper fit and attachment of items is required.
   2. Established dimensions: where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with fabrication of wall panel assebmlies corresponding to the established dimensions.

1.6 WARRANTY

A. Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty documents executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights owner may have under Contract Documents.

B. The Contractor shall warrant the materials to be free of faults and defects in accordance with the General Conditions, except that the warrant shall be extended by paint manufacturer's standard multi-year warranty. The warranty shall be in writing and shall be signed by the manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Description: Provide the following as noted on Drawings.
   1. Composite Plate Metal Composite Panel System or approved equal to be provided, consisting of a long term façade assembly incorporating premium composite materials with affordable design characteristics. The exposed fastener design shall include premium 4mm or 6mm composite plank, custom extrusions, tamper proof fasteners and EPDM gasket inserts providing flexibility for rain screen or a dry jointed application. Panels to have unique fabricated folded edge, with the core material is concealed.
   2. Color: Custom to match Architect's samples.

B. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

C. Sealant: As specified in Section 07 92 00.

D. Trim Material: Furnish required preformed sheet metal trim and flashing of same finish and color as indicated or as required at top of wall, bottom, corners, treatments at fenestration, etc.

E. Waterproofing Underlayment: In accordance with Section 07 25 00.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect.
   2. Commencements of Work will be construed as acceptance of subsurfaces.
   3. Examine alignment of support members before installing metal roof and wall panels. Do not proceed with such installation if the members are not aligned to the tolerances required by Panel Manufacturer.

B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation. Panel substructure shall be level and plumb. Panel substructure shall be structurally sound as determined by that subcontractor's engineer. Panel substructure shall be free of defects detrimental to work and erected in accordance with established building tolerances. Coordinate delivery of such items to project site.

B. Waterproofing underlayment shall be installed and tested prior to start of metal wall panel installation.

3.3 INSTALLATION

A. Panel Erection:
   1. Install panels, fasteners, trim, and accessories level and plumb, in proper alignment to substructure framing and established lines in accordance with drawings details and manufacturer's instructions.
   2. Panels shall be erected in accordance with approved shop drawings.
   3. Panel anchorage shall be structurally sound and per engineering recommendations.
   4. Where aluminum materials come in contact with dissimilar materials, an isolation shim or tape shall be installed at fastening locations.
   5. Make cuts, bends, punching and drilling accurate, neat and properly located.
   6. Use concealed fasteners, unless otherwise directed by Architect.
   7. Provide holes and connections as required for other trades.
   8. Repair or replace, as directed, panels and trim which have been damaged.

3.4 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises.

END OF SECTION

SECTION 07 60 00

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Flashings, sheet metal work and related items including, but not limited to:
   1. Counterflashing at vertical surfaces.
   2. Flashing at roof penetrations.
   3. Edge flashing.
   4. Louvers

1.2 SUBMITTALS

A. Product Data: Provide manufacturer's product and installation data for factory fabricated copings, reglets and counterflashing's

B. Shop Drawings: Submit Drawings indicating type of material, gauge, dimensions, profiles, and locations where used, fastening, and anchoring methods, joints, and provisions of expansion and contraction.

1.3 QUALITY ASSURANCE

A. Standards:
   1. Comply with design and installation methods of SMACNA Architectural Sheet Metal Manual.
   2. Comply with The NRCA Roofing and Waterproofing Manual installation details.
   3. Comply with ANSI/SPRI, ES I-98.

B. Performance Requirements:
   1. General: Designed and installed to withstand 90 mph wind, Exposure C per 2006 IBC.
   2. High performance coping shall be CERTIFIED by the coping manufacturer to meet performance design criteria according to the following test standards:
      a. ANSI/SPRI ES-1 Test RE-3 for Coping: The coping system shall be tested simultaneously on horizontal and vertical surfaces and shall exceed horizontal and vertical design wind pressure as calculated in accord with the ANSI/SPRI ES-1 Test RE-3. Use the current edition of ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.
      b. The coping product shall be listed in current FM Approval Guide approved for Class FM 1-60 through FM 1-180, as applicable.
      c. The coping product shall be UL Classified by Underwriters Laboratories, Inc.® or other 3rd party verification of compliance with the ANSI/SPRI ES-1 Wind Design Standard.

1.4 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened

B. Storage: Adequately protect against damage while stored at the site. Do not store materials on ground.

C. Handling: Comply with Manufacturer's instructions. Handle with care so as not to buckle or warp metal, or damage solder joints.

1.5 WARRANTY

A. General: Furnish 5 year warranty against flashing and sheet metal failure, in which contractor agrees to repair or replace flashing and sheet metal as necessary to maintain work in watertight condition during the warranty period. Warranty to cover workmanship, materials and repair or replacement of same, at no cost to Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Galvanized Steel: ASTM A653, 24 gauge minimum and as indicated, with G-60 coating.

2.2 ACCESSORIES

A. General
   1. Provide recycled materials (for accessories) in accordance with Recycled Content provisions of Section 01 60 00.
   2. Provide local/regional materials (for accessories) in accordance with Local/Regional Materials provisions of Section 01 60 00.

B. Reglets and Counterflashing's: Fry Reglet Corporation, Type STX at stucco, Type SM at masonry and Concrete, or fabricated as indicated on Drawings. Provide prefabricated inside and outside reglet and counterflashing corners.

C. Solder: ASTM B32, 50/50 type.

D. Flux: FS O-F-506.

E. Sealant: As specified in Section 07 92 00.

F. Plastic Cement: ASTM D4586

G. Roofing Felt: ASTM D226, 15 pound type or 30 pound type.

H. Bituminous Coating: FS TT-C-494 or SSPC paint - 12, dry film 15 mils per coat.

I. Polyethylene: Black, 6 mil.

J. Sheet Metal Fasteners: Galvanized steel with soft neoprene washers at exposed fasteners.

2.3 FABRICATION – GENERAL

A. Fabricate sheet metal with lines, arris, and angles sharp and true, and plane surfaces free from objectionable wave, warp, or buckle. Hem exposed edges to form a 1/2 inch wide hem on the side concealed from view.
   1. Provide concealed stiffeners and reinforcements as necessary to provide surfaces free of objectionable wave, warp or buckle.

B. Forming, anchoring, expansion, and contraction details shall conform to referenced quality standards.

C. Provide for thermal expansion of running trim, flashing, expansion joints, and other items exposed for more than 15 feet continuous length.

D. Fabricate cleats and starter strips of same material as sheet.

E. Form pieces in longest practical lengths, except form flashing and fascia in 8 to 10 foot units.

F. Fabricate corners from one piece with minimum 18 inch long legs, with mitered corners; solder for rigidity, seal with sealant.

G. Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.

H. Where prefabricated counterflashing and reglet system is used, form upper edge of counterflashing with an approved snap lock flange to engage reglet receiver and to provide a spring action at bottom edge against built-up flashing.

I. Flashing Pans: Form sheet metal pans 6 inch nominal square size, with 3 inch upstand, and 4 inch flanges. Fill pans watertight with plastic cement.

2.4 FINISH

A. Shop prepares and prime exposed ferrous metal surfaces.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 1.5 mil

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
   1. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips, and reglets in place, and nailing strips located.
   2. Verify membrane termination and base flashings are in place, sealed, and secure.

B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Installation shall conform to NRCA and SMACNA manuals.

B. Expansion Seams: Maintain a watertight installation at expansion seams. Locate expansion seams as shown or if not shown, at the following maximum spacing for each general flashing use:
   1. Flashing, expansion joints, gravel stops, and trim: At 10 foot intervals, 24 inches on each side of corners and intersections.
   2. Sealant-type expansion joints: Where sealant-filled expansion joints are used, embed the hooked flanges of the joint members not less than 1 inch into the sealant. Form joints to completely conceal the sealant. When ambient temperature is moderate at the time of installation (40 to 70 degrees F.), set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant type joints at temperatures below 40 degrees F. Installation of sealant is specified in Section 07 92 00.

C. Where dissimilar materials abut, provide proper separation or protection to minimize the possibility of galvanic action.

D. Soldering:
   1. Solder joints at corner fabrications.
   2. Except where other methods of joining are indicated or specified, solder joints and connections of Sheet Metal Work.
   3. Remove grease and dirt from metal surfaces to be joined.
   4. Remove flux residue by scrubbing, neutralizing with ammonia or a 5 to 10 percent solution of washing soda, followed by a clear water rinse.
   5. Assemble parts and solder using regular non-corrosive resin flux. Heat metal thoroughly to completely sweat solder through full contact area.

E. Sealed Joints: Form nonexpansion, but movable joints in metal with flat lapped seams to accommodate elastomeric sealant to comply with SMACNA Standards. Fill joint with sealant and form metal to completely conceal sealant.

F. Reglets: Install reglets in masonry, concrete, or stucco to receive flashings.

G. Counterflashing:
   1. Provide metal counterflashing at top edges of built-up base flashings and at other locations indicated.
   2. Lap end joints a minimum of 3 inches. Do not solder or weld joints. Make flashing continuous at angles. Counterflashing shall overlap base flashing a minimum of 4 inches, unless otherwise indicated.
   3. Where counterflashing terminates in reglets, fasten flashing with lead wedges every 12 inches. Fill reglets continuously with synthetic rubber type sealant.

3.3 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition

END OF SECTION

SECTION 07 61 13

SHEET METAL ROOFING

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

A. Performance Requirements: Comply with the following:
   1. Water Infiltration: No measurable water penetration per ASTM E 1646.
   2. Wind uplift: UL580, Class 90.
   3. Fire Rating: UL 790, Class A.

B. Design Requirements
   1. The metal roof panel shall be designed by the Manufacturer as a complete system. Members and connections not indicated on the drawings shall be the responsibility of the Contractor. All components of the system shall be supplied or specified by the same manufacturer.
   2. The panels and concealed anchor clips shall be capable of supporting a minimum uniform live load of 20 psf.
   3. Roof panels shall be free to move in response to the expansion and contraction forces resulting from temperature variation, as specified in the MBMA Metal Roofing Systems Design Manual. There shall be no sound transmitted to structure as a result of thermal movement of the panels.
   4. Provide a Class A roof covering as defined by NFPA 256.

1.2 REFERENCES

A. ASTM A 653/A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2001a.

B. ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2001.

C. 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; 1991 (Reapproved 1999).

D. ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls be Uniform Static Air Pressure Difference; 2000.

E. ASTEM E 408/C – 1371: “Standard Test Method for Total Normal Emittance of Surfaces Using inspection – Meter Techniques.

F. ASTM E 903/C – 1549: Standard Test Method for Solar Absorbance, using Integrating Spheres.

G. ASTM E 1646 – Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995.

H. ASTM E 1680 – Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems; 1995.

I. Dade County (Florida) Acceptance Report Numbers: 01-1106-01 and 01-1106-02.

J. FM-Tests Requirements for Class 1 Panel roofs, Factory Mutual Research Corporation.

K. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies; 1994.

L. UL 2218: Class 4 Impact Resistance Rating.

M. SMACNA (ASMM) – Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors National Association; 1993.

1.3 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation Methods.

B. Shop Drawings: Submit Drawings showing layout, dimensions, joints, finishes and textures and construction details.

C. Samples: Submit 2 samples of each type of roof panel with factory finish and Architect selected color(s).

D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

E. Operation and Maintenance Data: Include methods for maintaining installed products and precautions relating to cleaning materials and methods that might be detrimental to finishes and performance.

F. Engineering Calculations: Submit calculations, sealed by a Registered Structural Engineer, verifying wind uplift performance of roofing.

G. Close Out: Warranty documents specified herein.

1.4 QUALITY ASSURANCE

A. Qualifications: Manufacturer specializing in specified product with minimum 5 years documented experience.

B. Pre-Installation Meeting: Conduct pre-installation meeting to acquaint installers of roofing and related work with project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.

B. Storage: Adequately protect against damage while stored at the site. Store material in dry, above ground location.
   1. Stack pre-finished material to prevent twisting, bending, and abrasion, scratching and denting. Elevate on end of each skid to allow for moisture to run off.
   2. Prevent contact with material that may cause corrosion, discoloration, or staining.
   3. Do not expose to direct sunlight or extreme heat trim material with factory applied strippable film.
   4. Comply with all manufacturers' requirements.

1.6 WARRANTY

A. Furnish 10 year warranty against cracking, peeling and fade for paint finish.

B. Furnish special weather tightness warranty for a period of 20 years from substantial completion of the Work, on manufacturer's standard form in which manufacturer agrees to repair or replace sheet metal roofing as necessary to maintain roofing work in watertight condition during the warranty period. Warranty to cover workmanship and materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements.
   1. Petersen Aluminum PAC-CLAD Tite-Loc Plus system.
   2. Atas Aluminum Corp.
   3. Berridge Manufacturing Co.
   4. Englert, Inc.

2.2 SHEET MATERIALS

A. General: Factory fabricated panels; panels fabricated on site using portable roll former are prohibited.
   1. Peterson Aluminum Tite-Loc Plus Panels.
      a. 18" width smooth finish panels
      b. Tension leveled
      c. .032 Aluminum
      d. Factory applied sealant in seam
      e. Finish to be Kynar 500® or Hylar 5000®
      f. Triple folded to 180 degrees
      g. Flashing and trim: factory formed; fabricated as recommended by SMACNA.

2.3 SUBSTRATE BOARD

A. Substrate Board: Dens-Deck Prime, glass-mat faced, water resistant gypsum substrate board complying with ASTM C1177 as manufactured by Georgia Pacific Corporation.
   1. Thickness: 5/8" Firestop Type X.

B. Substrate Board Fasteners: Size and type as recommended by manufacturer for type of substrate and as required to comply with wind uplift requirements.

2.4 ACCESSORY MATERIALS

A. Insulation: Polyisocyanurate insulation to be minimum 1-1/2" thick with glass fiber facers and shall conform to ASTM C 1289. Insulation to have compressive strength greater than 16 psi (ASTM D 1621), moisture vapor transmission less than 1 perm (ASTM E96), nominal overall density of 2.0 lbs.cu.ft (ASTM D 1622) and core flame spread of 25 or less (ASTM E 84).

B. Roof Underlayment: ASTM D226, No. 30 unperforated asphalt saturated felts.

C. Fasteners: Stainless steel with washers where required.
   1. Underlayment: Provide fasteners with 1 inch diameter plastic caps.

D. Sealant: As specified in Section 07 92 00

E. Components shall be compatible with the roof panel furnished. Flashing, trim, metal closure strips, caps, gutters, downspouts, roof curbs, and similar metal components shall not be less than the minimum thickness specified by the panel Manufacturer. Exposed metal components shall be finished to match the panels or trim, as furnished. Molded closure strips shall be closed-cell or solid-cell synthetic rubber or neoprene, or polyvinyl chloride or metal pre-molded to match configuration of the covering and shall not absorb or retain water.

2.5 FABRICATION

A. Exposed adjacent flashing, trim, gutters, roof penetration flashing, closures, counterflashing, copings, etc. shall be of the same material and finish as the roof panels.

B. Flashings and trim: Hem exposed edges on underside ½ inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
   1. Examine deck to ensure proper attachment to framing.
   2. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves or projections, properly sloped to valleys and eaves.
   3. Verify roof openings, curbs, pipes, sleeves, ducts or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
   4. Verify deck is dry and free of snow or ice. Flutes in steel deck to be clean and dry and joints in deck to be solidly supported and fastened.
   5. Ensure that all fastener heads are totally flush with the substrate.

B. Coordination: Coordinate with other Work which affects, connect with, or will be concealed by this Work.

3.2 INSTALLATION – INSULATION

A. A. Install insulation board parallel to or perpendicular to deck ribs with long joints in continuous straight lines and perpendicular to roof slopes.

1. Locate edge joints on deck ribs.
2. Stagger end joints of adjacent rows.
3. Fit ends and edges tightly butted, but not forced together.

B. At roof deck location to receive ceilings (non-exposed underside of metal deck) Install approved fasteners in accordance with approved Shop Drawings and the following:
   1. Provide fasteners in quantity and spacing as required for specified wind uplift.
   2. Install fasteners through the roof board to top flange of steel deck.
   3. Fastener plate shall be flush with substrate board surface without crushing board.
   4. Increase fastener density as required by wind uplift at corners, perimeter and field of roofing.

C. Insulation Installation:
   1. Install insulation saddles/crickets at areas shown, fabricated to dimensions shown, by mechanically tapering roof insulation.
   2. Extend insulation full thickness as a single layer over entire surface to be insulated, cutting and fitting tightly around obstructions.
   3. Do not install more insulation each day than can be covered with membrane before end of day or before start of inclement weather.
   4. Secure insulation units with adhesive or fasteners (as applicable to underside exposure of roof deck) to comply with the Factory Mutual requirements of the membrane system. Cover immediately with underlayment.

3.3 INSTALLATION – SUBSTRATE BOARD

A. Install roof board parallel to or perpendicular to deck ribs with long joints in continuous straight lines and perpendicular to roof slopes.
   1. Locate edge joints on deck ribs.
   2. Stagger end joints of adjacent rows.
   3. Fit ends and edges tightly butted, but not forced together.

B. Install approved fasteners in accordance with approved Shop Drawings and the following:
   1. Provide fasteners in quantity and spacing as required for specified wind uplift.
   2. Install fasteners through the roof board to top flange of steel deck.
   3. Fastener plate shall be flush with substrate board surface without crushing board.
   4. Increase fastener density as required by wind uplift at corners, perimeter and field of roofing.

3.4 UNDERLAYMENT INSTALLATION

A. Install underlayment over entire area to be roofed.
   1. Apply from eave to ridge in shingle fashion free of wrinkles.
   2. Weather lap ends a minimum of 6 inches and ends a minimum of 4 inches.
   3. Stagger end laps of each consecutive layer.
   4. Use adhesive for temporary anchorage, where possible, to minimize use of
   5. mechanical fasteners under sheet metal roofing.

3.5 INSTALLATION

A. Comply with Manufacturers standard instructions and conform to SMACNA Architectural Sheet Metal Manual to achieve a watertight installation.

B. Install panels in such a manner that horizontal lines are tru and level and vertical lines are plumb.

C. Install starter and edge trim before installing roof panels.

D. Remove protective strippable film prior to installation of roof panels.

E. Attach panels using Manufacturer's standard clips and fasteners, spaced in accordance with approved Shop Drawings.

F. Provide flashings, counterflashings, gutters, flashings at roof penetrations, trims, closures, copings, etc. attached to or adjacent sheet metal roofing as required for a complete installation.

G. Install sealants for preformed roofing panels as approved on Shop Drawings.

H. Do not allow panels or trim to come into contact with dissimilar metals.

3.6 PROTECTION

A. Do not allow traffic on completed roof. If required, provide cushioned walk boards.

B. Protect installed roof panels and trim from damage caused by adjacent construction and traffic until completion of installation.

C. Remove and replace as directed panels or components which are damaged.

3.7 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

B. Clean grease, finger marks or stains from the panels per Manufacturer's recommendations.

END OF SECTION

SECTION 07 72 00

ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Submit Manufacturer's Specifications, design data and installation instructions.

B. Shop Drawings: Submit Drawings showing layout, dimensions and construction details.

1.2 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.

B. Storage: Adequately protect against damage while stored at the site.

C. Handling: Comply with Manufacturer's instructions.

1.3 QUALITY ASSURANCE

A. Manufacturer: A minimum of 5 years' experience manufacturing similar products.

B. Installer: A minimum of 2 years' experience installing similar products.

1.4 1.04 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions shown on Drawings by taking field measurements; proper fit and attachment of parts is required.

1.5 1.05 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. General:

1. Provide recycled materials in accordance with Recycled Content provisions of Section 01 60 00.
2. Provide local/regional materials in accordance with Local/Regional Materials provisions of Section 01 00 00.

B. Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specifications requirements:
1. Bilco Co. www.bilco.com
2. Bristolite www.bristolite.com
3. Babcock-Davis Div., Cierra Products www.babcockdavis.com
4. J.L. Industries www.jlindustries.com
5. Pate Co. www.patecurbs.com
6. Milcor, Inc. www.milcorinc.com
7. Nystrom Building Products www.nystrom.com
8. O'Keeffe's Inc. www.okeefes.com
9. Acralight International; Div. Of International Skylights (Roof Hatches) www.acralight.com

2.2 MANUFACTURED UNITS

A. Roof Hatch: Bilco, or as approved www.bilco.com, size as indicated on Drawings, galvanized steel, 14 gauge cover and curb, 22 gauge cover liner, 1 inch thick rigid insulation in curb and cover, 12 inch high curb.
1. Provide heavy duty padlock hasp.
2. Provide vandal resistant features as available.
3. Finish: Powder coat; standard color as selected.

B. Roof Hatch Safety Railing System:
1. Regulatory requirements:
   a. Local building code.
   b. OSHA Standards CFR 29 1910.23 and CFR 29 1910.27.
2. Manufacturer(s), model(s) and description(s):
   a. Bilco model Bil-Guard RL-XX, top rail, mid rail, and self-closing gate, 42 inch railing height. Bilco Co. www.bilco.com
   b. Nystrom Model No. RHSR-SS, Top rail, mid rail, and chain gate, with the hatch curb acting as the toe plate, 200-lb test load, 42 inch railing height (minimum). www.nystrom.com
   c. Nesea Corporation, Mt. Laurel, NJ (856) 235-3111, model as applicable to hatchway ladder mounting location. www.nesea-safetyproducts.com
   d. KeeHatch Railing System, top rail, mid rail, and chain gate designed for permanent bolt-on curb installation; The Safety Rail Source, Harleysville, PA www.thesafetyrailcource.com
   e. RailingReady, top rail, mid rail, and chain gate, 42 inch railing height. Acralight International www.acralight.com
3. Materials:
   a. Pipe: Galvanized, 1-1/4 inch ID, A53 Grade B seamed pipe or galvanized, 1-5/8 inch OD A500 seamed tube with weather-resistant plugged ends.
   b. Flat bar: 2 x 3/8 inch thickness A36 mild steel.
   c. Weld filler: Metal NR211 E70XX (AWS).
   d. Chain system: 3/16-inch proof coil ASTM specification, zinc plated with quick link on fixed end.
   e. Pipe caps: Weather and light resistant vinyl, 1-1/2 inch deep and to fit snugly over pipe ends.
   f. Bolts and washers: 3/8 x 2-1/2 inch grade Z, zinc plated. Fender washers for inside of hatch curb and standard flat washers outside.

g. Railing Clamps: Kee Klamp manufactured model 10-7 and 45-7 for 1- 1/4 inch pipe.
h. Sealant: As recommended by manufacturer. Brackets shall be sealed per roof manufacturer's approved methods.
i. Factory finish: Hot dipped galvanized.

4. Labels: Safety no hoisting warning label, model and serial # label, manufacturer identification label, patent or patent pending label.

C. Curbs: Pate Style pc-1b, or as approved, box section design, heavy gauge galvanized steel construction, continuous mitered and welded corner seams, integral base plate, factory installed wood nailer, and insulated with 1-1/2 inch thick rigid fiberglass board insulation.

D. Equipment Supports: Pate Style es-1 monolithic construction, heavy gauge galvanized steel, continuous mitered and welded corner seams, integral base plate, factory installed 2 inch x 4 inch wood nailer, and heavy gauge galvanized steel counterflashing.

E. Ladder extension (for roof hatches): Bilco Model 1 LadderUP safety post, or Bristolite Grab Bar. Coordinate with O'Keefe 531 Ladder requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Install roof specialties at locations shown or required in accordance with Manufacturer's instructions and as detailed on Drawings.

B. Install roof hatches, equipment supports and bases, curbs and curb assemblies, at locations indicated, fastening securely to deck through curb flange.

C. Set railing brackets in full bed of sealant and securely fastens to roof hatch curbs in compliance with manufacturer's instructions.

3.3 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 07 81 00

SPRAY-APPLIED FIRE RESISTIVE MATERIALS

PART 1 - GENERAL

1.1 PERFORMANCE REQUIREMENTS

A. Materials shall meet the following performance test criteria
   1. Dry Density: Measure field density in accordance with ASTM E605. Min. average density shall be 15 pcf and min. individual density shall be 14 pcf unless otherwise required by the authority having jurisdiction.
   2. Deflection: Material shall not crack or delaminate from the surface to which it is applied when tested in accordance with ASTM E759.
   3. Bond Impact: Material subject to impact tests in accordance with ASTM E760 shall not crack or delaminate from the surface to which it is applied.
   4. Bond Strength: Minimum bond strength of 200 psf when set and dry and tested in accordance with ASTM E736.
   5. Air Erosion: Maximum allowable weight loss of the fireproofing material shall be 0.025 gm./sq. ft. when tested in accordance with ASTM E859.
   6. Corrosion Resistance: Steel with applied fireproofing shall be tested in accordance with ASTM E937 without evidence of corrosion of the steel.
   7. Surface Burning Characteristics: Material shall exhibit the following surface burning characteristics when tested in accordance with ASTM E84:
      a. Flame Spread: 10 maximum
      b. Smoke Developed: 0

B. Fireproofing material shall not be subject to losses from the finished application by sifting, flaking, or dusting. Performance shall be measured by the results of a test for erosion resistance when subjected to high velocity air flow across the surface of dried samples. Samples thus tested must be representative of machine applied material similar to that which can be expected on the Project.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's instructions for proper application of sprayed and cementitious fireproofing.

B. Test Data: Submit laboratory test results for fireproofing for the following performance criteria specified, upon request:
   1. Bond strength per ASTM E736
   2. Compressive strength per ASTM E761
   3. Deflection per ASTM E759
   4. Bond impact per ASTM E760
   5. Air erosion per ASTM E859
   6. Corrosion resistance per ASTM E937
   7. Abrasion resistance per City of San Francisco, Bureau of Building Inspection Test Method, and impact penetration

C. Certification: Manufacturer to provide certification that fireproofing includes a mold inhibitor.

1.3 QUALITY ASSURANCE

A. Applicator: Company specializing in applying the work of this Section with minimum 2 years documented experience and approved by fireproofing manufacturer.

B. Products, execution and fireproofing thicknesses shall conform to the applicable code and UL requirements for the required fire resistance ratings.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver manufactured materials in original, unopened packages bearing the name of the manufacturer, the brand and the UL label verifying compliance with the UL quality control inspection program and the appropriate fire resistance ratings.

B. Fireproofing shall be kept dry until ready for use. The packages of materials shall be kept off the ground, under cover and away from walls and other damp surfaces. Material that has been exposed to water before actual use shall be discarded.

C. Fireproofing stock shall be rotated and material used before its expiration date.

1.5 PROJECT/SITE CONDITIONS

A. Physical Requirements for Proper Installation or Application: When the outdoor temperature at the building site is less than 40 degrees F., maintain an air and steel temperature of 40 degrees F. for 24 hours before and 24 hours after application of fireproofing materials. If necessary for job progress, provide enclosures and maintain heat to necessary temperatures.

B. Make provisions for natural ventilation to properly dry the fireproofing during and subsequent to its application. In enclosed areas or buildings lacking openings for natural ventilation, circulate and exhaust interior air to the outside by use of temporary circulators, exhaust fans or the air-conditioning system.

1.6 SCHEDULING

A. Prior to application of the fireproofing to the underside of roof decks, roofing applications shall be completed. Roof traffic shall be prohibited upon commencement of the fireproofing application and until the fireproofing material is cured and fully dried.

B. Prior to application of the fireproofing to the underside of steel decking, concrete work above shall be complete.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fireproofing:
   1. Moist areas: WR Grace Type 2 – 106-HY
   2. Other areas:

a. Sprayed Fiber: Cafco Blaze Shield II as manufactured by Isolatek International Corp. www.cafco.com
b. Cementitious Mixture (Sprayed):
    1) MK-6 as manufactured by the Grace Construction Products Division, W. R. Grace & Co. www.grace.com
    2) Cafco Blaze 300 as manufactured by Isolatek International Corp. www.cafco.com
    3) Acoustical Fireproofing (Painted Black): TBD

B. Water: Clean, fresh, suitable for domestic consumption and free from such amounts of mineral or organic substance as would affect the set of the fireproofing materials.

C. Fireproofing products shall be 100 percent free of asbestos fibers and shall contain a mold inhibitor

PART 3 - EXECUTION

3.1 EXAMINATION

A. Application of sprayed and cementitious fireproofing shall not begin until the Contractor and the fireproofing applicator have inspected the surfaces to receive fireproofing to determine if surfaces are acceptable to receive the fireproofing material.

B. Verify that surfaces are ready to receive work and that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.

C. Verify ducts, piping, equipment or other items which would interfere with application of fireproofing are not positioned until fireproofing work is complete.

D. Verify that voids and cracks in substrate are filled, and projections are removed where fireproofing is exposed to view as a finish material.

E. Beginning of installation means applicator accepts existing surfaces and substrates.

3.2 PREPARATION

A. Surfaces to receive sprayed and cementitious fireproofing shall be free of oil, grease, paints/primers, loose mill scale, dirt or other foreign substances which may impair proper adhesion of the fireproofing to the substrata.

B. When necessary, cleaning of surfaces to receive fireproofing shall be the responsibility of the structural steel erector, or Contractor, as specified in the structural steel and steel deck specifications.

C. Painted or primed steel surfaced may require a fireproofing bond test to determine if the paint formulation will impair proper adhesion. Determination of the compatibility of paint or primer with the sprayed and cementitious fireproofing shall be the responsibility of the paint or primer manufacturer.

3.3 PROTECTION

A. Provide masking, drop cloths or other satisfactory coverings so as to prevent overspray of sprayed and cementitious fireproofing.

B. Close off and seal ductwork in areas where fireproofing is being applied.

3.4 APPLICATION

A. Equipment and application procedure shall conform to the material manufacturer's application instructions.

B. Re-tempering or reuse of waste materials shall not be allowed.

C. Protect structural steel members with proper fireproofing thicknesses and densities to provide the fire resistance ratings indicated on Drawings.

D. Where structural steel columns are fireproofed with gypsum board applied in layers together with continuous metal sheathing, transition points between the gypsum board protection and fireproofing shall overlap fireproofing at the specified thickness for at least 12 inches from the top of the gypsum board.

3.5 FIELD QUALITY CONTROL

A. Re-inspect fireproofing for integrity of fire protection prior to concealment of work.

B. Correct unacceptable work and provide further inspection to verify compliance with requirements.

C. Architect may select an independent testing laboratory to sample and verify the thickness and density of the fireproofing in accordance with provisions of ASTM E605, "Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members," the "Inspection Procedure for Field Applied Sprayed Fire Protection Materials, as published by the AWCI, or UBC Standard No. 7-6 entitled "Thickness and Density Determination for Spray-Applied Fireproofing." Provide results of the above test to all parties at the completion of each floor.

D. Use of the W/D ratio formula to determine fireproofing thickness shall not be allowed, unless approved by the local building authority.

E. Owner will pay for testing laboratory to sample and verify the density of the direct-to-steel fireproofing as applied.

F. Contractor shall control thickness, utilizing a workable depth gauge to meet minimum thickness as required, and cooperate with the inspecting agency in furnishing samples for tests.

3.6 CLEANING

A. After the completion of fireproofing work, remove application equipment, and clean adjoining surfaces not to be sprayed with fireproofing material.

B. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises.

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Tested firestop systems, used in specific locations as follows:
   1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
   2. Safing slot gaps between edge of floor slabs and curtain walls.
   3. Openings between structurally separate sections of wall or floors.
   4. Gaps between the top of walls and ceilings or roof assemblies.
   5. Expansion joints in walls and floors.
   6. Openings and penetrations in fire-rated partitions or walls containing fire doors.
   7. Openings around structural members which penetrate floors or walls.
   8. Other locations as indicated on Drawings.

1.2 DEFINITIONS

A. Fire stopping: Material or combination of materials used to retain integrity of fire rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in, or construction joints between, fire rated wall and floor assemblies.

1.3 SYSTEM DESCRIPTION

A. Provide UL Classified or Warnock Hersey Listed firestopping system to prevent the spread of fire, smoke and gasses through penetrations in fire resistive walls, floors and partitions, including; but not limited to; the following areas:
   1. Unprotected openings and openings accommodating penetrating items such as cables, cable trays, pipes, ducts, boxes and conduits through fire rated floors, walls and smoke barriers.
   2. Head of wall openings between wall and connecting floor or roof deck assemblies.
      a. Meet requirements for exposure to hose stream test.
      b. Applicable for use with steel fluted deck floor assemblies.
      c. Allow deflection of floor or roof above.

B. Firestop systems shall not be intended to support live loads and traffic unless specifically approved by Testing Agency.

C. Firestop systems shall be approved by Code Authority.

D. Firestop products shall remain flexible where subject to movement without affecting the integrity of the product.

E. All Fire Barriers shall comply with NFPA 101.

F. Performance Requirements:
   1. Provide products that upon curing do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
   2. Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.
   3. Pipe insulation shall not be removed, cut away, or otherwise interrupted through wall or floor openings. Provide products appropriately tested for the thickness and type of insulation utilized.
   4. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur.
   5. When mechanical cable pathways are not practical, openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
   6. Penetrants passing through fire-resistance rated floor-ceiling assemblies contained within chase wall assemblies shall be protected with products tested by being fully exposed to the fire outside of the chase wall. Systems within the UL Fire Resistance Directory that meet this criterion are identified with the words “Chase Wall Optional”.
   7. Provide fire-resistive joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to the seal.
   8. Provide fire-resistive joint sealants designed to accommodate a specific range of movement and tested for this purpose in accordance with a cyclic movement test criteria as outlined in Standards, ASTM E-1399, ASTM E-1966 or ANSI/ UL 2079.
   9. Provide penetration firestop systems, fire-resistive joint systems, or perimeter fire barrier systems subjected to an air leakage test conducted in accordance with Standard, ANSI/ UL1479 for penetrations and ANSI/UL2079 for joint systems with published L-Ratings for ambient and elevated temperatures as evidence of the ability of firestop system to restrict the movement of smoke.
   10. Provide T-Rating Collar Devices tested in accordance with ASTM E-814 or ANSI/UL1479 for metallic pipe penetrations requiring T-Ratings per the applicable building code.

1.4 SUBMITTALS

A. Product Data: Submit Manufacturer's Specifications, performance criteria, Drawings and instructions.
   1. Submit technical data for each material including the composition and limitations, documentation of qualified tested firestop systems to be used and manufacturer's installation instructions.
   2. Provide manufacturer's engineering judgment identification number and document details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor’s name who will install firestop system as described in document.

B. Shop Drawings: Submit Manufacturer's complete Shop Drawings showing proposed material, reinforcement, anchorage, fastenings method of installation and UL or Warnock Hersey listing number.

C. Test Reports: Submit UL or Warnock Hersey test report description for firestopping system.

D. Provide certificate of compliance from authority having jurisdiction indicating approval of firestop systems.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Installers must be experienced, certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.
   2. Installation Responsibility: assign installation of through-penetration firestop systems and fire-resistive joint systems in project to a single sole source firestop specialty contractor.
   3. The work is to be installed by a contractor with at least one of the following qualifications:
      a. Hilti Accredited Fire Stop Specialty Contractor (HAFSC)
      b. 3M "Master Contractor"
      c. Hilti "Certified Contractor" with current letter from manufacturer
      d. . 3M "Certified Contractor" with current letter from manufacturer
      e. UL Approved Contractor
      f. FM 4991 Approved Contractor
   4. Installing firm must not have less than 3 years' experience with fire stop installation.
   5. Installing firm must have successfully completed not less than 3 comparable scale projects using similar systems.

B. Regulatory Requirements: Conform to applicable code for fire resistance ratings andsurface burning characteristics:
   1. ASTM E 136, ASTM E 119 and ASTM E 814, as applicable.
   2. UL 1479 fire test to achieve required fire-rating as noted on Drawings.
   3. Listing:
      a. UL Fire Resistance Directory (current edition).
      b. WH International Listings

C. Firestop Systems:
   1. Fire-Test-Response Characteristics: Provide through-penetration firestop systems and fire-resistive joint systems that comply with specified requirements of tested systems.
   2. Firestop system installation must meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.
   3. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
   4. Firestop systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
   5. For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by Code Officials.

D. Pre-Installation Conference:
   1. Convene a pre-installation conference to review specifications and procedures with the Architect, Contractor, installer, manufacturer's representative, Owner and other trades relevant to the work, prior to ordering materials.
   2. Notify Architect at least 48 hours prior to starting Work.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.7 PROJECT CONDITIONS

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with through penetration firestop systems (XHEZ), joint systems (XHBN), and perimeter firestop systems (XHDG) listed in Volume 2 of the UL Fire Resistance Directory; provide products of the following manufacturers as identified below:
   1. Hilti, Inc., Tulsa, Oklahoma, 800-879-8000/www.us.hilti.com
   2. 3M Company, St. Paul, Minnesota, 800-328-1687/www.3m.com/firestop
   3. Provide products from the above acceptable manufacturers; no substitutions will be accepted.

2.2 MATERIALS

A. General:

   1. VOC Content Limitations: For firestop system products, submit documentation of conformance with LEED EQ Credit 4.1 “Low-Emitting Materials, Adhesives, and Sealants.”

2. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
3. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
4. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement

B. Firestop System Materials - General: Use only firestop products that have been UL 1479,N ASTM E 814 or UL 2079, ASTM E 1966 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
1. Appropriate for penetration.
2. Include every component required for code approved installation, including; but not limited to:
    a. Firestopping putties or compound.
    b. Backing material.
    c. Wrap strips.
    d. Primers, clips and collars.
    e. Forming and damming materials.
    f. Sealant and solvent cleaner. At interior applications, provide sealant in accordance with the low-emitting materials requirements of Section 01 60 00– Product Requirements.

C. Properties:
1. Free of asbestos, halogens and volatile components after curing and shall not slump or sag, (except for self-leveling products).
2. Capable of maintaining an effective barrier against flames, heat and smoke in compliance with the requirements of ASTM E814, UL 1479 and U.B.C. Standard 7-5.
3. Non-combustible per ASTM E 136.
4. UV resistant where exposed to sunlight.
5. Water resistant where exposed to moisture.
6. Firestop system shall accommodate movement without adversely affecting firerating of wall/floor assembly.
7. Shrink resistant.
8. Paintable or capable of receiving finish materials in those areas which are exposed to view and which are scheduled to receive finishes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
1. Verify penetrations are properly sized and in suitable condition for application of materials.
2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.

3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during, and after installation of firestopping.
5. Do not proceed until unsatisfactory conditions have been corrected.

B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 COORDINATION

A. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

C. Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.

D. Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector, per requirements of Section 109, IBC 2000.

3.3 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.

B. Remove incompatible materials which affect bond.

C. Install backing materials to arrest liquid material leakage, if required.

3.4 INSTALLATION

A. General:
1. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.
2. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
3. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
4. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
5. Protect materials from damage on surfaces subjected to traffic.

B. Installation shall conform to requirements of qualified designs or manufacturer approved modifications as supported by engineering reports, and shall be approved and accepted by the authority having jurisdiction.

1. Apply primer and firestop materials in accordance with Manufacturer's instructions and in accordance with the appropriate UL Fire Resistance Directory or with the appropriate Warnock Hersey International Listing.
2. Apply firestopping material in sufficient thickness to achieve rating, to ensure against the passage of flames, smoke and toxic gases, and to a uniform density and texture.
3. Protect materials from damage on surface subjected to traffic and install cover plates as required on firestop system that will or may be subject to traffic.
4. Tool surfaces of firestop products to provide a smooth and clean appearance.

C. Provide firestopping for conditions specified whether or not firestopping is indicated, and, if indicated, whether such material is designated as insulation, safing or otherwise. Insulation types specified in other sections shall not be installed in lieu of firestopping materials.

D. Building Exterior Perimeters:
1. Where exterior facing construction is continuous past a structural floor, and a space (i.e. construction joint) would otherwise remain open between the inner face of the wall construction and the outer perimeter edge of the structural floor, provide firestopping to equal the fire resistance of the floor assembly.
2. Mineral wool by itself shall not constitute an acceptable firestop. If mineral wool is part of firestop system, the mineral wool shall be completely covered by appropriate thickness of UL or Warnock Hersey listed firestop sealant.
3. Firestopping shall be provided whether or not there are any clips, angles, plates, or other members bridging or interconnecting the facing and floor systems, and whether or not such items are continuous.
4. Provide firestopping to continuously fill open spaces where an exterior wall of composite type construction passes a perimeter structural member, such as a girder, beam or strut, and the finish on the interior wall face does not continue up too close with the underside of the structural floor above, thus interrupting the fireresistive integrity of the wall system, and creating a space that would otherwise remain open between the interior face of the wall and lower edge of the structural members.

E. Interior Walls and Partitions:
1. Construction joints between top of fire rated walls and underside of floors above shall be firestopped.
2. Firestop systems installed shall have been tested by either UL or Warnock Hersey, including exposure to hose stream test and including test for use with steel fluted deck floor assemblies.
3. Firestop system used shall allow for deflection of floor or roof above.

F. Penetrations:
1. Penetrations include conduit, cable, wire, pipe, duct or other elements which pass through one or both outer surfaces of a fire rated floor, wall, or partition.
2. Provide firestopping to fill spaces in accordance with ASTM E 814 (UL 1479) where a penetration occurs through a structural floor or roof and a space would otherwise remain open between the surfaces of the penetration and the edge of the adjoining structural floor or roof, except at floors on grade.
3. Requirements for penetrations shall apply whether or not sleeves have been provided. Firestop the annular space between sleeve and surrounding surfaces.

3.5 3.05 FIELD QUALITY CONTROL

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities.

C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops” or other recognized standard.

D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

E. Product Manufacturer’s Field Services Duties: During Installation, provide periodic destructive testing inspections to assure proper installation/application. After installation is complete, submit findings in writing indicating whether or not the installation of the tested system identified was installed correctly to both the general contractor and the Authority Having Jurisdiction.

3.6 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.
   1. Remove equipment, materials, and debris, leaving area in undamaged, clean condition.
   2. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

END OF SECTION

SECTION 07 92 00

JOINT SEALERS

PART 1 - GENERAL

1.1 SUMMARY

A. Product Data
1. Submit manufacturer's current specifications and recommended installation procedures.
2. Submit sample warranty to be signed jointly by applicator and manufacturer.
3. Submit manufacturer's standard color chart.

B. Shop Drawings: Illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades.

C. Contract Closeout: Submit Manufacturer's Warranty.

1.2 QUALITY ASSURANCE

A. Qualifications:
1. An approved manufacturer's installer shall perform the work, and have not less than 5 years of successful experience in the installation of caulks and sealants.
2. Installers shall be thoroughly trained and experienced in the necessary skills and shall be thoroughly familiar with the specified requirements.

1.3 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with labels intact.

B. Storage: Adequately protect against damage while stored at the site. Maintain product in accordance with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.

C. Handling: Comply with manufacturer's instructions.

1.4 PROJECT/SITE CONDITIONS

A. Physical Requirements for Proper Installation or Application: Observe manufacturer's temperature service range. Do not apply sealant when weather conditions will inhibit bonding and curing.

1.5 WARRANTY

A. Provide warranty, in writing and signed jointly by the installer and sealant manufacturer, to replace sealants which fail at no additional cost to the Owner because of loss of cohesion or adhesion, or do not cure, and which fail to achieve air-tight and water-tight seal.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Single Source Responsibility for Joint Sealer Materials:
1. Obtain joint sealer materials from a single manufacturer for each different product required.
2. If sealants from separate manufacturers must be used and could come in contact with each other, provide written certification from every manufacturer involved that the sealants are compatible and will adhere to each other

2.2 MATERIALS

A. General:
1. Sealants, primers, back-up materials, preformed joint fillers, bond breakers and related materials shall be compatible with adjoining materials.

B. SEALANT
1. The selection of proper sealant for a particular joint shall be in accordance with current published recommendations of the manufacturer.
2. General: Silicone base, conforming to ASTM C-920, color to match adjacent, installed at joints and where required to weatherproof and waterproof the building.
3. Sealant at fire penetrations: As specified in Section 07 84 00.
4. Dual Purpose Acoustic/Smoke Sealant: Provide one of the following:
    a. CP 506 Smoke and Acoustic Sealant as manufactured by Hilti, Inc.
    b. Sheetrock® Brand Acoustical Sealant as manufactured by United States Gypsum Company.
    c. SpecSeal® Smoke ‘N’ Sound Sealant as manufactured by STI
5. Color: Provide standard or custom colors as selected by Architect. In general, colors shall match adjacent materials.

C. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

D. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

E. Joint Filler (Backer): Compatible with sealant.
1. Buildings: ASTM C1330, Type B; round bi-cellular or closed cell polyethylene or polyolefin, or open cell polyurethane foam rod as recommended by the sealant manufacturer for the application; oversized 30 to 50 percent; “SofRod” as manufactured by Nomaco.
2. Pavement: ASTM D5249, Type 3, round bi-cellulare of closed cell polyethylene, urethane, or neoprene foam rod; oversized 30 to 50 percent; “SofRod” as manufactured by Nomaco.

F. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

G. Gloss Reducer: Silica sand No. 20, color to match adjacent surface. Gloss reducer shall be provided at traffic sealant applications.

H. Other Materials: Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the sealant manufacturer as compatible, subject to the review of the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces. Verify, before proceeding with the Work that required inspections of existing conditions have been completed.

B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 PREPARATION

A. Clean, prepare, and prime joints in accordance with manufacturer's instructions. Remove loose materials and other foreign matter which may impair adhesion of sealant.

B. Verify that joint shaping materials and release tapes are compatible with sealant.

C. Examine joint dimensions and size materials to achieve required width/depth rations.

D. Use joint filler to achieve required joint depths, to allow sealants to perform properly.

E. Use bond breaker where required.

F. Protect adjacent surfaces from damage by masking when necessary.

3.3 INSTALLATION

A. General:
1. Install sealant in accordance with manufacturer's instructions.
2. In general, seal openings and other locations which normally require sealant to seal again infiltration from air, water and most insects, including; but no limited to:
    a. Construction and expansion joints.
    b. Joints between dissimilar materials.
    c. Joints around windows, door frames, louvers and other penetrations and openings in the exterior wall. Provide minimum 3/8 inch sealant installation (exteriors only) around doors and windows.
    d. Interior wall openings.
    e. Other locations indicated on drawings.
3. Apply sealant within recommended temperature ranges. Consult manufacturer when sealant cannot by applied within recommended temperature ranges.

B. Joints:
1. Free of air pockets, foreign embedded matter, ridges, and sags.
2. Tool joints concave.

C. Apply sealant under pressure with hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as detailed.

D. Neatly point or tool joint surfaces to provide slightly concave surfaces, free of wrinkles and skips, uniformly smooth and with perfect adhesion along both sides of joint.

E. Dual Purpose Acoustic/Smoke Sealant: Apply in accordance with applicable UL Joint Systems and as follows.
1. Installation of sealant shall not begin until building is enclosed and bildn temperatures are as required by manufacturer.
2. Openings to receive sealant shall be cleaned of loose debris, dirt, oil, wax, grease, and other contaminants. The surface shall be moisture and frost free.
3. Apply sealant at required depth using method recommended by manufacturer as required for the individual fire-rated system.
4. Smooth sealant with a trowel before the skin forms.
5. Acoustical sealant shall be applives in accordance with ASTM C919.
6. Sheetrock® Brand Acoustical Sealant: In accordance with the following UL Joint Systems.
    a. Conventional Wall: HW-D-0262.
    b. Shaft Wall: HW-D-0603.

3.4 CLEANING

A. Clean adjacent surfaces of sealant as work progresses.

B. Use solvent or cleaning agent as recommended by sealant manufacture.

C. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION

SECTION 08 11 13

STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Shop Drawings: Submit Drawings showing elevations of each door and frame type, typical and details of construction, location, and installation requirements for hardware, size and thickness of material.

B. Fire Rated Doors and Frames:
   1. Installation Instructions: Door and frame manufacturer shall clearly identify the hardware products, other materials and work requirements necessary to maintain compliance with UL 10(c) (positive pressure testing) as required by 2006 IBC Section 714.
   2. Certification: Submit certification that fire rated doors (including frames and hardware as a unit) will comply with UL 10(c) (positive pressure testing) as required by 2006 IBC Section 714.

1.2 DELIVERY AND STORAGE

A. Deliver welded frames with spreaders and doors with wrappers.

B. Store doors and frames under protective cover in dry, enclosed spaces at the site. Place doors and frames on non-staining blocking Raise bottoms of doors at least 4 inches high and provide 1/4 inch air space between stacked doors to avoid metal to metal contact and permit air circulation.

1.3 QUALITY ASSURANCE

A. Doors and frames shall be certified to comply with ANSI A250.4, Test Procedure, and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing, and ANSI A250.8, Recommended Specifications for Standard Steel Doors and Frames.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish steel doors and frames from one of the following Manufacturers, except as otherwise approved by the Architect, subject to compliance with Specification requirements:
   1. Steelcraft Manufacturing Co.
   2. Curries Company www.curries.com
   3. The Ceco Corporation www.cecodoor.com
   4. The Kewanee Corp. www.kewaneecorp.com
   5. Republic Builders Products www.republicdoor.com
   6. Fleming Steel Doors and Frames

B. Doors and frames shall be furnished by the same Manufacturer.

2.2 MATERIALS

A. Doors: Furnish Level, Model and Physical Performance level in accordance with ANSI A250.8/SDI-100.
   1. Level: Level 2, 18 gauge.
   2. Physical Performance: Level B.
   3. Model: Model 1, Full Flush.

B. Core: Polystyrene core. Core shall be as allowed by UL 10(c) for fire rated doors.

C. Frames: ANSI A250.8/SDI 100, 16 gauge steel.

D. Glazing Beads: Minimum 20 gauge steel.

E. Steel: ASTM A1008 cold-rolled or ASTM A1011 hot-rolled. Hot-dip galvanized meeting ASTM A653, Grade A60 galvannealed for exterior openings.

F. Paint:
   1. Non-lifting, rust-inhibitive grey primer meeting ANSI A224.1, compatible with field finish specified in Section 09 91 00, applied after bonderizing.
   2. See also Section 09 91 00 for requirements regarding paints for compliance with LEED™ requirements.

2.3 FABRICATION- DOORS

A. Construct hollow metal doors, flush and vision lite types as scheduled on Drawings, in accordance with ANSI A250.8/SDI-100 with core as specified above. Reinforce top and bottom of doors horizontally by 16 gauge steel channels, full width, spot welded to each face at least 3 inches on center. Bevel edge of lock stile.

B. Door Edge Joint and Treatment: Joints at the edges of doors shall have manufacturer's standard edge construction with continuously welded seam, dressed smooth.

C. Where heavy duty hinges have been specified, provide 7 gauge or equivalent reinforcing at hinge cut outs. Coordinate with hardware schedule.

D. Exterior Doors: Provide insulated doors. Close top and bottom edges of all exterior doors flush as an integral part of the door construction, or by placing end closure channel with web of channel flush with top and bottom edge of door (not inverted), or by addition of end cap at top and bottom of door, spot welded to each face at least 3 inches on center, filled and dressed smooth.

E. Interior Doors: Provide view lites as indicated on Drawings.

F. Reinforce openings in doors for lites and vents on all sides with 14 gauge steel channel.

G. Provide non-egress double doors with one-piece astragals of 14 gauge steel unless otherwise indicated or scheduled. Provide solid drip cap at top of exterior out-swinging doors.

H. Accurately mortise doors for locks and hinges. Provide adequate box type reinforcement with steel plates welded to the interior reinforcing channels and drilled and tapped. Provide reinforcement for all other items of hardware.

I. Doors with glass lite openings shall have trim recessed from the face of the door, beveled and attached with screws.

J. Fire-Rated Doors: Provide fire rated doors investigated and tested as fire door doors, complete with type of hardware to be used. Identify each fire door with recognized testing laboratory labels, indicating applicable fire rating of steel doors. Doors required meeting smoke and draft control assembly requirements shall have labels that identify that the door has been tested and approved for smoke and drafting control assemblies (S-label). Construct doors to comply with NFPA Standard No. 80.

2.4 FABRICATION – FRAMES

A. Construct to shapes and sizes shown, meeting various wall thicknesses in accordance with ANSI/SDI-100.

B. Provide fully profile welded type frames with welds ground and dressed smooth. Continuously weld, fill, grind, and dress smooth face frame miters. Continuously back- welds casing, stop, soffit, and rabbet.

C. Wood Frames: Pre-hung wood frame / jamb, UL listed as shown on the drawings.

D. Mortise, reinforce, drill and tap for standard weight, full mortise template hinges and template strike.

E. Provide not less than three 18 gauge anchors per jamb, or as shown on Drawings, spaced for maximum stiffness. Provide adjustable 18 gauge floor clips at each jamb, welded to back face of jamb, punched for securing to floor with two spaced anchors.

F. Make cutouts for required hardware specified under Section 08 71 00, from templates furnished. Reinforce butt cutouts with minimum 8 gauge thick steel plate drilled and tapped and welded in place. When heavy duty hinges are specified, provide high frequency reinforcing at frames for hinges. Coordinate with hardware vendor. Provide strike stops of frames with holes for three rubber door silencers; on double door frames, provide for two silencers per door at head.

G. For openings over 42 inches wide and at double openings, reinforce head members full length with a matching profile of 12 gauge steel. Provide anchor at midpoint of door, if practical.

H. Construct frames for UL labeled doors in accordance with UL requirements and label as scheduled. Frames required meeting smoke and draft control assembly requirements shall have labels that identify that the frame has been tested and approved for smoke and drafting control assemblies (S-label).

2.5 ELECTRIFIED DOOR HARDWARE

A. Provide hollow metal frames and doors scheduled to receive electrified hardware with conduit, wiring harnesses, concealed plug connectors and other accessories as necessary to properly connect specified electrified hardware. Coordinate connectors on end of wiring harnesses to plug directly into the hardware, hinge, and other connections.

2.6 FABRICATION - GLAZING FRAMES

A. Construct in accordance with applicable parts of door frame Specification and as detailed. Extend partition frames around all four sides of openings.

B. Provide glazing stops, removable one side, and integral from the other side, secured with countersunk flat head Phillips screws spaced at not more than 16 inches on center and 2 inches from corners. Miter stops at corners.

2.7 FABRICATION TOLERANCES

A. Allowable Tolerances for Fabrication: As specified in ANSI/SDI-117, Manufacturing Tolerances Standard Steel Doors, and Frames.

2.8 PAINTING

A. Bonderize and prime doors and frames with one shop coat of rust inhibitive primer.

PART 3 - EXECUTION

3.2 INSTALLATION

A. Install metal door frames plumb, level, rigid and in true alignment as recommended in SDI 105 and ANSI/DHI A115.IG.

B. Install doors and fasten to maintain alignment with frames to achieve maximum operational effectiveness and appearance.
1. Maintain clearances as specified in ANSI A250.8, 2.1.8.
2. Shim as required per NFPA 80, ANSI/A115.IG and SDI

C. Fill backs of frames solid with mortar at concrete and masonry construction.

D. Install fire doors and frames to comply with NFPA 80 and in accordance with manufacturer's printed instructions.

E. Prepare and install doors in accordance with ANSI A115 and SDI 122.

3.2 FIELD QUALITY CONTROL

A. Manufacturer’s representative shall inspect fire rated doors (including frames and hardware as a unit) and verify compliance with UL 10C (positive pressure testing) as required by 2006 IBC Section 714. Fire rated doors (including frames and hardware as a unit) which do not comply with UL 10C (positive pressure testing) as required by 2003 IBC Section 714 shall be removed and replaced at no additional cost to Owner.

3.3 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 08 12 16

ALUMINUM FRAMES

PART 1 - GENERAL

1.1 SUBMITTALS

A. Manufacturer's data: Submit manufacturer's data specifications, recommendations, and standard details for aluminum frames and components of the Work.

1.2 QUALITY ASSURANCE

A. Standards: Except as otherwise indicated, the requirements for aluminum frames, and the terminology used in this Section, are those of NAAMM, AAMA and AA and in particular, those of the "Entrance Manual" and "Curtain Wall Manual" by NAAMM.

1.3 JOB CONDITIONS

A. Coordination of fabrication: Whenever possible, check the actual openings in the construction work by accurate field measurement before fabrication, and show recorded measurements on final Shop Drawings. However, coordinate fabrication schedule with construction progress as directed and avoid delays in the Work.

B. Where necessary, proceed with fabrication without field measurements, and coordinate installation tolerances to ensure proper fit of units.

PART 2 - PRODUCTS

2.1 MANUFACTURER AND MODEL

A. Aluminum frames: Frame system shall be Series 300 as manufactured by Western Integrated Materials, Inc., South El Monte, CA.
   1. Design: Rectilinear.
   2. Trim: 1 inch with 3/8-inch return.
   3. Throat size: As required for wall thickness.

2.2 MATERIALS

A. Extrusions: Section shall be extruded for 6063-T5 aluminum alloy (ASTM B221 – Alloy G.S. 10A T5).

B. Fasteners: Where exposed, shall be aluminum, stainless steel or plated steel in accordance with ASTM A-164. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from the aluminum.

C. Glazing gaskets (aluminum frames): Vinyl, color to match frame.

D. Door Seals: Neoprene sound seals in lieu of standard "brush" type.

E. Finish: All exposed aluminum surfaces shall be given a clear anodic coating, AAMA 611, commercial, AAM12C22A26, 0.4 mi minimum thickness.

2.3 FABRICATION

A. Cut, reinforce, drill and tap frames as required to receive hardware, except do not drill and tap for surface-mounted items until the time of installation at the Project site. Comply with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.

B. Frames shall be prepared for security hardware where applicable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's specifications and recommendations for the installation of aluminum frames.

B. Set units plumb, level and true in line, without warp or rack of frames. Anchor securely in place. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

C. Clean aluminum surfaces promptly after installation of frames, exercising care to avoid damage of the protective coating. Remove excess glazing and sealant compounds, dirt and other substances.

3.2 PROTECTION AND CLEANING

A. Protect materials against damage and contamination during construction. Clean surfaces as required to remove corrosive substances. At the conclusion of construction, clean surfaces to the satisfaction of the Architect.

B. Provide written verification that cleaning agents are compatible with finished aluminum, glass, glazing materials and sealants.

C. Periodically remove from the site debris, excess materials and unused tools and equipment resulting from this work. At the conclusion of construction, leave the premises in a clean condition acceptable to the Architect.

END OF SECTION

SECTION 08 14 00

WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Wood Veneer Doors, Fire Rated Doors, Pocket Door(s).

B. Fire Rated Doors and Frames:
   1. Installation Instructions: Door and frame manufacturer shall clearly identify the hardware products, other materials and work requirements necessary to maintain compliance with UL 10(c) (positive pressure testing) as required by 2006 IBC Section 714.
   2. Certification: Submit certification that fire rated doors (including frames and hardware as a unit) will comply with UL 10(c) (positive pressure testing) as required by 2006 IBC Section 714

1.2 SUBMITTALS

A. Shop Drawings: Submit Drawings showing schedule of door sizes and types, door details and elevations. Note discrepancies between the Drawings and door schedules, and the requirements of regulatory and testing agencies.

B. Product Data: Submit Manufacturer's data showing door construction.

C. Samples: Before fabrication, submit sample of each type of door to be furnished, showing face, edge, core construction, and finish for each type specified.

1.3 QUALITY ASSURANCE

A. Coordination: Contractor shall be responsible for coordinating and obtaining necessary information from Hardware and Metal Frame Manufacturers. Door Manufacturer shall be responsible for coordinating necessary information received by Contractor from Hardware and Metal Frame Manufacturers in order that doors shall be properly prepared to receive hinges and hardware. Contractor shall provide door supplier with approved frame schedule, hardware schedule, and hardware templates. Furnish to door supplier 60 days prior to desired delivery date of doors.

1.4 DELIVERY, STORAGE AND HANDLING

A. Prior to delivery, seal door edges with an approved clear sealer, compatible with field finish specified.

B. Delivery:
   1. Deliver doors to the jobsite only when proper storage site is available.
   2. Store doors in an area having controlled temperature and humidity as recommended by the Window & Door Manufacturers Association, AWI and the door manufacturer.

3. Store doors flat on factory pallets, or three full 2 x 4's, one centered and the other two 12 inches from each end. Do not stack doors on end, or on their vertical edge.
4. Protect wood doors from construction activity, dirt, and exposure to sunlight

C. Handling:
1. Always handle doors with clean hands or gloves.
2. Do not drag doors across one another.
3. Maintain factory packaging or other means of protection on doors, until date of Substantial Completion.

1.5 WARRANTY

A. Special Warranty: Furnish the following warranty to Owner:
1. Warrant doors from the date of installation against defects in materials and workmanship. Periods of warranty after date of installation:
a. Interior solid core and mineral core: Life of installation.
b. Interior hollow core: 5 years.
2. Replacement under warranty shall include removal of the defective door, hanging, installation of hardware, and finishing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following manufacturers, except as otherwise approved by the architect, subject to compliance with specifications requirements.
1. Algoma www.algomahardwoods.com
2. Buell Door Company www.buelldoor.com
3. Eggers Industries www.eggersindustries.com
4. Marshfield Door Systems www.marshfielddoors.com
5. Lambton www.lambtondoors.com
6. Oshkosh Architectural Door Company www.oshkoshdoor.com
7. Graham www.grahamdoors.com

2.2 MATERIALS GENERAL

A. Wood and agrifiber products must contain no added urea-formaldehyde resins in accordance with the requirements of "Low Emitting Materials"

2.3 FLUSH DOORS

A. Cores:
1. Solid Core: Shall conform to ANSI A208.1 1LD2, 32 lbs. per cubic foot density. For doors scheduled to receive closers, provide minimum 5 inch solid wood top rail.
2. Hollow Core: Expanded honeycomb made of corrugated fiberboard. Meet or exceed the requirements of NWWDA Industry Standards I.S.1 Series.

B. Edge Bandings:
1. Stiles (Dimensions given are minimum sizes allowed after factory trimming to book-size or pre-fitting).

a. Particleboard Core: Top rail to be 5-inch double banded laminated hardwood stile, laminated strand lumber or structural composite lumber (no finger joints allowed) in inner and outer band to be at least 1/2-inch-wide same species lumber as face veneer with the exception of birch doors which will have hard maple stiles.
b. Hollow Core: Stile shall be 5 inch minimum.
    1) Rails (Dimensions given are minimum sizes allowed after factory trimming to book-size or pre-fitting).
        a) Particleboard Core: 5-inch minimum mill option hardwood rail. Provide
        b) Hollow Core: 5-inch minimum mill option wood.

C. Face Veneers, Crossbands and Backers: When wood veneer or medium density overlay faces are specified, doors shall be 7 ply (AWI PC-7), made up of a face veneer, crossbanding and a core unit, all securely bonded together utilizing type 1 (fully waterproof) adhesive and the hot press assembly technique. All plies must be placed at right angles to adjacent plies. Face veneers shall have a minimum thickness of 1/50 inch after factory sanding and the individual pieces of veneer forming the face veneer must be spliced or edge glued together. Doors manufactured by cold pressing 2 or 3-ply pre-manufactured door skins to multiple cores in the same press shall not be acceptable.
1. Veneer:
    a. Veneer cut: Plain Sliced.
    b. Veneer match: Book match.
    c. Assembly: Running match.
2. Cross banding shall be thoroughly dried hardwood extending full width and height of door with grain at right angles to face and back veneer.
3. Paint Grade: Furnish Medium Density Overlay for paint grade doors. MDO shall meet PS1-74. Overlay shall be factory primed, readily sand-able, weatherproof, and carry a Class "B" Fire Rating. Paint grade Birch hardwood and hardwood surfaced doors shall not be considered as meeting this Specification.

D. Glue: Type 1 per NWWDA/WDMA T.M.-6 for interior and exterior doors.

2.4 LOUVERS

A. Material: Match face veneer species, with round edge, flat slat blade and 50 percent free area.

2.5 FIELD FINISHING

2.6 Shop Prime: Factory prime with 1 coat of wood primer to doors that will receive paint finish as specified in Section 09 91 00, as noted on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine door frames to assure that jambs are true and plumb. Correct frames which are not true and plumb before doors are hung.

3.2 INSTALLATION

A. Doors shall be hung true and plumb with standard bevel and with uniform 3/32-inch clearance at jambs and head, and 1/2 inch bottom clearance, unless otherwise required. Mortise, drill or otherwise prepare doors for finish hardware specified in Section 08 71 00, Finish Hardware. Pilot drill screw and bolt holes.

B. Doors that are cut or planed for fitting shall be immediately resealed with a transparent wood sealer. Doors shall operate freely without sticking or binding, without hinge-bound conditions and with hardware installed, properly adjusted and functioning.

C. Install fire doors and frames to comply with NFPA 80 and in accordance with manufacturer's printed instructions.

3.3 Field Finish: Provide as specified in Section 09 91 00 and in accordance with Door Manufacturer's written instructions. Protect finish after installation and up to building occupancy.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's representative shall inspect fire rated doors (including frames and hardware as a unit) and verify compliance with UL 10C (positive pressure testing) as required by 2006 IBC Section 714. Fire rated doors (including frames and hardware as a unit) which do not comply with UL 10C (positive pressure testing) as required by 2006IBC Section 714 shall be removed and replaced at no additional cost to Owner.

3.5 CLEANING

A. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 08 31 13

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUBMITTALS

A. Shop Drawings: Submit Drawings showing sizes, construction and installation details.

B. Products Form: In accordance with Section 01 33 00, prior to installation in the project, submit a completed products form, Section 00 62 33, for each product which contributes to the points required for LEED™ Certification. Information contained on the Products Forms shall be used to complete the information required for the LEED Submission.

1.2 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.

B. Storage and Protection: Deliver and store items in dry, protected areas. Adequately protect against damage while stored at the site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, except as otherwise approved by the Architect, subject to compliance with Specification requirements:
   1) Babcock-Davis (Cierra Products) www.babcockdavis.com
   2) Nystrom Building Products www.nystrom.com
   3) Karp Associates www.karpinc.com
   4) J.L. Industries www.jlindustries.com
   5) Milcor Inc. www.milcorinc.com

2.2 ACCESS DOORS

A. Doors: Sizes as shown on the Drawings. Units shall be prime painted steel at painted wall construction and stainless steel in tile and other locations as indicated, in types as
   1. Non-Rated Access Panels:
      a. Drywall Walls and Ceilings: Babcock-Davis B-NW access panel.
         1) Masonry, Tile Walls, Etc.: Babcock-Davis B-NT access pane
         2) Acoustical Tile: Babcock-Davis B-RA access panel.
   2. Fire-Rated Access Panels:
      a. Drywall Walls and Ceilings: Babcock-Davis B-IW, Insulated, Fire-Rated access panel.
      b. Masonry, Tile Walls, Etc.: Babcock-Davis B-UT, Insulated, Fire-Rated access panel.

B. Door and Frame: 16-gauge steel. Provide screw driver operated cam locks in sufficient quantity as recommended by manufacturer to hold door in flush closed position. 16-gauge steel shall be used for door and frame. Type K door shall have concealed spring hinges to allow door to open a minimum of 175 degrees. Size as required or as indicated on the Drawings.

C. Access Doors in Fire Rated Construction:
   1. Doors shall be UL or Warnock Hersey labeled and meets self-closing and self-latching requirements for fire rated ceiling assembly.
   2. Doors shall be UL 1-1/2-hour fire rated when located in a fire rated wall assembly.

PART 3 - EXECUTION

3.1 INSTALLATION

A. A. Install access doors in accordance with Manufacturer's directions at locations shown on Drawings or necessary for access to valves, dampers and other devices or equipment requiring periodic access. Do not install panels in locations where frame will extend over transition between two separate walls or ceiling finish materials (i.e. tile to gypsum board).

B. Install plumb and level, true to line.

3.2 CLEANING

A. A. During the course of the Work and on completion of the Work, remove excess materials, equipment, and debris and dispose of away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 08 33 00

COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: 2-hour rated overhead coiling door at Viewing 116.

1.2 SUBMITTALS

A. Shop Drawings: Submit Drawings indicating type of doors, operation, finishes and installation details. Clearly indicate the following:

B. Product Data: Indicating manufacturer's product data, and installation instructions

C. Samples: Submit 2 samples showing specified finish.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Fire doors shall be UL Class rated and labeled as scheduled on Drawings. Provide UL certificate of inspection for oversize doors. Meet NFPA-80 and FMG 4100 standard for durability.
   2. Unless otherwise noted, assemblies specified in this section shall be evaluated for conformance to the following standards:
      a. ASTM E-152, Methods of Fire Tests of Door Assemblies
      b. SCFM 43.7, Methods of Fire Tests of Door Assemblies
      c. CAN4-S104(ULC-S104), Standard Method for Fire Tests of Door Assemblies
      d. NFPA 252, Standard Methods for Fire Tests of Door assemblies
      e. UBC 7-2-94, Uniform Building Code
      f. UL 10(b), Fire Tests of Door Assemblies
   3. Unless otherwise noted, assemblies specified in this section shall be installed in accordance with the following:
      a. NFPA 80, Fire Doors & Windows
      b. Manufacturer's Instructions.
   4. Assemblies shall be identified by a label or marking bearing the wording, "Listed (Products)", a time interval, temperature rise (if applicable), a serial number and the WHI Certification Mark.
   5. Unless otherwise specified, all Fire Doors have a nominal thickness of 1-3/4".

1.4 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.

B. Storage: Adequately protect against damage while stored at the site.

C. Handling: Comply with Manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements:
   1. Cookson Co. www.cooksondoor.com
   2. Overhead Door Corp. wwwloverheaddoor.com
   3. Cornell Iron Works, Inc. www.conrelliron.com

B. Specifications are based on products as manufactured by Cookson Door Corp.

2.2 MATERIALS – GENERAL

A. Provide recycled materials in accordance with Recycled Content provisions of Section 01 60 00.

2.3 COILING DOORS

A. Materials
   1. The door curtain shall be constructed of interconnected strip steel slats conforming to ASTM A-653. The proper gauge of steel shall be chosen as follows:
      a. 22 gauge with a No. 5 (measuring 2-1/4" high by 5/8" deep) flat slat as designated by The Cookson Company if the door width does not exceed 18'4" and the door height do not exceed 18'4".
      b. 20 gauge with a No. 5 flat slat as designated by The Cookson Company if the door width is between 18'5" and 24'4" and the door height is between 18'5" and 24'4".
      c. 18 gauge No. 4 (measuring 2-3/4" high by 3/4" deep) flat slat as designated by The Cookson Company if the door width exceeds 24'4" and or the door height exceeds 24'4".
   2. The finish on the door curtain shall be Cookson Final Cote consisting of the following:
      a. Hot dipped galvanized G-90 coating consistent with ASTM A-653
      b. Bonderized coating for prime coat adhesion
      c. Corrosion inhibiting primer .2 mils per side
      d. Thermosetting tan polyester top coat with a minimum thickness of .6 mils each side
   3. The bottom bar shall consist of two 1/8" steel angles mechanically joined together. The finish on the bottom bar shall be one (1) coat of bronze rust- inhibiting prime paint.
   4. The guides shall consist of 4 steel angles bolted together with 3/8" fasteners to form a channel for the curtain to travel. The wall angle portion shall be continuous and fastened to the surrounding structure with minimum 1/2" fasteners. The finish on the guide angles shall be one (1) coat of bronze rust- inhibiting prime paint.
   5. The brackets shall be constructed of steel not less than 1/4" thick and shall be bolted to the wall angle with minimum 1/2" fasteners. The finish on the brackets shall be one (1) coat of bronze rust-inhibiting prime paint.
   6. All gears shall be cast iron with teeth cast from machine cut patterns. The pinion gear shall not be less than a 3" pitch diameter. The gear ratio shall be designed for a maximum effort of not more than 30 pounds.
   7. The barrel shall be steel tubing of not less than 4" in diameter. Oil tempered torsion springs shall be capable of correctly counter balancing the weight of the curtain and shall

have both a main and an auxiliary spring. The barrel shall be designed to limit the maximum deflection to .03" per foot of opening width. The springs shall be adjusted by means of an exterior wheel. The finish on the barrel shall be one (1) coat of bronze rust-inhibiting prime paint.

8. The hood shall be fabricated from 24 gauge galvanized steel and shall be formed to fit the curvature of the brackets. The finish on the hood shall be the Cookson Final Cote finish as indicated in the curtain section.

B. Operation

1. All crank operated fire doors shall have an automatic closing device, Release Spring and Governor to control the downward speed of the door which shall become operational upon the activation of a smoke detector. The door shall have an average closing speed of not less than six (6) inches per second and not more than twenty-four (24) inches per second as indicated in NFPA Bulletin 80. The Governor shall be fail-safe, maintenance-free, fully enclosed and warranted for the life time of the door. Once the door has closed, it should be able to be reset by one person on one side of the door only.
2. Crank operated doors shall open and close with a maximum of 30 pounds of effort utilizing an endless chain and cast iron reduction gears.
3. All fire doors shall be equipped with a Time Delayed Releasing Device.

C. Performance Requirements

1. Manual Auto-Test™ Crank Hoist: Provide combination crank/ controlled closing system operator including removable hand crank and geared reduction unit. Integral to the unit is a releasing device for connection to a central alarm system or local smoke detectors and a governor to control automatic closing speed.
2. Automatic closure shall be activated by [a central smoke/fire alarm system] [a local smoke/fire detector] [power outage in excess of 10 seconds].
3. Doors shall maintain a closing speed of not more than 12" (305 mm) per second during automatic closing.
4. Doors shall be fail-safe and close upon power failure.
5. Resetting of spring tension or mechanical dropouts shall not be required. Simply open door by use of crank operator after alarm is cleared and/or power is restored.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Doors are to be installed by the manufacturer or authorized representative in strict accordance with Manufacturer's printed instructions.

B. Upon completion, adjust doors for proper operation.

3.3 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 08 41 13

ALUMINUM ENTRANCES AND WINDOW WALLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Aluminum doors and window wall frames at new construction.

B. Related Sections
1. Section 08 14 00 - Flush Wood Doors: Wood doors at interior window wall.
2. Section 08 44 00 - Glazed Aluminum Curtain Walls
3. Section 08 71 00 - Door Hardware
4. Section 08 80 00 - Glazing.

1.2 SYSTEM DESCRIPTION

A. Design Requirements:
1. Window wall framing system shall provide for flush retained glazing on all sides without projecting stops, with glass in the center of the frame.
2. Framing system shall be suitable for outside or inside glazing.
3. System shall be either screw spline, shear block or a compensating/stick system.

B. Performance Requirements: Window wall.
1. Limit air leakage through assembly to 0.06 CFM/min/sq. ft. of wall area at 6.24 PSF as measured in accordance with ASTM E283.
2. Water leakage: None, when measured in accordance with ASTM E 331 with a minimum static test pressure of 10 psf.
3. Limit deflection to L/175 with a maximum of 3/4 inch when subjected to 25 psf wind load design pressure acting inward and outward.
4. System shall not deflect more than 1/8 inch at the center point of a horizontal member, or more than 1/16 inch at the center of members located directly above operable doors and windows, once dead load points have been established.
5. System shall accommodate expansion and contraction movement due to surface temperature differential of 180 degrees F.
6. Seismic requirements shall conform to AAMA recommended static test method for evaluating performance of curtain walls and window wall wall systems due to horizontal displacements associated with seismic movements and building sway.
7. Provide framing systems with condensation resistance factor (CRF) of not less than 55 when tested according to AAMA 1503.1.
8. Provide framing systems with average U values of not more than 0.65 Btu/sq. ft. x h. x degree F when tested according to AAMA 1502.7.

C. Performance - Aluminum Doors (Swinging): Resistance to corner racking shall be tested by the Dual Moment Load test as follows:
1. Test section shall consist of standard top door corner assembly. Side rail section shall be 24 inches (600mm) long and top rail section 12 inches long.
2. Anchor "top rail" positively to test bench so that corner protrudes 3 inches beyond bench edge.

3. Anchor a lever arm positively to side rail at a point 19 inches from inside edge of top rail. Attach weight support pad at a point 19 inches from inner edge of side rail.
4. Test section shall withstand a minimum load of 200 pounds on the lever arm before reaching the point of failure, which shall be considered a rotation on the lever arm in excess of 45 degrees.

1.3 SUBMITTALS

A. Submit product data, shop drawings, and samples in accordance with Section 01 33 00.
1. Product Data: Submit 2 copies of Manufacturer's Specifications, recommendations, and standard details for aluminum doors, frames, and components of the Work. Include manufacturer's installation manual.
2. Shop Drawings:
   a. Include wall elevations at 1/2 inch scale, and full-size detailed sections of every typical composite member.
   b. Show anchors, joint system, expansion provisions, end dams, water diverters and other components not included in Manufacturer's standard data.
   c. Include glazing details.
3. Samples:
   a. Submit 3 samples of each required aluminum finish on 12 inch long extrusions or 6 inch square sheets of the alloys to be used for the Work.
   b. Where normal color and texture variations are to be expected, include 2 or more units in each Sample, to show the range of such variations.
   c. Samples will be reviewed by Architect for color and texture only.
   d. Architect reserves the right to require samples of typical fabricated sections, showing joints, exposed fastenings (if any), quality of workmanship, hardware and accessory items, before fabrication of the Work proceeds.

1.4 QUALITY ASSURANCE

A. Standards: Except as otherwise indicated, the requirements for aluminum doors and frames, and the terminology used in this Section, are those of NAAMM, AAMA and AA and in particular, those of the "Entrance Manual" by NAAMM.

B. Regulatory Requirements:
1. ANSI A117.1, 2009 "Accessible and Usable Buildings and Facilities."
2. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA).
3. ADA Accessibility Guidelines (ADAAG) (2004)

C. Single Source Responsibility: Obtain entrance, operable windows, window wall, ribbon wall, and curtain wall systems, including finishes, used for this project through one source from a single manufacturer.

1.5 PROJECT/SITE CONDITIONS

A. Field Measurements:
1. Whenever possible, check the actual openings in the construction Work by accurate field measurement before fabrication, and show recorded measurements on final shop drawings.
2. Coordinate fabrication schedule with construction progress as directed and avoid delays of the Work.

3. Where necessary, proceed with fabrication without field measurement, and coordinate installation tolerances to ensure proper fit of units.

1.6 WARRANTY

A. Warrant entire system of aluminum entrance doors and frames against leaks or other defects for a period of 5 years.
   1. Defective materials and workmanship are hereby defined to include, but are not limited to, evidence of:
      a. Penetration of water into the building through fixed glazing and framing components.
      b. Air infiltration exceeding specified limits.
      c. Structural failure of components resulting from forces within specified limits.
      d. Failure of insulated glass units.
      e. Cracking, crazing, flaking, of coatings or opacifiers on glass.
      f. Secondary glass damage and/or damage due to falling components.
      g. Adhesive or cohesive failure of sealant.
      h. Crazing on surface of non-structural sealant.
      i. Non-structural sealant hardening beyond Shore A durometer 50 or softening below 20.
      j. Failure of operating parts to function normally.

B. Warrant aluminum finish against excessive fading, excessive non- uniformity of color or shade, cracking, peeling, pitting or corroding (all within the limits defined). Warranty shall include replacement at no charge (material and labor) for a period of 5 years beginning on the date of final acceptance.

C. Upon notification of defects within the warranty period, make the necessary repairs and replacements at the convenience of the Owner. Repairs and replacements shall include resultant damage to adjacent materials, systems, and equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following manufacturers, except as otherwise approved by the Architect, subject to compliance with specifications requirements:
   1. Arcadia, Inc. www.arcadiainc.com (Basis of Design)
   2. Kawneer Co. www.kawneer.com
   3. Vistawall Architectural Products. www.vistawall.com

B. Door 200.1 is to be the product: KLEIN Extendo System telescoping glass panels.
   1. Four glass sliders
   2. No floor track.
   3. No substitutions.

2.2 MATERIALS

A. Framing members, transition members, mullions, adapters, and mountings: Extruded 6063 T6 aluminum alloy (ASTM B221 - Alloy G.S. 10aT6).

B. Screws, miscellaneous fastening devices, and internal components: Aluminum, stainless steel, or zinc plated steel in accordance with ASTM B633. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from the aluminum.

C. Glazing gaskets: Elastomeric extrusions as required to provide specified performance. PVC glazing gaskets are not acceptable.

D. Steel Sections: ANSI/ASTM A36; shaped to suit mullion sections.

E. Glass: As specified in Section 08 80 00.

F. Sealant:
1. Silicone sealant in accordance with Section 07 92 00.
2. Interior Applications: In accordance with the low-emitting materials requirements of Section 01 60 00 – Product Requirements.

G. Shop and Touch-Up Primer for Steel Components: SSPC 15, Type 1, red oxide. Provide white primer at any visible steel.

H. Touch-Up Primer for Galvanized Steel Surfaces: SSPS 20, zinc rich type.

2.3 COMPONENTS

A. Sizes and Profiles: The required sizes for doors and frame units, and profile requirements, are shown and as follows.
1. Exterior: Provide one of the following as indicated on Drawings.
   a. TC-470 – 2-1/4" x 4'1/2" mullion, including cap, thermally broken system – one inch insulated glazing.
   b. T500B-OPG – 3" x 5" (including cap), thermally broken system with 2- 1/2" ballistic glazing. Frames shall comply with UL 752 – Level 4 Ballistic Standard.
2. Interior: Provide one of the following as indicated on Drawings.
   a. Basis of Design:
      1) ASL 451 – 2" x 4-1/2" (including cap), interior window wall system with ¼" clear glazing for 1' Glass installation.

3. Aluminum Swing Door Entrances: WS512HD (Heavy Duty)

2.4 FABRICATION

A. General:
1. Weld by methods recommended by the Manufacturer and AWS to avoid discoloration at welds.
2. Grind exposed welds smooth and restore mechanical finish.
3. Remove arises from cut edges and ease edges and corners to a radius of approximately 1/64 inch.
4. Conceal fasteners, wherever possible, except as otherwise shown.
5. Maintain continuity of line and accurate relation of planes and angles.
6. Provide secure attachment and support at mechanical joints, with hairline fit of contacting members.
7. Reinforce the Work as necessary for performance requirements, and for support to the structure.

8. Separate dissimilar metals with bituminous paint or preformed separators which will prevent corrosion.
9. Separate metal surfaces at moving joints with non-metallic separators to prevent "freeze-up" of joints.

B. Frames:
1. Fabricate tubular assemblies as shown, with either welded or mechanical joints in accordance with Manufacturer's standards, with concealed fasteners wherever possible.
2. Provide members of the size, shape, and profile shown.
3. Reinforce internally with steel channel shapes as shown, or as necessary to support the required loads. Secure vertical steel at head and sill as necessary for structural performance.
4. Weatherstripping: Provide compression weatherstripping on door-contact face of door stops on exterior door frames and/or other frames where indicated.
5. Provide glazing system for frames to receive lights. Design system for replacement of glass.
6. System shall provide resilient settings for glass by use of elastomeric extrusions as required to provide specified performance. PVC glazing gaskets are not acceptable.
7. Fabricate frame assemblies for exterior walls with flashing and weeps to drain penetrating moisture to exterior.
8. Provide anchorage and alignment brackets for concealed support of assembly from the building structure.
9. Allow for thermal expansion of exterior units.
10. Include flashings in conjunction with components as detailed, finished to match.

C. Doors (Swinging)
1. Materials: Sections shall be extruded for 6063-T6 aluminum alloy (ASTM B221 - Alloy G.S. 10A T6).
2. Fasteners, where exposed, shall be aluminum, stainless steel or plated steel. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from the aluminum.
3. Glazing gaskets shall be TPE or EPDM elastomeric extrusions.
4. Major portions of the door stiles shall be 0.188 inch in thickness and glazing molding shall be 0.050 inch thick.
5. Construction:
    a. Wide Stile:
        1) Top Rail: 5 inches.
        2) Bottom Rail: 10 inches
    b. Thickness of stiles and rails: 1-3/4 inches.
    c. Construction and Design: Door stiles and rails shall be accurately joined at corners with heavy concealed reinforcement brackets secured with bolts and screws, and shall be MIG welded. Doors shall have snap-in stops with bulb glazing vinyl on both sides of the glass. No exposed screws shall be permitted. Each door leaf shall be equipped with an adjusting mechanism located in the top rail near the lock stile which provides for minor clearance adjustments after installation. Weathering shall be installed in the hinge stiles of pairs or single center hung doors. The lock stile of a single center hung door, active meeting stiles at a pair of butt hung, offset pivot, or center hung doors shall have an adjustable astragal weatherstrip. Door frame and sidelight framing shall be accurately joined at corners with unexposed screws. Glazing shall be flush, including the horizontal muntins and sills and held in place with E.P.D.M. glazing gaskets on both sides. No applied stops shall be permitted except at the transom bar of center hung doors. Butt-hung and offset pivot door frames shall have doors stops at jambs and head with continuous weathering. Door shall be weatherstripped on 3 sides with metal-backed pile cloth

installed in door and/or frame. Provide an integral adjustable (uninterrupted) dual weathering at meeting stiles of pairs of doors.

6. Hardware: Provide the following items:
   a. Aluminum thresholds shall be provided for exterior doors.
   b. Panic devices shall be provided at entrance doors where required by code
   c. Custom Hardware: Doors shall be hung with 3 Stanley FBB179 NRP 26D or equal butts. Pairs of doors shall have a Von Duprin KR4954 removable mullion. Doors shall be prepped for Von Duprin series 99NL rim device. Doors receiving keyed cylinders shall have an exterior trim 99NL. Doors without keyed cylinders shall have an exterior trim 99DT. Von Duprin Series 99NL rim device and trim to be furnished by Owner and installed by Contractor. Doors shall be installed with a Norton 7500 or LCN 4040 door closer (except where an existing HDCP had been installed). Threshold (where required) shall meet ADA specification. At existing locations, remove recessed floor or jamb mounted closures and patch the frame or concrete prior to installation of threshold or frame mounted hardware.
   d. Doors and frames shall be prepared for security hardware where applicable

D. Flashings and Miscellaneous Trim:
   1. Provide interior sills, exterior sill (or subsills) with end dams, closures, flashings, break metal covers, trim and other elements in conjunction with or adjacent to window wall system as required for water-tightness and aesthetics. If sill frame does not provide means for conducting water out of the aluminum frame systems, then suitable flashings to ensure that water is conducted out of system shall be provided. Provide water diverters at ends of the horizontal mullion glazing pockets to drain water down the vertical mullion/hamb glazing pockets to sill can or flashing.
   2. Fabricate miscellaneous trim from 0.060-inch-thick minimum aluminum (break metal) finished to match other components, except fabricate interior and exterior sills (or subsills) from 0.075-inch-thick minimum extruded aluminum (unless the sill or subsill is supporting the weight of the system and then a 0.125-inch thick minimum extruded aluminum shall be provided).
   3. Flashings and sill can, in conjunction with mechanically fastened end dams and/or water diverters shall direct water entering the system to the outside of the building and shall not depend solely upon sealants.

E. Hardware Installation at Factory:
   1. Cut, reinforce, drill and tap frames as required to receive hardware except do not drill and tap for surface-mounted items until the time of installation at the Project Site. Comply with Hardware Manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.
   2. Install hardware, except surface-mounted hardware, at fabrication plant. Remove only as required for final finishing operations, and for delivery and installation of the Work at the Project Site.

F. Aluminum Finishes:
   1. Prepare the aluminum surfaces for finishing in accordance with the aluminum producer's recommendations and standards of the finisher or processor.
   2. Process components of each assembly in a manner to attain complete uniformity of color.
   3. Finish: Clear anodized, Architectural Class II anodic coating conforming to Aluminum Association Designation AA-M-12 C22 A31.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Comply with Manufacturer's Specifications and recommendations for the installation of aluminum entrance and window wall frames.
   1. Furnish necessary material, labor, and equipment for the complete installation of the following: glass framing, vertical, and horizontal mullions, transitional members connecting these components, adapters and mountings for trim moldings and facing materials.
   2. Set units plumb, level and true in line, without warp or rack of frames, doors or panels.
   3. Anchor securely in place.
   4. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
   5. Set sill members and other members in a bed of compound as shown, or with joint fillers or gaskets as shown to provide weathertight construction.

B. Comply with Section 07 92 00 for sealants, compounds, fillers, and gaskets to be installed integrally with aluminum entrances and window walls.
   1. Seal joints in aluminum entrance and window wall in a concealed manner, unless exposed sealant is indicated.

C. Comply with Section 08 80 00 and Aluminum Window Wall Manufacturers printed instructions for installation of glass shown to be glazed into aluminum entrances and window wall.

D. Dimensions indicated are based on an assumed design temperature of 70 degrees F. Take into account the ambient temperature range at the time of fabrication and erection.

E. Cut and trim component parts of the aluminum entrance and window wall during erection only with the approval of the manufacturer or fabricator and in accordance with his recommendations. Do not cut through reinforcing members. Restore finish completely to protect material and remove evidence of cutting and trimming. Remove and replace members where cutting or trimming has impaired strength or appearance.

F. Do not erect members which are warped, bowed, deformed, or otherwise damaged to such extent as to impair strength or appearance. Remove and replace members damaged in the process of erection.

3.3 FIELD QUALITY CONTROL

A. At Owner’s request, test the window wall system for water leaks in accordance with AAMA 501.2.

3.4 CLEANING

A. Clean aluminum surfaces promptly after installation of frames, exercising care to avoid damage of the protective coating.

B. Remove excess glazing and sealant compounds, dirt, and other substances.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Furnish and install Door Hardware as shown on Drawings and as specified herein, unless specifically excluded and specified in other Sections.

B. The Work of this Section shall be the total responsibility of one firm herein identified as the Supplier/Installer, and shall cover the complete coordination of related work in other Sections.

C. Door Hardware includes items known commercially as builders hardware that are required for swing, sliding and folding doors, gates and miscellaneous items as indicated, except special types of unique and non-matching hardware specified in the same Section as the door and door frame. Types of items in this Section include, but are not necessarily limited to the following:

1. Hinges
2. Lock and latch sets
3. Exit devices
4. Push/pull units
5. Overhead closers and holders
6. Protection plates
7. Door stops
8. Smoke, sound seals and threshold
9. Electric locking devices
10. Track and hardware

D. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.

1. Builders Hardware Manufacturing Association (BHMA)
2. NFPA 101 Life Safety Code
3. NFPA 80 Fire Doors and Windows
4. ANSI-A156.xx Various Performance Standards for Finish Hardware
5. UL 10C Positive Pressure Fire Test of Door Assemblies
6. ANSI-A117.1 Accessible and Usable Buildings and Facilities
7. DHI / ANSI A115.IG Installation Guide for Doors and Hardware

E. Warranty

1. Warranty hardware against defects in materials and workmanship for 2 years. Repair, replace, or otherwise correct deficient materials at no additional cost to Owner.
2. Provide minimum (5) year warranty on latch sets, locksets, hinges, panic device and cylinders.
3. Provide a minimum (10) year warranty on door closers against failure or leakage.

1.2 SYSTEM DESCRIPTION

A. General Requirements: While the Hardware Schedule is intended to cover doors and other movable parts of the building and establish a type and standard of quality, examine Drawings

and Specifications and furnish proper hardware for openings whether listed or not. Hardware must meet applicable handicapped access standards, ordinances and codes. Omissions or corrections in hardware groups shall be brought to the attention of the Architect prior to bid opening. No extras will be allowed for omissions, changes or corrections necessary to facilitate proper installation.

B. If an item is not specified but will be required in a similar situation, furnish equal hardware to that specified for similar locations if practicable. If no similar location is specified, then use hardware in keeping with that specified.

C. The Work of this Section shall be the total responsibility of one firm herein identified as the Supplier/Installer, and shall cover the complete coordination of related work in other Sections.

1.3 SUBMITTALS

A. General: Submittals requirements are specified in Section 01 3300, Submittal Procedures.

B. Materials List: As soon as practical after award of Contract, submit a complete listing of materials to be furnished. Submit in quantities as directed by the Architect, showing each item proposed for installation use and quantities to be furnished. Supplier/Installer shall state in their submittal the approximate delivery date to Contractor after receipt of reviewed submittals.

C. Product Data: Submit manufacturer's technical information for each item of hardware. Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and maintenance of operating parts and finish.

D. Hardware Schedule: Submit final Hardware Schedule in manner indicated below. Hardware Schedules are intended for coordination of Work. Hardware Schedule shall include a summary of individual items of hardware and related material used on the project, complete with the name of the manufacturer of each item. The Hardware Schedule shall be prepared in vertical format.
   1. Final Hardware Schedule Content: Based on builders hardware indicated, organize Hardware Schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
      a. Catalog number, type, style, function, size and finish of each hardware item.
      b. Name and manufacturer of each item.
      c. Fastenings and other pertinent information.
      d. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
      e. Explanation of abbreviations, symbols, codes, etc., contained in schedule.
      f. Mounting locations for hardware.
      g. Door and frame sizes and materials.
      h. Keying information.
   2. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of Hardware Schedule must precede fabrication of other Work (i.e., hollow metal frames) that is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by builders hardware, and other information essential to the coordinated review of Hardware Schedule.
   3. Keying Schedule: Submit separate detailed schedule indicting clearly how the Owner's final instruction on keying of locks has been fulfilled..

E. Templates: Supply templates to door and frame manufacturers, as required, to enable proper and accurate sizing and locations of cut-outs for hardware and door reinforcement. Delivery of templates shall be timely to prevent delays in construction.

1. Shipment of hardware prepaid to manufacturers requesting that hardware be incorporated in their Work.
2. Where cylindrical or mortise type locks are used, furnish lock information to the door manufacturer for reinforcing in the door at the time of manufacture.

F. Samples: (If requested by Architect)
1. 1 sample of Lever and Rose/Escutcheon design, (pair).
2. 3 samples metal finishes.

G. Contract Closeout Submittals:
1. Operating and maintenance manuals: Submit 3 sets containing the following:
a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Name, address, and phone number of local representative for each manufacturer.
d. Parts list for each product.

2. Copy of final hardware schedule, edited to reflect, “As installed.”
3. Copy of final keying schedule
4. As installed “Wiring Diagrams” for each piece of hardware connected to power, both low voltage and 110 volts.
5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturer: Obtain each kind of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer, although several may be indicated as offering products complying with requirements. Manufacturer shall have five (5) years’ experience in manufacture of comparable hardware.
2. The hardware consultant shall be, on a full-time basis, a licensed member of the Door and Hardware Institute (DHI) and a Certified Architectural Hardware Consultant (AHC) to properly detail work, order and supervise installation.
3. The Supplier/Installer shall be a recognized architectural finish hardware Supplier/Installer who has been furnishing hardware within a 300 mile radius of the project for a period of not less than five (5) years, and who is, or employs an experienced hardware consultant who shall be available to the Owner, Architect and Contractor at reasonable times during the course of the Work for consultation about the project's hardware requirements. The Supplier/Installer shall also be a factory authorized distributor for the items specified and a holder of current and proper contractor’s license.
4. Pre-approved Subcontractor’s (Supplier/Installer).

B. Regulatory Requirements:
1. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and national or local building code requirements. Provide only hardware that has been tested and listed by an approved testing agency for types and sizes of doors required and complies with requirements of door and door frame labels.
2. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors UL or FM labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL or FM label on exit devices indicating "Fire Exit Hardware".
3. Comply with other applicable fire, handicapped and building codes, guidelines and regulations. Hardware supplied and installed shall meet the requirements of Louisiana

Statutes, Handicapped Requirements, Uniform Building code, International Building code 5, and others as applicable.

C. Certifications: At the completion of installation, certify that material is properly installed, according to manufacturer's printed instructions.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packaging of hardware is the responsibility of the Supplier/Installer. As material is received by the hardware Supplier/Installer from the various manufacturers, sort hardware as necessary. Deliver hardware in original and individual containers, complete with necessary fastenings, keys, instructions and templates for spotting mortising tools. Items particular to a specific door shall be clearly marked by door number and heading number on the package.

B. The hardware Supplier/Installer shall inventory hardware and verify that the count is correct. Each carton of hardware shall be marked with item numbers, corresponding to the item numbers on the Finish Hardware Schedule.

C. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control and handling and installation of hardware items that are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation. Store materials off the ground in dry, protected areas.

D. The Supplier/Installer shall tag and index keys, manuals, schematics, operating instructions and factory diagrams for release and use by the Owner.

E. Containers holding keyed locks and cylinders shall be marked with the following:
   1. Heading Number
   2. Door Number
   3. Hand of Door (when required)
   4. Key Symbol

1.6 PROJECT CONDITIONS

A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.

B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.7 MAINTENANCE

A. Provide Owner with manufacturer's parts list and maintenance instructions for each type of hardware supplied, including necessary wrenches and tools required for proper maintenance and adjustment of hardware, as supplied with hardware when shipped to General Contractor. The Supplier/Installer shall gather parts lists, tools, etc. supplied with the hardware at the time of installation and hold these items until close-out at which time they shall turn over to the General Contractor.

B. Tools for Maintenance: Furnish a complete set of specialized tools as needed for Owner's continued adjustment, maintenance, and removal and replacement of builders hardware.

C. Establish training schedule with Owner prior to turning over the keys and maintenance information to the Owner for their use. Coordinate training requirements with Owner and Architect prior to final completion and training. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures and changes in product design.

D. Six (6) months after Substantial Completion verify that all hardware is functional as intended. Adjust all hardware as required to restore proper function. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware. The Supplier/Installer shall not be responsible for adjustments, corrections or replacements due to abuse, vandalism of lack or required maintenance by the Owner on the hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Hinges: Ives (IVE), Hager, Stanley, McKinney
2. Locksets: Schlage (SCH) – No Substitution
3. Exit Devices: Von Duprin (VON) – No Substitution
4. Closers: LCN (LCN) 4041 – No Substitution.
5. Threshold, Door bottom, Seals: National Guard (NGP), Reese, Pemko
6. Stops, Kickplates, Pull, Push Plates: Ives (IVE), Trimco, Rockwood
7. Auto/ Manual Flush Bolts, Coordinators and Accessories: Ives (IVE), Trimco, Rockwood
8. Pivots: Ives (IVE), Rixson
9. Dead latch and Accessories: Adams Rite (ADA)
10. Automatic Door Operator and Accessories: LCN (LCN) – No Substitution

2.2 HARDWARE

A. Scheduled Hardware: Requirements for design, grade, function, finish, size and other distinctive qualities of each type of builders hardware is indicated in the Hardware types and the Hardware Schedule at the end of this Section. The Drawings show the direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door movement as shown. Products are identified by using hardware designation numbers of the following:
1. Manufacturer's Product Designations: One or more manufacturers are listed for each hardware type required. Provide either the product designated, or, where more than one manufacturer is listed, the comparable product of one of the other manufacturers that comply with requirements including those specified elsewhere in this Section.

B. Fasteners: Manufacture hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for selftapping sheet metal screws, except as specifically indicated.
1. Furnish necessary screws, bolts or other fastenings of suitable size and type to anchor the hardware in position for heavy use and long life, and of compatible material and finish. Furnish fastenings with anchors according to the material to which it is applied,

and as recommended by the manufacturer. Fasten closers on wood or mineral core doors with sex nuts and bolts.

2. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.
3. Provide concealed fasteners for hardware units that are exposed when the door is closed, except to the extent no standard units of the type specified are available with concealed fasteners.

C. Finish: Hardware shall be BMHA satin chrome 626/652, stainless steel 630, and Door closer sprayed finish 689, Threshold / Auto. Bottom aluminum 628.

2.3 HARDWARE TYPES

A. Butt Hinges: Shall conform to the applicable requirements of ANSI A156.1 (Federal Specifications FF-H-116e), except as otherwise specified herein. Loose pin hinges for reverse-bevel doors with locks shall be constructed in a manner that will eliminate removal of the pins when the doors are in the closed position. Determine correct clearance from the Drawings. Provide non-removable pins on exterior doors or where shown in the Hardware Schedule. Provide five knuckle, concealed ball bearing hinges on doors. Flat button, top and bottom tips required on butt hinges.

B. Mortise Locksets:

1. Provide mortise locks certified as ANSI A156.13, Grade 1 Operational, Grade 1 Security, and manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to “KEYING” article, herein.
2. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
3. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
4. Provide electrified options as scheduled in the hardware sets. Provide electrified locksets with micro switch (RX) option that monitors retractor crank, and is actuated when rotation of inside or outside lever rotates retractor hub. Provide normally closed contacts or normally open contacts as required by security system.
5. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.

    a. Lever Design: Schlage 06A.
    b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

C. Door Closers:

1. Door closers shall meet handicapped access standards and codes. Complying with ANSI A117.1 for door opening force and delayed action closing.
2. Surface mounted. Finish, spray to match other hardware. Bodies; to be cast iron, with three (3) separate control valves (including back check). Arms to have forged steel. ANSI Grade I. Closers to be equipped with size adjustment (1 thru 6). Equip closers mounted on wood or mineral core doors with sex nuts and bolts.

3. Review all final door and frame details and provide adapter plates, shim spacers, and blade stop spacers as required by frame and door conditions for proper mounting.
4. Mount closers on non- public side of door, unless otherwise noted in specification.
5. Closers shall be non-handed, non-sized, and multi-sized.

D. Exit Devices:
1. Shall be U.L. approved for casualty. Rim type and functions as listed in hardware sets. Equip exit devices with cylinder dogging to hold down the push bars and the latch bolt in the open position.
2. Exposed components shall be of architectural metals and finishes.
3. Lever design shall match lockset lever design
4. Provide strikes as required by application. Provide extended lip strikes where required to protect frame or trim.
5. Fire exist devices to be listed for UL10C
6. Shall consist of a cross bar or push pad, the actuating portion of which extends across, shall not be less than on half the width of the door leaf.
7. Provide vandal resistant or breakaway trim.
8. Aluminum vertical rod assemblies are acceptable only when provided with the manufacturers optional top and bottom stainless steel rod guard protectors.

E. Kickplates: Shall be .050 thick (minimum), 10 inches high, by 2 inches less than door width for single doors and one inch less than the width for double doors without removable mullion. Finish 630.

F. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.
1. Wall and floor stop shall be wrought bronze, or stainless steel.
2. Provide fastener suitable for wall construction
3. Coordinate reinforcement of walls where stop is specified.
4. Provide dome stops where wall stops are not practical.
5. Provide a surface mounted or concealed overhead stop when a floor or wall stop cannot be used

G. Silencers: Supply three (3) each at jambs of single doors and two (2) each at pairs of doors. Not required on doors having smoke seals.

H. Weatherstrip, Smoke Seals and Sound Seals:
1. Shall be Type 5050 or as listed in the Hardware Sets.
2. Door Bottoms shall be Type 200NA or as listed in Hardware Sets.

I. Thresholds: Shall be type 1/2 inch x 5 inch or as detailed on Drawings or listed in the Hardware Sets.

J. Push Plates: Shall be .050 thick (minimum), 4 x 16 type with edges beveled.

K. Drip strip: Extruded aluminum, finish to match balance of hardware. Install drip caps at all exterior doors not protected by an overhanging eave or similar projection which extends a minimum of 4 inches out from the face of the door frame within 2 feet of top of door head.

2.4 HARDWARE FINISHES

A. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the

manufacturer's standard finish for the latch and lock set (or push-pull units if no latch-lock sets) for color and texture.

B. Provide finishes which match those established by BHMA or, if none established, match the Architect's sample.

C. 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 for the applicable units of hardware by referenced standards.

D. Provide protective lacquer coating on exposed hardware finishes or brass, bronze and aluminum, except as otherwise indicated.

E. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in "Materials & Finishes Standard 1301" by BHMA, including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

2.5 LOCK CYLINDERS AND KEYING

A. General: Supplier shall meet with Owner to finalize keying requirements and obtain final instructions in writing.

B. Provide new master key system for project with high security Schlage Primus system.

C. Provide construction cores at all locksets and cylinders. Permanent cores keys shall not be under any circumstance made available to the General Contractor. Furnish ten (10) construction keys to the Contractor.

D. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.

E. Key Quantity: Furnish three (3) change keys for each lock; 5 master keys for each master system; and five 5) grandmaster keys for each grandmaster system.
   1. Deliver keys to Owner's representative.
   2. Keys shall be made by the manufacturer of the locks. No “off brand” key blanks are acceptable.
   3. Keys shall be stamped “Do Not Duplicate”.

2.6 ELECTRONIC HARDWARE

A. Provide low voltage interfaces and other devices required for installation of electric hardware.

PART 3 - EXECUTION

3.1 EXAMINATION

A. As part of the hardware installation, the Supplier/Installer shall examine the hollow metal door frames and other surfaces to receive hardware for accuracy of installation and alignment. The Supplier/Installer shall report in writing to the Contractor with a copy to the Architect, of detrimental conditions. Failure to perform this requirement constitutes a waiver to subsequent

claims to the contrary and holds the Supplier/Installer responsible for corrections the Architect may require. Commencement of Work shall be construed as acknowledgment by the Supplier/Installer that doors and frames and other surfaces to receive hardware are in compliance with the requirements of the Contract Documents

3.2 PREPARATION

A. The Supplier/Installer shall meet with the Owner, Architect, and related trades prior to the commencement of Work. Tag items or packages with identification related to the final hardware schedule, and include basic installation instructions in the package.

B. Deliver hardware items at the proper times to the proper locations (ship to project site) for installation.

3.3 INSTALLATION

A. Install each hardware item in compliance with the manufacturer's instructions and recommendations.

B. Mount hardware units at heights as recommended per SDI-100, except as specifically indicated or required to comply with governing regulations, and except as may be directed otherwise by Architect.

C. Install exterior thresholds in full bed of sealant to prevent intrusion of water. Install into concrete using 1/4 inch x 7/8 inch machine screw anchors.

D. Application of Hardware: Hardware shall be installed in a neat, workmanlike manner following the manufacturer's instructions. Fasteners, supplied with the hardware, shall be used to secure the hardware in place. Wood screws shall be used for securing hardware to wood surfaces. Machine screws, set in expansion shields, shall be used for securing hardware to concrete or masonry surfaces. Thru-bolts shall be used where specified or where necessary for satisfactory installation.

E. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on the substrate. The Supplier/Installer shall be responsible for correct application according to factory installation instructions.

F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry.

G. Install thresholds in full bed of sealant from jamb to jamb.

H. Coordinate wiring, conduit, junction boxes, power supply, etc. and install equipment required for operation of electronic hardware.

3.4 FIELD QUALITY CONTROL

A. Inspection: The Supplier/Installer shall provide a final inspection with the Owner, and Architect at the completion of the installation.

B. After hardware is checked, keys shall be tagged, identified and delivered to the Owner by registered mail, or delivered in person after receiving a signed receipt from a responsible representative of the Owner.

C. Errors in cutting or fitting, or damage to adjoining work shall be repaired, as directed.

3.5 ADJUSTING

A. Check and adjust each operating item of hardware and each door, to ensure proper operation or function for each unit. Replace units that cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior of acceptance or occupancy, and make final check and adjustment of hardware items in such space or area. Adjust door control devices to compensate for final operation of heating and ventilating equipment. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

3.6 CLEANING

A. Insure that after installation, the materials furnished and installed will be free of paint or lacquer as may appear from the Work of other subcontractors. Clean operating items as necessary to restore proper function and finish of hardware and doors.

B. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01 5000, Temporary Facilities and Controls.

3.7 HARDWARE GROUPS

↯= Hardware Item Requiring Electrical Coordination

HARDWARE GROUP NO. 01

DOOR NUMBER:
117.1 218.1

EACH TO HAVE:

3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	PRIVACY LOCK	L9040 06A L583-363	626	SCH
1 EA	SURFACE CLOSER	4040XP REG	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS401CVX	626	IVE
1 EA	SEAL SET	188S X D.S.	S-BK	ZER

HARDWARE GROUP NO. 01.1

DOOR NUMBER:

102.1

EACH TO HAVE:

4 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	PRIVACY LOCK	L9040 06A L583-363	626	SCH
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS401CVX	626	IVE
1 EA	SEAL SET	188S X D.S.	S-BK	ZER

HARDWARE GROUP NO. 01.2

DOOR NUMBER:
205.1

EACH TO HAVE:

4 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	PRIVACY LOCK	L9040 06A L583-363	626	SCH
1 EA	SURFACE CLOSER	4040XP REG	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS401CVX	626	IVE
1 EA	SEAL SET	188S X D.S.	S-BK	ZER

HARDWARE GROUP NO. 02

DOOR NUMBER:
105.2 108.1 110.2 120.2 206.1

EACH TO HAVE:

3 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1 EA	STOREROOM LOCK	L9080T 06A	626	SCH
1 EA	PRIMUS CORE	20-740	626	SCH
1 EA	WALL STOP	WS401CVX	626	IVE
3 EA	SILENCER	SR64	GY	IVE

HARDWARE GROUP NO. 02.1

DOOR NUMBER:
111.1 119.1 121.1

EACH TO HAVE:

4 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1 EA	STOREROOM LOCK	L9080T 06A	626	SCH
1 EA	PRIMUS CORE	20-740	626	SCH
1 EA	SURFACE CLOSER	4040XP EDA	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1 EA	WALL STOP	WS401CVX	626	IVE

1 EA	SEAL SET	188S X D.S.	S-BK	ZER

HARDWARE GROUP NO. 02.2

DOOR NUMBER:
112.2

EACH TO HAVE:

3 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1 EA	STOREROOM LOCK	L9080T 06A	626	SCH
1 EA	PRIMUS CORE	20-740	626	SCH
1 EA	OH STOP	900S SNB	630	GLY
3 EA	SILENCER	SR64	GY	IVE

HARDWARE GROUP NO. 02.3

DOOR NUMBER:
210.1 217.1 220.1 220.2

EACH TO HAVE:

3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	STOREROOM LOCK	L9080T 06A	626	SCH
1 EA	PRIMUS CORE	20-740	626	SCH
1 EA	WALL STOP	WS401CVX	626	IVE
3 EA	SILENCER	SR64	GY	IVE

HARDWARE GROUP NO. 02.4

DOOR NUMBER:
118.1 201.1

EACH TO HAVE:

3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 SET	PUSH/PULL BAR	9190HD-10"	630	IVE
1 EA	SURFACE CLOSER	4040XP REG	689	LCN
1 EA	WALL STOP	WS401CVX	626	IVE
1 SET	SEALS	BY ALUMINUM FRAME SUPPLIER		

HARDWARE GROUP NO. 02A

DOOR NUMBER:
104.1

EACH TO HAVE:

2 EA	HW HINGE	5BB1HW 5 X 4.5 NRP		652	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 5 X 4.5 TW8	✓	652	IVE
1 EA	EU MORTISE LOCK	L9092TEU 06A RX	✓	626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
- RX SWITCH IN EU LOCK SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 02A.1

DOOR NUMBER:
106.1 106.2

EACH TO HAVE:

2 EA	HW HINGE	5BB1HW 5 X 4.5 NRP		652	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 5 X 4.5 TW8	✓	652	IVE
1 EA	ELEC FIRE EXIT HARDWARE	RX-99-L-F-E996-06-FSE-SNB	✓	626	VON
1 EA	RIM CYLINDER	20-057-ICX		626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK 900-2RS	✓	LGR	VON
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT RIM CYLINDER.
- RX SWITCH IN PANIC DEVICE SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 02A.2

DOOR NUMBER:
113.1

EACH TO HAVE:

3 EA	HW HINGE	5BB1HW 5 X 4.5 NRP		652	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 5 X 4.5 TW8	✓	652	IVE
1 EA	EU MORTISE LOCK	L9092TEU 06A RX	✓	626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
- RX SWITCH IN EU LOCK SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 02A.3

DOOR NUMBER:
115.1 201.2

EACH TO HAVE:

2 EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1 EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW8	✓	652	IVE
1 EA	EU MORTISE LOCK	L9092TEU 06A RX	✓	626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
- RX SWITCH IN EU LOCK SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 03

DOOR NUMBER:
105.1 112.1 114.1 120.1

EACH TO HAVE:

3 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1 EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1 EA	PRIMUS CORE	20-740	626	SCH
1 EA	WALL STOP	WS401CVX	626	IVE
1 SET	SEALS	BY ALUMINUM FRAME SUPPLIER		

HARDWARE GROUP NO. 03.1

DOOR NUMBER:
109.1 110.1

EACH TO HAVE:

3 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1 EA	PRIMUS CORE	20-740	626	SCH
1 EA	WALL STOP	WS401CVX	626	IVE
1 SET	SEALS	BY ALUMINUM FRAME SUPPLIER		

HARDWARE GROUP NO. 03.2

DOOR NUMBER:
211.1 212.1 213.1 214.1 215.1 216.1

EACH TO HAVE:

4 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1 EA	PRIMUS CORE	20-740	626	SCH
1 EA	WALL STOP	WS401CVX	626	IVE
1 SET	SEALS	BY ALUMINUM FRAME SUPPLIER		

HARDWARE GROUP NO. 04

DOOR NUMBER:
219.1

EACH TO HAVE:

4 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 SET	PUSH/PULL BAR	9190HD-10"	630	IVE
1 EA	SURFACE CLOSER	4040XP REG	689	LCN
1 EA	WALL STOP	WS401CVX	626	IVE
1 SET	SEALS	BY ALUMINUM FRAME SUPPLIER		

HARDWARE GROUP NO. 04.1

DOOR NUMBER:
207.1 209.1

EACH TO HAVE:

3 EA	HW HINGE	5BB1HW 4.5 X 4.5		652	IVE
1 EA	PUSH PLATE	8200 4" X 16"		630	IVE
1 EA	PULL PLATE	8302 6" 4" X 16"		630	IVE
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS407CVX		630	IVE
3 EA	SILENCER	SR64		GY	IVE

HARDWARE GROUP NO. 05

DOOR NUMBER:
221.1

EACH TO HAVE:

3 EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 4.5 X 4.5 TW8	✓	630	IVE
1 EA	ELEC PANIC HARDWARE	RX-99-L-E996-06-FSE	✓	626	VON
1 EA	RIM CYLINDER	20-057-ICX		626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	DRIP CAP	142A X D.W. +4" - AS REQ		AL	ZER
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	DOOR SWEEP	39A X D.W.		A	ZER
1 EA	THRESHOLD	8655A X D.W.		A	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT RIM CYLINDER.
- RX SWITCH IN PANIC DEVICE SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 05.1

DOOR NUMBER:
300.3 300.4

EACH TO HAVE:

3 EA	HW HINGE	5BB1HW 5 X 4.5 NRP		630	IVE

1 EA	ELECTRIC HW HINGE	5BB1HW 5 X 4.5 TW8	✓	630	IVE
1 EA	ELEC FIRE EXIT HARDWARE	RX-99-L-F-E996-06-FSE	✓	626	VON
1 EA	RIM CYLINDER	20-057-ICX		626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	DRIP CAP	142A X D.W. +4" - AS REQ		AL	ZER
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	DOOR SWEEP	39A X D.W.		A	ZER
1 EA	THRESHOLD	8655A X D.W.		A	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT RIM CYLINDER.
- RX SWITCH IN PANIC DEVICE SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 05.2

DOOR NUMBER:
303.1

EACH TO HAVE:

3 EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1 EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW8	✓	630	IVE
1 EA	EU MORTISE LOCK	L9092TEU 06A RX	✓	626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	LOCK GUARD	LG10		630	IVE
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	DRIP CAP	142A X D.W. +4" - AS REQ		AL	ZER
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	DOOR SWEEP	39A X D.W.		A	ZER
1 EA	THRESHOLD	8655A X D.W.		A	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
- RX SWITCH IN EU LOCK SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 05.3

DOOR NUMBER:
305.1

EACH TO HAVE:

3 EA	HINGE	5BB1 4.5 X 4.5 NRP		630	IVE
1 EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW8	✓	630	IVE
1 EA	EU MORTISE LOCK	L9092TEU 06A RX	✓	626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	LOCK GUARD	LG10		630	IVE
1 EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	DRIP CAP	142A X D.W. +4" - AS REQ		AL	ZER
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	DOOR SWEEP	39A X D.W.		A	ZER
1 EA	THRESHOLD	8655A X D.W.		A	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
- RX SWITCH IN EU LOCK SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 05.4

DOOR NUMBER:
300.2 301.1

EACH TO HAVE:

3 EA	HW HINGE	5BB1HW 5 X 4.5		652	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 5 X 4.5 TW8	✓	652	IVE
1 EA	EU MORTISE LOCK	L9092TEU 06A RX	✓	626	SCH
1 EA	SURFACE CLOSER	4040XP REG		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	DOOR BOTTOM	111A X D.W.		AL	ZER
1 EA	THRESHOLD	678A X D.W.		A	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
- RX SWITCH IN EU LOCK SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 05.5

DOOR NUMBER:
300.1

EACH TO HAVE:

3 EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1 EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW8	✓	652	IVE
1 EA	EU MORTISE LOCK	L9092TEU 06A RX	✓	626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
- RX SWITCH IN EU LOCK SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 05.6

DOOR NUMBER:
200.1

EACH TO HAVE:

3 EA	HW HINGE	5BB1HW 4.5 X 4.5 NRP		652	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 4.5 X 4.5 TW8	✓	652	IVE
1 EA	ELEC PANIC HARDWARE	RX-99-L-E996-06-FSE	✓	626	VON
1 EA	RIM CYLINDER	20-057-ICX		626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT RIM CYLINDER.
- RX SWITCH IN PANIC DEVICE SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.

- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 06

DOOR NUMBER:
301.2

EACH TO HAVE:

7 EA	HW HINGE	5BB1HW 5 X 4.5 NRP		630	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 5 X 4.5 TW8	✓	630	IVE
1 SET	AUTO FLUSH BOLT	FB31P		630	IVE
1 EA	DUST PROOF STRIKE	DP2		626	IVE
1 EA	ELEC PANIC HARDWARE	RX-LD-9975-L-E996-06-FSE	✓	626	VON
1 EA	MORTISE CYLINDER	30-008-ICX		626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	COORDINATOR	COR X FL		628	IVE
2 EA	MOUNTING BRACKET	MB		689	IVE
2 EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
2 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	DRIP CAP	142A X D.W. +4" - AS REQ		AL	ZER
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	ASTRAGAL	43SP X 188S X D.H.		SP	ZER
2 EA	DOOR SWEEP	39A X D.W.		A	ZER
1 EA	THRESHOLD	8655A X D.W.		A	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
2 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT RIM CYLINDER.
- RX SWITCH IN PANIC DEVICE SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 07

DOOR NUMBER:
203.1

EACH TO HAVE:

2 EA	HW HINGE	5BB1HW 5 X 4.5 NRP		652	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 5 X 4.5 TW8	✓	652	IVE
1 EA	EU MORTISE LOCK	L9092TEU 06A RX	✓	626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	SURFACE CLOSER	4040XP EDA		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE

1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
- RX SWITCH IN EU LOCK SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 07.1

DOOR NUMBER:
204.1

EACH TO HAVE:

2 EA	HW HINGE	5BB1HW 5 X 4.5		652	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 5 X 4.5 TW8	✓	652	IVE
1 EA	EU MORTISE LOCK	L9092TEU 06A RX	✓	626	SCH
1 EA	OH STOP	900S SNB		630	GLY
1 EA	SURFACE CLOSER	4040XP REG		689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS		630	IVE
1 EA	SEAL SET	188S X D.S.		S-BK	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
- RX SWITCH IN EU LOCK SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 08

DOOR NUMBER:
208.2

EACH TO HAVE:

2 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1 EA	STOREROOM LOCK	L9080T 06A	626	SCH
1 EA	PRIMUS CORE	20-740	626	SCH
1 EA	FLOOR STOP	FS436	626	IVE
3 EA	SILENCER	SR64	GY	IVE

HARDWARE GROUP NO. 09

DOOR NUMBER:
116.1 200.2 221.2

EACH TO HAVE:

ALL HARDWARE BY DOOR MANUFACTURER

HARDWARE GROUP NO. 10

DOOR NUMBER:
208.1

EACH TO HAVE:

3 EA	HINGE	5BB1 4.5 X 4.5 NRP	652	IVE
1 EA	STOREROOM LOCK	L9080T 06A	626	SCH
1 EA	PRIMUS CORE	20-740	626	SCH
1 EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1 EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3 EA	SILENCER	SR64	GY	IVE

HARDWARE GROUP NO. 11

DOOR NUMBER:
103.1

EACH TO HAVE:

1 EA	POCKET DR SET	940.94.104		HAF
1 EA	ADA POCKET DR LOCK	2001ADAP-3	626	ACC
1 EA	MORTISE CYLINDER	20-061-ICX	626	SCH
1 EA	PRIMUS CORE	20-740	626	SCH
2 EA	PULL	7200 BTB MOUNT	626	ACC
1 EA	ADA THUMBTURN	7200ADA	626	ACC

HARDWARE GROUP NO. AL-01

DOOR NUMBER:
101.1

EACH TO HAVE:

4 EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1 EA	OFFICE/ENTRY LOCK	L9050T 06A L583-363	626	SCH
1 EA	PRIMUS CORE	20-740	626	SCH
1 EA	FLOOR STOP	FS436	626	IVE
1 SET	SEALS	BY ALUMINUM FRAME SUPPLIER		

HARDWARE GROUP NO. AL-02

DOOR NUMBER:
100.1 123.2

EACH TO HAVE:

3 EA	HW HINGE	5BB1HW 5 X 4.5 NRP		630	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 5 X 4.5 TW8	✓	630	IVE
1 EA	ELEC PANIC HARDWARE	RX-99-L-E996-06-FSE	✓	626	VON
1 EA	RIM CYLINDER	20-057-ICX		626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	SURFACE CLOSER	4040XP EDAW/62G		689	LCN
1 EA	PA MOUNTING PLATE	4040-18PA		689	LCN
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	DOOR SWEEP	39A X D.W.		A	ZER
1 EA	THRESHOLD	8655A X D.W.		A	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		
1 SET	SEALS	BY ALUMINUM FRAME SUPPLIER			

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT RIM CYLINDER.
- RX SWITCH IN PANIC DEVICE SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. AL-02.1

DOOR NUMBER:
100.2 104.2 123.1

EACH TO HAVE:

3 EA	HW HINGE	5BB1HW 5 X 4.5 NRP		652	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 5 X 4.5 TW8	✓	652	IVE
1 EA	ELEC PANIC HARDWARE	RX-99-L-E996-06-FSE	✓	626	VON
1 EA	RIM CYLINDER	20-057-ICX		626	SCH
1 EA	PRIMUS CORE	20-740		626	SCH
1 EA	SURFACE CLOSER	4040XP EDAW/62G		689	LCN
1 EA	PA MOUNTING PLATE	4040-18PA		689	LCN
1 EA	WALL STOP	WS401CVX		626	IVE
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	✓	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	✓	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	✓	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	✓		
1 SET	SEALS	BY ALUMINUM FRAME SUPPLIER			

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT RIM CYLINDER.
- RX SWITCH IN PANIC DEVICE SHUNTS DOOR FORCED OPEN ALARM IN ACCES CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. AL-03

DOOR NUMBER:
101.2

EACH TO HAVE:

3 EA	HW HINGE	5BB1HW 5 X 4.5 NRP		630	IVE
1 EA	ELECTRIC HW HINGE	5BB1HW 5 X 4.5 TW8	↯	630	IVE
1 EA	EU MORTISE LOCK	L9092TEU 06A RX	↯	626	SCH
1 EA	LOCK GUARD	LG10		630	IVE
1 EA	SURFACE CLOSER	4040XP EDAW/62G		689	LCN
1 EA	PA MOUNTING PLATE	4040-18PA		689	LCN
1 EA	WALL STOP	WS407CVX		630	IVE
1 EA	DOOR SWEEP	39A X D.W.		A	ZER
1 EA	THRESHOLD	8655A X D.W.		A	ZER
1 EA	CARD READER	BY ACCESS CONTROL INTEGRATOR	↯	BLK	SCE
1 EA	DOOR CONTACT	679-05 HM OR WD AS REQ	↯	BLK	SCE
1 EA	POWER SUPPLY	PS902 900-BBK	↯	LGR	SCE
1 EA	WIRING DIAGRAM	POINT TO POINT / RISER	↯		
1 SET	SEALS	BY ALUMINUM FRAME SUPPLIER			

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY VALID CREDENTIAL AT CARD READER OR BY KEY AT LOCK.
- RX SWITCH IN EU LOCK SHUNTS DOOR FORCED OPEN ALARM IN ACCESS CONTROL SYSTEM.
- FREE EGRESS AT ALL TIMES.

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: 1" Insulated Glazing to be installed at interior and exterior window assemblies, Bullet-Resistant Glazing, Mirrors.

1.2 REFERENCE STANDARDS

A. ASTM C 1036 Standard Specification for Flat Glass

B. ASTM C 1048 Standard Specification for Heat-Treated Flat Glass – Kind HS, Kind FT Coated and Uncoated
   1. Heat Treated Flat Glass to be by horizontal (roller hearth) process with inherent rollerwave distortion parallel to the bottom edge of the glass as installed.
   2. Maximum peak to valley rollerwave 0.003" (0.08mm) in the central area and 0.008" (0.20mm) within 10.5" (267mm) of the leading and trailing edge.
   3. Maximum bow and warp 1/32" per lineal foot (0.79mm).
   4. Tempered architectural safety glass shall conform with ANSI Z97.1 and CPSC 16 CFR 1201.
   5. Coated glass product must be tempered or heat strengthened prior to applying low-e coating to provide optimum aesthetics and flatness.

C. ASTM C 1172 Standard Specification for Laminated Architectural Flat Glass

D. ASTM C 1376 Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass

E. ASTM C 1376 Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass

F. ASTM E 576 Standard Test Method for Frost Point of Sealed Insulating Glass Units in the Vertical Position

G. ASTM E 1300 Standard Practice for Determining Load Resistance of Glass in Buildings

H. ASTM C 1349 Standard Specification for Architectural Flat Glass Clad Polycarbonate

I. ANSI Z97.1 Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings

J. CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials

1.3 PERFORMANCE REQUIREMENTS

A. Glass and glazing materials shall provide continuity of building enclosure vapor and air barrier.
   1. To utilize the inner pane of multiple pane sealed units for the continuity of air and
   2. Maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead of glazing sealant.

B. Glass thickness indicated is minimum and shown for detailing only. Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass as calculated in accordance with IBC Chapter 24, as measured in accordance with ANSI/ASTM E330.

C. Limit glass deflection to 1/175 or flexure limit of glass, with full recovery of glazing materials, whichever is less.

D. Bullet Resistant Glazing: Underwriters Laboratory UL 752 9th Edition Standard for Bullet Resisting Equipment dated Jan. 27, 1995.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's Product Data for glass units, including the following:
   1. Structural, physical and environmental characteristics.
   2. Size limitations.
   3. Special handling or installation requirements
   4. Special application requirements for glazing materials.
   5. Available colors of glass and glazing materials with color selections.
   6. Bullet Resistant Glazing: Submit for approval prior to fabrication catalog cuts, brochures, specifications, UL Listing verification, proof of possession of PRODUCT LIABILITY INSURANCE in an amount not less than five million U.S. dollars, and printed data in sufficient detail to indicate compliance with the contract documents and manufacturer's instructions for the installation of Bullet Resistant Construction.

B. Samples: Submit samples as follows:
   1. Two samples 8 x 8 inch in size, illustrating glass units, coloration and design.
   2. Four inch long bead of glazing sealant, color as selected.

C. Manufacturer's Certificate: Submit Manufacturer's certification that sealed insulated glass meets or exceeds specified requirements.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Conform to IBC Chapter 24, to local requirements and to State law.

B. Standards:
   1. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
   2. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
   3. GANA'S - Glazing Manual and Laminated Glass Design Guide.

C. Perform Work in accordance with GANA Glazing Manual, GANA Sealant Manual, and Laminators Safety Glass Association - Standards Manual for Glazing Installation Methods.

1.6 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.

B. Storage: Adequately protect against damage while stored at the site.

C. Handling: Comply with Manufacturer's instructions.

1.7 WARRANTY

A. Provide 10 year Manufacturer's warranty for sealed glass units. Warranty covers deterioration due to normal conditions of use and not to handling, installing, protecting and maintaining practices contrary to the glass manufacturer’s published instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Glass Materials: Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements:
   1. Viracon. www.viracon.com (Basis of Design for exterior insulated glass).
   2. Pilkington LOF. www.pilkington.com .
   3. Guardian Industries. www.guardian.com
   4. Oldcastle Glass Group. www.oldcastleglass.com
   5. PPG Industries. www.ppg.com
   6. Visteon Float Glass www.visteon.com .

2.2 GLASS MATERIALS

A. Exterior – Storefront framing: 1” VUE 1-50 Insulating Glasswith the following performance requirements:
   1. ¼ inch clear VUE-50 #2.
   2. ½ inch airspace
   3. 1/4 inch clear
   4. Both plies of glass to be heat strengthened (except where tempered glass is required by code or windloading requirements).
   5. Transmittance:
      a. Visible Light: 48%
      b. Solar Energy: 20%
      c. Ultra-Violet: 5%
   6. Reflectance:
      a. Visible Light- Exterior: 11%
      b. Visible Light - Interior: 11%
      c. Solar Energy: 26%
   7. NFRC U-Value:
      a. Winter Nighttime: 0.29 Btu/(hr x sqft x oF)
      b. Summer Daytime: 0.26 Btu/(hr x sqft x oF)
   8. Shading Coefficient: 0.29
   9. Relative Heat Gain: 62 Btu/(hr x sqft)
   10. Solar Factor (SHGC): 0.25

B. Interior:
   1. 1 inch thick clear glass
      a. Fully tempered glass conforming to ASTM C 1048.
      b. Color to be selected by Architect. Basis of Design is
      c. Bullet resistant glass as specified herein.

C. Bullet-Resistant Glass per plans and specifications:
   1. Manufacturers:
      a. Global Security Glazing.
      b. Pacific Bulletprroof Co.
      c. Oldcastle Glass
      d. Viracon
   2. Rating and construction: UL Listed Level 4, Multi-Ply laminated glass

D. Mirror Glass: ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality q1 mirror select; 1/4 inch thick, sizes noted on Drawings. Unless noted otherwise, Provide full width mirror with stainless steel channel frames as manufactured by Schluter

2.3 GLAZING ACCESSORIES

A. Setting Blocks: 100% Silicone blocks of 70 to 90 Shore A durometer hardness tested for compatibility with glazing sealant, minimum length 4 inches.

B. Spacers: Neoprene blocks of 40 to 50 Shore A durometer hardness, adhesive backed on one face only and tested for compatibility with specified glazing sealant.

C. Interior Glazing Compound:
   1. Polymerized Butyl Rubber and Inert Fillers (pigments), solvent based with minimum 75% solids, non-sag consistency, tack-free time of 24 hours or less, paintable non-staining.
   2. In accordance with the low-emitting materials requirements of Section 01 60 00 – Product Requirements.

D. Exterior Glazing Compound: Conforming to ASTM C920, Type S, Grade NS, Use G. Compound shall be paintable, or colored to match frame.

E. Glazing Tape: Pre-shimmed 10 percent solids, non-shrinking, butyl rubber tape compatible with sealants. If exposed, tape shall be paintable, or colored to match frame.

F. Butt Glazing Sealant:
   1. GE 1200 Series Silicone, clear.
   2. Interior applications: In accordance with the low-emitting materials requirements of Section 01 60 00 – Product Requirements

2.4 MARKINGS

A. Tempered glass at all locations shall have each light permanently etched with Manufacturer's name and his compliance with ANSI Z-97.1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Examine framing or glazing channel surfaces, backing, removable stop design, and conditions under which glazing is to be performed.

C. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Comply with combined recommendations of Glass Manufacturer, aluminum frame manufacturer and manufacturer of sealants and other materials used in glazing., except where more stringent requirements are shown or specified.

B. Clean the glazing, channel, or other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to the substrate.

C. Do not attempt to cut, seam, nip or abrade glass which is tempered or heat strengthened.

D. Comply with "Glazing Manual" by GANA, except as shown and specified otherwise by Manufacturers of glass and glazing materials.

E. Inspect each piece of glass immediately before installation, and discard those which have observable edge damage or face imperfections.

F. Install setting blocks of proper size at quarter points of sill rabbet.

G. Provide spacers inside and out, and of proper size and spacing, for glass sizes larger than 50 united inches. Provide 1/8 inch minimum bite of spacers on glass and use thickness equal to sealant width.

H. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Inspect each piece and set with pattern, draw and bow oriented in the same direction as other pieces.

I. Miter cut and bond ends together at corners where gaskets are used for channel glazing, so that gaskets will not pull away from corners and result in voids or leaks in the glazing system.

3.3 EXTERIOR COMBINATION METHOD (TAPE AND SEALANT)

A. Clean contact surfaces with solvent.

B. Cut glazing tape to proper length and set against permanent stops, 3/16 inch below sightline. Weld corners together by butting tape and dabbing with sealant.

C. Apply bed of sealant along exterior void ensuring full contact with glass.

D. Place setting blocks at 1/4 points.

3.4 INTERIOR COMBINATION METHOD (TAPE AND SEALANT)

A. Cut glazing tape to proper length and install against permanent stop, projecting 1/16 inch above sightline.

B. Place setting blocks at 1/4 point.

C. Rest glass on setting blocks and push against tape with sufficient pressure to ensure full contact and adhesion at perimeter.

D. Install removable stops; spacer strips inserted between glass and applied stops at 2 foot intervals, 1/4 inch below sightline.

E. Fill gap between glass and applied stop with sealant to depth equal to bite of frame on glass to uniform and level line.

F. Neatly trim off excess tape to sightline.

3.5 ADHESIVE INSTALLATION OF MIRRORS

A. Apply mirror mastic to cover not more than 25 percent of back of mirror.

B. Set mirror in support on setting blocks or continuous gasket, and press against substrate to ensure bond of adhesive.

C. Leave open ventilation space, 1/8 inch or more in thickness between mirror and substrate, over 75 percent of mirror area (wherever there is no adhesive).

3.6 WINDOW AND MIRROR FILM

A. Apply window film in accordance with manufacturer’s instructions, free of bubbles and cut tight to frame at locations indicated on Drawings.

B. Apply mirror vandal-resistant film in accordance with manufacturer’s instructions, free of bubbles and cut tight to frame to all mirrors.

3.7 ADJUSTING

A. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in any other way during the construction period, including natural causes, accidents and vandalism.

3.8 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

B. Remove labels after Work is completed.

3.9 PROTECTION

A. Protect glass from breakage immediately upon installation, by attachment of crossed streamers to framing held away from glass.

B. Do not apply markers of any type to surfaces of glass.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD SHAFT WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Fire rated gypsum board and steel stud shaft wall construction for stairways, horizontal and vertical shafts, horizontal and vertical duct enclosures, and soffits as indicated on Drawings.

1.2 REFERENCES

A. ASTM A653/A653M: Standard Specification for Steel sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

B. ASTM C475: Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

C. ASTM C645: Standard Specification for Nonstructural Steel Framing Members

D. STM C665, Type I: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

E. ASTM C840: Standard Specification for Application and Finishing of Gypsum Board.

F. ASTM C919: Standard Practice for Use of Sealants in Acoustical Applications

G. 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.

H. ASTM C1325: Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cemetitious Backer Units.

I. ASTM C1396: Standard Specification for Gypsum Board

J. ASTM C1658: Standard Specification for Glass Mat Gypsum Panels

K. ASTM D3273: Standard Test Method for resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

L. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.

M. NFPA 252: Standard Methods of Fire Tests of Door Assemblies

N. Provide construction compliant with IBC and/or UL assemblies as indicated on Drawings for fire resistant ratings required.

1.3 SUBMITTALS

A. Certificates: Submit manufacturer's certification of compliance with fire and sound requirements for each system shown. Include name of manufacturer and complete description of door frames, elevator door frames, electrical boxes, and other penetrations included in each tested assembly for each system shown.

B. Shop Drawings: Submit installation drawings which:
   1. Show shaft wall dimensions relative to other work.
   2. Locate all openings in shaft wall with details indicating special construction for work of other Sections and conformance with requirements of fire rated construction.

1.4 QUALITY ASSURANCE

A. Single source Responsibility: Provide steel framing, gypsum boards, insulation, fasteners, joint treatments, and other materials in the assembly or assemblies from the single manufacturer which has utilized these materials in recognized fire containment and sound tests.

1.5 DELIVERY, STORAGE AND HANDLING

A. Protect the work from damage; repair to Architect's satisfaction or replace damaged materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements:
   1. Canadian Gypsum Company
   2. United States Gypsum Co. www.usg.com
   3. USG Mexico SA DE CV

2.2 MATERIALS

A. General
   1. Materials not specified herein but required for installation of shaft walls shall be as specified under Sections 09 22 16 and 09 29 00.
   2. Provide recycled materials in accordance with Recycled Content provisions of Section 01 60 00. Provide steel products with a postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
   3. Provide local/regional materials in accordance with Local/Regional Materials provisions of Section 01 60 00. Gypsum board products shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

B. B. Shaft Wall System Components:
   1. Liner Panels: Moisture- and mold-resistant 1 inch liner panels complying with ASTM C442 and ASTM C1396 and that are designed specifically for use as a shaft liner and

have been tested to resist the growth of mold and mildew according to ASTM D3273 with a minimum rating of 8 when tested for 4 weeks.
   a. Edges: Tapered.
   b. Rated Type X when tested in accordance with ASTM E119 and can be used as a replacement in any generic assembly utilizing a 1 inch shaftliner product.
2. Gypsum Wallboard: Complying with Section 09 29 00 and of type required by fire resistant ratings indicated. Provide moisture resistant- and mold-resistant type gypsum board formulated to resist the growth of mold where used in mechanical shafts.
3. Steel C-H or I Studs: 2-1/2 inch wide x 1-1/2 inch deep, or as required by UL assembly, 25 MSG hot dipped galvanized. Comply with applicable provisions of Section 09 22 16.
4. Steel J Runners: J-shaped 2-1/2 inch wide with unequal legs of 1 inch and 2 inch, or as required by ULC assembly, 24 MSG hot dipped galvanized. Comply with applicable provisions of Section 09 22 16.
5. Fasteners: 1-5/8 inch Type S head steel screws; 1 inch Type S steel screws.
6. Runner Fasteners: Power driven type, with-standing 193 lbs. single shear and 200 lbs. bearing force when driven through structural head or base and without exceeding allowable design stress in runner, fastener or structural support.
7. Other components as required by UL assembly, or as specified herein.

PART 3 - EXECUTION

3.1 ERECTION

A. General: Comply with Manufacturer's printed installation instructions and requirements of the fire-resistant rated assembly indicated for installation of metal framing and gypsum board for shaft wall systems.

B. Position steel runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power-driven fasteners at both ends and 24 inches o.c.

C. Use steel studs 3/8 inch less than floor-to-ceiling height, and install between liner panels with liner inserted in the groove.
   1. Install full-length steel studs or J-Runners vertically at T-intersections, corners, door jambs, and columns.
   2. Install full-length studs over shaft wall liner both sides of closure panels.
   3. Frame openings cut within a liner panel with J-Runner around perimeter.
   4. For openings, frame with vertical stud or J-Runner at edges, horizontal J-Runner at head and sill, and reinforcing as shown on the drawings.
   5. Suitably frame all openings to maintain structural support for wall.

D. Install floor-to-ceiling steel studs each side of steel hinged door frames and J-Runners or studs each side of door frames to act as strut-studs.
   1. Attach strut-stud to floor and ceiling runners with two 3/8 inch Type S-12 pan head screws.
   2. Over metal doors, install a cut-to-length section of J-Runner and attach to strutstuds with clip angles and 3/8 inch type S-12 screws.

E. Liner Panels
   1. Use maximum lengths possible to minimize number of joints.
   2. Cut liner board panels 1 inch less than floor-to-ceiling height and erect vertically between J-Runners.

3. Where shaft walls exceed 14 feet in height, position liner panel end joints within upper and lower third points of wall.
4. Stagger joints top and bottom in adjacent panels.

F. Gypsum Board Finish:
1. Erect 5/8 inch Type X gypsum base layer horizontally one side of studs with end joints staggered. Attach single layer gypsum board to studs with 1 inch long screws spaced at 12 inches center to center minimum.
2. Fasten base layer panels to studs with one inch Type S screws 24 inches o.c.
3. Caulk perimeter of base layer panels.

G. Apply 5/8 inch Type X gypsum face layer vertically over base layer with joints staggered and attached with 1-5/8 inch Type S screws staggered from those in base, spaces 12 inches o.c. and driven into studs.

H. Provide gypsum board shaft-wall assemblies for horizontal duct enclosures capable of spanning distances indicated within the deflection limit of L/240. Install gypsum board shaft wall horizontal duct enclosures to comply with manufacturer’s instructions and requirements of fire resistance rated assembly indicated.

3.2 ACCESSORY APPLICATION

A. Gypsum Panel Joints:
1. Finish face layer joints and internal angles with joint system installed according to manufacturer's directions.
2. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least 3 coats of joint compound, feathered out onto panel faces and sanded smooth.

B. Gypsum Base Joints:
1. Treat gypsum base joints, internal corners, trim and corner bead with joint system installed according to manufacturer's directions.
2. Allow to dry thoroughly before finish application.

C. Corner Bead: Reinforce vertical and horizontal exterior corners with corner bead fastened with staples 9 inches o.c. on both flanges along entire length of bead.

D. Metal Trim: Where shaft terminates against masonry or other dissimilar material, apply metal trim over face layer edge and fasten with screws or staples spaced 12 inches o.c.

E. Screws: Power-drive at least 3/8 inch from edges or ends of gypsum panels to provide uniform dimple 1/32 inch deep. In gypsum base, set flush with surface without tearing face paper.

F. Control Joints: Break face layer behind joint. Attach control joint to face layer with staples spaced 6 inches o.c. on both flanges along entire length of joint.

END OF SECTION

SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Formed metal stud framing, furring, suspension systems and accessories as shown on Drawings and as specified.

1.2 SUBMITTALS

A. Product Data: Submit data describing standard framing member materials and finish, product criteria, load charts, limitations, and installation instructions.

B. Certificates: Mill Certification shall be provided with shipment to verify chemical composition, yield strength, tensile strength, elongation, and coating thickness. Include listing of applicable ASTM standards specified in this section and comparison of ASTM requirements to actual materials provided to jobsite.

C. Manufacturer's letter: Manufacturer shall provide letter stating that the material supplied to the specific project meets or exceed the performance standards listed in these specifications.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C 754 requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

2.2 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, except as approved by Architect, subject to conformance with Specification requirements and fire rated assemblies as noted on Drawings:
1. ClarkDietrich Building Systems
2. California Expanded Metal Products
3. Marino/Ware
4. Telling Industries LLC
5. DMFCWBS, LLC
6. MBA Building Supplies
7. Southeastern Stud & Compound Inc.
8. Quail Run Building Materials
9. Scafco Steel Stud Manufacturing

10. United Metal Productts
11. Allsteel & Gypum Products
12. Consolidated Fabricators Corp.

2.3 FRAMING MATERIALS

A. Studs, Runners and Furring Channels:
   1. Steel complying with ASTM C 645- requirements for metal; C-channel, rollformed from hot dipped galvanized steel; complying with ASTM A1003 and ASTM A653 G40 or equivalent corrosion resistant coating.
   2. Thickness: In accordance with stud schedules as indicated on the drawings.
   3. Deflection Track:
      a. Slotted Top Track (non-fire rated and fire-rated, as applicable): SLPTRK ® as manufactured by Sliptrack Systems (888) 475-7875 www.BradyInnovations.com, as distributed by Dietrich Metal Framing (614) 438-3210 www.dietrichindustries.com, gauge as per ICBO ER- 5344, Table 2. Provide fire rated assemblies in accordance with manufacturer's literature, where applicable.
      b. Non-Fire Rated Slotted Top Track - Single Track Slip System for Interior Partitions: As manufactured by Metal Lite, Inc., Anaheim, CA (800) 886- 6824. Provide for partitions that are not required to be fire rated.
      c. Fire Rated Shadowline Top Track - Single Track Slip System for Interior Partitions: Applicable configuration as required for fire rating asmanufactured by Fire Trak Corporation, Kimball, MN (800) 394-9875. Provide for partitions that are required to be fire rated.

B. Studs and Track: C-shaped, non-structural rolled steel, punched for utility access, of size shown on Drawings.

C. Ceiling Runners: Cold or hot-rolled steel, meet ASTM C 754.

D. Hanger and Tie Wire: Meet ASTM C 754.

E. Furring Members: Of same gauge, material and finish as studs, thickness to suit purpose.

F. Channel Bridging and Bracing: Channel bridging and bracing members of same material and finish as studs. Spazzer® 9200 Bridging and Bracing Bar and Spazzer® Bar Guard, or U-channel assembly, thickness to suit purpose with EasyClip™ U-Series Clip Angle or equivalent.

G. Clips, Brackets: Galvanized wire or sheet metal designed for attachment of framing, furring and bridging members. Provide zee-clips at CMU wall to hold 1-½" board insulation as detailed.

H. Fasteners: ASTM C1513, self-drilling, self-tapping screws.

I. Anchorage Devices: Power driven, powder actuated, drilled expansion bolts or screws with sleeves as required for positive anchorage.

J. Acoustic Sealant: As specified in Section 09 29 00.

K. Primer: FS TT-P-645, for touch-up of galvanized surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that conditions are ready to receive Work.

B. Verify field measurements are as shown on Drawings.

C. Verify that rough-in utilities are in proper location.

D. Beginning of installation means acceptance of substrate.

3.2 METAL STUD ERECTION

A. Install stud framing in accordance with ASTM C 754 and in accordance with manufacture's printed instruction..

B. Align and secure top and bottom runners at 24 inches o.c. Place two beads of acoustic sealant between runners and substrate.

C. Fit runners under and above openings; secure intermediate studs at spacing of wall studs.

D. Install studs vertically at 16 inches on center; unless indicated otherwise on Drawings. Place two beads of acoustic sealant between studs and adjacent vertical surfaces. Install felt strips between wall and stud where studs abut exterior walls.

E. Connect studs to tracks using fastener method.

F. Backing and Blocking: Provide backing and blocking attached to studs. Bolt or screw steel channels to studs. Install backing and blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, and hardware. If proprietary system is used, install in accordance with manufacturer's printed instructions.

G. G. In areas where partitions are subject to severe impact loads, and in situations where fixtures and appurtances are intended to be supported directly from partitions, require the installation of backing and/or blocking in the partitions. Describe the locations for all backing and blocking on the drawings. Considerations for blocking are as follows:
   1. Provide 20 gauge metal backing where numerous light weight fixtures are intended to be supported directly from the walls.
   2. 2. Provide 3 ½ "blocking at the bottom of heavy duty partitions where resilient floors are scheduled to be installed (to protect walls from floor cleaning equipment impacts.)
   3. Provide 6" high minimum wood blocking or 20 gauge metal at points of attachment for small fixtures, toilet accessories and partitions, handrails, door stops, etc.

H. Coordinate installation of bucks, anchors, blocking, electrical, and mechanical Work placed in or behind partition framing.

I. Splice studs with 8 inch nested lap. Secure each stud flange with flush head screw.

J. Construct corners using minimum three studs.

K. Brace stud framing system and make rigid.

L. Coordinate erection of studs with requirements of door and window frame supports and attachments.

M. Align stud web openings.

N. Coordinate placement of insulation in multiple stud spaces made inaccessible after stud framing erection.

3.3 WALL FURRING INSTALLATION

A. Erect wall furring for direct attachment to concrete masonry, concrete walls, and wood studs.

B. Erect furring channels vertically. Secure in place on alternate channel flanges at maximum 24 inches.

C. Space furring channels maximum 16 inches on center, not more than 4 inches from floor and ceiling lines, and butting walls.

D. Install furring channels directly attached to concrete masonry, concrete walls, and wood studs as applicable in accordance with Manufacturer's instructions.

E. Erect free-standing metal stud framing tight to concrete, concrete and brick masonry walls, attached by adjustable furring brackets in accordance with Manufacturer's instructions.

3.4 ACOUSTICAL AND FIRE RATINGS

A. Install framing and furring as required for indicated acoustical and fire ratings.

3.5 CEILING FRAMING INSTALLATION

A. Install in accordance with ASTM C 754.

B. Coordinate location of hangers with other Work.

C. Install ceiling framing independent of walls, columns, and above-ceiling Work.

D. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 24 inches beyond each end of openings.

E. Laterally brace entire suspension system.

F. No hanger support shall be allowed from roof deck.

3.6 FIELD QUALITY CONTROL

A. Testing: At Owner's request, Contractor shall provide spot testing of actual properties of steel framing to verify compliance with specifications.

3.7 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Submit data on gypsum board, joint, finish and accessories.

B. Samples: Submit sample of textured finish prior to application.

C. Reports: Submit fire test report for fire rated assemblies and acoustical performance test reports for acoustically-rated assemblies.

1.2 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in Gypsum Board Systems Work with 2 years documented experience and approved by Manufacturer.

B. Regulatory Requirements: Conform to applicable code for fire rated assemblies as shown on the Drawings.

C. Comply with applicable specification recommendations of GA-216 and GA-600 as published by the Gypsum Association

D. All wall and ceiling assemblies to be install in conformance with ASTM E 84

1.3 DELIVERY, STORAGE AND HANDLING

A. Comply with GA-216 and Manufacturer's directions.

1.4 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Maintain temperature of installed gypsum board spaces in range of 55 degrees F. to 90 degrees F. until building is entirely closed.
   2. Ventilate as required to eliminate excessive moisture.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements and fire rated assemblies as noted on Drawings:
   1. CGC, Inc.
   2. American Gypsum Company

3. Certainteed Gypsum Inc.
4. Georgia-Pacific Gypsum, LLC
5. LaFarge North America, Inc.
6. Panel Rey S.A.
7. Temple-Inland
8. Gold Bond Building Products Div., National Gypsum Co. www.nationalgypsum.com
9. United States Gypsum Co. www.usg.com
10. Pabco Gypsum www.pabcogypsum.com

2.2 GYPSUM BOARD MATERIALS

A. Standard Gypsum Board: ANSI/ASTM C36 or ASTM C1396; 5/8 inch thick, maximum permissible length; ends square cut, tapered edges.

B. Fire Rated Type 'X' Gypsum Board: ANSI/ASTM C36 or ASTM C1396; fire resistive and moisture resistant type, UL rated; 5/8 inch, maximum permissible length; ends square cut, tapered edges.

C. Hi-Abuse Brand XP Wallboard: 5/8 inch Fire-shield Hi-Abuse XP. See drawings for locations.

D. Gypsum Backing Board: ANSI/ASTM C442 or ASTM C1396; fire rated type; 5/8 inch thick; square edges, ends square cut, maximum permissible length.

E. Ceramic Tile Backer Units: To be cementitious board only 5/8" or as shown on drawings.

2.3 ACCESSORIES

A. Adhesive:
1. ASTM C557.
2. In accordance with the low-emitting materials requirements of Section 01 60 00 – Product Requirements.

B. Acoustical Sealant:
1. Non-hardening, non-skinning, for use in conjunction with gypsum board, as recommended by Board Manufacturer.
2. In accordance with the low-emitting materials requirements of Section 01 60 00 – Product Requirements.

C. Corner Beads: GA216; Type CB; electro-galvanized steel.

D. Edge Trim: GA216; Type L bead; electro-galvanized steel and Type LC rolled-formed zinc.

E. Control Joint: No. 093, roll-formed zinc, as manufactured by U.S.Gypsum, Unimast, or Dietrich.

F. Joint Materials: ANSI/ASTM C475; reinforcing tape, joint compound, adhesive, water, and fasteners. For coated board and gypsum sheathing, use material recommended by Board Manufacturer.

G. Screws: ASTM C1002 for steel drill screws. Type G for fastening to gypsum board, Type S for fastening to light gauge steel framing and Type W for fastening to wood framing.

H. Wall Texture: As manufactured by USG, multi-purpose, pre-packaged, non-asbestos type.

I. Drywall Primer:

1. Paint material specifically formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads, and accessories and over skim coatings.
2. Drywall primer which is applied to the finished surface of the work specified in this section shall be provided as specified under Sections 09 91 00 and 09 72 00 as applicable.
3. A good quality, white latex drywall primer formulated with high binder solids, applied undiluted, and shall be applied to gypsum board surfaces prior to the application of texture materials.
4. In accordance with the low-emitting materials requirements of Section 01 60 00 – Product Requirements.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that site conditions are ready to receive Work and opening dimensions are as instructed by the Manufacturer.

B. Beginning of installation means acceptance of substrate.

3.2 GYPSUM BOARD INSTALLATION

A. Install gypsum board in accordance with GA-216, and Manufacturer's instructions as applicable.

B. Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Erect single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.

D. Ceiling Boards:
1. Install gypsum panels prior to wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
2. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

E. Use screws when fastening gypsum board to metal and wood furring or framing.

F. Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum ceiling board with sealant.

G. Place control joints consistent with lines of building spaces as indicated on Drawings and as recommended by Board Manufacturer.

H. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

3.3 JOINT TREATMENT

A. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

B. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.

C. Taping, filling, and sanding is not required at surfaces behind ceramic tile.

3.4 ACOUSTICAL TREATMENT

A. Install acoustical sealant in accordance with Manufacturer's instructions.

B. Install acoustical sealant at gypsum board perimeter at:
   1. Metal framing: Two beads.
   2. Base layer of double layer applications, if applicable.
   3. Face layer.
   4. Caulk partition penetrations by conduit, pipe, ductwork, and rough-in boxes.

C. Install acoustical sealant where gypsum board joins other walls or surfaces at sound control partitions.

3.5 FINISHING OF GYPSUM BOARD SURFACES

A. Provide finish of gypsum board surfaces in accordance with the Gypsum Association "Recommended Specification: Levels of Gypsum Board Finish" as follows as noted on Room Finish Schedule:
   1. Level 1 (Fire Taping at plenum areas above ceiling, in attics, in areas where the assembly will be concealed or in building service corridors and other areas not normally open to public view):
      a. Joints and interior angles shall have tape embedded in joint compound.
      b. Surface shall be free of excess joint compound.
      c. Tool marks and ridges are acceptable.
   2. Level 2 (Water resistant gypsum backing for tile):
      a. Joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating joint compound over joints and interior angles.
      b. Fastener heads and accessories shall be covered with a coat of joint compound.
      c. Surface shall be free of excess joint compound.
      d. Tool marks and ridges are acceptable.
      e. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
   3. Level 3 – To be used within storage closets and other locations as indicated on Drawings:
      a. Joints and interior angles shall have tape embedded in joint compound and one additional coat of joint compound applied over joints and interior angles.
      b. Fastener heads and accessories shall be covered with 2 separate coats of joint compound.
      c. Joint compound shall be smooth and free of tool marks and ridges.
      d. Surface to be coated with Drywall Primer as specified herein prior to application of texture.
      e. Untextured surfaces to be coated with Drywall Primer prior to application of final finishes as specified in Section 09 91 00, as applicable.
   4. Level 4 - To be used typically throughout at exposed gypsum board construction, except where Level 3 or Level 5 is noted:
      a. Joints and interior angles shall have tape embedded in joint compound and 2 separate coats of joint compound applied over flat joints and one separate coat of joint compound applied over interior angles.

b. Fastener heads and accessories shall be covered with 3 separate coats of joint compound..
c. Joint compound shall be smooth and free of tool marks and ridges.
d. Surface to be coated with Drywall Primer as specified herein prior to application of texture.
e. Un-textured surfaces to be coated with Drywall Primer prior to application of final finishes as specified in Section 09 91 00, as applicable.

5. 5. Level 5 – To be used where “Wall-Talkers” and plaster finished walls are is provided:
a. Joints and interior angles shall have tape embedded in joint compound and 2 separate coats of joint compound applied over flat joints and one separate coat applied over interior angles.
b. Fastener heads and accessories shall be covered with 3 separate coats of joint compound.
c. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface to fill imperfections in the joint work, smooth the paper texture and provide a uniform surface for decorating. Excess compound shall be immediately sheared off, leaving a film of skim coating compound completely covering the paper.
d. The surface shall be smooth and free of tool marks and ridges.
e. Surface to be coated with Drywall Primer as specified herein prior to application of texture.
f. Un-textured surfaces to be coated with Drywall Primer prior to application of final finishes as specified in Sections 09 91 00 and 09 72 00, as applicable.

B. Surfaces shall be free of dust, dirt and oil and shall receive Drywall Primer before application of texture or skim coat as required by the manufacturer of the texture or skim coat materials.

C. Surface Finish: Produce smooth surface finish to match approved sample.

3.6 CLEANING

A. After completion of wallboard installation, taping and texturing, remove rubbish, excess material and equipment from building and job site, leaving floors and other surfaces clean.

B. Remove overspray from adjoining construction.

C. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition.

D. Construction Waste: In accordance with Section 01 74 19.

3.7 PROTECTION

A. Protect Work from damage until acceptance.

B. Repair or replace damaged Work.

END OF SECTION

SECTION 09 30 00

TILE

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Submit Manufacturer's data for tile and accessory materials, including recommended procedures for mixing materials and setting tile.

B. Samples: Submit samples of each type of ceramic tile required, marked with

C. Manufacturer's name and location where tile is to be installed.

D. FloorScore Certification: Submit independent 3rd party certification that flooring products (vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring and wall base) as applicable to this specification section are compliant with the FloorScore standard

1.2 QUALITY ASSURANCE

A. Comply with applicable requirements of ANSI A-108 Series and the TCNA "Handbook for Ceramic Tile Installation." Tile shall bear the TCNA grade seal.

B. Blending:
   1. Tile manufacturer to blend tile at the factory.
   2. Provide additional blending at the job site as needed to obtain the Architect's approval.

C. Regulatory Requirements: Provide floor tiles with coefficient of friction in accordance with ADA guidelines.

1.3 DELIVERY, STORAGE AND HANDLING

A. Deliver manufactured materials in original, unbroken containers bearing name of Manufacturer, brand, and grade seals. Keep materials dry, clean and protected against deterioration.

1.4 MAINTENANCE

A. Extra Materials: Furnish 2 square foot of tile for each 100 square feet (2%) of each color and size of tile and grouting materials used in the Project. If less than 100 square feet is installed, provide a minimum of one square foot of extra stock. Extra materials shall be furnished in original packaging.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, subject to compliance with Specification requirements. Format and sizes as shown in the Drawings.
   1. Tiles: See Architect finish selections list
      a. Glass tile for walls.
      b. Ceramic tile at restrooms.
      c. Brushed aluminum vertical surface tile.

   2. Setting and Grouting Materials:
      a. Bostik – Hydroment, Middleton, MA (800) 726-7845 www.bostik-us.com b. C-Cure, as manufactured by Bonded Materials Company, Phoenix, AZ
      b. (623) 873-0001 www.c-cure.com
      c. Custom Building Products, Seal Beach, CA (562) 598-8808 www.custombuildingproducts.com (Arizona Representative: Dale Roberts, (909) 255-0243)
      d. Laticrete, Bethany CT (800) 243-4788 www.laticrete.com
      e. MAPEI Corporation, Garland, TX (800)-42-MAPEI www.mapei.com
      f. Tec Specialty Products, Inc., an H.B. Fuller company, Palatine, IL (800) 323-7407 www.tecspecialty.com

2.2 MATERIALS – GENERAL

A. Hard surface flooring, tile setting adhesives and tile grout shall meet low-emitting materials requirements.

2.3 TILE MATERIALS

A. Manufacturer, Product, Color, Thickness and Sizes: as indicated on drawings and on Owner-approved finish list.
   1. Kaiser Tile
   2. Daltile
   3. American Olean
   4. Marazzi

B. Trim Shapes:
   1. Provide all bases, caps, stops, returns, trimmers, and other shapes indicated or required to produce a completely finished installation.
   2. Except as may be shown otherwise on the Drawings, provide color, and finish matching the adjacent tile.

C. Format:
   1. Ceramic wall tile in 4” x 16” format in color(s) as selected by Architect.
   2. Ceramic floor tile in 12” x 24” format in color(s) as selected by Architect.
   3. Decorative Glass tile in 2” x 2” format in color(s) as selected by Architect.
   4. Aluminum Accent Tile for lobby vertical surface in sheets as determined by manufacturer. Color to be black.Basis of Design format is Kaiser Tile KT Accents, 103/4” x 11 7/8”.

2.4 INSTALLATION MATERIALS

A. Mortar Bed for Mud Set Method:
   1. Portland cement: ASTM C150, Type 1.
   2. Sand: ASTM C144.
   3. Mortar: One part Portland cement to 6 parts damp sand by volume.

B. Mortar for Thin Set Installation: Kerabond/Keralastic as manufactured by MAPEI Corporation or MasterBlend as manufactured by Custom Building Products. Dry-Set mortar conforming to per ANSI A118.1 with liquid flexible additive to produce a polymer modified mortar conforming to ANSI A118.4.

C. Grout:
   1. Latex grout: Conforming to ANSI 118.6 and the TCNA Handbook, by an approved Manufacturer. Grout shall be sealed as recommended by manufacturer.
      a. Provide sanded grout.
   2. Epoxy grout:
      a. Chemical-resistant per ANSI 118.3, water-cleanable during installation, by an approved Manufacturer.
      b. Epoxy mortars and grouts shall be used in all exterior applications, wet locations, areas subject to heavy traffic and areas that may come into contact with solvents, chemicals or continuous immersion in water.
   3. Colors shall be selected by architect.

D. Thresholds: Marble Institute of America, Class A, color selected by the Architect from standard colors of the approved manufacturer, shaped to provide a comfortable transition between tile and other floor finishes, with smooth matte surface finish and in the dimensions shown on the Drawings.

2.5 ACCESSORIES

A. Ceramic Tile Backer Units: Furnish units with manufacturer's recommended joint tape.
   1. Cement Backer Board: Provide cement or fiber-cement backer units conforming to ASTM C1288 or C1325 and ANSI A118.9.
      a. Thickness: Type X 5/8 inch
      b. Subject to compliance with requirements, provide one of the following:
         1) DUROCK Cement Board, USG Corporation.
         2) WonderBoard, Custom Building Products.
         3) Util-A-Crete Concrete Backer Board, FinPan, Inc.
         4) C-Cure Board 990, C-Cure.
         5) Hardibacker, James Hardie Building Products.

B. Edge and Transition Strips: Solid brass, extruded aluminum, or roll-formed stainless steel edge strips, height as indicated; with integral perforated anchoring leg for setting the strip into the setting material.
   1. Height: As required to suit application.
   2. Finish: Stainless steel.
   3. Products: Subject to compliance with specification requirements, provide
   4. Schlüter – SCHIENE and RONDEC as approved by Architect. Corners and trim at accessories.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine subsurfaces to receive Work and report detrimental conditions in writing. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordinate with other Work which affects, connects with, or is concealed by this Work. Before proceeding, make certain required inspections have been made.

C. Where tile units will be thin-set directly to the substrata, do not commence installation of the tile units until substrata are within the following tolerances:
   1. Horizontal surfaces: Level within 1/8 inch in ten feet in all directions.
   2. Vertical surfaces: Level within 1/8 inch in eight feet in all directions.
   3. Deflection: Vertical Surfaces: Verify that design of the wall or partition will not permit deflection exceeding 1/360 of the span for point and uniform loading. Space wood or metal studs not less than 16 inches on center.

D. Conditions of Surfaces to Receive Tile:
   1. Verify that surfaces to receive tile are firm, dry clean, and free from oily or waxy films and curing compounds.
   2. Verify that grounds, anchors, plugs, recess frames, bucks, electrical work, mechanical work, and similar items in or behind the tile have been installed before proceeding with installation of tile.
   3. Scarify hard steel trowel finish concrete surfaces.
   4. Completely remove curing compounds on concrete surfaces by scarification or cleaning methods acceptable to tile setting materials manufacturer.

3.2 PREPARATION

A. Lay out Work so that no tile of less than half size occurs.
   1. For heights stated in feet and inches, maintain full courses to produce nearest attainable heights without cutting tile.
   2. Align joints in wall tile vertically and horizontally except where other patterns are shown or specified. Align joints in walls to conform to patterns selected.
   3. Align joints in floor tile at right angles to each other and straight with walls and conform to patterns selected or indicated.

B. Obtain exact locations of expansion joints and accessories before installing tile.

C. Locate accessories in tile walls as indicated on Drawings or as directed by Architect. Where the size of accessory does not line up with the jointing pattern of adjacent tile, the cutting of tile and arrangement of joints around the accessories shall be as directed by Architect.

3.3 INSTALLATION

A. Ceramic Tile Backer Units: Install ceramic tile backer units at wet area walls and at adjacent walls as indicated on Drawings in accordance with Manufacturer's directions.
   1. Apply with un-cut long edge at bottom of work, and space 1/4 inch above fixture lips. Seal ends, cut edges, and penetrations of each piece with water-resistant compound before installation.
   2. Space units with gap of 1/8 to 3/16 inch wide (or as recommended by the manufacturer), fill solid with mortar, and cover with the fiberglass tape embedded in a skim coat of mortar.

B. Tile –General:
   1. Install tile in accordance with ANSI Specifications A108.1 through A118.1 and
   2. Manufacturer's recommendations.

3. Cut and drill neatly as required without marring tile. Rub smooth necessary cuts with a fine stone. Set cut edge against fixture, cabinet or other tile with joint at least 1/16-inch wide.
4. Tile walls at toilet rooms shall be full height of wall, typical.

C. Waterproof Membrane (Adhesive): Utilize where membrane is required beneath tile. Waterproof coves at wet areas in accordance with Manufacturer's recommendations to a minimum height of 8 inches above floor. Allow adhesive type waterproof membrane to cure before applying bonding materials.

D. Anti-Fracture Membrane: Install anti-fracture membrane over cracks, sawcuts and joints in concrete slab in accordance with Manufacturer’s printed instructions.

E. Thin Set: Where indicated to be thin-set, install tile using TCNA Method for substrate condition and type for dry set mortar, and as follows:
1. Floors: TCNA F115.
2. Walls: TCNA W244.

F. Grout:
1. Mix grout to a creamy consistency.
2. Mix only as much grout as can be used in one hour.
3. Thoroughly force into joints, fill entire depth.
Finished surface of joints shall be uniformly smooth, and continuously level with edges of tile.
4. Seal grout in accordance with manufacturer's recommendations.

G. Expansion and Control Joint Sealant:
1. Workmanship for caulking and sealants shall conform to requirements of Section 07 92 00.
2. Provide expansion/control joints where indicated on Drawings, and:
a. Interior: 24'-0" to 36'-0" in each direction.
b. Exterior: 12'-0" to 16'-0" in each direction.
3. Joints between tile and door frames and other metal accessories, tile and ceiling, wall tile and wall tile at inside corners and wall tile and floor tile shall be sealed with silicone rubber sealant.
4. Provide expansion joints at tile columns, curbs and pipes and fill with sealant. At building structural joints extend expansion joints through the tile. Seal with sealant.In no case shall tile be carried over expansion joints without a joint in the tile.

3.4 CURING

A. Damp cure all tile installations, including Portland cement grouts, for 72 hours minimum.
1. Cover with clean non-staining 40-pound Kraft paper.
2. Do not use polyethylene sheets directly over tile on horizontal surfaces.
3. Keep all traffic off newly installed floors for at least 72 hours. Protection may be necessary.

3.5 TOLERANCES

A. Tile: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignments shown:
1. Horizontal surfaces: 1/8 inch in 10’-0” in all directions;
2. Vertical surfaces: 1/8 inch in 8’-0” in all directions.

3. Lippage: 1/8 inch maximum.
4. Maximum Variation of Joint Width: 1/16 inch.

3.6 CLEANING

A. Wipe surfaces clean after grouting; remove traces of mortar and grout. Do not use acid solution for cleaning glazed tile.

B. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

C. Construction Waste: In accordance with Section 01 74 19.

3.7 PROTECTION

A. Close spaces to traffic or other Work until tile is firmly set. Protect from damage until acceptance. Repair damaged Work at no additional cost to Owner.

B. Prohibit foot and wheel traffic from using newly tiled floors for at least 7 days. Place large, flat boards in walkways and wheel ways where use of newly tiled floor is unavoidable.

END OF SECTION

SECTION 09 51 00

ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SUBMITTALS

A. Shop Drawings: Submit Drawings showing complete layout of systems including attachments, intersections of members and edge conditions.

B. Product Data: Provide data on metal grid system components and acoustical units.

C. Samples:
   1. Submit 2 samples of each type of unit specified, including color selection when applicable.
   2. Submit samples of Manufacturer's full color selection for selection by Architect.

1.2 QUALITY ASSURANCE

A. Qualifications: Installer shall be approved by Manufacturer of material or system.

B. Standards: Comply with the following:
   1. ASTM C635, "Standard Specification for Acoustical Tile and Lay-In Panel Ceilings."
   2. ASTM C636, "recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical tile and Lay-In Panels."
   3. Ceilings and interior Systems construction Association (CISCA) "Recommendations for Direct-Hung Acoustical tile and Lay-in Panel Ceilings."

1.3 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact. Protect finished surfaces with removable wrapping or coating which will not bond when exposed to sunlight.

B. Storage: Adequately protect against damage while stored at the site.

C. Handling: Comply with Manufacturer's instructions

1.4 MAINTENANCE

A. Extra Materials: Provide an additional 5 percent of each type of acoustical unit installed in unopened labeled cartons, to the Owner at completion of Work, for his maintenance use, at no additional cost. Provide, at minimum, one full carton of each type of acoustical unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of the following Manufacturers, except as approved otherwise by the Architect, subject to compliance with Specification requirements.
   1. Armstrong World Industries
   2. Chicago Metallic Corporation
   3. USG Interiors, Inc.
   4. BPB America, Inc, (Celotex, Capaul and Gyptone Brands).

2.2 SUSPENSION SYSTEM

A. Ceiling Suspension System: Heavy duty with components formed from commercial quality cold rolled steel electro-zinc coated.

B. ACT-1 Call Center Ceiling
   1. Main Runners: Minimum of 1-1/2 inch in height with an exposed dimensional capped face of 9/16 inch, equal to Armstrong Suprafine® XL suspension system, nominally 12 feet long.
   2. Cross-Tees: Minimum of 1-1/2 inch in height with an exposed dimensional capped face is a width to match main runners.
   3. Trim: 4 inch in height with an exposed dimensional capped face of 15/16 inch, equal to Armstrong Axiom® Classic Trim
   4. Finish: Exposed faces of main and cross runners shall be a baked enamel paint finish, white color.

C. ACT -2 Office Ceilings, other as indicated on Drawings.
   1. Main Runners: Minimum of 1-1/2 inch in height with an exposed capped face of 15/16 inch in width, nominally 12 feet long.
   2. Cross-Tees: Minimum of 1-1/2 inch in height with an exposed capped face in a width to match main runners.
   3. Finish: Exposed faces of main and cross runners shall be a baked enamel paint finish, white color.

D. Hanger Wire: Galvanized steel conforming to Federal Specification FF-QQ-W-461, Finish 5, class 1 annealed and not less than 12 gauge.

E. Suspension system shall support the ceiling system specified with a maximum deflection of 1/360 of the span.

F. Wall and Penetration Moldings: 24 MSG painted steel with a minimum one inch wide lower flange, finish and configuration to match grid. For circular penetrations provide edge molding manufactured to exact diameter of circular penetration.

2.3 CEILING PANELS

A. Acoustical Ceiling Panels – Type 1
   1. Style: Armstrong Optima® or equal as approved by Architect.
   2. Size: As shown on Reflected Ceiling Plan
   3. Surface Finish: Factory applied, washable vinyl latex paint finish, white color.
   4. Light reflectance: 0.86 per Red. Spec. SS-S-118B and ASTM 1264
   5. Surface Burning Characteristics: Class A per ASTM E-84 (UL Label).
   6. NRC: 0.55 in suspended mounting.
   7. CAC: 35(continuous ceiling)

8. Edge Detail: Beveled Tegular (Reveal edge).

2.4 ACCESSORIES

A. Acoustical Batt Insulation: Specified in Section 09 81 00.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing, with a copy to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Verify, before proceeding with this Work that required inspections of existing conditions have been completed.

3.2 INSTALLATION – SUSPENSION SYSTEM

A. Install suspension system in accordance with the following:
   1. ASTM C636 and as supplemented in this Section.
   2. CISCA's Recommendations for Acoustical Ceilings: comply with CISCA's "Recommendations for Direct-Hung Acoustical tile and Lay-in Panel Ceilings "

B. Install system capable of supporting imposed loads to a deflection of 1/360 maximum.

C. Locate system on room axis according to reflected ceiling plan.

D. Install after major above-ceiling Work is complete. Coordinate the location of hangers with other Work.

E. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.

F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are splices, avoid visible displacement of face plane of adjacent members.

G. 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.

H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches or each corner; or support components independently.

I. Do not eccentrically load system, or product rotation of runners.

J. Install edge mold at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions.

K. Form expansion joints as detailed. Form to accommodate plus or minus ½ inch movement. Maintain visual closure.

3.3 INSTALLATION ACOUSTICAL LAY-IN 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. Cut panels to fit irregular grid and perimeter edge trim. Field rabbett panel edge. Double cut and field paint exposed edges of reveal edge units.

G. Where round obstructions occur, provide preformed closers to match edge molding.

H. Install hold-down clips to retain panels tight to grid system where required for fire-rated system.

3.4 ERECTION TOLERANCES

A. Maximum Variation from Flat and Level Surface: ¼ inch in 10 feet

3.5 ADJUSTING

A. Remove damaged or soiled panels and replace with new units, as directed by Architect.

3.6 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in a clean condition.

END OF SECTION

SECTION 09 54 00

METAL BAFFLE CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Perforated and un-perforated metal ceiling panels.
   2. Acoustical backing
   3. Suspension assemblies
   4. Accessories; provide other necessary items including devices for attachment overhead construction, secondary members, splines, splices, connecting clips, wall connectors, wall angles, and other devices required for a complete installation.
   5. Supplemental support framing: Provide fully engineered secondary framing as required to meet code, conforming to layout shown in drawings, to support direct-hung metal ceilings suspension system.
   6. Coordinate layout and installation of items penetrating or being installed in ceiling systems with responsible trades.

B. This Section covers the general requirements only for Acoustical Metal Ceilings as shown on the drawings. The supplying and installation of additional accessory feature and other items not specifically mentioned herein, but which are necessary to make a complete installation shall also be included or clarified accordingly.

C. Qualification Data:
   1. Test Reports: Certified reports from independent agency substantiating structural compliance to wind loads and other governing requirements.
   2. Certificates:
      a. Data substantiating manufacturer and installer qualifications
      b. Certified data attesting fire rated materials comply with specifications.
      c. Manufacturer's Instructions: Detailed installation instructions and maintenance data.

1.2 SUBMITTALS

A. Product Data: Manufacturer's published literature, including specifications.

B. Product Certification: Manufacturer's certifications that products comply with specified requirements and governing codes including product data, laboratory test reports and research reports showing compliance with specified standards.

C. Shop Drawings: Submit shop drawings for reflected ceiling plans (RCP's), drawn to scale, and indicating penetrations and ceiling mounted items. Show the following details:
   1. Reflected Ceiling Plan(s): Indicating metal ceiling layout, ceiling mounted items and penetrations.
   2. Suspension System, Carrier and Component Layout.
   3. Details of system assembly and connections to building components

D. Samples for Verification: Full-size units (or as specified below) of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics. Submit samples for each type specified.

1.3 QUALITY ASSURANCE

A. Manufacturer/Installer Qualifications:
   1. Provide metal ceiling system components produced by a single manufacturer with a minimum 5 years' experience in actual production of specified products and with resources to provide consistent quality in appearance and physical properties, without delaying the work.
   2. Provide suspension system components produced by a single manufacturer to provide compatible components for a complete metal ceiling system installation.
   3. Perform installations using a firm with installers having no less than 3 years of successful experience on projects of similar size and requirements.

B. Regulatory Requirements:
   1. Fire Rating Performance Characteristics: Install system to provide a flame spread of 0 - 25, complying with certified testing to ASTM E 84.
   2. Structural Criteria: Install and certify system to comply with structural and wind load requirements of governing codes.
   3. Installation Standard for Suspension System: Comply with ASTM C 636.

C. Mock-Up: Prior to beginning installation erect a mock-up section, where directed, using all system components.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver system components in manufacturer's original unopened packages, clearly labeled.

B. Store components in fully enclosed dry space. Carefully place on skids, to damage from moisture and other construction activities.

C. Handle components to prevent damage to surfaces and edges, and to prevent distortion and other physical damage.

1.5 PROJECT CONDITIONS

A. Begin system installations only after spaces are enclosed and weather-tight, and after all wet work and overhead work have been completed.

B. Prior to starting installations, allow materials to reach ambient room temperature and humidity intended to be maintained for occupancy.

1.6 WARRANTY

A. Provide specified manufacturer's warranty against defects in workmanship, discoloration, or other defect considered undesirable by the Architect or Employer.

B. This warranty shall remain in effect for a minimum period of one (1) year from date of initial acceptance.

1.7 MAINTENANCE & EXTRA MATERIALS

A. Maintenance Instructions: Provide manufacturers standard maintenance and cleaning instructions for finishes provided.

B. Extra Materials: Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents. Only typical system components are included with attic stock.
   1. Acoustical Metal Ceiling Pan Units: Full-size units equal to 2 percent (2%) of amount installed.
   2. Ceiling Suspension System Components: Quantity of each grid and exposed component equal to 2 percent (2%) of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Provide “V150 -Baffle Fins” ceiling system manufactured by Hunter Douglas Architectural Products, Inc., 5015 Oakbrook Parkway, Suite 100, Norcross, GA 30093, USA. Ph. (800) 366-4327.

2.2 MATERIALS

A. Baffle ceiling system for interior installations:

B. V150 Panels roll formed aluminum panels with V formed edges, 150 mm (5.906”) deep, .025 inch thick.
   1. Panel length: (Standard 12 feet) (minimum 2’ – maximum 20’)
   2. Panel profile height: 6”

C. Panel Finish: Natural Aluminum

D. Panel screen Clip: Required on all moveable and pivot carrier applications.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

A. Fixed Screen Carrier: V-shaped, roll formed aluminum section with hook-shaped tabs spaced at (100 mm) (150 mm) (200 mm) on center. Carrier length: 5 m (16.4’).
   1. Finish: Factory applied black enamel.
   2. Hanger Wire: 12 gage galvanized carbon steel hanger wire.

B. Moveable Screen Carrier: U-shaped, roll formed steel section with clear, hook-shaped tabs spaced at (100 mm) (150 mm) (200 mm) on center and movable in sets of 12 panels. Carrier length: 5 m (16.4’).
   1. Finish: Factory applied black enamel.

C. Pivot Screen Carrier (for sloped, radial and flat applications): Pivot Clips to be used with 15/16” t-grid (by Others), clear, hook-shaped Pivot Clips spaced at (100 mm) (150 mm) (200 mm) on center.
   1. Supply 48 inch cross tee runners to stabilize pivot main tee
   2. Finish: Factory applied black t-grid

2.4 ACCESSORY MATERIALS

A. Stabilizer Bar: 1 ½ inch main tee stabilizer bars provided under related Sections.

B. Air Distribution Devices: Provide distribution devices that are independently suspended, locatable, capable of being fully integrated with ceiling system that requires no interruption of ceiling components.

C. Lighting Fixtures: Provide fixtures capable of being fully integrated with ceiling system and that require no interruption of ceiling components, that are independently suspended, and as selected to conform to lighting criteria specified in Division 16.

2.5 FABRICATION

A. Suspension System: Form and fabricate into a
   1. Fixed Carrier: One directional pattern with fixed V-shaped carriers spaced at max 60 inch on center.
   2. Movable Carrier Assembly: One directional pattern with fixed U-shaped carriers spaced at max 48 inch on center
   3. Pivot Clip Assembly (for sloped, radial and flat applications)
   4. 15/16” T-grid, by Others, with main tees spaced 48 inch on center and cross tee runners at 48 inch on center suspended from the building structure. Max on center spacing for Pivot Clips is 48” along panel length

B. Panels: Form edges to snap into carriers with a positive action
   1. Overlap continuous runs of panels (fixed carrier) (pivot carrier) applications. Overlap panels 2” and use Splice Clips top and bottom at overlap splice location.
   2. Separate continuous runs of panels in moveable carriers at 1” minimum apart to assure free movement. **A MINIMUM 1 INCH SEPARATION IS REQUIRED

C. Fixing Clips: Use fixing clips at all moveable carrier and pivot carrier applications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and structural framing to which acoustical metal panels attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect installation and anchorage, and other conditions affecting performance of metal panel ceilings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

B. Measure each ceiling area and establish layout of acoustical metal pan units to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width units at borders, and comply with layout shown on reflected ceiling plans

C. Survey substrate for wall attachment to assure squareness and proper elevation for wall panel installation.

3.3 INSTALLATION

A. Suspend ceiling hangers from building's approved structural substrates and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produces hanger spacing that interferes with location of hangers, install supplemental suspension hangers in form of trapezes or equivalent devices. Utilize supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
   4. Where used secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   5. Space hangers not more than 48 inches on center, along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches from ends of each member. Supply supporting calculations from licensed Structural Engineer verifying hanger spacing meets all requirements, when spacing exceed those recommended.
   6. Fine level grid to 1/8 inch in 10 feet from specified elevation(s), square and true.
   7. Adjust suspension system runners so they are square (within .5 degree from 90 degrees) and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

B. Secure bracing wires to ceiling suspension members and to supports acceptable to Architect Engineer and or inspector. Suspend bracing from building's structural members and / or structural deck, as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs(unless directed otherwise).

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical metal pan. Method of edge trim attachment and design of edge trims to be approved by Architect.
   1. Screw attach moldings to substrate at intervals not more than 18” O.C. and not more than 6” from ends, leveling with ceding suspension system to a tolerance of 1/8” in 10’. Miter corners accurately and connect securely.
   2. Do not use exposed fasteners, including pop rivets, on moldings and trim without prior written approval, or unless detailed otherwise.

D. Scribe and cut acoustical metal panel units for accurate fit at penetrations by, other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.

E. Install acoustical metal panel units in coordination with suspension system.

1. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions, unless otherwise indicated. Install directionally patterned or textured panels in directions indicated on approved shop drawings. Panel-joints shall flow smoothly and in a straight line within 1/8” in 10’. Intersections shall be continuous.
2. Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating ceiling.
3. Remove protective film from panels only when space is completely clean and free of airborne particles. Use white cotton gloves for final installation of panels into grid system.

3.4 ADJUST AND CLEAN

A. Adjust components to provide uniform tolerances.

B. Replace all ceiling panels that are scratched, dented or otherwise damaged.

C. Clean exposed surfaces with non-solvent, non-abrasive commercial type cleaner.

END OF SECTION

SECTION 09 65 00

FLOORING BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Rubber base and resilient accessories. Aluminum base.

1.2 SUBMITTALS

A. Product Data: Submit product data and samples in accordance with Section 01 33 00.
   1. Complete description of products and installation instructions.

B. Samples: 12-inch by full height or width sections of base and accessories in colors and materials selected.

1.3 QUALITY ASSURANCE

A. Standards: Prepare substrate and install products in accordance with product manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Resilient Base and Flooring Accessories: Furnish products of one of the specified manufacturers, except as approved by the architect, subject to compliance with specification requirements.
   1. Type TP – Thermoplastic Rubber
      a. Roppe
      b. Burke/Mercer
      c. Johnsonite

B. Aluminum Base: Furnish dimensions and gauge as shown in Drawings.

2.2 MATERIALS

A. Resilient Base: ASTM 1861
   1. Material: Type TP – Thermoplastic Rubber
   2. Height: 4" or as scheduled on drawings
   3. Thickness: 1/8" thick
   4. Length: Coils in manufacturer's standard lengths. Cut lengths are not acceptable.
   5. Type: Top set, coved typical, toe-less at carpet unless otherwise indicated on drawings.
   6. Color: As selected by Architect from manufacturer's full range of styles & colors.

B. Subfloor Filler, Adhesives, and Wax: Types recommended by resilient flooring manufacturer for material types and location.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Ensure substrate surfaces have solid backing, and are smooth and flat with maximum variation of 1/8-inch in 10-feet.

B. Ensure concrete substrates are dry (maximum 7% moisture content) and exhibit negative alkalinity, carbonization or dusting.

3.2 PROTECTION

A. Maintain minimum 70ºF air temperature at flooring installation area for three (3) days prior to, during and for 24 hours after installation.

B. Store materials in area of application. Allow three (3) days for material to reach equal temperature as area.

C. Extra Stock: Deliver base equaling at least 2%, but not less than 48 lineal feet of base installed to Owner when and where directed.

3.3 PREPARATION

A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with subfloor filler.

B. Clean floor and apply, trowel and float filler to leave smooth, flat hard surface. Prohibit traffic until filler is cured.

3.4 INSTALLATION

A. Clean substrate. Spread cement evenly in quantity recommended by manufacturer to ensure adhesion over entire area of installation. Spread only enough adhesive to permit installation of products before initial set.

B. Fit base joints tight and vertical. Maintain minimum measurement of 18-inches between joints. Miter internal corners. Use pre-molded sections with minimum 2-inch returns for external corners and exposed ends. Adhere tightly to wall surfaces. Scribe and fit base to door frames and other obstructions. Install base straight and level to variation of +1/8-inch over 10-feet.

C. Install edge strips at unprotected or exposed edges where flooring terminates.

3.5 CLEANING

A. Remove excess adhesive from floor, base and wall surfaces without damage.

B. Clean and wax floor in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 09 65 19

RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Submit data on specific products, describing physical and performance characteristics, sizes, patterns, and colors available.

B. Samples: Submit 2 samples of each material specified illustrating color and pattern.

C. Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.2 QUALITY ASSURANCE

A. Qualifications: Installation shall be by qualified installer approved by the Manufacturer of the materials.

B. Regulatory Requirements:
1. Critical Radiant flux Classification: Class 1 (Not less than 0.45 Watts per sq/cm per ASTM E648).
2. Slip resistance of floor surfaces and changes in level shall be in accordance with applicable law.

1.3 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer’s original unopened packaging with labels intact.

B. Storage: Adequately protect against damage while stored at the site.

C. Handling: comply with Manufacturer’s instructions.

1.4 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Installation shall not begin until work of other Trades is substantially completed and the area or rooms where flooring is to be installed hs been maintained at a minimum temperature of 70 degrees F. for at least 48 hours.

B. Moisture content and bond ability of concrete sub-floors shall be determined by a field testing method recommended by the flooring manufacturer.

C. Maintain ambient temperature required by Adhesive Manufacturer three days prior to, during, and 24 hours after installation of materials.

1.5 MAINTENANCE

A. Extra Materials: Provide 100 square feet of flooring and 60 lineal feet of base of each material specified.

PART 2 - PRODUCTS

2.1 MATERIALS – GENERAL

A. Hard surface flooring and tile setting adhesives shall be low-emitting materials.

2.2 TILE FLOORING

A. Static Dissipative Vinyl Tile::
1. Manufacurer: Julie Industries, Inc., North Reading MA. www.julieind.com or approved equal.
2. Series: Summit Series.
3. Composition (ASTM F1700): Homogeneous.
4. Thickness: (ASTM F536): 1/8 inch.
5. Nominal Size (ASTM F536): 12 inches by 12 inches
6. Squareness (ASTM F540): <0.010 inch.
7. Reidual Indentation (ASTM F1914): <7%
8. Flexibility (ASTM F137): No crack or break.
9. Dimensional Stability: 0.015 inch per foot.
10. Electrical Resistance (ESD S7.1 – 100V_:
    a. Conductive: 2.5 x 10^4 – 10^6 ohms
    b. Static Dissipative: 1.0 x 10^6 - 10^8
11. Electrical Resistance – Surface to Surface:
    a. ASTM F150 (100V): 1.0 x 10^6 – 10^8
        1) Conductive: 2.5 x 10^4 – 10^6 ohms
        2) 2)Static Dissipative: 1.0 x 10^6 – 10^8
    b. NFPA 99 (500V) – Static Dissipative: (SD: 10^6 – 10^9)
12. Electrical Resistance – Surface to Ground (DIN 51963 – 500V):
    a. Conductive: <2.5 x 10^4 – 10^6 ohms
    b. Static Dissipative: 1.0 x 10^6 – 10^8
13. Electrical Propensity (ESD STM 97.2 – with conductive footwear):
    a. Conductive: Less than 10V
    b. Static dissipative: Less than 20V
14. Electrical Propensity – kV Rating (AATCC 134-06 – without conductive footwear) – Conductive: Less than 2.0kV.
15. Static Decay (Federal Test Method 101B Method 4046 at 20% Relative Humidity
    a. Conductive: 0.01 sec
    b. Static Dissipative: 0.01 sec
16. Smoke Density (ASTM E662): <450
17. Flame Spread (ASTM E662): <450
18. Critical Radiant Flux (ASTM E48) CLASS 1> 1.08W/cm^2
19. UL 779: Meets standard
20. Color: As Selected by Architect

2.3 BASE

A. Manufacturer, Product, Color, Thickness and Sizes: As selected by Architect

B. Base Accessories: Pre-molded end stops and external corners of same material, size, and color as base.

2.4 ACCESSORIES

A. Adhesives
   1. Suitable for the underfloor substrate conditions involved as recommended by the Manufacturer of the flooring materials.
   2. Adhesives shall be waterproof, stabilized type. Asphalt emulsions are not acceptable.
   3. In accordance with the low-emitting materials requirements of Section 01 60 00 – Product Requirements.

B. Crack and Joint filler: Waterproof type as recommended by the Manufacturer.

C. Edge and Transition Strips: 1 inch wide with beveled edge. Material to match flooring.
   1. Profile and color selection by Architect.

D. Sealer:
   1. Type recommended by Flooring Manufacturer.
   2. In accordance with the low-emitting materials requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Inspect the sub-floor to receive resilient flooring in accordance with ASTM F710. Do not lay floor covering until sub-floors are in proper condition to receive same. Sub-floors shall be broom clean, free of foreign matter, and thoroughly clean before installation. Perform moisture testing of concrete subfloors in accordance with ASTM F1869 or other method as acceptable to flooring manufacturer. Verify that moisture vapor emission of subfloor does not exceed 2.5 lb/1000 sq. ft. (142µg/m_2), or as acceptable to flooring manufacturer.

C. Verify concrete floors are dry and bondable.

3.2 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.

B. Apply, trowel, and float filler to leave a smooth, flat, hard surface.

C. Prohibit traffic from area until filler is cured.

D. Vacuum clean substrate.

E. Apply primer to floor surfaces as recommended by Flooring Manufacturer.

3.3 INSTALLATION – TILE FLOORING

A. Install in accordance with Manufacturer's instructions and in accordance with "Recommended Work Procedures for Resilient Floor Coverings" of the resilient Floor Covering Institute.

B. Mix tile from container to ensure shade variations are consistent.

C. Spread only enough adhesive to permit installation of materials before initial set.

D. Set flooring in place; press with heavy roller to attain full adhesion.

E. Lay tile flooring with joints parallel to building lines and with symmetrical tile patterns

F. Install tile to square grid pattern with all joints aligned. Allow minimum ½ full size tile width at room or area perimeter.

G. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.

H. Install edge strips at unprotected or exposed edges, and where flooring terminates.

I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

J. Install flooring under movable partitions without interrupting floor pattern.

K. Install edge strips where indicated. Fit joints tightly.

L. Installation of resilient tile flooring over the Vapor Reduction Floor Coating (as specified in Section 07 26 53): Install using flooring manufacturer's recommended adhesive for the vapor reduction system.

3.4 INSTALLATION - BASE

A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

B. Miter internal corners. At external corners, use pre-molded units. At exposed ends use pre-molded units.

C. Install base on solid backing. Bond tight to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.5 CLEANING

A. After flooring has become well seated, minimum 72 hours, and just prior to opening it to traffic, thoroughly clean in accordance with Manufacturer's recommendations.
   1. Apply two coats of manufacturer's recommended wax to clean resilient flooring in accordance with manufacturer's published recommendations.

B. Remove dirt, debris, and adhesive from floor covering and adjacent surfaces using Manufacturers recommended methods and leave installation in a clean, undamaged condition.

C. During the course of the Work and on completion, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in a clean condition.

3.6 PROTECTION

A. Minimize traffic until flooring has become well seated, at least 72 hours, at a maintained temperature of not less than 70 degrees F., and do not permit fixtures, equipment, trucks, or similar items on flooring.
   1. Provide temporary protection materials of underlayment board or other suitable protection sheets over flooring where it is necessary to move heavy or sharp loads across the floor within 72 hours after installation.
   2. Protect installed flooring by providing protective coverings or other protection as recommended by manufacturer until time of final completion of Project

END OF SECTION

SECTION 09 66 23.16

TERRAZZO FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included: Section includes terrazzo flooring as indicated on Drawings, and edge trim.

1.2 SYSTEM DESCRIPTION

A. Design Requirements: Provide 3/8 inch thick epoxy thin-set terrazzo flooring system.

1.3 SUBMITTALS

A. Product Data:
   1. Submit Product Data for each type of terrazzo, accessory item, and component material specified.
   2. Submit manufacturer's specifications on cured system and individual components of the 3/8 inch thick Epoxy Thin set Terrazzo Flooring, including physical properties and performance properties and test specified herein.
      a. Each individual component of the system will be evaluated on the basis of these standards.
      b. For any tests not listed in the manufacturer's standard nationally published data, the manufacturer must supply the missing data accompanied by the independent testing laboratory's test results which prove compliance in accordance with the referenced standards(s).

B. Shop Drawings: Submit Shop Drawings showing layout of divider strips, control joint strips, and base and border strips.

C. Samples: Submit 6-inch samples of each different pattern, color and type of terrazzo required. Provide minimum 6 inch long samples of each type accessory item specified. The Contractor shall submit as many cured system samples as necessary (at least 3 will be required) to meet Architect requirements and for verification purposes and finish texture approval.

D. The Contractor shall submit a copy of the manufacturer's packing slip, tagged for this specific job, along with calculations, signed by an officer of the primary material supplier demonstrating that the quantity of material furnished for the project will achieve the specified coverage and mil thickness.

E. Maintenance Instructions: Submit 2 copies of written instructions recommended periodic maintenance of each type of terrazzo.

1.4 QUALITY ASSURANCE

A. NTMA Standards: Comply with specified provisions and recommendations of National Terrazzo and Mosaic Association, Inc. (NTMA)

B. Manufacturer's Qualifications: Obtain terrazzo epoxy and membrane materials from a single manufacturer with a minimum of 5 years verifiable experience providing materials of the type specified in this section.

C. Contractor's Qualifications:
   1. Installation must be performed by a manufacturer certified contractor with skilled mechanics having not less than 3 years satisfactory experience in the installation of the type of system as specified in this section, and must be certified in writing by the manufacturer of the 3/8 inch Epoxy Thin-set Terrazzo Flooring.
   2. The contractor shall furnish a list of projects (5 minimum) using either specified material or equivalent that they have installed during the last 3 years. Information shall include: project name, square footage, owner contact name with owner's address and phone number. Also, the contractor shall furnish resumes detailing the experience of key project personnel including supervisors and mechanics.

D. Manufacturer’s Instructions In addition to specified requirements, comply with Epoxy Thin-set Terrazzo Flooring manufacturer’s instructions and recommendations for substrate preparation, materials storage, mixing and application, finishing and curing.

1.5 DELIVERY, STORAGE AND HANDLING

A. Primary system materials shall be delivered in the manufacturer's undamaged, unopened containers. Each container shall be clearly marked with the following:
   1. Product name(s) and/or Number(s)
   2. Manufacturer's name
   3. Component designation (A, B, etc.)
   4. Product Mix Ratio
   5. Health and Safety Information
   6. CHEMTREC Emergency Response Information

B. Provide equipment and personnel to handle the materials by methods which prevent damage

C. The contractor shall promptly inspect direct jobsite material deliveries to assure that quantities are correct, comply with requirements and are not damaged

D. The contractor shall be responsible for materials furnished by him, and he shall replace, at his own expense, such materials that are found to be defective in manufacture or that have become damaged in transit, handling or storage

E. Store material(s) in accordance with manufacturer's instructions, with seals and labels intact and legible. Maintain temperatures within the required range. Do not use materials which exceed the manufacturer's maximum recommended shelf life.

1.6 PROJECT CONDITIONS

A. The contractor shall visit the jobsite prior to the installation of the terrazzo flooring to evaluate substrate condition, including substrate moisture content, quantity and severity of cracking, and the extent of repairs needed. Substrate imperfections should be repaired only after mechanical preparation of the substrate. Surface preparation reveals most imperfections

requiring repair. Concrete substrates shall be tested to verify that the moisture content of the substrate does not exceed the terrazzo flooring manufacturers' recommendations.

B. The contractor should exercise care during surface preparation and system installation to protect surrounding substrates and surfaces, as well as in-place equipment. The contractor shall prepare the substrate to remove laitance and open the surface. This shall be achieved by light brush grit blasting. Surface profile achieved shall be similar to medium grit sandpaper and free from bond-inhibiting contaminants. Costs incurred that are associated with damage from negligence or inadequate protection shall be the sole responsibility of the contractor.

C. Sub floor tolerances are specified in Section 03 30 00 (in accordance with ACI 302). Each drain in the installation area must be working and raised or lowered to the actual finished elevation of the terrazzo flooring.

D. The minimum slab temperature must be conditioned to 50 degrees F before commencing installation, during installation, and for at least 72 hours after installation is complete.

E. Maintain lighting at a minimum uniform level of 50 or more foot candles in areas where the terrazzo flooring is being installed. It is the recommendation of the manufacturer that the permanent lighting be in place and working during the installation.

F. Leaks from pipes and other sources must be corrected prior to the installation of the terrazzo flooring.

1.7 WARRANTY

A. The contractor and the manufacturer shall furnish a standard guarantee of the Epoxy Thin-set Terrazzo Flooring for a period of 2 years after installation. The labor and material guarantee shall include loss of bond and wear-through to the concrete substrate from normal use.

PART 2 - PRODUCTS

2.1 TERRAZZO MATERIALS

A. Epoxy Resin Primer, as recommended by Epoxy Resin supplier.

B. Epoxy Resin: Mixed according to manufacturer's recommendation and tested without aggregate added. All specimens cured for 7 days at 75 degrees plus or minus to degrees Fahrenheit and 50% plus or minus 2% R.H. The products shall meet the following requirements:

Property	Test Method	Requirement
Hardness	ASTM D-22 using Shore D Durometer	60-85
Tensile Strength	ASTM D-638 run at .2 min. Specimen made using "C" die Listed in ASTM D-412	3,000 PSI min.
Compressive	ASTM D-695, Specimen B Cylinder	10,000 PSI min.

Strength
Chemical Resistance ASTM D-1308

C. Epoxy Resin mixed according to manufacturer's recommendations and blended with marble chips, ground and grouted with epoxy resin according to 3.02 C-2-Finishing to a nominal 3/8" thickness. All specimens cured 7 days at 75 degrees plus or minus 2 degrees Fahrenheit and 50% plus or minus 2% R.H. The finished epoxy terrazzo shall meet the following requirements:
   1. Flammability: When tested in accordance with ASTM D-635, the Epoxy terrazzo shall comply with the following value: Self-extinguishing, extent of burning 0.25 inches maximum
   2. Thermal Coefficient of Linear Expansion: When tested in accordance with ASTM D-696, the Epoxy terrazzo will comply with the following value: 25 x 10 – 6 inches degrees Fahrenheit maximum. Temperature range – 12 degrees to 140 degrees Fahrenheit.
   3. Bond Strength: When tested in accordance with Field Test Method for surface soundness and adhesion as described in ACI Committee No. 403 Bulletin Title No. 59-43 (Pages 1139-1141) the Epoxy terrazzo shall comply with the following value: 100% concrete failure minimum, with 300 PSI minimum tensile strength.
   4. Color(s): Resin/aggregate color mix to be selected by Architect

D. Aggregate Chips: Size to confirm to NTMA graduation standards. The aggregate size shall be NTMA (#0, #1 and #2). Hardness according to ASTM C-241 Ha-10 minimum. Chips shall contain no deleterious or foreign matter. Dust content less than 1% by weight. Materials to be: (marble, recycled glass, or Mother of Pearl, etc.).

2.2 TERRAZZO ACCESSORIES

A. Divider Strips:
   1. Stop and divider "L" strips; white alloy of zinc material with a depth of 3/8 inch and a topping of width of 16 gauge or 1/8 inch.
   2. Control joints double "l" strips 16 gauge, white alloy of zinc material, 3/8 inch depth, laid back to back 1/4" apart with flexible sealant insert.

B. Transition Strips
   1. Schluter® Systems RENO-U at transition to ceramic tile.
   2. Schluter® Systems RENO-V at transitions to carpet.

C. Colorants: Alkali-resistant, color-stable pigments.

D. Terrazzo Cleaner:
   1. PH factor between 7 and 10.
   2. Biodegradable and phosphate free.
   3. Flash Point: ASTM D-56, 80 degrees Fahrenheit minimum.

E. Anti-Fracture Membrane: Elastomeric crack-bridging membrane, 12 inches wide, self-adhering. Flex Guard or approved equal.

F. Sealer:
   1. 2 Coats -Johnson Diversey - Plaza Plus Sealer/ Finish
   2. 2 Coats - Johnson Diversey – High Mileage Floor Finish

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine surfaces to receive Work and report in writing, with a copy to Architect, detrimental conditions. Failure to observe this injunction constitutes a waiver to subsequent claims to the contrary and holds Contractor responsible for corrections Architect may require. Commencement of Work will be construed as acceptance of subsurfaces.

B. Inspect the sub-floor to receive terrazzo flooring. Do not lay floor covering until sub-floors are in proper condition to receive same. Sub-floors shall be broom clean, free of foreign matter and thoroughly clean before installation.

3.2 PREPARATION

A. Examine concrete substrate to ensure that surface levelness tolerances are within tolerance ranges required by NTMA for type of terrazzo application specified.
   1. Concrete sub-floor shall be level (maximum variation not to exceed 1/4” on 10’-0”) and shall have a steel trowel finished surface. No curing agents or other additives, which could prevent bonding, should be used. Saw-cutting of control joints must be done between 12 and 24 hours after placement of structural concrete.
   2. Notify Contractor of unsatisfactory levelness tolerances. Do not begin installation until unsatisfactory tolerances have been corrected and are ready to receive terrazzo.
   3. General Contractor will modify or replace concrete not properly placed, resulting in excessive honeycombing, cracking, or other defects.

B. Clean and prepare substrate to comply with NTMA specifications for type of terrazzo application indicated. Clean substrate to loose chips and foreign matter.
   1. Clean and prepare concrete substrate using a blastrac machine.
   2. After cleaning, rout cracks of 1/16” width or greater to create a “v” shape opening. Insert concrete pins to hold the cracks open. Pour self-leveling 100% solids epoxy into the cracks.
   3. After epoxy has cured, apply anti-fracture membrane as required.
   4. Fill holes in the floor with filler as needed
   5. All new concrete pours shall have a 3/8” by 16 gauge zinc strip applied to the pour line in order to eliminate cracking through the terrazzo.
   6. Terrazzo that terminates at vinyl tile/carpet shall taper to a 1/4” zinc strip.

3.3 INSTALLATION, GENERAL

A. Terrazzo Selection: Matrix color and aggregate (sprinkle) blend to be selected by Architect.

B. Clean and prepare concrete subfloor by the use of a blastrac cleaning machine.

C. Install divider strips with construction adhesive as shown on drawings or wherenecessary to prevent irregular cracking.

D. Provide control joints where indicated by installing angle-type divider strips back-to-back with neoprene rubber filler cemented between strips, flush with finish floor.

E. Provide for expansion joints where indicated by installing angle-type divider strips back- to-back with removable backer rod filler of the width indicated (but not less than 1/4 inch wide) between strips. Expansion void is to be filled with self-leveling traffic grade elastomeric joint sealant.

F. Provide terrazzo bases and thresholds without interruptions of seams, except where divider strips, control joints, and expansion joints are indicated. Place and finish terrazzo around obstructions to achieve continuous color, pattern, and finish.

G. Mixing, Terrazzo Topping: Charge and mix marble chips, filler and epoxy resin in accordance with terrazzo manufacturer's recommendation.

H. Placing Terrazzo:
   1. Prime subfloor with bonding primer
   2. Place terrazzo mixture in panels formed by divider strips. Trowel mixture to top of strips.

I. Curing: Allow 24 hours before grinding terrazzo.

J. Finishing:
   1. Rough Grinding:
      a. Grind with 24-grit or finer stones or with comparable diamond plugs.
      b. Follow initial grind with 80-grit or finer stones.
   2. Grouting:
      a. Rinse floor with clean water.
      b. Remove excess rinse water, dry and apply grout to fill voids.
      c. Cure grout.
   3. Fine Grinding:
      a. Grind with 80-grit or finer stones until all grout is removed from surface.
      b. Polish floor to 400 grit.
      c. Upon completion, terrazzo shall show a minimum of 70% marble chips.

K. Cleaning and Sealing
   1. Wash all surfaces with a neutral cleaner.
   2. Rinse with clean water and allow surface to dry.
   3. Apply two coats of Plaza Plus to comply with the manufacturer's instructions
   4. Apply two (2) coats High Mileage to comply with manufacturers recommendations.

L. Protection:
   1. Upon completion, the work shall be ready for final inspection and acceptance by the Owner.
   2. The General Contractor shall protect the finished floor from the time that the terrazzo installer completes the work.

3.4 CLEANING, SEALING, AND PROTECTING

A. Clean terrazzo after installing and finishing operations are completed, complying with sealer manufacturer's instructions.

B. Apply sealer to cleansed terrazzo surfaces to comply with sealer manufacturer's instructions.

C. Protect terrazzo from damage and wear during construction operation

D. Entire installation shall be left clean and in a condition acceptable to the Architect.

E. During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of, away from premises. Leave Work in clean condition in accordance with Section 01500, Construction Facilities and Temporary Controls.

3.5 FINAL CLEANING

A. Clean terrazzo as recommended by manufacturer of sealer and machine buff terrazzo floor as required when building is ready for occupancy.

END OF SECTION

SECTION 09 68 16

CARPET TILE

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and recommended procedures for installing carpet tile, adhesive and accessories. Submit manufacturer's printed data on physical characteristics and properties

B. Shop Drawings: Submit Drawings indicating pattern type and direction, pile direction, cutouts, type and location of edge strips, transition details, type of sub-floor and installation, etc. in accordance with manufacturer's recommendations.

C. Samples: Full size sample of each type of carpet tile required and 6-inch (150mm) sample of edge strip in manufacturer's selected colors.

D. Certification:
   1. At least 30 days prior to scheduled installation, submit manufacturer's anticipated shipping date, including certification that carpet tile will conform to Specifications and approved samples.
   2. Provide certification from manufacturer that carpet tile will not display or evidence a significant change in color due to exposure to atmospheric contaminants (Ozone or Oxides of Nitrogen) for 5 years.

E. Test Reports: Submit reports for flammability, smoke density and static propensity from independent laboratory no more than 2 years old.

F. Quality Control Submittals:
   1. Manufacturer shall furnish dye lot numbers and other information, which will enable identification of certified carpet tile. Inspect carpet tile after manufacture for manufacturing defects.
   2. Certificates: Certification that submitted samples conform with Specification requirements.
   3. Installer to meet Class 1 flooring installation requirement per NFPA 101

G. Contract Closeout Submittals:
   1. Minimum of 5 years commercial installation experience.
   2. Review manufacturer's recommendations and recommend in writing to Architect variations required to assure installation guarantee.

1.2 QUALITY ASSURANCE

A. Carpet Installer Qualifications:
   1. Minimum of 5 years commercial installation experience.
   2. Review manufacturer's recommendations and recommend in writing to Architect variations required to assure installation guarantee.

B. Standards: Comply with the following:

1. Flammability: Passes (CPSC 16 CFR, Part 1630).
2. Flame Spread: Critical Radiant Flux Class I, not less than 0.45 Watts per cm2 (NFPA 253 or ASTM E-648, in direct glue-down application).
3. Optical Smoke Density Requirements (ASTM 662-79): Less than 450 (NBS Smoke Density Chamber – NFPA – 258).
4. Static Propensity: Under 3.0 KV (AATCC-134).
5. Colorfastness: Carpet tile shall not display or evidence a significant change in color due to exposure to atmospheric contaminants (Ozone or Oxides of Nitrogen) for 5 years.

1.3 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in manufacturer's original un-opened packaging with each roll having register number tags attached or register identification stenciled on mill wrappings and intact.

B. Storage and Protection: Store in well ventilated spaces protected from damage, dirt, stains, moisture, and other adverse conditionings.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify installation dimensions by making field measurements

1.5 WARRANTY

A. A. General: Special Project Warranty and Manufacturer's Warranty specified in this Article shall no deprive the Owner of other rights Owner may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with other warranties made by Contractor under requirements of Contract Documents.

B. Special Project Warranty: Provide special project warranty, signed by Contractor, Installer and Manufacturer (Carpet Mill) agreeing to repair or replace defective materials and workmanship, during 10-year warranty period following Substantial Completion. Special project warranty includes, but is not limited to the following:
1. Delamination of adhered carpet tile from substrate.
2. More than 10% loss of face fiber.
3. Tile curling.
4. Edge raveling, snags or runs.

C. Manufacturer's Warranty: In addition to Special Project Warranty, provide Manufacturer's Limited 10-Year Wear Warranty on form furnished following this section or on manufacturer's standard form of similar content subject to Architect's approval. Manufacturer's warranty shall include dimensional stability, wear and static resistance.

1.6 MAINTENANCE

A. Extra Materials: Furnish quantity of full-size units equal to 5% of amount installed. Neatly package in small quantities and identify with labels clearly describing contents. Deliver to Owner at Project Closeout.

PART 2 - PRODUCTS

2.1 PRODUCT/MANUFACTURER

A. Furnish products of one of the following manufacturers, except as otherwise approved by the Architect, subject to compliance with specification requirements:
   1. Shaw
   2. Julie Industries “Static Smart”
   3. Shaw Contract Group
   4. Interface
   5. Tandus

2.2 CARPET TILE

A. Carpet Tile: Static dissipative and other as selected by Architect from manufacturer’s full range of styles & colors.

B. Electrical Resistance
   1. ESD S7.1/NFPA 99 Resistive/resistance characterization of materials: Rtt six or more readings between points placed 3 feet apart. Tested with an applied votage of 100V. Measured in Ohms, 2.5 x 104 minimum, 1.0 x 108 maximum. Rtg six or more readings from surface to groundable point. Tested with an applied voltage of 100V. Measured in Ohms, 2.5 x 104 minimum, 1.0 x0108 maximum.
   2. Electrical Resistance/Voltage Test ANSI/ESD S-20.20, compliant when using approved conductive footwear system. Results within recommended range <35 x 106 Ign ir < 100 volts
   3. D.O.D. HDBK263A, Section 40.1.2: Meets recommended guidelines for sensitive ESD devices, Class 1.
   4. Exceeds FAA=STD-019e and Motorola R56 standards and guidelines for static control flooring.
   5. Roller Coaster Electrical Test (CET) Assessment. After 100,000 chair caster cycles there was no depreciable change in conductivity or electrical performance. Lab data available on request.

C. Groundable Path: ground strip or Rtg Connector Kit

D. Grounding Frequency: 1 per 1,000 sq. ft

E. Backing System: conductive Ecoworx® backing – 100% PVC-free recyclable, made from recycled material

F. Adhesives: Conductive releaseable adhesive for carpet tile 1.0 x 10^3 Ohms RTT.

G. Flammability:
   1. ASTM E-648 flooring radiant panel – Class 1 (≥ .45 W/cm2)
   2. ASTM E-662 NBS smoke density – less than 450

2.3 ACCESSORIES

A. Underlayment: Portland cement-latex concrete floor filler for leveling concrete floor as recommended by Carpet Manufacturer.

B. Floor Primer: Manufacturer’s approved floor primer applied to all areas that are to receive glue-down carpet tile.

C. Adhesive Tabs: Shaw Contract Group. Lokdots (low voc, pressure sensitive adhesive system)

D. Edge Strip: Vinyl reducer strip for areas, doorways and other areas where edge of carpet is exposed.

E. Rubber Base: Base shall be installed after carpet

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine sub-surfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of sub-surfaces.
   1. Test concrete for excessive moisture content or hydro-static moisture content. Excessive moisture is defined as no more than 2.5 lbs. per 1000 square feet in 24 hours.
   2. Test concrete for acidity/alkalinity, which shall test in the 6.0 to 8.0 range.
   3. Frequency of tests shall comply with manufacturer's guidelines.

B. Coordination: Coordinate with other Work that affects, connects with or will be concealed by this Work.

3.2 PREPARATION

A. Surface Preparation:
   1. Inspect surfaces to receive carpet tile, make tests recommended by Carpet Manufacturer, take necessary corrective action.
   2. Sand or grind ridges, bumps or protrusions level and smooth.
   3. Fill cracks, construction joints and other surface imperfections and level sub-floor with latex underlayment compound troweled level with adjacent surfaces to within 1/4-inch in 10-feet, non-cumulative, in all directions.
   4. Telegraphing of irregularities in sub-floor shall be sufficient cause for rejection.
   5. Remove foreign and incompatible materials and vacuum clean surfaces immediately prior to installation.
   6. Contractor shall provide written moisture and alkali test results pertaining to the concrete slab prior to installation.

B. Existing Surface Preparation: At existing floors, remove existing floors in areas indicated to receive carpet tile, to provide an acceptable surface for application of carpet tile as follows:
   1. Provide clean floor surfaces.
   2. Floods apply full strength floor stripping solution. Allow to stand for several minutes and prior to drying scrub with disc scrubber with screen mesh or stiff bristle brush.
   3. Flood rinse with hot water and completely remove rinse water with squeegee and/or wet-vac.
   4. Repeat any or all of above steps as required to insure complete removal of wax and stripper.
   5. Allow floor to dry completely.
   6. Repair floor as required by Carpet Manufacturer prior to installing carpet.

3.3 INSTALLATION

A. Install carpeting material and adhesive in strict accordance with manufacturer's recommendations and CRI 104, Section 13: "Carpet Modules", as published by the Carpet and Rug Institute.

B. B. Lay carpet tile pattern parallel to walls and partitions to comply with approved Shop Drawings for pattern and pile direction.

C. Lay carpet tile tight and free of irregularities. Cut and fit carpeting accurately and smoothly on wall and floor surfaces, permanent fixtures and furniture including cabinets, around projections and into trim strips or binding bars. Make installation continuous under removable portable and/or accordion partitions.

D. Extend carpet tile into alcoves, closets and other similar concealed openings.

E. Edge Strips:
   1. Install where carpet tile terminates and it abuts a dissimilar floor material.
   2. Securely fasten edge strips with concealed fasteners. Center under doors at doorways.

F. Provide grounding for static dissipative carpet in accordance with manufacturer's printed instructions.

3.4 CLEANING

A. Remove and replace individual carpet tile units with spots, smears, stains and similar defects that cannot be cleaned to an acceptable condition. Thoroughly vacuum and clean carpet tile after other Trades have been completed. Installed carpet tile shall be left free from adhesives, scraps, carpet ripples, scallop and puckers.

B. Carpet spots shall be cleaned with spot remover approved by Carpet Manufacturer and loose threads removed with sharp scissors. Installed carpet tile shall be free from defects at time of final acceptance by Owner.

C. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

3.5 PROTECTION

A. Protect installed carpet tile against soiling abuse or damage by other Trades, and cover completed Work as necessary to ensure protection.

B. Repair or replace damaged Work.

END OF SECTION

SECTION 09 69 00

ACCESS FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Work of this section includes, but is not limited to access floor panels, floor coverings, understructure and various electrical, data and communication accessories, including sealing of gaps at access floor perimeters, columns, wall and slab openings, around conduits, pipes and other obstructions to create an underfloor cavity for air distribution and to minimize unintentional air leakage.

B. The access floor contractor is aware that the space beneath the access floor will be used as an air delivery plenum and as such will take the necessary precautions when installing their work so as not to impact the integrity of the plenum space specific to air leakage and cleanliness. Any penetrations or holes in the underfloor plenum created for or resulting from the work performed by the Division 9 access flooring contractor are required to be properly sealed to prevent air leakage.

1.2 REFERENCES

A. CISCA (Ceilings & Interior Systems Construction Association) - “Recommended Test Procedures for Access Floors” shall only be used as a guideline when presenting load performance product information.

B. Access flooring shall comply with NFPA 75 requirements for access flooring.

1.3 RELATED SPECIFICATION SECTIONS

A. Concrete sealer shall be compatible with pedestal adhesive, see Division 3.

B. Electrical contractor shall provide necessary material and labor to electrically connect the access floor to the building, see Division 26.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide access flooring system capable of supporting the following loads and stresses within limits and under conditions indicated, as demonstrated by testing manufacturer’s current standard products according to referenced procedures in latest revised edition of Ceilings and Interior Systems Construction Associates (CISCA) “Recommended Test Procedures for Access Floors” referenced elsewhere in this section as CISCA/AF or, if not specified, manufacturers standard method.
   1. Design Load: Panel supported on actual understructure (the system) shall be capable of supporting a safe working load or design load of 1250 lbs. This rating signifies that the system will withstand not only a concentrated load placed on a one square inch area at any location on the panel without yielding but also demonstrate the ability to withstand an overload capacity of two times its rating (i.e. a safety factor of 2).

2. Safety Factor: Panel supported on actual understructure (the system) shall be capable of withstanding a minimum of (2) two times the design load anywhere on the panel without failure. Failure is defined as the point at which the system will no longer accept the load.
3. Uniform Load: Panel supported on actual understructure (the system) shall be capable of supporting a uniform load of 400 lbs./ft2 placed on the entire area of the panel without yielding and generating a permanent set of no more than 0.100" once the load is removed. Note: The uniform load rating of an access floor panel as specified herein should not be confused with the "uniform live load" as specified in seismic zone applications.
4. Rolling Load: Panel supported on actual understructure (the systemshall be able to withstand the following rolling loads at any location on the panel without developing a local and overall surface deformation greater than 0.040 inches. Note: wheel 1 and wheel 2 tests shall be performed on two separate panels. Wheel 1: Size: 3" dia x 1 13/16" wide Load: 1000 lbs. Passes: 10 Wheel 2: Size: 6" dia x 2" wide. Load: 800 lbs. Passes: 10,000
5. Impact Load: Panel supported on actual understructure (the system) shall be capable of supporting an impact load of 150 lbs. dropped from a height of 36 inches onto a one square inch area (using a round or square indentor) at any location on the panel.
6. Panel Drop Test: Panel shall be capable of being dropped face up onto to a concrete slab from a height of 36", after which it shall continue to meet all load performance requirements as previously defined.
7. Panel Cutout: Panel with an 8" diameter interior cutout supported on actualunderstructure shall be capable of maintaining its design load strength anywhere on the panel without the use of additional supports.
8. Axial Load: Pedestal support assembly shall provide a minimum 5000 lb. axial load without permanent deformation.
9. Overturning Moment: Pedestal support assembly shall provide an average overturning moment of 1000 in-lbs. when glued to a clean, sound, uncoated concrete surface. ICBO number for the specific system or structural calculations shall be required attesting to the lateral stability of the system under seismic conditions.

B. OTHER PERFORMANCE CRITERIA:
1. Flammability: System shall meet Class A Flame spread requirements for flame spread and smoke development. Tests shall be performed in accordance with ASTM-E84-1998, Standard Test Method for Surface Burning Characteristics for Building Materials.
2. Combustibility: All components of the access floor system shall qualify as noncombustible by demonstrating compliance with requirements of ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 deg C.
3. Recycled Content: Panel and understructure system shall be required to have aminimum recycled content of 25%.

C. Air Tightness: Access panels shall meet the following requirements for air tightness:
1. Floor Panel with bare surface - 0.05 inch: No greater than 0.50 CFM/sq.ft. and 0.10 inch: no greater than 0.60 CFM/sq.ft.
2. Floor Panel with carpeted surface – 0.05 inch: No greater than 01. CFM/sq.ft. and 0.10 inch: No greater than 0.10 CFM/sq.ft.
3. Floor Panel with Stringer and gasket, no carpet - 0.05 inch: No greater than 0.01 CFM/sq. and 0.10 inch: No greater than 0.02 CFM/sq.ft.

1.5 DESIGN REQUIREMENTS

A. Access floor system, where indicated on the design documents, shall consist of modular an removable cementitious filled welded steel panels fastened onto, and supported by adjustable height pedestal assemblies. Pedestal head and panel corner design must provide

a positive location and lateral engagement of the panel to the understructure support system without the use of fasteners. Panel construction shall be die-cut welded steel type which creates a consistent panel-to-panel seam width along the entire edge of the panel when installed in accordance with normal installation procedures.

B. Panel shall be easily removed by one person with a lifting device and shall be interchangeable except where cut for special conditions.

C. Quantities, finished floor heights (FFH) and location of accessories shall be as indicated on the contract drawings.

1.6 SUBMITTALS FOR REVIEW

A. Detail sheets, for each proposed product type, which provide the necessary information to describe the product and its performance.

B. Product Data and samples of each finish to be applied to the raised floor panel.

C. Test reports, by an independent testing laboratory, certifying that component parts perform as specified.

1.7 SUBMITTALS FOR INFORMATION

A. Manufacturer’s installation instructions and guidelines.

B. Manufacturer’s Owner Manual outlining recommended care and maintenance procedures.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who is approved by the access flooring manufacturer for installations of the type of access flooring indicated for this project with not less than 5 years of experience installing similar products.

B. Source Limitations: Obtain access flooring system through one source from a single manufacturer.

C. Regulatory Requirements: Fabricate and install access flooring system to comply withNFPA 75 requirements for raised flooring.

D. Provide floor panels that are clearly permanently marked with manufacturer’s name andpanel type.

E. Pre-installation Conference: Conduct conference at Project site.
   1. Review coordination with mechanical and electrical systems.
   2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   3. Review pedestal layout.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver access flooring components in original, unopened packages, clearly labeled with manufacturer's name and item description.

B. Handle and store packages containing access flooring in a manner which avoids overloading building structure.

C. Area to receive and store access floor materials shall be enclosed and maintained at ambient temperatures between 35 to 95 F and relative humidity levels between 20 to 80%. All floor panels shall be stored at ambient temperatures between 50 to 90 F for at least 24 hours before installation begins.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not install access flooring until installation area is enclosed and has an ambient temperature of between 50 degrees Fahrenheit and 85 degrees Fahrenheit (100 C to 290 C) and a relative humidity of not less than 20 percent and not more than 80 percent.

1.11 COORDINATION

A. Coordinate locations of mechanical and electrical work in under-floor cavity to prevent interferences with access flooring pedestals.

B. Pre-mark pedestal locations on a grid of 10' x 10' on sub-floor so that mechanical and electrical work can take place without interfering with pedestals.

C. Do not proceed with installation of access flooring until after substantial completion of other performable construction within affected spaces.

1.12 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage and identified with labels clearly describing contents.
   1. Standard field panels – 2% of each type and finish
   2. Pedestals – 2%

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Specifications and drawings are based upon access floor system as manufactured by Tate Access Floors, Inc. and shall consist of the ConCore 1250 access floor panel supported by PosiLock understructure system.

2.2 FLOOR PANELS AND UNDERSTRUCTURE

A. Floor Panels General: Provide modular panels complying with the following requirements, that are interchangeable with other standard field panels, and can be easily relocated by one

person, using a lifting device, without disturbing adjacent panels or understructure. Installed panels with floor covering in place are to be free of exposed metal edges.

1. Nominal Panel Size: 24” x 24”
2. Fabrication Tolerances: Fabricate panels to the following tolerances with squareness tolerances expressed as the difference between diagonal measurements from corner to corner.
    a. Size and Squareness: Plus or minus 0.010” (0.12 mm) of required size, with squareness tolerance of plus or minus 0.015” (0.38 mm).
    b. Flatness: Plus or minus 0.020” (0.50 mm), measured on a diagonal on top of the panel.
3. Panel Attachment to Understructure: By Bolting to pedestal head. Provide panels with holes in corners to align precisely with threaded holes in pedestal heads and to accep countersunk screws with heads flush with top of panel.
4. Panels to be rubber embedded with seamless square butt edge detail.

B. Cementitious–Filled, Formed-Steel Panels: Fabricate panels with a die formed all-steel bottom pan, fully welded to a die-cut full-hard steel top sheet to form a structural unitized construction. Completed panels to be filled with cementitious fill. Panels to be cleaned with 3-part wash and rinse system, prior to applying a protective powder-coat epoxy finish on the metal surfaces.
    1. Solid Panels: Flat, solid top surface
    2. Panels shall consist of a top steel sheet welded to a formed steel bottom pan filled internally with a lightweight cementitious material. Mechanical or adhesive methods for attachment of the steel top and bottom sheets are unacceptable.
    3. Cementitious fill material shall be totally encased within the steel welded shell except where cut for special conditions.
    4. Panel shall have an electrically conductive epoxy paint finish.
    5. Corner of panel shall have a locating tab and integral shape design to interface with the pedestal head for positive lateral retention and positioning with or without fasteners.
    6. Fastening of panels to pedestal heads shall be accomplished by the use of a machine screw which is specially designed to be self-capturing within the body of the panel. Note: This prevents the inadvertent loss of panel fastening screws when accessing the underfloor space and potential damage to objects by screws which extend beyond the depth of the panel.
    7. Top surface of the panel shall have an option for four positioning location holes to engage positioning buttons on the PosiTile® carpet tile for precise matching of the carpet tile to the panel.
    8. Fit between the pedestal head, panel, and screw shall enable an installation with an average panel to panel gap of 0.015”.9Fabrication Tollerances:
        a. Floor panel flatness measured on a diagonal: +/- 0.035”
        b. Floor panel flatness measured along edges: +/- 0.025”
        c. Floor panel width or length of required size: +/- 0.010”
        d. Floor panel squareness tolerance: +/- 0.015”
    9. Finishes
        a. Where carpet is not used finish the surface of floor panels with floor covering material as indicated on the contract drawings. Where floor coverings are by the access floor manufacturer, the type, color and pattern shall be as indicated on the contract documents. All locations scheduled as having Seamless Rubber, Tile and Terrazzo Tile shall have the product factory applied to the floor panel.
        b. Carpet tile: Access floor system shall be designed to accommodate a modular carpet tile. Tile shall be installed such that minimal seams align with joints between raised floor panels.
        c. Wet Area: Vinyl sheet or tile finish with ase as specified in Section 09 65 19.

C. Pedestals: Provide manufactures standard pedestal assembly including base, column with provisions for height adjustments, and head (Cap), made of steel.
   1. Pedestal assemblies shall be corrosive resistant, all steel welded construction, and shall provide an adjustment range of +/- 1" for finished floor heights 6" or greater.
   2. Pedestal assemblies shall provide a means of leveling and locking the assembly at a selected height, which requires deliberate action to change height setting and prevents vibration displacement.
   3. Pedestal head shall be designed with locating tabs and integral shape to interface with the panel for positive lateral retention and positioning without fasteners. Note: This allows the floor to be installed during the construction process without screws so that access by other related trades can be accomplished quickly and easily. It also enables the user to have a mixed installation of fastened and unfastened panels within the same installation.
   4. Hot dip galvanized steel pedestal head shall be welded to a threaded rod which includes a specially designed adjusting nut. The nut shall provide location lugs to engage the pedestal base assembly, such that deliberate action is required to change the height setting.
   5. Threaded rod shall provide a specially designed anti-rotation device, such that when the head assembly is engaged in the base assembly, the head cannot freely rotate (for FFH of 6" or greater). Note: This prevents the assembly from inadvertently losing its leveling adjustment when panels are removed from the installation during use.
   6. Hot dip galvanized pedestal base assembly shall consist of a formed steel plate with no less than 16 inches of bearing area, welded to a 7/8" square steel tube and shall be designed to engage the head assembly.

2.3 SPECIAL REQUIREMENTS AND ACCESSORIES

A. Service Cutouts: Coordinate and provide cutouts in floor panels for installation of devices by other trades. Comply with requirements indicated for size, shape, number, and location. Provide reinforcement or additional support, if needed, to make panels with cutouts comply with standard performance requirements.

B. Vertical Closures (Fascia): Where under floor cavity is not enclosed by abutting walls or other construction, provide manufacturer's standard metal closure plates with manufacturer's standard finish.

C. Plenum Dividers / Barriers: Install Plenum Barriers in locations as indicated on the Mechanical Drawings. Plenum Barrier shall be made of not less than 20 ga. Galvanized sheet metal formed to provide closure against concrete floor below and underside of raised floor panel above. Plenum Barriers around the perimeter of Secure Space 1, 2 and 3 shall be installed in such a manner that they cannot be removed from the exterior of these rooms.

D. Bridging Beams: Provide Bridging Beams above floor trench. Beams shall span between pedestals at 4' spacing and shall be sized to support load of pedestal at its midspan.

E. Stringers with gaskets shall be installed under floor panel joints at all locations where Carpet Tile will not be used in order to provide proper seal against air leakage.

F. Ramps: Manufacturer's standard ramp construction of width and slope indicated, of same materials, performance, and construction requirements as the access flooring. Base of ramp shall have aluminum extrusion fabricated in a wedge shape to transition from sloping raised floor panel and level concrete floor.

G. Steps: Provide steps of size and arrangement indicated with floor covering to match access flooring. Apply non-slip aluminum nosing to treads, unless otherwise indicated.

H. Panel Lifting Device:
   1. Manufacturer's standard portable suction cup lifting device as required for lifting panels.
   2. Provide a total of 6 lifters for tenant when installation is complete.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine structural subfloor for unevenness, irregularities and dampness that would affect the quality and execution of the work. Do not proceed with installation until structural floor surfaces are level, clean, and dry as completed by others.

B. Concrete sealer as specified under Section 03 30 00 shall be provided at concrete floor to receive access floor and shall be identified and proven to be compatible with pedestal adhesive. If other than manufacturer’s recommended adhesives or sealers are used, verify that adhesive achieves bond to slab before commencing work.

C. Verify dimensions on contract drawings, including level of interfaces including abutting floor, ledges and doorsills.

D. Pre-installation Inspection:
   1. Architect, Contractor and appropriate subcontractors shall jointly inspect the wall and slab prior to installation of access flooring to verify that openings into the space beneath the access floor has been sealed to control unintentional air leakage.
   2. Contractor shall make necessary corrections to mitigate any potential unintentional air leakage at construction adjacent to access flooring.
      a. Slab to ceiling wall shall fit tightly and shall be correctly sealed at the slab line. Irregular wall surfaces may require gaskets, caulking or tape to properly seal access floor to wall connections.
      b. Seal cavity seams where walls rest on subfloors, and where access flooring connects with slab-to ceiling walls, columns and other obstructions.
      c. Utility Access points, such as openings for air ducts, conduits, cables, and pipes, shall be carefully sealed. Openings in building elements for plumbing, electricity and voice/data cabling must be sealed by trades that make the initial installations. Additional openings cut for utilities after the access floor is installed shall be inspected for seal quality.

3.2 INSTALLATION

A. Pedestal locations shall be established from approved shop drawings so that mechanical and electrical work can be installed without interfering with pedestal installation.

B. Installation of access floor shall be coordinated with other trades to maintain the integrity of the installed system. Traffic shall not be permitted on any floor area for 24 hours to allow the pedestal adhesive to set.

C. Floor system and accessories shall be installed under the supervision of the manufacturer’s authorized representative and according to manufacturer’s recommendations.

D. No dust or debris producing operations by other trades shall be allowed in areas where access floor is being installed to ensure proper bonding of pedestals to subfloor.

E. Access floor installer shall keep the subfloor broom clean as installation progresses.

F. Partially complete floors shall be braced against shifting to maintain the integrity of the installed system where required.

G. Additional pedestals as needed shall support panels where floor is disrupted by columns, walls, and cutouts.

H. Understructure shall be aligned such that all uncut panels are interchangeable and fit snugly but do not bind when placed in alternate positions.

I. Finished floor shall be level, not varying more than 0.062” in 10 feet or 0.125” overall.

J. Installed panels shall be spaced so that the distance from one end to the other of any line of 12 panels is not less than 24 feet and does not exceed 24’ 1/8”.

K. Controlling Air Leakage: Access flooring and adjacent construction shall minimize unintentional air leakage.
   1. Irregular wall surfaces will require gaskets, caulking or tape to properly seal access floor to wall connections and shall be provided under the work of this section.
   2. Seals at flat perimeter walls and surfaces:
      a. Walls passing through the access floor shall extend completely to the slab and be sealed at the slab line.
      b. Floor panels shall fit to within 1⁄16" of perimeter walls, columns, and other vertical surfaces.
      c. Where carpet tiles are used, they shall be cut to fit tightly against perimeter walls and surfaces as an additional layer of airseal protection.
      d. Wall bases shall be installed tightly against carpet and access floor to cover joints.

   3. Seals at non-flat perimeter walls or other surfaces:
      a. Floor panels shall fit to within 1⁄16" of perimeter walls.
      b. If the wall does not have a completely flat surface because it is shaped, textured, or slightly irregular, foam strips or rubber tape shall be mounted flush with the floor surface to fill in gaps.
      c. The use of caulk or sealant to fill joints between floor panels and vertical surfaces is an option, if acceptable to Architect.
      d. Where carpet tiles are used, they shall be cut to fit tightly against perimeter walls and surfaces as an additional layer of airseal protection.
      e. Wall bases shall be installed tightly against carpet and access floor to cover joints.

   4. Seals at fascia or exposed edges:
      a. Fascia plates shall be cut to align with the tops of floor panels.
      b. If there are any gaps between floor panel top edges and fascia, duct tape, or metal tape shall be used to cover the joints before carpet installation.
      c. Where carpet tiles are used, they shall be cut to fit all the way over fascia. Fascia and carpet tiles shall be covered by angle trim pieces for air seal protection.

   5. Seals at curb interfaces:
      a. When access floor coverings extend all the way to the curb, cut the floor panels to within 1⁄16" of perimeter.
      b. Attach sealing foam or rubber tape to the curb if a gap exceeds 1⁄16” before floor panels are installed.
      c. Install carpet tiles by overlapping from access floor to curb.
      d. When access floor coverings do not extend all the way to the curb, cut the floor panels to within 1⁄16" of perimeter.

e. Attach sealing foam or rubber tape to the curb if a gap exceeds 1⁄16" before floor panels are installed.
f. Install carpet tiles by overlapping from access floor to curb.
g. Seal the joint with a transition strip or threshold at top.

6. Seals at utility access points: In accordance with air sealed installation requirements of utility access box manufacturer.

7. Seals at cable cutouts:
   a. Cut foam to fit snugly into openings and support ledges.
   b. Install manufacturer's trim for cable cutouts.

8. Seals at plenum dividers:
   a. Cut openings into the plenum divider that are sized for the dimensions ofthe ducts, pipes, conduit, and cable bundles that need to pass through.
   b. If there are any gaps, duct tape, or metal tape shall be used to fill them before access floor installation.
   c. All gaps in building architecture shall be sealed and inspected before the access floor is installed.

9. Seals at pipe openings through access flooring:
   a. Cut openings into the access floor sized specifically for the diameters of the pipes that need to pass through.
   b. Provide seals at subfloor pipe openings.
   c. Seal gaps around pipes with caulk or sealant materials before installing the access floor.

10. Testing: Contractor shall perform smoke test upon completion of flooring and installation of seals to verify that seals are performing as required under Base Bid. If smoke testing shows failure of the seals, repair as required and provide additional testing to confirm compliance at no additional cost to Owner

L. Acceptance: General contractor shall accept floor in whole or in part prior to allowing use by other trades.

3.3 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 09 77 23

FABRIC WRAPPED PANELS

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of wall panel required.

B. Samples: Minimum 6 inch x 6 inch samples of specified wall panel; minimum 4 inch long samples of attachment method including trim and decorative accents.

C. Shop Drawings: Submit shop drawings showing how panels are to be laid out on the walls, details of trim members and width of panels. Width of panels and location of vertical seams are critical.

1.2 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide wall panel units and installation components by single manufacturer.

B. Coordination of Work: Coordinate wall panel work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver wall panels to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing wall panels, permit them to reach room temperature and a stabilize moisture content.

C. Handle wall panels carefully to avoid chipping edges or damaged units in any way.

1.4 MAINTENANCE

A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
   1. Wall Panels: Furnish quantity of full-size units equal to 5.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 WALL PANELS

A. Fabric Wrapped Panels:
   1. Armstrong Sound Soak 60 Acoustical Panels
   2. PNC Acoustic Tackable Panels
   3. Other as approved by Architect.

B. Panel Construction
   1. 6 to 7 pcf medium density core with fabric finish.
   2. Thickness ¾ inch.
   3. Noise reduction coefficient (NRC): 0.70

C. Fabric covering: Guilford of Maine, color to be selected by Architect.

D. Fasteners – Screws:
   1. General: 20 gauge or heavier, self-tapping drywall steel screw.
   2. Wood Framing: Course thread drywall wood screw, length as required to penetrate framing ¾ inch (19mm) minimum.
   3. Metal Framing: 22-25 gauge, drywall type steel screw.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.2 PREPARATION

A. Measure each wall area and establish layout of wall panel units to balance border widths at opposite edges of each wall. Coordinate panel layout with mechanical and electrical fixtures and with pattern as indicated on Drawings.

3.3 INSTALLATION

A. Install wall panels by attaching the panels to an existing wall per the manufacturer's instructions, as detailed on Drawings, and in accordance with the authorities having jurisdiction.

B. Space panel joints 1/8 inch (3 mm) apart; 1/4 inch (6 mm) space at floors, ceilings, and window and door frames.

3.4 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

END OF SECTION

SECTION 09 81 00

ACOUSTICAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Acoustical insulation within partitions as shown on Drawings and as specified.

1.2 SUBMITTALS

A. Product data: Submit Manufacturer’s data, installation instructions, limitations and recommendations. Include certification and test data substantiating combustibility of each type of insulation.

1.3 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact. Protect finished surfaces with removable wrapping or coating which will not bond when exposed to sunlight

B. Storage: Adequately protect against damage while stored at the site.

C. Handling: Comply with Manufacturer's instructions

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the specified Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements.
   1. Manville Building Products Group
   2. Owens Corning Fiberglas
   3. U.S. Gypsum Company

2.2 MATERIALS

A. Sound Attenuation Blankets:
   1. ASTM C665, Type 1 (unfaced), glass or mineral fiber batts, with a Fire Hazard Classification of less than 50 when tested in accordance with ASTM E-84.
   2. Thickness: As indicated on Drawings
   3. Provide black colored batts where exposed to view in final work.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install acoustical insulation batts in sound-rated stud partition walls where indicated on Drawings. Size batts for a friction fit and install in accordance with Manufacturer's recommendations.

B. Butt ends of batts closely together and fill all voids.

3.2 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 09 90 00

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Painting as specified and as noted on Drawings. Surfaces requiring finishing and left un-finished by the requirements of other Sections shall be painted or finished as part of the Work of this Section.

1.2 DEFINITIONS

A. Touch-Up: Painting of items missed by painter at no additional cost to Owner.

B. Re-Paint: Repairs to paint work for damages caused by other Trades

C. Block Resistance (Non-Blocking): the capability of a coating to resist sticking to itself when used on 2 surfaces that comes in contact with each other (e.g. door and jamb, window sash and sill).

1.3 SUBMITTALS

A. Product Data: Submit schedule of manufacturers of products required for the Work, together with specifications recommended by each manufacturer. Provide manufacturer's technical information, including paint label analysis and VOC content.

B. Samples: Submit samples of each type of finished specified.
   1. Architect will furnish Contractor a color schedule of colors selected either from manufacturer's stock colors or specially requested color mixes before Work is begun.
   2. Submit two 8-inch x 10-inch samples of each color, including the correct sheen and texture, on heavy cardboard or masonry. Submit sealer and stain finishes on material of the same quality and species of wood on which that particular finish shall be used. Rejected samples shall be re-submitted until approved.
   3. Samples shall be submitted at least 30 days prior to the start of painting work. Label and identify each sample as to location and application. Upon submittal of color samples, minor variations or changes in color selection may be requested by the Architect and new samples ordered, until final color approval.

1.4 QUALITY ASSURANCE

A. Standards: Materials, preparation, application and workmanship shall be in accordance with manufacturer's recommendations and applicable provisions of the following:
   1. Painting and Decorating Contractors of America (PDCA) "Painting Specification Manual" and "Standards".
   2. Gypsum Association – GA210, "Gypsum Board for Walls and Ceilings".

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in manufacturer's sealed containers, legends and labels intact.

B. Storage:
   1. Adequately protect against damage while stored at site.
   2. In no case shall the amount or method of materials stored exceed the amount permitted or the manner allowed by local ordinances, state laws or fire underwriter regulations.

1.6 PROJECT/SITE CONDITIONS

A. Environmental Requirements:
   1. Do not apply varnish or paint when temperature is below 50°F. Avoid painting surfaces exposed to hot sunlight.
   2. During interior application, maintain minimum temperature of 65°F unless otherwise directed by Architect or manufacturer's printed instructions. Hold temperature as constant as possible.
   3. Provide adequate ventilation at all times so the humidity cannot rise above the dew point of the coldest surface to be painted.
   4. Moisture-containing surfaces, such as concrete, stucco and cement plaster shall have a moisture content of less than 8% as measured by moisture meter. Remove surface salt deposits prior to painting. Verify that pH is neutral, or within acceptable limits of Paint Manufacturer. Paint after thoroughly cured.

1.7 MAINTENANCE

A. Extra Materials: Upon completion of the Work, furnish Owner with one fresh gallon of each type and color of paint and finish used on this Project. Label containers with manufacturer's name, batch, color, shelf life, instructions and cautions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following manufacturers, except as otherwise approved by Architect, subject to compliance with specification requirements.
   1. Benjamin Moore www.benjaminmoore.com
   2. Dunn-Edwards Corporation www.dunnedwards.com
   3. Frazee Industries www.frazeepaint.com
   4. Glidden Professional https://www.gliddenprofessional.com/home
   5. PPG http://www.ppgpittsburghpaints.com/
   6. Sherwin Williams www.sherwin-williams.com
   7. Tnemec www.tnemec.com

2.2 MATERIALS

A. Water-borne Latex (Acrylic) Emulsion Paint: Shall not be formulated or manufactured with formaldehyde, halogenated solvents, aromatic hydrocarbons, mercury or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI and their oxides.

1. Zero-VOC Paint: Flat and eggshell, VOC content less than 10g/l.
2. Low-VOC Paint: Semi-gloss and gloss, VOC content less than 100 g/l

B. Oil-Based Paint: Low-VOC paint; VOC content shall not exceed 380 g/l. Generally avoid when acceptable acrylic alternatives are available. Shall not contain halogenated solvents. Shall not be formulated or manufactured with formaldehyde, mercury or mercury compounds, or tinted with pigments of lead, cadmium, chromium VI and their oxides. Shall not be formulated or manufactured with aromatic hydrocarbons in excess of 10%. For increased resistance to yellowing, specify high quality, soy-based oil paints.

C. Recycled Latex Paint: Unused paint that is filtered and re-blended for use – typically as a primer; minimum 90% post-consumer recycled content (50% for whites), VOC content unknown, available in pastel colors only.

D. Low-Biocide Paint: Interior use. Shall not contain formaldehyde. Shall not contain fungicides or bactericides that are classified as mercury acetates, phenol phenates or phenol formaldehyde.

E. Natural Plant and Mineral-Based Finishes: Contain extracts from plant sources and minimally processed earth minerals, such as chalk or iron oxides. Solvents include citrus oils and small amounts of low-odor petroleum solvents (de-aromatized isopafaffinics).

F. Milk-Based Paint: Contains lime, milk protein, clay and earth pigments; interior use only; not suitable for damp conditions.

G. Transparent Finishes:
1. Urethane Finishes: Water emulsion urethane.
2. Penetrating Oil-Based, Waterborne Finishes: Shall not contain lead acetate or cobalt manganese (drying agents).
3. Stain: Vegetable oil-based, waterborne stain for exterior use with UV Protection.
4. Acrylic: Waterborne, urethane; VOC less than 100 g/l.
5. Plant-Based Oil Finish: Low odor, water reducible, interior use.
6. Polymerized Linseed Oil: Interior use.
7. Polymerized Tung Oil: Interior use.

H. Paint Strippers – Low-Emitting: Shall not contain methylene chloride. Avoid products containing methanol and trichloroethane.

I. Clay and Mineral-Based Pigments:
1. Native Earths: Ochre, raw umber, raw sienna.
2. Calcined Earths: Burnt umber, burnt sienna.
3. Iron Oxides: Mars black, Mars yellow, Mars violet.

J. Conventional Pigments: Pigments used in conventional paint contain the following toxic compounds:
1. White: Antimony oxide, rutile titanium dioxide.
2. Yellow-orange-red: Cadmium, cadmium, lithopone, chrome yellow, molybdate orange, strontium chromate, zinc chromate.
3. Blue: Phthalocyanine blue.
4. Green: Chrome green, chromium oxide, hydrated chromium oxide, phthalocyanine green.

K. Biocides: Provide paint with levels below 0.025%.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine sub-surfaces to receive Work and report in writing with a copy to Architect, conditions detrimental to Work. Commencement of Work will be construed as acceptance of sub-surfaces.

3.2 PROTECTION

A. Before painting, remove hardware, accessories, electrical plates, lighting fixtures and similar items and protect.
   1. Provide “Wet Paint” signs and other barricades and protections as required to protect adjacent surfaces and work of other Trades, whether being painted or not.
   2. Mask permanent labels.
   3. Provide, distribute and maintain a sufficient supply of clean drop clothes and other protective coverings.
   4. Protect foliage and other exterior finished surfaces from contact with cleaning materials and thoroughly flush with water after contact.
   5. On completion of each space, replace above items.

3.3 SURFACE PREPARATION

A. General:
   1. Surfaces requiring painting or finishing shall be thoroughly dry and cured, free of dirt, dust, rust, stains, scale, mildew, wax, grease, oil, deteriorated substrates, bond-breakers, efflorescence and other foreign matter detrimental to the coating’s adhesion and performance. Repair voids, cracks, nicks and other surface defects with appropriate patching material. Finish flush with surrounding surfaces and match adjacent finish texture.
   2. Spot prime marred or damaged shop coats on metal surfaces with appropriate metal primer.
   3. Determine moisture content of plaster, stucco, cementitious materials, wood and other moisture-holding materials by use of a reliable electronic moisture meter.
   4. Determine alkalinity of plaster, stucco and other cementitious materials by performing appropriate tests.
   5. Do not paint surfaces where moisture content or alkalinity exceeds that which is allowed by paint manufacturer.

B. Wood:
   1. Sandpaper to smooth and even surface and then dust off. After primer or stain coat has been applied, thoroughly fill nail holes and other surface imperfections with putty tinted with primer or stain to match wood color. Sand woodwork between coats to a smooth surface. Cover knots and sap streaks with a thin coat of shellac, or seal with a suitable stain blocking sealer.
   2. Finish door and window edges after final fitting. Finish interior of cabinets in the same manner as the exterior unless otherwise specified. Seal interior of drawers unless otherwise specified.
   3. Back-priming:
      a. Back-prime interior woodwork, which is to receive paint or enamel finish, with enamel under-coater paint.

b. Back-prime interior woodwork, which is to receive stain and/or varnish finish with VOC compliant varnish acceptable to the Architect.
c. Back-prime wood trim before installation.

C. Steel and Iron:
1. Remove grease, oil, mill scale, rust and rust scale and touch-up chipped or abraded places on items that have been shop coated. Remove and re-prime incompatible or damaged shop applied primers. Comply with the Steel Structures Painting Council's (SSPC) recommendations for cleaning of un-coated steel and iron surfaces.
2. When area will be exposed to view, sandpaper the entire primed area smooth, feather the edge of surrounding un-damaged prime coat and spot prime in a manner to eliminate evidence of repair.

D. Galvanized Metal and Aluminum:
1. Thoroughly clean by wiping surfaces with a non-hydrocarbon, low VOC solvent that will not leave an oily residue. Apply surface conditioner or vinyl-wash pre-treatment as required for proper adhesion if required by paint manufacturer. Prime galvanized metal with galvanized iron primer as recommended by paint manufacturer. A test sample of the complete painting system should be applied and checked for adhesion before final painting begins.
2. Clean visible portions of throats of galvanized steel ductwork with low VOC solvent; wipe dry with clean rags and paint flat black.

E. Concrete:
1. The method of surface preparation shall be at Contractor's discretion, provided the results are satisfactory to the Architect, and the method is in compliance with applicable codes and requirements.
2. Clean and prepare surfaces of tilt-up pre-cast concrete wall panels to be painted by power washing surface to remove all efflorescence, chalk, dust, dirt, grease, oils and release agents.
3. Repair surfaces to be painted prior to application of prime and finish coat(s). Apply a tinted primer to the substrate to help identify surface imperfections. After the primer has thoroughly dried, patch, fill and repair surface imperfections to match and flush-out with adjacent finish texture and profile.
4. Before first paint coat is applied, spot prime nails and other exposed metal occurring in the surfaces with a rust inhibitive primer as recommended by paint manufacturer.

F. Gypsum Board Surfaces:
1. Fill cracks, holes, or imperfections with compatible patching material and smooth off to match adjoining surfaces. Before painting, surfaces shall be first tested for dryness with a moisture-testing device.
2. Apply no paint or sealer on gypsum board when the moisture content exceeds 8%. Test sufficient areas in each space and as often as necessary to determine if the surface has the proper moisture content for painting. If the moisture content is between 8% and 12%, prime the alkali resistant primer.
3. If 8% or less, prime with specified primer. Remove the dry salt deposits from plaster surfaces by brushing with a stiff brush before painting.

3.4 WORKMANSHIP

A. Apply products to achieve paint manufacturer's printed specifications for dry mil thickness.

B. Apply each coat of paint evenly and comply with manufacturer's drying time before applying subsequent coats.

C. Finished work shall be uniform, match approved color, texture and coverage, and free from runs, sags, clogging or excessive flooding. Make edges of paint adjoining other materials or colors sharp and clean, without overlapping. Where varnishes or enamel is used, lightly sand, dust, and clean undercoats to obtain a smooth finish coat. Sand carefully between each coat of finish on smooth surfaces for good adhesion of subsequent coats.

D. Where clear finishes are required, ensure tinted fillers match wood. Work fillers well into the grain before set. Wipe excess from the surface.

E. Where specific mil thicknesses are required, check thickness by the following methods:
   1. Over ferrous metal – Elecometer Film Gauge
   2. Other surfaces – Tooke Dry Mil Inspection Gauge

3.5 APPLICATION

A. Painting and finishing as required to be provided for un-finished surfaces.
   1. Paint shall be applied over proper primer, filler, or pre-treatment for each type of surface as required holding surface finish.
   2. Two coats of finish and additional coats are required to provide adequate coverage will be provided.
   3. High, overhead spaces to have dryfall paint finish.
   4. Transformer boxes, meter panels and electrical equipment, backflow valves and other utility equipment located on the site shall be painted to match the building color.
   5. Hollow metal frames.
   6. Stairs, ladders and miscellaneous metals.

B. The number of coats scheduled is the minimum number of coats required. Additional coat(s) shall be applied, at no additional cost to the Owner, to completely hide base material, provide uniform color and to produce satisfactory finish results.

C. Apply coatings without thinning except as specifically required by label directions, or required by these specifications. In such cases, thinning shall be the minimum reduction permitted.

D. Priming will not be required on items delivered with prime or shop coats, unless otherwise specified. Touch-up prime coats applied by others as required to ensure an even primed surface before applying finish coat.

E. Plumbing, Mechanical and Electrical:
   1. Interior exposed water, gas, waste piping, sprinkler piping, conduit, lighting and electrical panels, telephone terminal boxes, galvanized ducts and insulated ducts, shall be painted in areas other than mechanical rooms, unless otherwise scheduled.
   2. Paint exposed un-finished fixtures, metal ducts, switch boxes, control panels, devices, starters, junction boxes, vents, drains and other similar items as directed by Architect.

F. Spray paint prime coated (not pre-finished) grilles and registers with enamel or lacquer to match walls and ceilings. Paint materials shall not sag, run or bind movable parts of grilles, registers, louvers, baffles and other similar items.
   1. Throats of ducts shall be given one coat of flat black paint wherever visibility of the interior of the duct is allowed through registers or other similar items. At fiber lined duct, use black latex paint.
   2. Examine the Mechanical and Electrical Drawings and Specifications to determine the amount of exposed work to be painted.

G. Paint exposed surfaces of every member, paint items inaccessible after installation before installation, if required to be painted. Edges, tops and bottoms of wood doors shall be sealed and finished with the same finish as the door faces, to meet door manufacturer's warranty requirements. Verify edge color with Architect as different colors may be selected for each face.

H. Paint items fitted with finish hardware after hardware has been temporarily removed.

I. Heating and other equipment on or adjacent to walls or surfaces scheduled for painting, shall be disconnected, using workmen skilled in appropriate trades and moved temporarily to permit painting of surface. Following completion of painting, replace and reconnect items.

J. Each succeeding pigmented coat shall be distinguishably lighter than the previous coat. Tint prime and undercoats to a color similar to finish coat. Each coat of material applied must be inspected and approved by the Architect before the application of the succeeding specified coat; otherwise no credit for the concealed coat will be given, and the Contractor shall assume the responsibility to re-coat work in question. Contractor shall notify the Architect when each coat is completed.

K. Brush, wipe, or roll stain in two-coat application. Avoid lap marks by maintaining "wet-edge" continually being merged with existing liquid coverage and stop only at natural edges, turns and breaking places.

L. Do not paint over Underwriters' Laboratory labels, fusible links, exposed sprinkler heads and other similar items.

M. Paint piping, electrical or other equipment, conduit, vents and other similar items as directed by Architect.

N. Finish closets and the interior of cabinets with same color as adjoining rooms, unless otherwise specified. Finish other surfaces same as nearest or adjoining surfaces, unless otherwise shown or scheduled.

O. Paint surface of walls, which will be concealed by cabinets, chalkboards and other items attached to wall.

3.6 ADJUSTING

A. At completion, do touch-up and re-paint work and leave finish surfaces in good condition.

3.7 CLEANING

A. During the course of the Work, remove misplaced paint and stain spots or spills. Leave Work in clean condition acceptable to Architect.

B. Remove oily rags and waste daily, taking precaution to prevent fire.

3.8 SCHEDULES

A. Color Schedule: As listed on Interior Finishes Schedule or provided by Architect.

B. Schedule of Finishes: Refer to the “Finish Schedule” on the Drawing for designated finishes of areas. Low sheen eggshell paint shall be used in all areas. The only exceptions would be utility rooms, break rooms, kitchens and rest rooms where a semi-gloss finish is to be installed, and the interior soffits which are to be painted with flat.

C. Finishing of the following listed items and materials will not be required and shall be protected:
   1. Stainless Steel, brass, bronze, copper, monel, chromium, anodized aluminum; specially finished articles such as porcelain enamel, plastic coated fabrics and baked enamel, unless otherwise indicated.
   2. Finished products such as ceramic tile, glass, brick, resilient flooring and acoustical tiles, board and metal tees.
   3. Pre-finished products such as wood folding partitions and doors, wood classroom and laboratory casework, bleachers and elevator cabs.

3.9 INTERIOR PAINT FINISHES

A. System 201 (Ferrous Metals): Apply to exposed metals such as steel doors, hollow metal frames, metal beam saddles, columns, grilles and registers, stair and hand railings, ladders and other exposed miscellaneous metals.
   1. First Coat: Ferrous Metal Primer (Red or White color as applicable to finish coats).
   2. Second Coat: Same material as Third Coat as recommended by manufacturer.
   3. Third Coat: Enamel, Eggshell.

B. B. System 202 (Interior Wood Finishes – Enamel): Apply to wood door frames, columns, exposed and concealed casework and millwork, wood-window wall construction, medium density plywood surfaces, shelving, roll-up wood doors, perforated and plain type hardboard, particleboard and other exposed miscellaneous wood and trim, except wood specified for a transparent or stain finish
   1. First Coat: Enamel Undercoater.
   2. Second and Third Coats: Enamel, Eggshell.

C. System 203 (Interior Wood Finish – Flat): Apply to plywood telephone backing boards and other miscellaneous softwood as noted, specified, or scheduled.
   1. First Coat: Enamel Undercoater/Primer.
   2. Second and Third Coats: Flat Paint – Waterborne (Vinyl Acrylic).

D. System 204 (Galvanized Metals): Apply to exposed galvanized metal.
   1. Clean metal to remove foreign matter or any coating applied by the metal manufacturer. Apply Surface Conditioner or Vinyl Wash Pre-Treatment (if required by paint manufacturer).
   2. First Coat: Galvanized Metal Primer.
   3. Second and Third Coats: Enamel, Eggshell

E. System 205 (Aluminum): Apply to interior louvers and other miscellaneous exposed unfinished aluminum surfaces.
   1. Clean metal to remove foreign matter or any coating applied by the metal manufacturer. Apply Surface Conditioner or Vinyl Wash Pre-Treatment.
   2. First Coat: Aluminum Primer.
   3. Second and Third Coats: Enamel, Eggshell.

F. System 206 (Gypsum Board, Plaster and Concrete – Wet Areas): Apply to gypsum board, plaster and concrete surfaces in toilet rooms, janitor rooms, kitchens and other areas as scheduled.

1. First Coat: Enamel Undercoater.
2. Second and Third Coats: Enamel, Semi-Gloss.

G. System 207 (Gypsum Board, Plaster, and Concrete – Non-Wet Areas): Apply to gypsum board, plaster, and concrete except for wet areas.
   1. First Coat: Waterborne Primer/Sealer.
   2. Second and Third Coats: Enamel, Eggshell.

3.10 CLEAR WOOD FINISHES

A. System 301 (Stained and Clear Finish): Apply to wood doors, handrails and chair rails. Fill open grain hardwood such as Oak.
   1. Stained and finished with Clear Satin or Gloss Varnish – Waterborne:
      a. First Coat: Semi-Transparent Stain.
      b. Second Coat: Varnish, Gloss – Polyurethane (Waterborne).
      c. Third Coat:
         1) Satin: Varnish, Satin – Polyurethane (Waterborne).
         2) Gloss: Varnish, Gloss – Polyurethane (Waterborne).

END OF SECTION

SECTION 10 11 00

VISUAL DISPLAY BOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Porcelain Enamel Steel Markerboards, Field Applied Trim

1.2 SUBMITTALS

A. Shop Drawings: Submit brochures and Drawings of visual display boards showing method of construction and mounting techniques.

B. Samples: Submit color samples of visual display board surfaces and trim for color selection from Manufacturer's full range of standard colors and patterns.

C. Operation and Maintenance: Manufacturer to include instructions on regular cleaning and removal of stains.

D. Contract Closeout Submittals: Submit 2 copies of Manufacturer's printed maintenance instructions

1.3 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact. Protect finished surfaces with removable wrapping or coating which will not bond when exposed to sunlight.

B. Storage: Adequately protect against damage while stored at the site.

1.4 QUALITY ASSURANCE

A. Manufacturer shall be actively manufacturing visual display boards in the USA.

1.5 WARRANTY

A. Submit a guarantee that ceramic steel markerboards are guaranteed for the life of the building. Guarantee covers replacement of markerboards, but does not include removal or re-installation of the replacement board.

1.6 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements.
   1. Lemco Corporation www.adplemco.com

2. Claridge Products and Equipment Inc. www.claridgeproducts.com
3. Best-Rite Chalkboard Company www.bestrite.com
4. Greensteel Inc.
5. Nelson-Adams Co. (Naco) www.nelsonadams.com

1.7 MATERIALS

A. Writing Surface Face Sheet: Manufactured in accordance with E3 Porcelain Enamel Institute's specification.
   1. Surface shall be enameling grade cold rolled steel manufactured from a minimum of 30% recycled materials
   2. 3 Coat Process: Bottom Ground Coat 1.5 – 2.2 mils, Top Ground Coat 2.0 - 2.8 mils, Top Cover Color Coat 3.0 – 4.0 mils.
   3. Firing Temperature: Enamel shall be fired at lowest possible temperature to reduce steel and porcelain stress and achieve superior enamel and hardness.
   4. Color: As selected by Architect from manufacturer's standards.

B. Writing Surface Core
   1. ½", medium density fiberboard/particleboard composed of 90% recycled material.

C. Writing Surface Backing
   1. Moisture barrier back
   2. Foil back
   3. Aluminum sheet back

D. Panel Size: Refer to drawings for length and height dimensions

E. Accessories
   1. Metal trim: Aluminum extrusions with clear satin anodized finish.
   2. Chalktray: Standard continuous solid tray with ribbed section and smoothly curved ends
   3. Map Rail: Standard 2" or 1" high continuous rail with colored cork as follows:
      a. End Stops – One pair per map rail
      b. Map Hooks – One every 2' or map rail

1.8 FABRICATION

A. Factory assemble visual display board and ship to the job, ready to fasten to wall, pressure laminated to backing and framed on each side with extrusions as shown on review shop drawings and as specified.

B. Aluminum extrusions: Cut to exact length and accurately. At corners, except at chalk trough, reinforcing angles shall be used.

C. Sizes: As indicated on Drawings.

PART 2 - EXECUTION

2.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work shall be construed as acceptance of subsurfaces.

B. Verify that grounds and solid blocking necessary for proper installation of markerboard panels has been installed. Stud walls shall have solid blocking for attachments of markerboards.

2.2 INSTALLATION

A. Visual Display Boards:
   1. Install at locations shown on Drawings in accordance with Manufacturer's printed Specifications, except as otherwise detailed.
   2. Install plumb, level and true to line, securely attached to grounds, blocking and supports.

2.3 CLEANING

A. Upon completion of installation, clean markerboards and leave in ready-to-use condition.

B. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 10 21 13

CEILING HUNG TOILET PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Stainless steel toilet compartments and urinal screens as shown on Drawings and as specified of the following type:
   1. Compartment Style: Ceiling hung.
   2. Screen Style: Wall hung.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements
   1. Graffiti Resistance: Partition material shall have the following graffiti removal characteristics when tested in accordance with ASTM D6578-00 Standard Practice for Determination of Graffiti Resistance in accordance with Section 9, “Graffiti Removal Procedure Using Manual Solvent Rubs”.
      a. Cleanability: Five (5) required staining agents shall be cleaned off material.
   2. Scratch Resistance: Partition material shall have the following characteristics when tested in accordance with ASTM D2197-98(2002) Standard Test Method for Adhesion of Organic coating be Scrape Adhesion, using Gardner Stock #PA-2197/ST pointed stylus attachment on scrape tester:
      a. Scratch Resistance: Maximum Load Value shall exceed 10 kilograms.
   3. Impact Resistance: Partition material shll have the following characteristics when tested in accordance with ASTM D2794-93(1999)e1 Standard Test Method for Resistance of Organic Coating to the Effects of Rapid Deformation (Impact), using .625: hemispherical indenter with 2-lb impact weight:
      a. Impact Resistance: Maximum Impact Force value shall exceed 30 inch-lbs.
   4. Fire Resistance: Partition material shall comply with the following requirements, when tested in accordance with ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials:
      a. Smoke Developed Index: Not to exceed 450.
      b. Flame Spread Index: Not to exceed 75.
      c. Material Fire Ratings:
         1) National Fire Protection Association (NFPA): Class B
         2) International Code Council (ICC): Class B.

1.3 SUBMITTALS

A. Shop Drawings: Submit shop drawings showing plans, elevations, details of construction, finish color, hardware fittings and fastenings. Indicate locations of blocking or materials by others for proper attachment to supporting finished Work.

B. Samples: Submit 2 samples of Manufacturer's standard colors and hardware for selection and approval by Architect.

C. Manufacturer’s data sheets for each type of product indicated. Include fabrication details, description of materials and finishes.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with the following:
   1. ANSI A117.1, 1998 "Accessible and Usable Buildings and Facilities.
   2. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA).
   3. ADA Accessibility Guidelines (ADAAG).

B. Installers Qualifications: Experienced Installer regularly engaged in installation of toilet compartments for minimum 3 years.

C. Source Limitations: Obtain toilet compartment components and hardware from single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact. Protect finished surfaces with removable wrapping or coating which will not bond when exposed to sunlight.

B. Storage: Adequately protect against damage while stored at the site.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions shown on Drawings by taking field measurements; proper fit and attachment of parts is required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Drawings and specifications are based upon Bradley Mills Partitions, Sentinel, and Series 400.

2.2 MATERIALS

A. Finish
   1. 5WL Stainless textured.

B. Hardware – General
   1. Heavy Duty: Manufacturer’s heavy duty stainless steel castings, including stainless steel, tamper-resistant fasteners
      a. Hinges: Self-closing continuous spring-loaded type adjustable to hold doors open at any angle up to 90 degrees, with emergency access by lifting door.
      b. Latch and Keeper; Surface mounted side latch with rubber-faced combination door strike and keeper, with provision for emergency access, meeting requirements for accessibility at accessible compartments.

c. Coat Hook: combination hook and rubber-tipped stop, sized to prevent door from hitting compartment mounted accessories. Provide wall bumper where door abuts wall.
d. Door Pull: Provide pulls on both sides of outswing doors.
e. Mounting Brackets
    1) Minimum 18 g-gauge stainless steel and extend full height of panel
    2) U-channels shall be furnished to secure panels to stiles.
    3) Angle brackets shall be furnished to secure stiles to walls and panels to walls.
    4) Fasteners shall utilize through bolted, stainless steel, pin-in-head Torx sex bolt fasteners. Through-bolted fasteners shall withstand direct pull force exceeding 1.500 lbs. per fastener
    5) Wall mounted urinal screen brackets shall be 11 gauge double thickness.
f. Overhead Brace headrail shall be satin finish anodized aluminum
g. Shoes at to be 304 Series stainless steel with #4 satin brushed finish.

C. Accessibility Provisions: Where shown on the Drawings, provide accessible compartments, interior space as required by ADA, with outswinging doors, size as indicated.
1. Door opening size minimum 2 feet 10 inches clear, or greater where required by applicable codes.
2. At outswinging doors, install an additional bumper on the outside of the door.

D. Urinal Partitions.
1. Same material and construction used for toilet partitions.
2. Size: Approximately 58 inches high, 24 inches deep, mounted 12 inches above the floor.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Install toilet compartments in strict accordance with Manufacturer's printed instructions, at locations indicated. Erect straight and plumb, with horizontal lines level.

B. Ceiling Hung: Provide structural support in accordance with manufacturer requirements.

C. Installed Clearances:
1. Provide clearance at the wall of approximately 1 inch or less for panels and 1 inch or less for pilasters. Conceal evidence of drilling, cutting and fitting to room finish in the finish Work.
2. Provide uniform clearance at vertical edges of doors from top to bottom not to exceed 3/16 inch.

3.3 FIELD QUALITY CONTROL

A. Adjust hardware for satisfactory operation. Adjust door hinges to hold door open at approximately 30 degrees. Upon completion of the installation, put each operating component through at least ten operating cycles. Adjust to achieve optimum operation.

B. Upon completion of the installation, visually check exposed surfaces, and touch up scratches and abrasives to be completely invisible to the unaided eye from a distance of five feet.

3.4 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises.

END OF SECTION

SECTION 10 28 13

TOILET ACCESSORIES

PART 1 - GENERAL

A. QUALITY ASSURANCE
   1. ANSI A117.1, 2003 "Accessible and Usable Buildings and Facilities."
   2. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA).
   3. ADA Accessibility Guidelines (ADAAG).

1.2 SUBMITTALS

A. Product Data: Submit Drawings and brochures of toilet accessory items showing sizes, construction and mounting techniques.

B. Products Form: In accordance with Section 01 33 00, prior to installation in the project, submit a completed products form, Section 00 62 33, for each product which contributes to the points required for LEED™ Certification. Information contained on the Products Forms shall be used to complete the information required for the LEED Submission.

1.3 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact. Protect finished surfaces with removable wrapping or coating which will not bond when exposed to sunlight.

B. Storage: Adequately protect against damage while stored at site.

C. Handling: Comply with Manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. A. To establish function, capacity and quality, toilet accessories are based on products of Bobrick Washroom Equipment Co., Inc. Comparable toilet accessory products by one of the following Manufacturers may be provided, as approved by the Architect, subject to compliance with Specification requirements.
   1. Bobrick Washroom Equipment Co., Inc. www.bobrick.com
   2. Bradley Corporation www.bradleycorp.com
   3. Gamco www.gamcousa.com
   4. ASI www.americanspecialties.com
   5. 5Georgia-Pacific www.gp.com
   6. Waxie Sanitary Supply www.waxie.com

2.2 MATERIALS

A. Stainless Steel: AISI, Type 302/304, with satin No. 4 finish. Unless specified or indicated, the use of other stainless steel alloys shall not be allowed

B. Sheet Steel: Cold rolled, commercial quality, ASTM A1008. Surface preparation and metal pretreatment as required for applied finish.

C. Chromium Plating: Nickel and chromium electro-deposited on metal, ASTM B456, Type SC 2.

D. Mirror Glass: FS DD-G-451, Type I, Class 1, Quality 1, 1/4 inch (thick, with silver coating, copper protective coating, and non-metallic paint covering.

E. Galvanized Steel Mounting Devices: ASTM A123, hot-dip galvanized after fabrication.

F. Locks: Tumbler type, keyed alike unless specified otherwise.

G. Fasteners: Theft-proof screws. Use no adhesive mountings.

H. Backing Plates: 16 gauge cold-rolled steel for mounting grab bars in stud partitions.

2.3 TOILET ACCESSORIES

A. All accessories shall be stainless steel with polished No. 4 finish or nickel chromium electro-deposited on base metal, conforming to ASTM B 456, Type SC 2, and satin finish.

B. Soap dispensers: One per lavatory, located per drawings.

C. Mirrors:
1. Sizes and locations as indicated on Drawings.
2. Each conforming to FS DD-G-451, Type I, Class 1, Quality q2, 1/4 inch thick, with silver coating, copper protective coating, and nonmetallic paint coating.
3. All mirrors must have a moisture sealant applied to all edges.
4. Provide edge trim at ceramic tile as specified in Section 09 30 00
5. Provide ¼" stainless steel edge trim with mitered corners.

D. Paper towel dispenser:
1. C-fold fully recessed hand towel dispenser.
2. C-fold semi-recessed hand towel dispenser.

E. Grab bars: 1-1/2 inch diameter, knurled stainless steel finish. Provide manufacturer's standard grab bar anchor plate or grab bar fastening system for concealed fastener installation as applicable to substrate.

F. Sanitary napkin disposal unit: stainless steel with top opening. One per toilet compartment.

G. Toilet tissue dispensers: Dual Roll stainless steel with hood.

H. Coat hooks: Heavy duty with concealed mounting, provide at each stall.

I. Seat Cover Dispenser: satin finish stainless steel, one per toilet compartment.

J. Shelf with mop and broom handles: stainless steel with minimum two handles.

PART 3 - EXECUTION

3.1 EXAMINATION

A. A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination with other Work: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Install items in accordance with Manufacturer's published instructions and approved installation drawings in locations as shown on Drawings, and in compliance with ANSI A117.1 as applicable.

B. Secure toilet room accessories to adjacent walls and partitions in accordance with the Manufacturer's instructions for each item and each type of substrate construction and as follows:
   1. Attachment to Toilet Partitions: Secure at screw attachment point with sheet metal screws furnished by Manufacturer or by 3/16 inch diameter through-bolts.
   2. Attachments of Recessed Accessories: Place shims between framing and cabinet at screw attachment points.
   3. Attachment of Surface Mounted Accessories: At stud walls, provide concealed blocking or backing at screw points to allow attachments with No. 18 x 1-1/2 inch sheet metal screws. At solid walls, rawl plugs, expansion shields, or toggle bolts shall be provided. Mirrors shall be locked to wall hangers by tightening locking screws concealed in lower frame. Soap dispensers shall be mounted with 4 inch clearance from filler top to underside of any horizontal projection.

C. Grab Bars:
   1. 1. Framed wall construction: Install concealed anchor plates to studs. Attachment to studs must be sufficient to withstand a horizontal pull of 300 pounds. Accurately position and fasten before wall finish is applied. After wall surface is finished, secure concealed mounting plate to anchor plate using stainless steel machine screws furnished by the Manufacturer.
   2. Toilet Compartments: Through-bolted connection to anchors.

D. Seal wall penetrations with sealant as specified in Section 07 92 00 to prevent moisture penetration through joints around fixtures.

3.3 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Submit Manufacturer's data and installation instructions for each item, including dimensions and anchorage details.

1.2 QUALITY ASSURANCE

A. Standards: Comply with ANSI/UL 92 and 711.

B. Regulatory Requirements: Conform to ANSI/NFPA 10 and the following:
   1. ANSI A117.1, 1998 "Accessible and Usable Buildings and Facilities."
   2. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA).
   3. ADA Accessibility Guidelines (ADAAG).
   4. The Arizonans with Disabilities Act of 1992 Administrative Rules (AzDAAG)

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish DuPont™ FE-36™ in hand-held extinguishers in all areas considered to be high-value or essential operations with electronic equipment. See Drawings for locations.

B. Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements:
   1. Fire Extinguishers:
      a. Amerex
      b. Ansul
      c. Buckeye
      d. General
      e. Kidde.
      f. Any manufacturer that can meet all requirements in this section and can be serviced with the equipment, adapters, and parts that the Owner currently uses and will accept.
   2. Fire Extinguisher Cabinet:
      a. Larsen's Manufacturing Co. www.larsensmfg.com
      b. J.L. Industries www.jlindustries.com
      c. General
      d. Knox
      e. Supra Products Co.

2.2 MATERIALS AND ACCESSORIES – GENERAL

A. Fire suppression equipment shall not contain HCFC’s or Halons.

2.3 EQUIPMENT

A. Extinguishers and Cabinets:
   1. Mechanical rooms, electrical rooms and commercial kitchens:
      a. Minimum rating: 20-B:C.
      b. Extinguishing agent: Sodium bicarbonate base or potassium bicarbonate base. Carbon dioxide or halon agents are not acceptable.
      c. No cabinet required.
   2. Corridors and other areas requiring fire extinguishers (or are considered light hazard to ordinary hazard areas):
      a. Provide fire extinguisher cabinet
      b. Minimum rating of 4-A:20-B:C.
      c. Extinguishing agent: Ammonium phosphate.
   3. Fire extinguishers must be UL approved and bear an individual identification on the fire extinguisher.
   4. The cylinder head and internal parts must be constructed of steel or aluminum.
   5. Stainless steel cylinders or any other cylinders requiring normal hydrostatic testing less than every twelve years are not acceptable.
   6. Fire extinguisher cabinets, if provided with locks, must be key operated by the standard Larsen LL24 key.

B. Fire Extinguisher Cabinets: As manufactured by Larsen Manufacturing Co., Model "Occult" Series, trimless style with solid clear anodized aluminum door in a fully recessed cabinet, and black vertical die-cut lettering "Fire Extinguisher".

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Install items in accordance with Manufacturer's directions. Install cabinets plumb and level at heights shown on Drawings.

B. Comply with regulatory requirements and anchor securely.

C. Travel distance:
   1. Mechanical rooms, electrical rooms and commercial kitchens: Not to exceed 50 feet. Fire extinguishers outside the room/area of protection cannot be included in the travel distance requirements.
   2. Corridors and other areas requiring fire extinguishers (or are considered light hazard to ordinary hazard areas): Not to exceed 75 feet.

D. Verify that extinguishers are charged and tagged.

E. Place extinguishers in cabinets and on wall brackets.

3.3 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 10 51 26

PLASTIC LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Solid plastic Z lockers.

1.2 SUBMITTALS

A. Product data and installation instructions for locker units.

B. Shop drawings showing individual locker construction, materials, dimensions, room layout, overall dimensions for installation and installation details including end and filler panels, crown molding, trim, and accessories. Include locker numbering sequence information.

C. Samples: Color chip samples and manufacturer color chart selection.

1.3 QUALITY ASSURANCE

A. Uniformity: Provide lockers that are standard products of single manufacturer with interchangeable like parts. Include necessary mounting accessories, fittings, and fastenings.

B. Regulatory Requirements:
1. ANSI A117.1, 1998 "Accessible and Usable Buildings and Facilities."
2. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA).
3. ADA Accessibility Guidelines (ADAAG).

C. Designated ADA compliant units shall be affixed with “handicap accessible” label on door.

D. Shelf location and hook arrangements shall comply with ANSI standards.

1.4 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.

B. Do not deliver lockers until building is enclosed and ready for locker installation.

C. Storage and Protection: Adequately protect against damage during delivery, handling, storage, and installation.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions shown on Drawings by taking field measurements.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. The Mills Company, a subsidiary of Bradley Corporation.

B. Scranton Products.

2.2 MATERIALS AND ACCESSORIES – GENERAL

A. Provide recycled materials in accordance with Recycled Content provisions of Section 01 60 00.

B. Provide local/regional materials in accordance with Local/Regional Materials provisions of Section 01 60 00.

2.3 LOCKERS

A. Locker Style: Model LENOXZLOCKER, 18 inches wide by 18 inches deep by 72 inches tall overall.

B. Components:
1. Locker material: Sides, backs, shelves, tops, bottoms, doors, door frames and continuous latch constructed from high-density polyethylene (HDPE).
   a. Sides, shelves, tops, bottoms, and backs fabricated from 3/8 inch (10 mm) HDPE.
   b. Doors, door frames and continuous latch fabricated from ½ inch (13 mm) HDPE.
   c. End panels and flat top fabricated from ½ inch (13mm) HDPE.
2. Door Hinge: Continuous piano hinge fabricated from 16 gauge type 304 stainless steel.
3. Color(s): As selected by Architect from manufacturer's full range of standard colors.

C. Hardware and accessories
1. Provide one double coat hook for each opening in one, two tier and Z lockers
2. Provide one number plate fo reach opening, consecutively numbered as directed by Architect
3. Provide screws, anchors and angle brackets for locker base installation.

D. Ends and Fillers: Locker end, filler and back panels matching locker door cover exposed sides, backs and intersections.

E. Fabrication
1. Locker box fabricated from a single sheet of HDPE with corners fused together. Weld frame and shelves to box assembly.
2. Attach hinge to door and frame with vandal-resistant double threaded stainless steel screws.
3. Continuous latch securely attached to the entire length of the door with stainless steel screws, providing a full length latching mechanism capable of accepting several lock types.
4. Locking device: Provide latching device with recessed handle with padlock attachments.
5. Base: Steel tube support with bench top attachment as shown in drawings
6. Provide openings at top and bottom of each door for ventilation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.
   2. Verify that prepared bases are in correct position and properly sized. Lockers shall be installed on a 2"x4" or 2"x6" base per design drawing. Base shall extend from the wall 2" less than the locker depth.

3.2 INSTALLATION

A. Install lockers and accessories per approved plans and manufacturer's instructions for a plumb, rigid and flush installation.

B. Locker connector hardware and installation instructions shall be provided by manufacturer.

C. Anchor lockers to wall studs or furring strips attached to wall through locker back and to the base through the locker floor.

D. Adjust doors and hinges to accommodate uniform spacing after installation of lockers. Verify all working parts of locker including hinge and lock function.

E. Attach number disks in specified sequence using adhesive compliant with low-emitting material requirements specified in Section 01 60 00.

F. Clean lockers.

G. Verify that doors and latches operate easily and properly.

3.3 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 10 60 05

WIRE MESH PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Wire Mesh Partitions

1.2 RELATED SECTIONS

A. Section 05 50 00 - Metal Fabrications

1.3 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Detailed specification of construction and fabrication.
   2. Manufacturer's installation instructions.
   3. Preparation instructions and recommendations.
   4. Storage and handling requirements and recommendations.

B. Shop Drawings:
   1. Submit Product Data and Samples
   2. Provide layout drawings with detailed erection drawings and specifications.
   3. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
   4. Keys: Submit keys for door locks to Owner at Substantial Completion of the project.

1.4 QUALITY ASSURANCE

A. Mock-Up: Not required

B. Design Requirements:
   1. Design partition system to provide for movement of components without damage, undue stress on fasteners or other detrimental effects, when subject to design loads.
   2. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: SpaceGuard Products, which is located at: 711 S. Commerce Dr. ; Seymour, IN 47274; Toll Free Tel: 800-841-0680; Tel: 812-523-3044; Email: sales@spcgrd.com Web: www.spaceguardproducts.com

B. WireCrafters LLC, which is located at 6208 Strawberry Lane Louisville, KY 40214-2900 Tel: 1-800-924-9473

C. Substitutions: or equal

2.2 PRODUCT

A. Product: Wire Mesh Partitions/hinge doors.

B. Fabrication:
1. Wire Mesh: #10 W&M Gauge .130 inch (3.3 mm), triple crimped bright basic wire 1-1/2 inches (38 mm) diamond mesh pattern.
2. Horizontal Frames: 1 inch (25 mm) by 1/2 inch (13 mm) - 12 gauge .1046 inch (2.657 mm) roll formed channels tenoned at ends. Series of holes for through bolting of top cap bar.
3. Vertical Frames: 1-1/4 inches (32 mm) by 5/8 inch (16 mm) - 14 gauge .0747 inch (1.897 mm) roll formed "C" type channels mortised at ends. Series of slotted holes for securing to adjacent panels and post.
4. Center reinforcement bar: Two 1 inch (25 mm) by 3/8 inch (9.5 mm) - 12 gauge .1046 inch (2.657 mm) roll formed channels riveted together through mesh 42 inches (1067 mm) above finished floor on 7 feet (2134 mm), 8 feet (2438 mm), and 9 feet (2743 mm) high panels. Four channels are used on 10 feet (3048 mm) and 12 feet (3658 mm) high panels.
5. Panels: Consisting of the above horizontal and vertical members mortise and tenon at corners with diamond mesh securely clinched to frames. Center reinforcement bars are attached.
6. Adjustable Panels: 10 gauge .1345 inch (3.416 mm) wire mesh of above specification with 1-1/4 inches (32 mm) by 1/8 inch (3 mm) flat stock (same hole pattern as vertical frames) welded along sides. Two 1-1/4 inches (32 mm) by 1-1/4 inches (32 mm) corner angles for bolting to adjacent panels and securing to floor.
7. Flex Panels: Two 8 inches (203 mm) -16 gauge .0598 inch (1.519 mm) hot rolled sheet steel punched and formed. Two 1-1/4 inches (32 mm) by 1-1/4 inches (32 mm) corner angles for bolting to adjacent panels and securing to floor.
8. Hinge Doors: Constructed of the same materials as panels, with 1-1/4 inches (32 mm) by 1/8 inch (3 mm) flat steel bar cover on sides. Complete with all necessary mounting and locking hardware to install and operate.
    a. Jambs: Two 1-1/4 inches (32 mm) by 5/8 inch (16 mm) - 14 gauge .0747 inch (1.897 mm) roll formed "C" type channels.

b. Hinges: Three 3 inches (76 mm) by 3 inches (76 mm) butt hinges; welded to door framing and bolted to jamb.
c. Padlock Arrangement: 4 inches (102 mm) by 6 inches (152 mm) cover plate with 1-1/2 inches (38 mm) lug securing into lock opening.
d. Cylinder Lock: Mortise type with keyed different cylinder operated by key outside and recessed knob inside.

9. End/Corner post (for 90 degree corner): 1-1/4 inches (32 mm) by 1-1/4 inches (32 mm) by 1/8 inch (3 mm) hot rolled angle. With 1-1/4 inches (32 mm) by 3/8 inch (9.5 mm) slotted holes aligning with bolt holes in vertical frames.
10. Line/Stiffener post: 3-1/2 inches by 1-1/4 inches (32 mm) - 10 gauge .1345 inch (3.416 mm) with base plates of 4 inches (102 mm) by 7 inches (178 mm) - 10 gauge .1345 inch (3.416 mm) flat stock, with four 7/16 inch (11 mm) diameter holes to accept 3/8 inch (9.5 mm) diameter anchors. Recommended usage is every 15 feet (4572 mm) linear feet on 7 feet (2134 mm) and 8 feet (2438 mm) high systems and every 10 feet (3048 mm) linear feet on 9 feet (2743 mm), 10 feet (3048 mm) and 12 feet (3658 mm) high systems.
11. Three Way Post: 1-1/4 inches (32 mm) by 1-1/4 inches (32 mm) by 1-1/4 inches (32 mm) U-shaped post with 1-1/4 inches (32 mm) by 2 inches (51 mm) flat stock base plate punched to accept a 3/8 inch (9.5 mm) diameter anchor. All three sides are punched with same hole pattern as vertical frames for bolting to adjacent panels.
12. Top Capping Channel: 1-1/2 inches (38 mm) by 1/2 inch (13 mm) - 14 gauge .0747 (1.897 mm) roll formed channel with holes included for through bolting to panel's horizontal frame.
13. Base Shoes: 2 inches (51 mm) high Die Cast Aluminum with two holes to accept 1/4 inch (6 mm) diameter anchor for securing to floor; and with setscrew for leveling adjustment.
14. Accessories:
    a. Sweep Guards: 5-7/16 inches (138 mm) by 5/8 inch (16 mm) - 20 gauge .0359 inch (0.912 mm) cold-rolled steel; formed at top and bottom; secured with 1-1/4 inches (32 mm) by 1/4 inch (6 mm) hex head bolt and nut to bottom of panel frame; then anchored to finished floor.
    b. Sheet Metal Base: 16 gauge .0598 inch (1.519 mm) Hot Rolled Sheet Metal.
    c. Wall Clips: 3/4 inch (19 mm) wide by 1/8 inch (3 mm) thick cold rolled steel; formed and punched for securing to wall.
15. Hardware: 1/4 inch (6 mm) hex head bolts and nuts for all panel to panel, panel to door, and panel/door to post connections. Field bracing, floor and wall anchors by erector.
16. Finish: Two stage Phosphate wash with a standard 2 mil (.05 mm) Polyester Powder Coat finish.
17. Color: Black.

2.3 FABRICATION

A. Fabricate assemblies of framed sections; to sizes and profiles required; with framing members fitted, reinforced and braced to suit design requirements.

B. Fit and assemble in largest practical sections for delivery to Project Site, ready for installation.

C. Fabricate items with joints tightly fitted and secured.

D. Grind exposed welds smooth and flush with adjacent finish surface. Ease exposed edges to small uniform radius.

E. Make exposed joints flush and hairline.

F. Provide components required for anchorage. Fabricate anchorage and related components of same material and finish as framing members.

2.4 FINISH

A. Clean surfaces of rust, scale, grease, and foreign matter before finishing. Clean material using a two-stage phosphate wash system immediately prior to finishing.

B. Prefinished Surfaces: Wire partition manufacturer's polyester powder finishing system.
1. Finish colors of partitions and accessories: Selected by Architect from manufacturer's standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's recommendations.

B. Install partitions and gates plumb and level, accurately fitted, properly aligned, securely fastened, and free from distortion or detects.
1. Equipment Enclosure: Erect partitions enclosing data equipment to exclude a 2 inch diameter ball at any location.

C. Install field bracing as necessary (not furnished by mesh partition manufacturer) to provide rigid, secure installation.

3.3 TOLERANCES

A. Maximum Variation from Plumb or Level: 1/4 inch (6 mm) in total partition height.

B. Maximum Misalignment from True Position: 1/4 inch (6 mm).

3.4 ADJUSTING

A. Adjust moving components for smooth operation without binding.

B. Adjust locks to provide smooth and secure operation.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 10 75 00

FLAGPOLES

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

A. Design Requirements: Comply with National Association of Architectural Metal Manufacturer's "Guide Specifications for the Design of Metal Flagpoles," Standard FP-1.

1.2 SUBMITTALS

A. Shop Drawings: Submit Drawings showing sizes, finishes, methods of installation and accessories.

B. Samples: Submit samples showing material and finish.

C. Products Form: In accordance with Section 01 33 00, prior to installation in the project, submit a completed products form, Section 00 63 33, for each product which contributes to the points required for LEED™ Certification. Information contained on the Products Forms shall be used to complete the information required for the LEED Submission.

1.3 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact. Protect finished surfaces with removable wrapping or coating which will not bond when exposed to sunlight.

B. Storage: Adequately protect against damage while stored at the site.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with Specification requirements.

1. American Flagpole Division, Kearney-National

2. Baartol www.baartol.com

3. Concord Industries www.flagpoles.com

2.2 FLAGPOLES.

A. Pole: Cone tapered aluminum ground set of seamless cold drawn ASTM B241, 6063-T6 aluminum tubing with 0.188 inch wall thickness. Height as indicated on Drawings.

B. Accessories: Equip pole with the following:

1. 14 gage aluminum ball, diameter sized to be compatible for height of pole.

2. Internal Halyard Fittings: Manufacturer's standard cable based internal halyard system with locking door and reinforced door frame assembly.

3. Truck Assembly: Revolving truck assembly.

C. Anodized Finish: Manufacturer's standard clear anodized finish, meeting AA M32-C22- A41.

D. Foundation: 16 gage corrugated galvanized foundation tube with self-centering bottom plate and wedges and lightning protector ground spikes, as shown on Drawings.

E. Concrete: 3000 psi unless otherwise noted on Drawings, meeting requirements of Section 03 30 00.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

3.2 PREPARATION

A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

3.3 INSTALLATION

A. Install flagpole, base assembly, and fittings in accordance with Manufacturer's instructions.

B. Electrically ground flagpole installation.

C. Install foundation plate and centering wedges for flagpole base set in concrete and fasten. Fill foundation tube sleeve with sand and compact.

D. Allow concrete to cure at least 14 days before erecting pole.

3.4 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 11 31 00

RESIDENTAL EQUIPMENT

PART 1 - GENERAL

A. Section includes residential type appliances of the following type:
   1. Refrigerator
   2. Dishwasher
   3. Electric Stove/Oven
   4. Wall exhaust hood

1.2 SUBMITTALS

A. Product Data: Submit Manufacturer's specifications and installation instructions.

B. Shop Drawings: Submit drawings showing space requirements, and piping and wiring rough-in locations for gas, water, power, and for ductwork.

C. Samples: Submit samples or brochures showing color selection.

D. Operating and Maintenance: Submit 2 copies of Manufacturer's instructions for operating and maintaining equipment.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain residential appliances through one source.
   1. To the greatest extent possible, provide appliances by a single manufacturer for entire Project.

B. Energy Ratings: Provide residential appliances that carry labels indicating energy-cost analysis (estimated annual operating costs) and efficiency information as required by the FTC Appliance Labeling Rule.
   1. Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

C. Regulatory Requirements: Comply with provisions of the following product certifications:
   1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
   2. UL and NEMA: Provide electrical components required as part of residential appliances that are listed and labeled by UL and that comply with applicable NEMA standards.
   3. NAECA: Provide residential appliances that comply with NAECA standards.
   4. ANSI A117.1, 2003 "Accessible and Usable Buildings and Facilities."
   5. Public Law 101-336 "The Americans with Disabilities Act of 1990 (ADA).
   6. ADA Accessibility Guidelines (ADAAG).
   7. The Arizonans with Disabilities Act of 1992 Administrative Rules (AzDAAG)

D. AHAM Standards: Provide appliances that comply with the following AHAM standards:
   1. Household Refrigerators/Household Freezers: AHAM HRF-1.

1.4 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.

B. Storage: Adequately protect against damage while stored at the site.

C. Handling: Comply with Manufacturer's instructions.

1.5 WARRANTY

A. Special Warranties: Manufacturer's standard form in which manufacturer of each appliance specified agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.
   1. Refrigerator/Freezer: Five-year limited warranty for service on the sealed refrigeration system.
   2. Dishwasher: 10-year warranty for service against deterioration of tub and door liner.
   .

PART 2 - PRODUCTS

2.1 MATERIALS

A. Furnish products of one of the following Manufacturers, except as approved by the Architect, subject to compliance with specifications requirements:
   1. General Electric www.ge.com
   2. Whirlpool www.whirlpool.com
   3. Frigidaire www.frigidaire.com
   4. In-Sink-Erator www.insinkerator.com

2.2 EQUIPMENT

A. Side-by-Side Refrigerator
   1. Quantity 3 total
   2. Total capacity: 25 cu. ft. min.
   3. Fresh Food Capacity: 15.51 cu. ft. min.
   4. Freezer Capacity: 9.61 cu. ft. min.
   5. Freezer Features:
      a. 6 freezer door bins.
      b. 5 Freezer shelves/Baskets.
   6. Refrigerator features:
      a. 3 fresh food drawers.
      b. 4 fresh food door bins, 1 with gallon storage.
      c. Interior lighting.

B. Built-In Dishwasher:
   1. Quantity 2 total
   2. Width: 24 inches.
   3. 5 options, 6-cycles.
   4. Stainless steel tub.
   5. 1 piece silverware basket with covers.

6. Removable upper rack.
7. Delay start.
8. Soap and rinse aid dispensers.
9. Quiet package insulation

C. Colors: Standard color as selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. General: Comply with manufacturer's written instructions.

B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.

C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

D. Utilities: Refer to Divisions 22 and 26 for plumbing and electrical requirements

3.3 FIELD QUALITY CONTROL

A. Tests: Test each item for proper operation. Check and adjust oven thermostats for correct temperature.

3.4 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 11 52 00

AUDIO VISUAL EQUIPMENT

PART 1 - GENERAL

1.1 SUBMITTALS

A. Product Data: Submit Manufacturer's descriptive brochure for each item.

B. Shop Drawings: Submit Drawings showing construction and installation details for projection screens.

1.2 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer’s original unopened packaging with labels intact.

B. Storage: Adequately protect against damage while stored at the site.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Acceptable manufacturer or equal: Draper Inc. located at 411 S. Pearl, P.O. Box 425; Spiceland, IN 47385-0425; tele: 800-238-7999/765-987-7999; fax: 866-637-5611.E-mail to request information: drapercontract@draperinc.com; Web: www.draperinc.com.

B. MANUALLY OPERATED, CEILING RECESSED, FRONT PROJECTION SCREENS Access/Series M: Spring roller operated, steel case. Ceiling-recessed, 18-gauge steel housing, 6-1/2 inches (182 mm) deep and 6-13/16 inches (182 mm) wide with white paint finish and stamped 13-gauge steel end caps. UL approved "Suitable for use in environmental air space". Bottom closure panel forms slot for passage of viewing surface and can be released to hang down or be removed for access to viewing surface. Bottom perimeter flange provides support and trim for gypsum board ceiling. Steel mounting brackets slide in extruded aluminum mounting system along top of case. Brackets supporting roller/fabric assembly slide in tracks inside the top of the case, allowing viewing surface to be centered in case. Steel leveling brackets are attached to case to prevent deflection. Housing designed to be installed separately from roller/viewing surface assembly. Factory or site installed roller: metal tube with heavy-duty spring and mounted on zinc plated brackets with double row radial ball bearings. Viewing surface securely attached to roller at top and at bottom hemmed around steel dowel. Provide with pull cord.

- Auto Return spring roller with built-in inertia reduction mechanism to ensure viewing surface retracts slowly, smoothly and quietly into case. Provide intermediate stop positions.
- Projection Viewing Surface
- Matt White XT1000E - On Axis gain of 1.0. 180 degree viewing cone. Washable surface. GREENGUARD Gold certified.
- Viewing Area 6’ high x 8’ wide minimum.
- Provide with optional 6 foot aluminum operating pole.

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PART 3 EXECUTIONS

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Install items in accordance with details on Drawings and Manufacturer's installation instructions.

B. Securely fasten wall and ceiling mounted items to solid backings, blocking, or supports.

END OF SECTION

SECTION 12 21 26

ROLLER SHADES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Manually operated, roll-up fabric interior window shades including mounting and operating hardware.

B. Opaque window shade system: Manually operated, roll-up fabric opaque window shade system for complete blackout of window opening including side and bottom channels, headbox, manual operator, and mounting hardware.

1.2 REFERENCES:

A. NFPA 7- - National Electrical Code

B. NFPA 701-99 – Fire Tests for Flame-Resistant Textiles and Films.

1.3 SUBMITTALS

A. Product Data: Manufacturer’s data sheets on each product specified, including:
   1. Preparation instructions and recommendations
   2. Installation and maintenance instructions
   3. Styles, material descriptions, dimensions of individual components, profiles, reatures, finishes and operating instructions.
   4. Storage and handling requirements and recommendations.
   5. Mounting details and installation methods.

B. Samples: Submit samples of blind materials.

C. Certification: Submit Manufacturer's certification for flammability of shade fabric.

D. Window Treatment Schedule: for all roller shades. Use same room designations as indicated on the Drawings, field verified window dimensions, quantities, type of shade, controls, fabric, and color, and include opening sizes and key to typical mounting details.

1.4 QUALITY ASSURANCE

A. Qualifications
   1. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of ten years’ experience in manufacturing products comparable to those specified in this section.
   2. NFPA Flame-Test: Passes NFPA 701. Materials tested shall be identical to products proposed for use.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.

B. Storage and Protection: Adequately protect against damage while stored at the site.

C. Handling: Comply with Manufacturer's instructions.

D. Do not deliver window shades until building is enclosed and construction within spaces where shades will be installed is substantially complete.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions shown on Drawings by taking field measurements; proper fit and attachment of parts is required.

B. Install roller shades after finish work and ambient temperature, humidity and ventilation conditions are maintained at levels recommended for project upon completion.

1.7 Warranty

A. Furnish Manufacturer's 5 year warranty against defects in materials and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Draper, Inc. www.draperinc.com

B. MechoShade www.mechoshade.com

2.2 MANUALLY OPERATED WINDOW SHADES

A. Manually Operated Window Shades with Independent Control: Manually operated, vertical roll-up, fabric window shade with components necessary for complete installation.
   1. Operation: Bead chain and clutch operating mechanism allowing shade to stop when chain is released. Designed never to need adjustment or lubrication. Provide limit stops to prevent shade from being raised or lowered too far.
      a. Clutch mechanism: Fabricated from high carbon steel and molded fiberglass reinforced polyester or injected molded nylon.
      b. Bead Chain loop: Stainless steel bead chain hanging at side of window.
      c. Bead Chain Hold Down: P-Clip
   2. Mounting
      a. Endcaps and Headbox
      b. Ceiling Pocket
      c. Finish: clear anodized
   3. Fascia: L shaped aluminum extrusion to conceal shade roller and hardware
      a. Finish: clear anodized

2.3 OPAQUE WINDOW SHADE SYSTEM

A. Operation Type: Bead chain and clutch operated, vertical roll-up, fabric, opaque window shade system, complete with headbox, side and sill channels for total opacity.

2.4 MATERIALS

A. Light Filtering Fabrics:
   1. Average 3 percent open. Average Fabric Thickness: .031 inch (.79mm). Average fabric weight: 13.69 ounces per square yard.

B. Pocket: Extruded aluminum with removable closure.

C. Side Channels: Extruded aluminum with integral light sealing/rub strips on the sides and bottom of window framing system to prevent edge light leakage. Side channels shall be of 2-piece snap-together construction such that when installed there will be no visible fasteners. Where side channels are not used overlap adjacent shades to prevent light

D. Finishes: Powder coated, baked enamel, color as selected by Architect from manufacturer's standard colors. Steel parts shall be either cadmium plated or bonderized prior to painting.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine subsurfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of subsurfaces.

B. Verify, before proceeding with this Work that required inspections of existing conditions have been completed.

C. Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.2 INSTALLATION

A. Install shades in accordance with Manufacturer's written instructions and approved Shop Drawings.

B. Anchor components securely into position.

C. Install electrical components ready for wiring by Electrical Trade.

3.3 ADJUSTMENT

A. Upon completion of the installation, put each shade through at least 10 operating cycles. Adjust to achieve optimum operation.

B. Visually check exposed finished surfaces, and touch up scratches and abrasions to be completely invisible to the unaided eye from a distance of 5 feet.

3.4 CLEANING

A. During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION

SECTION 13 47 13

BULLET-RESISTANT FIBERGLASS PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Fiberglass Panels (FP-1) applied to wall framing beneath gypsum board finish at Main Lobby partitions as noted on Drawings and as specified.

1.2 REFERENCES

A. Underwriters Laboratories: UL 752 Specifications and Ammunition, 11th Edition, Standard for Bullet Resisting Equipment published September 9, 2005, revised December 21, 2006, Level 4.

B. American Society for Testing and Materials:
   1. ASTM E119-98 Standard Test for One-Hour Fire-Rating of Building Construction and Materials
   2. ASTM F1233-98 Standard Test Method for Forced Entry Testing of Materials/Assemblies
   3. ASTM E 90-97 Standard Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
   4. ASTM E 413-87 Classification for Sound Insulation Rating
   5. ASTM E 1332-90 Classification for Determination of Outdoor-Indoor Transmission Class

1.3 SYSTEM DESCRIPTION

A. Design Requirements: Through the design, manufacturing technique and material application the Bullet Resistant Fiberglass shall be of the “non-ricochet type.” This design is intended to permit the encapture and retention of an attacking projectile lessening the potential of a random injury or lateral penetration.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions, including the following:
   1. UL LISTING Verification and UL752 Current Test Results as provided by Underwriters Laboratories.
   2. Printed data in sufficient detail to indicate compliance with the contract documents.
   3. ASTM E119-98 One-Hour Fire Rating of Building Construction and Materials.
   4. ASTM F1233-98 Standard Test Method for Forced Entry Testing of Materials/Assemblies.
   5. Manufacturer’s Instructions for installation of Bullet Resistant Fiberglass Panels.

1.5 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver materials to site in manufacturer's original unopened packaging with UL Listed labels intact.

B. Storage: Adequately protect against damage while stored at the site. Store the materials inside under cover, stack flat and off the floor.

C. Handling: Comply with manufacturer's instructions.

1.6 WARRANTY

A. Materials and workmanship shall be warranted against defects for a period of two (2 Years from the date of substantial completion of the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturers:
   1. Waco Composites, Ltd., Waco, TX 76710, (254)-752-3622, www.armorcore.com (Basis of Design)Text
   2. North American Bullet Proof, Cibolo, TX 8108 (210) 225-0982 www.shotgard.com
   3. Or approved equal.

2.2 MATERIAL

A. The panels shall be made of multiple layers of woven roving ballistic grade fiberglass cloth impregnated with a thermoset polyester resin and compressed into flat rigid sheets. The production technique and materials used shall provide the controlled internal delamination to permit the encapture of a penetrating projectile.

B. Bullet Resistant Fiberglass panels: 1-3/8” nominal thickness, and 13.9 lbs. per sq. ft. nominal weight.

2.3 SECURITY LEVEL

A. The Bullet Resistant Fiberglass will be rated and tested for UL752 Level 4 and shall comply with NFPA 1221

PART 3 - EXECUTION

3.1 SUPPORTING MEMBERS

A. Prior to installing the bullet resistive material the contractor shall verify that supports have been installed as required by the contract documents and the architectural drawings.

3.2 JOINTS

A. Joints shall be reinforced by a back-up layer of bullet resistive material. The bullet resistance of the joint, as reinforced, shall be at least equal to that of the panel. Minimum width of reinforcing layer at joint shall be 4-inches (2” on each panel or a 2” minimum overlap).

3.3 APPLICATION

A. Armor shall be installed in accordance with the manufacturer’s printed recommendations. Armor panels shall be adhered using an industrial adhesive, mastic, screws or bolts. Method of application shall maintain the bullet resistive rating at junctures with the concrete floor slab, the concrete roof slab, the bullet resistive door frames, the bullet resistive window frames, and all required penetrations.

3.4 CLEANING

A. During the course of the Work and on completion of the Work, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition in accordance with Section 01 50 00.

END OF SECTION

SECTION 13 47 23

BULLET-RESISTANT DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Bullet-resistant steel door with wood veneer facing and aluminum frames with fiberglass cores at Main Lobby as noted on Drawings and as specified.

B. Related Sections:
1. Section 08 71 00 – Door Hardware.
2. Section 09 91 00 – Painting.
3. Section 13 47 13 – Bullet-Resistant Fiberglass Panels.

1.2 REFERENCES

A. AISC Manual of Steel Construction; American Institute of Steel Construction.

B. AISI Cold Formed Steel Design Manual; American Iron and Steel Institute.

C. ASTM A 366 - Standard Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

D. ASTM A 569 - Standard Specification for Steel, Carbon, (0.15 Maximum Percent), Hot-Rolled Sheet and Strip, Commercial Quality.

E. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.

F. ANSI / NFPA 80 – 1999 Fire Doors and Windows.

G. HMMA 840 – 99, Installation and Storage of Hollow Metal Doors and Frames; Hollow Metal Manufacturers Association.

H. HMMA 850-00, Fire-Rated Hollow Metal Doors and Frames, Second Edition.

I. TM5-855-1 - Fundamentals of Design for Conventional Weapons; Department of the Army.

J. ANSI/UL 10B – 2001 Fire Tests of Door Assemblies.

K. ANSI/UL 10C – 2001 Standard for Positive Pressure Fire Tests of Door Assemblies.

L. UL 752 – 00, 10th Edition, Bullet Resistant Equipment.

1.3 SYSTEM DESCRIPTION

A. Design requirements: Comply with applicable recommendations of the following:

1. AISC Manual of Steel Construction.
2. AISI Cold Formed Steel Design Manual.
3. TM5-855-1
4. TM5-1300.

B. Performance requirements:
   1. Bullet resistance requirements: Withstand bullet resistance level as follows, in accordance with and tested by UL 752, and consistent with ASTM F1450, Section 7.1, “Bullet Penetration”: Level 4 - .30 caliber rifle lead core soft point.
   2. Bullet resistance ratings: Test assemblies in accordance with UL 752 for specified ratings, assemblies bearing labels of that agency.

1.4 SUBMITTALS

A. Shop drawings: Indicate capability of door and frame assemblies to meet requirements of design data; include the following
   1. Door and frame elevations and sections.
   2. : Location and details of all openings; include door hanging and latching hardware in a schedule.
   3. Material types, gages, locations, and fabrication details of system components; include all reinforcements.

B. Quality assurance submittals:
   1. Design data: Bullet resistance for specific project conditions, certifying system conformance to specified performance requirements; bullet resistance system to bear the label of the recognized testing agency having a factory classification inspection services.
   2. Certificates: Contractor's certification that:
      a. Products of this section, as provided, meet or exceed specified requirements.
      b. Manufacturer of products of this section meets specified qualifications.
      c. Installer of products of this section meets specified qualifications.
   3. Manufacturer's instructions: Printed installation and adjusting instructions for systems.

C. Closeout submittals: Warranty documents, issued and executed by manufacturer of systems, countersigned by Contractor.

1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Minimum five (5) years documented experience producing products specified in this section.
   2. Installer: Minimum five (5) years documented experience installing products specified in this section.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store units in accordance with requirements of HMMA 840.

B. Remove wraps or covers from doors and frames upon delivery at the building site; clean and touch-up scratches or disfigurement caused by shipping or handling promptly with rust inhibitive primer.

C. Store units on planks or dunnage in a dry location; store doors in a vertical position spaced by blocking.

D. Store units covered to protect them from damage, but permitting air circulation.

1.7 WARRANTY

A. Materials and workmanship shall be warranted against defects for a period of two (2) years from the date of substantial completion of the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturers:
   1. Krieger Specialty Products, Pico Rivera CA 90660; (562) 695-0645 (Basis of Design) Or approved equal

2.2 MATERIAL

A. Steel sheet: One of the following:
   1. Cold-rolled steel sheet conforming to ASTM A 366, commercial quality.
   2. Hot-rolled steel sheet conforming to ASTM A 569, pickled and oiled, commercial quality.

B. Galvanized steel sheet: ASTM A 653/A 653M, minimum G90 zinc coating.

C. Insulating material: One of the following:
   1. Glass fiber
   2. Rock wool.
   3. Polyurethane foam

D. Primer: Manufacturer's standard.

2.3 COMPONENTS

A. Doors: Fabricate in accordance with Architect-approved shop drawings and as follows:
   1. Thickness: 1-3/4 inches (44mm) minimum.
   2. Face sheets:
      a. Doors for interior use: Steel sheet.
      b. Doors for exterior use: Galvanized steel sheet.
      c. Visible seams on face sheets not permitted.
   3. Core:
      a. Stiffen face sheets with continuous vertical sections, formed of steel sheet, which, upon assembly, span full thickness of interior space between door faces.
      b. Spot-weld stiffeners to both face sheets.
      c. Fill spaces between stiffeners with insulation material.
   4. Vertical Edges:
      a. Join face sheets at vertical edges by continuous welding:
         1) Join doof faces by continuous weld on each edge, extending full door height.

2) Grind, fill, and dress welds to provide smooth flush surface.

b. Form edge profiles both vertical edges of doors as follows:
   1) Single acting swing doors: Bevel 1/8 inch in 2 inches (3.17 mm in 50 mm).
   2) Double acting swing doors: Radius 2-1/8 inches (54mm).

c. Visible seams on vertical edges not permitted.

5. Horizontal edges:
   a. Close top and bottom edges of doors with inverted continuous recessed steel channels, 12 gage minimum; spot-weld channels to both door faces.
   b. Provide openings in bottom closure of exterior doors to permit escape of entrapped moisture.
   c. Provide additional flush closing channel at top edge of exterior doors; spot-weld channel to both door faces.
   d. Provide additional flush closing channel at bottom edge of doors to receive weatherstripping; spot-weld channel to both door faces.
6. Hardware preparation:
   a. Mortise, reinforce, drill, and tap doors at factory for fully templated mortised hardwar only, in accordance with approved hardware schedule and supplied templates.
   b. Provide reinforcing plates at surface-mounted or non-templated hardware locations.

B. Moldings and Stops:
   1. Fabricate of same material as door face material, gage in accordance with Architect-approved shop drawings.
   2. Weld fixed moldings to door on security side.
   3. Provide loose stops, countersunk for fasteners; secure stops to opening with fasteners of size, type, and spacing indicated on Architect-approved shop drawings.
   4. Form moldings with mitered corner joints.

C. Frames: Fabricate in accordance with Architect-approved shop drawings, and as follows:
   1. Frames for interior use: Fabricate from aluminum with fiberglass cores, configuration to match frames specified in Section 08 12 16 - Aluminum Frames.
   2. Form frame members straight, and of uniform profile through lengths in accordance with frame schedule and approved shop drawings.
   3. Hardware preparation:
      a. Mortise, reinforce, drill, and tap frames at factory for fully templated mortised hardware only, in accordance with approved hardware schedule and supplied templates.
      b. Provide reinforcing plates at surface-mounted or non-templated hardware locations.
   4. Floor anchors:
      a. Fabricate of material indicated on Architect-approved shop drawings; minimum 18 gage.
      b. Weld anchors inside each jamb for floor anchorage.
   5. Jamb anchors:
      a. Fabricate of material indicated on Architect-approved shop drawings; weld anchors inside each jamb for wall anchorage.
      b. Provide anchor types for indicated adjacent wall construction.

D. Door hardware: As specified in Section 08 71 00.

2.4 FINISHES

A. Doors: Provide wood veneer, adhesively applied over steel door surface, to match doors specified in Section 08 14 00.

B. Frames: As specified in Section 08 12 16 - Aluminum Frames.

2.5 SECURITY LEVEL

A. The Bullet Resistant Doors and Frames shall be rated and tested for UL752 Level 4.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of conditions:
   1. Prior to installation, check and correct frames for size, swing, squareness, alignment, twist and plumb.
   2. Verify openings are in accordance with approved shop drawings.

B. Installer's examination:
   1. Have installer of this section examine conditions under which construction activities of this section are to be performed, then submit written notification if such conditions are unacceptable.
   2. Transmit two copies of installer's report to Architect within 24 hours of receipt.
   3. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
   4. Beginning construction activities of this section indicates installer's acceptance of conditions.

3.2 PREPARATION

A. Remove spreaders from frames prior to installation; use of spreaders for installation purposes not permitted.

3.3 INSTALLATION

A. Install units in accordance with Architect-approved shop drawings, manufacturer's printed installation instructions, requirements of HMMA 840, and requirements of UL 752.

B. Installation of door hardware is specified in Section 08 71 00.

C. Site tolerances: Do not exceed the following installation tolerances:
   1. Squareness: Plus or minus 1/16 inch (1.6 mm) measured on a line, 90 degrees from one jamb, at the upper corner of the frame at the other jamb
   2. Alignment: Plus or minus 1/16 inch (1.6 mm) measured on jambs on a horizontal line parallel to the plane of the wall.
   3. Twist: Plus or minus 1/16 inch (1.6 mm) measured at face corners of jambs on parallel lines perpendicular to the plane of the wall.
   4. Plumb: Plus or minus 1/16 inch (1.6 mm) measured on the jamb at the floor.

3.4 ADJUSTING

A. Adjust installed doors for correct swings and site tolerances.

3.5

A. During the course of the Work and on completion of the Work, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION